KOONTZ BRYANT
JOHNSON WILLIAMS

FORMERLY CBC ENGINEERS

September 15, 2023

Contech Engineered Solutions LLC
9100 Centre Pointe Drive
Suite 400
West Chester, OH 45069

Attn: Mr. Erik Early, P.E.
Design Engineer – Drainage, Plate, and Specialty Products

Re: Peer Review of CANDE Finite Element Analyses, Design of Spread Footing Foundations, Design of Concrete Headwalls and Wingwalls, and Preparation of Load Rating Calculations for a BridgeCor Arch (723523); Arroya Lane, El Paso County, Colorado; KBJW Report No. 25353D-1-1122-05, Revision No. 1

Ladies and Gentlemen:

Koontz Bryant Johnson Williams, Inc. (KBJW, formerly CBC Engineers and Associates, Ltd.) is pleased to submit our report for the above referenced project. This report contains the peer review of the CANDE finite element analyses, design of spread footing foundations, design of concrete headwalls and wingwalls, and preparation of load rating calculations for the above referenced structure. Others are responsible for all other aspects of the design of the structure including but not limited to backfill evaluation, hydraulics, settlement, and scour/abrasion/corrosion, and the only responsibility of KBJW is as referenced above.

If you have any questions, please contact us.

Respectfully submitted,

Koontz Bryant Johnson Williams, Inc.

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SECTION I

TEXT

1.0 AUTHORIZATION

Authorization to proceed with this project was given by Mr. Erik Early of Contech Engineered Solutions LLC. Work was to proceed in accordance with KBJW Quotation No. 22-416-05 dated September 2, 2022, and the terms and conditions of the Master Agreement for Engineering Services dated July 30, 2009.

2.0 STRUCTURE DESCRIPTION

The proposed project consists of a BridgeCor arch structure with an inside span of 31'-11" and an inside rise of 11'-8". The 15" x 5-½" deep corrugated structural plates for the BridgeCor arch structure are proposed to be 8 gage (0.170"). The actual design height of cover over the structure under the roadway is reported to vary from 4.0 to 6.6 feet above the crown @ 120 pcf (3.0 ft. min. select backfill above the crown of the structure). The design live load considered in the evaluation is the HL-93 live loading.

TABLE 1

STRUCTURE CHARACTERISTICS

Number of Structures	1
Structure Type	BridgeCor Arch
Inside Span (ft.-in.)	31'-11"
Inside Rise (ft.-in.)	11'-8"
Gage	8 gage (0.170")
Live Load	HL-93
Design Cover (ft.)	4.0' to 6.6' at 120 pcf under the roadway

3.0 FOUNDATION EVALUATION

We have been provided a geotechnical report for this project location prepared by Entech Engineering, Inc. (their project no. 221106) dated August 19, 2022. Entech recommends the footings for the proposed BridgeCor arch be founded on sandstone bedrock and be designed for a net allowable bearing capacity of 4,000 psf.

We have accordingly designed the spread footings for a net allowable bearing capacity of 4,000 psf. A friction factor of 0.45 has also been utilized. It should be noted that KBJW has not

made any independent evaluation of the foundation and/or geotechnical conditions. We are relying totally on the information furnished to us as being correct and indicative of the bearing capacity and friction factor at the actual structure location. We recommend that a geotechnical engineer examine the foundation materials once the foundation has been excavated, and that the bearing capacity and friction factor be field verified before the footings are constructed. All recommendations in the project geotechnical report should be followed during construction. The footings should be permanently buried to provide frost protection in accordance with the geotechnical report and regional design requirements. Any foundation improvement required to achieve the recommended bearing capacity and friction factor, and to protect against frost and scour and settlement, is the responsibility of others than KBJW.

4.0 FOOTING EVALUATION

The load on a footing consists of the load on top of the structure carried by each leg of the structure, which is equal to the unit weight of the soil times the height of cover over the structure divided into each leg; plus the weight of the soil on the outside edges of the footing outside the structure, plus the weight of the structure itself plus the live load. The weight of the soil over the footings that is excavated can be deducted from the pressure at the bottom of the footing in the consideration of the net bearing capacity. The footing also must be designed for any horizontal thrust which is created by the angle of entry into the footing. Since the structure has a span of 31'-11"and a rise of 11'-8", the structure does enter the footing at an angle and there is, therefore, a horizontal component to the footing reactions. The horizontal portion of the reaction is toward the inside of the structure. The service loading of the footing is R_h= 2,001 plf, R_v= 22,785 plf (from CANDE structural model as per AASHTO LRFD Specifications). Figure 1 shows the loads on the footing.

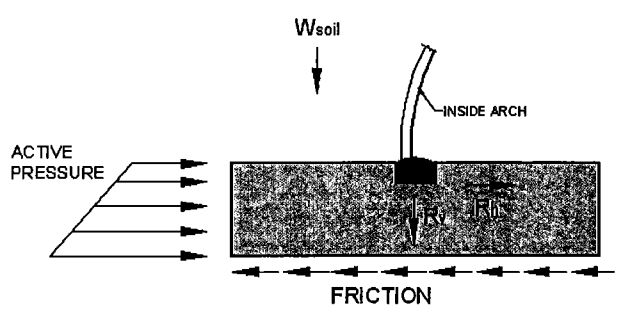


Figure 1

The footings for the structure are to be concrete spread footings and have been designed for the above referenced loading. Based on a net allowable bearing capacity of sandstone bedrock of 4,000 psf, the width of the footings must be 9'-0" with a minimum thickness of 36". The steel required in the footings is #6 bars at 6" on center at the bottom, #6 bars at 6" on center at the top, and #6 longitudinal reinforcement bars evenly spaced around the perimeter. The typical cross section of the footings for the structure is attached in Appendix B.

5.0 REVIEW OF CANDE ANALYSIS

The CANDE finite element analyses for the proposed BridgeCor arch structure is based on AASHTO – LRFD Bridge Design Specifications considering the specific requirements of Section 12 for deep corrugated steel plate profiles using the CANDE 2019 computer model with elasticity based correction for live load distribution.

CANDE analyses have been performed for the structure considering the design height of cover of 4.0 to 6.6 feet at 120 pcf under the roadway with HL-93 truck/tandem live loading. The 15" x 5-½" deep corrugated steel plates are proposed to be 8 gage (0.170"). The design calculations are based on the AASHTO-LRFD Bridge Design Specifications considering the specific requirements of Section 12 for deep corrugated steel plate profiles, using the CANDE 2019 computer model. The select backfill material above and around the proposed BridgeCor structure (modeled to extend to at least 8.0 feet outside the springline of the BridgeCor arch, and to 3.0 ft. min. over the crown of the structure) has been modeled in the provided CANDE analyses as an SW-95 material (gravelly sand with 95% relative compaction as per AASHTO T-99) with the established hyperbolic stress-strain parameters for this material designation and an in-place unit weight of 120 pcf. The general embankment fill material outside the select backfill zone has been modeled in the provided CANDE analyses as an SM-90 material (silty sand with 90% relative compaction as per AASHTO T-99) with the established hyperbolic stress-strain parameters for this material designation and an in-place unit weight of 120 pcf. The in-situ material at the project location has been considered as a stiff soil with E=3,000 psi.

Based on the reviewed Contech CANDE analyses, with deep corrugated steel with a thickness of 8 gage (0.170"), it is the opinion of this office that the structural analyses and

resultant plate gage for the proposed BridgeCor arch conform to industry standards for the structure type. The CANDE finite element analyses performed using the soil structure interaction model indicate that the proposed BridgeCor arch structure given the proposed installation conditions and proposed material properties, meets AASHTO LRFD Bridge Design Specification strength criteria including wall area, buckling, seam strength and combined moment and thrust criterion. We have not made an independent verification of the background site road and structure elevations and geotechnical data used in the design calculations and understand all initial assumptions and data are correct as presented to us. The actual in-service performance of the installed structure will be highly dependent on their conformity to the attributes modeled in the CANDE analyses, including but not limited to the geometry and strength parameters of the BridgeCor arch and the various soil zones. The soil parameters utilized in the CANDE analyses, including the type and strength characteristics of the foundation material, road fill/in-situ soil outside the select backfill zone, and the structural backfill must be available in the field (and verified by the project geotechnical engineer) during the installation of the structure in order for the actual performance of the proposed structure to be in agreement with the calculated performance from the CANDE analyses. Deviations between the actual installed conditions and the modeled conditions will result in changes in the expected performance of the structure.

We have accordingly included in this report the calculations, and they are attached in Appendix A. The select backfill around and over the proposed BridgeCor arch must be placed and compacted in strict conformance with the project specifications, the manufacturer's requirements, and accepted industry standards. The backfill material around the structure must be placed in balanced steps. The backfill must be brought up relatively level on both sides of the structure as recommended by the structure manufacturer. If the backfill on one side is much higher than the backfill on the other, the unbalanced soil pressure may distort the structure. Therefore, care must be exercised to maintain balanced loading on the structure during any backfilling operations and the structure must be properly backfilled to maintain this balanced loading.

6.0 DESIGN OF CONCRETE HEADWALLS AND WINGWALLS

Concrete headwalls have been designed to be connected to the upstream and downstream ends of the structure, with the BridgeCor arch connecting to the downstream/upstream headwalls at a skew of 20 degrees. The maximum height of the concrete headwalls is 20.5 feet above the top of the footings at the outlet end and 19.67 feet above the top of the footings at the inlet end. The top of the concrete headwalls are designed to extend approximately 2.0 ft. above finished grade elevations as shown on the attached design drawings, however the headwalls have not been designed for impact loading. The length of the headwall at the ends is about 41.75' as shown on the drawings. The design of any required vehicle barriers is the responsibility of others than KBJW. There is a wingwall connected to the headwall on each side of the structure as shown on the drawings, with expansion joints between the headwalls and wingwalls as shown on the drawings. The required geometry of the headwalls and wingwalls should be verified prior to construction.

The headwalls at both ends of the structure have been designed to carry the lateral soil pressure resulting from the backfill around the structure, lateral live load pressure from the HL-93 live load surcharge, and also the loads from the skew-cut end of BridgeCor structure. The headwalls have not been designed for any impact loading or unbalanced hydrostatic loading. The headwalls will bear on the BridgeCor footings as shown on the drawings, and the reinforcement for the headwalls is as shown on the attached drawings. The dimensions and reinforcing steel have been designed using AASHTO LRFD factored loads to resist the loads applied to the headwall and to protect against temperature and shrinkage effects.

The Bridge-Cor structure will be tied into the headwalls with 3/4" diameter hook bolts as shown on the construction drawings. The bolts will be placed on even centers all the way around the barrel. Double nuts will be used to attach each bolt to the corrugated plate. Dimensions and the reinforcing steel required for the headwalls is as shown on the attached drawings in Appendix B. The calculations are attached in Appendix A.

The wingwalls at both sides have been designed to carry the lateral soil pressure resulting from the maximum backfill above the footings considering a maximum backfill slope of 3H:1V backfill behind the wingwalls. The dimensions and reinforcing steel have also been designed

using AASHTO LRFD factored loads to resist the loads applied to the wingwalls, and to protect against temperature and shrinkage effects. The foundations for the wingwalls have been designed for a net allowbale bearing capacity of 4,000 psf and a friction factor of 0.45. The permanent finished groundline at the wingwalls must be maintained at the top of the footing elevations at all times as shown on the drawings to provide passive soil resistance against sliding. Dimensions and the reinforcing steel required for the wingwalls are as shown on the attached drawings in Appendix B. The calculations are attached in Appendix A.

The backfill behind the headwalls should meet the requirements of the select backfill for the BridgeCor structure and should have a minimum internal friction angle of 36 degrees with a maximum unit weight of 120 pcf. The select backfill behind the wingwalls must be a well-graded, angular, durable granular material placed and compacted to achieve a minimum internal friction angle of 36 degrees and a maximum unit weight of 120 pcf. These values to be field verified.

7.0 LOAD RATING PROCEDURE

The load carrying capability of the deep corrugated buried corrugated metal culvert has been analyzed in accordance with the *Manual for Bridge Evaluation (AASHTO)* as well as the provisions of the *NCSPA Design Data Sheet No. 19, AASHTO LRFD Bridge Design Specifications, Section 12.8.9 for deep corrugated structures (LRFR rating) for design vehicles, and CDOT Bridge Load Rating Manual* using the LRFR methodology. AASHTO LRFD Bridge Design Specifications state that finite element analyses shall be performed in the analysis of deep corrugated structures and CANDE is specifically referenced in AASHTO. CANDE is a computer program for the structural analysis, design, and evaluation of buried culverts with consideration of the soil-structure systems. We have accordingly utilized the finite element computer program CANDE for the load rating evaluation of the Bridge-Cor structure. Combined soil-structure interaction system models were developed using CANDE and the models subjected to earth and live loads for the detailed investigation of the performance of the structure for the various live load cases mentioned above. All design parameters including but not limited to, the structure properties, in-situ soil properties, and backfill soil properties, utilized in the CANDE finite element analysis for the structure have been utilized in the load rating evaluation. The load ratings have been performed assuming that the in-place condition of the Bridge-Cor arch is as per the design characteristics, and that no deformation,

deflection, corrosion, or any other type of distress is present in the Bridge-Cor arch structure. Deviations from these considered conditions will affect the load ratings presented herein, and if observed, should be investigated and evaluated as necessary. The structure is to be rated for HL-93 design live load, CDOT Legal Trucks, Specialized Hauling Vehicles, CDOT Permit Vehicles, and FHWA Emergency Vehicles as per CDOT Bridge Load Rating Manual with minimum cover conditions over the structure in traffic areas.

Inventory and Operating load ratings for the design loads have been performed for the Bridge-Cor structure. An earth load factor of 1.5 and a live load factor of 1.35 for operating load ratings and a live load factor of 1.75 for inventory load ratings have been utilized for the design loads. An earth load factor of 1.5 and a live load factor of 1.45 for operating load ratings have been utilized for the CDOT Legal Trucks, and Specialized Hauling Vehicles. An earth load factor of 1.5 and a live load factor of 1.3 for operating load ratings have been utilized for the Permit Live Load Vehicles and Emergency Vehicles. The actual pipe wall thrusts (critical for deep corrugated structures) from the earth dead loads and live loads as obtained from the CANDE analyses for the various live loads have been utilized in the load rating of the structure. These loads are used in in-house developed load rating spreadsheets following the provisions of the *NCSPA Design Data Sheet No. 19, Manual for Bridge Evaluation (AASHTO), and AASHTO LRFD Bridge Design Specifications* to analyze the structure for the defined dead loads and live loads (pipe-wall thrusts obtained from CANDE runs) for each load rating using the appropriate load/resistance factors (depending on LRFR), in order to compute the rating factors for wall strength, individually for the structures.

AASHTO LRFD Design Specifications Section 12.8.9 for deep corrugated structures state that in addition to the strength limit state criteria for wall area, buckling and seam resistance, the combined effects criteria of factored thrust and moment must be met for the structures at all stages of construction. For LRFR methodology, the structure is further modeled with the operating/inventory loads obtained based on the critical strength rating factor to verify that it meets AASHTO LRFD Design Specifications Section 12.8.9 combined effects criteria of factored thrust and moment. If the combined effects criteria of factored thrust and moment are not met for the computed loads, the operating and inventory rating factors for the various live loads are reduced to a level whereby the combined effects criteria is met.

The lowest load rating factor based on either wall strength or the factored thrust-moment criteria of the structure for LRFR methodology is the controlling load rating factor for the specific vehicle being considered. The Load Rating is calculated from the load factors and the Gross Vehicle Weight (GVW) using the following equations:

1) Operating Loads (tons)

   Load = RF_o(GVW)

2) Inventory Loads (tons)

   Load = RF_i(GVW)

The results of the calculations are as follows:

TABLE 2
LOAD RATINGS (LRFR METHODOLOGY)

VEHICLE		OPERATING LOAD		INVENTORY LOAD	
LIVE LOAD	GROSS VEHICLE WEIGHT (tons)	RF_o	LOAD RATING (tons)	RF_i	LOAD RATING (tons)
HL-93 Tandem	25.0	2.38	59.5	1.89	47.3
HL-93 Truck	36.0	3.70	133.2	2.93	105.5
Type 3	27.0	3.28	88.6	--	--
Type 3S2	42.5	3.28	139.4	--	--
Type 3-2	42.5	2.96	125.8	--	--
SU4	27.0	3.59	96.9	--	--
SU5	31.0	3.56	110.4	--	--
SU6	34.75	3.47	120.6	--	--
SU7	38.75	3.47	134.5	--	--
NRL	40.0	3.47	138.8	--	--
EV2	28.75	3.57	102.6	--	--
EV3	43.0	2.28	98.0	--	--
Permit Truck	96.0	2.68	257.3	--	--
Modified Tandem	50.0	2.83	141.5	--	--

The calculations based on the AASHTO LRFD Bridge Design Specifications, CDOT Bridge Load Rating Manual, Manual for Bridge Evaluation (AASHTO) and "NCSPA Design Data Sheet No. 19 - 1995" are attached in Appendix A.

8.0 SCOUR

It is beyond the scope of this report to evaluate scour and it is the responsibility of others than KBJW. The depth of all foundations should be evaluated for scour before the foundations are constructed, and scour countermeasures (by others) provided as necessary to protect the footings.

9.0 WARRANTY

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, expressed or implied, is made.

This report has been prepared for the exclusive use of Contech Engineered Solutions LLC for specific application to the structure herein described. Specific recommendations have been provided in the various sections of the report. The report shall, therefore, be used in its entirety. This report is not a bidding document and shall not be used for that purpose. Anyone reviewing this report must interpret and draw their own conclusions regarding specific construction techniques and methods chosen. KBJW is not responsible for the independent conclusions, opinions or recommendations made by others.

SECTION II

SPECIFICATIONS

I – GENERAL

1.0 STANDARDS AND DEFINITIONS

1.1 STANDARDS - All standards refer to latest edition unless otherwise noted.

1.1.1 ASTM D-698-70 (Method C) "Standard Test Methods for Moisture. Density Relations of Soils and Soil Aggregate Mixtures Using 5.5-lb (2.5 kg.) Rammer and 12-inch (305-mm) Drop".

1.1.2 ASTM D-2922 "Standard Test Method for Density of Soil and Soil Aggregate in Place by Nuclear methods (Shallow Depth)".

1.1.3 ASTM D-1556 "Standard Test Method for Density of Soil in place by the Sand-Cone Method".

1.1.4 ASTM D-1557 "Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort."

1.1.5 All construction and materials shall be in accordance with the latest AASHTO LRFD Bridge Design Specifications and DOT requirements.

1.2 DEFINITIONS

1.2.1 Owner - In these specifications the word "Owner" shall mean El Paso County, Colorado

1.2.2 Engineer - In these specifications the word "Engineer" shall mean the Owner designated engineer.

1.2.3 Design Engineer - In these specifications the words "Design Engineer" shall mean KBJW, Inc.

1.2.4 Contractor - In these specifications the word "Contractor" shall mean the firm or corporation undertaking the execution of any work under the terms of these specifications.

1.2.5 Approved - In these specifications the word "approved" shall refer to the approval of the Engineer or his designated representative.

1.2.6 As Directed - In these specifications the words "as directed" shall refer to the directions to the Contractor from the Owner or his designated representative.

2.0 GENERAL CONDITIONS

2.1 The Contractor shall furnish all labor, material and equipment and perform all work and services except those set out and furnished by the Owner, necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction, grading, footing construction, endwall construction as shown on the plans and as described therein.

This work shall consist of all mobilization clearing and grading, grubbing, stripping, removal of existing material unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications.

This work is to be accomplished under the observation of the Owner or his designated representative.

2.2 Prior to bidding the work, the Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including, without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work.

If conditions other than those indicated are discovered by the Contractor, the Owner should be notified immediately. The material which the Contractor believes to be a changed condition should not be disturbed so that the owner can investigate the condition.

2.3 The construction shall be performed under the direction of an experienced engineer who is familiar with the design plan.

II – BRIDGECOR FOOTINGS

1.0 EXCAVATION FOR FOOTINGS

1.1 Footing excavation shall consist of the removal of all material, of whatever nature, necessary for the construction of foundations.

1.2 It shall be the responsibility of the Contractor to identify and relocate all existing utilities which conflict with the proposed footing locations shown on the plan. The Contractor must call the appropriate utility company at least 48 hours before any excavation to request exact field location of utilities, and coordinate removal and installation of all utilities with the respective utility company.

1.3 The side of all excavations shall be cut to prevent sliding or caving of the material above the footings.

1.4 Excavated material shall be disposed in accordance with the plan established by the Engineer.

1.5 The footings are designed for a net allowable bearing capacity of 4,000 psf on sandstone bedrock in accordance with the recommendations by Entech Engineering, Inc. A friction factor of 0.45 has also been utilized. These shall be verified in the field before construction. The evaluation and design of any required foundation improvement to achieve the recommended bearing capacity and friction factor, and to protect against frost and scour and settlement, is the responsibility of others than KBJW. All recommendations in the project geotechnical report shall be followed during construction.

1.6 Care must be exercised to ensure that heavy equipment is not operated adjacent to the footings. Heavy equipment shall not be allowed any closer than 5 feet to the footings.

2.0 CONCRETE FOOTING DIMENSIONS

2.1 The footings shall be reinforced in accordance with the construction drawings.

III – HEADWALLS AND WINGWALLS

1.0 The headwalls and wingwalls shall consist of reinforced concrete conforming to Chapter IV of these specifications, and AASHTO LRFD Bridge Design Specifications having a minimum compression strength of 4,000 psi.

2.0 Reinforcing steel shall conform to ASTM A-615, Grade 60, having minimum yield strength of 60,000 psi.

3.0 The headwalls shall be anchored to the BridgeCor arch in the manner shown on the plans and shall be formed and poured in accordance with the plan dimensions.

4.0 Round weep holes spaced not over 5 feet on center shall be placed in the walls above finished grade as shown on the construction drawings. A granular envelope, consisting of #57 stone (clean ¾" aggregate) or equivalent, shall be placed behind each weep hole for a distance of approximately 1 foot from all edges of the weep hole. A free-draining geotextile screen shall be placed between the weep hole and the stone to prevent erosion of the stone.

5.0 The select backfill behind the headwalls must be a well-graded, angular, durable granular material conforming to the select backfill specifications for the BridgeCor arch placed and compacted to achieve a minimum internal friction angle of 36 degrees and a maximum unit weight of 120 pcf. The material must be placed in strict conformance with the project specifications, the manufacturer's requirements, and industry standards. The select backfill behind the wingwalls must be a well-graded, angular, durable granular material placed and compacted to achieve a minimum internal friction angle of 36 degrees and a maximum unit weight of 120 pcf. These values to be field verified.

6.0 All Federal, State, and Local regulations shall be strictly adhered to relative to excavation side-slope geometry and any required excavation shoring.

IV – CONCRETE FOR FOOTINGS AND ENDWALLS

1.0 CODES AND STANDARDS

1.1 Reinforced concrete shall conform to the requirements of Colorado DOT Standards and Section V of the AASHTO LRFD Bridge Design Specifications having a minimum compressive strength of 4,000 psi.

2.0 STANDARDS FOR MATERIALS

2.1 Portland Cement - Conforming to ASTM Specification C-150, Type II.

2.2 Water - The water shall be drinkable, clean free from injurious amounts of oils, acids, alkalis, organic materials, or deleterious substances.

2.3 Aggregates - Fine and coarse aggregates shall conform to current ASTM Specification C-33 "Specification for Concrete Aggregates" except that local aggregates which have been shown by tests and by actual service to produce satisfactory qualities may be used when approved by the Engineer.

2.4 Submittals - Test data and/or certifications to the Owner shall be furnished upon request.

3.0 PROPORTIONING OF CONCRETE

3.1 COMPOSITION

3.1.1 The concrete shall be composed of cement, fine aggregate, coarse aggregate and water.

3.1.2 The concrete shall be homogeneous, readily placeable and uniformly workable and shall be proportioned in accordance with ACI-211.1.

3.1.3 Proportions shall be established on the basis of field experience with the materials to be employed. The amount of water used shall not exceed the maximum 0.45 water/cement ratio, and shall be reduced as necessary to produce concrete of the specified consistency at the time of placement.

3.1.4 An air-entraining admixture, conforming to the requirements of ASTM C260, shall be used in all concrete furnished under this contract. The quantity of admixture shall be such as to produce an air content in the freshly mixed concrete of 6 percent plus or minus 1 percent as determined in accordance with ASTM C231 or C173.

3.2 Qualities Required - As indicated in the table below:

TABLE IV-1

QUALITIES REQUIRED

ITEM	QUALITY REQUIRED
AASHTO Class	A
Type of Cement	II
Compressive Strength f'c @ 28 days	4,000 psi
Slump, inches	2 - 4 in.

3.3 Maximum Size of Coarse Aggregates - Maximum size of coarse aggregates shall not be larger than 19 mm (3/4 inches).

3.4 Rate of Hardening of Concrete - Concrete mix shall be adjusted to produce the required rate of hardening for varied climatic conditions:

Under 40°F Ambient Temperature – All work to be in accordance with the recommendations of ACI-306R "Cold Weather Concreting."

4.0 MIXING AND PLACING

4.1 Equipment - Ready Mix Concrete shall be used and shall conform to the "Specifications for Ready-Mix Concrete," ASTM C-94. Approval is required prior to using job mixed concrete.

4.2 Preparation - All work shall be in accordance with ACI-304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete." All construction debris and extraneous matter shall be removed from within the forms. Concrete shall be placed on clean surfaces, free from water. Concrete that has to be dropped four (4) feet or more shall be placed through a tremie.

4.3 All concrete shall be consolidated by internal mechanical vibration immediately after placement. Vibrators shall be of a size appropriate for the work, capable of transmitting vibration to concrete at frequencies of not less than 4,500 impulses per minute.

5.0 FORM WORK

5.1 Forms shall be of wood, steel or other approved material and shall be set and held true to the dimensions, lines and grades of the structure prior to and during the placement of concrete.

5.2 Forms shall not be removed until the concrete has sufficient strength to prevent concrete damage and/or drainage.

6.0 CURING

6.1 Fresh concrete shall be protected from rains, flowing water and mechanical injury for a period of seven (7) days. Loads shall not be placed on the concrete until it has reached its design strength.

7.0 REINFORCING STEEL

7.1 MATERIAL

7.1.1 All reinforcing bars shall be deformed bars (ASTM-A615) Grade 60.

7.2 BENDING AND SPLICING

7.2.1 Bar reinforcement shall be cut and bent to the shapes shown on the plans. Fabrication tolerances shall be in accordance with ACI 315. All bars shall be bent cold, unless otherwise permitted.

7.2.2 All reinforcement shall be furnished in the full lengths indicated on the plans unless otherwise permitted. Except for splices shown on the plans and splices for No. 5 or smaller bars, splicing of bars will not be permitted without written approval. Splices shall be staggered as far as possible.

7.2.3 In lapped splices, the bars shall be placed and wired in such a manner as to maintain the minimum distance to the surface of the concrete shown on the plans.

7.2.4 Substitution of different size bars will be permitted only when authorized by the engineer. The substituted bars shall have an area equivalent to the design area, or larger.

7.3 PLACING AND FASTENING

7.3.1 Steel reinforcement shall be accurately placed as shown on the plans and firmly held in position during the placing and setting of concrete. Bars shall be tied at all intersections around the perimeter of each mat and at not less than 2-foot centers or at every intersection, whichever is greater, elsewhere. Welding of cross bars (tack welding) will not be permitted for assembly of reinforcement.

7.3.2 Reinforcing steel shall be supported in its proper position by use of mortar blocks, wire bar supports, supplementary bars or other approved devices. Such devices shall be of such height and placed at sufficiently frequent intervals so as to maintain the distance between the reinforcing and the formed surface or the top surface within 1/4 inch of that indicated on the plans.

V - FILTER FABRIC (GEOTEXTILE SCREEN)

1.0 Filter fabric shall be placed at all locations shown on the construction drawings, and as necessary between all dissimilar materials to prevent soil migration and to maintain a soil-tight system.

2.0 Filter fabric cloth shall conform to Contech specification for C60-NW or equivalent and shall meet the following ASTM tests:

2.1 ASTM D4751 - Apparent opening size equal to #70 U.S. Standard Sieve Size.

2.2 ASTM D4632 (Grab Tensile Test) - Minimum Strength = 160 pounds.

2.3 ASTM D4632 (Grab Elongation) - 30-70%.

2.4 ASTM D4533 (Trapezoidal Tear) - Minimum Strength = 60 pounds.

2.5 ASTM D4355 (Stabilized for Heat and Ultra-Violet Degradation) - 70% strength retained.

3.0 The minimum fabric coefficient of permeability (ASTM D4491) shall be 0.24 cm/sec.

4.0 The fabric shall be non-woven with a minimum thickness (ASTM D5199) of 60 mils.

5.0 Fabric shall not be placed over sharp or angular rocks that could tear or puncture it.

6.0 Care should be exercised to prevent any puncturing or rupture of the filter fabric. Should such rupture occur, the damaged area should be covered with a patch of filter fabric using an overlap minimum of one (1) foot.

APPENDIX A

CALCULATIONS

BEAM OUTPUT FOR HL-93 TANDEM γ_{DL}=1.5, YDL=1.75 (INV), 1.35 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	INV	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	($T_{DL,LLfac}$-T_{DLfac})/1.75	(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.75	(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.35
		kips/ft.	kips/ft.	kips/ft.			
-193.558	0	-22.25	-14.13	-27.28	2.87	12.71	16.47
-193.831	14.343	-22.84	-14.50	-27.99	2.94	12.30	15.95
-192.084	28.581	-23.37	-14.84	-28.70	3.04	11.80	15.29
-188.352	42.432	-23.63	-15.00	-29.64	3.44	10.41	13.49
-182.71	55.621	-23.40	-14.86	-30.54	4.08	8.80	11.41
-175.268	67.886	-22.67	-14.39	-30.62	4.55	7.98	10.35
-166.176	78.982	-21.76	-13.82	-29.86	4.63	7.94	10.30
-155.614	88.688	-20.97	-13.31	-28.86	4.51	8.25	10.69
-144.425	97.1	-20.32	-12.90	-28.08	4.44	8.47	10.97
-132.782	104.872	-19.81	-12.58	-27.49	4.39	8.63	11.18
-120.723	111.979	-19.38	-12.30	-26.88	4.29	8.88	11.52
-108.284	118.399	-19.04	-12.09	-26.41	4.21	9.09	11.78
-95.504	124.112	-18.74	-11.90	-26.17	4.25	9.05	11.73
-82.425	129.101	-18.43	-11.70	-25.93	4.29	9.00	11.67
-69.087	133.348	-18.13	-11.51	-25.58	4.26	9.10	11.80
-55.532	136.842	-17.83	-11.32	-25.11	4.16	9.36	12.13
-41.802	139.571	-17.54	-11.14	-24.55	4.00	9.76	12.65
-27.941	141.526	-17.26	-10.96	-23.93	3.81	10.29	13.34
-13.993	142.702	-17.00	-10.79	-23.37	3.64	10.81	14.01
0	143.094	-16.87	-10.71	-23.45	3.76	10.49	13.59
13.993	142.702	-16.99	-10.79	-24.05	4.03	9.76	12.65
27.941	141.526	-17.25	-10.95	-24.58	4.19	9.37	12.15
41.802	139.571	-17.53	-11.13	-25.03	4.29	9.12	11.82
55.532	136.842	-17.82	-11.31	-25.42	4.34	8.97	11.62
69.087	133.348	-18.11	-11.50	-25.77	4.37	8.86	11.49
82.425	129.101	-18.42	-11.70	-26.09	4.38	8.81	11.42
95.504	124.112	-18.76	-11.91	-26.38	4.36	8.82	11.43
108.284	118.399	-19.07	-12.11	-26.70	4.36	8.77	11.37
120.723	111.979	-19.42	-12.33	-27.21	4.45	8.55	11.09
132.782	104.872	-19.85	-12.60	-27.81	4.55	8.32	10.79
144.425	97.1	-20.35	-12.92	-28.41	4.61	8.15	10.57
155.614	88.688	-20.99	-13.32	-29.07	4.62	8.06	10.44
166.176	78.982	-21.77	-13.82	-29.50	4.41	8.34	10.80
175.268	67.886	-22.67	-14.39	-29.60	3.96	9.17	11.89
182.71	55.621	-23.42	-14.87	-29.20	3.30	10.86	14.08
188.352	42.432	-23.67	-15.03	-28.25	2.62	13.66	17.70
192.084	28.581	-23.41	-14.86	-27.37	2.26	15.88	20.58
193.831	14.343	-22.88	-14.53	-26.69	2.18	16.61	21.53
193.558	0	-22.29	-14.15	-26.01	2.13	17.16	22.24
					Thrust Load Rating=	7.94	10.30

BEAM OUTPUT FOR HL-93 TANDEM γ_{DL}=1.5, YDL=1.75 (INV), 1.35 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	INV	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.35
		kips-ft/ft.		kips-ft/ft.			
-193.558	0	0.00	0.00	0.00	0.00		
-193.831	14.343	-3.31	-2.10	-4.22	0.52	13.92	18.05
-192.084	28.581	-4.16	-2.64	-5.32	0.66	10.31	13.36
-188.352	42.432	-3.42	-2.17	-4.38	0.55	13.18	17.08
-182.71	55.621	-2.67	-1.70	-3.56	0.51	15.06	19.52
-175.268	67.886	-2.35	-1.49	-3.53	0.67	11.57	15.00
-166.176	78.982	-1.88	-1.19	-3.64	1.00	8.04	10.42
-155.614	88.688	-0.66	-0.42	-2.83	1.24	7.03	9.11
-144.425	97.1	0.60	0.38	-1.73	1.33	6.58	8.52
-132.782	104.872	1.24	0.79	-1.13	1.35	6.22	8.06
-120.723	111.979	1.40	0.89	-0.81	1.26	6.58	8.53
-108.284	118.399	1.23	0.78	-1.44	1.53	5.50	7.14
-95.504	124.112	1.19	0.76	-1.47	1.52	5.55	7.19
-82.425	129.101	1.11	0.70	-0.51	0.92	9.17	11.89
-69.087	133.348	1.00	0.63	1.28	0.16	52.77	68.41
-55.532	136.842	0.89	0.57	3.41	1.43	5.99	7.77
-41.802	139.571	0.77	0.49	5.41	2.65	3.27	4.24
-27.941	141.526	0.64	0.41	6.87	3.56	2.45	3.18
-13.993	142.702	0.54	0.34	7.50	3.97	2.21	2.87
0	143.094	0.51	0.32	7.02	3.72	2.37	3.07
13.993	142.702	0.60	0.38	5.62	2.87	3.05	3.96
27.941	141.526	0.77	0.49	3.77	1.71	5.06	6.56
41.802	139.571	0.96	0.61	1.84	0.50	17.01	22.05
55.532	136.842	1.15	0.73	0.20	0.54	15.61	20.23
69.087	133.348	1.30	0.83	-0.98	1.30	6.43	8.33
82.425	129.101	1.44	0.92	-1.66	1.77	4.68	6.07
95.504	124.112	1.50	0.95	-1.77	1.87	4.43	5.75
108.284	118.399	1.41	0.90	-1.27	1.53	5.42	7.03
120.723	111.979	1.43	0.91	-0.56	1.14	7.30	9.46
132.782	104.872	1.15	0.73	-0.70	1.05	8.02	10.40
144.425	97.1	0.44	0.28	-1.11	0.89	9.95	12.90
155.614	88.688	-0.84	-0.53	-2.10	0.72	11.98	15.53
166.176	78.982	-2.05	-1.30	-2.97	0.53	15.13	19.61
175.268	67.886	-2.48	-1.58	-3.11	0.36	21.55	27.94
182.71	55.621	-2.76	-1.75	-3.31	0.32	24.06	31.19
188.352	42.432	-3.46	-2.20	-4.19	0.41	17.40	22.55
192.084	28.581	-4.18	-2.65	-5.09	0.52	13.12	17.00
193.831	14.343	-3.32	-2.11	-4.02	0.40	18.06	23.41
193.558	0	0.00	0.00	0.00	0.00		

Moment Load Rating=	2.21	2.87
Actual Load Rating (from CANDE)	1.89	2.38

BEAM OUTPUT FOR HL-93 TRUCK

γ_{DL}=1.5, YDL=1.75 (INV), 1.35 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	INV	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.35$
		kips/ft.	kips/ft.	kips/ft.			
-193.558	0	-22.25	-14.13	-28.89	3.79	9.63	12.48
-193.831	14.343	-22.84	-14.50	-29.63	3.88	9.33	12.09
-192.084	28.581	-23.37	-14.84	-30.41	4.02	8.93	11.58
-188.352	42.432	-23.63	-15.00	-31.06	4.25	8.42	10.92
-182.71	55.621	-23.40	-14.86	-30.84	4.25	8.44	10.94
-175.268	67.886	-22.67	-14.39	-29.78	4.07	8.93	11.57
-166.176	78.982	-21.76	-13.82	-28.67	3.95	9.32	12.08
-155.614	88.688	-20.97	-13.31	-27.68	3.84	9.69	12.57
-144.425	97.1	-20.32	-12.90	-26.86	3.74	10.05	13.02
-132.782	104.872	-19.81	-12.58	-26.20	3.65	10.37	13.44
-120.723	111.979	-19.38	-12.30	-25.61	3.56	10.70	13.86
-108.284	118.399	-19.04	-12.09	-25.11	3.47	11.02	14.28
-95.504	124.112	-18.74	-11.90	-24.70	3.41	11.27	14.61
-82.425	129.101	-18.43	-11.70	-24.35	3.39	11.40	14.77
-69.087	133.348	-18.13	-11.51	-24.04	3.38	11.47	14.87
-55.532	136.842	-17.83	-11.32	-23.71	3.36	11.59	15.02
-41.802	139.571	-17.54	-11.14	-23.34	3.31	11.80	15.29
-27.941	141.526	-17.26	-10.96	-22.91	3.23	12.16	15.76
-13.993	142.702	-17.00	-10.79	-22.42	3.10	12.70	16.47
0	143.094	-16.87	-10.71	-22.37	3.14	12.56	16.28
13.993	142.702	-16.99	-10.79	-22.84	3.34	11.79	15.28
27.941	141.526	-17.25	-10.95	-23.35	3.48	11.27	14.61
41.802	139.571	-17.53	-11.13	-23.80	3.58	10.92	14.15
55.532	136.842	-17.82	-11.31	-24.19	3.64	10.69	13.86
69.087	133.348	-18.11	-11.50	-24.55	3.68	10.55	13.67
82.425	129.101	-18.42	-11.70	-24.87	3.69	10.47	13.57
95.504	124.112	-18.76	-11.91	-25.18	3.67	10.46	13.56
108.284	118.399	-19.07	-12.11	-25.51	3.68	10.40	13.48
120.723	111.979	-19.42	-12.33	-25.98	3.75	10.15	13.16
132.782	104.872	-19.85	-12.60	-26.55	3.83	9.89	12.81
144.425	97.1	-20.35	-12.92	-27.13	3.88	9.68	12.55
155.614	88.688	-20.99	-13.32	-27.74	3.86	9.63	12.49
166.176	78.982	-21.77	-13.82	-28.17	3.65	10.07	13.05
175.268	67.886	-22.67	-14.39	-28.39	3.27	11.10	14.39
182.71	55.621	-23.42	-14.87	-28.23	2.75	13.07	16.94
188.352	42.432	-23.67	-15.03	-27.43	2.15	16.61	21.53
192.084	28.581	-23.41	-14.86	-26.58	1.81	19.81	25.69
193.831	14.343	-22.88	-14.53	-25.93	1.74	20.78	26.93
193.558	0	-22.29	-14.15	-25.26	1.70	21.48	27.85

Thrust Load Rating= 8.42 10.92

BEAM OUTPUT FOR HL-93 TRUCK

γ_{DL}=1.5, YDL=1.75 (INV), 1.35 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	INV	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.35
		kips-ft/ft.		kips-ft/ft.			
-193.558	0	0.00	0.00	0.00	0.00		
-193.831	14.343	-3.31	-2.10	-4.42	0.64	11.41	14.80
-192.084	28.581	-4.16	-2.64	-5.52	0.77	8.81	11.41
-188.352	42.432	-3.42	-2.17	-4.64	0.70	10.35	13.41
-182.71	55.621	-2.67	-1.70	-4.08	0.81	9.47	12.28
-175.268	67.886	-2.35	-1.49	-4.10	1.00	7.83	10.15
-166.176	78.982	-1.88	-1.19	-3.73	1.06	7.62	9.88
-155.614	88.688	-0.66	-0.42	-2.12	0.84	10.42	13.51
-144.425	97.1	0.60	0.38	-0.28	0.50	17.39	22.54
-132.782	104.872	1.24	0.79	0.85	0.23	37.32	48.38
-120.723	111.979	1.40	0.89	1.34	0.04	229.79	297.88
-108.284	118.399	1.23	0.78	1.28	0.03	301.52	390.87
-95.504	124.112	1.19	0.76	1.14	0.03	292.34	378.96
-82.425	129.101	1.11	0.70	1.02	0.05	164.36	213.06
-69.087	133.348	1.00	0.63	1.24	0.14	62.19	80.62
-55.532	136.842	0.89	0.57	1.84	0.54	15.92	20.64
-41.802	139.571	0.77	0.49	2.74	1.13	7.70	9.98
-27.941	141.526	0.64	0.41	3.72	1.76	4.96	6.43
-13.993	142.702	0.54	0.34	4.52	2.27	3.87	5.01
0	143.094	0.51	0.32	4.77	2.43	3.62	4.69
13.993	142.702	0.60	0.38	4.21	2.06	4.24	5.50
27.941	141.526	0.77	0.49	3.12	1.34	6.45	8.37
41.802	139.571	0.96	0.61	1.81	0.48	17.71	22.96
55.532	136.842	1.15	0.73	0.59	0.32	26.32	34.12
69.087	133.348	1.30	0.83	-0.34	0.94	8.91	11.55
82.425	129.101	1.44	0.92	-0.89	1.33	6.23	8.07
95.504	124.112	1.50	0.95	-0.99	1.42	5.81	7.53
108.284	118.399	1.41	0.90	-0.66	1.18	7.02	9.10
120.723	111.979	1.43	0.91	-0.13	0.89	9.32	12.08
132.782	104.872	1.15	0.73	-0.28	0.82	10.37	13.44
144.425	97.1	0.44	0.28	-0.74	0.68	13.06	16.94
155.614	88.688	-0.84	-0.53	-1.79	0.54	15.83	20.53
166.176	78.982	-2.05	-1.30	-2.75	0.40	19.96	25.87
175.268	67.886	-2.48	-1.58	-2.95	0.26	29.26	37.93
182.71	55.621	-2.76	-1.75	-3.15	0.22	34.04	44.13
188.352	42.432	-3.46	-2.20	-4.01	0.31	23.15	30.01
192.084	28.581	-4.18	-2.65	-4.91	0.41	16.43	21.30
193.831	14.343	-3.32	-2.11	-3.88	0.32	22.78	29.52
193.558	0	0.00	0.00	0.00	0.00		

Moment Load Rating=	3.62	4.69
Actual Load Rating (from CANDE)	2.93	3.70

BEAM OUTPUT FOR TYPE 3 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.45$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-26.78	2.59	17.02
-193.831	14.343	-22.84	-14.50	-27.48	2.65	16.48
-192.084	28.581	-23.37	-14.84	-28.17	2.74	15.81
-188.352	42.432	-23.63	-15.00	-29.08	3.11	13.86
-182.71	55.621	-23.40	-14.86	-29.70	3.60	12.03
-175.268	67.886	-22.67	-14.39	-29.45	3.88	11.29
-166.176	78.982	-21.76	-13.82	-28.77	4.01	11.08
-155.614	88.688	-20.97	-13.31	-27.92	3.97	11.31
-144.425	97.1	-20.32	-12.90	-27.11	3.88	11.68
-132.782	104.872	-19.81	-12.58	-26.49	3.82	11.97
-120.723	111.979	-19.38	-12.30	-25.91	3.73	12.32
-108.284	118.399	-19.04	-12.09	-25.42	3.65	12.65
-95.504	124.112	-18.74	-11.90	-25.07	3.62	12.83
-82.425	129.101	-18.43	-11.70	-24.75	3.61	12.89
-69.087	133.348	-18.13	-11.51	-24.43	3.60	12.99
-55.532	136.842	-17.83	-11.32	-24.09	3.58	13.13
-41.802	139.571	-17.54	-11.14	-23.73	3.54	13.33
-27.941	141.526	-17.26	-10.96	-23.33	3.47	13.65
-13.993	142.702	-17.00	-10.79	-22.89	3.37	14.12
0	143.094	-16.87	-10.71	-22.40	3.16	15.07
13.993	142.702	-16.99	-10.79	-22.35	3.06	15.51
27.941	141.526	-17.25	-10.95	-22.83	3.19	14.86
41.802	139.571	-17.53	-11.13	-23.35	3.32	14.19
55.532	136.842	-17.82	-11.31	-23.85	3.45	13.64
69.087	133.348	-18.11	-11.50	-24.30	3.54	13.23
82.425	129.101	-18.42	-11.70	-24.71	3.59	12.97
95.504	124.112	-18.76	-11.91	-25.04	3.59	12.90
108.284	118.399	-19.07	-12.11	-25.33	3.58	12.91
120.723	111.979	-19.42	-12.33	-25.77	3.63	12.65
132.782	104.872	-19.85	-12.60	-26.34	3.71	12.31
144.425	97.1	-20.35	-12.92	-26.92	3.75	12.07
155.614	88.688	-20.99	-13.32	-27.66	3.81	11.77
166.176	78.982	-21.77	-13.82	-28.62	3.91	11.35
175.268	67.886	-22.67	-14.39	-29.43	3.86	11.35
182.71	55.621	-23.42	-14.87	-29.58	3.52	12.30
188.352	42.432	-23.67	-15.03	-28.87	2.97	14.51
192.084	28.581	-23.41	-14.86	-27.94	2.59	16.72
193.831	14.343	-22.88	-14.53	-27.25	2.50	17.47
193.558	0	-22.29	-14.15	-26.56	2.44	18.05

Thrust Load Rating= 11.08

BEAM OUTPUT FOR TYPE 3 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.45
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.11	0.46	19.25
-192.084	28.581	-4.16	-2.64	-5.16	0.57	14.46
-188.352	42.432	-3.42	-2.17	-4.17	0.43	20.22
-182.71	55.621	-2.67	-1.70	-3.30	0.36	25.89
-175.268	67.886	-2.35	-1.49	-3.09	0.42	22.30
-166.176	78.982	-1.88	-1.19	-2.83	0.54	18.02
-155.614	88.688	-0.65	-0.42	-1.68	0.58	18.05
-144.425	97.1	0.61	0.38	-0.37	0.56	18.96
-132.782	104.872	1.24	0.79	0.28	0.55	18.45
-120.723	111.979	1.40	0.89	0.43	0.55	18.20
-108.284	118.399	1.23	0.78	-0.06	0.74	13.76
-95.504	124.112	1.19	0.76	-0.50	0.96	10.56
-82.425	129.101	1.11	0.70	-0.65	1.00	10.20
-69.087	133.348	1.00	0.63	-0.39	0.79	12.99
-55.532	136.842	0.89	0.56	0.22	0.38	27.26
-41.802	139.571	0.76	0.49	1.19	0.24	43.10
-27.941	141.526	0.64	0.40	2.40	1.01	10.48
-13.993	142.702	0.53	0.34	3.63	1.77	6.00
0	143.094	0.51	0.32	4.65	2.37	4.49
13.993	142.702	0.61	0.38	5.18	2.61	4.04
27.941	141.526	0.78	0.49	5.06	2.45	4.27
41.802	139.571	0.97	0.62	4.39	1.95	5.28
55.532	136.842	1.15	0.73	3.30	1.23	8.30
69.087	133.348	1.31	0.83	2.02	0.41	24.82
82.425	129.101	1.45	0.92	0.81	0.36	27.64
95.504	124.112	1.50	0.95	-0.10	0.91	10.92
108.284	118.399	1.41	0.90	-0.45	1.06	9.42
120.723	111.979	1.43	0.91	-0.24	0.95	10.51
132.782	104.872	1.15	0.73	-0.72	1.07	9.58
144.425	97.1	0.44	0.28	-1.46	1.09	9.80
155.614	88.688	-0.84	-0.53	-2.67	1.05	9.95
166.176	78.982	-2.05	-1.30	-3.55	0.86	11.20
175.268	67.886	-2.49	-1.58	-3.49	0.57	16.23
182.71	55.621	-2.76	-1.75	-3.49	0.42	22.00
188.352	42.432	-3.46	-2.20	-4.25	0.45	19.35
192.084	28.581	-4.18	-2.66	-5.16	0.56	14.64
193.831	14.343	-3.32	-2.11	-4.09	0.44	19.82
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating= 4.04

Actual Load Rating (from CANDE) 3.28

BEAM OUTPUT FOR TYPE 3S2 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.45$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-27.46	2.98	14.81
-193.831	14.343	-22.84	-14.50	-28.17	3.04	14.35
-192.084	28.581	-23.37	-14.84	-28.88	3.15	13.77
-188.352	42.432	-23.63	-15.00	-29.76	3.50	12.33
-182.71	55.621	-23.40	-14.86	-30.26	3.92	11.05
-175.268	67.886	-22.67	-14.39	-29.76	4.05	10.81
-166.176	78.982	-21.76	-13.82	-28.75	3.99	11.12
-155.614	88.688	-20.97	-13.31	-27.77	3.89	11.55
-144.425	97.1	-20.32	-12.90	-26.99	3.81	11.90
-132.782	104.872	-19.82	-12.58	-26.38	3.75	12.18
-120.723	111.979	-19.38	-12.30	-25.79	3.67	12.54
-108.284	118.399	-19.04	-12.09	-25.34	3.60	12.82
-95.504	124.112	-18.74	-11.90	-25.07	3.62	12.83
-82.425	129.101	-18.43	-11.70	-24.79	3.63	12.82
-69.087	133.348	-18.13	-11.51	-24.43	3.60	12.99
-55.532	136.842	-17.83	-11.32	-24.00	3.52	13.33
-41.802	139.571	-17.54	-11.14	-23.50	3.41	13.85
-27.941	141.526	-17.26	-10.96	-22.97	3.26	14.52
-13.993	142.702	-17.00	-10.79	-22.48	3.13	15.17
0	143.094	-16.87	-10.71	-22.54	3.24	14.69
13.993	142.702	-16.99	-10.79	-23.07	3.47	13.69
27.941	141.526	-17.25	-10.96	-23.56	3.60	13.15
41.802	139.571	-17.53	-11.13	-23.99	3.69	12.78
55.532	136.842	-17.82	-11.32	-24.38	3.75	12.54
69.087	133.348	-18.12	-11.50	-24.73	3.78	12.38
82.425	129.101	-18.42	-11.70	-25.05	3.79	12.30
95.504	124.112	-18.76	-11.91	-25.35	3.77	12.31
108.284	118.399	-19.08	-12.11	-25.68	3.77	12.24
120.723	111.979	-19.42	-12.33	-26.16	3.85	11.94
132.782	104.872	-19.85	-12.61	-26.73	3.93	11.62
144.425	97.1	-20.35	-12.92	-27.32	3.98	11.38
155.614	88.688	-20.99	-13.33	-27.93	3.97	11.32
166.176	78.982	-21.78	-13.83	-28.40	3.78	11.74
175.268	67.886	-22.67	-14.40	-28.76	3.48	12.59
182.71	55.621	-23.42	-14.87	-28.90	3.13	13.82
188.352	42.432	-23.67	-15.03	-28.43	2.72	15.84
192.084	28.581	-23.41	-14.86	-27.66	2.43	17.82
193.831	14.343	-22.88	-14.53	-26.98	2.34	18.63
193.558	0	-22.29	-14.15	-26.31	2.30	19.18

Thrust Load Rating= 10.81

BEAM OUTPUT FOR TYPE 3S2 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.45
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.19	0.51	17.37
-192.084	28.581	-4.16	-2.64	-5.24	0.62	13.32
-188.352	42.432	-3.42	-2.17	-4.27	0.48	18.00
-182.71	55.621	-2.67	-1.70	-3.48	0.46	19.93
-175.268	67.886	-2.35	-1.49	-3.45	0.63	15.04
-166.176	78.982	-1.88	-1.19	-3.38	0.85	11.39
-155.614	88.688	-0.66	-0.42	-2.30	0.94	11.19
-144.425	97.1	0.60	0.38	-1.00	0.92	11.54
-132.782	104.872	1.24	0.79	-0.30	0.88	11.54
-120.723	111.979	1.39	0.89	-0.02	0.81	12.38
-108.284	118.399	1.23	0.78	-0.49	0.98	10.36
-95.504	124.112	1.19	0.75	-0.50	0.96	10.55
-82.425	129.101	1.11	0.70	0.16	0.54	18.99
-69.087	133.348	1.00	0.64	1.38	0.22	47.16
-55.532	136.842	0.89	0.57	2.84	1.11	9.35
-41.802	139.571	0.77	0.49	4.21	1.97	5.32
-27.941	141.526	0.64	0.41	5.22	2.61	4.03
-13.993	142.702	0.54	0.34	5.63	2.91	3.64
0	143.094	0.51	0.32	5.31	2.74	3.88
13.993	142.702	0.61	0.39	4.35	2.14	4.94
27.941	141.526	0.78	0.49	3.02	1.28	8.16
41.802	139.571	0.97	0.62	1.58	0.35	29.38
55.532	136.842	1.15	0.73	0.31	0.48	21.24
69.087	133.348	1.31	0.83	-0.63	1.10	9.15
82.425	129.101	1.45	0.92	-1.16	1.49	6.73
95.504	124.112	1.50	0.95	-1.19	1.54	6.50
108.284	118.399	1.41	0.90	-0.76	1.24	8.08
120.723	111.979	1.43	0.91	-0.16	0.91	11.06
132.782	104.872	1.14	0.73	-0.26	0.80	12.71
144.425	97.1	0.44	0.28	-0.68	0.64	16.63
155.614	88.688	-0.84	-0.53	-1.71	0.50	20.95
166.176	78.982	-2.05	-1.30	-2.64	0.34	28.64
175.268	67.886	-2.48	-1.58	-2.78	0.17	56.26
182.71	55.621	-2.76	-1.75	-2.89	0.07	129.02
188.352	42.432	-3.46	-2.20	-3.67	0.12	74.25
192.084	28.581	-4.18	-2.66	-4.65	0.27	30.48
193.831	14.343	-3.32	-2.11	-3.80	0.27	32.26
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating= 3.64

Actual Load Rating (from CANDE) 3.28

BEAM OUTPUT FOR TYPE 3-3 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.45$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-27.26	2.86	15.39
-193.831	14.343	-22.84	-14.50	-27.96	2.93	14.92
-192.084	28.581	-23.37	-14.84	-28.67	3.03	14.32
-188.352	42.432	-23.63	-15.00	-29.57	3.39	12.72
-182.71	55.621	-23.40	-14.86	-30.15	3.86	11.24
-175.268	67.886	-22.67	-14.39	-29.82	4.09	10.72
-166.176	78.982	-21.76	-13.82	-28.93	4.09	10.85
-155.614	88.688	-20.97	-13.31	-27.94	3.98	11.28
-144.425	97.1	-20.32	-12.90	-27.16	3.91	11.60
-132.782	104.872	-19.82	-12.58	-26.56	3.85	11.86
-120.723	111.979	-19.38	-12.30	-25.97	3.77	12.21
-108.284	118.399	-19.04	-12.09	-25.52	3.70	12.48
-95.504	124.112	-18.74	-11.90	-25.25	3.72	12.47
-82.425	129.101	-18.43	-11.70	-24.98	3.74	12.45
-69.087	133.348	-18.13	-11.51	-24.62	3.71	12.60
-55.532	136.842	-17.83	-11.32	-24.19	3.63	12.94
-41.802	139.571	-17.54	-11.14	-23.69	3.51	13.44
-27.941	141.526	-17.26	-10.96	-23.15	3.36	14.09
-13.993	142.702	-17.00	-10.79	-22.60	3.20	14.84
0	143.094	-16.87	-10.71	-22.61	3.28	14.51
13.993	142.702	-16.99	-10.79	-23.13	3.51	13.55
27.941	141.526	-17.25	-10.96	-23.61	3.63	13.03
41.802	139.571	-17.53	-11.13	-24.05	3.72	12.67
55.532	136.842	-17.82	-11.32	-24.43	3.78	12.44
69.087	133.348	-18.12	-11.50	-24.78	3.81	12.30
82.425	129.101	-18.42	-11.70	-25.09	3.81	12.23
95.504	124.112	-18.76	-11.91	-25.40	3.79	12.22
108.284	118.399	-19.08	-12.11	-25.74	3.81	12.12
120.723	111.979	-19.42	-12.33	-26.23	3.89	11.80
132.782	104.872	-19.85	-12.61	-26.82	3.98	11.47
144.425	97.1	-20.35	-12.92	-27.44	4.05	11.19
155.614	88.688	-20.99	-13.33	-28.22	4.13	10.86
166.176	78.982	-21.78	-13.83	-29.02	4.14	10.72
175.268	67.886	-22.67	-14.40	-29.69	4.01	10.93
182.71	55.621	-23.42	-14.87	-30.02	3.77	11.48
188.352	42.432	-23.67	-15.03	-29.59	3.38	12.75
192.084	28.581	-23.41	-14.86	-28.78	3.07	14.12
193.831	14.343	-22.88	-14.53	-28.07	2.97	14.72
193.558	0	-22.29	-14.15	-27.37	2.90	15.18

Thrust Load Rating= 10.72

BEAM OUTPUT FOR TYPE 3-3 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.45
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.15	0.48	18.29
-192.084	28.581	-4.16	-2.64	-5.18	0.58	14.14
-188.352	42.432	-3.42	-2.17	-4.18	0.43	20.08
-182.71	55.621	-2.67	-1.70	-3.35	0.39	23.83
-175.268	67.886	-2.35	-1.49	-3.27	0.52	17.95
-166.176	78.982	-1.88	-1.19	-3.21	0.76	12.76
-155.614	88.688	-0.66	-0.42	-2.24	0.90	11.66
-144.425	97.1	0.60	0.38	-1.03	0.93	11.31
-132.782	104.872	1.24	0.79	-0.42	0.95	10.71
-120.723	111.979	1.39	0.89	-0.20	0.91	11.05
-108.284	118.399	1.23	0.78	-0.75	1.13	9.01
-95.504	124.112	1.19	0.75	-0.82	1.15	8.87
-82.425	129.101	1.11	0.70	-0.17	0.73	14.03
-69.087	133.348	1.00	0.64	1.09	0.05	197.85
-55.532	136.842	0.89	0.57	2.60	0.97	10.65
-41.802	139.571	0.77	0.49	4.03	1.86	5.61
-27.941	141.526	0.64	0.41	5.08	2.54	4.15
-13.993	142.702	0.54	0.34	5.54	2.86	3.71
0	143.094	0.51	0.32	5.24	2.70	3.93
13.993	142.702	0.61	0.39	4.33	2.13	4.97
27.941	141.526	0.78	0.49	3.06	1.31	8.01
41.802	139.571	0.97	0.62	1.71	0.42	24.57
55.532	136.842	1.15	0.73	0.52	0.36	28.23
69.087	133.348	1.31	0.83	-0.32	0.93	10.84
82.425	129.101	1.45	0.92	-0.76	1.26	7.95
95.504	124.112	1.50	0.95	-0.71	1.26	7.89
108.284	118.399	1.41	0.90	-0.27	0.96	10.47
120.723	111.979	1.43	0.91	0.27	0.66	15.18
132.782	104.872	1.14	0.73	0.11	0.59	17.19
144.425	97.1	0.44	0.28	-0.49	0.53	20.01
155.614	88.688	-0.84	-0.53	-1.74	0.51	20.32
166.176	78.982	-2.05	-1.30	-2.83	0.45	21.54
175.268	67.886	-2.48	-1.58	-3.07	0.33	28.09
182.71	55.621	-2.76	-1.75	-3.24	0.28	33.15
188.352	42.432	-3.46	-2.20	-4.07	0.35	25.01
192.084	28.581	-4.18	-2.65	-5.06	0.50	16.34
193.831	14.343	-3.32	-2.11	-4.09	0.44	20.05
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating= 3.71

Actual Load Rating (from CANDE) 2.96

BEAM OUTPUT FOR SU4 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.45$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-27.08	2.76	15.96
-193.831	14.343	-22.84	-14.50	-27.78	2.83	15.46
-192.084	28.581	-23.37	-14.84	-28.48	2.92	14.83
-188.352	42.432	-23.62	-15.00	-29.41	3.30	13.07
-182.71	55.621	-23.40	-14.86	-30.04	3.79	11.42
-175.268	67.886	-22.67	-14.39	-29.76	4.05	10.80
-166.176	78.982	-21.76	-13.82	-28.94	4.10	10.83
-155.614	88.688	-20.97	-13.31	-27.98	4.01	11.20
-144.425	97.1	-20.32	-12.90	-27.19	3.93	11.55
-132.782	104.872	-19.81	-12.58	-26.57	3.86	11.83
-120.723	111.979	-19.38	-12.30	-25.99	3.78	12.17
-108.284	118.399	-19.04	-12.09	-25.52	3.70	12.47
-95.504	124.112	-18.74	-11.90	-25.18	3.68	12.59
-82.425	129.101	-18.43	-11.70	-24.86	3.68	12.66
-69.087	133.348	-18.12	-11.51	-24.51	3.65	12.81
-55.532	136.842	-17.83	-11.32	-24.13	3.60	13.05
-41.802	139.571	-17.54	-11.14	-23.72	3.53	13.36
-27.941	141.526	-17.27	-10.96	-23.28	3.44	13.78
-13.993	142.702	-17.00	-10.79	-22.82	3.32	14.30
0	143.094	-16.87	-10.71	-22.47	3.20	14.88
13.993	142.702	-16.98	-10.78	-22.59	3.20	14.83
27.941	141.526	-17.25	-10.95	-23.08	3.34	14.20
41.802	139.571	-17.53	-11.13	-23.58	3.46	13.65
55.532	136.842	-17.82	-11.31	-24.05	3.56	13.19
69.087	133.348	-18.11	-11.50	-24.49	3.64	12.84
82.425	129.101	-18.42	-11.70	-24.88	3.69	12.62
95.504	124.112	-18.75	-11.91	-25.22	3.69	12.56
108.284	118.399	-19.07	-12.11	-25.52	3.68	12.53
120.723	111.979	-19.42	-12.33	-25.97	3.74	12.27
132.782	104.872	-19.85	-12.60	-26.54	3.82	11.94
144.425	97.1	-20.34	-12.92	-27.12	3.87	11.71
155.614	88.688	-20.98	-13.32	-27.87	3.94	11.40
166.176	78.982	-21.77	-13.82	-28.73	3.98	11.16
175.268	67.886	-22.67	-14.39	-29.35	3.82	11.47
182.71	55.621	-23.42	-14.87	-29.37	3.40	12.73
188.352	42.432	-23.67	-15.03	-28.62	2.83	15.26
192.084	28.581	-23.41	-14.87	-27.71	2.45	17.66
193.831	14.343	-22.88	-14.53	-27.02	2.36	18.46
193.558	0	-22.29	-14.15	-26.33	2.31	19.08

Thrust Load Rating= 10.80

BEAM OUTPUT FOR SU4 TRUCK γ_{DL}=1.5, γ_{DL}= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.45
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.15	0.48	18.15
-192.084	28.581	-4.16	-2.64	-5.21	0.60	13.68
-188.352	42.432	-3.42	-2.17	-4.23	0.46	18.79
-182.71	55.621	-2.67	-1.70	-3.38	0.41	22.66
-175.268	67.886	-2.35	-1.49	-3.24	0.51	18.45
-166.176	78.982	-1.88	-1.19	-3.08	0.68	14.22
-155.614	88.688	-0.65	-0.41	-1.97	0.75	13.99
-144.425	97.1	0.61	0.39	-0.65	0.72	14.73
-132.782	104.872	1.24	0.79	0.05	0.68	14.88
-120.723	111.979	1.40	0.89	0.28	0.64	15.69
-108.284	118.399	1.24	0.79	-0.14	0.79	12.89
-95.504	124.112	1.19	0.76	-0.35	0.88	11.54
-82.425	129.101	1.11	0.70	-0.16	0.73	14.11
-69.087	133.348	0.99	0.63	0.42	0.33	31.66
-55.532	136.842	0.87	0.55	1.25	0.22	48.17
-41.802	139.571	0.74	0.47	2.22	0.85	12.39
-27.941	141.526	0.61	0.39	3.20	1.48	7.15
-13.993	142.702	0.52	0.33	4.02	2.00	5.31
0	143.094	0.51	0.32	4.55	2.31	4.60
13.993	142.702	0.62	0.39	4.68	2.32	4.54
27.941	141.526	0.80	0.51	4.33	2.02	5.17
41.802	139.571	0.99	0.63	3.57	1.48	6.99
55.532	136.842	1.17	0.74	2.54	0.78	13.01
69.087	133.348	1.32	0.84	1.41	0.05	188.05
82.425	129.101	1.45	0.92	0.40	0.60	16.64
95.504	124.112	1.50	0.95	-0.31	1.04	9.64
108.284	118.399	1.41	0.90	-0.50	1.09	9.17
120.723	111.979	1.43	0.91	-0.22	0.94	10.66
132.782	104.872	1.14	0.73	-0.62	1.01	10.12
144.425	97.1	0.44	0.28	-1.30	0.99	10.73
155.614	88.688	-0.84	-0.53	-2.46	0.92	11.26
166.176	78.982	-2.05	-1.30	-3.34	0.74	13.05
175.268	67.886	-2.49	-1.58	-3.35	0.49	18.93
182.71	55.621	-2.76	-1.76	-3.41	0.37	24.63
188.352	42.432	-3.46	-2.20	-4.20	0.42	20.55
192.084	28.581	-4.18	-2.66	-5.12	0.53	15.38
193.831	14.343	-3.32	-2.11	-4.06	0.42	20.88
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating= 4.54

Actual Load Rating (from CANDE) 3.59

BEAM OUTPUT FOR SU5 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.45$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-27.81	3.17	13.88
-193.831	14.343	-22.84	-14.50	-28.52	3.25	13.46
-192.084	28.581	-23.37	-14.84	-29.24	3.35	12.92
-188.352	42.432	-23.62	-15.00	-30.16	3.73	11.56
-182.71	55.621	-23.40	-14.86	-30.75	4.20	10.32
-175.268	67.886	-22.67	-14.39	-30.39	4.42	9.92
-166.176	78.982	-21.76	-13.82	-29.47	4.40	10.08
-155.614	88.688	-20.97	-13.31	-28.47	4.29	10.48
-144.425	97.1	-20.32	-12.90	-27.67	4.20	10.79
-132.782	104.872	-19.81	-12.58	-27.05	4.14	11.04
-120.723	111.979	-19.38	-12.30	-26.46	4.05	11.35
-108.284	118.399	-19.04	-12.09	-26.01	3.98	11.60
-95.504	124.112	-18.74	-11.90	-25.68	3.97	11.69
-82.425	129.101	-18.42	-11.70	-25.32	3.94	11.82
-69.087	133.348	-18.12	-11.51	-24.92	3.88	12.05
-55.532	136.842	-17.83	-11.32	-24.51	3.81	12.32
-41.802	139.571	-17.54	-11.14	-24.08	3.73	12.63
-27.941	141.526	-17.27	-10.96	-23.64	3.64	13.01
-13.993	142.702	-17.00	-10.79	-23.18	3.53	13.46
0	143.094	-16.87	-10.71	-22.89	3.44	13.83
13.993	142.702	-16.98	-10.78	-23.08	3.48	13.65
27.941	141.526	-17.25	-10.95	-23.58	3.62	13.10
41.802	139.571	-17.53	-11.13	-24.07	3.74	12.61
55.532	136.842	-17.82	-11.31	-24.55	3.85	12.21
69.087	133.348	-18.11	-11.50	-24.99	3.93	11.90
82.425	129.101	-18.42	-11.69	-25.39	3.98	11.70
95.504	124.112	-18.75	-11.91	-25.72	3.98	11.64
108.284	118.399	-19.07	-12.11	-26.03	3.98	11.61
120.723	111.979	-19.42	-12.33	-26.49	4.04	11.36
132.782	104.872	-19.85	-12.60	-27.07	4.13	11.06
144.425	97.1	-20.34	-12.92	-27.65	4.18	10.85
155.614	88.688	-20.98	-13.32	-28.43	4.25	10.56
166.176	78.982	-21.77	-13.82	-29.22	4.26	10.43
175.268	67.886	-22.67	-14.39	-29.71	4.02	10.88
182.71	55.621	-23.42	-14.87	-29.61	3.54	12.23
188.352	42.432	-23.67	-15.03	-28.79	2.93	14.74
192.084	28.581	-23.41	-14.87	-27.88	2.55	16.98
193.831	14.343	-22.88	-14.53	-27.19	2.46	17.74
193.558	0	-22.29	-14.15	-26.50	2.40	18.33

Thrust Load Rating= 9.92

BEAM OUTPUT FOR SU5 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.45
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.24	0.54	16.42
-192.084	28.581	-4.16	-2.64	-5.30	0.65	12.69
-188.352	42.432	-3.42	-2.17	-4.29	0.50	17.55
-182.71	55.621	-2.67	-1.70	-3.46	0.45	20.35
-175.268	67.886	-2.35	-1.49	-3.39	0.59	15.87
-166.176	78.982	-1.88	-1.19	-3.30	0.82	11.93
-155.614	88.688	-0.65	-0.41	-2.24	0.91	11.63
-144.425	97.1	0.61	0.39	-0.91	0.87	12.18
-132.782	104.872	1.24	0.79	-0.18	0.81	12.47
-120.723	111.979	1.40	0.89	0.13	0.73	13.77
-108.284	118.399	1.24	0.78	-0.22	0.83	12.22
-95.504	124.112	1.19	0.76	-0.13	0.76	13.42
-82.425	129.101	1.11	0.70	0.36	0.43	24.06
-69.087	133.348	0.99	0.63	1.03	0.03	388.74
-55.532	136.842	0.87	0.55	1.83	0.55	18.87
-41.802	139.571	0.74	0.47	2.68	1.11	9.43
-27.941	141.526	0.61	0.39	3.50	1.65	6.41
-13.993	142.702	0.52	0.33	4.17	2.09	5.09
0	143.094	0.51	0.32	4.58	2.32	4.57
13.993	142.702	0.62	0.39	4.62	2.28	4.62
27.941	141.526	0.80	0.51	4.18	1.94	5.39
41.802	139.571	0.99	0.63	3.37	1.36	7.59
55.532	136.842	1.17	0.74	2.30	0.65	15.76
69.087	133.348	1.32	0.84	1.16	0.09	112.13
82.425	129.101	1.45	0.92	0.16	0.74	13.52
95.504	124.112	1.50	0.95	-0.51	1.15	8.65
108.284	118.399	1.41	0.90	-0.64	1.17	8.55
120.723	111.979	1.43	0.91	-0.30	0.99	10.12
132.782	104.872	1.14	0.73	-0.68	1.04	9.79
144.425	97.1	0.44	0.28	-1.33	1.01	10.58
155.614	88.688	-0.84	-0.53	-2.45	0.92	11.31
166.176	78.982	-2.05	-1.30	-3.32	0.72	13.26
175.268	67.886	-2.49	-1.58	-3.35	0.49	18.95
182.71	55.621	-2.76	-1.76	-3.44	0.39	23.75
188.352	42.432	-3.46	-2.20	-4.25	0.45	19.41
192.084	28.581	-4.18	-2.66	-5.16	0.56	14.69
193.831	14.343	-3.32	-2.11	-4.09	0.44	19.95
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating= 4.57

Actual Load Rating (from CANDE) 3.56

BEAM OUTPUT FOR SU6 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.45$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-28.03	3.30	13.36
-193.831	14.343	-22.84	-14.50	-28.74	3.37	12.95
-192.084	28.581	-23.37	-14.84	-29.46	3.48	12.44
-188.352	42.432	-23.62	-15.00	-30.43	3.89	11.10
-182.71	55.621	-23.40	-14.86	-31.16	4.43	9.77
-175.268	67.886	-22.67	-14.39	-30.99	4.76	9.21
-166.176	78.982	-21.76	-13.82	-30.24	4.85	9.16
-155.614	88.688	-20.97	-13.31	-29.30	4.76	9.43
-144.425	97.1	-20.32	-12.90	-28.48	4.67	9.72
-132.782	104.872	-19.81	-12.58	-27.85	4.59	9.94
-120.723	111.979	-19.38	-12.30	-27.25	4.50	10.22
-108.284	118.399	-19.04	-12.09	-26.78	4.42	10.44
-95.504	124.112	-18.74	-11.90	-26.45	4.40	10.53
-82.425	129.101	-18.42	-11.70	-26.08	4.38	10.65
-69.087	133.348	-18.12	-11.51	-25.68	4.32	10.84
-55.532	136.842	-17.83	-11.32	-25.26	4.24	11.07
-41.802	139.571	-17.54	-11.14	-24.82	4.16	11.34
-27.941	141.526	-17.27	-10.96	-24.37	4.06	11.66
-13.993	142.702	-17.00	-10.79	-23.91	3.95	12.04
0	143.094	-16.87	-10.71	-23.52	3.80	12.52
13.993	142.702	-16.98	-10.78	-23.60	3.78	12.57
27.941	141.526	-17.25	-10.95	-24.09	3.91	12.11
41.802	139.571	-17.53	-11.13	-24.59	4.03	11.69
55.532	136.842	-17.82	-11.31	-25.08	4.15	11.32
69.087	133.348	-18.11	-11.50	-25.55	4.25	11.01
82.425	129.101	-18.42	-11.69	-25.99	4.33	10.76
95.504	124.112	-18.75	-11.91	-26.39	4.36	10.62
108.284	118.399	-19.07	-12.11	-26.72	4.37	10.56
120.723	111.979	-19.42	-12.33	-27.18	4.44	10.36
132.782	104.872	-19.85	-12.60	-27.77	4.53	10.08
144.425	97.1	-20.34	-12.92	-28.37	4.59	9.88
155.614	88.688	-20.98	-13.32	-29.15	4.66	9.63
166.176	78.982	-21.77	-13.82	-30.14	4.79	9.28
175.268	67.886	-22.67	-14.39	-30.92	4.72	9.28
182.71	55.621	-23.42	-14.87	-30.92	4.28	10.11
188.352	42.432	-23.67	-15.03	-30.07	3.66	11.80
192.084	28.581	-23.41	-14.87	-29.10	3.25	13.33
193.831	14.343	-22.88	-14.53	-28.38	3.14	13.90
193.558	0	-22.29	-14.15	-27.66	3.07	14.35

Thrust Load Rating= 9.16

BEAM OUTPUT FOR SU6 TRUCK

γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.45
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.30	0.57	15.52
-192.084	28.581	-4.16	-2.64	-5.37	0.69	11.93
-188.352	42.432	-3.42	-2.17	-4.34	0.53	16.56
-182.71	55.621	-2.67	-1.70	-3.47	0.45	20.27
-175.268	67.886	-2.35	-1.49	-3.34	0.57	16.56
-166.176	78.982	-1.88	-1.19	-3.24	0.78	12.46
-155.614	88.688	-0.65	-0.41	-2.21	0.89	11.82
-144.425	97.1	0.61	0.39	-0.94	0.88	11.96
-132.782	104.872	1.24	0.79	-0.27	0.86	11.77
-120.723	111.979	1.40	0.89	0.00	0.80	12.51
-108.284	118.399	1.24	0.78	-0.43	0.95	10.69
-95.504	124.112	1.19	0.76	-0.44	0.94	10.88
-82.425	129.101	1.11	0.70	-0.01	0.64	16.07
-69.087	133.348	0.99	0.63	0.65	0.19	53.12
-55.532	136.842	0.87	0.55	1.46	0.34	30.98
-41.802	139.571	0.74	0.47	2.34	0.92	11.42
-27.941	141.526	0.61	0.39	3.23	1.49	7.06
-13.993	142.702	0.52	0.33	3.99	1.98	5.35
0	143.094	0.51	0.32	4.52	2.29	4.64
13.993	142.702	0.62	0.39	4.73	2.35	4.50
27.941	141.526	0.80	0.51	4.51	2.12	4.91
41.802	139.571	0.99	0.63	3.93	1.68	6.13
55.532	136.842	1.17	0.74	3.07	1.09	9.38
69.087	133.348	1.32	0.84	2.04	0.42	24.26
82.425	129.101	1.45	0.92	1.03	0.24	41.79
95.504	124.112	1.50	0.95	0.12	0.79	12.60
108.284	118.399	1.41	0.90	-0.37	1.02	9.86
120.723	111.979	1.43	0.91	-0.26	0.96	10.41
132.782	104.872	1.14	0.73	-0.82	1.12	9.11
144.425	97.1	0.44	0.28	-1.64	1.19	8.96
155.614	88.688	-0.84	-0.53	-2.92	1.19	8.78
166.176	78.982	-2.05	-1.30	-3.81	1.00	9.58
175.268	67.886	-2.49	-1.58	-3.71	0.70	13.31
182.71	55.621	-2.76	-1.76	-3.72	0.54	16.82
188.352	42.432	-3.46	-2.20	-4.49	0.59	14.77
192.084	28.581	-4.18	-2.66	-5.42	0.71	11.59
193.831	14.343	-3.32	-2.11	-4.30	0.56	15.61
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating=	4.50
Actual Load Rating (from CANDE)	3.47

BEAM OUTPUT FOR SU7 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.45$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-28.11	3.35	13.15
-193.831	14.343	-22.84	-14.50	-28.83	3.43	12.75
-192.084	28.581	-23.37	-14.84	-29.55	3.54	12.26
-188.352	42.432	-23.62	-15.00	-30.52	3.94	10.95
-182.71	55.621	-23.40	-14.85	-31.31	4.52	9.58
-175.268	67.886	-22.66	-14.39	-31.25	4.91	8.92
-166.176	78.982	-21.76	-13.81	-30.64	5.07	8.75
-155.614	88.688	-20.96	-13.31	-29.77	5.03	8.92
-144.425	97.1	-20.31	-12.90	-28.94	4.93	9.20
-132.782	104.872	-19.81	-12.58	-28.31	4.86	9.41
-120.723	111.979	-19.37	-12.30	-27.70	4.76	9.66
-108.284	118.399	-19.03	-12.08	-27.21	4.67	9.88
-95.504	124.112	-18.73	-11.90	-26.88	4.65	9.97
-82.425	129.101	-18.42	-11.70	-26.51	4.62	10.08
-69.087	133.348	-18.12	-11.51	-26.11	4.56	10.25
-55.532	136.842	-17.83	-11.32	-25.68	4.49	10.47
-41.802	139.571	-17.54	-11.14	-25.24	4.40	10.71
-27.941	141.526	-17.26	-10.96	-24.79	4.30	11.01
-13.993	142.702	-17.00	-10.79	-24.32	4.18	11.36
0	143.094	-16.86	-10.71	-23.88	4.01	11.88
13.993	142.702	-16.98	-10.78	-23.91	3.96	12.00
27.941	141.526	-17.25	-10.95	-24.39	4.09	11.59
41.802	139.571	-17.52	-11.13	-24.88	4.20	11.22
55.532	136.842	-17.81	-11.31	-25.36	4.31	10.89
69.087	133.348	-18.11	-11.50	-25.82	4.41	10.61
82.425	129.101	-18.42	-11.69	-26.27	4.49	10.38
95.504	124.112	-18.75	-11.90	-26.70	4.55	10.20
108.284	118.399	-19.07	-12.11	-27.08	4.58	10.08
120.723	111.979	-19.41	-12.33	-27.56	4.65	9.87
132.782	104.872	-19.85	-12.60	-28.16	4.75	9.61
144.425	97.1	-20.34	-12.91	-28.78	4.82	9.40
155.614	88.688	-20.98	-13.32	-29.58	4.91	9.14
166.176	78.982	-21.77	-13.82	-30.58	5.03	8.82
175.268	67.886	-22.66	-14.39	-31.61	5.11	8.57
182.71	55.621	-23.42	-14.87	-31.99	4.90	8.84
188.352	42.432	-23.67	-15.03	-31.23	4.32	9.98
192.084	28.581	-23.41	-14.87	-30.21	3.89	11.15
193.831	14.343	-22.88	-14.53	-29.47	3.76	11.61
193.558	0	-22.29	-14.15	-28.73	3.68	11.98

Thrust Load Rating= 8.57

BEAM OUTPUT FOR SU7 TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.45
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.32	0.58	15.18
-192.084	28.581	-4.16	-2.64	-5.40	0.71	11.65
-188.352	42.432	-3.42	-2.17	-4.37	0.54	16.09
-182.71	55.621	-2.67	-1.70	-3.47	0.46	20.23
-175.268	67.886	-2.35	-1.49	-3.31	0.55	17.10
-166.176	78.982	-1.88	-1.19	-3.18	0.75	13.04
-155.614	88.688	-0.65	-0.41	-2.16	0.86	12.22
-144.425	97.1	0.61	0.39	-0.92	0.87	12.11
-132.782	104.872	1.24	0.79	-0.28	0.87	11.64
-120.723	111.979	1.40	0.89	-0.05	0.83	12.10
-108.284	118.399	1.24	0.79	-0.51	1.00	10.15
-95.504	124.112	1.20	0.76	-0.59	1.02	9.96
-82.425	129.101	1.11	0.70	-0.21	0.75	13.64
-69.087	133.348	0.99	0.63	0.42	0.32	31.94
-55.532	136.842	0.87	0.55	1.22	0.20	52.32
-41.802	139.571	0.74	0.47	2.11	0.78	13.42
-27.941	141.526	0.61	0.39	3.00	1.37	7.73
-13.993	142.702	0.52	0.33	3.79	1.87	5.69
0	143.094	0.51	0.32	4.34	2.19	4.85
13.993	142.702	0.62	0.39	4.60	2.27	4.64
27.941	141.526	0.79	0.50	4.46	2.10	4.98
41.802	139.571	0.98	0.62	4.00	1.72	5.99
55.532	136.842	1.16	0.74	3.28	1.21	8.41
69.087	133.348	1.31	0.83	2.43	0.64	15.77
82.425	129.101	1.45	0.92	1.60	0.08	119.11
95.504	124.112	1.51	0.96	0.82	0.39	25.43
108.284	118.399	1.42	0.90	0.23	0.68	14.71
120.723	111.979	1.44	0.91	0.12	0.75	13.34
132.782	104.872	1.15	0.73	-0.57	0.98	10.40
144.425	97.1	0.44	0.28	-1.60	1.17	9.15
155.614	88.688	-0.84	-0.53	-3.09	1.29	8.08
166.176	78.982	-2.06	-1.30	-4.17	1.21	7.95
175.268	67.886	-2.49	-1.58	-4.08	0.91	10.28
182.71	55.621	-2.77	-1.76	-3.98	0.69	13.21
188.352	42.432	-3.46	-2.20	-4.71	0.71	12.22
192.084	28.581	-4.18	-2.66	-5.66	0.85	9.72
193.831	14.343	-3.32	-2.11	-4.50	0.68	12.99
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating=	4.64
Actual Load Rating (from CANDE)	3.47

BEAM OUTPUT FOR NRL TRUCK γ_{DL}=1.5, YDL= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.45$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-27.87	3.21	13.71
-193.831	14.343	-22.84	-14.50	-28.59	3.29	13.28
-192.084	28.581	-23.37	-14.84	-29.31	3.40	12.75
-188.352	42.432	-23.62	-15.00	-30.27	3.80	11.37
-182.71	55.621	-23.40	-14.85	-31.19	4.45	9.73
-175.268	67.886	-22.66	-14.39	-31.36	4.97	8.81
-166.176	78.982	-21.76	-13.81	-30.87	5.21	8.52
-155.614	88.688	-20.96	-13.31	-30.05	5.19	8.65
-144.425	97.1	-20.31	-12.90	-29.22	5.09	8.91
-132.782	104.872	-19.81	-12.58	-28.58	5.01	9.11
-120.723	111.979	-19.37	-12.30	-27.97	4.91	9.36
-108.284	118.399	-19.03	-12.08	-27.48	4.82	9.57
-95.504	124.112	-18.73	-11.90	-27.12	4.79	9.68
-82.425	129.101	-18.42	-11.70	-26.75	4.76	9.79
-69.087	133.348	-18.12	-11.51	-26.34	4.70	9.96
-55.532	136.842	-17.83	-11.32	-25.92	4.62	10.16
-41.802	139.571	-17.54	-11.14	-25.48	4.54	10.40
-27.941	141.526	-17.26	-10.96	-25.02	4.44	10.68
-13.993	142.702	-17.00	-10.79	-24.55	4.32	11.01
0	143.094	-16.86	-10.71	-24.09	4.13	11.54
13.993	142.702	-16.98	-10.78	-24.09	4.06	11.70
27.941	141.526	-17.25	-10.95	-24.57	4.18	11.32
41.802	139.571	-17.52	-11.13	-25.05	4.30	10.97
55.532	136.842	-17.81	-11.31	-25.53	4.41	10.66
69.087	133.348	-18.11	-11.50	-25.99	4.50	10.39
82.425	129.101	-18.42	-11.69	-26.43	4.58	10.17
95.504	124.112	-18.75	-11.90	-26.87	4.64	9.99
108.284	118.399	-19.07	-12.11	-27.26	4.68	9.86
120.723	111.979	-19.41	-12.33	-27.74	4.76	9.65
132.782	104.872	-19.85	-12.60	-28.35	4.86	9.39
144.425	97.1	-20.34	-12.91	-29.00	4.95	9.16
155.614	88.688	-20.98	-13.32	-29.81	5.05	8.90
166.176	78.982	-21.77	-13.82	-30.82	5.17	8.58
175.268	67.886	-22.66	-14.39	-32.02	5.35	8.19
182.71	55.621	-23.42	-14.87	-32.72	5.32	8.14
188.352	42.432	-23.67	-15.03	-32.12	4.83	8.93
192.084	28.581	-23.41	-14.87	-31.08	4.38	9.88
193.831	14.343	-22.88	-14.53	-30.32	4.25	10.28
193.558	0	-22.29	-14.15	-29.56	4.15	10.60

Thrust Load Rating= 8.14

BEAM OUTPUT FOR NRL TRUCK γ_{DL}=1.5, γ_{DL}= 1.45 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.45
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.33	0.58	15.06
-192.084	28.581	-4.16	-2.64	-5.44	0.73	11.25
-188.352	42.432	-3.42	-2.17	-4.47	0.60	14.56
-182.71	55.621	-2.67	-1.70	-3.57	0.52	17.88
-175.268	67.886	-2.35	-1.49	-3.40	0.60	15.67
-166.176	78.982	-1.88	-1.19	-3.27	0.79	12.26
-155.614	88.688	-0.65	-0.41	-2.25	0.91	11.53
-144.425	97.1	0.61	0.39	-1.00	0.92	11.47
-132.782	104.872	1.24	0.79	-0.34	0.90	11.23
-120.723	111.979	1.40	0.89	-0.07	0.84	11.96
-108.284	118.399	1.24	0.79	-0.47	0.98	10.38
-95.504	124.112	1.20	0.76	-0.54	0.99	10.27
-82.425	129.101	1.11	0.70	-0.19	0.74	13.79
-69.087	133.348	0.99	0.63	0.40	0.34	30.71
-55.532	136.842	0.87	0.55	1.16	0.17	62.16
-41.802	139.571	0.74	0.47	2.03	0.74	14.23
-27.941	141.526	0.61	0.39	2.91	1.31	8.04
-13.993	142.702	0.52	0.33	3.69	1.81	5.86
0	143.094	0.51	0.32	4.25	2.14	4.97
13.993	142.702	0.62	0.39	4.51	2.23	4.74
27.941	141.526	0.79	0.50	4.40	2.06	5.06
41.802	139.571	0.98	0.62	3.98	1.71	6.03
55.532	136.842	1.16	0.74	3.31	1.23	8.30
69.087	133.348	1.31	0.83	2.52	0.69	14.57
82.425	129.101	1.45	0.92	1.76	0.18	56.34
95.504	124.112	1.51	0.96	1.06	0.26	38.57
108.284	118.399	1.42	0.90	0.50	0.53	19.06
120.723	111.979	1.44	0.91	0.37	0.61	16.48
132.782	104.872	1.15	0.73	-0.32	0.84	12.14
144.425	97.1	0.44	0.28	-1.42	1.06	10.03
155.614	88.688	-0.84	-0.53	-3.04	1.26	8.27
166.176	78.982	-2.06	-1.30	-4.26	1.26	7.62
175.268	67.886	-2.49	-1.58	-4.22	0.99	9.43
182.71	55.621	-2.77	-1.76	-4.09	0.76	12.07
188.352	42.432	-3.46	-2.20	-4.81	0.77	11.29
192.084	28.581	-4.18	-2.66	-5.81	0.93	8.86
193.831	14.343	-3.32	-2.11	-4.64	0.75	11.68
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating=	4.74
Actual Load Rating (from CANDE)	3.47

BEAM OUTPUT FOR EV2 TRUCK γ_{DL}=1.5, YDL= 1.30 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.30$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-28.10	3.34	14.72
-193.831	14.343	-22.84	-14.50	-28.82	3.42	14.26
-192.084	28.581	-23.37	-14.84	-29.56	3.54	13.66
-188.352	42.432	-23.63	-15.00	-30.32	3.83	12.59
-182.71	55.621	-23.40	-14.86	-30.48	4.05	11.94
-175.268	67.886	-22.67	-14.39	-29.65	3.99	12.25
-166.176	78.982	-21.76	-13.82	-28.53	3.87	12.81
-155.614	88.688	-20.97	-13.31	-27.55	3.76	13.32
-144.425	97.1	-20.32	-12.90	-26.74	3.67	13.77
-132.782	104.872	-19.81	-12.58	-26.10	3.59	14.17
-120.723	111.979	-19.38	-12.30	-25.52	3.51	14.61
-108.284	118.399	-19.04	-12.09	-25.04	3.43	15.03
-95.504	124.112	-18.74	-11.90	-24.66	3.39	15.28
-82.425	129.101	-18.43	-11.70	-24.33	3.38	15.39
-69.087	133.348	-18.13	-11.51	-24.02	3.37	15.49
-55.532	136.842	-17.83	-11.32	-23.68	3.34	15.67
-41.802	139.571	-17.54	-11.14	-23.30	3.29	15.98
-27.941	141.526	-17.26	-10.96	-22.86	3.20	16.51
-13.993	142.702	-17.00	-10.79	-22.36	3.06	17.31
0	143.094	-16.87	-10.71	-22.24	3.07	17.31
13.993	142.702	-16.99	-10.79	-22.66	3.24	16.38
27.941	141.526	-17.25	-10.95	-23.17	3.38	15.62
41.802	139.571	-17.53	-11.13	-23.63	3.48	15.10
55.532	136.842	-17.82	-11.31	-24.03	3.55	14.78
69.087	133.348	-18.11	-11.50	-24.38	3.58	14.58
82.425	129.101	-18.42	-11.70	-24.70	3.59	14.48
95.504	124.112	-18.76	-11.91	-25.01	3.57	14.48
108.284	118.399	-19.07	-12.11	-25.33	3.57	14.41
120.723	111.979	-19.42	-12.33	-25.80	3.64	14.06
132.782	104.872	-19.85	-12.60	-26.36	3.72	13.69
144.425	97.1	-20.35	-12.92	-26.94	3.77	13.41
155.614	88.688	-20.99	-13.32	-27.61	3.79	13.22
166.176	78.982	-21.77	-13.82	-28.14	3.64	13.62
175.268	67.886	-22.67	-14.39	-28.42	3.28	14.88
182.71	55.621	-23.42	-14.87	-28.29	2.79	17.34
188.352	42.432	-23.67	-15.03	-27.52	2.20	21.84
192.084	28.581	-23.41	-14.86	-26.66	1.86	25.99
193.831	14.343	-22.88	-14.53	-26.01	1.79	27.24
193.558	0	-22.29	-14.15	-25.34	1.74	28.16

Thrust Load Rating= 11.94

BEAM OUTPUT FOR EV2 TRUCK

γ_{DL}=1.5, YDL= 1.30 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.30
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.30	0.57	17.26
-192.084	28.581	-4.16	-2.64	-5.38	0.69	13.23
-188.352	42.432	-3.42	-2.17	-4.45	0.59	16.45
-182.71	55.621	-2.67	-1.70	-3.77	0.63	16.41
-175.268	67.886	-2.35	-1.49	-3.74	0.79	13.23
-166.176	78.982	-1.88	-1.19	-3.49	0.92	11.80
-155.614	88.688	-0.66	-0.42	-2.09	0.82	14.37
-144.425	97.1	0.60	0.38	-0.45	0.60	19.51
-132.782	104.872	1.24	0.79	0.50	0.42	26.65
-120.723	111.979	1.40	0.89	0.87	0.30	37.13
-108.284	118.399	1.23	0.78	0.65	0.33	34.01
-95.504	124.112	1.19	0.76	0.47	0.41	27.63
-82.425	129.101	1.11	0.70	0.47	0.36	31.56
-69.087	133.348	1.00	0.63	0.88	0.07	167.33
-55.532	136.842	0.89	0.57	1.67	0.45	25.99
-41.802	139.571	0.77	0.49	2.76	1.14	10.24
-27.941	141.526	0.64	0.41	3.92	1.87	6.28
-13.993	142.702	0.54	0.34	4.84	2.46	4.81
0	143.094	0.51	0.32	5.17	2.66	4.45
13.993	142.702	0.60	0.38	4.63	2.30	5.12
27.941	141.526	0.77	0.49	3.50	1.56	7.48
41.802	139.571	0.96	0.61	2.12	0.66	17.38
55.532	136.842	1.15	0.73	0.82	0.19	60.48
69.087	133.348	1.30	0.83	-0.19	0.85	13.20
82.425	129.101	1.44	0.92	-0.81	1.29	8.67
95.504	124.112	1.50	0.95	-0.98	1.41	7.87
108.284	118.399	1.41	0.90	-0.69	1.20	9.34
120.723	111.979	1.43	0.91	-0.17	0.91	12.26
132.782	104.872	1.15	0.73	-0.35	0.85	13.33
144.425	97.1	0.44	0.28	-0.84	0.73	16.27
155.614	88.688	-0.84	-0.53	-1.89	0.60	19.35
166.176	78.982	-2.05	-1.30	-2.82	0.44	24.44
175.268	67.886	-2.48	-1.58	-2.99	0.29	36.01
182.71	55.621	-2.76	-1.75	-3.17	0.23	43.46
188.352	42.432	-3.46	-2.20	-4.01	0.32	30.64
192.084	28.581	-4.18	-2.65	-4.92	0.42	21.78
193.831	14.343	-3.32	-2.11	-3.89	0.33	30.08
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating=	4.45
Actual Load Rating (from CANDE)	3.57

BEAM OUTPUT FOR EV3 TRUCK γ_{DL}=1.5, YDL= 1.30 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.30$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-29.33	4.04	12.16
-193.831	14.343	-22.84	-14.50	-30.07	4.13	11.80
-192.084	28.581	-23.37	-14.84	-30.81	4.25	11.37
-188.352	42.432	-23.63	-15.00	-31.81	4.68	10.30
-182.71	55.621	-23.40	-14.86	-32.70	5.31	9.09
-175.268	67.886	-22.67	-14.39	-32.76	5.77	8.47
-166.176	78.982	-21.76	-13.82	-32.23	5.98	8.28
-155.614	88.688	-20.96	-13.31	-31.38	5.95	8.42
-144.425	97.1	-20.32	-12.90	-30.48	5.81	8.70
-132.782	104.872	-19.81	-12.58	-29.80	5.71	8.92
-120.723	111.979	-19.38	-12.30	-29.14	5.58	9.19
-108.284	118.399	-19.04	-12.09	-28.58	5.45	9.45
-95.504	124.112	-18.74	-11.90	-28.24	5.43	9.53
-82.425	129.101	-18.43	-11.70	-27.95	5.44	9.55
-69.087	133.348	-18.13	-11.51	-27.63	5.43	9.61
-55.532	136.842	-17.83	-11.32	-27.27	5.39	9.71
-41.802	139.571	-17.54	-11.14	-26.88	5.33	9.86
-27.941	141.526	-17.26	-10.96	-26.41	5.23	10.10
-13.993	142.702	-17.00	-10.79	-25.86	5.07	10.46
0	143.094	-16.87	-10.71	-25.23	4.78	11.11
13.993	142.702	-16.99	-10.79	-25.10	4.64	11.43
27.941	141.526	-17.25	-10.95	-25.64	4.80	11.01
41.802	139.571	-17.53	-11.13	-26.30	5.01	10.50
55.532	136.842	-17.82	-11.31	-26.91	5.20	10.09
69.087	133.348	-18.11	-11.50	-27.46	5.34	9.78
82.425	129.101	-18.42	-11.70	-27.91	5.42	9.59
95.504	124.112	-18.76	-11.91	-28.23	5.41	9.55
108.284	118.399	-19.07	-12.11	-28.48	5.37	9.58
120.723	111.979	-19.42	-12.33	-28.97	5.46	9.39
132.782	104.872	-19.85	-12.60	-29.62	5.58	9.12
144.425	97.1	-20.35	-12.92	-30.22	5.64	8.96
155.614	88.688	-20.99	-13.32	-31.02	5.74	8.73
166.176	78.982	-21.77	-13.82	-32.07	5.88	8.41
175.268	67.886	-22.67	-14.39	-32.86	5.82	8.39
182.71	55.621	-23.42	-14.87	-32.60	5.25	9.20
188.352	42.432	-23.67	-15.03	-31.51	4.48	10.74
192.084	28.581	-23.41	-14.86	-30.49	4.05	11.94
193.831	14.343	-22.88	-14.53	-29.74	3.92	12.42
193.558	0	-22.29	-14.15	-29.00	3.84	12.81

Thrust Load Rating= 8.28

BEAM OUTPUT FOR EV3 TRUCK

γ_{DL}=1.5, γ_{DL}= 1.30 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.30
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.59	0.73	13.38
-192.084	28.581	-4.16	-2.64	-5.73	0.90	10.22
-188.352	42.432	-3.42	-2.17	-4.65	0.70	13.80
-182.71	55.621	-2.67	-1.70	-3.65	0.56	18.45
-175.268	67.886	-2.35	-1.49	-3.36	0.58	18.14
-166.176	78.982	-1.88	-1.19	-3.12	0.71	15.35
-155.614	88.688	-0.65	-0.41	-2.01	0.77	15.18
-144.425	97.1	0.61	0.39	-0.75	0.78	15.15
-132.782	104.872	1.24	0.79	-0.21	0.83	13.61
-120.723	111.979	1.40	0.89	-0.18	0.90	12.43
-108.284	118.399	1.23	0.78	-1.08	1.32	8.56
-95.504	124.112	1.19	0.76	-1.91	1.77	6.42
-82.425	129.101	1.10	0.70	-2.05	1.80	6.34
-69.087	133.348	1.00	0.63	-1.49	1.42	8.10
-55.532	136.842	0.89	0.56	-0.35	0.71	16.29
-41.802	139.571	0.76	0.49	1.35	0.33	34.94
-27.941	141.526	0.64	0.40	3.43	1.60	7.37
-13.993	142.702	0.53	0.34	5.52	2.85	4.15
0	143.094	0.51	0.32	7.23	3.84	3.09
13.993	142.702	0.61	0.38	8.03	4.24	2.78
27.941	141.526	0.78	0.49	7.73	3.98	2.93
41.802	139.571	0.97	0.62	6.52	3.17	3.63
55.532	136.842	1.15	0.73	4.66	2.00	5.68
69.087	133.348	1.31	0.83	2.49	0.67	16.74
82.425	129.101	1.45	0.92	0.44	0.58	19.33
95.504	124.112	1.50	0.95	-1.08	1.47	7.56
108.284	118.399	1.41	0.90	-1.56	1.70	6.59
120.723	111.979	1.43	0.91	-1.17	1.49	7.52
132.782	104.872	1.15	0.73	-1.79	1.68	6.80
144.425	97.1	0.44	0.28	-2.54	1.70	6.99
155.614	88.688	-0.84	-0.53	-3.68	1.62	7.15
166.176	78.982	-2.05	-1.30	-4.40	1.34	7.99
175.268	67.886	-2.49	-1.58	-4.13	0.94	11.07
182.71	55.621	-2.76	-1.75	-4.08	0.75	13.56
188.352	42.432	-3.46	-2.20	-4.88	0.81	11.96
192.084	28.581	-4.18	-2.66	-5.82	0.94	9.76
193.831	14.343	-3.32	-2.11	-4.63	0.75	13.13
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating=	2.78
Actual Load Rating (from CANDE)	2.28

BEAM OUTPUT FOR CO Permit TRUCK γ_{DL}=1.5, γ_{DL}= 1.30 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.30$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-28.09	3.33	14.75
-193.831	14.343	-22.84	-14.50	-28.81	3.41	14.28
-192.084	28.581	-23.37	-14.84	-29.55	3.53	13.69
-188.352	42.432	-23.63	-15.00	-30.53	3.94	12.21
-182.71	55.621	-23.40	-14.86	-31.64	4.71	10.27
-175.268	67.886	-22.67	-14.39	-32.11	5.39	9.06
-166.176	78.982	-21.76	-13.82	-31.76	5.72	8.66
-155.614	88.688	-20.97	-13.31	-30.96	5.71	8.77
-144.425	97.1	-20.32	-12.90	-30.13	5.61	9.02
-132.782	104.872	-19.81	-12.58	-29.51	5.54	9.19
-120.723	111.979	-19.38	-12.30	-28.87	5.42	9.45
-108.284	118.399	-19.04	-12.09	-28.36	5.33	9.66
-95.504	124.112	-18.74	-11.90	-28.10	5.35	9.67
-82.425	129.101	-18.42	-11.70	-27.79	5.35	9.71
-69.087	133.348	-18.12	-11.51	-27.38	5.29	9.87
-55.532	136.842	-17.83	-11.32	-26.90	5.18	10.12
-41.802	139.571	-17.54	-11.14	-26.37	5.04	10.43
-27.941	141.526	-17.26	-10.96	-25.81	4.88	10.82
-13.993	142.702	-17.00	-10.79	-25.24	4.71	11.26
0	143.094	-16.87	-10.71	-24.91	4.60	11.55
13.993	142.702	-16.98	-10.78	-25.16	4.67	11.34
27.941	141.526	-17.25	-10.95	-25.74	4.85	10.88
41.802	139.571	-17.53	-11.13	-26.30	5.01	10.49
55.532	136.842	-17.82	-11.31	-26.83	5.15	10.17
69.087	133.348	-18.11	-11.50	-27.31	5.26	9.93
82.425	129.101	-18.42	-11.69	-27.73	5.32	9.77
95.504	124.112	-18.75	-11.91	-28.05	5.31	9.74
108.284	118.399	-19.07	-12.11	-28.34	5.30	9.72
120.723	111.979	-19.42	-12.33	-28.85	5.39	9.51
132.782	104.872	-19.85	-12.60	-29.48	5.51	9.25
144.425	97.1	-20.34	-12.92	-30.09	5.57	9.07
155.614	88.688	-20.98	-13.32	-30.91	5.68	8.83
166.176	78.982	-21.77	-13.82	-31.72	5.68	8.71
175.268	67.886	-22.67	-14.39	-32.05	5.36	9.11
182.71	55.621	-23.42	-14.87	-31.55	4.65	10.40
188.352	42.432	-23.67	-15.03	-30.43	3.87	12.45
192.084	28.581	-23.41	-14.87	-29.46	3.46	13.97
193.831	14.343	-22.88	-14.53	-28.74	3.35	14.55
193.558	0	-22.29	-14.15	-28.02	3.27	15.01

Thrust Load Rating= 8.66

BEAM OUTPUT FOR CO Permit TRUCK γ_{DL}=1.5, γ_{DL}= 1.30 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.30
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-4.27	0.55	17.79
-192.084	28.581	-4.16	-2.64	-5.34	0.68	13.58
-188.352	42.432	-3.42	-2.17	-4.40	0.56	17.29
-182.71	55.621	-2.67	-1.70	-3.58	0.52	19.88
-175.268	67.886	-2.35	-1.49	-3.51	0.67	15.79
-166.176	78.982	-1.88	-1.19	-3.57	0.97	11.19
-155.614	88.688	-0.65	-0.41	-2.81	1.23	9.54
-144.425	97.1	0.61	0.39	-1.78	1.37	8.63
-132.782	104.872	1.25	0.79	-1.26	1.43	7.91
-120.723	111.979	1.40	0.89	-0.98	1.36	8.22
-108.284	118.399	1.24	0.79	-1.67	1.66	6.81
-95.504	124.112	1.19	0.76	-1.74	1.68	6.77
-82.425	129.101	1.10	0.70	-0.85	1.12	10.21
-69.087	133.348	0.99	0.63	0.61	0.22	53.41
-55.532	136.842	0.87	0.55	2.29	0.81	14.23
-41.802	139.571	0.74	0.47	3.96	1.84	6.36
-27.941	141.526	0.61	0.39	5.38	2.72	4.32
-13.993	142.702	0.52	0.33	6.37	3.34	3.54
0	143.094	0.51	0.32	6.75	3.57	3.32
13.993	142.702	0.62	0.39	6.51	3.36	3.50
27.941	141.526	0.80	0.51	5.61	2.75	4.23
41.802	139.571	0.99	0.63	4.24	1.86	6.19
55.532	136.842	1.17	0.74	2.61	0.83	13.76
69.087	133.348	1.32	0.84	0.96	0.21	54.83
82.425	129.101	1.45	0.92	-0.47	1.10	10.16
95.504	124.112	1.50	0.95	-1.38	1.65	6.75
108.284	118.399	1.41	0.90	-1.45	1.63	6.85
120.723	111.979	1.43	0.91	-0.92	1.34	8.32
132.782	104.872	1.14	0.73	-1.33	1.41	8.06
144.425	97.1	0.44	0.28	-1.93	1.36	8.78
155.614	88.688	-0.84	-0.53	-2.99	1.23	9.45
166.176	78.982	-2.05	-1.30	-3.75	0.97	11.04
175.268	67.886	-2.49	-1.58	-3.69	0.69	15.16
182.71	55.621	-2.76	-1.76	-3.78	0.58	17.50
188.352	42.432	-3.46	-2.20	-4.64	0.67	14.43
192.084	28.581	-4.18	-2.66	-5.57	0.79	11.58
193.831	14.343	-3.32	-2.11	-4.42	0.63	15.63
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating=	3.32
Actual Load Rating (from CANDE)	2.68

BEAM OUTPUT FOR MOD TANDEM γ_{DL}=1.5, YDL= 1.30 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Thrust (DL) T_{DLfac}	Thrust (DL) T_{DLs}	Thrust (DL+LL) $T_{DL,LLfac}$	Thrust (LL) T_{LLs}	Thrust Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	TDLfac/1.575	Load Step 22	$(T_{DL,LLfac}-T_{DLfac})/1.75$	$(T_{cap}-T_{DLs}*1.5)/T_{LLs}*1.30$
		kips/ft.	kips/ft.	kips/ft.		
-193.558	0	-22.25	-14.13	-32.13	5.64	8.71
-193.831	14.343	-22.84	-14.50	-32.93	5.77	8.45
-192.084	28.581	-23.37	-14.84	-33.78	5.95	8.13
-188.352	42.432	-23.63	-15.00	-34.69	6.32	7.62
-182.71	55.621	-23.40	-14.86	-34.73	6.47	7.47
-175.268	67.886	-22.67	-14.39	-33.62	6.26	7.81
-166.176	78.982	-21.76	-13.82	-32.39	6.07	8.16
-155.614	88.688	-20.97	-13.31	-31.30	5.91	8.48
-144.425	97.1	-20.32	-12.90	-30.39	5.76	8.79
-132.782	104.872	-19.82	-12.58	-29.65	5.62	9.06
-120.723	111.979	-19.38	-12.30	-28.98	5.49	9.34
-108.284	118.399	-19.04	-12.09	-28.39	5.34	9.64
-95.504	124.112	-18.74	-11.90	-27.85	5.21	9.94
-82.425	129.101	-18.43	-11.70	-27.43	5.14	10.10
-69.087	133.348	-18.13	-11.51	-27.10	5.13	10.17
-55.532	136.842	-17.83	-11.32	-26.77	5.11	10.26
-41.802	139.571	-17.54	-11.14	-26.41	5.07	10.38
-27.941	141.526	-17.27	-10.96	-25.99	4.99	10.59
-13.993	142.702	-17.00	-10.80	-25.51	4.86	10.91
0	143.094	-16.87	-10.71	-25.11	4.71	11.27
13.993	142.702	-16.99	-10.79	-25.27	4.73	11.20
27.941	141.526	-17.25	-10.95	-25.87	4.92	10.73
41.802	139.571	-17.53	-11.13	-26.46	5.10	10.32
55.532	136.842	-17.82	-11.31	-27.02	5.25	9.97
69.087	133.348	-18.11	-11.50	-27.52	5.37	9.71
82.425	129.101	-18.42	-11.70	-27.95	5.44	9.55
95.504	124.112	-18.76	-11.91	-28.29	5.45	9.50
108.284	118.399	-19.07	-12.11	-28.58	5.43	9.48
120.723	111.979	-19.42	-12.33	-29.09	5.53	9.27
132.782	104.872	-19.85	-12.60	-29.72	5.64	9.03
144.425	97.1	-20.35	-12.92	-30.34	5.71	8.85
155.614	88.688	-20.99	-13.32	-31.17	5.82	8.61
166.176	78.982	-21.77	-13.82	-31.91	5.79	8.54
175.268	67.886	-22.67	-14.39	-32.15	5.42	9.02
182.71	55.621	-23.42	-14.87	-31.57	4.66	10.37
188.352	42.432	-23.67	-15.03	-30.42	3.86	12.48
192.084	28.581	-23.41	-14.87	-29.46	3.45	13.99
193.831	14.343	-22.88	-14.53	-28.73	3.34	14.57
193.558	0	-22.29	-14.15	-28.02	3.27	15.03

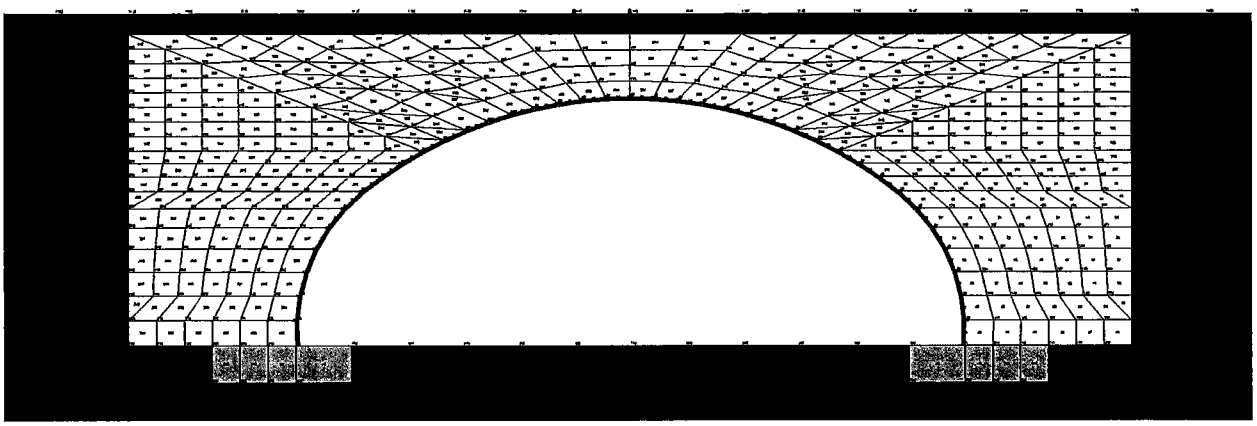
Thrust Load Rating= 7.47

BEAM OUTPUT FOR MOD TANDEM γ_{DL}=1.5, YDL= 1.30 (OPR)

X-coordinate (in.)	Y-coordinate (in.)	Moment (DL) M_{DLfac}	Moment (DL) M_{DLs}	Moment (DL+LL) $M_{DL,LLfac}$	Moment (LL) M_{LLs}	Moment Load Rating
		factored from CANDE	unfactored	factored from CANDE	unfactored	OPR
		Load Step 20	M_{DLfac}/1.575	Load Step 22	($M_{DL,LLfac}$-M_{DLfac})/1.75	(M_{cap}-M_{DLs}*1.5)/M_{LLs}*1.30
		kips-ft/ft.		kips-ft/ft.		
-193.558	0	0.00	0.00	0.00	0.00	
-193.831	14.343	-3.31	-2.10	-5.07	1.01	9.71
-192.084	28.581	-4.16	-2.64	-6.32	1.23	7.45
-188.352	42.432	-3.42	-2.17	-5.31	1.08	8.99
-182.71	55.621	-2.67	-1.70	-4.68	1.15	8.93
-175.268	67.886	-2.35	-1.49	-4.77	1.38	7.59
-166.176	78.982	-1.88	-1.19	-4.47	1.48	7.33
-155.614	88.688	-0.65	-0.41	-2.66	1.15	10.22
-144.425	97.1	0.61	0.39	-0.48	0.62	18.95
-132.782	104.872	1.24	0.79	0.95	0.17	67.31
-120.723	111.979	1.40	0.89	1.67	0.15	72.53
-108.284	118.399	1.23	0.78	1.84	0.35	32.43
-95.504	124.112	1.19	0.76	1.61	0.24	47.58
-82.425	129.101	1.11	0.70	1.02	0.05	231.96
-69.087	133.348	0.99	0.63	0.84	0.09	130.49
-55.532	136.842	0.87	0.56	1.11	0.14	84.87
-41.802	139.571	0.74	0.47	1.89	0.66	17.82
-27.941	141.526	0.62	0.39	3.01	1.37	8.61
-13.993	142.702	0.52	0.33	4.20	2.10	5.64
0	143.094	0.51	0.32	5.16	2.65	4.46
13.993	142.702	0.62	0.39	5.56	2.82	4.17
27.941	141.526	0.80	0.51	5.18	2.50	4.65
41.802	139.571	0.99	0.63	4.17	1.82	6.32
55.532	136.842	1.17	0.74	2.75	0.90	12.59
69.087	133.348	1.32	0.84	1.16	0.09	128.97
82.425	129.101	1.45	0.92	-0.26	0.98	11.43
95.504	124.112	1.50	0.95	-1.20	1.54	7.21
108.284	118.399	1.41	0.90	-1.32	1.56	7.18
120.723	111.979	1.43	0.91	-0.83	1.29	8.66
132.782	104.872	1.14	0.73	-1.23	1.36	8.39
144.425	97.1	0.44	0.28	-1.83	1.30	9.17
155.614	88.688	-0.84	-0.53	-2.89	1.17	9.92
166.176	78.982	-2.05	-1.30	-3.67	0.93	11.59
175.268	67.886	-2.49	-1.58	-3.66	0.67	15.59
182.71	55.621	-2.76	-1.76	-3.79	0.59	17.40
188.352	42.432	-3.46	-2.20	-4.67	0.69	14.05
192.084	28.581	-4.18	-2.66	-5.60	0.81	11.31
193.831	14.343	-3.32	-2.11	-4.44	0.64	15.32
193.558	0	0.00	0.00	0.00	0.00	

Moment Load Rating=	4.17
Actual Load Rating (from CANDE)	2.83

STRUCTURAL EVALUATION (4.0 FT. OF COVER)



HL-93 Tandem

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        *** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Tandem

        EXECUTION MODE ..................   ANALYS
        SOLUTION LEVEL ..................  #3 USER
        METHODOLOGY (LRFD OR SERVICE) ...     LRFD
        NUMBER OF PIPE-ELEMENT GROUPS ....       1
        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL
        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:
              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08
              POISSONS RATIO OF METAL (-) .......    0.30000E+00
              YIELD STRESS OF METAL (PSI)........    0.44000E+05
              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05
              DENSITY OF METAL (PCI).............    0.28400E+00
              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00
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MATERIAL CHARACTER CODE, NONLIN .........    2

    NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK...    4

    IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
    AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1


SECTION PROPERTIES OF CROSS-SECTION:

      THRUST AREA (IN**2/IN) ............   0.23020

      MOM. OF INERTIA (IN**4/IN) ........   0.87460

      SECTION MODULUS (IN**3/IN) ........   0.28840

      PLASTIC SECTION MOD(IN**3/IN) .....   0.40300

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.


LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

      THRUST STRESS YIELDING ............   0.70000

      BUCKLING STRESS FAILURE............   0.70000

      SEAM STRENGTH FAILURE .............   0.67000

      FULL PLASTIC PENETRATION...........   0.90000

      ALLOWABLE % DEFLECTION (SERVICE)...   5.00000

      COMBINED MOMENT-THRUST CRITERION...   0.90000

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 REVIEW SYSTEM INPUT DATA

 FINITE ELEMENT INPUT CONTROLS (PREP)


THE DATA TO BE RUN IS ENTITLED ...

BRIDGECOR

PRINT AND PLOT CONTROL CODES ...
  PRINT CONTROL FOR MESH DATA------------    3
  PLOT FILE CONTROL MESH & RESULS--------    3
  PRINT FINITE ELEMENT RESULTS ----------    1
  INPUT DATA CHECK CODE------------------    0

  BANDWIDTH MINIMIZER IS ON, MINBW-------    1

KEY NUMBERS DESCRIBING MESH ...
  THE NUMBER OF LOAD STEPS IS------------   22
  TOTAL NUMBER OF NODES IS--------------- 1163
  TOTAL NUMBER OF ELEMENTS IS------------ 1127
  TOTAL NUMBER OF BEAM ELEMENTS IS-------   38
  MAX NUMBER OF BOUNDARY CONDITIONS IS---   99


CONTINUOUS LOAD SCALING IS NOT ACTIVATED.


 NODAL INPUT DATA TO GENERATE COORDINATES
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NODE NUMBER	GENERATE CODE	NODE INCR.	X-AXIS COORD.	Y-AXIS COORD.	SPACING PARAMETER	ARC RADIUS
1	0	1	193.558	0.000	1.00	0.00
2	0	1	193.831	14.343	1.00	0.00
3	0	1	192.084	28.581	1.00	0.00
4	0	1	188.352	42.432	1.00	0.00
5	0	1	182.710	55.621	1.00	0.00
6	0	1	175.268	67.886	1.00	0.00
7	0	1	166.176	78.982	1.00	0.00
8	0	1	155.614	88.688	1.00	0.00
9	0	1	144.425	97.100	1.00	0.00
10	0	1	132.782	104.872	1.00	0.00
11	0	1	120.723	111.979	1.00	0.00
12	0	1	108.284	118.399	1.00	0.00
13	0	1	95.504	124.112	1.00	0.00
14	0	1	82.425	129.101	1.00	0.00
15	0	1	69.087	133.348	1.00	0.00
16	0	1	55.532	136.842	1.00	0.00
17	0	1	41.802	139.571	1.00	0.00
18	0	1	27.941	141.526	1.00	0.00
19	0	1	13.993	142.702	1.00	0.00
20	0	1	0.000	143.094	1.00	0.00
21	0	1	-13.993	142.702	1.00	0.00
22	0	1	-27.941	141.526	1.00	0.00
23	0	1	-41.802	139.571	1.00	0.00
24	0	1	-55.532	136.842	1.00	0.00
25	0	1	-69.087	133.348	1.00	0.00
26	0	1	-82.425	129.101	1.00	0.00
27	0	1	-95.504	124.112	1.00	0.00
28	0	1	-108.284	118.399	1.00	0.00
29	0	1	-120.723	111.979	1.00	0.00
30	0	1	-132.782	104.872	1.00	0.00
31	0	1	-144.425	97.100	1.00	0.00
32	0	1	-155.614	88.688	1.00	0.00
33	0	1	-166.176	78.982	1.00	0.00
34	0	1	-175.268	67.886	1.00	0.00
35	0	1	-182.710	55.621	1.00	0.00
36	0	1	-188.352	42.432	1.00	0.00
37	0	1	-192.084	28.581	1.00	0.00
38	0	1	-193.831	14.343	1.00	0.00
39	0	1	-193.558	0.000	1.00	0.00
40	0	1	193.831	14.343	1.00	0.00
41	0	1	192.084	28.581	1.00	0.00
42	0	1	188.352	42.432	1.00	0.00
43	0	1	182.710	55.621	1.00	0.00
44	0	1	175.268	67.886	1.00	0.00
45	0	1	166.176	78.982	1.00	0.00
46	0	1	155.614	88.688	1.00	0.00
47	0	1	144.425	97.100	1.00	0.00
48	0	1	132.782	104.872	1.00	0.00
49	0	1	120.723	111.979	1.00	0.00
50	0	1	108.284	118.399	1.00	0.00
51	0	1	95.504	124.112	1.00	0.00
52	0	1	82.425	129.101	1.00	0.00
53	0	1	69.087	133.348	1.00	0.00
54	0	1	55.532	136.842	1.00	0.00
55	0	1	41.802	139.571	1.00	0.00
56	0	1	27.941	141.526	1.00	0.00
57	0	1	13.993	142.702	1.00	0.00
58	0	1	0.000	143.094	1.00	0.00
59	0	1	-13.993	142.702	1.00	0.00
60	0	1	-27.941	141.526	1.00	0.00
61	0	1	-41.802	139.571	1.00	0.00
62	0	1	-55.532	136.842	1.00	0.00
63	0	1	-69.087	133.348	1.00	0.00
64	0	1	-82.425	129.101	1.00	0.00
65	0	1	-95.504	124.112	1.00	0.00
66	0	1	-108.284	118.399	1.00	0.00
67	0	1	-120.723	111.979	1.00	0.00
68	0	1	-132.782	104.872	1.00	0.00
69	0	1	-144.425	97.100	1.00	0.00
70	0	1	-155.614	88.688	1.00	0.00
71	0	1	-166.176	78.982	1.00	0.00
72	0	1	-175.268	67.886	1.00	0.00
73	0	1	-182.710	55.621	1.00	0.00
74	0	1	-188.352	42.432	1.00	0.00
75	0	1	-192.084	28.581	1.00	0.00
76	0	1	-193.831	14.343	1.00	0.00
77	0	1	193.831	14.343	1.00	0.00
78	0	1	192.084	28.581	1.00	0.00

79	0	1	188.352	42.432	1.00	0.00
80	0	1	182.710	55.621	1.00	0.00
81	0	1	175.268	67.886	1.00	0.00
82	0	1	166.176	78.982	1.00	0.00
83	0	1	155.614	88.688	1.00	0.00
84	0	1	144.425	97.100	1.00	0.00
85	0	1	132.782	104.872	1.00	0.00
86	0	1	120.723	111.979	1.00	0.00
87	0	1	108.284	118.399	1.00	0.00
88	0	1	95.504	124.112	1.00	0.00
89	0	1	82.425	129.101	1.00	0.00
90	0	1	69.087	133.348	1.00	0.00
91	0	1	55.532	136.842	1.00	0.00
92	0	1	41.802	139.571	1.00	0.00
93	0	1	27.941	141.526	1.00	0.00
94	0	1	13.993	142.702	1.00	0.00
95	0	1	0.000	143.094	1.00	0.00
96	0	1	-13.993	142.702	1.00	0.00
97	0	1	-27.941	141.526	1.00	0.00
98	0	1	-41.802	139.571	1.00	0.00
99	0	1	-55.532	136.842	1.00	0.00
100	0	1	-69.087	133.348	1.00	0.00
101	0	1	-82.425	129.101	1.00	0.00
102	0	1	-95.504	124.112	1.00	0.00
103	0	1	-108.284	118.399	1.00	0.00
104	0	1	-120.723	111.979	1.00	0.00
105	0	1	-132.782	104.872	1.00	0.00
106	0	1	-144.425	97.100	1.00	0.00
107	0	1	-155.614	88.688	1.00	0.00
108	0	1	-166.176	78.982	1.00	0.00
109	0	1	-175.268	67.886	1.00	0.00
110	0	1	-182.710	55.621	1.00	0.00
111	0	1	-188.352	42.432	1.00	0.00
112	0	1	-192.084	28.581	1.00	0.00
113	0	1	-193.831	14.343	1.00	0.00
114	0	1	0.000	179.094	1.00	0.00
115	0	1	0.000	152.094	1.00	0.00
116	0	1	0.000	161.094	1.00	0.00
117	0	1	0.000	170.094	1.00	0.00
118	0	1	0.000	0.000	1.00	0.00
119	0	1	0.000	-21.464	1.00	0.00
120	0	1	289.966	0.000	1.00	0.00
121	0	1	289.966	14.343	1.00	0.00
122	0	1	289.966	28.581	1.00	0.00
123	0	1	289.966	42.432	1.00	0.00
124	0	1	289.966	55.621	1.00	0.00
125	0	1	289.966	67.886	1.00	0.00
126	0	1	289.966	78.982	1.00	0.00
127	0	1	289.966	88.688	1.00	0.00
128	0	1	289.966	97.100	1.00	0.00
129	0	1	289.966	104.872	1.00	0.00
130	0	1	289.966	111.979	1.00	0.00
131	0	1	209.626	0.000	1.00	0.00
132	0	1	225.694	0.000	1.00	0.00
133	0	1	241.762	0.000	1.00	0.00
134	0	1	257.830	0.000	1.00	0.00
135	0	1	273.898	0.000	1.00	0.00
136	0	1	141.878	111.979	1.00	0.00
137	0	1	163.033	111.979	1.00	0.00
138	0	1	184.189	111.979	1.00	0.00
139	0	1	205.344	111.979	1.00	0.00
140	0	1	226.499	111.979	1.00	0.00
141	0	1	247.655	111.979	1.00	0.00
142	0	1	268.810	111.979	1.00	0.00
143	0	1	209.853	14.343	1.00	0.00
144	0	1	225.876	14.343	1.00	0.00
145	0	1	241.898	14.343	1.00	0.00
146	0	1	257.921	14.343	1.00	0.00
147	0	1	273.943	14.343	1.00	0.00
148	0	1	206.067	28.581	1.00	0.00
149	0	1	220.050	28.581	1.00	0.00
150	0	1	234.033	28.581	1.00	0.00
151	0	1	248.016	28.581	1.00	0.00
152	0	1	261.999	28.581	1.00	0.00
153	0	1	275.983	28.581	1.00	0.00
154	0	1	202.868	42.432	1.00	0.00
155	0	1	217.385	42.432	1.00	0.00
156	0	1	231.901	42.432	1.00	0.00
157	0	1	246.417	42.432	1.00	0.00
158	0	1	260.933	42.432	1.00	0.00
159	0	1	275.449	42.432	1.00	0.00

160	0	1	198.032	55.621	1.00	0.00
161	0	1	213.354	55.621	1.00	0.00
162	0	1	228.677	55.621	1.00	0.00
163	0	1	243.999	55.621	1.00	0.00
164	0	1	259.321	55.621	1.00	0.00
165	0	1	274.643	55.621	1.00	0.00
166	0	1	191.654	67.886	1.00	0.00
167	0	1	208.039	67.886	1.00	0.00
168	0	1	224.424	67.886	1.00	0.00
169	0	1	240.810	67.886	1.00	0.00
170	0	1	257.195	67.886	1.00	0.00
171	0	1	273.580	67.886	1.00	0.00
172	0	1	183.860	78.982	1.00	0.00
173	0	1	201.545	78.982	1.00	0.00
174	0	1	219.229	78.982	1.00	0.00
175	0	1	236.913	78.982	1.00	0.00
176	0	1	254.597	78.982	1.00	0.00
177	0	1	272.281	78.982	1.00	0.00
178	0	1	172.408	88.688	1.00	0.00
179	0	1	189.202	88.688	1.00	0.00
180	0	1	205.996	88.688	1.00	0.00
181	0	1	222.790	88.688	1.00	0.00
182	0	1	239.584	88.688	1.00	0.00
183	0	1	256.378	88.688	1.00	0.00
184	0	1	273.172	88.688	1.00	0.00
185	0	1	162.618	97.100	1.00	0.00
186	0	1	180.810	97.100	1.00	0.00
187	0	1	199.003	97.100	1.00	0.00
188	0	1	217.195	97.100	1.00	0.00
189	0	1	235.388	97.100	1.00	0.00
190	0	1	253.580	97.100	1.00	0.00
191	0	1	271.773	97.100	1.00	0.00
192	0	1	152.430	104.872	1.00	0.00
193	0	1	172.078	104.872	1.00	0.00
194	0	1	191.726	104.872	1.00	0.00
195	0	1	211.374	104.872	1.00	0.00
196	0	1	231.022	104.872	1.00	0.00
197	0	1	250.670	104.872	1.00	0.00
198	0	1	270.318	104.872	1.00	0.00
199	0	1	289.966	179.094	1.00	0.00
200	0	1	289.966	120.368	1.00	0.00
201	0	1	289.966	128.758	1.00	0.00
202	0	1	289.966	137.147	1.00	0.00
203	0	1	289.966	145.537	1.00	0.00
204	0	1	289.966	153.926	1.00	0.00
205	0	1	289.966	162.315	1.00	0.00
206	0	1	289.966	170.705	1.00	0.00
207	0	1	141.878	120.368	1.00	0.00
208	0	1	163.033	128.758	1.00	0.00
209	0	1	184.189	137.147	1.00	0.00
210	0	1	205.344	145.537	1.00	0.00
211	0	1	226.499	153.926	1.00	0.00
212	0	1	247.655	162.315	1.00	0.00
213	0	1	268.810	170.705	1.00	0.00
214	0	1	163.033	120.368	1.00	0.00
215	0	1	184.189	120.368	1.00	0.00
216	0	1	205.344	120.368	1.00	0.00
217	0	1	226.499	120.368	1.00	0.00
218	0	1	247.655	120.368	1.00	0.00
219	0	1	268.810	120.368	1.00	0.00
220	0	1	184.189	128.758	1.00	0.00
221	0	1	205.344	128.758	1.00	0.00
222	0	1	226.499	128.758	1.00	0.00
223	0	1	247.655	128.758	1.00	0.00
224	0	1	268.810	128.758	1.00	0.00
225	0	1	205.344	137.147	1.00	0.00
226	0	1	226.499	137.147	1.00	0.00
227	0	1	247.655	137.147	1.00	0.00
228	0	1	268.810	137.147	1.00	0.00
229	0	1	226.499	145.537	1.00	0.00
230	0	1	247.655	145.537	1.00	0.00
231	0	1	268.810	145.537	1.00	0.00
232	0	1	247.655	153.926	1.00	0.00
233	0	1	268.810	153.926	1.00	0.00
234	0	1	268.810	162.315	1.00	0.00
235	0	1	32.218	179.094	1.00	0.00
236	0	1	64.437	179.094	1.00	0.00
237	0	1	96.655	179.094	1.00	0.00
238	0	1	128.874	179.094	1.00	0.00
239	0	1	161.092	179.094	1.00	0.00
240	0	1	193.310	179.094	1.00	0.00

241	0	1	225.529	179.094	1.00	0.00
242	0	1	257.747	179.094	1.00	0.00
243	0	1	18.549	151.800	1.00	0.00
244	0	1	23.106	160.898	1.00	0.00
245	0	1	27.662	169.996	1.00	0.00
246	0	1	37.065	150.918	1.00	0.00
247	0	1	46.189	160.310	1.00	0.00
248	0	1	55.313	169.702	1.00	0.00
249	0	1	52.773	147.476	1.00	0.00
250	0	1	63.743	155.380	1.00	0.00
251	0	1	74.714	163.285	1.00	0.00
252	0	1	85.685	171.190	1.00	0.00
253	0	1	70.200	145.293	1.00	0.00
254	0	1	84.869	153.743	1.00	0.00
255	0	1	99.537	162.193	1.00	0.00
256	0	1	114.205	170.644	1.00	0.00
257	0	1	84.421	140.973	1.00	0.00
258	0	1	99.755	148.597	1.00	0.00
259	0	1	115.090	156.221	1.00	0.00
260	0	1	130.424	163.846	1.00	0.00
261	0	1	145.758	171.470	1.00	0.00
262	0	1	100.906	137.433	1.00	0.00
263	0	1	119.387	145.765	1.00	0.00
264	0	1	137.868	154.097	1.00	0.00
265	0	1	156.349	162.430	1.00	0.00
266	0	1	174.830	170.762	1.00	0.00
267	0	1	114.079	131.967	1.00	0.00
268	0	1	132.654	139.821	1.00	0.00
269	0	1	151.229	147.676	1.00	0.00
270	0	1	169.804	155.531	1.00	0.00
271	0	1	188.379	163.385	1.00	0.00
272	0	1	206.954	171.240	1.00	0.00
273	0	1	126.967	125.986	1.00	0.00
274	0	1	145.650	133.573	1.00	0.00
275	0	1	164.332	141.160	1.00	0.00
276	0	1	183.015	148.747	1.00	0.00
277	0	1	201.698	156.334	1.00	0.00
278	0	1	220.381	163.920	1.00	0.00
279	0	1	239.064	171.507	1.00	0.00
280	0	1	32.260	0.000	1.00	0.00
281	0	1	64.519	0.000	1.00	0.00
282	0	1	96.779	0.000	1.00	0.00
283	0	1	129.038	0.000	1.00	0.00
284	0	1	161.298	0.000	1.00	0.00
285	0	1	193.558	-21.464	1.00	0.00
286	0	1	289.966	-21.464	1.00	0.00
287	0	1	209.626	-21.464	1.00	0.00
288	0	1	225.694	-21.464	1.00	0.00
289	0	1	241.762	-21.464	1.00	0.00
290	0	1	257.830	-21.464	1.00	0.00
291	0	1	273.898	-21.464	1.00	0.00
292	0	1	32.260	-21.464	1.00	0.00
293	0	1	64.519	-21.464	1.00	0.00
294	0	1	96.779	-21.464	1.00	0.00
295	0	1	129.038	-21.464	1.00	0.00
296	0	1	161.298	-21.464	1.00	0.00
297	0	1	-289.966	0.000	1.00	0.00
298	0	1	-289.966	14.343	1.00	0.00
299	0	1	-289.966	28.581	1.00	0.00
300	0	1	-289.966	42.432	1.00	0.00
301	0	1	-289.966	55.621	1.00	0.00
302	0	1	-289.966	67.886	1.00	0.00
303	0	1	-289.966	78.982	1.00	0.00
304	0	1	-289.966	88.688	1.00	0.00
305	0	1	-289.966	97.100	1.00	0.00
306	0	1	-289.966	104.872	1.00	0.00
307	0	1	-289.966	111.979	1.00	0.00
308	0	1	-209.626	0.000	1.00	0.00
309	0	1	-225.694	0.000	1.00	0.00
310	0	1	-241.762	0.000	1.00	0.00
311	0	1	-257.830	0.000	1.00	0.00
312	0	1	-273.898	0.000	1.00	0.00
313	0	1	-141.878	111.979	1.00	0.00
314	0	1	-163.033	111.979	1.00	0.00
315	0	1	-184.189	111.979	1.00	0.00
316	0	1	-205.344	111.979	1.00	0.00
317	0	1	-226.499	111.979	1.00	0.00
318	0	1	-247.655	111.979	1.00	0.00
319	0	1	-268.810	111.979	1.00	0.00
320	0	1	-209.853	14.343	1.00	0.00
321	0	1	-225.876	14.343	1.00	0.00

322	0	1	-241.898	14.343	1.00	0.00
323	0	1	-257.921	14.343	1.00	0.00
324	0	1	-273.943	14.343	1.00	0.00
325	0	1	-206.067	28.581	1.00	0.00
326	0	1	-220.050	28.581	1.00	0.00
327	0	1	-234.033	28.581	1.00	0.00
328	0	1	-248.016	28.581	1.00	0.00
329	0	1	-261.999	28.581	1.00	0.00
330	0	1	-275.983	28.581	1.00	0.00
331	0	1	-202.868	42.432	1.00	0.00
332	0	1	-217.385	42.432	1.00	0.00
333	0	1	-231.901	42.432	1.00	0.00
334	0	1	-246.417	42.432	1.00	0.00
335	0	1	-260.933	42.432	1.00	0.00
336	0	1	-275.449	42.432	1.00	0.00
337	0	1	-198.032	55.621	1.00	0.00
338	0	1	-213.354	55.621	1.00	0.00
339	0	1	-228.677	55.621	1.00	0.00
340	0	1	-243.999	55.621	1.00	0.00
341	0	1	-259.321	55.621	1.00	0.00
342	0	1	-274.643	55.621	1.00	0.00
343	0	1	-191.654	67.886	1.00	0.00
344	0	1	-208.039	67.886	1.00	0.00
345	0	1	-224.424	67.886	1.00	0.00
346	0	1	-240.810	67.886	1.00	0.00
347	0	1	-257.195	67.886	1.00	0.00
348	0	1	-273.580	67.886	1.00	0.00
349	0	1	-183.860	78.982	1.00	0.00
350	0	1	-201.545	78.982	1.00	0.00
351	0	1	-219.229	78.982	1.00	0.00
352	0	1	-236.913	78.982	1.00	0.00
353	0	1	-254.597	78.982	1.00	0.00
354	0	1	-272.281	78.982	1.00	0.00
355	0	1	-172.408	88.688	1.00	0.00
356	0	1	-189.202	88.688	1.00	0.00
357	0	1	-205.996	88.688	1.00	0.00
358	0	1	-222.790	88.688	1.00	0.00
359	0	1	-239.584	88.688	1.00	0.00
360	0	1	-256.378	88.688	1.00	0.00
361	0	1	-273.172	88.688	1.00	0.00
362	0	1	-162.618	97.100	1.00	0.00
363	0	1	-180.810	97.100	1.00	0.00
364	0	1	-199.003	97.100	1.00	0.00
365	0	1	-217.195	97.100	1.00	0.00
366	0	1	-235.388	97.100	1.00	0.00
367	0	1	-253.580	97.100	1.00	0.00
368	0	1	-271.773	97.100	1.00	0.00
369	0	1	-152.430	104.872	1.00	0.00
370	0	1	-172.078	104.872	1.00	0.00
371	0	1	-191.726	104.872	1.00	0.00
372	0	1	-211.374	104.872	1.00	0.00
373	0	1	-231.022	104.872	1.00	0.00
374	0	1	-250.670	104.872	1.00	0.00
375	0	1	-270.318	104.872	1.00	0.00
376	0	1	-289.966	179.094	1.00	0.00
377	0	1	-289.966	120.368	1.00	0.00
378	0	1	-289.966	128.758	1.00	0.00
379	0	1	-289.966	137.147	1.00	0.00
380	0	1	-289.966	145.537	1.00	0.00
381	0	1	-289.966	153.926	1.00	0.00
382	0	1	-289.966	162.315	1.00	0.00
383	0	1	-289.966	170.705	1.00	0.00
384	0	1	-141.878	120.368	1.00	0.00
385	0	1	-163.033	128.758	1.00	0.00
386	0	1	-184.189	137.147	1.00	0.00
387	0	1	-205.344	145.537	1.00	0.00
388	0	1	-226.499	153.926	1.00	0.00
389	0	1	-247.655	162.315	1.00	0.00
390	0	1	-268.810	170.705	1.00	0.00
391	0	1	-163.033	120.368	1.00	0.00
392	0	1	-184.189	120.368	1.00	0.00
393	0	1	-205.344	120.368	1.00	0.00
394	0	1	-226.499	120.368	1.00	0.00
395	0	1	-247.655	120.368	1.00	0.00
396	0	1	-268.810	120.368	1.00	0.00
397	0	1	-184.189	128.758	1.00	0.00
398	0	1	-205.344	128.758	1.00	0.00
399	0	1	-226.499	128.758	1.00	0.00
400	0	1	-247.655	128.758	1.00	0.00
401	0	1	-268.810	128.758	1.00	0.00
402	0	1	-205.344	137.147	1.00	0.00

403	0	1	-226.499	137.147	1.00	0.00
404	0	1	-247.655	137.147	1.00	0.00
405	0	1	-268.810	137.147	1.00	0.00
406	0	1	-226.499	145.537	1.00	0.00
407	0	1	-247.655	145.537	1.00	0.00
408	0	1	-268.810	145.537	1.00	0.00
409	0	1	-247.655	153.926	1.00	0.00
410	0	1	-268.810	153.926	1.00	0.00
411	0	1	-268.810	162.315	1.00	0.00
412	0	1	-32.218	179.094	1.00	0.00
413	0	1	-64.437	179.094	1.00	0.00
414	0	1	-96.655	179.094	1.00	0.00
415	0	1	-128.874	179.094	1.00	0.00
416	0	1	-161.092	179.094	1.00	0.00
417	0	1	-193.310	179.094	1.00	0.00
418	0	1	-225.529	179.094	1.00	0.00
419	0	1	-257.747	179.094	1.00	0.00
420	0	1	-18.549	151.800	1.00	0.00
421	0	1	-23.106	160.898	1.00	0.00
422	0	1	-27.662	169.996	1.00	0.00
423	0	1	-37.065	150.918	1.00	0.00
424	0	1	-46.189	160.310	1.00	0.00
425	0	1	-55.313	169.702	1.00	0.00
426	0	1	-52.773	147.476	1.00	0.00
427	0	1	-63.743	155.380	1.00	0.00
428	0	1	-74.714	163.285	1.00	0.00
429	0	1	-85.685	171.190	1.00	0.00
430	0	1	-70.200	145.293	1.00	0.00
431	0	1	-84.869	153.743	1.00	0.00
432	0	1	-99.537	162.193	1.00	0.00
433	0	1	-114.205	170.644	1.00	0.00
434	0	1	-84.421	140.973	1.00	0.00
435	0	1	-99.755	148.597	1.00	0.00
436	0	1	-115.090	156.221	1.00	0.00
437	0	1	-130.424	163.846	1.00	0.00
438	0	1	-145.758	171.470	1.00	0.00
439	0	1	-100.906	137.433	1.00	0.00
440	0	1	-119.387	145.765	1.00	0.00
441	0	1	-137.868	154.097	1.00	0.00
442	0	1	-156.349	162.430	1.00	0.00
443	0	1	-174.830	170.762	1.00	0.00
444	0	1	-114.079	131.967	1.00	0.00
445	0	1	-132.654	139.821	1.00	0.00
446	0	1	-151.229	147.676	1.00	0.00
447	0	1	-169.804	155.531	1.00	0.00
448	0	1	-188.379	163.385	1.00	0.00
449	0	1	-206.954	171.240	1.00	0.00
450	0	1	-126.967	125.986	1.00	0.00
451	0	1	-145.650	133.573	1.00	0.00
452	0	1	-164.332	141.160	1.00	0.00
453	0	1	-183.015	148.747	1.00	0.00
454	0	1	-201.698	156.334	1.00	0.00
455	0	1	-220.381	163.920	1.00	0.00
456	0	1	-239.064	171.507	1.00	0.00
457	0	1	-32.260	0.000	1.00	0.00
458	0	1	-64.519	0.000	1.00	0.00
459	0	1	-96.779	0.000	1.00	0.00
460	0	1	-129.038	0.000	1.00	0.00
461	0	1	-161.298	0.000	1.00	0.00
462	0	1	-193.558	-21.464	1.00	0.00
463	0	1	-289.966	-21.464	1.00	0.00
464	0	1	-209.626	-21.464	1.00	0.00
465	0	1	-225.694	-21.464	1.00	0.00
466	0	1	-241.762	-21.464	1.00	0.00
467	0	1	-257.830	-21.464	1.00	0.00
468	0	1	-273.898	-21.464	1.00	0.00
469	0	1	-32.260	-21.464	1.00	0.00
470	0	1	-64.519	-21.464	1.00	0.00
471	0	1	-96.779	-21.464	1.00	0.00
472	0	1	-129.038	-21.464	1.00	0.00
473	0	1	-161.298	-21.464	1.00	0.00
474	0	1	-289.966	-45.075	1.00	0.00
475	0	1	-273.898	-45.075	1.00	0.00
476	0	1	-257.830	-45.075	1.00	0.00
477	0	1	-241.762	-45.075	1.00	0.00
478	0	1	-225.694	-45.075	1.00	0.00
479	0	1	-209.626	-45.075	1.00	0.00
480	0	1	-193.558	-45.075	1.00	0.00
481	0	1	-161.298	-45.075	1.00	0.00
482	0	1	-129.038	-45.075	1.00	0.00
483	0	1	-96.779	-45.075	1.00	0.00

