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THESIS

TESTING A WHEELED LANDING
GEAR SYSTEM FOR
THE TH-57 HELICOPTER

by

LT Nancy L. Heckman

December 1992

Thesis Advisor:

Ramesh Kolar

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Testing a Wheeled Landing
Gear System for the TH-57 Helicopter

by

Nancy L. Heckman
Lieutenant, United States Navy
B.S., United States Naval Academy, 1985

Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN AERONAUTICAL ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL
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Abstract

Using the main gear from a Cessna 182 and the nose gear from a Grumman AA1-B, (patent pending) a comparison with the skid gear currently installed on the TH-57 helicopters was conducted. The initial comparison was done using a structural analysis program, GIFTS, to simultaneously analyze and compare the gear systems. Experimental data was used to verify program results. Experimental testing was conducted for further code validation and analysis of each system's advantages and disadvantages. While the benefits of a wheeled system merit further study, the system analyzed requires modification to eliminate premature failure of the nose wheel attachment tube.

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I. INTRODUCTION

A. PURPOSE

Aircraft in general and helicopters in particular have landing gear for a number of reasons including:

- Transmission of a portion of the landing loads to the airframe.
- Aircraft towing.
- Protection of the runway and taxiway surface from damage.
- Absorption of landing and taxiing shocks.
- Braking.
- Providing for ability for ground maneuvering, (taxiing, take-off roll, landing roll and steering).

The current landing gear of the TH-57 can provide only the last two of these functions due to its skid configuration (Roskam, 1986). Despite these limitations, the Navy has historically conducted the training of all its helicopter pilots in the TH-57.

The landing gear is subject to the following loads (Roskam, 1986);

- Vertical loads from landing, autorotation, and taxiing.
- Longitudinal loads (most notably rotor engagement/disengagement loads).
- Lateral loads from crabbed landings and ground turning.

The question to be addressed in this thesis is whether the advantages of skidded gear outweigh the disadvantages sufficiently for the Navy to adopt the alternative system, which is a wheeled gear system.

B. THESIS OVERVIEW

The entire testing program was divided into five phases and culminated in the comparison of the benefits and drawbacks of the old skid gear and the proposed wheeled gear system. Based upon this comparison, recommendations were made for improvement and incorporation into the TH-57 fleet.

1. Phase I - Analysis of Current Skid Landing Gear System

Using the Graphical Interactive Finite Element Total System (GIFTS) structural analysis program, which is resident on the Aeronautical Engineering Department computer system, an analysis was conducted of the stresses experienced by each cross tube of the currently installed TH-57 skid gear in a level landing configuration. These results were then compared with the Bell Helicopter Textron experimentally measured results in order to establish the validity of the GIFTS calculations.

2. Phase II - Analysis of the Proposed Wheeled Landing Gear System

The candidate wheeled landing gear system consisted of the main landing gear from a Cessna 182 and the nose gear from a Grumman AA1-B. The GIFTS model procedure, established and validated in Phase I, was repeated for the wheeled gear configuration.

3. Phase III - Preparation and Calibration of Gear System for Testing

Strain gages were mounted near the points of the estimated maximum strain as calculated by the GIFTS program. Once the gear system was instrumented, calibration was conducted under static conditions to ensure proper operation of all equipment.

4. Phase IV - Static Testing

The candidate wheeled gear was loaded to failure in order to experimentally determine the maximum strains at gear failure. The tests were designed to match the GIFTS program conditions.

5. Phase V - Data Reduction

The data collected from the experimental tests were subsequently used for the stress analysis. The primary goals in this phase included comparison with the results from the GIFTS finite element model, identifying possible weak points in the gear system, and an analysis of the comparative advantages and disadvantages of each gear system.

C. DESIGN CONSIDERATIONS

The prime design considerations for the wheeled landing gear included the desire to use previously certified off-the-shelf parts. A fixed gear was chosen over a retractable design for the reasons of simplicity, weight, and cost.

A tricycle gear was chosen over the bicycle option due to its inherent light weight and better steering capabilities. The tail wheel gear type was excluded due to an undesirable high longitudinal attitude while on the ground and the requirement for extensive tail boom modifications.

With these factors in mind, the main gear of a Cessna 182 was chosen because the gross weight of the Cessna was similar to the TH-57, and it could be attached to the helicopter using existing mount points and hardware. The Cessna 182 gear did require the addition of a sleeving cross tube. The Grumman AA1-B nose gear was chosen for its strength and its ability to turn 65° either side of center.

Two structural deficiencies were discovered during testing, which required modification of the original factory design with two welds and two machined parts. Figures 1.1 to 1.3 are views of the helicopter with the wheeled gear installed with Figure 1.4 showing the current skid gear and Figure 1.5 depicting the proposed wheeled gear.

D. FAA REQUIREMENTS

The Federal Aviation Regulations, section 29.471, requires landing gear ground load test conditions to meet the following criteria:

- The limit ground loads obtained in the landing conditions, as defined in 29.471, must be external loads that would occur in the rotorcraft structure if it were acting as a rigid body.
- In each specified landing condition, the external loads must be in equilibrium with linear and angular inertia loads.

- The centers of gravity used during the testing must be selected so that the gear system will have each element subjected to its maximum design load.
- For the specified landing conditions, the design maximum weight must be used. A rotor lift may be assumed to act through the center of gravity throughout the landing impact. This lift may not exceed two thirds of the design maximum weight (FARs, 29.473)

Two dynamic tests were defined in the FARs, however, dynamic testing is not included in this thesis.

E. MILITARY REQUIREMENTS

Four existing documents dictate the requirements for the candidate wheeled landing gear. The first is the Request For Proposal (RFP) which contains the special requirements desired by the service. The second document is MIL-STD-1290A, which includes aircraft crash worthiness and energy absorption criterion, acceptable crash damage and the landing conditions for these tests.

Drop tests are defined in MIL-T-8679 and MIL-S-8698(ASG). These documents delineate ground loading conditions, yield strength for landing, reserve energy requirements, and specific landing test load conditions.

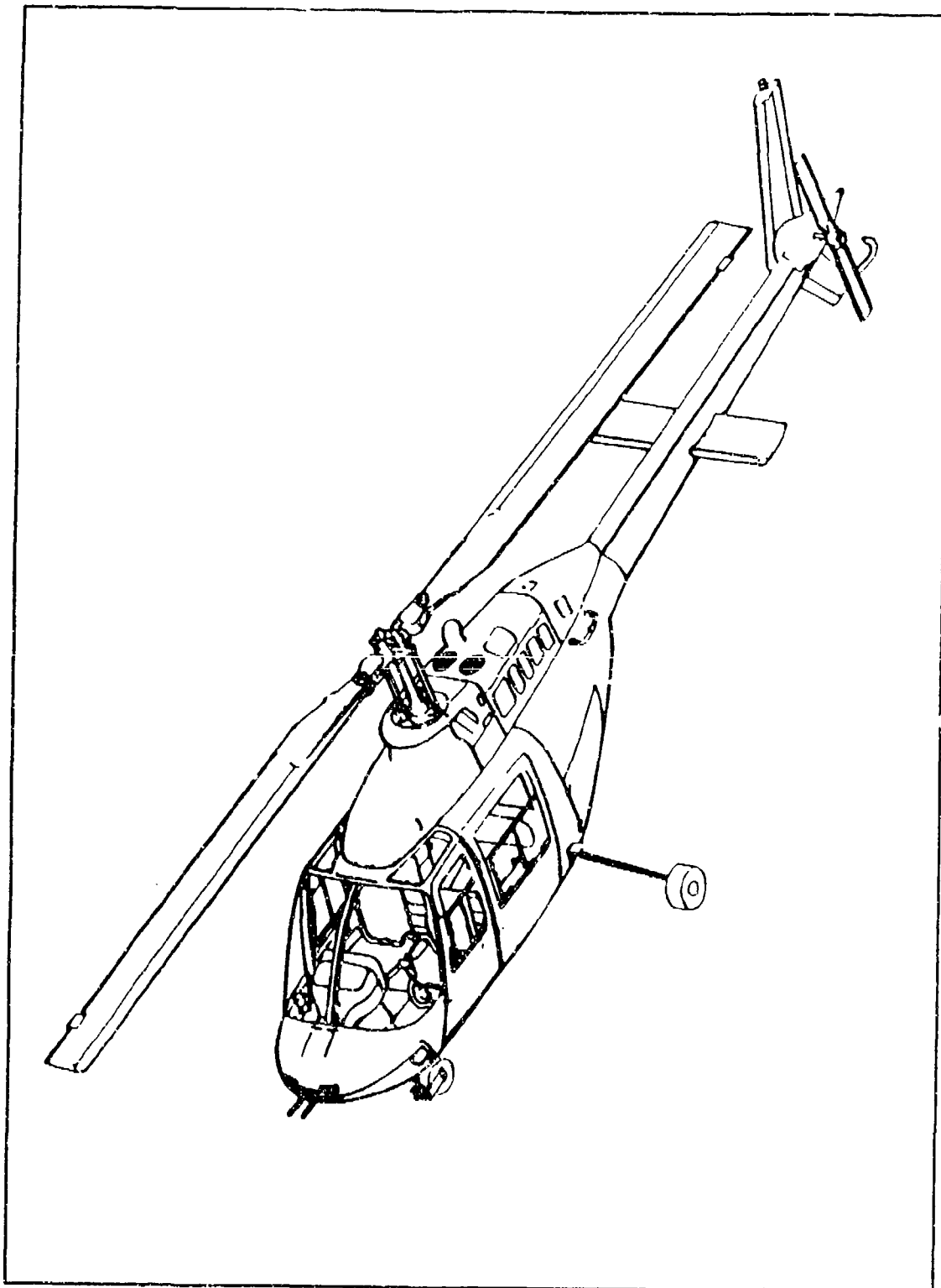


Figure 1.1: Aircraft Aerial View

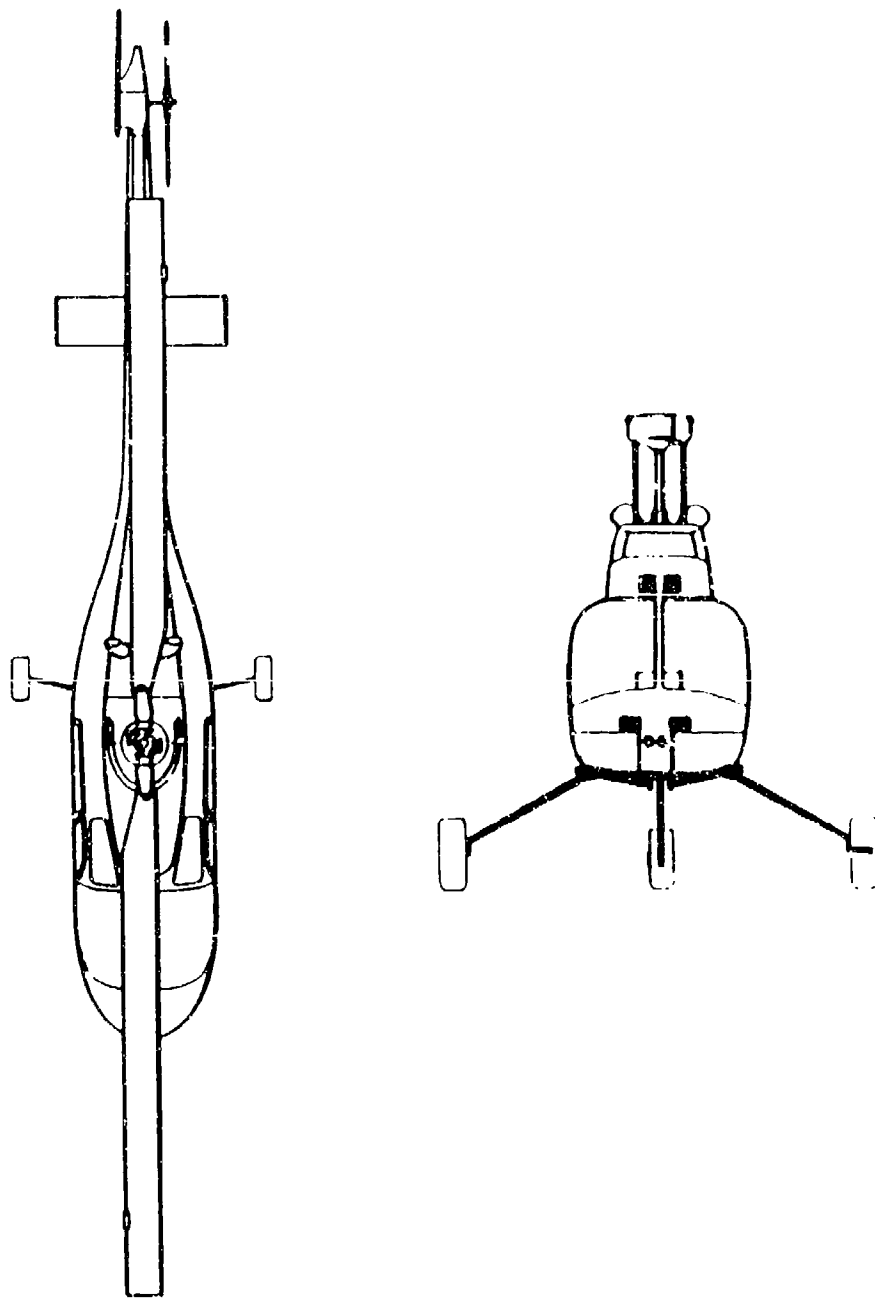


Figure 1.2: Aircraft Top and Front View

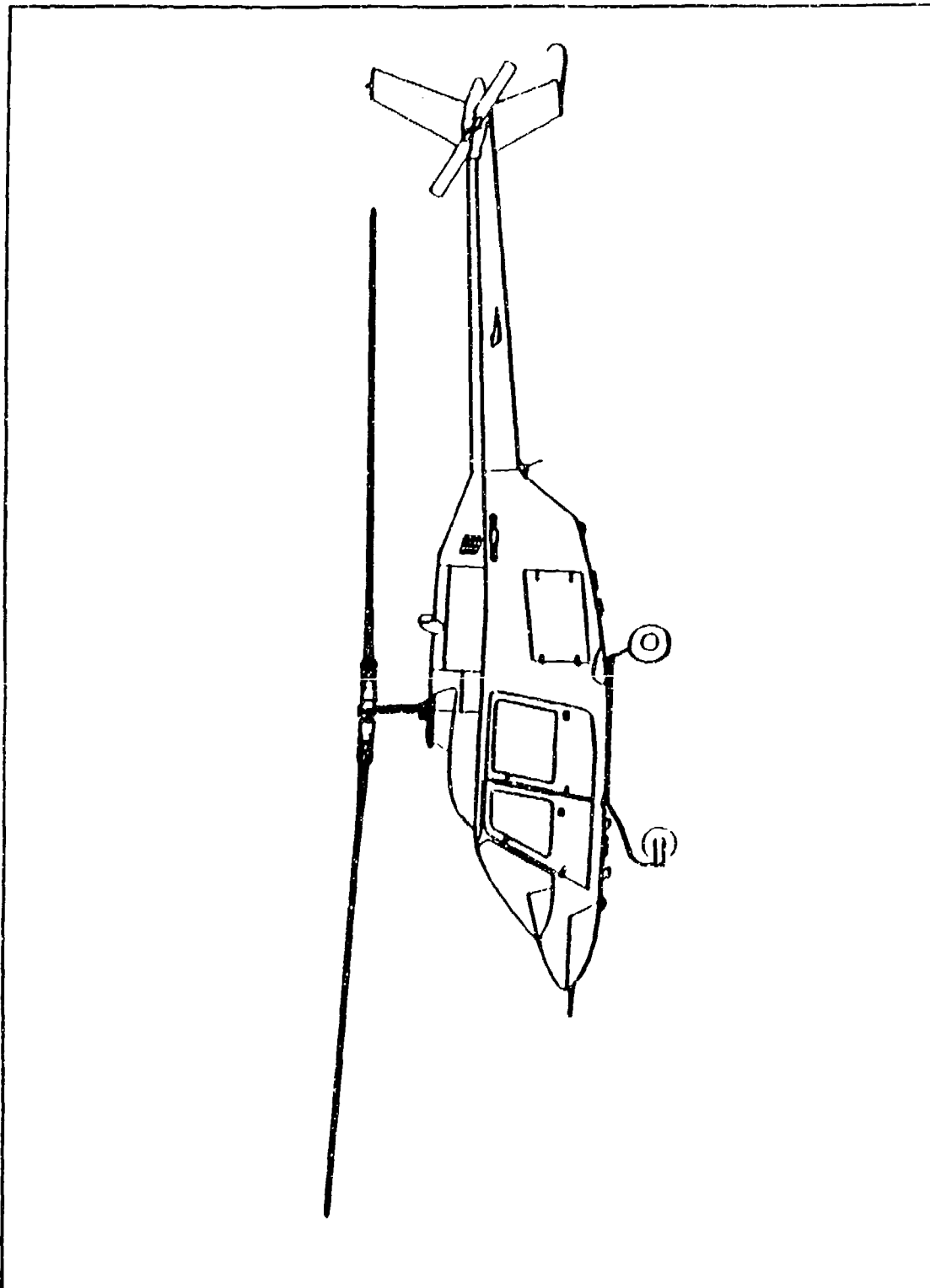


Figure 1.3: Aircraft Side View

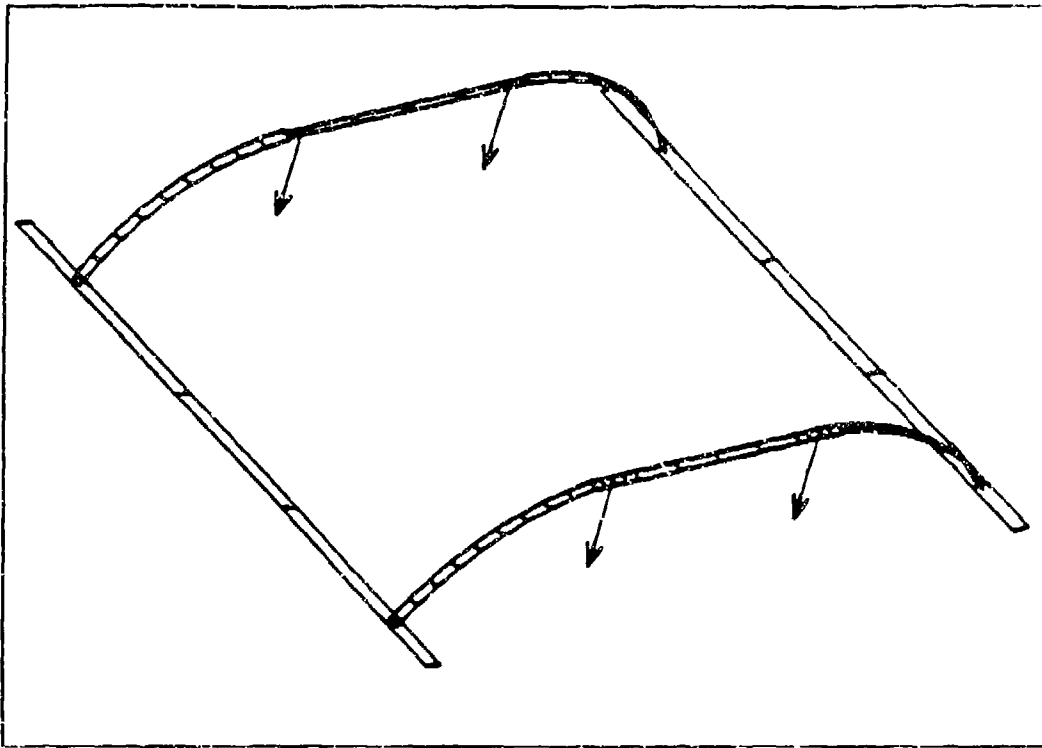


Figure 1.4: Current Skid Gear

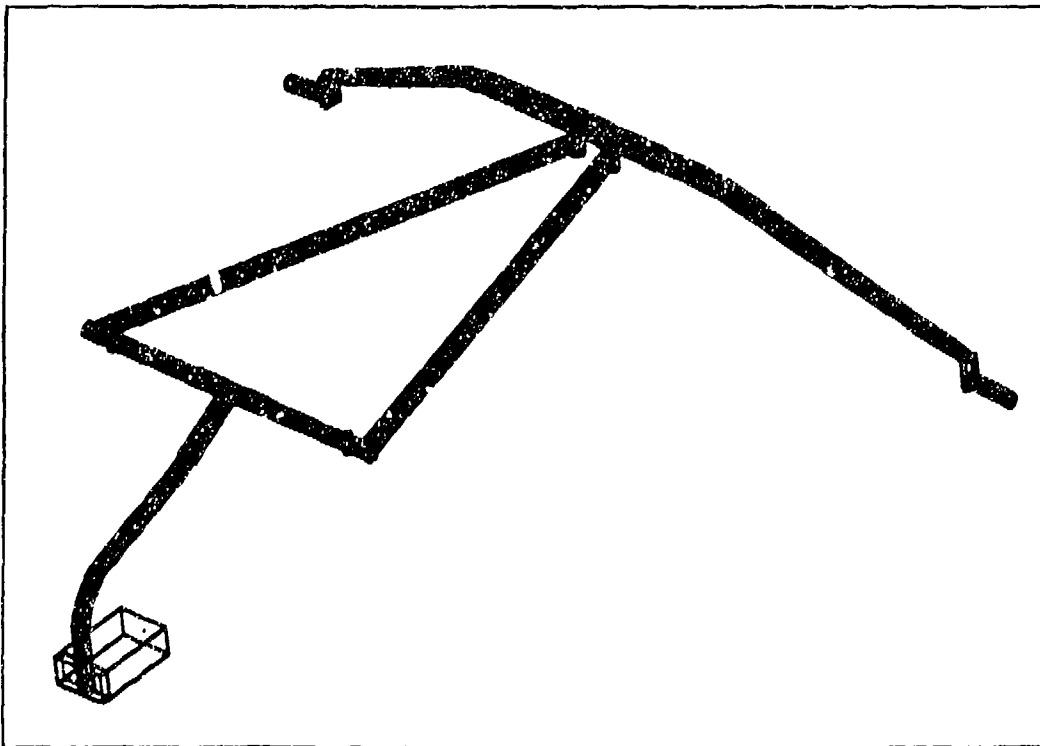


Figure 1.5: Proposed Wheeled Gear System

II. SYSTEM COMPARISON

A. COMPARISON CRITERION

The two landing systems were compared outlining advantages/disadvantages of each. Modifications are suggested for the wheeled system with the goal of improving its design. Many of the factors discussed are based on characteristics not finalized at this stage of the wheeled gear's development and are intended as a marker for further improvement or evaluation at later stages of the design.

B. PHYSICAL SYSTEM DIFFERENCES

1. Weight

The weights of the gears were computed using the MASS function in GIFTS program. Only a portion of the skid gear was available for weighing. The GIFTS calculations of the weight of this portion of the gear was compared to the experimentally derived weights. The experimental and calculated weights compared to within 12%, thus validating the MASS calculations. The assumption was made that the MASS calculations were correct for the portions of the gear not available for weighing. Changes were made in the wheeled gear mass data to add the wheels, which were not modeled and lighten the nose gear fork, modeled in the computer as a solid rectangular piece. The brakes, hydraulic lines, pedal extensions and associated hardware are not accounted for in the weights.

The MASS function calculated skid gear weight as 25.5 lbs and the wheeled gear weight as 142 lbs. For the TH-57B (basic weight 1875 lbs), this weight penalty of approximately 125 lbs (excluding the brake assembly) would not be a major factor, as it increases the takeoff weight to approximately 3020 lbs. For the TH-57C (2050 lbs basic weight) this weight becomes more critical allowing a baggage payload of approximately 5 lbs. (Two pilots- 400 lbs, 91 gallons fuel - 620 lbs, standard day).

2. Effects on Center of Gravity

Again using the data from the MASS function, a spread sheet was created to compute the center of gravity. Starting with two CG locations (WL 53.5, STA 114.5 and WL 56.5, STA 105) the effect of the skid gear was subtracted and the wheeled gear added. The new CG locations were WL 51.8, STA 114.5 and WL 54.6, STA 105.4.

Longitudinally, the helicopter CG was not affected by the new gear, but vertically the wheeled gear lowered the CG by almost two inches.

3. Brakes

Brakes will contribute to the improved taxing characteristics inherent with a wheeled system. The brake system was not available for this investigation and so no further discussion will be made of the brake components.

4. Towing

The skid gear configuration requires add-on ground handling wheels and a standard towbar for ground towing. The wheeled gear system requires only the towbar

for ground towing. The gear tested was not configured for a standard tow bar, but the configuration should neither pose any problem nor require a major modification.

C. PERFORMANCE FACTORS

1. Drag

If the landing gear tubes are modeled as constant diameter cylinders, an approximation for c_D , and thus an approximate drag value, can be determined (Anderson, 1991). (The wheels of the wheeled gear are modeled as two additional cylinders and their drag added to that of the tube's drag.) Using this simplification, the drag for the wheeled gear was 11% greater than that of the skid gear. The final drag study will have to take into account the advantages and disadvantages of the proposed additions of wheel and strut fairings which were not modeled in this study.

2. Static Roll Over

The static roll over angle of the skid gear equipped TH-57 is 31°. The wider footprint and lower CG of the wheeled system will increase the roll over angle to 35° at a CG of WL 54.6, STA 101. At this forward CG with the tricycle gear, a forward left or right attitude at touchdown will reduce the roll over angle to 27°; however, this is an unusual flight condition which is unlikely to be encountered. Figure 2.1 illustrates the roll over angle computation method.

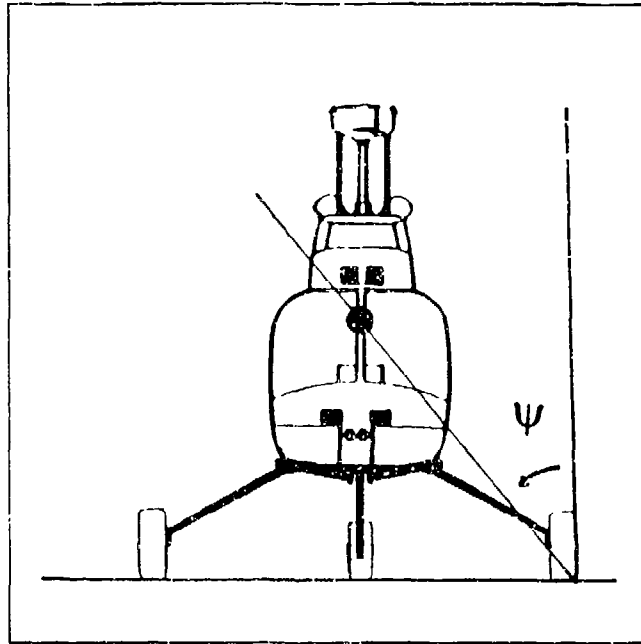


Figure 2.1 Static Roll Over Angle

3. Ground Resonance

As shown by Coleman in 1943 (Coleman, 1943), a two bladed helicopter is not susceptible to ground resonance irrespective of a skid or wheeled gear configuration.

4. Nosegear Loads

A normal force of not less than .08 times takeoff weight is required for adequate nosegear steering (Roskam, 1986). With slightly over a quarter of its weight on the nose wheel (CG aft) the steering wheeled system meets this requirement. This ratio is similar to the Navy's other tricycle geared helicopter, the HH-46.

5. Shimmy

The positive trail angle of the wheeled design inherently results in reduced gear shimmy (Roskam, 1986). A complete analysis of any wheeled gear shimmies should be performed during experimental taxi tests of the aircraft mounted hardware.

6. Turn Radius

The skid gear equipped helicopter must hover to turn. As shown in Figure 2.2, the turn radius of the helicopter using the hover-to-turn technique is nine feet less than the ground turn provided with the wheeled gear system.

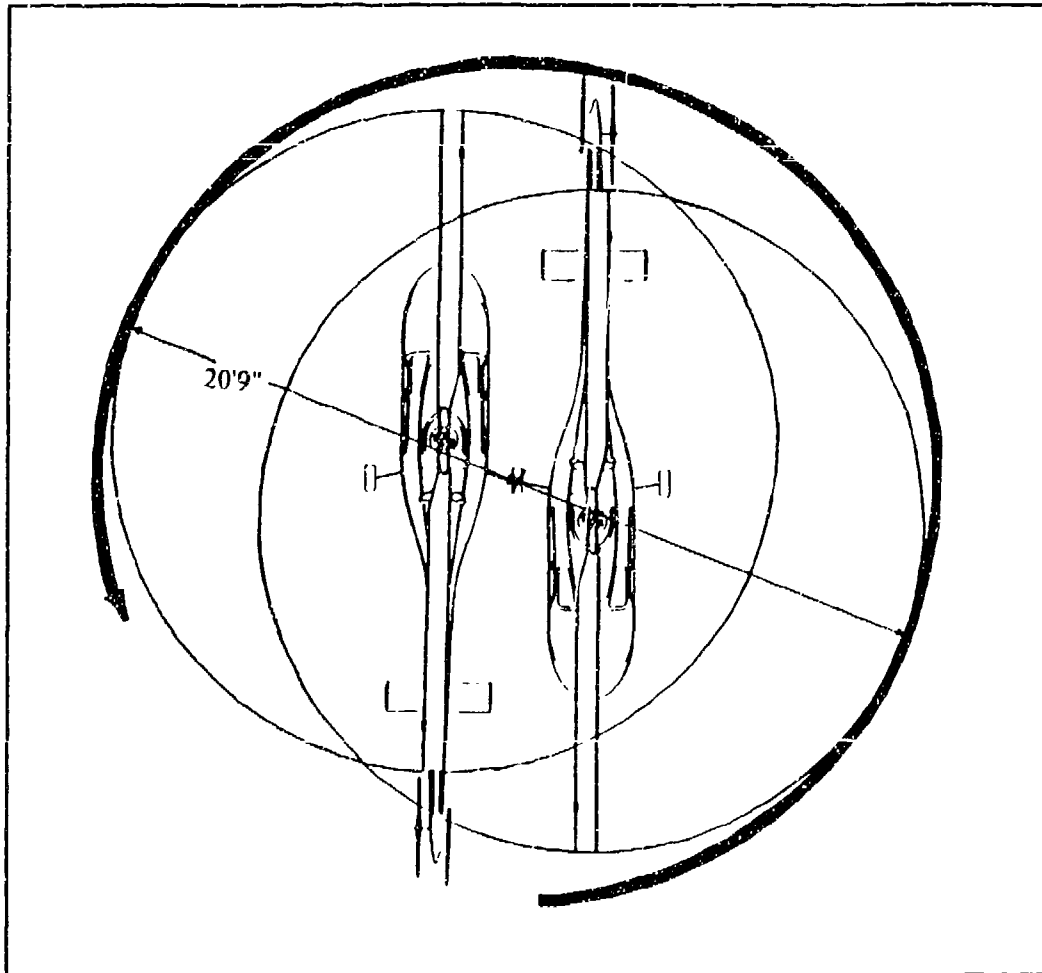


Figure 2.2: Turn Radius

III. ANALYSIS OF CURRENT GEAR SYSTEM

A. PURPOSE

The goal for this series of simulations and experiments was to generate and validate the use of a finite element model (using the GIFTS program) for the skid landing gear system. The results from Bell Helicopter's experimental testing of each crosstube of the TH-57 gear was obtained and compared with the deflections computed for the same loading conditions simulated in the GIFTS model.

B. GIFTS PROGRAM RESULTS

The GIFTS program is a versatile tool for use in a variety of structural applications including; animation, model generation, frequency response static analysis, steady state harmonic response and thermal stress analysis. GIFTS consists of different specialized modules, or processors, that run independently of one another. The BEAMCS module, for instance, generates the cross sections of elements that later in the BULKM module are given length, position in space and material properties. The model generation files used in this study, which may be identified by the *.SRC file name extension, are contained in Appendices A and B.

1. Model Generation

Appendix A contains the ASCII input data files for the GIFTS model generation of the individual crosstubes. Each crosstube was positioned so that

assembling a complete landing gear could be accomplished with the addition of the skid tubes. The model dimensions are those of the skid gear used on the TH-57, OH-58A and the civilian 206A-1. The crosstubes are made of AL7075-T6. The material properties were taken from the Alloy Digest (Alloy, 1973). Poisson's Ratio was computed from the given values of Modulus of Elasticity, E, and Modulus of Rigidity, G, using the formula:

$$G = \frac{E}{2(1+\nu)}$$

2. Program Results

Appendix D contains the program output from the GIFTS model. There are two pages devoted to each loading condition in identical formats. Tables D*-1 give the loads applied to the model. Tables D*-2 give the principal stresses for each element. Tables D*-3 are the deflections of each point shown in Figures D*-1. Bell Helicopter's data contained only the deflection of the center points, point 56 on the forward crosstube and point 51 on the aft crosstube. Figures D*-2 are the deflected crosstube and Figures D*-3 are the crosstube with the magnitude and deflection given by arrows.

Figures 3.1 and 3.2 compare the deflections of point 56 for the forward crosstube and point 51 for the aft crosstube respectively versus the values obtained by Bell Helicopter. As shown, there was excellent agreement up to a load of 1550 lbs per mount point or 3100 lbs per crosstube. At this point the principal stresses

exceeded the yield stress of the material, requiring nonlinear analysis, which was not performed in this thesis.

3. Conclusions

The GIFTS simulation results compared favorably with the Bell Helicopter experimental data through the region of linear behavior. Fidelity is lost only after reaching the yield stress of the material.

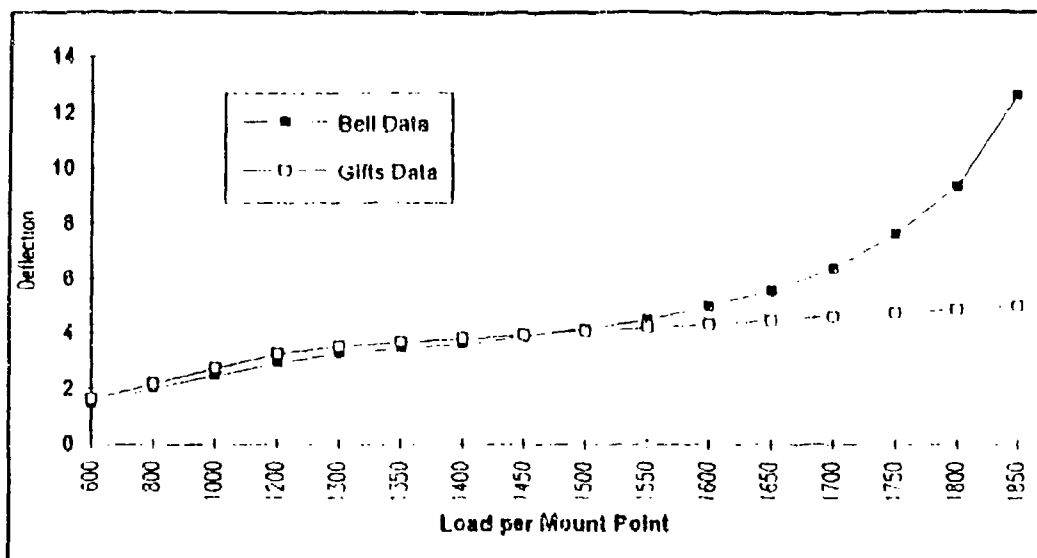


Figure 3.1: Forward Crosstube

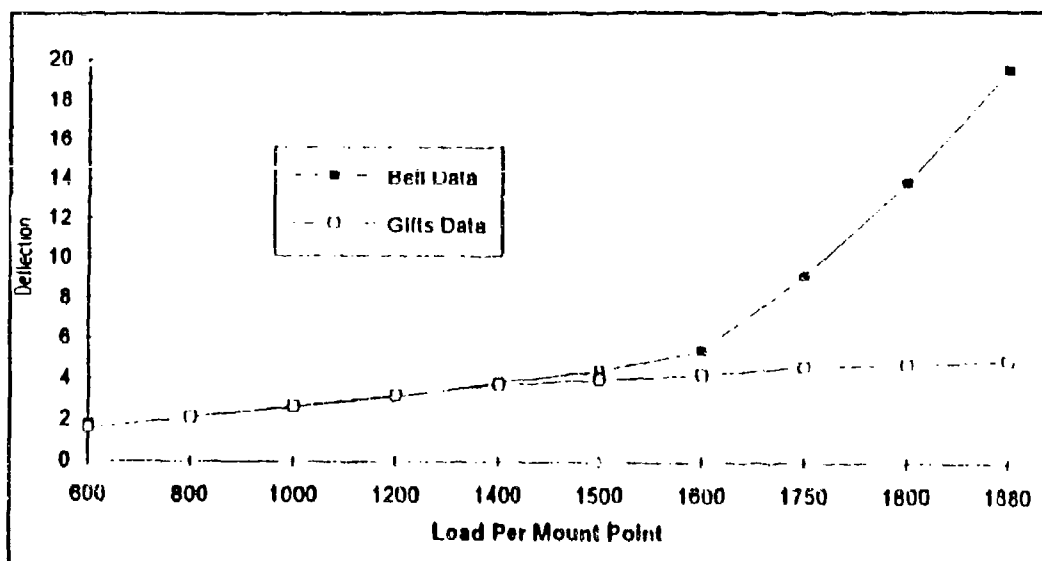


Figure 3.2: Aft Crosstube

IV. COMPUTER MODELING OF WHEELED GEAR SYSTEM

A. PURPOSE

The GIFTS computer model was used to duplicate the experimental loading test conditions used for the wheeled gear system. The model calculations were then compared to the experimental data. The intent was to use the experimental data to validate the computer simulation to the practical limits of testing for the single test structure (failure) and the limited experimental apparatus.

B. MODEL

Appendix B contains the ASCII input data files for the wheeled gear system model.

1. Nomenclature and Element Location

Figures 4.1 to 4.12 show the gear nomenclature and element location.

Figure 4.1 is a view of the entire gear without the tires. The right and left sides of the gear are those that would be on the right and left of a person sitting in the pilot's seat. From the lower left of the figure, the solid two piece rectangle is the modeled nose wheel fork which is also pictured in Figure 4.2. The tube going from the nose wheel fork up is referred to as the nose wheel attachment tube, and is also shown in Figure 4.3. Joining the nose wheel attachment tube to the torque tube is the T bracket, best seen in Figure 4.4. Extending back from the torque tube are the two

longitudinal tubes, enlarged in Figures 4.3 and 4.5. The longitudinal tubes are secured to the cross tube by the longitudinal attachment bolts, appearing again in Figure 4.6. Extending from these junctions, duplicated in Figures 4.7, and 4.8 are the gear legs, expanded in Figures 4.9 and 4.10, which end with the axles.

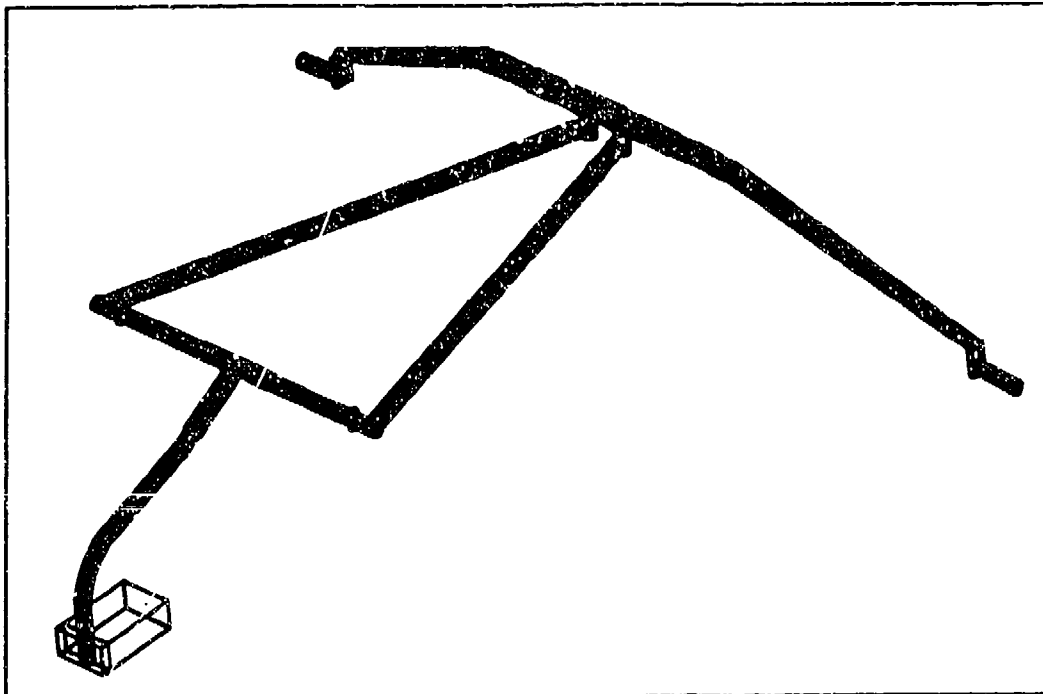


Figure 4.1: Computer Simulation of Wheeled Gear System

Figure 4.2 illustrates how elements 96 and 95 extend into the junction of element 130 and 131 making up the nose wheel fork. From Figure 4.4 the T bracket can be better visualized. Element 102 is the upper end of the nose wheel attachment tube, while element 103 is the base of the T bracket. Elements 105 and 104 make up the right and left sides respectively of the T bracket, where elements 115 to 120 are the portions of the torque tube sleeved inside the T bracket

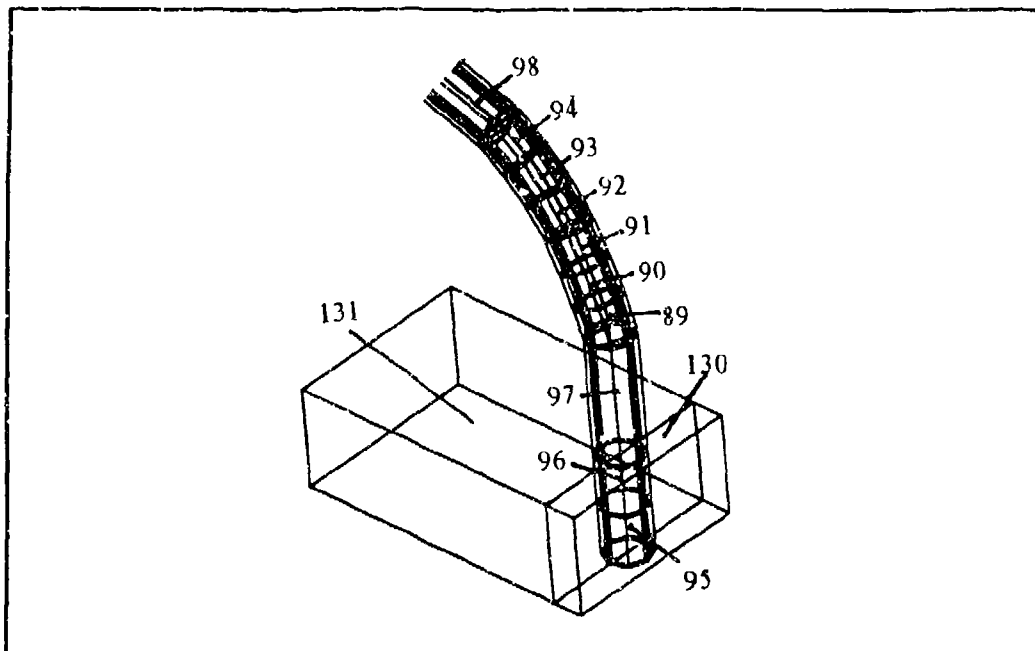


Figure 4.2: Nose Wheel Fork and Nose Wheel Attachment Tube

Figures 4.3 and 4.5 are the left and right longitudinal tubes respectively.

Figure 4.6 is the center portion of the aft gear. Elements 157 to 159 and 154 to 156 make up the right and left longitudinal bolts respectively. Elements 141 and 132 are the last elements of the longitudinal tubes. Elements 85 to 88 are the solid joining rod inside the cross tube held in place by the hollow ends of the gear legs. Elements 70 to 77 form the center portion of the cross tube, while elements 53 and 54 are the last elements of the right gear leg. Elements 55 and 56 are the mirror images of elements 53 and 54 for the left gear leg.

Figure 4.7 is the horizontal portion of the right gear leg. Elements 63 to 70 are the right end of the cross tube while the remainder of the elements pictured form the gear leg. The same structure is evident in Figure 4.8 where elements 77 to

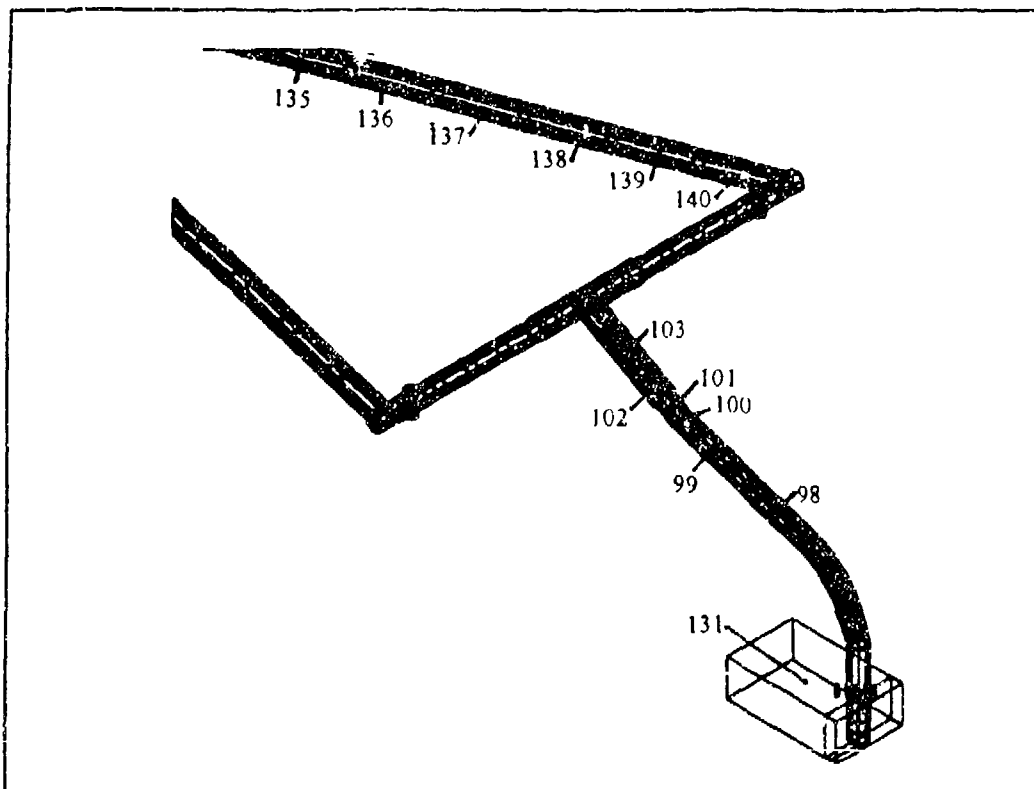


Figure 4.3: Forward Portion of Gear

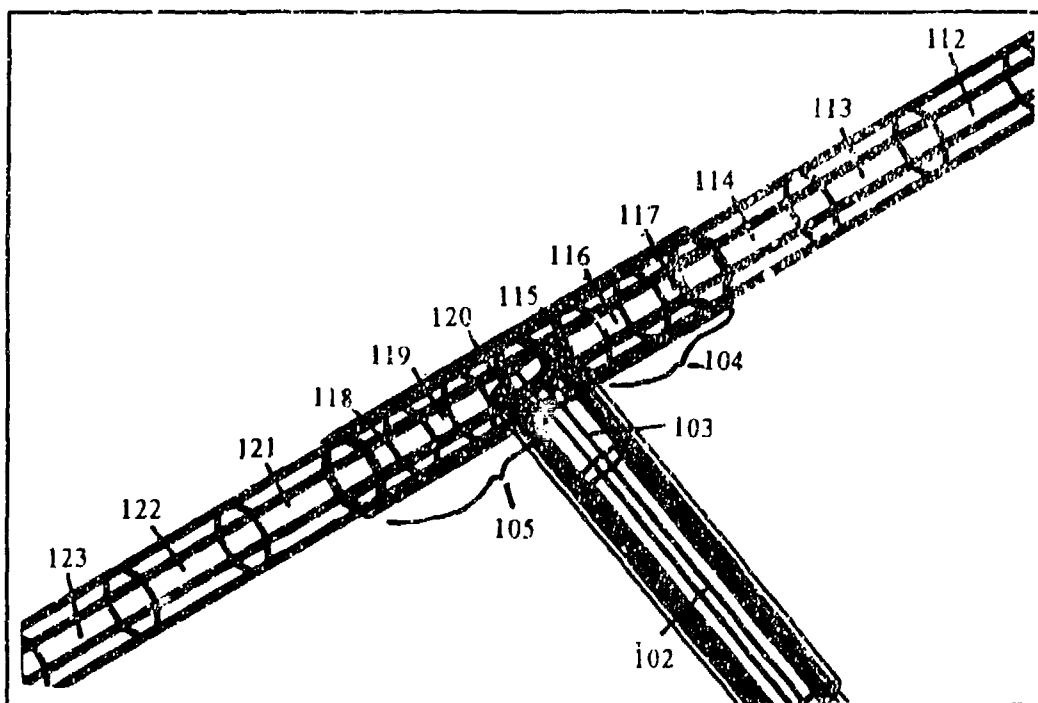


Figure 4.4: T Bracket

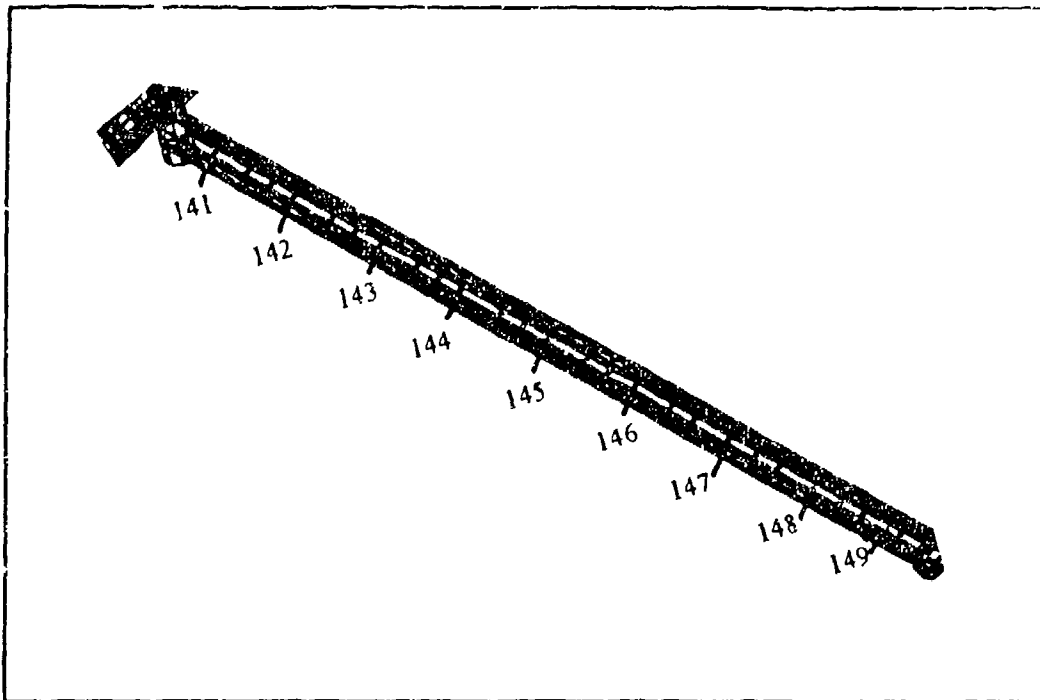


Figure 4.5: Right Longitudinal Tube

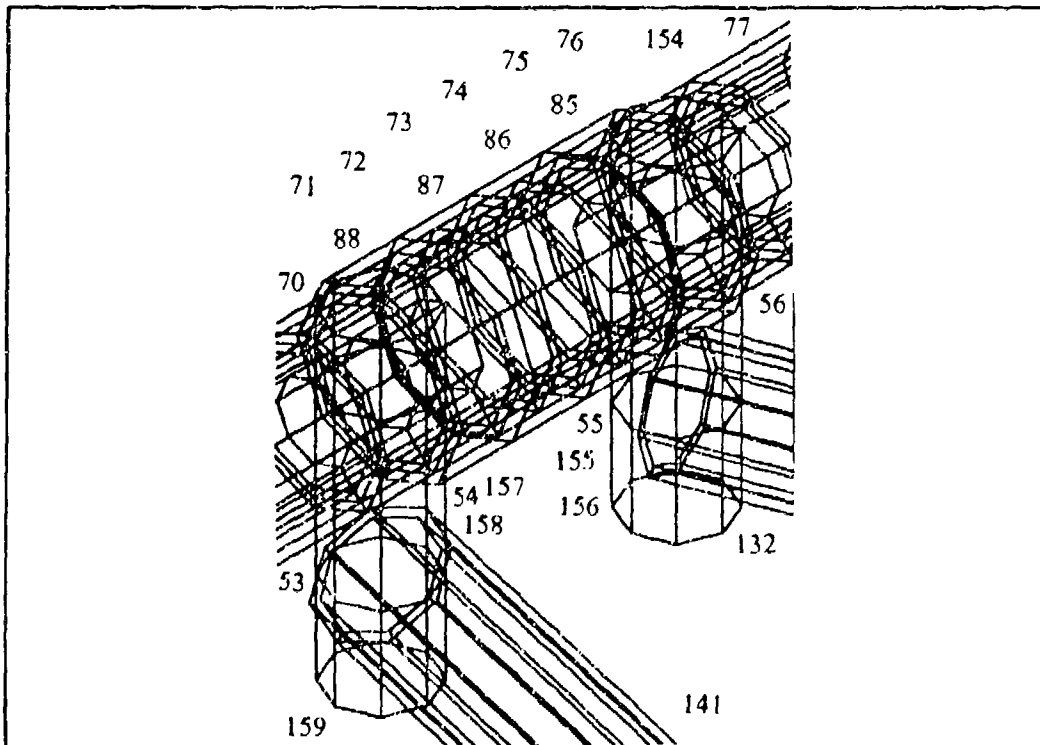


Figure 4.6: Center Aft Crosstube

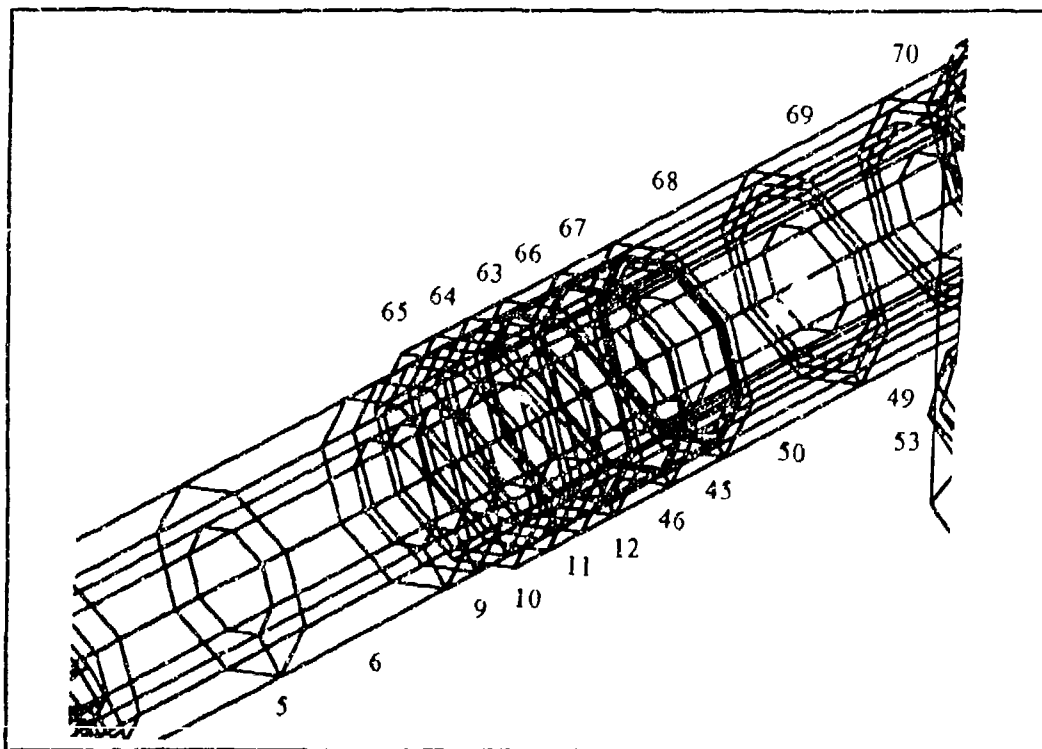


Figure 4.7: Attachment Point of Right Gear Leg and Aft Crosstube

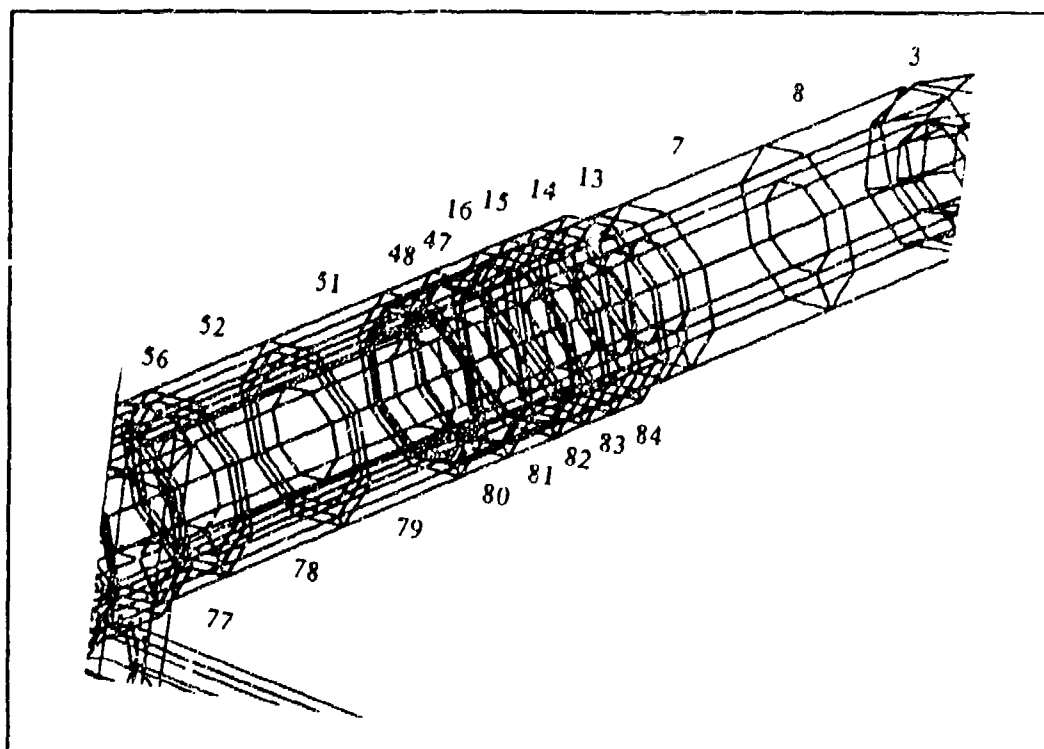


Figure 4.8: Attachment Point of Left Gear Leg and Aft Crosstube

84 are located on the left portion of the cross tube and the balance are on the left gear leg. Figures 4.9 and 4.10 show the right and left gear legs and axles respectively.

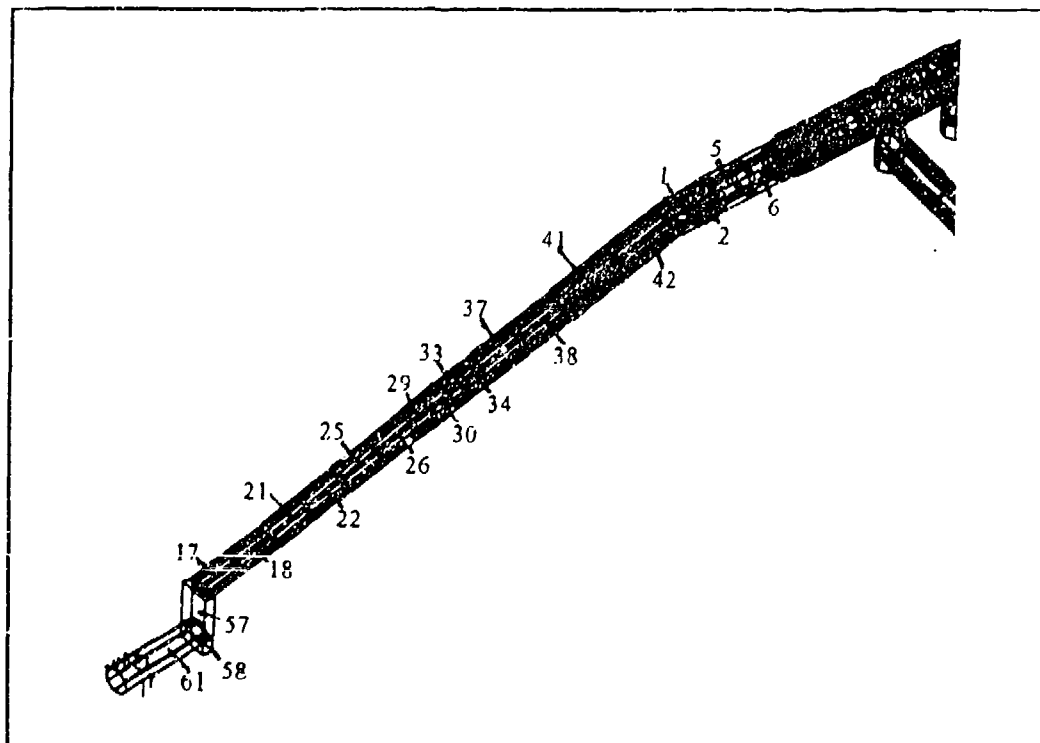


Figure 4.9: Right Gear Leg

Figures 4.11 and 4.12 are the right and left joints of the forward end of the longitudinal tubes with the torque tube. Elements 152, 153 and 150, 151 make up the bolts securing the longitudinal and torque tube together. These joints are modeled as the intersection of two tubes rather than the gear's bent longitudinal tube sleeving over the outer ends of the torque tube.

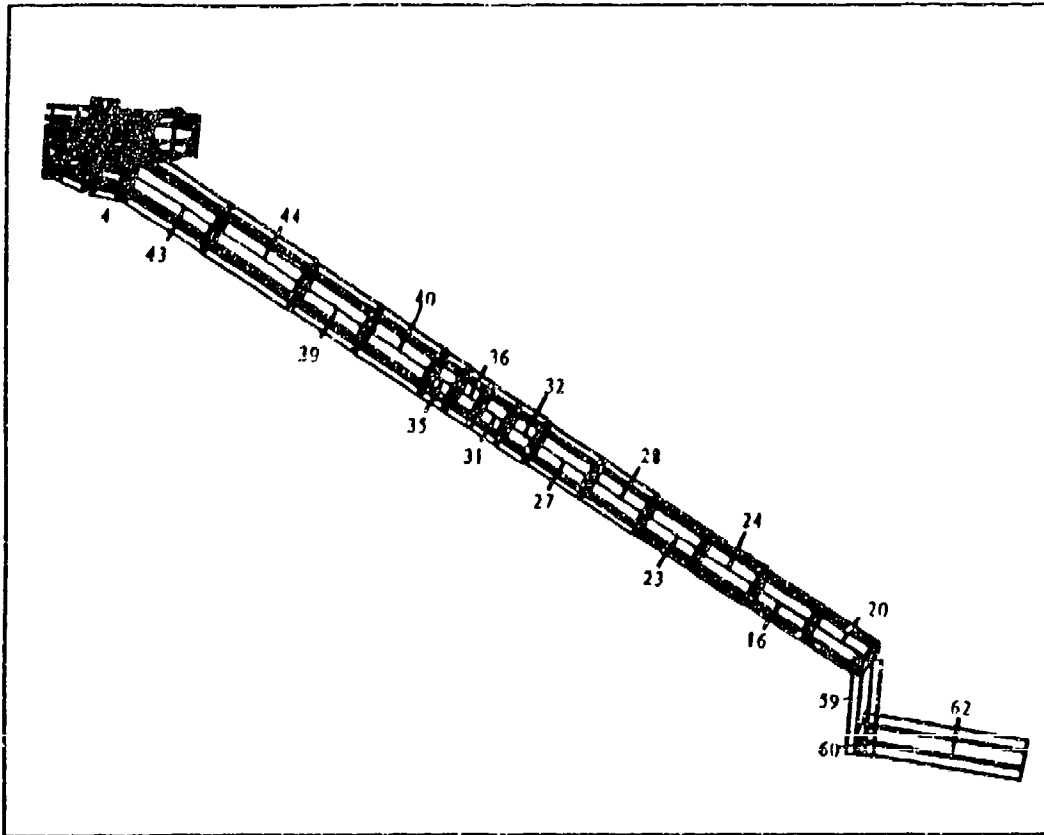


Figure 4.10: Left Gear Leg

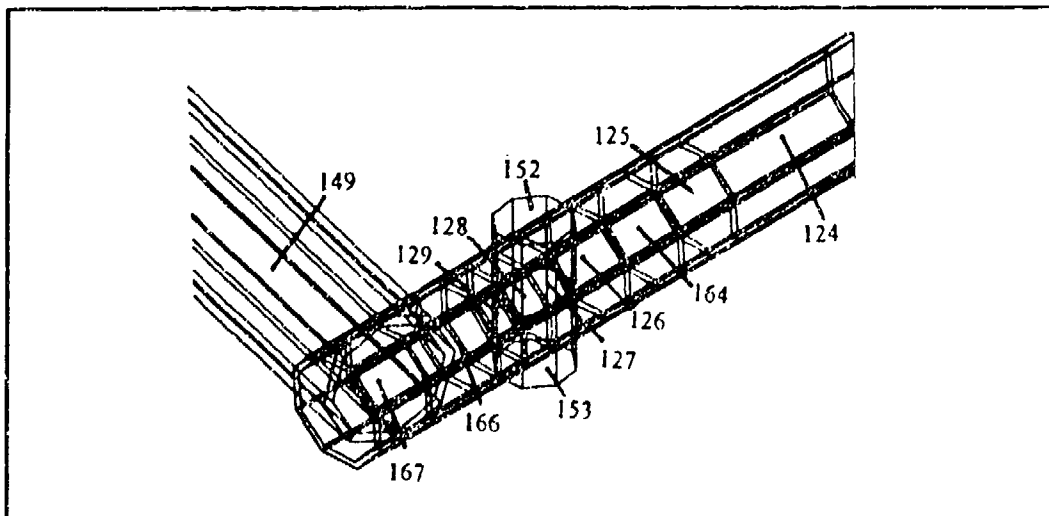


Figure 4.11: Attachment Point of Right Longitudinal Tube and Torque Tube

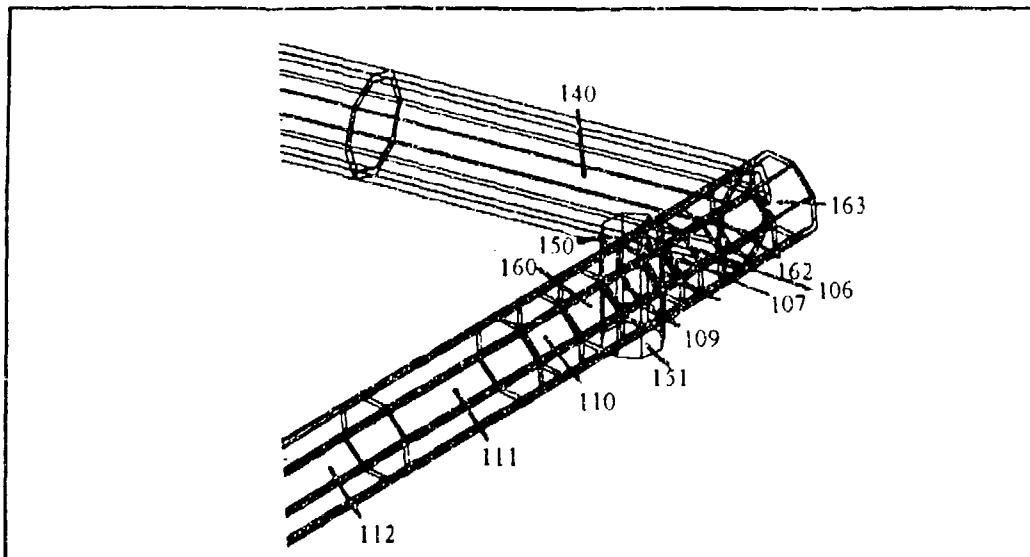


Figure 4.12: Attachment Point of Left Longitudinal Tube and Torque Tube

2. Model Assumptions and Differences

A number of simplifying assumptions were required by the GIFTS model.

The assumptions included.

- The welds on the forward portion of the longitudinal tubes were not modeled. As an approximation, the intersection of two tubes was used.
- The nose wheel fork was modeled as a solid rectangular piece of 4130 Steel (Alloy Digest, 1988). Deflections in this piece were unlikely to occur prior to plastic deformation of outer portions of the structure and thus this simplification was acceptable.
- The solid plugs in the center of the aft portion of the longitudinal tubes, through which the bolts run were not included in the computer model.
- The spacers on the aft bolts were excluded from the model
- The tires were omitted from both the computer model and the experimental wheeled gear test apparatus.
- The axles were modeled as rectangular and circular segments and did not include the attachment hardware.

- The tapering of the gear leg was modeled as seven constant diameter sections. Each section's diameter was different from the next, approximating a tapered tube.
- The simulated loads were applied directly at the helicopter attachment points. In the test structure, the loads were applied at a box beam structure which in turn transmits the loads to the wheeled gear via the gear attachment points.
- All sleeved components were modeled as fixed point loads and were thus not allowed to move in relation to each other. This assumption was acceptable because under the loading conditions tested, the bolts used in the gears assembly similarly limited movement.
- Compound curves, (one curve in each gear leg and two in the nose wheel attachment tube), were modeled as simple quadratic.
- The gussets on the attachment tube between the torque tube and the nose wheel attachment tube were not modeled.
- All bolts were modeled assuming 6150 steel (Alloy Digest, 1955) rather than the Grade 8 steel used in the gear construction.

C. LANDING TEST RESULTS

In accordance with the test plan in Appendix C, landing simulations were conducted using the GIFTS software. The data was grouped by aircraft CG location, with each run increasing the weight from the previous run until the structure was loaded to aircraft maximum gross weight and are contained in Appendix F. Included in each data set was the load placed at each mount point, the displacement of points 31 and 110 and the normal and shear stresses at the seven locations corresponding to the strain gage locations on the actual gear.

The experimentally derived wheeled landing gear results will be discussed in Chapter VI.

Where the GIFTS tests were not duplicated with experimental data, a survey of the failure points was conducted. This information was valuable because it would contribute to inspection criteria of the gear after a hard landing. Knowledge of the critical portion of the gear, where failure may occur when the aircraft was subject to a hard landing, allows for appropriate inspections of the gear and warning of the need to replace if warranted.

1. Different Center of Gravity Locations

Five different center of gravity locations were chosen for GIFTS software simulations. The centerline center of gravity was located along the centerline of the aircraft laterally and was midway between the fore and aft longitudinal CG limits, at STA 110. The other four were located four inches beyond the lateral and longitudinal limits. Aft, right refers to the CG location of STA 118, LAT -7, aft, left was located at STA 118, LAT 8, forward right was placed at STA 101.5, LAT -7 and forward left was situated at STA 101.5, LAT 8. Figure 4.13 presents the test CG locations.

Figures 4.14 and 4.15 show the CG limits of the TH-57 B/C.

Four inches outside the limits shown in Figures 4.14 and 4.15 was chosen as an extreme condition based on the fact that if the helicopter was flown in any of these conditions, the control authority of the aircraft would be insufficient to compensate and all landing loads normally experienced would be less than tested here.

The gear was modeled without the tires to keep the computer simulations similar to the configuration of the experimental gear apparatus.

The data from these tests appears in Appendix E.

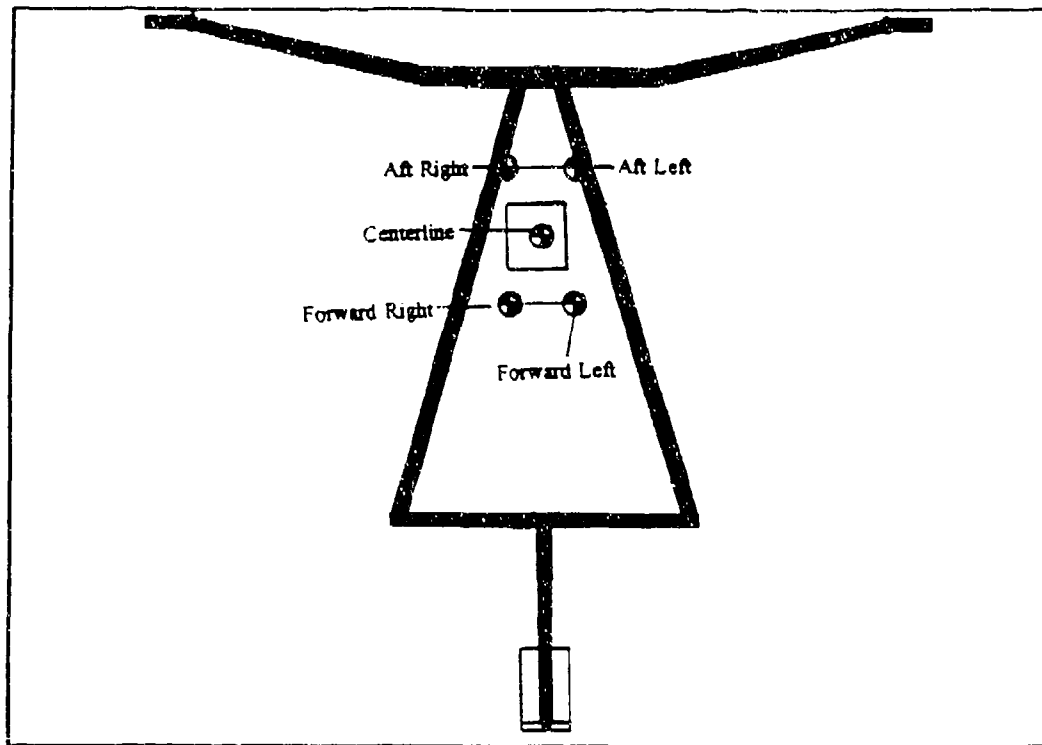


Figure 4.13: Test CG Locations

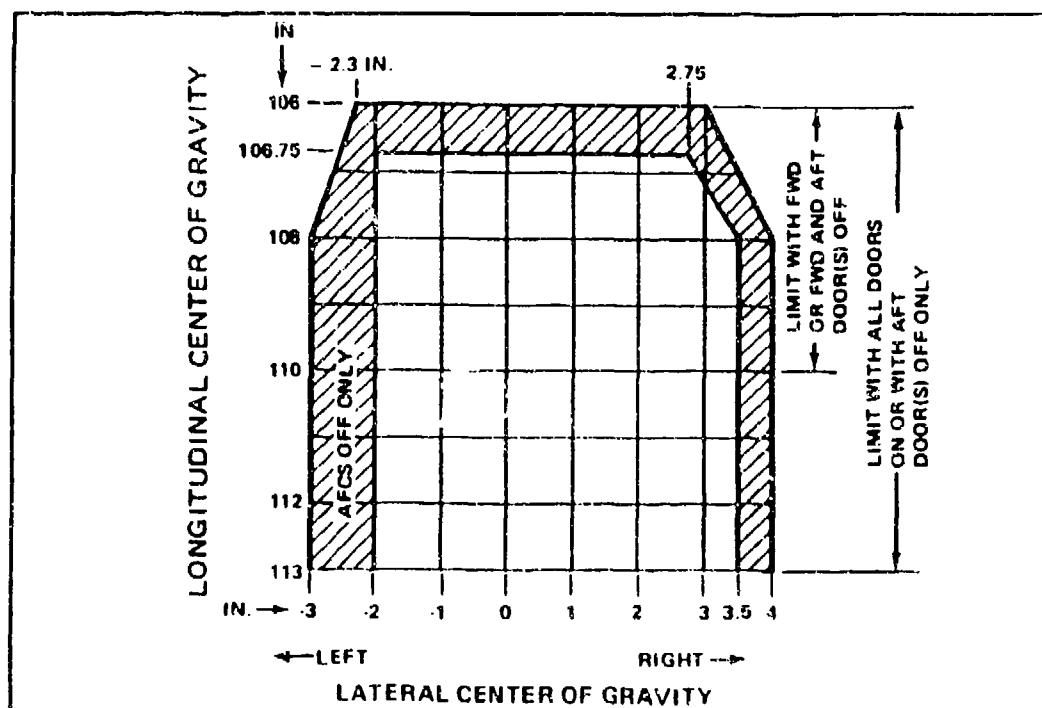


Figure 4.14: Lateral CG Limits

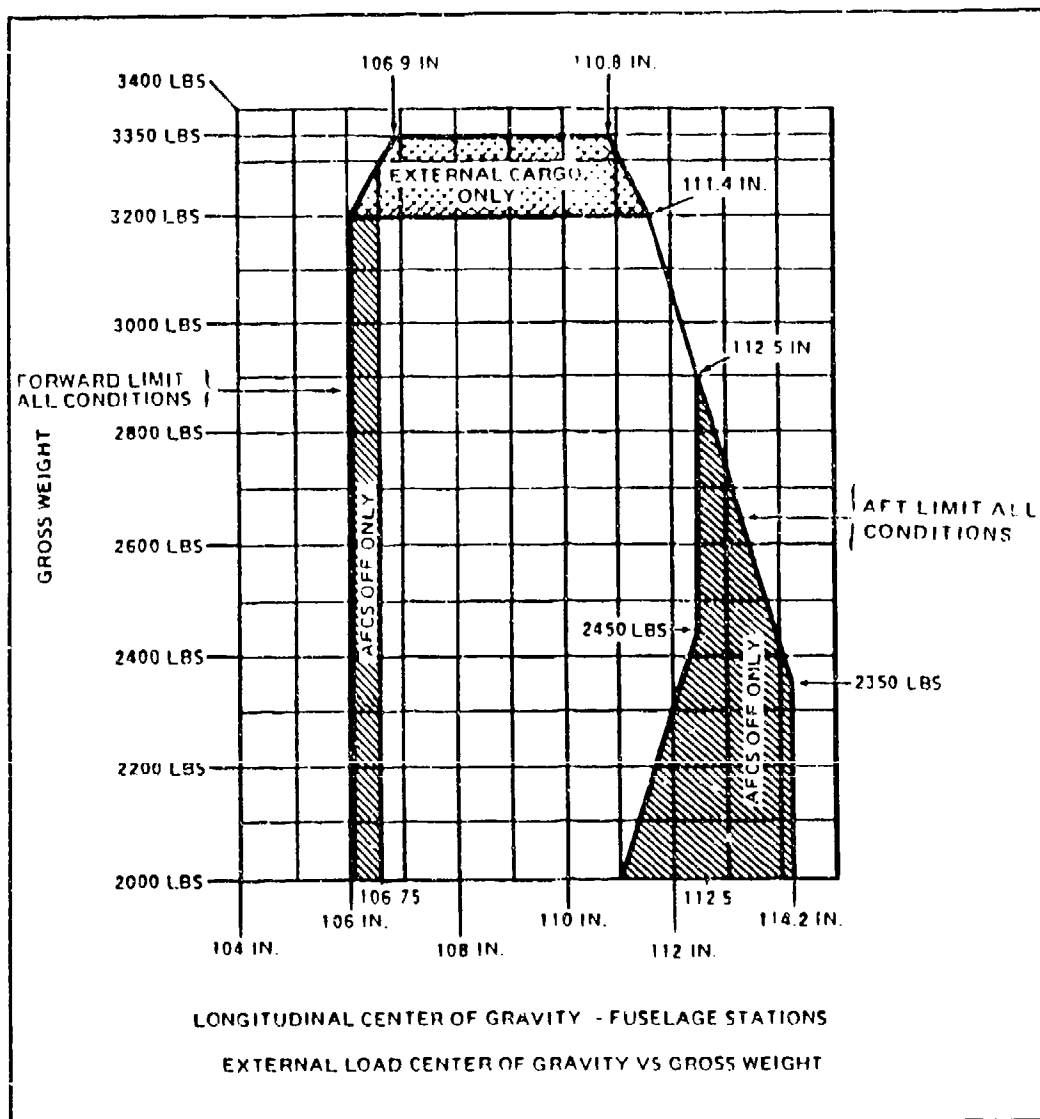


Figure 4.15: Longitudinal CG Limits

2. Single Point Landing

In this series of GIFTS simulations a load of 3200 lbs was placed at one mount point while the other three remained at zero. The intention was to simulate conditions associated with a single point landing.

Since this test was not duplicated experimentally on the physical gear, of interest here were the computer predicted locations of stresses exceeding those of the Von Mises yield stress.

Only one element, number 103 shown in Figure 4.3 reached 100% of yield stress in every CG location except the aft left one. This was validated experimentally when the gear failed at element 103 while testing the forward right CG location.

3. Landing with Obstacles

This test also was not experimentally duplicated and so the results presented here will also emphasize the predicted locations of failure. The aft right CG location at 3gs was investigated. Four configurations were modeled:

- Nose Wheel Fork Elevated
- One Axle Elevated
- Both Axles Elevated
- Nose Wheel Fork and One Axle Elevated

An elevation of 7.5 inches was used because at this height the raising of one axle would move the CG outside the lateral CG limits and the static roll over angle of the helicopter would be reached.

In all four configurations, element 103 was the first to fail and occurred when the helicopter weighed approximately 3600 lbs. The result led to the conclusion that a moderately hard landing with a wheel suspended on an object or lowered into a

depression would cause a bending of the nose wheel attachment tube and the possibility of the main rotor tip path plane striking the ground.

Elements 18 and 19, near the outer end of the gear legs, were the next ones to fail in all four cases. Since this did not occur until the helicopter was subject to a 2g landing, the effect of their failure would be secondary and unlikely to be a primary cause of collateral damage.

D. TOWING

No comparable experimental towing test was conducted on the actual gear. Of primary interest for the GIFTS tests were the stresses the gear would be subject to if towing was attempted with the brakes locked. The first concern was, whether any element experienced stresses exceeding the yield stress and second, the magnitude of deflections.

For the GIFTS test, the model was loaded to the maximum gross weight at the centerline CG and a force of 1470 lbs was applied to the nose wheel fork. A force of 1470 lbs was derived using a coefficient of friction, μ , of .6 corresponding to that of locked brakes on concrete and a μ of .05 for the nose wheel, which does not have brakes (Nicolai, 1954). The calculations appear in Appendix C, the test plan.

Table 4.1 contains typical results from element 103, the only element predicted to exceed yield strength. X/L PT is the X distance divided by the length, L, of the element thus an X/L of 0.0 is the beginning of the element. Stringer locations start at

the top of the element and are numbered counter clockwise. The % yield stress column is the percent yield stress computed by the von Mises method.

TABLE 4.1 VON MISES FAILURE CRITERION

X/L STRINGER %YIELD STRESS			X/L STRINGER %YIELD STRESS		
PT.			PT.		
0.00	1	8.12%	0.50	5	8.12%
0.00	2	89.63%	0.50	6	110.25%
0.00	3	127.05%	0.50	7	155.15%
0.00	4	89.63%	0.50	8	110.25%
0.00	5	8.12%	1.00	1	8.12%
0.00	6	92.28%	1.00	2	125.56%
0.00	7	129.71%	1.00	3	177.94%
0.00	8	92.28%	1.00	4	125.56%
0.50	1	8.12%	1.00	5	8.12%
0.50	2	107.59%	1.00	6	128.22%
0.50	3	152.49%	1.00	7	180.60%
0.50	4	107.59%	1.00	8	128.22%

Figure 4.16 shows the deflection of the gear as a solid line, with the dotted line indicating the undeformed condition. The nose wheel fork was predicted to experience the greatest displacement of 4 inches forward, while the rear gear legs dropped by 2 inches. The torque tube was predicted to be 2.3 inches lower. The axles were spread out by one inch.

V. STATIC TESTS OF WHEELED GEAR SYSTEM

A. PURPOSE

Static testing was performed on the wheeled gear system to validate GIFTS results so additional testing could be accomplished by simulation with a degree of confidence.

B. THE TEST RIG

The gear was assembled (without tires) and placed on stacked I beams. A box beam structure, weighing approximately 150 lbs, shown in Figure 5.1, was placed on top of the gear. The box beam was equipped with four TH-57 landing gear mounting brackets for attachment to the landing gear. At each of the box beam's four corners, was an eyebolt and from which was hung a series of shackles, a turnbuckle and a load cell (Dillon Dynamometer). Each set weighed from 12 to 15 lbs. The load cell was in turn mounted to the floor. Tightening of the four turnbuckles produced a downward load on the box beam structure thereby loading the gear to the desired weight and CG location. The test rig is shown in Figures 5.2 and 5.3. Figure 5.4 depicts the elements where the strain gages were located.