484	0	1	-64.519	-45.075	1.00	0.00
485	0	1	-32.260	-45.075	1.00	0.00
486	0	1	0.000	-45.075	1.00	0.00
487	0	1	32.260	-45.075	1.00	0.00
488	0	1	64.519	-45.075	1.00	0.00
489	0	1	96.779	-45.075	1.00	0.00
490	0	1	129.038	-45.075	1.00	0.00
491	0	1	161.298	-45.075	1.00	0.00
492	0	1	193.558	-45.075	1.00	0.00
493	0	1	209.626	-45.075	1.00	0.00
494	0	1	225.694	-45.075	1.00	0.00
495	0	1	241.762	-45.075	1.00	0.00
496	0	1	257.830	-45.075	1.00	0.00
497	0	1	273.898	-45.075	1.00	0.00
498	0	1	289.966	-45.075	1.00	0.00
499	0	1	-289.966	-71.046	1.00	0.00
500	0	1	-273.898	-71.046	1.00	0.00
501	0	1	-257.830	-71.046	1.00	0.00
502	0	1	-241.762	-71.046	1.00	0.00
503	0	1	-225.694	-71.046	1.00	0.00
504	0	1	-209.626	-71.046	1.00	0.00
505	0	1	-193.558	-71.046	1.00	0.00
506	0	1	-161.298	-71.046	1.00	0.00
507	0	1	-129.038	-71.046	1.00	0.00
508	0	1	-96.779	-71.046	1.00	0.00
509	0	1	-64.519	-71.046	1.00	0.00
510	0	1	-32.260	-71.046	1.00	0.00
511	0	1	0.000	-71.046	1.00	0.00
512	0	1	32.260	-71.046	1.00	0.00
513	0	1	64.519	-71.046	1.00	0.00
514	0	1	96.779	-71.046	1.00	0.00
515	0	1	129.038	-71.046	1.00	0.00
516	0	1	161.298	-71.046	1.00	0.00
517	0	1	193.558	-71.046	1.00	0.00
518	0	1	209.626	-71.046	1.00	0.00
519	0	1	225.694	-71.046	1.00	0.00
520	0	1	241.762	-71.046	1.00	0.00
521	0	1	257.830	-71.046	1.00	0.00
522	0	1	273.898	-71.046	1.00	0.00
523	0	1	289.966	-71.046	1.00	0.00
524	0	1	-289.966	-99.615	1.00	0.00
525	0	1	-273.898	-99.615	1.00	0.00
526	0	1	-257.830	-99.615	1.00	0.00
527	0	1	-241.762	-99.615	1.00	0.00
528	0	1	-225.694	-99.615	1.00	0.00
529	0	1	-209.626	-99.615	1.00	0.00
530	0	1	-193.558	-99.615	1.00	0.00
531	0	1	-161.298	-99.615	1.00	0.00
532	0	1	-129.038	-99.615	1.00	0.00
533	0	1	-96.779	-99.615	1.00	0.00
534	0	1	-64.519	-99.615	1.00	0.00
535	0	1	-32.260	-99.615	1.00	0.00
536	0	1	0.000	-99.615	1.00	0.00
537	0	1	32.260	-99.615	1.00	0.00
538	0	1	64.519	-99.615	1.00	0.00
539	0	1	96.779	-99.615	1.00	0.00
540	0	1	129.038	-99.615	1.00	0.00
541	0	1	161.298	-99.615	1.00	0.00
542	0	1	193.558	-99.615	1.00	0.00
543	0	1	209.626	-99.615	1.00	0.00
544	0	1	225.694	-99.615	1.00	0.00
545	0	1	241.762	-99.615	1.00	0.00
546	0	1	257.830	-99.615	1.00	0.00
547	0	1	273.898	-99.615	1.00	0.00
548	0	1	289.966	-99.615	1.00	0.00
549	0	1	-289.966	-131.041	1.00	0.00
550	0	1	-273.898	-131.041	1.00	0.00
551	0	1	-257.830	-131.041	1.00	0.00
552	0	1	-241.762	-131.041	1.00	0.00
553	0	1	-225.694	-131.041	1.00	0.00
554	0	1	-209.626	-131.041	1.00	0.00
555	0	1	-193.558	-131.041	1.00	0.00
556	0	1	-161.298	-131.041	1.00	0.00
557	0	1	-129.038	-131.041	1.00	0.00
558	0	1	-96.779	-131.041	1.00	0.00
559	0	1	-64.519	-131.041	1.00	0.00
560	0	1	-32.260	-131.041	1.00	0.00
561	0	1	0.000	-131.041	1.00	0.00
562	0	1	32.260	-131.041	1.00	0.00
563	0	1	64.519	-131.041	1.00	0.00
564	0	1	96.779	-131.041	1.00	0.00

565	0	1	129.038	-131.041	1.00	0.00
566	0	1	161.298	-131.041	1.00	0.00
567	0	1	193.558	-131.041	1.00	0.00
568	0	1	209.626	-131.041	1.00	0.00
569	0	1	225.694	-131.041	1.00	0.00
570	0	1	241.762	-131.041	1.00	0.00
571	0	1	257.830	-131.041	1.00	0.00
572	0	1	273.898	-131.041	1.00	0.00
573	0	1	289.966	-131.041	1.00	0.00
574	0	1	-289.966	-165.609	1.00	0.00
575	0	1	-273.898	-165.609	1.00	0.00
576	0	1	-257.830	-165.609	1.00	0.00
577	0	1	-241.762	-165.609	1.00	0.00
578	0	1	-225.694	-165.609	1.00	0.00
579	0	1	-209.626	-165.609	1.00	0.00
580	0	1	-193.558	-165.609	1.00	0.00
581	0	1	-161.298	-165.609	1.00	0.00
582	0	1	-129.038	-165.609	1.00	0.00
583	0	1	-96.779	-165.609	1.00	0.00
584	0	1	-64.519	-165.609	1.00	0.00
585	0	1	-32.260	-165.609	1.00	0.00
586	0	1	0.000	-165.609	1.00	0.00
587	0	1	32.260	-165.609	1.00	0.00
588	0	1	64.519	-165.609	1.00	0.00
589	0	1	96.779	-165.609	1.00	0.00
590	0	1	129.038	-165.609	1.00	0.00
591	0	1	161.298	-165.609	1.00	0.00
592	0	1	193.558	-165.609	1.00	0.00
593	0	1	209.626	-165.609	1.00	0.00
594	0	1	225.694	-165.609	1.00	0.00
595	0	1	241.762	-165.609	1.00	0.00
596	0	1	257.830	-165.609	1.00	0.00
597	0	1	273.898	-165.609	1.00	0.00
598	0	1	289.966	-165.609	1.00	0.00
599	0	1	-332.398	-165.609	1.00	0.00
600	0	1	-332.398	-131.041	1.00	0.00
601	0	1	-332.398	-99.615	1.00	0.00
602	0	1	-332.398	-71.046	1.00	0.00
603	0	1	-332.398	-45.075	1.00	0.00
604	0	1	-332.398	-21.464	1.00	0.00
605	0	1	-332.398	0.000	1.00	0.00
606	0	1	-332.398	14.343	1.00	0.00
607	0	1	-332.398	28.581	1.00	0.00
608	0	1	-332.398	42.432	1.00	0.00
609	0	1	-332.398	55.621	1.00	0.00
610	0	1	-332.398	67.886	1.00	0.00
611	0	1	-332.398	78.982	1.00	0.00
612	0	1	-332.398	88.688	1.00	0.00
613	0	1	-332.398	97.100	1.00	0.00
614	0	1	-332.398	104.872	1.00	0.00
615	0	1	-332.398	111.979	1.00	0.00
616	0	1	-332.398	120.368	1.00	0.00
617	0	1	-332.398	128.758	1.00	0.00
618	0	1	-332.398	137.147	1.00	0.00
619	0	1	-332.398	145.537	1.00	0.00
620	0	1	-332.398	153.926	1.00	0.00
621	0	1	-332.398	162.315	1.00	0.00
622	0	1	-332.398	170.705	1.00	0.00
623	0	1	-332.398	179.094	1.00	0.00
624	0	1	-368.947	-165.609	1.00	0.00
625	0	1	-368.947	-131.041	1.00	0.00
626	0	1	-368.947	-99.615	1.00	0.00
627	0	1	-368.947	-71.046	1.00	0.00
628	0	1	-368.947	-45.075	1.00	0.00
629	0	1	-368.947	-21.464	1.00	0.00
630	0	1	-368.947	0.000	1.00	0.00
631	0	1	-368.947	14.343	1.00	0.00
632	0	1	-368.947	28.581	1.00	0.00
633	0	1	-368.947	42.432	1.00	0.00
634	0	1	-368.947	55.621	1.00	0.00
635	0	1	-368.947	67.886	1.00	0.00
636	0	1	-368.947	78.982	1.00	0.00
637	0	1	-368.947	88.688	1.00	0.00
638	0	1	-368.947	97.100	1.00	0.00
639	0	1	-368.947	104.872	1.00	0.00
640	0	1	-368.947	111.979	1.00	0.00
641	0	1	-368.947	120.368	1.00	0.00
642	0	1	-368.947	128.758	1.00	0.00
643	0	1	-368.947	137.147	1.00	0.00
644	0	1	-368.947	145.537	1.00	0.00
645	0	1	-368.947	153.926	1.00	0.00

646	0	1	-368.947	162.315	1.00	0.00
647	0	1	-368.947	170.705	1.00	0.00
648	0	1	-368.947	179.094	1.00	0.00
649	0	1	-394.837	-165.609	1.00	0.00
650	0	1	-394.837	-131.041	1.00	0.00
651	0	1	-394.837	-99.615	1.00	0.00
652	0	1	-394.837	-71.046	1.00	0.00
653	0	1	-394.837	-45.075	1.00	0.00
654	0	1	-394.837	-21.464	1.00	0.00
655	0	1	-394.837	0.000	1.00	0.00
656	0	1	-394.837	14.343	1.00	0.00
657	0	1	-394.837	28.581	1.00	0.00
658	0	1	-394.837	42.432	1.00	0.00
659	0	1	-394.837	55.621	1.00	0.00
660	0	1	-394.837	67.886	1.00	0.00
661	0	1	-394.837	78.982	1.00	0.00
662	0	1	-394.837	88.688	1.00	0.00
663	0	1	-394.837	97.100	1.00	0.00
664	0	1	-394.837	104.872	1.00	0.00
665	0	1	-394.837	111.979	1.00	0.00
666	0	1	-394.837	120.368	1.00	0.00
667	0	1	-394.837	128.758	1.00	0.00
668	0	1	-394.837	137.147	1.00	0.00
669	0	1	-394.837	145.537	1.00	0.00
670	0	1	-394.837	153.926	1.00	0.00
671	0	1	-394.837	162.315	1.00	0.00
672	0	1	-394.837	170.705	1.00	0.00
673	0	1	-394.837	179.094	1.00	0.00
674	0	1	-418.723	-165.609	1.00	0.00
675	0	1	-418.723	-131.041	1.00	0.00
676	0	1	-418.723	-99.615	1.00	0.00
677	0	1	-418.723	-71.046	1.00	0.00
678	0	1	-418.723	-45.075	1.00	0.00
679	0	1	-418.723	-21.464	1.00	0.00
680	0	1	-418.723	0.000	1.00	0.00
681	0	1	-418.723	14.343	1.00	0.00
682	0	1	-418.723	28.581	1.00	0.00
683	0	1	-418.723	42.432	1.00	0.00
684	0	1	-418.723	55.621	1.00	0.00
685	0	1	-418.723	67.886	1.00	0.00
686	0	1	-418.723	78.982	1.00	0.00
687	0	1	-418.723	88.688	1.00	0.00
688	0	1	-418.723	97.100	1.00	0.00
689	0	1	-418.723	104.872	1.00	0.00
690	0	1	-418.723	111.979	1.00	0.00
691	0	1	-418.723	120.368	1.00	0.00
692	0	1	-418.723	128.758	1.00	0.00
693	0	1	-418.723	137.147	1.00	0.00
694	0	1	-418.723	145.537	1.00	0.00
695	0	1	-418.723	153.926	1.00	0.00
696	0	1	-418.723	162.315	1.00	0.00
697	0	1	-418.723	170.705	1.00	0.00
698	0	1	-418.723	179.094	1.00	0.00
699	0	1	-443.892	-165.609	1.00	0.00
700	0	1	-443.892	-131.041	1.00	0.00
701	0	1	-443.892	-99.615	1.00	0.00
702	0	1	-443.892	-71.046	1.00	0.00
703	0	1	-443.892	-45.075	1.00	0.00
704	0	1	-443.892	-21.464	1.00	0.00
705	0	1	-443.892	0.000	1.00	0.00
706	0	1	-443.892	14.343	1.00	0.00
707	0	1	-443.892	28.581	1.00	0.00
708	0	1	-443.892	42.432	1.00	0.00
709	0	1	-443.892	55.621	1.00	0.00
710	0	1	-443.892	67.886	1.00	0.00
711	0	1	-443.892	78.982	1.00	0.00
712	0	1	-443.892	88.688	1.00	0.00
713	0	1	-443.892	97.100	1.00	0.00
714	0	1	-443.892	104.872	1.00	0.00
715	0	1	-443.892	111.979	1.00	0.00
716	0	1	-443.892	120.368	1.00	0.00
717	0	1	-443.892	128.758	1.00	0.00
718	0	1	-443.892	137.147	1.00	0.00
719	0	1	-443.892	145.537	1.00	0.00
720	0	1	-443.892	153.926	1.00	0.00
721	0	1	-443.892	162.315	1.00	0.00
722	0	1	-443.892	170.705	1.00	0.00
723	0	1	-443.892	179.094	1.00	0.00
724	0	1	-469.060	-165.609	1.00	0.00
725	0	1	-469.060	-131.041	1.00	0.00
726	0	1	-469.060	-99.615	1.00	0.00

727	0	1	-469.060	-71.046	1.00	0.00
728	0	1	-469.060	-45.075	1.00	0.00
729	0	1	-469.060	-21.464	1.00	0.00
730	0	1	-469.060	0.000	1.00	0.00
731	0	1	-469.060	14.343	1.00	0.00
732	0	1	-469.060	28.581	1.00	0.00
733	0	1	-469.060	42.432	1.00	0.00
734	0	1	-469.060	55.621	1.00	0.00
735	0	1	-469.060	67.886	1.00	0.00
736	0	1	-469.060	78.982	1.00	0.00
737	0	1	-469.060	88.688	1.00	0.00
738	0	1	-469.060	97.100	1.00	0.00
739	0	1	-469.060	104.872	1.00	0.00
740	0	1	-469.060	111.979	1.00	0.00
741	0	1	-469.060	120.368	1.00	0.00
742	0	1	-469.060	128.758	1.00	0.00
743	0	1	-469.060	137.147	1.00	0.00
744	0	1	-469.060	145.537	1.00	0.00
745	0	1	-469.060	153.926	1.00	0.00
746	0	1	-469.060	162.315	1.00	0.00
747	0	1	-469.060	170.705	1.00	0.00
748	0	1	-469.060	179.094	1.00	0.00
749	0	1	-304.308	14.343	1.00	0.00
750	0	1	-318.547	28.581	1.00	0.00
751	0	1	-345.587	55.621	1.00	0.00
752	0	1	-357.851	67.886	1.00	0.00
753	0	1	-378.654	88.688	1.00	0.00
754	0	1	-387.066	97.100	1.00	0.00
755	0	1	-401.944	111.979	1.00	0.00
756	0	1	-410.334	120.368	1.00	0.00
757	0	1	-427.113	137.147	1.00	0.00
758	0	1	-435.502	145.537	1.00	0.00
759	0	1	-452.281	162.315	1.00	0.00
760	0	1	-460.670	170.705	1.00	0.00
761	0	1	-529.060	-165.609	1.00	0.00
762	0	1	-529.060	-131.041	1.00	0.00
763	0	1	-529.060	-99.615	1.00	0.00
764	0	1	-529.060	-71.046	1.00	0.00
765	0	1	-529.060	-45.075	1.00	0.00
766	0	1	-529.060	-21.464	1.00	0.00
767	0	1	-529.060	0.000	1.00	0.00
768	0	1	-529.060	14.343	1.00	0.00
769	0	1	-529.060	28.581	1.00	0.00
770	0	1	-529.060	42.432	1.00	0.00
771	0	1	-529.060	55.621	1.00	0.00
772	0	1	-529.060	67.886	1.00	0.00
773	0	1	-529.060	78.982	1.00	0.00
774	0	1	-529.060	88.688	1.00	0.00
775	0	1	-529.060	97.100	1.00	0.00
776	0	1	-529.060	104.872	1.00	0.00
777	0	1	-529.060	111.979	1.00	0.00
778	0	1	-529.060	120.368	1.00	0.00
779	0	1	-529.060	128.758	1.00	0.00
780	0	1	-529.060	137.147	1.00	0.00
781	0	1	-529.060	145.537	1.00	0.00
782	0	1	-529.060	153.926	1.00	0.00
783	0	1	-529.060	162.315	1.00	0.00
784	0	1	-529.060	170.705	1.00	0.00
785	0	1	-529.060	179.094	1.00	0.00
786	0	1	-589.060	-165.609	1.00	0.00
787	0	1	-589.060	-131.041	1.00	0.00
788	0	1	-589.060	-99.615	1.00	0.00
789	0	1	-589.060	-71.046	1.00	0.00
790	0	1	-589.060	-45.075	1.00	0.00
791	0	1	-589.060	-21.464	1.00	0.00
792	0	1	-589.060	0.000	1.00	0.00
793	0	1	-589.060	14.343	1.00	0.00
794	0	1	-589.060	28.581	1.00	0.00
795	0	1	-589.060	42.432	1.00	0.00
796	0	1	-589.060	55.621	1.00	0.00
797	0	1	-589.060	67.886	1.00	0.00
798	0	1	-589.060	78.982	1.00	0.00
799	0	1	-589.060	88.688	1.00	0.00
800	0	1	-589.060	97.100	1.00	0.00
801	0	1	-589.060	104.872	1.00	0.00
802	0	1	-589.060	111.979	1.00	0.00
803	0	1	-589.060	120.368	1.00	0.00
804	0	1	-589.060	128.758	1.00	0.00
805	0	1	-589.060	137.147	1.00	0.00
806	0	1	-589.060	145.537	1.00	0.00
807	0	1	-589.060	153.926	1.00	0.00

808	0	1	-589.060	162.315	1.00	0.00
809	0	1	-589.060	170.705	1.00	0.00
810	0	1	-589.060	179.094	1.00	0.00
811	0	1	-649.060	-165.609	1.00	0.00
812	0	1	-649.060	-131.041	1.00	0.00
813	0	1	-649.060	-99.615	1.00	0.00
814	0	1	-649.060	-71.046	1.00	0.00
815	0	1	-649.060	-45.075	1.00	0.00
816	0	1	-649.060	-21.464	1.00	0.00
817	0	1	-649.060	0.000	1.00	0.00
818	0	1	-649.060	14.343	1.00	0.00
819	0	1	-649.060	28.581	1.00	0.00
820	0	1	-649.060	42.432	1.00	0.00
821	0	1	-649.060	55.621	1.00	0.00
822	0	1	-649.060	67.886	1.00	0.00
823	0	1	-649.060	78.982	1.00	0.00
824	0	1	-649.060	88.688	1.00	0.00
825	0	1	-649.060	97.100	1.00	0.00
826	0	1	-649.060	104.872	1.00	0.00
827	0	1	-649.060	111.979	1.00	0.00
828	0	1	-649.060	120.368	1.00	0.00
829	0	1	-649.060	128.758	1.00	0.00
830	0	1	-649.060	137.147	1.00	0.00
831	0	1	-649.060	145.537	1.00	0.00
832	0	1	-649.060	153.926	1.00	0.00
833	0	1	-649.060	162.315	1.00	0.00
834	0	1	-649.060	170.705	1.00	0.00
835	0	1	-649.060	179.094	1.00	0.00
836	0	1	-709.060	-165.609	1.00	0.00
837	0	1	-709.060	-131.041	1.00	0.00
838	0	1	-709.060	-99.615	1.00	0.00
839	0	1	-709.060	-71.046	1.00	0.00
840	0	1	-709.060	-45.075	1.00	0.00
841	0	1	-709.060	-21.464	1.00	0.00
842	0	1	-709.060	0.000	1.00	0.00
843	0	1	-709.060	14.343	1.00	0.00
844	0	1	-709.060	28.581	1.00	0.00
845	0	1	-709.060	42.432	1.00	0.00
846	0	1	-709.060	55.621	1.00	0.00
847	0	1	-709.060	67.886	1.00	0.00
848	0	1	-709.060	78.982	1.00	0.00
849	0	1	-709.060	88.688	1.00	0.00
850	0	1	-709.060	97.100	1.00	0.00
851	0	1	-709.060	104.872	1.00	0.00
852	0	1	-709.060	111.979	1.00	0.00
853	0	1	-709.060	120.368	1.00	0.00
854	0	1	-709.060	128.758	1.00	0.00
855	0	1	-709.060	137.147	1.00	0.00
856	0	1	-709.060	145.537	1.00	0.00
857	0	1	-709.060	153.926	1.00	0.00
858	0	1	-709.060	162.315	1.00	0.00
859	0	1	-709.060	170.705	1.00	0.00
860	0	1	-709.060	179.094	1.00	0.00
861	0	1	332.398	-165.609	1.00	0.00
862	0	1	332.398	-131.041	1.00	0.00
863	0	1	332.398	-99.615	1.00	0.00
864	0	1	332.398	-71.046	1.00	0.00
865	0	1	332.398	-45.075	1.00	0.00
866	0	1	332.398	-21.464	1.00	0.00
867	0	1	332.398	0.000	1.00	0.00
868	0	1	332.398	14.343	1.00	0.00
869	0	1	332.398	28.581	1.00	0.00
870	0	1	332.398	42.432	1.00	0.00
871	0	1	332.398	55.621	1.00	0.00
872	0	1	332.398	67.886	1.00	0.00
873	0	1	332.398	78.982	1.00	0.00
874	0	1	332.398	88.688	1.00	0.00
875	0	1	332.398	97.100	1.00	0.00
876	0	1	332.398	104.872	1.00	0.00
877	0	1	332.398	111.979	1.00	0.00
878	0	1	332.398	120.368	1.00	0.00
879	0	1	332.398	128.758	1.00	0.00
880	0	1	332.398	137.147	1.00	0.00
881	0	1	332.398	145.537	1.00	0.00
882	0	1	332.398	153.926	1.00	0.00
883	0	1	332.398	162.315	1.00	0.00
884	0	1	332.398	170.705	1.00	0.00
885	0	1	332.398	179.094	1.00	0.00
886	0	1	368.947	-165.609	1.00	0.00
887	0	1	368.947	-131.041	1.00	0.00
888	0	1	368.947	-99.615	1.00	0.00

889	0	1	368.947	-71.046	1.00	0.00
890	0	1	368.947	-45.075	1.00	0.00
891	0	1	368.947	-21.464	1.00	0.00
892	0	1	368.947	0.000	1.00	0.00
893	0	1	368.947	14.343	1.00	0.00
894	0	1	368.947	28.581	1.00	0.00
895	0	1	368.947	42.432	1.00	0.00
896	0	1	368.947	55.621	1.00	0.00
897	0	1	368.947	67.886	1.00	0.00
898	0	1	368.947	78.982	1.00	0.00
899	0	1	368.947	88.688	1.00	0.00
900	0	1	368.947	97.100	1.00	0.00
901	0	1	368.947	104.872	1.00	0.00
902	0	1	368.947	111.979	1.00	0.00
903	0	1	368.947	120.368	1.00	0.00
904	0	1	368.947	128.758	1.00	0.00
905	0	1	368.947	137.147	1.00	0.00
906	0	1	368.947	145.537	1.00	0.00
907	0	1	368.947	153.926	1.00	0.00
908	0	1	368.947	162.315	1.00	0.00
909	0	1	368.947	170.705	1.00	0.00
910	0	1	368.947	179.094	1.00	0.00
911	0	1	394.837	-165.609	1.00	0.00
912	0	1	394.837	-131.041	1.00	0.00
913	0	1	394.837	-99.615	1.00	0.00
914	0	1	394.837	-71.046	1.00	0.00
915	0	1	394.837	-45.075	1.00	0.00
916	0	1	394.837	-21.464	1.00	0.00
917	0	1	394.837	0.000	1.00	0.00
918	0	1	394.837	14.343	1.00	0.00
919	0	1	394.837	28.581	1.00	0.00
920	0	1	394.837	42.432	1.00	0.00
921	0	1	394.837	55.621	1.00	0.00
922	0	1	394.837	67.886	1.00	0.00
923	0	1	394.837	78.982	1.00	0.00
924	0	1	394.837	88.688	1.00	0.00
925	0	1	394.837	97.100	1.00	0.00
926	0	1	394.837	104.872	1.00	0.00
927	0	1	394.837	111.979	1.00	0.00
928	0	1	394.837	120.368	1.00	0.00
929	0	1	394.837	128.758	1.00	0.00
930	0	1	394.837	137.147	1.00	0.00
931	0	1	394.837	145.537	1.00	0.00
932	0	1	394.837	153.926	1.00	0.00
933	0	1	394.837	162.315	1.00	0.00
934	0	1	394.837	170.705	1.00	0.00
935	0	1	394.837	179.094	1.00	0.00
936	0	1	418.723	-165.609	1.00	0.00
937	0	1	418.723	-131.041	1.00	0.00
938	0	1	418.723	-99.615	1.00	0.00
939	0	1	418.723	-71.046	1.00	0.00
940	0	1	418.723	-45.075	1.00	0.00
941	0	1	418.723	-21.464	1.00	0.00
942	0	1	418.723	0.000	1.00	0.00
943	0	1	418.723	14.343	1.00	0.00
944	0	1	418.723	28.581	1.00	0.00
945	0	1	418.723	42.432	1.00	0.00
946	0	1	418.723	55.621	1.00	0.00
947	0	1	418.723	67.886	1.00	0.00
948	0	1	418.723	78.982	1.00	0.00
949	0	1	418.723	88.688	1.00	0.00
950	0	1	418.723	97.100	1.00	0.00
951	0	1	418.723	104.872	1.00	0.00
952	0	1	418.723	111.979	1.00	0.00
953	0	1	418.723	120.368	1.00	0.00
954	0	1	418.723	128.758	1.00	0.00
955	0	1	418.723	137.147	1.00	0.00
956	0	1	418.723	145.537	1.00	0.00
957	0	1	418.723	153.926	1.00	0.00
958	0	1	418.723	162.315	1.00	0.00
959	0	1	418.723	170.705	1.00	0.00
960	0	1	418.723	179.094	1.00	0.00
961	0	1	443.892	-165.609	1.00	0.00
962	0	1	443.892	-131.041	1.00	0.00
963	0	1	443.892	-99.615	1.00	0.00
964	0	1	443.892	-71.046	1.00	0.00
965	0	1	443.892	-45.075	1.00	0.00
966	0	1	443.892	-21.464	1.00	0.00
967	0	1	443.892	0.000	1.00	0.00
968	0	1	443.892	14.343	1.00	0.00
969	0	1	443.892	28.581	1.00	0.00

970	0	1	443.892	42.432	1.00	0.00
971	0	1	443.892	55.621	1.00	0.00
972	0	1	443.892	67.886	1.00	0.00
973	0	1	443.892	78.982	1.00	0.00
974	0	1	443.892	88.688	1.00	0.00
975	0	1	443.892	97.100	1.00	0.00
976	0	1	443.892	104.872	1.00	0.00
977	0	1	443.892	111.979	1.00	0.00
978	0	1	443.892	120.368	1.00	0.00
979	0	1	443.892	128.758	1.00	0.00
980	0	1	443.892	137.147	1.00	0.00
981	0	1	443.892	145.537	1.00	0.00
982	0	1	443.892	153.926	1.00	0.00
983	0	1	443.892	162.315	1.00	0.00
984	0	1	443.892	170.705	1.00	0.00
985	0	1	443.892	179.094	1.00	0.00
986	0	1	469.060	-165.609	1.00	0.00
987	0	1	469.060	-131.041	1.00	0.00
988	0	1	469.060	-99.615	1.00	0.00
989	0	1	469.060	-71.046	1.00	0.00
990	0	1	469.060	-45.075	1.00	0.00
991	0	1	469.060	-21.464	1.00	0.00
992	0	1	469.060	0.000	1.00	0.00
993	0	1	469.060	14.343	1.00	0.00
994	0	1	469.060	28.581	1.00	0.00
995	0	1	469.060	42.432	1.00	0.00
996	0	1	469.060	55.621	1.00	0.00
997	0	1	469.060	67.886	1.00	0.00
998	0	1	469.060	78.982	1.00	0.00
999	0	1	469.060	88.688	1.00	0.00
1000	0	1	469.060	97.100	1.00	0.00
1001	0	1	469.060	104.872	1.00	0.00
1002	0	1	469.060	111.979	1.00	0.00
1003	0	1	469.060	120.368	1.00	0.00
1004	0	1	469.060	128.758	1.00	0.00
1005	0	1	469.060	137.147	1.00	0.00
1006	0	1	469.060	145.537	1.00	0.00
1007	0	1	469.060	153.926	1.00	0.00
1008	0	1	469.060	162.315	1.00	0.00
1009	0	1	469.060	170.705	1.00	0.00
1010	0	1	469.060	179.094	1.00	0.00
1011	0	1	304.308	14.343	1.00	0.00
1012	0	1	318.547	28.581	1.00	0.00
1013	0	1	345.587	55.621	1.00	0.00
1014	0	1	357.851	67.886	1.00	0.00
1015	0	1	378.654	88.688	1.00	0.00
1016	0	1	387.066	97.100	1.00	0.00
1017	0	1	401.944	111.979	1.00	0.00
1018	0	1	410.334	120.368	1.00	0.00
1019	0	1	427.113	137.147	1.00	0.00
1020	0	1	435.502	145.537	1.00	0.00
1021	0	1	452.281	162.315	1.00	0.00
1022	0	1	460.670	170.705	1.00	0.00
1023	0	1	529.060	-165.609	1.00	0.00
1024	0	1	529.060	-131.041	1.00	0.00
1025	0	1	529.060	-99.615	1.00	0.00
1026	0	1	529.060	-71.046	1.00	0.00
1027	0	1	529.060	-45.075	1.00	0.00
1028	0	1	529.060	-21.464	1.00	0.00
1029	0	1	529.060	0.000	1.00	0.00
1030	0	1	529.060	14.343	1.00	0.00
1031	0	1	529.060	28.581	1.00	0.00
1032	0	1	529.060	42.432	1.00	0.00
1033	0	1	529.060	55.621	1.00	0.00
1034	0	1	529.060	67.886	1.00	0.00
1035	0	1	529.060	78.982	1.00	0.00
1036	0	1	529.060	88.688	1.00	0.00
1037	0	1	529.060	97.100	1.00	0.00
1038	0	1	529.060	104.872	1.00	0.00
1039	0	1	529.060	111.979	1.00	0.00
1040	0	1	529.060	120.368	1.00	0.00
1041	0	1	529.060	128.758	1.00	0.00
1042	0	1	529.060	137.147	1.00	0.00
1043	0	1	529.060	145.537	1.00	0.00
1044	0	1	529.060	153.926	1.00	0.00
1045	0	1	529.060	162.315	1.00	0.00
1046	0	1	529.060	170.705	1.00	0.00
1047	0	1	529.060	179.094	1.00	0.00
1048	0	1	589.060	-165.609	1.00	0.00
1049	0	1	589.060	-131.041	1.00	0.00
1050	0	1	589.060	-99.615	1.00	0.00

1051	0	1	589.060	-71.046	1.00	0.00
1052	0	1	589.060	-45.075	1.00	0.00
1053	0	1	589.060	-21.464	1.00	0.00
1054	0	1	589.060	0.000	1.00	0.00
1055	0	1	589.060	14.343	1.00	0.00
1056	0	1	589.060	28.581	1.00	0.00
1057	0	1	589.060	42.432	1.00	0.00
1058	0	1	589.060	55.621	1.00	0.00
1059	0	1	589.060	67.886	1.00	0.00
1060	0	1	589.060	78.982	1.00	0.00
1061	0	1	589.060	88.688	1.00	0.00
1062	0	1	589.060	97.100	1.00	0.00
1063	0	1	589.060	104.872	1.00	0.00
1064	0	1	589.060	111.979	1.00	0.00
1065	0	1	589.060	120.368	1.00	0.00
1066	0	1	589.060	128.758	1.00	0.00
1067	0	1	589.060	137.147	1.00	0.00
1068	0	1	589.060	145.537	1.00	0.00
1069	0	1	589.060	153.926	1.00	0.00
1070	0	1	589.060	162.315	1.00	0.00
1071	0	1	589.060	170.705	1.00	0.00
1072	0	1	589.060	179.094	1.00	0.00
1073	0	1	649.060	-165.609	1.00	0.00
1074	0	1	649.060	-131.041	1.00	0.00
1075	0	1	649.060	-99.615	1.00	0.00
1076	0	1	649.060	-71.046	1.00	0.00
1077	0	1	649.060	-45.075	1.00	0.00
1078	0	1	649.060	-21.464	1.00	0.00
1079	0	1	649.060	0.000	1.00	0.00
1080	0	1	649.060	14.343	1.00	0.00
1081	0	1	649.060	28.581	1.00	0.00
1082	0	1	649.060	42.432	1.00	0.00
1083	0	1	649.060	55.621	1.00	0.00
1084	0	1	649.060	67.886	1.00	0.00
1085	0	1	649.060	78.982	1.00	0.00
1086	0	1	649.060	88.688	1.00	0.00
1087	0	1	649.060	97.100	1.00	0.00
1088	0	1	649.060	104.872	1.00	0.00
1089	0	1	649.060	111.979	1.00	0.00
1090	0	1	649.060	120.368	1.00	0.00
1091	0	1	649.060	128.758	1.00	0.00
1092	0	1	649.060	137.147	1.00	0.00
1093	0	1	649.060	145.537	1.00	0.00
1094	0	1	649.060	153.926	1.00	0.00
1095	0	1	649.060	162.315	1.00	0.00
1096	0	1	649.060	170.705	1.00	0.00
1097	0	1	649.060	179.094	1.00	0.00
1098	0	1	709.060	-165.609	1.00	0.00
1099	0	1	709.060	-131.041	1.00	0.00
1100	0	1	709.060	-99.615	1.00	0.00
1101	0	1	709.060	-71.046	1.00	0.00
1102	0	1	709.060	-45.075	1.00	0.00
1103	0	1	709.060	-21.464	1.00	0.00
1104	0	1	709.060	0.000	1.00	0.00
1105	0	1	709.060	14.343	1.00	0.00
1106	0	1	709.060	28.581	1.00	0.00
1107	0	1	709.060	42.432	1.00	0.00
1108	0	1	709.060	55.621	1.00	0.00
1109	0	1	709.060	67.886	1.00	0.00
1110	0	1	709.060	78.982	1.00	0.00
1111	0	1	709.060	88.688	1.00	0.00
1112	0	1	709.060	97.100	1.00	0.00
1113	0	1	709.060	104.872	1.00	0.00
1114	0	1	709.060	111.979	1.00	0.00
1115	0	1	709.060	120.368	1.00	0.00
1116	0	1	709.060	128.758	1.00	0.00
1117	0	1	709.060	137.147	1.00	0.00
1118	0	1	709.060	145.537	1.00	0.00
1119	0	1	709.060	153.926	1.00	0.00
1120	0	1	709.060	162.315	1.00	0.00
1121	0	1	709.060	170.705	1.00	0.00
1122	0	1	709.060	179.094	1.00	0.00
1123	0	1	-709.060	191.094	1.00	0.00
1124	0	1	-649.060	191.094	1.00	0.00
1125	0	1	-589.060	191.094	1.00	0.00
1126	0	1	-529.060	191.094	1.00	0.00
1127	0	1	-469.060	191.094	1.00	0.00
1128	0	1	-443.892	191.094	1.00	0.00
1129	0	1	-418.723	191.094	1.00	0.00
1130	0	1	-394.837	191.094	1.00	0.00
1131	0	1	-368.947	191.094	1.00	0.00

1132	0	1	-332.398	191.094	1.00	0.00
1133	0	1	-289.966	191.094	1.00	0.00
1134	0	1	-257.747	191.094	1.00	0.00
1135	0	1	-225.529	191.094	1.00	0.00
1136	0	1	-193.310	191.094	1.00	0.00
1137	0	1	-161.092	191.094	1.00	0.00
1138	0	1	-128.874	191.094	1.00	0.00
1139	0	1	-96.655	191.094	1.00	0.00
1140	0	1	-64.437	191.094	1.00	0.00
1141	0	1	-32.218	191.094	1.00	0.00
1142	0	1	0.000	191.094	1.00	0.00
1143	0	1	32.218	191.094	1.00	0.00
1144	0	1	64.437	191.094	1.00	0.00
1145	0	1	96.655	191.094	1.00	0.00
1146	0	1	128.874	191.094	1.00	0.00
1147	0	1	161.092	191.094	1.00	0.00
1148	0	1	193.310	191.094	1.00	0.00
1149	0	1	225.529	191.094	1.00	0.00
1150	0	1	257.747	191.094	1.00	0.00
1151	0	1	289.966	191.094	1.00	0.00
1152	0	1	332.398	191.094	1.00	0.00
1153	0	1	368.947	191.094	1.00	0.00
1154	0	1	394.837	191.094	1.00	0.00
1155	0	1	418.723	191.094	1.00	0.00
1156	0	1	443.892	191.094	1.00	0.00
1157	0	1	469.060	191.094	1.00	0.00
1158	0	1	529.060	191.094	1.00	0.00
1159	0	1	589.060	191.094	1.00	0.00
1160	0	1	649.060	191.094	1.00	0.00
1161	0	1	709.060	191.094	1.00	0.00
1162	0	1	-481.060	191.094	1.00	0.00
1163	0	1	481.060	191.094	1.00	0.00

ALL ELEMENT DATA AS INPUT "I" AND GENERATED

	ELEMENT NUMBER	NODE-CONNECTIVITY I	J	K	L	MATERIAL NUMBER	CONSTR. INCR.	ELEMENT TYPE	BAND WIDTH	GENERATION INCREMENTS
I	1	38	39	0	0	1	1	BEAM	6	1, 0, 0
I	2	37	38	0	0	1	1	BEAM	6	1, 0, 0
I	3	36	37	0	0	1	1	BEAM	6	1, 0, 0
I	4	35	36	0	0	1	1	BEAM	6	1, 0, 0
I	5	34	35	0	0	1	1	BEAM	6	1, 0, 0
I	6	33	34	0	0	1	1	BEAM	6	1, 0, 0
I	7	32	33	0	0	1	1	BEAM	6	1, 0, 0
I	8	31	32	0	0	1	1	BEAM	6	1, 0, 0
I	9	30	31	0	0	1	1	BEAM	6	1, 0, 0
I	10	29	30	0	0	1	1	BEAM	6	1, 0, 0
I	11	28	29	0	0	1	1	BEAM	6	1, 0, 0
I	12	27	28	0	0	1	1	BEAM	6	1, 0, 0
I	13	26	27	0	0	1	1	BEAM	6	1, 0, 0
I	14	25	26	0	0	1	1	BEAM	6	1, 0, 0
I	15	24	25	0	0	1	1	BEAM	6	1, 0, 0
I	16	23	24	0	0	1	1	BEAM	6	1, 0, 0
I	17	22	23	0	0	1	1	BEAM	6	1, 0, 0
I	18	21	22	0	0	1	1	BEAM	6	1, 0, 0
I	19	20	21	0	0	1	1	BEAM	6	1, 0, 0
I	20	19	20	0	0	1	1	BEAM	6	1, 0, 0
I	21	18	19	0	0	1	1	BEAM	6	1, 0, 0
I	22	17	18	0	0	1	1	BEAM	6	1, 0, 0
I	23	16	17	0	0	1	1	BEAM	6	1, 0, 0
I	24	15	16	0	0	1	1	BEAM	6	1, 0, 0
I	25	14	15	0	0	1	1	BEAM	6	1, 0, 0
I	26	13	14	0	0	1	1	BEAM	6	1, 0, 0
I	27	12	13	0	0	1	1	BEAM	6	1, 0, 0
I	28	11	12	0	0	1	1	BEAM	6	1, 0, 0
I	29	10	11	0	0	1	1	BEAM	6	1, 0, 0
I	30	9	10	0	0	1	1	BEAM	6	1, 0, 0
I	31	8	9	0	0	1	1	BEAM	6	1, 0, 0
I	32	7	8	0	0	1	1	BEAM	6	1, 0, 0
I	33	6	7	0	0	1	1	BEAM	6	1, 0, 0
I	34	5	6	0	0	1	1	BEAM	6	1, 0, 0
I	35	4	5	0	0	1	1	BEAM	6	1, 0, 0
I	36	3	4	0	0	1	1	BEAM	6	1, 0, 0
I	37	2	3	0	0	1	1	BEAM	6	1, 0, 0
I	38	1	2	0	0	1	1	BEAM	6	1, 0, 0
I	39	464	462	39	308	2	1	QUAD	852	1, 0, 0
I	40	462	473	461	39	2	1	QUAD	870	1, 0, 0
I	41	296	285	1	284	2	1	QUAD	592	1, 0, 0
I	42	285	287	131	1	2	1	QUAD	574	1, 0, 0

I	43	1	131	143	77	3	2	QUAD	286	1, 0, 0
I	44	131	132	144	143	3	2	QUAD	28	1, 0, 0
I	45	132	133	145	144	3	2	QUAD	28	1, 0, 0
I	46	133	134	146	145	3	2	QUAD	28	1, 0, 0
I	47	134	135	147	146	3	2	QUAD	28	1, 0, 0
I	48	135	120	121	147	3	2	QUAD	56	1, 0, 0
I	49	77	143	148	78	3	3	QUAD	144	1, 0, 0
I	50	143	144	149	148	3	3	QUAD	14	1, 0, 0
I	51	144	145	150	149	3	3	QUAD	14	1, 0, 0
I	52	145	146	151	150	3	3	QUAD	14	1, 0, 0
I	53	146	147	152	151	3	3	QUAD	14	1, 0, 0
I	54	147	121	153	152	3	3	QUAD	66	1, 0, 0
I	55	121	122	153	0	3	3	TRI.	66	1, 0, 0
I	56	78	148	154	79	3	4	QUAD	154	1, 0, 0
I	57	148	149	155	154	3	4	QUAD	16	1, 0, 0
I	58	149	150	156	155	3	4	QUAD	16	1, 0, 0
I	59	150	151	157	156	3	4	QUAD	16	1, 0, 0
I	60	151	152	158	157	3	4	QUAD	16	1, 0, 0
I	61	152	153	159	158	3	4	QUAD	16	1, 0, 0
I	62	153	122	123	159	3	4	QUAD	76	1, 0, 0
I	63	79	154	160	80	3	5	QUAD	164	1, 0, 0
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I	69	159	123	124	165	3	5	QUAD	86	1, 0, 0
I	70	80	160	166	81	3	6	QUAD	174	1, 0, 0
I	71	160	161	167	166	3	6	QUAD	16	1, 0, 0
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I	76	165	124	125	171	3	6	QUAD	96	1, 0, 0
I	77	81	166	172	82	3	7	QUAD	184	1, 0, 0
I	78	166	167	173	172	3	7	QUAD	16	1, 0, 0
I	79	167	168	174	173	3	7	QUAD	16	1, 0, 0
I	80	168	169	175	174	3	7	QUAD	16	1, 0, 0
I	81	169	170	176	175	3	7	QUAD	16	1, 0, 0
I	82	170	171	177	176	3	7	QUAD	16	1, 0, 0
I	83	171	125	126	177	3	7	QUAD	106	1, 0, 0
I	84	82	172	178	83	3	8	QUAD	194	1, 0, 0
I	85	172	173	179	178	3	8	QUAD	16	1, 0, 0
I	86	173	174	180	179	3	8	QUAD	16	1, 0, 0
I	87	174	175	181	180	3	8	QUAD	16	1, 0, 0
I	88	175	176	182	181	3	8	QUAD	16	1, 0, 0
I	89	176	177	183	182	3	8	QUAD	16	1, 0, 0
I	90	177	126	184	183	3	8	QUAD	118	1, 0, 0
I	91	126	127	184	0	3	8	TRI.	118	1, 0, 0
I	92	83	178	185	84	3	9	QUAD	206	1, 0, 0
I	93	178	179	186	185	3	9	QUAD	18	1, 0, 0
I	94	179	180	187	186	3	9	QUAD	18	1, 0, 0
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I	97	182	183	190	189	3	9	QUAD	18	1, 0, 0
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I	106	190	191	198	197	3	10	QUAD	18	1, 0, 0
I	107	191	128	129	198	3	10	QUAD	142	1, 0, 0
I	108	85	192	136	86	3	11	QUAD	216	1, 0, 0
I	109	192	193	137	136	3	12	QUAD	116	1, 0, 0
I	110	193	194	138	137	3	12	QUAD	116	1, 0, 0
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I	114	197	198	142	141	3	12	QUAD	116	1, 0, 0
I	115	198	129	130	142	3	12	QUAD	140	1, 0, 0
I	116	86	136	207	0	3	11	TRI.	244	1, 0, 0
I	117	136	137	214	207	3	13	QUAD	158	1, 0, 0
I	118	137	138	215	214	3	13	QUAD	158	1, 0, 0
I	119	138	139	216	215	3	13	QUAD	158	1, 0, 0
I	120	139	140	217	216	3	13	QUAD	158	1, 0, 0
I	121	140	141	218	217	3	13	QUAD	158	1, 0, 0
I	122	141	142	219	218	3	13	QUAD	158	1, 0, 0
I	123	142	130	200	219	3	13	QUAD	180	1, 0, 0

I	124	207	214	208	0	3	14	TRI.	16	1, 0, 0
I	125	214	215	220	208	3	14	QUAD	26	1, 0, 0
I	126	215	216	221	220	3	14	QUAD	14	1, 0, 0
I	127	216	217	222	221	3	14	QUAD	14	1, 0, 0
I	128	217	218	223	222	3	14	QUAD	14	1, 0, 0
I	129	218	219	224	223	3	14	QUAD	14	1, 0, 0
I	130	219	200	201	224	3	14	QUAD	50	1, 0, 0
I	131	208	220	209	0	3	15	TRI.	26	1, 0, 0
I	132	220	221	225	209	3	15	QUAD	34	1, 0, 0
I	133	221	222	226	225	3	15	QUAD	12	1, 0, 0
I	134	222	223	227	226	3	15	QUAD	12	1, 0, 0
I	135	223	224	228	227	3	15	QUAD	12	1, 0, 0
I	136	224	201	202	228	3	15	QUAD	56	1, 0, 0
I	137	209	225	210	0	3	16	TRI.	34	1, 0, 0
I	138	225	226	229	210	3	16	QUAD	40	1, 0, 0
I	139	226	227	230	229	3	16	QUAD	10	1, 0, 0
I	140	227	228	231	230	3	16	QUAD	10	1, 0, 0
I	141	228	202	203	231	3	16	QUAD	60	1, 0, 0
I	142	210	229	211	0	3	17	TRI.	40	1, 0, 0
I	143	229	230	232	211	3	17	QUAD	44	1, 0, 0
I	144	230	231	233	232	3	17	QUAD	8	1, 0, 0
I	145	231	203	204	233	3	17	QUAD	62	1, 0, 0
I	146	211	232	212	0	3	18	TRI.	44	1, 0, 0
I	147	232	233	234	212	3	18	QUAD	46	1, 0, 0
I	148	233	204	205	234	3	18	QUAD	62	1, 0, 0
I	149	212	234	213	0	3	19	TRI.	46	1, 0, 0
I	150	234	205	206	213	3	19	QUAD	60	1, 0, 0
I	151	213	206	199	0	3	19	TRI.	30	1, 0, 0
I	152	86	207	87	0	3	11	TRI.	244	1, 0, 0
I	153	207	208	273	0	3	14	TRI.	134	1, 0, 0
I	154	208	209	274	0	3	15	TRI.	134	1, 0, 0
I	155	209	210	276	275	3	16	QUAD	136	1, 0, 0
I	156	210	211	277	276	3	17	QUAD	136	1, 0, 0
I	157	211	212	278	277	3	18	QUAD	136	1, 0, 0
I	158	212	213	279	278	3	19	QUAD	136	1, 0, 0
I	159	213	199	242	279	3	19	QUAD	162	1, 0, 0
I	160	87	273	88	0	3	11	TRI.	374	1, 0, 0
I	161	273	274	267	0	3	15	TRI.	16	1, 0, 0
I	162	274	275	269	268	3	16	QUAD	16	1, 0, 0
I	163	275	276	269	0	3	16	TRI.	16	1, 0, 0
I	164	276	277	270	0	3	17	TRI.	16	1, 0, 0
I	165	277	278	271	0	3	18	TRI.	16	1, 0, 0
I	166	278	279	241	272	3	19	QUAD	78	1, 0, 0
I	167	279	242	241	0	3	19	TRI.	78	1, 0, 0
I	168	88	267	262	89	3	11	QUAD	360	1, 0, 0
I	169	267	268	263	262	3	16	QUAD	14	1, 0, 0
I	170	268	269	263	0	3	16	TRI.	14	1, 0, 0
I	171	269	270	264	0	3	17	TRI.	14	1, 0, 0
I	172	270	271	265	0	3	18	TRI.	14	1, 0, 0
I	173	271	272	240	266	3	19	QUAD	66	1, 0, 0
I	174	272	241	240	0	3	19	TRI.	66	1, 0, 0
I	175	89	262	257	90	3	11	QUAD	348	1, 0, 0
I	176	262	263	257	0	3	16	TRI.	14	1, 0, 0
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I	180	266	240	239	261	3	19	QUAD	56	1, 0, 0
I	181	90	257	253	91	3	11	QUAD	336	1, 0, 0
I	182	257	258	254	253	3	17	QUAD	12	1, 0, 0
I	183	258	259	254	0	3	17	TRI.	12	1, 0, 0
I	184	259	260	255	0	3	18	TRI.	12	1, 0, 0
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I	187	91	253	249	92	3	11	QUAD	326	1, 0, 0
I	188	253	254	250	249	3	17	QUAD	12	1, 0, 0
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I	191	256	238	237	252	3	19	QUAD	40	1, 0, 0
I	192	92	249	246	93	3	11	QUAD	316	1, 0, 0
I	193	249	250	247	246	3	17	QUAD	10	1, 0, 0
I	194	250	251	248	247	3	18	QUAD	10	1, 0, 0
I	195	251	252	236	248	3	19	QUAD	34	1, 0, 0
I	196	252	237	236	0	3	19	TRI.	34	1, 0, 0
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I	198	246	247	244	243	3	17	QUAD	10	1, 0, 0
I	199	247	248	245	244	3	18	QUAD	10	1, 0, 0
I	200	248	236	235	245	3	19	QUAD	28	1, 0, 0
I	201	94	243	115	95	3	11	QUAD	300	1, 0, 0
I	202	243	244	116	115	3	17	QUAD	260	1, 0, 0
I	203	244	245	117	116	3	18	QUAD	260	1, 0, 0
I	204	245	235	114	117	3	19	QUAD	264	1, 0, 0

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I	206	292	293	281	280	1	1	QUAD	28	1, 0, 0
I	207	293	294	282	281	1	1	QUAD	28	1, 0, 0
I	208	294	295	283	282	1	1	QUAD	28	1, 0, 0
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I	211	288	289	133	132	2	1	QUAD	316	1, 0, 0
I	212	289	290	134	133	1	1	QUAD	316	1, 0, 0
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I	221	8	83	46	0	7	8	FACE	152	1, 0, 0
I	222	9	84	47	0	8	9	FACE	152	1, 0, 0
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I	231	18	93	56	0	17	11	FACE	152	1, 0, 0
I	232	19	94	57	0	18	11	FACE	152	1, 0, 0
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I	239	308	39	113	320	3	2	QUAD	564	1, 0, 0
I	240	298	330	299	0	3	3	TRI.	66	1, 0, 0
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I	321	391	384	385	0	3	14	TRI.	16	1, 0, 0
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I	327	397	385	386	0	3	15	TRI.	26	1, 0, 0
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I	335	407	406	388	409	3	17	QUAD	44	1, 0, 0
I	336	406	387	388	0	3	17	TRI.	40	1, 0, 0
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I	339	409	388	389	0	3	18	TRI.	44	1, 0, 0
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I	341	411	389	390	0	3	19	TRI.	46	1, 0, 0
I	342	383	390	376	0	3	19	TRI.	30	1, 0, 0
I	343	104	103	384	0	3	11	TRI.	564	1, 0, 0
I	344	384	450	385	0	3	14	TRI.	134	1, 0, 0
I	345	385	451	386	0	3	15	TRI.	134	1, 0, 0
I	346	386	452	453	387	3	16	QUAD	136	1, 0, 0
I	347	387	453	454	388	3	17	QUAD	136	1, 0, 0
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I	350	390	456	419	376	3	19	QUAD	162	1, 0, 0
I	351	103	102	450	0	3	11	TRI.	698	1, 0, 0
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I	363	447	442	448	0	3	18	TRI.	14	1, 0, 0
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I	365	449	417	418	0	3	19	TRI.	66	1, 0, 0
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I	375	436	432	437	0	3	18	TRI.	12	1, 0, 0
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I	699	635	752	636	0	1	1	TRI.	236	1, 0, 0
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I	702	663	754	664	0	1	1	TRI.	184	1, 0, 0
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I	706	717	692	757	718	1	1	QUAD	132	1, 0, 0
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I	711	747	760	748	0	1	1	TRI.	28	1, 0, 0
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I	716	440	434	435	0	3	17	TRI.	14	1, 0, 0
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I	718	447	441	442	0	3	18	TRI.	14	1, 0, 0
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I	722	437	432	433	0	3	19	TRI.	12	1, 0, 0
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I	726	263	269	264	0	3	17	TRI.	14	1, 0, 0
I	727	269	276	270	0	3	17	TRI.	16	1, 0, 0
I	728	270	277	271	0	3	18	TRI.	16	1, 0, 0
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I	730	254	259	255	0	3	18	TRI.	12	1, 0, 0
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I	732	265	271	266	0	3	19	TRI.	14	1, 0, 0
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I	907	916	941	942	917	1	1	QUAD	54	1, 0, 0
I	908	917	942	943	918	1	1	QUAD	54	1, 0, 0
I	909	918	943	944	919	1	1	QUAD	54	1, 0, 0
I	910	919	944	945	920	1	1	QUAD	54	1, 0, 0
I	911	920	945	946	921	1	1	QUAD	54	1, 0, 0
I	912	921	946	947	922	1	1	QUAD	54	1, 0, 0
I	913	922	947	948	923	1	1	QUAD	54	1, 0, 0
I	914	923	948	949	924	1	1	QUAD	54	1, 0, 0
I	915	924	949	950	925	1	1	QUAD	54	1, 0, 0
I	916	925	950	951	926	1	1	QUAD	54	1, 0, 0
I	917	926	951	952	1017	1	1	QUAD	184	1, 0, 0
I	918	1017	952	953	1018	1	1	QUAD	134	1, 0, 0
I	919	1018	953	954	0	1	1	TRI.	132	1, 0, 0
I	920	929	954	955	930	4	15	QUAD	54	1, 0, 0
I	921	930	955	956	931	4	16	QUAD	54	1, 0, 0
I	922	931	956	957	932	4	17	QUAD	54	1, 0, 0
I	923	932	957	958	933	4	18	QUAD	54	1, 0, 0
I	924	933	958	959	934	4	19	QUAD	54	1, 0, 0
I	925	934	959	960	935	4	19	QUAD	54	1, 0, 0
I	926	936	961	962	937	1	1	QUAD	54	1, 0, 0
I	927	937	962	963	938	1	1	QUAD	54	1, 0, 0
I	928	938	963	964	939	1	1	QUAD	54	1, 0, 0
I	929	939	964	965	940	1	1	QUAD	54	1, 0, 0
I	930	940	965	966	941	1	1	QUAD	54	1, 0, 0
I	931	941	966	967	942	1	1	QUAD	54	1, 0, 0
I	932	942	967	968	943	1	1	QUAD	54	1, 0, 0
I	933	943	968	969	944	1	1	QUAD	54	1, 0, 0

I	934	944	969	970	945	1	1	QUAD	54	1, 0, 0
I	935	945	970	971	946	1	1	QUAD	54	1, 0, 0
I	936	946	971	972	947	1	1	QUAD	54	1, 0, 0
I	937	947	972	973	948	1	1	QUAD	54	1, 0, 0
I	938	948	973	974	949	1	1	QUAD	54	1, 0, 0
I	939	949	974	975	950	1	1	QUAD	54	1, 0, 0
I	940	950	975	976	951	1	1	QUAD	54	1, 0, 0
I	941	951	976	977	952	1	1	QUAD	54	1, 0, 0
I	942	952	977	978	953	1	1	QUAD	54	1, 0, 0
I	943	953	978	979	954	1	1	QUAD	54	1, 0, 0
I	944	954	979	980	1019	1	1	QUAD	132	1, 0, 0
I	945	1019	980	981	1020	1	1	QUAD	82	1, 0, 0
I	946	1020	981	982	0	1	1	TRI.	80	1, 0, 0
I	947	957	982	983	958	4	18	QUAD	54	1, 0, 0
I	948	958	983	984	959	4	19	QUAD	54	1, 0, 0
I	949	959	984	985	960	4	19	QUAD	54	1, 0, 0
I	950	961	986	987	962	1	1	QUAD	54	1, 0, 0
I	951	962	987	988	963	1	1	QUAD	54	1, 0, 0
I	952	963	988	989	964	1	1	QUAD	54	1, 0, 0
I	953	964	989	990	965	1	1	QUAD	54	1, 0, 0
I	954	965	990	991	966	1	1	QUAD	54	1, 0, 0
I	955	966	991	992	967	1	1	QUAD	54	1, 0, 0
I	956	967	992	993	968	1	1	QUAD	54	1, 0, 0
I	957	968	993	994	969	1	1	QUAD	54	1, 0, 0
I	958	969	994	995	970	1	1	QUAD	54	1, 0, 0
I	959	970	995	996	971	1	1	QUAD	54	1, 0, 0
I	960	971	996	997	972	1	1	QUAD	54	1, 0, 0
I	961	972	997	998	973	1	1	QUAD	54	1, 0, 0
I	962	973	998	999	974	1	1	QUAD	54	1, 0, 0
I	963	974	999	1000	975	1	1	QUAD	54	1, 0, 0
I	964	975	1000	1001	976	1	1	QUAD	54	1, 0, 0
I	965	976	1001	1002	977	1	1	QUAD	54	1, 0, 0
I	966	977	1002	1003	978	1	1	QUAD	54	1, 0, 0
I	967	978	1003	1004	979	1	1	QUAD	54	1, 0, 0
I	968	979	1004	1005	980	1	1	QUAD	54	1, 0, 0
I	969	980	1005	1006	981	1	1	QUAD	54	1, 0, 0
I	970	981	1006	1007	982	1	1	QUAD	54	1, 0, 0
I	971	982	1007	1008	1021	1	1	QUAD	80	1, 0, 0
I	972	1021	1008	1009	1022	1	1	QUAD	30	1, 0, 0
I	973	1022	1009	1010	0	1	1	TRI.	28	1, 0, 0
I	974	120	1011	121	0	4	2	TRI.	1784	1, 0, 0
I	975	121	1011	1012	122	4	3	QUAD	1784	1, 0, 0
I	976	122	1012	870	123	4	4	QUAD	1782	1, 0, 0
I	977	870	1013	871	0	4	5	TRI.	288	1, 0, 0
I	978	871	1013	1014	872	4	6	QUAD	288	1, 0, 0
I	979	872	1014	898	873	4	7	QUAD	286	1, 0, 0
I	980	898	1015	899	0	4	8	TRI.	236	1, 0, 0
I	981	899	1015	1016	900	4	9	QUAD	236	1, 0, 0
I	982	900	1016	926	901	4	10	QUAD	234	1, 0, 0
I	983	926	1017	927	0	4	12	TRI.	184	1, 0, 0
I	984	927	1017	1018	928	4	13	QUAD	184	1, 0, 0
I	985	928	1018	954	929	4	14	QUAD	182	1, 0, 0
I	986	954	1019	955	0	4	15	TRI.	132	1, 0, 0
I	987	955	1019	1020	956	4	16	QUAD	132	1, 0, 0
I	988	956	1020	982	957	4	17	QUAD	130	1, 0, 0
I	989	982	1021	983	0	4	18	TRI.	80	1, 0, 0
I	990	983	1021	1022	984	4	19	QUAD	80	1, 0, 0
I	991	984	1022	1010	985	4	19	QUAD	78	1, 0, 0
I	992	986	1023	1024	987	1	1	QUAD	78	1, 0, 0
I	993	987	1024	1025	988	1	1	QUAD	78	1, 0, 0
I	994	988	1025	1026	989	1	1	QUAD	78	1, 0, 0
I	995	989	1026	1027	990	1	1	QUAD	78	1, 0, 0
I	996	990	1027	1028	991	1	1	QUAD	78	1, 0, 0
I	997	991	1028	1029	992	1	1	QUAD	78	1, 0, 0
I	998	992	1029	1030	993	1	1	QUAD	78	1, 0, 0
I	999	993	1030	1031	994	1	1	QUAD	78	1, 0, 0
I	1000	994	1031	1032	995	1	1	QUAD	78	1, 0, 0
I	1001	995	1032	1033	996	1	1	QUAD	78	1, 0, 0
I	1002	996	1033	1034	997	1	1	QUAD	78	1, 0, 0
I	1003	997	1034	1035	998	1	1	QUAD	78	1, 0, 0
I	1004	998	1035	1036	999	1	1	QUAD	78	1, 0, 0
I	1005	999	1036	1037	1000	1	1	QUAD	78	1, 0, 0
I	1006	1000	1037	1038	1001	1	1	QUAD	78	1, 0, 0
I	1007	1001	1038	1039	1002	1	1	QUAD	78	1, 0, 0
I	1008	1002	1039	1040	1003	1	1	QUAD	78	1, 0, 0
I	1009	1003	1040	1041	1004	1	1	QUAD	78	1, 0, 0
I	1010	1004	1041	1042	1005	1	1	QUAD	78	1, 0, 0
I	1011	1005	1042	1043	1006	1	1	QUAD	78	1, 0, 0
I	1012	1006	1043	1044	1007	1	1	QUAD	78	1, 0, 0
I	1013	1007	1044	1045	1008	1	1	QUAD	78	1, 0, 0
I	1014	1008	1045	1046	1009	1	1	QUAD	78	1, 0, 0

I	1015	1009	1046	1047	1010	1	1	QUAD	78	1, 0, 0
I	1016	1023	1048	1049	1024	1	1	QUAD	54	1, 0, 0
I	1017	1024	1049	1050	1025	1	1	QUAD	54	1, 0, 0
I	1018	1025	1050	1051	1026	1	1	QUAD	54	1, 0, 0
I	1019	1026	1051	1052	1027	1	1	QUAD	54	1, 0, 0
I	1020	1027	1052	1053	1028	1	1	QUAD	54	1, 0, 0
I	1021	1028	1053	1054	1029	1	1	QUAD	54	1, 0, 0
I	1022	1029	1054	1055	1030	1	1	QUAD	54	1, 0, 0
I	1023	1030	1055	1056	1031	1	1	QUAD	54	1, 0, 0
I	1024	1031	1056	1057	1032	1	1	QUAD	54	1, 0, 0
I	1025	1032	1057	1058	1033	1	1	QUAD	54	1, 0, 0
I	1026	1033	1058	1059	1034	1	1	QUAD	54	1, 0, 0
I	1027	1034	1059	1060	1035	1	1	QUAD	54	1, 0, 0
I	1028	1035	1060	1061	1036	1	1	QUAD	54	1, 0, 0
I	1029	1036	1061	1062	1037	1	1	QUAD	54	1, 0, 0
I	1030	1037	1062	1063	1038	1	1	QUAD	54	1, 0, 0
I	1031	1038	1063	1064	1039	1	1	QUAD	54	1, 0, 0
I	1032	1039	1064	1065	1040	1	1	QUAD	54	1, 0, 0
I	1033	1040	1065	1066	1041	1	1	QUAD	54	1, 0, 0
I	1034	1041	1066	1067	1042	1	1	QUAD	54	1, 0, 0
I	1035	1042	1067	1068	1043	1	1	QUAD	54	1, 0, 0
I	1036	1043	1068	1069	1044	1	1	QUAD	54	1, 0, 0
I	1037	1044	1069	1070	1045	1	1	QUAD	54	1, 0, 0
I	1038	1045	1070	1071	1046	1	1	QUAD	54	1, 0, 0
I	1039	1046	1071	1072	1047	1	1	QUAD	54	1, 0, 0
I	1040	1048	1073	1074	1049	1	1	QUAD	54	1, 0, 0
I	1041	1049	1074	1075	1050	1	1	QUAD	54	1, 0, 0
I	1042	1050	1075	1076	1051	1	1	QUAD	54	1, 0, 0
I	1043	1051	1076	1077	1052	1	1	QUAD	54	1, 0, 0
I	1044	1052	1077	1078	1053	1	1	QUAD	54	1, 0, 0
I	1045	1053	1078	1079	1054	1	1	QUAD	54	1, 0, 0
I	1046	1054	1079	1080	1055	1	1	QUAD	54	1, 0, 0
I	1047	1055	1080	1081	1056	1	1	QUAD	54	1, 0, 0
I	1048	1056	1081	1082	1057	1	1	QUAD	54	1, 0, 0
I	1049	1057	1082	1083	1058	1	1	QUAD	54	1, 0, 0
I	1050	1058	1083	1084	1059	1	1	QUAD	54	1, 0, 0
I	1051	1059	1084	1085	1060	1	1	QUAD	54	1, 0, 0
I	1052	1060	1085	1086	1061	1	1	QUAD	54	1, 0, 0
I	1053	1061	1086	1087	1062	1	1	QUAD	54	1, 0, 0
I	1054	1062	1087	1088	1063	1	1	QUAD	54	1, 0, 0
I	1055	1063	1088	1089	1064	1	1	QUAD	54	1, 0, 0
I	1056	1064	1089	1090	1065	1	1	QUAD	54	1, 0, 0
I	1057	1065	1090	1091	1066	1	1	QUAD	54	1, 0, 0
I	1058	1066	1091	1092	1067	1	1	QUAD	54	1, 0, 0
I	1059	1067	1092	1093	1068	1	1	QUAD	54	1, 0, 0
I	1060	1068	1093	1094	1069	1	1	QUAD	54	1, 0, 0
I	1061	1069	1094	1095	1070	1	1	QUAD	54	1, 0, 0
I	1062	1070	1095	1096	1071	1	1	QUAD	54	1, 0, 0
I	1063	1071	1096	1097	1072	1	1	QUAD	54	1, 0, 0
I	1064	1073	1098	1099	1074	1	1	QUAD	54	1, 0, 0
I	1065	1074	1099	1100	1075	1	1	QUAD	54	1, 0, 0
I	1066	1075	1100	1101	1076	1	1	QUAD	54	1, 0, 0
I	1067	1076	1101	1102	1077	1	1	QUAD	54	1, 0, 0
I	1068	1077	1102	1103	1078	1	1	QUAD	54	1, 0, 0
I	1069	1078	1103	1104	1079	1	1	QUAD	54	1, 0, 0
I	1070	1079	1104	1105	1080	1	1	QUAD	54	1, 0, 0
I	1071	1080	1105	1106	1081	1	1	QUAD	54	1, 0, 0
I	1072	1081	1106	1107	1082	1	1	QUAD	54	1, 0, 0
I	1073	1082	1107	1108	1083	1	1	QUAD	54	1, 0, 0
I	1074	1083	1108	1109	1084	1	1	QUAD	54	1, 0, 0
I	1075	1084	1109	1110	1085	1	1	QUAD	54	1, 0, 0
I	1076	1085	1110	1111	1086	1	1	QUAD	54	1, 0, 0
I	1077	1086	1111	1112	1087	1	1	QUAD	54	1, 0, 0
I	1078	1087	1112	1113	1088	1	1	QUAD	54	1, 0, 0
I	1079	1088	1113	1114	1089	1	1	QUAD	54	1, 0, 0
I	1080	1089	1114	1115	1090	1	1	QUAD	54	1, 0, 0
I	1081	1090	1115	1116	1091	1	1	QUAD	54	1, 0, 0
I	1082	1091	1116	1117	1092	1	1	QUAD	54	1, 0, 0
I	1083	1092	1117	1118	1093	1	1	QUAD	54	1, 0, 0
I	1084	1093	1118	1119	1094	1	1	QUAD	54	1, 0, 0
I	1085	1094	1119	1120	1095	1	1	QUAD	54	1, 0, 0
I	1086	1095	1120	1121	1096	1	1	QUAD	54	1, 0, 0
I	1087	1096	1121	1122	1097	1	1	QUAD	54	1, 0, 0
I	1088	860	835	1124	1123	1	1	QUAD	580	1, 0, 0
I	1089	835	810	1125	1124	1	1	QUAD	632	1, 0, 0
I	1090	810	785	1126	1125	1	1	QUAD	684	1, 0, 0
I	1091	785	748	1162	1126	1	1	QUAD	830	1, 0, 0
I	1092	748	723	1128	1127	4	20	QUAD	812	1, 0, 0
I	1093	723	698	1129	1128	4	20	QUAD	864	1, 0, 0
I	1094	698	673	1130	1129	4	20	QUAD	916	1, 0, 0
I	1095	673	648	1131	1130	4	20	QUAD	968	1, 0, 0

I 1096	648	623	1132	1131	4	20	QUAD	1020	1, 0, 0
I 1097	623	376	1133	1132	4	20	QUAD	1516	1, 0, 0
I 1098	376	419	1134	1133	4	20	QUAD	1518	1, 0, 0
I 1099	419	418	1135	1134	4	20	QUAD	1436	1, 0, 0
I 1100	418	417	1136	1135	4	20	QUAD	1440	1, 0, 0
I 1101	417	416	1137	1136	4	20	QUAD	1444	1, 0, 0
I 1102	416	415	1138	1137	4	20	QUAD	1448	1, 0, 0
I 1103	415	414	1139	1138	4	20	QUAD	1452	1, 0, 0
I 1104	414	413	1140	1139	4	20	QUAD	1456	1, 0, 0
I 1105	413	412	1141	1140	4	20	QUAD	1460	1, 0, 0
I 1106	412	114	1142	1141	4	20	QUAD	2058	1, 0, 0
I 1107	114	235	1143	1142	4	20	QUAD	2060	1, 0, 0
I 1108	235	236	1144	1143	4	20	QUAD	1820	1, 0, 0
I 1109	236	237	1145	1144	4	20	QUAD	1820	1, 0, 0
I 1110	237	238	1146	1145	4	20	QUAD	1820	1, 0, 0
I 1111	238	239	1147	1146	4	20	QUAD	1820	1, 0, 0
I 1112	239	240	1148	1147	4	20	QUAD	1820	1, 0, 0
I 1113	240	241	1149	1148	4	20	QUAD	1820	1, 0, 0
I 1114	241	242	1150	1149	4	20	QUAD	1820	1, 0, 0
I 1115	242	199	1151	1150	4	20	QUAD	1906	1, 0, 0
I 1116	199	885	1152	1151	4	20	QUAD	1908	1, 0, 0
I 1117	885	910	1153	1152	4	20	QUAD	538	1, 0, 0
I 1118	910	935	1154	1153	4	20	QUAD	490	1, 0, 0
I 1119	935	960	1155	1154	4	20	QUAD	442	1, 0, 0
I 1120	960	985	1156	1155	4	20	QUAD	394	1, 0, 0
I 1121	985	1010	1157	1156	4	20	QUAD	346	1, 0, 0
I 1122	1010	1047	1158	1163	1	1	QUAD	308	1, 0, 0
I 1123	1047	1072	1159	1158	1	1	QUAD	226	1, 0, 0
I 1124	1072	1097	1160	1159	1	1	QUAD	178	1, 0, 0
I 1125	1097	1122	1161	1160	1	1	QUAD	130	1, 0, 0
I 1126	748	1127	1162	0	4	20	TRI.	830	1, 0, 0
I 1127	1010	1163	1157	0	4	20	TRI.	308	1, 0, 0

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 20

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 20
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.250E+00	-0.226E+01	0.171E-11	-0.806E+04	0.314E+03
	0.00	-0.834E+00	-0.136E+01	-0.185E+04	-0.806E+04	0.137E+04
2	-193.83	-0.301E+00	-0.684E+01	-0.331E+04	-0.197E+05	0.144E+03
	14.34	-0.838E+00	-0.206E+01	-0.190E+04	-0.827E+04	0.624E+03
3	-192.08	-0.330E+00	-0.114E+02	-0.416E+04	-0.229E+05	0.292E+01
	28.58	-0.839E+00	-0.276E+01	-0.195E+04	-0.846E+04	0.127E+02
4	-188.35	-0.331E+00	-0.193E+02	-0.342E+04	-0.204E+05	-0.524E+02
	42.43	-0.842E+00	-0.821E+00	-0.197E+04	-0.855E+04	-0.228E+03
5	-182.71	-0.309E+00	-0.212E+02	-0.267E+04	-0.177E+05	-0.373E+02
	55.62	-0.856E+00	0.245E+01	-0.195E+04	-0.847E+04	-0.162E+03
6	-175.27	-0.272E+00	-0.178E+02	-0.235E+04	-0.164E+05	-0.272E+02
	67.89	-0.883E+00	0.532E+01	-0.189E+04	-0.820E+04	-0.118E+03
7	-166.18	-0.226E+00	-0.142E+02	-0.188E+04	-0.144E+05	-0.582E+02
	78.98	-0.925E+00	0.422E+01	-0.181E+04	-0.788E+04	-0.253E+03
8	-155.61	-0.178E+00	-0.118E+02	-0.655E+03	-0.986E+04	-0.862E+02
	88.69	-0.983E+00	0.381E+01	-0.175E+04	-0.759E+04	-0.375E+03
9	-144.43	-0.134E+00	-0.992E+01	0.604E+03	-0.945E+04	-0.658E+02
	97.10	-0.105E+01	0.292E+01	-0.169E+04	-0.735E+04	-0.286E+03
10	-132.78	-0.947E-01	-0.900E+01	0.124E+04	-0.115E+05	-0.263E+02

	104.87	-0.111E+01	0.264E+01	-0.165E+04	-0.717E+04	-0.114E+03
11	-120.72	-0.636E-01	-0.807E+01	0.140E+04	-0.119E+05	0.247E+01
	111.98	-0.117E+01	0.238E+01	-0.161E+04	-0.701E+04	0.107E+02
12	-108.28	-0.402E-01	-0.566E+01	0.123E+04	-0.112E+05	0.964E+01
	118.40	-0.122E+01	0.167E+01	-0.159E+04	-0.689E+04	0.419E+02
13	-95.50	-0.232E-01	-0.639E+01	0.119E+04	-0.109E+05	0.667E+01
	124.11	-0.127E+01	0.189E+01	-0.156E+04	-0.678E+04	0.290E+02
14	-82.42	-0.117E-01	-0.621E+01	0.111E+04	-0.105E+05	0.891E+01
	129.10	-0.131E+01	0.184E+01	-0.154E+04	-0.667E+04	0.387E+02
15	-69.09	-0.462E-02	-0.595E+01	0.999E+03	-0.100E+05	0.947E+01
	133.35	-0.134E+01	0.177E+01	-0.151E+04	-0.656E+04	0.412E+02
16	-55.53	-0.107E-02	-0.596E+01	0.894E+03	-0.956E+04	0.976E+01
	136.84	-0.137E+01	0.177E+01	-0.149E+04	-0.646E+04	0.424E+02
17	-41.80	-0.104E-03	-0.579E+01	0.771E+03	-0.902E+04	0.102E+02
	139.57	-0.138E+01	0.173E+01	-0.146E+04	-0.635E+04	0.443E+02
18	-27.94	-0.933E-03	-0.554E+01	0.644E+03	-0.848E+04	0.911E+01
	141.53	-0.140E+01	0.166E+01	-0.144E+04	-0.625E+04	0.396E+02
19	-13.99	-0.288E-02	-0.520E+01	0.540E+03	-0.803E+04	0.518E+01
	142.70	-0.141E+01	0.154E+01	-0.142E+04	-0.615E+04	0.225E+02
20	0.00	-0.542E-02	-0.490E+01	0.511E+03	-0.788E+04	-0.229E+01
	143.09	-0.141E+01	0.958E-02	-0.141E+04	-0.611E+04	-0.997E+01
21	13.99	-0.814E-02	-0.520E+01	0.605E+03	-0.825E+04	-0.977E+01
	142.70	-0.141E+01	-0.154E+01	-0.142E+04	-0.615E+04	-0.424E+02
22	27.94	-0.106E-01	-0.554E+01	0.773E+03	-0.892E+04	-0.137E+02
	141.53	-0.141E+01	-0.166E+01	-0.144E+04	-0.625E+04	-0.595E+02
23	41.80	-0.122E-01	-0.580E+01	0.964E+03	-0.969E+04	-0.147E+02
	139.57	-0.140E+01	-0.174E+01	-0.146E+04	-0.635E+04	-0.637E+02
24	55.53	-0.120E-01	-0.601E+01	0.115E+04	-0.104E+05	-0.137E+02
	136.84	-0.139E+01	-0.179E+01	-0.149E+04	-0.645E+04	-0.596E+02
25	69.09	-0.905E-02	-0.603E+01	0.130E+04	-0.111E+05	-0.125E+02
	133.35	-0.136E+01	-0.179E+01	-0.151E+04	-0.656E+04	-0.542E+02
26	82.42	-0.207E-02	-0.653E+01	0.144E+04	-0.117E+05	-0.904E+01
	129.10	-0.133E+01	-0.193E+01	-0.154E+04	-0.667E+04	-0.393E+02
27	95.50	0.102E-01	-0.690E+01	0.150E+04	-0.120E+05	-0.976E+00
	124.11	-0.129E+01	-0.203E+01	-0.156E+04	-0.679E+04	-0.424E+01
28	108.28	0.288E-01	-0.577E+01	0.141E+04	-0.118E+05	0.264E+00
	118.40	-0.124E+01	-0.169E+01	-0.159E+04	-0.690E+04	0.115E+01
29	120.72	0.548E-01	-0.797E+01	0.143E+04	-0.120E+05	0.728E+01
	111.98	-0.119E+01	-0.234E+01	-0.162E+04	-0.703E+04	0.316E+02
30	132.78	0.887E-01	-0.872E+01	0.115E+04	-0.112E+05	0.331E+02
	104.87	-0.112E+01	-0.256E+01	-0.165E+04	-0.719E+04	0.144E+03

31	144.43	0.130E+00	-0.970E+01	0.442E+03	-0.890E+04	0.690E+02
	97.10	-0.105E+01	-0.285E+01	-0.170E+04	-0.737E+04	0.300E+03
32	155.61	0.177E+00	-0.116E+02	-0.838E+03	-0.105E+05	0.865E+02
	88.69	-0.986E+00	-0.375E+01	-0.175E+04	-0.760E+04	0.376E+03
33	166.18	0.227E+00	-0.141E+02	-0.205E+04	-0.150E+05	0.564E+02
	78.98	-0.925E+00	-0.420E+01	-0.181E+04	-0.788E+04	0.245E+03
34	175.27	0.274E+00	-0.178E+02	-0.248E+04	-0.168E+05	0.244E+02
	67.89	-0.882E+00	-0.531E+01	-0.189E+04	-0.821E+04	0.106E+03
35	182.71	0.312E+00	-0.212E+02	-0.276E+04	-0.181E+05	0.342E+02
	55.62	-0.855E+00	-0.267E+01	-0.195E+04	-0.848E+04	0.148E+03
36	188.35	0.333E+00	-0.195E+02	-0.346E+04	-0.206E+05	0.501E+02
	42.43	-0.841E+00	0.780E+00	-0.197E+04	-0.857E+04	0.217E+03
37	192.08	0.332E+00	-0.115E+02	-0.418E+04	-0.230E+05	-0.393E+01
	28.58	-0.838E+00	0.276E+01	-0.195E+04	-0.847E+04	-0.171E+02
38	193.83	0.302E+00	-0.685E+01	-0.332E+04	-0.198E+05	-0.144E+03
	14.34	-0.837E+00	0.206E+01	-0.191E+04	-0.828E+04	-0.627E+03
39	193.56	0.251E+00	-0.217E+01	-0.331E-10	-0.807E+04	-0.315E+03
	0.00	-0.833E+00	0.136E+01	-0.186E+04	-0.807E+04	-0.137E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 20

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.25279E-03	-0.25279E-03	.18309	0.00000
2	-0.61933E-03	0.10039E-03	.44857	0.00000
3	-0.71833E-03	0.18736E-03	.52027	0.00000
4	-0.64050E-03	0.10372E-03	.46390	0.00000
5	-0.55677E-03	0.25140E-04	.40325	0.00000
6	-0.51336E-03	-0.15721E-05	.37181	0.00000
7	-0.45196E-03	-0.42425E-04	.32734	0.00000
8	-0.30942E-03	-0.16688E-03	.22410	0.00000
9	-0.16506E-03	-0.29651E-03	.21476	0.00000
10	-0.90119E-04	-0.36000E-03	.26074	0.00000
11	-0.67945E-04	-0.37227E-03	.26963	0.00000
12	-0.82163E-04	-0.35031E-03	.25372	0.00000
13	-0.83310E-04	-0.34239E-03	.24799	0.00000
14	-0.88903E-04	-0.32971E-03	.23880	0.00000
15	-0.97176E-04	-0.31462E-03	.22787	0.00000
16	-0.10528E-03	-0.29984E-03	.21717	0.00000
17	-0.11537E-03	-0.28316E-03	.20508	0.00000
18	-0.12602E-03	-0.26614E-03	.19276	0.00000
19	-0.13429E-03	-0.25185E-03	.18241	0.00000
20	-0.13599E-03	-0.24720E-03	.17904	0.00000
21	-0.12723E-03	-0.25880E-03	.18744	0.00000
22	-0.11193E-03	-0.28006E-03	.20284	0.00000
23	-0.94260E-04	-0.30403E-03	.22020	0.00000
24	-0.77514E-04	-0.32734E-03	.23708	0.00000
25	-0.63953E-04	-0.34758E-03	.25175	0.00000
26	-0.52068E-04	-0.36648E-03	.26543	0.00000
27	-0.50038E-04	-0.37609E-03	.27239	0.00000
28	-0.63148E-04	-0.37019E-03	.26812	0.00000
29	-0.65147E-04	-0.37608E-03	.27238	0.00000
30	-0.10086E-03	-0.35016E-03	.25361	0.00000
31	-0.18300E-03	-0.27926E-03	.20226	0.00000
32	-0.32958E-03	-0.14721E-03	.23871	0.00000
33	-0.47044E-03	-0.24250E-04	.34073	0.00000
34	-0.52775E-03	0.12679E-04	.38224	0.00000
35	-0.56646E-03	0.34381E-04	.41027	0.00000
36	-0.64540E-03	0.10775E-03	.46744	0.00000

37	-0.72086E-03	0.18903E-03	.52210	0.00000
38	-0.62106E-03	0.10129E-03	.44982	0.00000
39	-0.25319E-03	-0.25319E-03	.18338	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 20

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.20343	0.00000	0.04139
2	-0.20881	-0.20725	0.25085
3	-0.21365	-0.26080	0.30644
4	-0.21599	-0.21430	0.26095
5	-0.21391	-0.16756	0.21332
6	-0.20719	-0.14737	0.19030
7	-0.19893	-0.11793	0.15750
8	-0.19165	-0.04104	0.07777
9	-0.18572	0.03785	0.07235
10	-0.18112	0.07771	0.11052
11	-0.17713	0.08763	0.11901
12	-0.17402	0.07721	0.10750
13	-0.17129	0.07460	0.10395
14	-0.16844	0.06934	0.09771
15	-0.16570	0.06261	0.09007
16	-0.16301	0.05602	0.08260
17	-0.16036	0.04831	0.07403
18	-0.15780	0.04035	0.06525
19	-0.15537	0.03385	0.05799
20	-0.15419	0.03202	0.05580
21	-0.15533	0.03788	0.06201
22	-0.15773	0.04841	0.07329
23	-0.16026	0.06040	0.08609
24	-0.16290	0.07194	0.09848
25	-0.16559	0.08167	0.10909
26	-0.16841	0.09053	0.11890
27	-0.17146	0.09389	0.12329
28	-0.17437	0.08842	0.11882
29	-0.17754	0.08953	0.12105
30	-0.18148	0.07179	0.10472
31	-0.18600	0.02772	0.06231
32	-0.19185	-0.05252	0.08932
33	-0.19905	-0.12848	0.16810
34	-0.20725	-0.15562	0.19857
35	-0.21409	-0.17301	0.21885
36	-0.21634	-0.21687	0.26367
37	-0.21400	-0.26201	0.30780
38	-0.20914	-0.20800	0.25174
39	-0.20375	0.00000	0.04152

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 20

LRFD STRENGTH-LIMIT RATIOS AT STEP 20, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	36	8567.	30800.	0.278
BUCKLING THRUST (psi)	36	8567.	53423.	0.160
SEAM THRUST (psi)	36	8567.	21589.	0.397
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	37	0.308	1.000	0.308

LRFD SERVICE PERFORMANCE AT STEP 20, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.26

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.05

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.361E+00	-0.193E+01	0.716E-11	-0.988E+04	0.400E+03
	0.00	-0.905E+00	-0.594E+00	-0.227E+04	-0.988E+04	0.174E+04
2	-193.83	-0.448E+00	-0.780E+01	-0.422E+04	-0.248E+05	0.182E+03
	14.34	-0.911E+00	-0.237E+01	-0.233E+04	-0.101E+05	0.792E+03
3	-192.08	-0.508E+00	-0.137E+02	-0.532E+04	-0.288E+05	0.299E+01
	28.58	-0.909E+00	-0.415E+01	-0.239E+04	-0.104E+05	0.130E+02
4	-188.35	-0.532E+00	-0.249E+02	-0.438E+04	-0.259E+05	-0.631E+02
	42.43	-0.907E+00	-0.751E+01	-0.247E+04	-0.107E+05	-0.274E+03
5	-182.71	-0.526E+00	-0.289E+02	-0.356E+04	-0.234E+05	-0.307E+02
	55.62	-0.915E+00	-0.388E+01	-0.254E+04	-0.111E+05	-0.133E+03
6	-175.27	-0.498E+00	-0.257E+02	-0.353E+04	-0.233E+05	0.227E+01
	67.89	-0.938E+00	0.248E+01	-0.255E+04	-0.111E+05	0.985E+01
7	-166.18	-0.452E+00	-0.201E+02	-0.364E+04	-0.234E+05	-0.239E+02
	78.98	-0.982E+00	0.601E+01	-0.249E+04	-0.108E+05	-0.104E+03
8	-155.61	-0.396E+00	-0.152E+02	-0.283E+04	-0.203E+05	-0.658E+02
	88.69	-0.105E+01	0.490E+01	-0.241E+04	-0.104E+05	-0.286E+03
9	-144.43	-0.337E+00	-0.120E+02	-0.173E+04	-0.162E+05	-0.578E+02
	97.10	-0.114E+01	0.353E+01	-0.234E+04	-0.102E+05	-0.251E+03
10	-132.78	-0.275E+00	-0.107E+02	-0.113E+04	-0.139E+05	-0.283E+02
	104.87	-0.124E+01	0.313E+01	-0.229E+04	-0.995E+04	-0.123E+03
11	-120.72	-0.215E+00	-0.138E+02	-0.813E+03	-0.126E+05	0.168E+02
	111.98	-0.135E+01	0.404E+01	-0.224E+04	-0.973E+04	0.731E+02
12	-108.28	-0.158E+00	-0.579E+01	-0.144E+04	-0.146E+05	0.303E+02
	118.40	-0.147E+01	0.170E+01	-0.220E+04	-0.956E+04	0.132E+03
13	-95.50	-0.104E+00	-0.373E+01	-0.147E+04	-0.146E+05	-0.249E+02
	124.11	-0.161E+01	0.110E+01	-0.218E+04	-0.947E+04	-0.108E+03
14	-82.42	-0.539E-01	-0.439E+01	-0.512E+03	-0.112E+05	-0.888E+02
	129.10	-0.175E+01	0.128E+01	-0.216E+04	-0.939E+04	-0.386E+03
15	-69.09	-0.115E-01	-0.677E+01	0.128E+04	-0.137E+05	-0.130E+03
	133.35	-0.190E+01	0.195E+01	-0.213E+04	-0.926E+04	-0.565E+03

16	-55.53	0.202E-01	-0.883E+01	0.341E+04	-0.209E+05	-0.138E+03
	136.84	-0.204E+01	0.254E+01	-0.209E+04	-0.909E+04	-0.601E+03
17	-41.80	0.395E-01	-0.106E+02	0.541E+04	-0.276E+05	-0.117E+03
	139.57	-0.216E+01	0.308E+01	-0.205E+04	-0.889E+04	-0.509E+03
18	-27.94	0.473E-01	-0.120E+02	0.687E+04	-0.325E+05	-0.709E+02
	141.53	-0.225E+01	0.349E+01	-0.199E+04	-0.866E+04	-0.308E+03
19	-13.99	0.466E-01	-0.131E+02	0.750E+04	-0.344E+05	-0.502E+01
	142.70	-0.228E+01	0.287E+01	-0.195E+04	-0.846E+04	-0.218E+02
20	0.00	0.425E-01	-0.123E+02	0.702E+04	-0.328E+05	0.637E+02
	143.09	-0.227E+01	-0.357E+01	-0.195E+04	-0.849E+04	0.277E+03
21	13.99	0.403E-01	-0.101E+02	0.562E+04	-0.282E+05	0.110E+03
	142.70	-0.221E+01	-0.290E+01	-0.200E+04	-0.871E+04	0.478E+03
22	27.94	0.446E-01	-0.837E+01	0.377E+04	-0.220E+05	0.126E+03
	141.53	-0.210E+01	-0.242E+01	-0.205E+04	-0.890E+04	0.549E+03
23	41.80	0.580E-01	-0.682E+01	0.184E+04	-0.155E+05	0.118E+03
	139.57	-0.198E+01	-0.197E+01	-0.209E+04	-0.906E+04	0.512E+03
24	55.53	0.810E-01	-0.606E+01	0.200E+03	-0.989E+04	0.910E+02
	136.84	-0.184E+01	-0.176E+01	-0.212E+04	-0.920E+04	0.395E+03
25	69.09	0.112E+00	-0.607E+01	-0.977E+03	-0.127E+05	0.573E+02
	133.35	-0.170E+01	-0.177E+01	-0.215E+04	-0.933E+04	0.249E+03
26	82.42	0.149E+00	-0.588E+01	-0.166E+04	-0.152E+05	0.206E+02
	129.10	-0.157E+01	-0.172E+01	-0.217E+04	-0.945E+04	0.895E+02
27	95.50	0.190E+00	-0.578E+01	-0.177E+04	-0.157E+05	-0.195E+02
	124.11	-0.145E+01	-0.170E+01	-0.220E+04	-0.955E+04	-0.847E+02
28	108.28	0.232E+00	-0.785E+01	-0.127E+04	-0.141E+05	-0.471E+02
	118.40	-0.134E+01	-0.230E+01	-0.223E+04	-0.967E+04	-0.205E+03
29	120.72	0.276E+00	-0.134E+02	-0.563E+03	-0.118E+05	-0.234E+02
	111.98	-0.124E+01	-0.394E+01	-0.227E+04	-0.985E+04	-0.101E+03
30	132.78	0.323E+00	-0.107E+02	-0.700E+03	-0.125E+05	0.178E+02
	104.87	-0.115E+01	-0.314E+01	-0.232E+04	-0.101E+05	0.775E+02
31	144.43	0.372E+00	-0.124E+02	-0.111E+04	-0.141E+05	0.491E+02
	97.10	-0.107E+01	-0.366E+01	-0.237E+04	-0.103E+05	0.213E+03
32	155.61	0.421E+00	-0.162E+02	-0.210E+04	-0.178E+05	0.657E+02
	88.69	-0.100E+01	-0.346E+01	-0.242E+04	-0.105E+05	0.285E+03
33	166.18	0.467E+00	-0.206E+02	-0.297E+04	-0.210E+05	0.360E+02
	78.98	-0.942E+00	-0.643E+00	-0.246E+04	-0.107E+05	0.156E+03
34	175.27	0.505E+00	-0.245E+02	-0.311E+04	-0.215E+05	0.130E+02
	67.89	-0.905E+00	0.508E-01	-0.247E+04	-0.107E+05	0.567E+02
35	182.71	0.528E+00	-0.272E+02	-0.331E+04	-0.221E+05	0.390E+02
	55.62	-0.885E+00	0.517E+01	-0.243E+04	-0.106E+05	0.170E+03

36	188.35	0.530E+00	-0.233E+02	-0.419E+04	-0.247E+05	0.640E+02
	42.43	-0.879E+00	0.702E+01	-0.235E+04	-0.102E+05	0.278E+03
37	192.08	0.503E+00	-0.129E+02	-0.509E+04	-0.276E+05	-0.311E+01
	28.58	-0.881E+00	0.391E+01	-0.228E+04	-0.991E+04	-0.135E+02
38	193.83	0.441E+00	-0.753E+01	-0.402E+04	-0.236E+05	-0.175E+03
	14.34	-0.884E+00	0.229E+01	-0.222E+04	-0.966E+04	-0.758E+03
39	193.56	0.354E+00	-0.218E+01	-0.385E-10	-0.942E+04	-0.381E+03
	0.00	-0.878E+00	0.663E+00	-0.217E+04	-0.942E+04	-0.165E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.30991E-03	-0.30991E-03	.22446	0.00000
2	-0.77742E-03	0.14152E-03	.56307	0.00000
3	-0.90478E-03	0.25278E-03	.65531	0.00000
4	-0.81318E-03	0.13973E-03	.58897	0.00000
5	-0.73428E-03	0.40541E-04	.53182	0.00000
6	-0.73218E-03	0.36462E-04	.53030	0.00000
7	-0.73490E-03	0.56441E-04	.53227	0.00000
8	-0.63563E-03	-0.20082E-04	.46037	0.00000
9	-0.50679E-03	-0.13125E-03	.36705	0.00000
10	-0.43479E-03	-0.18974E-03	.31491	0.00000
11	-0.39383E-03	-0.21681E-03	.28524	0.00000
12	-0.45684E-03	-0.14308E-03	.33088	0.00000
13	-0.45713E-03	-0.13740E-03	.33109	0.00000
14	-0.35021E-03	-0.23884E-03	.25365	0.00000
15	-0.15104E-03	-0.43010E-03	.31151	0.00000
16	0.85260E-04	-0.65572E-03	.47492	0.00000
17	0.30923E-03	-0.86696E-03	.62792	0.00000
18	0.47609E-03	-0.10198E-02	.73863	0.00000
19	0.55000E-03	-0.10810E-02	.78294	0.00000
20	0.49781E-03	-0.10306E-02	.74643	0.00000
21	0.33850E-03	-0.88495E-03	.64095	0.00000
22	0.13090E-03	-0.68933E-03	.49926	0.00000
23	-0.83700E-04	-0.48502E-03	.35129	0.00000
24	-0.26702E-03	-0.31047E-03	.22487	0.00000
25	-0.39900E-03	-0.18643E-03	.28899	0.00000
26	-0.47654E-03	-0.11623E-03	.34515	0.00000
27	-0.49181E-03	-0.10760E-03	.35620	0.00000
28	-0.44186E-03	-0.16478E-03	.32003	0.00000
29	-0.37035E-03	-0.24779E-03	.26823	0.00000
30	-0.39202E-03	-0.23972E-03	.28393	0.00000
31	-0.44377E-03	-0.20160E-03	.32141	0.00000
32	-0.55846E-03	-0.10197E-03	.40448	0.00000
33	-0.65841E-03	-0.11702E-04	.47687	0.00000
34	-0.67473E-03	0.23097E-05	.48869	0.00000
35	-0.69211E-03	0.28705E-04	.50128	0.00000
36	-0.77622E-03	0.13450E-03	.56219	0.00000
37	-0.86460E-03	0.24290E-03	.62621	0.00000
38	-0.74107E-03	0.13468E-03	.53674	0.00000
39	-0.29548E-03	-0.29548E-03	.21401	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.24940	0.00000	0.06220
2	-0.25587	-0.26461	0.33008
3	-0.26235	-0.33332	0.40215
4	-0.27098	-0.27439	0.34782
5	-0.27914	-0.22311	0.30103
6	-0.27994	-0.22133	0.29970
7	-0.27300	-0.22787	0.30240
8	-0.26384	-0.17725	0.24686
9	-0.25673	-0.10814	0.17405

10	-0.25130	-0.07056	0.13371
11	-0.24570	-0.05097	0.11134
12	-0.24139	-0.09035	0.14862
13	-0.23923	-0.09207	0.14930
14	-0.23702	-0.03207	0.08825
15	-0.23384	0.08036	0.13504
16	-0.22954	0.21337	0.26605
17	-0.22442	0.33869	0.38905
18	-0.21878	0.43075	0.47862
19	-0.21366	0.46965	0.51530
20	-0.21438	0.44011	0.48606
21	-0.21988	0.35230	0.40064
22	-0.22470	0.23619	0.28668
23	-0.22884	0.11556	0.16793
24	-0.23237	0.01251	0.06651
25	-0.23556	-0.06121	0.11670
26	-0.23852	-0.10375	0.16064
27	-0.24119	-0.11063	0.16880
28	-0.24410	-0.07979	0.13937
29	-0.24872	-0.03529	0.09715
30	-0.25420	-0.04386	0.10847
31	-0.25968	-0.06973	0.13717
32	-0.26574	-0.13145	0.20207
33	-0.26964	-0.18622	0.25893
34	-0.27056	-0.19495	0.26816
35	-0.26694	-0.20756	0.27882
36	-0.25821	-0.26224	0.32892
37	-0.25016	-0.31891	0.38149
38	-0.24400	-0.25217	0.31171
39	-0.23779	0.00000	0.05654

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	11086.	30800.	0.360
BUCKLING THRUST (psi)	6	11086.	54350.	0.204
SEAM THRUST (psi)	6	11086.	21589.	0.513
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	19	0.515	1.000	0.515

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.59

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

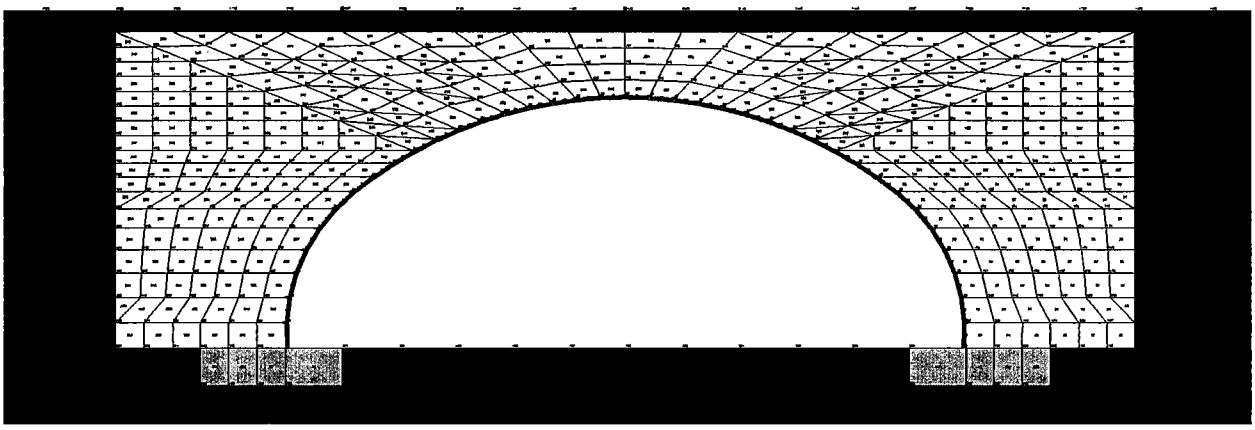
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.12

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *



HL-93 TRUCK

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage HL-93 TRUCK

EXECUTION MODE ..................   ANALYS
SOLUTION LEVEL ..................  #3 USER
METHODOLOGY (LRFD OR SERVICE) ...     LRFD
NUMBER OF PIPE-ELEMENT GROUPS ....       1
MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL
NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:
      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08
      POISSONS RATIO OF METAL (-) .......    0.30000E+00
      YIELD STRESS OF METAL (PSI)........    0.44000E+05
      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05
      DENSITY OF METAL (PCI).............    0.28400E+00
      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........    2
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NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40300

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -131.2	F = 0.000
1142	22	F = 0.000	F = -131.2	F = 0.000
1137	21	F = 0.000	F = -131.2	F = 0.000
1137	22	F = 0.000	F = -131.2	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000

724	1	D =	0.000	D =	0.000	D =	0.000
761	1	D =	0.000	D =	0.000	D =	0.000
786	1	D =	0.000	D =	0.000	D =	0.000
811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *
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BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000

5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.351E+00	-0.917E+00	0.135E-10	-0.105E+05	0.422E+03
	0.00	-0.957E+00	-0.295E+00	-0.241E+04	-0.105E+05	0.183E+04
2	-193.83	-0.428E+00	-0.816E+01	-0.442E+04	-0.261E+05	0.190E+03
	14.34	-0.964E+00	-0.249E+01	-0.247E+04	-0.107E+05	0.826E+03

3	-192.08	-0.478E+00	-0.154E+02	-0.552E+04	-0.301E+05	0.613E+01
	28.58	-0.963E+00	-0.468E+01	-0.253E+04	-0.110E+05	0.266E+02
4	-188.35	-0.489E+00	-0.270E+02	-0.464E+04	-0.273E+05	-0.506E+02
	42.43	-0.965E+00	-0.345E+01	-0.259E+04	-0.112E+05	-0.220E+03
5	-182.71	-0.469E+00	-0.281E+02	-0.408E+04	-0.253E+05	-0.187E+02
	55.62	-0.979E+00	0.516E+01	-0.257E+04	-0.112E+05	-0.813E+02
6	-175.27	-0.425E+00	-0.226E+02	-0.410E+04	-0.250E+05	-0.109E+02
	67.89	-0.101E+01	0.676E+01	-0.248E+04	-0.108E+05	-0.476E+02
7	-166.18	-0.363E+00	-0.175E+02	-0.373E+04	-0.233E+05	-0.665E+02
	78.98	-0.107E+01	0.522E+01	-0.239E+04	-0.104E+05	-0.289E+03
8	-155.61	-0.292E+00	-0.147E+02	-0.212E+04	-0.174E+05	-0.119E+03
	88.69	-0.115E+01	0.472E+01	-0.231E+04	-0.100E+05	-0.516E+03
9	-144.43	-0.222E+00	-0.126E+02	-0.277E+03	-0.107E+05	-0.102E+03
	97.10	-0.125E+01	0.369E+01	-0.224E+04	-0.972E+04	-0.443E+03
10	-132.78	-0.156E+00	-0.119E+02	0.846E+03	-0.124E+05	-0.534E+02
	104.87	-0.136E+01	0.347E+01	-0.218E+04	-0.949E+04	-0.232E+03
11	-120.72	-0.990E-01	-0.113E+02	0.134E+04	-0.139E+05	-0.112E+02
	111.98	-0.147E+01	0.327E+01	-0.213E+04	-0.927E+04	-0.487E+02
12	-108.28	-0.517E-01	-0.876E+01	0.128E+04	-0.135E+05	0.113E+02
	118.40	-0.157E+01	0.255E+01	-0.209E+04	-0.909E+04	0.490E+02
13	-95.50	-0.137E-01	-0.808E+01	0.114E+04	-0.129E+05	0.137E+02
	124.11	-0.166E+01	0.236E+01	-0.206E+04	-0.894E+04	0.596E+02
14	-82.42	0.161E-01	-0.630E+01	0.102E+04	-0.123E+05	0.656E+00
	129.10	-0.175E+01	0.184E+01	-0.203E+04	-0.882E+04	0.285E+01
15	-69.09	0.386E-01	-0.601E+01	0.124E+04	-0.130E+05	-0.253E+02
	133.35	-0.184E+01	0.175E+01	-0.200E+04	-0.870E+04	-0.110E+03
16	-55.53	0.542E-01	-0.627E+01	0.184E+04	-0.150E+05	-0.500E+02
	136.84	-0.192E+01	0.183E+01	-0.198E+04	-0.858E+04	-0.217E+03
17	-41.80	0.630E-01	-0.723E+01	0.274E+04	-0.179E+05	-0.645E+02
	139.57	-0.198E+01	0.212E+01	-0.194E+04	-0.845E+04	-0.280E+03
18	-27.94	0.656E-01	-0.842E+01	0.372E+04	-0.212E+05	-0.621E+02
	141.53	-0.203E+01	0.247E+01	-0.191E+04	-0.829E+04	-0.270E+03
19	-13.99	0.636E-01	-0.101E+02	0.452E+04	-0.238E+05	-0.378E+02
	142.70	-0.205E+01	0.294E+01	-0.187E+04	-0.812E+04	-0.164E+03
20	0.00	0.598E-01	-0.114E+02	0.477E+04	-0.246E+05	0.864E+01
	143.09	-0.203E+01	-0.240E+01	-0.186E+04	-0.810E+04	0.376E+02
21	13.99	0.573E-01	-0.102E+02	0.421E+04	-0.229E+05	0.548E+02
	142.70	-0.199E+01	-0.295E+01	-0.190E+04	-0.827E+04	0.238E+03
22	27.94	0.597E-01	-0.875E+01	0.312E+04	-0.193E+05	0.801E+02
	141.53	-0.192E+01	-0.255E+01	-0.195E+04	-0.845E+04	0.348E+03

23	41.80	0.689E-01	-0.739E+01	0.181E+04	-0.149E+05	0.839E+02
	139.57	-0.182E+01	-0.216E+01	-0.198E+04	-0.861E+04	0.365E+03
24	55.53	0.858E-01	-0.651E+01	0.586E+03	-0.108E+05	0.700E+02
	136.84	-0.171E+01	-0.190E+01	-0.202E+04	-0.876E+04	0.304E+03
25	69.09	0.110E+00	-0.623E+01	-0.341E+03	-0.101E+05	0.463E+02
	133.35	-0.160E+01	-0.182E+01	-0.205E+04	-0.889E+04	0.201E+03
26	82.42	0.139E+00	-0.610E+01	-0.887E+03	-0.121E+05	0.180E+02
	129.10	-0.150E+01	-0.179E+01	-0.207E+04	-0.900E+04	0.781E+02
27	95.50	0.172E+00	-0.619E+01	-0.994E+03	-0.126E+05	-0.121E+02
	124.11	-0.140E+01	-0.182E+01	-0.210E+04	-0.912E+04	-0.527E+02
28	108.28	0.208E+00	-0.751E+01	-0.663E+03	-0.115E+05	-0.338E+02
	118.40	-0.131E+01	-0.220E+01	-0.213E+04	-0.923E+04	-0.147E+03
29	120.72	0.247E+00	-0.122E+02	-0.130E+03	-0.986E+04	-0.155E+02
	111.98	-0.122E+01	-0.357E+01	-0.217E+04	-0.941E+04	-0.674E+02
30	132.78	0.290E+00	-0.104E+02	-0.283E+03	-0.106E+05	0.207E+02
	104.87	-0.114E+01	-0.306E+01	-0.221E+04	-0.961E+04	0.900E+02
31	144.43	0.336E+00	-0.121E+02	-0.742E+03	-0.124E+05	0.535E+02
	97.10	-0.106E+01	-0.355E+01	-0.226E+04	-0.982E+04	0.232E+03
32	155.61	0.383E+00	-0.155E+02	-0.179E+04	-0.163E+05	0.710E+02
	88.69	-0.993E+00	-0.289E+01	-0.231E+04	-0.100E+05	0.309E+03
33	166.18	0.429E+00	-0.194E+02	-0.275E+04	-0.197E+05	0.409E+02
	78.98	-0.936E+00	-0.107E+01	-0.235E+04	-0.102E+05	0.178E+03
34	175.27	0.467E+00	-0.233E+02	-0.295E+04	-0.205E+05	0.150E+02
	67.89	-0.898E+00	-0.881E+00	-0.237E+04	-0.103E+05	0.653E+02
35	182.71	0.492E+00	-0.263E+02	-0.315E+04	-0.211E+05	0.383E+02
	55.62	-0.878E+00	0.345E+01	-0.235E+04	-0.102E+05	0.166E+03
36	188.35	0.497E+00	-0.227E+02	-0.401E+04	-0.238E+05	0.628E+02
	42.43	-0.871E+00	0.684E+01	-0.229E+04	-0.993E+04	0.273E+03
37	192.08	0.475E+00	-0.124E+02	-0.491E+04	-0.266E+05	-0.244E+01
	28.58	-0.872E+00	0.377E+01	-0.221E+04	-0.962E+04	-0.106E+02
38	193.83	0.419E+00	-0.743E+01	-0.388E+04	-0.228E+05	-0.169E+03
	14.34	-0.875E+00	0.225E+01	-0.216E+04	-0.939E+04	-0.733E+03
39	193.56	0.338E+00	-0.243E+01	-0.331E-10	-0.914E+04	-0.367E+03
	0.00	-0.869E+00	0.734E+00	-0.211E+04	-0.914E+04	-0.160E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.32820E-03	-0.32820E-03	.23770	0.00000
2	-0.81795E-03	0.14474E-03	.59242	0.00000
3	-0.94566E-03	0.25486E-03	.68492	0.00000
4	-0.85781E-03	0.15217E-03	.62129	0.00000
5	-0.79465E-03	0.93943E-04	.57555	0.00000

6	-0.78384E-03	0.10729E-03	.56772	0.00000
7	-0.73171E-03	0.80340E-04	.52996	0.00000
8	-0.54519E-03	-0.83771E-04	.39487	0.00000
9	-0.33527E-03	-0.27500E-03	.24283	0.00000
10	-0.20559E-03	-0.38969E-03	.28224	0.00000
11	-0.14562E-03	-0.43616E-03	.31590	0.00000
12	-0.14589E-03	-0.42466E-03	.30757	0.00000
13	-0.15658E-03	-0.40468E-03	.29310	0.00000
14	-0.16605E-03	-0.38722E-03	.28045	0.00000
15	-0.13821E-03	-0.40794E-03	.29546	0.00000
16	-0.69262E-04	-0.46942E-03	.33999	0.00000
17	0.33009E-04	-0.56324E-03	.40794	0.00000
18	0.14485E-03	-0.66533E-03	.48188	0.00000
19	0.23695E-03	-0.74632E-03	.54054	0.00000
20	0.26518E-03	-0.77329E-03	.56008	0.00000
21	0.19900E-03	-0.71783E-03	.51990	0.00000
22	0.74421E-04	-0.60480E-03	.43804	0.00000
23	-0.73437E-04	-0.46723E-03	.33840	0.00000
24	-0.21109E-03	-0.33855E-03	.24520	0.00000
25	-0.31599E-03	-0.24169E-03	.22886	0.00000
26	-0.37909E-03	-0.18604E-03	.27456	0.00000
27	-0.39418E-03	-0.17795E-03	.28550	0.00000
28	-0.36187E-03	-0.21769E-03	.26209	0.00000
29	-0.30936E-03	-0.28096E-03	.22406	0.00000
30	-0.33231E-03	-0.27083E-03	.24068	0.00000
31	-0.38896E-03	-0.22750E-03	.28172	0.00000
32	-0.51009E-03	-0.12025E-03	.36944	0.00000
33	-0.61907E-03	-0.20866E-04	.44838	0.00000
34	-0.64304E-03	-0.20038E-05	.46574	0.00000
35	-0.66344E-03	0.22196E-04	.48051	0.00000
36	-0.74740E-03	0.12416E-03	.54132	0.00000
37	-0.83575E-03	0.23191E-03	.60532	0.00000
38	-0.71650E-03	0.12750E-03	.51894	0.00000
39	-0.28696E-03	-0.28696E-03	.20784	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.26412	0.00000	0.06976
2	-0.27089	-0.27721	0.35059
3	-0.27796	-0.34569	0.42295
4	-0.28393	-0.29083	0.37144
5	-0.28195	-0.25587	0.33537
6	-0.27223	-0.25660	0.33071
7	-0.26210	-0.23383	0.30253
8	-0.25308	-0.13287	0.19692
9	-0.24556	-0.01736	0.07766
10	-0.23953	0.05301	0.11038
11	-0.23410	0.08366	0.13846
12	-0.22957	0.08027	0.13298
13	-0.22584	0.07144	0.12244
14	-0.22262	0.06368	0.11325
15	-0.21976	0.07767	0.12596
16	-0.21675	0.11523	0.16221
17	-0.21335	0.17169	0.21721
18	-0.20943	0.23329	0.27715
19	-0.20496	0.28313	0.32514
20	-0.20445	0.29903	0.34083
21	-0.20876	0.26400	0.30758
22	-0.21341	0.19558	0.24113
23	-0.21755	0.11339	0.16072
24	-0.22116	0.03670	0.08561
25	-0.22440	-0.02140	0.07175
26	-0.22739	-0.05559	0.10730
27	-0.23021	-0.06226	0.11526
28	-0.23320	-0.04152	0.09590
29	-0.23753	-0.00818	0.06460
30	-0.24269	-0.01770	0.07660
31	-0.24805	-0.04649	0.10802
32	-0.25363	-0.11226	0.17658
33	-0.25749	-0.17225	0.23856
34	-0.25955	-0.18459	0.25195
35	-0.25802	-0.19743	0.26401
36	-0.25078	-0.25097	0.31386
37	-0.24297	-0.30744	0.36647

38	-0.23700	-0.24303	0.29920
39	-0.23093	0.00000	0.05333

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	4	11244.	30800.	0.365
BUCKLING THRUST (psi)	4	11244.	53934.	0.208
SEAM THRUST (psi)	4	11244.	21589.	0.521
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.423	1.000	0.423

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.50

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.10

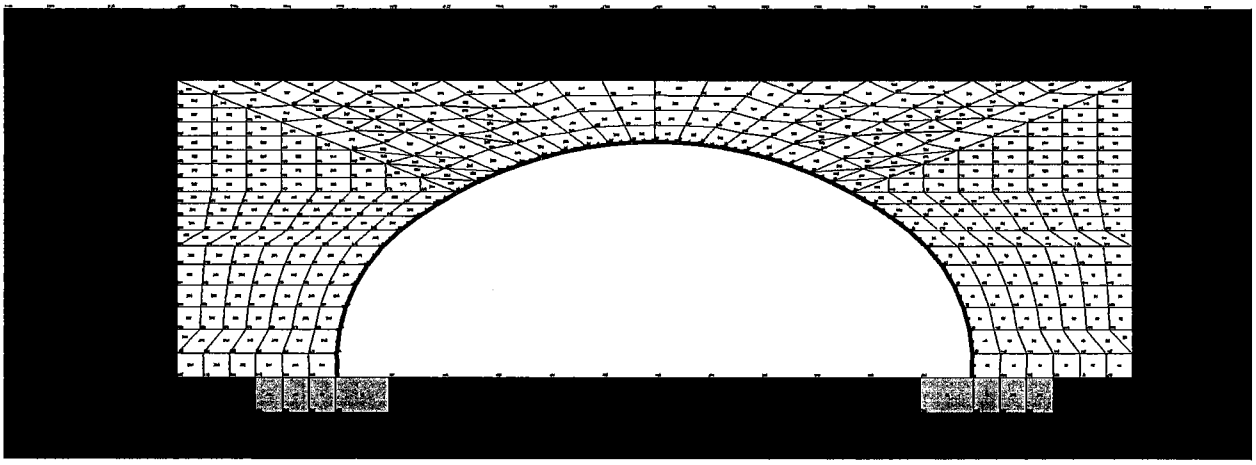
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *

STRUCTURAL EVALUATION (6.6 FT. OF COVER)



HL-93 TANDEM

*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM # 1

USER TITLE: Double Radius 33S 6.6ft Cover 8Gage Tandem

EXECUTION MODE ..... ANALYS

SOLUTION LEVEL ..... #3 USER

METHODOLOGY (LRFD OR SERVICE) ... LRFD

NUMBER OF PIPE-ELEMENT GROUPS 1

MAXIMUM ITERATIONS PER STEP ..... -99

PIPE ELEMENT TYPE ..... STEEL

NUMBER OF BEAM ELEMENTS 38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

YOUNGS MODULUS OF METAL (PSI)..... 0.29000E+08

POISSONS RATIO OF METAL (-) ..... 0.30000E+00

YIELD STRESS OF METAL (PSI)..... 0.44000E+05

LONGITUDINAL SEAM STRENGTH (PSI)... 0.32223E+05

DENSITY OF METAL (PCI)..... 0.28400E+00

MODULUS OF UPPER BI-SLOPE (PSI).... 0.00000E+00

MATERIAL CHARACTER CODE, NONLIN 2

NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

- -

REVIEW SYSTEM INPUT DATA

FINITE ELEMENT INPUT CONTROLS (PREP)

THE DATA TO BE RUN IS ENTITLED ...

BRIDGECOR

PRINT AND PLOT CONTROL CODES ...
PRINT CONTROL FOR MESH DATA---------- 3
PLOT FILE CONTROL MESH & RESULS-------- 3
PRINT FINITE ELEMENT RESULTS ---------- 1
INPUT DATA CHECK CODE---------- 0

BANDWIDTH MINIMIZER IS ON, MINBW------- 1

KEY NUMBERS DESCRIBING MESH ...
THE NUMBER OF LOAD STEPS IS---------- 22
TOTAL NUMBER OF NODES IS---------- 1204
TOTAL NUMBER OF ELEMENTS IS---------- 1167
TOTAL NUMBER OF BEAM ELEMENTS IS------- 38
MAX NUMBER OF BOUNDARY CONDITIONS IS--- 99

CONTINUOUS LOAD SCALING IS NOT ACTIVATED.

NODAL INPUT DATA TO GENERATE COORDINATES

NODE NUMBER	GENERATE CODE	NODE INCR.	X-AXIS COORD.	Y-AXIS COORD.	SPACING PARAMETER	ARC RADIUS
1	0	1	193.558	0.000	1.00	0.00
2	0	1	193.831	14.343	1.00	0.00
3	0	1	192.084	28.581	1.00	0.00
4	0	1	188.352	42.432	1.00	0.00
5	0	1	182.710	55.621	1.00	0.00
6	0	1	175.268	67.886	1.00	0.00

7	0	1	166.176	78.982	1.00	0.00
8	0	1	155.614	88.688	1.00	0.00
9	0	1	144.425	97.100	1.00	0.00
10	0	1	132.782	104.872	1.00	0.00
11	0	1	120.723	111.979	1.00	0.00
12	0	1	108.284	118.399	1.00	0.00
13	0	1	95.504	124.112	1.00	0.00
14	0	1	82.425	129.101	1.00	0.00
15	0	1	69.087	133.348	1.00	0.00
16	0	1	55.532	136.842	1.00	0.00
17	0	1	41.802	139.571	1.00	0.00
18	0	1	27.941	141.526	1.00	0.00
19	0	1	13.993	142.702	1.00	0.00
20	0	1	0.000	143.094	1.00	0.00
21	0	1	-13.993	142.702	1.00	0.00
22	0	1	-27.941	141.526	1.00	0.00
23	0	1	-41.802	139.571	1.00	0.00
24	0	1	-55.532	136.842	1.00	0.00
25	0	1	-69.087	133.348	1.00	0.00
26	0	1	-82.425	129.101	1.00	0.00
27	0	1	-95.504	124.112	1.00	0.00
28	0	1	-108.284	118.399	1.00	0.00
29	0	1	-120.723	111.979	1.00	0.00
30	0	1	-132.782	104.872	1.00	0.00
31	0	1	-144.425	97.100	1.00	0.00
32	0	1	-155.614	88.688	1.00	0.00
33	0	1	-166.176	78.982	1.00	0.00
34	0	1	-175.268	67.886	1.00	0.00
35	0	1	-182.710	55.621	1.00	0.00
36	0	1	-188.352	42.432	1.00	0.00
37	0	1	-192.084	28.581	1.00	0.00
38	0	1	-193.831	14.343	1.00	0.00
39	0	1	-193.558	0.000	1.00	0.00
40	0	1	193.831	14.343	1.00	0.00
41	0	1	192.084	28.581	1.00	0.00
42	0	1	188.352	42.432	1.00	0.00
43	0	1	182.710	55.621	1.00	0.00
44	0	1	175.268	67.886	1.00	0.00
45	0	1	166.176	78.982	1.00	0.00
46	0	1	155.614	88.688	1.00	0.00
47	0	1	144.425	97.100	1.00	0.00
48	0	1	132.782	104.872	1.00	0.00
49	0	1	120.723	111.979	1.00	0.00
50	0	1	108.284	118.399	1.00	0.00
51	0	1	95.504	124.112	1.00	0.00
52	0	1	82.425	129.101	1.00	0.00
53	0	1	69.087	133.348	1.00	0.00
54	0	1	55.532	136.842	1.00	0.00
55	0	1	41.802	139.571	1.00	0.00
56	0	1	27.941	141.526	1.00	0.00
57	0	1	13.993	142.702	1.00	0.00
58	0	1	0.000	143.094	1.00	0.00
59	0	1	-13.993	142.702	1.00	0.00
60	0	1	-27.941	141.526	1.00	0.00
61	0	1	-41.802	139.571	1.00	0.00
62	0	1	-55.532	136.842	1.00	0.00
63	0	1	-69.087	133.348	1.00	0.00
64	0	1	-82.425	129.101	1.00	0.00
65	0	1	-95.504	124.112	1.00	0.00
66	0	1	-108.284	118.399	1.00	0.00
67	0	1	-120.723	111.979	1.00	0.00
68	0	1	-132.782	104.872	1.00	0.00
69	0	1	-144.425	97.100	1.00	0.00
70	0	1	-155.614	88.688	1.00	0.00
71	0	1	-166.176	78.982	1.00	0.00
72	0	1	-175.268	67.886	1.00	0.00
73	0	1	-182.710	55.621	1.00	0.00
74	0	1	-188.352	42.432	1.00	0.00
75	0	1	-192.084	28.581	1.00	0.00
76	0	1	-193.831	14.343	1.00	0.00
77	0	1	193.831	14.343	1.00	0.00
78	0	1	192.084	28.581	1.00	0.00
79	0	1	188.352	42.432	1.00	0.00
80	0	1	182.710	55.621	1.00	0.00
81	0	1	175.268	67.886	1.00	0.00
82	0	1	166.176	78.982	1.00	0.00
83	0	1	155.614	88.688	1.00	0.00
84	0	1	144.425	97.100	1.00	0.00
85	0	1	132.782	104.872	1.00	0.00
86	0	1	120.723	111.979	1.00	0.00
87	0	1	108.284	118.399	1.00	0.00

88	0	1	95.504	124.112	1.00	0.00
89	0	1	82.425	129.101	1.00	0.00
90	0	1	69.087	133.348	1.00	0.00
91	0	1	55.532	136.842	1.00	0.00
92	0	1	41.802	139.571	1.00	0.00
93	0	1	27.941	141.526	1.00	0.00
94	0	1	13.993	142.702	1.00	0.00
95	0	1	0.000	143.094	1.00	0.00
96	0	1	-13.993	142.702	1.00	0.00
97	0	1	-27.941	141.526	1.00	0.00
98	0	1	-41.802	139.571	1.00	0.00
99	0	1	-55.532	136.842	1.00	0.00
100	0	1	-69.087	133.348	1.00	0.00
101	0	1	-82.425	129.101	1.00	0.00
102	0	1	-95.504	124.112	1.00	0.00
103	0	1	-108.284	118.399	1.00	0.00
104	0	1	-120.723	111.979	1.00	0.00
105	0	1	-132.782	104.872	1.00	0.00
106	0	1	-144.425	97.100	1.00	0.00
107	0	1	-155.614	88.688	1.00	0.00
108	0	1	-166.176	78.982	1.00	0.00
109	0	1	-175.268	67.886	1.00	0.00
110	0	1	-182.710	55.621	1.00	0.00
111	0	1	-188.352	42.432	1.00	0.00
112	0	1	-192.084	28.581	1.00	0.00
113	0	1	-193.831	14.343	1.00	0.00
114	0	1	0.000	179.094	1.00	0.00
115	0	1	0.000	152.094	1.00	0.00
116	0	1	0.000	161.094	1.00	0.00
117	0	1	0.000	170.094	1.00	0.00
118	0	1	0.000	0.000	1.00	0.00
119	0	1	0.000	-21.464	1.00	0.00
120	0	1	289.966	0.000	1.00	0.00
121	0	1	289.966	14.343	1.00	0.00
122	0	1	289.966	28.581	1.00	0.00
123	0	1	289.966	42.432	1.00	0.00
124	0	1	289.966	55.621	1.00	0.00
125	0	1	289.966	67.886	1.00	0.00
126	0	1	289.966	78.982	1.00	0.00
127	0	1	289.966	88.688	1.00	0.00
128	0	1	289.966	97.100	1.00	0.00
129	0	1	289.966	104.872	1.00	0.00
130	0	1	289.966	111.979	1.00	0.00
131	0	1	209.626	0.000	1.00	0.00
132	0	1	225.694	0.000	1.00	0.00
133	0	1	241.762	0.000	1.00	0.00
134	0	1	257.830	0.000	1.00	0.00
135	0	1	273.898	0.000	1.00	0.00
136	0	1	141.878	111.979	1.00	0.00
137	0	1	163.033	111.979	1.00	0.00
138	0	1	184.189	111.979	1.00	0.00
139	0	1	205.344	111.979	1.00	0.00
140	0	1	226.499	111.979	1.00	0.00
141	0	1	247.655	111.979	1.00	0.00
142	0	1	268.810	111.979	1.00	0.00
143	0	1	209.853	14.343	1.00	0.00
144	0	1	225.876	14.343	1.00	0.00
145	0	1	241.898	14.343	1.00	0.00
146	0	1	257.921	14.343	1.00	0.00
147	0	1	273.943	14.343	1.00	0.00
148	0	1	206.067	28.581	1.00	0.00
149	0	1	220.050	28.581	1.00	0.00
150	0	1	234.033	28.581	1.00	0.00
151	0	1	248.016	28.581	1.00	0.00
152	0	1	261.999	28.581	1.00	0.00
153	0	1	275.983	28.581	1.00	0.00
154	0	1	202.868	42.432	1.00	0.00
155	0	1	217.385	42.432	1.00	0.00
156	0	1	231.901	42.432	1.00	0.00
157	0	1	246.417	42.432	1.00	0.00
158	0	1	260.933	42.432	1.00	0.00
159	0	1	275.449	42.432	1.00	0.00
160	0	1	198.032	55.621	1.00	0.00
161	0	1	213.354	55.621	1.00	0.00
162	0	1	228.677	55.621	1.00	0.00
163	0	1	243.999	55.621	1.00	0.00
164	0	1	259.321	55.621	1.00	0.00
165	0	1	274.643	55.621	1.00	0.00
166	0	1	191.654	67.886	1.00	0.00
167	0	1	208.039	67.886	1.00	0.00
168	0	1	224.424	67.886	1.00	0.00

169	0	1	240.810	67.886	1.00	0.00
170	0	1	257.195	67.886	1.00	0.00
171	0	1	273.580	67.886	1.00	0.00
172	0	1	183.860	78.982	1.00	0.00
173	0	1	201.545	78.982	1.00	0.00
174	0	1	219.229	78.982	1.00	0.00
175	0	1	236.913	78.982	1.00	0.00
176	0	1	254.597	78.982	1.00	0.00
177	0	1	272.281	78.982	1.00	0.00
178	0	1	172.408	88.688	1.00	0.00
179	0	1	189.202	88.688	1.00	0.00
180	0	1	205.996	88.688	1.00	0.00
181	0	1	222.790	88.688	1.00	0.00
182	0	1	239.584	88.688	1.00	0.00
183	0	1	256.378	88.688	1.00	0.00
184	0	1	273.172	88.688	1.00	0.00
185	0	1	162.618	97.100	1.00	0.00
186	0	1	180.810	97.100	1.00	0.00
187	0	1	199.003	97.100	1.00	0.00
188	0	1	217.195	97.100	1.00	0.00
189	0	1	235.388	97.100	1.00	0.00
190	0	1	253.580	97.100	1.00	0.00
191	0	1	271.773	97.100	1.00	0.00
192	0	1	152.430	104.872	1.00	0.00
193	0	1	172.078	104.872	1.00	0.00
194	0	1	191.726	104.872	1.00	0.00
195	0	1	211.374	104.872	1.00	0.00
196	0	1	231.022	104.872	1.00	0.00
197	0	1	250.670	104.872	1.00	0.00
198	0	1	270.318	104.872	1.00	0.00
199	0	1	289.966	179.094	1.00	0.00
200	0	1	289.966	120.368	1.00	0.00
201	0	1	289.966	128.758	1.00	0.00
202	0	1	289.966	137.147	1.00	0.00
203	0	1	289.966	145.537	1.00	0.00
204	0	1	289.966	153.926	1.00	0.00
205	0	1	289.966	162.315	1.00	0.00
206	0	1	289.966	170.705	1.00	0.00
207	0	1	141.878	120.368	1.00	0.00
208	0	1	163.033	128.758	1.00	0.00
209	0	1	184.189	137.147	1.00	0.00
210	0	1	205.344	145.537	1.00	0.00
211	0	1	226.499	153.926	1.00	0.00
212	0	1	247.655	162.315	1.00	0.00
213	0	1	268.810	170.705	1.00	0.00
214	0	1	163.033	120.368	1.00	0.00
215	0	1	184.189	120.368	1.00	0.00
216	0	1	205.344	120.368	1.00	0.00
217	0	1	226.499	120.368	1.00	0.00
218	0	1	247.655	120.368	1.00	0.00
219	0	1	268.810	120.368	1.00	0.00
220	0	1	184.189	128.758	1.00	0.00
221	0	1	205.344	128.758	1.00	0.00
222	0	1	226.499	128.758	1.00	0.00
223	0	1	247.655	128.758	1.00	0.00
224	0	1	268.810	128.758	1.00	0.00
225	0	1	205.344	137.147	1.00	0.00
226	0	1	226.499	137.147	1.00	0.00
227	0	1	247.655	137.147	1.00	0.00
228	0	1	268.810	137.147	1.00	0.00
229	0	1	226.499	145.537	1.00	0.00
230	0	1	247.655	145.537	1.00	0.00
231	0	1	268.810	145.537	1.00	0.00
232	0	1	247.655	153.926	1.00	0.00
233	0	1	268.810	153.926	1.00	0.00
234	0	1	268.810	162.315	1.00	0.00
235	0	1	32.218	179.094	1.00	0.00
236	0	1	64.437	179.094	1.00	0.00
237	0	1	96.655	179.094	1.00	0.00
238	0	1	128.874	179.094	1.00	0.00
239	0	1	161.092	179.094	1.00	0.00
240	0	1	193.310	179.094	1.00	0.00
241	0	1	225.529	179.094	1.00	0.00
242	0	1	257.747	179.094	1.00	0.00
243	0	1	18.549	151.800	1.00	0.00
244	0	1	23.106	160.898	1.00	0.00
245	0	1	27.662	169.996	1.00	0.00
246	0	1	37.065	150.918	1.00	0.00
247	0	1	46.189	160.310	1.00	0.00
248	0	1	55.313	169.702	1.00	0.00
249	0	1	52.773	147.476	1.00	0.00

250	0	1	63.743	155.380	1.00	0.00
251	0	1	74.714	163.285	1.00	0.00
252	0	1	85.685	171.190	1.00	0.00
253	0	1	70.200	145.293	1.00	0.00
254	0	1	84.869	153.743	1.00	0.00
255	0	1	99.537	162.193	1.00	0.00
256	0	1	114.205	170.644	1.00	0.00
257	0	1	84.421	140.973	1.00	0.00
258	0	1	99.755	148.597	1.00	0.00
259	0	1	115.090	156.221	1.00	0.00
260	0	1	130.424	163.846	1.00	0.00
261	0	1	145.758	171.470	1.00	0.00
262	0	1	100.906	137.433	1.00	0.00
263	0	1	119.387	145.765	1.00	0.00
264	0	1	137.868	154.097	1.00	0.00
265	0	1	156.349	162.430	1.00	0.00
266	0	1	174.830	170.762	1.00	0.00
267	0	1	114.079	131.967	1.00	0.00
268	0	1	132.654	139.821	1.00	0.00
269	0	1	151.229	147.676	1.00	0.00
270	0	1	169.804	155.531	1.00	0.00
271	0	1	188.379	163.385	1.00	0.00
272	0	1	206.954	171.240	1.00	0.00
273	0	1	126.967	125.986	1.00	0.00
274	0	1	145.650	133.573	1.00	0.00
275	0	1	164.332	141.160	1.00	0.00
276	0	1	183.015	148.747	1.00	0.00
277	0	1	201.698	156.334	1.00	0.00
278	0	1	220.381	163.920	1.00	0.00
279	0	1	239.064	171.507	1.00	0.00
280	0	1	32.260	0.000	1.00	0.00
281	0	1	64.519	0.000	1.00	0.00
282	0	1	96.779	0.000	1.00	0.00
283	0	1	129.038	0.000	1.00	0.00
284	0	1	161.298	0.000	1.00	0.00
285	0	1	193.558	-21.464	1.00	0.00
286	0	1	289.966	-21.464	1.00	0.00
287	0	1	209.626	-21.464	1.00	0.00
288	0	1	225.694	-21.464	1.00	0.00
289	0	1	241.762	-21.464	1.00	0.00
290	0	1	257.830	-21.464	1.00	0.00
291	0	1	273.898	-21.464	1.00	0.00
292	0	1	32.260	-21.464	1.00	0.00
293	0	1	64.519	-21.464	1.00	0.00
294	0	1	96.779	-21.464	1.00	0.00
295	0	1	129.038	-21.464	1.00	0.00
296	0	1	161.298	-21.464	1.00	0.00
297	0	1	-289.966	0.000	1.00	0.00
298	0	1	-289.966	14.343	1.00	0.00
299	0	1	-289.966	28.581	1.00	0.00
300	0	1	-289.966	42.432	1.00	0.00
301	0	1	-289.966	55.621	1.00	0.00
302	0	1	-289.966	67.886	1.00	0.00
303	0	1	-289.966	78.982	1.00	0.00
304	0	1	-289.966	88.688	1.00	0.00
305	0	1	-289.966	97.100	1.00	0.00
306	0	1	-289.966	104.872	1.00	0.00
307	0	1	-289.966	111.979	1.00	0.00
308	0	1	-209.626	0.000	1.00	0.00
309	0	1	-225.694	0.000	1.00	0.00
310	0	1	-241.762	0.000	1.00	0.00
311	0	1	-257.830	0.000	1.00	0.00
312	0	1	-273.898	0.000	1.00	0.00
313	0	1	-141.878	111.979	1.00	0.00
314	0	1	-163.033	111.979	1.00	0.00
315	0	1	-184.189	111.979	1.00	0.00
316	0	1	-205.344	111.979	1.00	0.00
317	0	1	-226.499	111.979	1.00	0.00
318	0	1	-247.655	111.979	1.00	0.00
319	0	1	-268.810	111.979	1.00	0.00
320	0	1	-209.853	14.343	1.00	0.00
321	0	1	-225.876	14.343	1.00	0.00
322	0	1	-241.898	14.343	1.00	0.00
323	0	1	-257.921	14.343	1.00	0.00
324	0	1	-273.943	14.343	1.00	0.00
325	0	1	-206.067	28.581	1.00	0.00
326	0	1	-220.050	28.581	1.00	0.00
327	0	1	-234.033	28.581	1.00	0.00
328	0	1	-248.016	28.581	1.00	0.00
329	0	1	-261.999	28.581	1.00	0.00
330	0	1	-275.983	28.581	1.00	0.00

331	0	1	-202.868	42.432	1.00	0.00
332	0	1	-217.385	42.432	1.00	0.00
333	0	1	-231.901	42.432	1.00	0.00
334	0	1	-246.417	42.432	1.00	0.00
335	0	1	-260.933	42.432	1.00	0.00
336	0	1	-275.449	42.432	1.00	0.00
337	0	1	-198.032	55.621	1.00	0.00
338	0	1	-213.354	55.621	1.00	0.00
339	0	1	-228.677	55.621	1.00	0.00
340	0	1	-243.999	55.621	1.00	0.00
341	0	1	-259.321	55.621	1.00	0.00
342	0	1	-274.643	55.621	1.00	0.00
343	0	1	-191.654	67.886	1.00	0.00
344	0	1	-208.039	67.886	1.00	0.00
345	0	1	-224.424	67.886	1.00	0.00
346	0	1	-240.810	67.886	1.00	0.00
347	0	1	-257.195	67.886	1.00	0.00
348	0	1	-273.580	67.886	1.00	0.00
349	0	1	-183.860	78.982	1.00	0.00
350	0	1	-201.545	78.982	1.00	0.00
351	0	1	-219.229	78.982	1.00	0.00
352	0	1	-236.913	78.982	1.00	0.00
353	0	1	-254.597	78.982	1.00	0.00
354	0	1	-272.281	78.982	1.00	0.00
355	0	1	-172.408	88.688	1.00	0.00
356	0	1	-189.202	88.688	1.00	0.00
357	0	1	-205.996	88.688	1.00	0.00
358	0	1	-222.790	88.688	1.00	0.00
359	0	1	-239.584	88.688	1.00	0.00
360	0	1	-256.378	88.688	1.00	0.00
361	0	1	-273.172	88.688	1.00	0.00
362	0	1	-162.618	97.100	1.00	0.00
363	0	1	-180.810	97.100	1.00	0.00
364	0	1	-199.003	97.100	1.00	0.00
365	0	1	-217.195	97.100	1.00	0.00
366	0	1	-235.388	97.100	1.00	0.00
367	0	1	-253.580	97.100	1.00	0.00
368	0	1	-271.773	97.100	1.00	0.00
369	0	1	-152.430	104.872	1.00	0.00
370	0	1	-172.078	104.872	1.00	0.00
371	0	1	-191.726	104.872	1.00	0.00
372	0	1	-211.374	104.872	1.00	0.00
373	0	1	-231.022	104.872	1.00	0.00
374	0	1	-250.670	104.872	1.00	0.00
375	0	1	-270.318	104.872	1.00	0.00
376	0	1	-289.966	179.094	1.00	0.00
377	0	1	-289.966	120.368	1.00	0.00
378	0	1	-289.966	128.758	1.00	0.00
379	0	1	-289.966	137.147	1.00	0.00
380	0	1	-289.966	145.537	1.00	0.00
381	0	1	-289.966	153.926	1.00	0.00
382	0	1	-289.966	162.315	1.00	0.00
383	0	1	-289.966	170.705	1.00	0.00
384	0	1	-141.878	120.368	1.00	0.00
385	0	1	-163.033	128.758	1.00	0.00
386	0	1	-184.189	137.147	1.00	0.00
387	0	1	-205.344	145.537	1.00	0.00
388	0	1	-226.499	153.926	1.00	0.00
389	0	1	-247.655	162.315	1.00	0.00
390	0	1	-268.810	170.705	1.00	0.00
391	0	1	-163.033	120.368	1.00	0.00
392	0	1	-184.189	120.368	1.00	0.00
393	0	1	-205.344	120.368	1.00	0.00
394	0	1	-226.499	120.368	1.00	0.00
395	0	1	-247.655	120.368	1.00	0.00
396	0	1	-268.810	120.368	1.00	0.00
397	0	1	-184.189	128.758	1.00	0.00
398	0	1	-205.344	128.758	1.00	0.00
399	0	1	-226.499	128.758	1.00	0.00
400	0	1	-247.655	128.758	1.00	0.00
401	0	1	-268.810	128.758	1.00	0.00
402	0	1	-205.344	137.147	1.00	0.00
403	0	1	-226.499	137.147	1.00	0.00
404	0	1	-247.655	137.147	1.00	0.00
405	0	1	-268.810	137.147	1.00	0.00
406	0	1	-226.499	145.537	1.00	0.00
407	0	1	-247.655	145.537	1.00	0.00
408	0	1	-268.810	145.537	1.00	0.00
409	0	1	-247.655	153.926	1.00	0.00
410	0	1	-268.810	153.926	1.00	0.00
411	0	1	-268.810	162.315	1.00	0.00

412	0	1	-32.218	179.094	1.00	0.00
413	0	1	-64.437	179.094	1.00	0.00
414	0	1	-96.655	179.094	1.00	0.00
415	0	1	-128.874	179.094	1.00	0.00
416	0	1	-161.092	179.094	1.00	0.00
417	0	1	-193.310	179.094	1.00	0.00
418	0	1	-225.529	179.094	1.00	0.00
419	0	1	-257.747	179.094	1.00	0.00
420	0	1	-18.549	151.800	1.00	0.00
421	0	1	-23.106	160.898	1.00	0.00
422	0	1	-27.662	169.996	1.00	0.00
423	0	1	-37.065	150.918	1.00	0.00
424	0	1	-46.189	160.310	1.00	0.00
425	0	1	-55.313	169.702	1.00	0.00
426	0	1	-52.773	147.476	1.00	0.00
427	0	1	-63.743	155.380	1.00	0.00
428	0	1	-74.714	163.285	1.00	0.00
429	0	1	-85.685	171.190	1.00	0.00
430	0	1	-70.200	145.293	1.00	0.00
431	0	1	-84.869	153.743	1.00	0.00
432	0	1	-99.537	162.193	1.00	0.00
433	0	1	-114.205	170.644	1.00	0.00
434	0	1	-84.421	140.973	1.00	0.00
435	0	1	-99.755	148.597	1.00	0.00
436	0	1	-115.090	156.221	1.00	0.00
437	0	1	-130.424	163.846	1.00	0.00
438	0	1	-145.758	171.470	1.00	0.00
439	0	1	-100.906	137.433	1.00	0.00
440	0	1	-119.387	145.765	1.00	0.00
441	0	1	-137.868	154.097	1.00	0.00
442	0	1	-156.349	162.430	1.00	0.00
443	0	1	-174.830	170.762	1.00	0.00
444	0	1	-114.079	131.967	1.00	0.00
445	0	1	-132.654	139.821	1.00	0.00
446	0	1	-151.229	147.676	1.00	0.00
447	0	1	-169.804	155.531	1.00	0.00
448	0	1	-188.379	163.385	1.00	0.00
449	0	1	-206.954	171.240	1.00	0.00
450	0	1	-126.967	125.986	1.00	0.00
451	0	1	-145.650	133.573	1.00	0.00
452	0	1	-164.332	141.160	1.00	0.00
453	0	1	-183.015	148.747	1.00	0.00
454	0	1	-201.698	156.334	1.00	0.00
455	0	1	-220.381	163.920	1.00	0.00
456	0	1	-239.064	171.507	1.00	0.00
457	0	1	-32.260	0.000	1.00	0.00
458	0	1	-64.519	0.000	1.00	0.00
459	0	1	-96.779	0.000	1.00	0.00
460	0	1	-129.038	0.000	1.00	0.00
461	0	1	-161.298	0.000	1.00	0.00
462	0	1	-193.558	-21.464	1.00	0.00
463	0	1	-289.966	-21.464	1.00	0.00
464	0	1	-209.626	-21.464	1.00	0.00
465	0	1	-225.694	-21.464	1.00	0.00
466	0	1	-241.762	-21.464	1.00	0.00
467	0	1	-257.830	-21.464	1.00	0.00
468	0	1	-273.898	-21.464	1.00	0.00
469	0	1	-32.260	-21.464	1.00	0.00
470	0	1	-64.519	-21.464	1.00	0.00
471	0	1	-96.779	-21.464	1.00	0.00
472	0	1	-129.038	-21.464	1.00	0.00
473	0	1	-161.298	-21.464	1.00	0.00
474	0	1	-289.966	-45.075	1.00	0.00
475	0	1	-273.898	-45.075	1.00	0.00
476	0	1	-257.830	-45.075	1.00	0.00
477	0	1	-241.762	-45.075	1.00	0.00
478	0	1	-225.694	-45.075	1.00	0.00
479	0	1	-209.626	-45.075	1.00	0.00
480	0	1	-193.558	-45.075	1.00	0.00
481	0	1	-161.298	-45.075	1.00	0.00
482	0	1	-129.038	-45.075	1.00	0.00
483	0	1	-96.779	-45.075	1.00	0.00
484	0	1	-64.519	-45.075	1.00	0.00
485	0	1	-32.260	-45.075	1.00	0.00
486	0	1	0.000	-45.075	1.00	0.00
487	0	1	32.260	-45.075	1.00	0.00
488	0	1	64.519	-45.075	1.00	0.00
489	0	1	96.779	-45.075	1.00	0.00
490	0	1	129.038	-45.075	1.00	0.00
491	0	1	161.298	-45.075	1.00	0.00
492	0	1	193.558	-45.075	1.00	0.00