C. GEAR MODIFICATIONS

The wheeled gear configuration tested here was the third design. The first design tested had 14.5 inches, vice the 4.5 currently, between the rear longitudinal

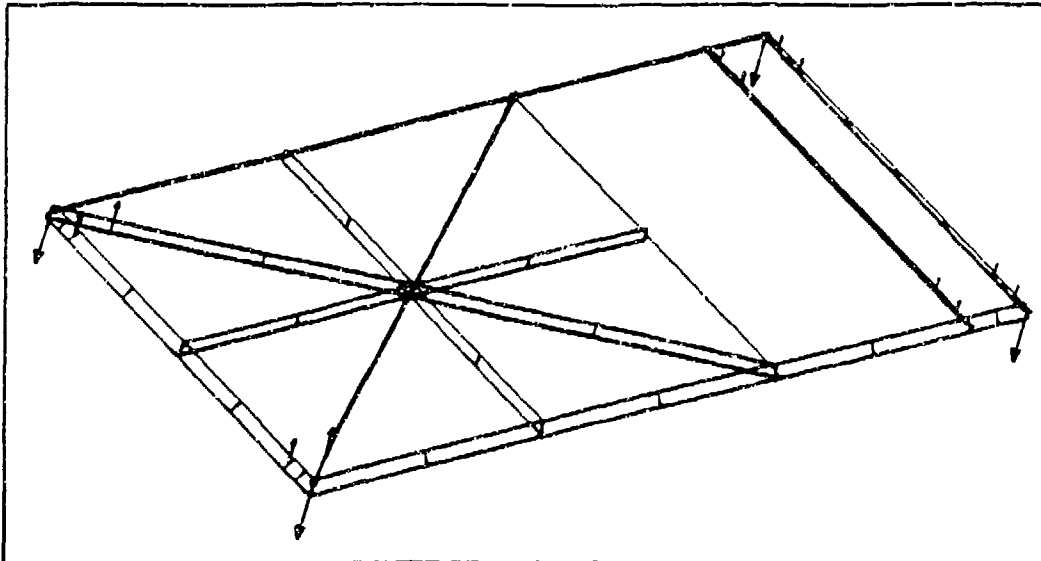


Figure 5.1: Box Beam Load Applying Structure

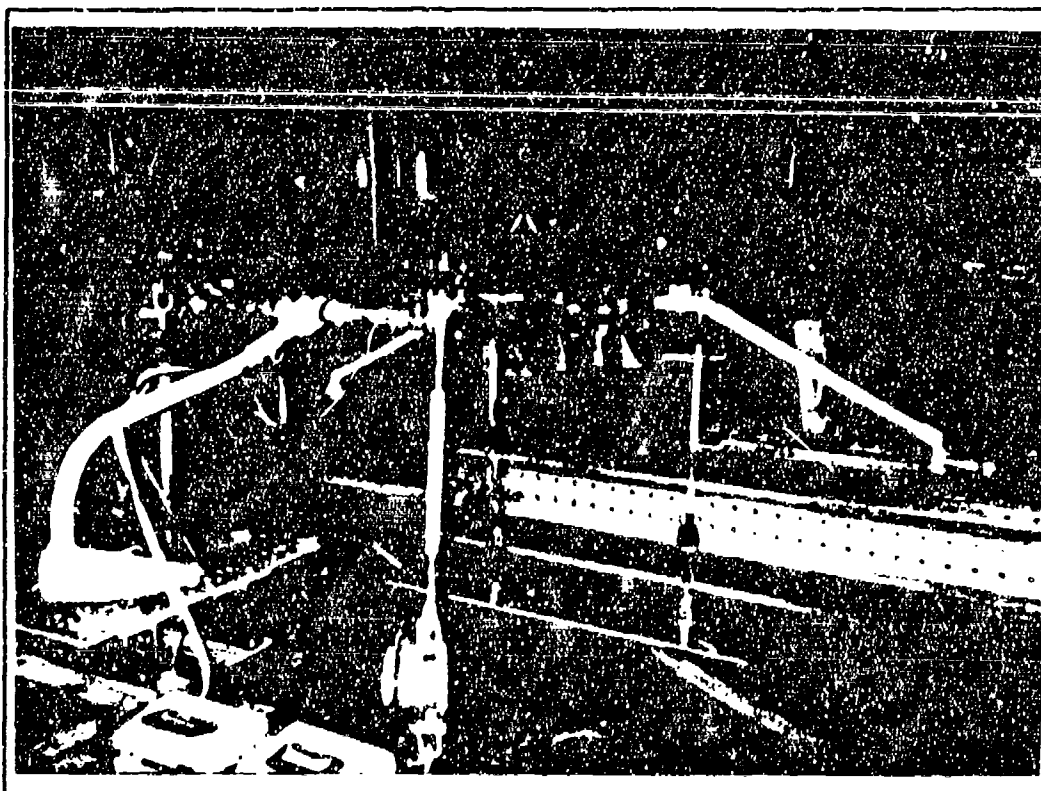


Figure 5.2: Test Rig Front View

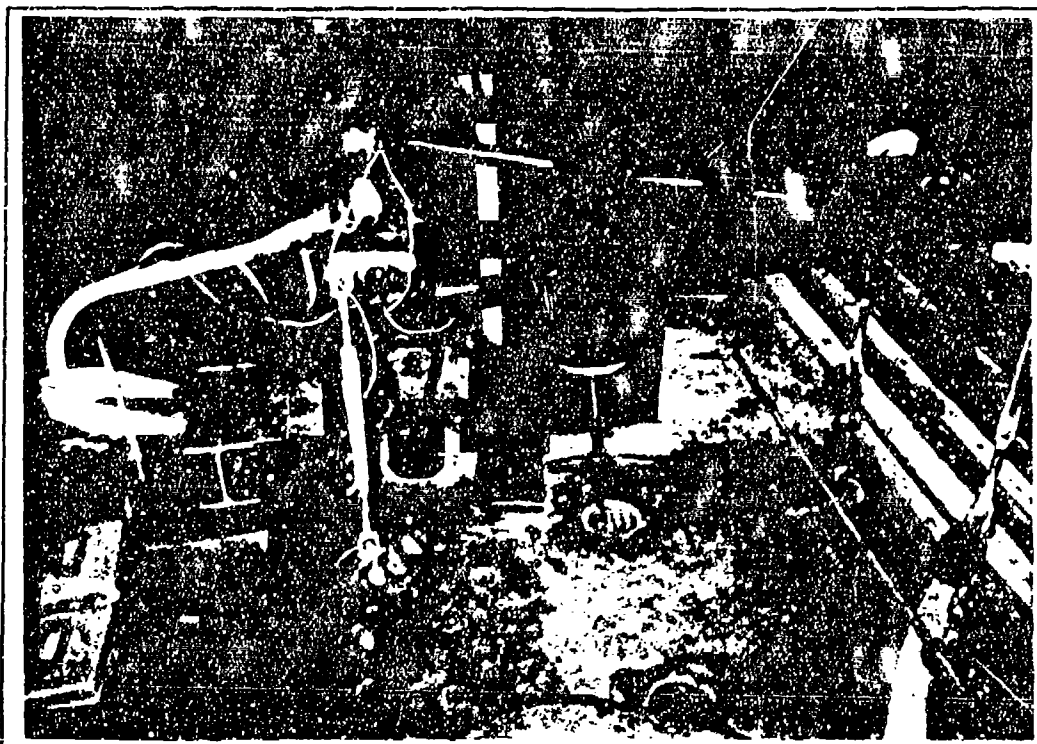


Figure 5.3: Test Rig Side View

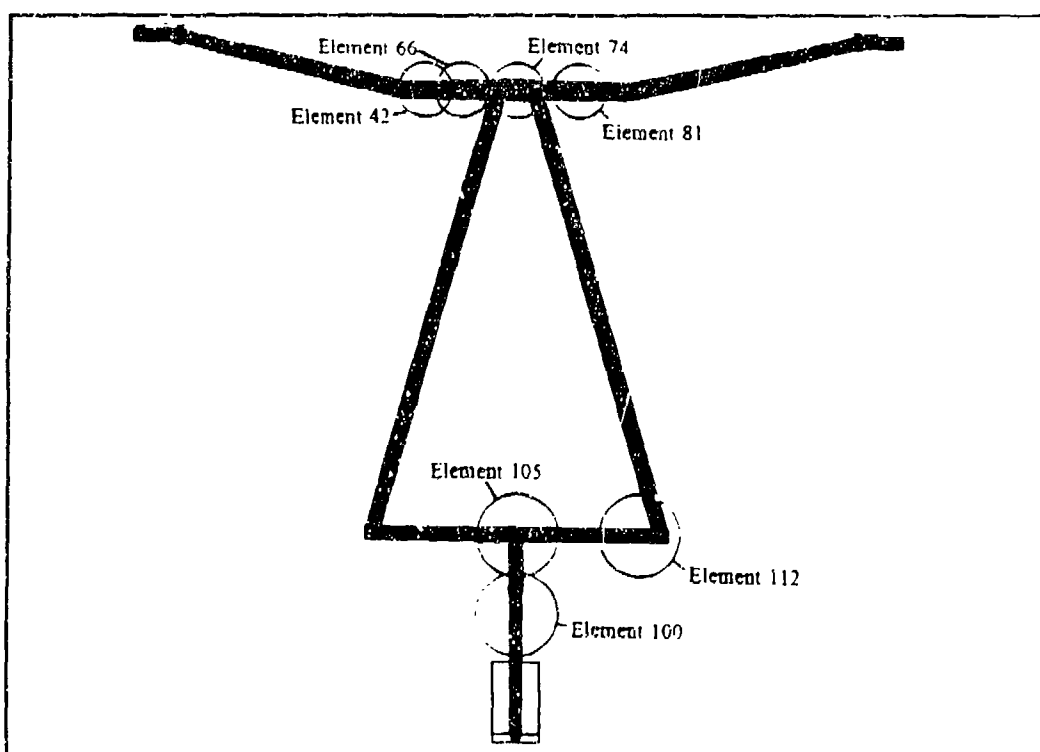


Figure 5.4: Elements Containing Strain Gages

mounting points. When this design was loaded to 3200 lbs (aft right CG) a deflection in the aft crosstube exceeding five inches was experienced, and the crosstube itself was bent. In addition to shortening the crosstube, to minimize the deflection, a 4130 steel rod (1 1/4 inch diameter) was sleeved into existing holes in the gear legs for additional support.

The gear for the first two tests had the longitudinal tubes mounted under the crosstube and the torque tube and secured by one vertical bolt through both tubes. This arrangement still exists on the aft crosstube, shown in Figure 5.5, to ensure adequate clearance of the undercarriage of the aircraft.

During the second set of tests, the grade 8 steel bolts securing the forward end of the longitudinal tubes were bent. Element 112 which was closest to this point experienced a stress of $-1.05E4$ psi with the yield stress being $6.33E4$ psi. The simplifications made in the computer model resulted in inadequate prediction of stress in the bolts.

To correct this deficiency, the gear was reconfigured with a cap piece welded on the end of the longitudinal tube and then sleeved over the end of the torque tube as shown in Figure 5.6. This configuration was used for the remainder of the tests.

D. RESULTS

1. Preliminary Results

Differences in the predicted results vs the actual results, examined prior to the plastic deformation of the bolt, were thought to be related to the inability of the

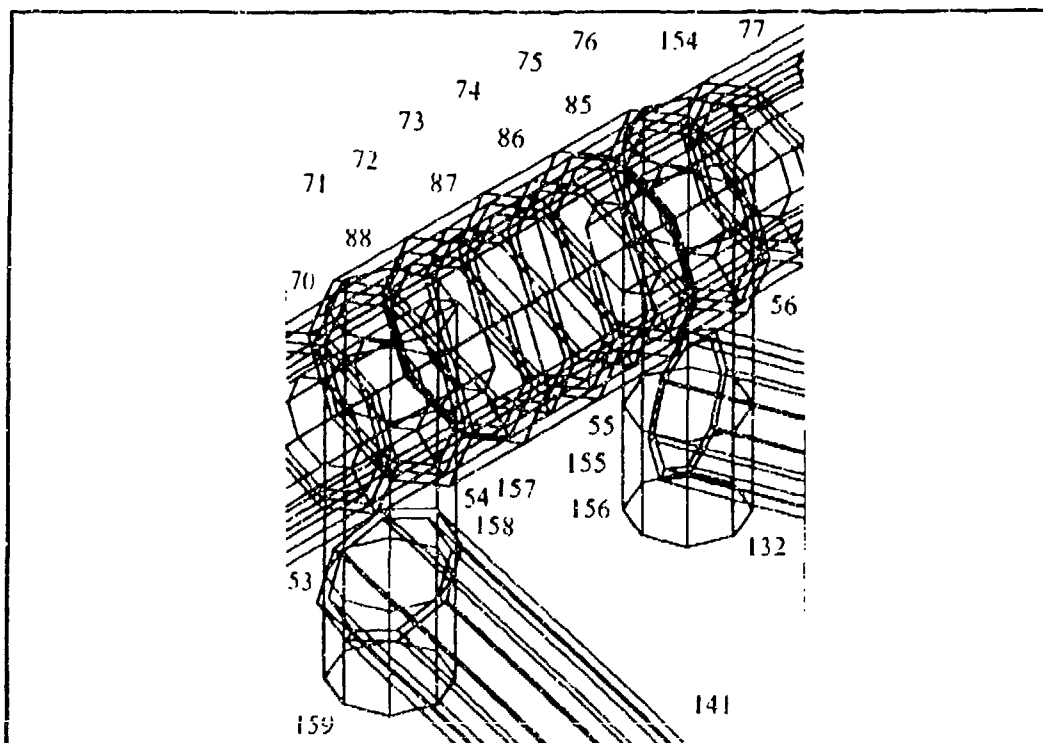


Figure 5.5: Center Aft Crosstube

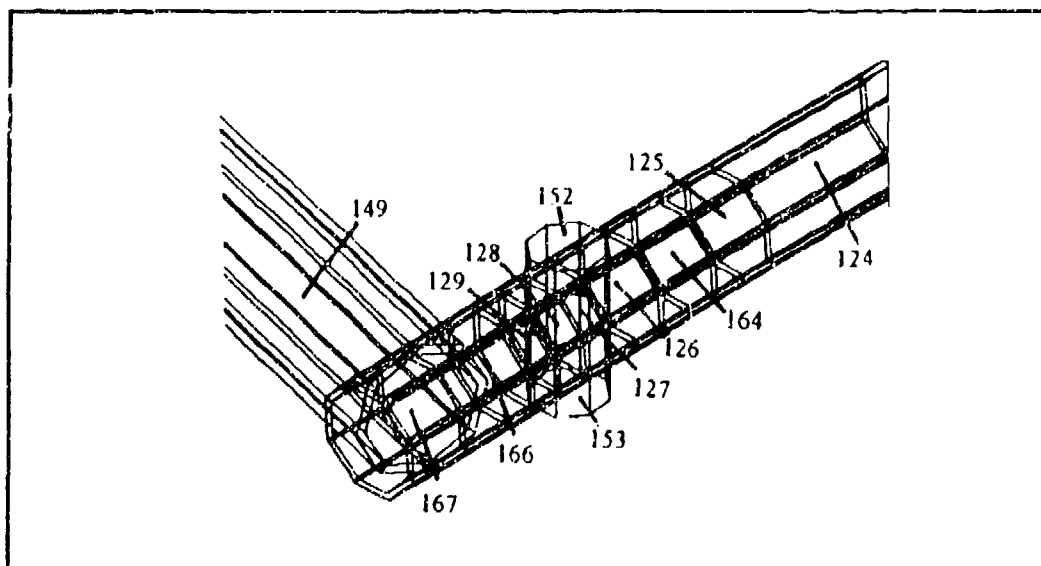


Figure 5.6: Junction of Longitudinal Tube and Torque Tube

axles to move freely. Therefore, for the remainder of the tests, the axles rested on 1/8 inch sheets of teflon.

2. Defective Gages

The 45° strain gage of the rosette at element 81 was damaged during installation and the 45° strain gage of the rosette at element 100 was damaged during testing. The remaining strain gages of those rosettes were inadequate to obtain a valid comparison with the predicated stress values. The data from element 100 is shown in Figure 5.7.

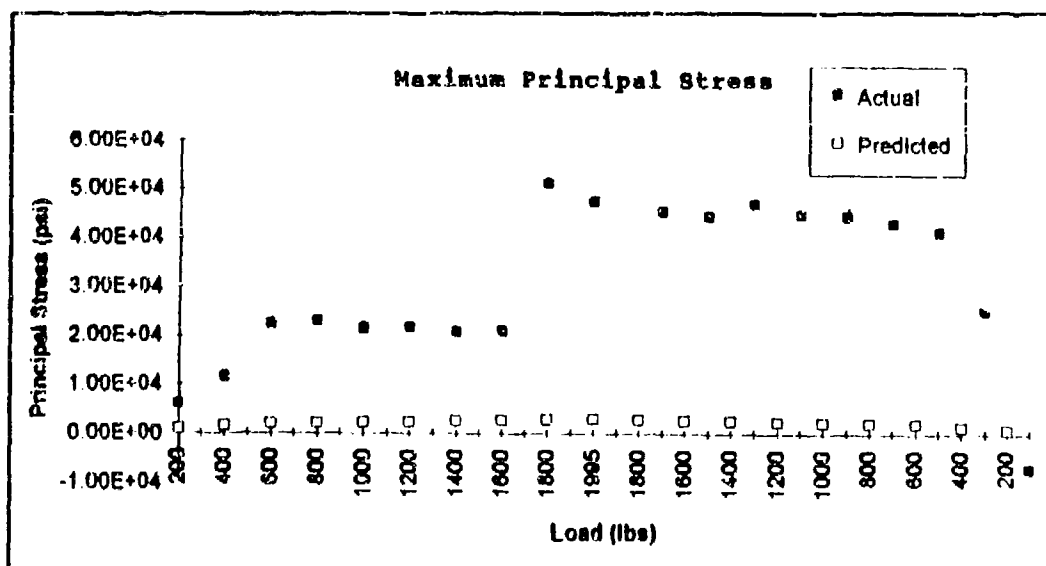


Figure 5.7: Element 100, Aft Right CG Location

3. Elements 100 and 195 Results

Rosettes at elements 112, 105 and the lateral strain gage from element 74 were measured by the SB-10 Switch and Balance Unit and the P-3500 Strain Indicator and the balance of the rosettes at elements, 44, 66 and the 45° and longitudinal strain

gages of element 74 were measured by two BAMIs. Test gear is described in detail in Appendix C.

From the results in Figures 5.8 to 5.11 for element 112 and Figures 5.12 to 5.15 for element 105 it appeared a problem existed with the P-3500 in reading the higher microvoltages. The gages exhibit expected results at lower loads and good correlation with the predicted results, but at higher loads they appeared to achieve a maximum value.

During trouble shooting, a decade box was wired in parallel with the compensating resistor and the P-3500 indicated the correct values. The P-3500 and the SB-10 were also verified to correctly measure the strain.

4. Element 74

During the trouble shooting, the decade box was also used to check the BAMIs readings. Instead of the expected 1000 microstrains, values of 225 to 650 microstrains were obtained. Consequently all results taken from the BAM1's were multiplied by the appropriate gain factor. The resulting data was better than the uncorrected readings, where test values differed from the predicted values not only by magnitude but by sign.

Element 74's corrected results indicated it experienced stresses beyond the yield stress of $6.33E4$ psi at all five CG locations as shown in Figures 5.16 and 5.17. Because no permanent deformation of the element was observed, it was hypothesized that the erroneous data was a result of the previously discussed problem with the P-3500 and/or the gain factor associated with the BAM1 readings.

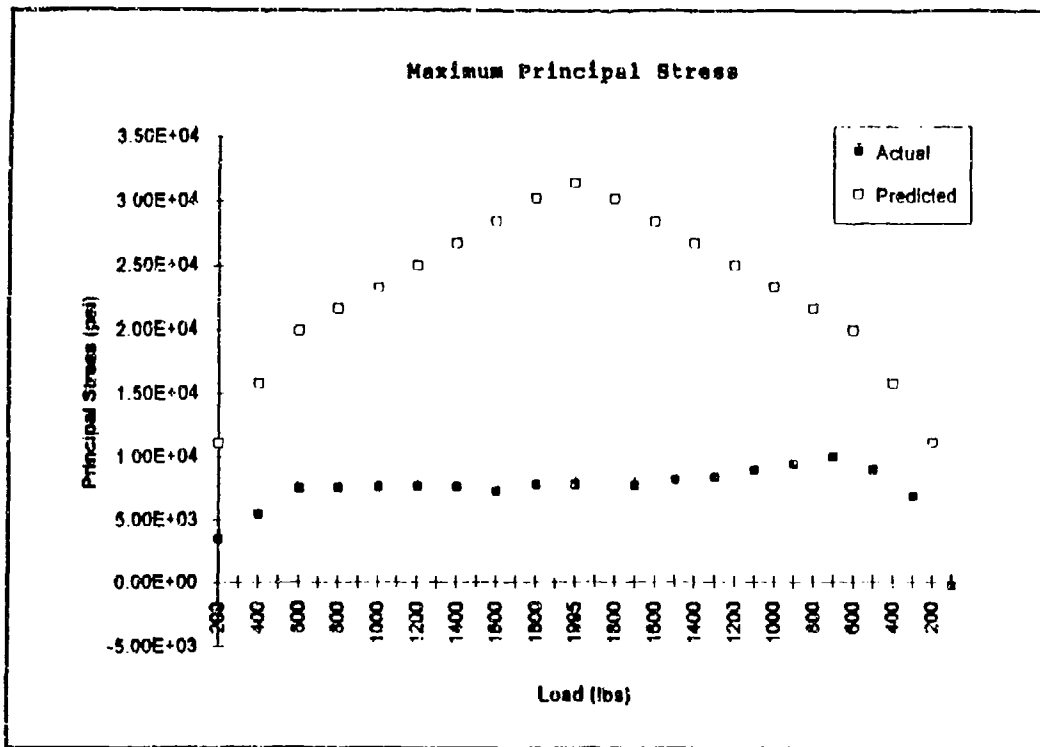


Figure 5.8: Element 112, Aft Right CG Location

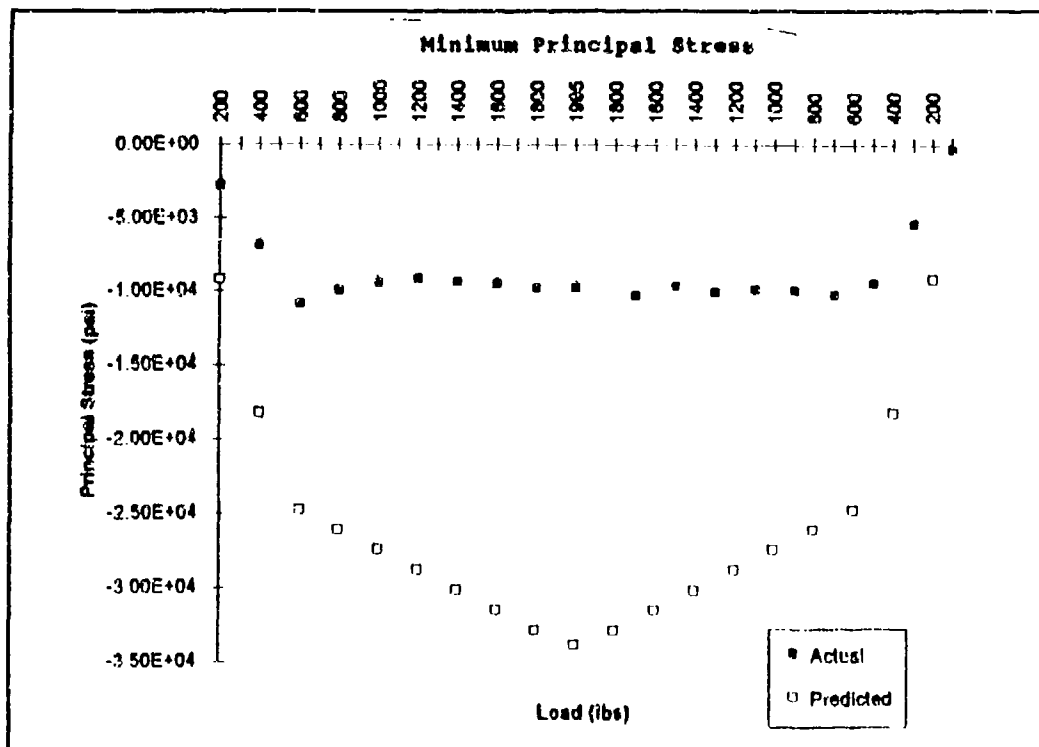


Figure 5.9: Element 112, Aft Right CG Location

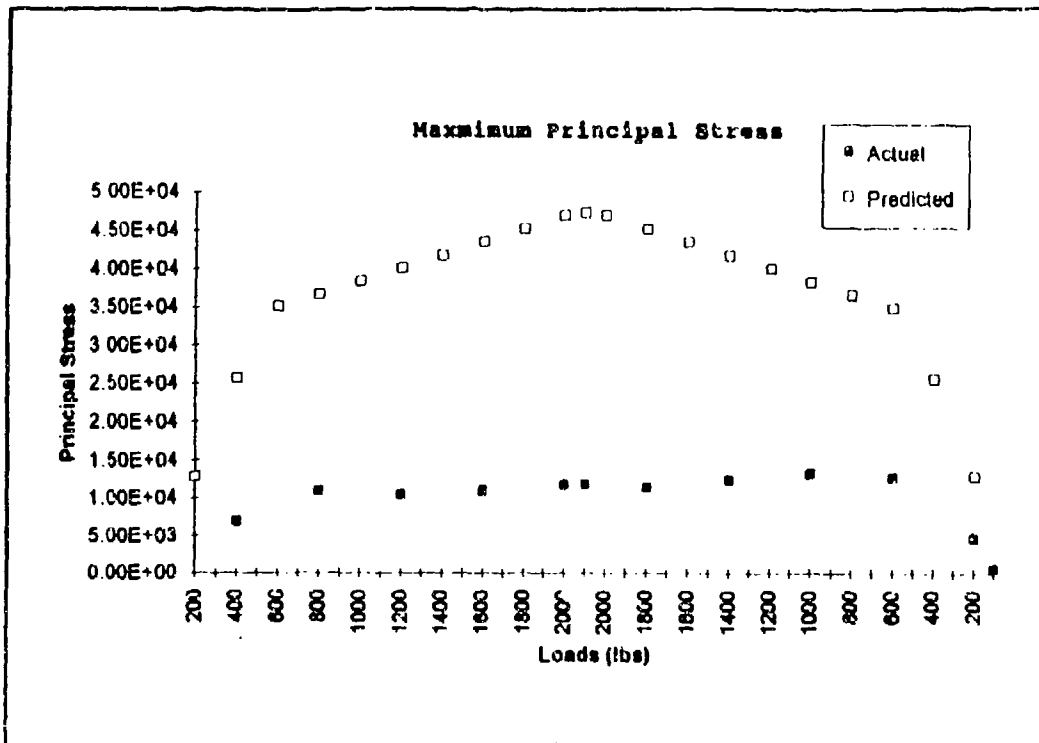


Figure 5.10: Element 112, Aft Left CG Location

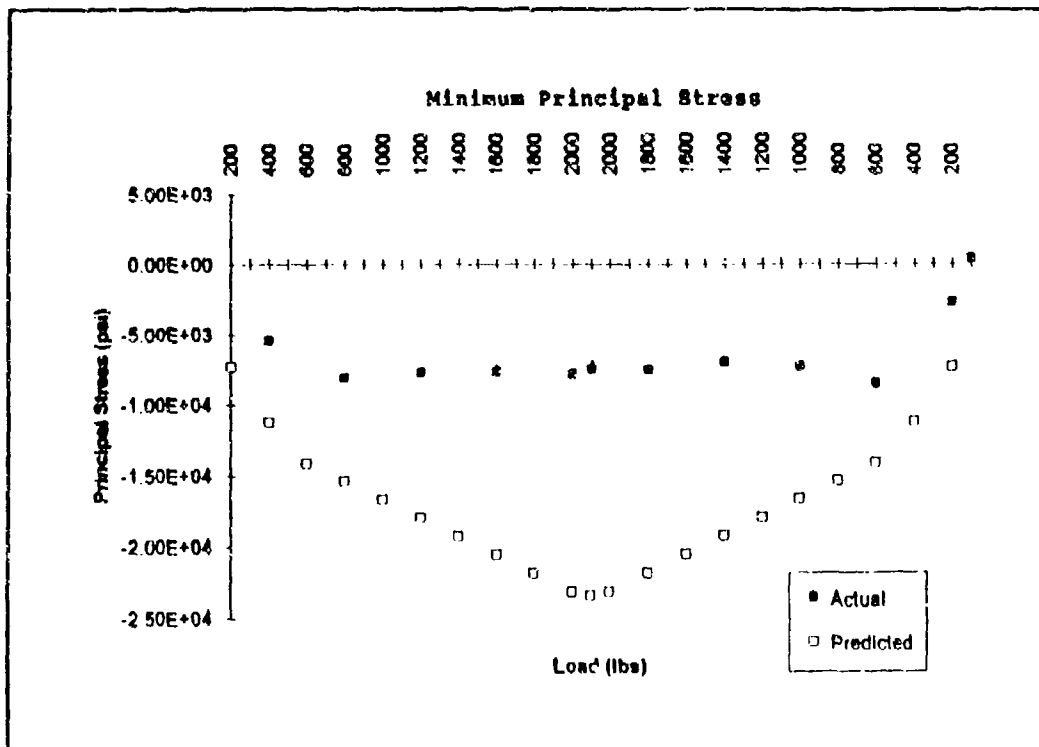


Figure 5.11: Element 112, Aft Left CG Location

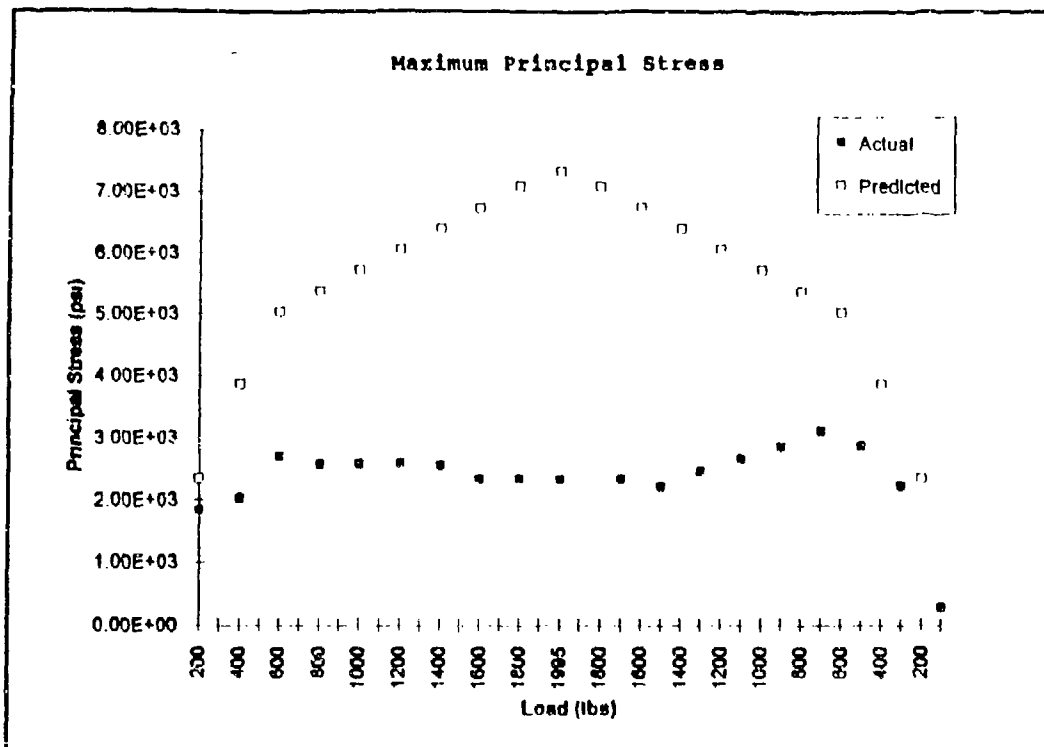


Figure 5.12: Element 105, Aft Right CG Location

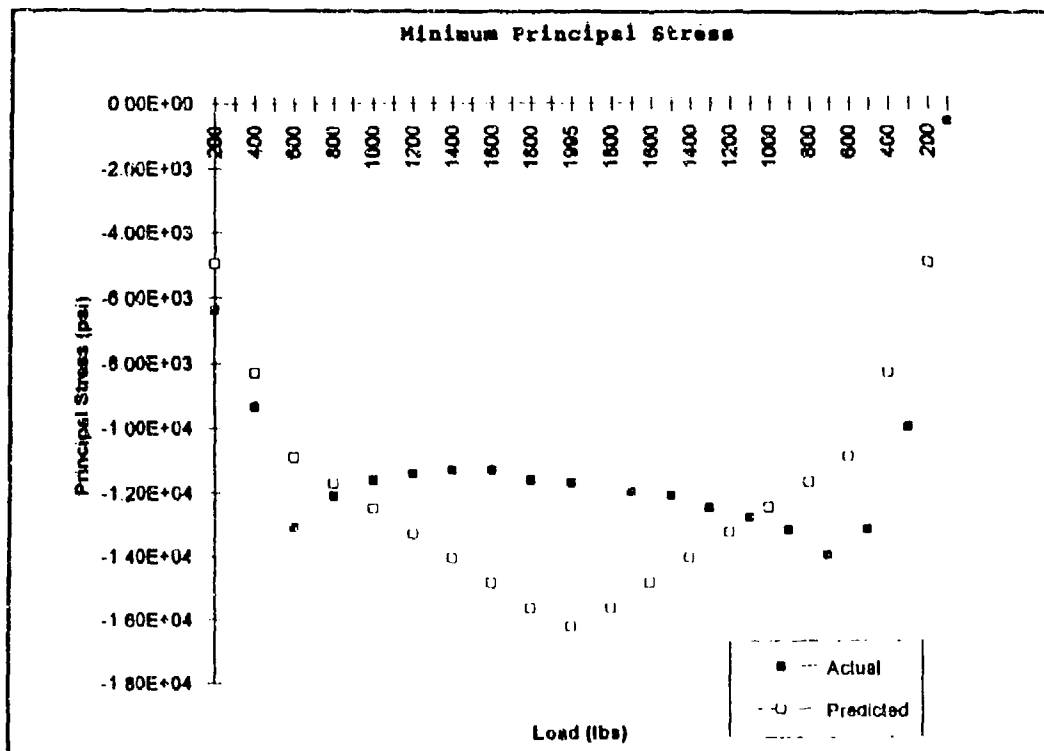


Figure 5.13: Element 105, Aft Right CG Location

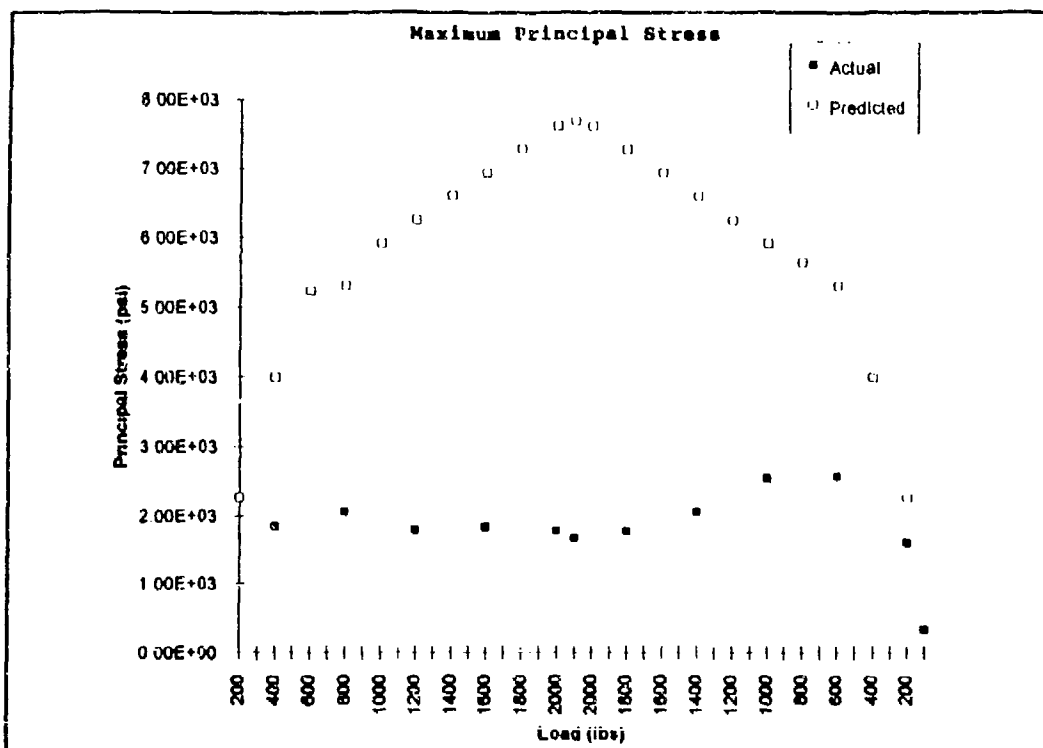


Figure 5.14: Element 105, Aft Left CG Location

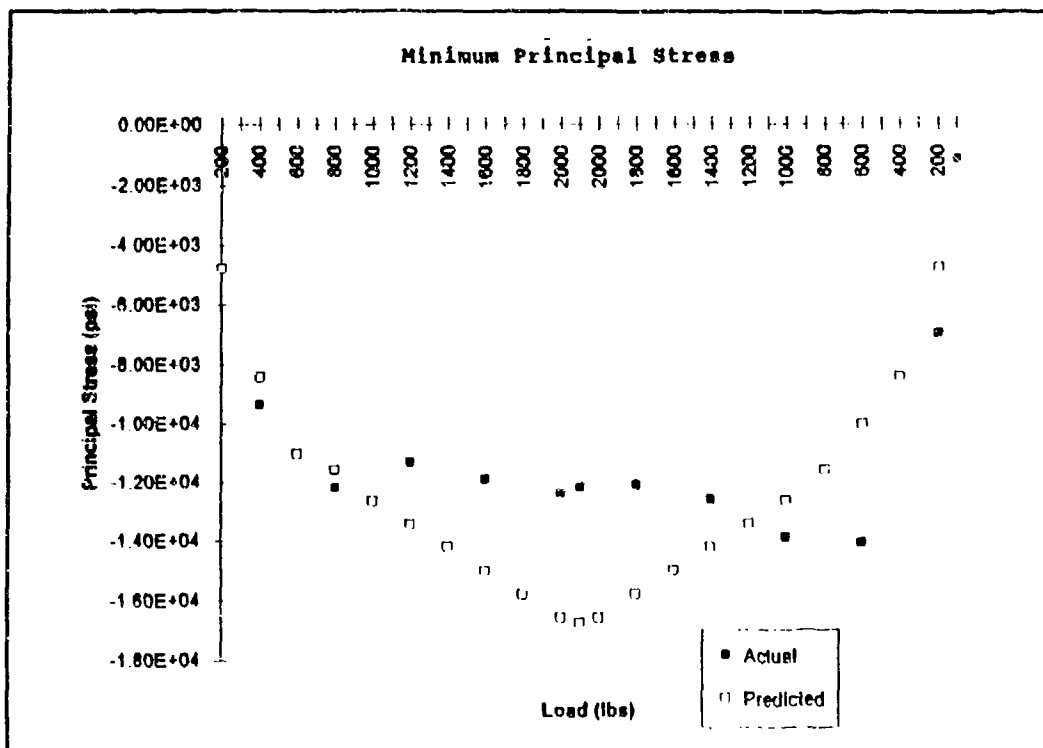


Figure 5.15: Element 105, Aft Left CG Location

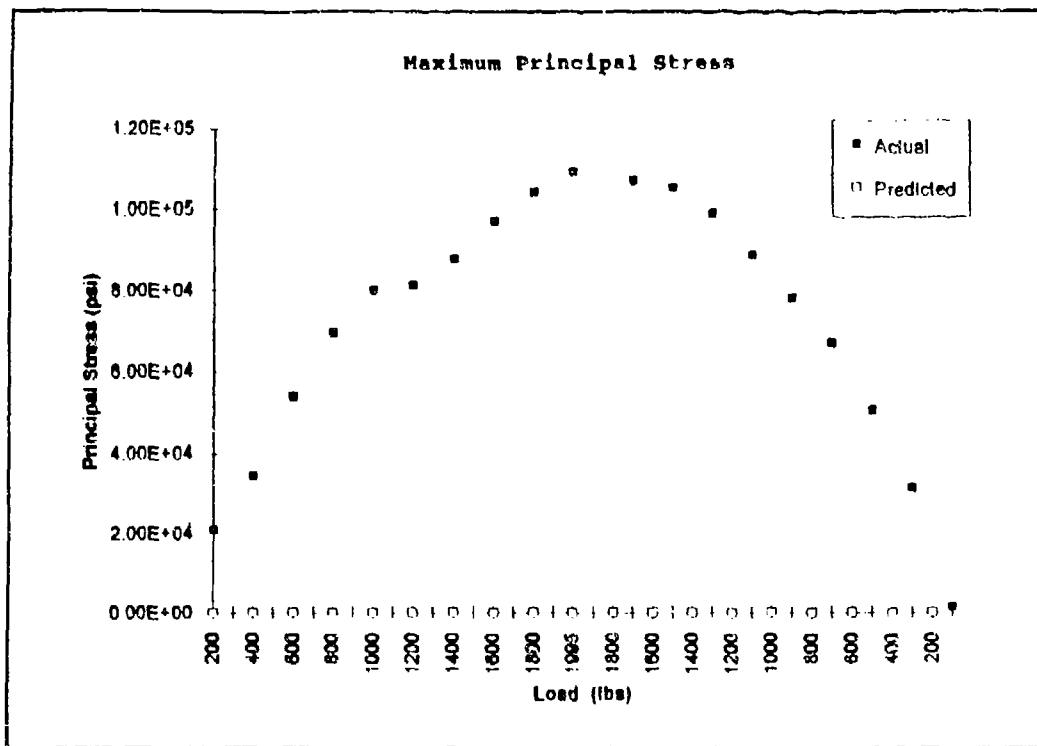


Figure 5.16: Element 74, Aft Right CG Location

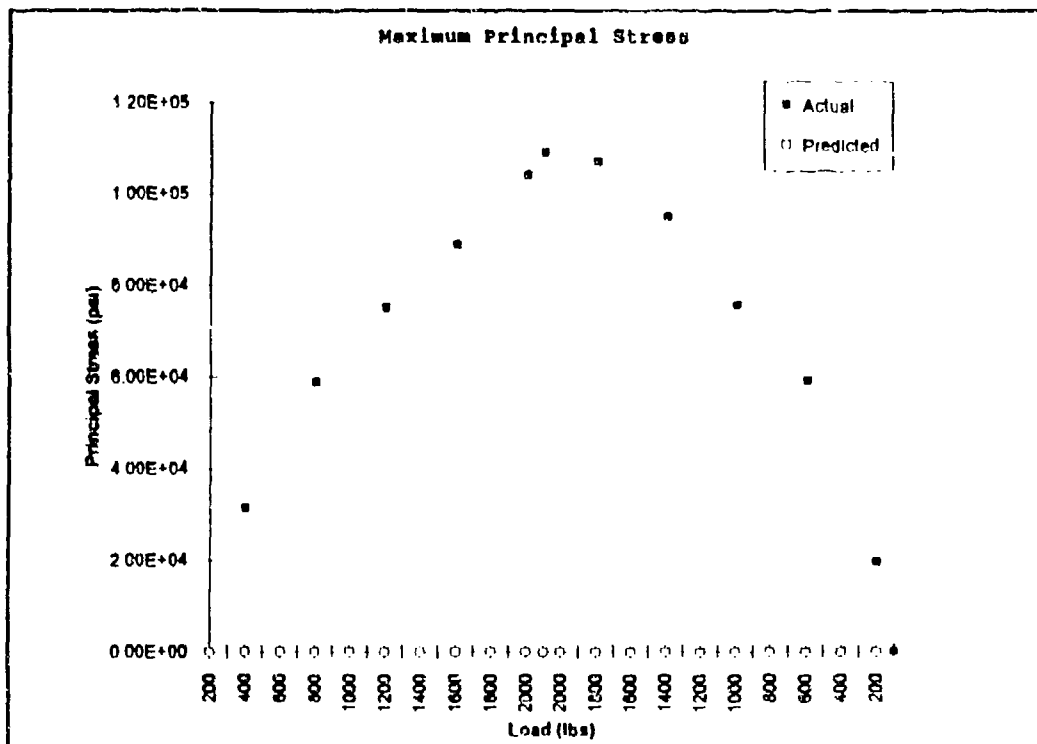
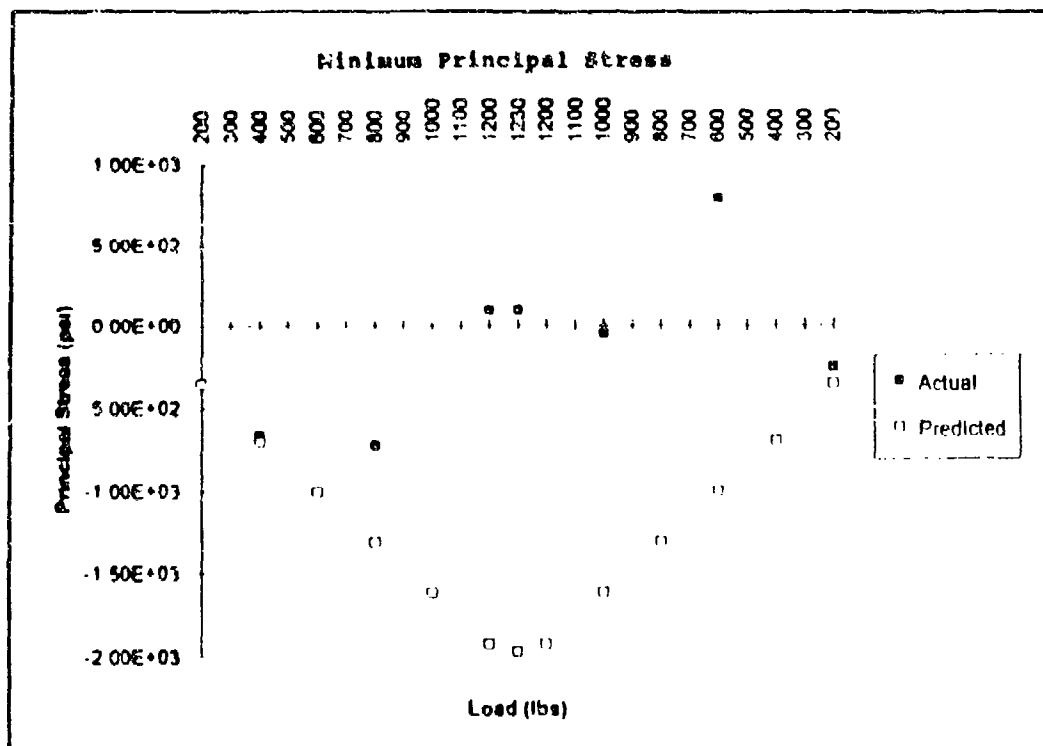


Figure 5.17: Element 74, Aft Left CG Location

5. Elements 66 and 42

No meaningful conclusions are drawn from the data taken at element 66 due to the scatter exhibited in Figures 5.18 and 5.19. While the minimum principal stress values for element 42, presented in Figures 5.20 to 5.23, compared favorably with the predicted values and general trends were observed in element 66's results the questionable validity of the gain factor precludes a meaningful discussion of the correlation between the predicted and actual stresses.



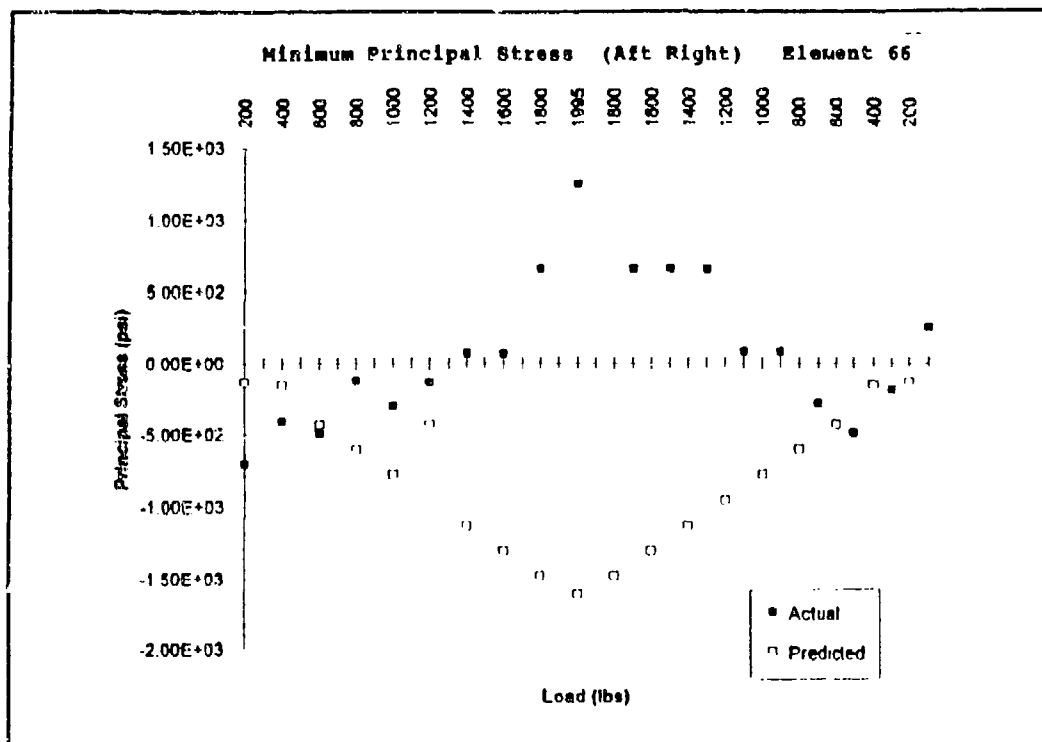


Figure 5.19: Element 66, Aft Right CG Location

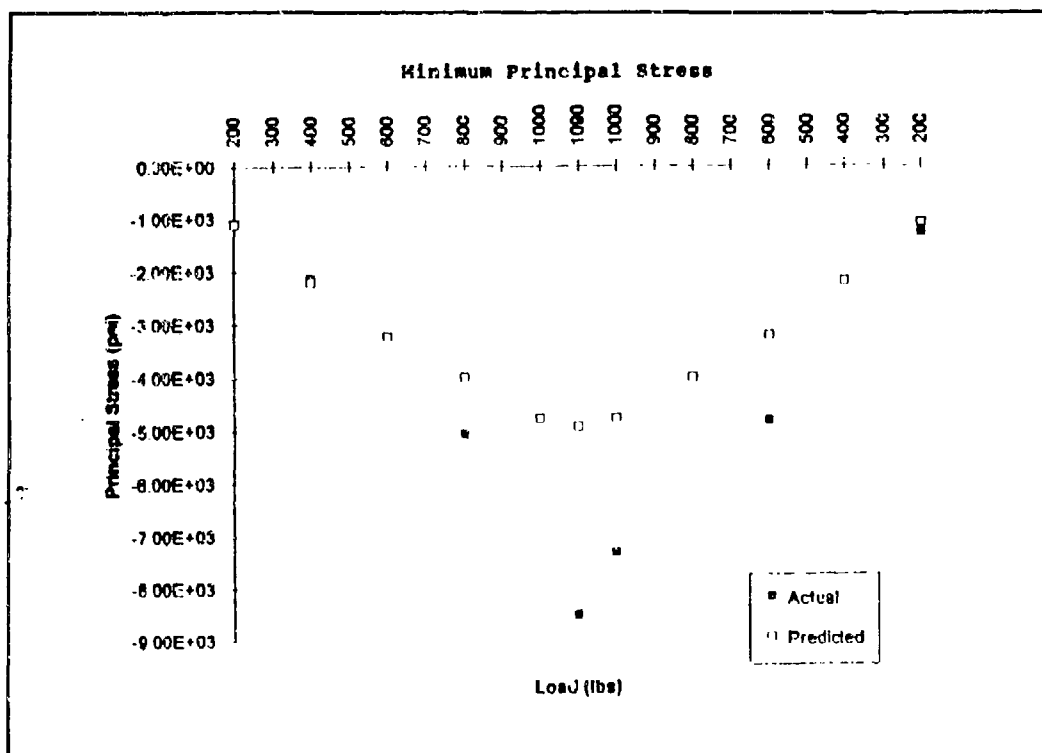


Figure 5.20: Element 42, Centerline CG Location

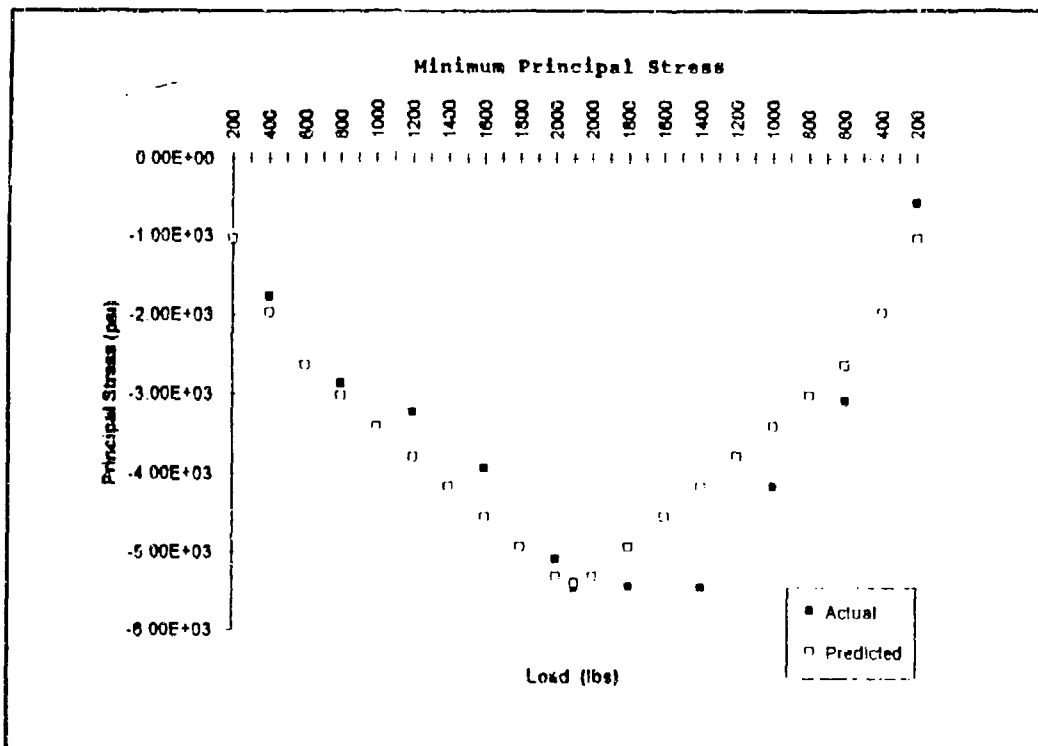


Figure 5.21: Element 42, Aft Left CG Location

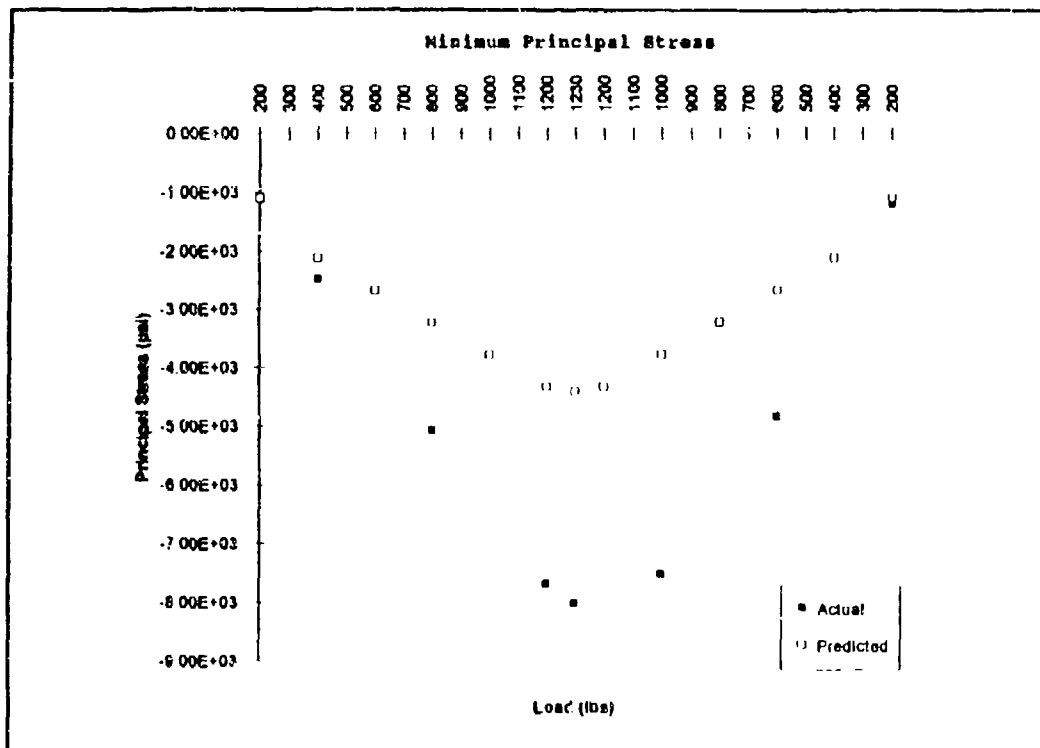


Figure 5.22: Element 42, Forward Left CG Location

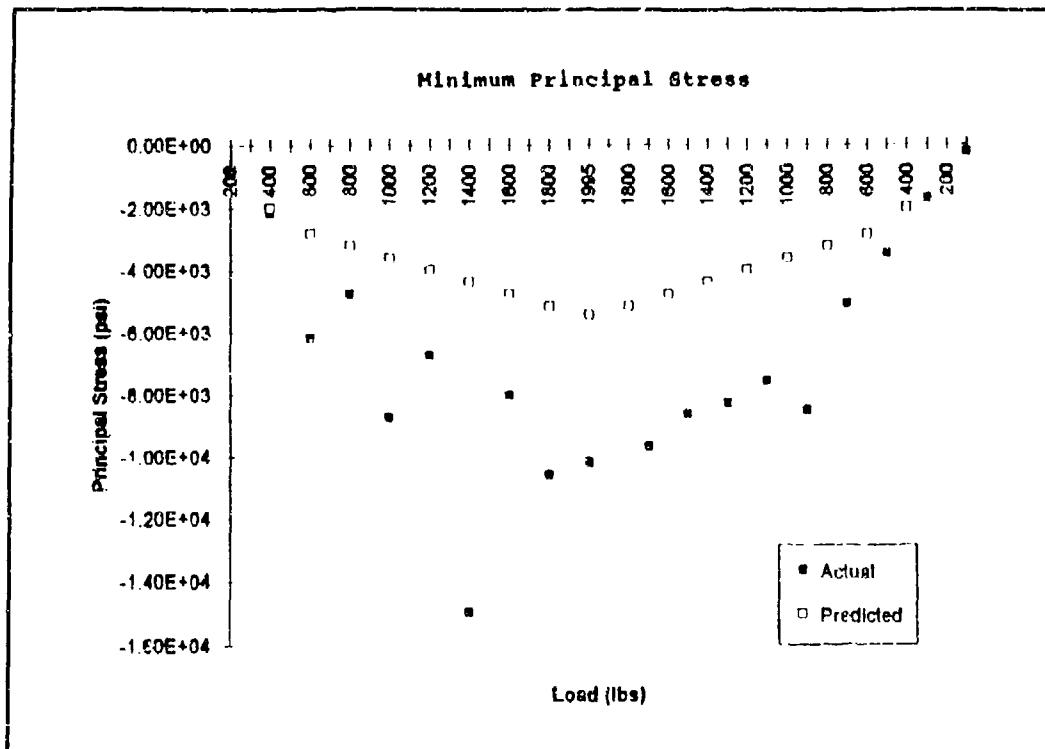


Figure 5.23: Element 42, Aft Right CG Location

6. Deflections

The deflections for the aft right CG load case are presented in Figures 5.24 and 5.25. While computer model simulation simplifications contributed to the difference between the actual and the predicted values, the majority of the difference was caused by inability of axles to slide freely on the teflon sheets.

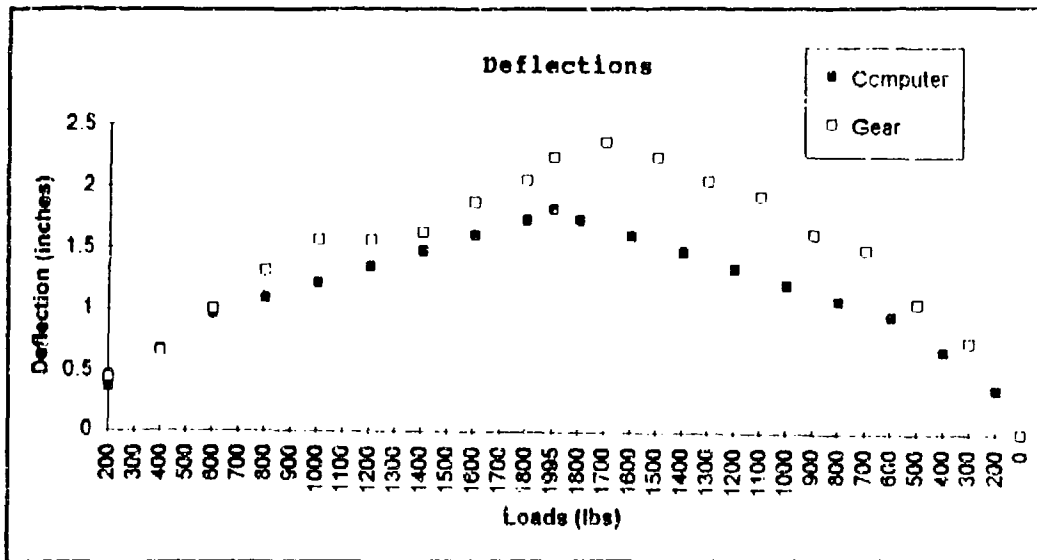


Figure 5.24: Forward Torque Tube Deflections

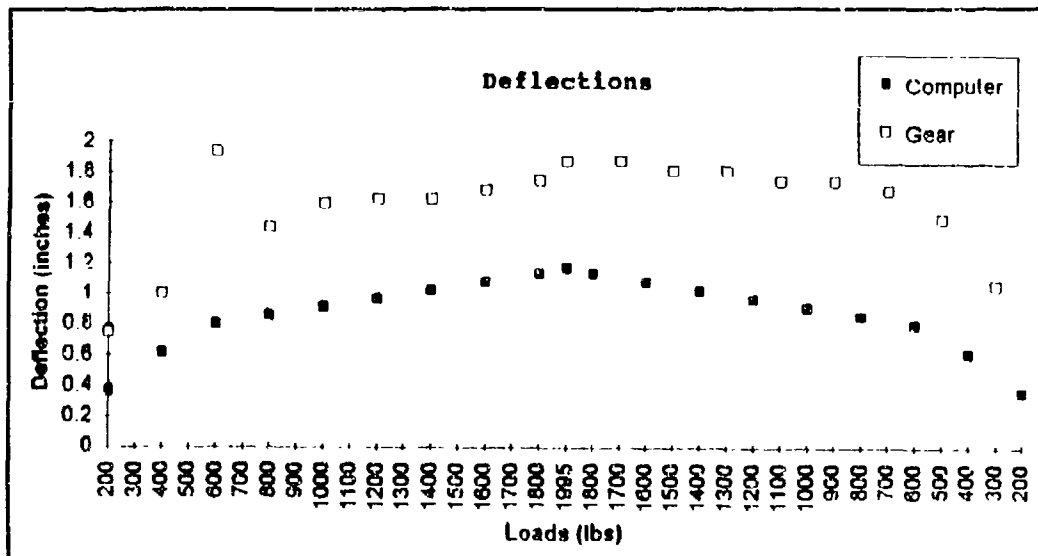


Figure 5.25: Aft Crosstube Deflections

VI. CONCLUSIONS

A. SELECTION CRITERION

1. Agility

The wheeled gear system provides significant land-based and maritime-based operational benefits over the skid gear system. Movement of the aircraft on board ships for maritime use is simplified without the requirement to attach the removable wheels. Similarly, during land-based operation, movement on remote locations of the field or at fields with limited support becomes much easier. The drawbacks of the enhanced ground agility is the necessity for ensuring the brakes are locked for shipboard landings to prevent rolling. Considering these factors, the advantages of wheeled gear outweigh the disadvantages.

2. Aircraft Modification

Despite the use of off the shelf equipment, the addition of a wheeled gear system does require some aircraft modification. Aircraft modifications include:

- The addition of brake pedals.
- The addition of pedal linkages and hydraulics.
- A small horizontal movement of the center of gravity of less than one inch.
- Finally, a vertical lowering of the center of gravity of the aircraft by approximately two inches.

The first three changes are minor and should pose no problems. The change in vertical CG location will enhance ground static stability but the effects upon the aircraft dynamics stability warrant further study.

3. Taxiing

Moving from the parking ramp to the point of takeoff with a skid system requires air taxiing. Wheeled ground maneuvering is inherently more safe and the reduced downwash associated with wheeled maneuvering leads to a reduction of ingested foreign objects in the aircraft engines.

4. Footprint

The wider footprint of the wheeled gear system will improve lateral stability. This is offset by the decreased stability in the directions of 45° either side of the nose.

5. Strength

In its present configuration, the weak nose wheel attachment tube will cause the aircraft to pitch forward during a sufficiently hard landing. While a level attitude would cause the least collateral damage, a forward pitch would preserve the tail rotor, whose high rotational velocity has the potential for inflicting lethal damage upon impact.

6. Weight

The increase in the weight is a definite liability to the wheeled gear system. The greater weight will require a proportional increase in the other aspects of the gear system to offset this disadvantage.

7. Tail Stinger Clearance

The unloaded wheeled gear increases the tail stinger clearance by five inches. This condition should be reexamined after any modifications to the nose wheel assembly and upon installation on the helicopter. While additional clearance is beneficial, the effects of changing the landed level attitude should be investigated.

B. CONCLUSIONS

The inability to make quantitative analysis of stresses experienced by the wheeled gear system does not preclude the realization that the wheeled system has merits that make it worth further investigation. Because plastic bending occurred in the nose wheel attachment tube, additional testing should not be conducted until this weakness is addressed. Upon completion of the test plan in Appendix C, a determination of applicability to Navy applications can be made.

C. RECOMMENDATIONS

The following recommendations are made for improvement of follow-on testing:

- As can be seen in pertinent figures in Chapter V, the gear did not experience hysteresis. Future testing need only record data as the gear is being loaded.

- Refine the computer model to reduce the simplifications listed in Chapter III to improve the GIFTS simulation.
- Reload the wheeled gear system to 3200 lbs and measure the microvoltages generated by the gages.
- Select gages for further testing whose optimum operating range include the measured microvoltages.
- Measurement equipment should have undergone recent calibration and be capable of measuring the expected microvoltages.
- Relocate new strain gages at expected areas of high stress determined by new GIFTS model simulation.
- Setup a new test rig to include application of the loads by hydraulics force and a load measurement system accurate to 10 lbs.
- Load mount points independent of each other so the load at one mount point does not apply a force to another mount point, or pull on the test rig from a single point coincident with the CG.
- Have the gear rest on a level surface that allows movement of axles with minimum friction.

Appendix A

KPOINT	129.85,10.0,31.28
\$ FWD CROSSTUBE	37
\$ PTS 1 AND 7 ARE AT CENTER OF	129.71,4.0,37.2
SKID TUBE, NOT END OF	\$ LEFT SKID TUBE
CROSSTUBE	51
1	62.52,4.0,-37.2
72.42,4,-37.2	52
2	136.92,4.0,-37.2
72.73,11.68,-31.28	\$ RIGHT SKID TUBE
3	61
73,18.3,-15.3	62.52,4.0,37.2
8	62
73,18.3,-13.2	136.92,4.0,37.2
4	99
73,18.3,0.0	0,0,0
9	
73,18.3,13.2	ELMAT,4
5	\$ MATERIAL 1 (AL7075-T6), SHEAR
73,18.3,15.3	MODULUS DEFINED
6	1
72.73,11.68,31.28	73000,10.4E6,.368,2.616E-4
7	
72.42,4,37.2	LETY
\$ AFT CROSSTUBE	BEAM2
\$ PTS 31 AND 37 ARE AT CENTER OF	\$ FORWARD CROSSTUBE
SKID TUBE, NOT END OF	\$ MATL 1, CROSS SECTION 1
CROSSTUBE	1,1
31	CARC,10
129.71,4.0,-37.2	L13
32	1,2,3,10,1
129.85,10.0,-31.28	
33	33
130,16.62,-15.7	L57
70	5,6,7,10,1
130,16.62,-13.125	
38	37
130,16.62,-10.25	
34	SLINE,10
130,16.62,0	L38
39	3,8,3,1
130,16.62,10.25	
71	99
130,16.62,13.125	L84
35	8,4,3,1
130,16.62,15.7	
36	99

L49
4,9,3,1

99
L95
9,5,3,1

99

\$ AFT CROSSTUBE

LETY
BEAM2
1,2
CARC,10
L3133
31,32,33,10,1

1
L3537
35,36,37,10,1

7

SLINE,10
L3370
33,70,3,1

5
L7038
70,38,3,1

5
L3834
38,34,3,1

5
L3439
34,39,3,1

5
L3971
39,71,3,1

5
L7135
71,35,3,1

5

\$ LEFT SKID TUBE

LETY
BEAM2
1,3
SLINE,10
L511
51,1,2,1

99
L131
1,31,4,1

99
L3152
31,52,2,1

99
\$ RIGHT SKID TUBE
L617
61,7,2,1

99
L737
7,37,4,1

99
L3762
37,62,2,1

99

END

\$ BATCH FILE FOR LOAD
 \$ BOUNDARY CONDITIONS
 SUPP,1
 8/9/70/71//
 SUPL,2
 L511/L131/L3152/L617/L737/L3762//
 SUPP,3
 4/34//
 SUPP,4
 8/9/70/71//
 SUPP,5
 8/9/70/71//
 SUPP,6
 8/9/70/71//
 \$ APPLIED LOADS
 LOADP,2
 8
 -1
 9
 -1
 70
 -1
 71
 -1

 MASS

 END

CIRCH
 1
 \$ OUTER RADIUS, INNER RADIUS (IN)
 \$ FORWARD CROSSTUBE
 1.125,.985
 \$ AFT CROSSTUBE
 2
 1.125,.969
 \$ SKID TUBE
 3
 1.5,1.435

 END

Appendix B

\$ OUTER RADIUS, INNER RADIUS (IN)	5, 66
CIRCS	\$ NOSE FORK
\$ BEAM FROM 1 TO 8 TAPERS 688	RECTS
\$ TO 1.0	19
1	6, 3 25
88, 563	\$ BOLTS
2	CIRCS
36, 563	20
3	21
85, 563	\$ JOINING ROD
4	22
34, 563	1 25
5	\$ AXILS
58, 563	RECTS
6	23
80, 563	2 0, 625
7	
4, 563	CIRCS
8	24
1 0, 563	5
\$ BEAM FROM 10 TO 12 TAPERS 111	
\$ TO 875	END
11	
5, 563	
\$ POINT 12	
12	
75, 563	
\$ POINT 13	
13	
99, 563	
\$ JOINING TUBE	
14	
1 125, 1 0	
\$ NOSE WHEEL ATTACHMENT TUBE	
15	
45, 609	
\$ NOSE T BRACKET BASE	
16	
75, 745	
\$ NOSE T BRACKET CROSS PIECE	
17	
75, 75	
\$ TORQUE TUBE	
18	

\$ OUTER RADIUS, INNER RADIUS (IN)

CIRCH

\$ BEAM FROM 1 TO 8 TAPERS 688

\$ TO 1.0

1

88,563

2

36,563

3

85,563

4

34,563

5

58,563

6

80,563

7

4,563

8

1.0,563

\$ BEAM FROM 10 TO 12 TAPERS 11N

\$ TO .875

11

5,563

\$ POINT 12

12

75,563

\$ POINT 13

13

99,563

\$ JOINING TUBE

14

1.125,1.0

\$ NOSE WHEEL ATTACHMENT TUBE

15

45,609

\$ NOSE T BRACKET BASE

16

75,745

\$ NOSE T BRACKET CROSS PIECE

17

75,75

\$ TORQUE TUBE

18

5,66

\$ NOSE FORK

RECTS

19

6,3 25

\$ BOLTS

CIRCS

20

21

\$ JOINING ROD

22

1 25

\$ AXILS

RECTS

23

2.0,625

CIRCS

24

5

END

KPOINT	0,25 92,-8 2	
\$ LEFT GEAR	29	108
1	0,25 92,-9 5	62 22,22 72,0
-6 5,11 25,42 85	19	109
2	0,25 92,-10 30	56 97,25 63,0
-5 49,13 36,38 96	20	\$ TORQUE TUBE
3	0,25 92,-14 55	110
-4 61,15 47,35 06	32	55,26 72,0
4	-25,25 45,-15 69	111
-3 71,17 58,31 17	21	55,26 72,-17
5	-48,25 32,-16 89	112
-3 28,18 64,29 22	22	55,26 72,-13 125
6	-1 85,22 04,-22 95	113
-2 89,19 56,27 52	23	55,26 72,-15 75
7	-2 89,19 56,-27 52	118
-1 85,22 04,22 95	24	55,26 72,-4 5
8	-3 28,18 64,-29 22	119
-48,25 32,16 89	25	55,26 72,4 5
33	-3 71,17 58,-31 17	114
-25,25 45,15 69	26	55,26 72,15 75
9	-4 61,15 47,-35 06	115
0,25 92,14 55	27	55,26 72,13 125
10	-5 49,13 36,-38 96	116
0,25 92,10 30	28	55,26 72,17
14	-6 5,11 25,-42 85	\$ NOSE WHEEL
0,25 92,0 5	\$ CENTER TUBE	FORK
15	31	120
0,25 92,8 2	0,25 92,0	80 75,6 75,0
11	\$ NOSE WHEEL	121
0,25 92,6 78	ATTACHMENT TUBE	79 75,6 75,0
12	101	122
0,25 92,3 25	79 75,5 12,0	70 75,6 75,0
34	102	\$ LONGITUDINAL
0,25 92,2 25	79 75,6 37,0	TUBE ATTACHMENT
13	103	BOLTS
0,25 92,1 25	79 75,12 37,0	50
\$ RIGHT GEAR	104	0,26 92,-2 25
16	79,14 37,0	51
0,25 92,-1 25	117	0,23 41,-2 25
35	78 5,15 37,0	52
0,25 92,-2 25	105	0,22 03,-2 25
17	77 75,16 37,0	60
0,25 92,-3 25	106	0,26 92,2 25
18	76 08,17 75,0	61
0,25 92,-6 78	107	0,23 41,2 25
30	63 75,21 87,0	62

0,22.03,2.25	(6150)	10,14,3,1
70	1	
55,24.72,-15.72	\$ MATERIAL 2	99
72	(4130)	1,14,15
55,25.72,-15.75	2	14,15,3,1
80	9.7E4,3E7, 302,7 324E-4	
55,27.72,15.75	\$ MATERIAL 3	99
82	(4340)	1,19,29
55,25.72,15.75	3	19,29,3,1
\$ AXILS	2 07E5,2.95E7, 304,7 324	
130	E-4	99
-6 5,8.75,42.85	\$ MATERIAL 4	L2930
131	(4140)	29,30,3,1
-6 5,8.0,42.85	4	
132	1.48E5,2.9E7, 303,7 324E-	99
-6 5,8.25,48.35	4	
140	\$ GEAR LEGS	\$ TAPERED
-6 5,8.75,-42.85	LETY	SECTIONS
141	BEAM2	LETY
-6 5,8.0,-42.85	\$ CURVES	BEAM2
142	\$ MATERIAL 1, CROSS	\$ MATERIAL 1 CROSS
-6 5,8.25,-48.35	SECTION 8	SECTION 1
\$ LONGITUDINAL	1,8	1,1
TUBE FWD POINT	CARC,10	SLINE,10
71	L89	L12
55,26.72,-18.15	8,33,9,3,1	1,2,3,1
81		
55,26.72,18.15	99	99
\$	L2021	L2728
LONGITUDINAL/TORQ	20,32,21,3,1	27,28,3,1
UE TUBE JOINT		
75	99	99
55,26.72,-14		
76	\$ UNTAPERED	LETY
55,26.72,-19	HORIZONTAL (PT 9 TO	BEAM2
85	10)	\$ MATERIAL 1 CROSS
55,26.72,14	SLINE,10	SECTION 2
86	L910	1,2
55,26.72,19	9,10,3,1	SLINE,10
\$ REFERENCE		L23
POINT	99	2,3,3,1
99	L1920	
0,0,0	19,20,3,1	99
		L2627
ELMAT,4	99	26,27,3,1
\$ MATERIAL 1	L1014	

99

LETY
BEAM2
\$ MATERIAL 1 CROSS
SECTION 3
1,3
SLINE,10
L34
3,4,3,1

99
L2523
25,26,3,1

99

LETY
BEAM2
\$ MATERIAL 1 CROSS
SECTION 4
1,4
SLINE,10
L45
4,5,3,1

99
L2423
24,25,3,1

99

LETY
BEAM2
\$ MATERIAL 1 CROSS
SECTION 5
1,5
SLINE,10
L56
5,6,3,1

99
L2324
23,24,3,1

99

LETY
BEAM2
\$ MATERIAL 1 CROSS
SECTION 6
1,6
SLINE,10
L67
6,7,3,1

99
L2223
22,23,3,1

99

LETY
BEAM2
\$ MATERIAL 1 CROSS
SECTION 7
1,7
SLINE,10
L78
7,8,3,1

99
L2122
21,22,3,1

99

LETY
BEAM2
\$ MATERIAL 1 CROSS
SECTION 11
1,11
SLINE,10
L1115
11,15,3,1

99
L3018
30,18,3,1

99

LETY

BEAM2
\$ MATERIAL 1 CROSS
SECTION 12
1,12
SLINE,10
L1211
12,11,3,1

99
L1817
18,17,3,1

99

LETY
BEAM2
\$ MATERIAL 1 CROSS
SECTION 13
1,13
SLINE,10
L1234
12,34,1,1

99
L3413
34,13,1,1

99
L1635
16,35,1,1

99
L3517
35,17,1,1

99

\$ AXIL BRACKET
LETY
BEAM2
\$ MATERIAL 3 CROSS
SECTION 23
3,23
SLINE,10
L1130
1,130,1,1

99
L130131
130,131,1,1

99
L28140
28,140,1,1

99
L140141
140,141,1,1

99

\$ AXIL ROD
LETY
BEAM2
\$ MATERIAL 3 CROSS
SECTION 24
3,24
SLINE,10
L130132
130,132,1,1

99
L140142
140,142,1,1

99

\$ JOINING TUBE
LETY
BEAM2
\$ MATERIAL 2 CROSS
SECTION 14
2,14
SLINE,10
L1514
15,14,4,1

99
L1511
15,11,3,1

99
L1112

11,12,3,1

99
L1213
12,13,3,1

99
L1331
13,31,3,1

99
L3116
31,16,3,1

99
L1617
16,17,3,1

99
L1718
17,18,3,1

99
L1830
18,30,3,1

99
L3029
30,29,4,1

99

\$ JOINING ROD
LETY
BEAM2
1,22
SLINE,10
L1534
35,34,5,1

99

\$ NOSE WHEEL
ATTACHMENT TUBE
LETY
BEAM2

\$ CURVE
\$ MATERIAL 3
CROSS SECTION 15
3,15
CARC,10
L103117
103,104,117,4,1

99
L117106
117,105,106,4,1

99

\$ STRAIGHT
SECTION
SLINE,10
L101121
101,121,2,1

99
L121102
121,102,2,1

99
L102103
102,103,2,1

99
L106107
106,107,3,1

99
L107108
107,108,3,1

99
L108109
108,109,1,1

99

\$ NOSE WHEEL
ATTACHMENT TUBE
SLEEVE
LETY

BEAM2	99	51,71,10,1
\$ MATERIAL 2 CROSS	L110118	
SECTION 16	110,118,4,1	99
2,16		L6181
SLINE,10	99	61,81,10,1
L108110	L119110	
108,110,1,1	119,110,4,1	99
99	99	\$ LONGITUDINAL
	L119115	ATTACHMENT BOLTS
\$ TORQUE TUBE	119,115,4,1	LETY
CROSS PIECE SLEEVE		BEAM2
LETY	99	1,20
BEAM2	L115114	SLINE,10
\$ MATERIAL 2 CROSS	115,114,4,1	L70113
SECTION 17		70,113,1,1
2,17	99	
SLINE,10	L114116	99
L118110	114,116,4,1	L11372
118,110,1,1		113,72,1,1
	99	
99		99
L110119	\$ NOSE WHEEL	L80114
110,119,1,1	FORK	80,114,1,1
	LETY	
99	BEAM2	99
\$ TORQUE TUBE	\$ MATERIAL 2 CROSS	L11482
LETY	SECTION 19	114,82,1,1
BEAM2	2,19	
\$ MATERIAL 3 CROSS	SLINE,10	99
SECTION 18	L120121	
3,18	120,121,1,1	LETY
		BEAM2
SLINE,10	99	2,21
L111113	L121122	SLINE,10
111,113,4,1	121,122,1,1	L5035
		50,35,1,1
	99	
99		99
L113112	\$ LONGITUDINAL	L3551
113,112,4,1	TUBES	35,51,1,1
	LETY	
99	BEAM2	99
L112118	2,17	L5152
112,118,4,1	SLINE,10	51,52,1,1
	L5171	

99	116,81,1,1
L6034	
60,34,1,1	99
	L8186
99	81,86,1,1
L3461	
34,61,1,1	99
99	END
L6162	
61,62,1,1	
99	
\$	
LONGITUDINAL/TORQ	
UE JOINT	
LETY	
BEAM2	
2,18	
SLINE,10	
L75113	
75,113,1,1	
99	
L113111	
113,111,1,1	
99	
L11171	
111,71,1,1	
99	
L7176	
71,76,1,1	
99	
L85114	
85,114,1,1	
99	
L116114	
116,114,1,1	
99	
L11681	

```
$ BATCH FILE FOR LOADBC
$ BOUNDARY CONDITIONS
SUPP,1
15/30/113/114//
SUPP,2
122/132/142//
SUPP,3
31/110//
SUPP,4
15/30/113/114//
SUPP,5
15/30/113/114//
SUPP,6
15/30/113/114//
$ APPLYING LOAD
LOADP,2
15
-1
30
-1
115
-1
112
-1

MASS
END
```

Appendix C

Static Testing Program for Advanced Controlled Motion Enterprises Landing Gear

Experimental Test Series One - Landings

Purpose The first experimental tests will be under static conditions to determine the deflections and strains experienced by the gear when subject to various conditions modeling those encountered during landing.

Considerations The helicopter being modeled is the TH-57 B/C currently in use by the Navy as a primary helicopter trainer. The civilian equivalent is the Bell 206A-1.

Test A - Landing at Different Weights

Considerations The weights were chosen to simulate a normal landing, a 2g and a 3g landing. The impulse associated with the landings will not be recreated here.

The load at station LAT 4, STA 106 is out of limits because the AFCS off aft cg limit actually moves forward from station 114.2 at 2350 lbs to 111.4 at 3200 lbs.¹

The 4 inches outside the longitudinal and lateral cg limit was chosen as an extreme condition because if the helicopter was flown in any of these conditions, the control authority would be insufficient to compensate and all loads experienced would be less than those experienced in normal flight.

The tests will be conducted with the tires removed, so deflections will be strictly those of the gear structure. The gear will be supported by bearings located at the tire mount points on the axles.

Description Weights duplicating those induced by a helicopter weighing 3200 lbs (max gross weight) (Table 1), 6400 lbs (Table 2) and 9600 lbs (Table 3) will be used. The loads are in the following format.

Right Rear Pt	Left Rear Pt
Right Front	Left Front

The center of gravity (cg) will be varied to simulate longitudinal and lateral limits (AFCS OFF, Max Gross Weight) and 4" beyond these limits. The structure will be loaded at the four helicopter attachment points.

Loads will be applied in 200 lb even increments and unloaded in 200 lb odd increments (up at 200, 400, 600, down at 500, 300, 100) to determine if the gear is subject to hysteresis.

Test B - Landing with Nose Wheel Deflected

Description Table 3 provides test conditions used to model the gear with the nose wheel placed at 45° deflection.

Test C - Single Point Landing

Description Each mounting point will be subject to 3200 lbs while the others remain at zero.

Test D - Landing with Obstacles

Considerations Raising one wheel mount will simulate experiencing landing with one wheel on an obstacle, or landing with two wheels in a depression. Raising two wheel mounts will simulate one wheel in a hole or two wheels on an obstacle.

For this test, the center of gravity is simulated at 56.4 WL, Station 110.1 and Centerline. The 7.5 inches that the wheel mount(s) is(are) raised will move the center of gravity out of either the longitudinal, the lateral or both limits.

Description At 3200 lbs (Table 1), three tests will be conducted where one wheel mount at a time will be raised 7.5 inches, followed by three tests where two wheel mounts at a time will be raised 7.5 inches.

Experimental Test Series Two - Towing

Purpose This series of tests will be to determine the strains and deflections experienced by the gear when subject to towing loads.

Considerations The modeled coefficients of friction (μ) are the largest values the gear is expected to experience and are thus the limiting case.

For BRAKES OFF, μ will be .10 created by a wet grass surface. For BRAKES ON, concrete has the greatest μ of .6. The nose wheel has no brakes and on concrete the μ will be .05.²

The weight used, 3200 lbs, is the aircraft maximum gross weight and the center of gravity will be simulated at Station 112, Centerline.

The formulas used are those applied to the case of static friction. Dynamic friction coefficients will be in effect once the gear is rolling, but must first be subject to the greater forces resulting from overcoming static friction.

Calculations

$$T = F_{f,nose} + F_{f,main}$$
$$= \mu * W_n + 2 * \mu * W_m$$

$$F_f = \mu * W$$

T = Force applied by towing
F_f = Force due to friction
W_n = weight on nose wheel
W_m = weight on main wheel

BRAKES OFF (Wet Grass)

BRAKES ON (Concrete)

$$T = .1 * 823 \text{ lbs} + 2 * .1 * 1189 \text{ lbs}$$

$$= 320 \text{ lbs}$$

$$T = .05 * 823 \text{ lbs} + 2 * .6 * 1189 \text{ lbs}$$

$$= 1468 \text{ lbs}$$

Description These weights will be applied at the towbar attachment points.

Equipment

Strain Gages

CEA-13-2500UN-350
Resistance 350.0 $\pm$.3%
Gage Factor (at 75° F) 2.12 $\pm$.5%
Lot Number R-A48AF21

Strain Measuring Gear

SB-10 Switch and Balance Unit
Property Code 00096, Measurements Group, Inst Div Raleigh, NC
Calibrated June 18, 1986
P-3500 Strain Indicator
Calibrated July 7, 1986
BAMs (Two of them)
Serial Numbers 2751 (013423 - USN Old Serial #) and Unknown
(013422 USN Old Serial #)
BSG6s (Two of them)
Serial Numbers 2269 and 1948
Ellis Associates, Pelham, NY

Load Measuring Gear

Aft Right
Dillon Serial Number 27495
Calibrated Feb 21, 1992 From 100-5000 lbs $\pm$ 25 lbs
Aft Left

Dillon Serial Number 28964
Calibrated Feb 21, 1992 From 100 - 2500 lbs $\pm$ 50 lbs
Forward Right
Dillon Serial Number 27600
Calibrated Feb 21, 1992 From 50 - 2500 lbs $\pm$ 10 lbs
Forward Left
Dillon Serial Number 27601
Calibrated Feb 21, 1992 From 50 - 2500 lbs $\pm$ 10 lbs

Calibration Performed on MTS 55 kip Testing Machine
Comments Do Not allow Load Indicating Needle to Push
Max Load Indicating Needle
Tap all Faces to Settle Readings

¹ Information from the TH-57 A/B NATOPS.