493	0	1	209.626	-45.075	1.00	0.00
494	0	1	225.694	-45.075	1.00	0.00
495	0	1	241.762	-45.075	1.00	0.00
496	0	1	257.830	-45.075	1.00	0.00
497	0	1	273.898	-45.075	1.00	0.00
498	0	1	289.966	-45.075	1.00	0.00
499	0	1	-289.966	-71.046	1.00	0.00
500	0	1	-273.898	-71.046	1.00	0.00
501	0	1	-257.830	-71.046	1.00	0.00
502	0	1	-241.762	-71.046	1.00	0.00
503	0	1	-225.694	-71.046	1.00	0.00
504	0	1	-209.626	-71.046	1.00	0.00
505	0	1	-193.558	-71.046	1.00	0.00
506	0	1	-161.298	-71.046	1.00	0.00
507	0	1	-129.038	-71.046	1.00	0.00
508	0	1	-96.779	-71.046	1.00	0.00
509	0	1	-64.519	-71.046	1.00	0.00
510	0	1	-32.260	-71.046	1.00	0.00
511	0	1	0.000	-71.046	1.00	0.00
512	0	1	32.260	-71.046	1.00	0.00
513	0	1	64.519	-71.046	1.00	0.00
514	0	1	96.779	-71.046	1.00	0.00
515	0	1	129.038	-71.046	1.00	0.00
516	0	1	161.298	-71.046	1.00	0.00
517	0	1	193.558	-71.046	1.00	0.00
518	0	1	209.626	-71.046	1.00	0.00
519	0	1	225.694	-71.046	1.00	0.00
520	0	1	241.762	-71.046	1.00	0.00
521	0	1	257.830	-71.046	1.00	0.00
522	0	1	273.898	-71.046	1.00	0.00
523	0	1	289.966	-71.046	1.00	0.00
524	0	1	-289.966	-99.615	1.00	0.00
525	0	1	-273.898	-99.615	1.00	0.00
526	0	1	-257.830	-99.615	1.00	0.00
527	0	1	-241.762	-99.615	1.00	0.00
528	0	1	-225.694	-99.615	1.00	0.00
529	0	1	-209.626	-99.615	1.00	0.00
530	0	1	-193.558	-99.615	1.00	0.00
531	0	1	-161.298	-99.615	1.00	0.00
532	0	1	-129.038	-99.615	1.00	0.00
533	0	1	-96.779	-99.615	1.00	0.00
534	0	1	-64.519	-99.615	1.00	0.00
535	0	1	-32.260	-99.615	1.00	0.00
536	0	1	0.000	-99.615	1.00	0.00
537	0	1	32.260	-99.615	1.00	0.00
538	0	1	64.519	-99.615	1.00	0.00
539	0	1	96.779	-99.615	1.00	0.00
540	0	1	129.038	-99.615	1.00	0.00
541	0	1	161.298	-99.615	1.00	0.00
542	0	1	193.558	-99.615	1.00	0.00
543	0	1	209.626	-99.615	1.00	0.00
544	0	1	225.694	-99.615	1.00	0.00
545	0	1	241.762	-99.615	1.00	0.00
546	0	1	257.830	-99.615	1.00	0.00
547	0	1	273.898	-99.615	1.00	0.00
548	0	1	289.966	-99.615	1.00	0.00
549	0	1	-289.966	-131.041	1.00	0.00
550	0	1	-273.898	-131.041	1.00	0.00
551	0	1	-257.830	-131.041	1.00	0.00
552	0	1	-241.762	-131.041	1.00	0.00
553	0	1	-225.694	-131.041	1.00	0.00
554	0	1	-209.626	-131.041	1.00	0.00
555	0	1	-193.558	-131.041	1.00	0.00
556	0	1	-161.298	-131.041	1.00	0.00
557	0	1	-129.038	-131.041	1.00	0.00
558	0	1	-96.779	-131.041	1.00	0.00
559	0	1	-64.519	-131.041	1.00	0.00
560	0	1	-32.260	-131.041	1.00	0.00
561	0	1	0.000	-131.041	1.00	0.00
562	0	1	32.260	-131.041	1.00	0.00
563	0	1	64.519	-131.041	1.00	0.00
564	0	1	96.779	-131.041	1.00	0.00
565	0	1	129.038	-131.041	1.00	0.00
566	0	1	161.298	-131.041	1.00	0.00
567	0	1	193.558	-131.041	1.00	0.00
568	0	1	209.626	-131.041	1.00	0.00
569	0	1	225.694	-131.041	1.00	0.00
570	0	1	241.762	-131.041	1.00	0.00
571	0	1	257.830	-131.041	1.00	0.00
572	0	1	273.898	-131.041	1.00	0.00
573	0	1	289.966	-131.041	1.00	0.00

574	0	1	-289.966	-165.609	1.00	0.00
575	0	1	-273.898	-165.609	1.00	0.00
576	0	1	-257.830	-165.609	1.00	0.00
577	0	1	-241.762	-165.609	1.00	0.00
578	0	1	-225.694	-165.609	1.00	0.00
579	0	1	-209.626	-165.609	1.00	0.00
580	0	1	-193.558	-165.609	1.00	0.00
581	0	1	-161.298	-165.609	1.00	0.00
582	0	1	-129.038	-165.609	1.00	0.00
583	0	1	-96.779	-165.609	1.00	0.00
584	0	1	-64.519	-165.609	1.00	0.00
585	0	1	-32.260	-165.609	1.00	0.00
586	0	1	0.000	-165.609	1.00	0.00
587	0	1	32.260	-165.609	1.00	0.00
588	0	1	64.519	-165.609	1.00	0.00
589	0	1	96.779	-165.609	1.00	0.00
590	0	1	129.038	-165.609	1.00	0.00
591	0	1	161.298	-165.609	1.00	0.00
592	0	1	193.558	-165.609	1.00	0.00
593	0	1	209.626	-165.609	1.00	0.00
594	0	1	225.694	-165.609	1.00	0.00
595	0	1	241.762	-165.609	1.00	0.00
596	0	1	257.830	-165.609	1.00	0.00
597	0	1	273.898	-165.609	1.00	0.00
598	0	1	289.966	-165.609	1.00	0.00
599	0	1	-332.398	-165.609	1.00	0.00
600	0	1	-332.398	-131.041	1.00	0.00
601	0	1	-332.398	-99.615	1.00	0.00
602	0	1	-332.398	-71.046	1.00	0.00
603	0	1	-332.398	-45.075	1.00	0.00
604	0	1	-332.398	-21.464	1.00	0.00
605	0	1	-332.398	0.000	1.00	0.00
606	0	1	-332.398	14.343	1.00	0.00
607	0	1	-332.398	28.581	1.00	0.00
608	0	1	-332.398	42.432	1.00	0.00
609	0	1	-332.398	55.621	1.00	0.00
610	0	1	-332.398	67.886	1.00	0.00
611	0	1	-332.398	78.982	1.00	0.00
612	0	1	-332.398	88.688	1.00	0.00
613	0	1	-332.398	97.100	1.00	0.00
614	0	1	-332.398	104.872	1.00	0.00
615	0	1	-332.398	111.979	1.00	0.00
616	0	1	-332.398	120.368	1.00	0.00
617	0	1	-332.398	128.758	1.00	0.00
618	0	1	-332.398	137.147	1.00	0.00
619	0	1	-332.398	145.537	1.00	0.00
620	0	1	-332.398	153.926	1.00	0.00
621	0	1	-332.398	162.315	1.00	0.00
622	0	1	-332.398	170.705	1.00	0.00
623	0	1	-332.398	179.094	1.00	0.00
624	0	1	-368.947	-165.609	1.00	0.00
625	0	1	-368.947	-131.041	1.00	0.00
626	0	1	-368.947	-99.615	1.00	0.00
627	0	1	-368.947	-71.046	1.00	0.00
628	0	1	-368.947	-45.075	1.00	0.00
629	0	1	-368.947	-21.464	1.00	0.00
630	0	1	-368.947	0.000	1.00	0.00
631	0	1	-368.947	14.343	1.00	0.00
632	0	1	-368.947	28.581	1.00	0.00
633	0	1	-368.947	42.432	1.00	0.00
634	0	1	-368.947	55.621	1.00	0.00
635	0	1	-368.947	67.886	1.00	0.00
636	0	1	-368.947	78.982	1.00	0.00
637	0	1	-368.947	88.688	1.00	0.00
638	0	1	-368.947	97.100	1.00	0.00
639	0	1	-368.947	104.872	1.00	0.00
640	0	1	-368.947	111.979	1.00	0.00
641	0	1	-368.947	120.368	1.00	0.00
642	0	1	-368.947	128.758	1.00	0.00
643	0	1	-368.947	137.147	1.00	0.00
644	0	1	-368.947	145.537	1.00	0.00
645	0	1	-368.947	153.926	1.00	0.00
646	0	1	-368.947	162.315	1.00	0.00
647	0	1	-368.947	170.705	1.00	0.00
648	0	1	-368.947	179.094	1.00	0.00
649	0	1	-394.837	-165.609	1.00	0.00
650	0	1	-394.837	-131.041	1.00	0.00
651	0	1	-394.837	-99.615	1.00	0.00
652	0	1	-394.837	-71.046	1.00	0.00
653	0	1	-394.837	-45.075	1.00	0.00
654	0	1	-394.837	-21.464	1.00	0.00

655	0	1	-394.837	0.000	1.00	0.00
656	0	1	-394.837	14.343	1.00	0.00
657	0	1	-394.837	28.581	1.00	0.00
658	0	1	-394.837	42.432	1.00	0.00
659	0	1	-394.837	55.621	1.00	0.00
660	0	1	-394.837	67.886	1.00	0.00
661	0	1	-394.837	78.982	1.00	0.00
662	0	1	-394.837	88.688	1.00	0.00
663	0	1	-394.837	97.100	1.00	0.00
664	0	1	-394.837	104.872	1.00	0.00
665	0	1	-394.837	111.979	1.00	0.00
666	0	1	-394.837	120.368	1.00	0.00
667	0	1	-394.837	128.758	1.00	0.00
668	0	1	-394.837	137.147	1.00	0.00
669	0	1	-394.837	145.537	1.00	0.00
670	0	1	-394.837	153.926	1.00	0.00
671	0	1	-394.837	162.315	1.00	0.00
672	0	1	-394.837	170.705	1.00	0.00
673	0	1	-394.837	179.094	1.00	0.00
674	0	1	-418.723	-165.609	1.00	0.00
675	0	1	-418.723	-131.041	1.00	0.00
676	0	1	-418.723	-99.615	1.00	0.00
677	0	1	-418.723	-71.046	1.00	0.00
678	0	1	-418.723	-45.075	1.00	0.00
679	0	1	-418.723	-21.464	1.00	0.00
680	0	1	-418.723	0.000	1.00	0.00
681	0	1	-418.723	14.343	1.00	0.00
682	0	1	-418.723	28.581	1.00	0.00
683	0	1	-418.723	42.432	1.00	0.00
684	0	1	-418.723	55.621	1.00	0.00
685	0	1	-418.723	67.886	1.00	0.00
686	0	1	-418.723	78.982	1.00	0.00
687	0	1	-418.723	88.688	1.00	0.00
688	0	1	-418.723	97.100	1.00	0.00
689	0	1	-418.723	104.872	1.00	0.00
690	0	1	-418.723	111.979	1.00	0.00
691	0	1	-418.723	120.368	1.00	0.00
692	0	1	-418.723	128.758	1.00	0.00
693	0	1	-418.723	137.147	1.00	0.00
694	0	1	-418.723	145.537	1.00	0.00
695	0	1	-418.723	153.926	1.00	0.00
696	0	1	-418.723	162.315	1.00	0.00
697	0	1	-418.723	170.705	1.00	0.00
698	0	1	-418.723	179.094	1.00	0.00
699	0	1	-443.892	-165.609	1.00	0.00
700	0	1	-443.892	-131.041	1.00	0.00
701	0	1	-443.892	-99.615	1.00	0.00
702	0	1	-443.892	-71.046	1.00	0.00
703	0	1	-443.892	-45.075	1.00	0.00
704	0	1	-443.892	-21.464	1.00	0.00
705	0	1	-443.892	0.000	1.00	0.00
706	0	1	-443.892	14.343	1.00	0.00
707	0	1	-443.892	28.581	1.00	0.00
708	0	1	-443.892	42.432	1.00	0.00
709	0	1	-443.892	55.621	1.00	0.00
710	0	1	-443.892	67.886	1.00	0.00
711	0	1	-443.892	78.982	1.00	0.00
712	0	1	-443.892	88.688	1.00	0.00
713	0	1	-443.892	97.100	1.00	0.00
714	0	1	-443.892	104.872	1.00	0.00
715	0	1	-443.892	111.979	1.00	0.00
716	0	1	-443.892	120.368	1.00	0.00
717	0	1	-443.892	128.758	1.00	0.00
718	0	1	-443.892	137.147	1.00	0.00
719	0	1	-443.892	145.537	1.00	0.00
720	0	1	-443.892	153.926	1.00	0.00
721	0	1	-443.892	162.315	1.00	0.00
722	0	1	-443.892	170.705	1.00	0.00
723	0	1	-443.892	179.094	1.00	0.00
724	0	1	-469.060	-165.609	1.00	0.00
725	0	1	-469.060	-131.041	1.00	0.00
726	0	1	-469.060	-99.615	1.00	0.00
727	0	1	-469.060	-71.046	1.00	0.00
728	0	1	-469.060	-45.075	1.00	0.00
729	0	1	-469.060	-21.464	1.00	0.00
730	0	1	-469.060	0.000	1.00	0.00
731	0	1	-469.060	14.343	1.00	0.00
732	0	1	-469.060	28.581	1.00	0.00
733	0	1	-469.060	42.432	1.00	0.00
734	0	1	-469.060	55.621	1.00	0.00
735	0	1	-469.060	67.886	1.00	0.00

736	0	1	-469.060	78.982	1.00	0.00
737	0	1	-469.060	88.688	1.00	0.00
738	0	1	-469.060	97.100	1.00	0.00
739	0	1	-469.060	104.872	1.00	0.00
740	0	1	-469.060	111.979	1.00	0.00
741	0	1	-469.060	120.368	1.00	0.00
742	0	1	-469.060	128.758	1.00	0.00
743	0	1	-469.060	137.147	1.00	0.00
744	0	1	-469.060	145.537	1.00	0.00
745	0	1	-469.060	153.926	1.00	0.00
746	0	1	-469.060	162.315	1.00	0.00
747	0	1	-469.060	170.705	1.00	0.00
748	0	1	-469.060	179.094	1.00	0.00
749	0	1	-304.308	14.343	1.00	0.00
750	0	1	-318.547	28.581	1.00	0.00
751	0	1	-345.587	55.621	1.00	0.00
752	0	1	-357.851	67.886	1.00	0.00
753	0	1	-378.654	88.688	1.00	0.00
754	0	1	-387.066	97.100	1.00	0.00
755	0	1	-401.944	111.979	1.00	0.00
756	0	1	-410.334	120.368	1.00	0.00
757	0	1	-427.113	137.147	1.00	0.00
758	0	1	-435.502	145.537	1.00	0.00
759	0	1	-452.281	162.315	1.00	0.00
760	0	1	-460.670	170.705	1.00	0.00
761	0	1	-577.060	-165.609	1.00	0.00
762	0	1	-577.060	-131.041	1.00	0.00
763	0	1	-577.060	-99.615	1.00	0.00
764	0	1	-577.060	-71.046	1.00	0.00
765	0	1	-577.060	-45.075	1.00	0.00
766	0	1	-577.060	-21.464	1.00	0.00
767	0	1	-577.060	0.000	1.00	0.00
768	0	1	-577.060	14.343	1.00	0.00
769	0	1	-577.060	28.581	1.00	0.00
770	0	1	-577.060	42.432	1.00	0.00
771	0	1	-577.060	55.621	1.00	0.00
772	0	1	-577.060	67.886	1.00	0.00
773	0	1	-577.060	78.982	1.00	0.00
774	0	1	-577.060	88.688	1.00	0.00
775	0	1	-577.060	97.100	1.00	0.00
776	0	1	-577.060	104.872	1.00	0.00
777	0	1	-577.060	111.979	1.00	0.00
778	0	1	-577.060	120.368	1.00	0.00
779	0	1	-577.060	128.758	1.00	0.00
780	0	1	-577.060	137.147	1.00	0.00
781	0	1	-577.060	145.537	1.00	0.00
782	0	1	-577.060	153.926	1.00	0.00
783	0	1	-577.060	162.315	1.00	0.00
784	0	1	-577.060	170.705	1.00	0.00
785	0	1	-577.060	179.094	1.00	0.00
786	0	1	-685.060	-165.609	1.00	0.00
787	0	1	-685.060	-131.041	1.00	0.00
788	0	1	-685.060	-99.615	1.00	0.00
789	0	1	-685.060	-71.046	1.00	0.00
790	0	1	-685.060	-45.075	1.00	0.00
791	0	1	-685.060	-21.464	1.00	0.00
792	0	1	-685.060	0.000	1.00	0.00
793	0	1	-685.060	14.343	1.00	0.00
794	0	1	-685.060	28.581	1.00	0.00
795	0	1	-685.060	42.432	1.00	0.00
796	0	1	-685.060	55.621	1.00	0.00
797	0	1	-685.060	67.886	1.00	0.00
798	0	1	-685.060	78.982	1.00	0.00
799	0	1	-685.060	88.688	1.00	0.00
800	0	1	-685.060	97.100	1.00	0.00
801	0	1	-685.060	104.872	1.00	0.00
802	0	1	-685.060	111.979	1.00	0.00
803	0	1	-685.060	120.368	1.00	0.00
804	0	1	-685.060	128.758	1.00	0.00
805	0	1	-685.060	137.147	1.00	0.00
806	0	1	-685.060	145.537	1.00	0.00
807	0	1	-685.060	153.926	1.00	0.00
808	0	1	-685.060	162.315	1.00	0.00
809	0	1	-685.060	170.705	1.00	0.00
810	0	1	-685.060	179.094	1.00	0.00
811	0	1	-793.060	-165.609	1.00	0.00
812	0	1	-793.060	-131.041	1.00	0.00
813	0	1	-793.060	-99.615	1.00	0.00
814	0	1	-793.060	-71.046	1.00	0.00
815	0	1	-793.060	-45.075	1.00	0.00
816	0	1	-793.060	-21.464	1.00	0.00

817	0	1	-793.060	0.000	1.00	0.00
818	0	1	-793.060	14.343	1.00	0.00
819	0	1	-793.060	28.581	1.00	0.00
820	0	1	-793.060	42.432	1.00	0.00
821	0	1	-793.060	55.621	1.00	0.00
822	0	1	-793.060	67.886	1.00	0.00
823	0	1	-793.060	78.982	1.00	0.00
824	0	1	-793.060	88.688	1.00	0.00
825	0	1	-793.060	97.100	1.00	0.00
826	0	1	-793.060	104.872	1.00	0.00
827	0	1	-793.060	111.979	1.00	0.00
828	0	1	-793.060	120.368	1.00	0.00
829	0	1	-793.060	128.758	1.00	0.00
830	0	1	-793.060	137.147	1.00	0.00
831	0	1	-793.060	145.537	1.00	0.00
832	0	1	-793.060	153.926	1.00	0.00
833	0	1	-793.060	162.315	1.00	0.00
834	0	1	-793.060	170.705	1.00	0.00
835	0	1	-793.060	179.094	1.00	0.00
836	0	1	-901.060	-165.609	1.00	0.00
837	0	1	-901.060	-131.041	1.00	0.00
838	0	1	-901.060	-99.615	1.00	0.00
839	0	1	-901.060	-71.046	1.00	0.00
840	0	1	-901.060	-45.075	1.00	0.00
841	0	1	-901.060	-21.464	1.00	0.00
842	0	1	-901.060	0.000	1.00	0.00
843	0	1	-901.060	14.343	1.00	0.00
844	0	1	-901.060	28.581	1.00	0.00
845	0	1	-901.060	42.432	1.00	0.00
846	0	1	-901.060	55.621	1.00	0.00
847	0	1	-901.060	67.886	1.00	0.00
848	0	1	-901.060	78.982	1.00	0.00
849	0	1	-901.060	88.688	1.00	0.00
850	0	1	-901.060	97.100	1.00	0.00
851	0	1	-901.060	104.872	1.00	0.00
852	0	1	-901.060	111.979	1.00	0.00
853	0	1	-901.060	120.368	1.00	0.00
854	0	1	-901.060	128.758	1.00	0.00
855	0	1	-901.060	137.147	1.00	0.00
856	0	1	-901.060	145.537	1.00	0.00
857	0	1	-901.060	153.926	1.00	0.00
858	0	1	-901.060	162.315	1.00	0.00
859	0	1	-901.060	170.705	1.00	0.00
860	0	1	-901.060	179.094	1.00	0.00
861	0	1	332.398	-165.609	1.00	0.00
862	0	1	332.398	-131.041	1.00	0.00
863	0	1	332.398	-99.615	1.00	0.00
864	0	1	332.398	-71.046	1.00	0.00
865	0	1	332.398	-45.075	1.00	0.00
866	0	1	332.398	-21.464	1.00	0.00
867	0	1	332.398	0.000	1.00	0.00
868	0	1	332.398	14.343	1.00	0.00
869	0	1	332.398	28.581	1.00	0.00
870	0	1	332.398	42.432	1.00	0.00
871	0	1	332.398	55.621	1.00	0.00
872	0	1	332.398	67.886	1.00	0.00
873	0	1	332.398	78.982	1.00	0.00
874	0	1	332.398	88.688	1.00	0.00
875	0	1	332.398	97.100	1.00	0.00
876	0	1	332.398	104.872	1.00	0.00
877	0	1	332.398	111.979	1.00	0.00
878	0	1	332.398	120.368	1.00	0.00
879	0	1	332.398	128.758	1.00	0.00
880	0	1	332.398	137.147	1.00	0.00
881	0	1	332.398	145.537	1.00	0.00
882	0	1	332.398	153.926	1.00	0.00
883	0	1	332.398	162.315	1.00	0.00
884	0	1	332.398	170.705	1.00	0.00
885	0	1	332.398	179.094	1.00	0.00
886	0	1	368.947	-165.609	1.00	0.00
887	0	1	368.947	-131.041	1.00	0.00
888	0	1	368.947	-99.615	1.00	0.00
889	0	1	368.947	-71.046	1.00	0.00
890	0	1	368.947	-45.075	1.00	0.00
891	0	1	368.947	-21.464	1.00	0.00
892	0	1	368.947	0.000	1.00	0.00
893	0	1	368.947	14.343	1.00	0.00
894	0	1	368.947	28.581	1.00	0.00
895	0	1	368.947	42.432	1.00	0.00
896	0	1	368.947	55.621	1.00	0.00
897	0	1	368.947	67.886	1.00	0.00

898	0	1	368.947	78.982	1.00	0.00
899	0	1	368.947	88.688	1.00	0.00
900	0	1	368.947	97.100	1.00	0.00
901	0	1	368.947	104.872	1.00	0.00
902	0	1	368.947	111.979	1.00	0.00
903	0	1	368.947	120.368	1.00	0.00
904	0	1	368.947	128.758	1.00	0.00
905	0	1	368.947	137.147	1.00	0.00
906	0	1	368.947	145.537	1.00	0.00
907	0	1	368.947	153.926	1.00	0.00
908	0	1	368.947	162.315	1.00	0.00
909	0	1	368.947	170.705	1.00	0.00
910	0	1	368.947	179.094	1.00	0.00
911	0	1	394.837	-165.609	1.00	0.00
912	0	1	394.837	-131.041	1.00	0.00
913	0	1	394.837	-99.615	1.00	0.00
914	0	1	394.837	-71.046	1.00	0.00
915	0	1	394.837	-45.075	1.00	0.00
916	0	1	394.837	-21.464	1.00	0.00
917	0	1	394.837	0.000	1.00	0.00
918	0	1	394.837	14.343	1.00	0.00
919	0	1	394.837	28.581	1.00	0.00
920	0	1	394.837	42.432	1.00	0.00
921	0	1	394.837	55.621	1.00	0.00
922	0	1	394.837	67.886	1.00	0.00
923	0	1	394.837	78.982	1.00	0.00
924	0	1	394.837	88.688	1.00	0.00
925	0	1	394.837	97.100	1.00	0.00
926	0	1	394.837	104.872	1.00	0.00
927	0	1	394.837	111.979	1.00	0.00
928	0	1	394.837	120.368	1.00	0.00
929	0	1	394.837	128.758	1.00	0.00
930	0	1	394.837	137.147	1.00	0.00
931	0	1	394.837	145.537	1.00	0.00
932	0	1	394.837	153.926	1.00	0.00
933	0	1	394.837	162.315	1.00	0.00
934	0	1	394.837	170.705	1.00	0.00
935	0	1	394.837	179.094	1.00	0.00
936	0	1	418.723	-165.609	1.00	0.00
937	0	1	418.723	-131.041	1.00	0.00
938	0	1	418.723	-99.615	1.00	0.00
939	0	1	418.723	-71.046	1.00	0.00
940	0	1	418.723	-45.075	1.00	0.00
941	0	1	418.723	-21.464	1.00	0.00
942	0	1	418.723	0.000	1.00	0.00
943	0	1	418.723	14.343	1.00	0.00
944	0	1	418.723	28.581	1.00	0.00
945	0	1	418.723	42.432	1.00	0.00
946	0	1	418.723	55.621	1.00	0.00
947	0	1	418.723	67.886	1.00	0.00
948	0	1	418.723	78.982	1.00	0.00
949	0	1	418.723	88.688	1.00	0.00
950	0	1	418.723	97.100	1.00	0.00
951	0	1	418.723	104.872	1.00	0.00
952	0	1	418.723	111.979	1.00	0.00
953	0	1	418.723	120.368	1.00	0.00
954	0	1	418.723	128.758	1.00	0.00
955	0	1	418.723	137.147	1.00	0.00
956	0	1	418.723	145.537	1.00	0.00
957	0	1	418.723	153.926	1.00	0.00
958	0	1	418.723	162.315	1.00	0.00
959	0	1	418.723	170.705	1.00	0.00
960	0	1	418.723	179.094	1.00	0.00
961	0	1	443.892	-165.609	1.00	0.00
962	0	1	443.892	-131.041	1.00	0.00
963	0	1	443.892	-99.615	1.00	0.00
964	0	1	443.892	-71.046	1.00	0.00
965	0	1	443.892	-45.075	1.00	0.00
966	0	1	443.892	-21.464	1.00	0.00
967	0	1	443.892	0.000	1.00	0.00
968	0	1	443.892	14.343	1.00	0.00
969	0	1	443.892	28.581	1.00	0.00
970	0	1	443.892	42.432	1.00	0.00
971	0	1	443.892	55.621	1.00	0.00
972	0	1	443.892	67.886	1.00	0.00
973	0	1	443.892	78.982	1.00	0.00
974	0	1	443.892	88.688	1.00	0.00
975	0	1	443.892	97.100	1.00	0.00
976	0	1	443.892	104.872	1.00	0.00
977	0	1	443.892	111.979	1.00	0.00
978	0	1	443.892	120.368	1.00	0.00

979	0	1	443.892	128.758	1.00	0.00
980	0	1	443.892	137.147	1.00	0.00
981	0	1	443.892	145.537	1.00	0.00
982	0	1	443.892	153.926	1.00	0.00
983	0	1	443.892	162.315	1.00	0.00
984	0	1	443.892	170.705	1.00	0.00
985	0	1	443.892	179.094	1.00	0.00
986	0	1	469.060	-165.609	1.00	0.00
987	0	1	469.060	-131.041	1.00	0.00
988	0	1	469.060	-99.615	1.00	0.00
989	0	1	469.060	-71.046	1.00	0.00
990	0	1	469.060	-45.075	1.00	0.00
991	0	1	469.060	-21.464	1.00	0.00
992	0	1	469.060	0.000	1.00	0.00
993	0	1	469.060	14.343	1.00	0.00
994	0	1	469.060	28.581	1.00	0.00
995	0	1	469.060	42.432	1.00	0.00
996	0	1	469.060	55.621	1.00	0.00
997	0	1	469.060	67.886	1.00	0.00
998	0	1	469.060	78.982	1.00	0.00
999	0	1	469.060	88.688	1.00	0.00
1000	0	1	469.060	97.100	1.00	0.00
1001	0	1	469.060	104.872	1.00	0.00
1002	0	1	469.060	111.979	1.00	0.00
1003	0	1	469.060	120.368	1.00	0.00
1004	0	1	469.060	128.758	1.00	0.00
1005	0	1	469.060	137.147	1.00	0.00
1006	0	1	469.060	145.537	1.00	0.00
1007	0	1	469.060	153.926	1.00	0.00
1008	0	1	469.060	162.315	1.00	0.00
1009	0	1	469.060	170.705	1.00	0.00
1010	0	1	469.060	179.094	1.00	0.00
1011	0	1	304.308	14.343	1.00	0.00
1012	0	1	318.547	28.581	1.00	0.00
1013	0	1	345.587	55.621	1.00	0.00
1014	0	1	357.851	67.886	1.00	0.00
1015	0	1	378.654	88.688	1.00	0.00
1016	0	1	387.066	97.100	1.00	0.00
1017	0	1	401.944	111.979	1.00	0.00
1018	0	1	410.334	120.368	1.00	0.00
1019	0	1	427.113	137.147	1.00	0.00
1020	0	1	435.502	145.537	1.00	0.00
1021	0	1	452.281	162.315	1.00	0.00
1022	0	1	460.670	170.705	1.00	0.00
1023	0	1	577.060	-165.609	1.00	0.00
1024	0	1	577.060	-131.041	1.00	0.00
1025	0	1	577.060	-99.615	1.00	0.00
1026	0	1	577.060	-71.046	1.00	0.00
1027	0	1	577.060	-45.075	1.00	0.00
1028	0	1	577.060	-21.464	1.00	0.00
1029	0	1	577.060	0.000	1.00	0.00
1030	0	1	577.060	14.343	1.00	0.00
1031	0	1	577.060	28.581	1.00	0.00
1032	0	1	577.060	42.432	1.00	0.00
1033	0	1	577.060	55.621	1.00	0.00
1034	0	1	577.060	67.886	1.00	0.00
1035	0	1	577.060	78.982	1.00	0.00
1036	0	1	577.060	88.688	1.00	0.00
1037	0	1	577.060	97.100	1.00	0.00
1038	0	1	577.060	104.872	1.00	0.00
1039	0	1	577.060	111.979	1.00	0.00
1040	0	1	577.060	120.368	1.00	0.00
1041	0	1	577.060	128.758	1.00	0.00
1042	0	1	577.060	137.147	1.00	0.00
1043	0	1	577.060	145.537	1.00	0.00
1044	0	1	577.060	153.926	1.00	0.00
1045	0	1	577.060	162.315	1.00	0.00
1046	0	1	577.060	170.705	1.00	0.00
1047	0	1	577.060	179.094	1.00	0.00
1048	0	1	685.060	-165.609	1.00	0.00
1049	0	1	685.060	-131.041	1.00	0.00
1050	0	1	685.060	-99.615	1.00	0.00
1051	0	1	685.060	-71.046	1.00	0.00
1052	0	1	685.060	-45.075	1.00	0.00
1053	0	1	685.060	-21.464	1.00	0.00
1054	0	1	685.060	0.000	1.00	0.00
1055	0	1	685.060	14.343	1.00	0.00
1056	0	1	685.060	28.581	1.00	0.00
1057	0	1	685.060	42.432	1.00	0.00
1058	0	1	685.060	55.621	1.00	0.00
1059	0	1	685.060	67.886	1.00	0.00

1060	0	1	685.060	78.982	1.00	0.00
1061	0	1	685.060	88.688	1.00	0.00
1062	0	1	685.060	97.100	1.00	0.00
1063	0	1	685.060	104.872	1.00	0.00
1064	0	1	685.060	111.979	1.00	0.00
1065	0	1	685.060	120.368	1.00	0.00
1066	0	1	685.060	128.758	1.00	0.00
1067	0	1	685.060	137.147	1.00	0.00
1068	0	1	685.060	145.537	1.00	0.00
1069	0	1	685.060	153.926	1.00	0.00
1070	0	1	685.060	162.315	1.00	0.00
1071	0	1	685.060	170.705	1.00	0.00
1072	0	1	685.060	179.094	1.00	0.00
1073	0	1	793.060	-165.609	1.00	0.00
1074	0	1	793.060	-131.041	1.00	0.00
1075	0	1	793.060	-99.615	1.00	0.00
1076	0	1	793.060	-71.046	1.00	0.00
1077	0	1	793.060	-45.075	1.00	0.00
1078	0	1	793.060	-21.464	1.00	0.00
1079	0	1	793.060	0.000	1.00	0.00
1080	0	1	793.060	14.343	1.00	0.00
1081	0	1	793.060	28.581	1.00	0.00
1082	0	1	793.060	42.432	1.00	0.00
1083	0	1	793.060	55.621	1.00	0.00
1084	0	1	793.060	67.886	1.00	0.00
1085	0	1	793.060	78.982	1.00	0.00
1086	0	1	793.060	88.688	1.00	0.00
1087	0	1	793.060	97.100	1.00	0.00
1088	0	1	793.060	104.872	1.00	0.00
1089	0	1	793.060	111.979	1.00	0.00
1090	0	1	793.060	120.368	1.00	0.00
1091	0	1	793.060	128.758	1.00	0.00
1092	0	1	793.060	137.147	1.00	0.00
1093	0	1	793.060	145.537	1.00	0.00
1094	0	1	793.060	153.926	1.00	0.00
1095	0	1	793.060	162.315	1.00	0.00
1096	0	1	793.060	170.705	1.00	0.00
1097	0	1	793.060	179.094	1.00	0.00
1098	0	1	901.060	-165.609	1.00	0.00
1099	0	1	901.060	-131.041	1.00	0.00
1100	0	1	901.060	-99.615	1.00	0.00
1101	0	1	901.060	-71.046	1.00	0.00
1102	0	1	901.060	-45.075	1.00	0.00
1103	0	1	901.060	-21.464	1.00	0.00
1104	0	1	901.060	0.000	1.00	0.00
1105	0	1	901.060	14.343	1.00	0.00
1106	0	1	901.060	28.581	1.00	0.00
1107	0	1	901.060	42.432	1.00	0.00
1108	0	1	901.060	55.621	1.00	0.00
1109	0	1	901.060	67.886	1.00	0.00
1110	0	1	901.060	78.982	1.00	0.00
1111	0	1	901.060	88.688	1.00	0.00
1112	0	1	901.060	97.100	1.00	0.00
1113	0	1	901.060	104.872	1.00	0.00
1114	0	1	901.060	111.979	1.00	0.00
1115	0	1	901.060	120.368	1.00	0.00
1116	0	1	901.060	128.758	1.00	0.00
1117	0	1	901.060	137.147	1.00	0.00
1118	0	1	901.060	145.537	1.00	0.00
1119	0	1	901.060	153.926	1.00	0.00
1120	0	1	901.060	162.315	1.00	0.00
1121	0	1	901.060	170.705	1.00	0.00
1122	0	1	901.060	179.094	1.00	0.00
1123	0	1	-901.060	200.694	1.00	0.00
1124	0	1	-793.060	200.694	1.00	0.00
1125	0	1	-685.060	200.694	1.00	0.00
1126	0	1	-577.060	200.694	1.00	0.00
1127	0	1	-469.060	200.694	1.00	0.00
1128	0	1	-443.892	200.694	1.00	0.00
1129	0	1	-418.723	200.694	1.00	0.00
1130	0	1	-394.837	200.694	1.00	0.00
1131	0	1	-368.947	200.694	1.00	0.00
1132	0	1	-332.398	200.694	1.00	0.00
1133	0	1	-289.966	200.694	1.00	0.00
1134	0	1	-257.747	200.694	1.00	0.00
1135	0	1	-225.529	200.694	1.00	0.00
1136	0	1	-193.310	200.694	1.00	0.00
1137	0	1	-161.092	200.694	1.00	0.00
1138	0	1	-128.874	200.694	1.00	0.00
1139	0	1	-96.655	200.694	1.00	0.00
1140	0	1	-64.437	200.694	1.00	0.00

1141	0	1	-32.218	200.694	1.00	0.00
1142	0	1	0.000	200.694	1.00	0.00
1143	0	1	32.218	200.694	1.00	0.00
1144	0	1	64.437	200.694	1.00	0.00
1145	0	1	96.655	200.694	1.00	0.00
1146	0	1	128.874	200.694	1.00	0.00
1147	0	1	161.092	200.694	1.00	0.00
1148	0	1	193.310	200.694	1.00	0.00
1149	0	1	225.529	200.694	1.00	0.00
1150	0	1	257.747	200.694	1.00	0.00
1151	0	1	289.966	200.694	1.00	0.00
1152	0	1	332.398	200.694	1.00	0.00
1153	0	1	368.947	200.694	1.00	0.00
1154	0	1	394.837	200.694	1.00	0.00
1155	0	1	418.723	200.694	1.00	0.00
1156	0	1	443.892	200.694	1.00	0.00
1157	0	1	469.060	200.694	1.00	0.00
1158	0	1	577.060	200.694	1.00	0.00
1159	0	1	685.060	200.694	1.00	0.00
1160	0	1	793.060	200.694	1.00	0.00
1161	0	1	901.060	200.694	1.00	0.00
1162	0	1	-901.060	222.294	1.00	0.00
1163	0	1	-793.060	222.294	1.00	0.00
1164	0	1	-685.060	222.294	1.00	0.00
1165	0	1	-577.060	222.294	1.00	0.00
1166	0	1	-469.060	222.294	1.00	0.00
1167	0	1	-443.892	222.294	1.00	0.00
1168	0	1	-418.723	222.294	1.00	0.00
1169	0	1	-394.837	222.294	1.00	0.00
1170	0	1	-368.947	222.294	1.00	0.00
1171	0	1	-332.398	222.294	1.00	0.00
1172	0	1	-289.966	222.294	1.00	0.00
1173	0	1	-257.747	222.294	1.00	0.00
1174	0	1	-225.529	222.294	1.00	0.00
1175	0	1	-193.310	222.294	1.00	0.00
1176	0	1	-161.092	222.294	1.00	0.00
1177	0	1	-128.874	222.294	1.00	0.00
1178	0	1	-96.655	222.294	1.00	0.00
1179	0	1	-64.437	222.294	1.00	0.00
1180	0	1	-32.218	222.294	1.00	0.00
1181	0	1	0.000	222.294	1.00	0.00
1182	0	1	32.218	222.294	1.00	0.00
1183	0	1	64.437	222.294	1.00	0.00
1184	0	1	96.655	222.294	1.00	0.00
1185	0	1	128.874	222.294	1.00	0.00
1186	0	1	161.092	222.294	1.00	0.00
1187	0	1	193.310	222.294	1.00	0.00
1188	0	1	225.529	222.294	1.00	0.00
1189	0	1	257.747	222.294	1.00	0.00
1190	0	1	289.966	222.294	1.00	0.00
1191	0	1	332.398	222.294	1.00	0.00
1192	0	1	368.947	222.294	1.00	0.00
1193	0	1	394.837	222.294	1.00	0.00
1194	0	1	418.723	222.294	1.00	0.00
1195	0	1	443.892	222.294	1.00	0.00
1196	0	1	469.060	222.294	1.00	0.00
1197	0	1	577.060	222.294	1.00	0.00
1198	0	1	685.060	222.294	1.00	0.00
1199	0	1	793.060	222.294	1.00	0.00
1200	0	1	901.060	222.294	1.00	0.00
1201	0	1	-490.660	200.694	1.00	0.00
1202	0	1	-512.260	222.294	1.00	0.00
1203	0	1	490.660	200.694	1.00	0.00
1204	0	1	512.260	222.294	1.00	0.00

ALL ELEMENT DATA AS INPUT "I" AND GENERATED

	ELEMENT NUMBER	NODE-CONNECTIVITY I	J	K	L	MATERIAL NUMBER	CONSTR. INCR.	ELEMENT TYPE	BAND WIDTH	GENERATION INCREMENTS
I	1	38	39	0	0	1	1	BEAM	6	1, 0, 0
I	2	37	38	0	0	1	1	BEAM	6	1, 0, 0
I	3	36	37	0	0	1	1	BEAM	6	1, 0, 0
I	4	35	36	0	0	1	1	BEAM	6	1, 0, 0
I	5	34	35	0	0	1	1	BEAM	6	1, 0, 0
I	6	33	34	0	0	1	1	BEAM	6	1, 0, 0
I	7	32	33	0	0	1	1	BEAM	6	1, 0, 0
I	8	31	32	0	0	1	1	BEAM	6	1, 0, 0
I	9	30	31	0	0	1	1	BEAM	6	1, 0, 0
I	10	29	30	0	0	1	1	BEAM	6	1, 0, 0
I	11	28	29	0	0	1	1	BEAM	6	1, 0, 0

I	12	27	28	0	0	1	1	BEAM	6	1, 0, 0
I	13	26	27	0	0	1	1	BEAM	6	1, 0, 0
I	14	25	26	0	0	1	1	BEAM	6	1, 0, 0
I	15	24	25	0	0	1	1	BEAM	6	1, 0, 0
I	16	23	24	0	0	1	1	BEAM	6	1, 0, 0
I	17	22	23	0	0	1	1	BEAM	6	1, 0, 0
I	18	21	22	0	0	1	1	BEAM	6	1, 0, 0
I	19	20	21	0	0	1	1	BEAM	6	1, 0, 0
I	20	19	20	0	0	1	1	BEAM	6	1, 0, 0
I	21	18	19	0	0	1	1	BEAM	6	1, 0, 0
I	22	17	18	0	0	1	1	BEAM	6	1, 0, 0
I	23	16	17	0	0	1	1	BEAM	6	1, 0, 0
I	24	15	16	0	0	1	1	BEAM	6	1, 0, 0
I	25	14	15	0	0	1	1	BEAM	6	1, 0, 0
I	26	13	14	0	0	1	1	BEAM	6	1, 0, 0
I	27	12	13	0	0	1	1	BEAM	6	1, 0, 0
I	28	11	12	0	0	1	1	BEAM	6	1, 0, 0
I	29	10	11	0	0	1	1	BEAM	6	1, 0, 0
I	30	9	10	0	0	1	1	BEAM	6	1, 0, 0
I	31	8	9	0	0	1	1	BEAM	6	1, 0, 0
I	32	7	8	0	0	1	1	BEAM	6	1, 0, 0
I	33	6	7	0	0	1	1	BEAM	6	1, 0, 0
I	34	5	6	0	0	1	1	BEAM	6	1, 0, 0
I	35	4	5	0	0	1	1	BEAM	6	1, 0, 0
I	36	3	4	0	0	1	1	BEAM	6	1, 0, 0
I	37	2	3	0	0	1	1	BEAM	6	1, 0, 0
I	38	1	2	0	0	1	1	BEAM	6	1, 0, 0
I	39	464	462	39	308	2	1	QUAD	852	1, 0, 0
I	40	462	473	461	39	2	1	QUAD	870	1, 0, 0
I	41	296	285	1	284	2	1	QUAD	592	1, 0, 0
I	42	285	287	131	1	2	1	QUAD	574	1, 0, 0
I	43	1	131	143	77	3	2	QUAD	286	1, 0, 0
I	44	131	132	144	143	3	2	QUAD	28	1, 0, 0
I	45	132	133	145	144	3	2	QUAD	28	1, 0, 0
I	46	133	134	146	145	3	2	QUAD	28	1, 0, 0
I	47	134	135	147	146	3	2	QUAD	28	1, 0, 0
I	48	135	120	121	147	3	2	QUAD	56	1, 0, 0
I	49	77	143	148	78	3	3	QUAD	144	1, 0, 0
I	50	143	144	149	148	3	3	QUAD	14	1, 0, 0
I	51	144	145	150	149	3	3	QUAD	14	1, 0, 0
I	52	145	146	151	150	3	3	QUAD	14	1, 0, 0
I	53	146	147	152	151	3	3	QUAD	14	1, 0, 0
I	54	147	121	153	152	3	3	QUAD	66	1, 0, 0
I	55	121	122	153	0	3	3	TRI.	66	1, 0, 0
I	56	78	148	154	79	3	4	QUAD	154	1, 0, 0
I	57	148	149	155	154	3	4	QUAD	16	1, 0, 0
I	58	149	150	156	155	3	4	QUAD	16	1, 0, 0
I	59	150	151	157	156	3	4	QUAD	16	1, 0, 0
I	60	151	152	158	157	3	4	QUAD	16	1, 0, 0
I	61	152	153	159	158	3	4	QUAD	16	1, 0, 0
I	62	153	122	123	159	3	4	QUAD	76	1, 0, 0
I	63	79	154	160	80	3	5	QUAD	164	1, 0, 0
I	64	154	155	161	160	3	5	QUAD	16	1, 0, 0
I	65	155	156	162	161	3	5	QUAD	16	1, 0, 0
I	66	156	157	163	162	3	5	QUAD	16	1, 0, 0
I	67	157	158	164	163	3	5	QUAD	16	1, 0, 0
I	68	158	159	165	164	3	5	QUAD	16	1, 0, 0
I	69	159	123	124	165	3	5	QUAD	86	1, 0, 0
I	70	80	160	166	81	3	6	QUAD	174	1, 0, 0
I	71	160	161	167	166	3	6	QUAD	16	1, 0, 0
I	72	161	162	168	167	3	6	QUAD	16	1, 0, 0
I	73	162	163	169	168	3	6	QUAD	16	1, 0, 0
I	74	163	164	170	169	3	6	QUAD	16	1, 0, 0
I	75	164	165	171	170	3	6	QUAD	16	1, 0, 0
I	76	165	124	125	171	3	6	QUAD	96	1, 0, 0
I	77	81	166	172	82	3	7	QUAD	184	1, 0, 0
I	78	166	167	173	172	3	7	QUAD	16	1, 0, 0
I	79	167	168	174	173	3	7	QUAD	16	1, 0, 0
I	80	168	169	175	174	3	7	QUAD	16	1, 0, 0
I	81	169	170	176	175	3	7	QUAD	16	1, 0, 0
I	82	170	171	177	176	3	7	QUAD	16	1, 0, 0
I	83	171	125	126	177	3	7	QUAD	106	1, 0, 0
I	84	82	172	178	83	3	8	QUAD	194	1, 0, 0
I	85	172	173	179	178	3	8	QUAD	16	1, 0, 0
I	86	173	174	180	179	3	8	QUAD	16	1, 0, 0
I	87	174	175	181	180	3	8	QUAD	16	1, 0, 0
I	88	175	176	182	181	3	8	QUAD	16	1, 0, 0
I	89	176	177	183	182	3	8	QUAD	16	1, 0, 0
I	90	177	126	184	183	3	8	QUAD	118	1, 0, 0
I	91	126	127	184	0	3	8	TRI.	118	1, 0, 0
I	92	83	178	185	84	3	9	QUAD	206	1, 0, 0

I	93	178	179	186	185	3	9	QUAD	18	1, 0, 0
I	94	179	180	187	186	3	9	QUAD	18	1, 0, 0
I	95	180	181	188	187	3	9	QUAD	18	1, 0, 0
I	96	181	182	189	188	3	9	QUAD	18	1, 0, 0
I	97	182	183	190	189	3	9	QUAD	18	1, 0, 0
I	98	183	184	191	190	3	9	QUAD	18	1, 0, 0
I	99	184	127	128	191	3	9	QUAD	130	1, 0, 0
I	100	84	185	192	85	3	10	QUAD	218	1, 0, 0
I	101	185	186	193	192	3	10	QUAD	18	1, 0, 0
I	102	186	187	194	193	3	10	QUAD	18	1, 0, 0
I	103	187	188	195	194	3	10	QUAD	18	1, 0, 0
I	104	188	189	196	195	3	10	QUAD	18	1, 0, 0
I	105	189	190	197	196	3	10	QUAD	18	1, 0, 0
I	106	190	191	198	197	3	10	QUAD	18	1, 0, 0
I	107	191	128	129	198	3	10	QUAD	142	1, 0, 0
I	108	85	192	136	86	3	11	QUAD	216	1, 0, 0
I	109	192	193	137	136	3	12	QUAD	116	1, 0, 0
I	110	193	194	138	137	3	12	QUAD	116	1, 0, 0
I	111	194	195	139	138	3	12	QUAD	116	1, 0, 0
I	112	195	196	140	139	3	12	QUAD	116	1, 0, 0
I	113	196	197	141	140	3	12	QUAD	116	1, 0, 0
I	114	197	198	142	141	3	12	QUAD	116	1, 0, 0
I	115	198	129	130	142	3	12	QUAD	140	1, 0, 0
I	116	86	136	207	0	3	11	TRI.	244	1, 0, 0
I	117	136	137	214	207	3	13	QUAD	158	1, 0, 0
I	118	137	138	215	214	3	13	QUAD	158	1, 0, 0
I	119	138	139	216	215	3	13	QUAD	158	1, 0, 0
I	120	139	140	217	216	3	13	QUAD	158	1, 0, 0
I	121	140	141	218	217	3	13	QUAD	158	1, 0, 0
I	122	141	142	219	218	3	13	QUAD	158	1, 0, 0
I	123	142	130	200	219	3	13	QUAD	180	1, 0, 0
I	124	207	214	208	0	3	14	TRI.	16	1, 0, 0
I	125	214	215	220	208	3	14	QUAD	26	1, 0, 0
I	126	215	216	221	220	3	14	QUAD	14	1, 0, 0
I	127	216	217	222	221	3	14	QUAD	14	1, 0, 0
I	128	217	218	223	222	3	14	QUAD	14	1, 0, 0
I	129	218	219	224	223	3	14	QUAD	14	1, 0, 0
I	130	219	200	201	224	3	14	QUAD	50	1, 0, 0
I	131	208	220	209	0	3	15	TRI.	26	1, 0, 0
I	132	220	221	225	209	3	15	QUAD	34	1, 0, 0
I	133	221	222	226	225	3	15	QUAD	12	1, 0, 0
I	134	222	223	227	226	3	15	QUAD	12	1, 0, 0
I	135	223	224	228	227	3	15	QUAD	12	1, 0, 0
I	136	224	201	202	228	3	15	QUAD	56	1, 0, 0
I	137	209	225	210	0	3	16	TRI.	34	1, 0, 0
I	138	225	226	229	210	3	16	QUAD	40	1, 0, 0
I	139	226	227	230	229	3	16	QUAD	10	1, 0, 0
I	140	227	228	231	230	3	16	QUAD	10	1, 0, 0
I	141	228	202	203	231	3	16	QUAD	60	1, 0, 0
I	142	210	229	211	0	3	17	TRI.	40	1, 0, 0
I	143	229	230	232	211	3	17	QUAD	44	1, 0, 0
I	144	230	231	233	232	3	17	QUAD	8	1, 0, 0
I	145	231	203	204	233	3	17	QUAD	62	1, 0, 0
I	146	211	232	212	0	3	18	TRI.	44	1, 0, 0
I	147	232	233	234	212	3	18	QUAD	46	1, 0, 0
I	148	233	204	205	234	3	18	QUAD	62	1, 0, 0
I	149	212	234	213	0	3	19	TRI.	46	1, 0, 0
I	150	234	205	206	213	3	19	QUAD	60	1, 0, 0
I	151	213	206	199	0	3	19	TRI.	30	1, 0, 0
I	152	86	207	87	0	3	11	TRI.	244	1, 0, 0
I	153	207	208	273	0	3	14	TRI.	134	1, 0, 0
I	154	208	209	274	0	3	15	TRI.	134	1, 0, 0
I	155	209	210	276	275	3	16	QUAD	136	1, 0, 0
I	156	210	211	277	276	3	17	QUAD	136	1, 0, 0
I	157	211	212	278	277	3	18	QUAD	136	1, 0, 0
I	158	212	213	279	278	3	19	QUAD	136	1, 0, 0
I	159	213	199	242	279	3	19	QUAD	162	1, 0, 0
I	160	87	273	88	0	3	11	TRI.	374	1, 0, 0
I	161	273	274	267	0	3	15	TRI.	16	1, 0, 0
I	162	274	275	269	268	3	16	QUAD	16	1, 0, 0
I	163	275	276	269	0	3	16	TRI.	16	1, 0, 0
I	164	276	277	270	0	3	17	TRI.	16	1, 0, 0
I	165	277	278	271	0	3	18	TRI.	16	1, 0, 0
I	166	278	279	241	272	3	19	QUAD	78	1, 0, 0
I	167	279	242	241	0	3	19	TRI.	78	1, 0, 0
I	168	88	267	262	89	3	11	QUAD	360	1, 0, 0
I	169	267	268	263	262	3	16	QUAD	14	1, 0, 0
I	170	268	269	263	0	3	16	TRI.	14	1, 0, 0
I	171	269	270	264	0	3	17	TRI.	14	1, 0, 0
I	172	270	271	265	0	3	18	TRI.	14	1, 0, 0
I	173	271	272	240	266	3	19	QUAD	66	1, 0, 0

I	174	272	241	240	0	3	19	TRI.	66	1, 0, 0
I	175	89	262	257	90	3	11	QUAD	348	1, 0, 0
I	176	262	263	257	0	3	16	TRI.	14	1, 0, 0
I	177	263	264	259	258	3	17	QUAD	14	1, 0, 0
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I	179	265	266	261	260	3	19	QUAD	14	1, 0, 0
I	180	266	240	239	261	3	19	QUAD	56	1, 0, 0
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I	182	257	258	254	253	3	17	QUAD	12	1, 0, 0
I	183	258	259	254	0	3	17	TRI.	12	1, 0, 0
I	184	259	260	255	0	3	18	TRI.	12	1, 0, 0
I	185	260	261	238	256	3	19	QUAD	48	1, 0, 0
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I	187	91	253	249	92	3	11	QUAD	326	1, 0, 0
I	188	253	254	250	249	3	17	QUAD	12	1, 0, 0
I	189	254	255	251	250	3	18	QUAD	12	1, 0, 0
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I	194	250	251	248	247	3	18	QUAD	10	1, 0, 0
I	195	251	252	236	248	3	19	QUAD	34	1, 0, 0
I	196	252	237	236	0	3	19	TRI.	34	1, 0, 0
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I	198	246	247	244	243	3	17	QUAD	10	1, 0, 0
I	199	247	248	245	244	3	18	QUAD	10	1, 0, 0
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I	201	94	243	115	95	3	11	QUAD	300	1, 0, 0
I	202	243	244	116	115	3	17	QUAD	260	1, 0, 0
I	203	244	245	117	116	3	18	QUAD	260	1, 0, 0
I	204	245	235	114	117	3	19	QUAD	264	1, 0, 0
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I	207	293	294	282	281	1	1	QUAD	28	1, 0, 0
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I	214	291	286	120	135	1	1	QUAD	344	1, 0, 0
I	215	2	77	40	0	1	2	FACE	152	1, 0, 0
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I	217	4	79	42	0	3	4	FACE	152	1, 0, 0
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I	220	7	82	45	0	6	7	FACE	152	1, 0, 0
I	221	8	83	46	0	7	8	FACE	152	1, 0, 0
I	222	9	84	47	0	8	9	FACE	152	1, 0, 0
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I	225	12	87	50	0	11	11	FACE	152	1, 0, 0
I	226	13	88	51	0	12	11	FACE	152	1, 0, 0
I	227	14	89	52	0	13	11	FACE	152	1, 0, 0
I	228	15	90	53	0	14	11	FACE	152	1, 0, 0
I	229	16	91	54	0	15	11	FACE	152	1, 0, 0
I	230	17	92	55	0	16	11	FACE	152	1, 0, 0
I	231	18	93	56	0	17	11	FACE	152	1, 0, 0
I	232	19	94	57	0	18	11	FACE	152	1, 0, 0
I	233	20	95	58	0	19	11	FACE	152	1, 0, 0
I	234	297	312	324	298	3	2	QUAD	56	1, 0, 0
I	235	312	311	323	324	3	2	QUAD	28	1, 0, 0
I	236	311	310	322	323	3	2	QUAD	28	1, 0, 0
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I	248	330	329	335	336	3	4	QUAD	16	1, 0, 0
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I	253	325	112	111	331	3	4	QUAD	442	1, 0, 0
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I	267	337	110	109	343	3	6	QUAD	470	1, 0, 0
I	268	302	348	354	303	3	7	QUAD	106	1, 0, 0
I	269	348	347	353	354	3	7	QUAD	16	1, 0, 0
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I	284	361	360	367	368	3	9	QUAD	18	1, 0, 0
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I	314	313	104	384	0	3	11	TRI.	562	1, 0, 0
I	315	377	396	401	378	3	14	QUAD	50	1, 0, 0
I	316	396	395	400	401	3	14	QUAD	14	1, 0, 0
I	317	395	394	399	400	3	14	QUAD	14	1, 0, 0
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I	320	392	391	385	397	3	14	QUAD	26	1, 0, 0
I	321	391	384	385	0	3	14	TRI.	16	1, 0, 0
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I	329	405	404	407	408	3	16	QUAD	10	1, 0, 0
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I	333	380	408	410	381	3	17	QUAD	62	1, 0, 0
I	334	408	407	409	410	3	17	QUAD	8	1, 0, 0
I	335	407	406	388	409	3	17	QUAD	44	1, 0, 0

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I	337	381	410	411	382	3	18	QUAD	62	1, 0, 0
I	338	410	409	389	411	3	18	QUAD	46	1, 0, 0
I	339	409	388	389	0	3	18	TRI.	44	1, 0, 0
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I	341	411	389	390	0	3	19	TRI.	46	1, 0, 0
I	342	383	390	376	0	3	19	TRI.	30	1, 0, 0
I	343	104	103	384	0	3	11	TRI.	564	1, 0, 0
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I	345	385	451	386	0	3	15	TRI.	134	1, 0, 0
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I	347	387	453	454	388	3	17	QUAD	136	1, 0, 0
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I	350	390	456	419	376	3	19	QUAD	162	1, 0, 0
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I	352	450	444	451	0	3	15	TRI.	16	1, 0, 0
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I	355	453	447	454	0	3	17	TRI.	16	1, 0, 0
I	356	454	448	455	0	3	18	TRI.	16	1, 0, 0
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I	358	456	418	419	0	3	19	TRI.	78	1, 0, 0
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I	363	447	442	448	0	3	18	TRI.	14	1, 0, 0
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I	365	449	417	418	0	3	19	TRI.	66	1, 0, 0
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I	398	471	470	458	459	1	1	QUAD	28	1, 0, 0
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I	402	466	465	309	310	2	1	QUAD	316	1, 0, 0
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I	406	21	96	59	0	20	11	FACE	152	1, 0, 0
I	407	22	97	60	0	21	11	FACE	152	1, 0, 0
I	408	23	98	61	0	22	11	FACE	152	1, 0, 0
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I	695	606	749	750	607	1	1	QUAD	290	1, 0, 0
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I	697	633	608	751	634	1	1	QUAD	288	1, 0, 0
I	698	634	751	752	635	1	1	QUAD	238	1, 0, 0
I	699	635	752	636	0	1	1	TRI.	236	1, 0, 0
I	700	661	636	753	662	1	1	QUAD	236	1, 0, 0
I	701	662	753	754	663	1	1	QUAD	186	1, 0, 0
I	702	663	754	664	0	1	1	TRI.	184	1, 0, 0
I	703	689	664	755	690	1	1	QUAD	184	1, 0, 0
I	704	690	755	756	691	1	1	QUAD	134	1, 0, 0
I	705	691	756	692	0	1	1	TRI.	132	1, 0, 0
I	706	717	692	757	718	1	1	QUAD	132	1, 0, 0
I	707	718	757	758	719	1	1	QUAD	82	1, 0, 0
I	708	719	758	720	0	1	1	TRI.	80	1, 0, 0
I	709	745	720	759	746	1	1	QUAD	80	1, 0, 0
I	710	746	759	760	747	1	1	QUAD	30	1, 0, 0
I	711	747	760	748	0	1	1	TRI.	28	1, 0, 0
I	712	386	451	452	0	3	16	TRI.	134	1, 0, 0
I	713	451	444	445	0	3	16	TRI.	16	1, 0, 0
I	714	453	446	447	0	3	17	TRI.	16	1, 0, 0
I	715	446	440	441	0	3	17	TRI.	14	1, 0, 0
I	716	440	434	435	0	3	17	TRI.	14	1, 0, 0
I	717	454	447	448	0	3	18	TRI.	16	1, 0, 0
I	718	447	441	442	0	3	18	TRI.	14	1, 0, 0
I	719	436	431	432	0	3	18	TRI.	12	1, 0, 0
I	720	455	448	449	0	3	19	TRI.	16	1, 0, 0
I	721	448	442	443	0	3	19	TRI.	14	1, 0, 0
I	722	437	432	433	0	3	19	TRI.	12	1, 0, 0
I	723	267	274	268	0	3	16	TRI.	16	1, 0, 0
I	724	274	209	275	0	3	16	TRI.	134	1, 0, 0
I	725	257	263	258	0	3	17	TRI.	14	1, 0, 0
I	726	263	269	264	0	3	17	TRI.	14	1, 0, 0
I	727	269	276	270	0	3	17	TRI.	16	1, 0, 0
I	728	270	277	271	0	3	18	TRI.	16	1, 0, 0
I	729	264	270	265	0	3	18	TRI.	14	1, 0, 0
I	730	254	259	255	0	3	18	TRI.	12	1, 0, 0
I	731	255	260	256	0	3	19	TRI.	12	1, 0, 0
I	732	265	271	266	0	3	19	TRI.	14	1, 0, 0
I	733	271	278	272	0	3	19	TRI.	16	1, 0, 0
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I	735	762	725	726	763	1	1	QUAD	78	1, 0, 0
I	736	763	726	727	764	1	1	QUAD	78	1, 0, 0
I	737	764	727	728	765	1	1	QUAD	78	1, 0, 0
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I	967	978	1003	1004	979	1	1	QUAD	54	1, 0, 0
I	968	979	1004	1005	980	1	1	QUAD	54	1, 0, 0
I	969	980	1005	1006	981	1	1	QUAD	54	1, 0, 0
I	970	981	1006	1007	982	1	1	QUAD	54	1, 0, 0
I	971	982	1007	1008	1021	1	1	QUAD	80	1, 0, 0
I	972	1021	1008	1009	1022	1	1	QUAD	30	1, 0, 0
I	973	1022	1009	1010	0	1	1	TRI.	28	1, 0, 0
I	974	120	1011	121	0	4	2	TRI.	1784	1, 0, 0
I	975	121	1011	1012	122	4	3	QUAD	1784	1, 0, 0
I	976	122	1012	870	123	4	4	QUAD	1782	1, 0, 0
I	977	870	1013	871	0	4	5	TRI.	288	1, 0, 0
I	978	871	1013	1014	872	4	6	QUAD	288	1, 0, 0
I	979	872	1014	898	873	4	7	QUAD	286	1, 0, 0
I	980	898	1015	899	0	4	8	TRI.	236	1, 0, 0
I	981	899	1015	1016	900	4	9	QUAD	236	1, 0, 0
I	982	900	1016	926	901	4	10	QUAD	234	1, 0, 0
I	983	926	1017	927	0	4	12	TRI.	184	1, 0, 0

I	984	927	1017	1018	928	4	13	QUAD	184	1, 0, 0
I	985	928	1018	954	929	4	14	QUAD	182	1, 0, 0
I	986	954	1019	955	0	4	15	TRI.	132	1, 0, 0
I	987	955	1019	1020	956	4	16	QUAD	132	1, 0, 0
I	988	956	1020	982	957	4	17	QUAD	130	1, 0, 0
I	989	982	1021	983	0	4	18	TRI.	80	1, 0, 0
I	990	983	1021	1022	984	4	19	QUAD	80	1, 0, 0
I	991	984	1022	1010	985	4	19	QUAD	78	1, 0, 0
I	992	986	1023	1024	987	1	1	QUAD	78	1, 0, 0
I	993	987	1024	1025	988	1	1	QUAD	78	1, 0, 0
I	994	988	1025	1026	989	1	1	QUAD	78	1, 0, 0
I	995	989	1026	1027	990	1	1	QUAD	78	1, 0, 0
I	996	990	1027	1028	991	1	1	QUAD	78	1, 0, 0
I	997	991	1028	1029	992	1	1	QUAD	78	1, 0, 0
I	998	992	1029	1030	993	1	1	QUAD	78	1, 0, 0
I	999	993	1030	1031	994	1	1	QUAD	78	1, 0, 0
I	1000	994	1031	1032	995	1	1	QUAD	78	1, 0, 0
I	1001	995	1032	1033	996	1	1	QUAD	78	1, 0, 0
I	1002	996	1033	1034	997	1	1	QUAD	78	1, 0, 0
I	1003	997	1034	1035	998	1	1	QUAD	78	1, 0, 0
I	1004	998	1035	1036	999	1	1	QUAD	78	1, 0, 0
I	1005	999	1036	1037	1000	1	1	QUAD	78	1, 0, 0
I	1006	1000	1037	1038	1001	1	1	QUAD	78	1, 0, 0
I	1007	1001	1038	1039	1002	1	1	QUAD	78	1, 0, 0
I	1008	1002	1039	1040	1003	1	1	QUAD	78	1, 0, 0
I	1009	1003	1040	1041	1004	1	1	QUAD	78	1, 0, 0
I	1010	1004	1041	1042	1005	1	1	QUAD	78	1, 0, 0
I	1011	1005	1042	1043	1006	1	1	QUAD	78	1, 0, 0
I	1012	1006	1043	1044	1007	1	1	QUAD	78	1, 0, 0
I	1013	1007	1044	1045	1008	1	1	QUAD	78	1, 0, 0
I	1014	1008	1045	1046	1009	1	1	QUAD	78	1, 0, 0
I	1015	1009	1046	1047	1010	1	1	QUAD	78	1, 0, 0
I	1016	1023	1048	1049	1024	1	1	QUAD	54	1, 0, 0
I	1017	1024	1049	1050	1025	1	1	QUAD	54	1, 0, 0
I	1018	1025	1050	1051	1026	1	1	QUAD	54	1, 0, 0
I	1019	1026	1051	1052	1027	1	1	QUAD	54	1, 0, 0
I	1020	1027	1052	1053	1028	1	1	QUAD	54	1, 0, 0
I	1021	1028	1053	1054	1029	1	1	QUAD	54	1, 0, 0
I	1022	1029	1054	1055	1030	1	1	QUAD	54	1, 0, 0
I	1023	1030	1055	1056	1031	1	1	QUAD	54	1, 0, 0
I	1024	1031	1056	1057	1032	1	1	QUAD	54	1, 0, 0
I	1025	1032	1057	1058	1033	1	1	QUAD	54	1, 0, 0
I	1026	1033	1058	1059	1034	1	1	QUAD	54	1, 0, 0
I	1027	1034	1059	1060	1035	1	1	QUAD	54	1, 0, 0
I	1028	1035	1060	1061	1036	1	1	QUAD	54	1, 0, 0
I	1029	1036	1061	1062	1037	1	1	QUAD	54	1, 0, 0
I	1030	1037	1062	1063	1038	1	1	QUAD	54	1, 0, 0
I	1031	1038	1063	1064	1039	1	1	QUAD	54	1, 0, 0
I	1032	1039	1064	1065	1040	1	1	QUAD	54	1, 0, 0
I	1033	1040	1065	1066	1041	1	1	QUAD	54	1, 0, 0
I	1034	1041	1066	1067	1042	1	1	QUAD	54	1, 0, 0
I	1035	1042	1067	1068	1043	1	1	QUAD	54	1, 0, 0
I	1036	1043	1068	1069	1044	1	1	QUAD	54	1, 0, 0
I	1037	1044	1069	1070	1045	1	1	QUAD	54	1, 0, 0
I	1038	1045	1070	1071	1046	1	1	QUAD	54	1, 0, 0
I	1039	1046	1071	1072	1047	1	1	QUAD	54	1, 0, 0
I	1040	1048	1073	1074	1049	1	1	QUAD	54	1, 0, 0
I	1041	1049	1074	1075	1050	1	1	QUAD	54	1, 0, 0
I	1042	1050	1075	1076	1051	1	1	QUAD	54	1, 0, 0
I	1043	1051	1076	1077	1052	1	1	QUAD	54	1, 0, 0
I	1044	1052	1077	1078	1053	1	1	QUAD	54	1, 0, 0
I	1045	1053	1078	1079	1054	1	1	QUAD	54	1, 0, 0
I	1046	1054	1079	1080	1055	1	1	QUAD	54	1, 0, 0
I	1047	1055	1080	1081	1056	1	1	QUAD	54	1, 0, 0
I	1048	1056	1081	1082	1057	1	1	QUAD	54	1, 0, 0
I	1049	1057	1082	1083	1058	1	1	QUAD	54	1, 0, 0
I	1050	1058	1083	1084	1059	1	1	QUAD	54	1, 0, 0
I	1051	1059	1084	1085	1060	1	1	QUAD	54	1, 0, 0
I	1052	1060	1085	1086	1061	1	1	QUAD	54	1, 0, 0
I	1053	1061	1086	1087	1062	1	1	QUAD	54	1, 0, 0
I	1054	1062	1087	1088	1063	1	1	QUAD	54	1, 0, 0
I	1055	1063	1088	1089	1064	1	1	QUAD	54	1, 0, 0
I	1056	1064	1089	1090	1065	1	1	QUAD	54	1, 0, 0
I	1057	1065	1090	1091	1066	1	1	QUAD	54	1, 0, 0
I	1058	1066	1091	1092	1067	1	1	QUAD	54	1, 0, 0
I	1059	1067	1092	1093	1068	1	1	QUAD	54	1, 0, 0
I	1060	1068	1093	1094	1069	1	1	QUAD	54	1, 0, 0
I	1061	1069	1094	1095	1070	1	1	QUAD	54	1, 0, 0
I	1062	1070	1095	1096	1071	1	1	QUAD	54	1, 0, 0
I	1063	1071	1096	1097	1072	1	1	QUAD	54	1, 0, 0
I	1064	1073	1098	1099	1074	1	1	QUAD	54	1, 0, 0

I	1065	1074	1099	1100	1075	1	1	QUAD	54	1, 0, 0
I	1066	1075	1100	1101	1076	1	1	QUAD	54	1, 0, 0
I	1067	1076	1101	1102	1077	1	1	QUAD	54	1, 0, 0
I	1068	1077	1102	1103	1078	1	1	QUAD	54	1, 0, 0
I	1069	1078	1103	1104	1079	1	1	QUAD	54	1, 0, 0
I	1070	1079	1104	1105	1080	1	1	QUAD	54	1, 0, 0
I	1071	1080	1105	1106	1081	1	1	QUAD	54	1, 0, 0
I	1072	1081	1106	1107	1082	1	1	QUAD	54	1, 0, 0
I	1073	1082	1107	1108	1083	1	1	QUAD	54	1, 0, 0
I	1074	1083	1108	1109	1084	1	1	QUAD	54	1, 0, 0
I	1075	1084	1109	1110	1085	1	1	QUAD	54	1, 0, 0
I	1076	1085	1110	1111	1086	1	1	QUAD	54	1, 0, 0
I	1077	1086	1111	1112	1087	1	1	QUAD	54	1, 0, 0
I	1078	1087	1112	1113	1088	1	1	QUAD	54	1, 0, 0
I	1079	1088	1113	1114	1089	1	1	QUAD	54	1, 0, 0
I	1080	1089	1114	1115	1090	1	1	QUAD	54	1, 0, 0
I	1081	1090	1115	1116	1091	1	1	QUAD	54	1, 0, 0
I	1082	1091	1116	1117	1092	1	1	QUAD	54	1, 0, 0
I	1083	1092	1117	1118	1093	1	1	QUAD	54	1, 0, 0
I	1084	1093	1118	1119	1094	1	1	QUAD	54	1, 0, 0
I	1085	1094	1119	1120	1095	1	1	QUAD	54	1, 0, 0
I	1086	1095	1120	1121	1096	1	1	QUAD	54	1, 0, 0
I	1087	1096	1121	1122	1097	1	1	QUAD	54	1, 0, 0
I	1088	860	835	1124	1123	1	1	QUAD	580	1, 0, 0
I	1089	835	810	1125	1124	1	1	QUAD	632	1, 0, 0
I	1090	810	785	1126	1125	1	1	QUAD	684	1, 0, 0
I	1091	785	748	1201	1126	1	1	QUAD	908	1, 0, 0
I	1092	748	723	1128	1127	4	20	QUAD	812	1, 0, 0
I	1093	723	698	1129	1128	4	20	QUAD	864	1, 0, 0
I	1094	698	673	1130	1129	4	20	QUAD	916	1, 0, 0
I	1095	673	648	1131	1130	4	20	QUAD	968	1, 0, 0
I	1096	648	623	1132	1131	4	20	QUAD	1020	1, 0, 0
I	1097	623	376	1133	1132	4	20	QUAD	1516	1, 0, 0
I	1098	376	419	1134	1133	4	20	QUAD	1518	1, 0, 0
I	1099	419	418	1135	1134	4	20	QUAD	1436	1, 0, 0
I	1100	418	417	1136	1135	4	20	QUAD	1440	1, 0, 0
I	1101	417	416	1137	1136	4	20	QUAD	1444	1, 0, 0
I	1102	416	415	1138	1137	4	20	QUAD	1448	1, 0, 0
I	1103	415	414	1139	1138	4	20	QUAD	1452	1, 0, 0
I	1104	414	413	1140	1139	4	20	QUAD	1456	1, 0, 0
I	1105	413	412	1141	1140	4	20	QUAD	1460	1, 0, 0
I	1106	412	114	1142	1141	4	20	QUAD	2058	1, 0, 0
I	1107	114	235	1143	1142	4	20	QUAD	2060	1, 0, 0
I	1108	235	236	1144	1143	4	20	QUAD	1820	1, 0, 0
I	1109	236	237	1145	1144	4	20	QUAD	1820	1, 0, 0
I	1110	237	238	1146	1145	4	20	QUAD	1820	1, 0, 0
I	1111	238	239	1147	1146	4	20	QUAD	1820	1, 0, 0
I	1112	239	240	1148	1147	4	20	QUAD	1820	1, 0, 0
I	1113	240	241	1149	1148	4	20	QUAD	1820	1, 0, 0
I	1114	241	242	1150	1149	4	20	QUAD	1820	1, 0, 0
I	1115	242	199	1151	1150	4	20	QUAD	1906	1, 0, 0
I	1116	199	885	1152	1151	4	20	QUAD	1908	1, 0, 0
I	1117	885	910	1153	1152	4	20	QUAD	538	1, 0, 0
I	1118	910	935	1154	1153	4	20	QUAD	490	1, 0, 0
I	1119	935	960	1155	1154	4	20	QUAD	442	1, 0, 0
I	1120	960	985	1156	1155	4	20	QUAD	394	1, 0, 0
I	1121	985	1010	1157	1156	4	20	QUAD	346	1, 0, 0
I	1122	1010	1047	1158	1203	1	1	QUAD	388	1, 0, 0
I	1123	1047	1072	1159	1158	1	1	QUAD	226	1, 0, 0
I	1124	1072	1097	1160	1159	1	1	QUAD	178	1, 0, 0
I	1125	1097	1122	1161	1160	1	1	QUAD	130	1, 0, 0
I	1126	1123	1124	1163	1162	1	1	QUAD	82	1, 0, 0
I	1127	1124	1125	1164	1163	1	1	QUAD	82	1, 0, 0
I	1128	1125	1126	1165	1164	1	1	QUAD	82	1, 0, 0
I	1129	1126	1201	1202	1165	1	1	QUAD	154	1, 0, 0
I	1130	1127	1128	1167	1166	4	21	QUAD	82	1, 0, 0
I	1131	1128	1129	1168	1167	4	21	QUAD	82	1, 0, 0
I	1132	1129	1130	1169	1168	4	21	QUAD	82	1, 0, 0
I	1133	1130	1131	1170	1169	4	21	QUAD	82	1, 0, 0
I	1134	1131	1132	1171	1170	4	21	QUAD	82	1, 0, 0
I	1135	1132	1133	1172	1171	4	21	QUAD	82	1, 0, 0
I	1136	1133	1134	1173	1172	4	21	QUAD	82	1, 0, 0
I	1137	1134	1135	1174	1173	4	21	QUAD	82	1, 0, 0
I	1138	1135	1136	1175	1174	4	21	QUAD	82	1, 0, 0
I	1139	1136	1137	1176	1175	4	21	QUAD	82	1, 0, 0
I	1140	1137	1138	1177	1176	4	21	QUAD	82	1, 0, 0
I	1141	1138	1139	1178	1177	4	21	QUAD	82	1, 0, 0
I	1142	1139	1140	1179	1178	4	21	QUAD	82	1, 0, 0
I	1143	1140	1141	1180	1179	4	21	QUAD	82	1, 0, 0
I	1144	1141	1142	1181	1180	4	21	QUAD	82	1, 0, 0
I	1145	1142	1143	1182	1181	4	21	QUAD	82	1, 0, 0

I 1146	1143	1144	1183	1182	4	21	QUAD	82	1, 0, 0
I 1147	1144	1145	1184	1183	4	21	QUAD	82	1, 0, 0
I 1148	1145	1146	1185	1184	4	21	QUAD	82	1, 0, 0
I 1149	1146	1147	1186	1185	4	21	QUAD	82	1, 0, 0
I 1150	1147	1148	1187	1186	4	21	QUAD	82	1, 0, 0
I 1151	1148	1149	1188	1187	4	21	QUAD	82	1, 0, 0
I 1152	1149	1150	1189	1188	4	21	QUAD	82	1, 0, 0
I 1153	1150	1151	1190	1189	4	21	QUAD	82	1, 0, 0
I 1154	1151	1152	1191	1190	4	21	QUAD	82	1, 0, 0
I 1155	1152	1153	1192	1191	4	21	QUAD	82	1, 0, 0
I 1156	1153	1154	1193	1192	4	21	QUAD	82	1, 0, 0
I 1157	1154	1155	1194	1193	4	21	QUAD	82	1, 0, 0
I 1158	1155	1156	1195	1194	4	21	QUAD	82	1, 0, 0
I 1159	1156	1157	1196	1195	4	21	QUAD	82	1, 0, 0
I 1160	1203	1158	1197	1204	1	1	QUAD	94	1, 0, 0
I 1161	1158	1159	1198	1197	1	1	QUAD	82	1, 0, 0
I 1162	1159	1160	1199	1198	1	1	QUAD	82	1, 0, 0
I 1163	1160	1161	1200	1199	1	1	QUAD	82	1, 0, 0
I 1164	748	1127	1201	0	4	20	TRI.	908	1, 0, 0
I 1165	1201	1127	1166	1202	4	21	QUAD	152	1, 0, 0
I 1166	1010	1203	1157	0	4	20	TRI.	388	1, 0, 0
I 1167	1157	1203	1204	1196	4	21	QUAD	96	1, 0, 0

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)		Y-FORCE(F) -OR- Y-DISPLACE.(D)		MOMENT(F) -OR- ROTATION (D)	
1181	22	F =	0.000	F =	-162.1	F =	0.000
1180	22	F =	0.000	F =	-162.1	F =	0.000
574	1	D =	0.000	D =	0.000	D =	0.000
575	1	D =	0.000	D =	0.000	D =	0.000
576	1	D =	0.000	D =	0.000	D =	0.000
577	1	D =	0.000	D =	0.000	D =	0.000
578	1	D =	0.000	D =	0.000	D =	0.000
579	1	D =	0.000	D =	0.000	D =	0.000
580	1	D =	0.000	D =	0.000	D =	0.000
581	1	D =	0.000	D =	0.000	D =	0.000
582	1	D =	0.000	D =	0.000	D =	0.000
583	1	D =	0.000	D =	0.000	D =	0.000
584	1	D =	0.000	D =	0.000	D =	0.000
585	1	D =	0.000	D =	0.000	D =	0.000
586	1	D =	0.000	D =	0.000	D =	0.000
587	1	D =	0.000	D =	0.000	D =	0.000
588	1	D =	0.000	D =	0.000	D =	0.000
589	1	D =	0.000	D =	0.000	D =	0.000
590	1	D =	0.000	D =	0.000	D =	0.000
591	1	D =	0.000	D =	0.000	D =	0.000
592	1	D =	0.000	D =	0.000	D =	0.000
593	1	D =	0.000	D =	0.000	D =	0.000
594	1	D =	0.000	D =	0.000	D =	0.000
595	1	D =	0.000	D =	0.000	D =	0.000
596	1	D =	0.000	D =	0.000	D =	0.000
597	1	D =	0.000	D =	0.000	D =	0.000
598	1	D =	0.000	D =	0.000	D =	0.000
599	1	D =	0.000	D =	0.000	D =	0.000
624	1	D =	0.000	D =	0.000	D =	0.000
649	1	D =	0.000	D =	0.000	D =	0.000
674	1	D =	0.000	D =	0.000	D =	0.000
699	1	D =	0.000	D =	0.000	D =	0.000
724	1	D =	0.000	D =	0.000	D =	0.000
761	1	D =	0.000	D =	0.000	D =	0.000
786	1	D =	0.000	D =	0.000	D =	0.000
811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000

841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1162	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1200	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
 * * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


 * * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
```

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6

8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000

22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.575	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 21

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 21
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.372E+00	-0.136E+00	-0.263E-11	-0.115E+05	0.445E+03
	0.00	-0.105E+01	-0.662E-01	-0.266E+04	-0.115E+05	0.193E+04
2	-193.83	-0.456E+00	-0.909E+01	-0.462E+04	-0.278E+05	0.191E+03
	14.34	-0.105E+01	-0.277E+01	-0.272E+04	-0.118E+05	0.830E+03
3	-192.08	-0.511E+00	-0.180E+02	-0.559E+04	-0.315E+05	-0.348E+01
	28.58	-0.105E+01	-0.547E+01	-0.279E+04	-0.121E+05	-0.151E+02
4	-188.35	-0.528E+00	-0.300E+02	-0.460E+04	-0.283E+05	-0.562E+02
	42.43	-0.105E+01	-0.207E+01	-0.284E+04	-0.123E+05	-0.244E+03
5	-182.71	-0.513E+00	-0.308E+02	-0.402E+04	-0.261E+05	-0.187E+02
	55.62	-0.107E+01	0.522E+01	-0.281E+04	-0.122E+05	-0.814E+02
6	-175.27	-0.474E+00	-0.254E+02	-0.406E+04	-0.259E+05	-0.533E+01
	67.89	-0.110E+01	0.759E+01	-0.272E+04	-0.118E+05	-0.231E+02

7	-166.18	-0.417E+00	-0.196E+02	-0.383E+04	-0.246E+05	-0.582E+02
	78.98	-0.115E+01	0.586E+01	-0.262E+04	-0.114E+05	-0.253E+03
8	-155.61	-0.349E+00	-0.160E+02	-0.232E+04	-0.190E+05	-0.113E+03
	88.69	-0.123E+01	0.516E+01	-0.253E+04	-0.110E+05	-0.489E+03
9	-144.43	-0.282E+00	-0.135E+02	-0.529E+03	-0.125E+05	-0.973E+02
	97.10	-0.133E+01	0.395E+01	-0.245E+04	-0.107E+05	-0.423E+03
10	-132.78	-0.218E+00	-0.125E+02	0.547E+03	-0.123E+05	-0.510E+02
	104.87	-0.144E+01	0.363E+01	-0.240E+04	-0.104E+05	-0.222E+03
11	-120.72	-0.161E+00	-0.118E+02	0.106E+04	-0.139E+05	-0.134E+02
	111.98	-0.154E+01	0.344E+01	-0.235E+04	-0.102E+05	-0.583E+02
12	-108.28	-0.113E+00	-0.795E+01	0.109E+04	-0.138E+05	-0.480E+01
	118.40	-0.165E+01	0.231E+01	-0.230E+04	-0.100E+05	-0.209E+02
13	-95.50	-0.742E-01	-0.898E+01	0.136E+04	-0.146E+05	-0.136E+02
	124.11	-0.174E+01	0.262E+01	-0.227E+04	-0.985E+04	-0.589E+02
14	-82.42	-0.443E-01	-0.912E+01	0.163E+04	-0.153E+05	-0.121E+02
	129.10	-0.184E+01	0.267E+01	-0.223E+04	-0.969E+04	-0.525E+02
15	-69.09	-0.228E-01	-0.881E+01	0.185E+04	-0.159E+05	-0.967E+01
	133.35	-0.192E+01	0.258E+01	-0.219E+04	-0.953E+04	-0.420E+02
16	-55.53	-0.913E-02	-0.888E+01	0.204E+04	-0.164E+05	-0.678E+01
	136.84	-0.199E+01	0.261E+01	-0.216E+04	-0.936E+04	-0.295E+02
17	-41.80	-0.206E-02	-0.869E+01	0.216E+04	-0.167E+05	-0.273E+01
	139.57	-0.204E+01	0.256E+01	-0.212E+04	-0.921E+04	-0.119E+02
18	-27.94	-0.179E-03	-0.842E+01	0.221E+04	-0.167E+05	0.245E+00
	141.53	-0.209E+01	0.249E+01	-0.208E+04	-0.905E+04	0.106E+01
19	-13.99	-0.188E-02	-0.809E+01	0.221E+04	-0.166E+05	0.938E+00
	142.70	-0.211E+01	0.237E+01	-0.205E+04	-0.890E+04	0.408E+01
20	0.00	-0.544E-02	-0.766E+01	0.221E+04	-0.165E+05	-0.233E+01
	143.09	-0.213E+01	0.276E-01	-0.203E+04	-0.883E+04	-0.101E+02
21	13.99	-0.920E-02	-0.809E+01	0.228E+04	-0.168E+05	-0.561E+01
	142.70	-0.212E+01	-0.238E+01	-0.205E+04	-0.890E+04	-0.244E+02
22	27.94	-0.114E-01	-0.842E+01	0.234E+04	-0.172E+05	-0.495E+01
	141.53	-0.210E+01	-0.249E+01	-0.208E+04	-0.905E+04	-0.215E+02
23	41.80	-0.103E-01	-0.871E+01	0.235E+04	-0.174E+05	-0.187E+01
	139.57	-0.206E+01	-0.257E+01	-0.212E+04	-0.920E+04	-0.812E+01
24	55.53	-0.405E-02	-0.893E+01	0.230E+04	-0.173E+05	0.272E+01
	136.84	-0.201E+01	-0.262E+01	-0.215E+04	-0.936E+04	0.118E+02
25	69.09	0.906E-02	-0.890E+01	0.216E+04	-0.170E+05	0.668E+01
	133.35	-0.194E+01	-0.260E+01	-0.219E+04	-0.952E+04	0.290E+02
26	82.42	0.304E-01	-0.943E+01	0.198E+04	-0.165E+05	0.119E+02
	129.10	-0.186E+01	-0.275E+01	-0.223E+04	-0.969E+04	0.518E+02

27	95.50	0.611E-01	-0.948E+01	0.168E+04	-0.157E+05	0.191E+02
	124.11	-0.177E+01	-0.276E+01	-0.227E+04	-0.986E+04	0.829E+02
28	108.28	0.102E+00	-0.810E+01	0.128E+04	-0.145E+05	0.148E+02
	118.40	-0.167E+01	-0.235E+01	-0.231E+04	-0.100E+05	0.641E+02
29	120.72	0.152E+00	-0.117E+02	0.109E+04	-0.140E+05	0.235E+02
	111.98	-0.156E+01	-0.340E+01	-0.235E+04	-0.102E+05	0.102E+03
30	132.78	0.212E+00	-0.122E+02	0.453E+03	-0.120E+05	0.583E+02
	104.87	-0.145E+01	-0.355E+01	-0.240E+04	-0.104E+05	0.253E+03
31	144.43	0.279E+00	-0.132E+02	-0.696E+03	-0.131E+05	0.101E+03
	97.10	-0.134E+01	-0.388E+01	-0.246E+04	-0.107E+05	0.438E+03
32	155.61	0.348E+00	-0.158E+02	-0.251E+04	-0.197E+05	0.113E+03
	88.69	-0.123E+01	-0.509E+01	-0.253E+04	-0.110E+05	0.490E+03
33	166.18	0.418E+00	-0.195E+02	-0.401E+04	-0.253E+05	0.560E+02
	78.98	-0.115E+01	-0.582E+01	-0.262E+04	-0.114E+05	0.243E+03
34	175.27	0.476E+00	-0.254E+02	-0.420E+04	-0.264E+05	0.215E+01
	67.89	-0.110E+01	-0.759E+01	-0.272E+04	-0.118E+05	0.935E+01
35	182.71	0.516E+00	-0.308E+02	-0.410E+04	-0.264E+05	0.158E+02
	55.62	-0.107E+01	-0.549E+01	-0.281E+04	-0.122E+05	0.688E+02
36	188.35	0.531E+00	-0.301E+02	-0.465E+04	-0.285E+05	0.542E+02
	42.43	-0.105E+01	0.205E+01	-0.284E+04	-0.124E+05	0.235E+03
37	192.08	0.513E+00	-0.181E+02	-0.562E+04	-0.316E+05	0.243E+01
	28.58	-0.105E+01	0.549E+01	-0.280E+04	-0.121E+05	0.105E+02
38	193.83	0.458E+00	-0.907E+01	-0.464E+04	-0.279E+05	-0.192E+03
	14.34	-0.105E+01	0.276E+01	-0.272E+04	-0.118E+05	-0.834E+03
39	193.56	0.372E+00	-0.200E-01	-0.231E-10	-0.115E+05	-0.447E+03
	0.00	-0.105E+01	0.318E-01	-0.266E+04	-0.115E+05	-0.194E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 21

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.36194E-03	-0.36194E-03	.26214	0.00000
2	-0.87377E-03	0.13193E-03	.63285	0.00000
3	-0.98858E-03	0.22723E-03	.71600	0.00000
4	-0.88750E-03	0.11277E-03	.64279	0.00000
5	-0.82035E-03	0.53480E-04	.59416	0.00000
6	-0.81275E-03	0.71671E-04	.58866	0.00000
7	-0.77319E-03	0.59894E-04	.56001	0.00000
8	-0.59669E-03	-0.92371E-04	.43217	0.00000
9	-0.39209E-03	-0.27707E-03	.28398	0.00000
10	-0.26717E-03	-0.38625E-03	.27975	0.00000
11	-0.20460E-03	-0.43472E-03	.31486	0.00000
12	-0.19556E-03	-0.43253E-03	.31327	0.00000
13	-0.16127E-03	-0.45717E-03	.33111	0.00000
14	-0.12639E-03	-0.48165E-03	.34885	0.00000
15	-0.97457E-04	-0.50033E-03	.36237	0.00000
16	-0.71887E-04	-0.51581E-03	.37359	0.00000
17	-0.54241E-04	-0.52347E-03	.37913	0.00000
18	-0.43999E-04	-0.52401E-03	.37952	0.00000
19	-0.38880E-04	-0.51982E-03	.37650	0.00000
20	-0.36569E-04	-0.51753E-03	.37484	0.00000
21	-0.31677E-04	-0.52685E-03	.38159	0.00000
22	-0.29581E-04	-0.53818E-03	.38979	0.00000

23	-0.32571E-04	-0.54482E-03	.39460	0.00000
24	-0.43349E-04	-0.54400E-03	.39401	0.00000
25	-0.63363E-04	-0.53408E-03	.38682	0.00000
26	-0.88820E-04	-0.51906E-03	.37594	0.00000
27	-0.12704E-03	-0.49168E-03	.35611	0.00000
28	-0.17531E-03	-0.45353E-03	.32848	0.00000
29	-0.20109E-03	-0.43912E-03	.31804	0.00000
30	-0.27779E-03	-0.37643E-03	.27264	0.00000
31	-0.41061E-03	-0.25915E-03	.29739	0.00000
32	-0.61804E-03	-0.71394E-04	.44763	0.00000
33	-0.79261E-03	0.79170E-04	.57407	0.00000
34	-0.82717E-03	0.86122E-04	.59910	0.00000
35	-0.82998E-03	0.62723E-04	.60114	0.00000
36	-0.89335E-03	0.11776E-03	.64703	0.00000
37	-0.99213E-03	0.23000E-03	.71858	0.00000
38	-0.87619E-03	0.13365E-03	.63461	0.00000
39	-0.36228E-03	-0.36228E-03	.26239	0.00000

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 21

LRFD STRENGTH-LIMIT RATIOS AT STEP 21, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	36	12358.	30800.	0.401
BUCKLING THRUST (psi)	36	12358.	62330.	0.198
SEAM THRUST (psi)	36	12358.	21589.	0.572
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000

LRFD SERVICE PERFORMANCE AT STEP 21, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.48

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.10

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.451E+00	0.134E+01	0.101E-10	-0.128E+05	0.527E+03
	0.00	-0.110E+01	0.336E+00	-0.296E+04	-0.128E+05	0.229E+04
2	-193.83	-0.563E+00	-0.885E+01	-0.549E+04	-0.322E+05	0.226E+03
	14.34	-0.111E+01	-0.273E+01	-0.303E+04	-0.131E+05	0.983E+03
3	-192.08	-0.641E+00	-0.190E+02	-0.664E+04	-0.365E+05	-0.625E+01
	28.58	-0.111E+01	-0.579E+01	-0.310E+04	-0.135E+05	-0.272E+02
4	-188.35	-0.673E+00	-0.339E+02	-0.542E+04	-0.327E+05	-0.707E+02
	42.43	-0.111E+01	-0.821E+01	-0.320E+04	-0.139E+05	-0.307E+03

5	-182.71	-0.666E+00	-0.364E+02	-0.469E+04	-0.303E+05	-0.190E+02
	55.62	-0.112E+01	0.250E+01	-0.323E+04	-0.140E+05	-0.826E+02
6	-175.27	-0.631E+00	-0.307E+02	-0.492E+04	-0.307E+05	0.131E+02
	67.89	-0.114E+01	0.824E+01	-0.315E+04	-0.137E+05	0.570E+02
7	-166.18	-0.572E+00	-0.230E+02	-0.507E+04	-0.308E+05	-0.378E+02
	78.98	-0.120E+01	0.688E+01	-0.304E+04	-0.132E+05	-0.164E+03
8	-155.61	-0.497E+00	-0.180E+02	-0.379E+04	-0.259E+05	-0.104E+03
	88.69	-0.129E+01	0.581E+01	-0.294E+04	-0.128E+05	-0.451E+03
9	-144.43	-0.417E+00	-0.147E+02	-0.204E+04	-0.195E+05	-0.976E+02
	97.10	-0.141E+01	0.430E+01	-0.286E+04	-0.124E+05	-0.424E+03
10	-132.78	-0.336E+00	-0.135E+02	-0.900E+03	-0.153E+05	-0.579E+02
	104.87	-0.154E+01	0.392E+01	-0.280E+04	-0.122E+05	-0.252E+03
11	-120.72	-0.258E+00	-0.154E+02	-0.205E+03	-0.126E+05	-0.100E+02
	111.98	-0.168E+01	0.445E+01	-0.274E+04	-0.119E+05	-0.436E+02
12	-108.28	-0.188E+00	-0.760E+01	-0.361E+03	-0.129E+05	-0.668E+00
	118.40	-0.183E+01	0.218E+01	-0.269E+04	-0.117E+05	-0.290E+01
13	-95.50	-0.125E+00	-0.804E+01	0.118E+03	-0.120E+05	-0.402E+02
	124.11	-0.199E+01	0.231E+01	-0.266E+04	-0.115E+05	-0.175E+03
14	-82.42	-0.718E-01	-0.933E+01	0.111E+04	-0.152E+05	-0.657E+02
	129.10	-0.215E+01	0.268E+01	-0.262E+04	-0.114E+05	-0.285E+03
15	-69.09	-0.296E-01	-0.996E+01	0.233E+04	-0.193E+05	-0.755E+02
	133.35	-0.230E+01	0.287E+01	-0.258E+04	-0.112E+05	-0.328E+03
16	-55.53	0.250E-03	-0.107E+02	0.359E+04	-0.235E+05	-0.729E+02
	136.84	-0.244E+01	0.310E+01	-0.253E+04	-0.110E+05	-0.317E+03
17	-41.80	0.177E-01	-0.112E+02	0.470E+04	-0.271E+05	-0.591E+02
	139.57	-0.255E+01	0.326E+01	-0.248E+04	-0.108E+05	-0.257E+03
18	-27.94	0.245E-01	-0.114E+02	0.549E+04	-0.296E+05	-0.374E+02
	141.53	-0.263E+01	0.335E+01	-0.243E+04	-0.106E+05	-0.162E+03
19	-13.99	0.236E-01	-0.119E+02	0.589E+04	-0.308E+05	-0.834E+01
	142.70	-0.268E+01	0.347E+01	-0.238E+04	-0.104E+05	-0.362E+02
20	0.00	0.193E-01	-0.113E+02	0.576E+04	-0.303E+05	0.209E+02
	143.09	-0.269E+01	-0.266E+01	-0.238E+04	-0.103E+05	0.908E+02
21	13.99	0.156E-01	-0.109E+02	0.521E+04	-0.286E+05	0.426E+02
	142.70	-0.265E+01	-0.318E+01	-0.242E+04	-0.105E+05	0.185E+03
22	27.94	0.168E-01	-0.104E+02	0.436E+04	-0.258E+05	0.560E+02
	141.53	-0.258E+01	-0.305E+01	-0.247E+04	-0.107E+05	0.243E+03
23	41.80	0.261E-01	-0.100E+02	0.335E+04	-0.225E+05	0.604E+02
	139.57	-0.248E+01	-0.291E+01	-0.251E+04	-0.109E+05	0.263E+03
24	55.53	0.453E-01	-0.987E+01	0.232E+04	-0.192E+05	0.584E+02
	136.84	-0.235E+01	-0.284E+01	-0.256E+04	-0.111E+05	0.254E+03

25	69.09	0.754E-01	-0.962E+01	0.135E+04	-0.160E+05	0.512E+02
	133.35	-0.221E+01	-0.276E+01	-0.260E+04	-0.113E+05	0.222E+03
26	82.42	0.116E+00	-0.958E+01	0.526E+03	-0.133E+05	0.395E+02
	129.10	-0.206E+01	-0.275E+01	-0.264E+04	-0.115E+05	0.172E+03
27	95.50	0.166E+00	-0.889E+01	-0.875E+02	-0.119E+05	0.205E+02
	124.11	-0.192E+01	-0.255E+01	-0.268E+04	-0.116E+05	0.890E+02
28	108.28	0.224E+00	-0.879E+01	-0.326E+03	-0.129E+05	-0.605E+01
	118.40	-0.177E+01	-0.252E+01	-0.272E+04	-0.118E+05	-0.263E+02
29	120.72	0.289E+00	-0.154E+02	-0.137E+03	-0.125E+05	0.106E+02
	111.98	-0.163E+01	-0.446E+01	-0.277E+04	-0.120E+05	0.460E+02
30	132.78	0.361E+00	-0.135E+02	-0.790E+03	-0.150E+05	0.569E+02
	104.87	-0.150E+01	-0.390E+01	-0.283E+04	-0.123E+05	0.247E+03
31	144.43	0.437E+00	-0.147E+02	-0.185E+04	-0.190E+05	0.949E+02
	97.10	-0.137E+01	-0.431E+01	-0.289E+04	-0.125E+05	0.412E+03
32	155.61	0.512E+00	-0.183E+02	-0.352E+04	-0.251E+05	0.101E+03
	88.69	-0.126E+01	-0.590E+01	-0.297E+04	-0.129E+05	0.441E+03
33	166.18	0.581E+00	-0.239E+02	-0.475E+04	-0.298E+05	0.408E+02
	78.98	-0.118E+01	-0.568E+01	-0.306E+04	-0.133E+05	0.177E+03
34	175.27	0.637E+00	-0.307E+02	-0.469E+04	-0.299E+05	-0.449E+01
	67.89	-0.113E+01	-0.490E+01	-0.314E+04	-0.136E+05	-0.195E+02
35	182.71	0.670E+00	-0.356E+02	-0.459E+04	-0.298E+05	0.254E+02
	55.62	-0.110E+01	-0.160E+01	-0.319E+04	-0.139E+05	0.110E+03
36	188.35	0.674E+00	-0.331E+02	-0.536E+04	-0.322E+05	0.722E+02
	42.43	-0.109E+01	0.888E+01	-0.314E+04	-0.137E+05	0.314E+03
37	192.08	0.641E+00	-0.185E+02	-0.657E+04	-0.360E+05	0.609E+01
	28.58	-0.109E+01	0.563E+01	-0.305E+04	-0.132E+05	0.265E+02
38	193.83	0.562E+00	-0.867E+01	-0.541E+04	-0.317E+05	-0.224E+03
	14.34	-0.110E+01	0.267E+01	-0.297E+04	-0.129E+05	-0.972E+03
39	193.56	0.449E+00	0.116E+01	-0.222E-10	-0.126E+05	-0.519E+03
	0.00	-0.109E+01	-0.288E+00	-0.290E+04	-0.126E+05	-0.226E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.40295E-03	-0.40295E-03	.29185	0.00000
2	-0.10093E-02	0.18428E-03	.73104	0.00000
3	-0.11459E-02	0.30013E-03	.82991	0.00000
4	-0.10257E-02	0.15427E-03	.74290	0.00000
5	-0.95094E-03	0.70271E-04	.68875	0.00000
6	-0.96465E-03	0.10537E-03	.69867	0.00000
7	-0.96624E-03	0.13727E-03	.69983	0.00000
8	-0.81300E-03	0.11023E-04	.58884	0.00000
9	-0.61159E-03	-0.16867E-03	.44296	0.00000
10	-0.47957E-03	-0.28368E-03	.34734	0.00000
11	-0.39561E-03	-0.35101E-03	.28653	0.00000
12	-0.40620E-03	-0.32757E-03	.29420	0.00000
13	-0.34950E-03	-0.37528E-03	.27180	0.00000
14	-0.23618E-03	-0.47817E-03	.34633	0.00000

15	-0.97705E-04	-0.60488E-03	.43810	0.00000
16	0.45879E-04	-0.73586E-03	.53297	0.00000
17	0.17258E-03	-0.84935E-03	.61517	0.00000
18	0.26610E-03	-0.92947E-03	.67319	0.00000
19	0.31561E-03	-0.96561E-03	.69937	0.00000
20	0.30195E-03	-0.95050E-03	.68842	0.00000
21	0.23691E-03	-0.89711E-03	.64975	0.00000
22	0.13829E-03	-0.81115E-03	.58749	0.00000
23	0.22439E-04	-0.70759E-03	.51249	0.00000
24	-0.95765E-04	-0.60131E-03	.43552	0.00000
25	-0.20761E-03	-0.50106E-03	.36291	0.00000
26	-0.30279E-03	-0.41718E-03	.30215	0.00000
27	-0.37483E-03	-0.35579E-03	.27148	0.00000
28	-0.40569E-03	-0.33483E-03	.29383	0.00000
29	-0.39194E-03	-0.36205E-03	.28388	0.00000
30	-0.47121E-03	-0.29938E-03	.34128	0.00000
31	-0.59504E-03	-0.19253E-03	.43097	0.00000
32	-0.78783E-03	-0.21608E-04	.57060	0.00000
33	-0.93404E-03	0.99763E-04	.67650	0.00000
34	-0.93800E-03	0.82095E-04	.67937	0.00000
35	-0.93385E-03	0.64569E-04	.67636	0.00000
36	-0.10114E-02	0.15429E-03	.73255	0.00000
37	-0.11303E-02	0.29986E-03	.81865	0.00000
38	-0.99390E-03	0.18366E-03	.71986	0.00000
39	-0.39570E-03	-0.39570E-03	.28660	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.32427	0.00000	0.10515
2	-0.33198	-0.34511	0.45532
3	-0.34030	-0.41808	0.53388
4	-0.35065	-0.34117	0.46412
5	-0.35436	-0.29526	0.42084
6	-0.34575	-0.30937	0.42892
7	-0.33356	-0.31906	0.43032
8	-0.32270	-0.23825	0.34238
9	-0.31396	-0.12806	0.22663
10	-0.30711	-0.05664	0.15096
11	-0.30042	-0.01290	0.10315
12	-0.29525	-0.02273	0.10991
13	-0.29163	0.00745	0.09250
14	-0.28744	0.06997	0.15259
15	-0.28270	0.14664	0.22656
16	-0.27763	0.22602	0.30310
17	-0.27232	0.29547	0.36963
18	-0.26693	0.34567	0.41692
19	-0.26154	0.37044	0.43884
20	-0.26096	0.36212	0.43022
21	-0.26565	0.32788	0.39845
22	-0.27074	0.27451	0.34781
23	-0.27569	0.21107	0.28707
24	-0.28049	0.14617	0.22484
25	-0.28515	0.08485	0.16616
26	-0.28970	0.03307	0.11700
27	-0.29398	-0.00551	0.09193
28	-0.29797	-0.02049	0.10927
29	-0.30339	-0.00864	0.10069
30	-0.31007	-0.04968	0.14582
31	-0.31690	-0.11638	0.21680
32	-0.32570	-0.22154	0.32761
33	-0.33569	-0.29890	0.41159
34	-0.34440	-0.29494	0.41355
35	-0.34978	-0.28867	0.41101
36	-0.34489	-0.33704	0.45599
37	-0.33415	-0.41350	0.52516
38	-0.32602	-0.34047	0.44676
39	-0.31844	0.00000	0.10141

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

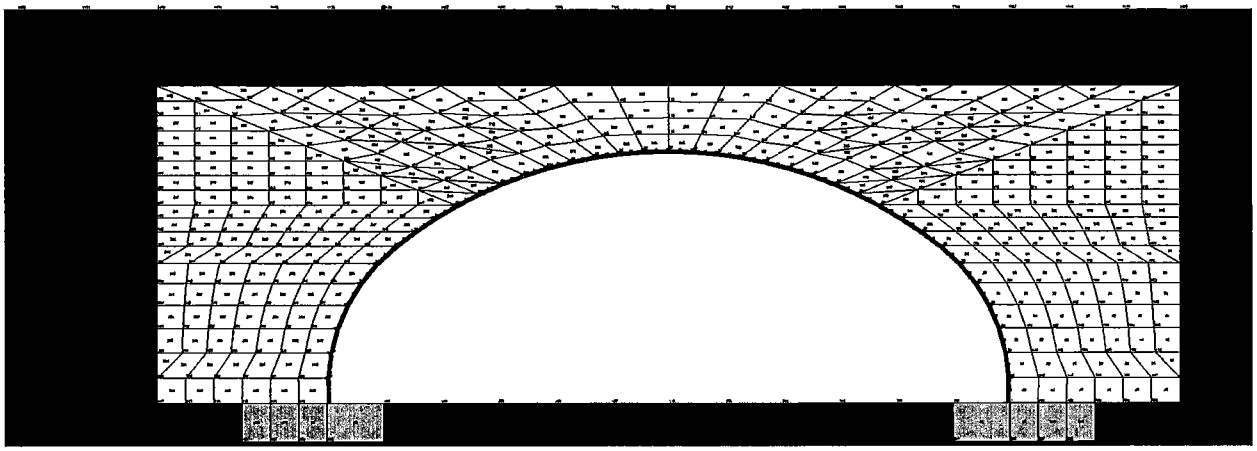
LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	14033.	30800.	0.456
BUCKLING THRUST (psi)	5	14033.	62900.	0.223
SEAM THRUST (psi)	5	14033.	21589.	0.650
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.534	1.000	0.534

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	0.69
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.14
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *



HL-93 TRUCK

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          *** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

 MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

          USER TITLE: Double Radius 33S 6.6ft Cover 8Gage HL-93 TRUCK

          EXECUTION MODE ..................   ANALYS

          SOLUTION LEVEL ..................  #3 USER

          METHODOLOGY (LRFD OR SERVICE) ...     LRFD

          NUMBER OF PIPE-ELEMENT GROUPS ....       1

          MAXIMUM ITERATIONS PER STEP ......     -99

          PIPE ELEMENT TYPE ............... STEEL

          NUMBER OF BEAM ELEMENTS .........       38

          STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

                YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

                POISSONS RATIO OF METAL (-) .......    0.30000E+00

                YIELD STRESS OF METAL (PSI)........    0.44000E+05

                LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

                DENSITY OF METAL (PCI).............    0.28400E+00

                MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

           MATERIAL CHARACTER CODE, NONLIN .........    2
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NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40300

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1181	22	F = 0.000	F = -103.7	F = 0.000
1181	23	F = 0.000	F = -103.7	F = 0.000
1176	22	F = 0.000	F = -103.7	F = 0.000
1176	23	F = 0.000	F = -103.7	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000

699	1	D =	0.000	D =	0.000	D =	0.000
724	1	D =	0.000	D =	0.000	D =	0.000
761	1	D =	0.000	D =	0.000	D =	0.000
786	1	D =	0.000	D =	0.000	D =	0.000
811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1162	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1200	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060
```

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

```
     DENSITY =     0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

      LRFD STRESS CONTROL..........        0

      ENTERING ELEMENT RATIO.......       0.5000

      ORIGINAL FORMULATION, ... NEWDS =  0

HYPERBOLIC STRESS-STRAIN PARAMETERS

      SOIL CLASSIFICATION ............SW95

      COHESION INTERCEPT  C ..........      0.0000

      FRICTION ANGLE  PHIO (DEG)......     48.0000

      10-FOLD REDUCTION IN PHIO(DEG)..     8.0000

      SCALED MODULUS NUMBER  ZK ......    950.0000

      MODULUS EXPONENT  ZN ...........      0.6000

      FAILURE RATIO  RF ..............      0.7000

      INIT. BULK MODULUS NUMBER BI....     74.8000

      ULT. VOLUMETRIC STRAIN EU ......      0.0200

PROPERTIES FOR MATERIAL  4   ********SM90

     DENSITY =     0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

      LRFD STRESS CONTROL..........        0

      ENTERING ELEMENT RATIO.......       0.5000

      ORIGINAL FORMULATION, ... NEWDS =  0

HYPERBOLIC STRESS-STRAIN PARAMETERS

      SOIL CLASSIFICATION ............SM90

      COHESION INTERCEPT  C ..........      0.0000

      FRICTION ANGLE  PHIO (DEG)......     32.0000

      10-FOLD REDUCTION IN PHIO(DEG)..     4.0000

      SCALED MODULUS NUMBER  ZK ......    300.0000

      MODULUS EXPONENT  ZN ...........      0.2500

      FAILURE RATIO  RF ..............      0.7000

      BULK MODULUS NUMBER  BK ........    250.0000

      BULK MODULUS EXPONENT  BM ......      0.0000

      INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

       MAT. NO.   NORMAL-ANGLE  COEF-FRICTION  TENSILE-RUPTURE    INITIAL-GAP

            1          2.95        0.30000       50.00000        0.00000
```

2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.575	Factor for load step #21
22	1.750	Factor for load step #22
23	1.750	Factor for load step #23

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 21

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 21
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.372E+00	-0.136E+00	-0.263E-11	-0.115E+05	0.445E+03

	0.00	-0.105E+01	-0.662E-01	-0.266E+04	-0.115E+05	0.193E+04
2	-193.83	-0.456E+00	-0.909E+01	-0.462E+04	-0.278E+05	0.191E+03
	14.34	-0.105E+01	-0.277E+01	-0.272E+04	-0.118E+05	0.830E+03
3	-192.08	-0.511E+00	-0.180E+02	-0.559E+04	-0.315E+05	-0.348E+01
	28.58	-0.105E+01	-0.547E+01	-0.279E+04	-0.121E+05	-0.151E+02
4	-188.35	-0.528E+00	-0.300E+02	-0.460E+04	-0.283E+05	-0.562E+02
	42.43	-0.105E+01	-0.207E+01	-0.284E+04	-0.123E+05	-0.244E+03
5	-182.71	-0.513E+00	-0.308E+02	-0.402E+04	-0.261E+05	-0.187E+02
	55.62	-0.107E+01	0.522E+01	-0.281E+04	-0.122E+05	-0.814E+02
6	-175.27	-0.474E+00	-0.254E+02	-0.406E+04	-0.259E+05	-0.533E+01
	67.89	-0.110E+01	0.759E+01	-0.272E+04	-0.118E+05	-0.231E+02
7	-166.18	-0.417E+00	-0.196E+02	-0.383E+04	-0.246E+05	-0.582E+02
	78.98	-0.115E+01	0.586E+01	-0.262E+04	-0.114E+05	-0.253E+03
8	-155.61	-0.349E+00	-0.160E+02	-0.232E+04	-0.190E+05	-0.113E+03
	88.69	-0.123E+01	0.516E+01	-0.253E+04	-0.110E+05	-0.489E+03
9	-144.43	-0.282E+00	-0.135E+02	-0.529E+03	-0.125E+05	-0.973E+02
	97.10	-0.133E+01	0.395E+01	-0.245E+04	-0.107E+05	-0.423E+03
10	-132.78	-0.218E+00	-0.125E+02	0.547E+03	-0.123E+05	-0.510E+02
	104.87	-0.144E+01	0.363E+01	-0.240E+04	-0.104E+05	-0.222E+03
11	-120.72	-0.161E+00	-0.118E+02	0.106E+04	-0.139E+05	-0.134E+02
	111.98	-0.154E+01	0.344E+01	-0.235E+04	-0.102E+05	-0.583E+02
12	-108.28	-0.113E+00	-0.795E+01	0.109E+04	-0.138E+05	-0.480E+01
	118.40	-0.165E+01	0.231E+01	-0.230E+04	-0.100E+05	-0.209E+02
13	-95.50	-0.742E-01	-0.898E+01	0.136E+04	-0.146E+05	-0.136E+02
	124.11	-0.174E+01	0.262E+01	-0.227E+04	-0.985E+04	-0.589E+02
14	-82.42	-0.443E-01	-0.912E+01	0.163E+04	-0.153E+05	-0.121E+02
	129.10	-0.184E+01	0.267E+01	-0.223E+04	-0.969E+04	-0.525E+02
15	-69.09	-0.228E-01	-0.881E+01	0.185E+04	-0.159E+05	-0.967E+01
	133.35	-0.192E+01	0.258E+01	-0.219E+04	-0.953E+04	-0.420E+02
16	-55.53	-0.913E-02	-0.888E+01	0.204E+04	-0.164E+05	-0.678E+01
	136.84	-0.199E+01	0.261E+01	-0.216E+04	-0.936E+04	-0.295E+02
17	-41.80	-0.206E-02	-0.869E+01	0.216E+04	-0.167E+05	-0.273E+01
	139.57	-0.204E+01	0.256E+01	-0.212E+04	-0.921E+04	-0.119E+02
18	-27.94	-0.179E-03	-0.842E+01	0.221E+04	-0.167E+05	0.245E+00
	141.53	-0.209E+01	0.249E+01	-0.208E+04	-0.905E+04	0.106E+01
19	-13.99	-0.188E-02	-0.809E+01	0.221E+04	-0.166E+05	0.938E+00
	142.70	-0.211E+01	0.237E+01	-0.205E+04	-0.890E+04	0.408E+01
20	0.00	-0.544E-02	-0.766E+01	0.221E+04	-0.165E+05	-0.233E+01
	143.09	-0.213E+01	0.276E-01	-0.203E+04	-0.883E+04	-0.101E+02
21	13.99	-0.920E-02	-0.809E+01	0.228E+04	-0.168E+05	-0.561E+01
	142.70	-0.212E+01	-0.238E+01	-0.205E+04	-0.890E+04	-0.244E+02

22	27.94	-0.114E-01	-0.842E+01	0.234E+04	-0.172E+05	-0.495E+01
	141.53	-0.210E+01	-0.249E+01	-0.208E+04	-0.905E+04	-0.215E+02
23	41.80	-0.103E-01	-0.871E+01	0.235E+04	-0.174E+05	-0.187E+01
	139.57	-0.206E+01	-0.257E+01	-0.212E+04	-0.920E+04	-0.812E+01
24	55.53	-0.405E-02	-0.893E+01	0.230E+04	-0.173E+05	0.272E+01
	136.84	-0.201E+01	-0.262E+01	-0.215E+04	-0.936E+04	0.118E+02
25	69.09	0.906E-02	-0.890E+01	0.216E+04	-0.170E+05	0.668E+01
	133.35	-0.194E+01	-0.260E+01	-0.219E+04	-0.952E+04	0.290E+02
26	82.42	0.304E-01	-0.943E+01	0.198E+04	-0.165E+05	0.119E+02
	129.10	-0.186E+01	-0.275E+01	-0.223E+04	-0.969E+04	0.518E+02
27	95.50	0.611E-01	-0.948E+01	0.168E+04	-0.157E+05	0.191E+02
	124.11	-0.177E+01	-0.276E+01	-0.227E+04	-0.986E+04	0.829E+02
28	108.28	0.102E+00	-0.810E+01	0.128E+04	-0.145E+05	0.148E+02
	118.40	-0.167E+01	-0.235E+01	-0.231E+04	-0.100E+05	0.641E+02
29	120.72	0.152E+00	-0.117E+02	0.109E+04	-0.140E+05	0.235E+02
	111.98	-0.156E+01	-0.340E+01	-0.235E+04	-0.102E+05	0.102E+03
30	132.78	0.212E+00	-0.122E+02	0.453E+03	-0.120E+05	0.583E+02
	104.87	-0.145E+01	-0.355E+01	-0.240E+04	-0.104E+05	0.253E+03
31	144.43	0.279E+00	-0.132E+02	-0.696E+03	-0.131E+05	0.101E+03
	97.10	-0.134E+01	-0.388E+01	-0.246E+04	-0.107E+05	0.438E+03
32	155.61	0.348E+00	-0.158E+02	-0.251E+04	-0.197E+05	0.113E+03
	88.69	-0.123E+01	-0.509E+01	-0.253E+04	-0.110E+05	0.490E+03
33	166.18	0.418E+00	-0.195E+02	-0.401E+04	-0.253E+05	0.560E+02
	78.98	-0.115E+01	-0.582E+01	-0.262E+04	-0.114E+05	0.243E+03
34	175.27	0.476E+00	-0.254E+02	-0.420E+04	-0.264E+05	0.215E+01
	67.89	-0.110E+01	-0.759E+01	-0.272E+04	-0.118E+05	0.935E+01
35	182.71	0.516E+00	-0.308E+02	-0.410E+04	-0.264E+05	0.158E+02
	55.62	-0.107E+01	-0.549E+01	-0.281E+04	-0.122E+05	0.688E+02
36	188.35	0.531E+00	-0.301E+02	-0.465E+04	-0.285E+05	0.542E+02
	42.43	-0.105E+01	0.205E+01	-0.284E+04	-0.124E+05	0.235E+03
37	192.08	0.513E+00	-0.181E+02	-0.562E+04	-0.316E+05	0.243E+01
	28.58	-0.105E+01	0.549E+01	-0.280E+04	-0.121E+05	0.105E+02
38	193.83	0.458E+00	-0.907E+01	-0.464E+04	-0.279E+05	-0.192E+03
	14.34	-0.105E+01	0.276E+01	-0.272E+04	-0.118E+05	-0.834E+03
39	193.56	0.372E+00	-0.200E-01	-0.231E-10	-0.115E+05	-0.447E+03
	0.00	-0.105E+01	0.318E-01	-0.266E+04	-0.115E+05	-0.194E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 21

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED

1	-0.36194E-03	-0.36194E-03	.26214	0.00000
2	-0.87377E-03	0.13193E-03	.63285	0.00000
3	-0.98858E-03	0.22723E-03	.71600	0.00000
4	-0.88750E-03	0.11277E-03	.64279	0.00000
5	-0.82035E-03	0.53480E-04	.59416	0.00000
6	-0.81275E-03	0.71671E-04	.58866	0.00000
7	-0.77319E-03	0.59894E-04	.56001	0.00000
8	-0.59669E-03	-0.92371E-04	.43217	0.00000
9	-0.39209E-03	-0.27707E-03	.28398	0.00000
10	-0.26717E-03	-0.38625E-03	.27975	0.00000
11	-0.20460E-03	-0.43472E-03	.31486	0.00000
12	-0.19556E-03	-0.43253E-03	.31327	0.00000
13	-0.16127E-03	-0.45717E-03	.33111	0.00000
14	-0.12639E-03	-0.48165E-03	.34885	0.00000
15	-0.97457E-04	-0.50033E-03	.36237	0.00000
16	-0.71887E-04	-0.51581E-03	.37359	0.00000
17	-0.54241E-04	-0.52347E-03	.37913	0.00000
18	-0.43999E-04	-0.52401E-03	.37952	0.00000
19	-0.38880E-04	-0.51982E-03	.37650	0.00000
20	-0.36569E-04	-0.51753E-03	.37484	0.00000
21	-0.31677E-04	-0.52685E-03	.38159	0.00000
22	-0.29581E-04	-0.53818E-03	.38979	0.00000
23	-0.32571E-04	-0.54482E-03	.39460	0.00000
24	-0.43349E-04	-0.54400E-03	.39401	0.00000
25	-0.63363E-04	-0.53408E-03	.38682	0.00000
26	-0.88820E-04	-0.51906E-03	.37594	0.00000
27	-0.12704E-03	-0.49168E-03	.35611	0.00000
28	-0.17531E-03	-0.45353E-03	.32848	0.00000
29	-0.20109E-03	-0.43912E-03	.31804	0.00000
30	-0.27779E-03	-0.37643E-03	.27264	0.00000
31	-0.41061E-03	-0.25915E-03	.29739	0.00000
32	-0.61804E-03	-0.71394E-04	.44763	0.00000
33	-0.79261E-03	0.79170E-04	.57407	0.00000
34	-0.82717E-03	0.86122E-04	.59910	0.00000
35	-0.82998E-03	0.62723E-04	.60114	0.00000
36	-0.89335E-03	0.11776E-03	.64703	0.00000
37	-0.99213E-03	0.23000E-03	.71858	0.00000
38	-0.87619E-03	0.13365E-03	.63461	0.00000
39	-0.36228E-03	-0.36228E-03	.26239	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 21

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.29127	0.00000	0.08484
2	-0.29850	-0.28959	0.37869
3	-0.30635	-0.35010	0.44394
4	-0.31173	-0.28803	0.38521
5	-0.30857	-0.25162	0.34684
6	-0.29819	-0.25467	0.34359
7	-0.28701	-0.23989	0.32227
8	-0.27726	-0.14522	0.22209
9	-0.26925	-0.03312	0.10562
10	-0.26292	0.03429	0.10342
11	-0.25725	0.06626	0.13244
12	-0.25273	0.06823	0.13211
13	-0.24884	0.08521	0.14713
14	-0.24466	0.10230	0.16216
15	-0.24053	0.11601	0.17386
16	-0.23647	0.12783	0.18375
17	-0.23246	0.13511	0.18915
18	-0.22855	0.13822	0.19045
19	-0.22481	0.13849	0.18903
20	-0.22296	0.13849	0.18820
21	-0.22474	0.14259	0.19310
22	-0.22845	0.14645	0.19864
23	-0.23233	0.14751	0.20148
24	-0.23633	0.14416	0.20002
25	-0.24040	0.13554	0.19334
26	-0.24459	0.12389	0.18371
27	-0.24896	0.10500	0.16698
28	-0.25303	0.08011	0.14414
29	-0.25761	0.06854	0.13490
30	-0.26324	0.02840	0.09770
31	-0.26949	-0.04361	0.11624
32	-0.27741	-0.15741	0.23436

33	-0.28707	-0.25103	0.33344
34	-0.29818	-0.26299	0.35190
35	-0.30873	-0.25706	0.35237
36	-0.31208	-0.29115	0.38854
37	-0.30666	-0.35192	0.44596
38	-0.29878	-0.29079	0.38006
39	-0.29155	0.00000	0.08500

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 21

LRFD STRENGTH-LIMIT RATIOS AT STEP 21, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	36	12358.	30800.	0.401
BUCKLING THRUST (psi)	36	12358.	62330.	0.198
SEAM THRUST (psi)	36	12358.	21589.	0.572
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	37	0.446	1.000	0.446

LRFD SERVICE PERFORMANCE AT STEP 21, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.48

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.10

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 23

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 23
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.446E+00	0.187E+01	-0.199E-10	-0.132E+05	0.536E+03
	0.00	-0.114E+01	0.486E+00	-0.304E+04	-0.132E+05	0.233E+04
2	-193.83	-0.553E+00	-0.939E+01	-0.554E+04	-0.327E+05	0.231E+03
	14.34	-0.114E+01	-0.290E+01	-0.312E+04	-0.135E+05	0.100E+04
3	-192.08	-0.625E+00	-0.206E+02	-0.669E+04	-0.371E+05	0.614E+00
	28.58	-0.114E+01	-0.628E+01	-0.320E+04	-0.139E+05	0.267E+01
4	-188.35	-0.651E+00	-0.351E+02	-0.560E+04	-0.336E+05	-0.547E+02
	42.43	-0.114E+01	-0.387E+01	-0.327E+04	-0.142E+05	-0.238E+03
5	-182.71	-0.638E+00	-0.354E+02	-0.514E+04	-0.318E+05	-0.546E+01
	55.62	-0.115E+01	0.888E+01	-0.322E+04	-0.140E+05	-0.237E+02
6	-175.27	-0.593E+00	-0.284E+02	-0.544E+04	-0.323E+05	0.708E+01
	67.89	-0.119E+01	0.852E+01	-0.310E+04	-0.135E+05	0.307E+02

7	-166.18	-0.523E+00	-0.215E+02	-0.530E+04	-0.314E+05	-0.636E+02
	78.98	-0.125E+01	0.645E+01	-0.299E+04	-0.130E+05	-0.276E+03
8	-155.61	-0.438E+00	-0.176E+02	-0.355E+04	-0.248E+05	-0.137E+03
	88.69	-0.136E+01	0.569E+01	-0.289E+04	-0.125E+05	-0.593E+03
9	-144.43	-0.350E+00	-0.150E+02	-0.135E+04	-0.169E+05	-0.127E+03
	97.10	-0.148E+01	0.437E+01	-0.281E+04	-0.122E+05	-0.551E+03
10	-132.78	-0.264E+00	-0.143E+02	0.113E+03	-0.123E+05	-0.764E+02
	104.87	-0.162E+01	0.413E+01	-0.274E+04	-0.119E+05	-0.332E+03
11	-120.72	-0.185E+00	-0.135E+02	0.914E+03	-0.148E+05	-0.332E+02
	111.98	-0.177E+01	0.387E+01	-0.268E+04	-0.116E+05	-0.144E+03
12	-108.28	-0.118E+00	-0.904E+01	0.117E+04	-0.155E+05	-0.240E+02
	118.40	-0.191E+01	0.259E+01	-0.263E+04	-0.114E+05	-0.104E+03
13	-95.50	-0.614E-01	-0.107E+02	0.171E+04	-0.172E+05	-0.316E+02
	124.11	-0.205E+01	0.306E+01	-0.259E+04	-0.113E+05	-0.137E+03
14	-82.42	-0.173E-01	-0.100E+02	0.218E+04	-0.186E+05	-0.301E+02
	129.10	-0.218E+01	0.287E+01	-0.255E+04	-0.111E+05	-0.131E+03
15	-69.09	0.150E-01	-0.969E+01	0.267E+04	-0.201E+05	-0.331E+02
	133.35	-0.230E+01	0.277E+01	-0.251E+04	-0.109E+05	-0.144E+03
16	-55.53	0.361E-01	-0.985E+01	0.320E+04	-0.218E+05	-0.348E+02
	136.84	-0.241E+01	0.283E+01	-0.247E+04	-0.107E+05	-0.151E+03
17	-41.80	0.472E-01	-0.999E+01	0.372E+04	-0.234E+05	-0.321E+02
	139.57	-0.249E+01	0.288E+01	-0.242E+04	-0.105E+05	-0.139E+03
18	-27.94	0.504E-01	-0.101E+02	0.415E+04	-0.247E+05	-0.252E+02
	141.53	-0.254E+01	0.292E+01	-0.238E+04	-0.103E+05	-0.110E+03
19	-13.99	0.481E-01	-0.105E+02	0.444E+04	-0.256E+05	-0.127E+02
	142.70	-0.257E+01	0.250E+01	-0.234E+04	-0.102E+05	-0.553E+02
20	0.00	0.436E-01	-0.107E+02	0.448E+04	-0.257E+05	0.502E+01
	143.09	-0.257E+01	-0.246E+01	-0.234E+04	-0.102E+05	0.218E+02
21	13.99	0.400E-01	-0.108E+02	0.424E+04	-0.250E+05	0.241E+02
	142.70	-0.253E+01	-0.312E+01	-0.238E+04	-0.103E+05	0.105E+03
22	27.94	0.407E-01	-0.105E+02	0.371E+04	-0.234E+05	0.397E+02
	141.53	-0.247E+01	-0.304E+01	-0.243E+04	-0.105E+05	0.172E+03
23	41.80	0.485E-01	-0.102E+02	0.300E+04	-0.211E+05	0.483E+02
	139.57	-0.238E+01	-0.293E+01	-0.247E+04	-0.107E+05	0.210E+03
24	55.53	0.652E-01	-0.100E+02	0.221E+04	-0.186E+05	0.507E+02
	136.84	-0.226E+01	-0.286E+01	-0.251E+04	-0.109E+05	0.220E+03
25	69.09	0.917E-01	-0.968E+01	0.143E+04	-0.161E+05	0.473E+02
	133.35	-0.214E+01	-0.277E+01	-0.256E+04	-0.111E+05	0.205E+03
26	82.42	0.128E+00	-0.966E+01	0.740E+03	-0.139E+05	0.391E+02
	129.10	-0.201E+01	-0.277E+01	-0.260E+04	-0.113E+05	0.170E+03
27	95.50	0.174E+00	-0.909E+01	0.202E+03	-0.122E+05	0.244E+02

	124.11	-0.187E+01	-0.262E+01	-0.264E+04	-0.115E+05	0.106E+03
28	108.28	0.227E+00	-0.878E+01	-0.500E+02	-0.118E+05	0.152E+01
	118.40	-0.174E+01	-0.253E+01	-0.268E+04	-0.116E+05	0.662E+01
29	120.72	0.288E+00	-0.148E+02	0.782E+02	-0.121E+05	0.159E+02
	111.98	-0.161E+01	-0.427E+01	-0.272E+04	-0.118E+05	0.690E+02
30	132.78	0.357E+00	-0.133E+02	-0.553E+03	-0.140E+05	0.588E+02
	104.87	-0.148E+01	-0.386E+01	-0.278E+04	-0.121E+05	0.256E+03
31	144.43	0.429E+00	-0.146E+02	-0.161E+04	-0.179E+05	0.968E+02
	97.10	-0.136E+01	-0.427E+01	-0.285E+04	-0.124E+05	0.420E+03
32	155.61	0.501E+00	-0.181E+02	-0.328E+04	-0.241E+05	0.104E+03
	88.69	-0.125E+01	-0.586E+01	-0.293E+04	-0.127E+05	0.453E+03
33	166.18	0.569E+00	-0.234E+02	-0.456E+04	-0.289E+05	0.451E+02
	78.98	-0.117E+01	-0.484E+01	-0.301E+04	-0.131E+05	0.196E+03
34	175.27	0.624E+00	-0.299E+02	-0.457E+04	-0.292E+05	-0.173E+01
	67.89	-0.112E+01	-0.490E+01	-0.308E+04	-0.134E+05	-0.752E+01
35	182.71	0.656E+00	-0.349E+02	-0.449E+04	-0.292E+05	0.246E+02
	55.62	-0.109E+01	-0.187E+01	-0.314E+04	-0.136E+05	0.107E+03
36	188.35	0.661E+00	-0.325E+02	-0.524E+04	-0.316E+05	0.690E+02
	42.43	-0.108E+01	0.823E+01	-0.310E+04	-0.135E+05	0.300E+03
37	192.08	0.629E+00	-0.183E+02	-0.643E+04	-0.353E+05	0.362E+01
	28.58	-0.108E+01	0.556E+01	-0.300E+04	-0.130E+05	0.157E+02
38	193.83	0.552E+00	-0.871E+01	-0.529E+04	-0.311E+05	-0.222E+03
	14.34	-0.109E+01	0.269E+01	-0.293E+04	-0.127E+05	-0.962E+03
39	193.56	0.442E+00	0.865E+00	-0.235E-10	-0.124E+05	-0.510E+03
	0.00	-0.108E+01	-0.193E+00	-0.286E+04	-0.124E+05	-0.222E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 23

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.41478E-03	-0.41478E-03	.30041	0.00000
2	-0.10274E-02	0.17780E-03	.74409	0.00000
3	-0.11634E-02	0.29163E-03	.84262	0.00000
4	-0.10545E-02	0.16414E-03	.76376	0.00000
5	-0.99851E-03	0.11935E-03	.72320	0.00000
6	-0.10139E-02	0.16906E-03	.73436	0.00000
7	-0.98422E-03	0.16998E-03	.71285	0.00000
8	-0.77961E-03	-0.77710E-05	.56465	0.00000
9	-0.52923E-03	-0.23587E-03	.38331	0.00000
10	-0.36128E-03	-0.38591E-03	.27950	0.00000
11	-0.26605E-03	-0.46489E-03	.33671	0.00000
12	-0.23160E-03	-0.48647E-03	.35234	0.00000
13	-0.16706E-03	-0.53970E-03	.39089	0.00000
14	-0.11051E-03	-0.58438E-03	.42325	0.00000
15	-0.51613E-04	-0.63195E-03	.45771	0.00000
16	0.12183E-04	-0.68448E-03	.49575	0.00000
17	0.73971E-04	-0.73482E-03	.53221	0.00000
18	0.12680E-03	-0.77609E-03	.56211	0.00000
19	0.16376E-03	-0.80239E-03	.58115	0.00000
20	0.16872E-03	-0.80720E-03	.58464	0.00000
21	0.13652E-03	-0.78588E-03	.56920	0.00000
22	0.73114E-04	-0.73473E-03	.53215	0.00000
23	-0.10451E-04	-0.66326E-03	.48038	0.00000

24	-0.10208E-03	-0.58349E-03	.42261	0.00000
25	-0.19344E-03	-0.50370E-03	.36482	0.00000
26	-0.27374E-03	-0.43473E-03	.31486	0.00000
27	-0.33773E-03	-0.38159E-03	.27638	0.00000
28	-0.37016E-03	-0.35928E-03	.26810	0.00000
29	-0.36283E-03	-0.37985E-03	.27512	0.00000
30	-0.43964E-03	-0.31926E-03	.31842	0.00000
31	-0.56275E-03	-0.21299E-03	.40759	0.00000
32	-0.75603E-03	-0.41459E-04	.54757	0.00000
33	-0.90645E-03	0.85709E-04	.65652	0.00000
34	-0.91746E-03	0.76587E-04	.66450	0.00000
35	-0.91592E-03	0.61108E-04	.66338	0.00000
36	-0.99259E-03	0.14820E-03	.71891	0.00000
37	-0.11088E-02	0.28983E-03	.80309	0.00000
38	-0.97486E-03	0.17598E-03	.70606	0.00000
39	-0.39003E-03	-0.39003E-03	.28249	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 23

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.33379	0.00000	0.11142
2	-0.34184	-0.34703	0.46389
3	-0.35078	-0.41898	0.54203
4	-0.35827	-0.35092	0.47927
5	-0.35375	-0.32189	0.44703
6	-0.33995	-0.34064	0.45621
7	-0.32763	-0.33236	0.43970
8	-0.31682	-0.22225	0.32263
9	-0.30786	-0.08447	0.17925
10	-0.30065	0.00709	0.09748
11	-0.29412	0.05726	0.14376
12	-0.28893	0.07339	0.15687
13	-0.28438	0.10730	0.18818
14	-0.27961	0.13645	0.21463
15	-0.27505	0.16711	0.24276
16	-0.27052	0.20061	0.27379
17	-0.26591	0.23289	0.30360
18	-0.26126	0.25999	0.32825
19	-0.25697	0.27820	0.34424
20	-0.25691	0.28102	0.34702
21	-0.26129	0.26561	0.33388
22	-0.26622	0.23262	0.30350
23	-0.27109	0.18798	0.26147
24	-0.27586	0.13862	0.21472
25	-0.28051	0.08934	0.16803
26	-0.28507	0.04636	0.12762
27	-0.28944	0.01263	0.09640
28	-0.29351	-0.00313	0.08928
29	-0.29884	0.00490	0.09421
30	-0.30536	-0.03466	0.12791
31	-0.31214	-0.10072	0.19815
32	-0.32089	-0.20576	0.30873
33	-0.33024	-0.28569	0.39476
34	-0.33835	-0.28624	0.40072
35	-0.34395	-0.28134	0.39964
36	-0.33976	-0.32850	0.44393
37	-0.32954	-0.40275	0.51134
38	-0.32145	-0.33139	0.43472
39	-0.31388	0.00000	0.09852

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 23

LRFD STRENGTH-LIMIT RATIOS AT STEP 23, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	4	14187.	30800.	0.461
BUCKLING THRUST (psi)	4	14187.	62748.	0.226

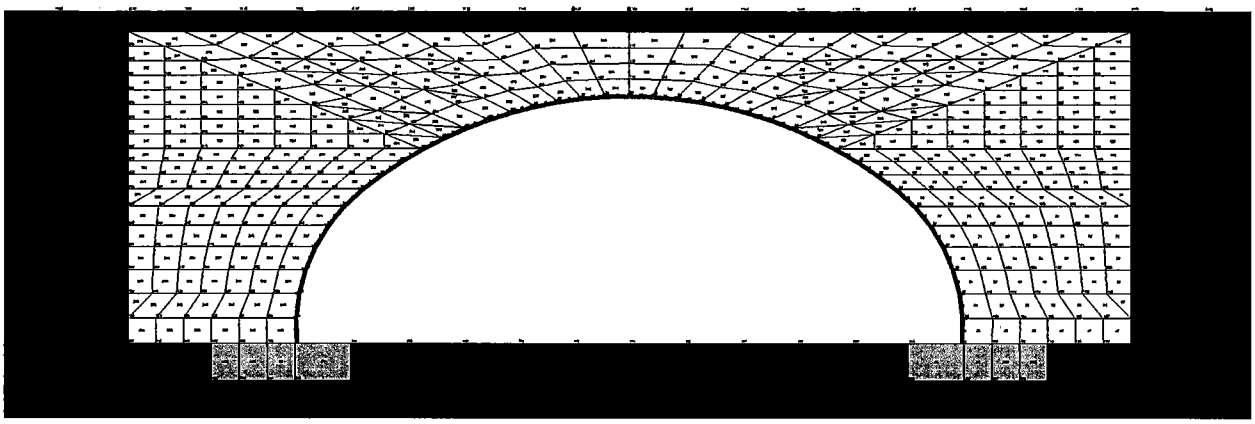
SEAM THRUST (psi)	4	14187.	21589.	0.657
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.542	1.000	0.542

LRFD SERVICE PERFORMANCE AT STEP 23, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	0.64
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.13
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *

LOAD RATING (4.0 FT. OF COVER)



HL-93 TANDEM

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***


 MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1


         USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Tandem

         EXECUTION MODE ..................   ANALYS

         SOLUTION LEVEL ..................  #3 USER

         METHODOLOGY (LRFD OR SERVICE) ...     LRFD

         NUMBER OF PIPE-ELEMENT GROUPS ....       1

         MAXIMUM ITERATIONS PER STEP ......     -99


         PIPE ELEMENT TYPE ............... STEEL

         NUMBER OF BEAM ELEMENTS .........       38


         STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

               YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

               POISSONS RATIO OF METAL (-) .......    0.30000E+00

               YIELD STRESS OF METAL (PSI)........    0.44000E+05

               LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

               DENSITY OF METAL (PCI).............    0.28400E+00

               MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

          MATERIAL CHARACTER CODE, NONLIN .........     2
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NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -102.5	F = 0.000
1142	22	F = 0.000	F = -102.5	F = 0.000
1141	21	F = 0.000	F = -102.5	F = 0.000
1141	22	F = 0.000	F = -102.5	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000

724	1	D =	0.000	D =	0.000	D =	0.000
761	1	D =	0.000	D =	0.000	D =	0.000
786	1	D =	0.000	D =	0.000	D =	0.000
811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
 * * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


 * * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *
```

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000

5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 20

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 20
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.250E+00	-0.226E+01	0.171E-11	-0.806E+04	0.314E+03
	0.00	-0.834E+00	-0.136E+01	-0.185E+04	-0.806E+04	0.137E+04
2	-193.83	-0.301E+00	-0.684E+01	-0.331E+04	-0.197E+05	0.144E+03
	14.34	-0.838E+00	-0.206E+01	-0.190E+04	-0.827E+04	0.624E+03

3	-192.08	-0.330E+00	-0.114E+02	-0.416E+04	-0.229E+05	0.292E+01
	28.58	-0.839E+00	-0.276E+01	-0.195E+04	-0.846E+04	0.127E+02
4	-188.35	-0.331E+00	-0.193E+02	-0.342E+04	-0.204E+05	-0.524E+02
	42.43	-0.842E+00	-0.821E+00	-0.197E+04	-0.855E+04	-0.228E+03
5	-182.71	-0.309E+00	-0.212E+02	-0.267E+04	-0.177E+05	-0.373E+02
	55.62	-0.856E+00	0.245E+01	-0.195E+04	-0.847E+04	-0.162E+03
6	-175.27	-0.272E+00	-0.178E+02	-0.235E+04	-0.164E+05	-0.272E+02
	67.89	-0.883E+00	0.532E+01	-0.189E+04	-0.820E+04	-0.118E+03
7	-166.18	-0.226E+00	-0.142E+02	-0.188E+04	-0.144E+05	-0.582E+02
	78.98	-0.925E+00	0.422E+01	-0.181E+04	-0.788E+04	-0.253E+03
8	-155.61	-0.178E+00	-0.118E+02	-0.655E+03	-0.986E+04	-0.862E+02
	88.69	-0.983E+00	0.381E+01	-0.175E+04	-0.759E+04	-0.375E+03
9	-144.43	-0.134E+00	-0.992E+01	0.604E+03	-0.945E+04	-0.658E+02
	97.10	-0.105E+01	0.292E+01	-0.169E+04	-0.735E+04	-0.286E+03
10	-132.78	-0.947E-01	-0.900E+01	0.124E+04	-0.115E+05	-0.263E+02
	104.87	-0.111E+01	0.264E+01	-0.165E+04	-0.717E+04	-0.114E+03
11	-120.72	-0.636E-01	-0.807E+01	0.140E+04	-0.119E+05	0.247E+01
	111.98	-0.117E+01	0.238E+01	-0.161E+04	-0.701E+04	0.107E+02
12	-108.28	-0.402E-01	-0.566E+01	0.123E+04	-0.112E+05	0.964E+01
	118.40	-0.122E+01	0.167E+01	-0.159E+04	-0.689E+04	0.419E+02
13	-95.50	-0.232E-01	-0.639E+01	0.119E+04	-0.109E+05	0.667E+01
	124.11	-0.127E+01	0.189E+01	-0.156E+04	-0.678E+04	0.290E+02
14	-82.42	-0.117E-01	-0.621E+01	0.111E+04	-0.105E+05	0.891E+01
	129.10	-0.131E+01	0.184E+01	-0.154E+04	-0.667E+04	0.387E+02
15	-69.09	-0.462E-02	-0.595E+01	0.999E+03	-0.100E+05	0.947E+01
	133.35	-0.134E+01	0.177E+01	-0.151E+04	-0.656E+04	0.412E+02
16	-55.53	-0.107E-02	-0.596E+01	0.894E+03	-0.956E+04	0.976E+01
	136.84	-0.137E+01	0.177E+01	-0.149E+04	-0.646E+04	0.424E+02
17	-41.80	-0.104E-03	-0.579E+01	0.771E+03	-0.902E+04	0.102E+02
	139.57	-0.138E+01	0.173E+01	-0.146E+04	-0.635E+04	0.443E+02
18	-27.94	-0.933E-03	-0.554E+01	0.644E+03	-0.848E+04	0.911E+01
	141.53	-0.140E+01	0.166E+01	-0.144E+04	-0.625E+04	0.396E+02
19	-13.99	-0.288E-02	-0.520E+01	0.540E+03	-0.803E+04	0.518E+01
	142.70	-0.141E+01	0.154E+01	-0.142E+04	-0.615E+04	0.225E+02
20	0.00	-0.542E-02	-0.490E+01	0.511E+03	-0.788E+04	-0.229E+01
	143.09	-0.141E+01	0.958E-02	-0.141E+04	-0.611E+04	-0.997E+01
21	13.99	-0.814E-02	-0.520E+01	0.605E+03	-0.825E+04	-0.977E+01
	142.70	-0.141E+01	-0.154E+01	-0.142E+04	-0.615E+04	-0.424E+02
22	27.94	-0.106E-01	-0.554E+01	0.773E+03	-0.892E+04	-0.137E+02
	141.53	-0.141E+01	-0.166E+01	-0.144E+04	-0.625E+04	-0.595E+02

23	41.80	-0.122E-01	-0.580E+01	0.964E+03	-0.969E+04	-0.147E+02
	139.57	-0.140E+01	-0.174E+01	-0.146E+04	-0.635E+04	-0.637E+02
24	55.53	-0.120E-01	-0.601E+01	0.115E+04	-0.104E+05	-0.137E+02
	136.84	-0.139E+01	-0.179E+01	-0.149E+04	-0.645E+04	-0.596E+02
25	69.09	-0.905E-02	-0.603E+01	0.130E+04	-0.111E+05	-0.125E+02
	133.35	-0.136E+01	-0.179E+01	-0.151E+04	-0.656E+04	-0.542E+02
26	82.42	-0.207E-02	-0.653E+01	0.144E+04	-0.117E+05	-0.904E+01
	129.10	-0.133E+01	-0.193E+01	-0.154E+04	-0.667E+04	-0.393E+02
27	95.50	0.102E-01	-0.690E+01	0.150E+04	-0.120E+05	-0.976E+00
	124.11	-0.129E+01	-0.203E+01	-0.156E+04	-0.679E+04	-0.424E+01
28	108.28	0.288E-01	-0.577E+01	0.141E+04	-0.118E+05	0.264E+00
	118.40	-0.124E+01	-0.169E+01	-0.159E+04	-0.690E+04	0.115E+01
29	120.72	0.548E-01	-0.797E+01	0.143E+04	-0.120E+05	0.728E+01
	111.98	-0.119E+01	-0.234E+01	-0.162E+04	-0.703E+04	0.316E+02
30	132.78	0.887E-01	-0.872E+01	0.115E+04	-0.112E+05	0.331E+02
	104.87	-0.112E+01	-0.256E+01	-0.165E+04	-0.719E+04	0.144E+03
31	144.43	0.130E+00	-0.970E+01	0.442E+03	-0.890E+04	0.690E+02
	97.10	-0.105E+01	-0.285E+01	-0.170E+04	-0.737E+04	0.300E+03
32	155.61	0.177E+00	-0.116E+02	-0.838E+03	-0.105E+05	0.865E+02
	88.69	-0.986E+00	-0.375E+01	-0.175E+04	-0.760E+04	0.376E+03
33	166.18	0.227E+00	-0.141E+02	-0.205E+04	-0.150E+05	0.564E+02
	78.98	-0.925E+00	-0.420E+01	-0.181E+04	-0.788E+04	0.245E+03
34	175.27	0.274E+00	-0.178E+02	-0.248E+04	-0.168E+05	0.244E+02
	67.89	-0.882E+00	-0.531E+01	-0.189E+04	-0.821E+04	0.106E+03
35	182.71	0.312E+00	-0.212E+02	-0.276E+04	-0.181E+05	0.342E+02
	55.62	-0.855E+00	-0.267E+01	-0.195E+04	-0.848E+04	0.148E+03
36	188.35	0.333E+00	-0.195E+02	-0.346E+04	-0.206E+05	0.501E+02
	42.43	-0.841E+00	0.780E+00	-0.197E+04	-0.857E+04	0.217E+03
37	192.08	0.332E+00	-0.115E+02	-0.418E+04	-0.230E+05	-0.393E+01
	28.58	-0.838E+00	0.276E+01	-0.195E+04	-0.847E+04	-0.171E+02
38	193.83	0.302E+00	-0.685E+01	-0.332E+04	-0.198E+05	-0.144E+03
	14.34	-0.837E+00	0.206E+01	-0.191E+04	-0.828E+04	-0.627E+03
39	193.56	0.251E+00	-0.217E+01	-0.331E-10	-0.807E+04	-0.315E+03
	0.00	-0.833E+00	0.136E+01	-0.186E+04	-0.807E+04	-0.137E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 20

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.25279E-03	-0.25279E-03	.18309	0.00000
2	-0.61933E-03	0.10039E-03	.44857	0.00000
3	-0.71833E-03	0.18736E-03	.52027	0.00000
4	-0.64050E-03	0.10372E-03	.46390	0.00000
5	-0.55677E-03	0.25140E-04	.40325	0.00000

6	-0.51336E-03	-0.15721E-05	.37181	0.00000
7	-0.45196E-03	-0.42425E-04	.32734	0.00000
8	-0.30942E-03	-0.16688E-03	.22410	0.00000
9	-0.16506E-03	-0.29651E-03	.21476	0.00000
10	-0.90119E-04	-0.36000E-03	.26074	0.00000
11	-0.67945E-04	-0.37227E-03	.26963	0.00000
12	-0.82163E-04	-0.35031E-03	.25372	0.00000
13	-0.83310E-04	-0.34239E-03	.24799	0.00000
14	-0.88903E-04	-0.32971E-03	.23880	0.00000
15	-0.97176E-04	-0.31462E-03	.22787	0.00000
16	-0.10528E-03	-0.29984E-03	.21717	0.00000
17	-0.11537E-03	-0.28316E-03	.20508	0.00000
18	-0.12602E-03	-0.26614E-03	.19276	0.00000
19	-0.13429E-03	-0.25185E-03	.18241	0.00000
20	-0.13599E-03	-0.24720E-03	.17904	0.00000
21	-0.12723E-03	-0.25880E-03	.18744	0.00000
22	-0.11193E-03	-0.28006E-03	.20284	0.00000
23	-0.94260E-04	-0.30403E-03	.22020	0.00000
24	-0.77514E-04	-0.32734E-03	.23708	0.00000
25	-0.63953E-04	-0.34758E-03	.25175	0.00000
26	-0.52068E-04	-0.36648E-03	.26543	0.00000
27	-0.50038E-04	-0.37609E-03	.27239	0.00000
28	-0.63148E-04	-0.37019E-03	.26812	0.00000
29	-0.65147E-04	-0.37608E-03	.27238	0.00000
30	-0.10086E-03	-0.35016E-03	.25361	0.00000
31	-0.18300E-03	-0.27926E-03	.20226	0.00000
32	-0.32958E-03	-0.14721E-03	.23871	0.00000
33	-0.47044E-03	-0.24250E-04	.34073	0.00000
34	-0.52775E-03	0.12679E-04	.38224	0.00000
35	-0.56646E-03	0.34381E-04	.41027	0.00000
36	-0.64540E-03	0.10775E-03	.46744	0.00000
37	-0.72086E-03	0.18903E-03	.52210	0.00000
38	-0.62106E-03	0.10129E-03	.44982	0.00000
39	-0.25319E-03	-0.25319E-03	.18338	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 20

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.20343	0.00000	0.04139
2	-0.20881	-0.20809	0.25169
3	-0.21365	-0.26186	0.30751
4	-0.21599	-0.21518	0.26183
5	-0.21391	-0.16825	0.21401
6	-0.20719	-0.14797	0.19090
7	-0.19893	-0.11841	0.15798
8	-0.19165	-0.04121	0.07794
9	-0.18572	0.03801	0.07250
10	-0.18112	0.07803	0.11083
11	-0.17713	0.08799	0.11937
12	-0.17402	0.07753	0.10781
13	-0.17129	0.07491	0.10425
14	-0.16844	0.06963	0.09800
15	-0.16570	0.06287	0.09033
16	-0.16301	0.05625	0.08282
17	-0.16036	0.04851	0.07423
18	-0.15780	0.04052	0.06541
19	-0.15537	0.03399	0.05813
20	-0.15419	0.03215	0.05593
21	-0.15533	0.03804	0.06217
22	-0.15773	0.04861	0.07349
23	-0.16026	0.06065	0.08634
24	-0.16290	0.07223	0.09877
25	-0.16559	0.08201	0.10943
26	-0.16841	0.09090	0.11927
27	-0.17146	0.09427	0.12367
28	-0.17437	0.08878	0.11918
29	-0.17754	0.08990	0.12142
30	-0.18148	0.07208	0.10501
31	-0.18600	0.02783	0.06243
32	-0.19185	-0.05273	0.08954
33	-0.19905	-0.12901	0.16863
34	-0.20725	-0.15625	0.19921
35	-0.21409	-0.17372	0.21956
36	-0.21634	-0.21776	0.26456
37	-0.21400	-0.26308	0.30887

38	-0.20914	-0.20885	0.25259
39	-0.20375	0.00000	0.04152

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 20

LRFD STRENGTH-LIMIT RATIOS AT STEP 20, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	36	8567.	30800.	0.278
BUCKLING THRUST (psi)	36	8567.	53423.	0.160
SEAM THRUST (psi)	36	8567.	21589.	0.397
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	37	0.309	1.000	0.309

LRFD SERVICE PERFORMANCE AT STEP 20, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.26

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.05

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56 0.00	-0.361E+00 -0.905E+00	-0.193E+01 -0.594E+00	0.716E-11 -0.227E+04	-0.988E+04 -0.988E+04	0.400E+03 0.174E+04
2	-193.83 14.34	-0.448E+00 -0.911E+00	-0.780E+01 -0.237E+01	-0.422E+04 -0.233E+04	-0.248E+05 -0.101E+05	0.182E+03 0.792E+03
3	-192.08 28.58	-0.508E+00 -0.909E+00	-0.137E+02 -0.415E+01	-0.532E+04 -0.239E+04	-0.288E+05 -0.104E+05	0.299E+01 0.130E+02
4	-188.35 42.43	-0.532E+00 -0.907E+00	-0.249E+02 -0.751E+01	-0.438E+04 -0.247E+04	-0.259E+05 -0.107E+05	-0.631E+02 -0.274E+03
5	-182.71 55.62	-0.526E+00 -0.915E+00	-0.289E+02 -0.388E+01	-0.356E+04 -0.254E+04	-0.234E+05 -0.111E+05	-0.307E+02 -0.133E+03
6	-175.27 67.89	-0.498E+00 -0.938E+00	-0.257E+02 0.248E+01	-0.353E+04 -0.255E+04	-0.233E+05 -0.111E+05	0.227E+01 0.985E+01
7	-166.18 78.98	-0.452E+00 -0.982E+00	-0.201E+02 0.601E+01	-0.364E+04 -0.249E+04	-0.234E+05 -0.108E+05	-0.239E+02 -0.104E+03

8	-155.61	-0.396E+00	-0.152E+02	-0.283E+04	-0.203E+05	-0.658E+02
	88.69	-0.105E+01	0.490E+01	-0.241E+04	-0.104E+05	-0.286E+03
9	-144.43	-0.337E+00	-0.120E+02	-0.173E+04	-0.162E+05	-0.578E+02
	97.10	-0.114E+01	0.353E+01	-0.234E+04	-0.102E+05	-0.251E+03
10	-132.78	-0.275E+00	-0.107E+02	-0.113E+04	-0.139E+05	-0.283E+02
	104.87	-0.124E+01	0.313E+01	-0.229E+04	-0.995E+04	-0.123E+03
11	-120.72	-0.215E+00	-0.138E+02	-0.813E+03	-0.126E+05	0.168E+02
	111.98	-0.135E+01	0.404E+01	-0.224E+04	-0.973E+04	0.731E+02
12	-108.28	-0.158E+00	-0.579E+01	-0.144E+04	-0.146E+05	0.303E+02
	118.40	-0.147E+01	0.170E+01	-0.220E+04	-0.956E+04	0.132E+03
13	-95.50	-0.104E+00	-0.373E+01	-0.147E+04	-0.146E+05	-0.249E+02
	124.11	-0.161E+01	0.110E+01	-0.218E+04	-0.947E+04	-0.108E+03
14	-82.42	-0.539E-01	-0.439E+01	-0.512E+03	-0.112E+05	-0.888E+02
	129.10	-0.175E+01	0.128E+01	-0.216E+04	-0.939E+04	-0.386E+03
15	-69.09	-0.115E-01	-0.677E+01	0.128E+04	-0.137E+05	-0.130E+03
	133.35	-0.190E+01	0.195E+01	-0.213E+04	-0.926E+04	-0.565E+03
16	-55.53	0.202E-01	-0.883E+01	0.341E+04	-0.209E+05	-0.138E+03
	136.84	-0.204E+01	0.254E+01	-0.209E+04	-0.909E+04	-0.601E+03
17	-41.80	0.395E-01	-0.106E+02	0.541E+04	-0.276E+05	-0.117E+03
	139.57	-0.216E+01	0.308E+01	-0.205E+04	-0.889E+04	-0.509E+03
18	-27.94	0.473E-01	-0.120E+02	0.687E+04	-0.325E+05	-0.709E+02
	141.53	-0.225E+01	0.349E+01	-0.199E+04	-0.866E+04	-0.308E+03
19	-13.99	0.466E-01	-0.131E+02	0.750E+04	-0.344E+05	-0.502E+01
	142.70	-0.228E+01	0.287E+01	-0.195E+04	-0.846E+04	-0.218E+02
20	0.00	0.425E-01	-0.123E+02	0.702E+04	-0.328E+05	0.637E+02
	143.09	-0.227E+01	-0.357E+01	-0.195E+04	-0.849E+04	0.277E+03
21	13.99	0.403E-01	-0.101E+02	0.562E+04	-0.282E+05	0.110E+03
	142.70	-0.221E+01	-0.290E+01	-0.200E+04	-0.871E+04	0.478E+03
22	27.94	0.446E-01	-0.837E+01	0.377E+04	-0.220E+05	0.126E+03
	141.53	-0.210E+01	-0.242E+01	-0.205E+04	-0.890E+04	0.549E+03
23	41.80	0.580E-01	-0.682E+01	0.184E+04	-0.155E+05	0.118E+03
	139.57	-0.198E+01	-0.197E+01	-0.209E+04	-0.906E+04	0.512E+03
24	55.53	0.810E-01	-0.606E+01	0.200E+03	-0.989E+04	0.910E+02
	136.84	-0.184E+01	-0.176E+01	-0.212E+04	-0.920E+04	0.395E+03
25	69.09	0.112E+00	-0.607E+01	-0.977E+03	-0.127E+05	0.573E+02
	133.35	-0.170E+01	-0.177E+01	-0.215E+04	-0.933E+04	0.249E+03
26	82.42	0.149E+00	-0.588E+01	-0.166E+04	-0.152E+05	0.206E+02
	129.10	-0.157E+01	-0.172E+01	-0.217E+04	-0.945E+04	0.895E+02
27	95.50	0.190E+00	-0.578E+01	-0.177E+04	-0.157E+05	-0.195E+02
	124.11	-0.145E+01	-0.170E+01	-0.220E+04	-0.955E+04	-0.847E+02
28	108.28	0.232E+00	-0.785E+01	-0.127E+04	-0.141E+05	-0.471E+02

	118.40	-0.134E+01	-0.230E+01	-0.223E+04	-0.967E+04	-0.205E+03
29	120.72	0.276E+00	-0.134E+02	-0.563E+03	-0.118E+05	-0.234E+02
	111.98	-0.124E+01	-0.394E+01	-0.227E+04	-0.985E+04	-0.101E+03
30	132.78	0.323E+00	-0.107E+02	-0.700E+03	-0.125E+05	0.178E+02
	104.87	-0.115E+01	-0.314E+01	-0.232E+04	-0.101E+05	0.775E+02
31	144.43	0.372E+00	-0.124E+02	-0.111E+04	-0.141E+05	0.491E+02
	97.10	-0.107E+01	-0.366E+01	-0.237E+04	-0.103E+05	0.213E+03
32	155.61	0.421E+00	-0.162E+02	-0.210E+04	-0.178E+05	0.657E+02
	88.69	-0.100E+01	-0.346E+01	-0.242E+04	-0.105E+05	0.285E+03
33	166.18	0.467E+00	-0.206E+02	-0.297E+04	-0.210E+05	0.360E+02
	78.98	-0.942E+00	-0.643E+00	-0.246E+04	-0.107E+05	0.156E+03
34	175.27	0.505E+00	-0.245E+02	-0.311E+04	-0.215E+05	0.130E+02
	67.89	-0.905E+00	0.508E-01	-0.247E+04	-0.107E+05	0.567E+02
35	182.71	0.528E+00	-0.272E+02	-0.331E+04	-0.221E+05	0.390E+02
	55.62	-0.885E+00	0.517E+01	-0.243E+04	-0.106E+05	0.170E+03
36	188.35	0.530E+00	-0.233E+02	-0.419E+04	-0.247E+05	0.640E+02
	42.43	-0.879E+00	0.702E+01	-0.235E+04	-0.102E+05	0.278E+03
37	192.08	0.503E+00	-0.129E+02	-0.509E+04	-0.276E+05	-0.311E+01
	28.58	-0.881E+00	0.391E+01	-0.228E+04	-0.991E+04	-0.135E+02
38	193.83	0.441E+00	-0.753E+01	-0.402E+04	-0.236E+05	-0.175E+03
	14.34	-0.884E+00	0.229E+01	-0.222E+04	-0.966E+04	-0.758E+03
39	193.56	0.354E+00	-0.218E+01	-0.385E-10	-0.942E+04	-0.381E+03
	0.00	-0.878E+00	0.663E+00	-0.217E+04	-0.942E+04	-0.165E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.30991E-03	-0.30991E-03	.22446	0.00000
2	-0.77742E-03	0.14152E-03	.56307	0.00000
3	-0.90478E-03	0.25278E-03	.65531	0.00000
4	-0.81318E-03	0.13973E-03	.58897	0.00000
5	-0.73428E-03	0.40541E-04	.53182	0.00000
6	-0.73218E-03	0.36462E-04	.53030	0.00000
7	-0.73490E-03	0.56441E-04	.53227	0.00000
8	-0.63563E-03	-0.20082E-04	.46037	0.00000
9	-0.50679E-03	-0.13125E-03	.36705	0.00000
10	-0.43479E-03	-0.18974E-03	.31491	0.00000
11	-0.39383E-03	-0.21681E-03	.28524	0.00000
12	-0.45684E-03	-0.14308E-03	.33088	0.00000
13	-0.45713E-03	-0.13740E-03	.33109	0.00000
14	-0.35021E-03	-0.23884E-03	.25365	0.00000
15	-0.15104E-03	-0.43010E-03	.31151	0.00000
16	0.85260E-04	-0.65572E-03	.47492	0.00000
17	0.30923E-03	-0.86696E-03	.62792	0.00000
18	0.47609E-03	-0.10198E-02	.73863	0.00000
19	0.55000E-03	-0.10810E-02	.78294	0.00000
20	0.49781E-03	-0.10306E-02	.74643	0.00000
21	0.33850E-03	-0.88495E-03	.64095	0.00000
22	0.13090E-03	-0.68933E-03	.49926	0.00000
23	-0.83700E-04	-0.48502E-03	.35129	0.00000
24	-0.26702E-03	-0.31047E-03	.22487	0.00000
25	-0.39900E-03	-0.18643E-03	.28899	0.00000
26	-0.47654E-03	-0.11623E-03	.34515	0.00000
27	-0.49181E-03	-0.10760E-03	.35620	0.00000

28	-0.44186E-03	-0.16478E-03	.32003	0.00000
29	-0.37035E-03	-0.24779E-03	.26823	0.00000
30	-0.39202E-03	-0.23972E-03	.28393	0.00000
31	-0.44377E-03	-0.20160E-03	.32141	0.00000
32	-0.55846E-03	-0.10197E-03	.40448	0.00000
33	-0.65841E-03	-0.11702E-04	.47687	0.00000
34	-0.67473E-03	0.23097E-05	.48869	0.00000
35	-0.69211E-03	0.28705E-04	.50128	0.00000
36	-0.77622E-03	0.13450E-03	.56219	0.00000
37	-0.86460E-03	0.24290E-03	.62621	0.00000
38	-0.74107E-03	0.13468E-03	.53674	0.00000
39	-0.29548E-03	-0.29548E-03	.21401	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.24940	0.00000	0.06220
2	-0.25587	-0.26569	0.33116
3	-0.26235	-0.33468	0.40351
4	-0.27098	-0.27551	0.34894
5	-0.27914	-0.22402	0.30195
6	-0.27994	-0.22224	0.30060
7	-0.27300	-0.22880	0.30333
8	-0.26384	-0.17797	0.24759
9	-0.25673	-0.10858	0.17449
10	-0.25130	-0.07085	0.13400
11	-0.24570	-0.05118	0.11155
12	-0.24139	-0.09072	0.14899
13	-0.23923	-0.09244	0.14967
14	-0.23702	-0.03220	0.08838
15	-0.23384	0.08069	0.13537
16	-0.22954	0.21424	0.26693
17	-0.22442	0.34007	0.39043
18	-0.21878	0.43251	0.48038
19	-0.21366	0.47157	0.51722
20	-0.21438	0.44190	0.48786
21	-0.21988	0.35373	0.40208
22	-0.22470	0.23715	0.28764
23	-0.22884	0.11603	0.16840
24	-0.23237	0.01256	0.06656
25	-0.23556	-0.06146	0.11695
26	-0.23852	-0.10418	0.16107
27	-0.24119	-0.11108	0.16926
28	-0.24410	-0.08011	0.13970
29	-0.24872	-0.03543	0.09730
30	-0.25420	-0.04404	0.10865
31	-0.25968	-0.07002	0.13745
32	-0.26574	-0.13199	0.20260
33	-0.26964	-0.18698	0.25969
34	-0.27056	-0.19575	0.26896
35	-0.26694	-0.20841	0.27966
36	-0.25821	-0.26331	0.32999
37	-0.25016	-0.32021	0.38279
38	-0.24400	-0.25320	0.31274
39	-0.23779	0.00000	0.05654

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	11086.	30800.	0.360
BUCKLING THRUST (psi)	6	11086.	54350.	0.204
SEAM THRUST (psi)	6	11086.	21589.	0.513
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000

COMBINED T&M Ratio	19	0.517	1.000	0.517

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	0.59
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.12
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM # 1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Tandem-INV (LL x 1.89)

        EXECUTION MODE ..................   ANALYS

        SOLUTION LEVEL ..................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4

             IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
             AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

        SECTION PROPERTIES OF CROSS-SECTION:

              THRUST AREA (IN**2/IN) ............   0.23020

              MOM. OF INERTIA (IN**4/IN) ........   0.87460

              SECTION MODULUS (IN**3/IN) ........   0.28840

              PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

        NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

        LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
        AND DEFLECTION LIMIT AT SERVICE LOAD

              THRUST STRESS YIELDING ............   0.70000

              BUCKLING STRESS FAILURE............   0.70000

              SEAM STRENGTH FAILURE .............   0.67000
```

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -194.0	F = 0.000
1142	22	F = 0.000	F = -194.0	F = 0.000
1141	21	F = 0.000	F = -194.0	F = 0.000
1141	22	F = 0.000	F = -194.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000

856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
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BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23

25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.455E+00	0.146E+01	0.781E-10	-0.116E+05	0.518E+03
	0.00	-0.971E+00	0.380E+00	-0.267E+04	-0.116E+05	0.225E+04
2	-193.83	-0.592E+00	-0.707E+01	-0.552E+04	-0.310E+05	0.233E+03
	14.34	-0.979E+00	-0.218E+01	-0.273E+04	-0.119E+05	0.101E+04
3	-192.08	-0.692E+00	-0.156E+02	-0.694E+04	-0.362E+05	0.563E+01
	28.58	-0.973E+00	-0.474E+01	-0.280E+04	-0.121E+05	0.245E+02
4	-188.35	-0.745E+00	-0.289E+02	-0.589E+04	-0.330E+05	-0.760E+02
	42.43	-0.964E+00	-0.872E+01	-0.289E+04	-0.125E+05	-0.330E+03
5	-182.71	-0.755E+00	-0.345E+02	-0.491E+04	-0.301E+05	-0.373E+02
	55.62	-0.966E+00	-0.105E+02	-0.302E+04	-0.131E+05	-0.162E+03
6	-175.27	-0.734E+00	-0.326E+02	-0.490E+04	-0.305E+05	0.134E+02
	67.89	-0.986E+00	-0.113E+01	-0.310E+04	-0.135E+05	0.581E+02
7	-166.18	-0.688E+00	-0.260E+02	-0.531E+04	-0.317E+05	0.461E+00
	78.98	-0.103E+01	0.777E+01	-0.305E+04	-0.133E+05	0.200E+01
8	-155.61	-0.622E+00	-0.185E+02	-0.486E+04	-0.297E+05	-0.422E+02
	88.69	-0.111E+01	0.597E+01	-0.295E+04	-0.128E+05	-0.183E+03
9	-144.43	-0.546E+00	-0.135E+02	-0.399E+04	-0.263E+05	-0.417E+02
	97.10	-0.122E+01	0.401E+01	-0.288E+04	-0.125E+05	-0.181E+03
10	-132.78	-0.461E+00	-0.113E+02	-0.347E+04	-0.243E+05	-0.265E+02
	104.87	-0.136E+01	0.333E+01	-0.282E+04	-0.123E+05	-0.115E+03

11	-120.72	-0.371E+00	-0.213E+02	-0.293E+04	-0.221E+05	0.465E+02
	111.98	-0.153E+01	0.621E+01	-0.275E+04	-0.120E+05	0.202E+03
12	-108.28	-0.280E+00	-0.568E+01	-0.438E+04	-0.269E+05	0.832E+02
	118.40	-0.172E+01	0.167E+01	-0.270E+04	-0.117E+05	0.361E+03
13	-95.50	-0.189E+00	0.741E+00	-0.476E+04	-0.282E+05	-0.325E+02
	124.11	-0.194E+01	0.224E+00	-0.269E+04	-0.117E+05	-0.141E+03
14	-82.42	-0.991E-01	-0.818E+00	-0.285E+04	-0.215E+05	-0.182E+03
	129.10	-0.220E+01	0.242E+00	-0.268E+04	-0.116E+05	-0.789E+03
15	-69.09	-0.191E-01	-0.668E+01	0.104E+04	-0.151E+05	-0.278E+03
	133.35	-0.248E+01	0.188E+01	-0.265E+04	-0.115E+05	-0.121E+04
16	-55.53	0.434E-01	-0.115E+02	0.569E+04	-0.310E+05	-0.297E+03
	136.84	-0.275E+01	0.322E+01	-0.260E+04	-0.113E+05	-0.129E+04
17	-41.80	0.836E-01	-0.152E+02	0.101E+05	-0.440E+05	-0.252E+03
	139.57	-0.299E+01	0.428E+01	-0.253E+04	-0.110E+05	-0.110E+04
18	-27.94	0.102E+00	-0.183E+02	0.133E+05	-0.440E+05	-0.156E+03
	141.53	-0.316E+01	0.523E+01	-0.245E+04	-0.107E+05	-0.679E+03
19	-13.99	0.103E+00	-0.211E+02	0.147E+05	-0.440E+05	-0.151E+02
	142.70	-0.323E+01	0.347E+01	-0.239E+04	-0.104E+05	-0.654E+02
20	0.00	0.968E-01	-0.197E+02	0.138E+05	-0.440E+05	0.137E+03
	143.09	-0.319E+01	-0.566E+01	-0.241E+04	-0.105E+05	0.596E+03
21	13.99	0.954E-01	-0.145E+02	0.106E+05	-0.440E+05	0.240E+03
	142.70	-0.304E+01	-0.405E+01	-0.249E+04	-0.108E+05	0.104E+04
22	27.94	0.107E+00	-0.109E+02	0.650E+04	-0.336E+05	0.277E+03
	141.53	-0.282E+01	-0.304E+01	-0.255E+04	-0.111E+05	0.120E+04
23	41.80	0.137E+00	-0.690E+01	0.218E+04	-0.188E+05	0.258E+03
	139.57	-0.256E+01	-0.194E+01	-0.260E+04	-0.113E+05	0.112E+04
24	55.53	0.184E+00	-0.478E+01	-0.149E+04	-0.166E+05	0.194E+03
	136.84	-0.228E+01	-0.137E+01	-0.264E+04	-0.115E+05	0.843E+03
25	69.09	0.245E+00	-0.526E+01	-0.401E+04	-0.255E+05	0.117E+03
	133.35	-0.202E+01	-0.154E+01	-0.267E+04	-0.116E+05	0.507E+03
26	82.42	0.312E+00	-0.396E+01	-0.543E+04	-0.305E+05	0.320E+02
	129.10	-0.178E+01	-0.119E+01	-0.269E+04	-0.117E+05	0.139E+03
27	95.50	0.380E+00	-0.321E+01	-0.545E+04	-0.306E+05	-0.682E+02
	124.11	-0.158E+01	-0.974E+00	-0.270E+04	-0.117E+05	-0.296E+03
28	108.28	0.445E+00	-0.102E+02	-0.393E+04	-0.255E+05	-0.126E+03
	118.40	-0.142E+01	-0.299E+01	-0.273E+04	-0.118E+05	-0.546E+03
29	120.72	0.506E+00	-0.204E+02	-0.221E+04	-0.198E+05	-0.652E+02
	111.98	-0.129E+01	-0.600E+01	-0.278E+04	-0.121E+05	-0.283E+03
30	132.78	0.565E+00	-0.120E+02	-0.229E+04	-0.203E+05	0.446E+01
	104.87	-0.118E+01	-0.352E+01	-0.285E+04	-0.124E+05	0.194E+02
31	144.43	0.622E+00	-0.147E+02	-0.246E+04	-0.212E+05	0.306E+02

	97.10	-0.108E+01	-0.435E+01	-0.291E+04	-0.126E+05	0.133E+03
32	155.61	0.673E+00	-0.204E+02	-0.322E+04	-0.241E+05	0.511E+02
	88.69	-0.101E+01	-0.449E+01	-0.297E+04	-0.129E+05	0.222E+03
33	166.18	0.717E+00	-0.267E+02	-0.392E+04	-0.266E+05	0.305E+02
	78.98	-0.949E+00	0.335E+01	-0.299E+04	-0.130E+05	0.133E+03
34	175.27	0.747E+00	-0.294E+02	-0.405E+04	-0.267E+05	0.179E+02
	67.89	-0.917E+00	0.899E+01	-0.290E+04	-0.126E+05	0.777E+02
35	182.71	0.756E+00	-0.306E+02	-0.435E+04	-0.271E+05	0.485E+02
	55.62	-0.905E+00	0.925E+01	-0.278E+04	-0.121E+05	0.211E+03
36	188.35	0.736E+00	-0.263E+02	-0.533E+04	-0.300E+05	0.739E+02
	42.43	-0.908E+00	0.793E+01	-0.266E+04	-0.116E+05	0.321E+03
37	192.08	0.677E+00	-0.143E+02	-0.631E+04	-0.331E+05	-0.387E+01
	28.58	-0.918E+00	0.435E+01	-0.258E+04	-0.112E+05	-0.168E+02
38	193.83	0.574E+00	-0.680E+01	-0.502E+04	-0.283E+05	-0.212E+03
	14.34	-0.925E+00	0.208E+01	-0.252E+04	-0.109E+05	-0.921E+03
39	193.56	0.439E+00	0.745E+00	-0.531E-10	-0.107E+05	-0.470E+03
	0.00	-0.917E+00	-0.184E+00	-0.246E+04	-0.107E+05	-0.204E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.36363E-03	-0.36363E-03	.26337	0.00000
2	-0.97312E-03	0.22857E-03	.70481	0.00000
3	-0.11369E-02	0.37440E-03	.82341	0.00000
4	-0.10342E-02	0.24692E-03	.74903	0.00000
5	-0.94519E-03	0.12273E-03	.68458	0.00000
6	-0.95552E-03	0.11100E-03	.69206	0.00000
7	-0.99362E-03	0.16204E-03	.71965	0.00000
8	-0.93101E-03	0.12693E-03	.67431	0.00000
9	-0.82561E-03	0.41745E-04	.59797	0.00000
10	-0.76250E-03	-0.66986E-05	.55226	0.00000
11	-0.69455E-03	-0.56459E-04	.50305	0.00000
12	-0.84448E-03	0.10765E-03	.61163	0.00000
13	-0.88507E-03	0.15158E-03	.64104	0.00000
14	-0.67540E-03	-0.55483E-04	.48917	0.00000
15	-0.24808E-03	-0.47516E-03	.34415	0.00000
16	0.26480E-03	-0.97385E-03	.70534	0.00000
17	0.75042E-03	-0.14426E-02	1.0449	0.02825
18	0.11813E-02	-0.19560E-02	1.4167	0.18337
19	0.14066E-02	-0.22748E-02	1.6476	0.24991
20	0.12508E-02	-0.20388E-02	1.4766	0.20005
21	0.82294E-03	-0.15076E-02	1.0920	0.05447
22	0.35992E-03	-0.10552E-02	.76427	0.00000
23	-0.11779E-03	-0.59114E-03	.42815	0.00000
24	-0.52162E-03	-0.19713E-03	.37780	0.00000
25	-0.79971E-03	0.72963E-04	.57921	0.00000
26	-0.95726E-03	0.22408E-03	.69332	0.00000
27	-0.96170E-03	0.22457E-03	.69654	0.00000
28	-0.79881E-03	0.55480E-04	.57856	0.00000
29	-0.62025E-03	-0.13889E-03	.44924	0.00000
30	-0.63816E-03	-0.13881E-03	.46221	0.00000
31	-0.66408E-03	-0.12834E-03	.48098	0.00000
32	-0.75505E-03	-0.55407E-04	.54687	0.00000
33	-0.83342E-03	0.19429E-04	.60362	0.00000
34	-0.83647E-03	0.45545E-04	.60584	0.00000
35	-0.85194E-03	0.95265E-04	.61704	0.00000
36	-0.94224E-03	0.21666E-03	.68244	0.00000
37	-0.10386E-02	0.33554E-03	.75226	0.00000
38	-0.88905E-03	0.20247E-03	.64391	0.00000
39	-0.33524E-03	-0.33524E-03	.24281	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.29263	0.00000	0.08564
2	-0.29959	-0.34745	0.43720
3	-0.30680	-0.43695	0.53108
4	-0.31677	-0.37041	0.47075
5	-0.33094	-0.30877	0.41829
6	-0.33982	-0.30836	0.42384
7	-0.33461	-0.33414	0.44610
8	-0.32354	-0.30588	0.41056
9	-0.31541	-0.25078	0.35026
10	-0.30951	-0.21853	0.31432
11	-0.30219	-0.18449	0.27581
12	-0.29648	-0.27529	0.36319
13	-0.29514	-0.29973	0.38683
14	-0.29409	-0.17924	0.26572
15	-0.29102	0.06566	0.15035
16	-0.28531	0.35813	0.43953
17	-0.27783	0.63278	0.70997
18	-0.26926	0.83767	0.91017
19	-0.26205	0.92791	0.99658
20	-0.26410	0.86556	0.93531
21	-0.27272	0.66880	0.74318
22	-0.27977	0.40916	0.48743
23	-0.28526	0.13686	0.21823
24	-0.28921	-0.09382	0.17746
25	-0.29243	-0.25232	0.33783
26	-0.29501	-0.34156	0.42859
27	-0.29660	-0.34299	0.43096
28	-0.29910	-0.24700	0.33646
29	-0.30546	-0.13918	0.23248
30	-0.31264	-0.14438	0.24212
31	-0.31885	-0.15490	0.25657
32	-0.32611	-0.20229	0.30864
33	-0.32753	-0.24658	0.35386
34	-0.31825	-0.25502	0.35630
35	-0.30447	-0.27386	0.36657
36	-0.29196	-0.33507	0.42031
37	-0.28291	-0.39731	0.47735
38	-0.27626	-0.31559	0.39191
39	-0.26979	0.00000	0.07279

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	13457.	30800.	0.437
BUCKLING THRUST (psi)	6	13457.	53574.	0.251
SEAM THRUST (psi)	6	13457.	21589.	0.623
PLASTIC-PENETRATE (%)	19	24.99	90.00	0.278
COMBINED T&M Ratio	19	0.997	1.000	0.997

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.95

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.19

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HANDLING FACTOR RATIO = (SPAN**2/EI)/FF...........      0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN)........    387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) .....      0.020


* * * * NORMAL EXIT FROM CANDE * * * *
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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM # 1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Tandem-OPR (LL x 2.38)

EXECUTION MODE ..... ANALYS

SOLUTION LEVEL ..... #3 USER

METHODOLOGY (LRFD OR SERVICE) ... LRFD

NUMBER OF PIPE-ELEMENT GROUPS 1

MAXIMUM ITERATIONS PER STEP ..... -99

PIPE ELEMENT TYPE ..... STEEL

NUMBER OF BEAM ELEMENTS 38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

YOUNGS MODULUS OF METAL (PSI).....	0.29000E+08
POISSONS RATIO OF METAL (-)	0.30000E+00
YIELD STRESS OF METAL (PSI).....	0.44000E+05
LONGITUDINAL SEAM STRENGTH (PSI)...	0.32223E+05
DENSITY OF METAL (PCI).....	0.28400E+00
MODULUS OF UPPER BI-SLOPE (PSI)....	0.00000E+00

MATERIAL CHARACTER CODE, NONLIN 2

NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN)	0.23020
MOM. OF INERTIA (IN**4/IN)	0.87460
SECTION MODULUS (IN**3/IN)	0.28840
PLASTIC SECTION MOD(IN**3/IN)	0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING	0.70000
BUCKLING STRESS FAILURE.....	0.70000
SEAM STRENGTH FAILURE	0.67000
FULL PLASTIC PENETRATION.....	0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -244.0	F = 0.000
1142	22	F = 0.000	F = -244.0	F = 0.000
1141	21	F = 0.000	F = -244.0	F = 0.000
1141	22	F = 0.000	F = -244.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000
857	1	D = 0.000	F = 0.000	D = 0.000

858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
```

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25

27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.350	Factor for load step #21
22	1.350	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.447E+00	0.164E+01	0.308E-10	-0.114E+05	0.527E+03
	0.00	-0.967E+00	0.433E+00	-0.263E+04	-0.114E+05	0.229E+04
2	-193.83	-0.588E+00	-0.656E+01	-0.565E+04	-0.313E+05	0.241E+03
	14.34	-0.975E+00	-0.203E+01	-0.269E+04	-0.117E+05	0.105E+04
3	-192.08	-0.692E+00	-0.148E+02	-0.717E+04	-0.369E+05	0.887E+01
	28.58	-0.968E+00	-0.449E+01	-0.276E+04	-0.120E+05	0.385E+02
4	-188.35	-0.746E+00	-0.280E+02	-0.612E+04	-0.336E+05	-0.788E+02
	42.43	-0.960E+00	-0.847E+01	-0.284E+04	-0.124E+05	-0.342E+03
5	-182.71	-0.757E+00	-0.339E+02	-0.506E+04	-0.305E+05	-0.438E+02
	55.62	-0.961E+00	-0.103E+02	-0.297E+04	-0.129E+05	-0.190E+03
6	-175.27	-0.735E+00	-0.320E+02	-0.495E+04	-0.304E+05	0.605E+01
	67.89	-0.981E+00	-0.771E-01	-0.304E+04	-0.132E+05	0.263E+02
7	-166.18	-0.687E+00	-0.257E+02	-0.525E+04	-0.312E+05	-0.443E+01
	78.98	-0.103E+01	0.767E+01	-0.299E+04	-0.130E+05	-0.192E+02
8	-155.61	-0.621E+00	-0.183E+02	-0.476E+04	-0.291E+05	-0.430E+02
	88.69	-0.111E+01	0.591E+01	-0.289E+04	-0.125E+05	-0.187E+03
9	-144.43	-0.545E+00	-0.132E+02	-0.390E+04	-0.257E+05	-0.415E+02
	97.10	-0.122E+01	0.390E+01	-0.281E+04	-0.122E+05	-0.180E+03
10	-132.78	-0.459E+00	-0.111E+02	-0.338E+04	-0.237E+05	-0.272E+02
	104.87	-0.136E+01	0.325E+01	-0.276E+04	-0.120E+05	-0.118E+03
11	-120.72	-0.370E+00	-0.216E+02	-0.283E+04	-0.215E+05	0.491E+02
	111.98	-0.152E+01	0.629E+01	-0.269E+04	-0.117E+05	0.213E+03

12	-108.28	-0.280E+00	-0.550E+01	-0.437E+04	-0.266E+05	0.897E+02
	118.40	-0.171E+01	0.162E+01	-0.264E+04	-0.115E+05	0.390E+03
13	-95.50	-0.189E+00	0.130E+01	-0.486E+04	-0.283E+05	-0.277E+02
	124.11	-0.193E+01	0.398E+00	-0.263E+04	-0.114E+05	-0.120E+03
14	-82.42	-0.999E-01	-0.216E+00	-0.298E+04	-0.217E+05	-0.182E+03
	129.10	-0.219E+01	0.686E-01	-0.262E+04	-0.114E+05	-0.789E+03
15	-69.09	-0.199E-01	-0.618E+01	0.940E+03	-0.145E+05	-0.282E+03
	133.35	-0.247E+01	0.174E+01	-0.259E+04	-0.113E+05	-0.123E+04
16	-55.53	0.428E-01	-0.114E+02	0.567E+04	-0.307E+05	-0.302E+03
	136.84	-0.274E+01	0.320E+01	-0.254E+04	-0.110E+05	-0.131E+04
17	-41.80	0.832E-01	-0.152E+02	0.101E+05	-0.440E+05	-0.255E+03
	139.57	-0.298E+01	0.427E+01	-0.247E+04	-0.107E+05	-0.111E+04
18	-27.94	0.101E+00	-0.182E+02	0.134E+05	-0.440E+05	-0.157E+03
	141.53	-0.315E+01	0.520E+01	-0.240E+04	-0.104E+05	-0.682E+03
19	-13.99	0.103E+00	-0.209E+02	0.148E+05	-0.440E+05	-0.145E+02
	142.70	-0.322E+01	0.332E+01	-0.233E+04	-0.101E+05	-0.631E+02
20	0.00	0.968E-01	-0.196E+02	0.138E+05	-0.440E+05	0.139E+03
	143.09	-0.318E+01	-0.562E+01	-0.235E+04	-0.102E+05	0.603E+03
21	13.99	0.955E-01	-0.143E+02	0.106E+05	-0.440E+05	0.243E+03
	142.70	-0.303E+01	-0.400E+01	-0.243E+04	-0.106E+05	0.105E+04
22	27.94	0.108E+00	-0.108E+02	0.648E+04	-0.333E+05	0.281E+03
	141.53	-0.281E+01	-0.302E+01	-0.249E+04	-0.108E+05	0.122E+04
23	41.80	0.137E+00	-0.648E+01	0.209E+04	-0.183E+05	0.261E+03
	139.57	-0.255E+01	-0.182E+01	-0.254E+04	-0.110E+05	0.113E+04
24	55.53	0.185E+00	-0.438E+01	-0.159E+04	-0.167E+05	0.195E+03
	136.84	-0.227E+01	-0.125E+01	-0.258E+04	-0.112E+05	0.846E+03
25	69.09	0.245E+00	-0.495E+01	-0.410E+04	-0.255E+05	0.116E+03
	133.35	-0.201E+01	-0.145E+01	-0.260E+04	-0.113E+05	0.502E+03
26	82.42	0.312E+00	-0.361E+01	-0.549E+04	-0.305E+05	0.297E+02
	129.10	-0.177E+01	-0.108E+01	-0.263E+04	-0.114E+05	0.129E+03
27	95.50	0.380E+00	-0.250E+01	-0.547E+04	-0.304E+05	-0.743E+02
	124.11	-0.158E+01	-0.766E+00	-0.264E+04	-0.115E+05	-0.323E+03
28	108.28	0.444E+00	-0.103E+02	-0.381E+04	-0.248E+05	-0.132E+03
	118.40	-0.142E+01	-0.303E+01	-0.266E+04	-0.116E+05	-0.576E+03
29	120.72	0.504E+00	-0.208E+02	-0.203E+04	-0.189E+05	-0.653E+02
	111.98	-0.129E+01	-0.608E+01	-0.272E+04	-0.118E+05	-0.283E+03
30	132.78	0.564E+00	-0.117E+02	-0.217E+04	-0.196E+05	0.831E+01
	104.87	-0.118E+01	-0.344E+01	-0.278E+04	-0.121E+05	0.361E+02
31	144.43	0.621E+00	-0.144E+02	-0.239E+04	-0.206E+05	0.339E+02
	97.10	-0.108E+01	-0.425E+01	-0.284E+04	-0.123E+05	0.147E+03

32	155.61	0.673E+00	-0.201E+02	-0.319E+04	-0.237E+05	0.544E+02
	88.69	-0.100E+01	-0.548E+01	-0.291E+04	-0.127E+05	0.236E+03
33	166.18	0.718E+00	-0.262E+02	-0.395E+04	-0.264E+05	0.345E+02
	78.98	-0.947E+00	0.287E+01	-0.294E+04	-0.128E+05	0.150E+03
34	175.27	0.749E+00	-0.290E+02	-0.414E+04	-0.268E+05	0.218E+02
	67.89	-0.914E+00	0.828E+01	-0.286E+04	-0.124E+05	0.947E+02
35	182.71	0.758E+00	-0.303E+02	-0.450E+04	-0.275E+05	0.524E+02
	55.62	-0.902E+00	0.917E+01	-0.274E+04	-0.119E+05	0.228E+03
36	188.35	0.737E+00	-0.257E+02	-0.553E+04	-0.306E+05	0.760E+02
	42.43	-0.905E+00	0.775E+01	-0.263E+04	-0.114E+05	0.330E+03
37	192.08	0.677E+00	-0.137E+02	-0.651E+04	-0.337E+05	-0.646E+01
	28.58	-0.916E+00	0.416E+01	-0.255E+04	-0.111E+05	-0.280E+02
38	193.83	0.571E+00	-0.637E+01	-0.513E+04	-0.286E+05	-0.218E+03
	14.34	-0.923E+00	0.196E+01	-0.249E+04	-0.108E+05	-0.948E+03
39	193.56	0.432E+00	0.942E+00	-0.676E-10	-0.106E+05	-0.479E+03
	0.00	-0.915E+00	-0.240E+00	-0.243E+04	-0.106E+05	-0.208E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.35864E-03	-0.35864E-03	.25975	0.00000
2	-0.98205E-03	0.24780E-03	.71128	0.00000
3	-0.11564E-02	0.40477E-03	.83753	0.00000
4	-0.10537E-02	0.27833E-03	.76320	0.00000
5	-0.95556E-03	0.14595E-03	.69209	0.00000
6	-0.95274E-03	0.12375E-03	.69005	0.00000
7	-0.97829E-03	0.16436E-03	.70855	0.00000
8	-0.91159E-03	0.12495E-03	.66024	0.00000
9	-0.80800E-03	0.41250E-04	.58521	0.00000
10	-0.74442E-03	-0.80213E-05	.53917	0.00000
11	-0.67545E-03	-0.58828E-04	.48921	0.00000
12	-0.83503E-03	0.11489E-03	.60479	0.00000
13	-0.88671E-03	0.17005E-03	.64222	0.00000
14	-0.68151E-03	-0.32563E-04	.49360	0.00000
15	-0.25123E-03	-0.45579E-03	.33012	0.00000
16	0.27043E-03	-0.96349E-03	.69783	0.00000
17	0.76178E-03	-0.14378E-02	1.0413	0.02594
18	0.11951E-02	-0.19521E-02	1.4139	0.18156
19	0.14209E-02	-0.22706E-02	1.6445	0.25196
20	0.12621E-02	-0.20318E-02	1.4716	0.19767
21	0.83128E-03	-0.14996E-02	1.0861	0.05102
22	0.36523E-03	-0.10449E-02	.75680	0.00000
23	-0.11873E-03	-0.57436E-03	.41600	0.00000
24	-0.52455E-03	-0.17795E-03	.37992	0.00000
25	-0.80114E-03	0.91048E-04	.58025	0.00000
26	-0.95561E-03	0.23948E-03	.69212	0.00000
27	-0.95455E-03	0.23514E-03	.69136	0.00000
28	-0.77669E-03	0.51524E-04	.56254	0.00000
29	-0.59175E-03	-0.14941E-03	.42859	0.00000
30	-0.61554E-03	-0.14349E-03	.44582	0.00000
31	-0.64726E-03	-0.12692E-03	.46879	0.00000
32	-0.74366E-03	-0.50362E-04	.53861	0.00000
33	-0.82979E-03	0.29247E-04	.60099	0.00000
34	-0.84055E-03	0.60586E-04	.60879	0.00000
35	-0.86293E-03	0.11552E-03	.62500	0.00000
36	-0.95974E-03	0.24280E-03	.69512	0.00000
37	-0.10561E-02	0.36088E-03	.76488	0.00000
38	-0.89781E-03	0.21870E-03	.65026	0.00000
39	-0.33164E-03	-0.33164E-03	.24020	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.28861	0.00000	0.08330
2	-0.29544	-0.35559	0.44287
3	-0.30242	-0.45137	0.54283
4	-0.31201	-0.38514	0.48249
5	-0.32576	-0.31848	0.42460
6	-0.33356	-0.31125	0.42251
7	-0.32750	-0.33038	0.43763
8	-0.31652	-0.29969	0.39988
9	-0.30852	-0.24554	0.34073
10	-0.30276	-0.21291	0.30458
11	-0.29546	-0.17828	0.26558
12	-0.28976	-0.27465	0.35861
13	-0.28837	-0.30554	0.38870
14	-0.28733	-0.18763	0.27019
15	-0.28448	0.05914	0.14008
16	-0.27887	0.35676	0.43453
17	-0.27140	0.63483	0.70849
18	-0.26284	0.84100	0.91009
19	-0.25576	0.93106	0.99647
20	-0.25791	0.86792	0.93444
21	-0.26648	0.66944	0.74045
22	-0.27349	0.40771	0.48251
23	-0.27888	0.13174	0.20951
24	-0.28267	-0.10021	0.18011
25	-0.28573	-0.25796	0.33960
26	-0.28815	-0.34553	0.42857
27	-0.28947	-0.34397	0.42777
28	-0.29179	-0.23946	0.32460
29	-0.29822	-0.12789	0.21683
30	-0.30542	-0.13649	0.22976
31	-0.31151	-0.15044	0.24748
32	-0.31949	-0.20045	0.30253
33	-0.32212	-0.24837	0.35213
34	-0.31384	-0.26055	0.35904
35	-0.30074	-0.28290	0.37334
36	-0.28848	-0.34769	0.43091
37	-0.27972	-0.40968	0.48793
38	-0.27326	-0.32282	0.39749
39	-0.26689	0.00000	0.07123

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	13209.	30800.	0.429
BUCKLING THRUST (psi)	6	13209.	52698.	0.251
SEAM THRUST (psi)	6	13209.	21589.	0.612
PLASTIC-PENETRATE (%)	19	25.20	90.00	0.280
COMBINED T&M Ratio	19	0.996	1.000	0.996

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.16

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.23

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

```
SPAN LENGTH FOR HANDLING AND BUCKLING (IN)........     387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) .....      0.020


* * * * NORMAL EXIT FROM CANDE * * * *
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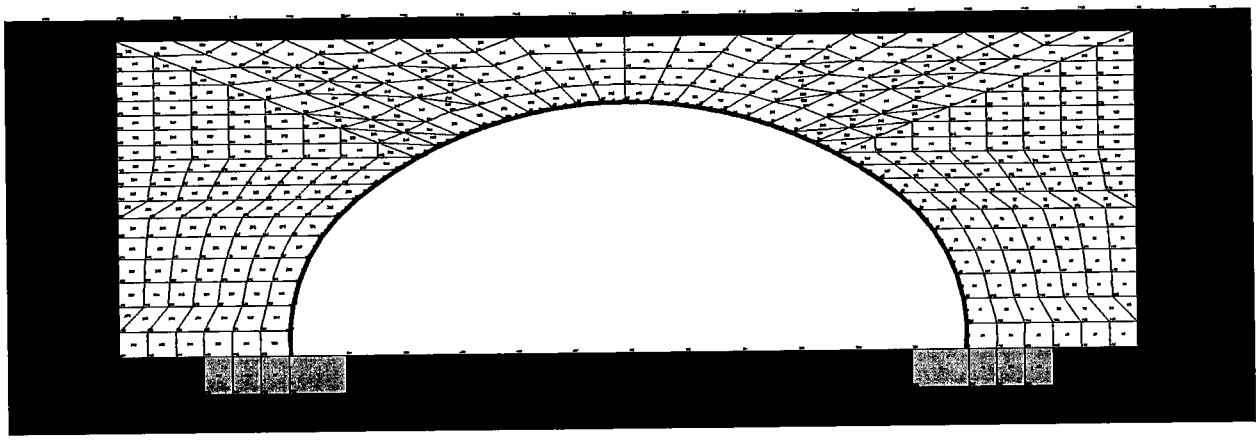

HL-93 TRUCK

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage HS-20

EXECUTION MODE ..................   ANALYS
SOLUTION LEVEL ..................  #3 USER
METHODOLOGY (LRFD OR SERVICE) ...     LRFD
NUMBER OF PIPE-ELEMENT GROUPS ....       1
MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL
NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:
      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08
      POISSONS RATIO OF METAL (-) .......    0.30000E+00
      YIELD STRESS OF METAL (PSI)........    0.44000E+05
      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05
      DENSITY OF METAL (PCI).............    0.28400E+00
      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........     2
     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC
```

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -131.2	F = 0.000
1142	22	F = 0.000	F = -131.2	F = 0.000
1137	21	F = 0.000	F = -131.2	F = 0.000
1137	22	F = 0.000	F = -131.2	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000

811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *
```

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000

8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.351E+00	-0.917E+00	0.135E-10	-0.105E+05	0.422E+03
	0.00	-0.957E+00	-0.295E+00	-0.241E+04	-0.105E+05	0.183E+04
2	-193.83	-0.428E+00	-0.816E+01	-0.442E+04	-0.261E+05	0.190E+03
	14.34	-0.964E+00	-0.249E+01	-0.247E+04	-0.107E+05	0.826E+03
3	-192.08	-0.478E+00	-0.154E+02	-0.552E+04	-0.301E+05	0.613E+01

	28.58	-0.963E+00	-0.468E+01	-0.253E+04	-0.110E+05	0.266E+02
4	-188.35	-0.489E+00	-0.270E+02	-0.464E+04	-0.273E+05	-0.506E+02
	42.43	-0.965E+00	-0.345E+01	-0.259E+04	-0.112E+05	-0.220E+03
5	-182.71	-0.469E+00	-0.281E+02	-0.408E+04	-0.253E+05	-0.187E+02
	55.62	-0.979E+00	0.516E+01	-0.257E+04	-0.112E+05	-0.813E+02
6	-175.27	-0.425E+00	-0.226E+02	-0.410E+04	-0.250E+05	-0.109E+02
	67.89	-0.101E+01	0.676E+01	-0.248E+04	-0.108E+05	-0.476E+02
7	-166.18	-0.363E+00	-0.175E+02	-0.373E+04	-0.233E+05	-0.665E+02
	78.98	-0.107E+01	0.522E+01	-0.239E+04	-0.104E+05	-0.289E+03
8	-155.61	-0.292E+00	-0.147E+02	-0.212E+04	-0.174E+05	-0.119E+03
	88.69	-0.115E+01	0.472E+01	-0.231E+04	-0.100E+05	-0.516E+03
9	-144.43	-0.222E+00	-0.126E+02	-0.277E+03	-0.107E+05	-0.102E+03
	97.10	-0.125E+01	0.369E+01	-0.224E+04	-0.972E+04	-0.443E+03
10	-132.78	-0.156E+00	-0.119E+02	0.846E+03	-0.124E+05	-0.534E+02
	104.87	-0.136E+01	0.347E+01	-0.218E+04	-0.949E+04	-0.232E+03
11	-120.72	-0.990E-01	-0.113E+02	0.134E+04	-0.139E+05	-0.112E+02
	111.98	-0.147E+01	0.327E+01	-0.213E+04	-0.927E+04	-0.487E+02
12	-108.28	-0.517E-01	-0.876E+01	0.128E+04	-0.135E+05	0.113E+02
	118.40	-0.157E+01	0.255E+01	-0.209E+04	-0.909E+04	0.490E+02
13	-95.50	-0.137E-01	-0.808E+01	0.114E+04	-0.129E+05	0.137E+02
	124.11	-0.166E+01	0.236E+01	-0.206E+04	-0.894E+04	0.596E+02
14	-82.42	0.161E-01	-0.630E+01	0.102E+04	-0.123E+05	0.656E+00
	129.10	-0.175E+01	0.184E+01	-0.203E+04	-0.882E+04	0.285E+01
15	-69.09	0.386E-01	-0.601E+01	0.124E+04	-0.130E+05	-0.253E+02
	133.35	-0.184E+01	0.175E+01	-0.200E+04	-0.870E+04	-0.110E+03
16	-55.53	0.542E-01	-0.627E+01	0.184E+04	-0.150E+05	-0.500E+02
	136.84	-0.192E+01	0.183E+01	-0.198E+04	-0.858E+04	-0.217E+03
17	-41.80	0.630E-01	-0.723E+01	0.274E+04	-0.179E+05	-0.645E+02
	139.57	-0.198E+01	0.212E+01	-0.194E+04	-0.845E+04	-0.280E+03
18	-27.94	0.656E-01	-0.842E+01	0.372E+04	-0.212E+05	-0.621E+02
	141.53	-0.203E+01	0.247E+01	-0.191E+04	-0.829E+04	-0.270E+03
19	-13.99	0.636E-01	-0.101E+02	0.452E+04	-0.238E+05	-0.378E+02
	142.70	-0.205E+01	0.294E+01	-0.187E+04	-0.812E+04	-0.164E+03
20	0.00	0.598E-01	-0.114E+02	0.477E+04	-0.246E+05	0.864E+01
	143.09	-0.203E+01	-0.240E+01	-0.186E+04	-0.810E+04	0.376E+02
21	13.99	0.573E-01	-0.102E+02	0.421E+04	-0.229E+05	0.548E+02
	142.70	-0.199E+01	-0.295E+01	-0.190E+04	-0.827E+04	0.238E+03
22	27.94	0.597E-01	-0.875E+01	0.312E+04	-0.193E+05	0.801E+02
	141.53	-0.192E+01	-0.255E+01	-0.195E+04	-0.845E+04	0.348E+03
23	41.80	0.689E-01	-0.739E+01	0.181E+04	-0.149E+05	0.839E+02
	139.57	-0.182E+01	-0.216E+01	-0.198E+04	-0.861E+04	0.365E+03

24	55.53	0.858E-01	-0.651E+01	0.586E+03	-0.108E+05	0.700E+02
	136.84	-0.171E+01	-0.190E+01	-0.202E+04	-0.876E+04	0.304E+03
25	69.09	0.110E+00	-0.623E+01	-0.341E+03	-0.101E+05	0.463E+02
	133.35	-0.160E+01	-0.182E+01	-0.205E+04	-0.889E+04	0.201E+03
26	82.42	0.139E+00	-0.610E+01	-0.887E+03	-0.121E+05	0.180E+02
	129.10	-0.150E+01	-0.179E+01	-0.207E+04	-0.900E+04	0.781E+02
27	95.50	0.172E+00	-0.619E+01	-0.994E+03	-0.126E+05	-0.121E+02
	124.11	-0.140E+01	-0.182E+01	-0.210E+04	-0.912E+04	-0.527E+02
28	108.28	0.208E+00	-0.751E+01	-0.663E+03	-0.115E+05	-0.338E+02
	118.40	-0.131E+01	-0.220E+01	-0.213E+04	-0.923E+04	-0.147E+03
29	120.72	0.247E+00	-0.122E+02	-0.130E+03	-0.986E+04	-0.155E+02
	111.98	-0.122E+01	-0.357E+01	-0.217E+04	-0.941E+04	-0.674E+02
30	132.78	0.290E+00	-0.104E+02	-0.283E+03	-0.106E+05	0.207E+02
	104.87	-0.114E+01	-0.306E+01	-0.221E+04	-0.961E+04	0.900E+02
31	144.43	0.336E+00	-0.121E+02	-0.742E+03	-0.124E+05	0.535E+02
	97.10	-0.106E+01	-0.355E+01	-0.226E+04	-0.982E+04	0.232E+03
32	155.61	0.383E+00	-0.155E+02	-0.179E+04	-0.163E+05	0.710E+02
	88.69	-0.993E+00	-0.289E+01	-0.231E+04	-0.100E+05	0.309E+03
33	166.18	0.429E+00	-0.194E+02	-0.275E+04	-0.197E+05	0.409E+02
	78.98	-0.936E+00	-0.107E+01	-0.235E+04	-0.102E+05	0.178E+03
34	175.27	0.467E+00	-0.233E+02	-0.295E+04	-0.205E+05	0.150E+02
	67.89	-0.898E+00	-0.881E+00	-0.237E+04	-0.103E+05	0.653E+02
35	182.71	0.492E+00	-0.263E+02	-0.315E+04	-0.211E+05	0.383E+02
	55.62	-0.878E+00	0.345E+01	-0.235E+04	-0.102E+05	0.166E+03
36	188.35	0.497E+00	-0.227E+02	-0.401E+04	-0.238E+05	0.628E+02
	42.43	-0.871E+00	0.684E+01	-0.229E+04	-0.993E+04	0.273E+03
37	192.08	0.475E+00	-0.124E+02	-0.491E+04	-0.266E+05	-0.244E+01
	28.58	-0.872E+00	0.377E+01	-0.221E+04	-0.962E+04	-0.106E+02
38	193.83	0.419E+00	-0.743E+01	-0.388E+04	-0.228E+05	-0.169E+03
	14.34	-0.875E+00	0.225E+01	-0.216E+04	-0.939E+04	-0.733E+03
39	193.56	0.338E+00	-0.243E+01	-0.331E-10	-0.914E+04	-0.367E+03
	0.00	-0.869E+00	0.734E+00	-0.211E+04	-0.914E+04	-0.160E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.32820E-03	-0.32820E-03	.23770	0.00000
2	-0.81795E-03	0.14474E-03	.59242	0.00000
3	-0.94566E-03	0.25486E-03	.68492	0.00000
4	-0.85781E-03	0.15217E-03	.62129	0.00000
5	-0.79465E-03	0.93943E-04	.57555	0.00000
6	-0.78384E-03	0.10729E-03	.56772	0.00000
7	-0.73171E-03	0.80340E-04	.52996	0.00000
8	-0.54519E-03	-0.83771E-04	.39487	0.00000

9	-0.33527E-03	-0.27500E-03	.24283	0.00000
10	-0.20559E-03	-0.38969E-03	.28224	0.00000
11	-0.14562E-03	-0.43616E-03	.31590	0.00000
12	-0.14589E-03	-0.42466E-03	.30757	0.00000
13	-0.15658E-03	-0.40468E-03	.29310	0.00000
14	-0.16605E-03	-0.38722E-03	.28045	0.00000
15	-0.13821E-03	-0.40794E-03	.29546	0.00000
16	-0.69262E-04	-0.46942E-03	.33999	0.00000
17	0.33009E-04	-0.56324E-03	.40794	0.00000
18	0.14485E-03	-0.66533E-03	.48188	0.00000
19	0.23695E-03	-0.74632E-03	.54054	0.00000
20	0.26518E-03	-0.77329E-03	.56008	0.00000
21	0.19900E-03	-0.71783E-03	.51990	0.00000
22	0.74421E-04	-0.60480E-03	.43804	0.00000
23	-0.73437E-04	-0.46723E-03	.33840	0.00000
24	-0.21109E-03	-0.33855E-03	.24520	0.00000
25	-0.31599E-03	-0.24169E-03	.22886	0.00000
26	-0.37909E-03	-0.18604E-03	.27456	0.00000
27	-0.39418E-03	-0.17795E-03	.28550	0.00000
28	-0.36187E-03	-0.21769E-03	.26209	0.00000
29	-0.30936E-03	-0.28096E-03	.22406	0.00000
30	-0.33231E-03	-0.27083E-03	.24068	0.00000
31	-0.38896E-03	-0.22750E-03	.28172	0.00000
32	-0.51009E-03	-0.12025E-03	.36944	0.00000
33	-0.61907E-03	-0.20866E-04	.44838	0.00000
34	-0.64304E-03	-0.20038E-05	.46574	0.00000
35	-0.66344E-03	0.22196E-04	.48051	0.00000
36	-0.74740E-03	0.12416E-03	.54132	0.00000
37	-0.83575E-03	0.23191E-03	.60532	0.00000
38	-0.71650E-03	0.12750E-03	.51894	0.00000
39	-0.28696E-03	-0.28696E-03	.20784	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.26412	0.00000	0.06976
2	-0.27089	-0.27834	0.35172
3	-0.27796	-0.34710	0.42437
4	-0.28393	-0.29201	0.37263
5	-0.28195	-0.25692	0.33641
6	-0.27223	-0.25765	0.33176
7	-0.26210	-0.23479	0.30348
8	-0.25308	-0.13341	0.19746
9	-0.24556	-0.01743	0.07773
10	-0.23953	0.05323	0.11060
11	-0.23410	0.08400	0.13880
12	-0.22957	0.08060	0.13331
13	-0.22584	0.07173	0.12273
14	-0.22262	0.06395	0.11351
15	-0.21976	0.07799	0.12628
16	-0.21675	0.11570	0.16268
17	-0.21335	0.17239	0.21791
18	-0.20943	0.23425	0.27811
19	-0.20496	0.28429	0.32630
20	-0.20445	0.30025	0.34205
21	-0.20876	0.26508	0.30866
22	-0.21341	0.19638	0.24193
23	-0.21755	0.11386	0.16118
24	-0.22116	0.03685	0.08576
25	-0.22440	-0.02148	0.07184
26	-0.22739	-0.05582	0.10752
27	-0.23021	-0.06252	0.11552
28	-0.23320	-0.04169	0.09607
29	-0.23753	-0.00821	0.06463
30	-0.24269	-0.01777	0.07667
31	-0.24805	-0.04668	0.10821
32	-0.25363	-0.11271	0.17704
33	-0.25749	-0.17296	0.23926
34	-0.25955	-0.18534	0.25271
35	-0.25802	-0.19824	0.26481
36	-0.25078	-0.25199	0.31488
37	-0.24297	-0.30869	0.36773
38	-0.23700	-0.24403	0.30019
39	-0.23093	0.00000	0.05333

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	4	11244.	30800.	0.365
BUCKLING THRUST (psi)	4	11244.	53934.	0.208
SEAM THRUST (psi)	4	11244.	21589.	0.521
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.424	1.000	0.424

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	0.50
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.10
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage HS-20-INV (LL x 2.93)

        EXECUTION MODE .................  ANALYS

        SOLUTION LEVEL .................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4

             IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
             AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

        SECTION PROPERTIES OF CROSS-SECTION:

              THRUST AREA (IN**2/IN) ............   0.23020

              MOM. OF INERTIA (IN**4/IN) ........   0.87460

              SECTION MODULUS (IN**3/IN) ........   0.28840

              PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

        NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

        LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
        AND DEFLECTION LIMIT AT SERVICE LOAD

              THRUST STRESS YIELDING ............   0.70000

              BUCKLING STRESS FAILURE............   0.70000

              SEAM STRENGTH FAILURE .............   0.67000

              FULL PLASTIC PENETRATION...........   0.90000
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ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -385.0	F = 0.000
1142	22	F = 0.000	F = -385.0	F = 0.000
1137	21	F = 0.000	F = -385.0	F = 0.000
1137	22	F = 0.000	F = -385.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000
857	1	D = 0.000	F = 0.000	D = 0.000

858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
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BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25

27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.543E+00	0.561E+01	0.599E-10	-0.151E+05	0.714E+03
	0.00	-0.120E+01	0.157E+01	-0.347E+04	-0.151E+05	0.310E+04
2	-193.83	-0.697E+00	-0.721E+01	-0.760E+04	-0.418E+05	0.316E+03
	14.34	-0.121E+01	-0.229E+01	-0.355E+04	-0.154E+05	0.137E+04
3	-192.08	-0.801E+00	-0.200E+02	-0.944E+04	-0.440E+05	0.516E+01
	28.58	-0.120E+01	-0.614E+01	-0.363E+04	-0.158E+05	0.224E+02
4	-188.35	-0.839E+00	-0.403E+02	-0.799E+04	-0.439E+05	-0.805E+02
	42.43	-0.120E+01	-0.858E+01	-0.373E+04	-0.162E+05	-0.350E+03
5	-182.71	-0.822E+00	-0.428E+02	-0.722E+04	-0.411E+05	-0.692E+01
	55.62	-0.122E+01	0.129E+02	-0.369E+04	-0.160E+05	-0.301E+02
6	-175.27	-0.760E+00	-0.326E+02	-0.773E+04	-0.421E+05	0.252E+02
	67.89	-0.126E+01	0.977E+01	-0.353E+04	-0.153E+05	0.110E+03
7	-166.18	-0.662E+00	-0.227E+02	-0.775E+04	-0.417E+05	-0.669E+02
	78.98	-0.135E+01	0.679E+01	-0.340E+04	-0.148E+05	-0.291E+03
8	-155.61	-0.540E+00	-0.191E+02	-0.548E+04	-0.333E+05	-0.171E+03
	88.69	-0.150E+01	0.615E+01	-0.330E+04	-0.143E+05	-0.743E+03
9	-144.43	-0.413E+00	-0.173E+02	-0.247E+04	-0.225E+05	-0.166E+03
	97.10	-0.168E+01	0.503E+01	-0.321E+04	-0.139E+05	-0.720E+03
10	-132.78	-0.287E+00	-0.179E+02	-0.308E+03	-0.147E+05	-0.959E+02
	104.87	-0.188E+01	0.515E+01	-0.313E+04	-0.136E+05	-0.417E+03
11	-120.72	-0.170E+00	-0.179E+02	0.799E+03	-0.160E+05	-0.173E+02
	111.98	-0.210E+01	0.514E+01	-0.305E+04	-0.133E+05	-0.753E+02

12	-108.28	-0.672E-01	-0.136E+02	0.781E+03	-0.157E+05	0.350E+02
	118.40	-0.231E+01	0.391E+01	-0.299E+04	-0.130E+05	0.152E+03
13	-95.50	0.214E-01	-0.107E+02	0.433E+03	-0.143E+05	0.397E+02
	124.11	-0.253E+01	0.308E+01	-0.294E+04	-0.128E+05	0.173E+03
14	-82.42	0.966E-01	-0.430E+01	0.298E+03	-0.137E+05	-0.188E+02
	129.10	-0.275E+01	0.122E+01	-0.291E+04	-0.126E+05	-0.815E+02
15	-69.09	0.158E+00	-0.477E+01	0.160E+04	-0.181E+05	-0.117E+03
	133.35	-0.297E+01	0.133E+01	-0.289E+04	-0.126E+05	-0.509E+03
16	-55.53	0.205E+00	-0.632E+01	0.422E+04	-0.270E+05	-0.200E+03
	136.84	-0.317E+01	0.176E+01	-0.286E+04	-0.124E+05	-0.867E+03
17	-41.80	0.234E+00	-0.108E+02	0.778E+04	-0.392E+05	-0.238E+03
	139.57	-0.336E+01	0.304E+01	-0.281E+04	-0.122E+05	-0.103E+04
18	-27.94	0.246E+00	-0.148E+02	0.113E+05	-0.440E+05	-0.214E+03
	141.53	-0.348E+01	0.421E+01	-0.275E+04	-0.119E+05	-0.929E+03
19	-13.99	0.245E+00	-0.208E+02	0.140E+05	-0.440E+05	-0.115E+03
	142.70	-0.353E+01	0.600E+01	-0.267E+04	-0.116E+05	-0.502E+03
20	0.00	0.238E+00	-0.258E+02	0.145E+05	-0.440E+05	0.622E+02
	143.09	-0.347E+01	-0.507E+01	-0.266E+04	-0.116E+05	0.270E+03
21	13.99	0.236E+00	-0.184E+02	0.119E+05	-0.440E+05	0.221E+03
	142.70	-0.330E+01	-0.517E+01	-0.274E+04	-0.119E+05	0.962E+03
22	27.94	0.250E+00	-0.143E+02	0.763E+04	-0.387E+05	0.296E+03
	141.53	-0.304E+01	-0.399E+01	-0.282E+04	-0.122E+05	0.129E+04
23	41.80	0.285E+00	-0.922E+01	0.268E+04	-0.218E+05	0.302E+03
	139.57	-0.273E+01	-0.257E+01	-0.288E+04	-0.125E+05	0.131E+04
24	55.53	0.340E+00	-0.562E+01	-0.184E+04	-0.191E+05	0.244E+03
	136.84	-0.240E+01	-0.160E+01	-0.293E+04	-0.127E+05	0.106E+04
25	69.09	0.411E+00	-0.515E+01	-0.514E+04	-0.307E+05	0.155E+03
	133.35	-0.209E+01	-0.153E+01	-0.296E+04	-0.129E+05	0.675E+03
26	82.42	0.489E+00	-0.276E+01	-0.707E+04	-0.375E+05	0.449E+02
	129.10	-0.182E+01	-0.856E+00	-0.298E+04	-0.130E+05	0.195E+03
27	95.50	0.566E+00	-0.156E+01	-0.711E+04	-0.376E+05	-0.914E+02
	124.11	-0.159E+01	-0.519E+00	-0.299E+04	-0.130E+05	-0.397E+03
28	108.28	0.637E+00	-0.117E+02	-0.503E+04	-0.305E+05	-0.166E+03
	118.40	-0.142E+01	-0.345E+01	-0.301E+04	-0.131E+05	-0.721E+03
29	120.72	0.702E+00	-0.239E+02	-0.282E+04	-0.231E+05	-0.863E+02
	111.98	-0.128E+01	-0.702E+01	-0.308E+04	-0.134E+05	-0.375E+03
30	132.78	0.764E+00	-0.129E+02	-0.285E+04	-0.236E+05	-0.230E+01
	104.87	-0.116E+01	-0.381E+01	-0.315E+04	-0.137E+05	-0.100E+02
31	144.43	0.820E+00	-0.169E+02	-0.290E+04	-0.240E+05	0.282E+02
	97.10	-0.106E+01	-0.499E+01	-0.321E+04	-0.140E+05	0.123E+03

32	155.61	0.870E+00	-0.232E+02	-0.370E+04	-0.270E+05	0.605E+02
	88.69	-0.988E+00	-0.122E+01	-0.326E+04	-0.142E+05	0.263E+03
33	166.18	0.909E+00	-0.283E+02	-0.461E+04	-0.300E+05	0.414E+02
	78.98	-0.935E+00	0.870E+01	-0.322E+04	-0.140E+05	0.180E+03
34	175.27	0.930E+00	-0.306E+02	-0.482E+04	-0.301E+05	0.205E+02
	67.89	-0.910E+00	0.936E+01	-0.309E+04	-0.134E+05	0.889E+02
35	182.71	0.925E+00	-0.331E+02	-0.506E+04	-0.304E+05	0.518E+02
	55.62	-0.907E+00	0.999E+01	-0.296E+04	-0.128E+05	0.225E+03
36	188.35	0.884E+00	-0.281E+02	-0.610E+04	-0.335E+05	0.825E+02
	42.43	-0.918E+00	0.847E+01	-0.283E+04	-0.123E+05	0.359E+03
37	192.08	0.799E+00	-0.148E+02	-0.717E+04	-0.368E+05	-0.367E+01
	28.58	-0.935E+00	0.448E+01	-0.275E+04	-0.119E+05	-0.159E+02
38	193.83	0.663E+00	-0.623E+01	-0.567E+04	-0.313E+05	-0.237E+03
	14.34	-0.945E+00	0.192E+01	-0.269E+04	-0.117E+05	-0.103E+04
39	193.56	0.490E+00	0.231E+01	-0.131E-09	-0.114E+05	-0.527E+03
	0.00	-0.936E+00	-0.632E+00	-0.263E+04	-0.114E+05	-0.229E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.47300E-03	-0.47300E-03	.34259	0.00000
2	-0.13104E-02	0.34352E-03	.94912	0.00000
3	-0.15413E-02	0.53946E-03	1.1163	0.07717
4	-0.13773E-02	0.36078E-03	.99758	0.00000
5	-0.12889E-02	0.28279E-03	.93352	0.00000
6	-0.13223E-02	0.36057E-03	.95771	0.00000
7	-0.13078E-02	0.37950E-03	.94718	0.00000
8	-0.10461E-02	0.14681E-03	.75769	0.00000
9	-0.70556E-03	-0.16857E-03	.51102	0.00000
10	-0.45975E-03	-0.39281E-03	.33298	0.00000
11	-0.32898E-03	-0.50294E-03	.36427	0.00000
12	-0.32235E-03	-0.49233E-03	.35658	0.00000
13	-0.35376E-03	-0.44804E-03	.32451	0.00000
14	-0.36438E-03	-0.42928E-03	.31092	0.00000
15	-0.21924E-03	-0.56843E-03	.41170	0.00000
16	0.69369E-04	-0.84866E-03	.61466	0.00000
17	0.46317E-03	-0.12299E-02	.89079	0.00000
18	0.87990E-03	-0.16601E-02	1.2024	0.11000
19	0.12663E-02	-0.21785E-02	1.5778	0.23159
20	0.13473E-02	-0.23074E-02	1.6712	0.25358
21	0.95137E-03	-0.17483E-02	1.2663	0.13618
22	0.44552E-03	-0.12139E-02	.87919	0.00000
23	-0.10083E-03	-0.68469E-03	.49590	0.00000
24	-0.59876E-03	-0.19895E-03	.43367	0.00000
25	-0.96253E-03	0.15574E-03	.69714	0.00000
26	-0.11756E-02	0.36265E-03	.85145	0.00000
27	-0.11811E-02	0.36584E-03	.85547	0.00000
28	-0.95740E-03	0.13638E-03	.69342	0.00000
29	-0.72593E-03	-0.11326E-03	.52577	0.00000
30	-0.73928E-03	-0.12003E-03	.53544	0.00000
31	-0.75359E-03	-0.12287E-03	.54581	0.00000
32	-0.84785E-03	-0.41648E-04	.61408	0.00000
33	-0.94003E-03	0.63478E-04	.68084	0.00000
34	-0.94555E-03	0.10303E-03	.68484	0.00000
35	-0.95359E-03	0.14741E-03	.69066	0.00000
36	-0.10503E-02	0.27748E-03	.76070	0.00000
37	-0.11542E-02	0.40499E-03	.83596	0.00000
38	-0.98343E-03	0.25115E-03	.71227	0.00000
39	-0.35794E-03	-0.35794E-03	.25924	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.38065	0.00000	0.14489
2	-0.38906	-0.47821	0.62958
3	-0.39811	-0.59418	0.75267
4	-0.40904	-0.50254	0.66986
5	-0.40483	-0.45442	0.61831
6	-0.38697	-0.48656	0.63631
7	-0.37351	-0.48784	0.62735
8	-0.36187	-0.34491	0.47586
9	-0.35173	-0.15526	0.27897
10	-0.34305	-0.01936	0.13704
11	-0.33475	0.05030	0.16235
12	-0.32781	0.04915	0.15660
13	-0.32263	0.02726	0.13135
14	-0.31935	0.01877	0.12075
15	-0.31694	0.10096	0.20141
16	-0.31357	0.26543	0.36375
17	-0.30851	0.48952	0.58470
18	-0.30154	0.71339	0.80432
19	-0.29268	0.88133	0.96699
20	-0.29180	0.91365	0.99879
21	-0.30054	0.74739	0.83771
22	-0.30918	0.47978	0.57538
23	-0.31607	0.16881	0.26871
24	-0.32098	-0.11560	0.21862
25	-0.32463	-0.32333	0.42871
26	-0.32711	-0.44475	0.55175
27	-0.32806	-0.44728	0.55490
28	-0.33036	-0.31624	0.42538
29	-0.33767	-0.17714	0.29116
30	-0.34576	-0.17904	0.29860
31	-0.35267	-0.18236	0.30673
32	-0.35791	-0.23310	0.36120
33	-0.35270	-0.29014	0.41454
34	-0.33901	-0.30318	0.41810
35	-0.32439	-0.31833	0.42356
36	-0.31096	-0.38390	0.48060
37	-0.30146	-0.45081	0.54169
38	-0.29465	-0.35695	0.44377
39	-0.28805	0.00000	0.08297

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	4	16198.	30800.	0.526
BUCKLING THRUST (psi)	4	16198.	52883.	0.306
SEAM THRUST (psi)	4	16198.	21589.	0.750
PLASTIC-PENETRATE (%)	20	25.36	90.00	0.282
COMBINED T&M Ratio	20	0.999	1.000	0.999

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.07

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.21

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

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SPAN LENGTH FOR HANDLING AND BUCKLING (IN)........     387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) .....      0.020


* * * * NORMAL EXIT FROM CANDE * * * *
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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM # 1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage HS-20-OPR (LL x 3.70)

EXECUTION MODE ..... ANALYS

SOLUTION LEVEL ..... #3 USER

METHODOLOGY (LRFD OR SERVICE) ... LRFD

NUMBER OF PIPE-ELEMENT GROUPS 1

MAXIMUM ITERATIONS PER STEP ..... -99

PIPE ELEMENT TYPE ..... STEEL

NUMBER OF BEAM ELEMENTS 38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

YOUNGS MODULUS OF METAL (PSI)..... 0.29000E+08

POISSONS RATIO OF METAL (-) ..... 0.30000E+00

YIELD STRESS OF METAL (PSI)..... 0.44000E+05

LONGITUDINAL SEAM STRENGTH (PSI)... 0.32223E+05

DENSITY OF METAL (PCI)..... 0.28400E+00

MODULUS OF UPPER BI-SLOPE (PSI).... 0.00000E+00

MATERIAL CHARACTER CODE, NONLIN 2

NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -485.0	F = 0.000
1142	22	F = 0.000	F = -485.0	F = 0.000
1137	21	F = 0.000	F = -485.0	F = 0.000
1137	22	F = 0.000	F = -485.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000

857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
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BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24

26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.350	Factor for load step #21
22	1.350	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.532E+00	0.563E+01	0.381E-10	-0.148E+05	0.729E+03
	0.00	-0.119E+01	0.155E+01	-0.342E+04	-0.148E+05	0.317E+04
2	-193.83	-0.690E+00	-0.643E+01	-0.781E+04	-0.422E+05	0.328E+03
	14.34	-0.120E+01	-0.207E+01	-0.349E+04	-0.152E+05	0.142E+04
3	-192.08	-0.797E+00	-0.185E+02	-0.980E+04	-0.440E+05	0.784E+01
	28.58	-0.120E+01	-0.569E+01	-0.357E+04	-0.155E+05	0.340E+02
4	-188.35	-0.837E+00	-0.388E+02	-0.828E+04	-0.440E+05	-0.900E+02
	42.43	-0.119E+01	-0.574E+01	-0.365E+04	-0.158E+05	-0.391E+03
5	-182.71	-0.818E+00	-0.420E+02	-0.730E+04	-0.409E+05	-0.202E+02
	55.62	-0.121E+01	0.127E+02	-0.359E+04	-0.156E+05	-0.876E+02
6	-175.27	-0.755E+00	-0.320E+02	-0.764E+04	-0.414E+05	0.165E+02
	67.89	-0.125E+01	0.960E+01	-0.343E+04	-0.149E+05	0.715E+02
7	-166.18	-0.655E+00	-0.219E+02	-0.757E+04	-0.406E+05	-0.714E+02
	78.98	-0.135E+01	0.655E+01	-0.331E+04	-0.144E+05	-0.310E+03
8	-155.61	-0.534E+00	-0.188E+02	-0.526E+04	-0.321E+05	-0.172E+03
	88.69	-0.149E+01	0.604E+01	-0.320E+04	-0.139E+05	-0.746E+03
9	-144.43	-0.407E+00	-0.172E+02	-0.227E+04	-0.214E+05	-0.163E+03
	97.10	-0.167E+01	0.499E+01	-0.311E+04	-0.135E+05	-0.706E+03
10	-132.78	-0.282E+00	-0.177E+02	-0.196E+03	-0.139E+05	-0.896E+02
	104.87	-0.187E+01	0.511E+01	-0.303E+04	-0.132E+05	-0.389E+03
11	-120.72	-0.167E+00	-0.180E+02	0.787E+03	-0.156E+05	-0.683E+01

	111.98	-0.208E+01	0.516E+01	-0.296E+04	-0.129E+05	-0.297E+02
12	-108.28	-0.658E-01	-0.129E+02	0.567E+03	-0.146E+05	0.460E+02
	118.40	-0.229E+01	0.371E+01	-0.290E+04	-0.126E+05	0.200E+03
13	-95.50	0.221E-01	-0.941E+01	0.853E+02	-0.127E+05	0.422E+02
	124.11	-0.251E+01	0.272E+01	-0.285E+04	-0.124E+05	0.183E+03
14	-82.42	0.976E-01	-0.328E+01	-0.212E+01	-0.123E+05	-0.274E+02
	129.10	-0.273E+01	0.918E+00	-0.283E+04	-0.123E+05	-0.119E+03
15	-69.09	0.160E+00	-0.457E+01	0.149E+04	-0.174E+05	-0.130E+03
	133.35	-0.295E+01	0.128E+01	-0.281E+04	-0.122E+05	-0.563E+03
16	-55.53	0.208E+00	-0.632E+01	0.427E+04	-0.269E+05	-0.209E+03
	136.84	-0.316E+01	0.176E+01	-0.278E+04	-0.121E+05	-0.908E+03
17	-41.80	0.238E+00	-0.109E+02	0.794E+04	-0.394E+05	-0.242E+03
	139.57	-0.334E+01	0.307E+01	-0.273E+04	-0.119E+05	-0.105E+04
18	-27.94	0.250E+00	-0.149E+02	0.115E+05	-0.440E+05	-0.212E+03
	141.53	-0.347E+01	0.424E+01	-0.267E+04	-0.116E+05	-0.921E+03
19	-13.99	0.249E+00	-0.205E+02	0.141E+05	-0.440E+05	-0.110E+03
	142.70	-0.352E+01	0.594E+01	-0.259E+04	-0.112E+05	-0.479E+03
20	0.00	0.242E+00	-0.253E+02	0.145E+05	-0.440E+05	0.670E+02
	143.09	-0.346E+01	-0.425E+01	-0.257E+04	-0.112E+05	0.291E+03
21	13.99	0.241E+00	-0.179E+02	0.119E+05	-0.440E+05	0.224E+03
	142.70	-0.329E+01	-0.503E+01	-0.265E+04	-0.115E+05	0.974E+03
22	27.94	0.255E+00	-0.140E+02	0.759E+04	-0.382E+05	0.298E+03
	141.53	-0.303E+01	-0.390E+01	-0.272E+04	-0.118E+05	0.129E+04
23	41.80	0.290E+00	-0.879E+01	0.263E+04	-0.212E+05	0.304E+03
	139.57	-0.272E+01	-0.245E+01	-0.279E+04	-0.121E+05	0.132E+04
24	55.53	0.345E+00	-0.528E+01	-0.189E+04	-0.188E+05	0.246E+03
	136.84	-0.240E+01	-0.151E+01	-0.283E+04	-0.123E+05	0.107E+04
25	69.09	0.415E+00	-0.465E+01	-0.521E+04	-0.305E+05	0.157E+03
	133.35	-0.208E+01	-0.138E+01	-0.286E+04	-0.124E+05	0.680E+03
26	82.42	0.493E+00	-0.224E+01	-0.714E+04	-0.373E+05	0.447E+02
	129.10	-0.181E+01	-0.708E+00	-0.288E+04	-0.125E+05	0.194E+03
27	95.50	0.570E+00	-0.285E+00	-0.716E+04	-0.373E+05	-0.984E+02
	124.11	-0.159E+01	-0.141E+00	-0.289E+04	-0.125E+05	-0.427E+03
28	108.28	0.641E+00	-0.119E+02	-0.488E+04	-0.296E+05	-0.174E+03
	118.40	-0.142E+01	-0.350E+01	-0.290E+04	-0.126E+05	-0.758E+03
29	120.72	0.705E+00	-0.241E+02	-0.261E+04	-0.220E+05	-0.864E+02
	111.98	-0.128E+01	-0.707E+01	-0.297E+04	-0.129E+05	-0.375E+03
30	132.78	0.767E+00	-0.125E+02	-0.270E+04	-0.226E+05	0.213E+01
	104.87	-0.116E+01	-0.370E+01	-0.304E+04	-0.132E+05	0.924E+01
31	144.43	0.824E+00	-0.162E+02	-0.282E+04	-0.233E+05	0.318E+02
	97.10	-0.106E+01	-0.481E+01	-0.311E+04	-0.135E+05	0.138E+03

32	155.61	0.875E+00	-0.227E+02	-0.366E+04	-0.265E+05	0.641E+02
	88.69	-0.985E+00	-0.389E+01	-0.317E+04	-0.138E+05	0.278E+03
33	166.18	0.916E+00	-0.280E+02	-0.464E+04	-0.297E+05	0.486E+02
	78.98	-0.931E+00	0.858E+01	-0.314E+04	-0.137E+05	0.211E+03
34	175.27	0.938E+00	-0.299E+02	-0.499E+04	-0.304E+05	0.295E+02
	67.89	-0.904E+00	0.916E+01	-0.302E+04	-0.131E+05	0.128E+03
35	182.71	0.933E+00	-0.323E+02	-0.535E+04	-0.311E+05	0.593E+02
	55.62	-0.901E+00	0.977E+01	-0.289E+04	-0.126E+05	0.257E+03
36	188.35	0.891E+00	-0.270E+02	-0.648E+04	-0.345E+05	0.856E+02
	42.43	-0.913E+00	0.815E+01	-0.278E+04	-0.121E+05	0.372E+03
37	192.08	0.802E+00	-0.136E+02	-0.753E+04	-0.378E+05	-0.855E+01
	28.58	-0.931E+00	0.413E+01	-0.269E+04	-0.117E+05	-0.372E+02
38	193.83	0.659E+00	-0.539E+01	-0.589E+04	-0.319E+05	-0.249E+03
	14.34	-0.943E+00	0.168E+01	-0.264E+04	-0.114E+05	-0.108E+04
39	193.56	0.477E+00	0.280E+01	0.488E-10	-0.112E+05	-0.544E+03
	0.00	-0.933E+00	-0.768E+00	-0.258E+04	-0.112E+05	-0.236E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.46598E-03	-0.46598E-03	.33749	0.00000
2	-0.13255E-02	0.37302E-03	.96000	0.00000
3	-0.15817E-02	0.58922E-03	1.1456	0.09259
4	-0.13983E-02	0.40371E-03	1.0128	0.00979
5	-0.12836E-02	0.30513E-03	.92968	0.00000
6	-0.12981E-02	0.36363E-03	.94020	0.00000
7	-0.12748E-02	0.37324E-03	.92332	0.00000
8	-0.10087E-02	0.13553E-03	.73061	0.00000
9	-0.67161E-03	-0.17670E-03	.48643	0.00000
10	-0.43476E-03	-0.39221E-03	.31489	0.00000
11	-0.31759E-03	-0.48892E-03	.35412	0.00000
12	-0.33314E-03	-0.45662E-03	.33072	0.00000
13	-0.37974E-03	-0.39831E-03	.28849	0.00000
14	-0.38580E-03	-0.38534E-03	.27943	0.00000
15	-0.22048E-03	-0.54520E-03	.39487	0.00000
16	0.86229E-04	-0.84345E-03	.61089	0.00000
17	0.49143E-03	-0.12359E-02	.89515	0.00000
18	0.91191E-03	-0.16718E-02	1.2108	0.11266
19	0.12913E-02	-0.21809E-02	1.5796	0.23045
20	0.13606E-02	-0.22876E-02	1.6568	0.24859
21	0.95929E-03	-0.17250E-02	1.2493	0.12825
22	0.45477E-03	-0.11973E-02	.86720	0.00000
23	-0.93077E-04	-0.66624E-03	.48254	0.00000
24	-0.59144E-03	-0.17969E-03	.42837	0.00000
25	-0.95695E-03	0.17717E-03	.69309	0.00000
26	-0.11694E-02	0.38406E-03	.84699	0.00000
27	-0.11719E-02	0.38526E-03	.84881	0.00000
28	-0.92730E-03	0.13565E-03	.67162	0.00000
29	-0.68901E-03	-0.12095E-03	.49903	0.00000
30	-0.70832E-03	-0.12167E-03	.51302	0.00000
31	-0.72989E-03	-0.11673E-03	.52864	0.00000
32	-0.83031E-03	-0.34234E-04	.60137	0.00000
33	-0.93328E-03	0.76101E-04	.67595	0.00000
34	-0.95456E-03	0.13045E-03	.69137	0.00000
35	-0.97664E-03	0.18771E-03	.70736	0.00000
36	-0.10838E-02	0.32694E-03	.78496	0.00000
37	-0.11871E-02	0.45258E-03	.85978	0.00000
38	-0.10005E-02	0.28209E-03	.72464	0.00000
39	-0.35124E-03	-0.35124E-03	.25440	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.37499	0.00000	0.14062
2	-0.38324	-0.49108	0.63795
3	-0.39186	-0.61639	0.76994
4	-0.40014	-0.52091	0.68103
5	-0.39371	-0.45935	0.61436
6	-0.37602	-0.48046	0.62186
7	-0.36278	-0.47650	0.60811
8	-0.35136	-0.33084	0.45430
9	-0.34134	-0.14309	0.25960
10	-0.33275	-0.01230	0.12303
11	-0.32452	0.04954	0.15485
12	-0.31778	0.03570	0.13669
13	-0.31307	0.00537	0.10338
14	-0.31029	-0.00013	0.09641
15	-0.30809	0.09389	0.18880
16	-0.30469	0.26880	0.36163
17	-0.29956	0.49943	0.58917
18	-0.29254	0.72435	0.80993
19	-0.28372	0.88809	0.96859
20	-0.28229	0.91540	0.99509
21	-0.29032	0.74616	0.83045
22	-0.29879	0.47767	0.56695
23	-0.30553	0.16572	0.25907
24	-0.31028	-0.11905	0.21533
25	-0.31376	-0.32791	0.42636
26	-0.31602	-0.44916	0.54902
27	-0.31654	-0.45023	0.55043
28	-0.31854	-0.30733	0.40880
29	-0.32591	-0.16424	0.27046
30	-0.33397	-0.16962	0.28115
31	-0.34066	-0.17728	0.29333
32	-0.34787	-0.23017	0.35118
33	-0.34491	-0.29184	0.41080
34	-0.33160	-0.31371	0.42367
35	-0.31745	-0.33665	0.43742
36	-0.30454	-0.40788	0.50062
37	-0.29555	-0.47408	0.56143
38	-0.28907	-0.37084	0.45440
39	-0.28266	0.00000	0.07990

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	4	15846.	30800.	0.514
BUCKLING THRUST (psi)	4	15846.	52156.	0.304
SEAM THRUST (psi)	4	15846.	21589.	0.734
PLASTIC-PENETRATE (%)	20	24.86	90.00	0.276
COMBINED T&M Ratio	20	0.995	1.000	0.995

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.31

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.26

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HANDLING FACTOR RATIO = (SPAN**2/EI)/FF...........      0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)........    387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) .....     0.020


* * * * NORMAL EXIT FROM CANDE * * * *
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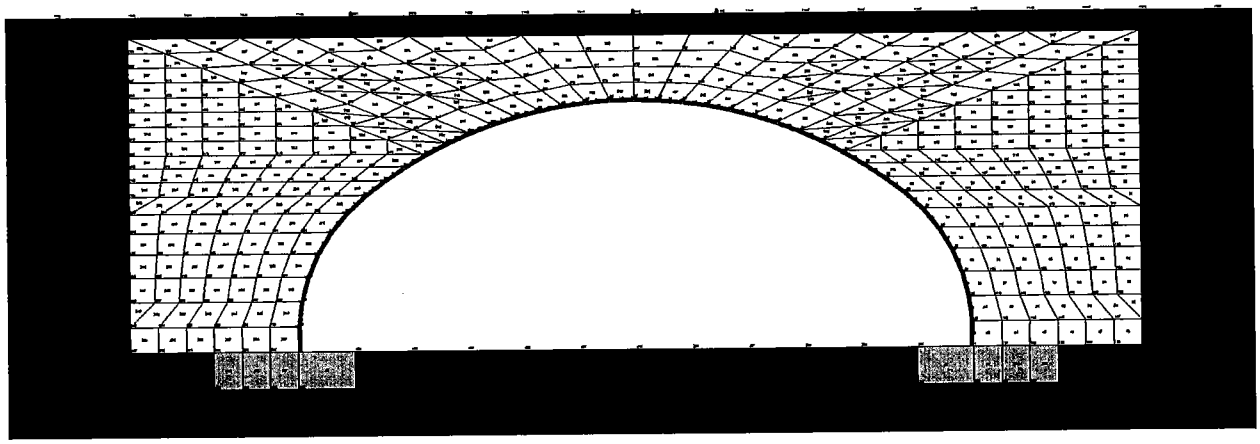

TYPE 3

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Type 3

EXECUTION MODE ..................   ANALYS
SOLUTION LEVEL ..................  #3 USER
METHODOLOGY (LRFD OR SERVICE) ...     LRFD
NUMBER OF PIPE-ELEMENT GROUPS ....       1
MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL
NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:
      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08
      POISSONS RATIO OF METAL (-) .......    0.30000E+00
      YIELD STRESS OF METAL (PSI)........    0.44000E+05
      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05
      DENSITY OF METAL (PCI).............    0.28400E+00
      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........     2
     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC
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LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -82.00	F = 0.000
1142	22	F = 0.000	F = -82.00	F = 0.000
1143	21	F = 0.000	F = -82.00	F = 0.000
1143	22	F = 0.000	F = -82.00	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000

811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1137	21	F =	0.000	F =	-57.40	F =	0.000
1137	22	F =	0.000	F =	-57.40	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *
```

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL

WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000

6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.341E+00	-0.221E+01	0.807E-11	-0.970E+04	0.390E+03
	0.00	-0.906E+00	-0.675E+00	-0.223E+04	-0.970E+04	0.170E+04
2	-193.83	-0.420E+00	-0.772E+01	-0.411E+04	-0.242E+05	0.178E+03
	14.34	-0.912E+00	-0.235E+01	-0.229E+04	-0.995E+04	0.772E+03

3	-192.08	-0.472E+00	-0.132E+02	-0.516E+04	-0.281E+05	0.651E+00
	28.58	-0.910E+00	-0.402E+01	-0.235E+04	-0.102E+05	0.283E+01
4	-188.35	-0.490E+00	-0.243E+02	-0.417E+04	-0.250E+05	-0.661E+02
	42.43	-0.911E+00	-0.728E+01	-0.242E+04	-0.105E+05	-0.287E+03
5	-182.71	-0.478E+00	-0.276E+02	-0.330E+04	-0.222E+05	-0.385E+02
	55.62	-0.921E+00	-0.111E+01	-0.248E+04	-0.108E+05	-0.167E+03
6	-175.27	-0.447E+00	-0.238E+02	-0.309E+04	-0.214E+05	-0.167E+02
	67.89	-0.945E+00	0.331E+01	-0.245E+04	-0.107E+05	-0.724E+02
7	-166.18	-0.402E+00	-0.193E+02	-0.283E+04	-0.202E+05	-0.491E+02
	78.98	-0.989E+00	0.387E+01	-0.240E+04	-0.104E+05	-0.213E+03
8	-155.61	-0.350E+00	-0.152E+02	-0.167E+04	-0.159E+05	-0.859E+02
	88.69	-0.105E+01	0.493E+01	-0.233E+04	-0.101E+05	-0.373E+03
9	-144.43	-0.299E+00	-0.124E+02	-0.370E+03	-0.111E+05	-0.685E+02
	97.10	-0.113E+01	0.364E+01	-0.226E+04	-0.981E+04	-0.297E+03
10	-132.78	-0.250E+00	-0.113E+02	0.279E+03	-0.106E+05	-0.268E+02
	104.87	-0.121E+01	0.332E+01	-0.221E+04	-0.959E+04	-0.117E+03
11	-120.72	-0.206E+00	-0.119E+02	0.434E+03	-0.109E+05	0.144E+02
	111.98	-0.129E+01	0.350E+01	-0.216E+04	-0.938E+04	0.626E+02
12	-108.28	-0.168E+00	-0.820E+01	-0.583E+02	-0.941E+04	0.362E+02
	118.40	-0.138E+01	0.241E+01	-0.212E+04	-0.920E+04	0.157E+03
13	-95.50	-0.134E+00	-0.691E+01	-0.496E+03	-0.108E+05	0.249E+02
	124.11	-0.146E+01	0.203E+01	-0.209E+04	-0.907E+04	0.108E+03
14	-82.42	-0.104E+00	-0.616E+01	-0.651E+03	-0.112E+05	0.888E+00
	129.10	-0.155E+01	0.181E+01	-0.206E+04	-0.896E+04	0.386E+01
15	-69.09	-0.784E-01	-0.631E+01	-0.392E+03	-0.102E+05	-0.258E+02
	133.35	-0.165E+01	0.185E+01	-0.204E+04	-0.884E+04	-0.112E+03
16	-55.53	-0.572E-01	-0.620E+01	0.223E+03	-0.949E+04	-0.507E+02
	136.84	-0.175E+01	0.182E+01	-0.201E+04	-0.872E+04	-0.220E+03
17	-41.80	-0.419E-01	-0.660E+01	0.119E+04	-0.127E+05	-0.719E+02
	139.57	-0.185E+01	0.193E+01	-0.198E+04	-0.859E+04	-0.312E+03
18	-27.94	-0.332E-01	-0.751E+01	0.240E+04	-0.168E+05	-0.821E+02
	141.53	-0.194E+01	0.219E+01	-0.194E+04	-0.845E+04	-0.357E+03
19	-13.99	-0.308E-01	-0.856E+01	0.363E+04	-0.209E+05	-0.767E+02
	142.70	-0.201E+01	0.248E+01	-0.191E+04	-0.829E+04	-0.333E+03
20	0.00	-0.331E-01	-0.976E+01	0.465E+04	-0.242E+05	-0.533E+02
	143.09	-0.206E+01	0.285E+01	-0.187E+04	-0.811E+04	-0.231E+03
21	13.99	-0.371E-01	-0.105E+02	0.518E+04	-0.260E+05	-0.149E+02
	142.70	-0.208E+01	-0.261E+01	-0.186E+04	-0.809E+04	-0.647E+02
22	27.94	-0.391E-01	-0.103E+02	0.506E+04	-0.258E+05	0.259E+02
	141.53	-0.206E+01	-0.300E+01	-0.190E+04	-0.826E+04	0.113E+03

23	41.80	-0.353E-01	-0.970E+01	0.439E+04	-0.237E+05	0.587E+02
	139.57	-0.200E+01	-0.283E+01	-0.195E+04	-0.845E+04	0.255E+03
24	55.53	-0.228E-01	-0.882E+01	0.330E+04	-0.201E+05	0.790E+02
	136.84	-0.192E+01	-0.255E+01	-0.199E+04	-0.863E+04	0.343E+03
25	69.09	-0.353E-04	-0.760E+01	0.202E+04	-0.158E+05	0.824E+02
	133.35	-0.181E+01	-0.220E+01	-0.203E+04	-0.880E+04	0.358E+03
26	82.42	0.327E-01	-0.671E+01	0.814E+03	-0.118E+05	0.690E+02
	129.10	-0.170E+01	-0.194E+01	-0.206E+04	-0.894E+04	0.300E+03
27	95.50	0.740E-01	-0.549E+01	-0.974E+02	-0.940E+04	0.391E+02
	124.11	-0.158E+01	-0.159E+01	-0.209E+04	-0.907E+04	0.170E+03
28	108.28	0.122E+00	-0.558E+01	-0.451E+03	-0.107E+05	-0.213E+00
	118.40	-0.146E+01	-0.163E+01	-0.211E+04	-0.917E+04	-0.927E+00
29	120.72	0.175E+00	-0.121E+02	-0.239E+03	-0.102E+05	0.521E+01
	111.98	-0.134E+01	-0.355E+01	-0.215E+04	-0.933E+04	0.226E+02
30	132.78	0.234E+00	-0.102E+02	-0.719E+03	-0.120E+05	0.403E+02
	104.87	-0.124E+01	-0.297E+01	-0.220E+04	-0.954E+04	0.175E+03
31	144.43	0.295E+00	-0.113E+02	-0.146E+04	-0.148E+05	0.672E+02
	97.10	-0.113E+01	-0.334E+01	-0.224E+04	-0.974E+04	0.292E+03
32	155.61	0.355E+00	-0.143E+02	-0.267E+04	-0.193E+05	0.724E+02
	88.69	-0.105E+01	-0.462E+01	-0.231E+04	-0.100E+05	0.315E+03
33	166.18	0.413E+00	-0.189E+02	-0.355E+04	-0.227E+05	0.281E+02
	78.98	-0.977E+00	-0.567E+01	-0.238E+04	-0.104E+05	0.122E+03
34	175.27	0.460E+00	-0.244E+02	-0.349E+04	-0.228E+05	-0.202E+01
	67.89	-0.932E+00	-0.334E+01	-0.245E+04	-0.107E+05	-0.877E+01
35	182.71	0.491E+00	-0.279E+02	-0.349E+04	-0.228E+05	0.272E+02
	55.62	-0.908E+00	0.187E+01	-0.247E+04	-0.107E+05	0.118E+03
36	188.35	0.500E+00	-0.244E+02	-0.425E+04	-0.252E+05	0.597E+02
	42.43	-0.898E+00	0.737E+01	-0.241E+04	-0.105E+05	0.259E+03
37	192.08	0.481E+00	-0.133E+02	-0.516E+04	-0.280E+05	-0.343E+01
	28.58	-0.899E+00	0.403E+01	-0.233E+04	-0.101E+05	-0.149E+02
38	193.83	0.426E+00	-0.767E+01	-0.409E+04	-0.241E+05	-0.178E+03
	14.34	-0.901E+00	0.233E+01	-0.227E+04	-0.987E+04	-0.772E+03
39	193.56	0.344E+00	-0.206E+01	-0.444E-10	-0.962E+04	-0.388E+03
	0.00	-0.895E+00	0.633E+00	-0.221E+04	-0.962E+04	-0.169E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.30425E-03	-0.30425E-03	.22036	0.00000
2	-0.75891E-03	0.13464E-03	.54966	0.00000
3	-0.88107E-03	0.24115E-03	.63814	0.00000
4	-0.78438E-03	0.12381E-03	.56810	0.00000
5	-0.69593E-03	0.21164E-04	.50404	0.00000
6	-0.67073E-03	0.15681E-05	.48579	0.00000

7	-0.63422E-03	-0.19407E-04	.45935	0.00000
8	-0.49937E-03	-0.13487E-03	.36168	0.00000
9	-0.34822E-03	-0.26773E-03	.25220	0.00000
10	-0.27058E-03	-0.33122E-03	.23990	0.00000
11	-0.24712E-03	-0.34146E-03	.24731	0.00000
12	-0.29514E-03	-0.28244E-03	.21376	0.00000
13	-0.33873E-03	-0.23075E-03	.24533	0.00000
14	-0.35193E-03	-0.21032E-03	.25490	0.00000
15	-0.32011E-03	-0.23489E-03	.23185	0.00000
16	-0.24941E-03	-0.29795E-03	.21579	0.00000
17	-0.14022E-03	-0.39900E-03	.28898	0.00000
18	-0.42618E-05	-0.52586E-03	.38087	0.00000
19	0.13505E-03	-0.65502E-03	.47441	0.00000
20	0.25159E-03	-0.76039E-03	.55073	0.00000
21	0.30956E-03	-0.81738E-03	.59201	0.00000
22	0.29178E-03	-0.81041E-03	.58696	0.00000
23	0.21248E-03	-0.74292E-03	.53808	0.00000
24	0.88595E-04	-0.63041E-03	.45659	0.00000
25	-0.56299E-04	-0.49588E-03	.35915	0.00000
26	-0.19204E-03	-0.36927E-03	.26745	0.00000
27	-0.29508E-03	-0.27390E-03	.21372	0.00000
28	-0.33684E-03	-0.23868E-03	.24397	0.00000
29	-0.31878E-03	-0.26678E-03	.23088	0.00000
30	-0.37752E-03	-0.22096E-03	.27343	0.00000
31	-0.46510E-03	-0.14638E-03	.33686	0.00000
32	-0.60470E-03	-0.23719E-04	.43797	0.00000
33	-0.71183E-03	0.61688E-04	.51556	0.00000
34	-0.71410E-03	0.45594E-04	.51721	0.00000
35	-0.71578E-03	0.43683E-04	.51842	0.00000
36	-0.79007E-03	0.13418E-03	.57223	0.00000
37	-0.87927E-03	0.24440E-03	.63684	0.00000
38	-0.75514E-03	0.13597E-03	.54693	0.00000
39	-0.30172E-03	-0.30172E-03	.21853	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.24484	0.00000	0.05995
2	-0.25119	-0.25835	0.32145
3	-0.25749	-0.32447	0.39077
4	-0.26579	-0.26258	0.33323
5	-0.27151	-0.20733	0.28105
6	-0.26925	-0.19438	0.26688
7	-0.26300	-0.17776	0.24693
8	-0.25520	-0.10539	0.17052
9	-0.24784	-0.02327	0.08470
10	-0.24215	0.01753	0.07617
11	-0.23683	0.02728	0.08337
12	-0.23240	-0.00367	0.05768
13	-0.22914	-0.03122	0.08373
14	-0.22624	-0.04094	0.09213
15	-0.22332	-0.02464	0.07451
16	-0.22024	0.01403	0.06254
17	-0.21697	0.07482	0.12190
18	-0.21331	0.15081	0.19631
19	-0.20922	0.22843	0.27221
20	-0.20473	0.29259	0.33451
21	-0.20433	0.32583	0.36759
22	-0.20869	0.31868	0.36223
23	-0.21344	0.27624	0.32179
24	-0.21801	0.20789	0.25541
25	-0.22218	0.12710	0.17646
26	-0.22586	0.05124	0.10225
27	-0.22894	-0.00613	0.05854
28	-0.23158	-0.02838	0.08201
29	-0.23561	-0.01504	0.07055
30	-0.24081	-0.04527	0.10326
31	-0.24604	-0.09215	0.15269
32	-0.25286	-0.16798	0.23192
33	-0.26160	-0.22365	0.29208
34	-0.26899	-0.21965	0.29201
35	-0.27044	-0.21958	0.29272
36	-0.26391	-0.26723	0.33688
37	-0.25546	-0.32489	0.39015
38	-0.24914	-0.25765	0.31972

39	-0.24281	0.00000	0.05896

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	10752.	30800.	0.349
BUCKLING THRUST (psi)	5	10752.	54113.	0.199
SEAM THRUST (psi)	5	10752.	21589.	0.498
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.391	1.000	0.391

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.50

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.10

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *

```
*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

 MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM # 1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Type 3-OPR (LL x 3.28)

        EXECUTION MODE ..................   ANALYS

        SOLUTION LEVEL ..................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4

             IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
             AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

        SECTION PROPERTIES OF CROSS-SECTION:

              THRUST AREA (IN**2/IN) ............   0.23020

              MOM. OF INERTIA (IN**4/IN) ........   0.87460

              SECTION MODULUS (IN**3/IN) ........   0.28840

              PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

        NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

        LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
        AND DEFLECTION LIMIT AT SERVICE LOAD

              THRUST STRESS YIELDING ............   0.70000

              BUCKLING STRESS FAILURE............   0.70000
```

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)		Y-FORCE(F) -OR- Y-DISPLACE.(D)		MOMENT(F) -OR- ROTATION (D)	
1142	21	F =	0.000	F =	-269.0	F =	0.000
1142	22	F =	0.000	F =	-269.0	F =	0.000
1143	21	F =	0.000	F =	-269.0	F =	0.000
1143	22	F =	0.000	F =	-269.0	F =	0.000
574	1	D =	0.000	D =	0.000	D =	0.000
575	1	D =	0.000	D =	0.000	D =	0.000
576	1	D =	0.000	D =	0.000	D =	0.000
577	1	D =	0.000	D =	0.000	D =	0.000
578	1	D =	0.000	D =	0.000	D =	0.000
579	1	D =	0.000	D =	0.000	D =	0.000
580	1	D =	0.000	D =	0.000	D =	0.000
581	1	D =	0.000	D =	0.000	D =	0.000
582	1	D =	0.000	D =	0.000	D =	0.000
583	1	D =	0.000	D =	0.000	D =	0.000
584	1	D =	0.000	D =	0.000	D =	0.000
585	1	D =	0.000	D =	0.000	D =	0.000
586	1	D =	0.000	D =	0.000	D =	0.000
587	1	D =	0.000	D =	0.000	D =	0.000
588	1	D =	0.000	D =	0.000	D =	0.000
589	1	D =	0.000	D =	0.000	D =	0.000
590	1	D =	0.000	D =	0.000	D =	0.000
591	1	D =	0.000	D =	0.000	D =	0.000
592	1	D =	0.000	D =	0.000	D =	0.000
593	1	D =	0.000	D =	0.000	D =	0.000
594	1	D =	0.000	D =	0.000	D =	0.000
595	1	D =	0.000	D =	0.000	D =	0.000
596	1	D =	0.000	D =	0.000	D =	0.000
597	1	D =	0.000	D =	0.000	D =	0.000
598	1	D =	0.000	D =	0.000	D =	0.000
599	1	D =	0.000	D =	0.000	D =	0.000
624	1	D =	0.000	D =	0.000	D =	0.000
649	1	D =	0.000	D =	0.000	D =	0.000
674	1	D =	0.000	D =	0.000	D =	0.000
699	1	D =	0.000	D =	0.000	D =	0.000
724	1	D =	0.000	D =	0.000	D =	0.000
761	1	D =	0.000	D =	0.000	D =	0.000
786	1	D =	0.000	D =	0.000	D =	0.000
811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000

854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1137	21	F =	0.000	F =	-188.3	F =	0.000
1137	22	F =	0.000	F =	-188.3	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
```

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19

21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000

35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.450	Factor for load step #21
22	1.450	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.487E+00	0.269E+01	0.326E-10	-0.126E+05	0.596E+03
	0.00	-0.103E+01	0.717E+00	-0.289E+04	-0.126E+05	0.259E+04
2	-193.83	-0.645E+00	-0.639E+01	-0.640E+04	-0.350E+05	0.270E+03
	14.34	-0.104E+01	-0.200E+01	-0.296E+04	-0.128E+05	0.117E+04
3	-192.08	-0.761E+00	-0.155E+02	-0.810E+04	-0.412E+05	0.501E+01
	28.58	-0.103E+01	-0.472E+01	-0.302E+04	-0.131E+05	0.218E+02
4	-188.35	-0.821E+00	-0.300E+02	-0.682E+04	-0.372E+05	-0.101E+03
	42.43	-0.102E+01	-0.908E+01	-0.311E+04	-0.135E+05	-0.439E+03
5	-182.71	-0.833E+00	-0.362E+02	-0.538E+04	-0.327E+05	-0.738E+02
	55.62	-0.102E+01	-0.110E+02	-0.324E+04	-0.141E+05	-0.321E+03
6	-175.27	-0.811E+00	-0.345E+02	-0.479E+04	-0.311E+05	-0.301E+02
	67.89	-0.104E+01	-0.261E+01	-0.333E+04	-0.145E+05	-0.131E+03
7	-166.18	-0.764E+00	-0.289E+02	-0.453E+04	-0.301E+05	-0.438E+02
	78.98	-0.109E+01	0.488E+01	-0.331E+04	-0.144E+05	-0.190E+03
8	-155.61	-0.702E+00	-0.212E+02	-0.348E+04	-0.261E+05	-0.781E+02
	88.69	-0.117E+01	0.684E+01	-0.322E+04	-0.140E+05	-0.339E+03
9	-144.43	-0.634E+00	-0.160E+02	-0.220E+04	-0.212E+05	-0.614E+02
	97.10	-0.127E+01	0.472E+01	-0.313E+04	-0.136E+05	-0.267E+03

10	-132.78	-0.564E+00	-0.145E+02	-0.158E+04	-0.188E+05	-0.208E+02
	104.87	-0.139E+01	0.424E+01	-0.307E+04	-0.133E+05	-0.902E+02
11	-120.72	-0.494E+00	-0.207E+02	-0.138E+04	-0.178E+05	0.566E+02
	111.98	-0.152E+01	0.606E+01	-0.300E+04	-0.130E+05	0.246E+03
12	-108.28	-0.426E+00	-0.123E+02	-0.286E+04	-0.227E+05	0.122E+03
	118.40	-0.166E+01	0.359E+01	-0.293E+04	-0.127E+05	0.530E+03
13	-95.50	-0.359E+00	-0.608E+01	-0.442E+04	-0.279E+05	0.879E+02
	124.11	-0.183E+01	0.180E+01	-0.290E+04	-0.126E+05	0.382E+03
14	-82.42	-0.290E+00	-0.416E+01	-0.484E+04	-0.293E+05	-0.177E+01
	129.10	-0.203E+01	0.125E+01	-0.288E+04	-0.125E+05	-0.769E+01
15	-69.09	-0.224E+00	-0.592E+01	-0.376E+04	-0.255E+05	-0.913E+02
	133.35	-0.226E+01	0.175E+01	-0.286E+04	-0.124E+05	-0.397E+03
16	-55.53	-0.165E+00	-0.536E+01	-0.157E+04	-0.177E+05	-0.171E+03
	136.84	-0.252E+01	0.155E+01	-0.283E+04	-0.123E+05	-0.742E+03
17	-41.80	-0.119E+00	-0.718E+01	0.181E+04	-0.184E+05	-0.240E+03
	139.57	-0.280E+01	0.203E+01	-0.279E+04	-0.121E+05	-0.104E+04
18	-27.94	-0.895E-01	-0.109E+02	0.595E+04	-0.325E+05	-0.267E+03
	141.53	-0.306E+01	0.307E+01	-0.274E+04	-0.119E+05	-0.116E+04
19	-13.99	-0.778E-01	-0.143E+02	0.100E+05	-0.440E+05	-0.242E+03
	142.70	-0.328E+01	0.399E+01	-0.268E+04	-0.116E+05	-0.105E+04
20	0.00	-0.795E-01	-0.194E+02	0.133E+05	-0.440E+05	-0.154E+03
	143.09	-0.343E+01	0.553E+01	-0.260E+04	-0.113E+05	-0.667E+03
21	13.99	-0.860E-01	-0.207E+02	0.146E+05	-0.440E+05	-0.173E+02
	142.70	-0.349E+01	-0.270E+01	-0.257E+04	-0.112E+05	-0.753E+02
22	27.94	-0.861E-01	-0.188E+02	0.137E+05	-0.440E+05	0.114E+03
	141.53	-0.342E+01	-0.535E+01	-0.263E+04	-0.114E+05	0.494E+03
23	41.80	-0.692E-01	-0.162E+02	0.111E+05	-0.440E+05	0.210E+03
	139.57	-0.326E+01	-0.454E+01	-0.271E+04	-0.118E+05	0.910E+03
24	55.53	-0.287E-01	-0.137E+02	0.726E+04	-0.373E+05	0.265E+03
	136.84	-0.302E+01	-0.381E+01	-0.278E+04	-0.121E+05	0.115E+04
25	69.09	0.367E-01	-0.986E+01	0.286E+04	-0.223E+05	0.273E+03
	133.35	-0.273E+01	-0.275E+01	-0.285E+04	-0.124E+05	0.119E+04
26	82.42	0.124E+00	-0.521E+01	-0.128E+04	-0.170E+05	0.219E+03
	129.10	-0.243E+01	-0.147E+01	-0.289E+04	-0.126E+05	0.950E+03
27	95.50	0.225E+00	0.325E+00	-0.415E+04	-0.270E+05	0.913E+02
	124.11	-0.214E+01	-0.104E+00	-0.291E+04	-0.126E+05	0.396E+03
28	108.28	0.333E+00	-0.349E+01	-0.462E+04	-0.287E+05	-0.490E+02
	118.40	-0.188E+01	-0.103E+01	-0.292E+04	-0.127E+05	-0.213E+03
29	120.72	0.441E+00	-0.230E+02	-0.344E+04	-0.248E+05	-0.277E+02
	111.98	-0.165E+01	-0.670E+01	-0.297E+04	-0.129E+05	-0.120E+03
30	132.78	0.549E+00	-0.112E+02	-0.439E+04	-0.284E+05	0.444E+02

	104.87	-0.145E+01	-0.329E+01	-0.304E+04	-0.132E+05	0.193E+03
31	144.43	0.650E+00	-0.135E+02	-0.512E+04	-0.312E+05	0.460E+02
	97.10	-0.129E+01	-0.399E+01	-0.310E+04	-0.134E+05	0.200E+03
32	155.61	0.740E+00	-0.196E+02	-0.600E+04	-0.346E+05	0.366E+02
	88.69	-0.116E+01	-0.633E+01	-0.317E+04	-0.138E+05	0.159E+03
33	166.18	0.815E+00	-0.289E+02	-0.635E+04	-0.363E+05	-0.458E+01
	78.98	-0.106E+01	-0.866E+01	-0.328E+04	-0.143E+05	-0.199E+02
34	175.27	0.867E+00	-0.355E+02	-0.596E+04	-0.351E+05	-0.746E+01
	67.89	-0.101E+01	0.346E+01	-0.332E+04	-0.144E+05	-0.324E+02
35	182.71	0.887E+00	-0.366E+02	-0.612E+04	-0.352E+05	0.492E+02
	55.62	-0.993E+00	0.111E+02	-0.322E+04	-0.140E+05	0.214E+03
36	188.35	0.867E+00	-0.304E+02	-0.726E+04	-0.386E+05	0.856E+02
	42.43	-0.995E+00	0.918E+01	-0.308E+04	-0.134E+05	0.372E+03
37	192.08	0.796E+00	-0.154E+02	-0.836E+04	-0.420E+05	-0.141E+02
	28.58	-0.101E+01	0.470E+01	-0.299E+04	-0.130E+05	-0.610E+02
38	193.83	0.666E+00	-0.604E+01	-0.654E+04	-0.354E+05	-0.277E+03
	14.34	-0.102E+01	0.190E+01	-0.292E+04	-0.127E+05	-0.121E+04
39	193.56	0.493E+00	0.333E+01	-0.763E-10	-0.124E+05	-0.604E+03
	0.00	-0.101E+01	-0.900E+00	-0.286E+04	-0.124E+05	-0.262E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.39387E-03	-0.39387E-03	.28527	0.00000
2	-0.10996E-02	0.29382E-03	.79639	0.00000
3	-0.12934E-02	0.46939E-03	.93675	0.00000
4	-0.11661E-02	0.31717E-03	.84457	0.00000
5	-0.10272E-02	0.14250E-03	.74396	0.00000
6	-0.97543E-03	0.66313E-04	.70648	0.00000
7	-0.94398E-03	0.40942E-04	.68371	0.00000
8	-0.81747E-03	-0.60730E-04	.59208	0.00000
9	-0.66636E-03	-0.18797E-03	.48262	0.00000
10	-0.59006E-03	-0.24640E-03	.42736	0.00000
11	-0.55833E-03	-0.25861E-03	.40439	0.00000
12	-0.71157E-03	-0.88198E-04	.51537	0.00000
13	-0.87641E-03	0.85433E-04	.63476	0.00000
14	-0.91988E-03	0.13415E-03	.66625	0.00000
15	-0.79912E-03	0.19894E-04	.57878	0.00000
16	-0.55582E-03	-0.21506E-03	.40257	0.00000
17	-0.18323E-03	-0.57763E-03	.41836	0.00000
18	0.27344E-03	-0.10207E-02	.73924	0.00000
19	0.72689E-03	-0.14596E-02	1.0571	0.03608
20	0.11610E-02	-0.19862E-02	1.4385	0.19239
21	0.13684E-02	-0.23013E-02	1.6668	0.25088
22	0.12279E-02	-0.21023E-02	1.5226	0.21668
23	0.85185E-03	-0.16132E-02	1.1684	0.09433
24	0.41086E-03	-0.11699E-02	.84734	0.00000
25	-0.76504E-04	-0.69925E-03	.50645	0.00000
26	-0.53260E-03	-0.25507E-03	.38575	0.00000
27	-0.84760E-03	0.54457E-04	.61389	0.00000
28	-0.90069E-03	0.10497E-03	.65235	0.00000
29	-0.77877E-03	-0.31219E-04	.56404	0.00000
30	-0.89260E-03	0.63290E-04	.64649	0.00000
31	-0.97865E-03	0.13460E-03	.70881	0.00000
32	-0.10850E-02	0.22013E-03	.78585	0.00000
33	-0.11380E-02	0.24332E-03	.82422	0.00000
34	-0.11008E-02	0.19595E-03	.79728	0.00000
35	-0.11048E-02	0.22744E-03	.80017	0.00000

36	-0.12100E-02	0.36955E-03	.87636	0.00000
37	-0.13174E-02	0.50255E-03	.95417	0.00000
38	-0.11096E-02	0.31303E-03	.80365	0.00000
39	-0.38934E-03	-0.38934E-03	.28199	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.31697	0.00000	0.10047
2	-0.32421	-0.40287	0.50798
3	-0.33155	-0.50966	0.61959
4	-0.34159	-0.42885	0.54554
5	-0.35597	-0.33819	0.46490
6	-0.36581	-0.30120	0.43502
7	-0.36336	-0.28477	0.41680
8	-0.35337	-0.21880	0.34366
9	-0.34376	-0.13831	0.25649
10	-0.33657	-0.09936	0.21264
11	-0.32872	-0.08666	0.19471
12	-0.32181	-0.18023	0.28379
13	-0.31827	-0.27810	0.37939
14	-0.31616	-0.30475	0.40471
15	-0.31354	-0.23680	0.33511
16	-0.31018	-0.09853	0.19474
17	-0.30615	0.11403	0.20776
18	-0.30066	0.37416	0.46456
19	-0.29367	0.63010	0.71635
20	-0.28514	0.83509	0.91639
21	-0.28245	0.91939	0.99917
22	-0.28893	0.86467	0.94815
23	-0.29753	0.69766	0.78619
24	-0.30542	0.45705	0.55033
25	-0.31215	0.18006	0.27749
26	-0.31694	-0.08024	0.18069
27	-0.31914	-0.26081	0.36266
28	-0.32018	-0.29077	0.39328
29	-0.32592	-0.21614	0.32236
30	-0.33369	-0.27638	0.38773
31	-0.33962	-0.32187	0.43722
32	-0.34801	-0.37736	0.49847
33	-0.36000	-0.39938	0.52898
34	-0.36409	-0.37493	0.50749
35	-0.35302	-0.38519	0.50981
36	-0.33817	-0.45669	0.57105
37	-0.32788	-0.52621	0.63371
38	-0.32052	-0.41132	0.51406
39	-0.31332	0.00000	0.09817

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

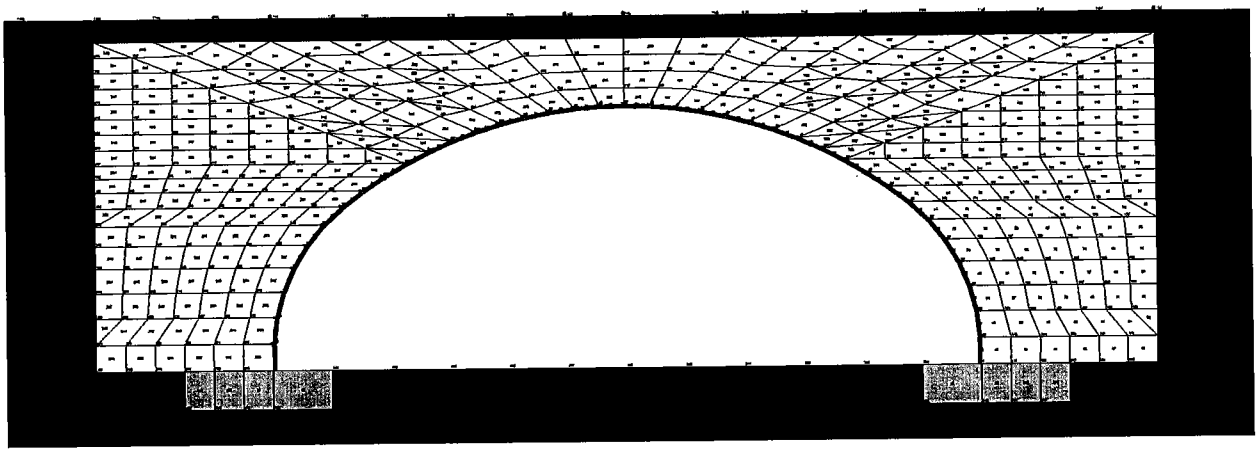
DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	14486.	30800.	0.470
BUCKLING THRUST (psi)	6	14486.	52244.	0.277
SEAM THRUST (psi)	6	14486.	21589.	0.671
PLASTIC-PENETRATE (%)	21	25.09	90.00	0.279
COMBINED T&M Ratio	21	0.999	1.000	0.999

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.18

RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.24
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *



TYPE 3S2

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Type 3S2

EXECUTION MODE ..................   ANALYS
SOLUTION LEVEL ..................  #3 USER
METHODOLOGY (LRFD OR SERVICE) ...     LRFD
NUMBER OF PIPE-ELEMENT GROUPS ....       1
MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL
NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:
      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08
      POISSONS RATIO OF METAL (-) .......    0.30000E+00
      YIELD STRESS OF METAL (PSI)........    0.44000E+05
      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05
      DENSITY OF METAL (PCI).............    0.28400E+00
      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........     2
     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

 LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1141	21	F = 0.000	F = -82.00	F = 0.000
1141	22	F = 0.000	F = -82.00	F = 0.000
1142	21	F = 0.000	F = -82.00	F = 0.000
1142	22	F = 0.000	F = -82.00	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000

836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1136	21	F =	0.000	F =	-49.20	F =	0.000
1136	22	F =	0.000	F =	-49.20	F =	0.000
1152	21	F =	0.000	F =	-67.70	F =	0.000
1152	22	F =	0.000	F =	-67.70	F =	0.000
1151	21	F =	0.000	F =	-67.70	F =	0.000
1151	22	F =	0.000	F =	-67.70	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060
```

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000

3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.349E+00	-0.187E+01	0.326E-10	-0.994E+04	0.399E+03
	0.00	-0.921E+00	-0.576E+00	-0.229E+04	-0.994E+04	0.173E+04

2	-193.83	-0.428E+00	-0.786E+01	-0.419E+04	-0.247E+05	0.181E+03
	14.34	-0.927E+00	-0.239E+01	-0.235E+04	-0.102E+05	0.784E+03
3	-192.08	-0.481E+00	-0.139E+02	-0.524E+04	-0.286E+05	0.863E+00
	28.58	-0.925E+00	-0.421E+01	-0.241E+04	-0.105E+05	0.375E+01
4	-188.35	-0.497E+00	-0.253E+02	-0.427E+04	-0.256E+05	-0.625E+02
	42.43	-0.926E+00	-0.670E+01	-0.248E+04	-0.108E+05	-0.272E+03
5	-182.71	-0.484E+00	-0.284E+02	-0.348E+04	-0.230E+05	-0.292E+02
	55.62	-0.937E+00	-0.210E+00	-0.252E+04	-0.110E+05	-0.127E+03
6	-175.27	-0.451E+00	-0.242E+02	-0.345E+04	-0.227E+05	-0.356E+01
	67.89	-0.963E+00	0.562E+01	-0.248E+04	-0.108E+05	-0.155E+02
7	-166.18	-0.401E+00	-0.187E+02	-0.338E+04	-0.221E+05	-0.389E+02
	78.98	-0.101E+01	0.559E+01	-0.240E+04	-0.104E+05	-0.169E+03
8	-155.61	-0.343E+00	-0.148E+02	-0.230E+04	-0.180E+05	-0.821E+02
	88.69	-0.108E+01	0.478E+01	-0.231E+04	-0.101E+05	-0.357E+03
9	-144.43	-0.283E+00	-0.121E+02	-0.100E+04	-0.132E+05	-0.688E+02
	97.10	-0.117E+01	0.355E+01	-0.225E+04	-0.977E+04	-0.299E+03
10	-132.78	-0.224E+00	-0.110E+02	-0.302E+03	-0.106E+05	-0.314E+02
	104.87	-0.126E+01	0.320E+01	-0.220E+04	-0.955E+04	-0.136E+03
11	-120.72	-0.169E+00	-0.124E+02	-0.250E+02	-0.942E+04	0.109E+02
	111.98	-0.137E+01	0.363E+01	-0.215E+04	-0.934E+04	0.473E+02
12	-108.28	-0.119E+00	-0.617E+01	-0.487E+03	-0.109E+05	0.221E+02
	118.40	-0.147E+01	0.181E+01	-0.211E+04	-0.917E+04	0.960E+02
13	-95.50	-0.746E-01	-0.489E+01	-0.500E+03	-0.108E+05	-0.173E+02
	124.11	-0.158E+01	0.143E+01	-0.209E+04	-0.908E+04	-0.752E+02
14	-82.42	-0.351E-01	-0.542E+01	0.165E+03	-0.954E+04	-0.607E+02
	129.10	-0.170E+01	0.158E+01	-0.207E+04	-0.897E+04	-0.264E+03
15	-69.09	-0.267E-02	-0.686E+01	0.138E+04	-0.136E+05	-0.888E+02
	133.35	-0.182E+01	0.199E+01	-0.204E+04	-0.884E+04	-0.386E+03
16	-55.53	0.209E-01	-0.827E+01	0.284E+04	-0.185E+05	-0.951E+02
	136.84	-0.193E+01	0.240E+01	-0.200E+04	-0.869E+04	-0.413E+03
17	-41.80	0.346E-01	-0.953E+01	0.421E+04	-0.231E+05	-0.806E+02
	139.57	-0.202E+01	0.277E+01	-0.196E+04	-0.851E+04	-0.350E+03
18	-27.94	0.394E-01	-0.104E+02	0.522E+04	-0.264E+05	-0.485E+02
	141.53	-0.208E+01	0.305E+01	-0.191E+04	-0.832E+04	-0.211E+03
19	-13.99	0.380E-01	-0.111E+02	0.563E+04	-0.277E+05	-0.338E+01
	142.70	-0.210E+01	0.254E+01	-0.187E+04	-0.814E+04	-0.147E+02
20	0.00	0.341E-01	-0.105E+02	0.531E+04	-0.266E+05	0.435E+02
	143.09	-0.209E+01	-0.308E+01	-0.188E+04	-0.816E+04	0.189E+03
21	13.99	0.317E-01	-0.937E+01	0.435E+04	-0.234E+05	0.772E+02
	142.70	-0.204E+01	-0.271E+01	-0.192E+04	-0.835E+04	0.335E+03
22	27.94	0.345E-01	-0.823E+01	0.302E+04	-0.190E+05	0.924E+02

	141.53	-0.196E+01	-0.240E+01	-0.196E+04	-0.853E+04	0.402E+03
23	41.80	0.445E-01	-0.709E+01	0.158E+04	-0.142E+05	0.896E+02
	139.57	-0.186E+01	-0.207E+01	-0.200E+04	-0.869E+04	0.389E+03
24	55.53	0.621E-01	-0.639E+01	0.312E+03	-0.991E+04	0.719E+02
	136.84	-0.175E+01	-0.187E+01	-0.203E+04	-0.883E+04	0.312E+03
25	69.09	0.865E-01	-0.616E+01	-0.627E+03	-0.111E+05	0.460E+02
	133.35	-0.164E+01	-0.180E+01	-0.206E+04	-0.895E+04	0.200E+03
26	82.42	0.116E+00	-0.586E+01	-0.116E+04	-0.131E+05	0.147E+02
	129.10	-0.153E+01	-0.172E+01	-0.209E+04	-0.907E+04	0.640E+02
27	95.50	0.149E+00	-0.615E+01	-0.119E+04	-0.133E+05	-0.181E+02
	124.11	-0.143E+01	-0.181E+01	-0.211E+04	-0.918E+04	-0.787E+02
28	108.28	0.184E+00	-0.769E+01	-0.761E+03	-0.119E+05	-0.395E+02
	118.40	-0.134E+01	-0.226E+01	-0.214E+04	-0.930E+04	-0.172E+03
29	120.72	0.221E+00	-0.124E+02	-0.157E+03	-0.100E+05	-0.195E+02
	111.98	-0.126E+01	-0.363E+01	-0.218E+04	-0.947E+04	-0.848E+02
30	132.78	0.262E+00	-0.105E+02	-0.261E+03	-0.106E+05	0.179E+02
	104.87	-0.118E+01	-0.309E+01	-0.223E+04	-0.968E+04	0.779E+02
31	144.43	0.306E+00	-0.122E+02	-0.682E+03	-0.123E+05	0.516E+02
	97.10	-0.111E+01	-0.359E+01	-0.228E+04	-0.989E+04	0.224E+03
32	155.61	0.351E+00	-0.156E+02	-0.171E+04	-0.160E+05	0.696E+02
	88.69	-0.104E+01	-0.289E+01	-0.233E+04	-0.101E+05	0.302E+03
33	166.18	0.395E+00	-0.194E+02	-0.264E+04	-0.194E+05	0.380E+02
	78.98	-0.988E+00	-0.160E+01	-0.237E+04	-0.103E+05	0.165E+03
34	175.27	0.432E+00	-0.234E+02	-0.278E+04	-0.200E+05	0.976E+01
	67.89	-0.951E+00	-0.206E+01	-0.240E+04	-0.104E+05	0.424E+02
35	182.71	0.456E+00	-0.269E+02	-0.289E+04	-0.205E+05	0.324E+02
	55.62	-0.931E+00	0.909E+00	-0.241E+04	-0.105E+05	0.141E+03
36	188.35	0.462E+00	-0.243E+02	-0.367E+04	-0.230E+05	0.630E+02
	42.43	-0.923E+00	0.559E+01	-0.237E+04	-0.103E+05	0.274E+03
37	192.08	0.443E+00	-0.137E+02	-0.465E+04	-0.261E+05	0.614E+01
	28.58	-0.923E+00	0.415E+01	-0.231E+04	-0.100E+05	0.267E+02
38	193.83	0.393E+00	-0.786E+01	-0.380E+04	-0.229E+05	-0.160E+03
	14.34	-0.925E+00	0.238E+01	-0.225E+04	-0.977E+04	-0.697E+03
39	193.56	0.318E+00	-0.201E+01	-0.253E-10	-0.952E+04	-0.365E+03
	0.00	-0.919E+00	0.609E+00	-0.219E+04	-0.952E+04	-0.159E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.31191E-03	-0.31191E-03	.22591	0.00000
2	-0.77610E-03	0.13620E-03	.56211	0.00000
3	-0.89844E-03	0.24236E-03	.65072	0.00000

4	-0.80219E-03	0.12616E-03	.58100	0.00000
5	-0.72246E-03	0.34888E-04	.52326	0.00000
6	-0.71293E-03	0.36805E-04	.51636	0.00000
7	-0.69382E-03	0.40695E-04	.50252	0.00000
8	-0.56607E-03	-0.64848E-04	.40999	0.00000
9	-0.41547E-03	-0.19767E-03	.30091	0.00000
10	-0.33257E-03	-0.26676E-03	.24088	0.00000
11	-0.29573E-03	-0.29029E-03	.21419	0.00000
12	-0.34092E-03	-0.23487E-03	.24692	0.00000
13	-0.33921E-03	-0.23034E-03	.24568	0.00000
14	-0.26365E-03	-0.29947E-03	.21690	0.00000
15	-0.12702E-03	-0.42808E-03	.31005	0.00000
16	0.36033E-04	-0.58129E-03	.42101	0.00000
17	0.19114E-03	-0.72514E-03	.52520	0.00000
18	0.30662E-03	-0.82847E-03	.60004	0.00000
19	0.35753E-03	-0.86830E-03	.62889	0.00000
20	0.32154E-03	-0.83364E-03	.60379	0.00000
21	0.21092E-03	-0.73500E-03	.53234	0.00000
22	0.60813E-04	-0.59597E-03	.43165	0.00000
23	-0.10012E-03	-0.44499E-03	.32229	0.00000
24	-0.24299E-03	-0.31091E-03	.22519	0.00000
25	-0.34911E-03	-0.21276E-03	.25285	0.00000
26	-0.41045E-03	-0.15868E-03	.29728	0.00000
27	-0.41723E-03	-0.15870E-03	.30219	0.00000
28	-0.37447E-03	-0.20888E-03	.27122	0.00000
29	-0.31419E-03	-0.28006E-03	.22756	0.00000
30	-0.33197E-03	-0.27522E-03	.24043	0.00000
31	-0.38453E-03	-0.23609E-03	.27850	0.00000
32	-0.50323E-03	-0.13131E-03	.36448	0.00000
33	-0.60973E-03	-0.35372E-04	.44161	0.00000
34	-0.62864E-03	-0.24756E-04	.45531	0.00000
35	-0.64235E-03	-0.14321E-04	.46524	0.00000
36	-0.72191E-03	0.75903E-04	.52286	0.00000
37	-0.82055E-03	0.19206E-03	.59430	0.00000
38	-0.71950E-03	0.10654E-03	.52112	0.00000
39	-0.29885E-03	-0.29885E-03	.21645	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.25101	0.00000	0.06301
2	-0.25748	-0.26377	0.33007
3	-0.26399	-0.32984	0.39953
4	-0.27202	-0.26841	0.34241
5	-0.27666	-0.21897	0.29551
6	-0.27205	-0.21677	0.29078
7	-0.26280	-0.21237	0.28144
8	-0.25387	-0.14492	0.20937
9	-0.24671	-0.06297	0.12384
10	-0.24116	-0.01903	0.07719
11	-0.23580	-0.00157	0.05717
12	-0.23168	-0.03066	0.08434
13	-0.22917	-0.03148	0.08400
14	-0.22659	0.01036	0.06170
15	-0.22336	0.08704	0.13693
16	-0.21940	0.17849	0.22662
17	-0.21487	0.26492	0.31109
18	-0.20998	0.32819	0.37228
19	-0.20552	0.35442	0.39666
20	-0.20605	0.33400	0.37646
21	-0.21088	0.27349	0.31796
22	-0.21533	0.18990	0.23626
23	-0.21934	0.09971	0.14782
24	-0.22288	0.01964	0.06931
25	-0.22608	-0.03943	0.09054
26	-0.22901	-0.07279	0.12524
27	-0.23174	-0.07475	0.12845
28	-0.23473	-0.04788	0.10297
29	-0.23911	-0.00987	0.06704
30	-0.24432	-0.01641	0.07610
31	-0.24972	-0.04292	0.10528
32	-0.25532	-0.10753	0.17272
33	-0.25957	-0.16606	0.23344
34	-0.26291	-0.17460	0.24372
35	-0.26423	-0.18158	0.25140

36	-0.25994	-0.23067	0.29824
37	-0.25289	-0.29277	0.35673
38	-0.24664	-0.23883	0.29967
39	-0.24050	0.00000	0.05784

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	10956.	30800.	0.356
BUCKLING THRUST (psi)	5	10956.	53970.	0.203
SEAM THRUST (psi)	5	10956.	21589.	0.507
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.400	1.000	0.400

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.50

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.10

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *

```
*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

 MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

          USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Type 3S2-OPR (LL x 3.28)

          EXECUTION MODE ..................   ANALYS

          SOLUTION LEVEL ..................  #3 USER

          METHODOLOGY (LRFD OR SERVICE) ...     LRFD

          NUMBER OF PIPE-ELEMENT GROUPS ....       1

          MAXIMUM ITERATIONS PER STEP ......     -99


          PIPE ELEMENT TYPE ............... STEEL

          NUMBER OF BEAM ELEMENTS .........       38


          STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

                YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

                POISSONS RATIO OF METAL (-) .......    0.30000E+00

                YIELD STRESS OF METAL (PSI)........    0.44000E+05

                LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

                DENSITY OF METAL (PCI).............    0.28400E+00

                MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

           MATERIAL CHARACTER CODE, NONLIN .........    2

               NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

           LARGE DEFORMATION/BUCKLING CODE, IBUCK...    4

               IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
               AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1


          SECTION PROPERTIES OF CROSS-SECTION:

                THRUST AREA (IN**2/IN) ............   0.23020

                MOM. OF INERTIA (IN**4/IN) ........   0.87460

                SECTION MODULUS (IN**3/IN) ........   0.28840

                PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

          NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.


          LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
          AND DEFLECTION LIMIT AT SERVICE LOAD

                THRUST STRESS YIELDING ............   0.70000

                BUCKLING STRESS FAILURE............   0.70000

                SEAM STRENGTH FAILURE .............   0.67000

                FULL PLASTIC PENETRATION...........   0.90000
```

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -269.0	F = 0.000
1142	22	F = 0.000	F = -269.0	F = 0.000
1141	21	F = 0.000	F = -269.0	F = 0.000
1141	22	F = 0.000	F = -269.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000
857	1	D = 0.000	F = 0.000	D = 0.000

858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1136	21	F =	0.000	F =	-161.4	F =	0.000
1136	22	F =	0.000	F =	-161.4	F =	0.000
1152	21	F =	0.000	F =	-221.9	F =	0.000
1152	22	F =	0.000	F =	-221.9	F =	0.000
1151	21	F =	0.000	F =	-221.9	F =	0.000
1151	22	F =	0.000	F =	-221.9	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
```

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19

21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000

35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.450	Factor for load step #21
22	1.450	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.510E+00	0.370E+01	-0.383E-10	-0.135E+05	0.644E+03
	0.00	-0.109E+01	0.102E+01	-0.311E+04	-0.135E+05	0.280E+04
2	-193.83	-0.665E+00	-0.661E+01	-0.689E+04	-0.377E+05	0.290E+03
	14.34	-0.110E+01	-0.208E+01	-0.318E+04	-0.138E+05	0.126E+04
3	-192.08	-0.776E+00	-0.169E+02	-0.867E+04	-0.440E+05	0.482E+01
	28.58	-0.109E+01	-0.518E+01	-0.325E+04	-0.141E+05	0.210E+02
4	-188.35	-0.827E+00	-0.340E+02	-0.729E+04	-0.398E+05	-0.955E+02
	42.43	-0.109E+01	-0.103E+02	-0.335E+04	-0.146E+05	-0.415E+03
5	-182.71	-0.826E+00	-0.401E+02	-0.607E+04	-0.360E+05	-0.434E+02
	55.62	-0.109E+01	-0.530E+01	-0.345E+04	-0.150E+05	-0.188E+03
6	-175.27	-0.787E+00	-0.361E+02	-0.608E+04	-0.359E+05	0.200E+02
	67.89	-0.112E+01	0.108E+02	-0.341E+04	-0.148E+05	0.868E+02
7	-166.18	-0.718E+00	-0.261E+02	-0.657E+04	-0.370E+05	-0.528E+01
	78.98	-0.119E+01	0.779E+01	-0.328E+04	-0.142E+05	-0.229E+02
8	-155.61	-0.627E+00	-0.189E+02	-0.574E+04	-0.337E+05	-0.715E+02
	88.69	-0.130E+01	0.610E+01	-0.317E+04	-0.138E+05	-0.311E+03
9	-144.43	-0.525E+00	-0.147E+02	-0.426E+04	-0.282E+05	-0.775E+02
	97.10	-0.145E+01	0.432E+01	-0.309E+04	-0.134E+05	-0.336E+03

10	-132.78	-0.415E+00	-0.130E+02	-0.318E+04	-0.242E+05	-0.546E+02
	104.87	-0.163E+01	0.379E+01	-0.303E+04	-0.132E+05	-0.237E+03
11	-120.72	-0.304E+00	-0.216E+02	-0.223E+04	-0.206E+05	0.202E+02
	111.98	-0.183E+01	0.625E+01	-0.296E+04	-0.129E+05	0.880E+02
12	-108.28	-0.196E+00	-0.397E+01	-0.316E+04	-0.236E+05	0.351E+02
	118.40	-0.205E+01	0.116E+01	-0.291E+04	-0.126E+05	0.152E+03
13	-95.50	-0.935E-01	-0.636E+00	-0.255E+04	-0.214E+05	-0.946E+02
	124.11	-0.230E+01	0.194E+00	-0.290E+04	-0.126E+05	-0.411E+03
14	-82.42	0.453E-03	-0.595E+01	0.236E+03	-0.133E+05	-0.210E+03
	129.10	-0.257E+01	0.168E+01	-0.288E+04	-0.125E+05	-0.911E+03
15	-69.09	0.783E-01	-0.103E+02	0.411E+04	-0.266E+05	-0.255E+03
	133.35	-0.285E+01	0.288E+01	-0.283E+04	-0.123E+05	-0.111E+04
16	-55.53	0.134E+00	-0.138E+02	0.814E+04	-0.403E+05	-0.243E+03
	136.84	-0.309E+01	0.386E+01	-0.277E+04	-0.120E+05	-0.106E+04
17	-41.80	0.166E+00	-0.160E+02	0.116E+05	-0.440E+05	-0.187E+03
	139.57	-0.329E+01	0.451E+01	-0.270E+04	-0.117E+05	-0.814E+03
18	-27.94	0.176E+00	-0.187E+02	0.138E+05	-0.440E+05	-0.932E+02
	141.53	-0.340E+01	0.535E+01	-0.262E+04	-0.114E+05	-0.405E+03
19	-13.99	0.172E+00	-0.197E+02	0.143E+05	-0.440E+05	0.308E+02
	142.70	-0.341E+01	0.466E+00	-0.258E+04	-0.112E+05	0.134E+03
20	0.00	0.164E+00	-0.193E+02	0.128E+05	-0.440E+05	0.159E+03
	143.09	-0.331E+01	-0.549E+01	-0.262E+04	-0.114E+05	0.691E+03
21	13.99	0.163E+00	-0.146E+02	0.936E+04	-0.440E+05	0.248E+03
	142.70	-0.311E+01	-0.409E+01	-0.270E+04	-0.117E+05	0.108E+04
22	27.94	0.177E+00	-0.116E+02	0.509E+04	-0.297E+05	0.280E+03
	141.53	-0.285E+01	-0.325E+01	-0.277E+04	-0.120E+05	0.122E+04
23	41.80	0.210E+00	-0.796E+01	0.660E+03	-0.145E+05	0.261E+03
	139.57	-0.256E+01	-0.225E+01	-0.282E+04	-0.122E+05	0.113E+04
24	55.53	0.260E+00	-0.560E+01	-0.313E+04	-0.233E+05	0.198E+03
	136.84	-0.226E+01	-0.162E+01	-0.286E+04	-0.124E+05	0.858E+03
25	69.09	0.322E+00	-0.548E+01	-0.573E+04	-0.324E+05	0.115E+03
	133.35	-0.199E+01	-0.163E+01	-0.289E+04	-0.126E+05	0.499E+03
26	82.42	0.389E+00	-0.305E+01	-0.707E+04	-0.372E+05	0.127E+02
	129.10	-0.175E+01	-0.943E+00	-0.291E+04	-0.127E+05	0.551E+02
27	95.50	0.452E+00	-0.278E+01	-0.664E+04	-0.357E+05	-0.109E+03
	124.11	-0.157E+01	-0.871E+00	-0.292E+04	-0.127E+05	-0.475E+03
28	108.28	0.507E+00	-0.125E+02	-0.438E+04	-0.280E+05	-0.166E+03
	118.40	-0.143E+01	-0.369E+01	-0.295E+04	-0.128E+05	-0.722E+03
29	120.72	0.556E+00	-0.230E+02	-0.221E+04	-0.208E+05	-0.839E+02
	111.98	-0.132E+01	-0.677E+01	-0.302E+04	-0.131E+05	-0.365E+03
30	132.78	0.602E+00	-0.131E+02	-0.215E+04	-0.209E+05	-0.156E+01

	104.87	-0.123E+01	-0.386E+01	-0.309E+04	-0.134E+05	-0.677E+01
31	144.43	0.645E+00	-0.162E+02	-0.221E+04	-0.213E+05	0.292E+02
	97.10	-0.116E+01	-0.479E+01	-0.315E+04	-0.137E+05	0.127E+03
32	155.61	0.682E+00	-0.217E+02	-0.295E+04	-0.241E+05	0.514E+02
	88.69	-0.110E+01	-0.131E+01	-0.320E+04	-0.139E+05	0.223E+03
33	166.18	0.711E+00	-0.271E+02	-0.359E+04	-0.263E+05	0.185E+02
	78.98	-0.105E+01	0.385E+01	-0.318E+04	-0.138E+05	0.806E+02
34	175.27	0.725E+00	-0.314E+02	-0.337E+04	-0.252E+05	-0.578E+01
	67.89	-0.103E+01	0.479E+01	-0.312E+04	-0.136E+05	-0.251E+02
35	182.71	0.722E+00	-0.343E+02	-0.328E+04	-0.245E+05	0.325E+02
	55.62	-0.103E+01	0.962E+01	-0.302E+04	-0.131E+05	0.141E+03
36	188.35	0.695E+00	-0.303E+02	-0.413E+04	-0.269E+05	0.793E+02
	42.43	-0.103E+01	0.913E+01	-0.289E+04	-0.126E+05	0.344E+03
37	192.08	0.639E+00	-0.176E+02	-0.538E+04	-0.308E+05	0.221E+02
	28.58	-0.104E+01	0.533E+01	-0.280E+04	-0.122E+05	0.960E+02
38	193.83	0.545E+00	-0.859E+01	-0.457E+04	-0.277E+05	-0.180E+03
	14.34	-0.105E+01	0.261E+01	-0.273E+04	-0.119E+05	-0.782E+03
39	193.56	0.421E+00	0.450E+00	-0.708E-10	-0.116E+05	-0.443E+03
	0.00	-0.104E+01	-0.105E+00	-0.267E+04	-0.116E+05	-0.192E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.42346E-03	-0.42346E-03	.30670	0.00000
2	-0.11830E-02	0.31702E-03	.85681	0.00000
3	-0.13860E-02	0.50038E-03	1.0039	0.00283
4	-0.12502E-02	0.33627E-03	.90547	0.00000
5	-0.11311E-02	0.18959E-03	.81923	0.00000
6	-0.11261E-02	0.19604E-03	.81558	0.00000
7	-0.11615E-02	0.26781E-03	.84121	0.00000
8	-0.10576E-02	0.19226E-03	.76601	0.00000
9	-0.88531E-03	0.41663E-04	.64121	0.00000
10	-0.75940E-03	-0.67618E-04	.55002	0.00000
11	-0.64685E-03	-0.16061E-03	.46850	0.00000
12	-0.74117E-03	-0.52465E-04	.53681	0.00000
13	-0.67291E-03	-0.11759E-03	.48737	0.00000
14	-0.36657E-03	-0.41794E-03	.30270	0.00000
15	0.61515E-04	-0.83368E-03	.60381	0.00000
16	0.50833E-03	-0.12638E-02	.91531	0.00000
17	0.91278E-03	-0.16844E-02	1.2200	0.11695
18	0.12397E-02	-0.21159E-02	1.5325	0.21910
19	0.13179E-02	-0.22209E-02	1.6085	0.23743
20	0.10856E-02	-0.18861E-02	1.3661	0.17008
21	0.65012E-03	-0.13861E-02	1.0039	0.00265
22	0.17693E-03	-0.93095E-03	.67427	0.00000
23	-0.31249E-03	-0.45621E-03	.33042	0.00000
24	-0.72988E-03	-0.49776E-04	.52863	0.00000
25	-0.10174E-02	0.22904E-03	.73685	0.00000
26	-0.11665E-02	0.37220E-03	.84486	0.00000
27	-0.11208E-02	0.32365E-03	.81174	0.00000
28	-0.87864E-03	0.74831E-04	.63638	0.00000
29	-0.65114E-03	-0.17083E-03	.47161	0.00000
30	-0.65500E-03	-0.18675E-03	.47440	0.00000
31	-0.66972E-03	-0.18889E-03	.48506	0.00000
32	-0.75684E-03	-0.11449E-03	.54816	0.00000
33	-0.82449E-03	-0.43009E-04	.59716	0.00000
34	-0.79164E-03	-0.59370E-04	.57336	0.00000
35	-0.76833E-03	-0.55153E-04	.55648	0.00000

36	-0.84415E-03	0.55048E-04	.61140	0.00000
37	-0.96633E-03	0.20337E-03	.69989	0.00000
38	-0.87002E-03	0.12542E-03	.63013	0.00000
39	-0.36384E-03	-0.36384E-03	.26352	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.34078	0.00000	0.11613
2	-0.34845	-0.43370	0.55511
3	-0.35635	-0.54540	0.67239
4	-0.36773	-0.45869	0.59392
5	-0.37884	-0.38185	0.52537
6	-0.37422	-0.38226	0.52230
7	-0.35958	-0.41324	0.54254
8	-0.34820	-0.36138	0.48262
9	-0.33946	-0.26801	0.38325
10	-0.33277	-0.20002	0.31075
11	-0.32490	-0.14058	0.24615
12	-0.31934	-0.19912	0.30110
13	-0.31808	-0.16056	0.26173
14	-0.31567	0.01485	0.11450
15	-0.31070	0.25883	0.35536
16	-0.30397	0.51237	0.60476
17	-0.29620	0.72680	0.81454
18	-0.28775	0.86898	0.95178
19	-0.28309	0.89949	0.97963
20	-0.28752	0.80318	0.88585
21	-0.29613	0.58872	0.67641
22	-0.30340	0.32032	0.41237
23	-0.30931	0.04155	0.13722
24	-0.31371	-0.19664	0.29506
25	-0.31720	-0.36037	0.46099
26	-0.31960	-0.44488	0.54703
27	-0.32074	-0.41762	0.52050
28	-0.32343	-0.27568	0.38029
29	-0.33074	-0.13887	0.24826
30	-0.33870	-0.13539	0.25010
31	-0.34549	-0.13902	0.25838
32	-0.35060	-0.18572	0.30864
33	-0.34906	-0.22595	0.34779
34	-0.34242	-0.21172	0.32897
35	-0.33135	-0.20620	0.31599
36	-0.31752	-0.25999	0.36080
37	-0.30700	-0.33820	0.43244
38	-0.29961	-0.28781	0.37758
39	-0.29280	0.00000	0.08573

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

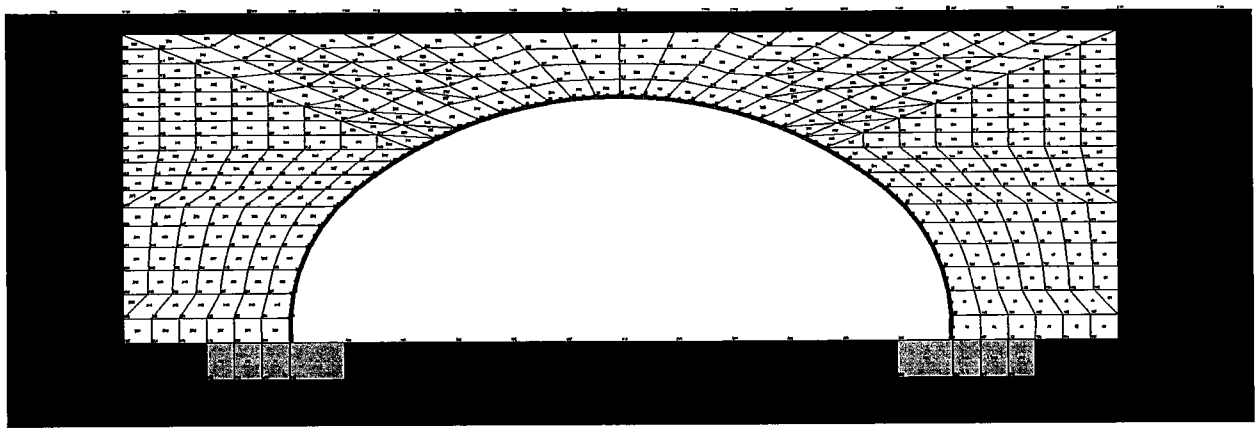
DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	15002.	30800.	0.487
BUCKLING THRUST (psi)	5	15002.	52285.	0.287
SEAM THRUST (psi)	5	15002.	21589.	0.695
PLASTIC-PENETRATE (%)	19	23.74	90.00	0.264
COMBINED T&M Ratio	19	0.980	1.000	0.980

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.12

RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.22
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *



TYPE 3-3

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MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Type 3-3

        EXECUTION MODE ..................   ANALYS

        SOLUTION LEVEL ..................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1141	21	F = 0.000	F = -82.00	F = 0.000
1141	22	F = 0.000	F = -82.00	F = 0.000
1142	21	F = 0.000	F = -82.00	F = 0.000
1142	22	F = 0.000	F = -82.00	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000

836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1135	21	F =	0.000	F =	-49.20	F =	0.000
1135	22	F =	0.000	F =	-49.20	F =	0.000
1148	21	F =	0.000	F =	-67.70	F =	0.000
1148	22	F =	0.000	F =	-67.70	F =	0.000
1153	21	F =	0.000	F =	-67.70	F =	0.000
1153	22	F =	0.000	F =	-67.70	F =	0.000

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 * * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060
```

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000

3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.349E+00	-0.199E+01	0.226E-10	-0.987E+04	0.395E+03
	0.00	-0.918E+00	-0.612E+00	-0.227E+04	-0.987E+04	0.172E+04

2	-193.83	-0.428E+00	-0.782E+01	-0.415E+04	-0.245E+05	0.178E+03
	14.34	-0.925E+00	-0.238E+01	-0.233E+04	-0.101E+05	0.774E+03
3	-192.08	-0.482E+00	-0.136E+02	-0.518E+04	-0.283E+05	-0.763E+00
	28.58	-0.923E+00	-0.414E+01	-0.239E+04	-0.104E+05	-0.331E+01
4	-188.35	-0.500E+00	-0.250E+02	-0.418E+04	-0.252E+05	-0.651E+02
	42.43	-0.923E+00	-0.705E+01	-0.246E+04	-0.107E+05	-0.283E+03
5	-182.71	-0.489E+00	-0.283E+02	-0.335E+04	-0.225E+05	-0.325E+02
	55.62	-0.933E+00	-0.785E+00	-0.251E+04	-0.109E+05	-0.141E+03
6	-175.27	-0.458E+00	-0.246E+02	-0.327E+04	-0.221E+05	-0.490E+01
	67.89	-0.957E+00	0.411E+01	-0.248E+04	-0.108E+05	-0.213E+02
7	-166.18	-0.412E+00	-0.192E+02	-0.321E+04	-0.216E+05	-0.355E+02
	78.98	-0.100E+01	0.575E+01	-0.241E+04	-0.105E+05	-0.154E+03
8	-155.61	-0.357E+00	-0.149E+02	-0.224E+04	-0.179E+05	-0.758E+02
	88.69	-0.107E+01	0.482E+01	-0.233E+04	-0.101E+05	-0.329E+03
9	-144.43	-0.301E+00	-0.121E+02	-0.103E+04	-0.134E+05	-0.626E+02
	97.10	-0.115E+01	0.355E+01	-0.226E+04	-0.983E+04	-0.272E+03
10	-132.78	-0.245E+00	-0.108E+02	-0.422E+03	-0.111E+05	-0.268E+02
	104.87	-0.124E+01	0.317E+01	-0.221E+04	-0.961E+04	-0.117E+03
11	-120.72	-0.193E+00	-0.126E+02	-0.197E+03	-0.101E+05	0.155E+02
	111.98	-0.134E+01	0.370E+01	-0.216E+04	-0.940E+04	0.673E+02
12	-108.28	-0.145E+00	-0.612E+01	-0.746E+03	-0.118E+05	0.272E+02
	118.40	-0.144E+01	0.179E+01	-0.213E+04	-0.924E+04	0.118E+03
13	-95.50	-0.101E+00	-0.471E+01	-0.821E+03	-0.120E+05	-0.147E+02
	124.11	-0.155E+01	0.138E+01	-0.210E+04	-0.914E+04	-0.637E+02
14	-82.42	-0.609E-01	-0.522E+01	-0.169E+03	-0.963E+04	-0.616E+02
	129.10	-0.167E+01	0.153E+01	-0.208E+04	-0.904E+04	-0.268E+03
15	-69.09	-0.277E-01	-0.688E+01	0.109E+04	-0.127E+05	-0.919E+02
	133.35	-0.179E+01	0.200E+01	-0.205E+04	-0.891E+04	-0.399E+03
16	-55.53	-0.308E-02	-0.833E+01	0.260E+04	-0.178E+05	-0.985E+02
	136.84	-0.190E+01	0.241E+01	-0.202E+04	-0.876E+04	-0.428E+03
17	-41.80	0.118E-01	-0.964E+01	0.403E+04	-0.225E+05	-0.837E+02
	139.57	-0.200E+01	0.280E+01	-0.197E+04	-0.857E+04	-0.364E+03
18	-27.94	0.177E-01	-0.105E+02	0.508E+04	-0.260E+05	-0.511E+02
	141.53	-0.207E+01	0.307E+01	-0.193E+04	-0.838E+04	-0.222E+03
19	-13.99	0.169E-01	-0.112E+02	0.554E+04	-0.274E+05	-0.516E+01
	142.70	-0.210E+01	0.314E+01	-0.188E+04	-0.818E+04	-0.224E+02
20	0.00	0.133E-01	-0.105E+02	0.524E+04	-0.264E+05	0.416E+02
	143.09	-0.210E+01	-0.306E+01	-0.188E+04	-0.818E+04	0.181E+03
21	13.99	0.107E-01	-0.931E+01	0.433E+04	-0.234E+05	0.740E+02
	142.70	-0.206E+01	-0.270E+01	-0.193E+04	-0.837E+04	0.321E+03
22	27.94	0.127E-01	-0.818E+01	0.306E+04	-0.192E+05	0.881E+02

	141.53	-0.199E+01	-0.239E+01	-0.197E+04	-0.855E+04	0.383E+03
23	41.80	0.214E-01	-0.705E+01	0.171E+04	-0.146E+05	0.844E+02
	139.57	-0.190E+01	-0.206E+01	-0.200E+04	-0.871E+04	0.367E+03
24	55.53	0.374E-01	-0.637E+01	0.521E+03	-0.106E+05	0.659E+02
	136.84	-0.180E+01	-0.186E+01	-0.204E+04	-0.884E+04	0.286E+03
25	69.09	0.600E-01	-0.615E+01	-0.324E+03	-0.101E+05	0.396E+02
	133.35	-0.169E+01	-0.180E+01	-0.206E+04	-0.897E+04	0.172E+03
26	82.42	0.879E-01	-0.598E+01	-0.756E+03	-0.117E+05	0.881E+01
	129.10	-0.159E+01	-0.175E+01	-0.209E+04	-0.908E+04	0.383E+02
27	95.50	0.120E+00	-0.642E+01	-0.713E+03	-0.117E+05	-0.215E+02
	124.11	-0.149E+01	-0.188E+01	-0.212E+04	-0.919E+04	-0.934E+02
28	108.28	0.155E+00	-0.814E+01	-0.266E+03	-0.102E+05	-0.382E+02
	118.40	-0.140E+01	-0.238E+01	-0.215E+04	-0.932E+04	-0.166E+03
29	120.72	0.195E+00	-0.123E+02	0.272E+03	-0.104E+05	-0.154E+02
	111.98	-0.132E+01	-0.362E+01	-0.219E+04	-0.950E+04	-0.671E+02
30	132.78	0.239E+00	-0.111E+02	0.105E+03	-0.101E+05	0.258E+02
	104.87	-0.123E+01	-0.326E+01	-0.223E+04	-0.971E+04	0.112E+03
31	144.43	0.289E+00	-0.124E+02	-0.493E+03	-0.116E+05	0.648E+02
	97.10	-0.115E+01	-0.366E+01	-0.229E+04	-0.993E+04	0.281E+03
32	155.61	0.340E+00	-0.155E+02	-0.174E+04	-0.162E+05	0.822E+02
	88.69	-0.107E+01	-0.473E+01	-0.235E+04	-0.102E+05	0.357E+03
33	166.18	0.392E+00	-0.196E+02	-0.283E+04	-0.203E+05	0.463E+02
	78.98	-0.101E+01	-0.349E+01	-0.242E+04	-0.105E+05	0.201E+03
34	175.27	0.436E+00	-0.240E+02	-0.307E+04	-0.214E+05	0.148E+02
	67.89	-0.968E+00	-0.352E+01	-0.247E+04	-0.107E+05	0.642E+02
35	182.71	0.467E+00	-0.277E+02	-0.324E+04	-0.221E+05	0.358E+02
	55.62	-0.943E+00	0.227E+00	-0.250E+04	-0.109E+05	0.155E+03
36	188.35	0.478E+00	-0.250E+02	-0.407E+04	-0.248E+05	0.645E+02
	42.43	-0.933E+00	0.590E+01	-0.247E+04	-0.107E+05	0.280E+03
37	192.08	0.461E+00	-0.141E+02	-0.506E+04	-0.280E+05	0.220E+01
	28.58	-0.933E+00	0.426E+01	-0.240E+04	-0.104E+05	0.954E+01
38	193.83	0.410E+00	-0.793E+01	-0.409E+04	-0.243E+05	-0.174E+03
	14.34	-0.934E+00	0.241E+01	-0.234E+04	-0.102E+05	-0.758E+03
39	193.56	0.333E+00	-0.181E+01	-0.476E-10	-0.991E+04	-0.391E+03
	0.00	-0.928E+00	0.556E+00	-0.228E+04	-0.991E+04	-0.170E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.30969E-03	-0.30969E-03	.22430	0.00000
2	-0.76899E-03	0.13367E-03	.55696	0.00000
3	-0.88919E-03	0.23793E-03	.64402	0.00000

4	-0.79044E-03	0.11876E-03	.57250	0.00000
5	-0.70671E-03	0.21786E-04	.51185	0.00000
6	-0.69423E-03	0.16769E-04	.50282	0.00000
7	-0.67831E-03	0.21146E-04	.49129	0.00000
8	-0.56067E-03	-0.74056E-04	.40608	0.00000
9	-0.42090E-03	-0.19608E-03	.30485	0.00000
10	-0.34757E-03	-0.25575E-03	.25174	0.00000
11	-0.31641E-03	-0.27359E-03	.22917	0.00000
12	-0.37099E-03	-0.20874E-03	.26870	0.00000
13	-0.37620E-03	-0.19746E-03	.27248	0.00000
14	-0.30212E-03	-0.26531E-03	.21882	0.00000
15	-0.16091E-03	-0.39853E-03	.28865	0.00000
16	0.80249E-05	-0.55753E-03	.40380	0.00000
17	0.16925E-03	-0.70736E-03	.51233	0.00000
18	0.28994E-03	-0.81579E-03	.59085	0.00000
19	0.34610E-03	-0.85965E-03	.62262	0.00000
20	0.31358E-03	-0.82723E-03	.59914	0.00000
21	0.20806E-03	-0.73359E-03	.53132	0.00000
22	0.64895E-04	-0.60139E-03	.43557	0.00000
23	-0.87613E-04	-0.45872E-03	.33224	0.00000
24	-0.22085E-03	-0.33417E-03	.24203	0.00000
25	-0.31668E-03	-0.24619E-03	.22936	0.00000
26	-0.36731E-03	-0.20278E-03	.26603	0.00000
27	-0.36613E-03	-0.21088E-03	.26518	0.00000
28	-0.32133E-03	-0.26347E-03	.23273	0.00000
29	-0.26835E-03	-0.32761E-03	.23728	0.00000
30	-0.29319E-03	-0.31610E-03	.22894	0.00000
31	-0.36526E-03	-0.25806E-03	.26455	0.00000
32	-0.50953E-03	-0.13165E-03	.36904	0.00000
33	-0.63793E-03	-0.21391E-04	.46204	0.00000
34	-0.67081E-03	-0.36122E-05	.48585	0.00000
35	-0.69408E-03	0.12015E-04	.50271	0.00000
36	-0.77887E-03	0.10664E-03	.56411	0.00000
37	-0.87760E-03	0.22378E-03	.63563	0.00000
38	-0.76343E-03	0.12575E-03	.55293	0.00000
39	-0.31089E-03	-0.31089E-03	.22517	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.24922	0.00000	0.06211
2	-0.25563	-0.26099	0.32634
3	-0.26205	-0.32589	0.39456
4	-0.27027	-0.26288	0.33592
5	-0.27560	-0.21063	0.28658
6	-0.27260	-0.20557	0.27988
7	-0.26443	-0.20223	0.27216
8	-0.25540	-0.14069	0.20592
9	-0.24826	-0.06500	0.12664
10	-0.24276	-0.02655	0.08548
11	-0.23740	-0.01238	0.06874
12	-0.23327	-0.04691	0.10132
13	-0.23083	-0.05168	0.10496
14	-0.22832	-0.01064	0.06277
15	-0.22511	0.06871	0.11938
16	-0.22111	0.16352	0.21241
17	-0.21652	0.25346	0.30034
18	-0.21159	0.31970	0.36447
19	-0.20664	0.34862	0.39132
20	-0.20668	0.32984	0.37256
21	-0.21146	0.27226	0.31697
22	-0.21587	0.19264	0.23924
23	-0.21983	0.10730	0.15563
24	-0.22332	0.03276	0.08264
25	-0.22648	-0.02038	0.07167
26	-0.22939	-0.04757	0.10019
27	-0.23218	-0.04489	0.09879
28	-0.23531	-0.01673	0.07210
29	-0.23980	0.01713	0.07464
30	-0.24516	0.00662	0.06673
31	-0.25081	-0.03100	0.09390
32	-0.25800	-0.10925	0.17582
33	-0.26529	-0.17826	0.24864
34	-0.27137	-0.19291	0.26655
35	-0.27445	-0.20415	0.27947

36	-0.27049	-0.25603	0.32919
37	-0.26308	-0.31844	0.38766
38	-0.25659	-0.25709	0.32293
39	-0.25019	0.00000	0.06259

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	10914.	30800.	0.354
BUCKLING THRUST (psi)	5	10914.	53924.	0.202
SEAM THRUST (psi)	5	10914.	21589.	0.506
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.395	1.000	0.395

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.50

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.10

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM # 1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Type 3-3 (LL x 2.96)

EXECUTION MODE ..... ANALYS

SOLUTION LEVEL ..... #3 USER

METHODOLOGY (LRFD OR SERVICE) ... LRFD

NUMBER OF PIPE-ELEMENT GROUPS 1

MAXIMUM ITERATIONS PER STEP ..... -99

PIPE ELEMENT TYPE ..... STEEL

NUMBER OF BEAM ELEMENTS 38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

YOUNGS MODULUS OF METAL (PSI)..... 0.29000E+08

POISSONS RATIO OF METAL (-) ..... 0.30000E+00

YIELD STRESS OF METAL (PSI)..... 0.44000E+05

LONGITUDINAL SEAM STRENGTH (PSI)... 0.32223E+05

DENSITY OF METAL (PCI)..... 0.28400E+00

MODULUS OF UPPER BI-SLOPE (PSI).... 0.00000E+00

MATERIAL CHARACTER CODE, NONLIN 2

NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1141	21	F = 0.000	F = -243.0	F = 0.000
1141	22	F = 0.000	F = -243.0	F = 0.000
1142	21	F = 0.000	F = -243.0	F = 0.000
1142	22	F = 0.000	F = -243.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000
857	1	D = 0.000	F = 0.000	D = 0.000
858	1	D = 0.000	F = 0.000	D = 0.000
859	1	D = 0.000	F = 0.000	D = 0.000

860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1135	21	F =	0.000	F =	-145.8	F =	0.000
1135	22	F =	0.000	F =	-145.8	F =	0.000
1148	21	F =	0.000	F =	-200.5	F =	0.000
1148	22	F =	0.000	F =	-200.5	F =	0.000
1153	21	F =	0.000	F =	-200.5	F =	0.000
1153	22	F =	0.000	F =	-200.5	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
```

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21

23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000

37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.450	Factor for load step #21
22	1.450	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.486E+00	0.261E+01	0.190E-10	-0.126E+05	0.582E+03
	0.00	-0.104E+01	0.700E+00	-0.290E+04	-0.126E+05	0.253E+04
2	-193.83	-0.634E+00	-0.669E+01	-0.621E+04	-0.344E+05	0.259E+03
	14.34	-0.105E+01	-0.209E+01	-0.297E+04	-0.129E+05	0.113E+04
3	-192.08	-0.741E+00	-0.160E+02	-0.774E+04	-0.400E+05	-0.201E+01
	28.58	-0.105E+01	-0.487E+01	-0.303E+04	-0.132E+05	-0.872E+01
4	-188.35	-0.795E+00	-0.312E+02	-0.639E+04	-0.357E+05	-0.980E+02
	42.43	-0.104E+01	-0.942E+01	-0.313E+04	-0.136E+05	-0.426E+03
5	-182.71	-0.804E+00	-0.374E+02	-0.509E+04	-0.318E+05	-0.554E+02
	55.62	-0.104E+01	-0.981E+01	-0.326E+04	-0.141E+05	-0.241E+03
6	-175.27	-0.779E+00	-0.350E+02	-0.488E+04	-0.313E+05	0.215E+01
	67.89	-0.106E+01	0.270E+01	-0.330E+04	-0.143E+05	0.934E+01
7	-166.18	-0.730E+00	-0.275E+02	-0.516E+04	-0.319E+05	-0.917E+01
	78.98	-0.111E+01	0.823E+01	-0.322E+04	-0.140E+05	-0.398E+02
8	-155.61	-0.663E+00	-0.197E+02	-0.455E+04	-0.293E+05	-0.520E+02
	88.69	-0.120E+01	0.637E+01	-0.311E+04	-0.135E+05	-0.226E+03
9	-144.43	-0.587E+00	-0.149E+02	-0.355E+04	-0.255E+05	-0.453E+02
	97.10	-0.131E+01	0.441E+01	-0.303E+04	-0.132E+05	-0.197E+03
10	-132.78	-0.503E+00	-0.125E+02	-0.306E+04	-0.235E+05	-0.211E+02

	104.87	-0.145E+01	0.366E+01	-0.298E+04	-0.129E+05	-0.915E+02
11	-120.72	-0.416E+00	-0.230E+02	-0.265E+04	-0.218E+05	0.632E+02
	111.98	-0.161E+01	0.670E+01	-0.290E+04	-0.126E+05	0.275E+03
12	-108.28	-0.329E+00	-0.655E+01	-0.443E+04	-0.277E+05	0.110E+03
	118.40	-0.179E+01	0.192E+01	-0.285E+04	-0.124E+05	0.476E+03
13	-95.50	-0.240E+00	0.121E+01	-0.521E+04	-0.304E+05	-0.114E+02
	124.11	-0.201E+01	0.362E+00	-0.283E+04	-0.123E+05	-0.494E+02
14	-82.42	-0.152E+00	-0.561E+00	-0.347E+04	-0.243E+05	-0.174E+03
	129.10	-0.226E+01	0.175E+00	-0.282E+04	-0.123E+05	-0.755E+03
15	-69.09	-0.727E-01	-0.677E+01	0.419E+03	-0.136E+05	-0.279E+03
	133.35	-0.254E+01	0.191E+01	-0.280E+04	-0.122E+05	-0.121E+04
16	-55.53	-0.934E-02	-0.120E+02	0.517E+04	-0.298E+05	-0.302E+03
	136.84	-0.282E+01	0.335E+01	-0.274E+04	-0.119E+05	-0.131E+04
17	-41.80	0.320E-01	-0.157E+02	0.966E+04	-0.440E+05	-0.260E+03
	139.57	-0.306E+01	0.442E+01	-0.267E+04	-0.116E+05	-0.113E+04
18	-27.94	0.512E-01	-0.189E+02	0.131E+05	-0.440E+05	-0.164E+03
	141.53	-0.324E+01	0.537E+01	-0.259E+04	-0.113E+05	-0.714E+03
19	-13.99	0.531E-01	-0.219E+02	0.146E+05	-0.440E+05	-0.216E+02
	142.70	-0.333E+01	0.387E+01	-0.252E+04	-0.110E+05	-0.940E+02
20	0.00	0.474E-01	-0.203E+02	0.137E+05	-0.440E+05	0.133E+03
	143.09	-0.330E+01	-0.584E+01	-0.254E+04	-0.110E+05	0.576E+03
21	13.99	0.454E-01	-0.152E+02	0.107E+05	-0.440E+05	0.237E+03
	142.70	-0.317E+01	-0.427E+01	-0.262E+04	-0.114E+05	0.103E+04
22	27.94	0.562E-01	-0.116E+02	0.656E+04	-0.344E+05	0.277E+03
	141.53	-0.296E+01	-0.327E+01	-0.269E+04	-0.117E+05	0.120E+04
23	41.80	0.841E-01	-0.744E+01	0.220E+04	-0.195E+05	0.260E+03
	139.57	-0.271E+01	-0.209E+01	-0.274E+04	-0.119E+05	0.113E+04
24	55.53	0.129E+00	-0.510E+01	-0.148E+04	-0.172E+05	0.193E+03
	136.84	-0.245E+01	-0.146E+01	-0.278E+04	-0.121E+05	0.840E+03
25	69.09	0.186E+00	-0.514E+01	-0.397E+04	-0.260E+05	0.109E+03
	133.35	-0.219E+01	-0.151E+01	-0.281E+04	-0.122E+05	0.475E+03
26	82.42	0.250E+00	-0.390E+01	-0.523E+04	-0.304E+05	0.155E+02
	129.10	-0.197E+01	-0.117E+01	-0.283E+04	-0.123E+05	0.672E+02
27	95.50	0.314E+00	-0.378E+01	-0.495E+04	-0.295E+05	-0.890E+02
	124.11	-0.178E+01	-0.114E+01	-0.285E+04	-0.124E+05	-0.387E+03
28	108.28	0.376E+00	-0.119E+02	-0.314E+04	-0.234E+05	-0.139E+03
	118.40	-0.163E+01	-0.349E+01	-0.287E+04	-0.125E+05	-0.603E+03
29	120.72	0.436E+00	-0.214E+02	-0.136E+04	-0.175E+05	-0.676E+02
	111.98	-0.150E+01	-0.627E+01	-0.293E+04	-0.127E+05	-0.294E+03
30	132.78	0.497E+00	-0.140E+02	-0.146E+04	-0.181E+05	0.149E+02
	104.87	-0.138E+01	-0.411E+01	-0.301E+04	-0.131E+05	0.647E+02

31	144.43	0.559E+00	-0.159E+02	-0.193E+04	-0.200E+05	0.546E+02
	97.10	-0.128E+01	-0.468E+01	-0.307E+04	-0.133E+05	0.237E+03
32	155.61	0.618E+00	-0.207E+02	-0.309E+04	-0.244E+05	0.715E+02
	88.69	-0.119E+01	-0.667E+01	-0.316E+04	-0.137E+05	0.311E+03
33	166.18	0.671E+00	-0.277E+02	-0.401E+04	-0.279E+05	0.339E+02
	78.98	-0.112E+01	-0.358E+01	-0.324E+04	-0.141E+05	0.147E+03
34	175.27	0.712E+00	-0.335E+02	-0.407E+04	-0.283E+05	0.151E+02
	67.89	-0.108E+01	-0.132E+00	-0.327E+04	-0.142E+05	0.654E+02
35	182.71	0.732E+00	-0.360E+02	-0.440E+04	-0.292E+05	0.565E+02
	55.62	-0.106E+01	0.756E+01	-0.322E+04	-0.140E+05	0.246E+03
36	188.35	0.725E+00	-0.313E+02	-0.560E+04	-0.329E+05	0.938E+02
	42.43	-0.106E+01	0.947E+01	-0.311E+04	-0.135E+05	0.407E+03
37	192.08	0.677E+00	-0.171E+02	-0.695E+04	-0.372E+05	0.102E+02
	28.58	-0.106E+01	0.521E+01	-0.301E+04	-0.131E+05	0.441E+02
38	193.83	0.582E+00	-0.749E+01	-0.569E+04	-0.325E+05	-0.233E+03
	14.34	-0.107E+01	0.231E+01	-0.294E+04	-0.128E+05	-0.101E+04
39	193.56	0.449E+00	0.214E+01	-0.503E-10	-0.125E+05	-0.541E+03
	0.00	-0.106E+01	-0.584E+00	-0.288E+04	-0.125E+05	-0.235E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.39553E-03	-0.39553E-03	.28647	0.00000
2	-0.10796E-02	0.27068E-03	.78196	0.00000
3	-0.12563E-02	0.42897E-03	.90989	0.00000
4	-0.11215E-02	0.26838E-03	.81230	0.00000
5	-0.99754E-03	0.10986E-03	.72249	0.00000
6	-0.98102E-03	0.80637E-04	.71053	0.00000
7	-0.10009E-02	0.12223E-03	.72490	0.00000
8	-0.92002E-03	0.70870E-04	.66635	0.00000
9	-0.79996E-03	-0.27272E-04	.57939	0.00000
10	-0.73856E-03	-0.72630E-04	.53492	0.00000
11	-0.68379E-03	-0.10782E-03	.49525	0.00000
12	-0.86996E-03	0.93602E-04	.63009	0.00000
13	-0.95291E-03	0.18027E-03	.69017	0.00000
14	-0.76259E-03	-0.75227E-05	.55233	0.00000
15	-0.33571E-03	-0.42689E-03	.30919	0.00000
16	0.18805E-03	-0.93610E-03	.67800	0.00000
17	0.68720E-03	-0.14167E-02	1.0261	0.01711
18	0.11314E-02	-0.19402E-02	1.4052	0.18215
19	0.13769E-02	-0.22904E-02	1.6588	0.24805
20	0.12339E-02	-0.20702E-02	1.4994	0.20868
21	0.81029E-03	-0.15350E-02	1.1117	0.06578
22	0.34713E-03	-0.10800E-02	.78221	0.00000
23	-0.13393E-03	-0.61331E-03	.44421	0.00000
24	-0.54031E-03	-0.21723E-03	.39133	0.00000
25	-0.81520E-03	0.49613E-04	.59043	0.00000
26	-0.95441E-03	0.18267E-03	.69125	0.00000
27	-0.92690E-03	0.15124E-03	.67133	0.00000
28	-0.73298E-03	-0.49878E-04	.53088	0.00000
29	-0.54789E-03	-0.25213E-03	.39682	0.00000
30	-0.56846E-03	-0.25109E-03	.41172	0.00000
31	-0.62863E-03	-0.20836E-03	.45530	0.00000
32	-0.76643E-03	-0.93893E-04	.55511	0.00000
33	-0.87694E-03	-0.50665E-05	.63515	0.00000
34	-0.88766E-03	-0.27633E-05	.64291	0.00000
35	-0.91707E-03	0.39613E-04	.66421	0.00000
36	-0.10330E-02	0.18578E-03	.74817	0.00000

37	-0.11663E-02	0.34557E-03	.84469	0.00000
38	-0.10205E-02	0.21861E-03	.73912	0.00000
39	-0.39204E-03	-0.39204E-03	.28394	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.31830	0.00000	0.10132
2	-0.32551	-0.39042	0.49637
3	-0.33289	-0.48726	0.59807
4	-0.34329	-0.40187	0.51972
5	-0.35718	-0.32018	0.44776
6	-0.36229	-0.30696	0.43821
7	-0.35354	-0.32472	0.44971
8	-0.34168	-0.28650	0.40324
9	-0.33286	-0.22341	0.33420
10	-0.32640	-0.19254	0.29908
11	-0.31852	-0.16653	0.26799
12	-0.31239	-0.27859	0.37618
13	-0.31089	-0.32764	0.42429
14	-0.30987	-0.21831	0.31434
15	-0.30685	0.02636	0.12052
16	-0.30100	0.32503	0.41563
17	-0.29328	0.60784	0.69385
18	-0.28444	0.82176	0.90266
19	-0.27676	0.92080	0.99739
20	-0.27860	0.86361	0.94123
21	-0.28750	0.67087	0.75353
22	-0.29489	0.41262	0.49958
23	-0.30067	0.13860	0.22901
24	-0.30481	-0.09341	0.18632
25	-0.30805	-0.25004	0.34494
26	-0.31053	-0.32876	0.42519
27	-0.31211	-0.31172	0.40913
28	-0.31500	-0.19751	0.29673
29	-0.32191	-0.08551	0.18914
30	-0.32977	-0.09176	0.20051
31	-0.33679	-0.12151	0.23494
32	-0.34617	-0.19445	0.31429
33	-0.35490	-0.25209	0.37804
34	-0.35829	-0.25585	0.38422
35	-0.35307	-0.27661	0.40126
36	-0.34090	-0.35238	0.46859
37	-0.33022	-0.43712	0.54616
38	-0.32266	-0.35826	0.46237
39	-0.31549	0.00000	0.09954

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

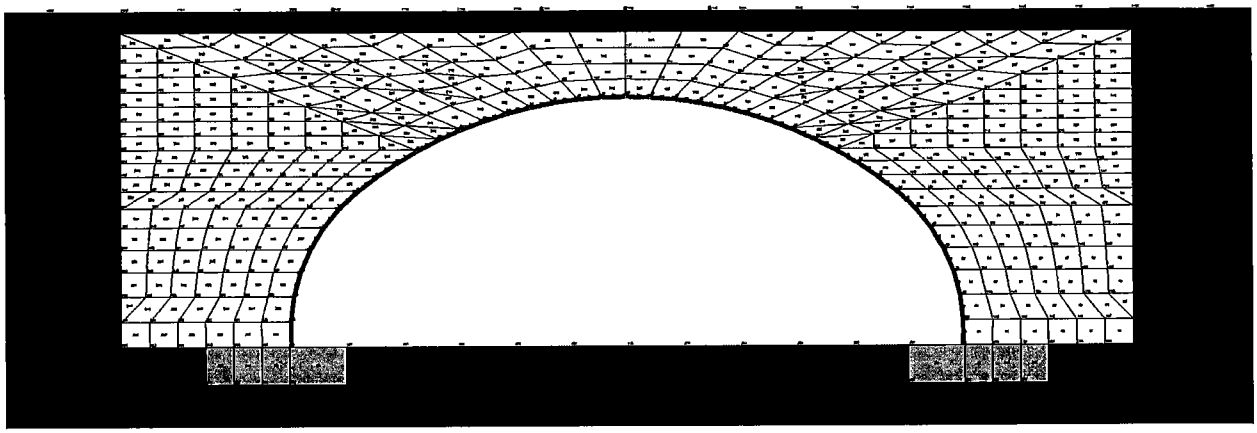
DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	14347.	30800.	0.466
BUCKLING THRUST (psi)	6	14347.	52791.	0.272
SEAM THRUST (psi)	6	14347.	21589.	0.665
PLASTIC-PENETRATE (%)	19	24.81	90.00	0.276
COMBINED T&M Ratio	19	0.997	1.000	0.997

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.08

RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.22
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *



SU4

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage SU4

EXECUTION MODE ..................   ANALYS
SOLUTION LEVEL ..................  #3 USER
METHODOLOGY (LRFD OR SERVICE) ...     LRFD
NUMBER OF PIPE-ELEMENT GROUPS ....       1
MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL
NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:
      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08
      POISSONS RATIO OF METAL (-) .......    0.30000E+00
      YIELD STRESS OF METAL (PSI)........    0.44000E+05
      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05
      DENSITY OF METAL (PCI).............    0.28400E+00
      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........     2
     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

 LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -69.70	F = 0.000
1142	22	F = 0.000	F = -69.70	F = 0.000
1143	21	F = 0.000	F = -69.70	F = 0.000
1143	22	F = 0.000	F = -69.70	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000

836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-32.80	F =	0.000
1141	22	F =	0.000	F =	-32.80	F =	0.000
1137	21	F =	0.000	F =	-49.20	F =	0.000
1137	22	F =	0.000	F =	-49.20	F =	0.000

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* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *
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BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000

5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.344E+00	-0.210E+01	0.352E-11	-0.980E+04	0.395E+03
	0.00	-0.911E+00	-0.645E+00	-0.226E+04	-0.980E+04	0.172E+04
2	-193.83	-0.424E+00	-0.778E+01	-0.415E+04	-0.245E+05	0.180E+03
	14.34	-0.917E+00	-0.236E+01	-0.232E+04	-0.101E+05	0.780E+03

3	-192.08	-0.476E+00	-0.135E+02	-0.521E+04	-0.284E+05	0.914E+00
	28.58	-0.916E+00	-0.408E+01	-0.237E+04	-0.103E+05	0.397E+01
4	-188.35	-0.494E+00	-0.247E+02	-0.423E+04	-0.253E+05	-0.650E+02
	42.43	-0.916E+00	-0.739E+01	-0.245E+04	-0.106E+05	-0.282E+03
5	-182.71	-0.482E+00	-0.280E+02	-0.338E+04	-0.226E+05	-0.351E+02
	55.62	-0.926E+00	-0.104E+01	-0.250E+04	-0.109E+05	-0.153E+03
6	-175.27	-0.450E+00	-0.243E+02	-0.324E+04	-0.220E+05	-0.108E+02
	67.89	-0.952E+00	0.368E+01	-0.248E+04	-0.108E+05	-0.469E+02
7	-166.18	-0.403E+00	-0.192E+02	-0.308E+04	-0.211E+05	-0.438E+02
	78.98	-0.996E+00	0.522E+01	-0.241E+04	-0.105E+05	-0.190E+03
8	-155.61	-0.348E+00	-0.150E+02	-0.197E+04	-0.170E+05	-0.845E+02
	88.69	-0.106E+01	0.483E+01	-0.233E+04	-0.101E+05	-0.367E+03
9	-144.43	-0.293E+00	-0.123E+02	-0.648E+03	-0.121E+05	-0.702E+02
	97.10	-0.114E+01	0.360E+01	-0.227E+04	-0.984E+04	-0.305E+03
10	-132.78	-0.240E+00	-0.112E+02	0.501E+02	-0.979E+04	-0.306E+02
	104.87	-0.123E+01	0.328E+01	-0.221E+04	-0.962E+04	-0.133E+03
11	-120.72	-0.191E+00	-0.120E+02	0.282E+03	-0.104E+05	0.100E+02
	111.98	-0.132E+01	0.352E+01	-0.217E+04	-0.941E+04	0.436E+02
12	-108.28	-0.149E+00	-0.741E+01	-0.141E+03	-0.973E+04	0.264E+02
	118.40	-0.142E+01	0.217E+01	-0.213E+04	-0.924E+04	0.115E+03
13	-95.50	-0.111E+00	-0.638E+01	-0.348E+03	-0.103E+05	0.536E+01
	124.11	-0.151E+01	0.187E+01	-0.210E+04	-0.912E+04	0.233E+02
14	-82.42	-0.773E-01	-0.628E+01	-0.162E+03	-0.956E+04	-0.221E+02
	129.10	-0.161E+01	0.184E+01	-0.207E+04	-0.900E+04	-0.960E+02
15	-69.09	-0.494E-01	-0.685E+01	0.418E+03	-0.103E+05	-0.447E+02
	133.35	-0.171E+01	0.200E+01	-0.204E+04	-0.887E+04	-0.194E+03
16	-55.53	-0.279E-01	-0.725E+01	0.125E+04	-0.131E+05	-0.587E+02
	136.84	-0.181E+01	0.211E+01	-0.201E+04	-0.874E+04	-0.255E+03
17	-41.80	-0.138E-01	-0.776E+01	0.222E+04	-0.163E+05	-0.646E+02
	139.57	-0.191E+01	0.227E+01	-0.198E+04	-0.859E+04	-0.281E+03
18	-27.94	-0.681E-02	-0.837E+01	0.320E+04	-0.195E+05	-0.605E+02
	141.53	-0.198E+01	0.245E+01	-0.194E+04	-0.843E+04	-0.263E+03
19	-13.99	-0.591E-02	-0.895E+01	0.402E+04	-0.222E+05	-0.460E+02
	142.70	-0.204E+01	0.260E+01	-0.190E+04	-0.826E+04	-0.200E+03
20	0.00	-0.876E-02	-0.930E+01	0.455E+04	-0.239E+05	-0.231E+02
	143.09	-0.207E+01	0.131E+01	-0.187E+04	-0.813E+04	-0.100E+03
21	13.99	-0.122E-01	-0.984E+01	0.468E+04	-0.244E+05	0.650E+01
	142.70	-0.206E+01	-0.287E+01	-0.188E+04	-0.818E+04	0.282E+02
22	27.94	-0.128E-01	-0.956E+01	0.433E+04	-0.234E+05	0.365E+02
	141.53	-0.203E+01	-0.280E+01	-0.192E+04	-0.836E+04	0.159E+03

23	41.80	-0.736E-02	-0.909E+01	0.357E+04	-0.209E+05	0.590E+02
	139.57	-0.196E+01	-0.265E+01	-0.196E+04	-0.853E+04	0.256E+03
24	55.53	0.641E-02	-0.840E+01	0.254E+04	-0.175E+05	0.711E+02
	136.84	-0.187E+01	-0.244E+01	-0.200E+04	-0.871E+04	0.309E+03
25	69.09	0.295E-01	-0.748E+01	0.141E+04	-0.138E+05	0.699E+02
	133.35	-0.176E+01	-0.217E+01	-0.204E+04	-0.886E+04	0.304E+03
26	82.42	0.613E-01	-0.676E+01	0.400E+03	-0.104E+05	0.551E+02
	129.10	-0.165E+01	-0.196E+01	-0.207E+04	-0.901E+04	0.240E+03
27	95.50	0.101E+00	-0.576E+01	-0.309E+03	-0.102E+05	0.266E+02
	124.11	-0.153E+01	-0.168E+01	-0.210E+04	-0.913E+04	0.116E+03
28	108.28	0.146E+00	-0.609E+01	-0.502E+03	-0.110E+05	-0.798E+01
	118.40	-0.142E+01	-0.178E+01	-0.213E+04	-0.924E+04	-0.347E+02
29	120.72	0.196E+00	-0.122E+02	-0.217E+03	-0.102E+05	0.466E+00
	111.98	-0.131E+01	-0.357E+01	-0.216E+04	-0.940E+04	0.203E+01
30	132.78	0.250E+00	-0.103E+02	-0.621E+03	-0.118E+05	0.358E+02
	104.87	-0.121E+01	-0.301E+01	-0.221E+04	-0.961E+04	0.155E+03
31	144.43	0.308E+00	-0.115E+02	-0.130E+04	-0.143E+05	0.637E+02
	97.10	-0.112E+01	-0.339E+01	-0.226E+04	-0.982E+04	0.277E+03
32	155.61	0.364E+00	-0.147E+02	-0.246E+04	-0.186E+05	0.712E+02
	88.69	-0.103E+01	-0.474E+01	-0.232E+04	-0.101E+05	0.309E+03
33	166.18	0.419E+00	-0.193E+02	-0.334E+04	-0.220E+05	0.309E+02
	78.98	-0.968E+00	-0.440E+01	-0.239E+04	-0.104E+05	0.134E+03
34	175.27	0.464E+00	-0.243E+02	-0.335E+04	-0.222E+05	0.293E+01
	67.89	-0.925E+00	-0.231E+01	-0.245E+04	-0.106E+05	0.127E+02
35	182.71	0.493E+00	-0.276E+02	-0.341E+04	-0.225E+05	0.307E+02
	55.62	-0.901E+00	0.249E+01	-0.245E+04	-0.106E+05	0.133E+03
36	188.35	0.501E+00	-0.240E+02	-0.420E+04	-0.249E+05	0.608E+02
	42.43	-0.893E+00	0.726E+01	-0.238E+04	-0.104E+05	0.264E+03
37	192.08	0.481E+00	-0.131E+02	-0.512E+04	-0.278E+05	-0.319E+01
	28.58	-0.893E+00	0.399E+01	-0.231E+04	-0.100E+05	-0.139E+02
38	193.83	0.425E+00	-0.763E+01	-0.406E+04	-0.238E+05	-0.176E+03
	14.34	-0.896E+00	0.232E+01	-0.225E+04	-0.978E+04	-0.765E+03
39	193.56	0.344E+00	-0.213E+01	-0.408E-10	-0.953E+04	-0.384E+03
	0.00	-0.890E+00	0.649E+00	-0.219E+04	-0.953E+04	-0.167E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.30763E-03	-0.30763E-03	.22281	0.00000
2	-0.76760E-03	0.13641E-03	.55596	0.00000
3	-0.89078E-03	0.24372E-03	.64517	0.00000
4	-0.79429E-03	0.12622E-03	.57528	0.00000
5	-0.70920E-03	0.26769E-04	.51366	0.00000

6	-0.69076E-03	0.14598E-04	.50030	0.00000
7	-0.66338E-03	0.59180E-05	.48047	0.00000
8	-0.53219E-03	-0.10356E-03	.38545	0.00000
9	-0.37934E-03	-0.23838E-03	.27475	0.00000
10	-0.29638E-03	-0.30729E-03	.22256	0.00000
11	-0.26449E-03	-0.32592E-03	.23605	0.00000
12	-0.30519E-03	-0.27452E-03	.22104	0.00000
13	-0.32397E-03	-0.24818E-03	.23465	0.00000
14	-0.30009E-03	-0.26477E-03	.21735	0.00000
15	-0.23300E-03	-0.32395E-03	.23463	0.00000
16	-0.13836E-03	-0.40988E-03	.29687	0.00000
17	-0.28005E-04	-0.51088E-03	.37002	0.00000
18	0.83338E-04	-0.61223E-03	.44342	0.00000
19	0.17848E-03	-0.69690E-03	.50475	0.00000
20	0.23994E-03	-0.75036E-03	.54347	0.00000
21	0.25305E-03	-0.76634E-03	.55504	0.00000
22	0.20873E-03	-0.73319E-03	.53103	0.00000
23	0.12055E-03	-0.65617E-03	.47525	0.00000
24	0.30137E-05	-0.54939E-03	.39791	0.00000
25	-0.12471E-03	-0.43160E-03	.31259	0.00000
26	-0.23905E-03	-0.32618E-03	.23624	0.00000
27	-0.32011E-03	-0.25278E-03	.23185	0.00000
28	-0.34448E-03	-0.23525E-03	.24950	0.00000
29	-0.31865E-03	-0.27134E-03	.23079	0.00000
30	-0.36900E-03	-0.23394E-03	.26726	0.00000
31	-0.44945E-03	-0.16659E-03	.32553	0.00000
32	-0.58411E-03	-0.49148E-04	.42306	0.00000
33	-0.69015E-03	0.37399E-04	.49986	0.00000
34	-0.69793E-03	0.31188E-04	.50549	0.00000
35	-0.70516E-03	0.37915E-04	.51073	0.00000
36	-0.78236E-03	0.13223E-03	.56664	0.00000
37	-0.87147E-03	0.24202E-03	.63118	0.00000
38	-0.74825E-03	0.13436E-03	.54194	0.00000
39	-0.29913E-03	-0.29913E-03	.21666	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.24757	0.00000	0.06129
2	-0.25398	-0.26138	0.32588
3	-0.26036	-0.32802	0.39580
4	-0.26881	-0.26615	0.33841
5	-0.27459	-0.21279	0.28819
6	-0.27207	-0.20394	0.27796
7	-0.26455	-0.19351	0.26350
8	-0.25581	-0.12393	0.18937
9	-0.24856	-0.04076	0.10254
10	-0.24290	0.00315	0.06215
11	-0.23756	0.01776	0.07420
12	-0.23326	-0.00887	0.06328
13	-0.23022	-0.02191	0.07492
14	-0.22729	-0.01021	0.06187
15	-0.22410	0.02630	0.07652
16	-0.22060	0.07851	0.12717
17	-0.21683	0.13961	0.18663
18	-0.21281	0.20111	0.24640
19	-0.20860	0.25310	0.29661
20	-0.20538	0.28633	0.32851
21	-0.20654	0.29474	0.33739
22	-0.21103	0.27234	0.31687
23	-0.21552	0.22457	0.27102
24	-0.21985	0.15972	0.20805
25	-0.22385	0.08873	0.13884
26	-0.22743	0.02519	0.07692
27	-0.23052	-0.01947	0.07260
28	-0.23327	-0.03158	0.08599
29	-0.23740	-0.01368	0.07004
30	-0.24261	-0.03905	0.09791
31	-0.24788	-0.08178	0.14323
32	-0.25481	-0.15467	0.21960
33	-0.26265	-0.21035	0.27934
34	-0.26828	-0.21081	0.28278
35	-0.26848	-0.21485	0.28693
36	-0.26160	-0.26443	0.33287
37	-0.25327	-0.32194	0.38609

38	-0.24701	-0.25519	0.31620
39	-0.24073	0.00000	0.05795

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	10874.	30800.	0.353
BUCKLING THRUST (psi)	5	10874.	54165.	0.201
SEAM THRUST (psi)	5	10874.	21589.	0.504
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.396	1.000	0.396

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	0.50
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.10
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

 MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage su4 (LL X 3.59)

        EXECUTION MODE ..................   ANALYS

        SOLUTION LEVEL ..................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4

             IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
             AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

        SECTION PROPERTIES OF CROSS-SECTION:

              THRUST AREA (IN**2/IN) ............   0.23020

              MOM. OF INERTIA (IN**4/IN) ........   0.87460

              SECTION MODULUS (IN**3/IN) ........   0.28840

              PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

        NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

        LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
        AND DEFLECTION LIMIT AT SERVICE LOAD

              THRUST STRESS YIELDING ............   0.70000

              BUCKLING STRESS FAILURE............   0.70000

              SEAM STRENGTH FAILURE .............   0.67000
```

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -250.0	F = 0.000
1142	22	F = 0.000	F = -250.0	F = 0.000
1143	21	F = 0.000	F = -250.0	F = 0.000
1143	22	F = 0.000	F = -250.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000

856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-117.6	F =	0.000
1141	22	F =	0.000	F =	-117.6	F =	0.000
1137	21	F =	0.000	F =	-176.5	F =	0.000
1137	22	F =	0.000	F =	-176.5	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


 * * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =    1
```

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19

21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000

35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.450	Factor for load step #21
22	1.450	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.514E+00	0.397E+01	0.114E-09	-0.134E+05	0.660E+03
	0.00	-0.107E+01	0.107E+01	-0.308E+04	-0.134E+05	0.287E+04
2	-193.83	-0.691E+00	-0.600E+01	-0.713E+04	-0.384E+05	0.300E+03
	14.34	-0.108E+01	-0.191E+01	-0.315E+04	-0.137E+05	0.131E+04
3	-192.08	-0.823E+00	-0.160E+02	-0.906E+04	-0.440E+05	0.791E+01
	28.58	-0.107E+01	-0.488E+01	-0.322E+04	-0.140E+05	0.344E+02
4	-188.35	-0.891E+00	-0.321E+02	-0.770E+04	-0.411E+05	-0.109E+03
	42.43	-0.106E+01	-0.971E+01	-0.332E+04	-0.144E+05	-0.471E+03
5	-182.71	-0.905E+00	-0.391E+02	-0.616E+04	-0.364E+05	-0.756E+02
	55.62	-0.106E+01	-0.119E+02	-0.346E+04	-0.150E+05	-0.328E+03
6	-175.27	-0.879E+00	-0.375E+02	-0.562E+04	-0.349E+05	-0.204E+02
	67.89	-0.108E+01	-0.270E+01	-0.356E+04	-0.155E+05	-0.885E+02
7	-166.18	-0.824E+00	-0.308E+02	-0.556E+04	-0.345E+05	-0.282E+02
	78.98	-0.114E+01	0.920E+01	-0.351E+04	-0.152E+05	-0.123E+03
8	-155.61	-0.750E+00	-0.216E+02	-0.469E+04	-0.310E+05	-0.682E+02
	88.69	-0.123E+01	0.696E+01	-0.339E+04	-0.147E+05	-0.296E+03
9	-144.43	-0.668E+00	-0.161E+02	-0.342E+04	-0.262E+05	-0.615E+02
	97.10	-0.135E+01	0.473E+01	-0.330E+04	-0.143E+05	-0.267E+03

10	-132.78	-0.578E+00	-0.144E+02	-0.267E+04	-0.233E+05	-0.308E+02
	104.87	-0.150E+01	0.420E+01	-0.323E+04	-0.140E+05	-0.134E+03
11	-120.72	-0.488E+00	-0.231E+02	-0.216E+04	-0.212E+05	0.534E+02
	111.98	-0.167E+01	0.674E+01	-0.316E+04	-0.137E+05	0.232E+03
12	-108.28	-0.399E+00	-0.102E+02	-0.369E+04	-0.262E+05	0.112E+03
	118.40	-0.185E+01	0.297E+01	-0.309E+04	-0.134E+05	0.487E+03
13	-95.50	-0.311E+00	-0.284E+01	-0.472E+04	-0.297E+05	0.311E+02
	124.11	-0.207E+01	0.855E+00	-0.307E+04	-0.133E+05	0.135E+03
14	-82.42	-0.224E+00	-0.411E+01	-0.386E+04	-0.266E+05	-0.911E+02
	129.10	-0.232E+01	0.121E+01	-0.305E+04	-0.133E+05	-0.396E+03
15	-69.09	-0.145E+00	-0.800E+01	-0.135E+04	-0.178E+05	-0.176E+03
	133.35	-0.260E+01	0.230E+01	-0.302E+04	-0.131E+05	-0.764E+03
16	-55.53	-0.787E-01	-0.968E+01	0.197E+04	-0.197E+05	-0.219E+03
	136.84	-0.289E+01	0.274E+01	-0.297E+04	-0.129E+05	-0.952E+03
17	-41.80	-0.316E-01	-0.117E+02	0.569E+04	-0.324E+05	-0.234E+03
	139.57	-0.317E+01	0.328E+01	-0.292E+04	-0.127E+05	-0.102E+04
18	-27.94	-0.507E-02	-0.142E+02	0.935E+04	-0.440E+05	-0.214E+03
	141.53	-0.341E+01	0.399E+01	-0.286E+04	-0.124E+05	-0.930E+03
19	-13.99	0.336E-02	-0.163E+02	0.123E+05	-0.440E+05	-0.158E+03
	142.70	-0.359E+01	0.459E+01	-0.279E+04	-0.121E+05	-0.686E+03
20	0.00	0.161E-03	-0.188E+02	0.142E+05	-0.440E+05	-0.656E+02
	143.09	-0.368E+01	0.463E+01	-0.271E+04	-0.118E+05	-0.285E+03
21	13.99	-0.449E-02	-0.200E+02	0.143E+05	-0.440E+05	0.548E+02
	142.70	-0.366E+01	-0.573E+01	-0.272E+04	-0.118E+05	0.238E+03
22	27.94	0.686E-03	-0.170E+02	0.124E+05	-0.440E+05	0.160E+03
	141.53	-0.352E+01	-0.478E+01	-0.280E+04	-0.122E+05	0.695E+03
23	41.80	0.249E-01	-0.153E+02	0.922E+04	-0.440E+05	0.228E+03
	139.57	-0.330E+01	-0.427E+01	-0.288E+04	-0.125E+05	0.989E+03
24	55.53	0.729E-01	-0.129E+02	0.520E+04	-0.308E+05	0.263E+03
	136.84	-0.301E+01	-0.360E+01	-0.294E+04	-0.128E+05	0.114E+04
25	69.09	0.145E+00	-0.972E+01	0.894E+03	-0.161E+05	0.255E+03
	133.35	-0.270E+01	-0.274E+01	-0.300E+04	-0.130E+05	0.111E+04
26	82.42	0.237E+00	-0.514E+01	-0.297E+04	-0.235E+05	0.191E+03
	129.10	-0.238E+01	-0.148E+01	-0.305E+04	-0.132E+05	0.828E+03
27	95.50	0.340E+00	0.705E+00	-0.541E+04	-0.321E+05	0.513E+02
	124.11	-0.208E+01	-0.204E+00	-0.307E+04	-0.133E+05	0.223E+03
28	108.28	0.445E+00	-0.530E+01	-0.524E+04	-0.315E+05	-0.878E+02
	118.40	-0.182E+01	-0.155E+01	-0.308E+04	-0.134E+05	-0.381E+03
29	120.72	0.550E+00	-0.251E+02	-0.363E+04	-0.262E+05	-0.482E+02
	111.98	-0.160E+01	-0.731E+01	-0.314E+04	-0.136E+05	-0.209E+03
30	132.78	0.652E+00	-0.118E+02	-0.444E+04	-0.293E+05	0.328E+02

	104.87	-0.141E+01	-0.346E+01	-0.321E+04	-0.139E+05	0.143E+03
31	144.43	0.748E+00	-0.146E+02	-0.498E+04	-0.315E+05	0.367E+02
	97.10	-0.126E+01	-0.434E+01	-0.327E+04	-0.142E+05	0.159E+03
32	155.61	0.832E+00	-0.218E+02	-0.577E+04	-0.346E+05	0.377E+02
	88.69	-0.113E+01	-0.707E+01	-0.335E+04	-0.146E+05	0.164E+03
33	166.18	0.901E+00	-0.315E+02	-0.623E+04	-0.366E+05	0.106E+02
	78.98	-0.105E+01	-0.558E+01	-0.345E+04	-0.150E+05	0.462E+02
34	175.27	0.947E+00	-0.357E+02	-0.615E+04	-0.361E+05	0.970E+01
	67.89	-0.100E+01	0.109E+02	-0.341E+04	-0.148E+05	0.421E+02
35	182.71	0.961E+00	-0.365E+02	-0.647E+04	-0.366E+05	0.580E+02
	55.62	-0.985E+00	0.111E+02	-0.326E+04	-0.141E+05	0.252E+03
36	188.35	0.931E+00	-0.306E+02	-0.766E+04	-0.401E+05	0.898E+02
	42.43	-0.991E+00	0.925E+01	-0.312E+04	-0.136E+05	0.390E+03
37	192.08	0.846E+00	-0.152E+02	-0.878E+04	-0.436E+05	-0.150E+02
	28.58	-0.101E+01	0.464E+01	-0.303E+04	-0.132E+05	-0.652E+02
38	193.83	0.699E+00	-0.551E+01	-0.684E+04	-0.366E+05	-0.289E+03
	14.34	-0.102E+01	0.175E+01	-0.296E+04	-0.129E+05	-0.126E+04
39	193.56	0.508E+00	0.419E+01	-0.854E-10	-0.126E+05	-0.629E+03
	0.00	-0.101E+01	-0.114E+01	-0.290E+04	-0.126E+05	-0.273E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.42051E-03	-0.42051E-03	.30456	0.00000
2	-0.12058E-02	0.34603E-03	.87336	0.00000
3	-0.14275E-02	0.54755E-03	1.0339	0.02369
4	-0.12899E-02	0.38469E-03	.93426	0.00000
5	-0.11420E-02	0.19822E-03	.82714	0.00000
6	-0.10963E-02	0.12592E-03	.79400	0.00000
7	-0.10827E-02	0.12629E-03	.78421	0.00000
8	-0.97201E-03	0.48660E-04	.70400	0.00000
9	-0.82155E-03	-0.77777E-04	.59503	0.00000
10	-0.73086E-03	-0.15057E-03	.52935	0.00000
11	-0.66554E-03	-0.19505E-03	.48203	0.00000
12	-0.82256E-03	-0.20653E-04	.59576	0.00000
13	-0.93252E-03	0.95612E-04	.67540	0.00000
14	-0.83591E-03	0.34904E-05	.60543	0.00000
15	-0.55867E-03	-0.26494E-03	.40463	0.00000
16	-0.19127E-03	-0.61964E-03	.44879	0.00000
17	0.22153E-03	-0.10174E-02	.73691	0.00000
18	0.62830E-03	-0.14072E-02	1.0192	0.01304
19	0.10102E-02	-0.18451E-02	1.3364	0.16265
20	0.12876E-02	-0.22347E-02	1.6185	0.24245
21	0.13015E-02	-0.22610E-02	1.6376	0.24711
22	0.10140E-02	-0.18567E-02	1.3448	0.16582
23	0.61087E-03	-0.13950E-02	1.0104	0.00714
24	0.16399E-03	-0.96684E-03	.70026	0.00000
25	-0.31222E-03	-0.50675E-03	.36703	0.00000
26	-0.73842E-03	-0.92085E-04	.53482	0.00000
27	-0.10064E-02	0.17070E-03	.72888	0.00000
28	-0.98947E-03	0.15063E-03	.71665	0.00000
29	-0.82225E-03	-0.32595E-04	.59553	0.00000
30	-0.92031E-03	0.44898E-04	.66656	0.00000
31	-0.98703E-03	0.96058E-04	.71488	0.00000
32	-0.10844E-02	0.17059E-03	.78543	0.00000
33	-0.11476E-02	0.20826E-03	.83117	0.00000
34	-0.11335E-02	0.20402E-03	.82097	0.00000
35	-0.11478E-02	0.25990E-03	.83133	0.00000

36	-0.12586E-02	0.40752E-03	.91160	0.00000
37	-0.13679E-02	0.54234E-03	.99076	0.00000
38	-0.11482E-02	0.34073E-03	.83161	0.00000
39	-0.39486E-03	-0.39486E-03	.28599	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.33840	0.00000	0.11452
2	-0.34597	-0.44869	0.56838
3	-0.35361	-0.57029	0.69533
4	-0.36424	-0.48418	0.61685
5	-0.37976	-0.38750	0.53172
6	-0.39044	-0.35337	0.50581
7	-0.38486	-0.34957	0.49768
8	-0.37153	-0.29510	0.43314
9	-0.36187	-0.21505	0.34599
10	-0.35466	-0.16778	0.29357
11	-0.34628	-0.13603	0.25594
12	-0.33929	-0.23186	0.34697
13	-0.33675	-0.29726	0.41067
14	-0.33495	-0.24270	0.35489
15	-0.33140	-0.08493	0.19475
16	-0.32629	0.12385	0.23032
17	-0.32025	0.35822	0.46079
18	-0.31328	0.58828	0.68642
19	-0.30554	0.77672	0.87008
20	-0.29777	0.89210	0.98077
21	-0.29858	0.89793	0.98709
22	-0.30732	0.77933	0.87378
23	-0.31547	0.57988	0.67941
24	-0.32305	0.32696	0.43132
25	-0.32954	0.05625	0.16484
26	-0.33418	-0.18688	0.29855
27	-0.33625	-0.34032	0.45339
28	-0.33753	-0.32964	0.44356
29	-0.34397	-0.22831	0.34662
30	-0.35225	-0.27907	0.40315
31	-0.35851	-0.31315	0.44168
32	-0.36771	-0.36286	0.49807
33	-0.37796	-0.39202	0.53487
34	-0.37400	-0.38672	0.52660
35	-0.35727	-0.40701	0.53465
36	-0.34247	-0.48174	0.59902
37	-0.33220	-0.55232	0.66267
38	-0.32490	-0.43049	0.53605
39	-0.31776	0.00000	0.10097

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

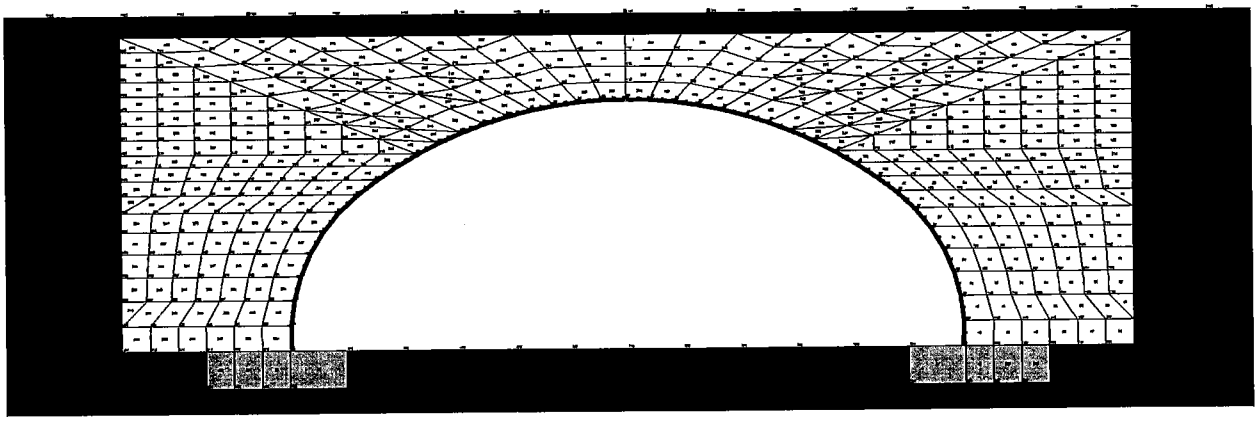
DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	15461.	30800.	0.502
BUCKLING THRUST (psi)	6	15461.	51586.	0.300
SEAM THRUST (psi)	6	15461.	21589.	0.716
PLASTIC-PENETRATE (%)	21	24.71	90.00	0.275
COMBINED T&M Ratio	21	0.987	1.000	0.987

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.28

RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.26
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *



SU5

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage SU5

EXECUTION MODE ..................   ANALYS
SOLUTION LEVEL ..................  #3 USER
METHODOLOGY (LRFD OR SERVICE) ...     LRFD
NUMBER OF PIPE-ELEMENT GROUPS ....       1
MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL
NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:
      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08
      POISSONS RATIO OF METAL (-) .......    0.30000E+00
      YIELD STRESS OF METAL (PSI)........    0.44000E+05
      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05
      DENSITY OF METAL (PCI).............    0.28400E+00
      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........    2
     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

 LARGE DEFORMATION/BUCKLING CODE, IBUCK...    4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -69.70	F = 0.000
1142	22	F = 0.000	F = -69.70	F = 0.000
1143	21	F = 0.000	F = -69.70	F = 0.000
1143	22	F = 0.000	F = -69.70	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000

861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-32.80	F =	0.000
1141	22	F =	0.000	F =	-32.80	F =	0.000
1139	21	F =	0.000	F =	-32.80	F =	0.000
1139	22	F =	0.000	F =	-32.80	F =	0.000
1135	21	F =	0.000	F =	-49.20	F =	0.000
1135	22	F =	0.000	F =	-49.20	F =	0.000

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* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060
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* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000

4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.351E+00	-0.185E+01	-0.557E-11	-0.101E+05	0.404E+03
	0.00	-0.929E+00	-0.572E+00	-0.232E+04	-0.101E+05	0.176E+04
2	-193.83	-0.432E+00	-0.792E+01	-0.424E+04	-0.250E+05	0.182E+03
	14.34	-0.935E+00	-0.241E+01	-0.238E+04	-0.103E+05	0.791E+03

3	-192.08	-0.486E+00	-0.140E+02	-0.530E+04	-0.289E+05	-0.319E+00
	28.58	-0.933E+00	-0.425E+01	-0.244E+04	-0.106E+05	-0.139E+01
4	-188.35	-0.504E+00	-0.256E+02	-0.429E+04	-0.258E+05	-0.651E+02
	42.43	-0.933E+00	-0.719E+01	-0.251E+04	-0.109E+05	-0.283E+03
5	-182.71	-0.493E+00	-0.288E+02	-0.346E+04	-0.231E+05	-0.321E+02
	55.62	-0.944E+00	-0.725E+00	-0.256E+04	-0.111E+05	-0.139E+03
6	-175.27	-0.460E+00	-0.249E+02	-0.339E+04	-0.227E+05	-0.552E+01
	67.89	-0.970E+00	0.437E+01	-0.253E+04	-0.110E+05	-0.240E+02
7	-166.18	-0.412E+00	-0.194E+02	-0.330E+04	-0.221E+05	-0.393E+02
	78.98	-0.102E+01	0.579E+01	-0.246E+04	-0.107E+05	-0.171E+03
8	-155.61	-0.355E+00	-0.151E+02	-0.224E+04	-0.181E+05	-0.830E+02
	88.69	-0.108E+01	0.486E+01	-0.237E+04	-0.103E+05	-0.361E+03
9	-144.43	-0.297E+00	-0.123E+02	-0.910E+03	-0.132E+05	-0.710E+02
	97.10	-0.117E+01	0.361E+01	-0.231E+04	-0.100E+05	-0.308E+03
10	-132.78	-0.240E+00	-0.112E+02	-0.180E+03	-0.104E+05	-0.337E+02
	104.87	-0.126E+01	0.327E+01	-0.225E+04	-0.979E+04	-0.146E+03
11	-120.72	-0.188E+00	-0.121E+02	0.125E+03	-0.100E+05	0.532E+01
	111.98	-0.136E+01	0.355E+01	-0.221E+04	-0.958E+04	0.231E+02
12	-108.28	-0.140E+00	-0.649E+01	-0.218E+03	-0.102E+05	0.139E+02
	118.40	-0.146E+01	0.190E+01	-0.217E+04	-0.941E+04	0.604E+02
13	-95.50	-0.986E-01	-0.645E+01	-0.132E+03	-0.976E+04	-0.153E+02
	124.11	-0.157E+01	0.189E+01	-0.214E+04	-0.930E+04	-0.665E+02
14	-82.42	-0.625E-01	-0.751E+01	0.362E+03	-0.104E+05	-0.358E+02
	129.10	-0.168E+01	0.219E+01	-0.211E+04	-0.917E+04	-0.156E+03
15	-69.09	-0.332E-01	-0.758E+01	0.103E+04	-0.126E+05	-0.466E+02
	133.35	-0.178E+01	0.221E+01	-0.208E+04	-0.902E+04	-0.203E+03
16	-55.53	-0.117E-01	-0.782E+01	0.183E+04	-0.152E+05	-0.533E+02
	136.84	-0.188E+01	0.228E+01	-0.204E+04	-0.887E+04	-0.231E+03
17	-41.80	0.177E-02	-0.806E+01	0.268E+04	-0.180E+05	-0.547E+02
	139.57	-0.197E+01	0.235E+01	-0.201E+04	-0.872E+04	-0.238E+03
18	-27.94	0.777E-02	-0.843E+01	0.350E+04	-0.207E+05	-0.498E+02
	141.53	-0.204E+01	0.246E+01	-0.197E+04	-0.856E+04	-0.216E+03
19	-13.99	0.791E-02	-0.892E+01	0.417E+04	-0.229E+05	-0.368E+02
	142.70	-0.209E+01	0.259E+01	-0.193E+04	-0.839E+04	-0.160E+03
20	0.00	0.474E-02	-0.929E+01	0.458E+04	-0.242E+05	-0.161E+02
	143.09	-0.211E+01	0.642E+00	-0.191E+04	-0.829E+04	-0.699E+02
21	13.99	0.150E-02	-0.991E+01	0.462E+04	-0.244E+05	0.119E+02
	142.70	-0.209E+01	-0.289E+01	-0.192E+04	-0.835E+04	0.515E+02
22	27.94	0.159E-02	-0.964E+01	0.418E+04	-0.230E+05	0.406E+02
	141.53	-0.205E+01	-0.282E+01	-0.196E+04	-0.853E+04	0.176E+03

23	41.80	0.812E-02	-0.915E+01	0.337E+04	-0.204E+05	0.617E+02
	139.57	-0.197E+01	-0.266E+01	-0.201E+04	-0.871E+04	0.268E+03
24	55.53	0.232E-01	-0.846E+01	0.230E+04	-0.169E+05	0.722E+02
	136.84	-0.188E+01	-0.245E+01	-0.205E+04	-0.889E+04	0.314E+03
25	69.09	0.475E-01	-0.756E+01	0.116E+04	-0.131E+05	0.696E+02
	133.35	-0.176E+01	-0.219E+01	-0.208E+04	-0.905E+04	0.302E+03
26	82.42	0.804E-01	-0.678E+01	0.157E+03	-0.973E+04	0.531E+02
	129.10	-0.165E+01	-0.197E+01	-0.212E+04	-0.919E+04	0.231E+03
27	95.50	0.120E+00	-0.580E+01	-0.515E+03	-0.111E+05	0.227E+02
	124.11	-0.153E+01	-0.169E+01	-0.214E+04	-0.931E+04	0.985E+02
28	108.28	0.166E+00	-0.634E+01	-0.641E+03	-0.116E+05	-0.123E+02
	118.40	-0.141E+01	-0.185E+01	-0.217E+04	-0.942E+04	-0.535E+02
29	120.72	0.215E+00	-0.125E+02	-0.304E+03	-0.106E+05	-0.236E+01
	111.98	-0.131E+01	-0.366E+01	-0.221E+04	-0.959E+04	-0.102E+02
30	132.78	0.269E+00	-0.104E+02	-0.681E+03	-0.122E+05	0.336E+02
	104.87	-0.121E+01	-0.305E+01	-0.226E+04	-0.980E+04	0.146E+03
31	144.43	0.326E+00	-0.117E+02	-0.133E+04	-0.146E+05	0.614E+02
	97.10	-0.111E+01	-0.345E+01	-0.230E+04	-0.100E+05	0.267E+03
32	155.61	0.382E+00	-0.151E+02	-0.245E+04	-0.188E+05	0.697E+02
	88.69	-0.103E+01	-0.487E+01	-0.237E+04	-0.103E+05	0.303E+03
33	166.18	0.435E+00	-0.199E+02	-0.332E+04	-0.221E+05	0.312E+02
	78.98	-0.966E+00	-0.352E+01	-0.243E+04	-0.106E+05	0.135E+03
34	175.27	0.479E+00	-0.246E+02	-0.335E+04	-0.224E+05	0.460E+01
	67.89	-0.924E+00	-0.171E+01	-0.248E+04	-0.108E+05	0.200E+02
35	182.71	0.507E+00	-0.277E+02	-0.344E+04	-0.226E+05	0.324E+02
	55.62	-0.901E+00	0.330E+01	-0.247E+04	-0.107E+05	0.141E+03
36	188.35	0.514E+00	-0.241E+02	-0.425E+04	-0.251E+05	0.616E+02
	42.43	-0.893E+00	0.727E+01	-0.240E+04	-0.104E+05	0.268E+03
37	192.08	0.491E+00	-0.132E+02	-0.516E+04	-0.280E+05	-0.331E+01
	28.58	-0.894E+00	0.401E+01	-0.232E+04	-0.101E+05	-0.144E+02
38	193.83	0.434E+00	-0.765E+01	-0.409E+04	-0.240E+05	-0.177E+03
	14.34	-0.897E+00	0.232E+01	-0.227E+04	-0.984E+04	-0.770E+03
39	193.56	0.350E+00	-0.208E+01	-0.103E-10	-0.959E+04	-0.387E+03
	0.00	-0.891E+00	0.634E+00	-0.221E+04	-0.959E+04	-0.168E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.31587E-03	-0.31587E-03	.22877	0.00000
2	-0.78567E-03	0.13772E-03	.56904	0.00000
3	-0.90831E-03	0.24407E-03	.65787	0.00000
4	-0.80906E-03	0.12390E-03	.58598	0.00000
5	-0.72605E-03	0.27473E-04	.52586	0.00000

6	-0.71370E-03	0.23204E-04	.51692	0.00000
7	-0.69432E-03	0.24801E-04	.50288	0.00000
8	-0.56672E-03	-0.80011E-04	.41046	0.00000
9	-0.41333E-03	-0.21532E-03	.29936	0.00000
10	-0.32691E-03	-0.28767E-03	.23677	0.00000
11	-0.28697E-03	-0.31423E-03	.22759	0.00000
12	-0.31909E-03	-0.27175E-03	.23111	0.00000
13	-0.30616E-03	-0.27735E-03	.22174	0.00000
14	-0.24824E-03	-0.32700E-03	.23684	0.00000
15	-0.17052E-03	-0.39560E-03	.28652	0.00000
16	-0.78817E-04	-0.47791E-03	.34614	0.00000
17	0.18378E-04	-0.56539E-03	.40950	0.00000
18	0.11214E-03	-0.64912E-03	.47014	0.00000
19	0.19060E-03	-0.71725E-03	.51949	0.00000
20	0.23796E-03	-0.75802E-03	.54902	0.00000
21	0.24017E-03	-0.76450E-03	.55371	0.00000
22	0.18743E-03	-0.72307E-03	.52370	0.00000
23	0.92765E-04	-0.63968E-03	.46331	0.00000
24	-0.28695E-04	-0.52906E-03	.38319	0.00000
25	-0.15780E-03	-0.40997E-03	.29693	0.00000
26	-0.27126E-03	-0.30548E-03	.22125	0.00000
27	-0.34819E-03	-0.23620E-03	.25218	0.00000
28	-0.36539E-03	-0.22594E-03	.26464	0.00000
29	-0.33402E-03	-0.26784E-03	.24192	0.00000
30	-0.38161E-03	-0.23341E-03	.27639	0.00000
31	-0.45838E-03	-0.16991E-03	.33199	0.00000
32	-0.58975E-03	-0.56078E-04	.42714	0.00000
33	-0.69350E-03	0.29660E-04	.50229	0.00000
34	-0.70191E-03	0.26946E-04	.50838	0.00000
35	-0.71055E-03	0.37775E-04	.51464	0.00000
36	-0.78905E-03	0.13495E-03	.57149	0.00000
37	-0.87820E-03	0.24486E-03	.63606	0.00000
38	-0.75386E-03	0.13617E-03	.54600	0.00000
39	-0.30100E-03	-0.30100E-03	.21801	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.25419	0.00000	0.06461
2	-0.26072	-0.26698	0.33495
3	-0.26727	-0.33319	0.40462
4	-0.27569	-0.26975	0.34575
5	-0.28109	-0.21787	0.29688
6	-0.27784	-0.21306	0.29026
7	-0.26940	-0.20792	0.28049
8	-0.26023	-0.14072	0.20844
9	-0.25295	-0.05725	0.12124
10	-0.24729	-0.01135	0.07250
11	-0.24191	0.00788	0.06640
12	-0.23774	-0.01369	0.07021
13	-0.23479	-0.00833	0.06346
14	-0.23146	0.02277	0.07635
15	-0.22779	0.06508	0.11697
16	-0.22401	0.11539	0.16557
17	-0.22011	0.16878	0.21723
18	-0.21607	0.22010	0.26679
19	-0.21191	0.26249	0.30739
20	-0.20926	0.28797	0.33176
21	-0.21098	0.29048	0.33499
22	-0.21553	0.26325	0.30971
23	-0.22007	0.21177	0.26020
24	-0.22443	0.14467	0.19504
25	-0.22846	0.07291	0.12510
26	-0.23206	0.00989	0.06375
27	-0.23514	-0.03238	0.08767
28	-0.23794	-0.04032	0.09693
29	-0.24217	-0.01914	0.07778
30	-0.24747	-0.04285	0.10409
31	-0.25281	-0.08340	0.14732
32	-0.25987	-0.15430	0.22183
33	-0.26711	-0.20909	0.28044
34	-0.27159	-0.21074	0.28450
35	-0.27071	-0.21636	0.28965
36	-0.26319	-0.26716	0.33643
37	-0.25484	-0.32471	0.38965

38	-0.24854	-0.25734	0.31911
39	-0.24223	0.00000	0.05867

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	11131.	30800.	0.361
BUCKLING THRUST (psi)	5	11131.	54164.	0.206
SEAM THRUST (psi)	5	11131.	21589.	0.516
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.405	1.000	0.405

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.51

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.10

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage SU5-OPR (LL x 3.56)

        EXECUTION MODE ................   ANALYS

        SOLUTION LEVEL .................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4

             IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
             AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

        SECTION PROPERTIES OF CROSS-SECTION:

              THRUST AREA (IN**2/IN) ............   0.23020

              MOM. OF INERTIA (IN**4/IN) ........   0.87460

              SECTION MODULUS (IN**3/IN) ........   0.28840

              PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

        NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

        LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
        AND DEFLECTION LIMIT AT SERVICE LOAD

              THRUST STRESS YIELDING ............   0.70000

              BUCKLING STRESS FAILURE............   0.70000

              SEAM STRENGTH FAILURE .............   0.67000
```

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -248.0	F = 0.000
1142	22	F = 0.000	F = -248.0	F = 0.000
1143	21	F = 0.000	F = -248.0	F = 0.000
1143	22	F = 0.000	F = -248.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000

857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-116.7	F =	0.000
1141	22	F =	0.000	F =	-116.7	F =	0.000
1139	21	F =	0.000	F =	-116.7	F =	0.000
1139	22	F =	0.000	F =	-116.7	F =	0.000
1135	21	F =	0.000	F =	-175.1	F =	0.000
1135	22	F =	0.000	F =	-175.1	F =	0.000

* * * * * COMPLETED MESH GENERATION * * * * *

BRIDGECOR

CALCULATED KEY NUMBERS ...
THE NUMBER OF DATA ERRORS IS---------- 0
THE NUMBER OF SOIL MATERIALS IS-------- 4
THE NUMBER OF PIPE-TYPE GROUPS IS------ 1
THE NUMBER OF INTERFACE MATERIALS IS--- 37
BAND WIDTH ESTIMATE (MAX)---------- 2060

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18

20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000

34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.450	Factor for load step #21
22	1.450	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56 0.00	-0.533E+00 -0.112E+01	0.466E+01 0.126E+01	0.254E-10 -0.325E+04	-0.141E+05 -0.141E+05	0.694E+03 0.302E+04
2	-193.83 14.34	-0.715E+00 -0.113E+01	-0.598E+01 -0.191E+01	-0.748E+04 -0.332E+04	-0.403E+05 -0.144E+05	0.312E+03 0.135E+04
3	-192.08 28.58	-0.849E+00 -0.112E+01	-0.166E+02 -0.509E+01	-0.941E+04 -0.339E+04	-0.440E+05 -0.147E+05	0.143E+00 0.622E+00
4	-188.35 42.43	-0.916E+00 -0.111E+01	-0.344E+02 -0.104E+02	-0.784E+04 -0.349E+04	-0.423E+05 -0.152E+05	-0.119E+03 -0.517E+03
5	-182.71 55.62	-0.929E+00 -0.111E+01	-0.422E+02 -0.128E+02	-0.621E+04 -0.364E+04	-0.374E+05 -0.158E+05	-0.721E+02 -0.313E+03
6	-175.27 67.89	-0.901E+00 -0.114E+01	-0.398E+02 0.252E+01	-0.585E+04 -0.371E+04	-0.364E+05 -0.161E+05	-0.195E+01 -0.849E+01
7	-166.18 78.98	-0.842E+00 -0.120E+01	-0.312E+02 0.933E+01	-0.612E+04 -0.362E+04	-0.370E+05 -0.157E+05	-0.937E+01 -0.407E+02
8	-155.61 88.69	-0.763E+00 -0.129E+01	-0.217E+02 0.702E+01	-0.544E+04 -0.350E+04	-0.341E+05 -0.152E+05	-0.589E+02 -0.256E+03
9	-144.43 97.10	-0.673E+00 -0.143E+01	-0.164E+02 0.483E+01	-0.421E+04 -0.341E+04	-0.294E+05 -0.148E+05	-0.578E+02 -0.251E+03

10	-132.78	-0.573E+00	-0.140E+02	-0.346E+04	-0.265E+05	-0.340E+02
	104.87	-0.159E+01	0.409E+01	-0.335E+04	-0.145E+05	-0.148E+03
11	-120.72	-0.471E+00	-0.241E+02	-0.278E+04	-0.238E+05	0.478E+02
	111.98	-0.178E+01	0.701E+01	-0.327E+04	-0.142E+05	0.208E+03
12	-108.28	-0.370E+00	-0.594E+01	-0.421E+04	-0.286E+05	0.770E+02
	118.40	-0.199E+01	0.174E+01	-0.321E+04	-0.140E+05	0.335E+03
13	-95.50	-0.269E+00	-0.263E+01	-0.423E+04	-0.286E+05	-0.417E+02
	124.11	-0.224E+01	0.791E+00	-0.320E+04	-0.139E+05	-0.181E+03
14	-82.42	-0.174E+00	-0.911E+01	-0.221E+04	-0.214E+05	-0.137E+03
	129.10	-0.251E+01	0.263E+01	-0.317E+04	-0.138E+05	-0.595E+03
15	-69.09	-0.893E-01	-0.106E+02	0.545E+03	-0.154E+05	-0.174E+03
	133.35	-0.281E+01	0.301E+01	-0.312E+04	-0.135E+05	-0.758E+03
16	-55.53	-0.226E-01	-0.112E+02	0.366E+04	-0.260E+05	-0.194E+03
	136.84	-0.311E+01	0.315E+01	-0.306E+04	-0.133E+05	-0.844E+03
17	-41.80	0.230E-01	-0.121E+02	0.693E+04	-0.371E+05	-0.201E+03
	139.57	-0.338E+01	0.338E+01	-0.301E+04	-0.131E+05	-0.871E+03
18	-27.94	0.474E-01	-0.139E+02	0.101E+05	-0.440E+05	-0.184E+03
	141.53	-0.361E+01	0.391E+01	-0.295E+04	-0.128E+05	-0.801E+03
19	-13.99	0.540E-01	-0.158E+02	0.127E+05	-0.440E+05	-0.138E+03
	142.70	-0.376E+01	0.446E+01	-0.288E+04	-0.125E+05	-0.601E+03
20	0.00	0.500E-01	-0.186E+02	0.143E+05	-0.440E+05	-0.560E+02
	143.09	-0.382E+01	0.444E+01	-0.281E+04	-0.122E+05	-0.243E+03
21	13.99	0.459E-01	-0.207E+02	0.143E+05	-0.440E+05	0.621E+02
	142.70	-0.377E+01	-0.570E+01	-0.282E+04	-0.122E+05	0.270E+03
22	27.94	0.531E-01	-0.176E+02	0.122E+05	-0.440E+05	0.171E+03
	141.53	-0.361E+01	-0.496E+01	-0.290E+04	-0.126E+05	0.743E+03
23	41.80	0.808E-01	-0.158E+02	0.883E+04	-0.435E+05	0.242E+03
	139.57	-0.335E+01	-0.441E+01	-0.298E+04	-0.129E+05	0.105E+04
24	55.53	0.133E+00	-0.133E+02	0.453E+04	-0.290E+05	0.277E+03
	136.84	-0.304E+01	-0.370E+01	-0.305E+04	-0.132E+05	0.120E+04
25	69.09	0.210E+00	-0.977E+01	-0.285E+02	-0.136E+05	0.266E+03
	133.35	-0.270E+01	-0.276E+01	-0.311E+04	-0.135E+05	0.116E+04
26	82.42	0.306E+00	-0.395E+01	-0.406E+04	-0.278E+05	0.188E+03
	129.10	-0.237E+01	-0.115E+01	-0.315E+04	-0.137E+05	0.816E+03
27	95.50	0.412E+00	0.159E+01	-0.634E+04	-0.357E+05	0.280E+02
	124.11	-0.206E+01	-0.469E+00	-0.317E+04	-0.138E+05	0.122E+03
28	108.28	0.519E+00	-0.646E+01	-0.574E+04	-0.337E+05	-0.115E+03
	118.40	-0.180E+01	-0.190E+01	-0.318E+04	-0.138E+05	-0.500E+03
29	120.72	0.622E+00	-0.266E+02	-0.383E+04	-0.274E+05	-0.629E+02
	111.98	-0.158E+01	-0.775E+01	-0.325E+04	-0.141E+05	-0.273E+03

30	132.78	0.723E+00	-0.121E+02	-0.454E+04	-0.302E+05	0.249E+02
	104.87	-0.140E+01	-0.357E+01	-0.332E+04	-0.144E+05	0.108E+03
31	144.43	0.817E+00	-0.156E+02	-0.496E+04	-0.319E+05	0.318E+02
	97.10	-0.124E+01	-0.463E+01	-0.338E+04	-0.147E+05	0.138E+03
32	155.61	0.898E+00	-0.235E+02	-0.574E+04	-0.350E+05	0.424E+02
	88.69	-0.112E+01	-0.760E+01	-0.347E+04	-0.151E+05	0.184E+03
33	166.18	0.965E+00	-0.323E+02	-0.635E+04	-0.373E+05	0.215E+02
	78.98	-0.104E+01	0.758E+00	-0.353E+04	-0.153E+05	0.933E+02
34	175.27	0.101E+01	-0.353E+02	-0.641E+04	-0.372E+05	0.157E+02
	67.89	-0.994E+00	0.109E+02	-0.345E+04	-0.150E+05	0.680E+02
35	182.71	0.102E+01	-0.370E+02	-0.673E+04	-0.376E+05	0.597E+02
	55.62	-0.981E+00	0.112E+02	-0.329E+04	-0.143E+05	0.259E+03
36	188.35	0.978E+00	-0.310E+02	-0.794E+04	-0.412E+05	0.928E+02
	42.43	-0.990E+00	0.936E+01	-0.316E+04	-0.137E+05	0.403E+03
37	192.08	0.883E+00	-0.151E+02	-0.908E+04	-0.440E+05	-0.148E+02
	28.58	-0.101E+01	0.462E+01	-0.306E+04	-0.133E+05	-0.645E+02
38	193.83	0.724E+00	-0.508E+01	-0.708E+04	-0.376E+05	-0.298E+03
	14.34	-0.102E+01	0.163E+01	-0.300E+04	-0.130E+05	-0.129E+04
39	193.56	0.519E+00	0.497E+01	-0.158E-10	-0.127E+05	-0.648E+03
	0.00	-0.101E+01	-0.137E+01	-0.293E+04	-0.127E+05	-0.282E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.44249E-03	-0.44249E-03	.32048	0.00000
2	-0.12658E-02	0.36154E-03	.91676	0.00000
3	-0.14966E-02	0.56640E-03	1.0840	0.05620
4	-0.13283E-02	0.37678E-03	.96207	0.00000
5	-0.11725E-02	0.17928E-03	.84919	0.00000
6	-0.11424E-02	0.13063E-03	.82742	0.00000
7	-0.11604E-02	0.17229E-03	.84047	0.00000
8	-0.10695E-02	0.11431E-03	.77459	0.00000
9	-0.92337E-03	-0.76237E-05	.66878	0.00000
10	-0.83274E-03	-0.80390E-04	.60313	0.00000
11	-0.74799E-03	-0.14394E-03	.54175	0.00000
12	-0.89622E-03	0.20151E-04	.64911	0.00000
13	-0.89617E-03	0.24773E-04	.64907	0.00000
14	-0.67200E-03	-0.19142E-03	.48671	0.00000
15	-0.36575E-03	-0.48444E-03	.35086	0.00000
16	-0.19884E-04	-0.81565E-03	.59076	0.00000
17	0.34373E-03	-0.11637E-02	.84287	0.00000
18	0.70327E-03	-0.15145E-02	1.0969	0.06032
19	0.10543E-02	-0.19452E-02	1.4088	0.18820
20	0.13044E-02	-0.23092E-02	1.6725	0.25694
21	0.13002E-02	-0.23064E-02	1.6705	0.25667
22	0.98438E-03	-0.18541E-02	1.3429	0.16679
23	0.55434E-03	-0.13662E-02	.98950	0.00000
24	0.77323E-04	-0.90868E-03	.65814	0.00000
25	-0.42705E-03	-0.42085E-03	.30930	0.00000
26	-0.87158E-03	0.12670E-04	.63126	0.00000
27	-0.11217E-02	0.25795E-03	.81242	0.00000
28	-0.10581E-02	0.19039E-03	.76635	0.00000
29	-0.85884E-03	-0.26047E-04	.62204	0.00000
30	-0.94689E-03	0.40547E-04	.68581	0.00000
31	-0.10011E-02	0.78554E-04	.72509	0.00000
32	-0.10975E-02	0.15050E-03	.79492	0.00000
33	-0.11711E-02	0.20974E-03	.84822	0.00000
34	-0.11676E-02	0.22803E-03	.84563	0.00000

35	-0.11814E-02	0.28345E-03	.85563	0.00000
36	-0.12941E-02	0.43335E-03	.93730	0.00000
37	-0.14062E-02	0.57080E-03	1.0185	0.01293
38	-0.11784E-02	0.36126E-03	.85345	0.00000
39	-0.39975E-03	-0.39975E-03	.28953	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.35609	0.00000	0.12680
2	-0.36384	-0.47050	0.60288
3	-0.37168	-0.59232	0.73047
4	-0.38288	-0.49299	0.63959
5	-0.39964	-0.39083	0.55054
6	-0.40712	-0.36808	0.53382
7	-0.39761	-0.38533	0.54342
8	-0.38433	-0.34226	0.48997
9	-0.37461	-0.26477	0.40510
10	-0.36742	-0.21753	0.35253
11	-0.35889	-0.17465	0.30345
12	-0.35251	-0.26495	0.38921
13	-0.35063	-0.26627	0.38921
14	-0.34742	-0.13895	0.25965
15	-0.34209	0.03431	0.15134
16	-0.33620	0.23008	0.34311
17	-0.32995	0.43586	0.54472
18	-0.32316	0.63568	0.74011
19	-0.31573	0.80071	0.90039
20	-0.30829	0.90216	0.99720
21	-0.30928	0.90054	0.99619
22	-0.31819	0.77040	0.87164
23	-0.32667	0.55529	0.66200
24	-0.33452	0.28508	0.39699
25	-0.34117	-0.00179	0.11819
26	-0.34560	-0.25566	0.37511
27	-0.34755	-0.39890	0.51969
28	-0.34914	-0.36097	0.48288
29	-0.35606	-0.24079	0.36756
30	-0.36469	-0.28550	0.41850
31	-0.37122	-0.31217	0.44997
32	-0.38107	-0.36085	0.50606
33	-0.38684	-0.39925	0.54889
34	-0.37804	-0.40351	0.54642
35	-0.36130	-0.42352	0.55406
36	-0.34635	-0.49946	0.61942
37	-0.33603	-0.57139	0.68431
38	-0.32878	-0.44515	0.55324
39	-0.32170	0.00000	0.10349

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

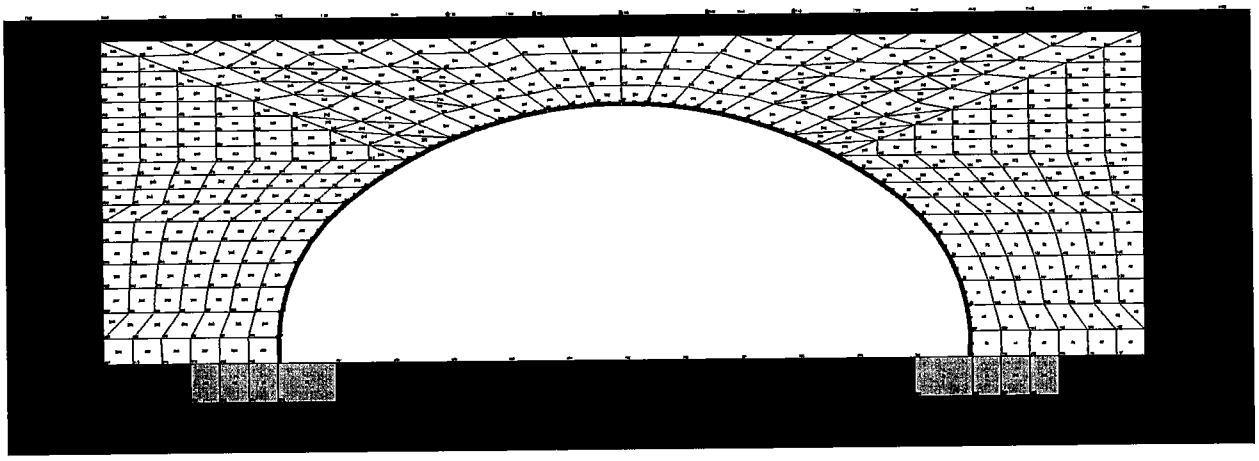
LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	16122.	30800.	0.523
BUCKLING THRUST (psi)	6	16122.	51049.	0.316
SEAM THRUST (psi)	6	16122.	21589.	0.747
PLASTIC-PENETRATE (%)	20	25.69	90.00	0.285
COMBINED T&M Ratio	20	0.997	1.000	0.997

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	1.35
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.27
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *



SU6

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***


 MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1


        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage SU6

        EXECUTION MODE ..................   ANALYS

        SOLUTION LEVEL ..................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99


        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38


        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -69.70	F = 0.000
1142	22	F = 0.000	F = -69.70	F = 0.000
1143	21	F = 0.000	F = -69.70	F = 0.000
1143	22	F = 0.000	F = -69.70	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000

836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-32.80	F =	0.000
1141	22	F =	0.000	F =	-32.80	F =	0.000
1139	21	F =	0.000	F =	-32.80	F =	0.000
1139	22	F =	0.000	F =	-32.80	F =	0.000
1135	21	F =	0.000	F =	-49.20	F =	0.000
1135	22	F =	0.000	F =	-49.20	F =	0.000
1145	21	F =	0.000	F =	-32.80	F =	0.000
1145	22	F =	0.000	F =	-32.80	F =	0.000

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* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060
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* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO. NORMAL-ANGLE COEF-FRICTION TENSILE-RUPTURE INITIAL-GAP

1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.359E+00	-0.187E+01	0.108E-10	-0.101E+05	0.409E+03
	0.00	-0.930E+00	-0.577E+00	-0.234E+04	-0.101E+05	0.178E+04

2	-193.83	-0.444E+00	-0.793E+01	-0.430E+04	-0.253E+05	0.184E+03
	14.34	-0.937E+00	-0.241E+01	-0.240E+04	-0.104E+05	0.801E+03
3	-192.08	-0.502E+00	-0.140E+02	-0.537E+04	-0.293E+05	-0.688E+00
	28.58	-0.934E+00	-0.425E+01	-0.246E+04	-0.107E+05	-0.299E+01
4	-188.35	-0.522E+00	-0.257E+02	-0.434E+04	-0.261E+05	-0.678E+02
	42.43	-0.934E+00	-0.775E+01	-0.254E+04	-0.110E+05	-0.295E+03
5	-182.71	-0.513E+00	-0.292E+02	-0.347E+04	-0.233E+05	-0.356E+02
	55.62	-0.943E+00	-0.181E+01	-0.260E+04	-0.113E+05	-0.155E+03
6	-175.27	-0.483E+00	-0.255E+02	-0.334E+04	-0.228E+05	-0.797E+01
	67.89	-0.968E+00	0.319E+01	-0.258E+04	-0.112E+05	-0.346E+02
7	-166.18	-0.437E+00	-0.203E+02	-0.324E+04	-0.222E+05	-0.389E+02
	78.98	-0.101E+01	0.494E+01	-0.252E+04	-0.109E+05	-0.169E+03
8	-155.61	-0.382E+00	-0.156E+02	-0.221E+04	-0.183E+05	-0.801E+02
	88.69	-0.108E+01	0.505E+01	-0.244E+04	-0.106E+05	-0.348E+03
9	-144.43	-0.326E+00	-0.126E+02	-0.939E+03	-0.136E+05	-0.673E+02
	97.10	-0.116E+01	0.370E+01	-0.237E+04	-0.103E+05	-0.292E+03
10	-132.78	-0.271E+00	-0.114E+02	-0.265E+03	-0.110E+05	-0.303E+02
	104.87	-0.125E+01	0.333E+01	-0.232E+04	-0.101E+05	-0.131E+03
11	-120.72	-0.220E+00	-0.126E+02	-0.342E+01	-0.988E+04	0.968E+01
	111.98	-0.135E+01	0.369E+01	-0.227E+04	-0.986E+04	0.421E+02
12	-108.28	-0.173E+00	-0.687E+01	-0.426E+03	-0.112E+05	0.205E+02
	118.40	-0.145E+01	0.201E+01	-0.223E+04	-0.969E+04	0.889E+02
13	-95.50	-0.132E+00	-0.651E+01	-0.442E+03	-0.111E+05	-0.929E+01
	124.11	-0.155E+01	0.190E+01	-0.220E+04	-0.957E+04	-0.404E+02
14	-82.42	-0.950E-01	-0.756E+01	-0.791E+01	-0.947E+04	-0.326E+02
	129.10	-0.166E+01	0.221E+01	-0.217E+04	-0.944E+04	-0.142E+03
15	-69.09	-0.645E-01	-0.772E+01	0.648E+03	-0.115E+05	-0.457E+02
	133.35	-0.177E+01	0.225E+01	-0.214E+04	-0.930E+04	-0.199E+03
16	-55.53	-0.413E-01	-0.793E+01	0.146E+04	-0.142E+05	-0.542E+02
	136.84	-0.188E+01	0.231E+01	-0.210E+04	-0.914E+04	-0.235E+03
17	-41.80	-0.261E-01	-0.817E+01	0.234E+04	-0.171E+05	-0.576E+02
	139.57	-0.198E+01	0.238E+01	-0.207E+04	-0.899E+04	-0.250E+03
18	-27.94	-0.185E-01	-0.856E+01	0.323E+04	-0.200E+05	-0.544E+02
	141.53	-0.207E+01	0.250E+01	-0.203E+04	-0.882E+04	-0.236E+03
19	-13.99	-0.174E-01	-0.901E+01	0.399E+04	-0.225E+05	-0.433E+02
	142.70	-0.213E+01	0.261E+01	-0.199E+04	-0.866E+04	-0.188E+03
20	0.00	-0.203E-01	-0.927E+01	0.452E+04	-0.242E+05	-0.252E+02
	143.09	-0.216E+01	0.176E+01	-0.196E+04	-0.851E+04	-0.110E+03
21	13.99	-0.240E-01	-0.982E+01	0.473E+04	-0.249E+05	-0.798E+00
	142.70	-0.216E+01	-0.287E+01	-0.197E+04	-0.854E+04	-0.346E+01

22	27.94	-0.252E-01	-0.969E+01	0.451E+04	-0.244E+05	0.253E+02
	141.53	-0.213E+01	-0.283E+01	-0.201E+04	-0.872E+04	0.110E+03
23	41.80	-0.205E-01	-0.947E+01	0.393E+04	-0.225E+05	0.467E+02
	139.57	-0.207E+01	-0.276E+01	-0.205E+04	-0.890E+04	0.203E+03
24	55.53	-0.713E-02	-0.905E+01	0.307E+04	-0.197E+05	0.611E+02
	136.84	-0.198E+01	-0.262E+01	-0.209E+04	-0.908E+04	0.265E+03
25	69.09	0.163E-01	-0.835E+01	0.204E+04	-0.163E+05	0.656E+02
	133.35	-0.187E+01	-0.242E+01	-0.213E+04	-0.925E+04	0.285E+03
26	82.42	0.499E-01	-0.815E+01	0.103E+04	-0.130E+05	0.616E+02
	129.10	-0.175E+01	-0.236E+01	-0.217E+04	-0.941E+04	0.267E+03
27	95.50	0.928E-01	-0.658E+01	0.117E+03	-0.996E+04	0.432E+02
	124.11	-0.162E+01	-0.191E+01	-0.220E+04	-0.955E+04	0.188E+03
28	108.28	0.143E+00	-0.588E+01	-0.368E+03	-0.109E+05	0.728E+01
	118.40	-0.150E+01	-0.171E+01	-0.223E+04	-0.967E+04	0.316E+02
29	120.72	0.200E+00	-0.125E+02	-0.257E+03	-0.107E+05	0.109E+02
	111.98	-0.138E+01	-0.365E+01	-0.226E+04	-0.984E+04	0.474E+02
30	132.78	0.261E+00	-0.106E+02	-0.818E+03	-0.129E+05	0.454E+02
	104.87	-0.126E+01	-0.311E+01	-0.231E+04	-0.101E+05	0.197E+03
31	144.43	0.326E+00	-0.118E+02	-0.164E+04	-0.160E+05	0.719E+02
	97.10	-0.116E+01	-0.347E+01	-0.236E+04	-0.103E+05	0.312E+03
32	155.61	0.389E+00	-0.149E+02	-0.292E+04	-0.207E+05	0.747E+02
	88.69	-0.107E+01	-0.481E+01	-0.243E+04	-0.106E+05	0.325E+03
33	166.18	0.448E+00	-0.199E+02	-0.381E+04	-0.241E+05	0.271E+02
	78.98	-0.994E+00	-0.596E+01	-0.251E+04	-0.109E+05	0.118E+03
34	175.27	0.496E+00	-0.258E+02	-0.371E+04	-0.241E+05	-0.311E+01
	67.89	-0.948E+00	-0.274E+01	-0.258E+04	-0.112E+05	-0.135E+02
35	182.71	0.527E+00	-0.291E+02	-0.372E+04	-0.241E+05	0.281E+02
	55.62	-0.923E+00	0.318E+01	-0.258E+04	-0.112E+05	0.122E+03
36	188.35	0.535E+00	-0.254E+02	-0.449E+04	-0.265E+05	0.611E+02
	42.43	-0.914E+00	0.767E+01	-0.251E+04	-0.109E+05	0.266E+03
37	192.08	0.511E+00	-0.139E+02	-0.542E+04	-0.293E+05	-0.416E+01
	28.58	-0.916E+00	0.423E+01	-0.242E+04	-0.105E+05	-0.181E+02
38	193.83	0.451E+00	-0.783E+01	-0.430E+04	-0.252E+05	-0.186E+03
	14.34	-0.918E+00	0.238E+01	-0.236E+04	-0.103E+05	-0.808E+03
39	193.56	0.363E+00	-0.171E+01	-0.449E-10	-0.100E+05	-0.408E+03
	0.00	-0.912E+00	0.530E+00	-0.231E+04	-0.100E+05	-0.177E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.31835E-03	-0.31835E-03	.23058	0.00000

2	-0.79410E-03	0.14108E-03	.57515	0.00000
3	-0.91873E-03	0.24937E-03	.66541	0.00000
4	-0.81783E-03	0.12651E-03	.59234	0.00000
5	-0.73100E-03	0.23151E-04	.52944	0.00000
6	-0.71581E-03	0.11725E-04	.51844	0.00000
7	-0.69644E-03	0.94028E-05	.50442	0.00000
8	-0.57344E-03	-0.92178E-04	.41533	0.00000
9	-0.42565E-03	-0.22142E-03	.30829	0.00000
10	-0.34523E-03	-0.28754E-03	.25004	0.00000
11	-0.30991E-03	-0.30917E-03	.22446	0.00000
12	-0.35050E-03	-0.25783E-03	.25386	0.00000
13	-0.34855E-03	-0.25228E-03	.25245	0.00000
14	-0.29714E-03	-0.29542E-03	.21521	0.00000
15	-0.22116E-03	-0.36222E-03	.26234	0.00000
16	-0.12837E-03	-0.44546E-03	.32264	0.00000
17	-0.26887E-04	-0.53708E-03	.38899	0.00000
18	0.74490E-04	-0.62824E-03	.45502	0.00000
19	0.16305E-03	-0.70627E-03	.51153	0.00000
20	0.22481E-03	-0.75915E-03	.54984	0.00000
21	0.24629E-03	-0.78255E-03	.56678	0.00000
22	0.21734E-03	-0.76469E-03	.55385	0.00000
23	0.14848E-03	-0.70708E-03	.51212	0.00000
24	0.49001E-04	-0.61874E-03	.44814	0.00000
25	-0.67754E-04	-0.51263E-03	.37129	0.00000
26	-0.18288E-03	-0.40767E-03	.29527	0.00000
27	-0.28708E-03	-0.31251E-03	.22634	0.00000
28	-0.34356E-03	-0.26342E-03	.24883	0.00000
29	-0.33672E-03	-0.28076E-03	.24388	0.00000
30	-0.40448E-03	-0.22647E-03	.29296	0.00000
31	-0.50112E-03	-0.14341E-03	.36295	0.00000
32	-0.64835E-03	-0.13798E-04	.46959	0.00000
33	-0.75703E-03	0.72192E-04	.54830	0.00000
34	-0.75546E-03	0.52906E-04	.54716	0.00000
35	-0.75554E-03	0.53146E-04	.54722	0.00000
36	-0.83031E-03	0.14723E-03	.60137	0.00000
37	-0.92049E-03	0.25939E-03	.66669	0.00000
38	-0.79069E-03	0.14596E-03	.57267	0.00000
39	-0.31424E-03	-0.31424E-03	.22759	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.25620	0.00000	0.06564
2	-0.26276	-0.27039	0.33943
3	-0.26934	-0.33773	0.41027
4	-0.27817	-0.27304	0.35042
5	-0.28482	-0.21805	0.29917
6	-0.28330	-0.21035	0.29061
7	-0.27645	-0.20408	0.28050
8	-0.26783	-0.13915	0.21088
9	-0.26037	-0.05905	0.12684
10	-0.25461	-0.01668	0.08150
11	-0.24910	-0.00021	0.06227
12	-0.24477	-0.02679	0.08671
13	-0.24176	-0.02784	0.08628
14	-0.23843	-0.00050	0.05735
15	-0.23473	0.04078	0.09588
16	-0.23090	0.09168	0.14499
17	-0.22693	0.14751	0.19901
18	-0.22281	0.20318	0.25283
19	-0.21858	0.25135	0.29912
20	-0.21500	0.28449	0.33072
21	-0.21578	0.29747	0.34403
22	-0.22024	0.28394	0.33244
23	-0.22477	0.24737	0.29789
24	-0.22925	0.19306	0.24562
25	-0.23353	0.12863	0.18317
26	-0.23762	0.06499	0.12146
27	-0.24126	0.00735	0.06556
28	-0.24424	-0.02317	0.08282
29	-0.24846	-0.01618	0.07791
30	-0.25388	-0.05147	0.11592
31	-0.25934	-0.10342	0.17068
32	-0.26643	-0.18347	0.25446
33	-0.27556	-0.23975	0.31569

34	-0.28269	-0.23372	0.31364
35	-0.28262	-0.23381	0.31369
36	-0.27486	-0.28264	0.35818
37	-0.26601	-0.34114	0.41190
38	-0.25942	-0.27081	0.33811
39	-0.25288	0.00000	0.06395

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	11279.	30800.	0.366
BUCKLING THRUST (psi)	5	11279.	54064.	0.209
SEAM THRUST (psi)	5	11279.	21589.	0.522
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	37	0.412	1.000	0.412

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.52

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.10

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage SU6-OPR (LL x 3.47)

        EXECUTION MODE ..................   ANALYS

        SOLUTION LEVEL ..................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4

             IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
             AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

        SECTION PROPERTIES OF CROSS-SECTION:

              THRUST AREA (IN**2/IN) ............   0.23020

              MOM. OF INERTIA (IN**4/IN) ........   0.87460

              SECTION MODULUS (IN**3/IN) ........   0.28840

              PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

        NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

        LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
        AND DEFLECTION LIMIT AT SERVICE LOAD

              THRUST STRESS YIELDING ............   0.70000

              BUCKLING STRESS FAILURE............   0.70000

              SEAM STRENGTH FAILURE .............   0.67000
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FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -242.0	F = 0.000
1142	22	F = 0.000	F = -242.0	F = 0.000
1143	21	F = 0.000	F = -242.0	F = 0.000
1143	22	F = 0.000	F = -242.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000

857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-113.9	F =	0.000
1141	22	F =	0.000	F =	-113.9	F =	0.000
1139	21	F =	0.000	F =	-113.9	F =	0.000
1139	22	F =	0.000	F =	-113.9	F =	0.000
1135	21	F =	0.000	F =	-170.9	F =	0.000
1135	22	F =	0.000	F =	-170.9	F =	0.000
1145	21	F =	0.000	F =	-113.9	F =	0.000
1145	22	F =	0.000	F =	-113.9	F =	0.000

* * * * * COMPLETED MESH GENERATION * * * * *

BRIDGECOR

CALCULATED KEY NUMBERS ...
THE NUMBER OF DATA ERRORS IS---------- 0
THE NUMBER OF SOIL MATERIALS IS-------- 4
THE NUMBER OF PIPE-TYPE GROUPS IS------ 1
THE NUMBER OF INTERFACE MATERIALS IS--- 37
BAND WIDTH ESTIMATE (MAX)---------- 2060

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16

18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000

32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.450	Factor for load step #21
22	1.450	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56 0.00	-0.545E+00 -0.112E+01	0.531E+01 0.144E+01	0.125E-09 -0.328E+04	-0.142E+05 -0.142E+05	0.716E+03 0.311E+04
2	-193.83 14.34	-0.744E+00 -0.113E+01	-0.548E+01 -0.177E+01	-0.775E+04 -0.335E+04	-0.414E+05 -0.145E+05	0.322E+03 0.140E+04
3	-192.08 28.58	-0.892E+00 -0.112E+01	-0.163E+02 -0.499E+01	-0.978E+04 -0.342E+04	-0.440E+05 -0.148E+05	0.375E+00 0.163E+01
4	-188.35 42.43	-0.972E+00 -0.111E+01	-0.343E+02 -0.104E+02	-0.817E+04 -0.352E+04	-0.436E+05 -0.153E+05	-0.125E+03 -0.545E+03
5	-182.71 55.62	-0.993E+00 -0.110E+01	-0.421E+02 -0.128E+02	-0.645E+04 -0.367E+04	-0.383E+05 -0.159E+05	-0.832E+02 -0.361E+03
6	-175.27 67.89	-0.972E+00 -0.113E+01	-0.402E+02 -0.472E+01	-0.591E+04 -0.379E+04	-0.369E+05 -0.164E+05	-0.174E+02 -0.756E+02
7	-166.18 78.98	-0.919E+00 -0.118E+01	-0.336E+02 0.826E+01	-0.595E+04 -0.376E+04	-0.369E+05 -0.163E+05	-0.192E+02 -0.834E+02
8	-155.61 88.69	-0.846E+00 -0.127E+01	-0.234E+02 0.755E+01	-0.524E+04 -0.364E+04	-0.340E+05 -0.158E+05	-0.565E+02 -0.245E+03
9	-144.43	-0.762E+00	-0.171E+02	-0.412E+04	-0.297E+05	-0.491E+02

	97.10	-0.139E+01	0.505E+01	-0.355E+04	-0.154E+05	-0.213E+03
10	-132.78	-0.668E+00	-0.144E+02	-0.352E+04	-0.273E+05	-0.247E+02
	104.87	-0.155E+01	0.422E+01	-0.348E+04	-0.151E+05	-0.107E+03
11	-120.72	-0.571E+00	-0.255E+02	-0.297E+04	-0.250E+05	0.625E+02
	111.98	-0.173E+01	0.742E+01	-0.340E+04	-0.148E+05	0.272E+03
12	-108.28	-0.473E+00	-0.727E+01	-0.470E+04	-0.308E+05	0.104E+03
	118.40	-0.194E+01	0.213E+01	-0.334E+04	-0.145E+05	0.451E+03
13	-95.50	-0.375E+00	-0.224E+01	-0.517E+04	-0.323E+05	-0.151E+02
	124.11	-0.218E+01	0.696E+00	-0.332E+04	-0.144E+05	-0.657E+02
14	-82.42	-0.279E+00	-0.853E+01	-0.341E+04	-0.261E+05	-0.124E+03
	129.10	-0.246E+01	0.248E+01	-0.329E+04	-0.143E+05	-0.539E+03
15	-69.09	-0.192E+00	-0.107E+02	-0.697E+03	-0.165E+05	-0.172E+03
	133.35	-0.276E+01	0.307E+01	-0.324E+04	-0.141E+05	-0.746E+03
16	-55.53	-0.122E+00	-0.115E+02	0.246E+04	-0.224E+05	-0.195E+03
	136.84	-0.307E+01	0.325E+01	-0.319E+04	-0.139E+05	-0.849E+03
17	-41.80	-0.716E-01	-0.125E+02	0.584E+04	-0.338E+05	-0.204E+03
	139.57	-0.337E+01	0.350E+01	-0.313E+04	-0.136E+05	-0.886E+03
18	-27.94	-0.432E-01	-0.143E+02	0.914E+04	-0.440E+05	-0.189E+03
	141.53	-0.364E+01	0.401E+01	-0.307E+04	-0.133E+05	-0.821E+03
19	-13.99	-0.338E-01	-0.159E+02	0.119E+05	-0.440E+05	-0.147E+03
	142.70	-0.383E+01	0.446E+01	-0.300E+04	-0.130E+05	-0.637E+03
20	0.00	-0.369E-01	-0.182E+02	0.138E+05	-0.440E+05	-0.731E+02
	143.09	-0.394E+01	0.519E+01	-0.292E+04	-0.127E+05	-0.318E+03
21	13.99	-0.427E-01	-0.193E+02	0.142E+05	-0.440E+05	0.260E+02
	142.70	-0.395E+01	-0.501E+01	-0.292E+04	-0.127E+05	0.113E+03
22	27.94	-0.399E-01	-0.170E+02	0.129E+05	-0.440E+05	0.115E+03
	141.53	-0.384E+01	-0.478E+01	-0.299E+04	-0.130E+05	0.498E+03
23	41.80	-0.186E-01	-0.159E+02	0.104E+05	-0.440E+05	0.175E+03
	139.57	-0.364E+01	-0.443E+01	-0.307E+04	-0.133E+05	0.762E+03
24	55.53	0.274E-01	-0.146E+02	0.712E+04	-0.383E+05	0.216E+03
	136.84	-0.336E+01	-0.406E+01	-0.314E+04	-0.136E+05	0.937E+03
25	69.09	0.999E-01	-0.128E+02	0.335E+04	-0.255E+05	0.230E+03
	133.35	-0.304E+01	-0.357E+01	-0.320E+04	-0.139E+05	0.100E+04
26	82.42	0.197E+00	-0.108E+02	-0.468E+03	-0.158E+05	0.215E+03
	129.10	-0.270E+01	-0.305E+01	-0.326E+04	-0.142E+05	0.933E+03
27	95.50	0.312E+00	-0.211E+01	-0.382E+04	-0.276E+05	0.122E+03
	124.11	-0.237E+01	-0.623E+00	-0.330E+04	-0.143E+05	0.529E+03
28	108.28	0.435E+00	-0.271E+01	-0.495E+04	-0.315E+05	-0.288E+02
	118.40	-0.207E+01	-0.814E+00	-0.331E+04	-0.144E+05	-0.125E+03
29	120.72	0.561E+00	-0.254E+02	-0.394E+04	-0.283E+05	-0.183E+02
	111.98	-0.180E+01	-0.737E+01	-0.337E+04	-0.146E+05	-0.793E+02

30	132.78	0.687E+00	-0.124E+02	-0.522E+04	-0.331E+05	0.563E+02
	104.87	-0.157E+01	-0.363E+01	-0.345E+04	-0.150E+05	0.245E+03
31	144.43	0.806E+00	-0.146E+02	-0.616E+04	-0.366E+05	0.509E+02
	97.10	-0.138E+01	-0.432E+01	-0.351E+04	-0.152E+05	0.221E+03
32	155.61	0.910E+00	-0.223E+02	-0.713E+04	-0.403E+05	0.362E+02
	88.69	-0.123E+01	-0.721E+01	-0.359E+04	-0.156E+05	0.157E+03
33	166.18	0.996E+00	-0.341E+02	-0.750E+04	-0.422E+05	0.357E+00
	78.98	-0.112E+01	-0.102E+02	-0.372E+04	-0.161E+05	0.155E+01
34	175.27	0.105E+01	-0.399E+02	-0.731E+04	-0.415E+05	0.817E+01
	67.89	-0.106E+01	0.106E+02	-0.372E+04	-0.161E+05	0.355E+02
35	182.71	0.107E+01	-0.399E+02	-0.775E+04	-0.423E+05	0.690E+02
	55.62	-0.104E+01	0.121E+02	-0.356E+04	-0.155E+05	0.300E+03
36	188.35	0.104E+01	-0.332E+02	-0.913E+04	-0.440E+05	0.103E+03
	42.43	-0.105E+01	0.100E+02	-0.341E+04	-0.148E+05	0.446E+03
37	192.08	0.944E+00	-0.157E+02	-0.104E+05	-0.440E+05	-0.206E+02
	28.58	-0.107E+01	0.481E+01	-0.331E+04	-0.144E+05	-0.897E+02
38	193.83	0.772E+00	-0.457E+01	-0.803E+04	-0.419E+05	-0.338E+03
	14.34	-0.108E+01	0.151E+01	-0.324E+04	-0.141E+05	-0.147E+04
39	193.56	0.547E+00	0.653E+01	-0.367E-10	-0.138E+05	-0.731E+03
	0.00	-0.107E+01	-0.179E+01	-0.317E+04	-0.138E+05	-0.318E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.44654E-03	-0.44654E-03	.32342	0.00000
2	-0.12988E-02	0.38667E-03	.94072	0.00000
3	-0.15518E-02	0.60687E-03	1.1239	0.07928
4	-0.13688E-02	0.40997E-03	.99140	0.00000
5	-0.12016E-02	0.20151E-03	.87026	0.00000
6	-0.11590E-02	0.12680E-03	.83947	0.00000
7	-0.11592E-02	0.13483E-03	.83961	0.00000
8	-0.10664E-02	0.74054E-04	.77237	0.00000
9	-0.93183E-03	-0.35032E-04	.67490	0.00000
10	-0.85726E-03	-0.91196E-04	.62090	0.00000
11	-0.78597E-03	-0.14043E-03	.56926	0.00000
12	-0.96566E-03	0.56340E-04	.69941	0.00000
13	-0.10148E-02	0.11026E-03	.73497	0.00000
14	-0.81999E-03	-0.77305E-04	.59390	0.00000
15	-0.51798E-03	-0.36639E-03	.37516	0.00000
16	-0.16662E-03	-0.70284E-03	.50905	0.00000
17	0.20839E-03	-0.10619E-02	.76908	0.00000
18	0.57672E-03	-0.14134E-02	1.0237	0.01642
19	0.92898E-03	-0.18151E-02	1.3146	0.15831
20	0.12048E-02	-0.21986E-02	1.5924	0.24032
21	0.12653E-02	-0.22980E-02	1.6644	0.25743
22	0.10623E-02	-0.20060E-02	1.4529	0.20381
23	0.72598E-03	-0.15792E-02	1.1438	0.08613
24	0.34738E-03	-0.12028E-02	.87114	0.00000
25	-0.72733E-04	-0.80068E-03	.57991	0.00000
26	-0.49565E-03	-0.39387E-03	.35898	0.00000
27	-0.86524E-03	-0.33952E-04	.62667	0.00000
28	-0.98968E-03	0.86938E-04	.71680	0.00000
29	-0.88764E-03	-0.30477E-04	.64290	0.00000
30	-0.10378E-02	0.98236E-04	.75163	0.00000
31	-0.11479E-02	0.19220E-03	.83138	0.00000
32	-0.12649E-02	0.28603E-03	.91614	0.00000

33	-0.13230E-02	0.30951E-03	.95821	0.00000
34	-0.13016E-02	0.28839E-03	.94270	0.00000
35	-0.13279E-02	0.35750E-03	.96176	0.00000
36	-0.14641E-02	0.53020E-03	1.0604	0.04184
37	-0.16182E-02	0.69058E-03	1.1720	0.10286
38	-0.13153E-02	0.43116E-03	.95261	0.00000
39	-0.43270E-03	-0.43270E-03	.31339	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.35935	0.00000	0.12913
2	-0.36704	-0.48733	0.62205
3	-0.37476	-0.61559	0.75603
4	-0.38582	-0.51430	0.66315
5	-0.40239	-0.40567	0.56759
6	-0.41535	-0.37178	0.54429
7	-0.41220	-0.37416	0.54406
8	-0.39930	-0.32974	0.48918
9	-0.38904	-0.25929	0.41064
10	-0.38164	-0.22149	0.36714
11	-0.37276	-0.18664	0.32559
12	-0.36589	-0.29549	0.42937
13	-0.36395	-0.32528	0.45774
14	-0.36105	-0.21473	0.34509
15	-0.35585	-0.04383	0.17046
16	-0.34985	0.15504	0.27743
17	-0.34342	0.36727	0.48520
18	-0.33643	0.57502	0.68820
19	-0.32888	0.74982	0.85798
20	-0.32079	0.86628	0.96918
21	-0.32051	0.89065	0.99338
22	-0.32847	0.80923	0.91712
23	-0.33645	0.65522	0.76841
24	-0.34419	0.44820	0.56667
25	-0.35144	0.21047	0.33398
26	-0.35792	-0.02943	0.15753
27	-0.36181	-0.24035	0.37126
28	-0.36324	-0.31128	0.44323
29	-0.36943	-0.24783	0.38431
30	-0.37805	-0.32845	0.47137
31	-0.38454	-0.38746	0.53533
32	-0.39387	-0.44842	0.60356
33	-0.40780	-0.47200	0.63831
34	-0.40768	-0.45970	0.62591
35	-0.39046	-0.48730	0.63976
36	-0.37438	-0.57428	0.71444
37	-0.36340	-0.65195	0.78401
38	-0.35574	-0.50494	0.63149
39	-0.34822	0.00000	0.12125

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

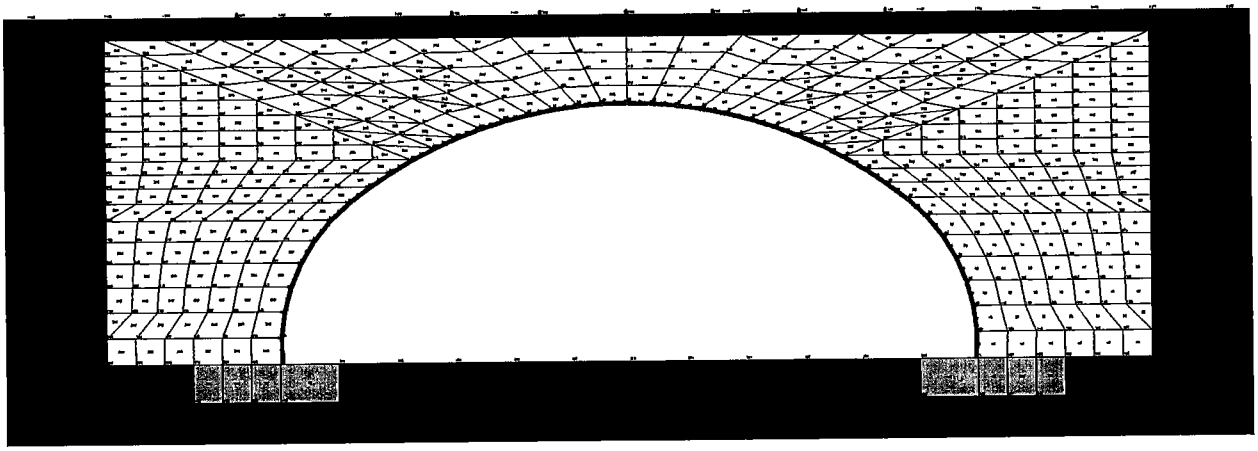
LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	16448.	30800.	0.534
BUCKLING THRUST (psi)	6	16448.	50592.	0.325
SEAM THRUST (psi)	6	16448.	21589.	0.762
PLASTIC-PENETRATE (%)	21	25.74	90.00	0.286
COMBINED T&M Ratio	21	0.993	1.000	0.993

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	1.38
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.28
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * *



SU7

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage SU7

EXECUTION MODE ..................   ANALYS

SOLUTION LEVEL ..................  #3 USER

METHODOLOGY (LRFD OR SERVICE) ...     LRFD

NUMBER OF PIPE-ELEMENT GROUPS ....       1

MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL

NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

      POISSONS RATIO OF METAL (-) .......    0.30000E+00

      YIELD STRESS OF METAL (PSI)........    0.44000E+05

      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

      DENSITY OF METAL (PCI).............    0.28400E+00

      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........     2

     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

 LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -69.70	F = 0.000
1142	22	F = 0.000	F = -69.70	F = 0.000
1143	21	F = 0.000	F = -69.70	F = 0.000
1143	22	F = 0.000	F = -69.70	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000

811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-32.80	F =	0.000
1141	22	F =	0.000	F =	-32.80	F =	0.000
1139	21	F =	0.000	F =	-32.80	F =	0.000
1139	22	F =	0.000	F =	-32.80	F =	0.000
1135	21	F =	0.000	F =	-49.20	F =	0.000
1135	22	F =	0.000	F =	-49.20	F =	0.000
1145	21	F =	0.000	F =	-32.80	F =	0.000
1145	22	F =	0.000	F =	-32.80	F =	0.000
1146	21	F =	0.000	F =	-32.80	F =	0.000
1146	22	F =	0.000	F =	-32.80	F =	0.000

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* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
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THE NUMBER OF PIPE-TYPE GROUPS IS------ 1
THE NUMBER OF INTERFACE MATERIALS IS--- 37
BAND WIDTH ESTIMATE (MAX)---------- 2060

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS

1	-193.56	-0.364E+00	-0.184E+01	-0.492E-10	-0.102E+05	0.411E+03
	0.00	-0.930E+00	-0.568E+00	-0.234E+04	-0.102E+05	0.178E+04
2	-193.83	-0.451E+00	-0.793E+01	-0.432E+04	-0.254E+05	0.185E+03
	14.34	-0.937E+00	-0.241E+01	-0.240E+04	-0.104E+05	0.804E+03
3	-192.08	-0.510E+00	-0.140E+02	-0.540E+04	-0.294E+05	-0.720E+00
	28.58	-0.934E+00	-0.426E+01	-0.246E+04	-0.107E+05	-0.313E+01
4	-188.35	-0.533E+00	-0.256E+02	-0.437E+04	-0.262E+05	-0.689E+02
	42.43	-0.933E+00	-0.774E+01	-0.254E+04	-0.110E+05	-0.299E+03
5	-182.71	-0.525E+00	-0.293E+02	-0.347E+04	-0.234E+05	-0.378E+02
	55.62	-0.942E+00	-0.255E+01	-0.261E+04	-0.113E+05	-0.164E+03
6	-175.27	-0.496E+00	-0.257E+02	-0.331E+04	-0.228E+05	-0.103E+02
	67.89	-0.966E+00	0.259E+01	-0.260E+04	-0.113E+05	-0.448E+02
7	-166.18	-0.452E+00	-0.208E+02	-0.318E+04	-0.221E+05	-0.398E+02
	78.98	-0.101E+01	0.393E+01	-0.255E+04	-0.111E+05	-0.173E+03
8	-155.61	-0.398E+00	-0.160E+02	-0.216E+04	-0.183E+05	-0.788E+02
	88.69	-0.107E+01	0.517E+01	-0.248E+04	-0.108E+05	-0.342E+03
9	-144.43	-0.344E+00	-0.127E+02	-0.918E+03	-0.137E+05	-0.650E+02
	97.10	-0.115E+01	0.375E+01	-0.241E+04	-0.105E+05	-0.282E+03
10	-132.78	-0.290E+00	-0.115E+02	-0.280E+03	-0.112E+05	-0.281E+02
	104.87	-0.124E+01	0.337E+01	-0.236E+04	-0.102E+05	-0.122E+03
11	-120.72	-0.240E+00	-0.128E+02	-0.492E+02	-0.102E+05	0.121E+02
	111.98	-0.134E+01	0.375E+01	-0.231E+04	-0.100E+05	0.526E+02
12	-108.28	-0.195E+00	-0.713E+01	-0.513E+03	-0.116E+05	0.241E+02
	118.40	-0.144E+01	0.209E+01	-0.227E+04	-0.985E+04	0.105E+03
13	-95.50	-0.154E+00	-0.658E+01	-0.592E+03	-0.118E+05	-0.536E+01
	124.11	-0.154E+01	0.193E+01	-0.224E+04	-0.973E+04	-0.233E+02
14	-82.42	-0.118E+00	-0.761E+01	-0.205E+03	-0.103E+05	-0.299E+02
	129.10	-0.165E+01	0.223E+01	-0.221E+04	-0.960E+04	-0.130E+03
15	-69.09	-0.868E-01	-0.781E+01	0.424E+03	-0.109E+05	-0.440E+02
	133.35	-0.176E+01	0.228E+01	-0.218E+04	-0.945E+04	-0.191E+03
16	-55.53	-0.631E-01	-0.801E+01	0.122E+04	-0.135E+05	-0.533E+02
	136.84	-0.187E+01	0.234E+01	-0.214E+04	-0.930E+04	-0.231E+03
17	-41.80	-0.472E-01	-0.825E+01	0.211E+04	-0.164E+05	-0.575E+02
	139.57	-0.197E+01	0.241E+01	-0.210E+04	-0.914E+04	-0.250E+03
18	-27.94	-0.390E-01	-0.868E+01	0.300E+04	-0.194E+05	-0.550E+02
	141.53	-0.206E+01	0.253E+01	-0.207E+04	-0.897E+04	-0.239E+03
19	-13.99	-0.373E-01	-0.910E+01	0.379E+04	-0.219E+05	-0.443E+02
	142.70	-0.213E+01	0.264E+01	-0.203E+04	-0.880E+04	-0.193E+03
20	0.00	-0.400E-01	-0.930E+01	0.434E+04	-0.237E+05	-0.272E+02
	143.09	-0.217E+01	0.233E+01	-0.199E+04	-0.864E+04	-0.118E+03

21	13.99	-0.441E-01	-0.975E+01	0.460E+04	-0.246E+05	-0.461E+01
	142.70	-0.218E+01	-0.285E+01	-0.199E+04	-0.866E+04	-0.200E+02
22	27.94	-0.462E-01	-0.962E+01	0.446E+04	-0.243E+05	0.191E+02
	141.53	-0.216E+01	-0.282E+01	-0.203E+04	-0.883E+04	0.828E+02
23	41.80	-0.431E-01	-0.940E+01	0.400E+04	-0.229E+05	0.380E+02
	139.57	-0.211E+01	-0.274E+01	-0.207E+04	-0.901E+04	0.165E+03
24	55.53	-0.318E-01	-0.900E+01	0.328E+04	-0.206E+05	0.503E+02
	136.84	-0.203E+01	-0.261E+01	-0.211E+04	-0.918E+04	0.219E+03
25	69.09	-0.106E-01	-0.841E+01	0.243E+04	-0.178E+05	0.535E+02
	133.35	-0.193E+01	-0.243E+01	-0.215E+04	-0.935E+04	0.233E+03
26	82.42	0.211E-01	-0.841E+01	0.160E+04	-0.151E+05	0.505E+02
	129.10	-0.182E+01	-0.243E+01	-0.219E+04	-0.951E+04	0.219E+03
27	95.50	0.631E-01	-0.793E+01	0.822E+03	-0.125E+05	0.420E+02
	124.11	-0.170E+01	-0.230E+01	-0.223E+04	-0.967E+04	0.182E+03
28	108.28	0.114E+00	-0.653E+01	0.227E+03	-0.106E+05	0.185E+02
	118.40	-0.157E+01	-0.189E+01	-0.226E+04	-0.980E+04	0.802E+02
29	120.72	0.173E+00	-0.122E+02	0.121E+03	-0.104E+05	0.224E+02
	111.98	-0.144E+01	-0.354E+01	-0.230E+04	-0.998E+04	0.975E+02
30	132.78	0.239E+00	-0.112E+02	-0.567E+03	-0.122E+05	0.563E+02
	104.87	-0.132E+01	-0.325E+01	-0.235E+04	-0.102E+05	0.244E+03
31	144.43	0.310E+00	-0.120E+02	-0.160E+04	-0.160E+05	0.863E+02
	97.10	-0.121E+01	-0.353E+01	-0.240E+04	-0.104E+05	0.375E+03
32	155.61	0.379E+00	-0.149E+02	-0.309E+04	-0.214E+05	0.882E+02
	88.69	-0.111E+01	-0.482E+01	-0.246E+04	-0.107E+05	0.383E+03
33	166.18	0.445E+00	-0.194E+02	-0.417E+04	-0.255E+05	0.327E+02
	78.98	-0.103E+01	-0.581E+01	-0.255E+04	-0.111E+05	0.142E+03
34	175.27	0.499E+00	-0.259E+02	-0.408E+04	-0.256E+05	-0.708E+01
	67.89	-0.975E+00	-0.580E+01	-0.263E+04	-0.114E+05	-0.308E+02
35	182.71	0.534E+00	-0.303E+02	-0.398E+04	-0.254E+05	0.226E+02
	55.62	-0.948E+00	0.163E+01	-0.267E+04	-0.116E+05	0.982E+02
36	188.35	0.545E+00	-0.267E+02	-0.471E+04	-0.276E+05	0.602E+02
	42.43	-0.938E+00	0.807E+01	-0.260E+04	-0.113E+05	0.262E+03
37	192.08	0.523E+00	-0.145E+02	-0.566E+04	-0.306E+05	-0.471E+01
	28.58	-0.939E+00	0.442E+01	-0.252E+04	-0.109E+05	-0.204E+02
38	193.83	0.462E+00	-0.797E+01	-0.450E+04	-0.263E+05	-0.194E+03
	14.34	-0.941E+00	0.243E+01	-0.246E+04	-0.107E+05	-0.844E+03
39	193.56	0.372E+00	-0.138E+01	-0.749E-10	-0.104E+05	-0.427E+03
	0.00	-0.934E+00	0.436E+00	-0.239E+04	-0.104E+05	-0.185E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER	OUTER-FIBER	STRAIN RATIO	FRACTION OF

	STRAIN	STRAIN	MAX-TO-YIELD	WALL YIELDED
1	-0.31935E-03	-0.31935E-03	.23129	0.00000
2	-0.79750E-03	0.14247E-03	.57761	0.00000
3	-0.92288E-03	0.25148E-03	.66842	0.00000
4	-0.82173E-03	0.12838E-03	.59516	0.00000
5	-0.73290E-03	0.21670E-04	.53082	0.00000
6	-0.71534E-03	0.53287E-05	.51810	0.00000
7	-0.69433E-03	-0.17424E-05	.50289	0.00000
8	-0.57312E-03	-0.10327E-03	.41510	0.00000
9	-0.42865E-03	-0.22889E-03	.31046	0.00000
10	-0.35206E-03	-0.29103E-03	.25499	0.00000
11	-0.31998E-03	-0.30927E-03	.23175	0.00000
12	-0.36498E-03	-0.25328E-03	.26435	0.00000
13	-0.36974E-03	-0.24089E-03	.26780	0.00000
14	-0.32351E-03	-0.27884E-03	.23431	0.00000
15	-0.25037E-03	-0.34273E-03	.24823	0.00000
16	-0.15912E-03	-0.42436E-03	.30735	0.00000
17	-0.57630E-04	-0.51590E-03	.37365	0.00000
18	0.45156E-04	-0.60835E-03	.44061	0.00000
19	0.13587E-03	-0.68840E-03	.49859	0.00000
20	0.20134E-03	-0.74384E-03	.53875	0.00000
21	0.22848E-03	-0.77175E-03	.55896	0.00000
22	0.20844E-03	-0.76267E-03	.55238	0.00000
23	0.15227E-03	-0.71757E-03	.51972	0.00000
24	0.68934E-04	-0.64517E-03	.46728	0.00000
25	-0.28790E-04	-0.55792E-03	.40408	0.00000
26	-0.12456E-03	-0.47230E-03	.34208	0.00000
27	-0.21396E-03	-0.39273E-03	.28444	0.00000
28	-0.28294E-03	-0.33231E-03	.24068	0.00000
29	-0.29986E-03	-0.32618E-03	.23625	0.00000
30	-0.38151E-03	-0.25823E-03	.27632	0.00000
31	-0.50068E-03	-0.15324E-03	.36263	0.00000
32	-0.67266E-03	0.70346E-06	.48719	0.00000
33	-0.80111E-03	0.10647E-03	.58023	0.00000
34	-0.80267E-03	0.84571E-04	.58136	0.00000
35	-0.79627E-03	0.69476E-04	.57672	0.00000
36	-0.86701E-03	0.15740E-03	.62795	0.00000
37	-0.95928E-03	0.27284E-03	.69478	0.00000
38	-0.82466E-03	0.15522E-03	.59728	0.00000
39	-0.32634E-03	-0.32634E-03	.23636	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.25699	0.00000	0.06605
2	-0.26357	-0.27177	0.34124
3	-0.27016	-0.33954	0.41253
4	-0.27899	-0.27471	0.35254
5	-0.28618	-0.21817	0.30007
6	-0.28569	-0.20837	0.28999
7	-0.28008	-0.20025	0.27869
8	-0.27216	-0.13585	0.20992
9	-0.26458	-0.05776	0.12776
10	-0.25876	-0.01765	0.08461
11	-0.25319	-0.00310	0.06720
12	-0.24877	-0.03229	0.09418
13	-0.24571	-0.03725	0.09763
14	-0.24237	-0.01291	0.07166
15	-0.23865	0.02670	0.08366
16	-0.23478	0.07669	0.13181
17	-0.23077	0.13250	0.18575
18	-0.22662	0.18895	0.24030
19	-0.22233	0.23832	0.28775
20	-0.21829	0.27328	0.32093
21	-0.21860	0.28920	0.33698
22	-0.22301	0.28078	0.33051
23	-0.22746	0.25150	0.30324
24	-0.23186	0.20647	0.26023
25	-0.23608	0.15299	0.20872
26	-0.24016	0.10054	0.15822
27	-0.24412	0.05169	0.11128
28	-0.24756	0.01427	0.07556
29	-0.25191	0.00761	0.07107
30	-0.25742	-0.03564	0.10191

31	-0.26312	-0.10046	0.16969
32	-0.27038	-0.19469	0.26780
33	-0.27951	-0.26241	0.34053
34	-0.28895	-0.25653	0.34002
35	-0.29245	-0.25031	0.33584
36	-0.28553	-0.29619	0.37771
37	-0.27621	-0.35624	0.43253
38	-0.26936	-0.28331	0.35587
39	-0.26262	0.00000	0.06897

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	35	11581.	30800.	0.376
BUCKLING THRUST (psi)	35	11581.	53940.	0.215
SEAM THRUST (psi)	35	11581.	21589.	0.536
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	37	0.433	1.000	0.433

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.53

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.11

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

 MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage SU7 (LL x 3.47)

        EXECUTION MODE ..................   ANALYS

        SOLUTION LEVEL ..................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4

             IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
             AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

        SECTION PROPERTIES OF CROSS-SECTION:

              THRUST AREA (IN**2/IN) ...........   0.23020

              MOM. OF INERTIA (IN**4/IN) ........  0.87460

              SECTION MODULUS (IN**3/IN) ........  0.28840

              PLASTIC SECTION MOD(IN**3/IN) .....  0.40136

        NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

        LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
        AND DEFLECTION LIMIT AT SERVICE LOAD

              THRUST STRESS YIELDING ...........   0.70000

              BUCKLING STRESS FAILURE...........   0.70000

              SEAM STRENGTH FAILURE ............   0.67000
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FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)		Y-FORCE(F) -OR- Y-DISPLACE.(D)		MOMENT(F) -OR- ROTATION (D)	
1142	21	F =	0.000	F =	-242.0	F =	0.000
1142	22	F =	0.000	F =	-242.0	F =	0.000
1143	21	F =	0.000	F =	-242.0	F =	0.000
1143	22	F =	0.000	F =	-242.0	F =	0.000
574	1	D =	0.000	D =	0.000	D =	0.000
575	1	D =	0.000	D =	0.000	D =	0.000
576	1	D =	0.000	D =	0.000	D =	0.000
577	1	D =	0.000	D =	0.000	D =	0.000
578	1	D =	0.000	D =	0.000	D =	0.000
579	1	D =	0.000	D =	0.000	D =	0.000
580	1	D =	0.000	D =	0.000	D =	0.000
581	1	D =	0.000	D =	0.000	D =	0.000
582	1	D =	0.000	D =	0.000	D =	0.000
583	1	D =	0.000	D =	0.000	D =	0.000
584	1	D =	0.000	D =	0.000	D =	0.000
585	1	D =	0.000	D =	0.000	D =	0.000
586	1	D =	0.000	D =	0.000	D =	0.000
587	1	D =	0.000	D =	0.000	D =	0.000
588	1	D =	0.000	D =	0.000	D =	0.000
589	1	D =	0.000	D =	0.000	D =	0.000
590	1	D =	0.000	D =	0.000	D =	0.000
591	1	D =	0.000	D =	0.000	D =	0.000
592	1	D =	0.000	D =	0.000	D =	0.000
593	1	D =	0.000	D =	0.000	D =	0.000
594	1	D =	0.000	D =	0.000	D =	0.000
595	1	D =	0.000	D =	0.000	D =	0.000
596	1	D =	0.000	D =	0.000	D =	0.000
597	1	D =	0.000	D =	0.000	D =	0.000
598	1	D =	0.000	D =	0.000	D =	0.000
599	1	D =	0.000	D =	0.000	D =	0.000
624	1	D =	0.000	D =	0.000	D =	0.000
649	1	D =	0.000	D =	0.000	D =	0.000
674	1	D =	0.000	D =	0.000	D =	0.000
699	1	D =	0.000	D =	0.000	D =	0.000
724	1	D =	0.000	D =	0.000	D =	0.000
761	1	D =	0.000	D =	0.000	D =	0.000
786	1	D =	0.000	D =	0.000	D =	0.000
811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000

854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-113.9	F =	0.000
1141	22	F =	0.000	F =	-113.9	F =	0.000
1139	21	F =	0.000	F =	-113.9	F =	0.000
1139	22	F =	0.000	F =	-113.9	F =	0.000
1135	21	F =	0.000	F =	-170.8	F =	0.000
1135	22	F =	0.000	F =	-170.8	F =	0.000
1145	21	F =	0.000	F =	-113.9	F =	0.000
1145	22	F =	0.000	F =	-113.9	F =	0.000
1146	21	F =	0.000	F =	-113.9	F =	0.000
1146	22	F =	0.000	F =	-113.9	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =    1
```