² Nicolai, Leland M. Fundamentals of Aircraft Design METS, Inc. San Jose, CA 1954.

3200 lbs

STA\LAT	-7		Centerline		8	
118	1945	585			485	2040
	520	155			130	545
110			1040	1040		
			560	560		
101.5	1230	370			310	1290
	1230	370			310	1290

Table 1: Longitudinal Station vs Lateral Station

6400 lbs

STA\LAT	-7		Centerline		8	
118	3890	1165			970	4080
	1040	310			260	1090
110			2080	2080		
			1125	1125		
101.5	2460	740			615	2585
	2460	740			615	2585

Table 2: Longitudinal Station vs Lateral Station

9600 lbs

STA\LAT	-7		Centerline		8	
118	5000	1750			1455	5000
	1556	465			390	1630
110			3115	3115		
			1685	1685		
101.5	3690	1110			925	3875
	3690	1110			925	3875

Table 3: Longitudinal Station vs Lateral Station

Appendix D

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-2.4285E+03
2	1	-4.6579E+03
3	1	-7.2997E+03
4	1	-1.0306E+04
5	1	-1.3617E+04
6	1	-1.7168E+04
7	1	-2.0886E+04
8	1	-2.4707E+04
9	1	-2.8569E+04
10	1	-2.8569E+04
11	1	-2.4707E+04
12	1	-2.0886E+04
13	1	-1.7168E+04
14	1	-1.3618E+04
15	1	-1.0306E+04
16	1	-7.2997E+03
17	1	-4.6579E+03
18	1	-2.4285E+03
19	1	3.1201E+04
20	1	3.1201E+04
21	1	3.1201E+04
22	1	3.1201E+04

Table D1.2: Principal Stresses

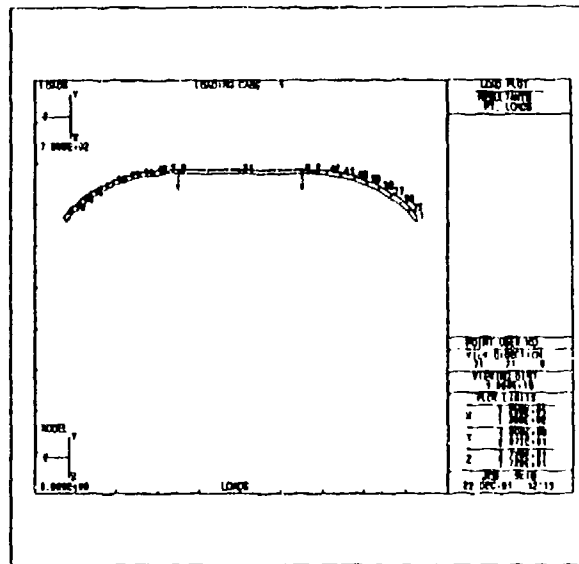


Figure D1.1: Point Location



Table D1.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-9.317E-01	7.011E-02	0.000E+00	0.000E+00
3	0.000E+00	-1.309E+00	2.475E-16	4.059E-02	0.000E+00	0.000E+00
5	0.000E+00	-1.309E+00	-2.420E-16	-4.059E-02	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	9.317E-01	-7.011E-02	0.000E+00	0.000E+00
8	0.000E+00	-1.389E+00	2.143E-16	3.523E-02	0.000E+00	0.000E+00
9	0.000E+00	-1.389E+00	-2.088E-16	-3.523E-02	0.000E+00	0.000E+00
35	0.000E+00	-1.078E-01	-7.475E-01	6.985E-02	0.000E+00	0.000E+00
36	0.000E+00	-2.353E-01	-5.782E-01	6.903E-02	0.000E+00	0.000E+00
37	0.000E+00	-3.791E-01	-4.273E-01	6.754E-02	0.000E+00	0.000E+00
38	0.000E+00	-5.352E-01	-2.976E-01	6.529E-02	0.000E+00	0.000E+00
39	0.000E+00	-6.984E-01	-1.911E-01	6.223E-02	0.000E+00	0.000E+00
40	0.000E+00	-8.635E-01	-1.089E-01	5.827E-02	0.000E+00	0.000E+00
41	0.000E+00	-1.024E+00	-5.083E-02	5.337E-02	0.000E+00	0.000E+00
42	0.000E+00	-1.175E+00	-1.550E-02	4.749E-02	0.000E+00	0.000E+00
43	0.000E+00	-1.175E+00	1.550E-02	-4.749E-02	0.000E+00	0.000E+00
44	0.000E+00	-1.024E+00	5.083E-02	-5.337E-02	0.000E+00	0.000E+00
45	0.000E+00	-8.635E-01	1.089E-01	-5.827E-02	0.000E+00	0.000E+00
46	0.000E+00	-6.985E-01	1.911E-01	-6.223E-02	0.000E+00	0.000E+00
47	0.000E+00	-5.352E-01	2.976E-01	-6.529E-02	0.000E+00	0.000E+00
48	0.000E+00	-3.791E-01	4.273E-01	-6.754E-02	0.000E+00	0.000E+00
49	0.000E+00	-2.353E-01	5.782E-01	-6.903E-02	0.000E+00	0.000E+00
50	0.000E+00	-1.078E-01	7.475E-01	-6.985E-02	0.000E+00	0.000E+00
51	0.000E+00	-1.622E+00	0.000E+00	6.397E-10	0.000E+00	0.000E+00

Table D1.3: Deflections

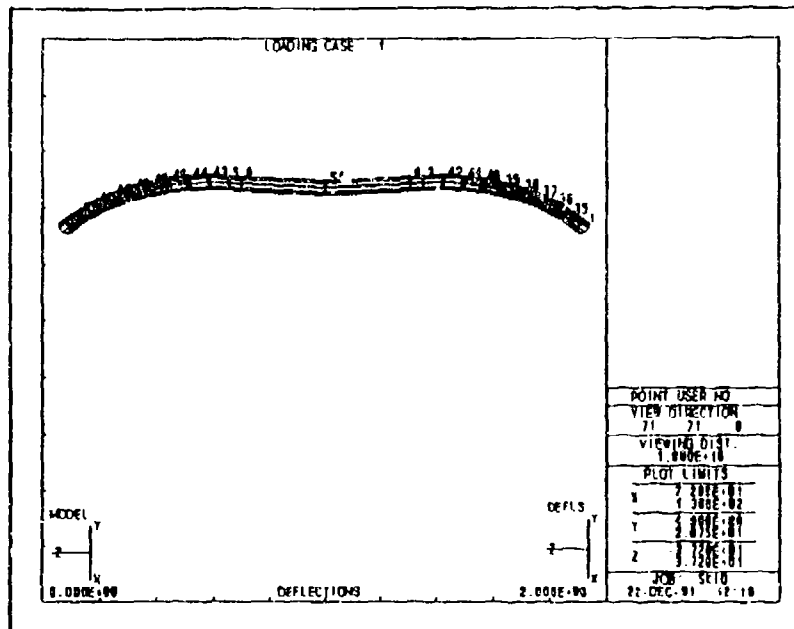


Figure D1.2: Deflected Crosstube

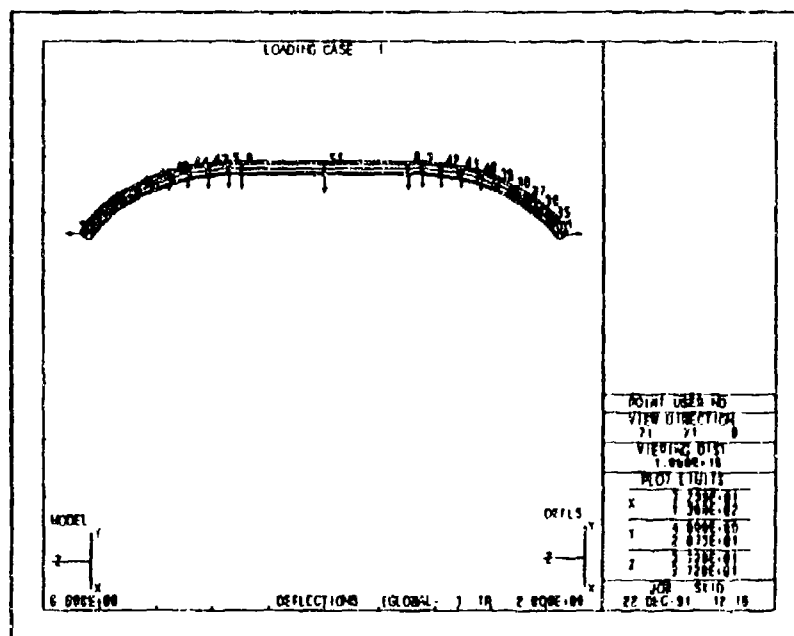


Figure D1.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE

ELE NO.	STR PT.	S11
1	1	-3.2364E+03
2	1	-6.2107E+03
3	1	-9.7331E+03
4	1	-1.3741E+04
5	1	-1.8157E+04
6	1	-2.2890E+04
7	1	-2.7848E+04
8	1	-3.2943E+04
9	1	-3.8093E+04
10	1	-3.8093E+04
11	1	-3.2943E+04
12	1	-2.7849E+04
13	1	-2.2890E+04
14	1	-1.8157E+04
15	1	-1.3741E+04
16	1	-9.7332E+03
17	1	-6.2104E+03
18	1	-3.2382E+03
19	1	4.1602E+04
20	-	4.1602E+04
21	1	4.1602E+04
22	1	4.1602E+04

Table D2.2: Principal Stresses

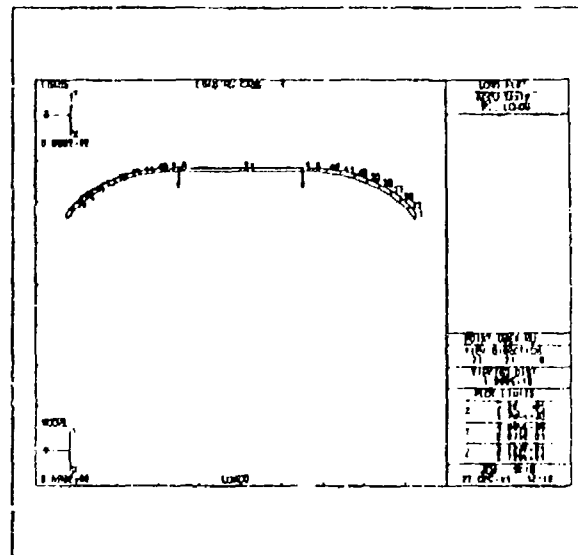


Figure D2.1: Point Location

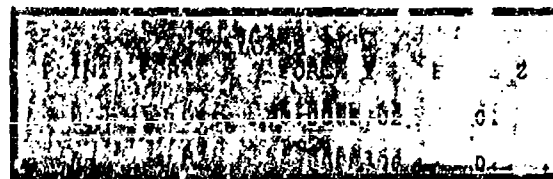


Table D2.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	PX	PY	PZ
1	0.000E+00	0.000E+00	-1.242E+00	9.348E-02	0.000E+00	0.000E+00
3	0.000E+00	-1.745E+00	3.258E-16	5.413E-02	0.000E+00	0.000E+00
5	0.000E+00	-1.745E+00	-3.227E-16	-5.413E-02	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	1.242E+00	-9.348E-02	0.000E+00	0.000E+00
8	0.000E+00	-1.853E+00	2.844E-16	4.698E-02	0.000E+00	0.000E+00
9	0.000E+00	-1.853E+00	-2.784E-16	-4.698E-02	0.000E+00	0.000E+00
35	0.000E+00	-1.438E-01	-9.967E-01	9.314E-02	0.000E+00	0.000E+00
36	0.000E+00	-3.138E-01	-7.710E-01	9.203E-02	0.000E+00	0.000E+00
37	0.000E+00	-5.055E-01	-5.697E-01	9.005E-02	0.000E+00	0.000E+00
38	0.000E+00	-7.136E-01	-3.967E-01	8.706E-02	0.000E+00	0.000E+00
39	0.000E+00	-9.313E-01	-2.547E-01	8.297E-02	0.000E+00	0.000E+00
40	0.000E+00	-1.151E+00	-1.452E-01	7.770E-02	0.000E+00	0.000E+00
41	0.000E+00	-1.366E+00	-6.778E-02	7.116E-02	0.000E+00	0.000E+00
42	0.000E+00	-1.566E+00	-2.066E-02	6.332E-02	0.000E+00	0.000E+00
43	0.000E+00	-1.766E+00	2.066E-02	-6.332E-02	0.000E+00	0.000E+00
44	0.000E+00	-1.966E+00	6.777E-02	-7.116E-02	0.000E+00	0.000E+00
45	0.000E+00	-1.151E+00	1.452E-01	-7.770E-02	0.000E+00	0.000E+00
46	0.000E+00	-9.313E-01	2.547E-01	-8.297E-02	0.000E+00	0.000E+00
47	0.000E+00	-7.136E-01	3.967E-01	-9.005E-02	0.000E+00	0.000E+00
48	0.000E+00	-5.055E-01	5.697E-01	-9.203E-02	0.000E+00	0.000E+00
49	0.000E+00	-3.138E-01	7.710E-01	-9.314E-02	0.000E+00	0.000E+00
50	0.000E+00	-1.438E-01	9.967E-01	-9.348E-02	0.000E+00	0.000E+00
51	0.000E+00	-2.163E+00	0.000E+00	6.579E-10	0.000E+00	0.000E+00

Table D2.3: Deflections

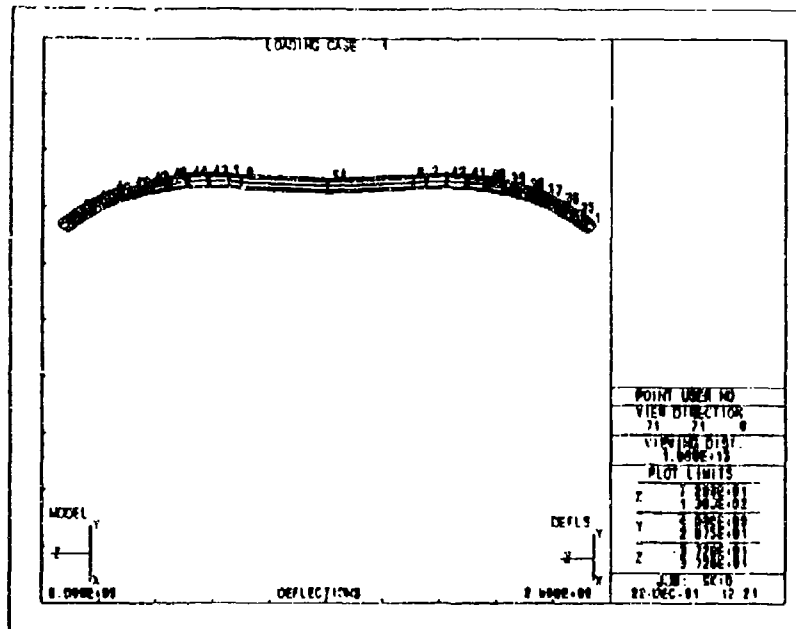


Figure D2.2: Deflected Crosstube

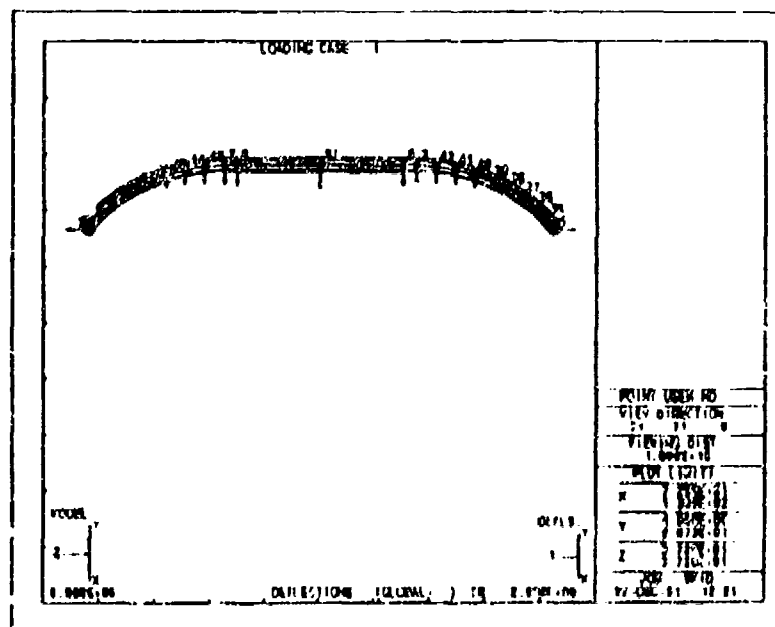


Figure D2.3: Crosstube Deflections Indicated by Vectors

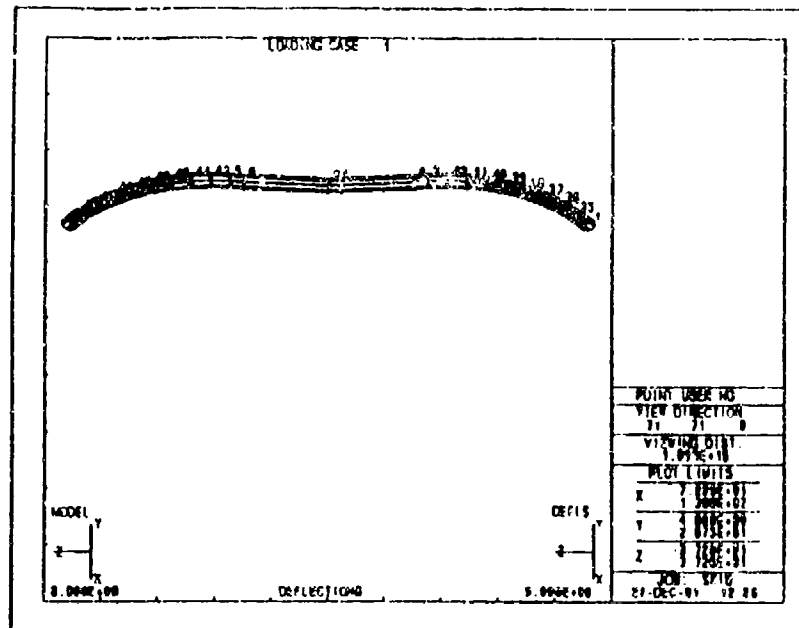


Figure D3.2: Deflected Crosstube

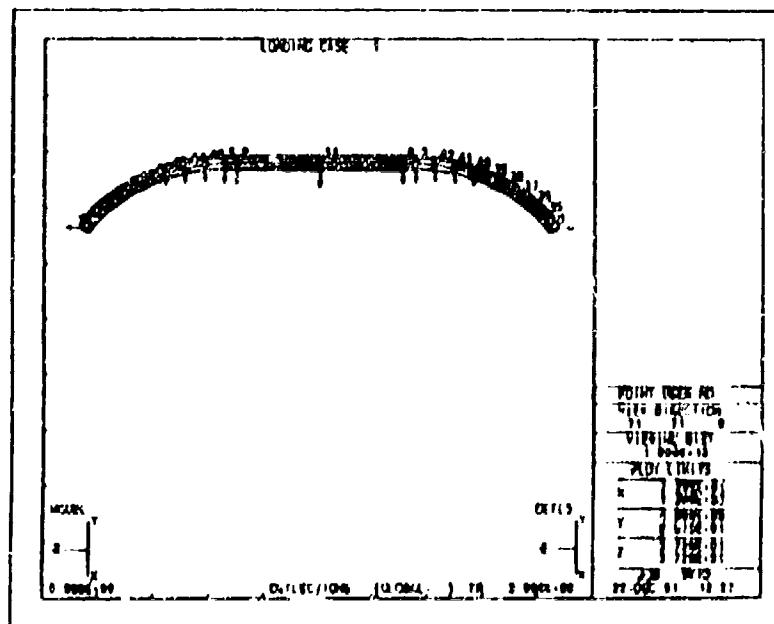


Figure D3.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-4.0476E+03
2	1	-7.7630E+03
3	1	-1.2166E+04
4	1	-1.7176E+04
5	1	-2.2696E+04
6	1	-2.8613E+04
7	1	-3.4811E+04
8	1	-4.1179E+04
9	1	-4.7616E+04
10	1	-4.7616E+04
11	1	-4.1179E+04
12	1	-3.4811E+04
13	1	-2.8613E+04
14	1	-2.2696E+04
15	1	-1.7176E+04
16	1	-1.2166E+04
17	1	-7.7634E+03
18	1	-4.0475E+03
19	1	5.2003E+04
20	1	5.2002E+04
21	1	5.2002E+04
22	1	5.2002E+04

Table D3.2: Principal Stresses

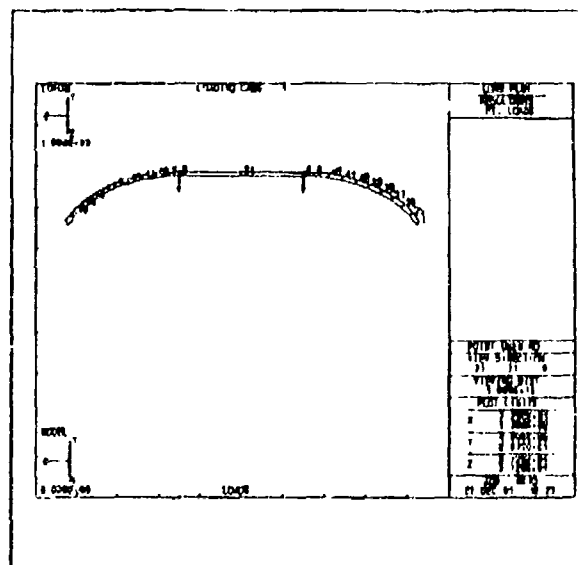


Figure D3.1: Point Location

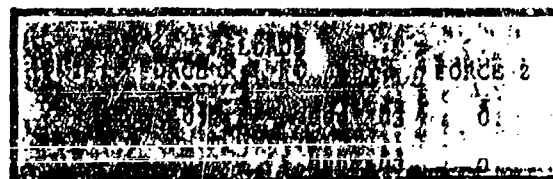


Table D3.1: Applied Loads

DISPLACEMENT INFORMATION						
POINT	U	V	W	RX	RY	PZ
1	0.000E+00	0.000E+00	-1.553E+00	1.159E-01	0.000E+00	0.000E+00
3	0.000E+00	-2.192E+00	4.059E-16	6.765E-02	0.000E+00	0.000E+00
5	0.000E+00	-2.192E+00	-4.042E-16	-5.766E-02	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	1.553E+00	-1.169E-01	0.000E+00	0.000E+00
9	0.000E+00	-2.316E+00	3.517E-16	5.872E-02	0.000E+00	0.000E+00
11	0.000E+00	-2.316E+00	-3.497E-16	-5.872E-02	0.000E+00	0.000E+00
13	0.000E+00	-1.797E-01	-1.246E+00	1.164E-01	0.000E+00	0.000E+00
15	0.000E+00	-3.922E-01	-9.637E-01	1.150E-01	0.000E+00	0.000E+00
17	0.000E+00	-6.319E-01	-7.122E-01	1.126E-01	0.000E+00	0.000E+00
19	0.000E+00	-8.919E-01	-4.959E-01	1.088E-01	0.000E+00	0.000E+00
21	0.000E+00	-1.164E+00	-3.104E-01	1.037E-01	0.000E+00	0.000E+00
23	0.000E+00	-1.439E+00	-1.814E-01	9.712E-02	0.000E+00	0.000E+00
25	0.000E+00	-1.707E+00	-8.672E-02	8.095E-02	0.000E+00	0.000E+00
27	0.000E+00	-1.958E+00	-5.657E-02	7.615E-02	0.000E+00	0.000E+00
29	0.000E+00	-1.958E+00	2.583E-02	-7.215E-02	0.000E+00	0.000E+00
31	0.000E+00	-1.707E+00	1.472E-02	-6.895E-02	0.000E+00	0.000E+00
33	0.000E+00	-1.439E+00	1.814E-01	-9.712E-02	0.000E+00	0.000E+00
35	0.000E+00	-1.164E+00	3.104E-01	-1.037E-01	0.000E+00	0.000E+00
37	0.000E+00	-8.919E-01	4.959E-01	-1.088E-01	0.000E+00	0.000E+00
39	0.000E+00	-6.319E-01	7.122E-01	-1.126E-01	0.000E+00	0.000E+00
41	0.000E+00	-3.922E-01	9.637E-01	-1.150E-01	0.000E+00	0.000E+00
43	0.000E+00	-1.797E-01	1.246E+00	-1.164E-01	0.000E+00	0.000E+00
45	0.000E+00	0.000E+00	1.553E+00	-1.169E-01	0.000E+00	0.000E+00
47	0.000E+00	2.192E+00	4.059E-16	6.765E-02	0.000E+00	0.000E+00
49	0.000E+00	2.192E+00	-4.042E-16	-5.766E-02	0.000E+00	0.000E+00
51	0.000E+00	0.000E+00	1.553E+00	-1.169E-01	0.000E+00	0.000E+00

Table D3.3: Displacements

PRINCIPAL STRESSES ENVELOPE

ELE NO.	STR PT.	S11
1	1	-4.8569E+03
2	1	-9.3158E+03
3	1	-1.4599E+04
4	1	-2.0612E+04
5	1	-2.7235E+04
6	1	-3.4336E+04
7	1	-4.1773E+04
8	1	-4.9414E+04
9	1	-5.7138E+04
10	1	-5.7139E+04
11	1	-4.9414E+04
12	1	-4.1773E+04
13	1	-3.4336E+04
14	1	-2.7235E+04
15	1	-2.0612E+04
16	1	-1.4599E+04
17	1	-9.3158E+03
18	1	-4.8570E+03
19	1	6.2402E+04
20	1	6.2403E+04
21	1	6.2402E+04
22	1	6.2402E+04

Table D4.2: Principal Stresses

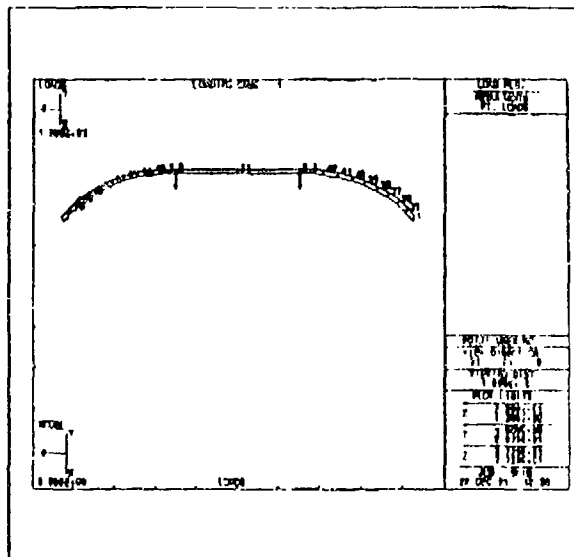


Figure D4.1: Point Location



Table D4.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	PX	PY	PZ
1	0.000E+00	0.000E+00	-1.963E+00	1.402E-01	0.000E+00	0.000E+00
3	0.000E+00	-2.613E+00	4.949E-16	2.119E-02	0.000E+00	0.000E+00
5	0.000E+00	-2.618E+00	-4.840E-16	-8.119E-02	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	1.863E+00	-1.402E-01	0.000E+00	0.000E+00
8	0.000E+00	-2.779E+00	4.286E-16	7.047E-02	0.000E+00	0.000E+00
9	0.000E+00	-2.779E+00	-4.176E-16	-7.047E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.157E-01	-1.495E+00	1.397E-01	0.000E+00	0.000E+00
36	0.000E+00	-4.706E-01	-1.156E+00	1.381E-01	0.000E+00	0.000E+00
37	0.000E+00	-7.583E-01	-8.546E-01	1.351E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.070E+00	-5.951E-01	1.306E-01	0.000E+00	0.000E+00
39	0.000E+00	-1.397E+00	-3.821E-01	1.245E-01	0.000E+00	0.000E+00
40	0.000E+00	-1.727E+00	-2.177E-01	1.165E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.048E+00	-1.017E-01	1.067E-01	0.000E+00	0.000E+00
42	0.000E+00	-2.349E+00	-3.099E-02	9.498E-02	0.000E+00	0.000E+00
43	0.000E+00	-2.349E+00	3.099E-02	-9.498E-02	0.000E+00	0.000E+00
44	0.000E+00	-2.048E+00	1.017E-01	-1.067E-01	0.000E+00	0.000E+00
45	0.000E+00	-1.727E+00	2.177E-01	-1.165E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.397E+00	3.821E-01	-1.245E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.070E+00	5.951E-01	-1.306E-01	0.000E+00	0.000E+00
48	0.000E+00	-7.583E-01	8.546E-01	-1.351E-01	0.000E+00	0.000E+00
49	0.000E+00	-4.706E-01	1.156E+00	-1.381E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.157E-01	1.495E+00	-1.397E-01	0.000E+00	0.000E+00
51	0.000E+00	-3.244E+00	0.000E+00	1.279E-09	0.000E+00	0.000E+00

Table D4.3: Deflections

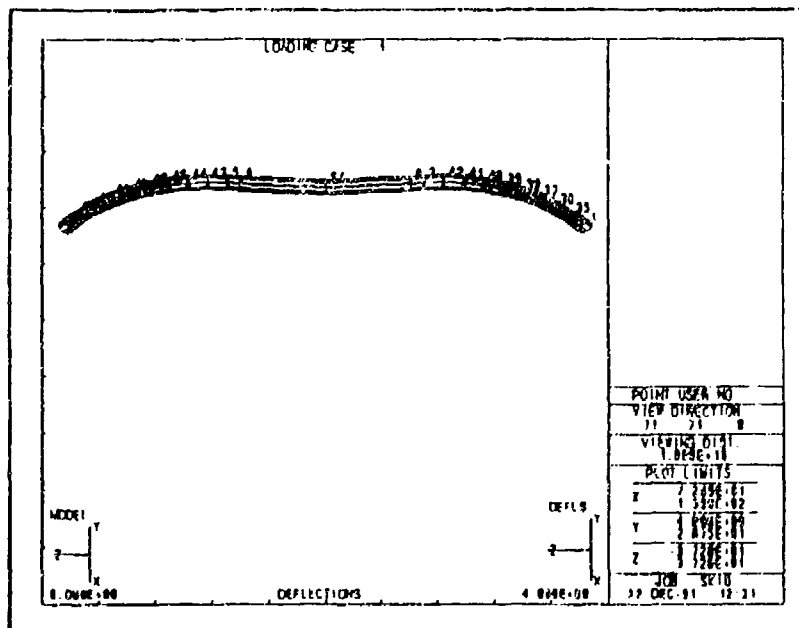


Figure B4.2: Deflected Crossbe

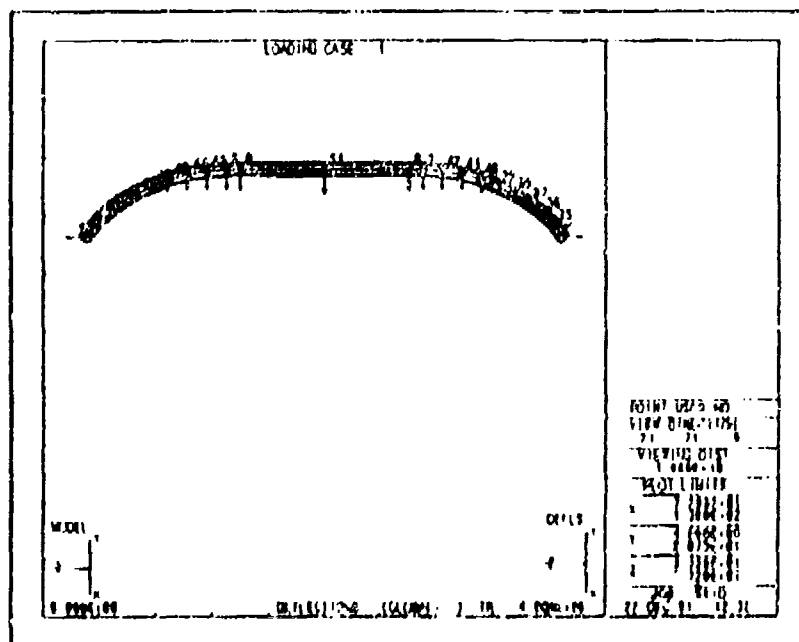


Figure B4.3: Crossbe Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STA PT.	S:1
1	1	-5.2620E+03
2	1	-1.0092E+04
3	1	-1.5816E+04
4	1	-2.2329E+04
5	1	-2.9505E+04
6	1	-3.7197E+04
7	1	-4.5255E+04
8	1	-5.3531E+04
9	1	-6.1901E+04
10	1	-6.1900E+04
11	1	-5.3532E+04
12	1	-4.5255E+04
13	1	-3.7197E+04
14	1	-2.9505E+04
15	1	-2.2329E+04
16	1	-1.5816E+04
17	1	-1.0092E+04
18	1	-5.2615E+03
19	1	6.7602E+04
20	1	6.7603E+04
21	1	6.7603E+04
22	1	6.7603E+04

Table D5.2: Principal Stresses

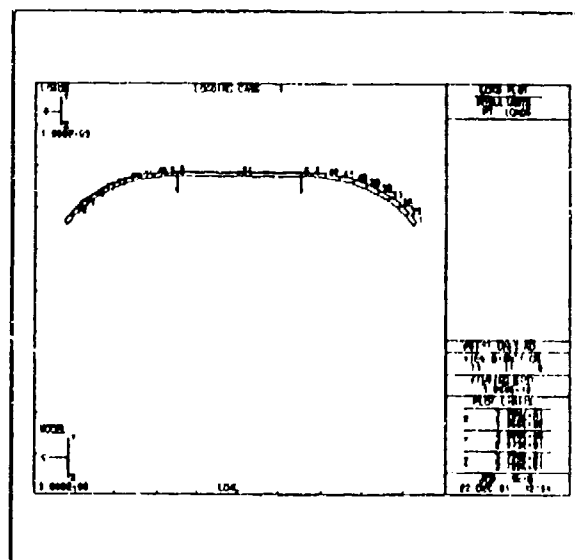


Figure D5.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
1	0.	-1.300E+03	0.
2	0.	-1.300E+03	0.

Table D5.1: Applied Loads

DISPLACEMENT INFORMATION						
POINT	U	V	W	PX	PY	PZ
1	0.000E+00	0.000E+00	-2.019E+00	1.519E-01	0.000E+00	0.000E+00
3	0.000E+00	-2.836E+00	5.301E-16	8.795E-02	0.000E+00	0.000E+00
5	0.000E+00	-2.836E+00	-5.274E-16	-8.795E-02	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.019E+00	-1.519E-01	0.000E+00	0.000E+00
8	0.000E+00	-3.010E+00	4.608E-16	7.634E-02	0.000E+00	0.000E+00
9	0.000E+00	-3.010E+00	-4.550E-16	-7.634E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.336E-01	-1.620E+00	1.513E-01	0.000E+00	0.000E+00
36	0.000E+00	-5.098E-01	-1.253E+00	1.496E-01	0.000E+00	0.000E+00
37	0.000E+00	-8.215E-01	-9.256E-01	1.463E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.160E+00	-6.447E-01	1.415E-01	0.000E+00	0.000E+00
39	0.000E+00	-1.513E+00	-4.140E-01	1.348E-01	0.000E+00	0.000E+00
40	0.000E+00	-1.871E+00	-2.359E-01	1.263E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.219E+00	-1.101E-01	1.156E-01	0.000E+00	0.000E+00
42	0.000E+00	-2.545E+00	-3.357E-02	1.029E-01	0.000E+00	0.000E+00
43	0.000E+00	-2.545E+00	3.357E-02	-1.029E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.219E+00	1.101E-01	-1.156E-01	0.000E+00	0.000E+00
45	0.000E+00	-1.871E+00	2.355E-01	-1.263E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.513E+00	4.140E-01	-1.348E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.160E+00	6.447E-01	-1.415E-01	0.000E+00	0.000E+00
48	0.000E+00	-8.215E-01	9.256E-01	-1.463E-01	0.000E+00	0.000E+00
49	0.000E+00	-5.098E-01	1.253E+00	-1.496E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.336E-01	1.620E+00	-1.513E-01	0.000E+00	0.000E+00
51	0.000E+00	-3.514E+00	0.000E+00	1.386E-09	0.000E+00	0.000E+00

Table D5.2: Deflections

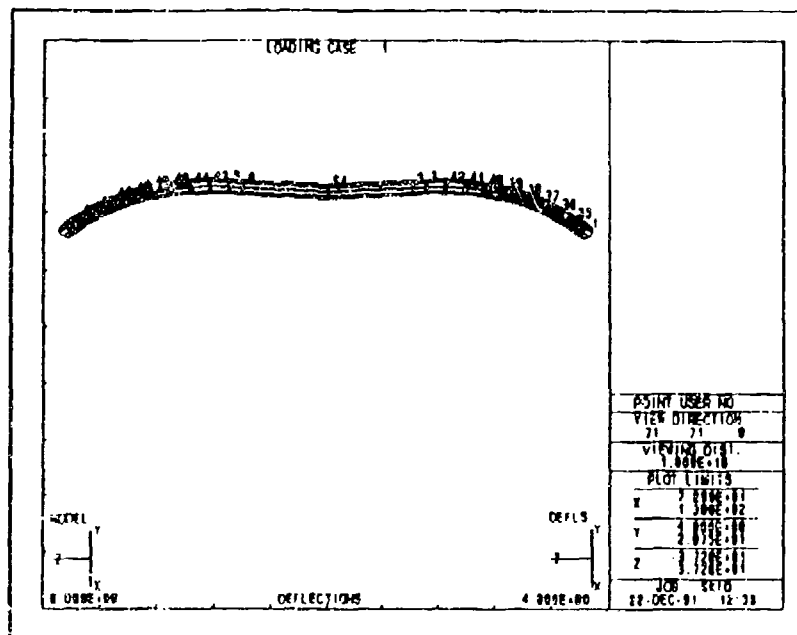


Figure D5.2: Deflected Crosstube

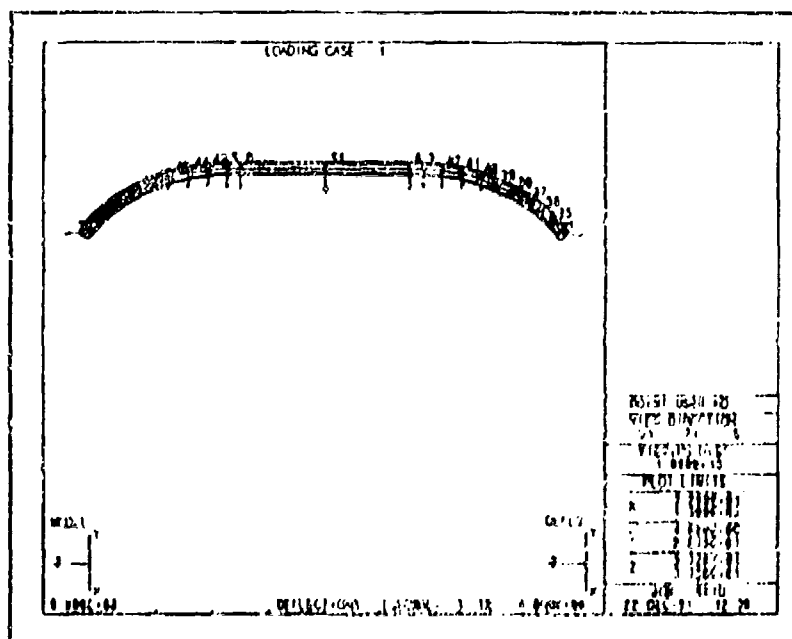


Figure D5.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-5.4644E+03
2	1	-1.0480E+04
3	1	-1.6425E+04
4	1	-2.3188E+04
5	1	-3.0639E+04
6	1	-3.8627E+04
7	1	-4.6995E+04
8	1	-5.5592E+04
9	1	-6.4282E+04
10	1	-6.4282E+04
11	1	-5.5591E+04
12	1	-4.6995E+04
13	1	-3.8628E+04
14	1	-3.0640E+04
15	1	-2.3188E+04
16	1	-1.6424E+04
17	1	-1.0480E+04
18	1	-5.4641E+03
19	1	7.0203E+04
20	1	7.0203E+04
21	1	7.0203E+04
22	1	7.0203E+04

Table D6.2: Principal Stresses

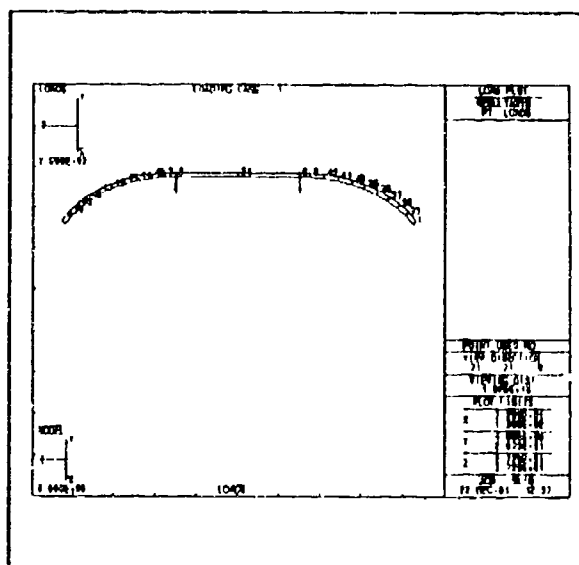


Figure D6.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.350E+03	0.
9	0.	-1.350E+03	0.

Table D6.1: Applied Loads

DISPLACEMENT INFORMATION						
POINT	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.096E+00	1.578E-01	0.000E+00	0.000E+00
3	0.000E+00	-2.945E+00	5.467E-16	9.134E-02	0.000E+00	0.000E+00
5	0.000E+00	-2.945E+00	-5.447E-16	-9.134E-02	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.096E+00	-1.578E-01	0.000E+00	0.000E+00
8	0.000E+00	-3.126E+00	4.769E-16	7.928E-02	0.000E+00	0.000E+00
9	0.000E+00	-3.126E+00	-4.699E-16	-7.928E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.426E-01	-1.682E+00	1.572E-01	0.000E+00	0.000E+00
36	0.000E+00	-5.295E-01	-1.301E+00	1.553E-01	0.000E+00	0.000E+00
37	0.000E+00	-8.531E-01	-9.614E-01	1.520E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.204E+00	-6.695E-01	1.469E-01	0.000E+00	0.000E+00
39	0.000E+00	-1.572E+00	-4.299E-01	1.400E-01	0.000E+00	0.000E+00
40	0.000E+00	-1.943E+00	-2.449E-01	1.311E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.305E+00	-1.144E-01	1.201E-01	0.000E+00	0.000E+00
42	0.000E+00	-2.643E+00	-3.487E-02	1.068E-01	0.000E+00	0.000E+00
43	0.000E+00	-2.643E+00	3.487E-02	-1.068E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.305E+00	1.144E-01	-1.201E-01	0.000E+00	0.000E+00
45	0.000E+00	-1.943E+00	2.449E-01	-1.311E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.572E+00	4.299E-01	-1.400E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.204E+00	6.695E-01	-1.469E-01	0.000E+00	0.000E+00
48	0.000E+00	-8.531E-01	9.614E-01	-1.520E-01	0.000E+00	0.000E+00
49	0.000E+00	-5.295E-01	1.301E+00	-1.553E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.426E-01	1.682E+00	-1.572E-01	0.000E+00	0.000E+00
51	0.000E+00	-3.650E+00	0.000E+00	1.439E-09	0.000E+00	0.000E+00

Table D6.3: Deflections

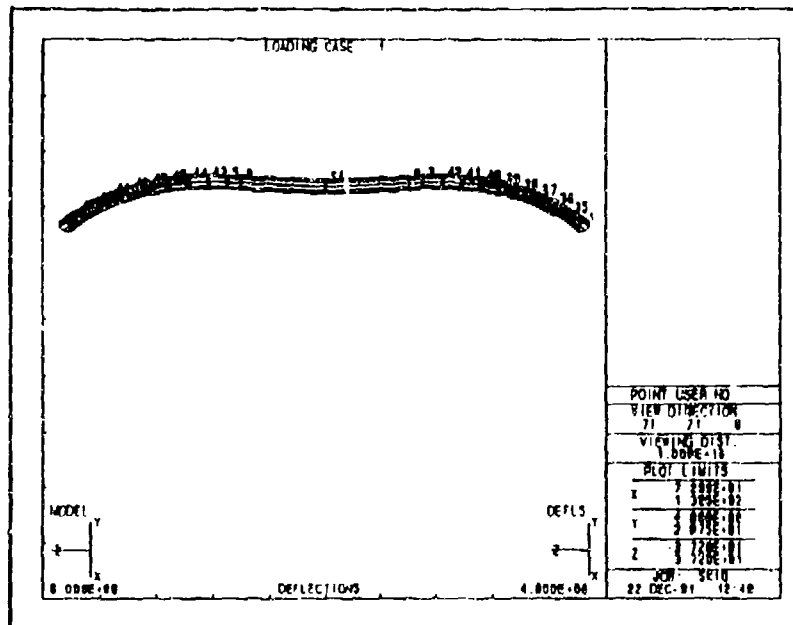


Figure D6.2: Deflected Crosstube

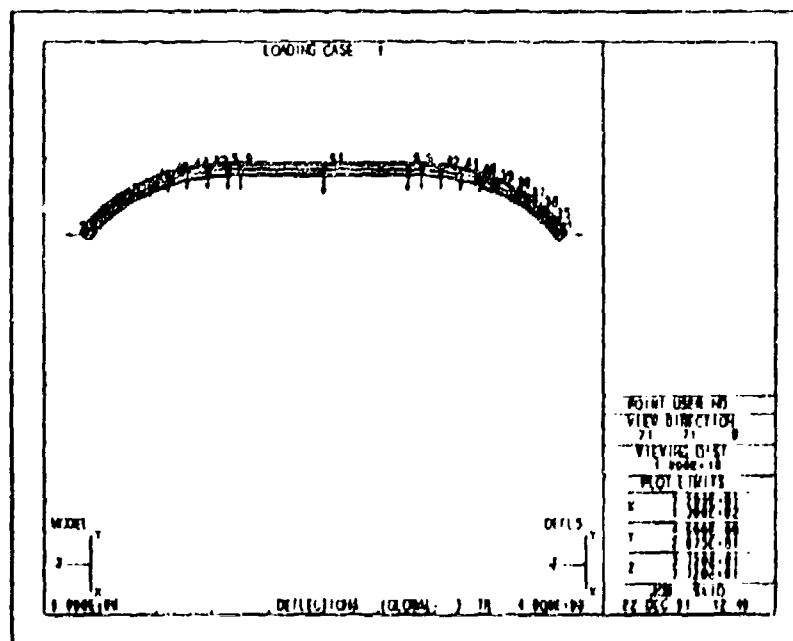


Figure D6.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-5.6666E+03
2	1	-1.0868E+04
3	1	-1.7033E+04
4	1	-2.4048E+04
5	1	-3.1774E+04
6	1	-4.0058E+04
7	1	-4.8735E+04
8	1	-5.7650E+04
9	1	-6.6663E+04
10	1	-6.6662E+04
11	1	-5.7650E+04
12	1	-4.8735E+04
13	1	-4.0059E+04
14	1	-3.1774E+04
15	1	-2.4047E+04
16	1	-1.7033E+04
17	1	-1.0868E+04
18	1	-5.6665E+03
19	1	7.2803E+04
20	1	7.2803E+04
21	1	7.2803E+04
22	1	7.2803E+04

Table D7.2: Principal Stresses

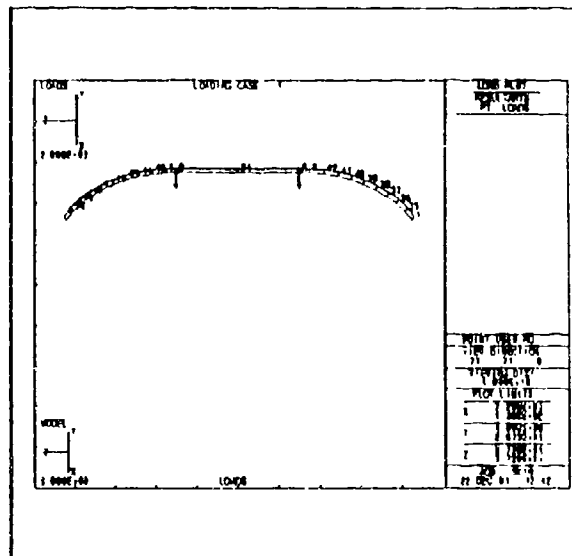


Figure D7.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
1	0.	-1.400E+03	0.
2	0.	-1.400E+03	0.
3	0.	-1.400E+03	0.
4	0.	-1.400E+03	0.
5	0.	-1.400E+03	0.
6	0.	-1.400E+03	0.
7	0.	-1.400E+03	0.
8	0.	-1.400E+03	0.
9	0.	-1.400E+03	0.
10	0.	-1.400E+03	0.
11	0.	-1.400E+03	0.
12	0.	-1.400E+03	0.
13	0.	-1.400E+03	0.
14	0.	-1.400E+03	0.
15	0.	-1.400E+03	0.
16	0.	-1.400E+03	0.
17	0.	-1.400E+03	0.
18	0.	-1.400E+03	0.
19	0.	-1.400E+03	0.
20	0.	-1.400E+03	0.
21	0.	-1.400E+03	0.
22	0.	-1.400E+03	0.

Table D7.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.174E+00	1.636E-01	0.000E+00	0.000E+00
3	0.000E+00	-3.054E+00	5.729E-16	9.472E-02	0.000E+00	0.000E+00
5	0.000E+00	-3.054E+00	-5.690E-18	-9.472E-02	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.174E+00	-1.636E-01	0.000E+00	0.000E+00
8	0.000E+00	-3.242E+00	4.984E-16	8.221E-02	0.000E+00	0.000E+00
9	0.000E+00	-3.242E+00	-4.909E-18	-8.221E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.516E-01	-1.744E+00	1.630E-01	0.000E+00	0.000E+00
36	0.000E+00	-5.491E-01	-1.349E+00	1.611E-01	0.000E+00	0.000E+00
37	0.000E+00	-8.847E-01	-9.970E-01	1.576E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.249E+00	-6.943E-01	1.524E-01	0.000E+00	0.000E+00
39	0.000E+00	-1.630E+00	-4.458E-01	1.452E-01	0.000E+00	0.000E+00
40	0.000E+00	-2.015E+00	-2.540E-01	1.360E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.390E+00	-1.186E-01	1.245E-01	0.000E+00	0.000E+00
42	0.000E+00	-2.741E+00	-3.616E-02	1.108E-01	0.000E+00	0.000E+00
43	0.000E+00	-2.741E+00	3.616E-02	-1.108E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.390E+00	1.186E-01	-1.245E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.015E+00	2.540E-01	-1.360E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.630E+00	4.458E-01	-1.452E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.249E+00	6.943E-01	-1.524E-01	0.000E+00	0.000E+00
48	0.000E+00	-8.847E-01	9.970E-01	-1.576E-01	0.000E+00	0.000E+00
49	0.000E+00	-5.491E-01	1.349E+00	-1.611E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.516E-01	1.744E+00	-1.630E-01	0.000E+00	0.000E+00
51	0.000E+00	-3.785E+00	0.000E+00	1.493E-09	0.000E+00	0.000E+00

Table D7.3: Deflections

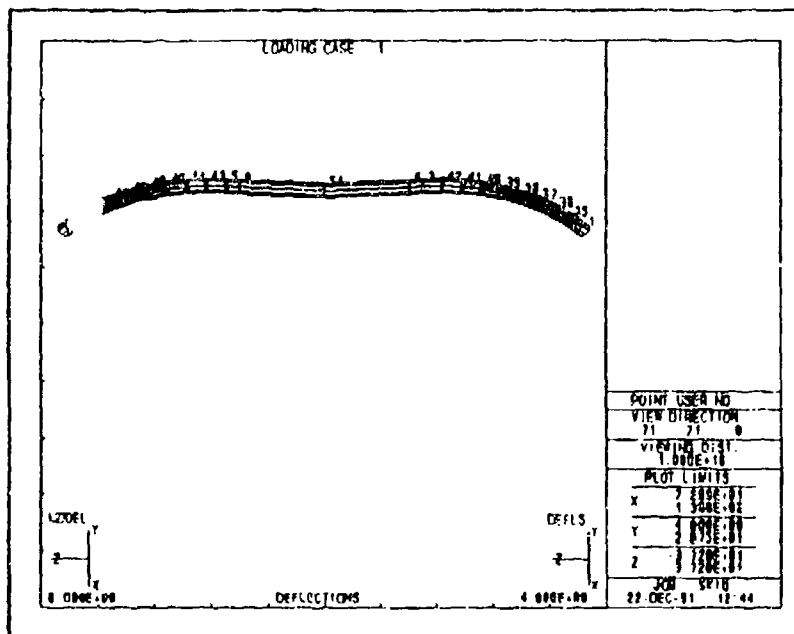


Figure D7.2: Deflected Crosstube

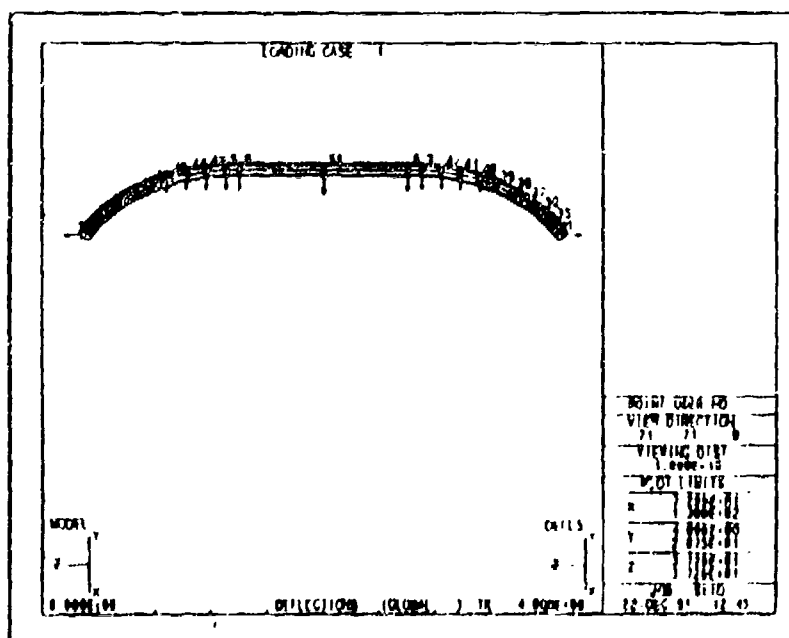


Figure D7.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-5.8696E+03
2	1	-1.1256E+04
3	1	-1.7641E+04
4	1	-2.4906E+04
5	1	-3.2910E+04
6	1	-4.1489E+04
7	1	-5.0476E+04
8	1	-5.9708E+04
9	1	-6.9043E+04
10	1	-6.9043E+04
11	1	-5.9708E+04
12	1	-5.0476E+04
13	1	-4.1489E+04
14	1	-3.2909E+04
15	1	-2.4907E+04
16	1	-1.7641E+04
17	1	-1.1257E+04
18	1	-5.8690E+03
19	1	7.5403E+04
20	1	7.5403E+04
21	1	7.5403E+04
22	1	7.5404E+04

Table D8.2: Principal Stresses

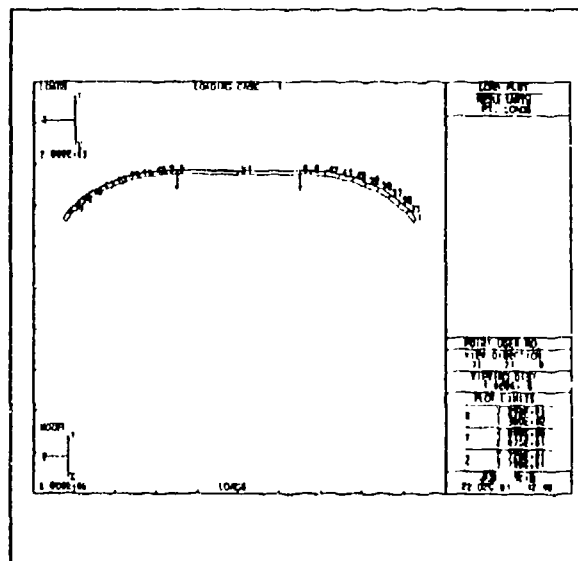


Figure D8.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.450E+03	0.
9	0.	-1.450E+03	0.

Table D8.1: Applied Loads

DISPLACEMENT INFORMATION						
POINT	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.252E+00	1.694E-01	0.000E+00	0.000E+00
3	0.000E+00	-3.164E+00	5.916E-16	9.810E-02	0.000E+00	0.000E+00
5	0.000E+00	-3.164E+00	-5.846E-16	-9.810E-02	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.252E+00	-1.694E-01	0.000E+00	0.000E+00
8	0.000E+00	-3.358E+00	5.170E-16	8.515E-02	0.000E+00	0.000E+00
9	0.000E+00	-3.358E+00	-5.044E-16	-8.515E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.606E-01	-1.806E+00	1.688E-01	0.000E+00	0.000E+00
36	0.000E+00	-5.687E-01	-1.397E+00	1.668E-01	0.000E+00	0.000E+00
37	0.000E+00	-9.163E-01	-1.033E+00	1.632E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.293E+00	-7.191E-01	1.578E-01	0.000E+00	0.000E+00
39	0.000E+00	-1.688E+00	-4.617E-01	1.504E-01	0.000E+00	0.000E+00
40	0.000E+00	-2.087E+00	-2.631E-01	1.408E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.475E+00	-1.278E-01	1.290E-01	0.000E+00	0.000E+00
42	0.000E+00	-2.839E+00	-3.745E-02	1.148E-01	0.000E+00	0.000E+00
43	0.000E+00	-2.839E+00	3.745E-02	-1.148E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.475E+00	1.228E-01	-1.290E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.087E+00	2.631E-01	-1.408E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.688E+00	4.617E-01	-1.504E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.293E+00	7.191E-01	-1.578E-01	0.000E+00	0.000E+00
48	0.000E+00	-9.163E-01	1.033E+00	-1.632E-01	0.000E+00	0.000E+00
49	0.000E+00	-5.687E-01	1.397E+00	-1.668E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.606E-01	1.806E+00	-1.688E-01	0.000E+00	0.000E+00
51	0.000E+00	-3.920E+00	0.000E+00	1.546E-02	0.000E+00	0.000E+00

Table D8.3: Deflections

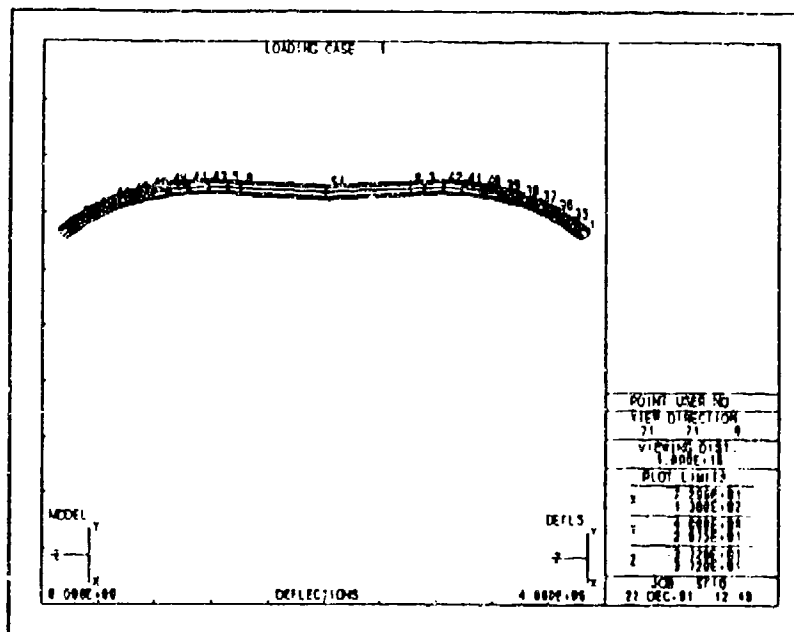


Figure D8.2: Deflected Crosstube

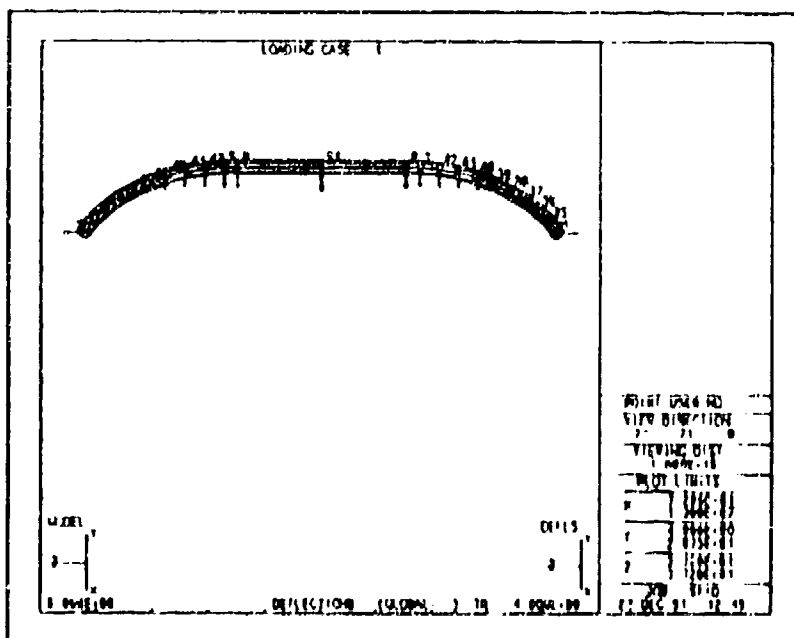


Figure D8.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE

ELE NO.	STR PT.	S11
1	1	-6.0715E+03
2	1	-1.1644E+04
3	1	-1.8249E+04
4	1	-2.5765E+04
5	1	-3.4044E+04
6	1	-4.2319E+04
7	1	-5.2216E+04
8	1	-6.1767E+04
9	1	-7.1425E+04
10	1	-7.1424E+04
11	1	-6.1768E+04
12	1	-5.2217E+04
13	1	-4.2919E+04
14	1	-3.4044E+04
15	1	-2.5764E+04
16	1	-1.8249E+04
17	1	-1.1645E+04
18	1	-6.0717E+03
19	1	7.8004E+04
20	1	7.8003E+04
21	1	7.8003E+04
22	1	7.8003E+04

Table D9.2: Principal Stresses

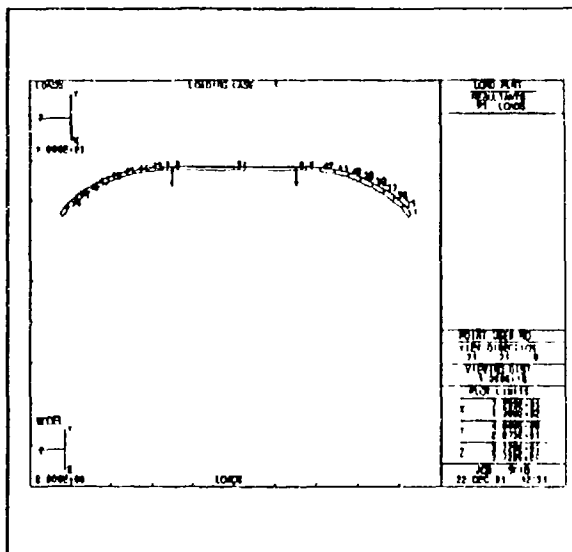


Figure D9.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.500E+03	0.
9	0.	-1.500E+03	0.

Table D9.1: Applied Loads

DISPLACEMENT INFORMATION						
POINT	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.329E+00	1.753E-01	0.000E+00	0.000E+00
3	0.000E+00	-3.273E+00	6.176E-16	1.015E-01	0.000E+00	0.000E+00
5	0.000E+00	-3.273E+00	-6.037E-16	-1.015E-01	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.329E+00	-1.753E-01	0.000E+00	0.000E+00
8	0.000E+00	-3.474E+00	5.360E-16	8.808E-02	0.000E+00	0.000E+00
9	0.000E+00	-3.474E+00	-5.208E-16	-8.808E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.696E-01	-1.869E+00	1.746E-01	0.000E+00	0.000E+00
36	0.000E+00	-5.883E-01	-1.446E+00	1.726E-01	0.000E+00	0.000E+00
37	0.000E+00	-9.479E-01	-1.068E+00	1.688E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.338E+00	-7.439E-01	1.632E-01	0.000E+00	0.000E+00
39	0.000E+00	-1.746E+00	-4.776E-01	1.556E-01	0.000E+00	0.000E+00
40	0.000E+00	-2.159E+00	-2.722E-01	1.457E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.561E+00	-1.271E-01	1.334E-01	0.000E+00	0.000E+00
42	0.000E+00	-2.937E+00	-3.874E-02	1.187E-01	0.000E+00	0.000E+00
43	0.000E+00	-2.937E+00	3.874E-02	-1.187E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.561E+00	1.271E-01	-1.334E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.159E+00	2.722E-01	-1.457E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.746E+00	4.776E-01	-1.556E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.338E+00	7.439E-01	-1.632E-01	0.000E+00	0.000E+00
48	0.000E+00	-9.479E-01	1.068E+00	-1.688E-01	0.000E+00	0.000E+00
49	0.000E+00	-5.883E-01	1.446E+00	-1.726E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.696E-01	1.869E+00	-1.746E-01	0.000E+00	0.000E+00
51	0.000E+00	-4.055E+00	0.000E+00	1.599E-09	0.000E+00	0.000E+00

Table D9.3: Deflections

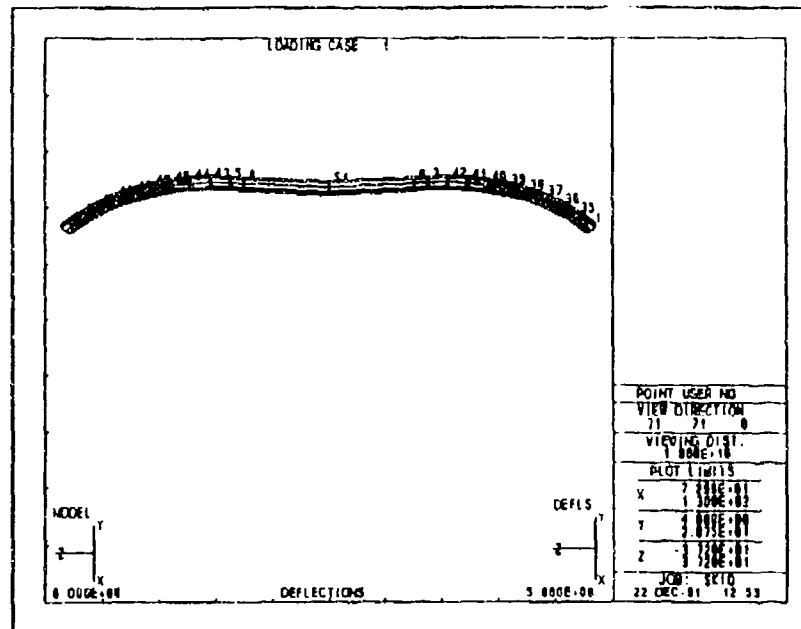


Figure D9.2: Deflected Crosstube

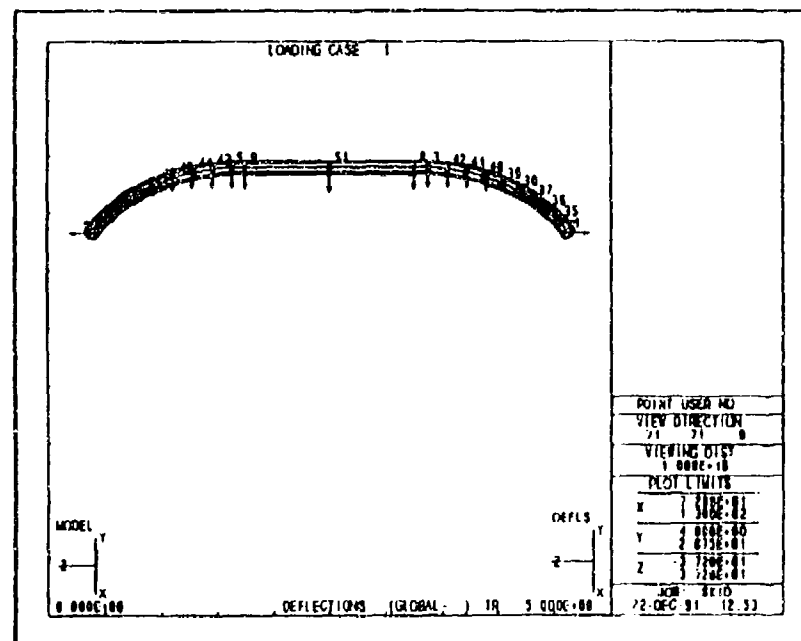


Figure D9.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE

ELE NO.	STR PT:	S11
1	1	-8.2739E+03
2	1	-1.2032E+04
3	1	-1.8857E+04
4	1	-2.8623E+04
5	1	-3.5179E+04
6	1	-4.4351E+04
7	1	-5.3957E+04
8	1	-6.3826E+04
9	1	-7.3806E+04
10	1	-7.3805E+04
11	1	-6.3827E+04
12	1	-5.3957E+04
13	1	-4.4350E+04
14	1	-3.5179E+04
15	1	-2.8623E+04
16	1	-1.8858E+04
17	1	-1.2033E+04
18	1	-8.2739E+03
19	1	8.0602E+04
20	1	8.0603E+04
21	1	8.0603E+04
22	1	8.0604E+04

Table D10.2: Principal Stresses

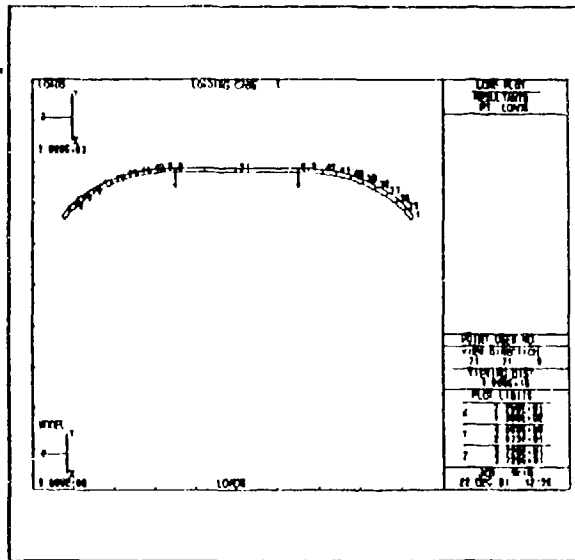


Figure D10.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.550E+03	0.
9	0.	-1.550E+03	0.

Table D10.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.407E+00	1.811E-01	0.000E+00	0.000E+00
3	0.000E+00	-3.382E+00	6.326E-16	1.049E-01	0.000E+00	0.000E+00
5	0.000E+00	-3.382E+00	-6.245E-16	-1.049E-01	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.407E+00	-1.811E-01	0.000E+00	0.000E+00
8	0.000E+00	-3.589E+00	5.478E-16	9.102E-02	0.000E+00	0.000E+00
9	0.000E+00	-3.589E+00	-5.388E-16	-9.102E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.786E-01	-1.931E+00	1.805E-01	0.000E+00	0.000E+00
36	0.000E+00	-6.079E-01	-1.494E+00	1.783E-01	0.000E+00	0.000E+00
37	0.000E+00	-9.795E-01	-1.104E+00	1.745E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.383E+00	-7.687E-01	1.687E-01	0.000E+00	0.000E+00
39	0.000E+00	-1.804E+00	-4.936E-01	1.608E-01	0.000E+00	0.000E+00
40	0.000E+00	-2.231E+00	-2.812E-01	1.505E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.646E+00	-1.313E-01	1.379E-01	0.000E+00	0.000E+00
42	0.000E+00	-3.035E+00	-4.003E-02	1.227E-01	0.000E+00	0.000E+00
43	0.000E+00	-3.035E+00	4.003E-02	-1.227E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.646E+00	1.313E-01	-1.379E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.231E+00	2.812E-01	-1.505E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.804E+00	4.936E-01	-1.608E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.383E+00	7.687E-01	-1.687E-01	0.000E+00	0.000E+00
48	0.000E+00	-9.795E-01	1.104E+00	-1.745E-01	0.000E+00	0.000E+00
49	0.000E+00	-6.079E-01	1.494E+00	-1.783E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.786E-01	1.931E+00	-1.805E-01	0.000E+00	0.000E+00
51	0.000E+00	-4.190E+00	0.000E+00	1.653E-09	0.000E+00	0.000E+00

Table D10.3: Deflections

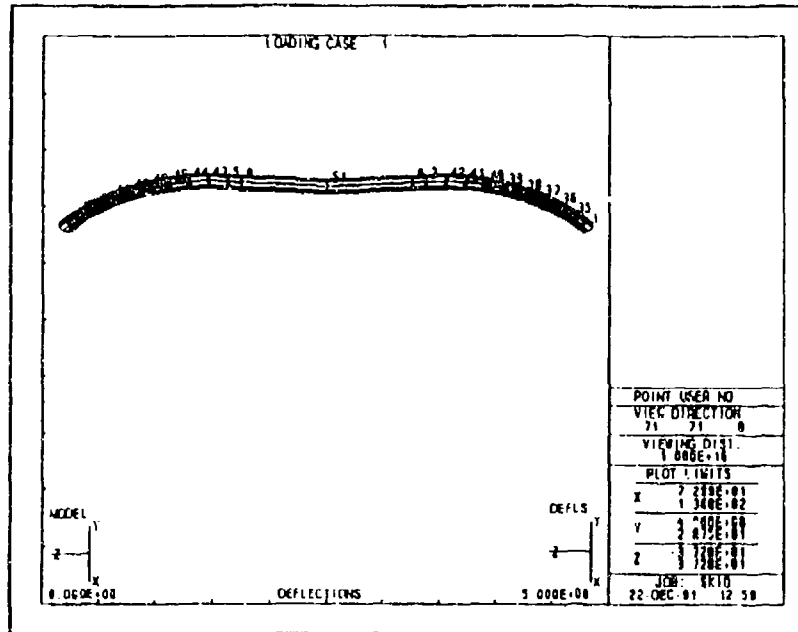


Figure D10.2: Deflected Crosstube

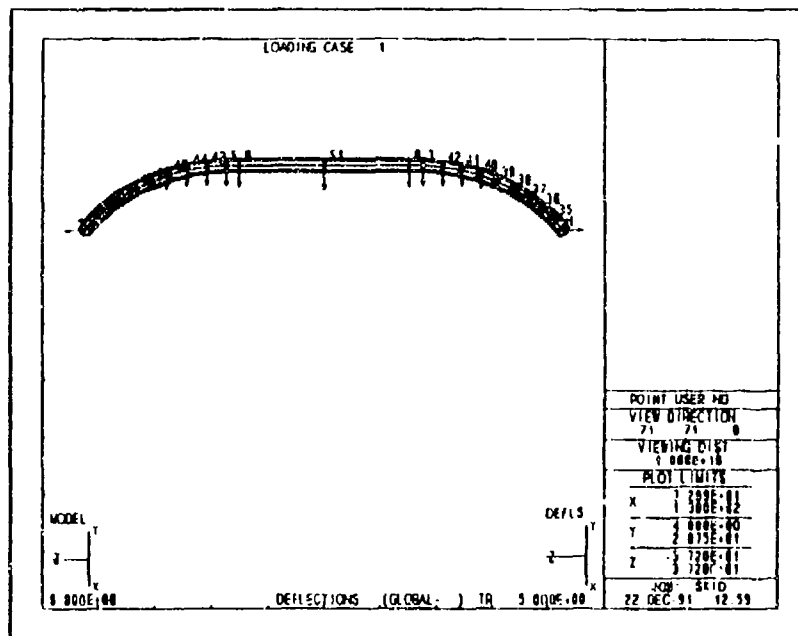


Figure D10.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES
ENVELOPE

ELE NO.	STR PT.	S11
1	1	-6.4767E+03
2	1	-1.2421E+04
3	1	-1.9466E+04
4	1	-2.7482E+04
5	1	-3.6314E+04
6	1	-4.5781E+04
7	1	-5.5696E+04
8	1	-6.5886E+04
9	1	-7.6186E+04
10	2	-7.6185E+04
11	1	-6.5885E+04
12	1	-5.5697E+04
13	1	-4.5781E+04
14	1	-3.6313E+04
15	1	-2.7482E+04
16	1	-1.9466E+04
17	1	-1.2421E+04
18	1	-6.4764E+03
19	1	8.3204E+04
20	1	8.3203E+04
21	1	8.3203E+04
22	1	8.3204E+04

Table D11.2: Principal Stresses

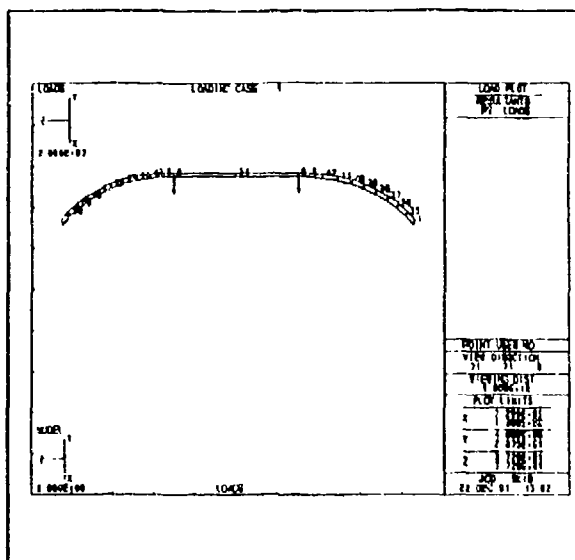


Figure D11.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.600E+03	0.
9	0.	-1.600E+03	0.

Table D11.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.485E+00	1.870E-01	0.000E+00	0.000E+00
3	0.000E+00	-3.491E+00	6.516E-16	1.083E-01	0.000E+00	0.000E+00
5	0.000E+00	-3.491E+00	-6.453E-16	-1.083E-01	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.485E+00	-1.870E-01	0.000E+00	0.000E+00
8	0.000E+00	-3.705E+00	5.689E-16	9.396E-02	0.000E+00	0.000E+00
9	0.000E+00	-3.705E+00	-5.567E-16	-9.396E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.876E-01	-1.993E+00	1.863E-01	0.000E+00	0.000E+00
36	0.000E+00	-6.275E-01	-1.542E+00	1.841E-01	0.000E+00	0.000E+00
37	0.000E+00	-1.011E+00	-1.139E+00	1.801E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.427E+00	-7.935E-01	1.741E-01	0.000E+00	0.000E+00
39	0.000E+00	-1.863E+00	-5.095E-01	1.659E-01	0.000E+00	0.000E+00
40	0.000E+00	-2.303E+00	-2.903E-01	1.554E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.731E+00	-1.356E-01	1.423E-01	0.000E+00	0.000E+00
42	0.000E+00	-3.133E+00	-4.132E-02	1.266E-01	0.000E+00	0.000E+00
43	0.000E+00	-3.133E+00	4.132E-02	-1.266E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.731E+00	1.355E-01	-1.423E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.303E+00	2.903E-01	-1.554E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.863E+00	5.095E-01	-1.659E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.427E+00	7.935E-01	-1.741E-01	0.000E+00	0.000E+00
48	0.000E+00	-1.011E+00	1.139E+00	-1.801E-01	0.000E+00	0.000E+00
49	0.000E+00	-6.275E-01	1.542E+00	-1.841E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.876E-01	1.993E+00	-1.863E-01	0.000E+00	0.000E+00
51	0.000E+00	-4.325E+00	0.000E+00	1.706E-09	0.000E+00	0.000E+00

Table D11.3: Deflections

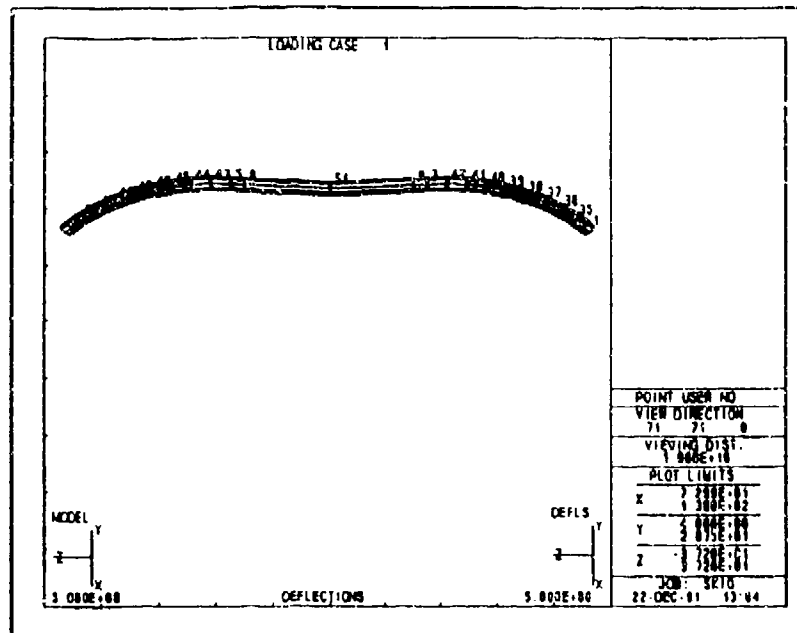


Figure D11.2: Deflected Crosstube

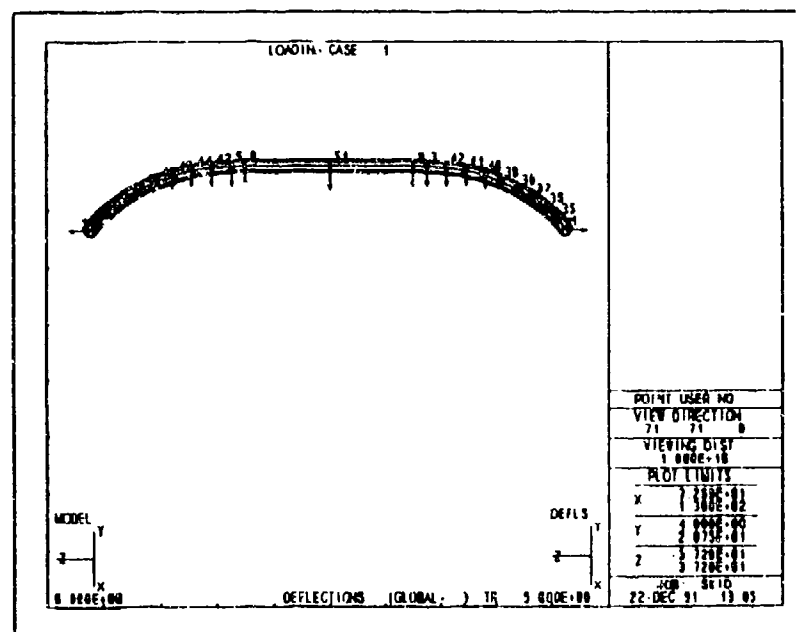


Figure D11.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-6.6791E+03
2	1	-1.2809E+04
3	1	-2.0074E+04
4	1	-2.8341E+04
5	1	-3.7448E+04
6	1	-4.7212E+04
7	1	-5.7438E+04
8	1	-6.7945E+04
9	1	-7.8566E+04
10	1	-7.8566E+04
11	1	-6.7945E+04
12	1	-5.7437E+04
13	1	-4.7212E+04
14	1	-3.7449E+04
15	1	-2.8342E+04
16	1	-2.0075E+04
17	1	-1.2810E+04
18	1	-6.6787E+03
19	1	8.5804E+04
20	1	8.5803E+04
21	1	8.5803E+04
22	1	8.5803E+04

Table D12.2: Principal Stresses

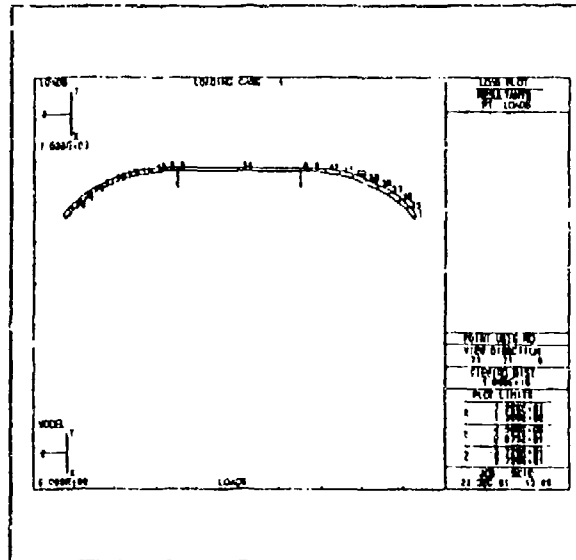


Figure D12.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.650E+03	0.
9	0.	-1.650E+03	0.