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11

13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000

27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.450	Factor for load step #21
22	1.450	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.554E+00	0.578E+01	-0.547E-10	-0.143E+05	0.732E+03
	0.00	-0.112E+01	0.157E+01	-0.329E+04	-0.143E+05	0.318E+04
2	-193.83	-0.766E+00	-0.506E+01	-0.795E+04	-0.422E+05	0.330E+03
	14.34	-0.113E+01	-0.165E+01	-0.336E+04	-0.146E+05	0.143E+04
3	-192.08	-0.925E+00	-0.159E+02	-0.101E+05	-0.440E+05	0.589E+00
	28.58	-0.112E+01	-0.487E+01	-0.343E+04	-0.149E+05	0.256E+01
4	-188.35	-0.101E+01	-0.343E+02	-0.843E+04	-0.440E+05	-0.130E+03
	42.43	-0.110E+01	-0.104E+02	-0.353E+04	-0.153E+05	-0.566E+03
5	-182.71	-0.104E+01	-0.420E+02	-0.663E+04	-0.390E+05	-0.912E+02
	55.62	-0.110E+01	-0.128E+02	-0.368E+04	-0.160E+05	-0.396E+03
6	-175.27	-0.102E+01	-0.403E+02	-0.597E+04	-0.373E+05	-0.289E+02
	67.89	-0.112E+01	-0.790E+01	-0.382E+04	-0.166E+05	-0.126E+03
7	-166.18	-0.975E+00	-0.348E+02	-0.582E+04	-0.369E+05	-0.297E+02
	78.98	-0.117E+01	0.404E+01	-0.384E+04	-0.167E+05	-0.129E+03

8	-155.61	-0.906E+00	-0.249E+02	-0.502E+04	-0.337E+05	-0.588E+02
	88.69	-0.125E+01	0.803E+01	-0.375E+04	-0.163E+05	-0.256E+03
9	-144.43	-0.826E+00	-0.179E+02	-0.394E+04	-0.295E+05	-0.441E+02
	97.10	-0.137E+01	0.527E+01	-0.365E+04	-0.159E+05	-0.191E+03
10	-132.78	-0.737E+00	-0.148E+02	-0.346E+04	-0.276E+05	-0.176E+02
	104.87	-0.152E+01	0.434E+01	-0.358E+04	-0.156E+05	-0.766E+02
11	-120.72	-0.645E+00	-0.263E+02	-0.301E+04	-0.256E+05	0.724E+02
	111.98	-0.169E+01	0.768E+01	-0.350E+04	-0.152E+05	0.314E+03
12	-108.28	-0.551E+00	-0.831E+01	-0.493E+04	-0.320E+05	0.121E+03
	118.40	-0.189E+01	0.244E+01	-0.343E+04	-0.149E+05	0.526E+03
13	-95.50	-0.455E+00	-0.223E+01	-0.571E+04	-0.346E+05	0.388E+01
	124.11	-0.213E+01	0.703E+00	-0.342E+04	-0.148E+05	0.169E+02
14	-82.42	-0.361E+00	-0.828E+01	-0.417E+04	-0.292E+05	-0.112E+03
	129.10	-0.240E+01	0.241E+01	-0.339E+04	-0.147E+05	-0.489E+03
15	-69.09	-0.273E+00	-0.109E+02	-0.153E+04	-0.198E+05	-0.166E+03
	133.35	-0.271E+01	0.314E+01	-0.334E+04	-0.145E+05	-0.721E+03
16	-55.53	-0.201E+00	-0.116E+02	0.160E+04	-0.198E+05	-0.193E+03
	136.84	-0.303E+01	0.330E+01	-0.329E+04	-0.143E+05	-0.838E+03
17	-41.80	-0.149E+00	-0.127E+02	0.500E+04	-0.314E+05	-0.204E+03
	139.57	-0.335E+01	0.357E+01	-0.323E+04	-0.140E+05	-0.887E+03
18	-27.94	-0.118E+00	-0.145E+02	0.838E+04	-0.428E+05	-0.192E+03
	141.53	-0.363E+01	0.407E+01	-0.316E+04	-0.137E+05	-0.834E+03
19	-13.99	-0.107E+00	-0.161E+02	0.113E+05	-0.440E+05	-0.152E+03
	142.70	-0.385E+01	0.452E+01	-0.309E+04	-0.134E+05	-0.660E+03
20	0.00	-0.110E+00	-0.183E+02	0.133E+05	-0.440E+05	-0.813E+02
	143.09	-0.399E+01	0.520E+01	-0.302E+04	-0.131E+05	-0.353E+03
21	13.99	-0.117E+00	-0.190E+02	0.139E+05	-0.440E+05	0.115E+02
	142.70	-0.403E+01	-0.421E+01	-0.301E+04	-0.131E+05	0.500E+02
22	27.94	-0.117E+00	-0.170E+02	0.129E+05	-0.440E+05	0.937E+02
	141.53	-0.396E+01	-0.481E+01	-0.308E+04	-0.134E+05	0.407E+03
23	41.80	-0.101E+00	-0.157E+02	0.108E+05	-0.440E+05	0.149E+03
	139.57	-0.380E+01	-0.439E+01	-0.315E+04	-0.137E+05	0.647E+03
24	55.53	-0.613E-01	-0.144E+02	0.802E+04	-0.418E+05	0.182E+03
	136.84	-0.356E+01	-0.401E+01	-0.322E+04	-0.140E+05	0.791E+03
25	69.09	0.468E-02	-0.129E+02	0.479E+04	-0.309E+05	0.192E+03
	133.35	-0.326E+01	-0.360E+01	-0.328E+04	-0.143E+05	0.836E+03
26	82.42	0.963E-01	-0.116E+02	0.154E+04	-0.199E+05	0.179E+03
	129.10	-0.294E+01	-0.326E+01	-0.334E+04	-0.145E+05	0.780E+03
27	95.50	0.210E+00	-0.750E+01	-0.138E+04	-0.195E+05	0.126E+03
	124.11	-0.262E+01	-0.213E+01	-0.339E+04	-0.147E+05	0.546E+03

28	108.28	0.338E+00	-0.431E+01	-0.310E+04	-0.256E+05	0.186E+02
	118.40	-0.230E+01	-0.125E+01	-0.341E+04	-0.148E+05	0.809E+02
29	120.72	0.474E+00	-0.236E+02	-0.294E+04	-0.253E+05	0.215E+02
	111.98	-0.202E+01	-0.679E+01	-0.347E+04	-0.151E+05	0.933E+02
30	132.78	0.616E+00	-0.143E+02	-0.462E+04	-0.315E+05	0.901E+02
	104.87	-0.176E+01	-0.415E+01	-0.355E+04	-0.154E+05	0.391E+03
31	144.43	0.754E+00	-0.147E+02	-0.626E+04	-0.374E+05	0.923E+02
	97.10	-0.153E+01	-0.433E+01	-0.362E+04	-0.157E+05	0.401E+03
32	155.61	0.878E+00	-0.208E+02	-0.785E+04	-0.433E+05	0.597E+02
	88.69	-0.135E+01	-0.676E+01	-0.370E+04	-0.161E+05	0.259E+03
33	166.18	0.985E+00	-0.331E+02	-0.841E+04	-0.440E+05	-0.657E+01
	78.98	-0.123E+01	-0.990E+01	-0.382E+04	-0.166E+05	-0.285E+02
34	175.27	0.106E+01	-0.433E+02	-0.795E+04	-0.440E+05	-0.380E+01
	67.89	-0.115E+01	-0.317E+01	-0.392E+04	-0.170E+05	-0.165E+02
35	182.71	0.110E+01	-0.441E+02	-0.841E+04	-0.440E+05	0.763E+02
	55.62	-0.112E+01	0.135E+02	-0.385E+04	-0.167E+05	0.331E+03
36	188.35	0.108E+01	-0.358E+02	-0.101E+05	-0.440E+05	0.118E+03
	42.43	-0.112E+01	0.108E+02	-0.369E+04	-0.160E+05	0.514E+03
37	192.08	0.987E+00	-0.163E+02	-0.115E+05	-0.440E+05	-0.213E+02
	28.58	-0.114E+01	0.501E+01	-0.358E+04	-0.156E+05	-0.923E+02
38	193.83	0.810E+00	-0.435E+01	-0.889E+04	-0.440E+05	-0.374E+03
	14.34	-0.115E+01	0.148E+01	-0.351E+04	-0.152E+05	-0.163E+04
39	193.56	0.573E+00	0.754E+01	-0.396E-11	-0.149E+05	-0.808E+03
	0.00	-0.114E+01	-0.205E+01	-0.344E+04	-0.149E+05	-0.351E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.44883E-03	-0.44883E-03	.32508	0.00000
2	-0.13235E-02	0.40692E-03	.95859	0.00000
3	-0.15969E-02	0.64045E-03	1.1566	0.09662
4	-0.13993E-02	0.43647E-03	1.0135	0.01013
5	-0.12232E-02	0.21972E-03	.88594	0.00000
6	-0.11701E-02	0.12862E-03	.84749	0.00000
7	-0.11573E-02	0.10959E-03	.83823	0.00000
8	-0.10571E-02	0.34360E-04	.76566	0.00000
9	-0.92719E-03	-0.68764E-04	.67154	0.00000
10	-0.86468E-03	-0.11232E-03	.62627	0.00000
11	-0.80460E-03	-0.14976E-03	.58275	0.00000
12	-0.10043E-02	0.67880E-04	.72739	0.00000
13	-0.10867E-02	0.15545E-03	.78709	0.00000
14	-0.91600E-03	-0.84014E-05	.66344	0.00000
15	-0.62278E-03	-0.28882E-03	.45106	0.00000
16	-0.27447E-03	-0.62204E-03	.45053	0.00000
17	0.10382E-03	-0.98414E-03	.71279	0.00000
18	0.47991E-03	-0.13426E-02	.97241	0.00000
19	0.83166E-03	-0.17206E-02	1.2462	0.13317
20	0.11202E-02	-0.21069E-02	1.5260	0.22505
21	0.12118E-02	-0.22517E-02	1.6308	0.25148
22	0.10600E-02	-0.20385E-02	1.4765	0.21231
23	0.76910E-03	-0.16595E-02	1.2019	0.11479
24	0.43387E-03	-0.13109E-02	.94942	0.00000
25	0.74130E-04	-0.96857E-03	.70151	0.00000
26	-0.28756E-03	-0.62290E-03	.45115	0.00000

27	-0.61182E-03	-0.31135E-03	.44312	0.00000
28	-0.80255E-03	-0.12827E-03	.58127	0.00000
29	-0.79269E-03	-0.15390E-03	.57413	0.00000
30	-0.98743E-03	0.18978E-04	.71517	0.00000
31	-0.11741E-02	0.18793E-03	.85037	0.00000
32	-0.13587E-02	0.34954E-03	.98406	0.00000
33	-0.14387E-02	0.39440E-03	1.0420	0.03163
34	-0.13998E-02	0.33151E-03	1.0138	0.01103
35	-0.14428E-02	0.39119E-03	1.0450	0.03387
36	-0.16455E-02	0.60857E-03	1.1918	0.11749
37	-0.18775E-02	0.80872E-03	1.3598	0.18496
38	-0.14498E-02	0.49051E-03	1.0500	0.03560
39	-0.46842E-03	-0.46842E-03	.33926	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.36120	0.00000	0.13046
2	-0.36882	-0.50032	0.63635
3	-0.37642	-0.63382	0.77551
4	-0.38734	-0.53064	0.68067
5	-0.40378	-0.41719	0.58023
6	-0.41907	-0.37551	0.55113
7	-0.42159	-0.36630	0.54404
8	-0.41154	-0.31559	0.48495
9	-0.40075	-0.24820	0.40879
10	-0.39312	-0.21753	0.37208
11	-0.38401	-0.18933	0.33680
12	-0.37679	-0.31000	0.45197
13	-0.37472	-0.35915	0.49956
14	-0.37196	-0.26241	0.40077
15	-0.36680	-0.09656	0.23110
16	-0.36073	0.10049	0.23062
17	-0.35422	0.31456	0.44003
18	-0.34712	0.52694	0.64743
19	-0.33946	0.70901	0.82424
20	-0.33127	0.83496	0.94471
21	-0.33030	0.87245	0.98154
22	-0.33756	0.81173	0.92568
23	-0.34538	0.68167	0.80096
24	-0.35288	0.50445	0.62897
25	-0.35990	0.30148	0.43100
26	-0.36635	0.09696	0.23117
27	-0.37146	-0.08687	0.22486
28	-0.37454	-0.19495	0.33523
29	-0.38089	-0.18469	0.32977
30	-0.38968	-0.29098	0.44283
31	-0.39681	-0.39380	0.55126
32	-0.40605	-0.49390	0.65878
33	-0.41945	-0.52888	0.70482
34	-0.42977	-0.50044	0.68514
35	-0.42230	-0.52893	0.70726
36	-0.40472	-0.63263	0.79643
37	-0.39307	-0.72287	0.87738
38	-0.38499	-0.55941	0.70763
39	-0.37696	0.00000	0.14210

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

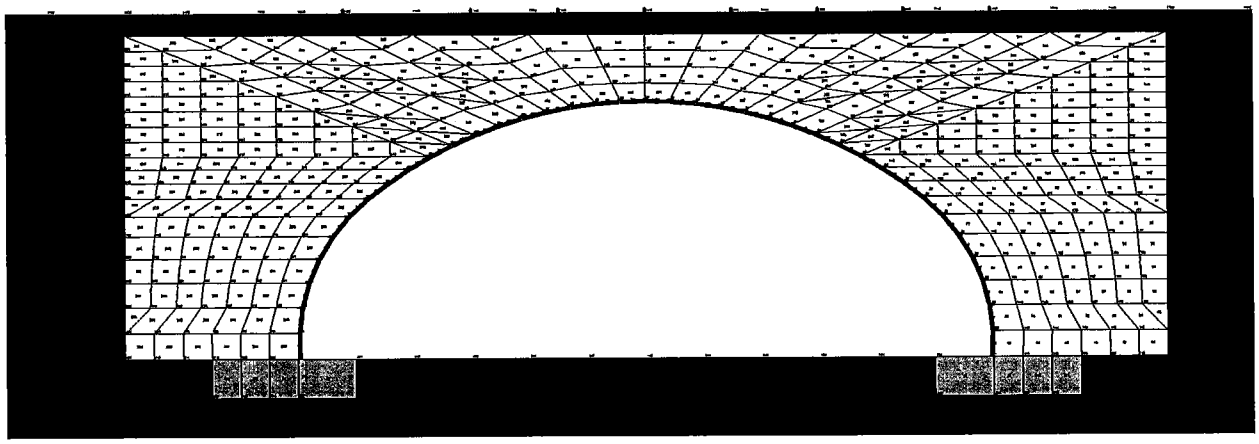
DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	34	17019.	30800.	0.553
BUCKLING THRUST (psi)	34	17019.	50284.	0.338
SEAM THRUST (psi)	34	17019.	21589.	0.788
PLASTIC-PENETRATE (%)	21	25.15	90.00	0.279

COMBINED T&M Ratio	21	0.982	1.000	0.982

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	1.39
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.28
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *



NRL

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage NRL

EXECUTION MODE ..................   ANALYS

SOLUTION LEVEL ..................  #3 USER

METHODOLOGY (LRFD OR SERVICE) ...     LRFD

NUMBER OF PIPE-ELEMENT GROUPS ....       1

MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL

NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

      POISSONS RATIO OF METAL (-) .......    0.30000E+00

      YIELD STRESS OF METAL (PSI)........    0.44000E+05

      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

      DENSITY OF METAL (PCI).............    0.28400E+00

      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........    2

     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

 LARGE DEFORMATION/BUCKLING CODE, IBUCK...    4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -69.70	F = 0.000
1142	22	F = 0.000	F = -69.70	F = 0.000
1143	21	F = 0.000	F = -69.70	F = 0.000
1143	22	F = 0.000	F = -69.70	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000

861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-32.80	F =	0.000
1141	22	F =	0.000	F =	-32.80	F =	0.000
1139	21	F =	0.000	F =	-32.80	F =	0.000
1139	22	F =	0.000	F =	-32.80	F =	0.000
1137	21	F =	0.000	F =	-24.60	F =	0.000
1137	22	F =	0.000	F =	-24.60	F =	0.000
1145	21	F =	0.000	F =	-32.80	F =	0.000
1145	22	F =	0.000	F =	-32.80	F =	0.000
1146	21	F =	0.000	F =	-32.80	F =	0.000
1146	22	F =	0.000	F =	-32.80	F =	0.000
1148	21	F =	0.000	F =	-32.80	F =	0.000
1148	22	F =	0.000	F =	-32.80	F =	0.000

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 * * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
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THE NUMBER OF PIPE-TYPE GROUPS IS------ 1
THE NUMBER OF INTERFACE MATERIALS IS--- 37
BAND WIDTH ESTIMATE (MAX)---------- 2060

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

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PROPERTIES FOR MATERIAL  3    ********SW95

     DENSITY =     0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

      LRFD STRESS CONTROL..........        0

      ENTERING ELEMENT RATIO.......       0.5000

      ORIGINAL FORMULATION, ... NEWDS =  0

HYPERBOLIC STRESS-STRAIN PARAMETERS

      SOIL CLASSIFICATION ............SW95

      COHESION INTERCEPT  C ..........       0.0000

      FRICTION ANGLE  PHIO (DEG)......      48.0000

      10-FOLD REDUCTION IN PHIO(DEG)..      8.0000

      SCALED MODULUS NUMBER  ZK ......     950.0000

      MODULUS EXPONENT  ZN ...........       0.6000

      FAILURE RATIO  RF ..............       0.7000

      INIT. BULK MODULUS NUMBER BI....      74.8000

      ULT. VOLUMETRIC STRAIN EU ......       0.0200

PROPERTIES FOR MATERIAL  4    ********SM90

     DENSITY =     0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

      LRFD STRESS CONTROL..........        0

      ENTERING ELEMENT RATIO.......       0.5000

      ORIGINAL FORMULATION, ... NEWDS =  0

HYPERBOLIC STRESS-STRAIN PARAMETERS

      SOIL CLASSIFICATION ............SM90

      COHESION INTERCEPT  C ..........       0.0000

      FRICTION ANGLE  PHIO (DEG)......      32.0000

      10-FOLD REDUCTION IN PHIO(DEG)..      4.0000

      SCALED MODULUS NUMBER  ZK ......     300.0000

      MODULUS EXPONENT  ZN ...........       0.2500

      FAILURE RATIO  RF ..............       0.7000

      BULK MODULUS NUMBER  BK ........     250.0000

      BULK MODULUS EXPONENT  BM ......       0.0000


      INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES
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MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD	X-DISP.	N-PRES.	MOMENT	MAX-STRESS	SHEAR
	Y-COORD	Y-DISP.	S-PRES.	THRUST	HOOP-STRESS	S-STRESS

1	-193.56	-0.368E+00	-0.182E+01	0.390E-10	-0.101E+05	0.410E+03
	0.00	-0.917E+00	-0.561E+00	-0.232E+04	-0.101E+05	0.178E+04
2	-193.83	-0.458E+00	-0.787E+01	-0.433E+04	-0.254E+05	0.186E+03
	14.34	-0.923E+00	-0.239E+01	-0.238E+04	-0.104E+05	0.810E+03
3	-192.08	-0.520E+00	-0.139E+02	-0.544E+04	-0.295E+05	0.222E+01
	28.58	-0.921E+00	-0.423E+01	-0.244E+04	-0.106E+05	0.965E+01
4	-188.35	-0.544E+00	-0.252E+02	-0.447E+04	-0.264E+05	-0.670E+02
	42.43	-0.919E+00	-0.761E+01	-0.252E+04	-0.110E+05	-0.291E+03
5	-182.71	-0.538E+00	-0.291E+02	-0.357E+04	-0.237E+05	-0.383E+02
	55.62	-0.927E+00	-0.423E+01	-0.260E+04	-0.113E+05	-0.167E+03
6	-175.27	-0.510E+00	-0.259E+02	-0.340E+04	-0.231E+05	-0.111E+02
	67.89	-0.950E+00	0.166E+01	-0.261E+04	-0.114E+05	-0.484E+02
7	-166.18	-0.466E+00	-0.210E+02	-0.327E+04	-0.225E+05	-0.397E+02
	78.98	-0.993E+00	0.338E+01	-0.257E+04	-0.112E+05	-0.173E+03
8	-155.61	-0.413E+00	-0.161E+02	-0.225E+04	-0.187E+05	-0.787E+02
	88.69	-0.106E+01	0.521E+01	-0.250E+04	-0.109E+05	-0.342E+03
9	-144.43	-0.358E+00	-0.127E+02	-0.100E+04	-0.141E+05	-0.661E+02
	97.10	-0.114E+01	0.374E+01	-0.243E+04	-0.106E+05	-0.287E+03
10	-132.78	-0.303E+00	-0.116E+02	-0.337E+03	-0.115E+05	-0.304E+02
	104.87	-0.123E+01	0.338E+01	-0.238E+04	-0.103E+05	-0.132E+03
11	-120.72	-0.253E+00	-0.128E+02	-0.663E+02	-0.104E+05	0.886E+01
	111.98	-0.133E+01	0.375E+01	-0.233E+04	-0.101E+05	0.385E+02
12	-108.28	-0.206E+00	-0.743E+01	-0.474E+03	-0.116E+05	0.217E+02
	118.40	-0.143E+01	0.217E+01	-0.229E+04	-0.995E+04	0.944E+02
13	-95.50	-0.165E+00	-0.694E+01	-0.538E+03	-0.117E+05	-0.430E+01
	124.11	-0.153E+01	0.203E+01	-0.226E+04	-0.982E+04	-0.187E+02
14	-82.42	-0.128E+00	-0.767E+01	-0.191E+03	-0.103E+05	-0.270E+02
	129.10	-0.164E+01	0.224E+01	-0.223E+04	-0.968E+04	-0.117E+03
15	-69.09	-0.968E-01	-0.787E+01	0.402E+03	-0.109E+05	-0.414E+02
	133.35	-0.175E+01	0.230E+01	-0.220E+04	-0.954E+04	-0.180E+03
16	-55.53	-0.727E-01	-0.804E+01	0.116E+04	-0.134E+05	-0.511E+02
	136.84	-0.187E+01	0.235E+01	-0.216E+04	-0.938E+04	-0.222E+03
17	-41.80	-0.565E-01	-0.828E+01	0.203E+04	-0.163E+05	-0.560E+02
	139.57	-0.197E+01	0.242E+01	-0.212E+04	-0.922E+04	-0.243E+03
18	-27.94	-0.480E-01	-0.872E+01	0.291E+04	-0.192E+05	-0.540E+02
	141.53	-0.206E+01	0.255E+01	-0.209E+04	-0.906E+04	-0.235E+03
19	-13.99	-0.461E-01	-0.914E+01	0.369E+04	-0.217E+05	-0.438E+02
	142.70	-0.213E+01	0.265E+01	-0.205E+04	-0.889E+04	-0.190E+03
20	0.00	-0.488E-01	-0.933E+01	0.425E+04	-0.234E+05	-0.272E+02
	143.09	-0.218E+01	0.261E+01	-0.201E+04	-0.872E+04	-0.118E+03

21	13.99	-0.530E-01	-0.972E+01	0.451E+04	-0.244E+05	-0.553E+01
	142.70	-0.220E+01	-0.278E+01	-0.201E+04	-0.872E+04	-0.240E+02
22	27.94	-0.556E-01	-0.961E+01	0.440E+04	-0.242E+05	0.171E+02
	141.53	-0.218E+01	-0.282E+01	-0.205E+04	-0.889E+04	0.741E+02
23	41.80	-0.532E-01	-0.940E+01	0.398E+04	-0.229E+05	0.352E+02
	139.57	-0.213E+01	-0.274E+01	-0.209E+04	-0.907E+04	0.153E+03
24	55.53	-0.430E-01	-0.900E+01	0.331E+04	-0.207E+05	0.466E+02
	136.84	-0.206E+01	-0.261E+01	-0.213E+04	-0.924E+04	0.203E+03
25	69.09	-0.231E-01	-0.841E+01	0.252E+04	-0.182E+05	0.491E+02
	133.35	-0.197E+01	-0.243E+01	-0.217E+04	-0.941E+04	0.213E+03
26	82.42	0.725E-02	-0.847E+01	0.176E+04	-0.157E+05	0.457E+02
	129.10	-0.186E+01	-0.245E+01	-0.220E+04	-0.957E+04	0.198E+03
27	95.50	0.480E-01	-0.813E+01	0.106E+04	-0.134E+05	0.382E+02
	124.11	-0.173E+01	-0.235E+01	-0.224E+04	-0.973E+04	0.166E+03
28	108.28	0.984E-01	-0.689E+01	0.500E+03	-0.116E+05	0.179E+02
	118.40	-0.161E+01	-0.199E+01	-0.227E+04	-0.987E+04	0.777E+02
29	120.72	0.158E+00	-0.121E+02	0.371E+03	-0.113E+05	0.233E+02
	111.98	-0.148E+01	-0.353E+01	-0.231E+04	-0.100E+05	0.101E+03
30	132.78	0.224E+00	-0.115E+02	-0.321E+03	-0.114E+05	0.586E+02
	104.87	-0.136E+01	-0.336E+01	-0.236E+04	-0.103E+05	0.254E+03
31	144.43	0.297E+00	-0.124E+02	-0.142E+04	-0.154E+05	0.928E+02
	97.10	-0.124E+01	-0.363E+01	-0.242E+04	-0.105E+05	0.403E+03
32	155.61	0.369E+00	-0.151E+02	-0.304E+04	-0.213E+05	0.973E+02
	88.69	-0.114E+01	-0.488E+01	-0.248E+04	-0.108E+05	0.423E+03
33	166.18	0.438E+00	-0.192E+02	-0.426E+04	-0.259E+05	0.391E+02
	78.98	-0.105E+01	-0.574E+01	-0.257E+04	-0.112E+05	0.170E+03
34	175.27	0.496E+00	-0.258E+02	-0.422E+04	-0.262E+05	-0.673E+01
	67.89	-0.100E+01	-0.773E+01	-0.267E+04	-0.116E+05	-0.292E+02
35	182.71	0.534E+00	-0.310E+02	-0.409E+04	-0.260E+05	0.208E+02
	55.62	-0.972E+00	-0.179E+00	-0.273E+04	-0.118E+05	0.906E+02
36	188.35	0.547E+00	-0.277E+02	-0.481E+04	-0.283E+05	0.611E+02
	42.43	-0.960E+00	0.812E+01	-0.268E+04	-0.116E+05	0.265E+03
37	192.08	0.526E+00	-0.150E+02	-0.581E+04	-0.314E+05	-0.376E+01
	28.58	-0.960E+00	0.456E+01	-0.259E+04	-0.113E+05	-0.163E+02
38	193.83	0.466E+00	-0.808E+01	-0.464E+04	-0.270E+05	-0.199E+03
	14.34	-0.963E+00	0.247E+01	-0.253E+04	-0.110E+05	-0.865E+03
39	193.56	0.377E+00	-0.115E+01	0.220E-10	-0.107E+05	-0.440E+03
	0.00	-0.956E+00	0.371E+00	-0.246E+04	-0.107E+05	-0.191E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER	OUTER-FIBER	STRAIN RATIO	FRACTION OF

	STRAIN	STRAIN	MAX-TO-YIELD	WALL YIELDED
1	-0.31663E-03	-0.31663E-03	.22933	0.00000
2	-0.79565E-03	0.14606E-03	.57627	0.00000
3	-0.92496E-03	0.25901E-03	.66993	0.00000
4	-0.82975E-03	0.14209E-03	.60097	0.00000
5	-0.74299E-03	0.34395E-04	.53813	0.00000
6	-0.72614E-03	0.13689E-04	.52592	0.00000
7	-0.70602E-03	0.46233E-05	.51135	0.00000
8	-0.58607E-03	-0.96641E-04	.42448	0.00000
9	-0.44109E-03	-0.22270E-03	.31947	0.00000
10	-0.36135E-03	-0.28797E-03	.26172	0.00000
11	-0.32492E-03	-0.31049E-03	.23533	0.00000
12	-0.36368E-03	-0.26054E-03	.26341	0.00000
13	-0.36670E-03	-0.24953E-03	.26559	0.00000
14	-0.32464E-03	-0.28309E-03	.23513	0.00000
15	-0.25551E-03	-0.34295E-03	.24839	0.00000
16	-0.16778E-03	-0.42105E-03	.30495	0.00000
17	-0.68766E-04	-0.51010E-03	.36945	0.00000
18	0.32628E-04	-0.60114E-03	.43539	0.00000
19	0.12266E-03	-0.68048E-03	.49285	0.00000
20	0.18851E-03	-0.73572E-03	.53286	0.00000
21	0.21698E-03	-0.76427E-03	.55355	0.00000
22	0.19990E-03	-0.75800E-03	.54900	0.00000
23	0.14810E-03	-0.71723E-03	.51947	0.00000
24	0.70338E-04	-0.65036E-03	.47104	0.00000
25	-0.20605E-04	-0.56984E-03	.41272	0.00000
26	-0.10856E-03	-0.49200E-03	.35634	0.00000
27	-0.19040E-03	-0.42006E-03	.30424	0.00000
28	-0.25527E-03	-0.36402E-03	.26365	0.00000
29	-0.27471E-03	-0.35555E-03	.25751	0.00000
30	-0.35698E-03	-0.28717E-03	.25855	0.00000
31	-0.48368E-03	-0.17510E-03	.35032	0.00000
32	-0.66973E-03	-0.75871E-05	.48507	0.00000
33	-0.81396E-03	0.11374E-03	.58953	0.00000
34	-0.82298E-03	0.95540E-04	.59607	0.00000
35	-0.81697E-03	0.73523E-04	.59171	0.00000
36	-0.88818E-03	0.15850E-03	.64329	0.00000
37	-0.98475E-03	0.27859E-03	.71323	0.00000
38	-0.84870E-03	0.15997E-03	.61469	0.00000
39	-0.33582E-03	-0.33582E-03	.24322	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.25481	0.00000	0.06493
2	-0.26138	-0.27228	0.34059
3	-0.26796	-0.34232	0.41412
4	-0.27670	-0.28099	0.35755
5	-0.28512	-0.22476	0.30606
6	-0.28667	-0.21391	0.29609
7	-0.28222	-0.20547	0.28512
8	-0.27471	-0.14151	0.21697
9	-0.26709	-0.06314	0.13448
10	-0.26127	-0.02122	0.08948
11	-0.25567	-0.00417	0.06954
12	-0.25117	-0.02982	0.09291
13	-0.24795	-0.03388	0.09536
14	-0.24454	-0.01201	0.07181
15	-0.24081	0.02528	0.08327
16	-0.23693	0.07323	0.12936
17	-0.23292	0.12760	0.18186
18	-0.22875	0.18324	0.23557
19	-0.22445	0.23221	0.28259
20	-0.22019	0.26722	0.31570
21	-0.22022	0.28371	0.33221
22	-0.22456	0.27696	0.32739
23	-0.22901	0.25019	0.30264
24	-0.23339	0.20838	0.26285
25	-0.23758	0.15880	0.21524
26	-0.24165	0.11086	0.16926
27	-0.24563	0.06640	0.12674
28	-0.24919	0.03144	0.09353
29	-0.25360	0.02337	0.08769
30	-0.25919	-0.02018	0.08736

31	-0.26508	-0.08922	0.15949
32	-0.27254	-0.19145	0.26572
33	-0.28175	-0.26823	0.34761
34	-0.29271	-0.26557	0.35125
35	-0.29914	-0.25747	0.34695
36	-0.29361	-0.30263	0.38883
37	-0.28414	-0.36527	0.44601
38	-0.27712	-0.29164	0.36843
39	-0.27025	0.00000	0.07303

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	35	11846.	30800.	0.385
BUCKLING THRUST (psi)	35	11846.	53902.	0.220
SEAM THRUST (psi)	35	11846.	21589.	0.549
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	37	0.446	1.000	0.446

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.54

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.11

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage NRL-OPR (LL x 3.47)

        EXECUTION MODE .................   ANALYS

        SOLUTION LEVEL .................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........    2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...    4

             IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
             AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

        SECTION PROPERTIES OF CROSS-SECTION:

              THRUST AREA (IN**2/IN) ............   0.23020

              MOM. OF INERTIA (IN**4/IN) ........   0.87460

              SECTION MODULUS (IN**3/IN) ........   0.28840

              PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

        NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

        LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
        AND DEFLECTION LIMIT AT SERVICE LOAD

              THRUST STRESS YIELDING ............   0.70000

              BUCKLING STRESS FAILURE............   0.70000

              SEAM STRENGTH FAILURE .............   0.67000
```

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -242.0	F = 0.000
1142	22	F = 0.000	F = -242.0	F = 0.000
1143	21	F = 0.000	F = -242.0	F = 0.000
1143	22	F = 0.000	F = -242.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000

856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-113.4	F =	0.000
1141	22	F =	0.000	F =	-113.4	F =	0.000
1139	21	F =	0.000	F =	-113.4	F =	0.000
1139	22	F =	0.000	F =	-113.4	F =	0.000
1137	21	F =	0.000	F =	-85.40	F =	0.000
1137	22	F =	0.000	F =	-85.40	F =	0.000
1145	21	F =	0.000	F =	-113.4	F =	0.000
1145	22	F =	0.000	F =	-113.4	F =	0.000
1146	21	F =	0.000	F =	-113.4	F =	0.000
1146	22	F =	0.000	F =	-113.4	F =	0.000
1148	21	F =	0.000	F =	-113.4	F =	0.000
1148	22	F =	0.000	F =	-113.4	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
```

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11

13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000

27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.450	Factor for load step #21
22	1.450	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.558E+00	0.716E+01	0.590E-10	-0.141E+05	0.755E+03
	0.00	-0.108E+01	0.196E+01	-0.324E+04	-0.141E+05	0.328E+04
2	-193.83	-0.796E+00	-0.417E+01	-0.829E+04	-0.431E+05	0.347E+03
	14.34	-0.110E+01	-0.140E+01	-0.331E+04	-0.144E+05	0.151E+04
3	-192.08	-0.979E+00	-0.155E+02	-0.107E+05	-0.440E+05	0.155E+02
	28.58	-0.108E+01	-0.476E+01	-0.338E+04	-0.147E+05	0.672E+02
4	-188.35	-0.109E+01	-0.333E+02	-0.930E+04	-0.440E+05	-0.118E+03
	42.43	-0.106E+01	-0.101E+02	-0.348E+04	-0.151E+05	-0.511E+03
5	-182.71	-0.112E+01	-0.401E+02	-0.767E+04	-0.423E+05	-0.907E+02
	55.62	-0.105E+01	-0.122E+02	-0.362E+04	-0.157E+05	-0.394E+03
6	-175.27	-0.111E+01	-0.386E+02	-0.689E+04	-0.403E+05	-0.477E+02
	67.89	-0.107E+01	-0.118E+02	-0.378E+04	-0.164E+05	-0.207E+03
7	-166.18	-0.106E+01	-0.358E+02	-0.633E+04	-0.388E+05	-0.538E+02
	78.98	-0.112E+01	-0.148E+01	-0.387E+04	-0.168E+05	-0.234E+03

8	-155.61	-0.989E+00	-0.265E+02	-0.522E+04	-0.347E+05	-0.700E+02
	88.69	-0.121E+01	0.855E+01	-0.382E+04	-0.166E+05	-0.304E+03
9	-144.43	-0.904E+00	-0.181E+02	-0.409E+04	-0.303E+05	-0.471E+02
	97.10	-0.133E+01	0.533E+01	-0.371E+04	-0.161E+05	-0.204E+03
10	-132.78	-0.811E+00	-0.149E+02	-0.353E+04	-0.281E+05	-0.220E+02
	104.87	-0.149E+01	0.436E+01	-0.364E+04	-0.158E+05	-0.956E+02
11	-120.72	-0.714E+00	-0.258E+02	-0.298E+04	-0.258E+05	0.618E+02
	111.98	-0.167E+01	0.753E+01	-0.356E+04	-0.155E+05	0.268E+03
12	-108.28	-0.617E+00	-0.957E+01	-0.465E+04	-0.313E+05	0.113E+03
	118.40	-0.188E+01	0.280E+01	-0.349E+04	-0.152E+05	0.490E+03
13	-95.50	-0.519E+00	-0.360E+01	-0.539E+04	-0.338E+05	0.108E+02
	124.11	-0.212E+01	0.109E+01	-0.347E+04	-0.151E+05	0.469E+02
14	-82.42	-0.422E+00	-0.829E+01	-0.405E+04	-0.290E+05	-0.988E+02
	129.10	-0.240E+01	0.241E+01	-0.344E+04	-0.149E+05	-0.429E+03
15	-69.09	-0.334E+00	-0.110E+02	-0.157E+04	-0.202E+05	-0.155E+03
	133.35	-0.271E+01	0.315E+01	-0.339E+04	-0.147E+05	-0.672E+03
16	-55.53	-0.261E+00	-0.116E+02	0.143E+04	-0.195E+05	-0.184E+03
	136.84	-0.304E+01	0.329E+01	-0.334E+04	-0.145E+05	-0.801E+03
17	-41.80	-0.208E+00	-0.127E+02	0.476E+04	-0.307E+05	-0.199E+03
	139.57	-0.335E+01	0.357E+01	-0.328E+04	-0.142E+05	-0.864E+03
18	-27.94	-0.176E+00	-0.146E+02	0.810E+04	-0.420E+05	-0.189E+03
	141.53	-0.364E+01	0.408E+01	-0.322E+04	-0.140E+05	-0.822E+03
19	-13.99	-0.165E+00	-0.162E+02	0.110E+05	-0.440E+05	-0.151E+03
	142.70	-0.387E+01	0.454E+01	-0.315E+04	-0.137E+05	-0.657E+03
20	0.00	-0.167E+00	-0.184E+02	0.130E+05	-0.440E+05	-0.825E+02
	143.09	-0.403E+01	0.522E+01	-0.307E+04	-0.133E+05	-0.358E+03
21	13.99	-0.175E+00	-0.190E+02	0.137E+05	-0.440E+05	0.788E+01
	142.70	-0.408E+01	-0.383E+01	-0.306E+04	-0.133E+05	0.342E+02
22	27.94	-0.177E+00	-0.171E+02	0.128E+05	-0.440E+05	0.878E+02
	141.53	-0.403E+01	-0.484E+01	-0.312E+04	-0.136E+05	0.382E+03
23	41.80	-0.163E+00	-0.157E+02	0.108E+05	-0.440E+05	0.141E+03
	139.57	-0.388E+01	-0.440E+01	-0.319E+04	-0.139E+05	0.613E+03
24	55.53	-0.126E+00	-0.144E+02	0.818E+04	-0.425E+05	0.172E+03
	136.84	-0.366E+01	-0.402E+01	-0.326E+04	-0.142E+05	0.746E+03
25	69.09	-0.639E-01	-0.129E+02	0.514E+04	-0.323E+05	0.179E+03
	133.35	-0.338E+01	-0.359E+01	-0.332E+04	-0.144E+05	0.778E+03
26	82.42	0.239E-01	-0.118E+02	0.211E+04	-0.220E+05	0.165E+03
	129.10	-0.307E+01	-0.330E+01	-0.338E+04	-0.147E+05	0.716E+03
27	95.50	0.134E+00	-0.817E+01	-0.596E+03	-0.170E+05	0.114E+03
	124.11	-0.275E+01	-0.231E+01	-0.343E+04	-0.149E+05	0.497E+03

28	108.28	0.261E+00	-0.565E+01	-0.221E+04	-0.227E+05	0.188E+02
	118.40	-0.244E+01	-0.162E+01	-0.346E+04	-0.150E+05	0.818E+02
29	120.72	0.398E+00	-0.230E+02	-0.217E+04	-0.228E+05	0.243E+02
	111.98	-0.215E+01	-0.660E+01	-0.352E+04	-0.153E+05	0.106E+03
30	132.78	0.543E+00	-0.158E+02	-0.385E+04	-0.290E+05	0.971E+02
	104.87	-0.189E+01	-0.458E+01	-0.360E+04	-0.157E+05	0.422E+03
31	144.43	0.688E+00	-0.159E+02	-0.575E+04	-0.359E+05	0.116E+03
	97.10	-0.165E+01	-0.466E+01	-0.367E+04	-0.160E+05	0.502E+03
32	155.61	0.822E+00	-0.205E+02	-0.780E+04	-0.434E+05	0.839E+02
	88.69	-0.146E+01	-0.663E+01	-0.376E+04	-0.163E+05	0.365E+03
33	166.18	0.941E+00	-0.311E+02	-0.866E+04	-0.440E+05	-0.652E+01
	78.98	-0.132E+01	-0.929E+01	-0.388E+04	-0.169E+05	-0.283E+02
34	175.27	0.103E+01	-0.452E+02	-0.799E+04	-0.440E+05	-0.170E+02
	67.89	-0.123E+01	-0.136E+02	-0.404E+04	-0.176E+05	-0.739E+02
35	182.71	0.108E+01	-0.478E+02	-0.836E+04	-0.440E+05	0.797E+02
	55.62	-0.119E+01	0.122E+02	-0.406E+04	-0.176E+05	0.346E+03
36	188.35	0.107E+01	-0.381E+02	-0.103E+05	-0.440E+05	0.135E+03
	42.43	-0.119E+01	0.115E+02	-0.390E+04	-0.170E+05	0.585E+03
37	192.08	0.992E+00	-0.168E+02	-0.120E+05	-0.440E+05	-0.138E+02
	28.58	-0.120E+01	0.521E+01	-0.379E+04	-0.165E+05	-0.600E+02
38	193.83	0.822E+00	-0.454E+01	-0.933E+04	-0.440E+05	-0.390E+03
	14.34	-0.121E+01	0.156E+01	-0.372E+04	-0.161E+05	-0.170E+04
39	193.56	0.588E+00	0.776E+01	0.411E-10	-0.158E+05	-0.850E+03
	0.00	-0.120E+01	-0.209E+01	-0.364E+04	-0.158E+05	-0.369E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.44197E-03	-0.44197E-03	.32011	0.00000
2	-0.13535E-02	0.45100E-03	.98034	0.00000
3	-0.16811E-02	0.72216E-03	1.2176	0.12499
4	-0.14973E-02	0.54240E-03	1.0845	0.05717
5	-0.13284E-02	0.34076E-03	.96212	0.00000
6	-0.12657E-02	0.23384E-03	.91672	0.00000
7	-0.12162E-02	0.16035E-03	.88086	0.00000
8	-0.10879E-02	0.47788E-04	.78792	0.00000
9	-0.95045E-03	-0.61492E-04	.68839	0.00000
10	-0.88022E-03	-0.11256E-03	.63752	0.00000
11	-0.80894E-03	-0.16132E-03	.58590	0.00000
12	-0.98187E-03	0.30111E-04	.71115	0.00000
13	-0.10596E-02	0.11439E-03	.76742	0.00000
14	-0.90969E-03	-0.28038E-04	.65887	0.00000
15	-0.63376E-03	-0.29135E-03	.45902	0.00000
16	-0.29924E-03	-0.61093E-03	.44248	0.00000
17	0.70623E-04	-0.96473E-03	.69873	0.00000
18	0.44281E-03	-0.13193E-02	.95555	0.00000
19	0.78946E-03	-0.16841E-02	1.2198	0.12267
20	0.10777E-02	-0.20629E-02	1.4941	0.21723
21	0.11763E-02	-0.22157E-02	1.6047	0.24616
22	0.10406E-02	-0.20283E-02	1.4691	0.21103
23	0.76584E-03	-0.16709E-02	1.2102	0.11911
24	0.44583E-03	-0.13348E-02	.96680	0.00000
25	0.10638E-03	-0.10127E-02	.73345	0.00000

26	-0.23127E-03	-0.69089E-03	.50040	0.00000
27	-0.53241E-03	-0.40269E-03	.38561	0.00000
28	-0.71203E-03	-0.23169E-03	.51571	0.00000
29	-0.71646E-03	-0.24341E-03	.51891	0.00000
30	-0.91032E-03	-0.71949E-04	.65932	0.00000
31	-0.11266E-02	0.12491E-03	.81595	0.00000
32	-0.13617E-02	0.33617E-03	.98623	0.00000
33	-0.14793E-02	0.41651E-03	1.0714	0.05203
34	-0.14214E-02	0.31824E-03	1.0295	0.02341
35	-0.14698E-02	0.35924E-03	1.0645	0.04871
36	-0.17249E-02	0.61016E-03	1.2493	0.14740
37	-0.20373E-02	0.85444E-03	1.4756	0.22708
38	-0.15408E-02	0.51541E-03	1.1160	0.07789
39	-0.49603E-03	-0.49603E-03	.35927	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.35568	0.00000	0.12651
2	-0.36316	-0.52175	0.65363
3	-0.37073	-0.67147	0.80890
4	-0.38154	-0.58535	0.73092
5	-0.39740	-0.48260	0.64052
6	-0.41520	-0.43356	0.60595
7	-0.42484	-0.39800	0.57849
8	-0.41850	-0.32835	0.50350
9	-0.40718	-0.25703	0.42282
10	-0.39947	-0.22195	0.38153
11	-0.39041	-0.18725	0.33967
12	-0.38297	-0.29259	0.43926
13	-0.38032	-0.33943	0.48407
14	-0.37732	-0.25491	0.39728
15	-0.37224	-0.09900	0.23756
16	-0.36623	0.09012	0.22425
17	-0.35977	0.29935	0.42878
18	-0.35268	0.50948	0.63387
19	-0.34501	0.69136	0.81039
20	-0.33680	0.81901	0.93244
21	-0.33550	0.85979	0.97235
22	-0.34246	0.80528	0.92256
23	-0.35028	0.68258	0.80528
24	-0.35772	0.51485	0.64281
25	-0.36467	0.32355	0.45653
26	-0.37106	0.13289	0.27057
27	-0.37626	-0.03750	0.17908
28	-0.37973	-0.13888	0.28308
29	-0.38623	-0.13677	0.28594
30	-0.39524	-0.24240	0.39861
31	-0.40304	-0.36184	0.52428
32	-0.41264	-0.49090	0.66117
33	-0.42559	-0.54509	0.72622
34	-0.44351	-0.50244	0.69914
35	-0.44512	-0.52626	0.72439
36	-0.42812	-0.64559	0.82887
37	-0.41595	-0.75325	0.92627
38	-0.40759	-0.58696	0.75309
39	-0.39918	0.00000	0.15935

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

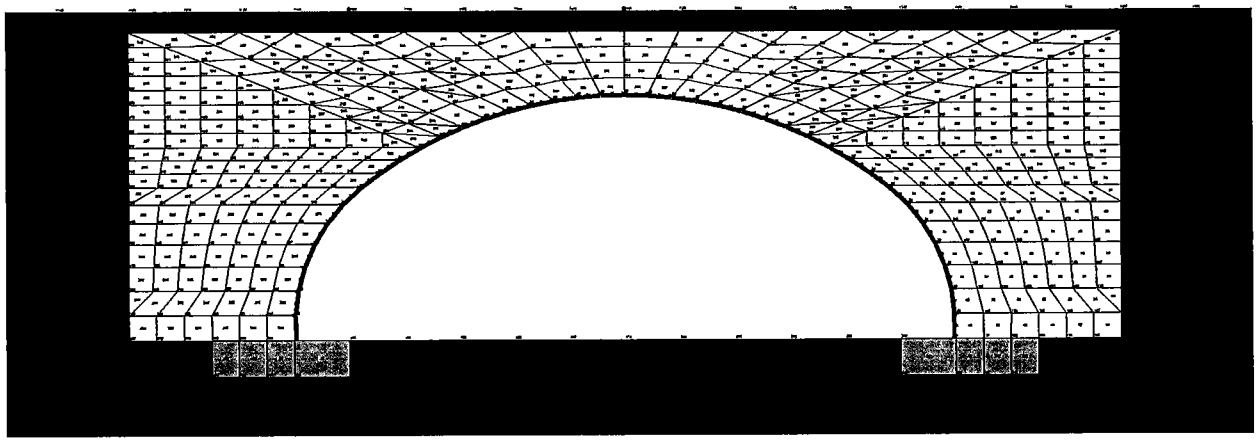
DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	35	17627.	30800.	0.572
BUCKLING THRUST (psi)	35	17627.	50199.	0.351
SEAM THRUST (psi)	35	17627.	21589.	0.816

PLASTIC-PENETRATE (%)	21	24.62	90.00	0.274
COMBINED T&M Ratio	21	0.972	1.000	0.972

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	1.44
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.29
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *



EV2

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage EV2

EXECUTION MODE ..................   ANALYS
SOLUTION LEVEL ..................  #3 USER
METHODOLOGY (LRFD OR SERVICE) ...     LRFD
NUMBER OF PIPE-ELEMENT GROUPS ....       1
MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL
NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:
      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08
      POISSONS RATIO OF METAL (-) .......    0.30000E+00
      YIELD STRESS OF METAL (PSI)........    0.44000E+05
      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05
      DENSITY OF METAL (PCI).............    0.28400E+00
      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........    2
     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

 LARGE DEFORMATION/BUCKLING CODE, IBUCK...    4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -137.4	F = 0.000
1142	22	F = 0.000	F = -137.4	F = 0.000
1137	21	F = 0.000	F = -98.40	F = 0.000
1137	22	F = 0.000	F = -98.40	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000

836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP
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BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000

9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.346E+00	-0.143E+01	0.261E-11	-0.102E+05	0.410E+03
	0.00	-0.938E+00	-0.447E+00	-0.234E+04	-0.102E+05	0.178E+04
2	-193.83	-0.424E+00	-0.800E+01	-0.430E+04	-0.253E+05	0.185E+03
	14.34	-0.944E+00	-0.244E+01	-0.240E+04	-0.104E+05	0.805E+03
3	-192.08	-0.474E+00	-0.146E+02	-0.538E+04	-0.293E+05	0.382E+01
	28.58	-0.943E+00	-0.442E+01	-0.246E+04	-0.107E+05	0.166E+02

4	-188.35	-0.487E+00	-0.260E+02	-0.445E+04	-0.264E+05	-0.568E+02
	42.43	-0.944E+00	-0.500E+01	-0.253E+04	-0.110E+05	-0.247E+03
5	-182.71	-0.470E+00	-0.282E+02	-0.377E+04	-0.241E+05	-0.249E+02
	55.62	-0.957E+00	0.225E+01	-0.254E+04	-0.110E+05	-0.108E+03
6	-175.27	-0.431E+00	-0.232E+02	-0.374E+04	-0.237E+05	-0.898E+01
	67.89	-0.987E+00	0.694E+01	-0.247E+04	-0.107E+05	-0.390E+02
7	-166.18	-0.375E+00	-0.178E+02	-0.349E+04	-0.224E+05	-0.561E+02
	78.98	-0.104E+01	0.532E+01	-0.238E+04	-0.103E+05	-0.244E+03
8	-155.61	-0.310E+00	-0.146E+02	-0.209E+04	-0.172E+05	-0.105E+03
	88.69	-0.112E+01	0.472E+01	-0.230E+04	-0.997E+04	-0.456E+03
9	-144.43	-0.246E+00	-0.124E+02	-0.453E+03	-0.113E+05	-0.892E+02
	97.10	-0.121E+01	0.363E+01	-0.223E+04	-0.968E+04	-0.387E+03
10	-132.78	-0.185E+00	-0.116E+02	0.497E+03	-0.112E+05	-0.437E+02
	104.87	-0.131E+01	0.339E+01	-0.218E+04	-0.945E+04	-0.190E+03
11	-120.72	-0.130E+00	-0.115E+02	0.871E+03	-0.123E+05	-0.154E+01
	111.98	-0.141E+01	0.336E+01	-0.213E+04	-0.924E+04	-0.669E+01
12	-108.28	-0.844E-01	-0.810E+01	0.650E+03	-0.113E+05	0.185E+02
	118.40	-0.151E+01	0.236E+01	-0.209E+04	-0.906E+04	0.802E+02
13	-95.50	-0.458E-01	-0.726E+01	0.472E+03	-0.106E+05	0.108E+02
	124.11	-0.161E+01	0.212E+01	-0.206E+04	-0.893E+04	0.468E+02
14	-82.42	-0.139E-01	-0.603E+01	0.474E+03	-0.105E+05	-0.978E+01
	129.10	-0.170E+01	0.176E+01	-0.203E+04	-0.881E+04	-0.425E+02
15	-69.09	0.116E-01	-0.596E+01	0.879E+03	-0.117E+05	-0.380E+02
	133.35	-0.180E+01	0.174E+01	-0.200E+04	-0.870E+04	-0.165E+03
16	-55.53	0.302E-01	-0.629E+01	0.167E+04	-0.144E+05	-0.628E+02
	136.84	-0.188E+01	0.183E+01	-0.197E+04	-0.857E+04	-0.273E+03
17	-41.80	0.415E-01	-0.732E+01	0.276E+04	-0.180E+05	-0.764E+02
	139.57	-0.196E+01	0.214E+01	-0.194E+04	-0.844E+04	-0.332E+03
18	-27.94	0.460E-01	-0.859E+01	0.392E+04	-0.219E+05	-0.719E+02
	141.53	-0.202E+01	0.251E+01	-0.191E+04	-0.828E+04	-0.312E+03
19	-13.99	0.450E-01	-0.103E+02	0.484E+04	-0.249E+05	-0.444E+02
	142.70	-0.205E+01	0.300E+01	-0.186E+04	-0.809E+04	-0.193E+03
20	0.00	0.414E-01	-0.117E+02	0.517E+04	-0.260E+05	0.602E+01
	143.09	-0.205E+01	-0.173E+01	-0.185E+04	-0.805E+04	0.262E+02
21	13.99	0.389E-01	-0.103E+02	0.463E+04	-0.243E+05	0.561E+02
	142.70	-0.201E+01	-0.300E+01	-0.189E+04	-0.820E+04	0.244E+03
22	27.94	0.409E-01	-0.882E+01	0.350E+04	-0.205E+05	0.840E+02
	141.53	-0.194E+01	-0.257E+01	-0.193E+04	-0.839E+04	0.365E+03
23	41.80	0.499E-01	-0.741E+01	0.212E+04	-0.159E+05	0.892E+02
	139.57	-0.185E+01	-0.216E+01	-0.197E+04	-0.855E+04	0.388E+03

24	55.53	0.670E-01	-0.645E+01	0.819E+03	-0.115E+05	0.758E+02
	136.84	-0.174E+01	-0.188E+01	-0.200E+04	-0.870E+04	0.329E+03
25	69.09	0.914E-01	-0.612E+01	-0.191E+03	-0.949E+04	0.517E+02
	133.35	-0.163E+01	-0.178E+01	-0.203E+04	-0.883E+04	0.225E+03
26	82.42	0.122E+00	-0.598E+01	-0.810E+03	-0.118E+05	0.225E+02
	129.10	-0.152E+01	-0.175E+01	-0.206E+04	-0.894E+04	0.979E+02
27	95.50	0.156E+00	-0.602E+01	-0.978E+03	-0.124E+05	-0.876E+01
	124.11	-0.142E+01	-0.177E+01	-0.208E+04	-0.905E+04	-0.381E+02
28	108.28	0.194E+00	-0.730E+01	-0.687E+03	-0.116E+05	-0.322E+02
	118.40	-0.132E+01	-0.214E+01	-0.211E+04	-0.917E+04	-0.140E+03
29	120.72	0.235E+00	-0.122E+02	-0.167E+03	-0.992E+04	-0.143E+02
	111.98	-0.123E+01	-0.358E+01	-0.215E+04	-0.934E+04	-0.621E+02
30	132.78	0.280E+00	-0.104E+02	-0.349E+03	-0.108E+05	0.225E+02
	104.87	-0.115E+01	-0.304E+01	-0.220E+04	-0.954E+04	0.979E+02
31	144.43	0.328E+00	-0.119E+02	-0.837E+03	-0.127E+05	0.543E+02
	97.10	-0.107E+01	-0.349E+01	-0.225E+04	-0.975E+04	0.236E+03
32	155.61	0.376E+00	-0.153E+02	-0.189E+04	-0.165E+05	0.699E+02
	88.69	-0.998E+00	-0.367E+01	-0.230E+04	-0.100E+05	0.304E+03
33	166.18	0.423E+00	-0.194E+02	-0.282E+04	-0.200E+05	0.389E+02
	78.98	-0.940E+00	-0.147E+01	-0.234E+04	-0.102E+05	0.169E+03
34	175.27	0.462E+00	-0.233E+02	-0.299E+04	-0.207E+05	0.133E+02
	67.89	-0.902E+00	-0.116E+01	-0.237E+04	-0.103E+05	0.576E+02
35	182.71	0.488E+00	-0.264E+02	-0.317E+04	-0.212E+05	0.370E+02
	55.62	-0.881E+00	0.316E+01	-0.236E+04	-0.102E+05	0.161E+03
36	188.35	0.494E+00	-0.228E+02	-0.401E+04	-0.239E+05	0.624E+02
	42.43	-0.873E+00	0.688E+01	-0.229E+04	-0.996E+04	0.271E+03
37	192.08	0.472E+00	-0.125E+02	-0.492E+04	-0.267E+05	-0.245E+01
	28.58	-0.874E+00	0.379E+01	-0.222E+04	-0.965E+04	-0.107E+02
38	193.83	0.417E+00	-0.745E+01	-0.389E+04	-0.229E+05	-0.169E+03
	14.34	-0.877E+00	0.226E+01	-0.217E+04	-0.941E+04	-0.735E+03
39	193.56	0.337E+00	-0.240E+01	-0.272E-10	-0.917E+04	-0.368E+03
	0.00	-0.871E+00	0.727E+00	-0.211E+04	-0.917E+04	-0.160E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.31920E-03	-0.31920E-03	.23119	0.00000
2	-0.79541E-03	0.14058E-03	.57609	0.00000
3	-0.92077E-03	0.24911E-03	.66689	0.00000
4	-0.82906E-03	0.14019E-03	.60047	0.00000
5	-0.75634E-03	0.63884E-04	.54780	0.00000
6	-0.74385E-03	0.70292E-04	.53875	0.00000
7	-0.70381E-03	0.55742E-04	.50975	0.00000
8	-0.53987E-03	-0.85996E-04	.39102	0.00000
9	-0.35308E-03	-0.25451E-03	.25573	0.00000

10	-0.24245E-03	-0.35059E-03	.25393	0.00000
11	-0.19512E-03	-0.38457E-03	.27854	0.00000
12	-0.21372E-03	-0.35506E-03	.25716	0.00000
13	-0.22887E-03	-0.33147E-03	.24008	0.00000
14	-0.22490E-03	-0.32795E-03	.23753	0.00000
15	-0.17722E-03	-0.36851E-03	.26690	0.00000
16	-0.86982E-04	-0.45111E-03	.32673	0.00000
17	0.36070E-04	-0.56548E-03	.40956	0.00000
18	0.16652E-03	-0.68588E-03	.49677	0.00000
19	0.27301E-03	-0.78093E-03	.56561	0.00000
20	0.31041E-03	-0.81560E-03	.59072	0.00000
21	0.24628E-03	-0.76099E-03	.55117	0.00000
22	0.11758E-03	-0.64402E-03	.46645	0.00000
23	-0.37312E-04	-0.49952E-03	.36179	0.00000
24	-0.18386E-03	-0.36200E-03	.26218	0.00000
25	-0.29773E-03	-0.25615E-03	.21564	0.00000
26	-0.36872E-03	-0.19254E-03	.26706	0.00000
27	-0.39047E-03	-0.17770E-03	.28281	0.00000
28	-0.36246E-03	-0.21295E-03	.26252	0.00000
29	-0.31123E-03	-0.27486E-03	.22542	0.00000
30	-0.33744E-03	-0.26148E-03	.24440	0.00000
31	-0.39718E-03	-0.21493E-03	.28767	0.00000
32	-0.51915E-03	-0.10822E-03	.37601	0.00000
33	-0.62624E-03	-0.12975E-04	.45357	0.00000
34	-0.64802E-03	0.24530E-05	.46935	0.00000
35	-0.66653E-03	0.23713E-04	.48275	0.00000
36	-0.74943E-03	0.12416E-03	.54279	0.00000
37	-0.83792E-03	0.23217E-03	.60689	0.00000
38	-0.71860E-03	0.12774E-03	.52046	0.00000
39	-0.28787E-03	-0.28787E-03	.20850	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.25687	0.00000	0.06598
2	-0.26349	-0.27062	0.34005
3	-0.27026	-0.33825	0.41129
4	-0.27719	-0.28024	0.35707
5	-0.27863	-0.23715	0.31478
6	-0.27102	-0.23539	0.30884
7	-0.26077	-0.21961	0.28761
8	-0.25183	-0.13123	0.19465
9	-0.24448	-0.02850	0.08827
10	-0.23863	0.03127	0.08821
11	-0.23325	0.05478	0.10919
12	-0.22886	0.04087	0.09325
13	-0.22547	0.02967	0.08050
14	-0.22245	0.02980	0.07928
15	-0.21959	0.05531	0.10353
16	-0.21652	0.10528	0.15216
17	-0.21302	0.17392	0.21930
18	-0.20898	0.24646	0.29013
19	-0.20437	0.30473	0.34649
20	-0.20328	0.32556	0.36688
21	-0.20711	0.29123	0.33413
22	-0.21183	0.22020	0.26507
23	-0.21601	0.13364	0.18030
24	-0.21964	0.05151	0.09975
25	-0.22287	-0.01202	0.06169
26	-0.22584	-0.05094	0.10194
27	-0.22862	-0.06152	0.11379
28	-0.23153	-0.04323	0.09684
29	-0.23583	-0.01052	0.06613
30	-0.24099	-0.02196	0.08004
31	-0.24630	-0.05269	0.11335
32	-0.25244	-0.11881	0.18254
33	-0.25720	-0.17731	0.24347
34	-0.25976	-0.18807	0.25555
35	-0.25865	-0.19957	0.26647
36	-0.25159	-0.25258	0.31588
37	-0.24374	-0.30940	0.36880
38	-0.23774	-0.24470	0.30122
39	-0.23166	0.00000	0.05367

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	11034.	30800.	0.358
BUCKLING THRUST (psi)	5	11034.	54046.	0.204
SEAM THRUST (psi)	5	11034.	21589.	0.511
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.411	1.000	0.411

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.50

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.10

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

        USER TITLE: Double Radius 33S 4.0ft Cover 8Gage EV2-OPR (LL x 3.57)

        EXECUTION MODE ..................   ANALYS

        SOLUTION LEVEL ..................  #3 USER

        METHODOLOGY (LRFD OR SERVICE) ...     LRFD

        NUMBER OF PIPE-ELEMENT GROUPS ....       1

        MAXIMUM ITERATIONS PER STEP ......     -99

        PIPE ELEMENT TYPE ............... STEEL

        NUMBER OF BEAM ELEMENTS .........       38

        STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

              YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

              POISSONS RATIO OF METAL (-) .......    0.30000E+00

              YIELD STRESS OF METAL (PSI)........    0.44000E+05

              LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

              DENSITY OF METAL (PCI).............    0.28400E+00

              MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

         MATERIAL CHARACTER CODE, NONLIN .........     2

             NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

         LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4

             IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
             AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

        SECTION PROPERTIES OF CROSS-SECTION:

              THRUST AREA (IN**2/IN) ............   0.23020

              MOM. OF INERTIA (IN**4/IN) ........   0.87460

              SECTION MODULUS (IN**3/IN) ........   0.28840

              PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

        NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

        LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
        AND DEFLECTION LIMIT AT SERVICE LOAD

              THRUST STRESS YIELDING ............   0.70000

              BUCKLING STRESS FAILURE............   0.70000

              SEAM STRENGTH FAILURE .............   0.67000
```

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -490.0	F = 0.000
1142	22	F = 0.000	F = -490.0	F = 0.000
1137	21	F = 0.000	F = -351.0	F = 0.000
1137	22	F = 0.000	F = -351.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000

857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000

* * * * * COMPLETED MESH GENERATION * * * * *

BRIDGECOR

CALCULATED KEY NUMBERS ...
THE NUMBER OF DATA ERRORS IS---------- 0
THE NUMBER OF SOIL MATERIALS IS-------- 4
THE NUMBER OF PIPE-TYPE GROUPS IS------ 1
THE NUMBER OF INTERFACE MATERIALS IS--- 37
BAND WIDTH ESTIMATE (MAX)---------- 2060

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24

26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.300	Factor for load step #21
22	1.300	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56 0.00	-0.499E+00 -0.111E+01	0.352E+01 0.955E+00	-0.529E-10 -0.313E+04	-0.136E+05 -0.136E+05	0.658E+03 0.286E+04
2	-193.83 14.34	-0.649E+00 -0.112E+01	-0.641E+01 -0.203E+01	-0.705E+04 -0.320E+04	-0.383E+05 -0.139E+05	0.298E+03 0.130E+04
3	-192.08 28.58	-0.754E+00 -0.111E+01	-0.163E+02 -0.501E+01	-0.890E+04 -0.327E+04	-0.440E+05 -0.142E+05	0.522E+01 0.227E+02
4	-188.35 42.43	-0.797E+00 -0.111E+01	-0.348E+02 -0.105E+02	-0.743E+04 -0.337E+04	-0.404E+05 -0.147E+05	-0.962E+02 -0.418E+03
5	-182.71 55.62	-0.789E+00 -0.112E+01	-0.396E+02 0.656E+01	-0.625E+04 -0.339E+04	-0.364E+05 -0.147E+05	-0.391E+02 -0.170E+03
6	-175.27 67.89	-0.741E+00 -0.116E+01	-0.325E+02 0.973E+01	-0.631E+04 -0.327E+04	-0.361E+05 -0.142E+05	0.896E+01 0.389E+02
7	-166.18 78.98	-0.663E+00 -0.123E+01	-0.231E+02 0.690E+01	-0.640E+04 -0.315E+04	-0.359E+05 -0.137E+05	-0.447E+02 -0.194E+03
8	-155.61 88.69	-0.565E+00 -0.135E+01	-0.181E+02 0.584E+01	-0.482E+04 -0.305E+04	-0.300E+05 -0.132E+05	-0.122E+03 -0.532E+03
9	-144.43 97.10	-0.461E+00 -0.150E+01	-0.154E+02 0.449E+01	-0.264E+04 -0.296E+04	-0.220E+05 -0.129E+05	-0.119E+03 -0.515E+03
10	-132.78 104.87	-0.355E+00 -0.167E+01	-0.155E+02 0.449E+01	-0.113E+04 -0.290E+04	-0.165E+05 -0.126E+05	-0.658E+02 -0.286E+03

11	-120.72	-0.255E+00	-0.187E+02	-0.373E+03	-0.136E+05	0.140E+02
	111.98	-0.185E+01	0.541E+01	-0.282E+04	-0.123E+05	0.609E+02
12	-108.28	-0.162E+00	-0.111E+02	-0.105E+04	-0.157E+05	0.664E+02
	118.40	-0.205E+01	0.320E+01	-0.277E+04	-0.120E+05	0.288E+03
13	-95.50	-0.782E-01	-0.646E+01	-0.172E+04	-0.178E+05	0.359E+02
	124.11	-0.225E+01	0.190E+01	-0.273E+04	-0.119E+05	0.156E+03
14	-82.42	-0.190E-02	-0.273E+01	-0.149E+04	-0.170E+05	-0.516E+02
	129.10	-0.247E+01	0.771E+00	-0.271E+04	-0.118E+05	-0.224E+03
15	-69.09	0.645E-01	-0.436E+01	0.355E+03	-0.129E+05	-0.153E+03
	133.35	-0.270E+01	0.124E+01	-0.269E+04	-0.117E+05	-0.664E+03
16	-55.53	0.117E+00	-0.616E+01	0.345E+04	-0.235E+05	-0.228E+03
	136.84	-0.293E+01	0.172E+01	-0.266E+04	-0.116E+05	-0.992E+03
17	-41.80	0.152E+00	-0.107E+02	0.737E+04	-0.369E+05	-0.258E+03
	139.57	-0.314E+01	0.300E+01	-0.262E+04	-0.114E+05	-0.112E+04
18	-27.94	0.168E+00	-0.146E+02	0.112E+05	-0.440E+05	-0.225E+03
	141.53	-0.330E+01	0.415E+01	-0.255E+04	-0.111E+05	-0.976E+03
19	-13.99	0.170E+00	-0.199E+02	0.140E+05	-0.440E+05	-0.123E+03
	142.70	-0.338E+01	0.572E+01	-0.247E+04	-0.107E+05	-0.535E+03
20	0.00	0.164E+00	-0.246E+02	0.147E+05	-0.440E+05	0.508E+02
	143.09	-0.336E+01	-0.303E+01	-0.245E+04	-0.107E+05	0.221E+03
21	13.99	0.163E+00	-0.178E+02	0.123E+05	-0.440E+05	0.209E+03
	142.70	-0.322E+01	-0.502E+01	-0.252E+04	-0.109E+05	0.908E+03
22	27.94	0.175E+00	-0.137E+02	0.827E+04	-0.399E+05	0.287E+03
	141.53	-0.300E+01	-0.384E+01	-0.259E+04	-0.113E+05	0.125E+04
23	41.80	0.207E+00	-0.875E+01	0.349E+04	-0.236E+05	0.299E+03
	139.57	-0.271E+01	-0.244E+01	-0.265E+04	-0.115E+05	0.130E+04
24	55.53	0.259E+00	-0.510E+01	-0.956E+03	-0.150E+05	0.247E+03
	136.84	-0.241E+01	-0.144E+01	-0.269E+04	-0.117E+05	0.107E+04
25	69.09	0.327E+00	-0.450E+01	-0.428E+04	-0.267E+05	0.163E+03
	133.35	-0.211E+01	-0.133E+01	-0.273E+04	-0.118E+05	0.708E+03
26	82.42	0.403E+00	-0.227E+01	-0.631E+04	-0.338E+05	0.577E+02
	129.10	-0.185E+01	-0.699E+00	-0.275E+04	-0.119E+05	0.251E+03
27	95.50	0.479E+00	-0.178E+00	-0.655E+04	-0.346E+05	-0.784E+02
	124.11	-0.162E+01	-0.105E+00	-0.275E+04	-0.120E+05	-0.341E+03
28	108.28	0.551E+00	-0.107E+02	-0.459E+04	-0.279E+05	-0.156E+03
	118.40	-0.145E+01	-0.315E+01	-0.277E+04	-0.120E+05	-0.677E+03
29	120.72	0.617E+00	-0.230E+02	-0.252E+04	-0.210E+05	-0.761E+02
	111.98	-0.131E+01	-0.672E+01	-0.283E+04	-0.123E+05	-0.331E+03
30	132.78	0.682E+00	-0.119E+02	-0.269E+04	-0.219E+05	0.783E+01
	104.87	-0.118E+01	-0.351E+01	-0.290E+04	-0.126E+05	0.340E+02
31	144.43	0.742E+00	-0.149E+02	-0.289E+04	-0.229E+05	0.318E+02

	97.10	-0.108E+01	-0.441E+01	-0.296E+04	-0.129E+05	0.138E+03
32	155.61	0.796E+00	-0.213E+02	-0.367E+04	-0.259E+05	0.548E+02
	88.69	-0.100E+01	-0.687E+01	-0.304E+04	-0.132E+05	0.238E+03
33	166.18	0.840E+00	-0.277E+02	-0.446E+04	-0.288E+05	0.388E+02
	78.98	-0.944E+00	0.428E+01	-0.307E+04	-0.133E+05	0.169E+03
34	175.27	0.868E+00	-0.299E+02	-0.473E+04	-0.293E+05	0.269E+02
	67.89	-0.914E+00	0.916E+01	-0.298E+04	-0.129E+05	0.117E+03
35	182.71	0.869E+00	-0.316E+02	-0.513E+04	-0.302E+05	0.586E+02
	55.62	-0.906E+00	0.957E+01	-0.285E+04	-0.124E+05	0.254E+03
36	188.35	0.837E+00	-0.265E+02	-0.625E+04	-0.335E+05	0.827E+02
	42.43	-0.914E+00	0.800E+01	-0.273E+04	-0.119E+05	0.359E+03
37	192.08	0.758E+00	-0.135E+02	-0.727E+04	-0.367E+05	-0.942E+01
	28.58	-0.930E+00	0.411E+01	-0.265E+04	-0.115E+05	-0.409E+02
38	193.83	0.629E+00	-0.573E+01	-0.568E+04	-0.310E+05	-0.241E+03
	14.34	-0.940E+00	0.178E+01	-0.259E+04	-0.113E+05	-0.105E+04
39	193.56	0.462E+00	0.208E+01	-0.102E-09	-0.110E+05	-0.525E+03
	0.00	-0.931E+00	-0.558E+00	-0.253E+04	-0.110E+05	-0.228E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.42623E-03	-0.42623E-03	.30871	0.00000
2	-0.12029E-02	0.33124E-03	.87123	0.00000
3	-0.14147E-02	0.52303E-03	1.0246	0.01755
4	-0.12685E-02	0.34891E-03	.91871	0.00000
5	-0.11422E-02	0.21770E-03	.82727	0.00000
6	-0.11324E-02	0.24059E-03	.82014	0.00000
7	-0.11256E-02	0.26731E-03	.81524	0.00000
8	-0.94010E-03	0.10929E-03	.68089	0.00000
9	-0.69186E-03	-0.11639E-03	.50110	0.00000
10	-0.51790E-03	-0.27165E-03	.37510	0.00000
11	-0.42564E-03	-0.34449E-03	.30828	0.00000
12	-0.49176E-03	-0.26245E-03	.35617	0.00000
13	-0.55962E-03	-0.18554E-03	.40532	0.00000
14	-0.53192E-03	-0.20794E-03	.38526	0.00000
15	-0.32861E-03	-0.40578E-03	.29390	0.00000
16	0.12084E-04	-0.73785E-03	.53441	0.00000
17	0.44589E-03	-0.11589E-02	.83935	0.00000
18	0.88239E-03	-0.15969E-02	1.1566	0.08720
19	0.12813E-02	-0.21137E-02	1.5309	0.21591
20	0.13912E-02	-0.22799E-02	1.6513	0.24782
21	0.10327E-02	-0.17735E-02	1.2845	0.13997
22	0.54678E-03	-0.12533E-02	.90771	0.00000
23	0.18773E-04	-0.74175E-03	.53723	0.00000
24	-0.47132E-03	-0.26328E-03	.34137	0.00000
25	-0.83747E-03	0.94389E-04	.60656	0.00000
26	-0.10605E-02	0.31178E-03	.76810	0.00000
27	-0.10873E-02	0.33708E-03	.78748	0.00000
28	-0.87687E-03	0.12214E-03	.63509	0.00000
29	-0.65989E-03	-0.11203E-03	.47794	0.00000
30	-0.68847E-03	-0.10259E-03	.49864	0.00000
31	-0.71804E-03	-0.88598E-04	.52006	0.00000
32	-0.81352E-03	-0.15930E-04	.58922	0.00000
33	-0.90359E-03	0.67606E-04	.65445	0.00000
34	-0.92055E-03	0.10945E-03	.66673	0.00000
35	-0.94618E-03	0.16992E-03	.68529	0.00000
36	-0.10520E-02	0.30727E-03	.76197	0.00000
37	-0.11523E-02	0.42965E-03	.83462	0.00000
38	-0.97145E-03	0.26488E-03	.70360	0.00000
39	-0.34528E-03	-0.34528E-03	.25007	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.34301	0.00000	0.11765
2	-0.35073	-0.44357	0.56658
3	-0.35854	-0.55985	0.68840
4	-0.37000	-0.46763	0.60453
5	-0.37200	-0.39319	0.53157
6	-0.35883	-0.39696	0.52572
7	-0.34535	-0.40273	0.52200
8	-0.33430	-0.30341	0.41517
9	-0.32522	-0.16638	0.27215
10	-0.31769	-0.07120	0.17213
11	-0.30988	-0.02346	0.11949
12	-0.30347	-0.06630	0.15840
13	-0.29984	-0.10816	0.19806
14	-0.29770	-0.09367	0.18230
15	-0.29550	0.02231	0.10963
16	-0.29203	0.21683	0.30211
17	-0.28689	0.46398	0.54629
18	-0.27990	0.70334	0.78168
19	-0.27124	0.87984	0.95341
20	-0.26895	0.92333	0.99566
21	-0.27594	0.77390	0.85004
22	-0.28427	0.52045	0.60126
23	-0.29091	0.21989	0.30452
24	-0.29558	-0.06015	0.14752
25	-0.29900	-0.26943	0.35883
26	-0.30127	-0.39677	0.48753
27	-0.30186	-0.41182	0.50294
28	-0.30368	-0.28884	0.38107
29	-0.31060	-0.15840	0.25487
30	-0.31830	-0.16939	0.27071
31	-0.32457	-0.18199	0.28733
32	-0.33375	-0.23061	0.34200
33	-0.33638	-0.28080	0.39396
34	-0.32637	-0.29780	0.40432
35	-0.31235	-0.32270	0.42026
36	-0.29968	-0.39302	0.48283
37	-0.29079	-0.45740	0.54197
38	-0.28431	-0.35746	0.43829
39	-0.27786	0.00000	0.07721

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	14731.	30800.	0.478
BUCKLING THRUST (psi)	5	14731.	52493.	0.281
SEAM THRUST (psi)	5	14731.	21589.	0.682
PLASTIC-PENETRATE (%)	20	24.78	90.00	0.275
COMBINED T&M Ratio	20	0.996	1.000	0.996

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.28

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.26

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HANDLING FACTOR RATIO = (SPAN**2/EI)/FF...........      0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)........    387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) .....     0.020


* * * * NORMAL EXIT FROM CANDE * * * *
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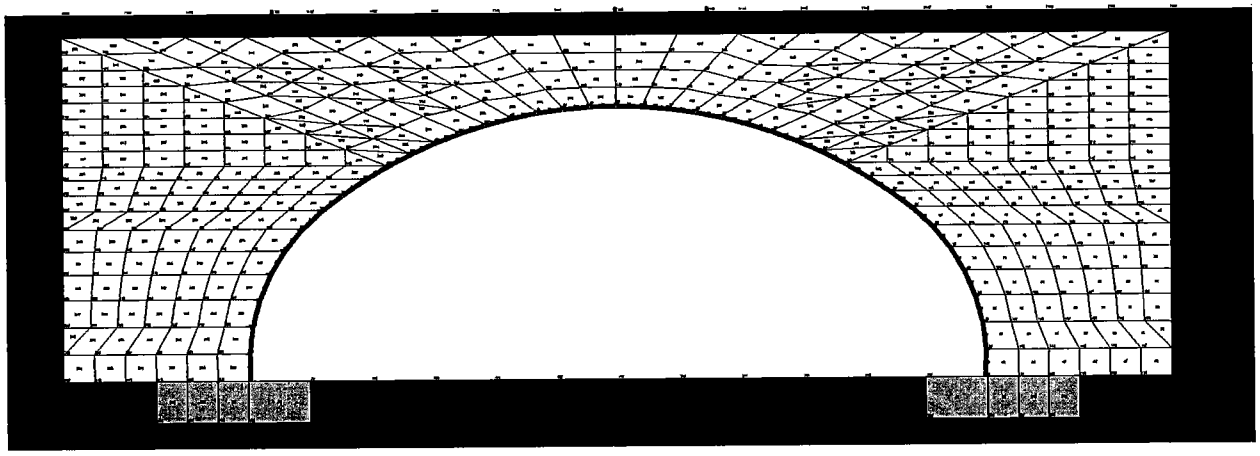

EV3

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***


 MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1


          USER TITLE: Double Radius 33S 4.0ft Cover 8Gage EV3

          EXECUTION MODE ..................   ANALYS

          SOLUTION LEVEL ..................  #3 USER

          METHODOLOGY (LRFD OR SERVICE) ...     LRFD

          NUMBER OF PIPE-ELEMENT GROUPS ....       1

          MAXIMUM ITERATIONS PER STEP ......     -99


          PIPE ELEMENT TYPE ............... STEEL

          NUMBER OF BEAM ELEMENTS .........       38


          STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

                YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

                POISSONS RATIO OF METAL (-) .......    0.30000E+00

                YIELD STRESS OF METAL (PSI)........    0.44000E+05

                LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

                DENSITY OF METAL (PCI).............    0.28400E+00

                MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

           MATERIAL CHARACTER CODE, NONLIN .........     2

               NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

           LARGE DEFORMATION/BUCKLING CODE, IBUCK...     4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -127.1	F = 0.000
1142	22	F = 0.000	F = -127.1	F = 0.000
1143	21	F = 0.000	F = -127.1	F = 0.000
1143	22	F = 0.000	F = -127.1	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000

861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1136	21	F =	0.000	F =	-98.40	F =	0.000
1136	22	F =	0.000	F =	-98.40	F =	0.000

```
 * * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


 * * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *
```

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000

8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.387E+00	-0.142E+01	0.563E-10	-0.106E+05	0.436E+03
	0.00	-0.950E+00	-0.450E+00	-0.244E+04	-0.106E+05	0.189E+04
2	-193.83	-0.482E+00	-0.796E+01	-0.459E+04	-0.268E+05	0.196E+03
	14.34	-0.957E+00	-0.243E+01	-0.251E+04	-0.109E+05	0.851E+03
3	-192.08	-0.548E+00	-0.145E+02	-0.573E+04	-0.310E+05	-0.850E+00

	28.58	-0.954E+00	-0.441E+01	-0.257E+04	-0.112E+05	-0.369E+01
4	-188.35	-0.575E+00	-0.264E+02	-0.465E+04	-0.276E+05	-0.748E+02
	42.43	-0.952E+00	-0.799E+01	-0.265E+04	-0.115E+05	-0.325E+03
5	-182.71	-0.569E+00	-0.303E+02	-0.365E+04	-0.245E+05	-0.462E+02
	55.62	-0.960E+00	-0.363E+01	-0.272E+04	-0.118E+05	-0.201E+03
6	-175.27	-0.541E+00	-0.270E+02	-0.336E+04	-0.235E+05	-0.190E+02
	67.89	-0.984E+00	0.219E+01	-0.273E+04	-0.119E+05	-0.826E+02
7	-166.18	-0.498E+00	-0.222E+02	-0.312E+04	-0.225E+05	-0.471E+02
	78.98	-0.103E+01	0.323E+01	-0.269E+04	-0.117E+05	-0.204E+03
8	-155.61	-0.446E+00	-0.173E+02	-0.201E+04	-0.183E+05	-0.824E+02
	88.69	-0.109E+01	0.558E+01	-0.261E+04	-0.114E+05	-0.358E+03
9	-144.43	-0.393E+00	-0.138E+02	-0.754E+03	-0.136E+05	-0.622E+02
	97.10	-0.117E+01	0.406E+01	-0.254E+04	-0.110E+05	-0.270E+03
10	-132.78	-0.341E+00	-0.125E+02	-0.213E+03	-0.115E+05	-0.179E+02
	104.87	-0.126E+01	0.367E+01	-0.248E+04	-0.108E+05	-0.776E+02
11	-120.72	-0.293E+00	-0.145E+02	-0.176E+03	-0.112E+05	0.347E+02
	111.98	-0.135E+01	0.426E+01	-0.243E+04	-0.105E+05	0.151E+03
12	-108.28	-0.249E+00	-0.918E+01	-0.108E+04	-0.141E+05	0.667E+02
	118.40	-0.145E+01	0.269E+01	-0.238E+04	-0.103E+05	0.290E+03
13	-95.50	-0.207E+00	-0.598E+01	-0.191E+04	-0.168E+05	0.410E+02
	124.11	-0.155E+01	0.176E+01	-0.235E+04	-0.102E+05	0.178E+03
14	-82.42	-0.167E+00	-0.584E+01	-0.205E+04	-0.172E+05	-0.661E+01
	129.10	-0.167E+01	0.172E+01	-0.233E+04	-0.101E+05	-0.287E+02
15	-69.09	-0.129E+00	-0.633E+01	-0.149E+04	-0.152E+05	-0.504E+02
	133.35	-0.180E+01	0.186E+01	-0.230E+04	-0.100E+05	-0.219E+03
16	-55.53	-0.971E-01	-0.616E+01	-0.355E+03	-0.111E+05	-0.903E+02
	136.84	-0.195E+01	0.180E+01	-0.227E+04	-0.987E+04	-0.392E+03
17	-41.80	-0.727E-01	-0.694E+01	0.135E+04	-0.144E+05	-0.124E+03
	139.57	-0.210E+01	0.201E+01	-0.224E+04	-0.973E+04	-0.540E+03
18	-27.94	-0.579E-01	-0.855E+01	0.343E+04	-0.215E+05	-0.139E+03
	141.53	-0.224E+01	0.247E+01	-0.220E+04	-0.956E+04	-0.605E+03
19	-13.99	-0.527E-01	-0.103E+02	0.552E+04	-0.285E+05	-0.128E+03
	142.70	-0.236E+01	0.296E+01	-0.216E+04	-0.936E+04	-0.557E+03
20	0.00	-0.548E-01	-0.127E+02	0.723E+04	-0.342E+05	-0.856E+02
	143.09	-0.244E+01	0.367E+01	-0.210E+04	-0.913E+04	-0.372E+03
21	13.99	-0.596E-01	-0.136E+02	0.803E+04	-0.369E+05	-0.180E+02
	142.70	-0.246E+01	-0.255E+01	-0.209E+04	-0.909E+04	-0.783E+02
22	27.94	-0.614E-01	-0.129E+02	0.773E+04	-0.361E+05	0.501E+02
	141.53	-0.244E+01	-0.374E+01	-0.214E+04	-0.928E+04	0.218E+03
23	41.80	-0.546E-01	-0.118E+02	0.652E+04	-0.321E+05	0.102E+03
	139.57	-0.236E+01	-0.339E+01	-0.219E+04	-0.952E+04	0.445E+03

24	55.53	-0.349E-01	-0.103E+02	0.466E+04	-0.259E+05	0.134E+03
	136.84	-0.223E+01	-0.296E+01	-0.224E+04	-0.974E+04	0.581E+03
25	69.09	-0.723E-03	-0.839E+01	0.249E+04	-0.186E+05	0.139E+03
	133.35	-0.208E+01	-0.240E+01	-0.229E+04	-0.994E+04	0.603E+03
26	82.42	0.471E-01	-0.657E+01	0.437E+03	-0.116E+05	0.115E+03
	129.10	-0.191E+01	-0.189E+01	-0.233E+04	-0.101E+05	0.500E+03
27	95.50	0.106E+00	-0.420E+01	-0.108E+04	-0.139E+05	0.602E+02
	124.11	-0.174E+01	-0.121E+01	-0.235E+04	-0.102E+05	0.262E+03
28	108.28	0.171E+00	-0.512E+01	-0.156E+04	-0.157E+05	-0.614E+01
	118.40	-0.158E+01	-0.149E+01	-0.237E+04	-0.103E+05	-0.267E+02
29	120.72	0.240E+00	-0.148E+02	-0.117E+04	-0.145E+05	0.143E+00
	111.98	-0.144E+01	-0.433E+01	-0.241E+04	-0.105E+05	0.621E+00
30	132.78	0.313E+00	-0.107E+02	-0.179E+04	-0.169E+05	0.425E+02
	104.87	-0.130E+01	-0.312E+01	-0.247E+04	-0.107E+05	0.185E+03
31	144.43	0.386E+00	-0.121E+02	-0.254E+04	-0.197E+05	0.632E+02
	97.10	-0.118E+01	-0.358E+01	-0.252E+04	-0.109E+05	0.274E+03
32	155.61	0.455E+00	-0.158E+02	-0.368E+04	-0.240E+05	0.630E+02
	88.69	-0.108E+01	-0.511E+01	-0.259E+04	-0.112E+05	0.274E+03
33	166.18	0.518E+00	-0.216E+02	-0.440E+04	-0.269E+05	0.145E+02
	78.98	-0.101E+01	-0.646E+01	-0.267E+04	-0.116E+05	0.629E+02
34	175.27	0.566E+00	-0.280E+02	-0.413E+04	-0.262E+05	-0.109E+02
	67.89	-0.960E+00	-0.251E+01	-0.274E+04	-0.119E+05	-0.474E+02
35	182.71	0.594E+00	-0.309E+02	-0.408E+04	-0.259E+05	0.275E+02
	55.62	-0.936E+00	0.571E+01	-0.272E+04	-0.118E+05	0.120E+03
36	188.35	0.597E+00	-0.265E+02	-0.488E+04	-0.283E+05	0.633E+02
	42.43	-0.930E+00	0.802E+01	-0.263E+04	-0.114E+05	0.275E+03
37	192.08	0.566E+00	-0.146E+02	-0.582E+04	-0.312E+05	-0.532E+01
	28.58	-0.933E+00	0.445E+01	-0.254E+04	-0.110E+05	-0.231E+02
38	193.83	0.494E+00	-0.779E+01	-0.463E+04	-0.268E+05	-0.199E+03
	14.34	-0.936E+00	0.238E+01	-0.248E+04	-0.108E+05	-0.863E+03
39	193.56	0.393E+00	-0.942E+00	-0.260E-11	-0.105E+05	-0.437E+03
	0.00	-0.929E+00	0.307E+00	-0.242E+04	-0.105E+05	-0.190E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.33316E-03	-0.33316E-03	.24130	0.00000
2	-0.84099E-03	0.15785E-03	.60911	0.00000
3	-0.97385E-03	0.27378E-03	.70533	0.00000
4	-0.86755E-03	0.14488E-03	.62834	0.00000
5	-0.76830E-03	0.25432E-04	.55646	0.00000
6	-0.73814E-03	-0.60727E-05	.53462	0.00000
7	-0.70518E-03	-0.26952E-04	.51075	0.00000
8	-0.57480E-03	-0.13804E-03	.41631	0.00000

9	-0.42832E-03	-0.26425E-03	.31022	0.00000
10	-0.36168E-03	-0.31539E-03	.26195	0.00000
11	-0.35014E-03	-0.31179E-03	.25359	0.00000
12	-0.44230E-03	-0.20700E-03	.32035	0.00000
13	-0.52820E-03	-0.11332E-03	.38256	0.00000
14	-0.54018E-03	-0.94861E-04	.39124	0.00000
15	-0.47557E-03	-0.15213E-03	.34444	0.00000
16	-0.34837E-03	-0.27122E-03	.25232	0.00000
17	-0.15857E-03	-0.45205E-03	.32741	0.00000
18	0.73127E-04	-0.67314E-03	.48754	0.00000
19	0.30696E-03	-0.89454E-03	.64789	0.00000
20	0.49971E-03	-0.10730E-02	.77713	0.00000
21	0.58861E-03	-0.11589E-02	.83940	0.00000
22	0.55021E-03	-0.11328E-02	.82047	0.00000
23	0.41054E-03	-0.10080E-02	.73004	0.00000
24	0.20110E-03	-0.81250E-03	.58847	0.00000
25	-0.41423E-04	-0.58236E-03	.42179	0.00000
26	-0.26939E-03	-0.36458E-03	.26406	0.00000
27	-0.43770E-03	-0.20363E-03	.31701	0.00000
28	-0.49320E-03	-0.15380E-03	.35722	0.00000
29	-0.45652E-03	-0.20167E-03	.33064	0.00000
30	-0.53075E-03	-0.14211E-03	.38441	0.00000
31	-0.61955E-03	-0.67047E-04	.44873	0.00000
32	-0.75300E-03	0.48212E-04	.54538	0.00000
33	-0.84300E-03	0.11438E-03	.61056	0.00000
34	-0.82268E-03	0.76225E-04	.59584	0.00000
35	-0.81419E-03	0.73466E-04	.58970	0.00000
36	-0.88882E-03	0.17301E-03	.64375	0.00000
37	-0.98003E-03	0.28730E-03	.70981	0.00000
38	-0.84109E-03	0.16543E-03	.60918	0.00000
39	-0.32947E-03	-0.32947E-03	.23863	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.26811	0.00000	0.07188
2	-0.27488	-0.28879	0.36435
3	-0.28169	-0.36073	0.44008
4	-0.29078	-0.29272	0.37728
5	-0.29891	-0.22949	0.31884
6	-0.29945	-0.21166	0.30134
7	-0.29459	-0.19610	0.28288
8	-0.28683	-0.12628	0.20855
9	-0.27867	-0.04744	0.12510
10	-0.27243	-0.01338	0.08760
11	-0.26634	-0.01109	0.08203
12	-0.26127	-0.06803	0.13629
13	-0.25813	-0.11995	0.18659
14	-0.25553	-0.12876	0.19405
15	-0.25257	-0.09352	0.15731
16	-0.24931	-0.02231	0.08446
17	-0.24570	0.08485	0.14522
18	-0.24143	0.21577	0.27406
19	-0.23643	0.34739	0.40329
20	-0.23067	0.45471	0.50792
21	-0.22949	0.50527	0.55794
22	-0.23443	0.48661	0.54157
23	-0.24039	0.41013	0.46792
24	-0.24601	0.29306	0.35358
25	-0.25099	0.15640	0.21940
26	-0.25510	0.02752	0.09260
27	-0.25805	-0.06768	0.13427
28	-0.26034	-0.09813	0.16591
29	-0.26484	-0.07369	0.14382
30	-0.27074	-0.11237	0.18567
31	-0.27627	-0.15975	0.23607
32	-0.28359	-0.23165	0.31208
33	-0.29318	-0.27681	0.36276
34	-0.30035	-0.25990	0.35011
35	-0.29805	-0.25665	0.34548
36	-0.28802	-0.30701	0.38996
37	-0.27874	-0.36642	0.44412
38	-0.27187	-0.29102	0.36493
39	-0.26514	0.00000	0.07030

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	34	11894.	30800.	0.386
BUCKLING THRUST (psi)	34	11894.	53948.	0.220
SEAM THRUST (psi)	34	11894.	21589.	0.551
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	21	0.558	1.000	0.558

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 0.64

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.13

HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..... 0.30

SPAN LENGTH FOR HANDLING AND BUCKLING (IN)..... 387.66

FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) 0.020

* * * * NORMAL EXIT FROM CANDE * * * *

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

     USER TITLE: Double Radius 33S 4.0ft Cover 8Gage EV3 (LL x 2.28)

     EXECUTION MODE ................  ANALYS

     SOLUTION LEVEL ................  #3 USER

     METHODOLOGY (LRFD OR SERVICE) ...     LRFD

     NUMBER OF PIPE-ELEMENT GROUPS ....       1

     MAXIMUM ITERATIONS PER STEP ......     -99

     PIPE ELEMENT TYPE ............... STEEL

     NUMBER OF BEAM ELEMENTS .........       38

     STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

          YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

          POISSONS RATIO OF METAL (-) .......    0.30000E+00

          YIELD STRESS OF METAL (PSI)........    0.44000E+05

          LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

          DENSITY OF METAL (PCI).............    0.28400E+00

          MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

      MATERIAL CHARACTER CODE, NONLIN .........    2

          NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

      LARGE DEFORMATION/BUCKLING CODE, IBUCK...    4

          IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
          AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

     SECTION PROPERTIES OF CROSS-SECTION:

          THRUST AREA (IN**2/IN) ............   0.23020

          MOM. OF INERTIA (IN**4/IN) ........   0.87460

          SECTION MODULUS (IN**3/IN) ........   0.28840

          PLASTIC SECTION MOD(IN**3/IN) .....   0.40136

     NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

     LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
     AND DEFLECTION LIMIT AT SERVICE LOAD

          THRUST STRESS YIELDING ............   0.70000

          BUCKLING STRESS FAILURE............   0.70000

          SEAM STRENGTH FAILURE .............   0.67000
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FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -290.0	F = 0.000
1142	22	F = 0.000	F = -290.0	F = 0.000
1143	21	F = 0.000	F = -290.0	F = 0.000
1143	22	F = 0.000	F = -290.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000

856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1136	21	F =	0.000	F =	-224.5	F =	0.000
1136	22	F =	0.000	F =	-224.5	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
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BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21

23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000

37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.300	Factor for load step #21
22	1.300	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.474E+00	0.226E+01	-0.739E-11	-0.124E+05	0.587E+03
	0.00	-0.103E+01	0.592E+00	-0.286E+04	-0.124E+05	0.255E+04
2	-193.83	-0.623E+00	-0.634E+01	-0.629E+04	-0.345E+05	0.266E+03
	14.34	-0.104E+01	-0.199E+01	-0.292E+04	-0.127E+05	0.115E+04
3	-192.08	-0.732E+00	-0.149E+02	-0.793E+04	-0.405E+05	0.131E+01
	28.58	-0.103E+01	-0.456E+01	-0.299E+04	-0.130E+05	0.567E+01
4	-188.35	-0.786E+00	-0.294E+02	-0.656E+04	-0.361E+05	-0.108E+03
	42.43	-0.103E+01	-0.890E+01	-0.307E+04	-0.134E+05	-0.467E+03
5	-182.71	-0.793E+00	-0.358E+02	-0.500E+04	-0.312E+05	-0.811E+02
	55.62	-0.103E+01	-0.104E+02	-0.320E+04	-0.139E+05	-0.352E+03
6	-175.27	-0.769E+00	-0.338E+02	-0.431E+04	-0.291E+05	-0.363E+02
	67.89	-0.105E+01	0.109E+00	-0.326E+04	-0.142E+05	-0.158E+03
7	-166.18	-0.723E+00	-0.279E+02	-0.397E+04	-0.277E+05	-0.500E+02
	78.98	-0.110E+01	0.482E+01	-0.322E+04	-0.140E+05	-0.217E+03
8	-155.61	-0.665E+00	-0.210E+02	-0.283E+04	-0.234E+05	-0.819E+02
	88.69	-0.117E+01	0.675E+01	-0.313E+04	-0.136E+05	-0.356E+03
9	-144.43	-0.603E+00	-0.163E+02	-0.156E+04	-0.186E+05	-0.582E+02
	97.10	-0.126E+01	0.479E+01	-0.304E+04	-0.132E+05	-0.253E+03
10	-132.78	-0.540E+00	-0.145E+02	-0.108E+04	-0.167E+05	-0.109E+02
	104.87	-0.137E+01	0.424E+01	-0.298E+04	-0.129E+05	-0.474E+02

11	-120.72	-0.479E+00	-0.214E+02	-0.109E+04	-0.164E+05	0.764E+02
	111.98	-0.148E+01	0.627E+01	-0.290E+04	-0.126E+05	0.332E+03
12	-108.28	-0.420E+00	-0.121E+02	-0.300E+04	-0.227E+05	0.150E+03
	118.40	-0.161E+01	0.354E+01	-0.284E+04	-0.123E+05	0.653E+03
13	-95.50	-0.360E+00	-0.330E+01	-0.501E+04	-0.296E+05	0.100E+03
	124.11	-0.176E+01	0.100E+01	-0.282E+04	-0.122E+05	0.435E+03
14	-82.42	-0.297E+00	-0.394E+01	-0.540E+04	-0.309E+05	-0.589E+01
	129.10	-0.195E+01	0.119E+01	-0.280E+04	-0.122E+05	-0.256E+02
15	-69.09	-0.233E+00	-0.555E+01	-0.430E+04	-0.270E+05	-0.952E+02
	133.35	-0.217E+01	0.164E+01	-0.278E+04	-0.121E+05	-0.413E+03
16	-55.53	-0.176E+00	-0.507E+01	-0.206E+04	-0.191E+05	-0.175E+03
	136.84	-0.243E+01	0.147E+01	-0.275E+04	-0.120E+05	-0.760E+03
17	-41.80	-0.130E+00	-0.686E+01	0.135E+04	-0.165E+05	-0.244E+03
	139.57	-0.269E+01	0.195E+01	-0.272E+04	-0.118E+05	-0.106E+04
18	-27.94	-0.101E+00	-0.107E+02	0.554E+04	-0.308E+05	-0.271E+03
	141.53	-0.296E+01	0.301E+01	-0.267E+04	-0.116E+05	-0.118E+04
19	-13.99	-0.889E-01	-0.139E+02	0.964E+04	-0.440E+05	-0.245E+03
	142.70	-0.318E+01	0.390E+01	-0.260E+04	-0.113E+05	-0.106E+04
20	0.00	-0.904E-01	-0.190E+02	0.130E+05	-0.440E+05	-0.158E+03
	143.09	-0.334E+01	0.542E+01	-0.253E+04	-0.110E+05	-0.684E+03
21	13.99	-0.970E-01	-0.202E+02	0.144E+05	-0.440E+05	-0.234E+02
	142.70	-0.340E+01	-0.224E+01	-0.250E+04	-0.109E+05	-0.102E+03
22	27.94	-0.979E-01	-0.185E+02	0.136E+05	-0.440E+05	0.106E+03
	141.53	-0.335E+01	-0.528E+01	-0.255E+04	-0.111E+05	0.462E+03
23	41.80	-0.826E-01	-0.159E+02	0.111E+05	-0.440E+05	0.203E+03
	139.57	-0.320E+01	-0.446E+01	-0.263E+04	-0.114E+05	0.880E+03
24	55.53	-0.446E-01	-0.134E+02	0.742E+04	-0.375E+05	0.259E+03
	136.84	-0.297E+01	-0.375E+01	-0.270E+04	-0.117E+05	0.113E+04
25	69.09	0.181E-01	-0.965E+01	0.313E+04	-0.228E+05	0.269E+03
	133.35	-0.270E+01	-0.270E+01	-0.276E+04	-0.120E+05	0.117E+04
26	82.42	0.102E+00	-0.518E+01	-0.925E+03	-0.154E+05	0.217E+03
	129.10	-0.240E+01	-0.147E+01	-0.281E+04	-0.122E+05	0.944E+03
27	95.50	0.201E+00	0.177E+00	-0.378E+04	-0.254E+05	0.953E+02
	124.11	-0.212E+01	-0.633E-01	-0.283E+04	-0.123E+05	0.414E+03
28	108.28	0.306E+00	-0.312E+01	-0.434E+04	-0.274E+05	-0.419E+02
	118.40	-0.187E+01	-0.927E+00	-0.283E+04	-0.123E+05	-0.182E+03
29	120.72	0.413E+00	-0.222E+02	-0.324E+04	-0.237E+05	-0.240E+02
	111.98	-0.164E+01	-0.646E+01	-0.288E+04	-0.125E+05	-0.104E+03
30	132.78	0.519E+00	-0.110E+02	-0.419E+04	-0.273E+05	0.459E+02
	104.87	-0.145E+01	-0.324E+01	-0.295E+04	-0.128E+05	0.199E+03

31	144.43	0.620E+00	-0.131E+02	-0.494E+04	-0.302E+05	0.486E+02
	97.10	-0.128E+01	-0.388E+01	-0.301E+04	-0.131E+05	0.211E+03
32	155.61	0.709E+00	-0.189E+02	-0.586E+04	-0.337E+05	0.392E+02
	88.69	-0.115E+01	-0.612E+01	-0.308E+04	-0.134E+05	0.170E+03
33	166.18	0.785E+00	-0.278E+02	-0.624E+04	-0.355E+05	-0.281E+01
	78.98	-0.106E+01	-0.833E+01	-0.319E+04	-0.138E+05	-0.122E+02
34	175.27	0.838E+00	-0.347E+02	-0.587E+04	-0.344E+05	-0.651E+01
	67.89	-0.101E+01	0.968E+00	-0.324E+04	-0.141E+05	-0.283E+02
35	182.71	0.861E+00	-0.360E+02	-0.605E+04	-0.347E+05	0.503E+02
	55.62	-0.988E+00	0.109E+02	-0.316E+04	-0.137E+05	0.219E+03
36	188.35	0.844E+00	-0.296E+02	-0.722E+04	-0.382E+05	0.856E+02
	42.43	-0.989E+00	0.895E+01	-0.303E+04	-0.131E+05	0.372E+03
37	192.08	0.776E+00	-0.149E+02	-0.831E+04	-0.416E+05	-0.155E+02
	28.58	-0.100E+01	0.454E+01	-0.293E+04	-0.127E+05	-0.672E+02
38	193.83	0.649E+00	-0.588E+01	-0.647E+04	-0.349E+05	-0.276E+03
	14.34	-0.101E+01	0.185E+01	-0.287E+04	-0.125E+05	-0.120E+04
39	193.56	0.480E+00	0.310E+01	-0.782E-12	-0.122E+05	-0.597E+03
	0.00	-0.100E+01	-0.839E+00	-0.280E+04	-0.122E+05	-0.259E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.38924E-03	-0.38924E-03	.28191	0.00000
2	-0.10825E-02	0.28622E-03	.78400	0.00000
3	-0.12703E-02	0.45632E-03	.92004	0.00000
4	-0.11332E-02	0.29510E-03	.82073	0.00000
5	-0.97968E-03	0.10771E-03	.70956	0.00000
6	-0.91360E-03	0.24003E-04	.66170	0.00000
7	-0.87053E-03	-0.75566E-05	.63050	0.00000
8	-0.73510E-03	-0.11827E-03	.53241	0.00000
9	-0.58460E-03	-0.24489E-03	.42341	0.00000
10	-0.52306E-03	-0.28854E-03	.37884	0.00000
11	-0.51401E-03	-0.27789E-03	.37229	0.00000
12	-0.71343E-03	-0.61368E-04	.51672	0.00000
13	-0.92856E-03	0.16062E-03	.67254	0.00000
14	-0.96953E-03	0.20514E-03	.70221	0.00000
15	-0.84689E-03	0.88750E-04	.61338	0.00000
16	-0.59970E-03	-0.15037E-03	.43435	0.00000
17	-0.22292E-03	-0.51736E-03	.37471	0.00000
18	0.23885E-03	-0.96571E-03	.69944	0.00000
19	0.69479E-03	-0.14048E-02	1.0174	0.01147
20	0.11224E-02	-0.19006E-02	1.3766	0.17200
21	0.13378E-02	-0.22151E-02	1.6043	0.23486
22	0.12195E-02	-0.20546E-02	1.4881	0.20584
23	0.86460E-03	-0.16018E-02	1.1602	0.08966
24	0.43898E-03	-0.11756E-02	.85149	0.00000
25	-0.36117E-04	-0.71694E-03	.51926	0.00000
26	-0.48305E-03	-0.28174E-03	.34986	0.00000
27	-0.79613E-03	0.25938E-04	.57662	0.00000
28	-0.85827E-03	0.85681E-04	.62162	0.00000
29	-0.74517E-03	-0.41119E-04	.53971	0.00000
30	-0.85814E-03	0.53050E-04	.62153	0.00000
31	-0.94727E-03	0.12772E-03	.68609	0.00000
32	-0.10571E-02	0.21730E-03	.76566	0.00000
33	-0.11136E-02	0.24499E-03	.80658	0.00000
34	-0.10804E-02	0.19732E-03	.78252	0.00000
35	-0.10890E-02	0.22817E-03	.78874	0.00000
36	-0.11974E-02	0.37268E-03	.86724	0.00000
37	-0.13038E-02	0.50397E-03	.94433	0.00000

38	-0.10950E-02	0.31305E-03	.79309	0.00000
39	-0.38215E-03	-0.38215E-03	.27678	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.31324	0.00000	0.09812
2	-0.32039	-0.39573	0.49838
3	-0.32752	-0.49921	0.60648
4	-0.33722	-0.41296	0.52667
5	-0.35086	-0.31440	0.43750
6	-0.35795	-0.27109	0.39922
7	-0.35332	-0.24951	0.37434
8	-0.34337	-0.17834	0.29625
9	-0.33377	-0.09822	0.20962
10	-0.32656	-0.06781	0.17445
11	-0.31864	-0.06827	0.16980
12	-0.31176	-0.18853	0.28572
13	-0.30900	-0.31492	0.41040
14	-0.30757	-0.33963	0.43423
15	-0.30506	-0.27052	0.36358
16	-0.30181	-0.12991	0.22100
17	-0.29787	0.08513	0.17386
18	-0.29247	0.34827	0.43381
19	-0.28557	0.60684	0.68839
20	-0.27717	0.81508	0.89191
21	-0.27417	0.90442	0.97959
22	-0.28021	0.85790	0.93642
23	-0.28866	0.69927	0.78260
24	-0.29641	0.46684	0.55470
25	-0.30301	0.19685	0.28866
26	-0.30773	-0.05820	0.15290
27	-0.30991	-0.23768	0.33373
28	-0.31087	-0.27292	0.36956
29	-0.31638	-0.20356	0.30366
30	-0.32395	-0.26345	0.36840
31	-0.32977	-0.31081	0.41956
32	-0.33793	-0.36848	0.48268
33	-0.34952	-0.39282	0.51499
34	-0.35534	-0.36943	0.49570
35	-0.34638	-0.38083	0.50081
36	-0.33184	-0.45395	0.56407
37	-0.32184	-0.52269	0.62627
38	-0.31464	-0.40711	0.50611
39	-0.30754	0.00000	0.09458

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	14175.	30800.	0.460
BUCKLING THRUST (psi)	6	14175.	52007.	0.273
SEAM THRUST (psi)	6	14175.	21589.	0.657
PLASTIC-PENETRATE (%)	21	23.49	90.00	0.261
COMBINED T&M Ratio	21	0.980	1.000	0.980

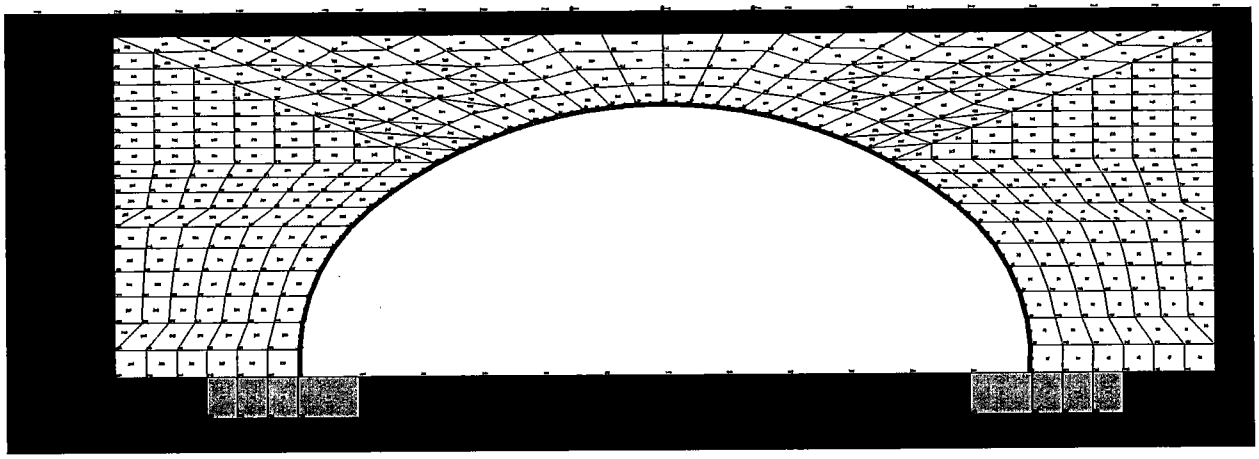
LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.24

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.25
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *



COLORADO PERMIT

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Permit

EXECUTION MODE ..................   ANALYS
SOLUTION LEVEL ..................  #3 USER
METHODOLOGY (LRFD OR SERVICE) ...     LRFD
NUMBER OF PIPE-ELEMENT GROUPS ....       1
MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL
NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:
      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08
      POISSONS RATIO OF METAL (-) .......    0.30000E+00
      YIELD STRESS OF METAL (PSI)........    0.44000E+05
      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05
      DENSITY OF METAL (PCI).............    0.28400E+00
      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........    2
     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

 LARGE DEFORMATION/BUCKLING CODE, IBUCK...    4
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IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -88.85	F = 0.000
1142	22	F = 0.000	F = -88.85	F = 0.000
1143	21	F = 0.000	F = -88.85	F = 0.000
1143	22	F = 0.000	F = -88.85	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000

811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-88.85	F =	0.000
1141	22	F =	0.000	F =	-88.85	F =	0.000
1127	21	F =	0.000	F =	-102.5	F =	0.000
1127	22	F =	0.000	F =	-102.5	F =	0.000
1126	21	F =	0.000	F =	-102.5	F =	0.000
1126	22	F =	0.000	F =	-102.5	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060
```

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000

2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.352E+00	-0.177E+01	0.247E-10	-0.102E+05	0.405E+03
	0.00	-0.921E+00	-0.545E+00	-0.234E+04	-0.102E+05	0.176E+04

2	-193.83	-0.446E+00	-0.812E+01	-0.427E+04	-0.252E+05	0.183E+03
	14.34	-0.928E+00	-0.247E+01	-0.240E+04	-0.104E+05	0.793E+03
3	-192.08	-0.513E+00	-0.145E+02	-0.534E+04	-0.292E+05	0.149E+01
	28.58	-0.924E+00	-0.439E+01	-0.246E+04	-0.107E+05	0.648E+01
4	-188.35	-0.543E+00	-0.256E+02	-0.440E+04	-0.263E+05	-0.641E+02
	42.43	-0.921E+00	-0.771E+01	-0.254E+04	-0.111E+05	-0.278E+03
5	-182.71	-0.542E+00	-0.296E+02	-0.358E+04	-0.239E+05	-0.328E+02
	55.62	-0.927E+00	-0.620E+01	-0.264E+04	-0.115E+05	-0.142E+03
6	-175.27	-0.519E+00	-0.269E+02	-0.351E+04	-0.238E+05	-0.979E+00
	67.89	-0.947E+00	0.313E+00	-0.268E+04	-0.116E+05	-0.425E+01
7	-166.18	-0.479E+00	-0.220E+02	-0.357E+04	-0.239E+05	-0.246E+02
	78.98	-0.987E+00	0.328E+01	-0.265E+04	-0.115E+05	-0.107E+03
8	-155.61	-0.427E+00	-0.166E+02	-0.281E+04	-0.209E+05	-0.621E+02
	88.69	-0.105E+01	0.536E+01	-0.258E+04	-0.112E+05	-0.270E+03
9	-144.43	-0.371E+00	-0.127E+02	-0.178E+04	-0.171E+05	-0.526E+02
	97.10	-0.113E+01	0.373E+01	-0.251E+04	-0.109E+05	-0.229E+03
10	-132.78	-0.313E+00	-0.112E+02	-0.126E+04	-0.150E+05	-0.244E+02
	104.87	-0.123E+01	0.328E+01	-0.246E+04	-0.107E+05	-0.106E+03
11	-120.72	-0.256E+00	-0.146E+02	-0.981E+03	-0.139E+05	0.204E+02
	111.98	-0.134E+01	0.428E+01	-0.241E+04	-0.105E+05	0.888E+02
12	-108.28	-0.201E+00	-0.636E+01	-0.167E+04	-0.161E+05	0.342E+02
	118.40	-0.146E+01	0.187E+01	-0.236E+04	-0.103E+05	0.149E+03
13	-95.50	-0.148E+00	-0.453E+01	-0.174E+04	-0.162E+05	-0.205E+02
	124.11	-0.159E+01	0.133E+01	-0.234E+04	-0.102E+05	-0.891E+02
14	-82.42	-0.988E-01	-0.638E+01	-0.851E+03	-0.130E+05	-0.738E+02
	129.10	-0.173E+01	0.186E+01	-0.232E+04	-0.101E+05	-0.321E+03
15	-69.09	-0.561E-01	-0.793E+01	0.609E+03	-0.120E+05	-0.102E+03
	133.35	-0.188E+01	0.230E+01	-0.228E+04	-0.991E+04	-0.442E+03
16	-55.53	-0.230E-01	-0.896E+01	0.229E+04	-0.177E+05	-0.109E+03
	136.84	-0.203E+01	0.259E+01	-0.224E+04	-0.974E+04	-0.475E+03
17	-41.80	-0.113E-02	-0.981E+01	0.396E+04	-0.233E+05	-0.101E+03
	139.57	-0.217E+01	0.283E+01	-0.220E+04	-0.955E+04	-0.441E+03
18	-27.94	0.958E-02	-0.105E+02	0.538E+04	-0.280E+05	-0.799E+02
	141.53	-0.227E+01	0.306E+01	-0.215E+04	-0.934E+04	-0.347E+03
19	-13.99	0.114E-01	-0.112E+02	0.637E+04	-0.312E+05	-0.457E+02
	142.70	-0.235E+01	0.325E+01	-0.210E+04	-0.914E+04	-0.199E+03
20	0.00	0.816E-02	-0.112E+02	0.675E+04	-0.324E+05	-0.490E+01
	143.09	-0.237E+01	0.433E+00	-0.208E+04	-0.902E+04	-0.213E+02
21	13.99	0.472E-02	-0.114E+02	0.651E+04	-0.317E+05	0.376E+02
	142.70	-0.236E+01	-0.332E+01	-0.210E+04	-0.911E+04	0.163E+03

22	27.94	0.592E-02	-0.107E+02	0.561E+04	-0.288E+05	0.746E+02
	141.53	-0.229E+01	-0.310E+01	-0.215E+04	-0.932E+04	0.324E+03
23	41.80	0.158E-01	-0.990E+01	0.424E+04	-0.242E+05	0.982E+02
	139.57	-0.219E+01	-0.286E+01	-0.219E+04	-0.952E+04	0.427E+03
24	55.53	0.369E-01	-0.897E+01	0.261E+04	-0.188E+05	0.107E+03
	136.84	-0.206E+01	-0.258E+01	-0.224E+04	-0.971E+04	0.465E+03
25	69.09	0.696E-01	-0.787E+01	0.957E+03	-0.132E+05	0.995E+02
	133.35	-0.191E+01	-0.227E+01	-0.228E+04	-0.989E+04	0.432E+03
26	82.42	0.112E+00	-0.665E+01	-0.469E+03	-0.117E+05	0.734E+02
	129.10	-0.176E+01	-0.193E+01	-0.231E+04	-0.100E+05	0.319E+03
27	95.50	0.163E+00	-0.510E+01	-0.138E+04	-0.149E+05	0.262E+02
	124.11	-0.161E+01	-0.149E+01	-0.234E+04	-0.102E+05	0.114E+03
28	108.28	0.218E+00	-0.649E+01	-0.145E+04	-0.153E+05	-0.235E+02
	118.40	-0.148E+01	-0.190E+01	-0.236E+04	-0.103E+05	-0.102E+03
29	120.72	0.276E+00	-0.144E+02	-0.923E+03	-0.136E+05	-0.100E+02
	111.98	-0.135E+01	-0.422E+01	-0.240E+04	-0.104E+05	-0.435E+02
30	132.78	0.337E+00	-0.109E+02	-0.133E+04	-0.153E+05	0.318E+02
	104.87	-0.124E+01	-0.320E+01	-0.246E+04	-0.107E+05	0.138E+03
31	144.43	0.399E+00	-0.124E+02	-0.193E+04	-0.176E+05	0.565E+02
	97.10	-0.114E+01	-0.366E+01	-0.251E+04	-0.109E+05	0.246E+03
32	155.61	0.458E+00	-0.164E+02	-0.299E+04	-0.216E+05	0.629E+02
	88.69	-0.105E+01	-0.529E+01	-0.258E+04	-0.112E+05	0.273E+03
33	166.18	0.513E+00	-0.220E+02	-0.375E+04	-0.245E+05	0.241E+02
	78.98	-0.980E+00	-0.332E+01	-0.264E+04	-0.115E+05	0.105E+03
34	175.27	0.556E+00	-0.270E+02	-0.369E+04	-0.244E+05	0.184E+01
	67.89	-0.938E+00	-0.172E+00	-0.267E+04	-0.116E+05	0.800E+01
35	182.71	0.581E+00	-0.295E+02	-0.378E+04	-0.245E+05	0.347E+02
	55.62	-0.917E+00	0.641E+01	-0.263E+04	-0.114E+05	0.151E+03
36	188.35	0.583E+00	-0.253E+02	-0.464E+04	-0.271E+05	0.646E+02
	42.43	-0.911E+00	0.764E+01	-0.254E+04	-0.110E+05	0.280E+03
37	192.08	0.552E+00	-0.141E+02	-0.557E+04	-0.300E+05	-0.444E+01
	28.58	-0.914E+00	0.428E+01	-0.246E+04	-0.107E+05	-0.193E+02
38	193.83	0.482E+00	-0.774E+01	-0.442E+04	-0.257E+05	-0.190E+03
	14.34	-0.917E+00	0.236E+01	-0.239E+04	-0.104E+05	-0.826E+03
39	193.56	0.385E+00	-0.138E+01	-0.877E-11	-0.101E+05	-0.417E+03
	0.00	-0.911E+00	0.434E+00	-0.233E+04	-0.101E+05	-0.181E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.31904E-03	-0.31904E-03	.23107	0.00000
2	-0.79202E-03	0.13748E-03	.57364	0.00000

3	-0.91711E-03	0.24583E-03	.66424	0.00000
4	-0.82587E-03	0.13231E-03	.59816	0.00000
5	-0.74845E-03	0.29719E-04	.54209	0.00000
6	-0.74690E-03	0.17489E-04	.54096	0.00000
7	-0.74976E-03	0.28093E-04	.54303	0.00000
8	-0.65692E-03	-0.46476E-04	.47579	0.00000
9	-0.53593E-03	-0.14860E-03	.38816	0.00000
10	-0.47185E-03	-0.19856E-03	.34175	0.00000
11	-0.43470E-03	-0.22113E-03	.31485	0.00000
12	-0.50412E-03	-0.14028E-03	.36512	0.00000
13	-0.50850E-03	-0.12980E-03	.36830	0.00000
14	-0.40834E-03	-0.22305E-03	.29575	0.00000
15	-0.24471E-03	-0.37733E-03	.27329	0.00000
16	-0.55926E-04	-0.55512E-03	.40206	0.00000
17	0.13084E-03	-0.72988E-03	.52863	0.00000
18	0.29206E-03	-0.87844E-03	.63623	0.00000
19	0.40633E-03	-0.97970E-03	.70957	0.00000
20	0.45160E-03	-0.10175E-02	.73698	0.00000
21	0.42211E-03	-0.99382E-03	.71980	0.00000
22	0.31772E-03	-0.90255E-03	.65369	0.00000
23	0.16268E-03	-0.76024E-03	.55062	0.00000
24	-0.20373E-04	-0.58919E-03	.42674	0.00000
25	-0.20611E-03	-0.41437E-03	.30012	0.00000
26	-0.36602E-03	-0.26387E-03	.26510	0.00000
27	-0.46885E-03	-0.16840E-03	.33958	0.00000
28	-0.47952E-03	-0.16432E-03	.34730	0.00000
29	-0.42809E-03	-0.22728E-03	.31006	0.00000
30	-0.47933E-03	-0.19049E-03	.34717	0.00000
31	-0.55203E-03	-0.13169E-03	.39982	0.00000
32	-0.67650E-03	-0.25843E-04	.48998	0.00000
33	-0.76871E-03	0.48163E-04	.55676	0.00000
34	-0.76543E-03	0.37349E-04	.55438	0.00000
35	-0.77020E-03	0.53434E-04	.55784	0.00000
36	-0.85029E-03	0.15892E-03	.61584	0.00000
37	-0.94039E-03	0.27099E-03	.68110	0.00000
38	-0.80698E-03	0.15410E-03	.58448	0.00000
39	-0.31829E-03	-0.31829E-03	.23053	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.25675	0.00000	0.06592
2	-0.26337	-0.26874	0.33811
3	-0.27011	-0.33624	0.40920
4	-0.27907	-0.27704	0.35492
5	-0.28920	-0.22499	0.30863
6	-0.29350	-0.22101	0.30715
7	-0.29038	-0.22490	0.30922
8	-0.28303	-0.17650	0.25660
9	-0.27544	-0.11199	0.18786
10	-0.26976	-0.07902	0.15179
11	-0.26389	-0.06175	0.13139
12	-0.25929	-0.10519	0.17243
13	-0.25684	-0.10950	0.17546
14	-0.25406	-0.05357	0.11812
15	-0.25030	0.03834	0.10099
16	-0.24587	0.14433	0.20478
17	-0.24104	0.24886	0.30696
18	-0.23594	0.33843	0.39409
19	-0.23071	0.40074	0.45397
20	-0.22772	0.42477	0.47663
21	-0.23004	0.40939	0.46231
22	-0.23532	0.35282	0.40819
23	-0.24044	0.26685	0.32466
24	-0.24527	0.16446	0.22462
25	-0.24966	0.06022	0.12255
26	-0.25345	-0.02953	0.09377
27	-0.25642	-0.08687	0.15262
28	-0.25906	-0.09113	0.15825
29	-0.26370	-0.05806	0.12760
30	-0.26952	-0.08351	0.15615
31	-0.27511	-0.12153	0.19722
32	-0.28261	-0.18813	0.26799
33	-0.28993	-0.23618	0.32024
34	-0.29296	-0.23211	0.31793

35	-0.28841	-0.23814	0.32132
36	-0.27819	-0.29179	0.36918
37	-0.26935	-0.35025	0.42279
38	-0.26271	-0.27788	0.34689
39	-0.25614	0.00000	0.06561

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	6	11622.	30800.	0.377
BUCKLING THRUST (psi)	6	11622.	54228.	0.214
SEAM THRUST (psi)	6	11622.	21589.	0.538
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	20	0.477	1.000	0.477

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	0.61
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.12
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *

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*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM #  1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Permit-OPR (LL x 2.68)

EXECUTION MODE ..................  ANALYS

SOLUTION LEVEL ..................  #3 USER

METHODOLOGY (LRFD OR SERVICE) ...     LRFD

NUMBER OF PIPE-ELEMENT GROUPS ....       1

MAXIMUM ITERATIONS PER STEP ......     -99

PIPE ELEMENT TYPE ............... STEEL

NUMBER OF BEAM ELEMENTS .........       38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

      YOUNGS MODULUS OF METAL (PSI)......    0.29000E+08

      POISSONS RATIO OF METAL (-) .......    0.30000E+00

      YIELD STRESS OF METAL (PSI)........    0.44000E+05

      LONGITUDINAL SEAM STRENGTH (PSI)...    0.32223E+05

      DENSITY OF METAL (PCI).............    0.28400E+00

      MODULUS OF UPPER BI-SLOPE (PSI)....    0.00000E+00

 MATERIAL CHARACTER CODE, NONLIN .........    2

     NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

 LARGE DEFORMATION/BUCKLING CODE, IBUCK...    4

     IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
     AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

      THRUST AREA (IN**2/IN) ............    0.23020

      MOM. OF INERTIA (IN**4/IN) ........    0.87460

      SECTION MODULUS (IN**3/IN) ........    0.28840

      PLASTIC SECTION MOD(IN**3/IN) .....    0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

      THRUST STRESS YIELDING ............    0.70000

      BUCKLING STRESS FAILURE............    0.70000

      SEAM STRENGTH FAILURE .............    0.67000
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FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -238.0	F = 0.000
1142	22	F = 0.000	F = -238.0	F = 0.000
1143	21	F = 0.000	F = -238.0	F = 0.000
1143	22	F = 0.000	F = -238.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000

857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1141	21	F =	0.000	F =	-238.0	F =	0.000
1141	22	F =	0.000	F =	-238.0	F =	0.000
1127	21	F =	0.000	F =	-274.6	F =	0.000
1127	22	F =	0.000	F =	-274.6	F =	0.000
1126	21	F =	0.000	F =	-274.6	F =	0.000
1126	22	F =	0.000	F =	-274.6	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060


* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *


  BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP


     BEAM-ELEMENT GROUP NUMBER =     1
```

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18

20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000

34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.300	Factor for load step #21
22	1.300	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.441E+00	0.350E+01	0.665E-10	-0.123E+05	0.572E+03
	0.00	-0.101E+01	0.968E+00	-0.284E+04	-0.123E+05	0.249E+04
2	-193.83	-0.615E+00	-0.654E+01	-0.616E+04	-0.340E+05	0.256E+03
	14.34	-0.102E+01	-0.204E+01	-0.290E+04	-0.126E+05	0.111E+04
3	-192.08	-0.748E+00	-0.166E+02	-0.776E+04	-0.398E+05	0.778E+01
	28.58	-0.101E+01	-0.504E+01	-0.297E+04	-0.129E+05	0.338E+02
4	-188.35	-0.827E+00	-0.308E+02	-0.672E+04	-0.366E+05	-0.778E+02
	42.43	-0.996E+00	-0.929E+01	-0.307E+04	-0.133E+05	-0.338E+03
5	-182.71	-0.857E+00	-0.356E+02	-0.578E+04	-0.339E+05	-0.432E+02
	55.62	-0.989E+00	-0.108E+02	-0.320E+04	-0.139E+05	-0.188E+03
6	-175.27	-0.849E+00	-0.341E+02	-0.564E+04	-0.341E+05	-0.428E+01
	67.89	-0.100E+01	-0.102E+02	-0.335E+04	-0.145E+05	-0.186E+02
7	-166.18	-0.810E+00	-0.305E+02	-0.572E+04	-0.346E+05	-0.155E+02
	78.98	-0.104E+01	0.262E+01	-0.340E+04	-0.148E+05	-0.675E+02
8	-155.61	-0.750E+00	-0.223E+02	-0.515E+04	-0.323E+05	-0.415E+02
	88.69	-0.112E+01	0.721E+01	-0.333E+04	-0.145E+05	-0.180E+03
9	-144.43	-0.676E+00	-0.152E+02	-0.440E+04	-0.293E+05	-0.312E+02
	97.10	-0.123E+01	0.450E+01	-0.324E+04	-0.141E+05	-0.135E+03

10	-132.78	-0.592E+00	-0.120E+02	-0.403E+04	-0.278E+05	-0.202E+02
	104.87	-0.137E+01	0.354E+01	-0.318E+04	-0.138E+05	-0.876E+02
11	-120.72	-0.502E+00	-0.253E+02	-0.346E+04	-0.255E+05	0.656E+02
	111.98	-0.153E+01	0.740E+01	-0.311E+04	-0.135E+05	0.285E+03
12	-108.28	-0.408E+00	-0.620E+01	-0.538E+04	-0.319E+05	0.115E+03
	118.40	-0.173E+01	0.184E+01	-0.305E+04	-0.132E+05	0.498E+03
13	-95.50	-0.312E+00	0.121E+01	-0.605E+04	-0.342E+05	-0.201E+02
	124.11	-0.197E+01	0.348E+00	-0.303E+04	-0.132E+05	-0.873E+02
14	-82.42	-0.215E+00	-0.463E+01	-0.404E+04	-0.271E+05	-0.165E+03
	129.10	-0.224E+01	0.136E+01	-0.302E+04	-0.131E+05	-0.717E+03
15	-69.09	-0.127E+00	-0.943E+01	-0.517E+03	-0.147E+05	-0.234E+03
	133.35	-0.255E+01	0.269E+01	-0.298E+04	-0.129E+05	-0.102E+04
16	-55.53	-0.555E-01	-0.118E+02	0.349E+04	-0.248E+05	-0.249E+03
	136.84	-0.287E+01	0.332E+01	-0.292E+04	-0.127E+05	-0.108E+04
17	-41.80	-0.571E-02	-0.135E+02	0.744E+04	-0.382E+05	-0.234E+03
	139.57	-0.316E+01	0.377E+01	-0.286E+04	-0.124E+05	-0.101E+04
18	-27.94	0.213E-01	-0.153E+02	0.109E+05	-0.440E+05	-0.190E+03
	141.53	-0.341E+01	0.428E+01	-0.279E+04	-0.121E+05	-0.824E+03
19	-13.99	0.291E-01	-0.172E+02	0.134E+05	-0.440E+05	-0.116E+03
	142.70	-0.358E+01	0.488E+01	-0.272E+04	-0.118E+05	-0.502E+03
20	0.00	0.256E-01	-0.181E+02	0.145E+05	-0.440E+05	-0.184E+02
	143.09	-0.365E+01	0.183E+01	-0.267E+04	-0.116E+05	-0.799E+02
21	13.99	0.216E-01	-0.188E+02	0.139E+05	-0.440E+05	0.905E+02
	142.70	-0.360E+01	-0.536E+01	-0.269E+04	-0.117E+05	0.393E+03
22	27.94	0.283E-01	-0.160E+02	0.116E+05	-0.440E+05	0.182E+03
	141.53	-0.345E+01	-0.451E+01	-0.277E+04	-0.120E+05	0.791E+03
23	41.80	0.542E-01	-0.142E+02	0.822E+04	-0.409E+05	0.237E+03
	139.57	-0.321E+01	-0.397E+01	-0.284E+04	-0.123E+05	0.103E+04
24	55.53	0.103E+00	-0.120E+02	0.415E+04	-0.270E+05	0.261E+03
	136.84	-0.292E+01	-0.336E+01	-0.291E+04	-0.126E+05	0.113E+04
25	69.09	0.175E+00	-0.909E+01	-0.492E+02	-0.130E+05	0.245E+03
	133.35	-0.260E+01	-0.257E+01	-0.296E+04	-0.129E+05	0.106E+04
26	82.42	0.265E+00	-0.406E+01	-0.371E+04	-0.259E+05	0.170E+03
	129.10	-0.229E+01	-0.118E+01	-0.300E+04	-0.130E+05	0.740E+03
27	95.50	0.364E+00	0.104E+01	-0.575E+04	-0.331E+05	0.237E+02
	124.11	-0.201E+01	-0.306E+00	-0.302E+04	-0.131E+05	0.103E+03
28	108.28	0.464E+00	-0.645E+01	-0.516E+04	-0.311E+05	-0.107E+03
	118.40	-0.176E+01	-0.190E+01	-0.303E+04	-0.132E+05	-0.465E+03
29	120.72	0.561E+00	-0.251E+02	-0.339E+04	-0.252E+05	-0.568E+02
	111.98	-0.156E+01	-0.732E+01	-0.309E+04	-0.134E+05	-0.247E+03

30	132.78	0.657E+00	-0.118E+02	-0.407E+04	-0.279E+05	0.268E+02
	104.87	-0.138E+01	-0.347E+01	-0.317E+04	-0.138E+05	0.117E+03
31	144.43	0.748E+00	-0.149E+02	-0.453E+04	-0.297E+05	0.354E+02
	97.10	-0.123E+01	-0.442E+01	-0.322E+04	-0.140E+05	0.154E+03
32	155.61	0.827E+00	-0.221E+02	-0.534E+04	-0.329E+05	0.441E+02
	88.69	-0.111E+01	-0.716E+01	-0.331E+04	-0.144E+05	0.191E+03
33	166.18	0.893E+00	-0.308E+02	-0.594E+04	-0.353E+05	0.209E+02
	78.98	-0.103E+01	-0.223E+01	-0.338E+04	-0.147E+05	0.910E+02
34	175.27	0.937E+00	-0.344E+02	-0.600E+04	-0.352E+05	0.160E+02
	67.89	-0.986E+00	0.106E+02	-0.332E+04	-0.144E+05	0.697E+02
35	182.71	0.949E+00	-0.355E+02	-0.636E+04	-0.358E+05	0.592E+02
	55.62	-0.971E+00	0.108E+02	-0.318E+04	-0.138E+05	0.257E+03
36	188.35	0.919E+00	-0.297E+02	-0.754E+04	-0.394E+05	0.888E+02
	42.43	-0.977E+00	0.898E+01	-0.305E+04	-0.132E+05	0.386E+03
37	192.08	0.834E+00	-0.147E+02	-0.864E+04	-0.428E+05	-0.155E+02
	28.58	-0.994E+00	0.449E+01	-0.295E+04	-0.128E+05	-0.672E+02
38	193.83	0.688E+00	-0.527E+01	-0.672E+04	-0.359E+05	-0.285E+03
	14.34	-0.100E+01	0.167E+01	-0.289E+04	-0.126E+05	-0.124E+04
39	193.56	0.499E+00	0.415E+01	-0.597E-10	-0.123E+05	-0.618E+03
	0.00	-0.995E+00	-0.114E+01	-0.283E+04	-0.123E+05	-0.268E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.38662E-03	-0.38662E-03	.28002	0.00000
2	-0.10658E-02	0.27491E-03	.77190	0.00000
3	-0.12493E-02	0.43970E-03	.90480	0.00000
4	-0.11493E-02	0.31325E-03	.83241	0.00000
5	-0.10651E-02	0.19225E-03	.77142	0.00000
6	-0.10702E-02	0.15725E-03	.77511	0.00000
7	-0.10858E-02	0.15848E-03	.78641	0.00000
8	-0.10144E-02	0.10719E-03	.73471	0.00000
9	-0.92020E-03	0.36438E-04	.66648	0.00000
10	-0.87190E-03	0.40133E-05	.63150	0.00000
11	-0.79996E-03	-0.47278E-04	.57939	0.00000
12	-0.10004E-02	0.16955E-03	.72458	0.00000
13	-0.10722E-02	0.24487E-03	.77656	0.00000
14	-0.85087E-03	0.28321E-04	.61627	0.00000
15	-0.46212E-03	-0.34958E-03	.33470	0.00000
16	-0.18059E-04	-0.77842E-03	.56379	0.00000
17	0.41941E-03	-0.11986E-02	.86813	0.00000
18	0.81772E-03	-0.15978E-02	1.1572	0.08988
19	0.11689E-02	-0.20480E-02	1.4833	0.20745
20	0.13423E-02	-0.23021E-02	1.6674	0.25283
21	0.12543E-02	-0.21706E-02	1.5721	0.23065
22	0.91716E-03	-0.17146E-02	1.2419	0.12689
23	0.50759E-03	-0.12821E-02	.92862	0.00000
24	0.55282E-04	-0.84768E-03	.61395	0.00000
25	-0.40918E-03	-0.39848E-03	.29636	0.00000
26	-0.81235E-03	-0.57252E-05	.58836	0.00000
27	-0.10372E-02	0.21475E-03	.75125	0.00000
28	-0.97443E-03	0.14826E-03	.70576	0.00000
29	-0.78978E-03	-0.52844E-04	.57202	0.00000
30	-0.87426E-03	0.11147E-04	.63321	0.00000
31	-0.93207E-03	0.53288E-04	.67507	0.00000
32	-0.10315E-02	0.12946E-03	.74709	0.00000
33	-0.11074E-02	0.18599E-03	.80206	0.00000
34	-0.11056E-02	0.19961E-03	.80076	0.00000

35	-0.11247E-02	0.25881E-03	.81458	0.00000
36	-0.12358E-02	0.40556E-03	.89508	0.00000
37	-0.13428E-02	0.53728E-03	.97256	0.00000
38	-0.11256E-02	0.33764E-03	.81521	0.00000
39	-0.38532E-03	-0.38532E-03	.27908	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.31114	0.00000	0.09681
2	-0.31822	-0.38762	0.48889
3	-0.32574	-0.48832	0.59443
4	-0.33641	-0.42287	0.53603
5	-0.35121	-0.36354	0.48689
6	-0.36735	-0.35489	0.48983
7	-0.37313	-0.35975	0.49898
8	-0.36504	-0.32429	0.45754
9	-0.35560	-0.27659	0.40305
10	-0.34922	-0.25325	0.37521
11	-0.34091	-0.21762	0.33384
12	-0.33432	-0.33827	0.45004
13	-0.33289	-0.38080	0.49162
14	-0.33097	-0.25420	0.36375
15	-0.32661	-0.03254	0.13921
16	-0.32048	0.21984	0.32255
17	-0.31353	0.46782	0.56612
18	-0.30604	0.68504	0.77870
19	-0.29805	0.84318	0.93202
20	-0.29248	0.91200	0.99754
21	-0.29541	0.87754	0.96480
22	-0.30384	0.73264	0.82496
23	-0.31166	0.51746	0.61459
24	-0.31884	0.26107	0.36273
25	-0.32498	-0.00309	0.10871
26	-0.32917	-0.23322	0.34157
27	-0.33095	-0.36199	0.47152
28	-0.33243	-0.32461	0.43511
29	-0.33905	-0.21307	0.32803
30	-0.34730	-0.25600	0.37661
31	-0.35360	-0.28490	0.40993
32	-0.36296	-0.33567	0.46741
33	-0.37075	-0.37396	0.51141
34	-0.36455	-0.37738	0.51027
35	-0.34841	-0.40001	0.52139
36	-0.33408	-0.47457	0.58618
37	-0.32412	-0.54359	0.64865
38	-0.31704	-0.42305	0.52357
39	-0.31009	0.00000	0.09616

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

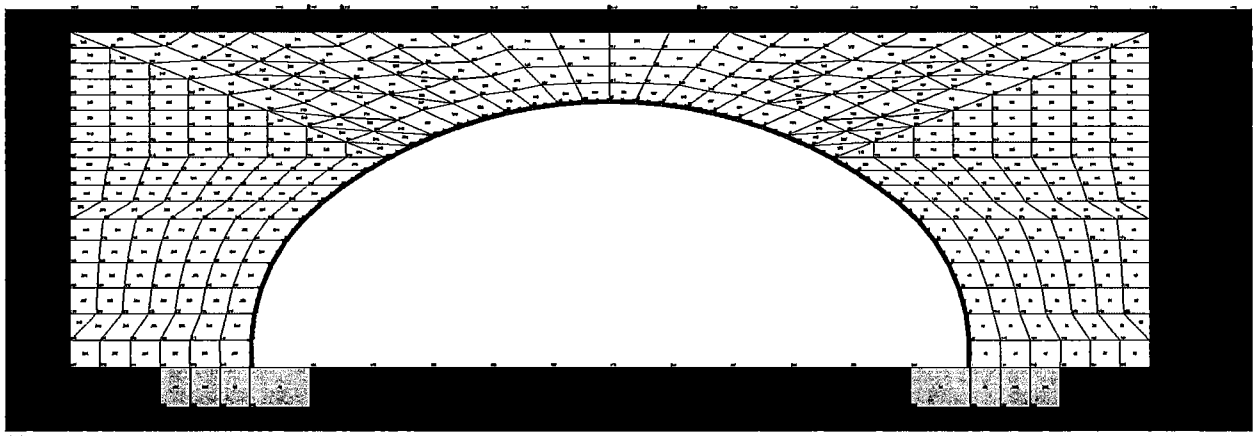
DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	7	14776.	30800.	0.480
BUCKLING THRUST (psi)	7	14776.	50568.	0.292
SEAM THRUST (psi)	7	14776.	21589.	0.684
PLASTIC-PENETRATE (%)	20	25.28	90.00	0.281
COMBINED T&M Ratio	20	0.998	1.000	0.998

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	1.38
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.28
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *

*



** MOD TANDEM

WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM # 1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage mod Tandem

EXECUTION MODE ..... ANALYS

SOLUTION LEVEL ..... #3 USER

METHODOLOGY (LRFD OR SERVICE) ... LRFD

NUMBER OF PIPE-ELEMENT GROUPS 1

MAXIMUM ITERATIONS PER STEP ..... -99

PIPE ELEMENT TYPE ..... STEEL

NUMBER OF BEAM ELEMENTS 38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

YOUNGS MODULUS OF METAL (PSI)..... 0.29000E+08

POISSONS RATIO OF METAL (-) ..... 0.30000E+00

YIELD STRESS OF METAL (PSI)..... 0.44000E+05

LONGITUDINAL SEAM STRENGTH (PSI)... 0.32223E+05

DENSITY OF METAL (PCI)..... 0.28400E+00

MODULUS OF UPPER BI-SLOPE (PSI).... 0.00000E+00

MATERIAL CHARACTER CODE, NONLIN 2

NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -102.5	F = 0.000
1142	22	F = 0.000	F = -102.5	F = 0.000
1143	21	F = 0.000	F = -102.5	F = 0.000
1143	22	F = 0.000	F = -102.5	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000

761	1	D =	0.000	D =	0.000	D =	0.000
786	1	D =	0.000	D =	0.000	D =	0.000
811	1	D =	0.000	D =	0.000	D =	0.000
836	1	D =	0.000	D =	0.000	D =	0.000
861	1	D =	0.000	D =	0.000	D =	0.000
886	1	D =	0.000	D =	0.000	D =	0.000
911	1	D =	0.000	D =	0.000	D =	0.000
936	1	D =	0.000	D =	0.000	D =	0.000
961	1	D =	0.000	D =	0.000	D =	0.000
986	1	D =	0.000	D =	0.000	D =	0.000
1023	1	D =	0.000	D =	0.000	D =	0.000
1048	1	D =	0.000	D =	0.000	D =	0.000
1073	1	D =	0.000	D =	0.000	D =	0.000
1098	1	D =	0.000	D =	0.000	D =	0.000
837	1	D =	0.000	F =	0.000	D =	0.000
838	1	D =	0.000	F =	0.000	D =	0.000
839	1	D =	0.000	F =	0.000	D =	0.000
840	1	D =	0.000	F =	0.000	D =	0.000
841	1	D =	0.000	F =	0.000	D =	0.000
842	1	D =	0.000	F =	0.000	D =	0.000
843	1	D =	0.000	F =	0.000	D =	0.000
844	1	D =	0.000	F =	0.000	D =	0.000
845	1	D =	0.000	F =	0.000	D =	0.000
846	1	D =	0.000	F =	0.000	D =	0.000
847	1	D =	0.000	F =	0.000	D =	0.000
848	1	D =	0.000	F =	0.000	D =	0.000
849	1	D =	0.000	F =	0.000	D =	0.000
850	1	D =	0.000	F =	0.000	D =	0.000
851	1	D =	0.000	F =	0.000	D =	0.000
852	1	D =	0.000	F =	0.000	D =	0.000
853	1	D =	0.000	F =	0.000	D =	0.000
854	1	D =	0.000	F =	0.000	D =	0.000
855	1	D =	0.000	F =	0.000	D =	0.000
856	1	D =	0.000	F =	0.000	D =	0.000
857	1	D =	0.000	F =	0.000	D =	0.000
858	1	D =	0.000	F =	0.000	D =	0.000
859	1	D =	0.000	F =	0.000	D =	0.000
860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1138	21	F =	0.000	F =	-102.5	F =	0.000
1138	22	F =	0.000	F =	-102.5	F =	0.000
1137	21	F =	0.000	F =	-102.5	F =	0.000
1137	22	F =	0.000	F =	-102.5	F =	0.000

```
* * * * * COMPLETED MESH GENERATION  * * * * *

BRIDGECOR

 CALCULATED KEY NUMBERS ...
   THE NUMBER OF DATA ERRORS IS-----------     0
   THE NUMBER OF SOIL MATERIALS IS--------     4
   THE NUMBER OF PIPE-TYPE GROUPS IS------     1
   THE NUMBER OF INTERFACE MATERIALS IS---    37
   BAND WIDTH ESTIMATE (MAX)-------------- 2060
```

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23
25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000

2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.750	Factor for load step #21
22	1.750	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56	-0.400E+00	-0.846E-01	0.120E-10	-0.116E+05	0.482E+03
	0.00	-0.101E+01	-0.645E-01	-0.268E+04	-0.116E+05	0.210E+04

2	-193.83 14.34	-0.494E+00 -0.102E+01	-0.847E+01 -0.260E+01	-0.507E+04 -0.274E+04	-0.295E+05 -0.119E+05	0.216E+03 0.940E+03
3	-192.08 28.58	-0.555E+00 -0.102E+01	-0.169E+02 -0.513E+01	-0.632E+04 -0.281E+04	-0.341E+05 -0.122E+05	0.567E+01 0.246E+02
4	-188.35 42.43	-0.573E+00 -0.102E+01	-0.303E+02 -0.608E+01	-0.531E+04 -0.289E+04	-0.310E+05 -0.126E+05	-0.580E+02 -0.252E+03
5	-182.71 55.62	-0.555E+00 -0.103E+01	-0.320E+02 0.477E+01	-0.468E+04 -0.289E+04	-0.288E+05 -0.126E+05	-0.183E+02 -0.796E+02
6	-175.27 67.89	-0.508E+00 -0.107E+01	-0.257E+02 0.769E+01	-0.477E+04 -0.280E+04	-0.287E+05 -0.122E+05	-0.543E+01 -0.236E+02
7	-166.18 78.98	-0.440E+00 -0.113E+01	-0.193E+02 0.578E+01	-0.447E+04 -0.270E+04	-0.272E+05 -0.117E+05	-0.697E+02 -0.303E+03
8	-155.61 88.69	-0.361E+00 -0.123E+01	-0.160E+02 0.516E+01	-0.266E+04 -0.261E+04	-0.206E+05 -0.113E+05	-0.136E+03 -0.589E+03
9	-144.43 97.10	-0.281E+00 -0.134E+01	-0.140E+02 0.408E+01	-0.481E+03 -0.253E+04	-0.127E+05 -0.110E+05	-0.123E+03 -0.534E+03
10	-132.78 104.87	-0.206E+00 -0.147E+01	-0.135E+02 0.390E+01	0.947E+03 -0.247E+04	-0.140E+05 -0.107E+05	-0.703E+02 -0.306E+03
11	-120.72 111.98	-0.141E+00 -0.159E+01	-0.124E+02 0.358E+01	0.167E+04 -0.242E+04	-0.163E+05 -0.105E+05	-0.256E+02 -0.111E+03
12	-108.28 118.40	-0.869E-01 -0.170E+01	-0.115E+02 0.334E+01	0.184E+04 -0.237E+04	-0.167E+05 -0.103E+05	0.827E+01 0.359E+02
13	-95.50 124.11	-0.448E-01 -0.181E+01	-0.110E+02 0.321E+01	0.161E+04 -0.232E+04	-0.157E+05 -0.101E+05	0.351E+02 0.152E+03
14	-82.42 129.10	-0.123E-01 -0.191E+01	-0.704E+01 0.205E+01	0.102E+04 -0.229E+04	-0.135E+05 -0.993E+04	0.330E+02 0.144E+03
15	-69.09 133.35	0.123E-01 -0.200E+01	-0.662E+01 0.193E+01	0.837E+03 -0.226E+04	-0.127E+05 -0.981E+04	0.211E+01 0.914E+01
16	-55.53 136.84	0.302E-01 -0.209E+01	-0.630E+01 0.184E+01	0.111E+04 -0.223E+04	-0.136E+05 -0.969E+04	-0.324E+02 -0.141E+03
17	-41.80 139.57	0.416E-01 -0.217E+01	-0.695E+01 0.203E+01	0.189E+04 -0.220E+04	-0.161E+05 -0.956E+04	-0.631E+02 -0.274E+03
18	-27.94 141.53	0.467E-01 -0.223E+01	-0.813E+01 0.238E+01	0.301E+04 -0.217E+04	-0.198E+05 -0.941E+04	-0.790E+02 -0.343E+03
19	-13.99 142.70	0.464E-01 -0.228E+01	-0.951E+01 0.276E+01	0.420E+04 -0.213E+04	-0.238E+05 -0.923E+04	-0.749E+02 -0.325E+03
20	0.00 143.09	0.428E-01 -0.230E+01	-0.110E+02 0.144E+01	0.516E+04 -0.209E+04	-0.270E+05 -0.909E+04	-0.489E+02 -0.213E+03
21	13.99 142.70	0.394E-01 -0.228E+01	-0.122E+02 -0.354E+01	0.556E+04 -0.211E+04	-0.284E+05 -0.915E+04	-0.391E+01 -0.170E+02

22	27.94 141.53	0.400E-01 -0.222E+01	-0.116E+02 -0.337E+01	0.518E+04 -0.216E+04	-0.273E+05 -0.936E+04	0.437E+02 0.190E+03
23	41.80 139.57	0.485E-01 -0.213E+01	-0.108E+02 -0.312E+01	0.417E+04 -0.220E+04	-0.240E+05 -0.958E+04	0.789E+02 0.343E+03
24	55.53 136.84	0.676E-01 -0.201E+01	-0.968E+01 -0.280E+01	0.275E+04 -0.225E+04	-0.193E+05 -0.978E+04	0.981E+02 0.426E+03
25	69.09 133.35	0.978E-01 -0.187E+01	-0.827E+01 -0.239E+01	0.116E+04 -0.229E+04	-0.140E+05 -0.996E+04	0.974E+02 0.423E+03
26	82.42 129.10	0.138E+00 -0.173E+01	-0.689E+01 -0.200E+01	-0.258E+03 -0.233E+04	-0.110E+05 -0.101E+05	0.748E+02 0.325E+03
27	95.50 124.11	0.186E+00 -0.159E+01	-0.528E+01 -0.154E+01	-0.120E+04 -0.236E+04	-0.144E+05 -0.102E+05	0.295E+02 0.128E+03
28	108.28 118.40	0.238E+00 -0.146E+01	-0.652E+01 -0.191E+01	-0.132E+04 -0.238E+04	-0.149E+05 -0.103E+05	-0.198E+02 -0.859E+02
29	120.72 111.98	0.294E+00 -0.134E+01	-0.143E+02 -0.418E+01	-0.832E+03 -0.242E+04	-0.134E+05 -0.105E+05	-0.824E+01 -0.358E+02
30	132.78 104.87	0.353E+00 -0.123E+01	-0.110E+02 -0.322E+01	-0.123E+04 -0.248E+04	-0.150E+05 -0.108E+05	0.318E+02 0.138E+03
31	144.43 97.10	0.413E+00 -0.113E+01	-0.125E+02 -0.369E+01	-0.183E+04 -0.253E+04	-0.173E+05 -0.110E+05	0.566E+02 0.246E+03
32	155.61 88.69	0.471E+00 -0.104E+01	-0.166E+02 -0.537E+01	-0.289E+04 -0.260E+04	-0.213E+05 -0.113E+05	0.639E+02 0.278E+03
33	166.18 78.98	0.524E+00 -0.976E+00	-0.223E+02 -0.254E+01	-0.367E+04 -0.266E+04	-0.243E+05 -0.116E+05	0.267E+02 0.116E+03
34	175.27 67.89	0.566E+00 -0.935E+00	-0.271E+02 0.233E+00	-0.366E+04 -0.268E+04	-0.243E+05 -0.116E+05	0.501E+01 0.218E+02
35	182.71 55.62	0.589E+00 -0.915E+00	-0.295E+02 0.694E+01	-0.379E+04 -0.263E+04	-0.246E+05 -0.114E+05	0.371E+02 0.161E+03
36	188.35 42.43	0.589E+00 -0.909E+00	-0.252E+02 0.760E+01	-0.467E+04 -0.253E+04	-0.272E+05 -0.110E+05	0.657E+02 0.285E+03
37	192.08 28.58	0.557E+00 -0.913E+00	-0.140E+02 0.426E+01	-0.560E+04 -0.245E+04	-0.301E+05 -0.107E+05	-0.456E+01 -0.198E+02
38	193.83 14.34	0.485E+00 -0.917E+00	-0.768E+01 0.234E+01	-0.444E+04 -0.239E+04	-0.258E+05 -0.104E+05	-0.191E+03 -0.830E+03
39	193.56 0.00	0.386E+00 -0.910E+00	-0.133E+01 0.418E+00	0.260E-11 -0.233E+04	-0.101E+05 -0.101E+05	-0.419E+03 -0.182E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.36495E-03	-0.36495E-03	.26433	0.00000
2	-0.92617E-03	0.17799E-03	.67080	0.00000

3	-0.10709E-02	0.30358E-03	.77564	0.00000
4	-0.97181E-03	0.18375E-03	.70386	0.00000
5	-0.90402E-03	0.11508E-03	.65476	0.00000
6	-0.90096E-03	0.13712E-03	.65254	0.00000
7	-0.85394E-03	0.11817E-03	.61849	0.00000
8	-0.64534E-03	-0.65801E-04	.46741	0.00000
9	-0.39762E-03	-0.29286E-03	.28798	0.00000
10	-0.23375E-03	-0.43987E-03	.31859	0.00000
11	-0.14762E-03	-0.51085E-03	.37000	0.00000
12	-0.12198E-03	-0.52303E-03	.37881	0.00000
13	-0.14135E-03	-0.49139E-03	.35590	0.00000
14	-0.20048E-03	-0.42266E-03	.30612	0.00000
15	-0.21681E-03	-0.39892E-03	.28893	0.00000
16	-0.18297E-03	-0.42527E-03	.30801	0.00000
17	-0.94342E-04	-0.50573E-03	.36629	0.00000
18	0.32257E-04	-0.62279E-03	.45108	0.00000
19	0.16737E-03	-0.74690E-03	.54096	0.00000
20	0.27582E-03	-0.84637E-03	.61300	0.00000
21	0.31759E-03	-0.89176E-03	.64588	0.00000
22	0.26965E-03	-0.85733E-03	.62095	0.00000
23	0.15359E-03	-0.75464E-03	.54657	0.00000
24	-0.80060E-05	-0.60575E-03	.43873	0.00000
25	-0.18613E-03	-0.43908E-03	.31801	0.00000
26	-0.34558E-03	-0.28940E-03	.25030	0.00000
27	-0.45164E-03	-0.19097E-03	.32711	0.00000
28	-0.46793E-03	-0.18144E-03	.33891	0.00000
29	-0.42098E-03	-0.23989E-03	.30491	0.00000
30	-0.47179E-03	-0.20350E-03	.34171	0.00000
31	-0.54388E-03	-0.14541E-03	.39392	0.00000
32	-0.66841E-03	-0.39737E-04	.48411	0.00000
33	-0.76227E-03	0.37229E-04	.55209	0.00000
34	-0.76296E-03	0.32589E-04	.55259	0.00000
35	-0.77113E-03	0.53797E-04	.55851	0.00000
36	-0.85357E-03	0.16254E-03	.61822	0.00000
37	-0.94392E-03	0.27471E-03	.68366	0.00000
38	-0.80936E-03	0.15661E-03	.58620	0.00000
39	-0.31824E-03	-0.31824E-03	.23049	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.29370	0.00000	0.08626
2	-0.30105	-0.31925	0.40987
3	-0.30876	-0.39741	0.49274
4	-0.31710	-0.33411	0.43466
5	-0.31745	-0.29465	0.39543
6	-0.30735	-0.30014	0.39460
7	-0.29606	-0.28106	0.36871
8	-0.28615	-0.16756	0.24944
9	-0.27783	-0.03029	0.10748
10	-0.27105	0.05960	0.13306
11	-0.26495	0.10502	0.17522
12	-0.25954	0.11595	0.18331
13	-0.25460	0.10121	0.16603
14	-0.25074	0.06424	0.12711
15	-0.24775	0.05265	0.11404
16	-0.24474	0.07006	0.12996
17	-0.24146	0.11895	0.17725
18	-0.23762	0.18939	0.24586
19	-0.23319	0.26434	0.31872
20	-0.22957	0.32446	0.37716
21	-0.23103	0.34966	0.40303
22	-0.23647	0.32584	0.38176
23	-0.24185	0.26260	0.32109
24	-0.24696	0.17283	0.23382
25	-0.25157	0.07313	0.13642
26	-0.25550	-0.01624	0.08152
27	-0.25857	-0.07537	0.14223
28	-0.26129	-0.08283	0.15110
29	-0.26592	-0.05236	0.12307
30	-0.27172	-0.07757	0.15140
31	-0.27735	-0.11521	0.19213
32	-0.28494	-0.18177	0.26296
33	-0.29174	-0.23116	0.31627
34	-0.29388	-0.23002	0.31639

35	-0.28864	-0.23851	0.32182
36	-0.27806	-0.29379	0.37110
37	-0.26927	-0.35234	0.42485
38	-0.26265	-0.27929	0.34828
39	-0.25610	0.00000	0.06559

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	12571.	30800.	0.408
BUCKLING THRUST (psi)	5	12571.	53657.	0.234
SEAM THRUST (psi)	5	12571.	21589.	0.582
PLASTIC-PENETRATE (%)	0	0.00	90.00	0.000
COMBINED T&M Ratio	3	0.493	1.000	0.493

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%).....	0.58
RISE HEIGHT OF VERTICAL DEFLECTION (IN).....	143.09
RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-).....	0.12
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF.....	0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN).....	387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB)	0.020

* * * * NORMAL EXIT FROM CANDE * * * *

*** WELCOME TO CANDE-2019 (Version April 1, 2019) ***

MASTER CONTROL AND PIPE-TYPE DATA FOR PROBLEM # 1

USER TITLE: Double Radius 33S 4.0ft Cover 8Gage Mod- Tandem-OPR (LL x 2.83)

EXECUTION MODE ..... ANALYS

SOLUTION LEVEL ..... #3 USER

METHODOLOGY (LRFD OR SERVICE) ... LRFD

NUMBER OF PIPE-ELEMENT GROUPS 1

MAXIMUM ITERATIONS PER STEP ..... -99

PIPE ELEMENT TYPE ..... STEEL

NUMBER OF BEAM ELEMENTS 38

STEEL ELEMENT PROPERTIES ARE AS FOLLOWS:

YOUNGS MODULUS OF METAL (PSI)..... 0.29000E+08

POISSONS RATIO OF METAL (-) ..... 0.30000E+00

YIELD STRESS OF METAL (PSI)..... 0.44000E+05

LONGITUDINAL SEAM STRENGTH (PSI)... 0.32223E+05

DENSITY OF METAL (PCI)..... 0.28400E+00

MODULUS OF UPPER BI-SLOPE (PSI).... 0.00000E+00

MATERIAL CHARACTER CODE, NONLIN 2

NONLIN=2,MEANS BILINEAR ELASTIC-PLASTIC

LARGE DEFORMATION/BUCKLING CODE, IBUCK... 4

IBUCK=4, MEANS LARGE DEFORMATION THEORY FOR GROUP
AND SIMPLIFIED BUCKLING PREDICTION, AASHTO 12.8.9.6-1

SECTION PROPERTIES OF CROSS-SECTION:

THRUST AREA (IN**2/IN) 0.23020

MOM. OF INERTIA (IN**4/IN) 0.87460

SECTION MODULUS (IN**3/IN) 0.28840

PLASTIC SECTION MOD(IN**3/IN) 0.40136

NOTE: AASHTO COMBINED T&M CRITERION 12.8.9.5 IS ACTIVATED.

LRFD RESISTANCE FACTORS FOR STRENGTH-LIMIT STATES
AND DEFLECTION LIMIT AT SERVICE LOAD

THRUST STRESS YIELDING 0.70000

BUCKLING STRESS FAILURE..... 0.70000

SEAM STRENGTH FAILURE 0.67000

FULL PLASTIC PENETRATION..... 0.90000

ALLOWABLE % DEFLECTION (SERVICE)... 5.00000

COMBINED MOMENT-THRUST CRITERION... 0.90000

BOUNDARY CONDITIONS AS GENERATED FROM INPUT
(FORCE=LBS/INCH; MOMENT=IN-LBS/INCH; DISPLACEMENT=INCHES; ROTATION=DEGREES)
(ONLY BEAM-ELEMENT NODES CAN SUSTAIN AN APPLIED MOMENT OR ROTATION)

BOUNDARY NODE	LOAD STEP	X-FORCE(F) -OR- X-DISPLACE.(D)	Y-FORCE(F) -OR- Y-DISPLACE.(D)	MOMENT(F) -OR- ROTATION (D)
1142	21	F = 0.000	F = -290.0	F = 0.000
1142	22	F = 0.000	F = -290.0	F = 0.000
1143	21	F = 0.000	F = -290.0	F = 0.000
1143	22	F = 0.000	F = -290.0	F = 0.000
574	1	D = 0.000	D = 0.000	D = 0.000
575	1	D = 0.000	D = 0.000	D = 0.000
576	1	D = 0.000	D = 0.000	D = 0.000
577	1	D = 0.000	D = 0.000	D = 0.000
578	1	D = 0.000	D = 0.000	D = 0.000
579	1	D = 0.000	D = 0.000	D = 0.000
580	1	D = 0.000	D = 0.000	D = 0.000
581	1	D = 0.000	D = 0.000	D = 0.000
582	1	D = 0.000	D = 0.000	D = 0.000
583	1	D = 0.000	D = 0.000	D = 0.000
584	1	D = 0.000	D = 0.000	D = 0.000
585	1	D = 0.000	D = 0.000	D = 0.000
586	1	D = 0.000	D = 0.000	D = 0.000
587	1	D = 0.000	D = 0.000	D = 0.000
588	1	D = 0.000	D = 0.000	D = 0.000
589	1	D = 0.000	D = 0.000	D = 0.000
590	1	D = 0.000	D = 0.000	D = 0.000
591	1	D = 0.000	D = 0.000	D = 0.000
592	1	D = 0.000	D = 0.000	D = 0.000
593	1	D = 0.000	D = 0.000	D = 0.000
594	1	D = 0.000	D = 0.000	D = 0.000
595	1	D = 0.000	D = 0.000	D = 0.000
596	1	D = 0.000	D = 0.000	D = 0.000
597	1	D = 0.000	D = 0.000	D = 0.000
598	1	D = 0.000	D = 0.000	D = 0.000
599	1	D = 0.000	D = 0.000	D = 0.000
624	1	D = 0.000	D = 0.000	D = 0.000
649	1	D = 0.000	D = 0.000	D = 0.000
674	1	D = 0.000	D = 0.000	D = 0.000
699	1	D = 0.000	D = 0.000	D = 0.000
724	1	D = 0.000	D = 0.000	D = 0.000
761	1	D = 0.000	D = 0.000	D = 0.000
786	1	D = 0.000	D = 0.000	D = 0.000
811	1	D = 0.000	D = 0.000	D = 0.000
836	1	D = 0.000	D = 0.000	D = 0.000
861	1	D = 0.000	D = 0.000	D = 0.000
886	1	D = 0.000	D = 0.000	D = 0.000
911	1	D = 0.000	D = 0.000	D = 0.000
936	1	D = 0.000	D = 0.000	D = 0.000
961	1	D = 0.000	D = 0.000	D = 0.000
986	1	D = 0.000	D = 0.000	D = 0.000
1023	1	D = 0.000	D = 0.000	D = 0.000
1048	1	D = 0.000	D = 0.000	D = 0.000
1073	1	D = 0.000	D = 0.000	D = 0.000
1098	1	D = 0.000	D = 0.000	D = 0.000
837	1	D = 0.000	F = 0.000	D = 0.000
838	1	D = 0.000	F = 0.000	D = 0.000
839	1	D = 0.000	F = 0.000	D = 0.000
840	1	D = 0.000	F = 0.000	D = 0.000
841	1	D = 0.000	F = 0.000	D = 0.000
842	1	D = 0.000	F = 0.000	D = 0.000
843	1	D = 0.000	F = 0.000	D = 0.000
844	1	D = 0.000	F = 0.000	D = 0.000
845	1	D = 0.000	F = 0.000	D = 0.000
846	1	D = 0.000	F = 0.000	D = 0.000
847	1	D = 0.000	F = 0.000	D = 0.000
848	1	D = 0.000	F = 0.000	D = 0.000
849	1	D = 0.000	F = 0.000	D = 0.000
850	1	D = 0.000	F = 0.000	D = 0.000
851	1	D = 0.000	F = 0.000	D = 0.000
852	1	D = 0.000	F = 0.000	D = 0.000
853	1	D = 0.000	F = 0.000	D = 0.000
854	1	D = 0.000	F = 0.000	D = 0.000
855	1	D = 0.000	F = 0.000	D = 0.000
856	1	D = 0.000	F = 0.000	D = 0.000
857	1	D = 0.000	F = 0.000	D = 0.000
858	1	D = 0.000	F = 0.000	D = 0.000
859	1	D = 0.000	F = 0.000	D = 0.000

860	1	D =	0.000	F =	0.000	D =	0.000
1123	1	D =	0.000	F =	0.000	D =	0.000
1161	1	D =	0.000	F =	0.000	D =	0.000
1099	1	D =	0.000	F =	0.000	D =	0.000
1100	1	D =	0.000	F =	0.000	D =	0.000
1101	1	D =	0.000	F =	0.000	D =	0.000
1102	1	D =	0.000	F =	0.000	D =	0.000
1103	1	D =	0.000	F =	0.000	D =	0.000
1104	1	D =	0.000	F =	0.000	D =	0.000
1105	1	D =	0.000	F =	0.000	D =	0.000
1106	1	D =	0.000	F =	0.000	D =	0.000
1107	1	D =	0.000	F =	0.000	D =	0.000
1108	1	D =	0.000	F =	0.000	D =	0.000
1109	1	D =	0.000	F =	0.000	D =	0.000
1110	1	D =	0.000	F =	0.000	D =	0.000
1111	1	D =	0.000	F =	0.000	D =	0.000
1112	1	D =	0.000	F =	0.000	D =	0.000
1113	1	D =	0.000	F =	0.000	D =	0.000
1114	1	D =	0.000	F =	0.000	D =	0.000
1115	1	D =	0.000	F =	0.000	D =	0.000
1116	1	D =	0.000	F =	0.000	D =	0.000
1117	1	D =	0.000	F =	0.000	D =	0.000
1118	1	D =	0.000	F =	0.000	D =	0.000
1119	1	D =	0.000	F =	0.000	D =	0.000
1120	1	D =	0.000	F =	0.000	D =	0.000
1121	1	D =	0.000	F =	0.000	D =	0.000
1122	1	D =	0.000	F =	0.000	D =	0.000
1138	21	F =	0.000	F =	-290.0	F =	0.000
1138	22	F =	0.000	F =	-290.0	F =	0.000
1137	21	F =	0.000	F =	-290.0	F =	0.000
1137	22	F =	0.000	F =	-290.0	F =	0.000

* * * * * COMPLETED MESH GENERATION * * * * *

BRIDGECOR

CALCULATED KEY NUMBERS ...
THE NUMBER OF DATA ERRORS IS---------- 0
THE NUMBER OF SOIL MATERIALS IS-------- 4
THE NUMBER OF PIPE-TYPE GROUPS IS------ 1
THE NUMBER OF INTERFACE MATERIALS IS--- 37
BAND WIDTH ESTIMATE (MAX)---------- 2060

* * * * MESH DATA HAS BEEN SAVED ON UNIT 14 * * * *

BEAM-NODE SEQUENCE NUMBERS FOR EACH GROUP

BEAM-ELEMENT GROUP NUMBER = 1

BEAM-NODE SEQUENCE	MESH-NODE NUMBER	CONNECTED-GROUP-ELEMENTS FOREWARD-#	BACKWARD-#
1	39	1	0
2	38	2	1
3	37	3	2
4	36	4	3
5	35	5	4
6	34	6	5
7	33	7	6
8	32	8	7
9	31	9	8
10	30	10	9
11	29	11	10
12	28	12	11
13	27	13	12
14	26	14	13
15	25	15	14
16	24	16	15
17	23	17	16
18	22	18	17
19	21	19	18
20	20	20	19
21	19	21	20
22	18	22	21
23	17	23	22
24	16	24	23

25	15	25	24
26	14	26	25
27	13	27	26
28	12	28	27
29	11	29	28
30	10	30	29
31	9	31	30
32	8	32	31
33	7	33	32
34	6	34	33
35	5	35	34
36	4	36	35
37	3	37	36
38	2	38	37
39	1	0	38

MATERIAL DESCRIPTION FOR SOILS AND INTERFACE
(ALL DENSITY UNITS ARE pcf, ALL MODULUS UNITS ARE psi)

PROPERTIES FOR MATERIAL 1 ********In Situ

DENSITY = 0.10000E+01

YOUNGS MODULUS= 0.3000E+04
POISSONS RATIO= 0.3000E+00
CONFINED MOD.= 0.4038E+04
LATERAL COEFF.= 0.4286E+00

PROPERTIES FOR MATERIAL 2 ********Footing

DENSITY = 0.15000E+03

YOUNGS MODULUS= 0.3500E+07
POISSONS RATIO= 0.1800E+00
CONFINED MOD.= 0.3800E+07
LATERAL COEFF.= 0.2195E+00

PROPERTIES FOR MATERIAL 3 ********SW95

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH SELIG HYPERBOLIC BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SW95

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 48.0000

10-FOLD REDUCTION IN PHIO(DEG).. 8.0000

SCALED MODULUS NUMBER ZK 950.0000

MODULUS EXPONENT ZN 0.6000

FAILURE RATIO RF 0.7000

INIT. BULK MODULUS NUMBER BI.... 74.8000

ULT. VOLUMETRIC STRAIN EU 0.0200

PROPERTIES FOR MATERIAL 4 ********SM90

DENSITY = 0.12000E+03

CONTROLS FOR DUNCAN SOIL MODEL
WITH DUNCAN POWER-LAW BULK MODULUS FORMULATION

LRFD STRESS CONTROL..... 0

ENTERING ELEMENT RATIO..... 0.5000

ORIGINAL FORMULATION, ... NEWDS = 0

HYPERBOLIC STRESS-STRAIN PARAMETERS

SOIL CLASSIFICATION SM90

COHESION INTERCEPT C 0.0000

FRICTION ANGLE PHIO (DEG)..... 32.0000

10-FOLD REDUCTION IN PHIO(DEG).. 4.0000

SCALED MODULUS NUMBER ZK 300.0000

MODULUS EXPONENT ZN 0.2500

FAILURE RATIO RF 0.7000

BULK MODULUS NUMBER BK 250.0000

BULK MODULUS EXPONENT BM 0.0000

INTERFACE ELEMENT MATERIAL-GROUP PROPERTIES

MAT. NO.	NORMAL-ANGLE	COEF-FRICTION	TENSILE-RUPTURE	INITIAL-GAP
1	2.95	0.30000	50.00000	0.00000
2	11.04	0.30000	50.00000	0.00000
3	19.12	0.30000	50.00000	0.00000
4	27.20	0.30000	50.00000	0.00000
5	35.29	0.30000	50.00000	0.00000
6	43.37	0.30000	50.00000	0.00000
7	51.46	0.30000	50.00000	0.00000
8	54.67	0.30000	50.00000	0.00000
9	57.88	0.30000	50.00000	0.00000
10	61.09	0.30000	50.00000	0.00000
11	64.31	0.30000	50.00000	0.00000
12	67.52	0.30000	50.00000	0.00000
13	70.73	0.30000	50.00000	0.00000
14	73.94	0.30000	50.00000	0.00000
15	77.15	0.30000	50.00000	0.00000
16	80.36	0.30000	50.00000	0.00000
17	83.58	0.30000	50.00000	0.00000
18	86.79	0.30000	50.00000	0.00000
19	90.00	0.30000	50.00000	0.00000
20	93.21	0.30000	50.00000	0.00000
21	96.42	0.30000	50.00000	0.00000
22	99.64	0.30000	50.00000	0.00000
23	102.85	0.30000	50.00000	0.00000
24	106.06	0.30000	50.00000	0.00000
25	109.27	0.30000	50.00000	0.00000
26	112.48	0.30000	50.00000	0.00000
27	115.69	0.30000	50.00000	0.00000
28	118.91	0.30000	50.00000	0.00000
29	122.12	0.30000	50.00000	0.00000
30	125.33	0.30000	50.00000	0.00000
31	128.54	0.30000	50.00000	0.00000
32	136.63	0.30000	50.00000	0.00000
33	144.71	0.30000	50.00000	0.00000
34	152.79	0.30000	50.00000	0.00000
35	160.88	0.30000	50.00000	0.00000
36	168.96	0.30000	50.00000	0.00000
37	177.05	0.30000	50.00000	0.00000

LRFD TOTAL LOAD FACTORS PER LOAD STEP

LOAD STEP	LOAD FACTOR	USER COMMENT
1	1.575	Factor for load step #1
2	1.575	Factor for load step #2
3	1.575	Factor for load step #3
4	1.575	Factor for load step #4
5	1.575	Factor for load step #5
6	1.575	Factor for load step #6
7	1.575	Factor for load step #7
8	1.575	Factor for load step #8
9	1.575	Factor for load step #9
10	1.575	Factor for load step #10
11	1.575	Factor for load step #11
12	1.575	Factor for load step #12
13	1.575	Factor for load step #13
14	1.575	Factor for load step #14
15	1.575	Factor for load step #15
16	1.575	Factor for load step #16
17	1.575	Factor for load step #17
18	1.575	Factor for load step #18
19	1.575	Factor for load step #19
20	1.575	Factor for load step #20
21	1.300	Factor for load step #21
22	1.300	Factor for load step #22

STEEL, FACTORED-EVALUATION FOR GROUP 1, LOAD-STEP 22

STRUCTURAL RESPONSES OF STEEL-GROUP 1, LOAD STEP 22
UNITS INCH-LB SYSTEM: (FORCE = LB/IN, MOMENT = IN-LB/IN, STRESS = PSI)

NODE	X-COORD Y-COORD	X-DISP. Y-DISP.	N-PRES. S-PRES.	MOMENT THRUST	MAX-STRESS HOOP-STRESS	SHEAR S-STRESS
1	-193.56 0.00	-0.551E+00 -0.122E+01	0.609E+01 0.165E+01	-0.988E-11 -0.360E+04	-0.156E+05 -0.156E+05	0.795E+03 0.345E+04
2	-193.83 14.34	-0.732E+00 -0.123E+01	-0.579E+01 -0.190E+01	-0.857E+04 -0.367E+04	-0.440E+05 -0.160E+05	0.359E+03 0.156E+04
3	-192.08 28.58	-0.857E+00 -0.123E+01	-0.177E+02 -0.546E+01	-0.108E+05 -0.375E+04	-0.440E+05 -0.163E+05	0.325E+01 0.141E+02
4	-188.35 42.43	-0.905E+00 -0.122E+01	-0.401E+02 -0.122E+02	-0.900E+04 -0.387E+04	-0.440E+05 -0.168E+05	-0.120E+03 -0.520E+03
5	-182.71 55.62	-0.890E+00 -0.124E+01	-0.462E+02 0.910E+01	-0.750E+04 -0.388E+04	-0.429E+05 -0.168E+05	-0.469E+02 -0.204E+03
6	-175.27 67.89	-0.827E+00 -0.128E+01	-0.366E+02 0.110E+02	-0.759E+04 -0.373E+04	-0.425E+05 -0.162E+05	0.111E+02 0.483E+02
7	-166.18 78.98	-0.728E+00 -0.137E+01	-0.244E+02 0.729E+01	-0.761E+04 -0.359E+04	-0.420E+05 -0.156E+05	-0.676E+02 -0.293E+03
8	-155.61 88.69	-0.608E+00 -0.152E+01	-0.198E+02 0.637E+01	-0.530E+04 -0.348E+04	-0.335E+05 -0.151E+05	-0.177E+03 -0.769E+03
9	-144.43 97.10	-0.482E+00 -0.170E+01	-0.181E+02 0.526E+01	-0.213E+04 -0.339E+04	-0.221E+05 -0.147E+05	-0.176E+03 -0.763E+03
10	-132.78 104.87	-0.358E+00 -0.190E+01	-0.186E+02 0.535E+01	0.171E+03 -0.330E+04	-0.149E+05 -0.144E+05	-0.105E+03 -0.458E+03

11	-120.72 111.98	-0.246E+00 -0.211E+01	-0.167E+02 0.479E+01	0.142E+04 -0.323E+04	-0.189E+05 -0.140E+05	-0.404E+02 -0.176E+03
12	-108.28 118.40	-0.149E+00 -0.231E+01	-0.168E+02 0.482E+01	0.191E+04 -0.316E+04	-0.203E+05 -0.137E+05	0.158E+02 0.685E+02
13	-95.50 124.11	-0.685E-01 -0.251E+01	-0.164E+02 0.473E+01	0.157E+04 -0.310E+04	-0.189E+05 -0.134E+05	0.735E+02 0.319E+03
14	-82.42 129.10	-0.264E-02 -0.270E+01	-0.614E+01 0.176E+01	0.438E+03 -0.305E+04	-0.148E+05 -0.133E+05	0.595E+02 0.259E+03
15	-69.09 133.35	0.510E-01 -0.289E+01	-0.646E+01 0.186E+01	0.498E+03 -0.303E+04	-0.149E+05 -0.132E+05	-0.220E+02 -0.955E+02
16	-55.53 136.84	0.928E-01 -0.308E+01	-0.615E+01 0.175E+01	0.166E+04 -0.300E+04	-0.188E+05 -0.130E+05	-0.102E+03 -0.442E+03
17	-41.80 139.57	0.121E+00 -0.326E+01	-0.800E+01 0.228E+01	0.394E+04 -0.296E+04	-0.265E+05 -0.129E+05	-0.169E+03 -0.734E+03
18	-27.94 141.53	0.136E+00 -0.342E+01	-0.115E+02 0.327E+01	0.692E+04 -0.291E+04	-0.366E+05 -0.127E+05	-0.197E+03 -0.854E+03
19	-13.99 142.70	0.139E+00 -0.352E+01	-0.142E+02 0.403E+01	0.984E+04 -0.285E+04	-0.440E+05 -0.124E+05	-0.178E+03 -0.772E+03
20	0.00 143.09	0.135E+00 -0.356E+01	-0.189E+02 0.515E+01	0.121E+05 -0.278E+04	-0.440E+05 -0.121E+05	-0.103E+03 -0.449E+03
21	13.99 142.70	0.131E+00 -0.350E+01	-0.213E+02 -0.548E+01	0.127E+05 -0.278E+04	-0.440E+05 -0.121E+05	0.228E+02 0.989E+02
22	27.94 141.53	0.137E+00 -0.336E+01	-0.176E+02 -0.498E+01	0.111E+05 -0.286E+04	-0.440E+05 -0.124E+05	0.138E+03 0.598E+03
23	41.80 139.57	0.161E+00 -0.314E+01	-0.159E+02 -0.445E+01	0.825E+04 -0.293E+04	-0.414E+05 -0.127E+05	0.210E+03 0.913E+03
24	55.53 136.84	0.207E+00 -0.286E+01	-0.133E+02 -0.374E+01	0.445E+04 -0.301E+04	-0.285E+05 -0.131E+05	0.249E+03 0.108E+04
25	69.09 133.35	0.276E+00 -0.256E+01	-0.994E+01 -0.281E+01	0.341E+03 -0.306E+04	-0.145E+05 -0.133E+05	0.242E+03 0.105E+04
26	82.42 129.10	0.363E+00 -0.225E+01	-0.521E+01 -0.151E+01	-0.332E+04 -0.311E+04	-0.250E+05 -0.135E+05	0.176E+03 0.765E+03
27	95.50 124.11	0.459E+00 -0.198E+01	0.642E+00 -0.182E+00	-0.551E+04 -0.313E+04	-0.327E+05 -0.136E+05	0.342E+02 0.148E+03
28	108.28 118.40	0.556E+00 -0.174E+01	-0.637E+01 -0.188E+01	-0.505E+04 -0.314E+04	-0.311E+05 -0.136E+05	-0.100E+03 -0.436E+03
29	120.72 111.98	0.652E+00 -0.154E+01	-0.253E+02 -0.737E+01	-0.332E+04 -0.320E+04	-0.254E+05 -0.139E+05	-0.556E+02 -0.242E+03
30	132.78 104.87	0.745E+00 -0.136E+01	-0.121E+02 -0.357E+01	-0.399E+04 -0.328E+04	-0.281E+05 -0.142E+05	0.256E+02 0.111E+03
31	144.43	0.833E+00	-0.158E+02	-0.442E+04	-0.298E+05	0.365E+02

	97.10	-0.122E+01	-0.468E+01	-0.334E+04	-0.145E+05	0.158E+03
32	155.61	0.910E+00	-0.237E+02	-0.528E+04	-0.332E+05	0.532E+02
	88.69	-0.110E+01	-0.765E+01	-0.343E+04	-0.149E+05	0.231E+03
33	166.18	0.974E+00	-0.317E+02	-0.609E+04	-0.362E+05	0.359E+02
	78.98	-0.102E+01	0.264E+01	-0.347E+04	-0.151E+05	0.156E+03
34	175.27	0.101E+01	-0.343E+02	-0.636E+04	-0.367E+05	0.272E+02
	67.89	-0.982E+00	0.105E+02	-0.338E+04	-0.147E+05	0.118E+03
35	182.71	0.102E+01	-0.361E+02	-0.680E+04	-0.376E+05	0.667E+02
	55.62	-0.971E+00	0.110E+02	-0.323E+04	-0.140E+05	0.290E+03
36	188.35	0.981E+00	-0.300E+02	-0.808E+04	-0.415E+05	0.953E+02
	42.43	-0.981E+00	0.907E+01	-0.310E+04	-0.135E+05	0.414E+03
37	192.08	0.883E+00	-0.143E+02	-0.922E+04	-0.440E+05	-0.170E+02
	28.58	-0.100E+01	0.438E+01	-0.301E+04	-0.131E+05	-0.739E+02
38	193.83	0.720E+00	-0.453E+01	-0.715E+04	-0.376E+05	-0.302E+03
	14.34	-0.101E+01	0.146E+01	-0.295E+04	-0.128E+05	-0.131E+04
39	193.56	0.509E+00	0.525E+01	-0.558E-11	-0.125E+05	-0.653E+03
	0.00	-0.100E+01	-0.145E+01	-0.288E+04	-0.125E+05	-0.284E+04

STRAIN AND YIELDING DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	INNER-FIBER STRAIN	OUTER-FIBER STRAIN	STRAIN RATIO MAX-TO-YIELD	FRACTION OF WALL YIELDED
1	-0.49022E-03	-0.49022E-03	.35506	0.00000
2	-0.14362E-02	0.43305E-03	1.0402	0.02969
3	-0.17877E-02	0.69839E-03	1.2948	0.16371
4	-0.15214E-02	0.45666E-03	1.1019	0.07115
5	-0.13448E-02	0.28747E-03	.97401	0.00000
6	-0.13343E-02	0.31720E-03	.96640	0.00000
7	-0.13177E-02	0.33765E-03	.95437	0.00000
8	-0.10512E-02	0.10156E-03	.76133	0.00000
9	-0.69307E-03	-0.23031E-03	.50198	0.00000
10	-0.43184E-03	-0.46900E-03	.33969	0.00000
11	-0.28614E-03	-0.59412E-03	.43030	0.00000
12	-0.22335E-03	-0.63826E-03	.46227	0.00000
13	-0.25103E-03	-0.59291E-03	.42943	0.00000
14	-0.36856E-03	-0.46393E-03	.33601	0.00000
15	-0.35875E-03	-0.46706E-03	.33828	0.00000
16	-0.22880E-03	-0.58911E-03	.42668	0.00000
17	0.24165E-04	-0.83226E-03	.60278	0.00000
18	0.35516E-03	-0.11498E-02	.83280	0.00000
19	0.68426E-03	-0.14655E-02	1.0614	0.03943
20	0.97787E-03	-0.17991E-02	1.3030	0.15066
21	0.10607E-02	-0.19148E-02	1.3868	0.17949
22	0.84214E-03	-0.16508E-02	1.1956	0.10834
23	0.49752E-03	-0.12976E-02	.93982	0.00000
24	0.74446E-04	-0.89372E-03	.64730	0.00000
25	-0.38068E-03	-0.45491E-03	.32948	0.00000
26	-0.78433E-03	-0.62789E-04	.56807	0.00000
27	-0.10252E-02	0.17312E-03	.74250	0.00000
28	-0.97744E-03	0.12185E-03	.70793	0.00000
29	-0.79704E-03	-0.75135E-04	.57727	0.00000
30	-0.88049E-03	-0.12471E-04	.63772	0.00000
31	-0.93551E-03	0.26183E-04	.67757	0.00000
32	-0.10418E-02	0.10765E-03	.75456	0.00000
33	-0.11354E-02	0.19010E-03	.82237	0.00000
34	-0.11527E-02	0.23176E-03	.83487	0.00000
35	-0.11805E-02	0.29963E-03	.85498	0.00000
36	-0.13018E-02	0.45684E-03	.94284	0.00000
37	-0.14140E-02	0.59312E-03	1.0241	0.01659
38	-0.11791E-02	0.37610E-03	.85397	0.00000
39	-0.39292E-03	-0.39292E-03	.28458	0.00000

COMBINED THRUST AND MOMENT DIAGNOSTICS OF STEEL-GROUP 1, LOAD STEP 22

NODE	FACTORED THRUST-RATIO P/(P-resist)	FACTORED MOMENT-RATIO M/(M-resist)	FACTORED COMBINED-RATIO AASHTO 12.8.9.5
1	-0.39451	0.00000	0.15564
2	-0.40298	-0.53943	0.70182
3	-0.41149	-0.68073	0.85005
4	-0.42441	-0.56598	0.74610
5	-0.42545	-0.47194	0.65295
6	-0.40926	-0.47750	0.64499
7	-0.39434	-0.47861	0.63412
8	-0.38210	-0.33328	0.47928
9	-0.37155	-0.13380	0.27184
10	-0.36248	0.01075	0.14214
11	-0.35419	0.08905	0.21450
12	-0.34669	0.11996	0.24016
13	-0.33958	0.09885	0.21417
14	-0.33497	0.02757	0.13978
15	-0.33228	0.03132	0.14173
16	-0.32911	0.10418	0.21249
17	-0.32516	0.24762	0.35334
18	-0.31976	0.43514	0.53738
19	-0.31299	0.61916	0.71712
20	-0.30507	0.76154	0.85461
21	-0.30508	0.79889	0.89196
22	-0.31361	0.70116	0.79951
23	-0.32193	0.51902	0.62267
24	-0.32966	0.27993	0.38860
25	-0.33622	0.02146	0.13451
26	-0.34086	-0.20862	0.32480
27	-0.34284	-0.34646	0.46400
28	-0.34426	-0.31784	0.43636
29	-0.35094	-0.20872	0.33188
30	-0.35931	-0.25097	0.38007
31	-0.36589	-0.27805	0.41193
32	-0.37588	-0.33235	0.47364
33	-0.38038	-0.38325	0.52794
34	-0.37056	-0.40029	0.53760
35	-0.35443	-0.42794	0.55355
36	-0.33998	-0.50847	0.62405
37	-0.33008	-0.57993	0.68888
38	-0.32310	-0.44965	0.55404
39	-0.31621	0.00000	0.09999

ASSESSMENT SUMMARY STEEL-GROUP 1, LOAD-STEP 22

LRFD STRENGTH-LIMIT RATIOS AT STEP 22, FOR STEEL GROUP # 1

DESIGN-CRITERION	CONTROL NODE	FACTORED DEMAND	FACTORED CAPACITY	RATIO VALUE
MATERIAL THRUST (psi)	5	16848.	30800.	0.547
BUCKLING THRUST (psi)	5	16848.	50709.	0.332
SEAM THRUST (psi)	5	16848.	21589.	0.780
PLASTIC-PENETRATE (%)	21	17.95	90.00	0.199
COMBINED T&M Ratio	21	0.892	1.000	0.892

LRFD SERVICE PERFORMANCE AT STEP 22, FOR STEEL GROUP # 1

PERCENT VERTICAL DEFLECTION (%)..... 1.34

RISE HEIGHT OF VERTICAL DEFLECTION (IN)..... 143.09

RATIO OF VERTICAL DEFLECTION TO ALLOWABLE (-)..... 0.27

```
HANDLING FACTOR RATIO = (SPAN**2/EI)/FF..........      0.30
SPAN LENGTH FOR HANDLING AND BUCKLING (IN)........   387.66
FLEXIBILITY FACTOR (FF) FOR HANDLING (IN/LB) .....     0.020