Table D12.1: Applied Loads

DISPLACEMENT INFORMATION						
POINT	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.562E+00	1.928E-01	0.000E+00	0.000E+00
3	0.000E+00	-3.600E+00	6.760E-16	1.116E-01	0.000E+00	0.000E+00
5	0.000E+00	-3.600E+00	-6.661E-16	-1.116E-01	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.562E+00	-1.928E-01	0.000E+00	0.000E+00
8	0.000E+00	-3.821E+00	5.860E-16	9.689E-02	0.000E+00	0.000E+00
9	0.000E+00	-3.821E+00	-5.747E-16	-9.689E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.966E-01	-2.056E+00	1.921E-01	0.000E+00	0.000E+00
36	0.000E+00	-6.471E-01	-1.590E+00	1.898E-01	0.000E+00	0.000E+00
37	0.000E+00	-1.043E+00	-1.175E+00	1.857E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.472E+00	-8.183E-01	1.796E-01	0.000E+00	0.000E+00
39	0.000E+00	-1.921E+00	-5.254E-01	1.711E-01	0.000E+00	0.000E+00
40	0.000E+00	-2.375E+00	-2.994E-01	1.602E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.817E+00	-1.398E-01	1.468E-01	0.000E+00	0.000E+00
42	0.000E+00	-3.231E+00	-4.261E-02	1.306E-01	0.000E+00	0.000E+00
43	0.000E+00	-3.231E+00	4.261E-02	-1.306E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.317E+00	1.395E-01	-1.468E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.375E+00	2.994E-01	-1.602E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.921E+00	5.254E-01	-1.711E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.472E+00	8.183E-01	-1.796E-01	0.000E+00	0.000E+00
48	0.000E+00	-1.043E+00	1.175E+00	-1.857E-01	0.000E+00	0.000E+00
49	0.000E+00	-6.471E-01	1.590E+00	-1.898E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.966E-01	2.056E+00	-1.921E-01	0.000E+00	0.000E+00
51	0.000E+00	-4.461E+00	0.000E+00	1.759E-09	0.000E+00	0.000E+00

Table D12.3: Deflections

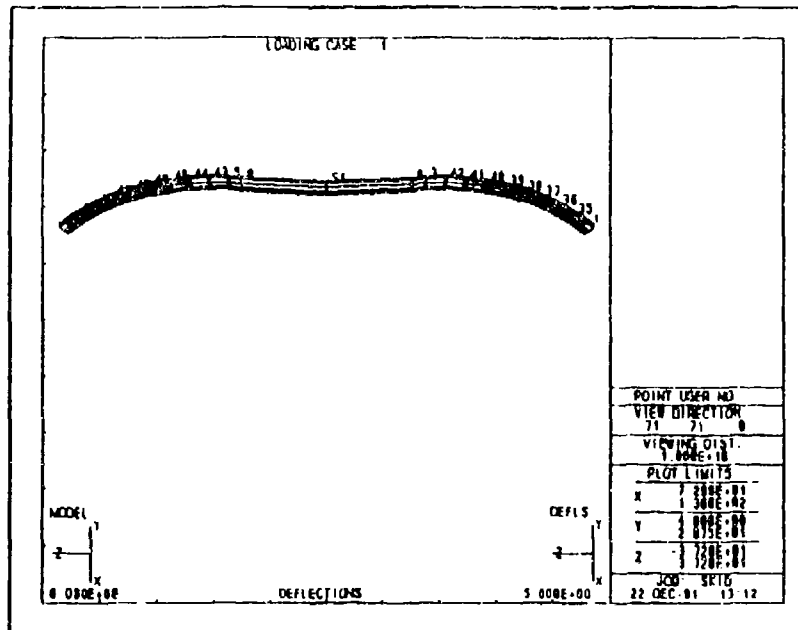


Figure D12.2: Deflected Crosstube

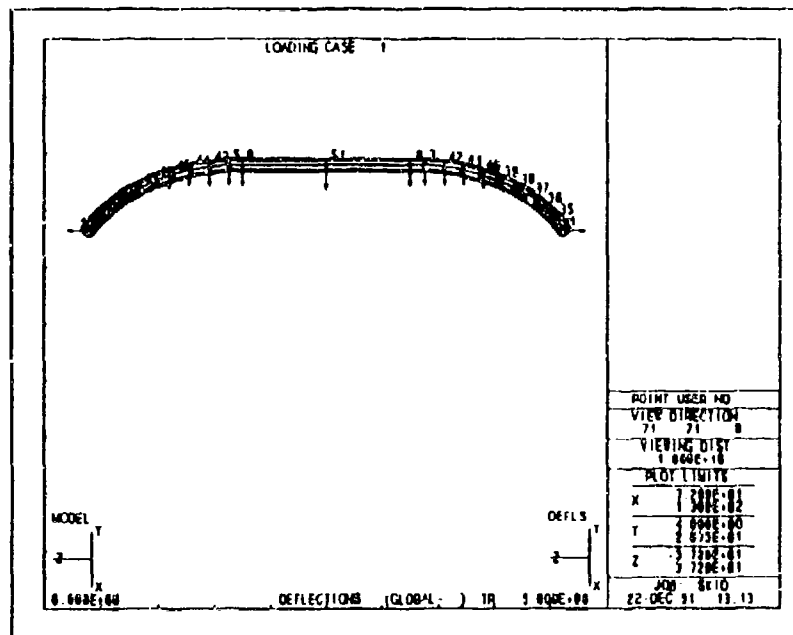


Figure D12.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE

ELE NO.	STR PT.	S11
1	1	-6.8820E+03
2	1	-1.3198E+04
3	1	-2.0682E+04
4	1	-2.9200E+04
5	1	-3.2583E+04
6	1	-4.8642E+04
7	1	-5.9178E+04
8	1	-7.0004E+04
9	1	-8.0947E+04
10	1	-8.0947E+04
11	1	-7.0004E+04
12	1	-5.9179E+04
13	1	-4.8642E+04
14	1	-3.8583E+04
15	1	-2.9200E+04
16	1	-2.0683E+04
17	1	-1.3197E+04
18	1	-6.8811E+03
19	1	8.8404E+04
20	1	8.8403E+04
21	1	8.8403E+04
22	1	8.8404E+04

Table D13.2: Principal Stresses

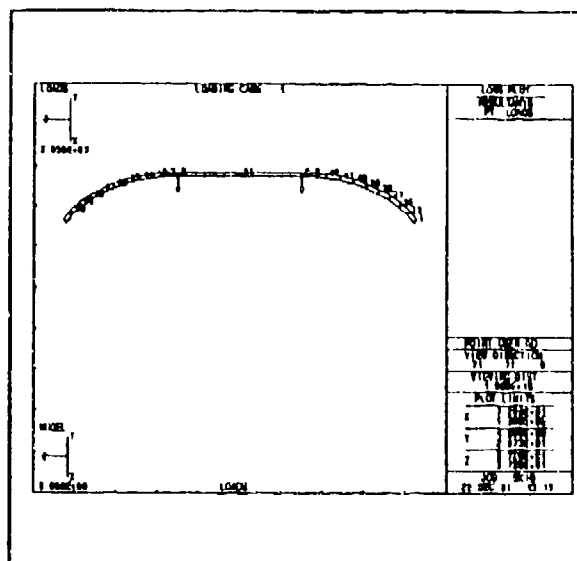


Figure D13.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.700E+03	0.
9	0.	-1.700E+03	0.

Table D13.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.640E+00	1.987E-01	0.000E+00	0.000E+00
3	0.000E+00	-3.709E+00	6.991E-16	1.150E-01	0.000E+00	0.000E+00
5	0.000E+00	-3.709E+00	-6.870E-16	-1.150E-01	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.640E+00	-1.987E-01	0.000E+00	0.000E+00
8	0.000E+00	-3.937E+00	6.080E-16	9.983E-02	0.000E+00	0.000E+00
9	0.000E+00	-3.937E+00	-5.927E-16	-9.983E-02	0.000E+00	0.000E+00
15	0.000E+00	-3.055E-01	-2.118E+00	1.979E-01	0.000E+00	0.000E+00
16	0.000E+00	-6.667E-01	-1.638E+00	1.956E-01	0.000E+00	0.000E+00
17	0.000E+00	-1.074E+00	-1.211E+00	1.913E-01	0.000E+00	0.000E+00
18	0.000E+00	-1.516E+00	-8.431E-01	1.850E-01	0.000E+00	0.000E+00
19	0.000E+00	-1.979E+00	-5.413E-01	1.763E-01	0.000E+00	0.000E+00
20	0.000E+00	-2.446E+00	-3.084E-01	1.651E-01	0.000E+00	0.000E+00
21	0.000E+00	-2.902E+00	-1.440E-01	1.512E-01	0.000E+00	0.000E+00
22	0.000E+00	-3.328E+00	-4.391E-02	1.346E-01	0.000E+00	0.000E+00
43	0.000E+00	-3.328E+00	4.391E-02	-1.346E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.902E+00	1.440E-01	-1.512E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.446E+00	3.084E-01	-1.651E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.979E+00	5.413E-01	-1.763E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.516E+00	8.431E-01	-1.850E-01	0.000E+00	0.000E+00
48	0.000E+00	-1.074E+00	1.211E+00	-1.913E-01	0.000E+00	0.000E+00
49	0.000E+00	-6.667E-01	1.638E+00	-1.956E-01	0.000E+00	0.000E+00
50	0.000E+00	-3.055E-01	2.118E+00	-1.979E-01	0.000E+00	0.000E+00
51	0.000E+00	-4.596E+00	0.000E+00	1.812E-09	0.000E+00	0.000E+00

Table D13.3: Deflections

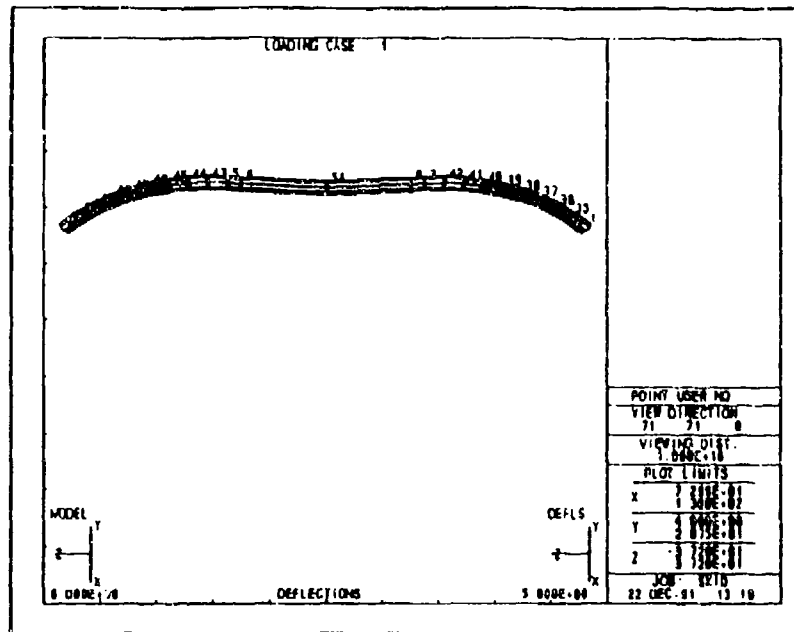


Figure D13.2: Deflected Crosstube

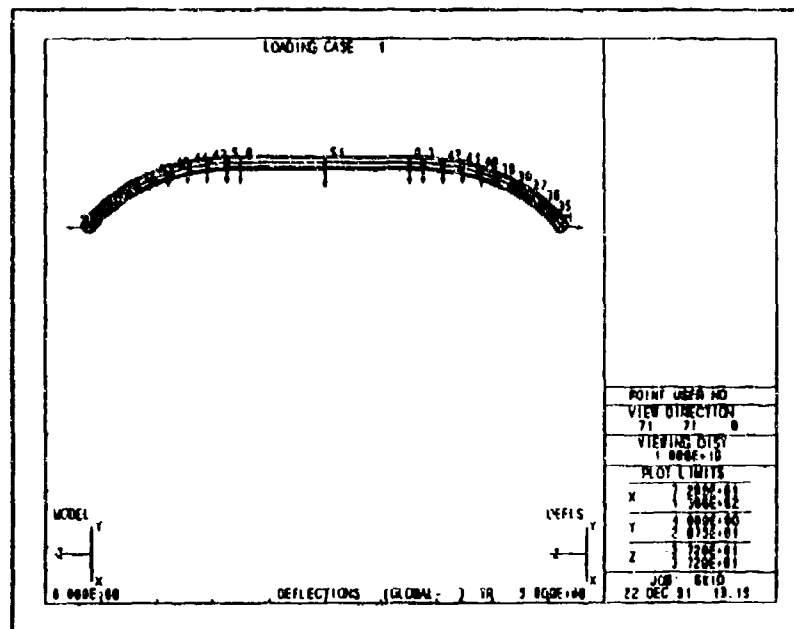


Figure D13.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-7.0832E+03
2	1	-1.3586E+04
3	1	-2.1290E+04
4	1	-3.0059E+04
5	1	-3.9718E+04
6	1	-5.0072E+04
7	1	-6.0918E+04
8	1	-7.2061E+04
9	1	-8.3328E+04
10	1	-8.3328E+04
11	1	-7.2062E+04
12	1	-6.0919E+04
13	1	-5.0072E+04
14	1	-3.9718E+04
15	1	-3.0058E+04
16	1	-2.1291E+04
17	1	-1.3585E+04
18	1	-7.0831E+03
19	1	9.1004E+04
20	1	9.1004E+04
21	1	9.1004E+04
22	1	9.1003E+04

Table D14.2: Principal Stresses

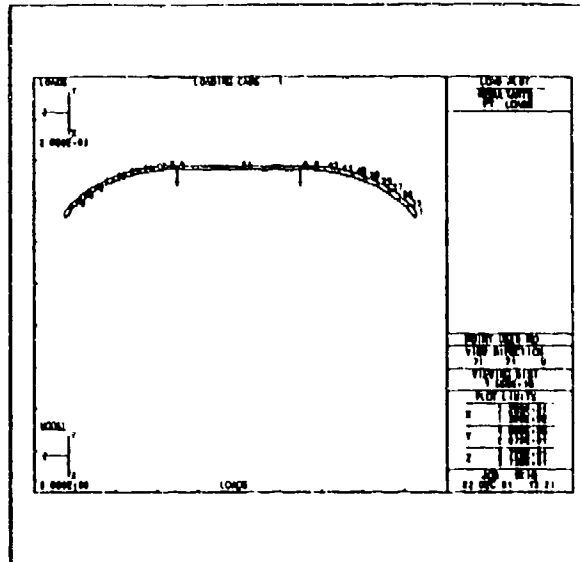


Figure D14.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.750E+03	0.
9	0.	-1.750E+03	0.

Table D14.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.717E+00	2.045E-01	0.000E+00	0.000E+00
3	0.000E+00	-3.818E+00	7.160E-16	1.184E-01	0.000E+00	0.000E+00
5	0.000E+00	-3.818E+00	-7.095E-16	-1.184E-01	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.717E+00	-2.045E-01	0.000E+00	0.000E+00
8	0.000E+00	-4.053E+00	6.221E-16	1.028E-01	0.000E+00	0.000E+00
9	0.000E+00	-4.053E+00	-6.121E-16	-1.028E-01	0.000E+00	0.000E+00
35	0.000E+00	-3.145E-01	-2.180E+00	2.037E-01	0.000E+00	0.000E+00
36	0.000E+00	-6.863E-01	-1.687E+00	2.013E-01	0.000E+00	0.000E+00
37	0.000E+00	-1.106E+00	-1.246E+00	1.970E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.561E+00	-8.679E-01	1.904E-01	0.000E+00	0.000E+00
39	0.000E+00	-2.037E+00	-5.572E-01	1.815E-01	0.000E+00	0.000E+00
40	0.000E+00	-2.518E+00	-3.175E-01	1.700E-01	0.000E+00	0.000E+00
41	0.000E+00	-2.987E+00	-1.483E-01	1.557E-01	0.000E+00	0.000E+00
42	0.000E+00	-3.426E+00	-4.520E-02	1.385E-01	0.000E+00	0.000E+00
43	0.000E+00	-3.426E+00	4.520E-02	-1.385E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.987E+00	1.483E-01	-1.557E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.518E+00	3.175E-01	-1.700E-01	0.000E+00	0.000E+00
46	0.000E+00	-2.037E+00	5.572E-01	-1.815E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.561E+00	8.679E-01	-1.904E-01	0.000E+00	0.000E+00
48	0.000E+00	-1.106E+00	1.246E+00	-1.970E-01	0.000E+00	0.000E+00
49	0.000E+00	-6.863E-01	1.687E+00	-2.013E-01	0.000E+00	0.000E+00
50	0.000E+00	-3.145E-01	2.180E+00	-2.037E-01	0.000E+00	0.000E+00
51	0.000E+00	-4.731E+00	0.000E+00	1.866E-09	0.000E+00	0.000E+00

Table D14.3: Deflections

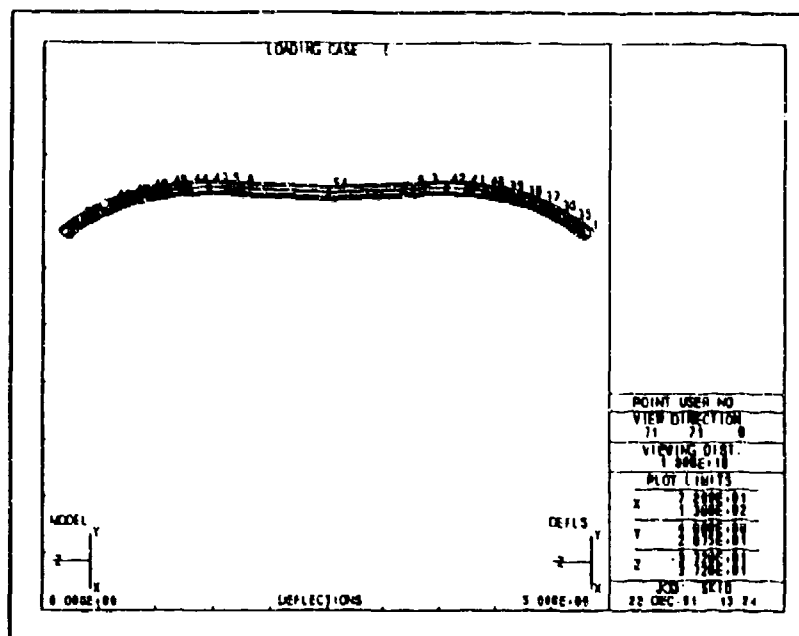


Figure D14.2: Deflected Crosstube

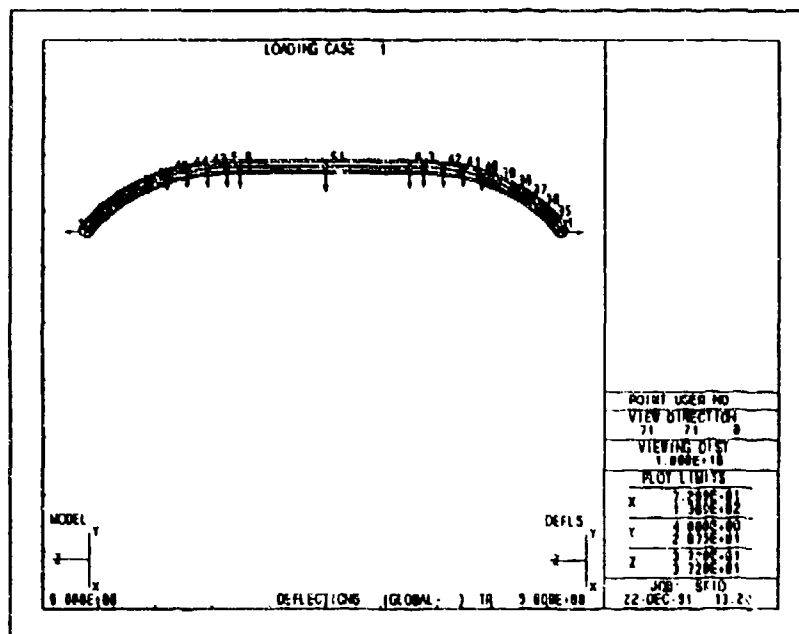


Figure D14.3: Crosstube Deflections Indicated by Vectors

**PRINCIPAL STRESSES
ENVELOPE**

ELE NO.	STR PT.	S11
1	1	-7.2860E+03
2	1	-1.3973E+04
3	1	-2.1899E+04
4	1	-3.0918E+04
5	1	-4.0853E+04
6	1	-5.1503E+04
7	1	-6.2658E+04
8	1	-7.4120E+04
9	1	-8.5708E+04
10	1	-8.5709E+04
11	1	-7.4121E+04
12	1	-6.2659E+04
13	1	-5.1504E+04
14	1	-4.0853E+04
15	1	-3.0918E+04
16	1	-2.1899E+04
17	1	-1.3974E+04
18	1	-7.2858E+03
19	1	9.3603E+04
20	1	9.3604E+04
21	1	9.3604E+04
22	1	9.3604E+04

Table D15.2: Principal Stresses

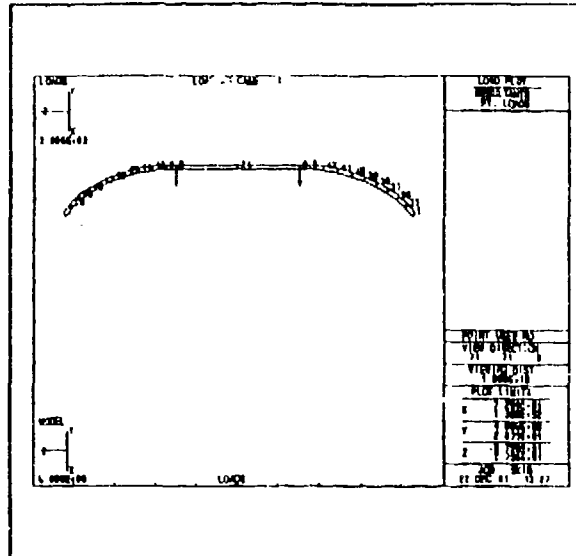


Figure D15.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.800E+03	0.
9	0.	-1.800E+03	0.

Table D15.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.795E+00	2.103E-01	0.000E+00	0.000E+00
3	0.000E+00	-3.927E+00	7.355E-16	1.218E-01	0.000E+00	0.000E+00
5	0.000E+00	-3.927E+00	-7.286E-16	-1.218E-01	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.795E+00	-2.103E-01	0.000E+00	0.000E+00
8	0.000E+00	-4.168E+00	6.396E-16	1.057E-01	0.000E+00	0.000E+00
9	0.000E+00	-4.168E+00	-6.286E-16	-1.057E-01	0.000E+00	0.000E+00
35	0.000E+00	-3.235E-01	-2.243E+00	2.096E-01	0.000E+00	0.000E+00
36	0.000E+00	-7.059E-01	-1.735E+00	2.071E-01	0.000E+00	0.000E+00
37	0.000E+00	-1.137E+00	-1.282E+00	2.026E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.605E+00	-8.927E-01	1.959E-01	0.000E+00	0.000E+00
39	0.000E+00	-2.095E+00	-5.732E-01	1.867E-01	0.000E+00	0.000E+00
40	0.000E+00	-2.590E+00	-3.266E-01	1.748E-01	0.000E+00	0.000E+00
41	0.000E+00	-3.073E+00	-1.525E-01	1.601E-01	0.000E+00	0.000E+00
42	0.000E+00	-3.524E+00	-4.649E-02	1.425E-01	0.000E+00	0.000E+00
43	0.000E+00	-3.524E+00	4.649E-02	-1.425E-01	0.000E+00	0.000E+00
44	0.000E+00	-3.073E+00	1.525E-01	-1.601E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.590E+00	3.266E-01	-1.748E-01	0.000E+00	0.000E+00
46	0.000E+00	-2.095E+00	5.732E-01	-1.867E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.605E+00	8.927E-01	-1.959E-01	0.000E+00	0.000E+00
48	0.000E+00	-1.137E+00	1.282E+00	-2.026E-01	0.000E+00	0.000E+00
49	0.000E+00	-7.059E-01	1.735E+00	-2.071E-01	0.000E+00	0.000E+00
50	0.000E+00	-3.235E-01	2.243E+00	-2.096E-01	0.000E+00	0.000E+00
51	0.000E+00	-4.866E+00	0.000E+00	1.919E-09	0.000E+00	0.000E+00

Table D15.3: Deflections

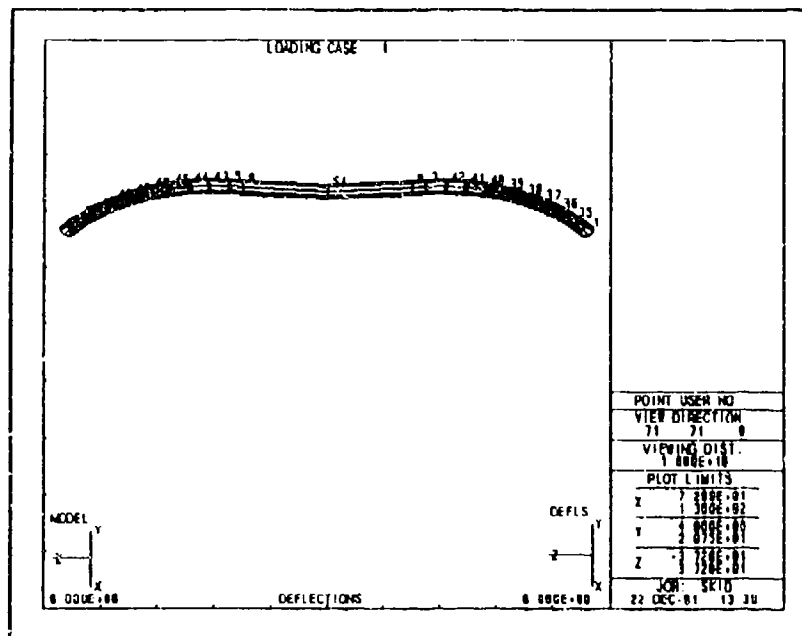


Figure D15.2: Deflected Crosstube

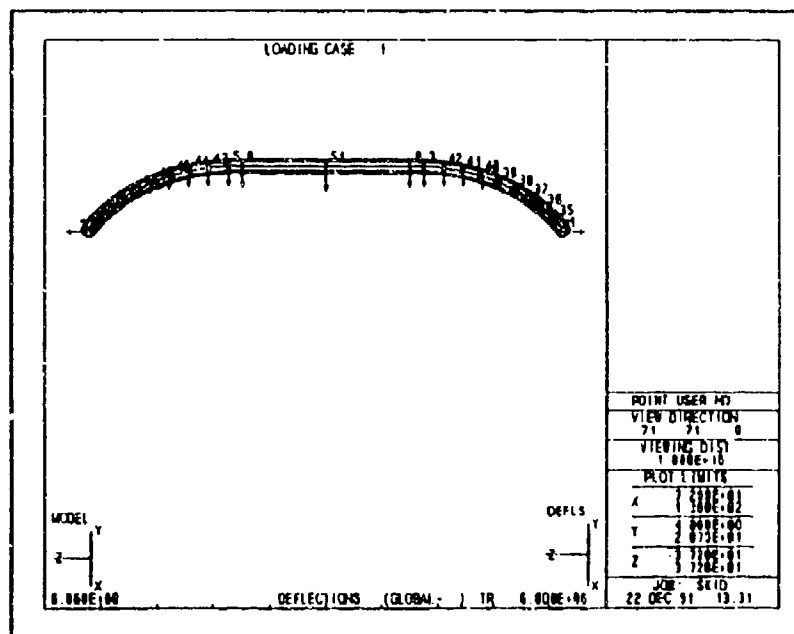


Figure D15.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES
ENVELOPE

ELE NO.	STR PT.	G11
1	1	-7.4877E+03
2	1	-1.4362E+04
3	1	-2.2507E+04
4	1	-3.1776E+04
5	1	-4.1988E+04
6	1	-5.2934E+04
7	1	-6.4400E+04
8	1	-7.6181E+04
9	1	-8.8089E+04
10	1	-8.8089E+04
11	1	-7.6180E+04
12	1	-6.4400E+04
13	1	-5.2934E+04
14	1	-4.1988E+04
15	1	-3.1775E+04
16	1	-2.2508E+04
17	1	-1.4362E+04
18	1	-7.4877E+03
19	1	9.6204E+04
20	1	9.6204E+04
21	1	9.6204E+04
22	1	9.6204E+04

Table D16.2: Principal Stresses

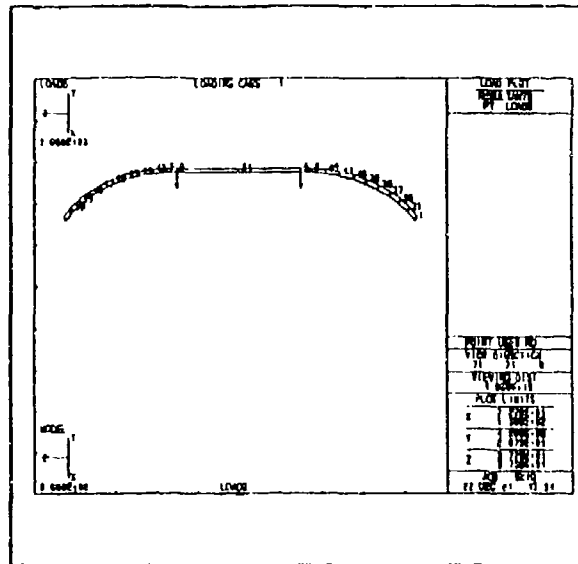


Figure D16.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
8	0.	-1.850E+03	0.
9	0.	-1.850E+03	0.

Table D16.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
1	0.000E+00	0.000E+00	-2.873E+00	2.162E-01	0.000E+00	0.000E+00
3	0.000E+00	-4.036E+00	7.481E-16	1.252E-01	0.000E+00	0.000E+00
5	0.000E+00	-4.036E+00	-7.494E-16	-1.252E-01	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	2.873E+00	-2.162E-01	0.000E+00	0.000E+00
8	0.000E+00	-4.284E+00	6.484E-16	1.086E-01	0.000E+00	0.000E+00
9	0.000E+00	-4.284E+00	-6.465E-16	-1.086E-01	0.000E+00	0.000E+00
35	0.000E+00	-3.325E-01	-2.305E+00	2.154E-01	0.000E+00	0.000E+00
36	0.000E+00	-7.256E-01	-1.783E+00	2.128E-01	0.000E+00	0.000E+00
37	0.000E+00	-1.169E+00	-1.318E+00	2.082E-01	0.000E+00	0.000E+00
38	0.000E+00	-1.650E+00	-9.175E-01	2.013E-01	0.000E+00	0.000E+00
39	0.000E+00	-2.154E+00	-5.891E-01	1.919E-01	0.000E+00	0.000E+00
40	0.000E+00	-2.662E+00	-3.357E-01	1.797E-01	0.000E+00	0.000E+00
41	0.000E+00	-3.158E+00	-1.567E-01	1.646E-01	0.000E+00	0.000E+00
42	0.000E+00	-3.622E+00	-4.778E-02	1.464E-01	0.000E+00	0.000E+00
43	0.000E+00	-3.622E+00	4.778E-02	-1.464E-01	0.000E+00	0.000E+00
44	0.000E+00	-3.158E+00	1.567E-01	-1.646E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.662E+00	3.357E-01	-1.797E-01	0.000E+00	0.000E+00
46	0.000E+00	-2.154E+00	5.891E-01	-1.919E-01	0.000E+00	0.000E+00
47	0.000E+00	-1.650E+00	9.175E-01	-2.013E-01	0.000E+00	0.000E+00
48	0.000E+00	-1.169E+00	1.318E+00	-2.082E-01	0.000E+00	0.000E+00
49	0.000E+00	-7.256E-01	1.783E+00	-2.128E-01	0.000E+00	0.000E+00
50	0.000E+00	-3.325E-01	2.305E+00	-2.154E-01	0.000E+00	0.000E+00
51	0.000E+00	-5.001E+00	0.000E+00	1.972E-09	0.000E+00	0.000E+00

Table D16.3: Deflections

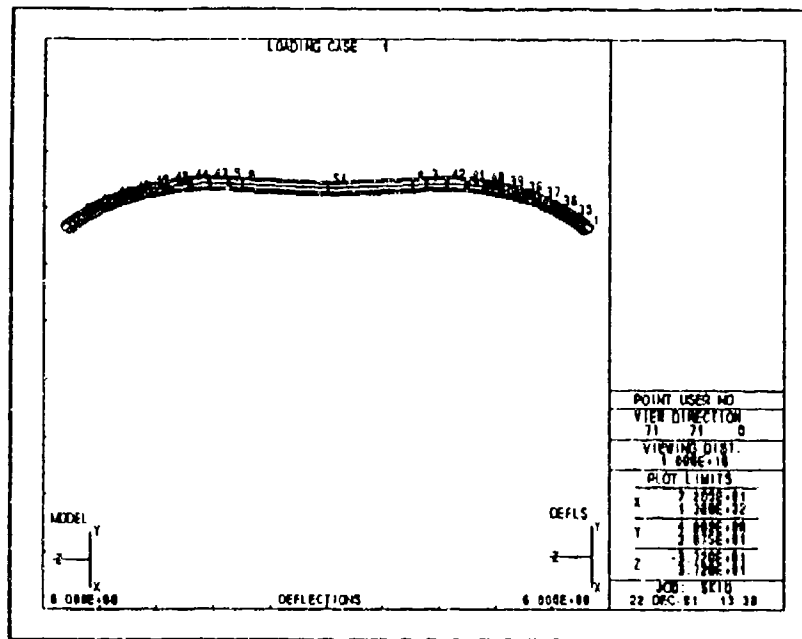


Figure D16.2: Deflected Crosstube

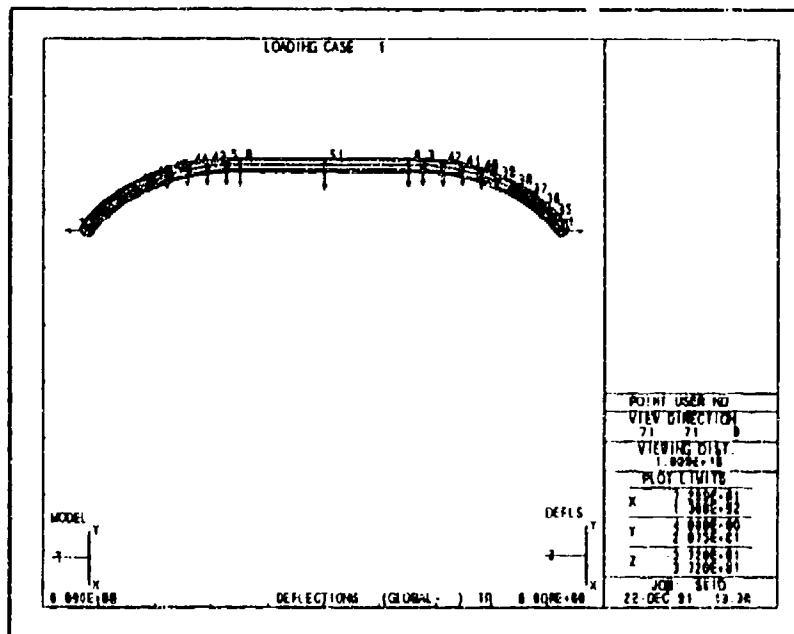


Figure D16.3: Crosstube Deflections Indicated by Vectors

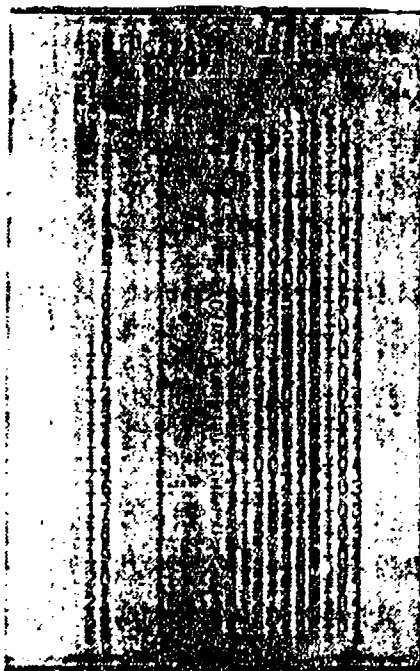


Table D17.2: Principal Stresses

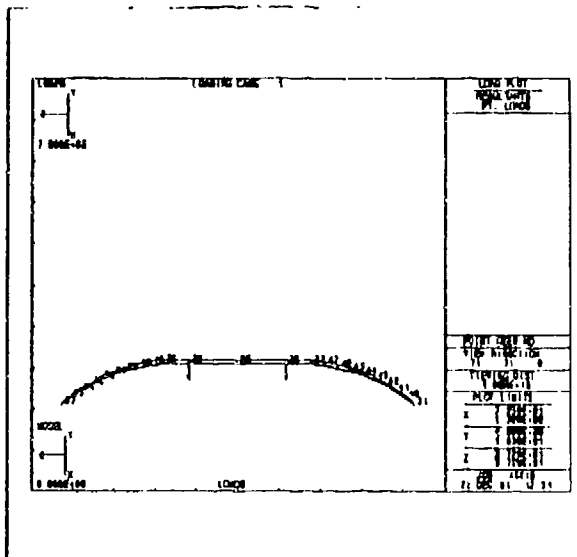


Figure D17.1: Point Location

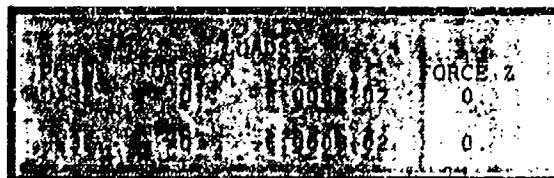


Table D17.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
31	0.000E+00	0.000E+00	-7.871E-01	6.754E-02	0.000E+00	0.000E+00
33	0.000E+00	-1.261E+00	4.425E-16	4.164E-02	0.000E+00	0.000E+00
35	0.000E+00	-1.261E+00	-3.755E-16	-4.164E-02	0.000E+00	0.000E+00
37	0.000E+00	0.000E+00	7.871E-01	-6.754E-02	0.000E+00	0.000E+00
38	0.000E+00	-1.455E+00	2.864E-16	2.818E-02	0.000E+00	0.000E+00
39	0.000E+00	-1.455E+00	-2.450E-16	-2.818E-02	0.000E+00	0.000E+00
40	0.000E+00	-1.229E-01	-6.394E-01	6.728E-02	0.000E+00	0.000E+00
41	0.000E+00	-2.570E-01	-5.038E-01	6.646E-02	0.000E+00	0.000E+00
42	0.000E+00	-4.001E-01	-3.824E-01	6.504E-02	0.000E+00	0.000E+00
43	0.000E+00	-5.491E-01	-2.767E-01	6.298E-02	0.000E+00	0.000E+00
44	0.000E+00	-7.008E-01	-1.878E-01	6.022E-02	0.000E+00	0.000E+00
45	0.000E+00	-8.517E-01	-1.160E-01	5.673E-02	0.000E+00	0.000E+00
46	0.000E+00	-9.980E-01	-6.148E-02	5.249E-02	0.000E+00	0.000E+00
47	0.000E+00	-1.136E+00	-2.330E-02	4.747E-02	0.000E+00	0.000E+00
48	0.000E+00	-1.136E+00	2.330E-02	-4.747E-02	0.000E+00	0.000E+00
49	0.000E+00	-9.980E-01	6.148E-02	-5.249E-02	0.000E+00	0.000E+00
50	0.000E+00	-8.517E-01	1.160E-01	-5.673E-02	0.000E+00	0.000E+00
51	0.000E+00	-7.008E-01	1.878E-01	-6.022E-02	0.000E+00	0.000E+00
52	0.000E+00	-5.491E-01	2.767E-01	-6.298E-02	0.000E+00	0.000E+00
53	0.000E+00	-4.001E-01	3.824E-01	-6.504E-02	0.000E+00	0.000E+00
54	0.000E+00	-2.570E-01	5.038E-01	-6.646E-02	0.000E+00	0.000E+00
55	0.000E+00	-1.229E-01	6.394E-01	-6.728E-02	0.000E+00	0.000E+00
56	1.000E+00	-1.599E+00	0.000E+00	-1.605E-11	0.000E+00	0.000E+00

Table D17.3: Deflections

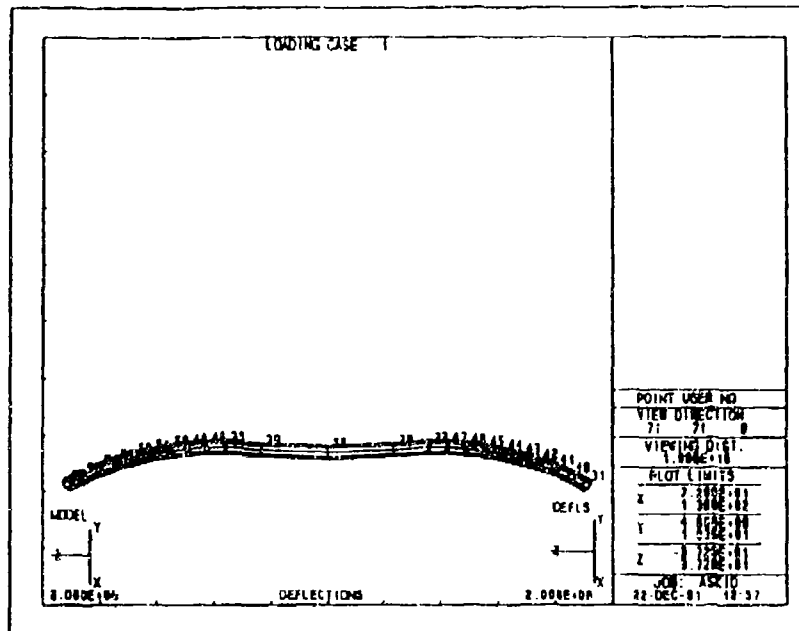


Figure D17.2: Deflected Crosstube

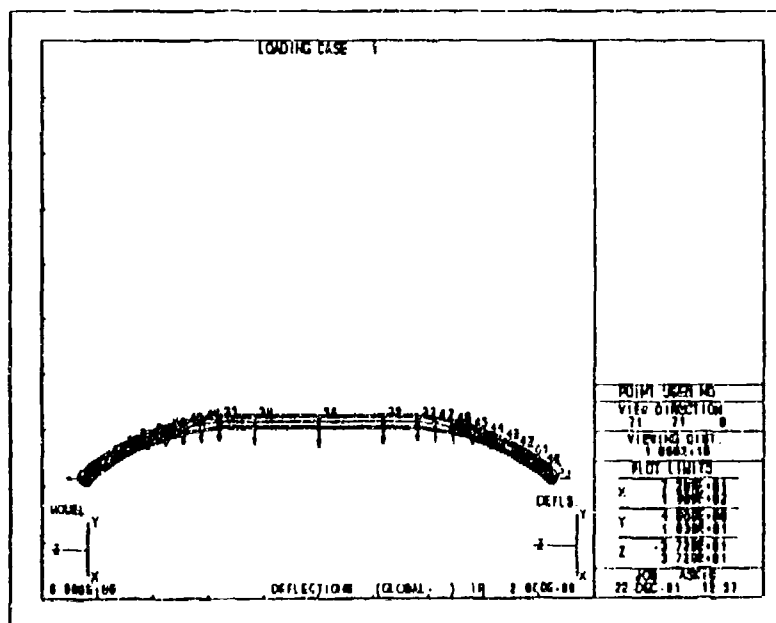


Figure D17.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-3.3628E+03
2	1	-6.3921E+03
3	1	-9.7521E+03
4	1	-1.3398E+04
5	1	-1.7285E+04
6	1	-2.1368E+04
7	1	-2.5600E+04
8	1	-2.9939E+04
9	1	-3.4345E+04
10	1	-3.4345E+04
11	1	-2.9939E+04
12	1	-2.5600E+04
13	1	-2.1368E+04
14	1	-1.7286E+04
15	1	-1.3398E+04
16	1	-9.7520E+03
17	1	-6.3918E+03
18	1	-3.3626E+03
19	1	-4.2864E+04
20	1	-4.2864E+04
21	1	-4.2864E+04
22	1	-4.2864E+04