* * * * NORMAL EXIT FROM CANDE * * * *
```

BridgeCor Arch (31'-11" X 11'-8") FOOTING DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)

Project No: CBC 25353 Project Title: ARROYA LANE, EL PASO COUNTY, CO

Structure Size: BridgeCor Span, S (ft)= 31.92 Rise, R (ft)= 11.67

Net Allowable bearing capacity (psf) 4000

$Rv = (V_{dl} + V_{LL}) x \cos (A)^o$ Vertical Footing Reaction Component

$Rh = (V_{dl} + V_{LL}) x \sin (A)^o$ Horizontal Footing Reaction Component

$Vdl = (H_2 xS - A_t) xGamma/2$

Gamma = Unit Weight of Soil 120 pcf

$V_{LL} = n \cdot (AL) / (L_W + 2xH_1)$

S=	31.92	ft	Span
R=	11.67	ft	Rise
H=	6.60		Height of cover above the crown
H1=	17.94	ft.	Height of cover above the footing to traffic surf
H2=	17.94	ft.	Height of cover above the springline
A^o =	5.02	o	Return angle
At =	295.40	sq.ft.	Area of the top portion above springline
AL =	50000.00	lbs.	HL-93
n =	2.00		Traffic lanes
Lw =	8.00	ft.	Lane width

			From CANDE			
Vdl =	16634.7	lbs/ft.	Vdl =	20266.7 lbs/ft		
V_{LL} =	2278.9	lbs/ft.	V_{LL} =	2605.7 lbs/ft		
Rv=	18841.1	lbs/ft.	Rv=	22784.6 lbs/ft	Rh=	2001.4
Rvd=	16570.9	lbs/ft.	Rvd=	20188.9 lbs/ft	Rhd=	1773.4

Factored Footing Reaction AS PER AASHTO LRFD (FROM CANDE)

LOAD FACTORS:
Beta Coefficient = 1.25 for Dead Load
= 1.75for Live Load
= 1.5 for Vertical Earth Press.

Rvu = **34825.9** lbs/ft.

Rhu = **2532.37** lbs/ft.

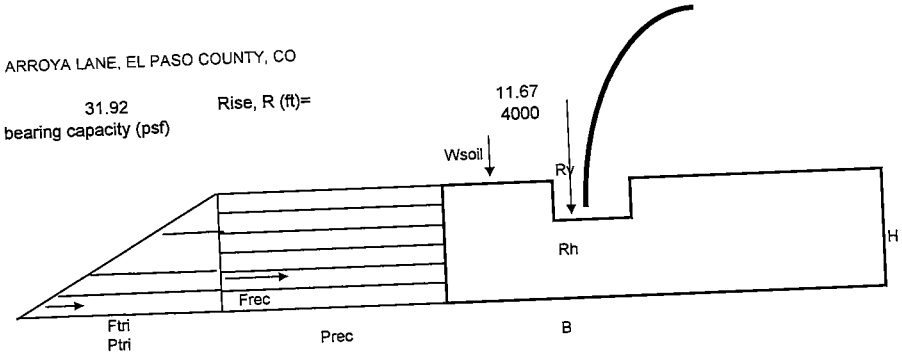
BridgeCor Arch (31'-11" X 11'-8") FOOTING DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)

Project No: CBC 25353 Project Title: ARROYA LANE, EL PASO COUNTY, CO

Structure Size: BridgeCor Span, S (ft)= 31.92 Rise, R (ft)= 11.67

Net Allowable bearing capacity (psf) 4000



DATA		
HEIGHT OF COVER (ft)	6.60	
Hc to INVERT (ft)	17.94	
Rv (plf)	22785	
Rh (plf)	2001	from CANDE
Rvd(plf)=	20189	
Rh dl(plf)=	1773.4	
ALL. BEARING (psf)	4000	

FOOTING GEOMETRY	
WIDTH, B (ft)	9.00
OUTSIDE WIDTH, w (ft)	5.00
THICKNESS, t (ft)	2.670
HEIGHT, h (ft)	3.000

FOOTING LOADS	
SOIL WEIGHT, Ws1 (plf)	10764.00
MOMENT ARM (ft)	2.500
CONCRETE WEIGHT, Wc1 (plf)	4050.0
MOMENT ARM (ft)	4.50
Rv (plf)	22784.6
MOMENT ARM (ft)	5.00
Rh (plf)	2001.4
MOMENT ARM (ft)	2.670

OUTSIDE SOIL PRESSURE	
At rest COEFFICIENT, Ko	0.4
Prec (psf)	887.4
Ptri (psf)	148.4
Frec (plf)	2662.2
MOMENT ARM (ft)	1.50
Ftri (plf)	222.6
MOMENT ARM (ft)	1.0

BEARING PRESSURE CALCULATION (STATIC)		
SUM OF VERTICALS, Q (plf)	37598.6	
SUM OF MOMENTS, Mo (ft-#/ft)	168617.8	(CLOCKWISE POSITIVE)
ECCENTRICITY, e (ft)	-0.0153	B/6 = 1.5000
BEARING PRESSURES, q (psf)		
MAXIMUM PRESSURE (psf)	3860	
MINIMUM PRESSURE (psf)	3775	

AFTER STRUCTURE INSTALLATION

SLIDING CALCULATIONS (STATIC): f=0.45

SLIDING FORCE (lbs/ft)	4886.2	
RESISTING FORCE (lbs/ft)	15751.3	
F.S=	3.2	> 1.5
OVERTURNING CALCULATIONS:		
OVERTUNING MOMENT (lbs-ft/ft)	9559.6	
RESITING MOMENT(lbs/ft)	179329.6	
F.S.=	18.8	>2.0

BEFORE STRUCTURE INSTALLATION (TEMPORARY)

SLIDING CALCULATIONS (STATIC): f=0.45

100 PSF SURCHARGE FROM CONSTRUCTION LOADS

SLIDING FORCE (lbs/ft)	346.2	
RESISTING FORCE (lbs/ft)	1822.5	
F.S=	5.3	> 1.125 (75% OF 1.5)
OVERTURNING CALCULATIONS:		
OVERTUNING MOMENT (lbs-ft/ft)	408.1	
RESITING MOMENT(lbs/ft)	18225.0	
F.S.=	44.7	>1.5 (75% OF 2.0)

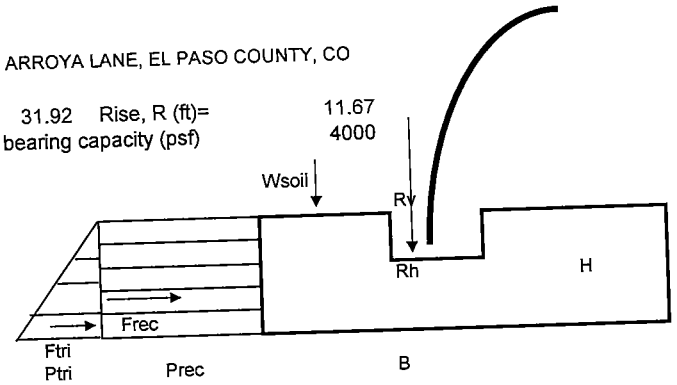
BridgeCor Arch (31'-11" X 11'-8") FOOTING DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)

Project No: CBC 25353 Project Title: ARROYA LANE, EL PASO COUNTY, CO

Structure Size: BridgeCor Span, S (ft)= 31.92 Rise, R (ft)= 11.67

Net Allowable bearing capacity (psf) 4000



DATA

HEIGHT OF COVER (ft)	6.60
Hc to INVERT (ft)	17.94
Rvfac (plf)	34826
Rhfac (plf)	2532
ALL. BEARING (psf)	4500

DL=1.5, LL=1.75

FOOTING GEOMETRY

WIDTH, B (ft)	9.00
OUTSIDE WIDTH, w (ft)	5.00
THICKNESS, t (ft)	2.670
HEIGHT, h (ft)	3.000

FOOTING LOADS

SOIL WEIGHT, Ws1 (plf)	13993.20	1.3
MOMENT ARM (ft)	2.500	
CONCRETE WEIGHT, Wc1 (plf)	5062.5	1.25
MOMENT ARM (ft)	4.50	
Rvfac (plf)	34825.9	
MOMENT ARM (ft)	5.00	
Rhfac (plf)	2532.4	
MOMENT ARM (ft)	2.670	

OUTSIDE SOIL PRESSURE

At rest COEFFICIENT, Ko	0.4	1.35
Prec (psf)	1200.5	
Ptri (psf)	200.7	
Frec (plf)	3601.4	
MOMENT ARM (ft)	1.50	
Ftri (plf)	301.1	
MOMENT ARM (ft)	1.0	

BEARING PRESSURE CALCULATION

SUM OF VERTICALS, Q (plf)	53881.6	
SUM OF MOMENTS, Mo (ft-#/ft)	244358.4	(CLOCKWISE POSITIVE)
ECCENTRICITY, e (ft)	0.0351	B/6 = 1.5000
BEARING PRESSURES, q (psf)		
MAXIMUM PRESSURE (psf)	6127	
MINIMUM PRESSURE (psf)	5847	

BridgeCor Arch (31'-11" X 11'-8") FOOTING DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)

Project No: CBC 25353 Project Title: ARROYA LANE, EL PASO COUNTY, CO

Structure Size: BridgeCor Span, S (ft)= 31.92 Rise, R (ft)= 11.67

Net Allowable bearing capacity (psf) 4000

DATA

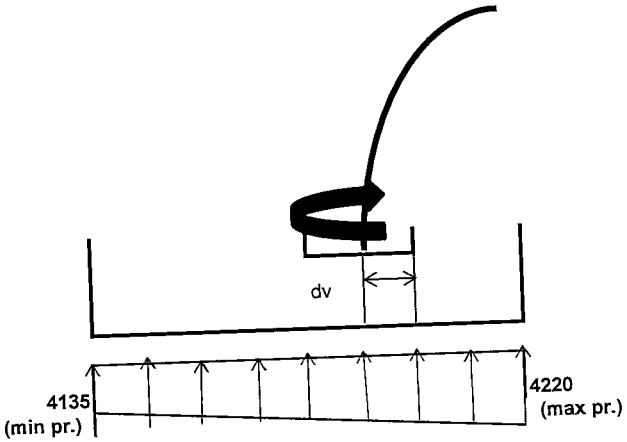
Cantilever Length :		5.00	ft.
Footing width:		9.00	ft.
Concrete Beam :	b=	12	in.
	h=	32	in.
	d =	28.63	in.
	dv=	25.76	in.
	f'_c =	4000	psi

Service Bending Moment @ arch connection Mu= 25,843.76 ft.- lb

(See attached calculations for the reinforcement)

Max. Service pressure @ arch connection= 4182.37 psf

Max. Service pressure @ dv from the arch connection= 4202.73 psf



CBC ENGINEERS

BridgeCor Arch (31'-11" X 11'-8") FOOTING DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)

Project No: CBC 25353 Project Title: ARROYA LANE, EL PASO COUNTY, CO

Structure Size: BridgeCor Span, S (ft)= 31.92 Rise, R (ft)= 11.67

Net Allowable bearing capacity (psf) 4000

DATA

Cantilever Length :		5.00	ft.
Footing width:		9.00	ft.
Concrete Beam :	b=	12	in.
	h=	32	in.
	d =	28.63	in.
	dv=	25.76	in.
	f'_c =	4000	psi
Factored Bending Moment @ arch connection Mu=		38,750.02	ft.- lb

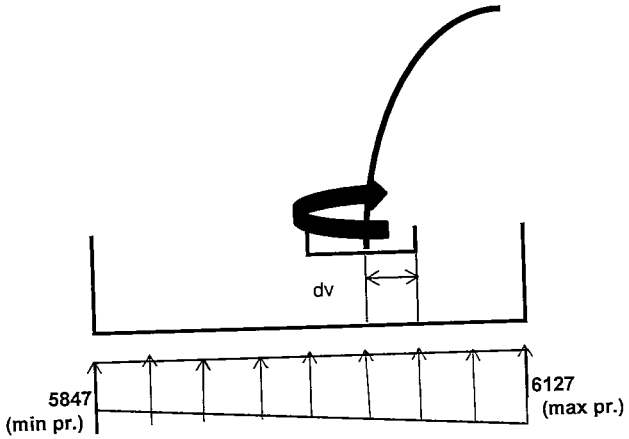
(See attached calculations for the reinforcement)

Max. Factored pressure @ arch connection=		6002.41	psf
Max. Factored pressure @ dv from the arch connection=		6069.24	psf
Shear @ the arch connection	Vu =	16932.32	lbs

Required Depth : $d = Vu/(0.85x2x(f'_c)^{0.5} x b$

d= 13.12 in. < 28.63 in. provided

O.K. for SHEAR



CBC ENGINEERS

BridgeCor Arch (31'-11" X 11'-8") FOOTING DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)

Project No: CBC 25353 Project Title: ARROYA LANE, EL PASO COUNTY, CO

Structure Size: BridgeCor Span, S (ft)= 31.92 Rise, R (ft)= 11.67

Net Allowable bearing capacity (psf) 4000

AASHTO LRFD SPECIFICATIONS SECTION 5.7.3.4

Size of the bar #	*#6*
Width of the footing,b (in)	*12.0*
Net design depth,d (in)	*28.63*
dc(in)	*7.38*
bar diameter (in)	*0.75*
c/s area of the bar(in^2)	*0.44*
spacing(in)	*6.0*
no: of bars (n)	*2.00*
Area of steel,As(in^2)	*0.88*
fy(kips/in^2)	*60*
f'c(kips/in^2)	*4000*
M(ft-kips) (service load moment)	*25.84*
M(ft-kips) (factored load moment)	*38.8*
γ e (exposure factor)	*0.75*
fss (ksi)	*12.4*
$\beta s = 1 + \frac{dc}{0.7(h - dc)}$	*1.368*

Note: $sact < 700\gamma e/\beta s.fss - 2\,de$

700γe/βs.fss - 2 de *16.1* *O.K*

2.0 CHECK FOR MINIMUM REINFORCEMENT FOR CRACKING CONTROL:

AASHTO LRFD SPECIFICATION 5.7.3.3.2

Total Depth (in) *36*

fcr(psi)	*Ig(in^4)*	*yt*	*Mcr (ft-k)*
480.0	*46656.0*	*18.0*	*103.7*

Criterion:

φMn ≥ the lesser of Mcr and 1.33 Mu

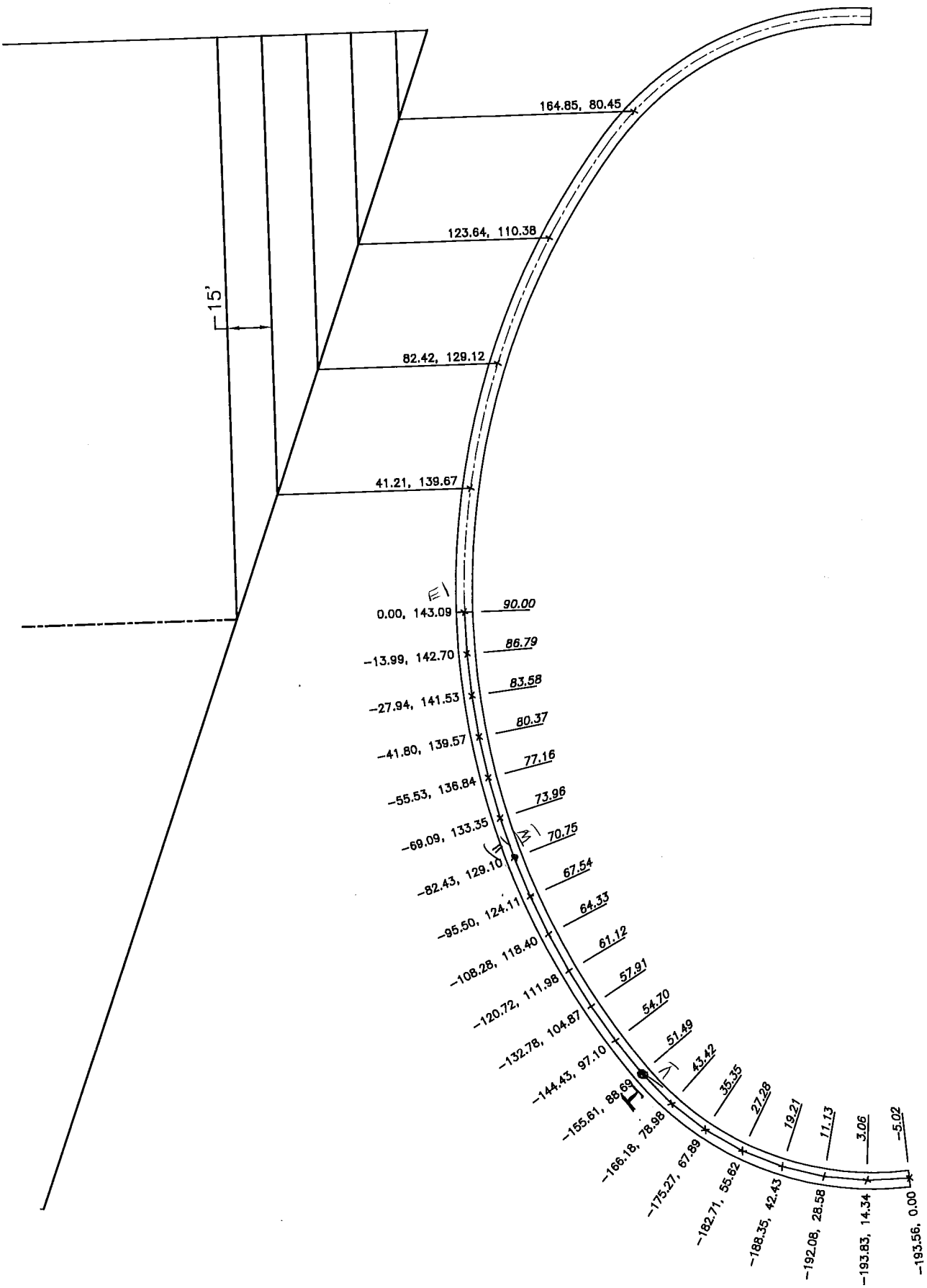
3.0

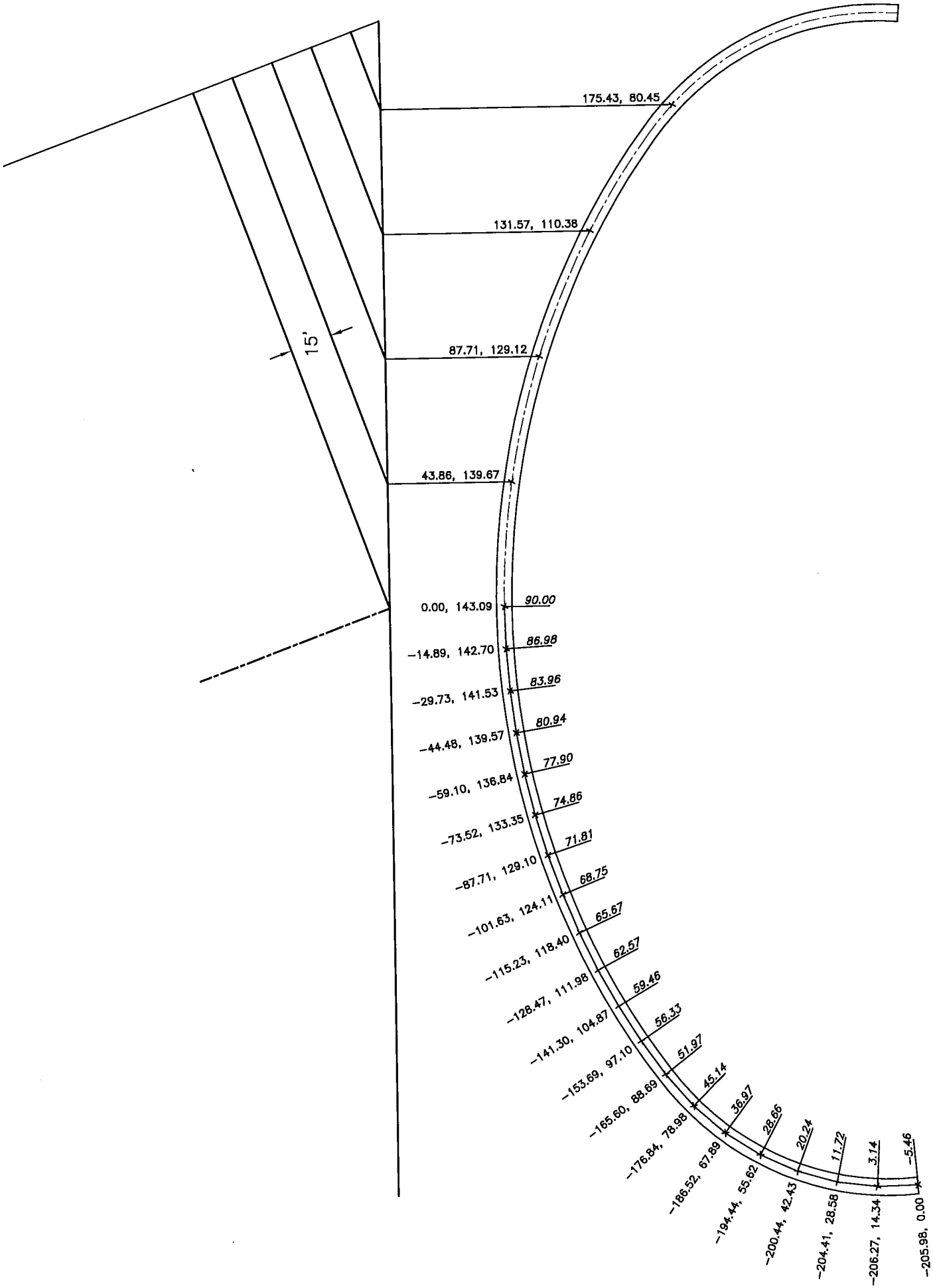
	Mu(ft-kips)	*a(in)(assumed)*	*b(in)*	*d(in)*	*As (in^2)*	*a cal(in)*
(1.33Mu)	*46.50*	*0.54*	*12.0*	*28.6*	*0.36*	*0.54*

As provided = *0.88 sq.in*

φMn(ft-kips) > 1.33 Mu(ft-Kips) *O.K*

SKEWED HEADWALL DESIGN




175.43, 80.45
131.57, 110.38
87.71, 129.12
43.86, 139.67
15'
0.00, 143.09
90.00
-14.89, 142.70
86.98
-29.73, 141.53
83.96
-44.48, 139.57
80.94
-59.10, 136.84
77.90
-73.52, 133.35
74.86
-87.71, 129.10
71.81
-101.63, 124.11
68.75
-115.23, 118.40
65.67
-128.47, 111.98
62.57
-141.30, 104.87
59.46
-153.69, 97.10
56.33
-165.60, 88.69
51.97
-176.84, 78.98
45.14
-186.52, 67.89
36.97
-194.44, 55.62
28.66
-200.44, 42.43
20.24
-204.41, 28.58
11.72
-206.27, 14.34
3.14
-205.98, 0.00
-5.46

TWO- DIMENSIONAL ANALYSIS OF THE SKEWED BRIDGECOR SECTION:

STRENGTH DESIGN
(SOIL +LIVE LOAD)

HL-93 LIVE LOAD

ka 0.26 γ= 120
φ= 36 pcf

Nodes	Depth from finished grade	Vd (unfac)	Vl(unfac)	Vtot	EH unfac	LS unfac	Htot
	D ft	psi	psi	psi	psi	psi	psi
143.09	7.13	5.94	1.68	7.62	1.54	0.44	1.98
142.70	7.16	5.97	1.67	7.64	1.55	0.43	1.98
141.53	7.26	6.05	1.64	7.69	1.57	0.43	2.00
139.57	7.42	6.19	1.60	7.79	1.61	0.42	2.02
136.84	7.65	6.38	1.55	7.92	1.66	0.40	2.06
133.35	7.94	6.62	1.48	8.10	1.72	0.38	2.10
129.10	8.30	6.91	1.40	8.32	1.79	0.36	2.16
124.11	8.71	7.26	1.32	8.58	1.88	0.34	2.23
118.40	9.19	7.66	1.24	8.89	1.99	0.32	2.31
111.98	9.72	8.10	1.15	9.25	2.10	0.30	2.40
104.87	10.32	8.60	1.06	9.66	2.23	0.28	2.51
97.10	10.96	9.14	0.98	10.12	2.37	0.25	2.63
88.69	11.66	9.72	0.90	10.62	2.52	0.23	2.76
78.98	12.47	10.39	0.82	11.22	2.70	0.21	2.91
67.89	13.40	11.16	0.74	11.91	2.90	0.19	3.09
55.62	14.42	12.02	0.67	12.68	3.12	0.17	3.29
42.43	15.52	12.93	0.60	13.53	3.36	0.16	3.51
28.58	16.67	13.89	0.54	14.43	3.61	0.14	3.75
14.34	17.86	14.88	0.49	15.37	3.86	0.13	3.99
0.00	19.05	15.88	0.44	16.32	4.12	0.11	4.24

STRENGTH I DESIGN:	TYPE	LOAD FACTORS
Soil Pressure (psi) Vd	D.γ/144	1.00
Live Load Pressure Vl (psi)	Live Load /distributed area in sq.in	1
EH (psi)	ka.Vd	1.00
LS (psii)	ka.Vl	1

NOTE:

Headwall design for skewed ends. (20°)
Max. ht. of cover @ downstream = 7.13'
Max ht of cover @ upstream = 6.33'
HL-93 live load
Concrete headwall designed for skewed cut corrugations for the structure. Two-dimensional analysis have been performed to determine horizontal and vertical loads on the headwall from the skewed cut corrugations. SAP 2000 3D-model developed with the determined loads from 2-D analysis.

TWO- DIMENSIONAL ANALYSIS OF THE SKEWED BRIDGECOR SECTION:

STRENGTH DESIGN
(SOIL +LIVE LOAD)

HL-93 LIVE LOAD

ka 0.26 γ= 120
φ= 36 pcf

Nodes	Depth from finished grade	Vd (unfac)	Vl(unfac)	Vtot	EH unfac	LS unfac	Htot
	D ft	psi	psi	psi	psi	psi	psi
143.09	6.33	5.28	1.92	7.19	1.37	0.50	1.87
142.70	6.36	5.30	1.91	7.21	1.38	0.50	1.87
141.53	6.46	5.38	1.88	7.26	1.40	0.49	1.88
139.57	6.62	5.52	1.82	7.34	1.43	0.47	1.91
136.84	6.85	5.71	1.76	7.47	1.48	0.46	1.94
133.35	7.14	5.95	1.68	7.63	1.54	0.44	1.98
129.10	7.50	6.25	1.58	7.83	1.62	0.41	2.03
124.11	7.91	6.59	1.49	8.08	1.71	0.39	2.10
118.40	8.39	6.99	1.38	8.37	1.81	0.36	2.17
111.98	8.92	7.44	1.28	8.72	1.93	0.33	2.26
104.87	9.52	7.93	1.18	9.11	2.06	0.31	2.37
97.10	10.16	8.47	1.09	9.55	2.20	0.28	2.48
88.69	10.86	9.05	0.99	10.05	2.35	0.26	2.61
78.98	11.67	9.73	0.90	10.63	2.53	0.23	2.76
67.89	12.60	10.50	0.81	11.31	2.73	0.21	2.94
55.62	13.62	11.35	0.73	12.08	2.95	0.19	3.13
42.43	14.72	12.27	0.65	12.91	3.18	0.17	3.35
28.58	15.87	13.23	0.58	13.81	3.43	0.15	3.58
14.34	17.06	14.22	0.52	14.74	3.69	0.14	3.83
0.00	18.25	15.21	0.47	15.68	3.95	0.12	4.07

STRENGTH I DESIGN:	TYPE	LOAD FACTORS
Soil Pressure (psi) Vd	D.γ/144	1.00
Live Load Pressure Vl (psi)	Live Load /distributed area in sq.in	1
EH (psi)	ka.Vd	1.00
LS (psii)	ka.Vl	1

EngiLab Beam.2D 2018 Analysis Report
Model: "S-1.bea"
Report created: Wednesday, 02 November 2022, 15:19:02

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0000
2	0.0010	-0.0044	-0.0003
3	0.0080	-0.0090	-0.0008
4	0.0195	-0.0152	-0.0009
5	0.0284	-0.0217	-0.0005
6	0.0281	-0.0238	0.0004
7	0.0172	-0.0168	0.0014
8	0.0000	0.0000	0.0019

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-1418.76	-52.71	0.00
1 End	-1189.93	-107.50	-1148.90
2 Start	-1193.22	60.92	-1148.90
2 End	-988.08	-20.09	-856.03
3 Start	-981.12	118.76	-856.03
3 End	-802.21	16.96	117.33
4 Start	-791.87	129.52	117.33
4 End	-640.27	12.28	1134.41
5 Start	-632.19	102.14	1134.41
5 End	-507.92	-25.57	1683.84
6 Start	-506.45	46.34	1683.84
6 End	-409.04	-87.27	1390.36
7 Start	-417.25	-28.85	1390.36
7 End	-344.91	-164.89	0.00

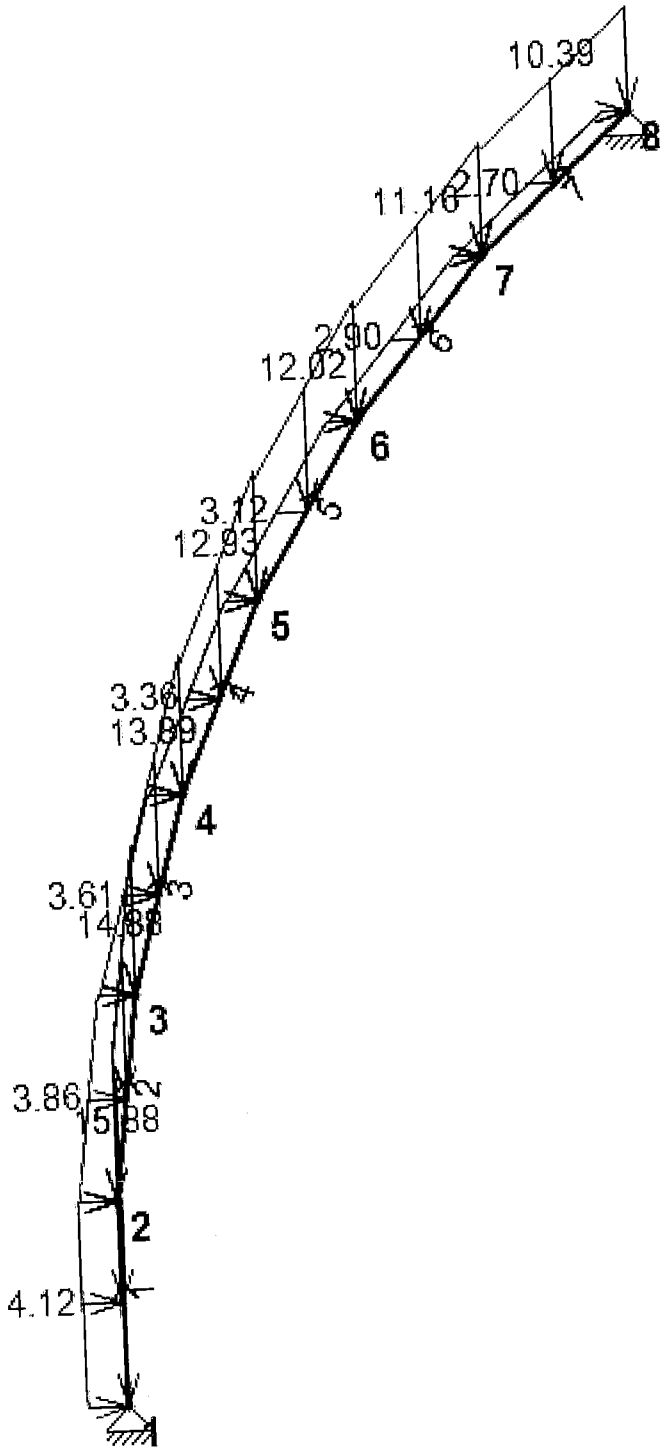
Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	25.99	1419.50	
8	-365.55	-111.90	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Model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11.16
2.70
7
2.90
12.02
6
3.12
12.93
5
3.36
13.89
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3.61
14.88
3
3.86
15.88
2
4.12
1

EngiLab Beam.2D 2018 Analysis Report
Model: "S-2.bea"
Report created: Wednesday, 02 November 2022, 15:18:15

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0064
2	-0.0862	-0.0081	0.0052
3	-0.1403	-0.0073	0.0022
4	-0.1472	-0.0108	-0.0013
5	-0.1102	-0.0317	-0.0044
6	-0.0451	-0.0760	-0.0064
7	0.0276	-0.1402	-0.0069
8	0.0887	-0.2115	-0.0059
9	0.1268	-0.2670	-0.0035
10	0.1399	-0.2914	-0.0003
11	0.1273	-0.2753	0.0032
12	0.0941	-0.2163	0.0064
13	0.0484	-0.1200	0.0087
14	0.0000	0.0000	0.0096

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-2019.12	-288.41	0.00
1 End	-1790.29	-343.20	-4529.49
2 Start	-1820.76	-88.01	-4529.49
2 End	-1615.62	-169.02	-6373.28
3 Start	-1623.36	59.37	-6373.28
3 End	-1444.44	-42.44	-6251.81
4 Start	-1436.07	160.97	-6251.81
4 End	-1284.48	43.73	-4783.57
5 Start	-1265.58	223.82	-4783.57
5 End	-1141.31	96.11	-2488.14
6 Start	-1116.34	256.14	-2488.14
6 End	-1018.94	122.54	226.88
7 Start	-991.56	264.68	226.88
7 End	-919.21	128.64	3049.57
8 Start	-902.20	218.04	3049.57
8 End	-848.63	88.18	5191.58
9 Start	-842.26	136.15	5191.58
9 End	-798.85	11.26	6223.71
10 Start	-797.00	55.55	6223.71
10 End	-762.75	-64.02	6164.46
11 Start	-765.14	-21.02	6164.46
11 End	-739.26	-135.26	5070.60
12 Start	-745.70	-93.49	5070.60
12 End	-727.39	-202.75	2997.28
13 Start	-737.51	-162.11	2997.28
13 End	-725.86	-266.38	0.00

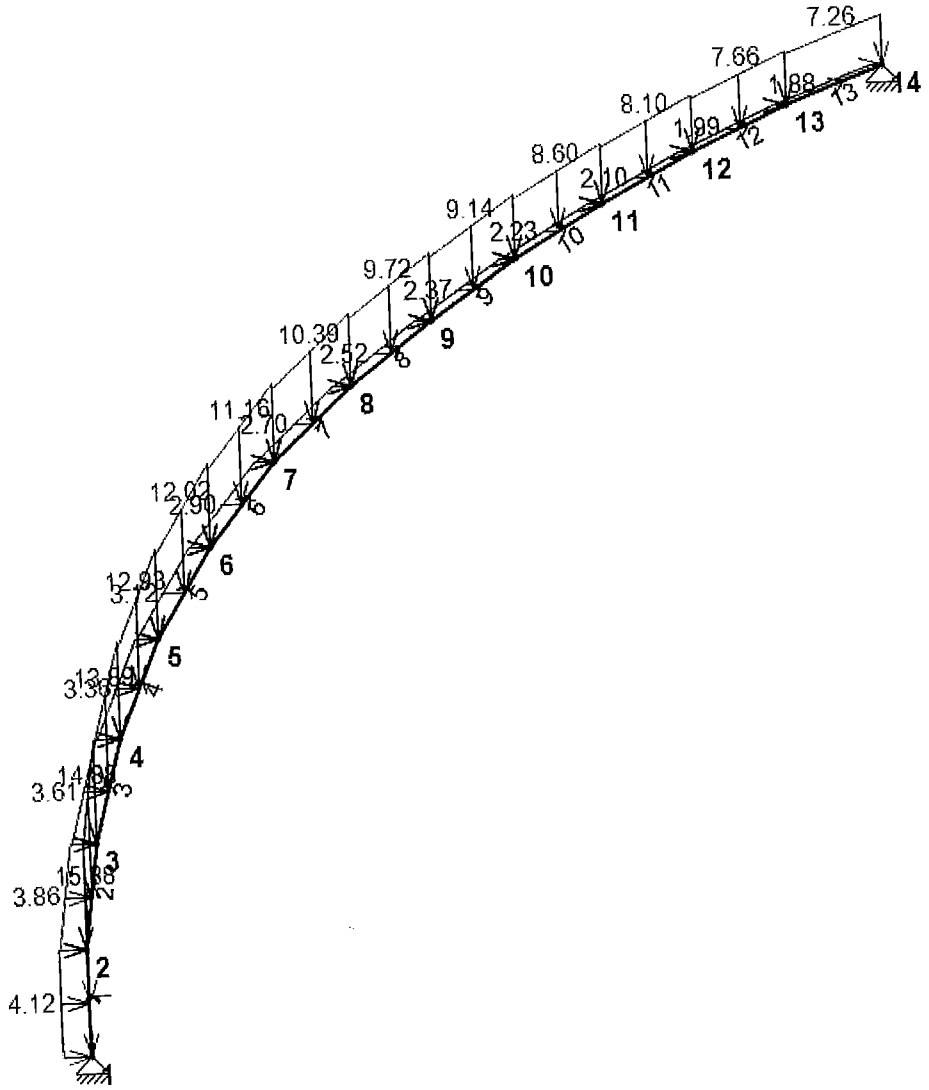
Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	250.35	2024.19	
14	-773.13	-10.04	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Model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8.60
9.14
9.72
10.30
11.16
12.03
12.93
13.99
14.97
15.88
1.88
1.99
2.10
2.23
2.37
2.52
2.70
2.90
3.12
3.36
3.61
3.86
4.12
4
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11
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3
2
1

EngiLab Beam.2D 2018 Analysis Report
Model: "S-3.bea"
Report created: Wednesday, 02 November 2022, 15:17:30

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0202
2	-0.2798	-0.0128	0.0181
3	-0.5021	0.0074	0.0126
4	-0.6296	0.0350	0.0054
5	-0.6543	0.0391	-0.0020
6	-0.5902	-0.0061	-0.0087
7	-0.4666	-0.1137	-0.0138
8	-0.3193	-0.2808	-0.0168
9	-0.1771	-0.4766	-0.0174
10	-0.0492	-0.6755	-0.0160
11	0.0519	-0.8544	-0.0131
12	0.1203	-0.9948	-0.0090
13	0.1554	-1.0820	-0.0043
14	0.1609	-1.1061	0.0008
15	0.1433	-1.0624	0.0059
16	0.1111	-0.9510	0.0106
17	0.0730	-0.7773	0.0147
18	0.0375	-0.5509	0.0179
19	0.0116	-0.2860	0.0200
20	0.0000	0.0000	0.0207

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-2345.67	-507.66	0.00
1 End	-2116.84	-562.46	-7674.13
2 Start	-2174.90	-259.16	-7674.13
2 End	-1969.77	-340.16	-11973.41
3 Start	-1998.01	-60.39	-11973.41
3 End	-1819.10	-162.19	-13569.69
4 Start	-1823.84	95.05	-13569.69
4 End	-1672.24	-22.19	-13047.09
5 Start	-1658.77	213.06	-13047.09
5 End	-1534.49	85.34	-10906.16
6 Start	-1507.11	300.95	-10906.16
6 End	-1409.71	167.34	-7548.70
7 Start	-1372.14	364.02	-7548.70
7 End	-1299.79	227.98	-3300.21
8 Start	-1271.22	354.17	-3300.21
8 End	-1217.65	224.31	746.27
9 Start	-1202.97	292.99	746.27
9 End	-1159.56	168.09	3974.62
10 Start	-1148.45	232.15	3974.62
10 End	-1114.20	112.58	6387.77

11	Start	-1106.10	175.07	6387.77
11	End	-1080.23	60.83	8038.96
12	Start	-1075.10	121.46	8038.96
12	End	-1056.79	12.20	8974.38
13	Start	-1054.49	70.77	8974.38
13	End	-1042.83	-33.50	9235.13
14	Start	-1043.07	25.22	9235.13
14	End	-1037.58	-74.56	8889.72
15	Start	-1040.13	-15.84	8889.72
15	End	-1040.35	-111.61	7997.50
16	Start	-1044.95	-53.59	7997.50
16	End	-1050.32	-145.71	6602.52
17	Start	-1056.82	-86.92	6602.52
17	End	-1067.00	-175.87	4763.29
18	Start	-1075.26	-115.00	4763.29
18	End	-1090.08	-201.24	2549.77
19	Start	-1099.61	-140.12	2549.77
19	End	-1118.97	-224.25	0.00

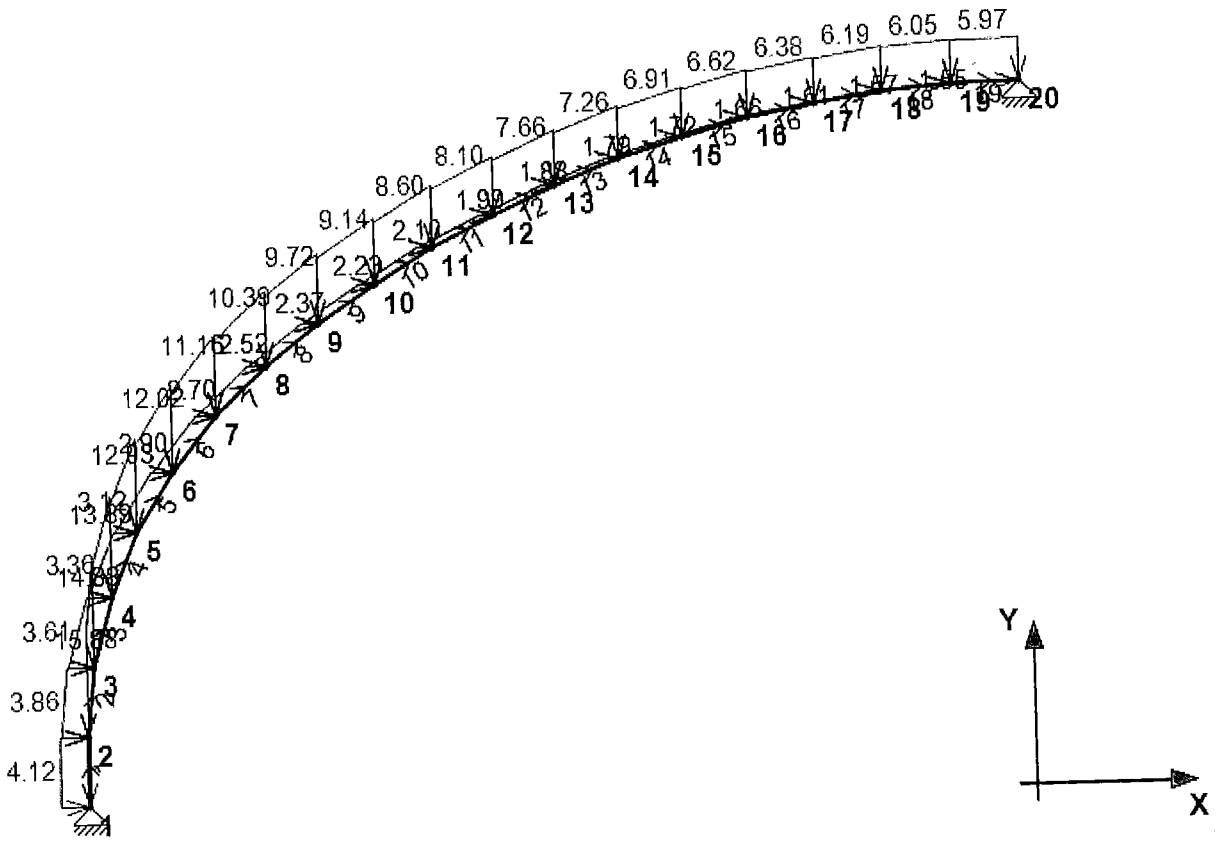
Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	463.42	2354.81	
20	-1124.78	192.98	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Model


5.97
6.05
6.19
6.38
6.62
6.91
7.26
7.66
8.10
8.60
9.14
9.72
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11.16
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13.82
14.86
15.98
4.12
3.86
3.61
3.36
3.12
2.90
2.70
2.52
2.37
2.20
2.12
1.99
1.88
1.79
1.72
1.66
1.61
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1.55
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1.55
1.57
1.61
1.66
1.72
1.79
1.88
1.99
2.12
2.20
2.37
2.52
2.70
2.90
3.12
3.36
3.61
3.86
4.12
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X

EngiLab Beam.2D 2018 Analysis Report
Model: "S-4.bea"
Report created: Wednesday, 02 November 2022, 15:16:48

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0383
2	-0.5357	-0.0181	0.0355
3	-0.9958	0.0307	0.0284
4	-1.3252	0.1121	0.0186
5	-1.5034	0.1812	0.0079
6	-1.5391	0.1957	-0.0025
7	-1.4629	0.1259	-0.0116
8	-1.3182	-0.0393	-0.0186
9	-1.1458	-0.2764	-0.0229
10	-0.9623	-0.5598	-0.0249
11	-0.7873	-0.8653	-0.0250
12	-0.6344	-1.1709	-0.0235
13	-0.5111	-1.4571	-0.0208
14	-0.4201	-1.7068	-0.0171
15	-0.3607	-1.9067	-0.0126
16	-0.3288	-2.0465	-0.0078
17	-0.3185	-2.1190	-0.0027
18	-0.3224	-2.1205	0.0025
19	-0.3324	-2.0504	0.0076
20	-0.3404	-1.9107	0.0124
21	-0.3389	-1.7055	0.0169
22	-0.3209	-1.4413	0.0209
23	-0.2805	-1.1268	0.0243
24	-0.2142	-0.7725	0.0270
25	-0.1204	-0.3917	0.0288
26	0.0000	0.0000	0.0295

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-2491.21	-652.43	0.00
1 End	-2262.37	-707.22	-9750.40
2 Start	-2339.35	-382.01	-9750.40
2 End	-2134.22	-463.02	-15812.30
3 Start	-2178.07	-158.95	-15812.30
3 End	-1999.16	-260.76	-18822.33
4 Start	-2015.97	22.77	-18822.33
4 End	-1864.37	-94.47	-19336.64
5 Start	-1859.14	168.49	-19336.64
5 End	-1734.87	40.78	-17835.14
6 Start	-1711.77	285.10	-17835.14
6 End	-1614.37	151.49	-14704.98
7 Start	-1576.99	377.12	-14704.98
7 End	-1504.65	241.08	-10268.44

8 Start	-1473.80	387.27	-10268.44
8 End	-1420.23	257.41	-5758.89
9 Start	-1403.35	337.52	-5758.89
9 End	-1359.95	212.63	-1906.92
10 Start	-1346.06	287.73	-1906.92
10 End	-1311.81	168.16	1284.33
11 Start	-1300.27	241.68	1284.33
11 End	-1274.39	127.43	3867.95
12 Start	-1265.21	198.87	3867.95
12 End	-1246.91	89.61	5887.01
13 Start	-1240.02	158.61	5887.01
13 End	-1228.36	54.34	7376.61
14 Start	-1223.36	123.36	7376.61
14 End	-1217.87	23.57	8405.17
15 Start	-1214.60	92.33	8405.17
15 End	-1214.82	-3.44	9027.45
16 Start	-1213.13	64.11	9027.45
16 End	-1218.50	-28.02	9280.08
17 Start	-1218.17	39.97	9280.08
17 End	-1228.35	-48.98	9217.07
18 Start	-1229.15	20.85	9217.07
18 End	-1243.97	-65.39	8905.29
19 Start	-1245.68	4.10	8905.29
19 End	-1265.04	-80.03	8373.95
20 Start	-1267.53	-9.43	8373.95
20 End	-1248.18	-93.55	7653.33
21 Start	-1251.45	-23.79	7653.33
21 End	-1236.63	-110.02	6716.73
22 Start	-1240.88	-39.63	6716.73
22 End	-1230.70	-128.58	5539.42
23 Start	-1235.96	-59.75	5539.42
23 End	-1230.58	-151.88	4058.10
24 Start	-1237.12	-83.22	4058.10
24 End	-1236.90	-178.99	2222.34
25 Start	-1245.04	-108.84	2222.34
25 End	-1250.53	-208.63	0.00

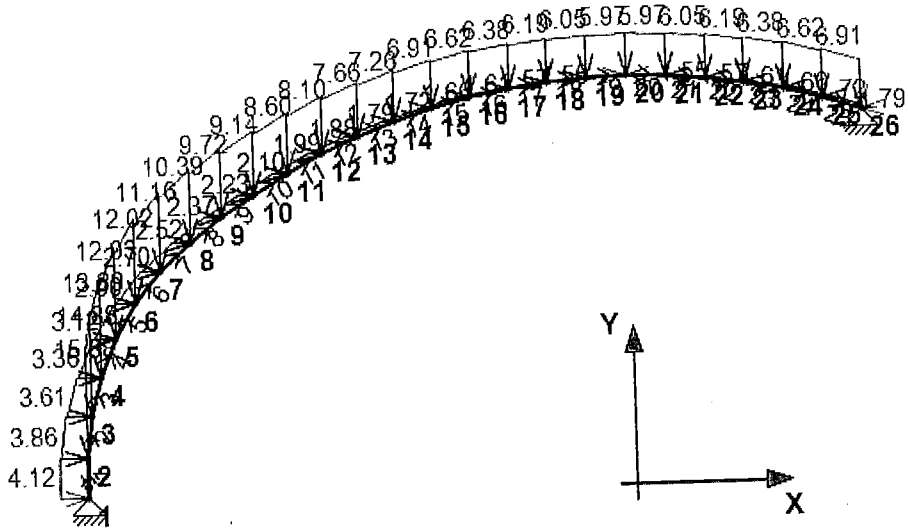
Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	605.41	2503.05	
26	-1128.19	578.39	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Model



EngiLab Beam.2D 2018 Analysis Report
Model: "S-5.bea"
Report created: Wednesday, 02 November 2022, 15:15:42

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0660
2	-0.9304	-0.0259	0.0627
3	-1.7673	0.0689	0.0540
4	-2.4355	0.2410	0.0418
5	-2.8991	0.4316	0.0279
6	-3.1577	0.5806	0.0137
7	-3.2392	0.6394	0.0005
8	-3.1914	0.5789	-0.0108
9	-3.0668	0.4043	-0.0194
10	-2.8945	0.1367	-0.0257
11	-2.7002	-0.2026	-0.0298
12	-2.5043	-0.5926	-0.0322
13	-2.3215	-1.0132	-0.0331
14	-2.1615	-1.4453	-0.0326
15	-2.0303	-1.8722	-0.0310
16	-1.9305	-2.2780	-0.0285
17	-1.8615	-2.6485	-0.0252
18	-1.8203	-2.9720	-0.0213
19	-1.8026	-3.2380	-0.0167
20	-1.8016	-3.4376	-0.0117
21	-1.8097	-3.5635	-0.0062
22	-1.8181	-3.6096	-0.0004
23	-1.8172	-3.5714	0.0058
24	-1.7970	-3.4468	0.0122
25	-1.7473	-3.2359	0.0187
26	-1.6582	-2.9417	0.0251
27	-1.5214	-2.5709	0.0313
28	-1.3303	-2.1321	0.0370
29	-1.0807	-1.6384	0.0419
30	-0.7722	-1.1056	0.0458
31	-0.4089	-0.5521	0.0485
32	0.0000	0.0000	0.0494

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-2591.39	-785.79	0.00
1 End	-2362.56	-840.59	-11663.20
2 Start	-2457.30	-499.96	-11663.20
2 End	-2252.16	-580.97	-19417.35
3 Start	-2311.40	-259.18	-19417.35
3 End	-2132.49	-360.99	-23865.06
4 Start	-2162.06	-57.73	-23865.06
4 End	-2010.46	-174.97	-25534.15

5 Start	-2015.10	109.33	-25534.15
5 End	-1890.83	-18.39	-24881.69
6 Start	-1874.52	248.52	-24881.69
6 End	-1777.11	114.91	-22276.01
7 Start	-1743.27	363.81	-22276.01
7 End	-1670.92	227.77	-18030.59
8 Start	-1640.58	390.30	-18030.59
8 End	-1587.01	260.44	-13478.62
9 Start	-1569.69	350.00	-13478.62
9 End	-1526.28	225.11	-9451.85
10 Start	-1511.45	309.43	-9451.85
10 End	-1477.19	189.85	-5956.93
11 Start	-1464.18	272.64	-5956.93
11 End	-1438.30	158.39	-2939.92
12 Start	-1427.12	239.00	-2939.92
12 End	-1408.81	129.74	-359.23
13 Start	-1399.45	207.65	-359.23
13 End	-1387.80	103.38	1816.44
14 Start	-1379.79	181.29	1816.44
14 End	-1374.30	81.50	3656.05
15 Start	-1367.50	159.00	3656.05
15 End	-1367.72	63.23	5211.89
16 Start	-1362.09	139.18	5211.89
16 End	-1367.46	47.05	6515.44
17 Start	-1362.71	123.23	6515.44
17 End	-1372.89	34.29	7617.92
18 Start	-1368.73	112.18	7617.92
18 End	-1383.55	25.94	8584.72
19 Start	-1379.95	103.07	8584.72
19 End	-1399.31	18.95	9438.60
20 Start	-1396.08	96.88	9438.60
20 End	-1376.72	12.75	10205.74
21 Start	-1373.87	89.52	10205.74
21 End	-1359.05	3.29	10855.34
22 Start	-1356.67	80.44	10855.34
22 End	-1346.48	-8.51	11358.82
23 Start	-1344.86	66.59	11358.82
23 End	-1339.49	-25.54	11646.17
24 Start	-1338.84	48.98	11646.17
24 End	-1338.62	-46.79	11661.54
25 Start	-1339.12	28.90	11661.54
25 End	-1344.61	-70.89	11367.63
26 Start	-1346.47	4.87	11367.63
26 End	-1358.13	-99.40	10706.39
27 Start	-1361.55	-23.95	10706.39
27 End	-1379.85	-133.20	9606.52
28 Start	-1385.16	-55.43	9606.52
28 End	-1411.04	-169.67	8030.94
29 Start	-1418.35	-90.04	8030.94
29 End	-1452.60	-209.61	5933.42
30 Start	-1461.99	-128.71	5933.42
30 End	-1505.40	-253.61	3256.53
31 Start	-1517.36	-167.84	3256.53
31 End	-1570.93	-297.71	0.00

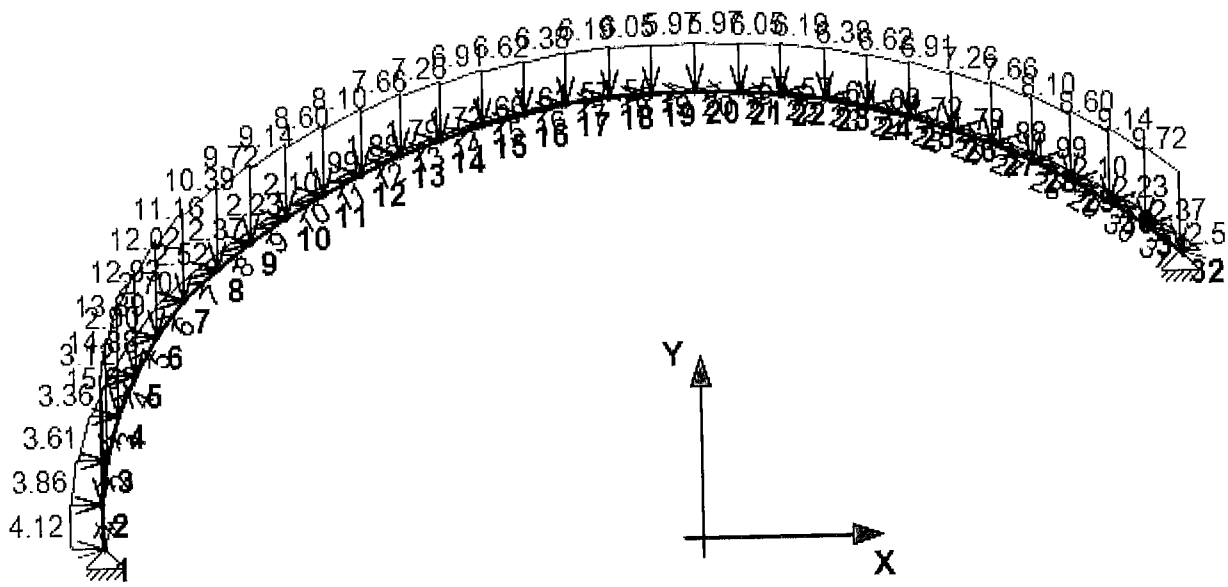
Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	736.87	2605.73	
32	-1076.43	1182.26	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Model



EngiLab Beam.2D 2018 Analysis Report
Model: "S-1L.bea"
Report created: Wednesday, 02 November 2022, 15:05:36

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0000
2	-0.0002	-0.0002	0.0000
3	0.0001	-0.0005	0.0000
4	0.0008	-0.0008	-0.0001
5	0.0016	-0.0013	0.0000
6	0.0018	-0.0015	0.0000
7	0.0012	-0.0012	0.0001
8	0.0000	0.0000	0.0001

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-67.10	-5.06	0.00
1 End	-60.33	-6.66	-84.04
2 Start	-60.67	1.89	-84.04
2 End	-53.51	-1.01	-77.70
3 Start	-53.12	6.51	-77.70
3 End	-45.65	2.27	-14.74
4 Start	-44.88	8.66	-14.74
4 End	-37.26	2.75	67.12
5 Start	-36.50	7.96	67.12
5 End	-28.96	0.20	125.68
6 Start	-28.64	4.28	125.68
6 End	-21.57	-5.41	117.60
7 Start	-22.12	-2.32	117.60
7 End	-15.81	-14.07	0.00

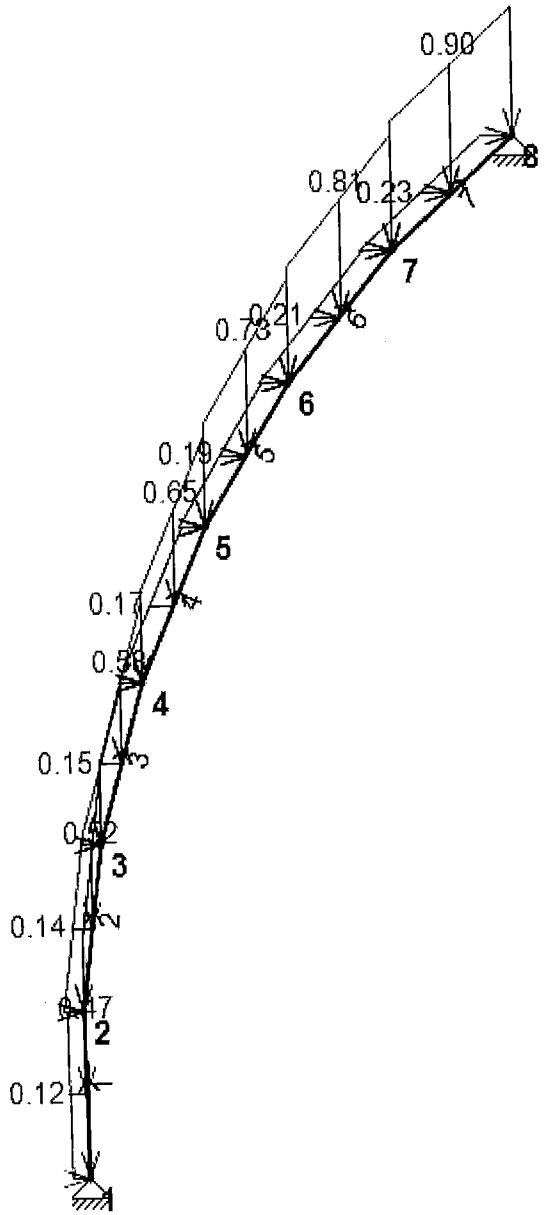
Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	3.80	67.19	
8	-21.16	-0.33	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Model



EngiLab Beam.2D 2018 Analysis Report
Model: "S-2L.bea"
Report created: Wednesday, 02 November 2022, 15:04:47

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0009
2	-0.0123	-0.0007	0.0008
3	-0.0207	-0.0002	0.0004
4	-0.0229	0.0000	-0.0001
5	-0.0189	-0.0022	-0.0005
6	-0.0102	-0.0079	-0.0009
7	0.0002	-0.0169	-0.0010
8	0.0096	-0.0277	-0.0009
9	0.0162	-0.0368	-0.0006
10	0.0192	-0.0418	-0.0002
11	0.0183	-0.0408	0.0004
12	0.0140	-0.0329	0.0009
13	0.0073	-0.0186	0.0013
14	0.0000	0.0000	0.0015

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-145.13	-36.30	0.00
1 End	-138.36	-37.90	-532.09
2 Start	-142.31	-18.06	-532.09
2 End	-135.15	-20.96	-812.03
3 Start	-136.75	-1.79	-812.03
3 End	-129.28	-6.03	-868.14
4 Start	-128.85	12.20	-868.14
4 End	-121.23	6.29	-735.57
5 Start	-119.14	23.26	-735.57
5 End	-111.60	15.50	-457.45
6 Start	-108.30	31.09	-457.45
6 End	-101.22	21.40	-81.16
7 Start	-97.21	35.43	-81.16
7 End	-90.90	23.68	343.01
8 Start	-88.14	32.47	343.01
8 End	-82.72	19.21	704.51
9 Start	-81.50	23.87	704.51
9 End	-76.29	9.00	934.65
10 Start	-75.68	13.22	934.65
10 End	-71.03	-3.22	1004.64
11 Start	-71.10	0.78	1004.64
11 End	-66.98	-17.26	889.29
12 Start	-67.85	-13.47	889.29
12 End	-64.57	-33.16	562.95
13 Start	-66.31	-29.53	562.95
13 End	-63.97	-50.95	0.00

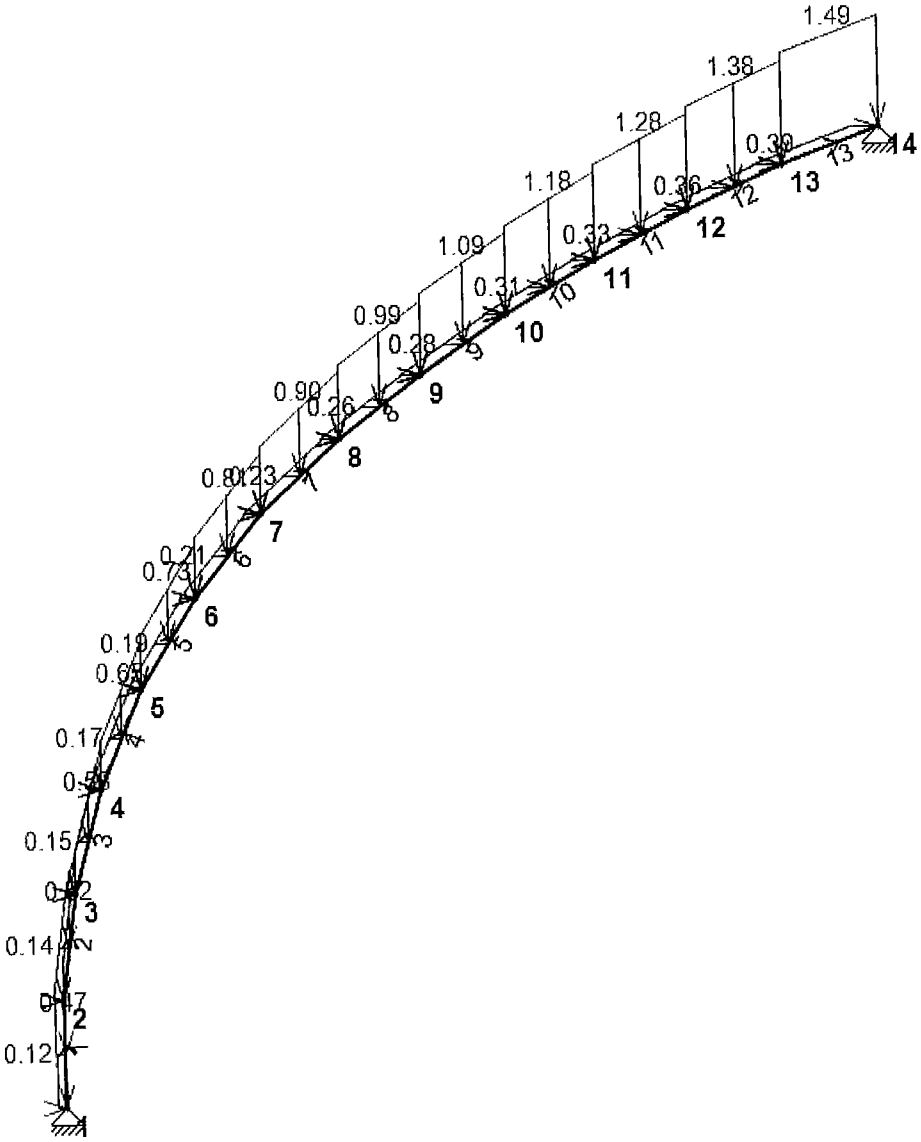
Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	33.56	145.79	
14	-77.93	24.78	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Model


1.49
1.38
1.28
1.18
1.09
0.99
0.90
0.80
0.73
0.65
0.17
0.15
0.14
0.12
0.39
0.36
0.33
0.31
0.28
0.26
0.23
0.21
0.19
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EngiLab Beam.2D 2018 Analysis Report
Model: "S-3L.bea"
Report created: Wednesday, 02 November 2022, 15:04:03

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0047
2	-0.0652	-0.0020	0.0043
3	-0.1196	0.0039	0.0032
4	-0.1549	0.0125	0.0018
5	-0.1679	0.0172	0.0001
6	-0.1600	0.0116	-0.0015
7	-0.1362	-0.0089	-0.0028
8	-0.1039	-0.0451	-0.0038
9	-0.0697	-0.0915	-0.0043
10	-0.0362	-0.1427	-0.0043
11	-0.0072	-0.1932	-0.0039
12	0.0151	-0.2374	-0.0031
13	0.0292	-0.2702	-0.0020
14	0.0352	-0.2875	-0.0006
15	0.0342	-0.2858	0.0009
16	0.0280	-0.2636	0.0024
17	0.0190	-0.2209	0.0038
18	0.0098	-0.1596	0.0050
19	0.0029	-0.0839	0.0058
20	0.0000	0.0000	0.0061

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-234.72	-95.87	0.00
1 End	-227.95	-97.46	-1386.43
2 Start	-239.39	-64.44	-1386.43
2 End	-232.23	-67.34	-2331.73
3 Start	-239.38	-34.09	-2331.73
3 End	-231.91	-38.33	-2851.05
4 Start	-234.99	-5.36	-2851.05
4 End	-227.38	-11.26	-2970.27
5 Start	-226.70	20.80	-2970.27
5 End	-219.16	13.04	-2727.44
6 Start	-215.13	43.83	-2727.44
6 End	-208.05	34.13	-2168.50
7 Start	-201.18	63.07	-2168.50
7 End	-194.87	51.32	-1347.60
8 Start	-188.91	70.16	-1347.60
8 End	-183.49	56.90	-458.82
9 Start	-179.97	67.21	-458.82
9 End	-174.76	52.34	378.28
10 Start	-171.59	61.95	378.28
10 End	-166.94	45.52	1130.59

11 Start	-164.11	54.84	1130.59
11 End	-160.00	36.80	1771.97
12 Start	-157.68	45.73	1771.97
12 End	-154.40	26.04	2274.28
13 Start	-152.72	34.56	2274.28
13 End	-150.38	13.14	2607.94
14 Start	-149.41	21.58	2607.94
14 End	-148.16	-1.24	2750.31
15 Start	-147.99	7.13	2750.31
15 End	-148.10	-17.19	2679.91
16 Start	-148.82	-8.92	2679.91
16 End	-150.33	-34.35	2377.05
17 Start	-152.02	-25.91	2377.05
17 End	-154.96	-52.06	1831.38
18 Start	-157.67	-43.17	1831.38
18 End	-162.30	-69.97	1039.42
19 Start	-165.95	-60.81	1039.42
19 End	-172.20	-87.73	0.00

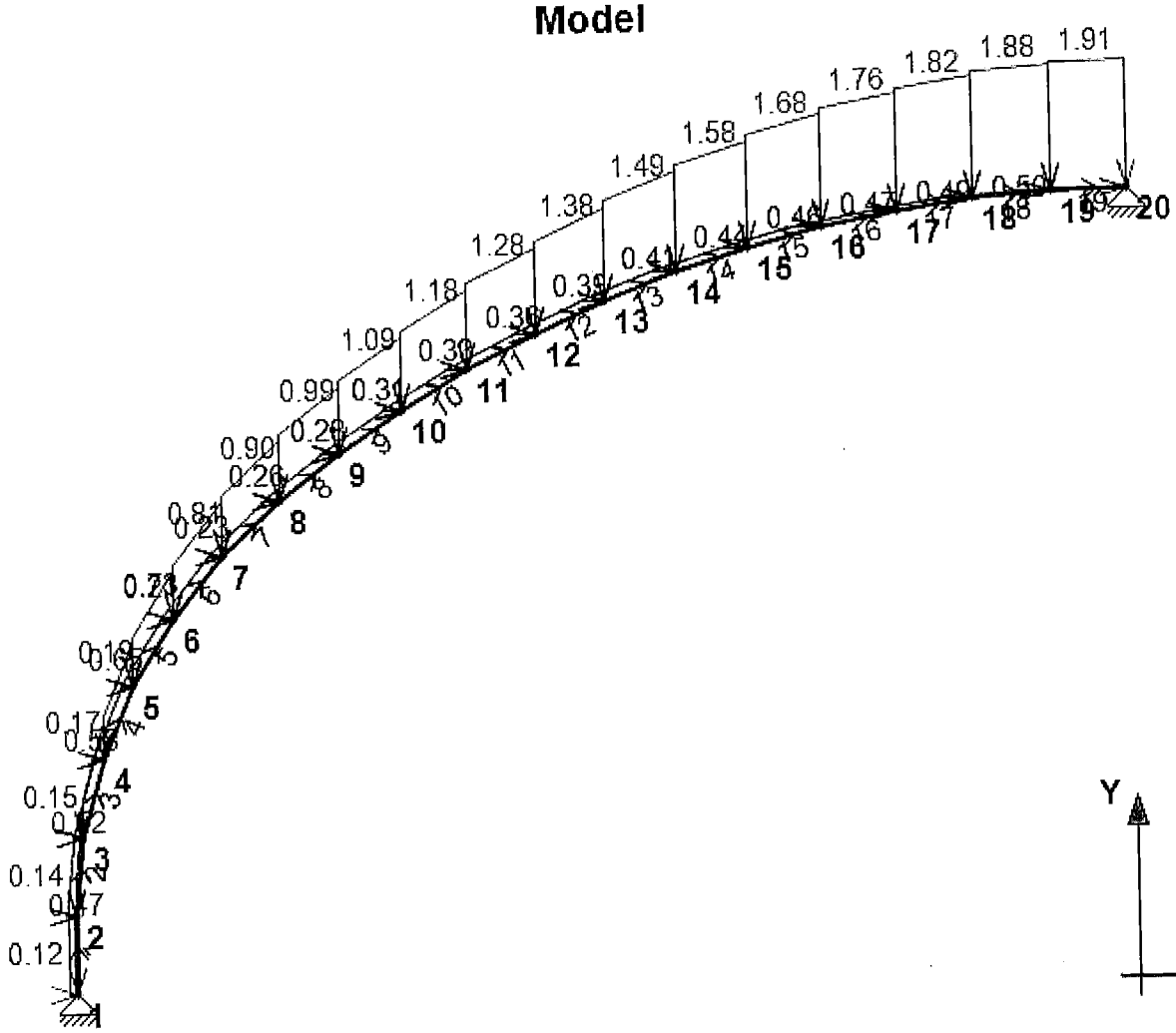
Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	91.43	236.48	
20	-174.58	82.89	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Model


1.91
1.88
1.82
1.76
1.68
1.58
1.49
1.38
1.28
1.18
1.09
0.99
0.90
0.81
0.12
0.14
0.15
0.17
0.41
0.44
0.46
0.50
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Y

EngiLab Beam.2D 2018 Analysis Report
Model: "S-4L.bea"
Report created: Wednesday, 02 November 2022, 15:03:16

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0127
2	-0.1793	-0.0044	0.0121
3	-0.3395	0.0142	0.0102
4	-0.4642	0.0467	0.0076
5	-0.5447	0.0799	0.0045
6	-0.5799	0.1000	0.0012
7	-0.5757	0.0952	-0.0020
8	-0.5430	0.0582	-0.0048
9	-0.4941	-0.0084	-0.0069
10	-0.4348	-0.0990	-0.0084
11	-0.3721	-0.2071	-0.0093
12	-0.3119	-0.3255	-0.0096
13	-0.2586	-0.4466	-0.0092
14	-0.2153	-0.5625	-0.0084
15	-0.1832	-0.6657	-0.0070
16	-0.1624	-0.7494	-0.0052
17	-0.1516	-0.8076	-0.0032
18	-0.1484	-0.8359	-0.0009
19	-0.1495	-0.8313	0.0015
20	-0.1514	-0.7927	0.0040
21	-0.1502	-0.7207	0.0063
22	-0.1423	-0.6176	0.0084
23	-0.1247	-0.4876	0.0103
24	-0.0954	-0.3364	0.0117
25	-0.0537	-0.1711	0.0126
26	0.0000	0.0000	0.0129

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-304.08	-162.47	0.00
1 End	-297.31	-164.07	-2341.73
2 Start	-317.43	-120.62	-2341.73
2 End	-310.27	-123.53	-4093.18
3 Start	-324.53	-78.77	-4093.18
3 End	-317.06	-83.01	-5253.38
4 Start	-325.58	-37.63	-5253.38
4 End	-317.96	-43.54	-5835.54
5 Start	-320.93	1.58	-5835.54
5 End	-313.38	-6.18	-5868.49
6 Start	-311.12	38.09	-5868.49
6 End	-304.05	28.40	-5391.79
7 Start	-297.03	70.89	-5391.79
7 End	-290.72	59.15	-4458.53

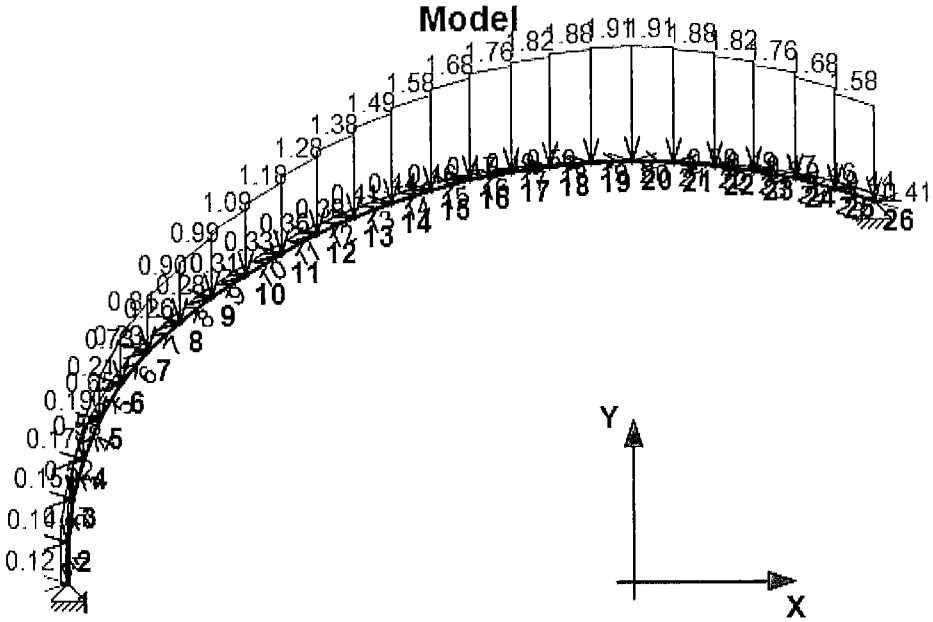
8 Start	-283.53	87.33	-4458.53
8 End	-278.11	74.08	-3329.44
9 Start	-273.46	89.73	-3329.44
9 End	-268.26	74.85	-2177.07
10 Start	-263.69	89.62	-2177.07
10 End	-259.04	73.19	-1037.45
11 Start	-254.51	87.64	-1037.45
11 End	-250.40	69.60	63.12
12 Start	-246.09	83.56	63.12
12 End	-242.81	63.87	1094.98
13 Start	-238.90	77.24	1094.98
13 End	-236.56	55.82	2025.68
14 Start	-233.05	69.03	2025.68
14 End	-231.80	46.22	2832.47
15 Start	-228.82	59.24	2832.47
15 End	-228.92	34.92	3491.64
16 Start	-226.63	47.59	3491.64
16 End	-228.14	22.17	3979.96
17 Start	-226.55	34.86	3979.96
17 End	-229.49	8.71	4284.93
18 Start	-228.63	21.73	4284.93
18 End	-233.27	-5.07	4401.55
19 Start	-233.18	7.95	4401.55
19 End	-239.43	-18.97	4324.45
20 Start	-240.12	-5.60	4324.45
20 End	-233.87	-32.51	4057.75
21 Start	-235.32	-19.42	4057.75
21 End	-230.68	-46.22	3598.32
22 Start	-232.94	-33.05	3598.32
22 End	-229.99	-59.19	2952.74
23 Start	-232.93	-46.28	2952.74
23 End	-231.42	-71.70	2127.01
24 Start	-235.05	-58.72	2127.01
24 End	-234.95	-83.03	1134.61
25 Start	-239.26	-69.63	1134.61
25 End	-240.51	-92.45	0.00

Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	156.72	307.09	
26	-201.09	161.09	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF


Model
Y
X

EngiLab Beam.2D 2018 Analysis Report
Model: "S-5L.bea"
Report created: Wednesday, 02 November 2022, 15:02:13

Node Displacements

Node ID	X-Displacement	Y-Displacement	Z-Rotation
1	0.0000	0.0000	0.0226
2	-0.3206	-0.0072	0.0218
3	-0.6158	0.0279	0.0194
4	-0.8620	0.0929	0.0159
5	-1.0451	0.1698	0.0117
6	-1.1608	0.2385	0.0070
7	-1.2138	0.2803	0.0024
8	-1.2166	0.2817	-0.0019
9	-1.1856	0.2386	-0.0056
10	-1.1311	0.1549	-0.0086
11	-1.0623	0.0361	-0.0109
12	-0.9875	-0.1111	-0.0126
13	-0.9136	-0.2790	-0.0135
14	-0.8459	-0.4590	-0.0138
15	-0.7884	-0.6425	-0.0135
16	-0.7435	-0.8208	-0.0126
17	-0.7117	-0.9856	-0.0113
18	-0.6922	-1.1296	-0.0094
19	-0.6834	-1.2467	-0.0073
20	-0.6819	-1.3317	-0.0048
21	-0.6842	-1.3814	-0.0022
22	-0.6862	-1.3937	0.0005
23	-0.6835	-1.3683	0.0032
24	-0.6721	-1.3063	0.0058
25	-0.6483	-1.2103	0.0083
26	-0.6091	-1.0842	0.0105
27	-0.5523	-0.9329	0.0125
28	-0.4769	-0.7619	0.0141
29	-0.3827	-0.5771	0.0154
30	-0.2704	-0.3848	0.0163
31	-0.1420	-0.1905	0.0169
32	0.0000	0.0000	0.0170

Sign convention: Positive according to Global Axes
Displacements reported with 4 decimal places
Rotations (in Radians) reported with 4 decimal places
Background color: Free DOF Constrained DOF Spring DOF

Element End Forces

Element ID	Axial Force	Shear Force	Bending Moment
1 Start	-338.67	-209.37	0.00
1 End	-331.90	-210.96	-3014.28
2 Start	-358.27	-162.19	-3014.28
2 End	-351.11	-165.09	-5362.02
3 Start	-370.80	-114.19	-5362.02
3 End	-363.33	-118.43	-7030.27
4 Start	-376.36	-66.19	-7030.27
4 End	-368.75	-72.10	-8022.22

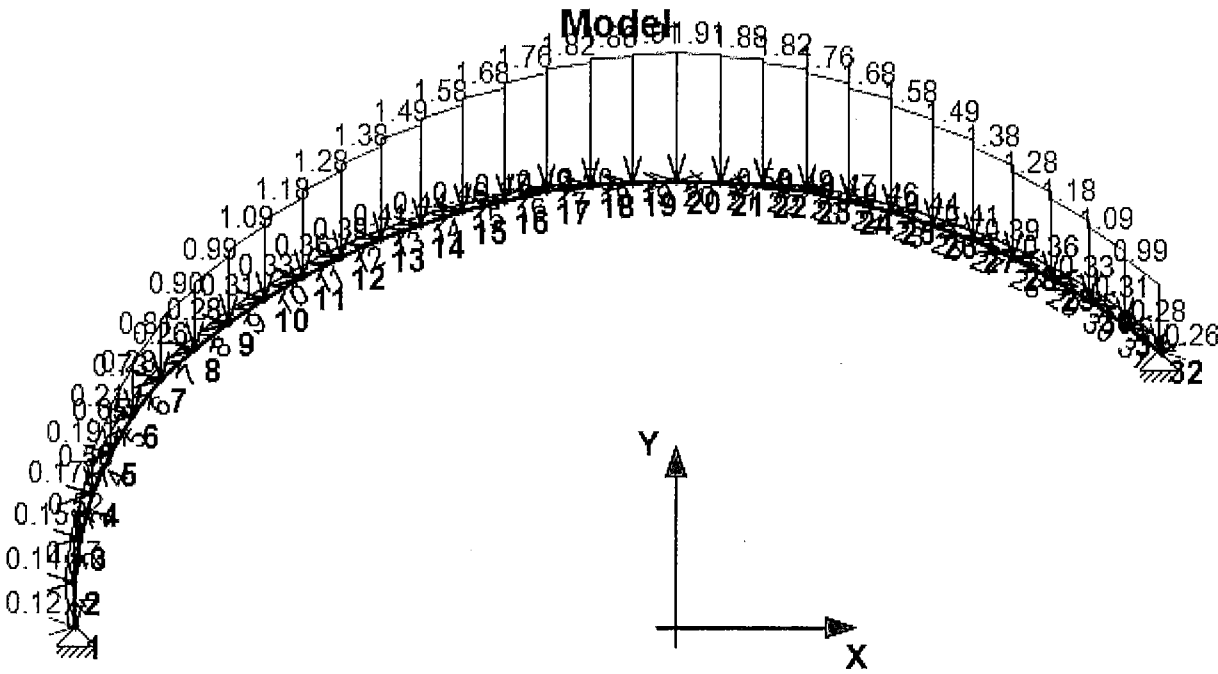
5	Start	-375.22	-19.56	-8022.22
5	End	-367.68	-27.32	-8358.59
6	Start	-367.86	24.82	-8358.59
6	End	-360.78	15.12	-8072.24
7	Start	-355.07	65.73	-8072.24
7	End	-348.76	53.99	-7213.05
8	Start	-341.80	87.88	-7213.05
8	End	-336.38	74.63	-6076.29
9	Start	-331.60	93.58	-6076.29
9	End	-326.40	78.71	-4870.00
10	Start	-321.53	96.69	-4870.00
10	End	-316.88	80.26	-3631.39
11	Start	-311.86	97.95	-3631.39
11	End	-307.75	79.91	-2386.46
12	Start	-302.77	97.08	-2386.46
12	End	-299.49	77.39	-1165.36
13	Start	-294.74	93.88	-1165.36
13	End	-292.40	72.46	-1.85
14	Start	-287.86	88.79	-1.85
14	End	-286.62	65.97	1081.54
15	Start	-282.43	82.06	1081.54
15	End	-282.54	57.74	2060.25
16	Start	-278.89	73.36	2060.25
16	End	-280.40	47.94	2909.28
17	Start	-277.29	63.50	2909.28
17	End	-280.24	37.35	3615.17
18	Start	-277.66	53.21	3615.17
18	End	-282.30	26.41	4172.41
19	Start	-280.39	42.11	4172.41
19	End	-286.64	15.20	4573.42
20	Start	-285.35	31.14	4573.42
20	End	-279.10	4.22	4820.89
21	Start	-278.43	19.78	4820.89
21	End	-273.79	-7.01	4910.28
22	Start	-273.75	8.54	4910.28
22	End	-270.80	-17.60	4846.85
23	Start	-271.36	-2.48	4846.85
23	End	-269.85	-27.90	4634.25
24	Start	-270.98	-12.85	4634.25
24	End	-270.88	-37.17	4284.10
25	Start	-272.55	-21.81	4284.10
25	End	-273.79	-44.63	3819.06
26	Start	-275.87	-29.15	3819.06
26	End	-278.21	-50.57	3261.39
27	Start	-280.58	-35.07	3261.39
27	End	-283.86	-54.76	2632.68
28	Start	-286.49	-38.72	2632.68
28	End	-290.60	-56.76	1964.39
29	Start	-293.34	-40.32	1964.39
29	End	-297.99	-56.76	1284.81
30	Start	-300.68	-40.14	1284.81
30	End	-305.88	-55.02	618.53
31	Start	-308.51	-37.58	618.53
31	End	-313.93	-50.84	0.00

Sign convention: According to the diagrams' sign convention
Axial force: Positive when member is in tension
Shear force: Positive when it rotates the member clockwise
Bending moment: Positive when the "bottom" fiber is in tension ("top" fiber in compression)
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Normal DOF Hinge DOF

Support Reactions

Node ID	X-Force	Y-Force	Z-Moment
1	202.95	342.55	
32	-220.31	229.35	

Sign convention: Positive according to Global Axes
Forces reported with 2 decimal places
Bending moments reported with 2 decimal places
Background color: Free DOF Constrained DOF Spring DOF



UNFACTORED REACTIONS FROM BEAM 2D ANALYSIS ACTING ON THE HEADWALL TO BE APPLIED TO THE SAP 3D MODEL:

(from earth load)

SECTION I			
Reactions/inch			
Reactions/TRIBUTARY LENGTH			
Reactions perpendicular to structure			
SECTION II			
Reactions/inch			
Reactions/TRIBUTARY LENGTH			
Reactions perpendicular to structure			
SECTION III			
Reactions/inch			
Reactions/TRIBUTARY LENGTH			
Reactions perpendicular to structure			
SECTION IV			
Reactions/inch			
Reactions/TRIBUTARY LENGTH			
Reactions perpendicular to structure			
SECTION V			
Reactions/inch			
Reactions/TRIBUTARY LENGTH			
Reactions perpendicular to structure			

top

H1 (lbs)	V1 (lbs)	
366	111.9	
10221	3129	(2.33')
3496	3129	
H2 (lbs)	V2 (lbs)	
773	10	
21617	281	(2.33')
7393	281	
H3 (lbs)	V3 (lbs)	
1125	193	
31449	5396	(2.33')
10756	5396	
H4 (lbs)	V4 (lbs)	
1128	578	
31544	16172	(2.33')
10789	16172	
H1 (lbs)	V1 (lbs)	
1076	1182	
30097	33056	(2.33')
10294	33056	

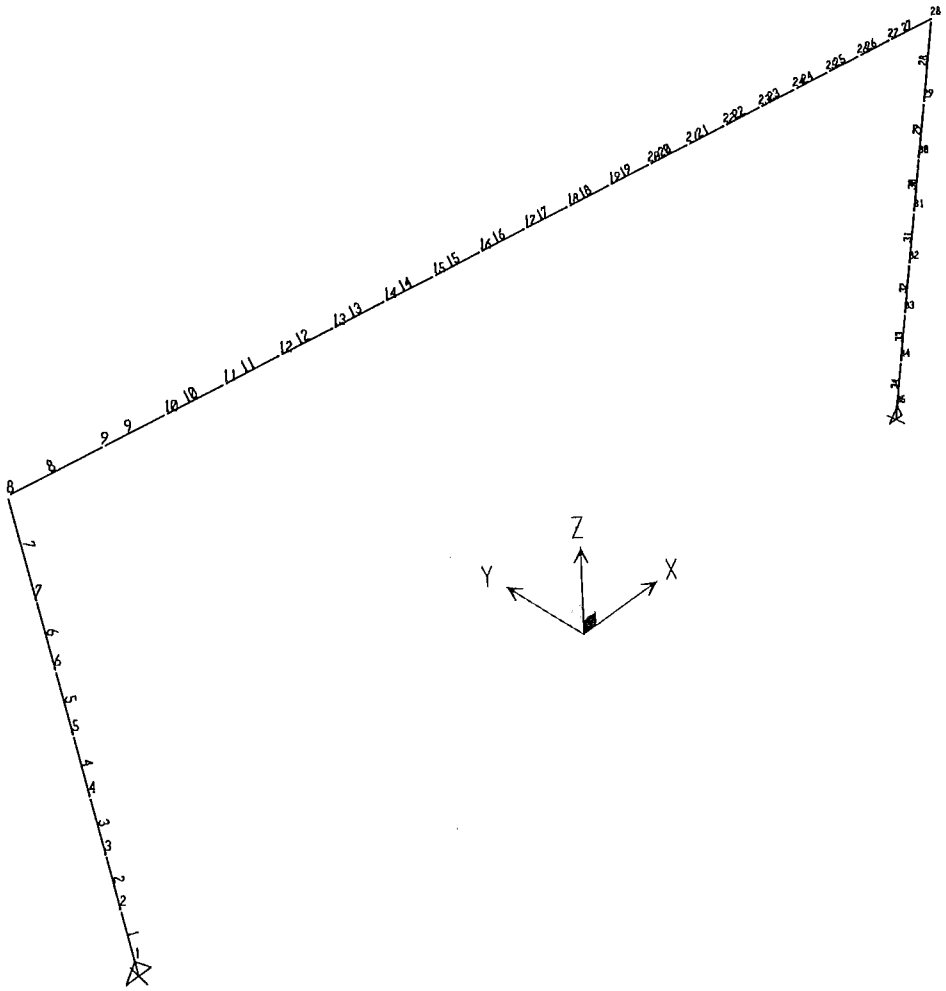
UNFACTORED REACTIONS FROM BEAM 2D ANALYSIS ACTING ON THE HEADWALL TO BE APPLIED TO THE SAP 3D MODEL:

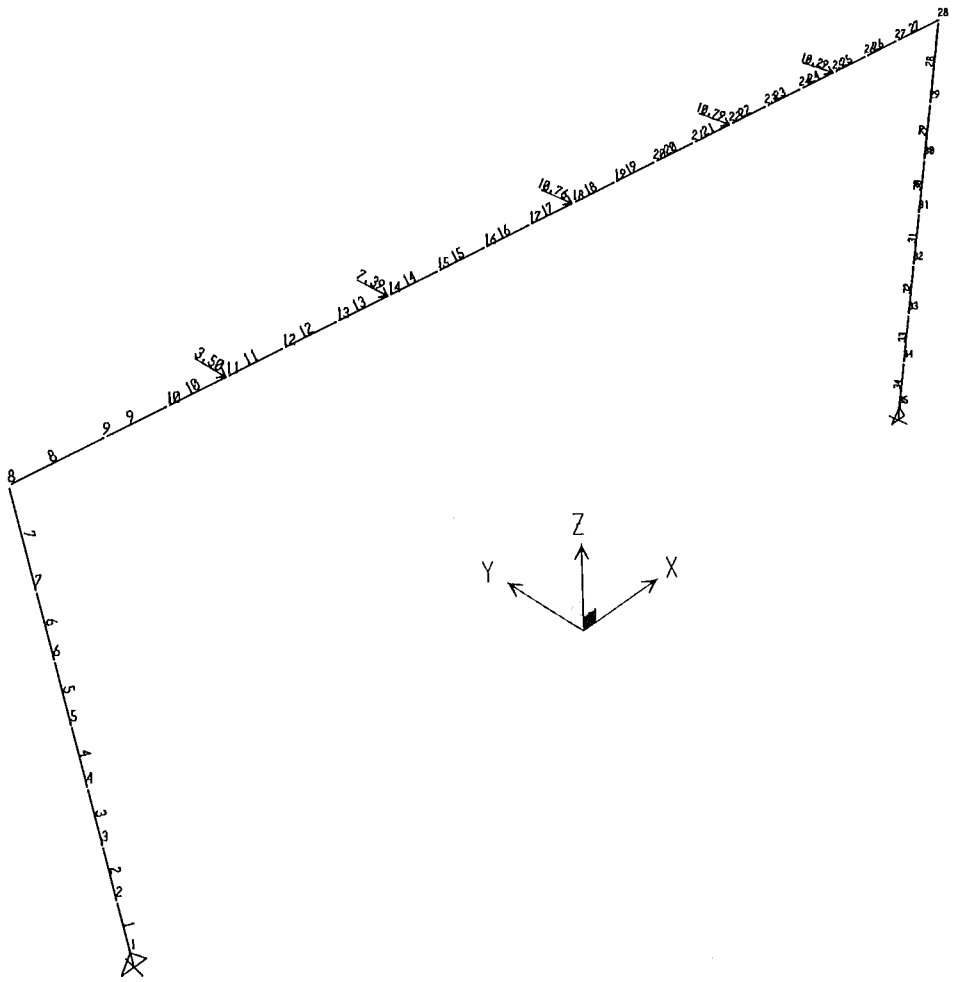
(from live load)

SECTION I
Reactions/inch
Reactions/TRIBUTARY LENGTH
Reactions perpendicular to structure
SECTION II
Reactions/inch
Reactions/TRIBUTARY LENGTH
Reactions perpendicular to structure
SECTION III
Reactions/inch
Reactions/TRIBUTARY LENGTH
Reactions perpendicular to structure
SECTION IV
Reactions/inch
Reactions/TRIBUTARY LENGTH
Reactions perpendicular to structure
SECTION V
Reactions/inch
Reactions/TRIBUTARY LENGTH
Reactions perpendicular to structure

top

H1 (lbs)	V1 (lbs)	
21	0.3	
592	9	(2.33')
202	9	
H2 (lbs)	V2 (lbs)	
78	25	
2179	693	(2.33')
745	693	
H3 (lbs)	V3 (lbs)	
175	83	
4881	2318	(2.33')
1669	2318	
H4 (lbs)	V4 (lbs)	
201	161	
5622	4504	(2.33')
1923	4504	
H1 (lbs)	V1 (lbs)	
220	229	
6160	6413	(2.33')
2107	6413	


Z
Y
X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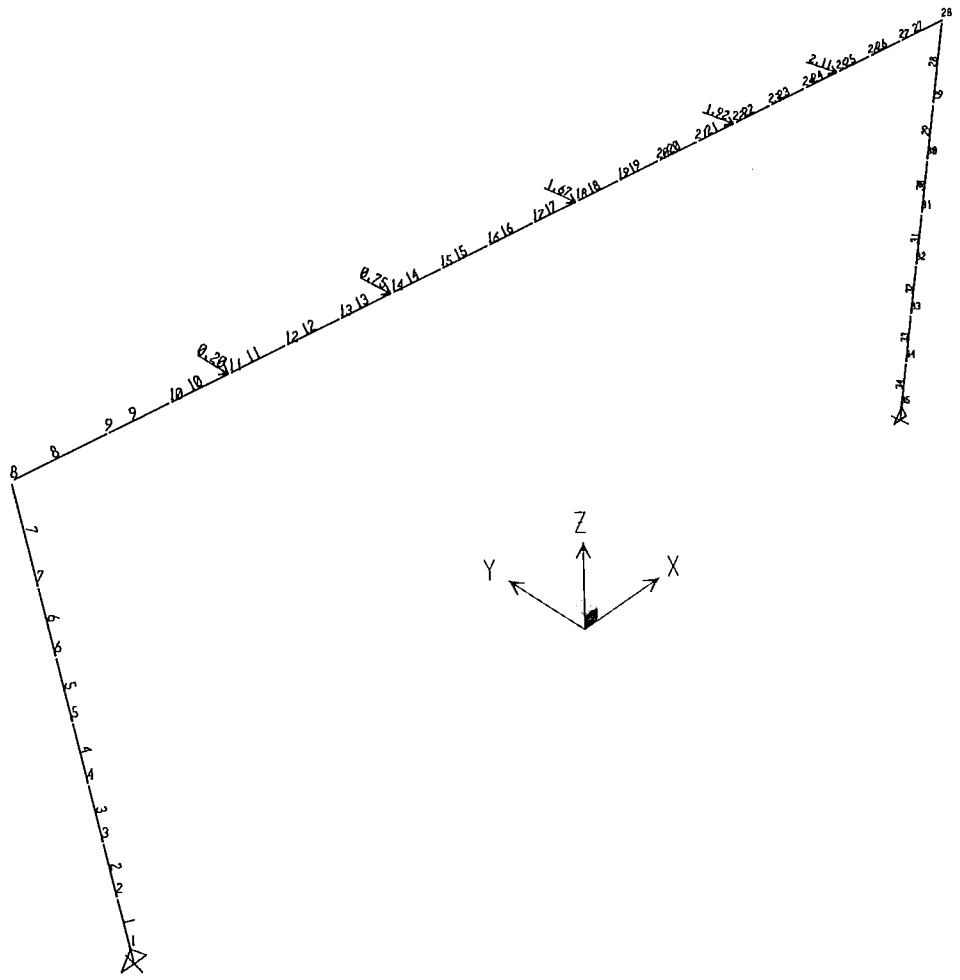
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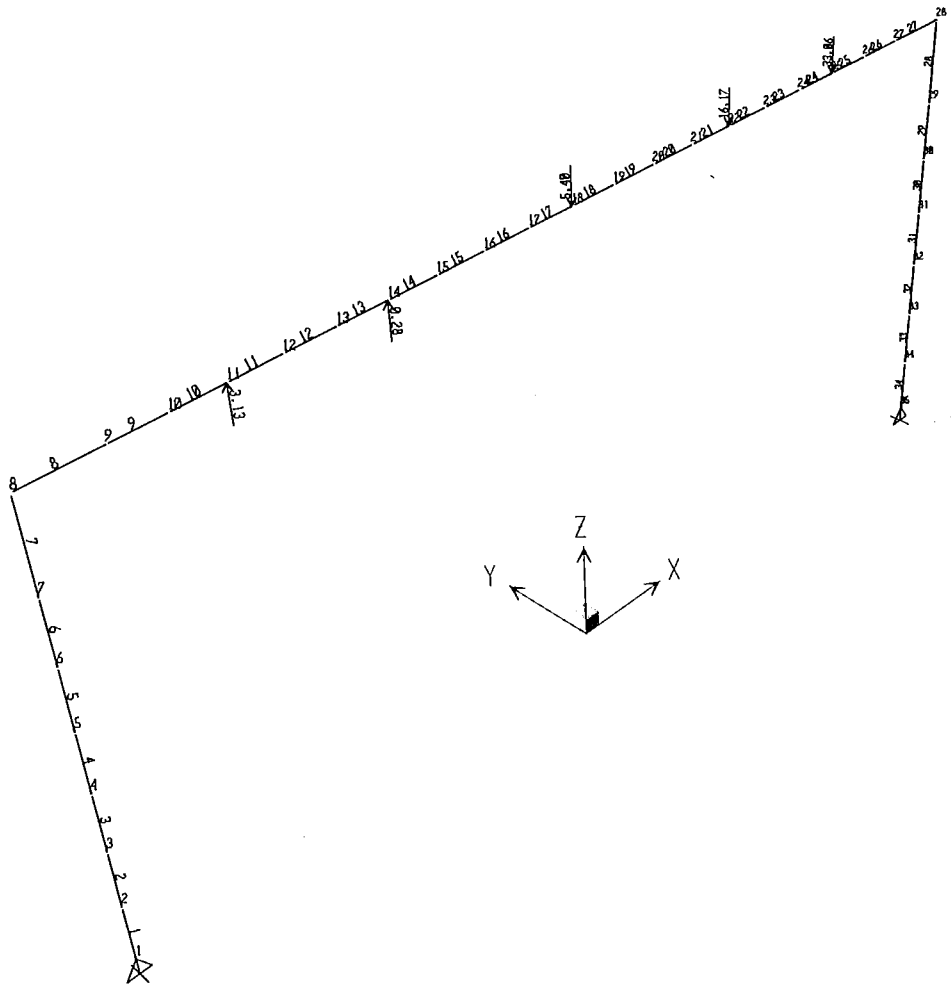
X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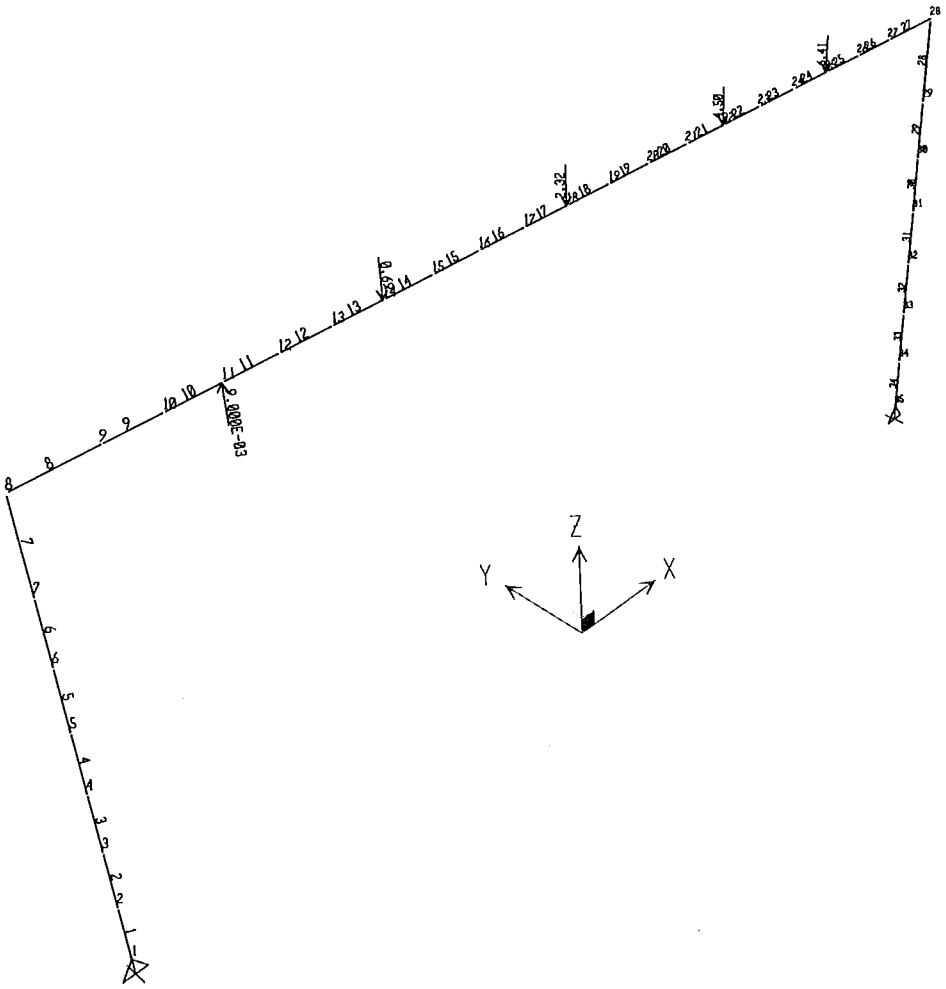
Y
X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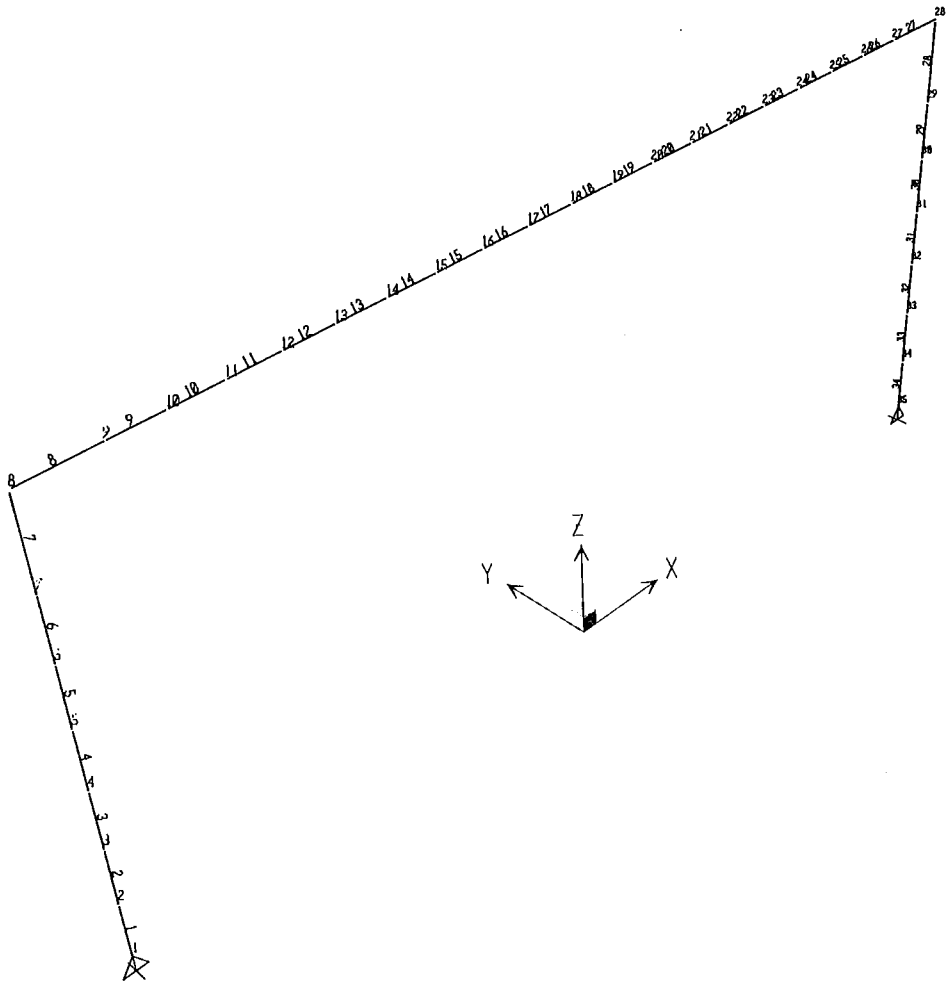
Y
X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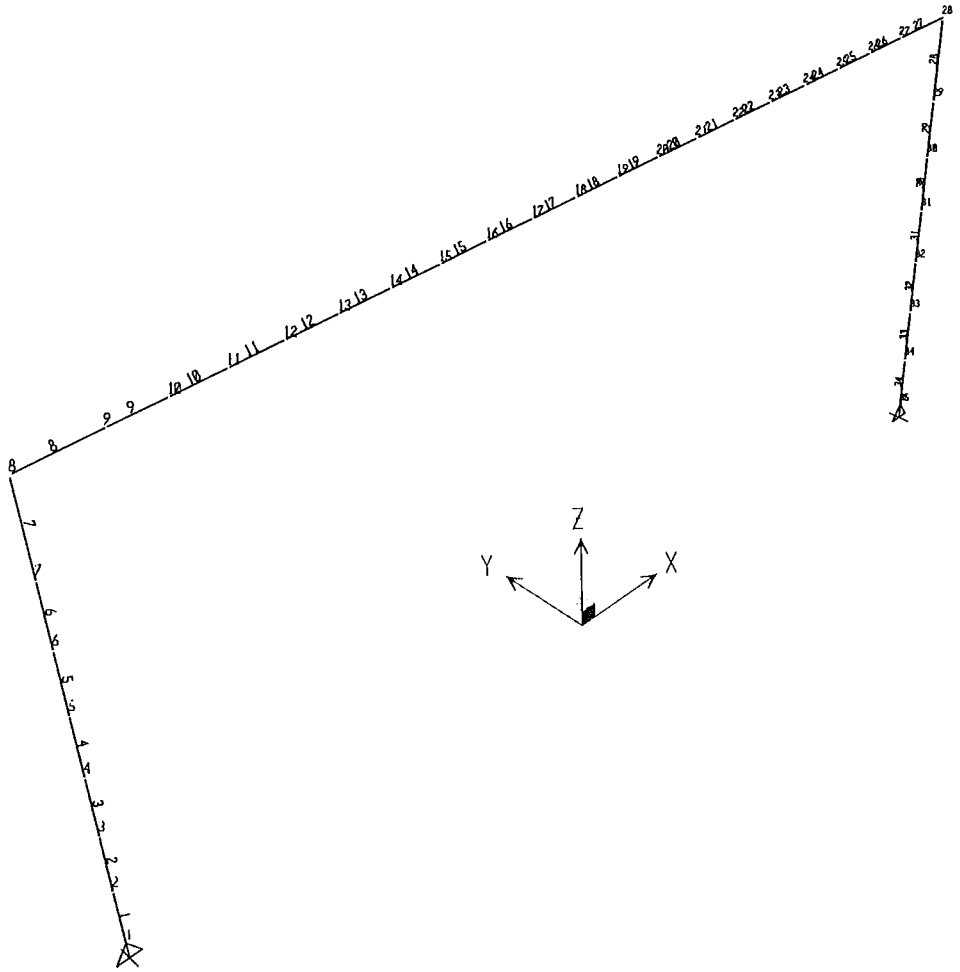
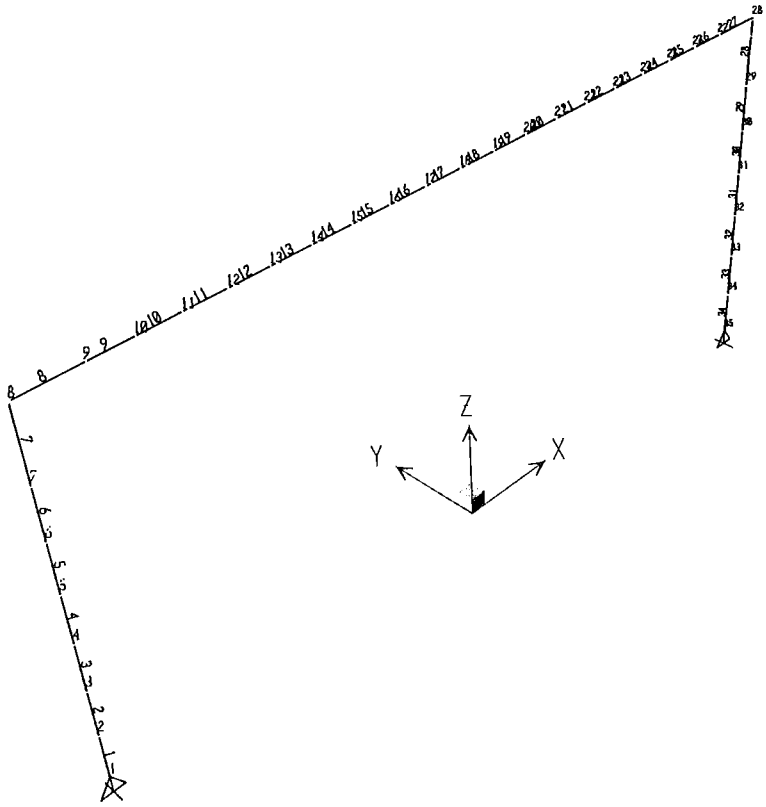
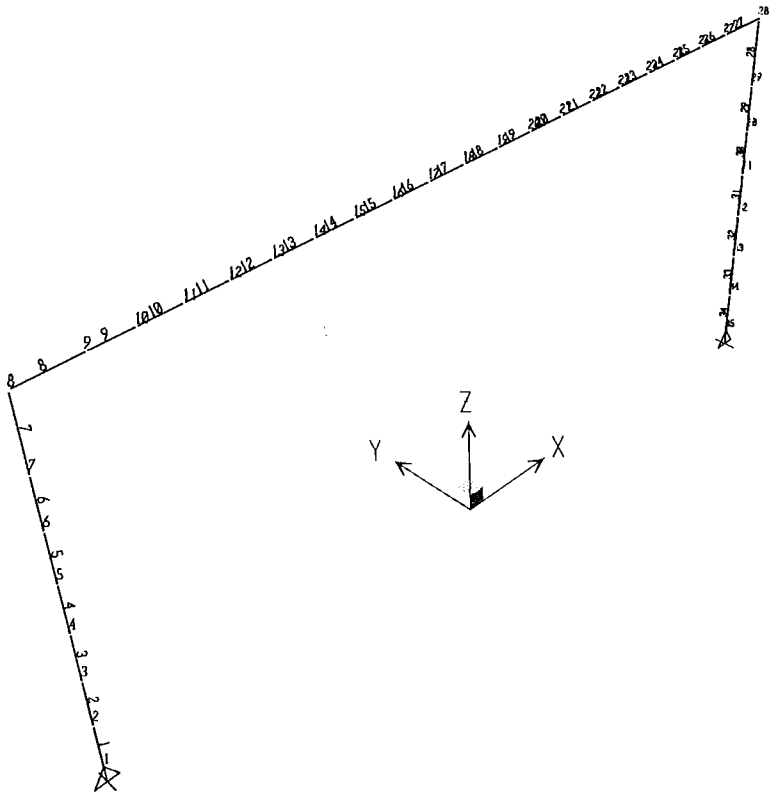
Y
X


Z
Y
X


Z
Y
X


Z
Y
X

L O A D C O M B I N A T I O N M U L T I P L I E R S

COMBO	TYPE	CASE	FACTOR	TYPE	TITLE
STRENGTH	ADD				STRENGTH
		LOAD1	1.2500	STATIC(DEAD)	
		HORZETH	1.5000	STATIC(DEAD)	
		HORZLL	1.7500	STATIC(DEAD)	
		VERTETH	1.5000	STATIC(DEAD)	
		VERTLL	1.7500	STATIC(DEAD)	
		SOIL	1.5000	STATIC(DEAD)	
		LIVE	1.7500	STATIC(DEAD)	
SERVICE	ADD				SERVICE
		LOAD1	1.0000	STATIC(DEAD)	
		HORZETH	1.0000	STATIC(DEAD)	
		HORZLL	1.0000	STATIC(DEAD)	
		VERTETH	1.0000	STATIC(DEAD)	
		VERTLL	1.0000	STATIC(DEAD)	
		SOIL	1.0000	STATIC(DEAD)	
		LIVE	1.0000	STATIC(DEAD)	

F R A M E E L E M E N T F O R C E S

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
1	STRENGTH	0.00	-109.65	-11.26	-77.24	-156.56	-959.46	0.00
		1.25	-107.54	-11.26	-71.92	-156.56	-866.28	14.08
		2.50	-105.43	-11.26	-66.93	-156.56	-779.54	28.15
1	SERVICE	0.00	-84.02	-8.14	-49.78	-100.52	-614.38	0.00
		1.25	-82.34	-8.14	-46.29	-100.52	-554.37	10.18
		2.50	-80.65	-8.14	-43.02	-100.52	-498.58	20.36
2	STRENGTH	0.00	-105.43	-11.26	-66.93	-156.56	-779.54	28.15
		1.25	-103.32	-11.26	-62.26	-156.56	-698.83	42.23
		2.50	-101.21	-11.26	-57.93	-156.56	-623.74	56.31
2	SERVICE	0.00	-80.65	-8.14	-43.02	-100.52	-498.58	20.36
		1.25	-78.96	-8.14	-39.97	-100.52	-446.73	30.54
		2.50	-77.27	-8.14	-37.14	-100.52	-398.56	40.72
3	STRENGTH	0.00	-101.21	-11.26	-57.93	-156.56	-623.74	56.31
		1.25	-99.10	-11.26	-53.93	-156.56	-553.86	70.39
		2.50	-96.99	-11.26	-50.25	-156.56	-488.78	84.46
3	SERVICE	0.00	-77.27	-8.14	-37.14	-100.52	-398.56	40.72
		1.25	-75.59	-8.14	-34.53	-100.52	-353.79	50.89
		2.50	-73.90	-8.14	-32.14	-100.52	-312.15	61.07
4	STRENGTH	0.00	-96.99	-11.26	-50.25	-156.56	-488.78	84.46
		1.25	-94.88	-11.26	-46.91	-156.56	-428.09	98.54
		2.50	-92.77	-11.26	-43.89	-156.56	-371.37	112.62
4	SERVICE	0.00	-73.90	-8.14	-32.14	-100.52	-312.15	61.07
		1.25	-72.21	-8.14	-29.97	-100.52	-273.36	71.25
		2.50	-70.52	-8.14	-28.01	-100.52	-237.14	81.43
5	STRENGTH	0.00	-92.77	-11.26	-43.89	-156.56	-371.37	112.62
		1.25	-90.66	-11.26	-41.21	-156.56	-318.22	126.70
		2.50	-88.55	-11.26	-38.85	-156.56	-268.22	140.77
5	SERVICE	0.00	-70.52	-8.14	-28.01	-100.52	-237.14	81.43
		1.25	-68.84	-8.14	-26.28	-100.52	-203.23	91.61
		2.50	-67.15	-8.14	-24.77	-100.52	-171.35	101.79
6	STRENGTH	0.00	-88.55	-11.26	-38.85	-156.56	-268.22	140.77
		1.25	-86.44	-11.26	-36.82	-156.56	-220.97	154.85
		2.50	-84.33	-11.26	-35.12	-156.56	-176.04	168.93
6	SERVICE	0.00	-67.15	-8.14	-24.77	-100.52	-171.35	101.79
		1.25	-65.46	-8.14	-23.47	-100.52	-141.22	111.97
		2.50	-63.77	-8.14	-22.40	-100.52	-112.57	122.15
7	STRENGTH	0.00	-84.33	-11.26	-35.12	-156.56	-176.04	168.93
		1.75	-81.38	-11.26	-33.20	-156.56	-116.33	188.64
		3.50	-78.43	-11.26	-31.74	-156.56	-59.58	208.34
7	SERVICE	0.00	-63.77	-8.14	-22.40	-100.52	-112.57	122.15
		1.75	-61.41	-8.14	-21.20	-100.52	-74.47	136.40
		3.50	-59.05	-8.14	-20.31	-100.52	-38.19	150.65
8	STRENGTH	0.00	-11.26	-78.43	34.99	59.58	156.56	-208.34
		1.44	-11.26	-74.58	32.16	59.58	108.30	-98.37
		2.88	-11.26	-70.74	29.33	59.58	64.10	6.09
8	SERVICE	0.00	-8.14	-59.05	22.39	38.19	100.52	-150.65
		1.44	-8.14	-55.97	20.61	38.19	69.62	-67.98
		2.88	-8.14	-52.90	18.83	38.19	41.27	10.27
9	STRENGTH	0.00	-11.26	-70.74	32.82	59.58	64.10	6.09
		1.00	-11.26	-68.07	30.85	59.58	32.26	75.49
		2.00	-11.26	-65.39	28.88	59.58	2.39	142.22
9	SERVICE	0.00	-8.14	-52.90	21.06	38.19	41.27	10.27

F R A M E E L E M E N T F O R C E S

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
		1.00	-8.14	-50.76	19.82	38.19	20.83	62.10
		2.00	-8.14	-48.62	18.58	38.19	1.63	111.79
10	STRENGTH							
		0.00	-11.26	-65.39	32.54	59.58	2.39	142.22
		1.00	-11.26	-62.72	30.57	59.58	-29.17	206.28
		2.00	-11.26	-60.05	28.61	59.58	-58.76	267.66
10	SERVICE							
		0.00	-8.14	-48.62	20.92	38.19	1.63	111.79
		1.00	-8.14	-46.48	19.69	38.19	-18.68	159.34
		2.00	-8.14	-44.34	18.45	38.19	-37.75	204.75
11	STRENGTH							
		0.00	-11.26	-64.75	26.84	59.58	-58.76	267.66
		1.00	-11.26	-62.08	24.87	59.58	-84.61	331.08
		2.00	-11.26	-59.41	22.90	59.58	-108.50	391.82
11	SERVICE							
		0.00	-8.14	-47.48	17.20	38.19	-37.75	204.75
		1.00	-8.14	-45.34	15.96	38.19	-54.33	251.16
		2.00	-8.14	-43.20	14.72	38.19	-69.67	295.44
12	STRENGTH							
		0.00	-11.26	-59.41	26.90	59.58	-108.50	391.82
		1.00	-11.26	-56.73	24.93	59.58	-134.41	449.89
		2.00	-11.26	-54.06	22.96	59.58	-158.35	505.29
12	SERVICE							
		0.00	-8.14	-43.20	17.28	38.19	-69.67	295.44
		1.00	-8.14	-41.06	16.04	38.19	-86.33	337.57
		2.00	-8.14	-38.92	14.80	38.19	-101.76	377.56
13	STRENGTH							
		0.00	-11.26	-54.06	27.11	59.58	-158.35	505.29
		1.00	-11.26	-51.39	25.14	59.58	-184.48	558.01
		2.00	-11.26	-48.71	23.18	59.58	-208.64	608.06
13	SERVICE							
		0.00	-8.14	-38.92	17.46	38.19	-101.76	377.56
		1.00	-8.14	-36.79	16.22	38.19	-118.60	415.42
		2.00	-8.14	-34.65	14.99	38.19	-134.20	451.13
14	STRENGTH							
		0.00	-11.26	-47.92	15.08	59.58	-208.64	608.06
		1.00	-11.26	-45.25	13.11	59.58	-222.73	654.65
		2.00	-11.26	-42.57	11.14	59.58	-234.86	698.56
14	SERVICE							
		0.00	-8.14	-34.23	9.60	38.19	-134.20	451.13
		1.00	-8.14	-32.10	8.36	38.19	-143.18	484.30
		2.00	-8.14	-29.96	7.12	38.19	-150.92	515.32
15	STRENGTH							
		0.00	-11.26	-42.57	15.56	59.58	-234.86	698.56
		1.00	-11.26	-39.90	13.60	59.58	-249.44	739.79
		2.00	-11.26	-37.23	11.63	59.58	-262.05	778.36
15	SERVICE							
		0.00	-8.14	-29.96	9.95	38.19	-150.92	515.32
		1.00	-8.14	-27.82	8.71	38.19	-160.26	544.21
		2.00	-8.14	-25.68	7.48	38.19	-168.35	570.96
16	STRENGTH							
		0.00	-11.26	-37.23	16.16	59.58	-262.05	778.36
		1.00	-11.26	-34.55	14.19	59.58	-277.23	814.25
		2.00	-11.26	-31.88	12.22	59.58	-290.43	847.46
16	SERVICE							
		0.00	-8.14	-25.68	10.38	38.19	-168.35	570.96
		1.00	-8.14	-23.54	9.14	38.19	-178.11	595.57
		2.00	-8.14	-21.40	7.90	38.19	-186.63	618.04
17	STRENGTH							
		0.00	-11.26	-31.88	16.84	59.58	-290.43	847.46
		1.00	-11.26	-29.20	14.87	59.58	-306.29	878.00
		2.00	-11.26	-26.53	12.90	59.58	-320.18	905.87
17	SERVICE							
		0.00	-8.14	-21.40	10.86	38.19	-186.63	618.04
		1.00	-8.14	-19.26	9.62	38.19	-196.87	638.37
		2.00	-8.14	-17.12	8.38	38.19	-205.87	656.56
18	STRENGTH							
		0.00	-11.26	-14.38	-1.47	59.58	-320.18	905.87
		1.00	-11.26	-11.71	-3.44	59.58	-317.73	918.92

F R A M E E L E M E N T F O R C E S

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
		2.00	-11.26	-9.03	-5.41	59.58	-313.30	929.29
18	SERVICE							
		0.00	-8.14	-9.41	-1.05	38.19	-205.87	656.56
		1.00	-8.14	-7.27	-2.29	38.19	-204.20	664.90
		2.00	-8.14	-5.13	-3.52	38.19	-201.30	671.10
19	STRENGTH							
		0.00	-11.26	-9.03	-6.892E-01	59.58	-313.30	929.29
		1.00	-11.26	-6.36	-2.66	59.58	-311.63	936.98
		2.00	-11.26	-3.69	-4.63	59.58	-307.99	942.00
19	SERVICE							
		0.00	-8.14	-5.13	-5.034E-01	38.19	-201.30	671.10
		1.00	-8.14	-2.99	-1.74	38.19	-200.17	675.16
		2.00	-8.14	-8.522E-01	-2.98	38.19	-197.81	677.08
20	STRENGTH							
		0.00	-11.26	-3.69	1.029E-01	59.58	-307.99	942.00
		1.00	-11.26	-1.01	-1.87	59.58	-307.11	944.35
		2.00	-11.26	1.66	-3.83	59.58	-304.26	944.03
20	SERVICE							
		0.00	-8.14	-8.522E-01	4.773E-02	38.19	-197.81	677.08
		1.00	-8.14	1.29	-1.19	38.19	-197.24	676.86
		2.00	-8.14	3.43	-2.43	38.19	-195.43	674.51
21	STRENGTH							
		0.00	-11.26	1.66	8.813E-01	59.58	-304.26	944.03
		1.00	-11.26	4.34	-1.09	59.58	-304.16	941.03
		2.00	-11.26	7.01	-3.05	59.58	-302.08	935.36
21	SERVICE							
		0.00	-8.14	3.43	5.900E-01	38.19	-195.43	674.51
		1.00	-8.14	5.56	-6.479E-01	38.19	-195.40	670.01
		2.00	-8.14	7.70	-1.89	38.19	-194.14	663.38
22	STRENGTH							
		0.00	-11.26	39.15	-17.93	59.58	-302.08	935.36
		1.00	-11.26	41.82	-19.90	59.58	-283.17	894.87
		2.00	-11.26	44.50	-21.86	59.58	-262.29	851.71
22	SERVICE							
		0.00	-8.14	28.38	-11.60	38.19	-194.14	663.38
		1.00	-8.14	30.52	-12.84	38.19	-181.91	633.93
		2.00	-8.14	32.66	-14.08	38.19	-168.45	602.34
23	STRENGTH							
		0.00	-11.26	44.50	-17.25	59.58	-262.29	851.71
		1.00	-11.26	47.17	-19.22	59.58	-244.06	805.88
		2.00	-11.26	49.84	-21.19	59.58	-223.85	757.37
23	SERVICE							
		0.00	-8.14	32.66	-11.13	38.19	-168.45	602.34
		1.00	-8.14	34.80	-12.37	38.19	-156.71	568.61
		2.00	-8.14	36.94	-13.60	38.19	-143.72	532.75
24	STRENGTH							
		0.00	-11.26	49.84	-16.66	59.58	-223.85	757.37
		1.00	-11.26	52.52	-18.63	59.58	-206.21	706.19
		2.00	-11.26	55.19	-20.60	59.58	-186.60	652.33
24	SERVICE							
		0.00	-8.14	36.94	-10.71	38.19	-143.72	532.75
		1.00	-8.14	39.07	-11.94	38.19	-132.40	494.74
		2.00	-8.14	41.21	-13.18	38.19	-119.83	454.60
25	STRENGTH							
		0.00	-11.26	116.00	-35.30	59.58	-186.60	652.33
		1.00	-11.26	118.67	-37.27	59.58	-150.32	535.00
		2.00	-11.26	121.35	-39.23	59.58	-112.07	414.99
25	SERVICE							
		0.00	-8.14	80.68	-22.75	38.19	-119.83	454.60
		1.00	-8.14	82.82	-23.99	38.19	-96.46	372.84
		2.00	-8.14	84.96	-25.23	38.19	-71.86	288.95
26	STRENGTH							
		0.00	-11.26	121.35	-34.93	59.58	-112.07	414.99
		1.00	-11.26	124.02	-36.90	59.58	-76.15	292.31
		2.00	-11.26	126.69	-38.86	59.58	-38.27	166.95
26	SERVICE							
		0.00	-8.14	84.96	-22.47	38.19	-71.86	288.95
		1.00	-8.14	87.10	-23.71	38.19	-48.77	202.92
		2.00	-8.14	89.24	-24.95	38.19	-24.44	114.75

F R A M E E L E M E N T F O R C E S

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
27	STRENGTH							
		0.00	-11.26	126.69	-34.69	59.58	-38.27	166.95
		1.44	-11.26	130.54	-37.51	59.58	13.62	-17.93
		2.88	-11.26	134.38	-40.34	59.58	69.58	-208.34
27	SERVICE							
		0.00	-8.14	89.24	-22.27	38.19	-24.44	114.75
		1.44	-8.14	92.31	-24.05	38.19	8.86	-15.74
		2.88	-8.14	95.39	-25.83	38.19	44.71	-150.65
28	STRENGTH							
		0.00	-134.38	-11.26	-36.35	69.58	-59.58	-208.34
		1.75	-136.35	-11.26	-37.32	69.58	4.84	-188.64
		3.50	-138.32	-11.26	-38.60	69.58	71.23	-168.93
28	SERVICE							
		0.00	-95.39	-8.14	-23.28	44.71	-38.19	-150.65
		1.75	-96.96	-8.14	-23.87	44.71	3.03	-136.40
		3.50	-98.54	-8.14	-24.67	44.71	45.48	-122.15
29	STRENGTH							
		0.00	-138.32	-11.26	-38.60	69.58	71.23	-168.93
		1.25	-139.72	-11.26	-39.74	69.58	120.17	-154.85
		2.50	-141.13	-11.26	-41.09	69.58	170.67	-140.77
29	SERVICE							
		0.00	-98.54	-8.14	-24.67	44.71	45.48	-122.15
		1.25	-99.66	-8.14	-25.39	44.71	76.75	-111.97
		2.50	-100.79	-8.14	-26.25	44.71	109.01	-101.79
30	STRENGTH							
		0.00	-141.13	-11.26	-41.09	69.58	170.67	-140.77
		1.25	-142.54	-11.26	-42.66	69.58	222.99	-126.70
		2.50	-143.94	-11.26	-44.45	69.58	277.41	-112.62
30	SERVICE							
		0.00	-100.79	-8.14	-26.25	44.71	109.01	-101.79
		1.25	-101.91	-8.14	-27.26	44.71	142.44	-91.61
		2.50	-103.04	-8.14	-28.41	44.71	177.22	-81.43
31	STRENGTH							
		0.00	-143.94	-11.26	-44.45	69.58	277.41	-112.62
		1.25	-145.35	-11.26	-46.46	69.58	334.21	-98.54
		2.50	-146.76	-11.26	-48.69	69.58	393.67	-84.46
31	SERVICE							
		0.00	-103.04	-8.14	-28.41	44.71	177.22	-81.43
		1.25	-104.16	-8.14	-29.72	44.71	213.53	-71.25
		2.50	-105.29	-8.14	-31.16	44.71	251.57	-61.07
32	STRENGTH							
		0.00	-146.76	-11.26	-48.69	69.58	393.67	-84.46
		1.25	-148.16	-11.26	-51.14	69.58	456.04	-70.39
		2.50	-149.57	-11.26	-53.81	69.58	521.62	-56.31
32	SERVICE							
		0.00	-105.29	-8.14	-31.16	44.71	251.57	-61.07
		1.25	-106.41	-8.14	-32.76	44.71	291.50	-50.89
		2.50	-107.54	-8.14	-34.50	44.71	333.52	-40.72
33	STRENGTH							
		0.00	-149.57	-11.26	-53.81	69.58	521.62	-56.31
		1.25	-150.97	-11.26	-56.70	69.58	590.67	-42.23
		2.50	-152.38	-11.26	-59.81	69.58	663.46	-28.15
33	SERVICE							
		0.00	-107.54	-8.14	-34.50	44.71	333.52	-40.72
		1.25	-108.66	-8.14	-36.38	44.71	377.81	-30.54
		2.50	-109.79	-8.14	-38.42	44.71	424.55	-20.36
34	STRENGTH							
		0.00	-152.38	-11.26	-59.81	69.58	663.46	-28.15
		1.25	-153.79	-11.26	-63.14	69.58	740.28	-14.08
		2.50	-155.19	-11.26	-66.68	69.58	821.40	0.00
34	SERVICE							
		0.00	-109.79	-8.14	-38.42	44.71	424.55	-20.36
		1.25	-110.91	-8.14	-40.60	44.71	473.91	-10.18
		2.50	-112.04	-8.14	-42.92	44.71	526.10	0.00

HEADWALL DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)
CONCRETE HEADWALL DESIGN
CBC # 25353

FLEXURAL CRACKING CONTROL:

AASHTO LRFD SPECIFICATIONS SECTION 5.7.3.4 — *TOP BEAM*

Size of the bar #	*#8*	M2-2
Width of the beam,b (in)	*76.00*	
Net design depth,d (in)	*20.38*	
dc(in)	*3.63*	
bar diameter (in)	*1*	
c/s area of the bar(in^2)	*0.79*	
spacing(in)	*7.0*	
no: of bars (n)	*9.0*	
Area of steel,As(in^2)	*7.11*	
fy(kips/in^2)	*60*	
f'c(kips/in^2)	*4000*	
M(ft-kips) (service load moment)	*205.87*	
M(ft-kips) (factored load moment)	*320.2*	
γ e (exposure factor)	*0.75*	
fss (ksi)	*17.5*	
$\beta s = 1 + \frac{dc}{0.7(h - dc)}$	*1.254*	

Note: $sact < 700\gamma e/\beta s.fss - 2\,dc$		
700γe/βs.fss - 2 de	*16.6*	*O.K*

2.0 *CHECK FOR MINIMUM REINFORCEMENT FOR CRACKING CONTROL:*

AASHTO LRFD SPECIFICATION 5.7.3.3.2

Total Depth (in) *24*

fcr(psi)	*Ig(in^4)*	*yt*	*Mcr (ft-k)*
480.0	*87552.0*	*12.0*	*291.8*

Criterion:

φMn ≥ the lesser of Mcr and 1.33 Mu

3.0

	Mu(ft-kips)	*a(in)(assumed)*	*b(in)*	*d(in)*	*As (in^2)*	*a cal(in)*
1.33(Mu)	*425.87*	*1.11*	*76.0*	*20.4*	*4.8*	*1.11*

As provided = 7.1 sq.in

φMn(ft-kips) > 1.33 Mu(ft-Kips) *O.K*

HEADWALL DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)
CONCRETE HEADWALL DESIGN
CBC # 25353

FLEXURAL CRACKING CONTROL:

AASHTO LRFD SPECIFICATIONS SECTION 5.7.3.4 — *TOP BEAM*

Size of the bar #	*#8*	M3-3
Width of the beam,b (in)	*24.00*	
Net design depth,d (in)	*79.56*	
dc(in)	*6.00*	
bar diameter (in)	*1*	
c/s area of the bar(in^2)	*0.79*	
spacing(in)	*6.3*	
no: of bars (n)	*4.0*	
Area of steel,As(in^2)	*6.35*	
fy(kips/in^2)	*60*	
f'c(kips/in^2)	*4000*	
M(ft-kips) (service load moment)	*677.00*	
M(ft-kips) (factored load moment)	*944.0*	
γ e (exposure factor)	*0.75*	
fss (ksi)	*16.4*	
$\beta s = 1 + \frac{dc}{0.7(h - dc)}$	*1.108*	

Note: $sact < 700\gamma e/\beta s.fss - 2\,dc$

700γe/βs.fss - 2 de *16.9* *O.K*

2.0 *CHECK FOR MINIMUM REINFORCEMENT FOR CRACKING CONTROL:*
AASHTO LRFD SPECIFICATION 5.7.3.3.2

Total Depth (in) *85*

fcr(psi)	Ig(in^4)	yt	Mcr (ft-k)
480.0	1228250.0	42.5	1156.0

Criterion:

φMn ≥ the lesser of Mcr and 1.33 Mu

	Mu(ft-kips)	a(in)(assumed)	b(in)	d(in)	As (in^2)	a cal(in)
3.0						
1.33(Mu)	1255.52	2.62	24.0	79.6	3.6	2.62

As provided = *6.3 sq.in*

φMn(ft-kips) > 1.33 Mu(ft-Kips) *O.K*

HEADWALL DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)
CONCRETE HEADWALL DESIGN
CBC # 25353

FLEXURAL CRACKING CONTROL:
AASHTO LRFD SPECIFICATIONS SECTION 5.7.3.4 *END BEAM*

Size of the bar #	*#9*	
Width of the beam,b (in)	*36.0*	M2-2
Net design depth,d (in)	*20.87*	
dc(in)	*3.13*	
bar diameter (in)	*1.128*	
c/s area of the bar(in^2)	*1*	
spacing(in)	*4.5*	
no: of bars (n)	*6.00*	
Area of steel,As(in^2)	*12.00*	
fy(kips/in^2)	*60*	
f'c(kips/in^2)	*4000*	
M(ft-kips, (service load moment)	*526.10*	
M(ft-kips, (factored load moment)	*821.4*	
γ e (exposure factor)	*0.75*	
fss (ksi)	*28.5*	
$\beta s = 1 + \frac{dc}{0.7(h - dc)}$	*1.214*	

Note: $sact < 700\gamma e/\beta s.fss - 2\,dc$		
700γe/βs.fss - 2 de	*8.9*	*O.K*

2.0 CHECK FOR MINIMUM REINFORCEMENT FOR CRACKING CONTROL:
AASHTO LRFD SPECIFICATION 5.7.3.3.2

Total Depth (in) *24*

fcr(psi)	*Ig(in^4)*	*yt*	*Mcr (ft-k)*
480.0	*41472.0*	*12.0*	*138.2*

Criterion:
φMn ≥ the lesser of Mcr and 1.33 Mu

3.0

Mu(ft-kips)	*a(in)(assumed)*	*b(in)*	*d(in)*	*As (in^2)*	*a cal(in)*
821.40	*4.85*	*36.0*	*20.9*	*9.9*	*4.85*

(Mu)

As provided =	*12.0 sq.in*
φMn(ft-kips) > 1.33 Mu(ft-Kips)	*O.K*

HEADWALL DESIGN :

(AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)
CONCRETE HEADWALL DESIGN
CBC # 25353

FLEXURAL CRACKING CONTROL:
AASHTO LRFD SPECIFICATIONS SECTION 5.7.3.4 *END BEAM*

Size of the bar #	#9	
Width of the beam,b (in)	48.0	M2-2
Net design depth,d (in)	20.87	
dc(in)	3.13	
bar diameter (in)	1.128	
c/s area of the bar(in^2)	1	
spacing(in)	4.5	
no: of bars (n)	12.00	
Area of steel,As(in^2)	24.00	
fy(kips/in^2)	60	
f'c(kips/in^2)	4000	
M(ft-kips) (service load moment)	614.40	
M(ft-kips) (factored load moment)	959.5	
γ e (exposure factor)	0.75	
fss (ksi)	16.4	
$\beta s = 1 + \frac{dc}{0.7(h - dc)}$	1.214	

Note: $sact < 700\gamma e/\beta s.fss - 2\,dc$

700γe/βs.fss - 2 de 20.2 O.K

2.0 CHECK FOR MINIMUM REINFORCEMENT FOR CRACKING CONTROL:
AASHTO LRFD SPECIFICATION 5.7.3.3.2

Total Depth (in) 24

fcr(psi)	Ig(in^4)	yt	Mcr (ft-k)
480.0	55296.0	12.0	184.3

Criterion:
φMn ≥ the lesser of Mcr and 1.33 Mu

3.0 (Mu)

Mu(ft-kips)	a(in)(assumed)	b(in)	d(in)	As (in^2)	a cal(in)
959.50	4.17	48.0	20.9	11.3	4.17

As provided = 24.0 sq.in

φMn(ft-kips) > 1.33 Mu(ft-Kips) O.K

CBC Engineers&Associates, Ltd.

125 Westpark Rd.
Centerville, OH 45459

Title : ARROYA
Job # : 25353
Description....
WINGWALL

Dsgnr: CBC

Date: JAN 28,2010

Retain Pro 9 © 1989 - 2011 Ver: 9.27 8171
Registration #: RP-1110505 RP9.27

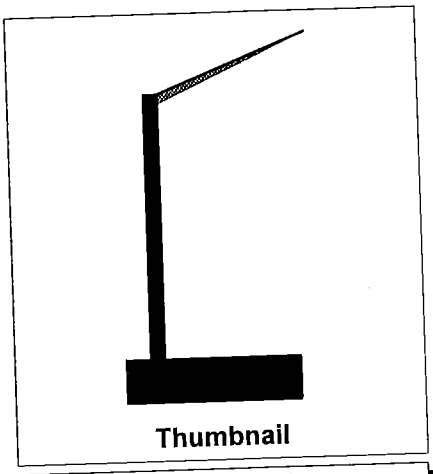
Cantilevered Retaining Wall Design

Criteria

Retained Height	=	18.40 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	3.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	33.9 psf/ft
Toe Active Pressure	=	33.9 psf/ft
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	120.00 pcf
Footing||Soil Friction	=	0.450
Soil height to ignore for passive pressure	=	0.00 in



Surcharge Loads

Surcharge Over Heel = 240.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
The above lateral load has been increased by a factor of		1.00
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	2.73	OK
Sliding	=	1.50	OK
Total Bearing Load	=	37,346 lbs	
...resultant ecc.	=	25.03 in	
Soil Pressure @ Toe	=	4,799 psf	NG Av.
Soil Pressure @ Heel	=	352 psf	OK <4,000
Allowable	=	4,000 psf	
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	6,718 psf	
ACI Factored @ Heel	=	493 psf	
Footing Shear @ Toe	=	0.0 psi	OK
Footing Shear @ Heel	=	41.6 psi	OK
Allowable	=	94.9 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	12,273.9 lbs
less 100% Passive Force	=	- 1,620.0 lbs
less 100% Friction Force	=	- 16,805.8 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Building Code	[illegible]
Dead Load	1.250
Live Load	1.750
Earth, H	1.500
Wind, W	1.000
Seismic, E	1.000

Stem Construction

Top Stem

Stem OK

Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Thickness	=	15.00
Rebar Size	=	# 8
Rebar Spacing	=	6.00
Rebar Placed at	=	Edge

Design Data

fb/FB + fa/Fa	=	0.869
Total Force @ Section	lbs =	10,479.2
Moment....Actual	ft-# =	70,010.8
Moment.....Allowable	=	80,590.1
Shear.....Actual	psi =	69.9
Shear.....Allowable	psi =	94.9
Wall Weight	=	187.5
Rebar Depth 'd'	in =	12.50
LAP SPLICE IF ABOVE	in =	32.31
LAP SPLICE IF BELOW	in =	
HOOK EMBED INTO FTG	in =	13.28

Lap splice above base reduced by stress ratio

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	4,000.0
Fy	psi =	60,000.0

Cantilevered Retaining Wall Design

Footing Dimensions & Strengths

Toe Width	=	2.00 ft
Heel Width	=	12.50
Total Footing Width	=	14.50
Footing Thickness	=	36.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	6,718	493 psf
Mu' : Upward	=	12,864	133,101 ft-#
Mu' : Downward	=	1,260	284,842 ft-#
Mu: Design	=	11,604	151,741 ft-#
Actual 1-Way Shear	=	0.00	41.64 psi
Allow 1-Way Shear	=	94.87	94.87 psi

Toe Reinforcing = # 8 @ 6.00 in
Heel Reinforcing = # 8 @ 6.00 in
Key Reinforcing = None Spec'd

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: #4@ 2.00 in, #5@ 3.00 in, #6@ 4.00 in, #7@ 5.50 in, #8@ 7.25 in, #9@ 9.00 i
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	10,721.3	8.38	89,879.9
Surcharge over Heel	=	1,705.2	12.58	21,442.5
Toe Active Pressure	=	-152.6	1.00	-152.6
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	12,273.9	**O.T.M.** =	111,169.8

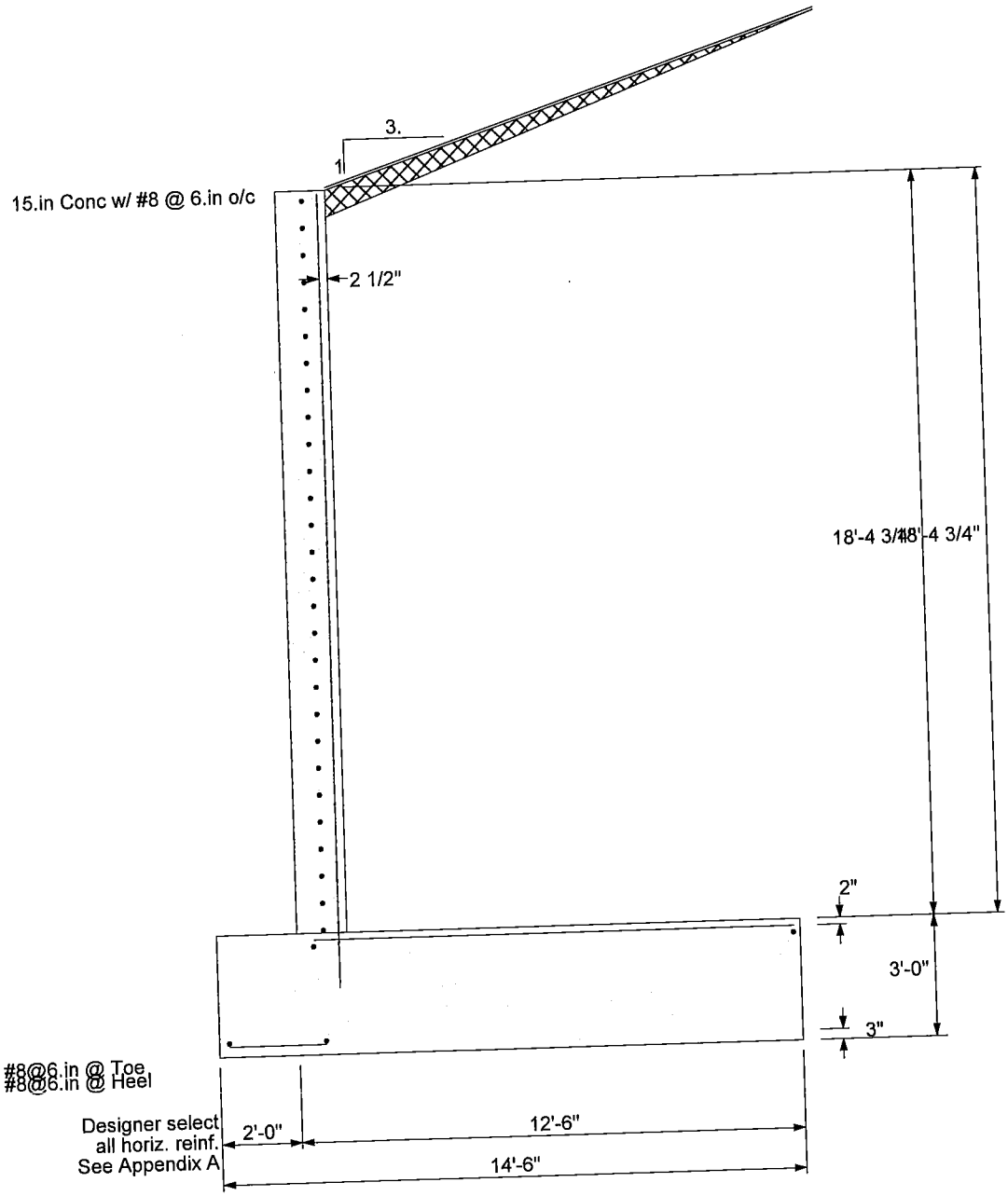
Resisting/Overturning Ratio = **2.73**
Vertical Loads used for Soil Pressure = 37,346.3 lbs

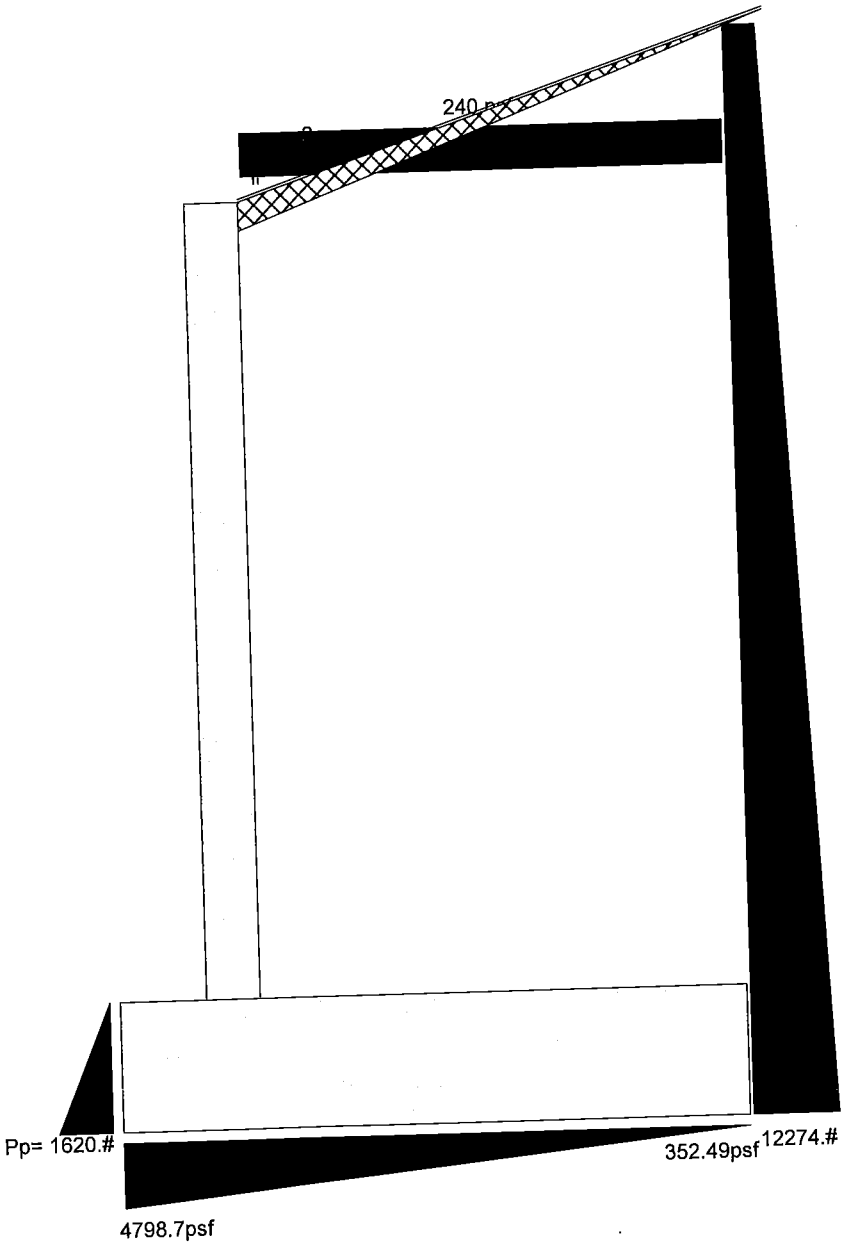
Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	24,840.0	8.88	220,455.0
Sloped Soil Over Heel	=	2,531.3	10.75	27,210.9
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	3,450.0	2.63	9,056.3
Earth @ Stem Transitions	=			
Footing Weight	=	6,525.0	7.25	47,306.3
Key Weight	=			
Vert. Component	=			
Total	=	37,346.3 lbs	**R.M.=**	304,028.4

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

DESIGNER NOTES:


3.
1
15.in Conc w/ #8 @ 6.in o/c
2 1/2"
18'-4 3/4"
18'-4 3/4"
2"
3'-0"
3"
#8@6.in @ Toe
#8@6.in @ Heel
Designer select
all horiz. reinf.
See Appendix A
2'-0"
12'-6"
14'-6"


240 psf
Pp= 1620.#
4798.7psf
352.49psf
12274.#

CBC Engineers&Associates, Ltd.

125 Westpark Rd.
Centerville, OH 45459

Title : ARROYA
Job # : 25353
Description....
WINGWALL

Dsgnr: CBC

Date: JAN 28,2010

Retain Pro 9 © 1989 - 2011 Ver: 9.27 8171
Registration #: RP-1110505 RP9.27

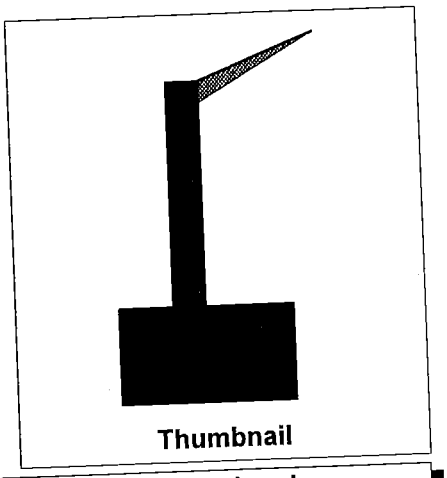
Cantilevered Retaining Wall Design

Criteria

Retained Height	=	7.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	3.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	33.9 psf/ft
Toe Active Pressure	=	33.9 psf/ft
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	120.00 pcf
Footing||Soil Friction	=	0.450
Soil height to ignore for passive pressure	=	0.00 in



Surcharge Loads

Surcharge Over Heel = 240.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
The above lateral load has been increased by a factor of		1.00
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	2.34	OK
Sliding	=	1.81	OK
Total Bearing Load	=	7,179 lbs	
...resultant ecc.	=	12.76 in	
Soil Pressure @ Toe	=	2,188 psf	OK
Soil Pressure @ Heel	=	21 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	3,063 psf	
ACI Factored @ Heel	=	29 psf	
Footing Shear @ Toe	=	0.0 psi	OK
Footing Shear @ Heel	=	11.9 psi	OK
Allowable	=	94.9 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	2,681.0 lbs	
less 100% Passive Force	= -	1,620.0 lbs	
less 100% Friction Force	= -	3,230.4 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	
Dead Load	1.250
Live Load	1.750
Earth, H	1.500
Wind, W	1.000
Seismic, E	1.000

Stem Construction

Top Stem

		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Thickness	=	15.00
Rebar Size	=	# 8
Rebar Spacing	=	6.00
Rebar Placed at	=	Edge

Design Data

fb/FB + fa/Fa	=	0.067
Total Force @ Section	lbs =	1,957.7
Moment....Actual	ft-# =	5,398.6
Moment.....Allowable	=	80,590.1
Shear.....Actual	psi =	13.1
Shear.....Allowable	psi =	94.9
Wall Weight	=	187.5
Rebar Depth 'd'	in =	12.50
LAP SPLICE IF ABOVE	in =	12.00
LAP SPLICE IF BELOW	in =	
HOOK EMBED INTO FTG	in =	13.28

Lap splice above base reduced by stress ratio

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	4,000.0
Fy	psi =	60,000.0

CBC Engineers&Associates, Ltd.

125 Westpark Rd.
Centerville, OH 45459

Title : ARROYA
Job # : 25353
Description....
WINGWALL

Dsgnr: CBC

Date: JAN 28,2010

Retain Pro 9 © 1989 - 2011 Ver: 9.27 8171
Registration #: RP-1110505 RP9.27

Cantilevered Retaining Wall Design

Footing Dimensions & Strengths

Toe Width	=	2.00 ft
Heel Width	=	4.50
Total Footing Width	=	6.50
Footing Thickness	=	36.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	3,063	29 psf
Mu' : Upward	=	5,504	2,825 ft-#
Mu' : Downward	=	1,260	12,080 ft-#
Mu: Design	=	4,244	9,255 ft-#
Actual 1-Way Shear	=	0.00	11.88 psi
Allow 1-Way Shear	=	94.87	94.87 psi
Toe Reinforcing	=	# 8 @ 6.00 in	
Heel Reinforcing	=	# 8 @ 6.00 in	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

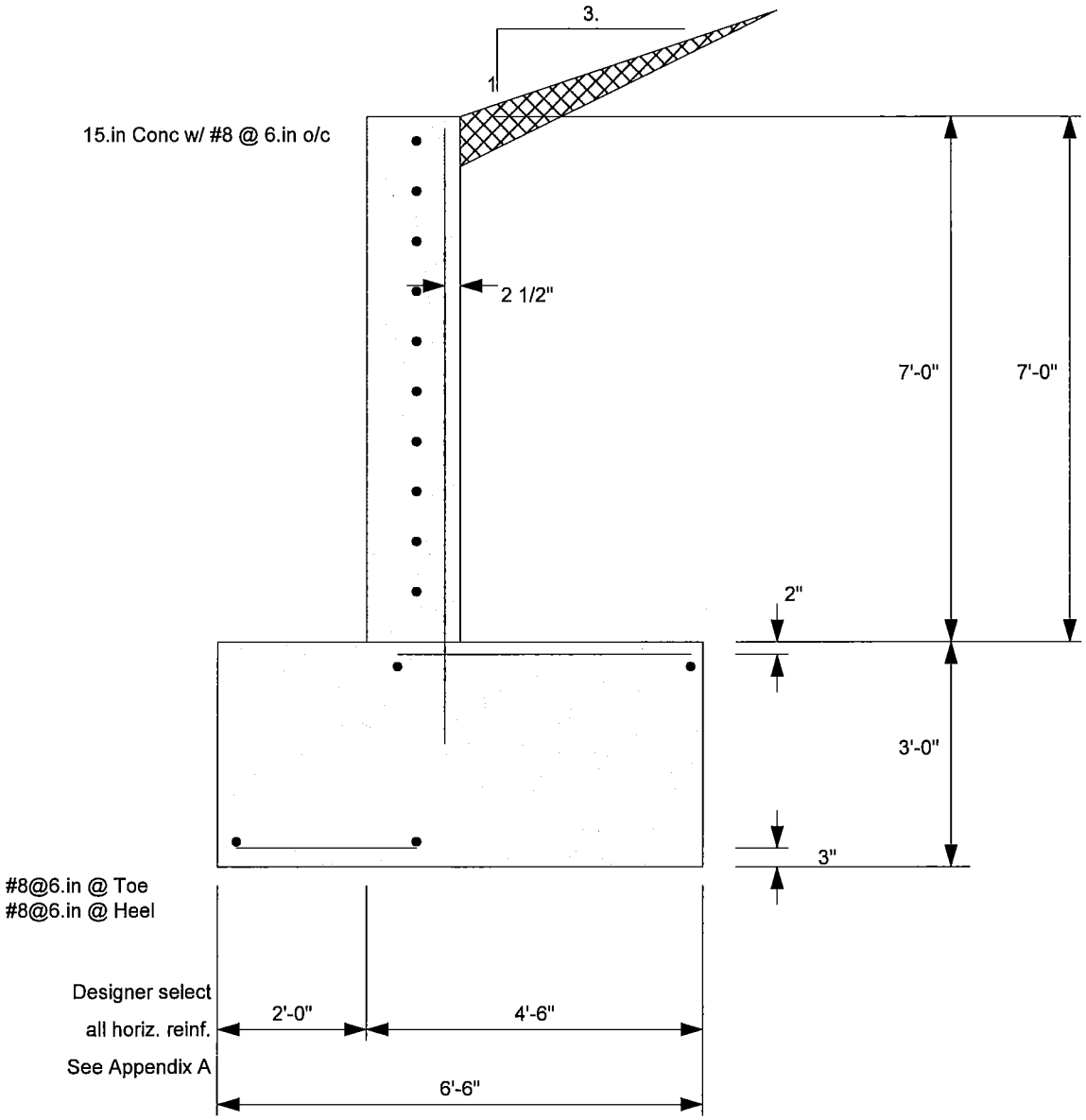
Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	2,082.1	3.69	7,692.4
Surcharge over Heel	=	751.5	5.54	4,164.3
Toe Active Pressure	=	-152.6	1.00	-152.6
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	2,681.0	**O.T.M.** =	11,704.1

Resisting/Overturning Ratio = **2.34**
Vertical Loads used for Soil Pressure = 7,178.8 lbs
Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	2,730.0	4.88	13,308.8
Sloped Soil Over Heel	=	211.3	5.42	1,144.3
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	1,312.5	2.63	3,445.3
Earth @ Stem Transitions	=			
Footing Weight	=	2,925.0	3.25	9,506.3
Key Weight	=			
Vert. Component	=			
Total =		7,178.8 lbs	**R.M.=**	27,404.6

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

DESIGNER NOTES: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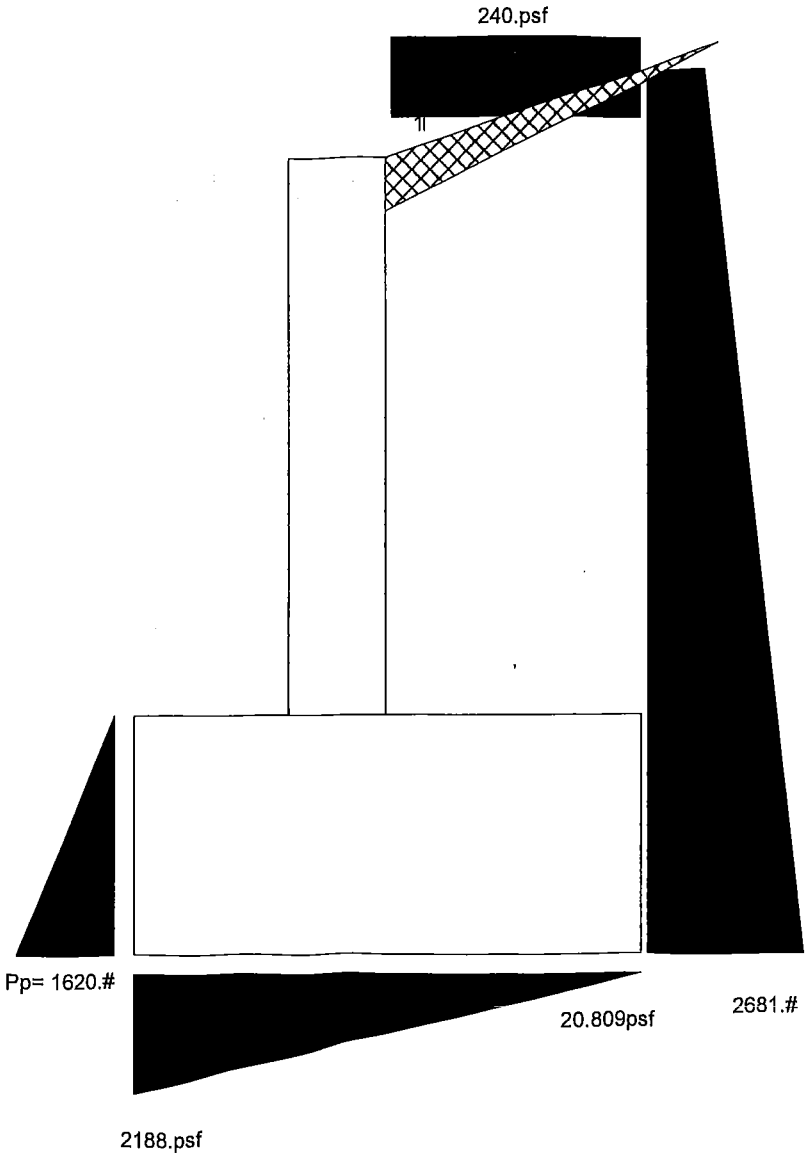
1
15.in Conc w/ #8 @ 6.in o/c
2 1/2"
7'-0"
7'-0"
2"
3'-0"
3"
#8@6.in @ Toe
#8@6.in @ Heel
Designer select
all horiz. reinf.
See Appendix A
2'-0"
4'-6"
6'-6"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CBC Engineers&Associates, Ltd.

125 Westpark Rd.
Centerville, OH 45459

Title : ARROYA
Job # : 25353
Description....
WINGWALL

Dsgnr: CBC

Date: JAN 28,2010

Retain Pro 9 © 1989 - 2011 Ver: 9.27 8171
Registration #: RP-1110505 RP9.27

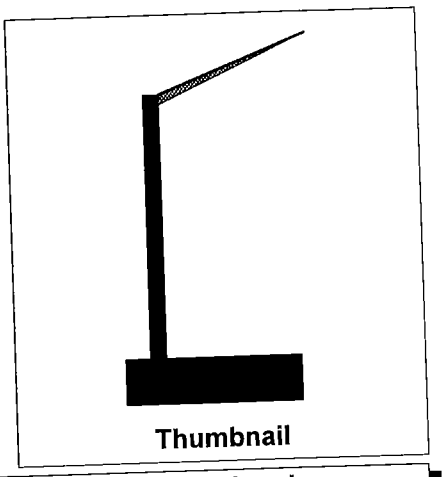
Cantilevered Retaining Wall Design

Criteria

Retained Height	=	17.67 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	3.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	33.9 psf/ft
Toe Active Pressure	=	33.9 psf/ft
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	120.00 pcf
Footing||Soil Friction	=	0.450
Soil height to ignore for passive pressure	=	0.00 in



Surcharge Loads

Surcharge Over Heel = 240.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
The above lateral load has been increased by a factor of		1.00
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	2.72	OK
Sliding	=	1.50	OK
Total Bearing Load	=	34,719 lbs	
...resultant ecc.	=	24.18 in	
Soil Pressure @ Toe	=	4,621 psf	NG Av
Soil Pressure @ Heel	=	339 psf	OK 24,000
Allowable	=	4,000 psf	
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	6,470 psf	
ACI Factored @ Heel	=	474 psf	
Footing Shear @ Toe	=	0.0 psi	OK
Footing Shear @ Heel	=	39.7 psi	OK
Allowable	=	94.9 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	11,462.2 lbs	
less 100% Passive Force	=	- 1,620.0 lbs	
less 100% Friction Force	=	- 15,623.4 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	[illegible]
Dead Load	1.250
Live Load	1.750
Earth, H	1.500
Wind, W	1.000
Seismic, E	1.000

Stem Construction

Top Stem

		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Thickness	=	15.00
Rebar Size	=	# 8
Rebar Spacing	=	6.00
Rebar Placed at	=	Edge

Design Data

fb/FB + fa/Fa	=	0.777
Total Force @ Section	lbs =	9,735.5
Moment....Actual	ft-# =	62,634.1
Moment.....Allowable	=	80,590.1
Shear.....Actual	psi =	64.9
Shear.....Allowable	psi =	94.9
Wall Weight	=	187.5
Rebar Depth 'd'	in =	12.50
LAP SPLICE IF ABOVE	in =	28.90
LAP SPLICE IF BELOW	in =	
HOOK EMBED INTO FTG	in =	13.28

Lap splice above base reduced by stress ratio

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	4,000.0
Fy	psi =	60,000.0

125 Westpark Rd.
Centerville, OH 45459

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Registration #: RP-1110505 RP9.27

Cantilevered Retaining Wall Design

Footing Dimensions & Strengths

Toe Width	=	2.00 ft
Heel Width	=	12.00
Total Footing Width	=	14.00
Footing Thickness	=	36.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	6,470	474 psf
Mu' : Upward	=	12,368	116,060 ft-#
Mu' : Downward	=	1,260	251,920 ft-#
Mu: Design	=	11,108	135,860 ft-#
Actual 1-Way Shear	=	0.00	39.67 psi
Allow 1-Way Shear	=	94.87	94.87 psi
Toe Reinforcing	=	# 8 @ 6.00 in	
Heel Reinforcing	=	# 8 @ 6.00 in	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: #4@ 2.00 in, #5@ 3.25 in, #6@ 4.50 in, #7@ 6.00 in, #8@ 7.75 in, #9@ 10.00
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

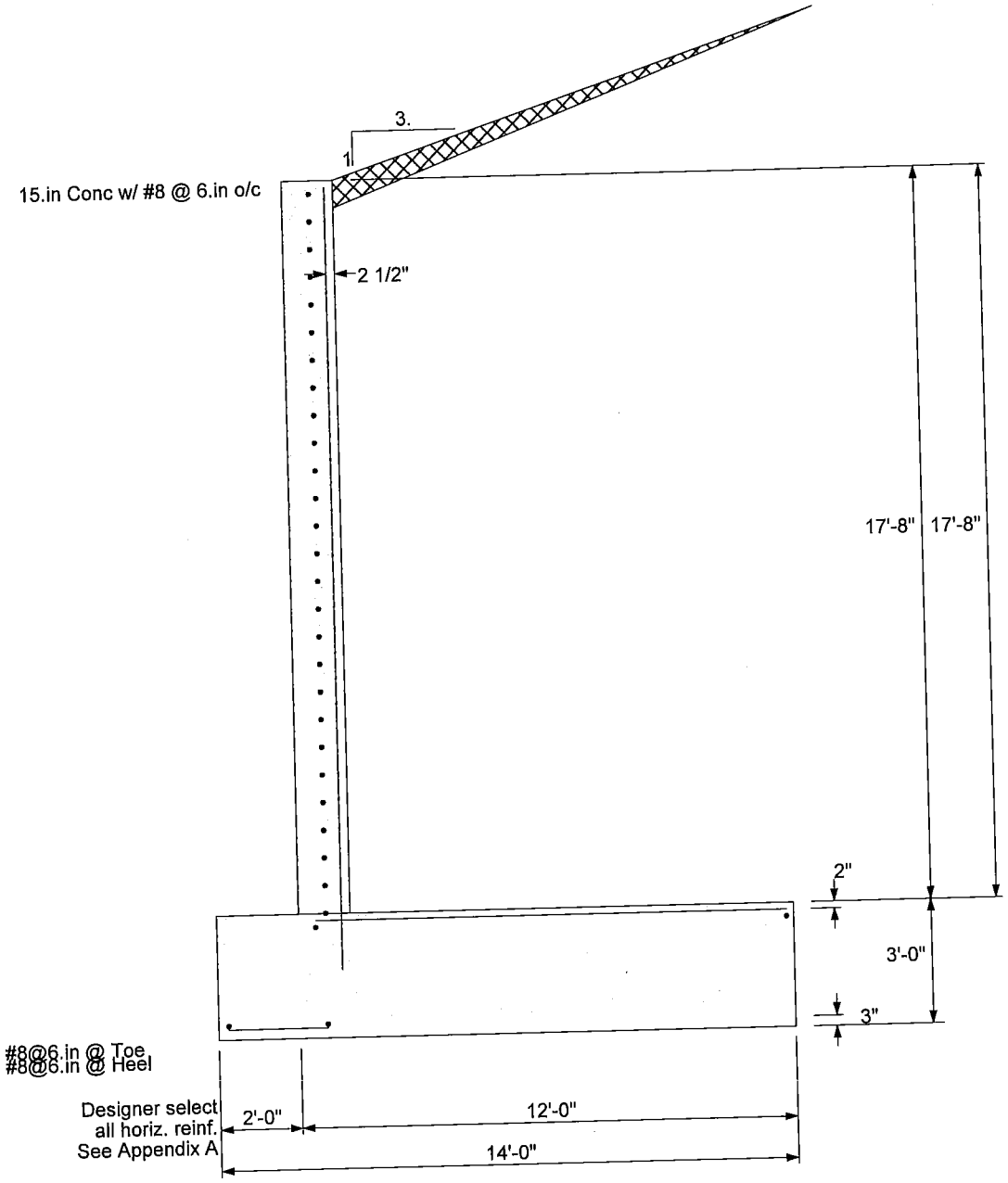
Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	9,970.4	8.08	80,605.1
Surcharge over Heel	=	1,644.4	12.13	19,940.8
Toe Active Pressure	=	-152.6	1.00	-152.6
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	11,462.2	**O.T.M.** =	100,393.4

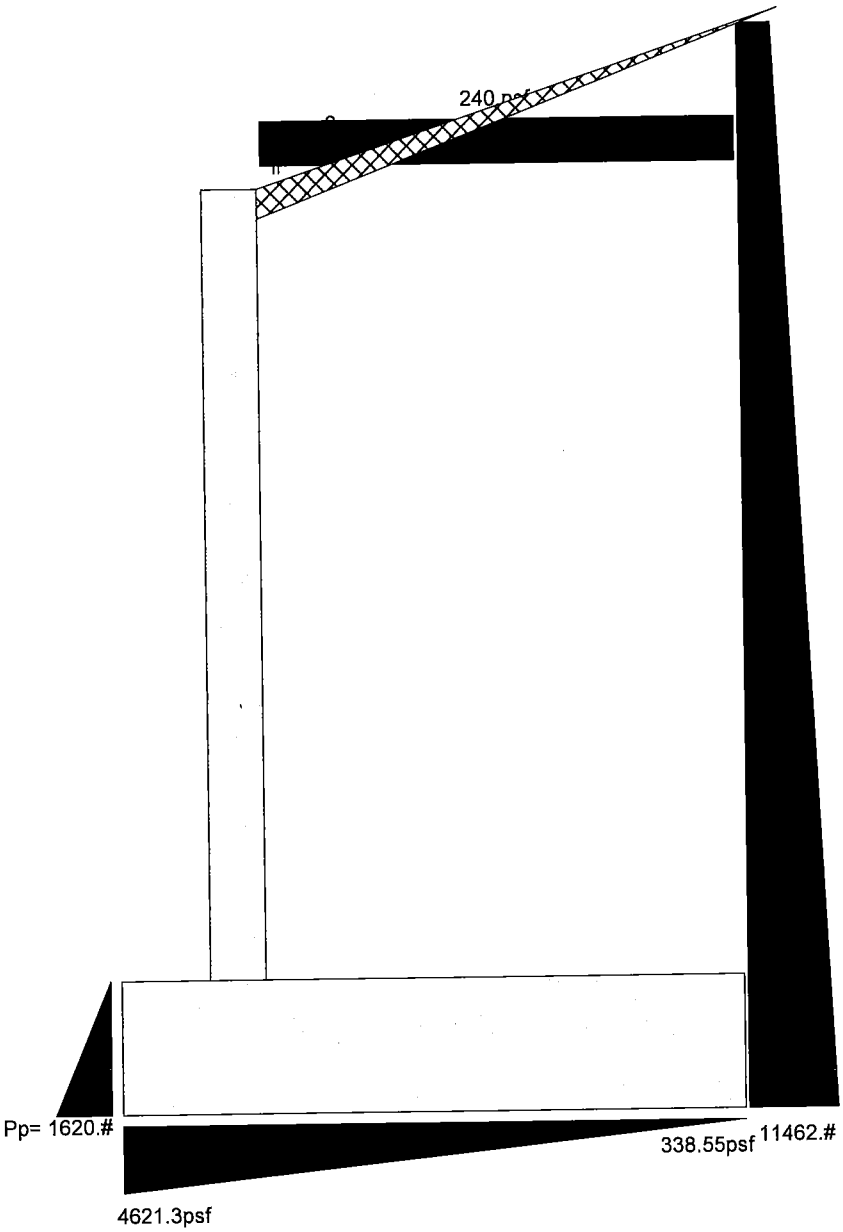
Resisting/Overturning Ratio = **2.72**
Vertical Loads used for Soil Pressure = 34,718.7 lbs
Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	22,794.3	8.63	196,600.8
Sloped Soil Over Heel	=	2,311.3	10.42	24,075.5
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	3,313.1	2.63	8,697.0
Earth @ Stem Transitions	=			
Footing Weight	=	6,300.0	7.00	44,100.0
Key Weight	=			
Vert. Component	=			
Total =		34,718.7 lbs	**R.M.=**	273,473.3

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

DESIGNER NOTES:


3.
1
15.in Conc w/ #8 @ 6.in o/c
2 1/2"
17'-8"
17'-8"
2"
3'-0"
3"
#8@6.in @ Toe
#8@6.in @ Heel
Designer select
all horiz. reinf.
See Appendix A
2'-0"
12'-0"
14'-0"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4621.3psf

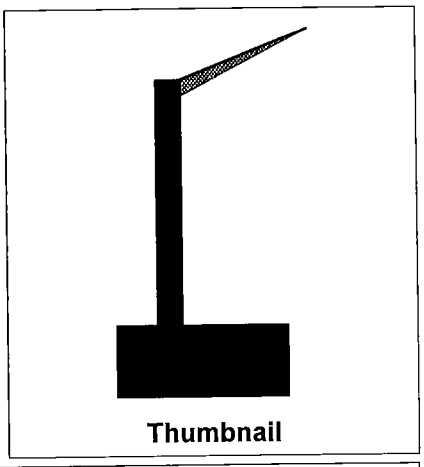
Cantilevered Retaining Wall Design

Criteria

Retained Height	=	10.20 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	3.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	33.9 psf/ft
Toe Active Pressure	=	33.9 psf/ft
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	120.00 pcf
Footing||Soil Friction	=	0.450
Soil height to ignore for passive pressure	=	0.00 in



Surcharge Loads

Surcharge Over Heel = 240.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
The above lateral load has been increased by a factor of		1.00
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Design Summary

Wall Stability Ratios

Overturning	=	2.39	OK
Sliding	=	1.58	OK
Total Bearing Load	=	12,715 lbs	
...resultant ecc.	=	16.60 in	
Soil Pressure @ Toe	=	2,957 psf	OK
Soil Pressure @ Heel	=	35 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	4,139 psf	
ACI Factored @ Heel	=	49 psf	
Footing Shear @ Toe	=	0.0 psi	OK
Footing Shear @ Heel	=	20.1 psi	OK
Allowable	=	94.9 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	4,649.4 lbs	
less 100% Passive Force	= -	1,620.0 lbs	
less 100% Friction Force	= -	5,721.6 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	
Dead Load	1.250
Live Load	1.750
Earth, H	1.500
Wind, W	1.000
Seismic, E	1.000

Stem Construction

Top Stem

		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Thickness	=	15.00
Rebar Size	=	# 8
Rebar Spacing	=	6.00
Rebar Placed at	=	Edge

Design Data

fb/FB + fa/Fa	=	0.177
Total Force @ Section	lbs =	3,682.6
Moment....Actual	ft-# =	14,284.2
Moment.....Allowable	=	80,590.1
Shear.....Actual	psi =	24.6
Shear.....Allowable	psi =	94.9
Wall Weight	=	187.5
Rebar Depth 'd'	in =	12.50
LAP SPLICE IF ABOVE	in =	12.00
LAP SPLICE IF BELOW	in =	
HOOK EMBED INTO FTG	in =	13.28

Lap splice above base reduced by stress ratio

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	4,000.0
Fy	psi =	60,000.0

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Registration #: RP-1110505 RP9.27

Cantilevered Retaining Wall Design

Footing Dimensions & Strengths

Toe Width	=	2.00 ft
Heel Width	=	6.50
Total Footing Width	=	8.50
Footing Thickness	=	36.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	4,139	49 psf
Mu' : Upward	=	7,637	12,282 ft-#
Mu' : Downward	=	1,260	39,960 ft-#
Mu: Design	=	6,377	27,678 ft-#
Actual 1-Way Shear	=	0.00	20.09 psi
Allow 1-Way Shear	=	94.87	94.87 psi
Toe Reinforcing	=	# 8 @ 6.00 in	
Heel Reinforcing	=	# 8 @ 6.00 in	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

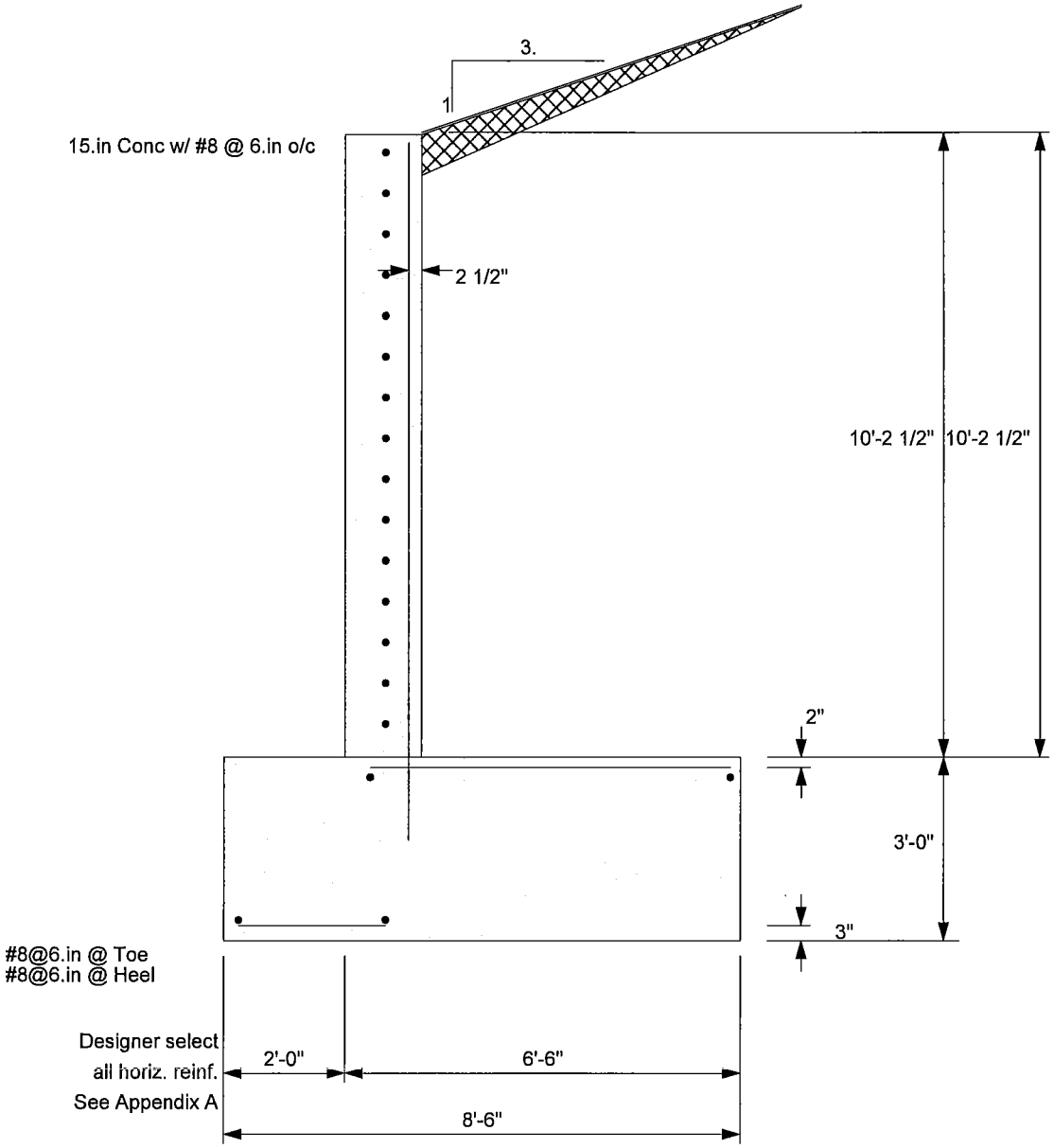
Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	3,788.4	4.98	18,878.7
Surcharge over Heel	=	1,013.6	7.48	7,576.7
Toe Active Pressure	=	-152.6	1.00	-152.6
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	4,649.4	**O.T.M.** =	26,302.9

Resisting/Overturning Ratio = **2.39**
Vertical Loads used for Soil Pressure = 12,714.8 lbs
Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	6,426.0	5.88	37,752.8
Sloped Soil Over Heel	=	551.3	6.75	3,720.9
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	1,912.5	2.63	5,020.3
Earth @ Stem Transitions	=			
Footing Weight	=	3,825.0	4.25	16,256.3
Key Weight	=			
Vert. Component	=			
Total =		12,714.8 lbs	**R.M.=**	62,750.3

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

DESIGNER NOTES: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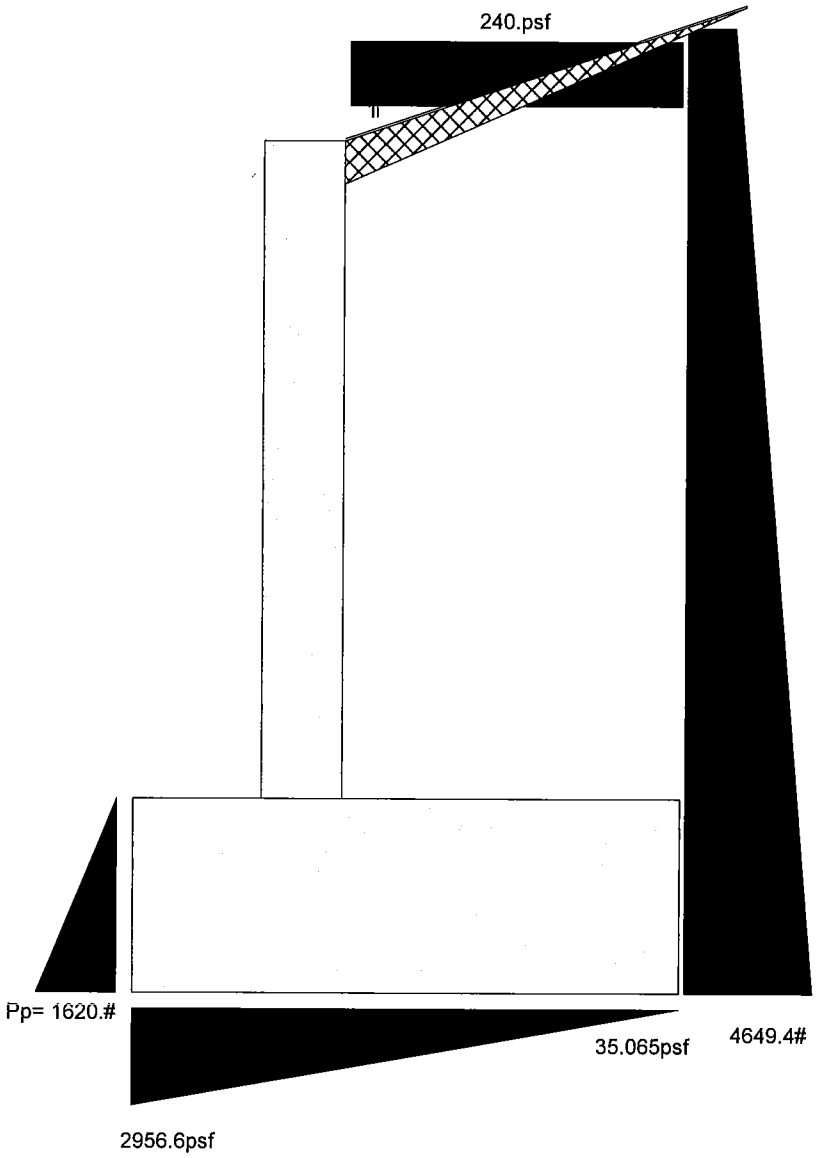
1
15.in Conc w/ #8 @ 6.in o/c
2 1/2"
10'-2 1/2"
10'-2 1/2"
2"
3'-0"
3"
#8@6.in @ Toe
#8@6.in @ Heel
Designer select
all horiz. reinf.
See Appendix A
2'-0"
6'-6"
8'-6"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APPENDIX B

PRINTS

CONTECH ENGINEERED SOLUTIONS, LLC
Design of Spread Footing Foundations, Concrete Headwalls and Wingwalls for a BridgeCor Arch (723523); Arroya Lane, El Paso County, Colorado

INDEX

APPROVALS:

DESIGN ENGINEER'S STATEMENT:

THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION. SAID PLANS AND SPECIFICATIONS HAVE BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR DETAILED ROADWAY, DRAINAGE, GRADING AND EROSION CONTROL PLANS AND SPECIFICATIONS, AND SAID PLANS AND SPECIFICATIONS ARE IN CONFORMITY WITH APPLICABLE MASTER DRAINAGE PLANS AND MASTER TRANSPORTATION PLANS. SAID PLANS AND SPECIFICATIONS MEET THE PURPOSES FOR WHICH THE PARTICULAR ROADWAY AND DRAINAGE FACILITIES ARE DESIGNED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY DIRECTLY CAUSED BY THE NEGLIGENT ACTS, ERRORS, OR OMISSIONS ON MY PART IN PREPARATION OF THESE DETAILED PLANS AND SPECIFICATIONS.

Mitchell Hardert — 9/15/23

MITCHELL T. HARDERT, COLORADO P.E. #45539 — DATE

OWNER/DEVELOPER'S STATEMENT:

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH THE REQUIREMENTS OF THE GRADING AND EROSION CONTROL PLAN AND ALL OF THE REQUIREMENTS SPECIFIED IN THESE DETAILED PLANS AND SPECIFICATIONS.

V.P. — 9/22/2023

GREN C. MORELAND — DATE

EL PASO COUNTY:

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

FILED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EL PASO COUNTY LAND DEVELOPMENT CODE, DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2 AND ENGINEERING CRITERIA MANUAL AS AMENDED.

IN ACCORDANCE WITH WITH ECM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTOR'S DISCRETION.

JOSHUA PALMER, P.E. — DATE

COUNTY ENGINEER / ECM ADMINISTRATOR

PCD NO. SF-2241

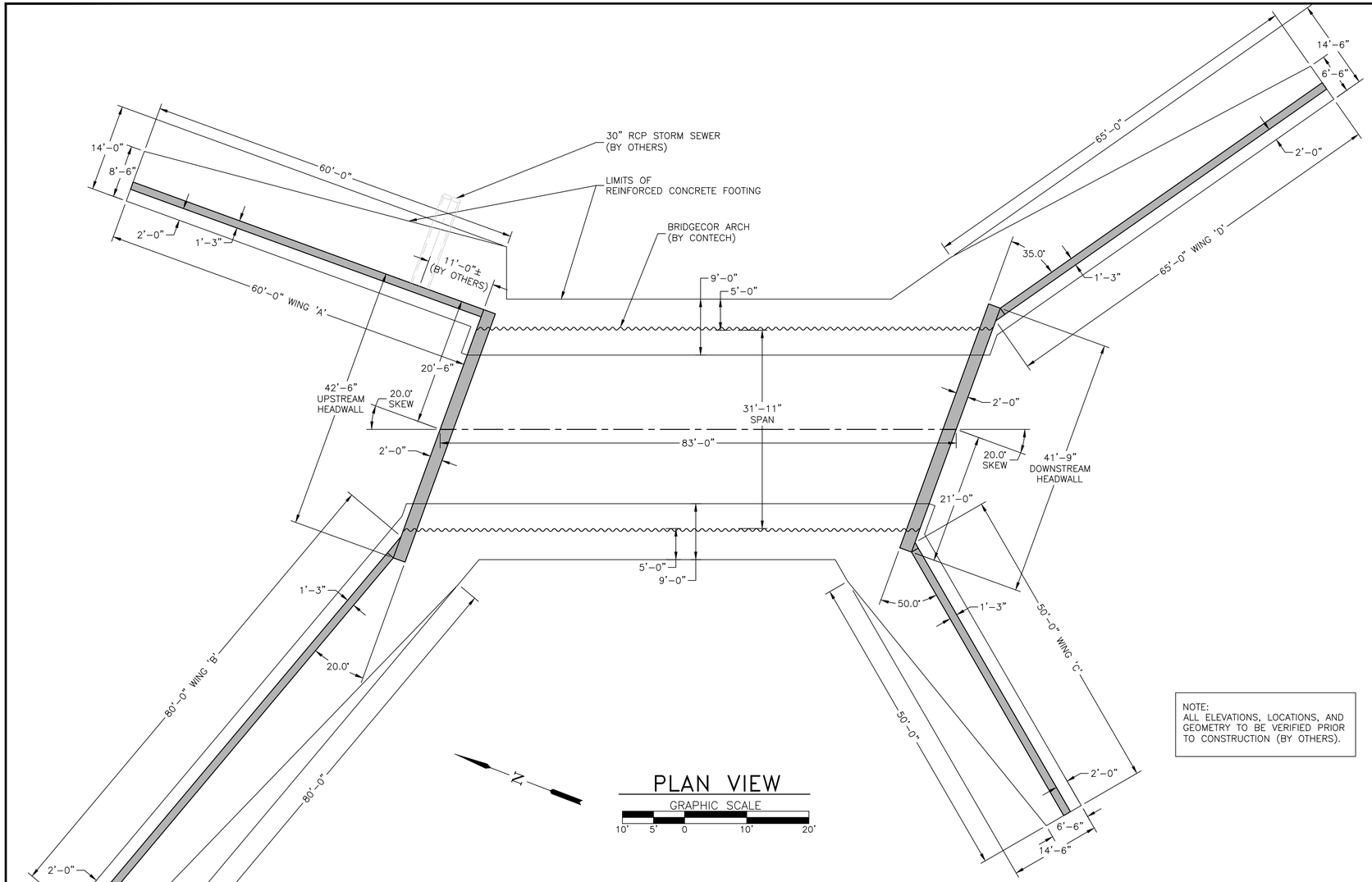
1	9/15/23	JBE	REV. 1

KOONTZ BRYANT JOHNSON WILLIAMS
Formerly CBC Engineers

TITLE SHEET / INDEX

Drawn By: DJH	Date: 11/9/22	CONTECH ENGINEERED SOLUTIONS, LLC Design of Spread Footing Foundations, Concrete Headwalls and Wingwalls for a BridgeCor Arch (723523); Arroya Lane, El Paso County, Colorado	
Approved By:	Date:		
Scale: GRAPHIC	Project No: KBJW-25353	Rev: 1	Sheet: 1 OF 7

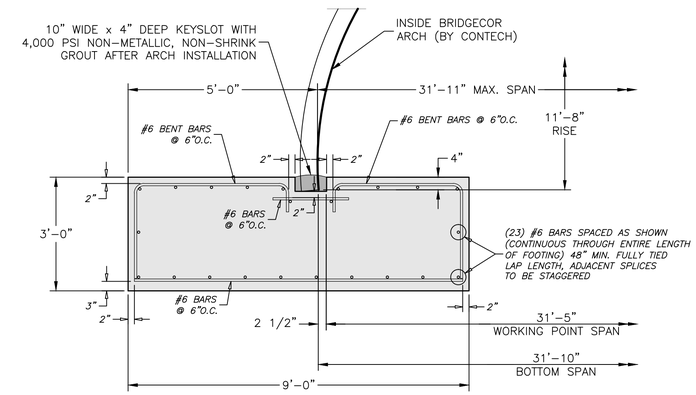
COLORADO LICENSED — MITCHELL T. HARDERT — PE-45539 — PROFESSIONAL ENGINEER



PLAN VIEW

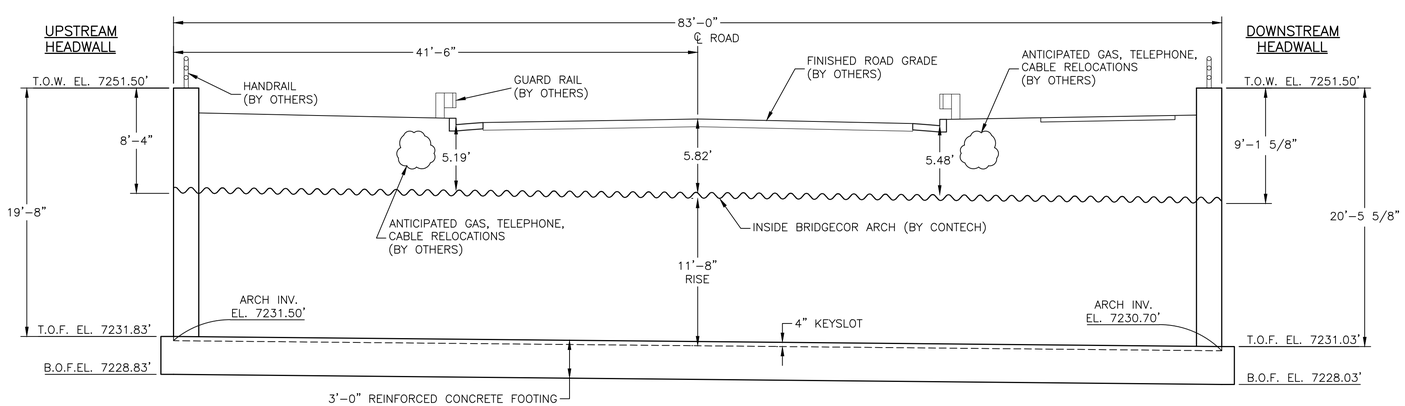
GRAPHIC SCALE
10' 5' 0 10' 20'

NOTE:
ALL ELEVATIONS, LOCATIONS, AND GEOMETRY TO BE VERIFIED PRIOR TO CONSTRUCTION (BY OTHERS).



TYPICAL ARCH FOOTING SECTION

GRAPHIC SCALE
2' 1' 0 2' 4'



PROFILE THROUGH CENTERLINE OF STRUCTURE

GRAPHIC SCALE
6' 3' 0 6' 12'

NOTES:
1.) CONCRETE SHALL BE f'c = 4,000 psi.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60.
3.) FOOTING IS DESIGNED FOR A 4,000 psf ALLOWABLE BEARING CAPACITY ON SANDSTONE PER EEI. THIS VALUE MUST BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
4.) SCOUR IS NOT ADDRESSED HEREIN AND IS THE RESPONSIBILITY OF OTHERS THAN KBJW.

1	9/15/23	JBE	REV. 1

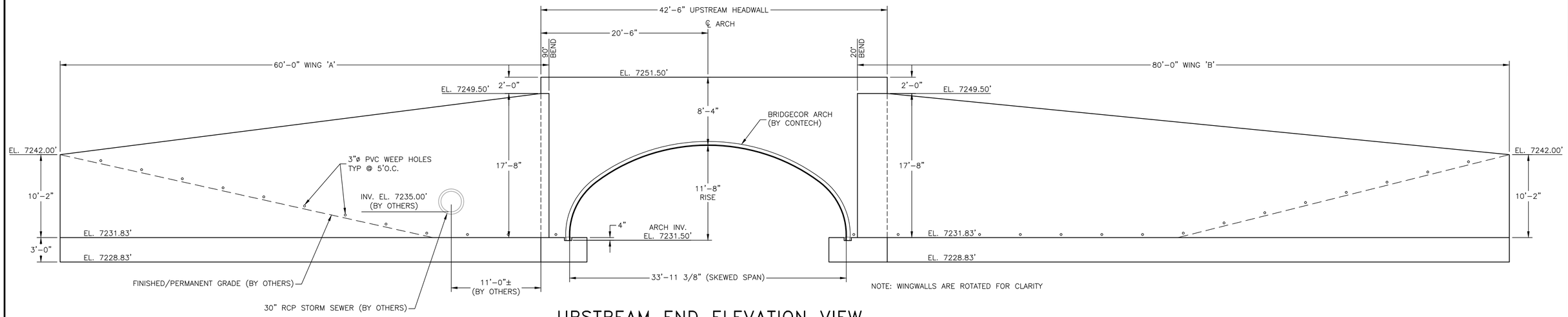
KOONTZ BRYANT JOHNSON WILLIAMS
Formerly CBC Engineers

COLORADO LICENSED
MICHAEL T. HARDIN
PE-45339
PROFESSIONAL ENGINEER

PLAN, PROFILE & FOOTING SECTION

Drawn By: DJH	Date: 11/9/22	CONTECH ENGINEERED SOLUTIONS, LLC Design of Spread Footing Foundations, Concrete Headwalls and Wingwalls for a BridgeCor Arch (723523); Arroya Lane, El Paso County, Colorado
Approved By:	Date:	

Scale	Project No.	Rev.	Sheet
GRAPHIC	KBJW-25353	1	2 OF 7

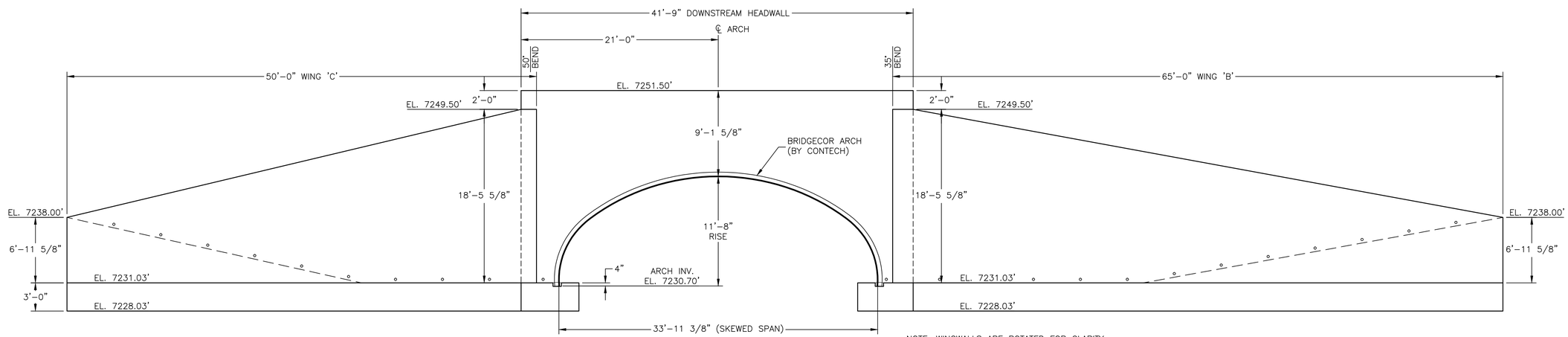


NOTE: WINGWALLS ARE ROTATED FOR CLARITY

UPSTREAM END ELEVATION VIEW

GRAPHIC SCALE

6' 3' 0 6' 12'



NOTE: WINGWALLS ARE ROTATED FOR CLARITY

DOWNSTREAM END ELEVATION VIEW

GRAPHIC SCALE

6' 3' 0 6' 12'

NOTES:
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COLORADO LICENSED
MICHAEL T. HARDISTY
PE-45439
PROFESSIONAL ENGINEER

1	9/15/23	JBE	REV. 1

KOONTZ BRYANT JOHNSON WILLIAMS
Formerly CBC Engineers

END ELEVATION VIEWS

Drawn By: DJH	Date: 11/9/22	CONTECH ENGINEERED SOLUTIONS, LLC Design of Spread Footing Foundations, Concrete Headwalls and Wingwalls for a BridgeCor Arch (723523); Arroya Lane, El Paso County, Colorado
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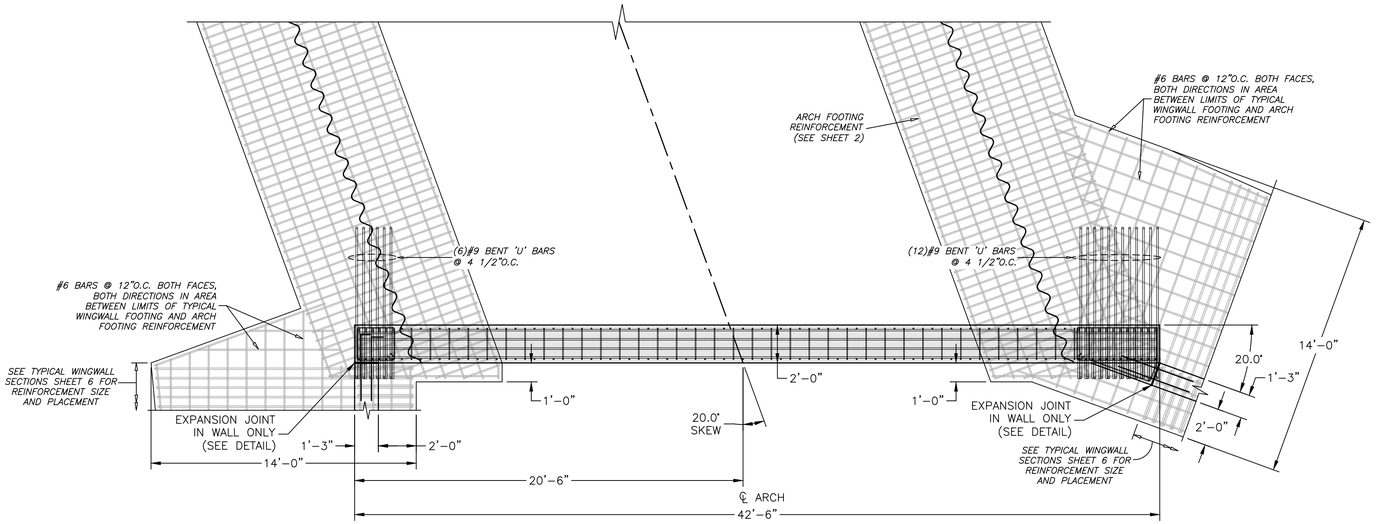
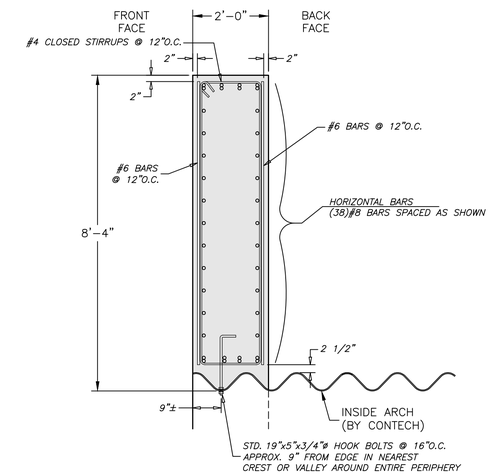


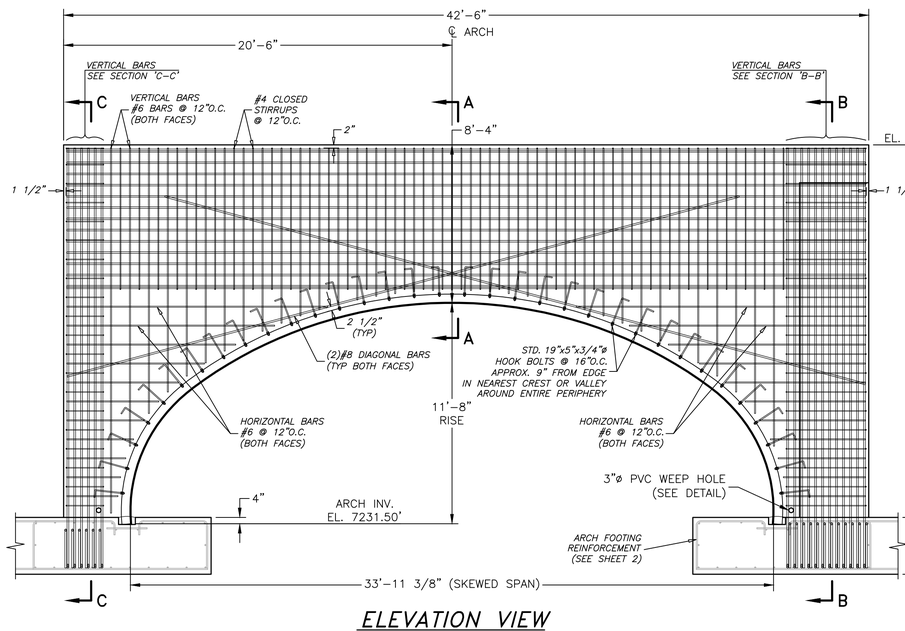
PLAN VIEW



SECTION 'A-A'

GRAPHIC SCALE

2' 1' 0 2' 4'

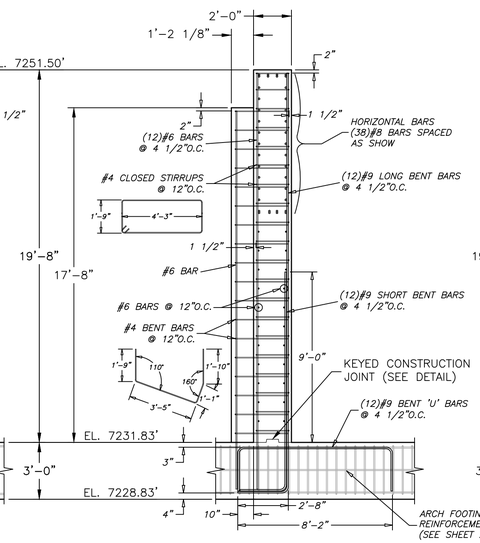


ELEVATION VIEW

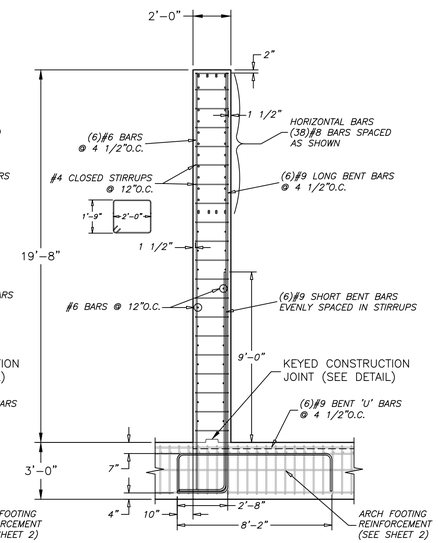
UPSTREAM HEADWALL DETAILS

GRAPHIC SCALE

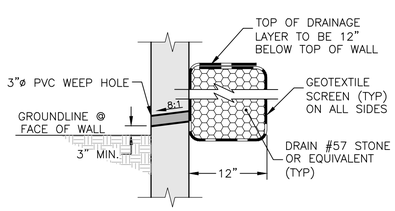
4' 2' 0 4' 8'



SECTION 'B-B'

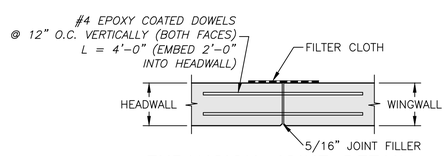


SECTION 'C-C'



WEEP HOLE DETAIL

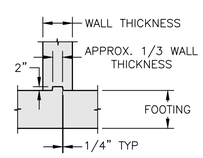
NOT TO SCALE



EXPANSION JOINT DETAIL

NOT TO SCALE

NOTES FOR EXPANSION JOINT:
A FILTER CLOTH THREE FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE APPLIED TO ALL TRANSVERSE JOINTS IN THE FOOTING AND WALLS. THE MATERIAL SHALL BE CENTERED ON THE JOINT AND THE EDGES SEALED WITH A MASTIC OR WITH TWO SIDED TAPE. THE FILTER CLOTH SHALL BE A GEOTEXTILE MEETING THE APPROVAL OF THE ENGINEER.



KEYED CONSTRUCTION JOINT DETAIL

NOT TO SCALE

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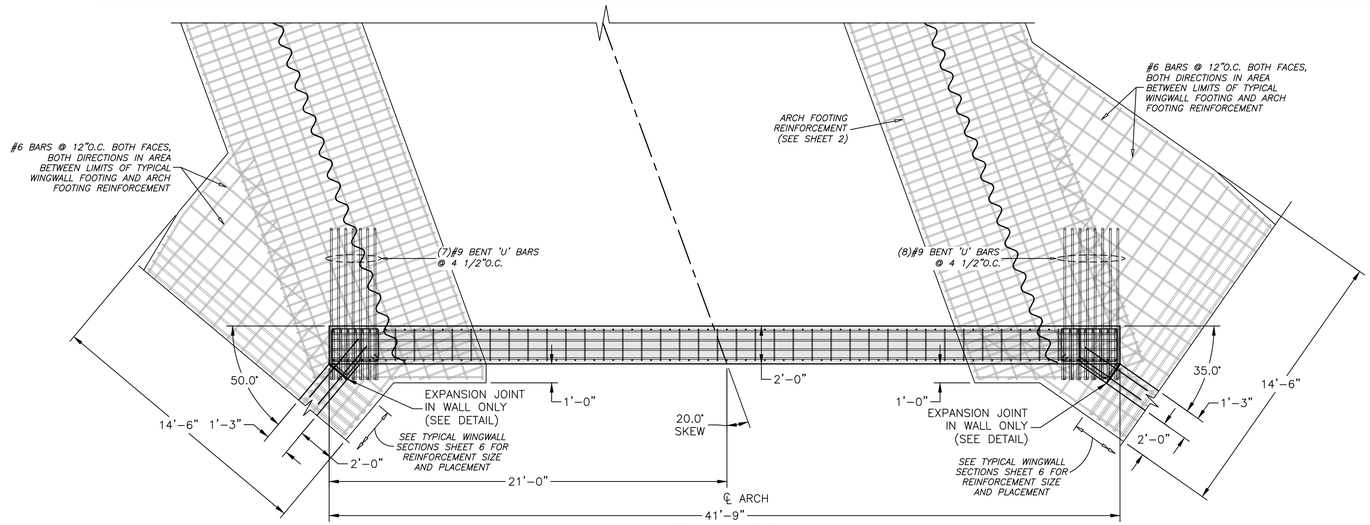
COLORADO LICENSED MICHAEL T. HAROWITZ PE-45339 PROFESSIONAL ENGINEER

1	9/15/23	JBE	REV. 1

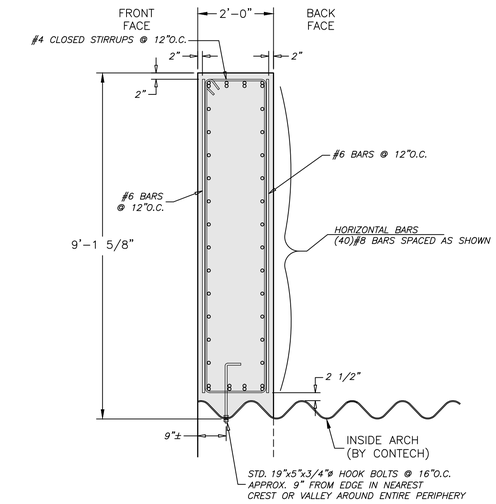
KOONTZ BRYANT JOHNSON WILLIAMS
Formerly CBC Engineers

UPSTREAM HEADWALL DETAILS

Drawn By	Date	CONTECH ENGINEERED SOLUTIONS, LLC Design of Spread Footing Foundations, Concrete Headwalls and Wingwalls for a BridgeCor Arch (723523); Arroya Lane, El Paso County, Colorado		
DJH	11/9/22			
Approved By	Date			
Scale		Project No.	Rev.	Sheet
GRAPHIC		KBJW-25353	1	4 OF 7

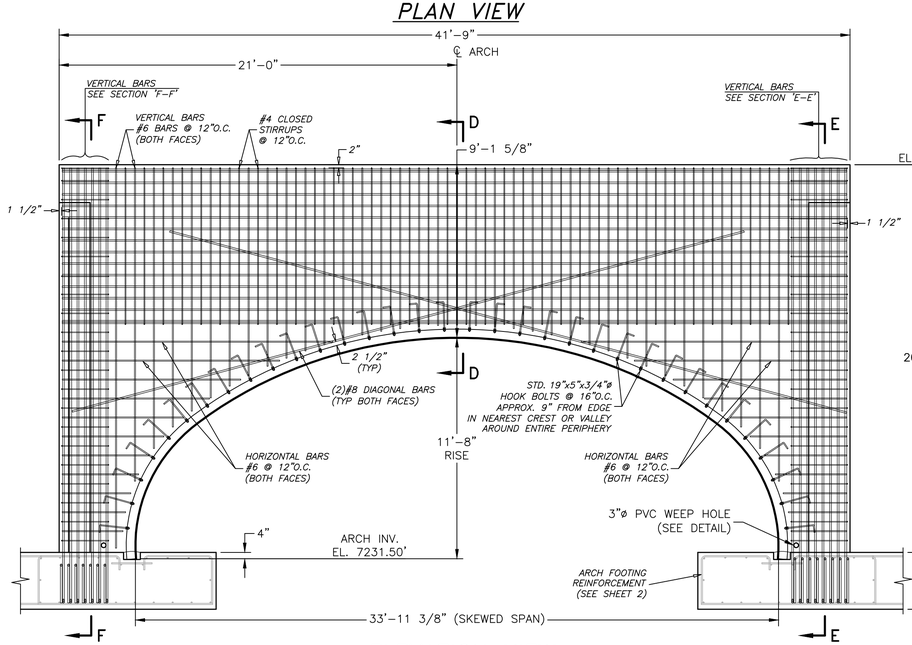


PLAN VIEW

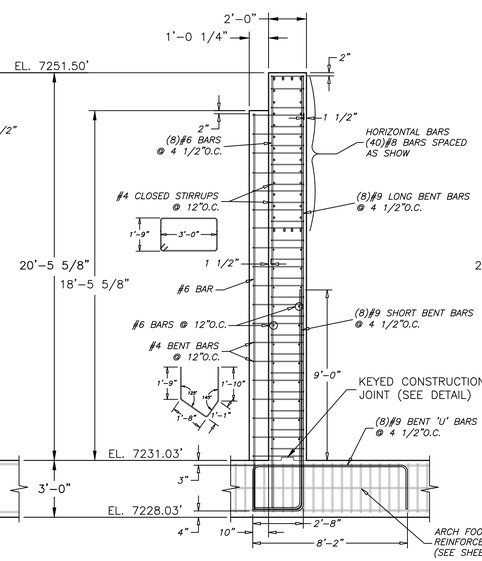


SECTION 'D-D'

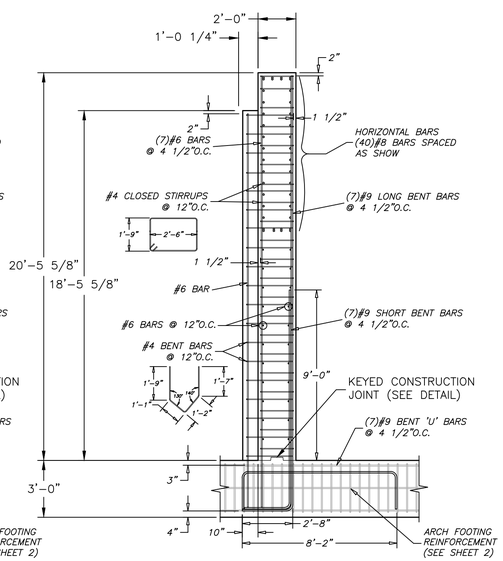
GRAPHIC SCALE
2' 1' 0 2' 4'



ELEVATION VIEW



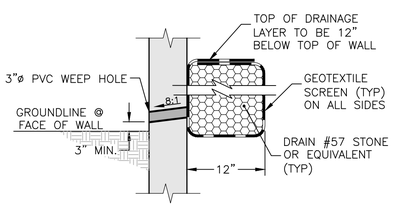
SECTION 'E-E'



SECTION 'F-F'

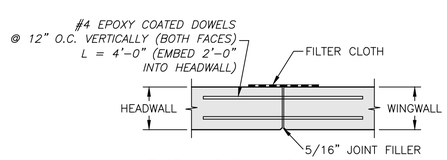
DOWNSTREAM HEADWALL DETAILS

GRAPHIC SCALE
4' 2' 0 4' 8'



WEEP HOLE DETAIL

NOT TO SCALE



EXPANSION JOINT DETAIL

NOT TO SCALE

NOTES FOR EXPANSION JOINT:
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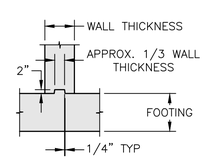

KEYED CONSTRUCTION JOINT DETAIL

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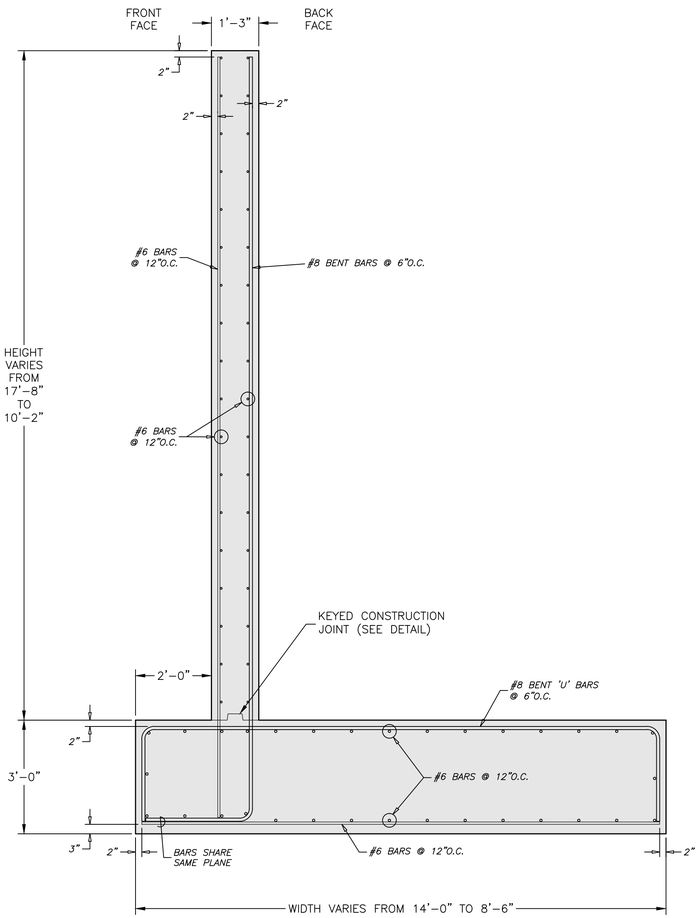
COLORADO LICENSED MICHAEL T. HARDEN PE-45339 PROFESSIONAL ENGINEER

1	9/15/23	JBE	REV. 1

KOONTZ BRYANT JOHNSON WILLIAMS
Formerly CBC Engineers

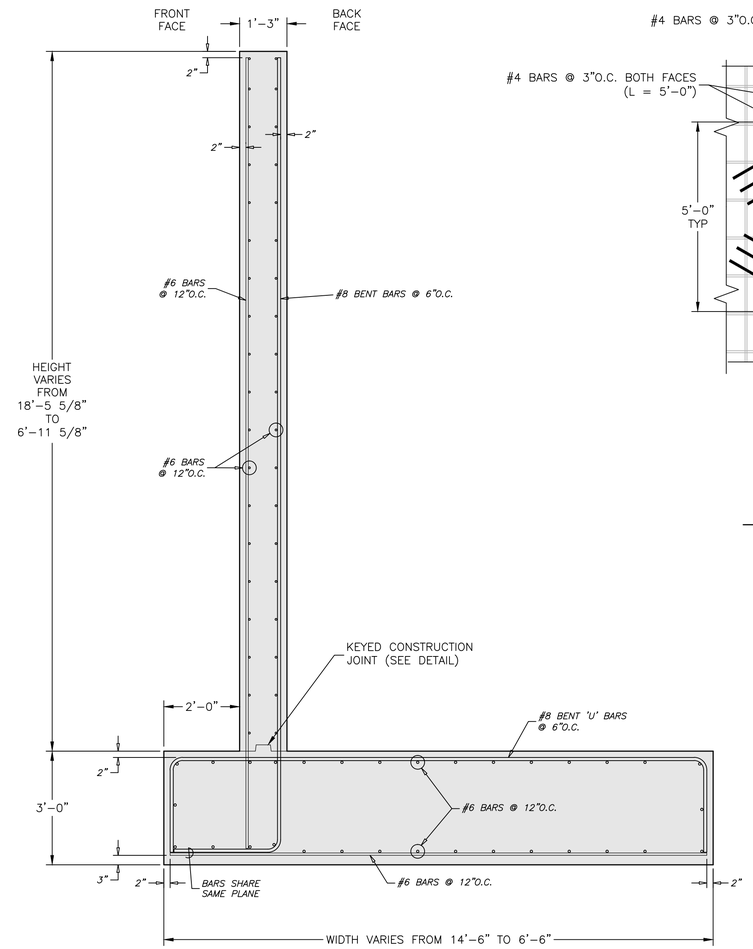
DOWNSTREAM HEADWALL DETAILS

Drawn By: DJH	Date: 11/9/22	CONTECH ENGINEERED SOLUTIONS, LLC Design of Spread Footing Foundations, Concrete Headwalls and Wingwalls for a BridgeCor Arch (723523); Arroya Lane, El Paso County, Colorado
Approved By:	Date:	
Scale: GRAPHIC	Project No.: KBJW-25353	Rev.: 1 / Sheet: 5 OF 7



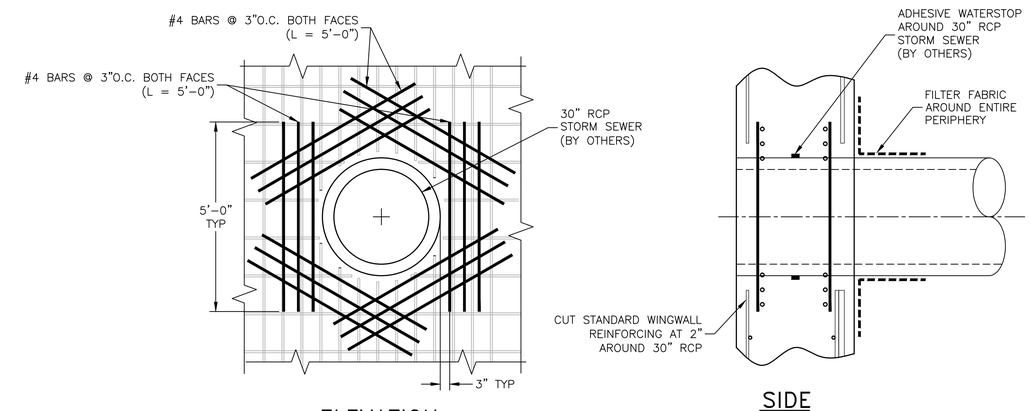
TYPICAL SECTION UPSTREAM WINGWALLS 'A' AND 'B'

GRAPHIC SCALE
2' 1' 0 2' 4'



TYPICAL SECTION DOWNSTREAM WINGWALLS 'C' AND 'D'

GRAPHIC SCALE
2' 1' 0 2' 4'



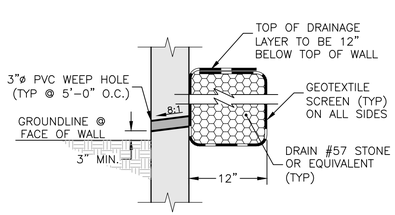
ELEVATION

SIDE

DETAIL FOR REINFORCEMENT AT 30" RCP STORM SEWER PENETRATION

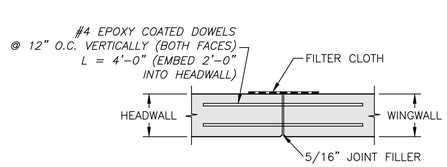
GRAPHIC SCALE
2' 1' 0 2' 4'

NOTE:
PROVIDE ADDITIONAL REINFORCING THE SAME SIZE AS CUT REINFORCEMENT AT PENETRATION. QUANTITY OF REINFORCING IN EACH DIRECTION SHALL BE EQUAL TO OR ONE GREATER THAN THE NUMBER OF CUT BARS. PLACE HALF OF ADDITIONAL REINFORCING BARS EACH SIDE OF PENETRATION.



WEEP HOLE DETAIL

NOT TO SCALE



EXPANSION JOINT DETAIL

NOT TO SCALE

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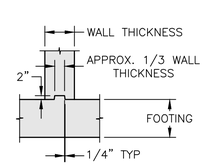

KEYED CONSTRUCTION JOINT DETAIL

NOT TO SCALE

NOTES:
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COLORADO LICENSED
MICHAEL T. HARDEBECK
PE-45839
11/9/22
PROFESSIONAL ENGINEER

1	9/15/23	JBE	REV. 1

KOONTZ BRYANT JOHNSON WILLIAMS
Formerly CBC Engineers

TYPICAL WINGWALL DETAILS

Drawn By: DJH	Date: 11/9/22	CONTECH ENGINEERED SOLUTIONS, LLC Design of Spread Footing Foundations, Concrete Headwalls and Wingwalls for a BridgeCor Arch (723523); Arroya Lane, El Paso County, Colorado	
Approved By:	Date:		
Scale: GRAPHIC	Project No.: KBJW-25353	Rev.: 1	Sheet: 6 OF 7

I – GENERAL

1.0 STANDARDS AND DEFINITIONS

1.1 STANDARDS - All standards refer to latest edition unless otherwise noted.

1.1.1 ASTM D-698-70 (Method C) "Standard Test Methods for Moisture. Density Relations of Soils and Soil Aggregate Mixtures Using 5.5-lb (2.5 kg.) Rammer and 12-inch (305-mm) Drop".

1.1.2 ASTM D-2922 "Standard Test Method for Density of Soil and Soil Aggregate in Place by Nuclear methods (Shallow Depth)".

1.1.3 ASTM D-1556 "Standard Test Method for Density of Soil in place by the Sand-Cone Method".

1.1.4 ASTM D-1557 "Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort."

1.1.5 All construction and materials shall be in accordance with the latest AASHTO LRFD Bridge Design Specifications and DOT requirements.

1.2 DEFINITIONS

1.2.1 Owner - In these specifications the word "Owner" shall mean El Paso County, Colorado

1.2.2 Engineer - In these specifications the word "Engineer" shall mean the Owner designated engineer.

1.2.3 Design Engineer - In these specifications the words "Design Engineer" shall mean KBJW, Inc.

1.2.4 Contractor - In these specifications the word "Contractor" shall mean the firm or corporation undertaking the execution of any work under the terms of these specifications.

1.2.5 Approved - In these specifications the word "approved" shall refer to the approval of the Engineer or his designated representative.

1.2.6 As Directed - In these specifications the words "as directed" shall refer to the directions to the Contractor from the Owner or his designated representative.

2.0 GENERAL CONDITIONS

2.1 The Contractor shall furnish all labor, material and equipment and perform all work and services except those set out and furnished by the Owner, necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction, grading, footing construction, endwall construction as shown on the plans and as described therein.

This work shall consist of all mobilization clearing and grading, grubbing, stripping, removal of existing material unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications.

This work is to be accomplished under the observation of the Owner or his designated representative.

2.2 Prior to bidding the work, the Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including, without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work.

If conditions other than those indicated are discovered by the Contractor, the Owner should be notified immediately. The material which the Contractor believes to be a changed condition should not be disturbed so that the owner can investigate the condition.

2.3 The construction shall be performed under the direction of an experienced engineer who is familiar with the design plan.

II – BRIDGECOR FOOTINGS

1.0 EXCAVATION FOR FOOTINGS

1.1 Footing excavation shall consist of the removal of all material, of whatever nature, necessary for the construction of foundations.

1.2 It shall be the responsibility of the Contractor to identify and relocate all existing utilities which conflict with the proposed footing locations shown on the plan. The Contractor must call the appropriate utility company at least 48 hours before any excavation to request exact field location of utilities, and coordinate removal and installation of all utilities with the respective utility company.

1.3 The side of all excavations shall be cut to prevent sliding or caving of the material above the footings.

1.4 Excavated material shall be disposed in accordance with the plan established by the Engineer.

1.5 The footings are designed for a net allowable bearing capacity of 4,000 psf on sandstone bedrock in accordance with the recommendations by Entech Engineering, Inc. A friction factor of 0.45 has also been utilized. These shall be verified in the field before construction. The evaluation and design of any required foundation improvement to achieve the recommended bearing capacity and friction factor, and to protect against frost and scour and settlement, is the responsibility of others than KBJW. All recommendations in the project geotechnical report shall be followed during construction.

1.6 Care must be exercised to ensure that heavy equipment is not operated adjacent to the footings. Heavy equipment shall not be allowed any closer than 5 feet to the footings.

2.0 CONCRETE FOOTING DIMENSIONS

2.1 The footings shall be reinforced in accordance with the construction drawings.

III – HEADWALLS AND WINGWALLS

1.0 The headwalls and wingwalls shall consist of reinforced concrete conforming to Chapter IV of these specifications, and AASHTO LRFD Bridge Design Specifications having a minimum compression strength of 4,000 psi.

2.0 Reinforcing steel shall conform to ASTM A-615, Grade 60, having minimum yield strength of 60,000 psi.

3.0 The headwalls shall be anchored to the BridgeCor arch in the manner shown on the plans and shall be formed and poured in accordance with the plan dimensions.

4.0 Round weep holes spaced not over 5 feet on center shall be placed in the walls above finished grade as shown on the construction drawings. A granular envelope, consisting of #57 stone (clean ¾" aggregate) or equivalent, shall be placed behind each weep hole for a distance of approximately 1 foot from all edges of the weep hole. A free-draining geotextile screen shall be placed between the weep hole and the stone to prevent erosion of the stone.

5.0 The select backfill behind the headwalls must be a well-graded, angular, durable granular material conforming to the select backfill specifications for the BridgeCor arch placed and compacted to achieve a minimum internal friction angle of 36 degrees and a maximum unit weight of 120 pcf. The material must be placed in strict conformance with the project specifications, the manufacturer's requirements, and industry standards. The select backfill behind the wingwalls must be a well-graded, angular, durable granular material placed and compacted to achieve a minimum internal friction angle of 36 degrees and a maximum unit weight of 120 pcf. These values to be field verified.

6.0 All Federal, State, and Local regulations shall be strictly adhered to relative to excavation side-slope geometry and any required excavation shoring.

IV – CONCRETE FOR FOOTINGS AND ENDWALLS

1.0 CODES AND STANDARDS

1.1 Reinforced concrete shall conform to the requirements of Colorado DOT Standards and Section V of the AASHTO LRFD Bridge Design Specifications having a minimum compressive strength of 4,000 psi.

2.0 STANDARDS FOR MATERIALS

2.1 Portland Cement - Conforming to ASTM Specification C-150, Type II.

2.2 Water - The water shall be drinkable, clean free from injurious amounts of oils, acids, alkalis, organic materials, or deleterious substances.

2.3 Aggregates - Fine and coarse aggregates shall conform to current ASTM Specification C-33 "Specification for Concrete Aggregates" except that local aggregates which have been shown by tests and by actual service to produce satisfactory qualities may be used when approved by the Engineer.

2.4 Submittals - Test data and/or certifications to the Owner shall be furnished upon request.

3.0 PROPORTIONING OF CONCRETE

3.1 COMPOSITION

3.1.1 The concrete shall be composed of cement, fine aggregate, coarse aggregate and water.

3.1.2 The concrete shall be homogeneous, readily placeable and uniformly workable and shall be proportioned in accordance with ACI-211.1.

3.1.3 Proportions shall be established on the basis of field experience with the materials to be employed. The amount of water used shall not exceed the maximum 0.45 water/cement ratio, and shall be reduced as necessary to produce concrete of the specified consistency at the time of placement.

3.1.4 An air-entraining admixture, conforming to the requirements of ASTM C260, shall be used in all concrete furnished under this contract. The quantity of admixture shall be such as to produce an air content in the freshly mixed concrete of 6 percent plus or minus 1 percent as determined in accordance with ASTM C231 or C173.

3.2 Qualities Required - As indicated in the table below:

TABLE IV-1

QUALITIES REQUIRED

ITEM	QUALITY REQUIRED
AASHTO Class	A
Type of Cement	II
Compressive Strength f'c @ 28 days	4,000 psi
Slump, inches	2 - 4 in.

3.3 Maximum Size of Coarse Aggregates - Maximum size of coarse aggregates shall not be larger than 19 mm (3/4 inches).

3.4 Rate of Hardening of Concrete - Concrete mix shall be adjusted to produce the required rate of hardening for varied climatic conditions:

Under 40°F Ambient Temperature – All work to be in accordance with the recommendations of ACI-306R "Cold Weather Concreting."

4.0 MIXING AND PLACING

4.1 Equipment - Ready Mix Concrete shall be used and shall conform to the "Specifications for Ready-Mix Concrete," ASTM C-94. Approval is required prior to using job mixed concrete.

4.2 Preparation - All work shall be in accordance with ACI-304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete." All construction debris and extraneous matter shall be removed from within the forms. Concrete shall be placed on clean surfaces, free from water. Concrete that has to be dropped four (4) feet or more shall be placed through a tremie.

4.3 All concrete shall be consolidated by internal mechanical vibration immediately after placement. Vibrators shall be of a size appropriate for the work, capable of transmitting vibration to concrete at frequencies of not less than 4,500 impulses per minute.

5.0 FORM WORK

5.1 Forms shall be of wood, steel or other approved material and shall be set and held true to the dimensions, lines and grades of the structure prior to and during the placement of concrete.

5.2 Forms shall not be removed until the concrete has sufficient strength to prevent concrete damage and/or drainage.

6.0 CURING

6.1 Fresh concrete shall be protected from rains, flowing water and mechanical injury for a period of seven (7) days. Loads shall not be placed on the concrete until it has reached its design strength.

7.0 REINFORCING STEEL

7.1 MATERIAL

7.1.1 All reinforcing bars shall be deformed bars (ASTM-A615) Grade 60.

7.2 BENDING AND SPLICING

7.2.1 Bar reinforcement shall be cut and bent to the shapes shown on the plans. Fabrication tolerances shall be in accordance with ACI 315. All bars shall be bent cold, unless otherwise permitted.

7.2.2 All reinforcement shall be furnished in the full lengths indicated on the plans unless otherwise permitted. Except for splices shown on the plans and splices for No. 5 or smaller bars, splicing of bars will not be permitted without written approval. Splices shall be staggered as far as possible.

7.2.3 In lapped splices, the bars shall be placed and wired in such a manner as to maintain the minimum distance to the surface of the concrete shown on the plans.

7.2.4 Substitution of different size bars will be permitted only when authorized by the engineer. The substituted bars shall have an area equivalent to the design area, or larger.

7.3 PLACING AND FASTENING

7.3.1 Steel reinforcement shall be accurately placed as shown on the plans and firmly held in position during the placing and setting of concrete. Bars shall be tied at all intersections around the perimeter of each mat and at not less than 2-foot centers or at every intersection, whichever is greater, elsewhere. Welding of cross bars (tack welding) will not be permitted for assembly of reinforcement.

7.3.2 Reinforcing steel shall be supported in its proper position by use of mortar blocks, wire bar supports, supplementary bars or other approved devices. Such devices shall be of such height and placed at sufficiently frequent intervals so as to maintain the distance between the reinforcing and the formed surface or the top surface within 1/4 inch of that indicated on the plans.

V - FILTER FABRIC (GEOTEXTILE SCREEN)

1.0 Filter fabric shall be placed at all locations shown on the construction drawings, and as necessary between all dissimilar materials to prevent soil migration and to maintain a soil-tight system.

2.0 Filter fabric cloth shall conform to Contech specification for C60-NW or equivalent and shall meet the following ASTM tests:

2.1 ASTM D4751 - Apparent opening size equal to #70 U.S. Standard Sieve Size.

2.2 ASTM D4632 (Grab Tensile Test) - Minimum Strength = 160 pounds.

2.3 ASTM D4632 (Grab Elongation) - 30-70%.

2.4 ASTM D4533 (Trapezoidal Tear) - Minimum Strength = 60 pounds.

2.5 ASTM D4355 (Stabilized for Heat and Ultra-Violet Degradation) - 70% strength retained.

3.0 The minimum fabric coefficient of permeability (ASTM D4491) shall be 0.24 cm/sec.

4.0 The fabric shall be non-woven with a minimum thickness (ASTM D5199) of 60 mils.

5.0 Fabric shall not be placed over sharp or angular rocks that could tear or puncture it.

6.0 Care should be exercised to prevent any puncturing or rupture of the filter fabric. Should such rupture occur, the damaged area should be covered with a patch of filter fabric using an overlap minimum of one (1) foot.

COLORADO LICENSED
MITCHELL T. HARDING
PE-45339
PROFESSIONAL ENGINEER

1	9/15/23	JBE	REV. 1

KOONTZ BRYANT JOHNSON WILLIAMS
Formerly CBC Engineers

SPECIFICATIONS

Drawn By: DJH	Date: 11/9/22	CONTECH ENGINEERED SOLUTIONS, LLC Design of Spread Footing Foundations, Concrete Headwalls and Wingwalls for a BridgeCor Arch (723523); Arroya Lane, El Paso County, Colorado		
Approved By	Date			
Scale: GRAPHIC		Project No.: KBJW-25353	Rev.: 1	Sheet: 7 OF 7