Table D18.2: Principal Stresses

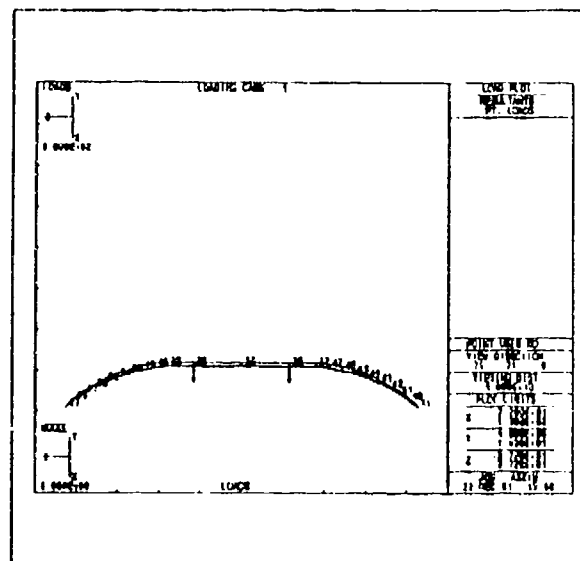


Figure D18.1: Point Location

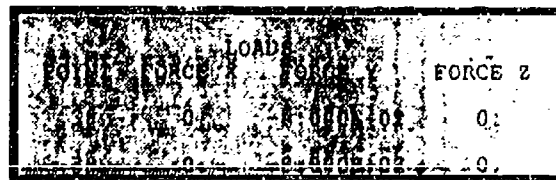


Table D18.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
31	0.000E+00	0.000E+00	-1.049E+00	9.005E-02	0.000E+00	0.000E+00
33	0.000E+00	-1.682E+00	5.889E-16	5.552E-02	0.000E+00	0.000E+00
35	0.000E+00	-1.682E+00	-4.948E-16	-5.552E-02	0.000E+00	0.000E+00
37	0.000E+00	0.000E+00	1.049E+00	-9.005E-02	0.000E+00	0.000E+00
38	0.000E+00	-1.940E+00	3.813E-16	3.757E-02	0.000E+00	0.000E+00
39	0.000E+00	-1.940E+00	-3.231E-16	-3.757E-02	0.000E+00	0.000E+00
40	0.000E+00	-1.638E-01	-8.525E-01	8.970E-02	0.000E+00	0.000E+00
41	0.000E+00	-3.427E-01	-6.718E-01	8.862E-02	0.000E+00	0.000E+00
42	0.000E+00	-5.334E-01	-5.099E-01	8.672E-02	0.000E+00	0.000E+00
43	0.000E+00	-7.321E-01	-3.690E-01	8.397E-02	0.000E+00	0.000E+00
44	0.000E+00	-9.345E-01	-2.503E-01	8.029E-02	0.000E+00	0.000E+00
45	0.000E+00	-1.136E+00	-1.547E-01	7.564E-02	0.000E+00	0.000E+00
46	0.000E+00	-1.331E+00	-8.198E-02	6.999E-02	0.000E+00	0.000E+00
47	0.000E+00	-1.514E+00	-3.107E-02	6.329E-02	0.000E+00	0.000E+00
48	0.000E+00	-1.514E+00	3.107E-02	-6.329E-02	0.000E+00	0.000E+00
49	0.000E+00	-1.331E+00	8.198E-02	-6.999E-02	0.000E+00	0.000E+00
50	0.000E+00	-1.136E+00	1.547E-01	-7.564E-02	0.000E+00	0.000E+00
51	0.000E+00	-9.345E-01	2.503E-01	-8.029E-02	0.000E+00	0.000E+00
52	0.000E+00	-7.321E-01	3.690E-01	-8.397E-02	0.000E+00	0.000E+00
53	0.000E+00	-5.334E-01	5.099E-01	-8.672E-02	0.000E+00	0.000E+00
54	0.000E+00	-3.427E-01	6.718E-01	-8.862E-02	0.000E+00	0.000E+00
55	0.000E+00	-1.638E-01	8.525E-01	-8.970E-02	0.000E+00	0.000E+00
56	0.000E+00	-2.132E+00	0.000E+00	-2.140E-11	0.000E+00	0.000E+00

Table D18.3: Deflections

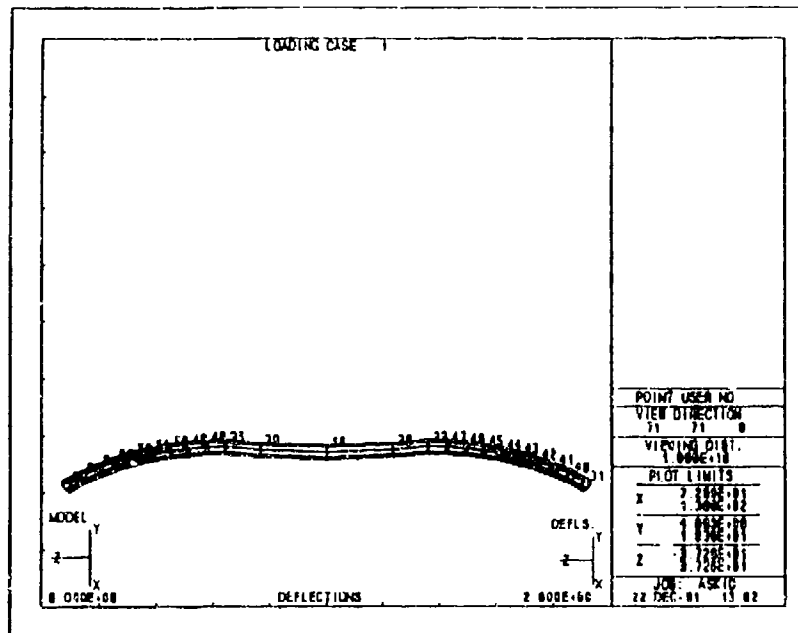


Figure D18.2: Deflected Crosstube

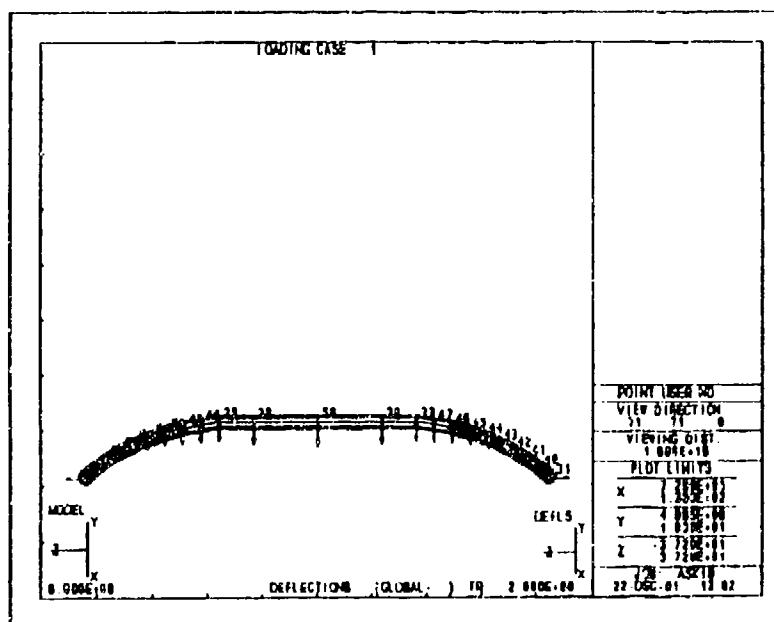


Figure D18.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE

ELE NO.	STR PT.	S11
1	1	-4.2035E+03
2	1	-7.9900E+03
3	1	-1.2190E+04
4	1	-1.6748E+04
5	1	-2.1607E+04
6	1	-2.6710E+04
7	1	-3.2000E+04
8	1	-3.7423E+04
9	1	-4.2932E+04
10	1	-4.2932E+04
11	1	-3.7424E+04
12	1	-3.2000E+04
13	1	-2.6710E+04
14	1	-2.1607E+04
15	1	-1.6748E+04
16	1	-1.2190E+04
17	1	-7.9895E+03
18	1	-4.2037E+03
19	1	-5.3580E+04
20	1	-5.3580E+04
21	1	-5.3580E+04
22	1	-5.3580E+04

Table D19.2: Principal Stresses

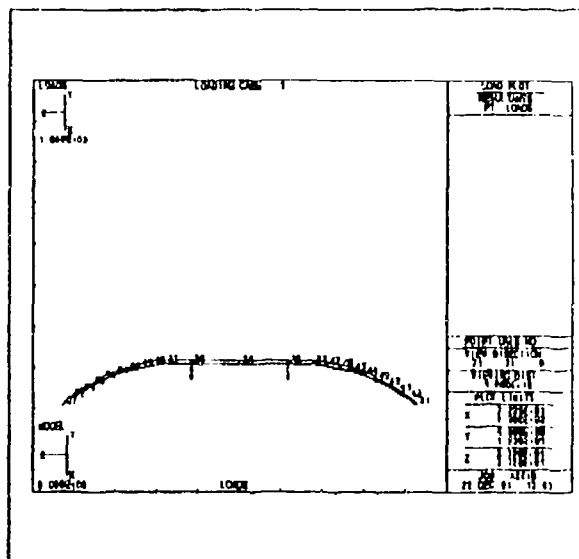


Figure D19.1: Point Location

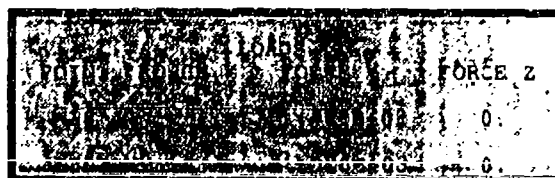


Table D19.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	FZ
31	0.000E+00	0.000E+00	-1.312E+00	1.126E-01	0.000E+00	0.000E+00
33	0.000E+00	-2.102E+00	7.393E-16	6.940E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.102E+00	-6.186E-16	-6.940E-02	0.000E+00	0.000E+00
37	0.000E+00	0.000E+00	1.312E+00	-1.126E-01	0.000E+00	0.000E+00
38	0.000E+00	-2.424E+00	4.780E-16	4.696E-02	0.000E+00	0.000E+00
39	0.000E+00	-2.424E+00	-4.038E-16	-4.696E-02	0.000E+00	0.000E+00
40	0.000E+00	-2.048E-01	-1.066E+00	1.121E-01	0.000E+00	0.000E+00
41	0.000E+00	-4.284E-01	-8.397E-01	1.108E-01	0.000E+00	0.000E+00
42	0.000E+00	-6.668E-01	-6.374E-01	1.084E-01	0.000E+00	0.000E+00
43	0.000E+00	-9.152E-01	-4.612E-01	1.050E-01	0.000E+00	0.000E+00
44	0.000E+00	-1.168E+00	-3.129E-01	1.004E-01	0.000E+00	0.000E+00
45	0.000E+00	-1.420E+00	-1.934E-01	9.456E-02	0.000E+00	0.000E+00
46	0.000E+00	-1.663E+00	-1.025E-01	8.749E-02	0.000E+00	0.000E+00
47	0.000E+00	-1.893E+00	-3.883E-02	7.911E-02	0.000E+00	0.000E+00
48	0.000E+00	-1.893E+00	3.883E-02	-7.911E-02	0.000E+00	0.000E+00
49	0.000E+00	-1.663E+00	1.025E-01	-8.749E-02	0.000E+00	0.000E+00
50	0.000E+00	-1.420E+00	1.934E-01	-9.456E-02	0.000E+00	0.000E+00
51	0.000E+00	-1.168E+00	3.129E-01	-1.004E-01	0.000E+00	0.000E+00
52	0.000E+00	-9.152E-01	4.612E-01	-1.050E-01	0.000E+00	0.000E+00
53	0.000E+00	-6.668E-01	6.374E-01	-1.084E-01	0.000E+00	0.000E+00
54	0.000E+00	-4.284E-01	8.397E-01	-1.108E-01	0.000E+00	0.000E+00
55	0.000E+00	-2.048E-01	1.066E+00	-1.121E-01	0.000E+00	0.000E+00
56	0.000E+00	-2.665E+00	0.000E+00	-2.675E-11	0.000E+00	0.000E+00

Table D19.3: Deflections

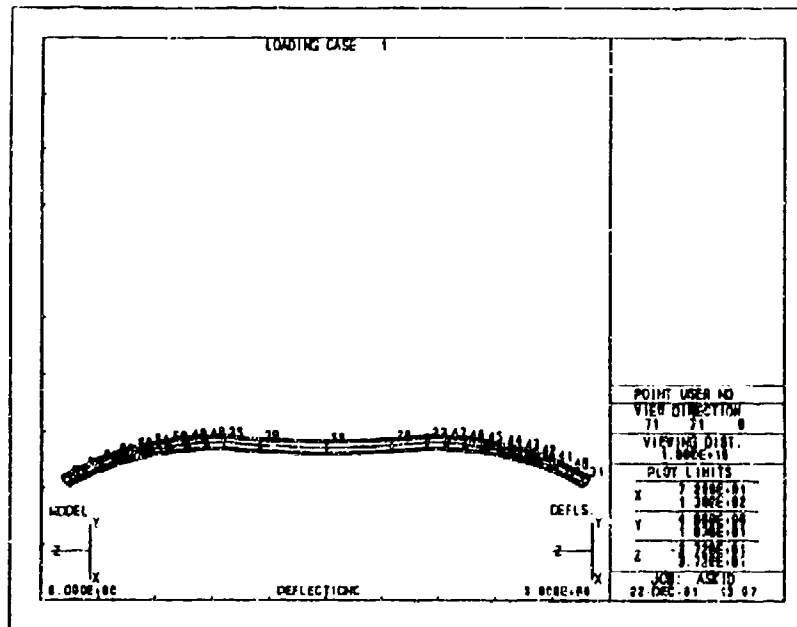


Figure D19.2: Deflected Crosstube

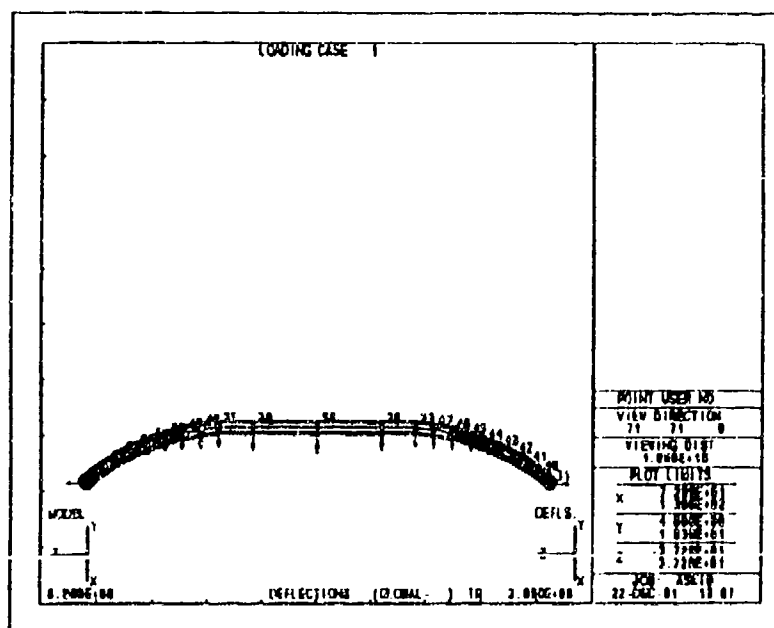


Figure D19.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-5.0446E+03
2	1	-9.5880E+03
3	1	-1.4629E+04
4	1	-2.0098E+04
5	1	-2.5928E+04
6	1	-3.2052E+04
7	1	-3.8400E+04
8	1	-4.4908E+04
9	1	-5.1518E+04
10	1	-5.1518E+04
11	1	-4.4908E+04
12	1	-3.8401E+04
13	1	-3.2053E+04
14	1	-2.5927E+04
15	1	-2.0098E+04
16	1	-1.4628E+04
17	1	-9.5874E+03
18	1	-5.0442E+03
19	1	-6.4297E+04
20	1	-6.4296E+04
21	1	-6.4296E+04
22	1	-6.4296E+04

Table D20.2: Principal Stresses

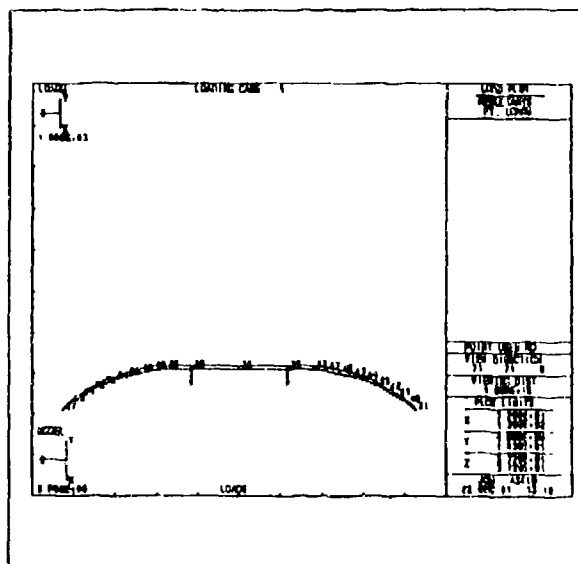


Figure D20.1: Point Location

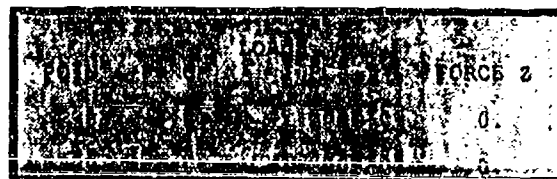


Table D20.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
31	0.000E+00	0.000E+00	-1.574E+00	1.351E-01	0.000E+00	0.000E+00
33	0.000E+00	-2.523E+00	8.851E-16	8.329E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.523E+00	-7.509E-16	-8.329E-02	0.000E+00	0.000E+00
37	0.000E+00	0.000E+00	1.574E+00	-1.351E-01	0.000E+00	0.000E+00
38	0.000E+00	-2.909E+00	5.728E-16	5.635E-02	0.000E+00	0.000E+00
39	0.000E+00	-2.909E+00	-4.901E-16	-5.635E-02	0.000E+00	0.000E+00
40	0.000E+00	-2.457E-01	-1.279E+00	1.346E-01	0.000E+00	0.000E+00
41	0.000E+00	-5.141E-01	-1.008E+00	1.329E-01	0.000E+00	0.000E+00
42	0.000E+00	-8.002E-01	-7.649E-01	1.301E-01	0.000E+00	0.000E+00
43	0.000E+00	-1.098E+00	-5.535E-01	1.260E-01	0.000E+00	0.000E+00
44	0.000E+00	-1.402E+00	-3.755E-01	1.204E-01	0.000E+00	0.000E+00
45	0.000E+00	-1.703E+00	-2.321E-01	1.135E-01	0.000E+00	0.000E+00
46	0.000E+00	-1.996E+00	-1.230E-01	1.050E-01	0.000E+00	0.000E+00
47	0.000E+00	-2.272E+00	-4.660E-02	9.494E-02	0.000E+00	0.000E+00
48	0.000E+00	-2.272E+00	4.660E-02	-9.494E-02	0.000E+00	0.000E+00
49	0.000E+00	-1.996E+00	1.230E-01	-1.050E-01	0.000E+00	0.000E+00
50	0.000E+00	-1.703E+00	2.321E-01	-1.135E-01	0.000E+00	0.000E+00
51	0.000E+00	-1.402E+00	3.755E-01	-1.204E-01	0.000E+00	0.000E+00
52	0.000E+00	-1.098E+00	5.535E-01	-1.260E-01	0.000E+00	0.000E+00
53	0.000E+00	-8.002E-01	7.649E-01	-1.301E-01	0.000E+00	0.000E+00
54	0.000E+00	-5.141E-01	1.008E+00	-1.329E-01	0.000E+00	0.000E+00
55	0.000E+00	-2.457E-01	1.279E+00	-1.346E-01	0.000E+00	0.000E+00
56	0.000E+00	-3.198E+00	0.000E+00	-3.209E-11	0.000E+00	0.000E+00

Table D20.3: Deflections

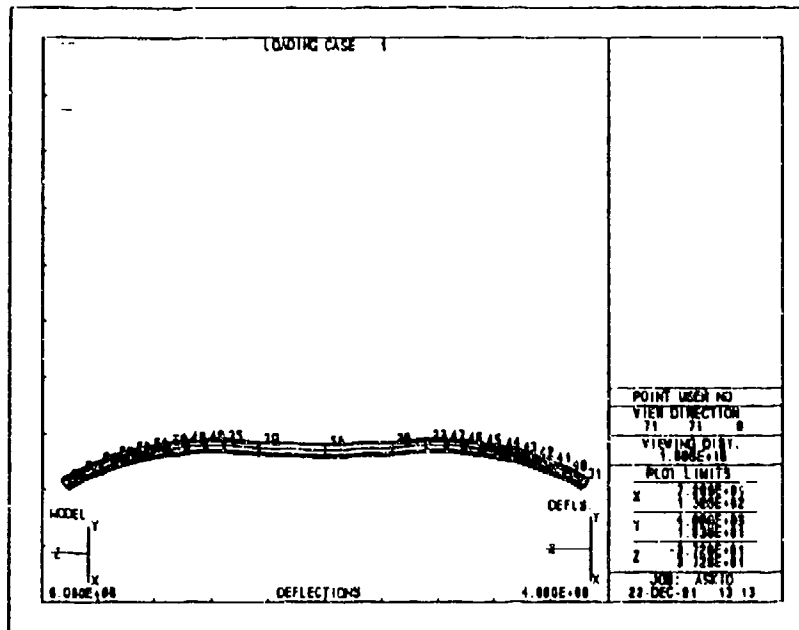


Figure D20.2: Deflected Crosstube

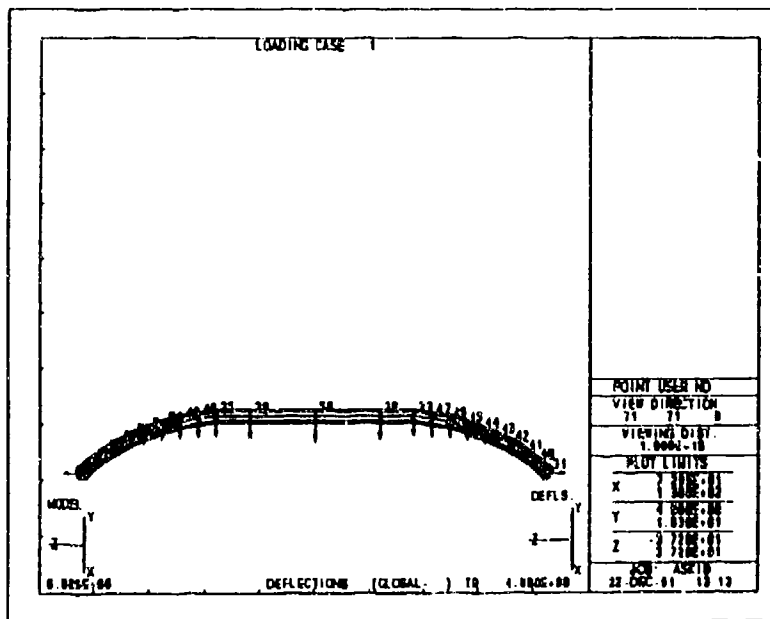


Figure D20.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-5.8849E+03
2	1	-1.1186E+04
3	1	-1.7066E+04
4	1	-2.3447E+04
5	1	-3.0250E+04
6	1	-3.7393E+04
7	1	-4.4800E+04
8	1	-5.2393E+04
9	1	-6.0104E+04
10	1	-6.0104E+04
11	1	-5.2393E+04
12	1	-4.4801E+04
13	1	-3.7394E+04
14	1	-3.0250E+04
15	1	-2.3447E+04
16	1	-1.7066E+04
17	1	-1.1186E+04
18	1	-5.8854E+03
19	1	-7.5013E+04
20	1	-7.5012E+04
21	1	-7.5012E+04
22	1	-7.5013E+04

Table D21.2: Principal Stresses

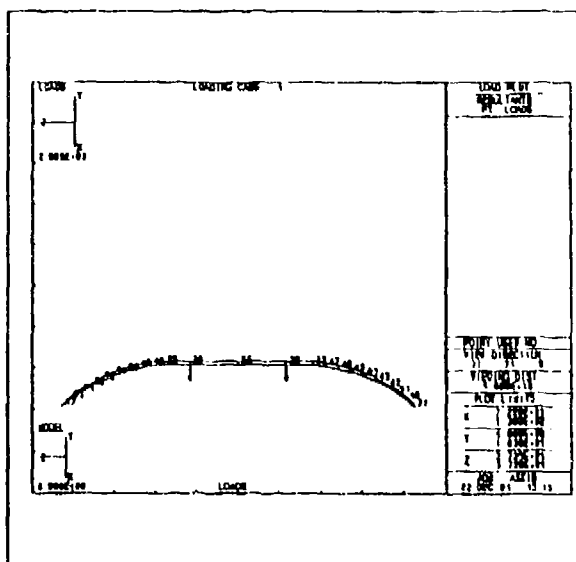


Figure D21.1: Point Location

POINT	FORCE X	FORCE Y	FORCE Z
1	0.000E+00	0.000E+00	0.000E+00
2	0.000E+00	0.000E+00	0.000E+00
3	0.000E+00	0.000E+00	0.000E+00
4	0.000E+00	0.000E+00	0.000E+00
5	0.000E+00	0.000E+00	0.000E+00
6	0.000E+00	0.000E+00	0.000E+00
7	0.000E+00	0.000E+00	0.000E+00
8	0.000E+00	0.000E+00	0.000E+00
9	0.000E+00	0.000E+00	0.000E+00
10	0.000E+00	0.000E+00	0.000E+00
11	0.000E+00	0.000E+00	0.000E+00
12	0.000E+00	0.000E+00	0.000E+00
13	0.000E+00	0.000E+00	0.000E+00
14	0.000E+00	0.000E+00	0.000E+00
15	0.000E+00	0.000E+00	0.000E+00
16	0.000E+00	0.000E+00	0.000E+00
17	0.000E+00	0.000E+00	0.000E+00
18	0.000E+00	0.000E+00	0.000E+00
19	0.000E+00	0.000E+00	0.000E+00
20	0.000E+00	0.000E+00	0.000E+00
21	0.000E+00	0.000E+00	0.000E+00
22	0.000E+00	0.000E+00	0.000E+00

Table D21.1: Applied Loads

DISPLACEMENT INFORMATION						
POINT	U	V	W	RX	RY	RZ
31	0.000E+00	0.000E+00	-1.837E+00	1.576E-01	0.000E+00	0.000E+00
33	0.000E+00	-2.943E+00	1.033E-15	9.717E-02	0.000E+00	0.000E+00
35	0.000E+00	-2.943E+00	-8.639E-16	-9.717E-02	0.000E+00	0.000E+00
37	0.000E+00	0.000E+00	1.837E+00	-1.576E-01	0.000E+00	0.000E+00
38	0.000E+00	-3.394E+00	6.673E-16	6.574E-02	0.000E+00	0.000E+00
39	0.000E+00	-3.394E+00	-5.640E-16	-6.574E-02	0.000E+00	0.000E+00
40	0.000E+00	-2.867E-01	-1.492E+00	1.570E-01	0.000E+00	0.000E+00
41	0.000E+00	-5.998E-01	-1.176E+00	1.551E-01	0.000E+00	0.000E+00
42	0.000E+00	-9.335E-01	-8.924E-01	1.518E-01	0.000E+00	0.000E+00
43	0.000E+00	-1.281E+00	-6.457E-01	1.469E-01	0.000E+00	0.000E+00
44	0.000E+00	-1.635E+00	-4.381E-01	1.405E-01	0.000E+00	0.000E+00
45	0.000E+00	-1.987E+00	-2.708E-01	1.324E-01	0.000E+00	0.000E+00
46	0.000E+00	-2.329E+00	-1.435E-01	1.225E-01	0.000E+00	0.000E+00
47	0.000E+00	-2.650E+00	-5.437E-02	1.108E-01	0.000E+00	0.000E+00
48	0.000E+00	-2.650E+00	5.437E-02	-1.108E-01	0.000E+00	0.000E+00
49	0.000E+00	-2.329E+00	1.435E-01	-1.225E-01	0.000E+00	0.000E+00
50	0.000E+00	-1.987E+00	2.708E-01	-1.324E-01	0.000E+00	0.000E+00
51	0.000E+00	-1.635E+00	4.381E-01	-1.405E-01	0.000E+00	0.000E+00
52	0.000E+00	-1.281E+00	6.457E-01	-1.469E-01	0.000E+00	0.000E+00
53	0.000E+00	-9.335E-01	8.924E-01	-1.518E-01	0.000E+00	0.000E+00
54	0.000E+00	-5.998E-01	1.176E+00	-1.551E-01	0.000E+00	0.000E+00
55	0.000E+00	-2.867E-01	1.492E+00	-1.570E-01	0.000E+00	0.000E+00
56	0.000E+00	-3.731E+00	0.000E+00	-3.744E-11	0.000E+00	0.000E+00

Table D21.3: Deflections

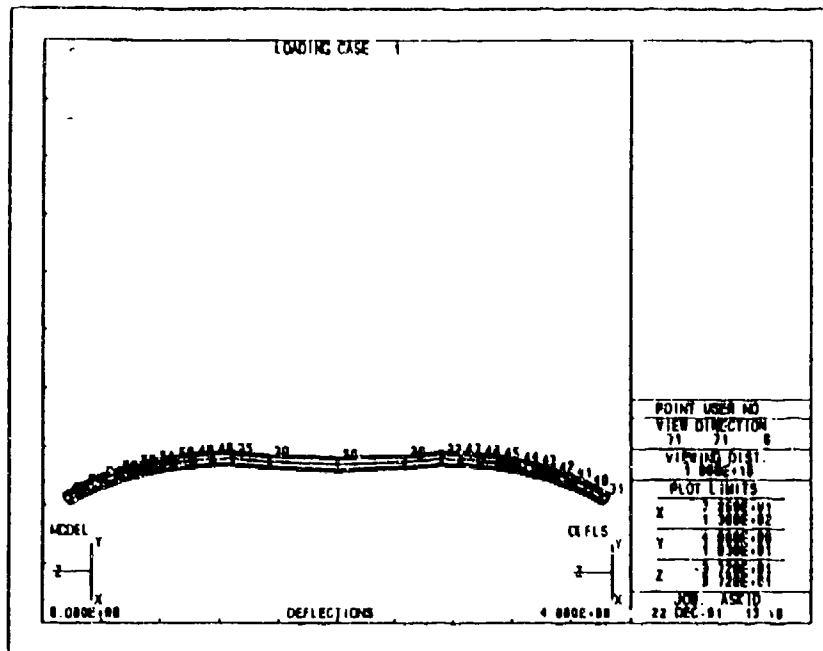


Figure D21.2: Deflected Crosstube

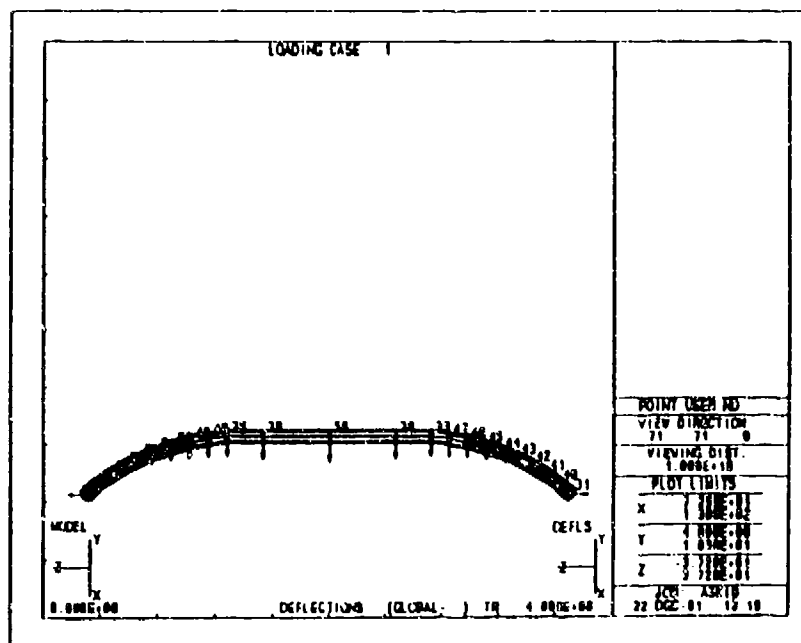


Figure D21.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE

ELE NO.	STR PT.	S11
1	1	-6.3055E+03
2	1	-1.1984E+04
3	1	-1.8285E+04
4	1	-2.5122E+04
5	1	-3.2410E+04
6	1	-4.0065E+04
7	1	-4.8001E+04
8	1	-5.6134E+04
9	1	-6.4398E+04
10	1	-6.4397E+04
11	1	-5.6135E+04
12	1	-4.8000E+04
13	1	-4.0065E+04
14	1	-3.2410E+04
15	1	-2.5121E+04
16	1	-1.8285E+04
17	1	-1.1985E+04
18	1	-6.3061E+03
19	1	-8.0370E+04
20	1	-8.0370E+04
21	1	-8.0371E+04
22	1	-8.0370E+04

Table D22.2: Principal Stresses

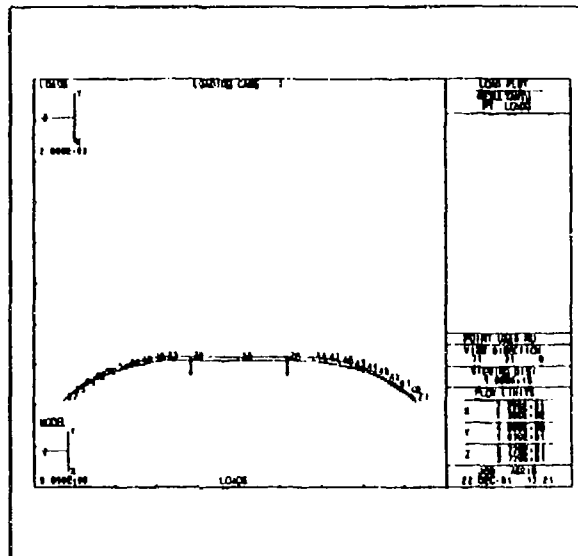


Figure D22.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
38	0.	-1.500E+03	0.
39	0.	-1.500E+03	0.

Table D22.1: Applied Loads

DISPLACEMENT INFORMATION						
POINT	U	V	W	RX	RY	RZ
31	0.000E+00	0.000E+00	-1.968E+00	1.689E-01	0.000E+00	0.000E+00
33	0.000E+00	-3.153E+00	1.108E-15	1.041E-01	0.000E+00	0.000E+00
35	0.000E+00	-3.153E+00	-9.337E-16	-1.041E-01	0.000E+00	0.000E+00
37	0.000E+00	0.000E+00	1.968E+00	-1.689E-01	0.000E+00	0.000E+00
38	0.000E+00	-3.637E+00	7.162E-16	7.044E-02	0.000E+00	0.000E+00
39	0.000E+00	-3.637E+00	-6.093E-16	-7.044E-02	0.000E+00	0.000E+00
40	0.000E+00	-3.072E-01	-1.598E+00	1.682E-01	0.000E+00	0.000E+00
41	0.000E+00	-6.426E-01	-1.260E+00	1.662E-01	0.000E+00	0.000E+00
42	0.000E+00	-1.000E+00	-9.561E-01	1.626E-01	0.000E+00	0.000E+00
43	0.000E+00	-1.373E+00	-6.916E-01	1.574E-01	0.000E+00	0.000E+00
44	0.000E+00	-1.752E+00	-4.694E-01	1.505E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.129E+00	-2.901E-01	1.416E-01	0.000E+00	0.000E+00
46	0.000E+00	-2.495E+00	-1.537E-01	1.312E-01	0.000E+00	0.000E+00
47	0.000E+00	-2.840E+00	-5.825E-02	1.187E-01	0.000E+00	0.000E+00
48	0.000E+00	-2.840E+00	5.825E-02	-1.187E-01	0.000E+00	0.000E+00
49	0.000E+00	-2.495E+00	1.537E-01	-1.312E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.129E+00	2.901E-01	-1.416E-01	0.000E+00	0.000E+00
51	0.000E+00	-1.752E+00	4.694E-01	-1.505E-01	0.000E+00	0.000E+00
52	0.000E+00	-1.373E+00	6.916E-01	-1.574E-01	0.000E+00	0.000E+00
53	0.000E+00	-1.000E+00	9.561E-01	-1.626E-01	0.000E+00	0.000E+00
54	0.000E+00	-6.426E-01	1.260E+00	-1.662E-01	0.000E+00	0.000E+00
55	0.000E+00	-3.072E-01	1.598E+00	-1.682E-01	0.000E+00	0.000E+00
56	0.000E+00	-3.998E+00	0.000E+00	-4.012E-11	0.000E+00	0.000E+00

Table D22.3: Deflections

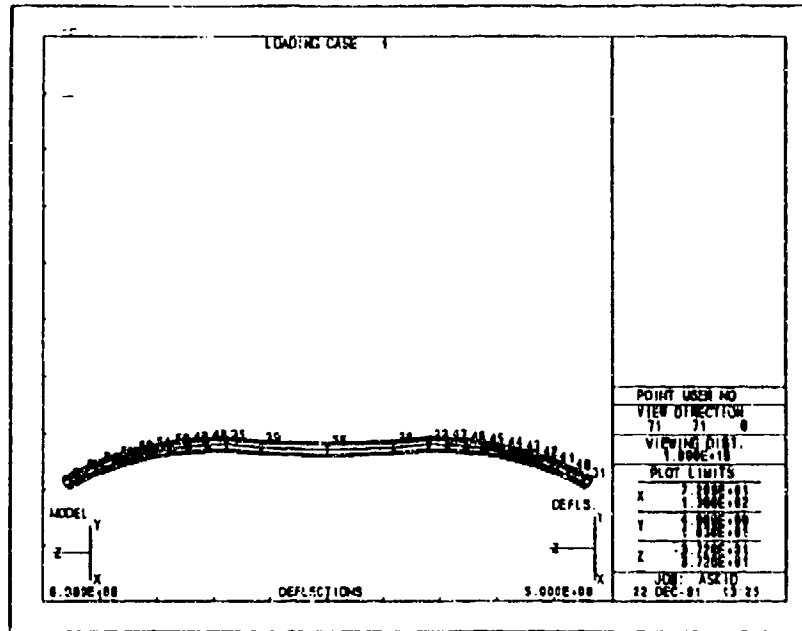


Figure D22.2: Deflected Crosstube

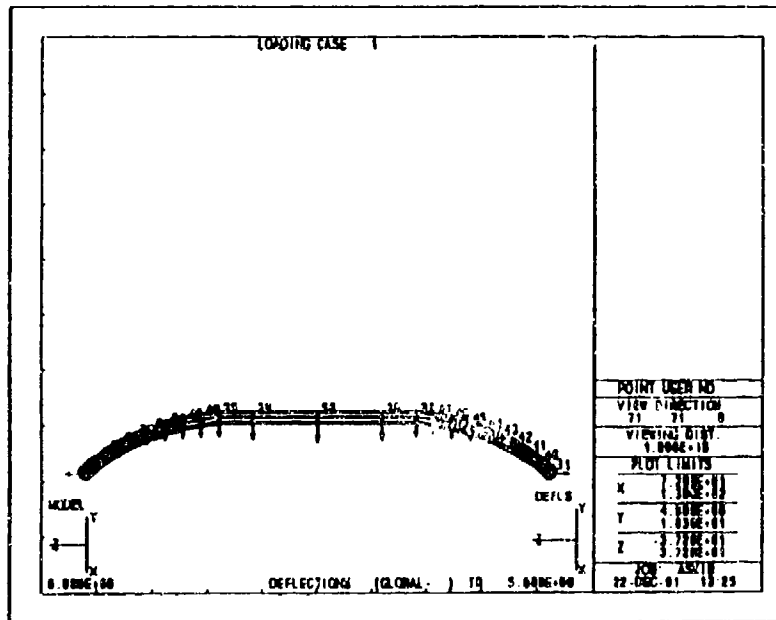


Figure D22.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE

ELE NO.	STR PT.	S11
1	1	-6.7257E+03
2	1	-1.2784E+04
3	1	-1.9504E+04
4	1	-2.6796E+04
5	1	-3.4571E+04
6	1	-4.2735E+04
7	1	-5.1201E+04
8	1	-5.9878E+04
9	1	-6.8690E+04
10	1	-6.8691E+04
11	1	-5.9878E+04
12	1	-5.1200E+04
13	1	-4.2736E+04
14	1	-3.4572E+04
15	1	-2.6796E+04
16	1	-1.9504E+04
17	1	-1.2784E+04
18	1	-6.7252E+03
19	1	-8.5729E+04
20	1	-8.5728E+04
21	1	-8.5729E+04
22	1	-8.5728E+04

Table D23.2: Principal Stresses

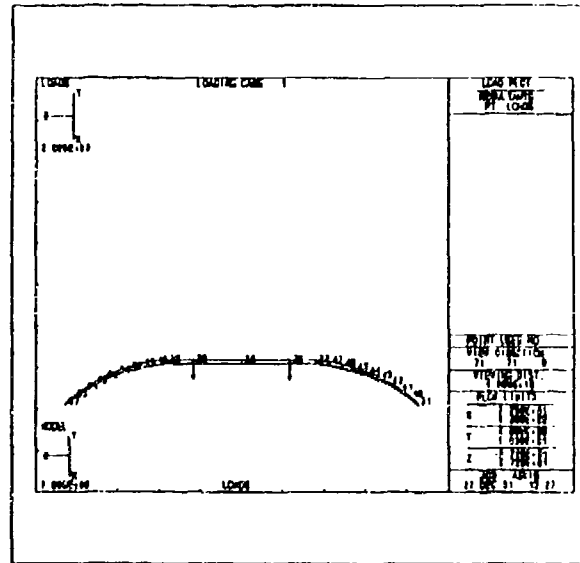


Figure D23.1: Point Location

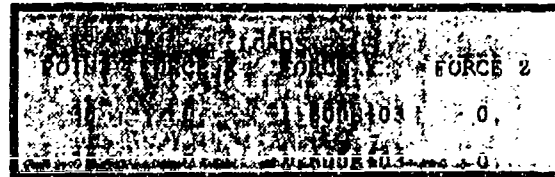


Table D23.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
31	0.000E+00	0.000E+00	-2.099E+00	1.801E-01	0.000E+00	0.000E+00
33	0.000E+00	-3.364E+00	1.178E-15	1.110E-01	0.000E+00	0.000E+00
35	0.000E+00	-3.364E+00	-9.897E-16	-1.110E-01	0.000E+00	0.000E+00
37	0.000E+00	0.000E+00	2.099E+00	-1.801E-01	0.000E+00	0.000E+00
38	0.000E+00	-3.879E+00	7.626E-16	7.514E-02	0.000E+00	0.000E+00
39	0.000E+00	-3.879E+00	-6.462E-16	-7.514E-02	0.000E+00	0.000E+00
40	0.000E+00	-3.277E-01	-1.705E+00	1.794E-01	0.000E+00	0.000E+00
41	0.000E+00	-6.855E-01	-1.344E+00	1.772E-01	0.000E+00	0.000E+00
42	0.000E+00	-1.067E+00	-1.020E+00	1.734E-01	0.000E+00	0.000E+00
43	0.000E+00	-1.464E+00	-7.380E-01	1.679E-01	0.000E+00	0.000E+00
44	0.000E+00	-1.869E+00	-5.007E-01	1.606E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.271E+00	-3.094E-01	1.513E-01	0.000E+00	0.000E+00
46	0.000E+00	-2.661E+00	-1.640E-01	1.400E-01	0.000E+00	0.000E+00
47	0.000E+00	-3.029E+00	-6.214E-02	1.266E-01	0.000E+00	0.000E+00
48	0.000E+00	-3.029E+00	6.214E-02	-1.266E-01	0.000E+00	0.000E+00
49	0.000E+00	-2.661E+00	1.640E-01	-1.400E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.271E+00	3.094E-01	-1.513E-01	0.000E+00	0.000E+00
51	0.000E+00	-1.869E+00	5.007E-01	-1.606E-01	0.000E+00	0.000E+00
52	0.000E+00	-1.464E+00	7.380E-01	-1.679E-01	0.000E+00	0.000E+00
53	0.000E+00	-1.067E+00	1.020E+00	-1.734E-01	0.000E+00	0.000E+00
54	0.000E+00	-6.855E-01	1.344E+00	-1.772E-01	0.000E+00	0.000E+00
55	0.000E+00	-3.277E-01	1.705E+00	-1.794E-01	0.000E+00	0.000E+00
56	0.000E+00	-4.264E+00	0.000E+00	-4.279E-11	0.000E+00	0.000E+00

Table D23.3: Deflections

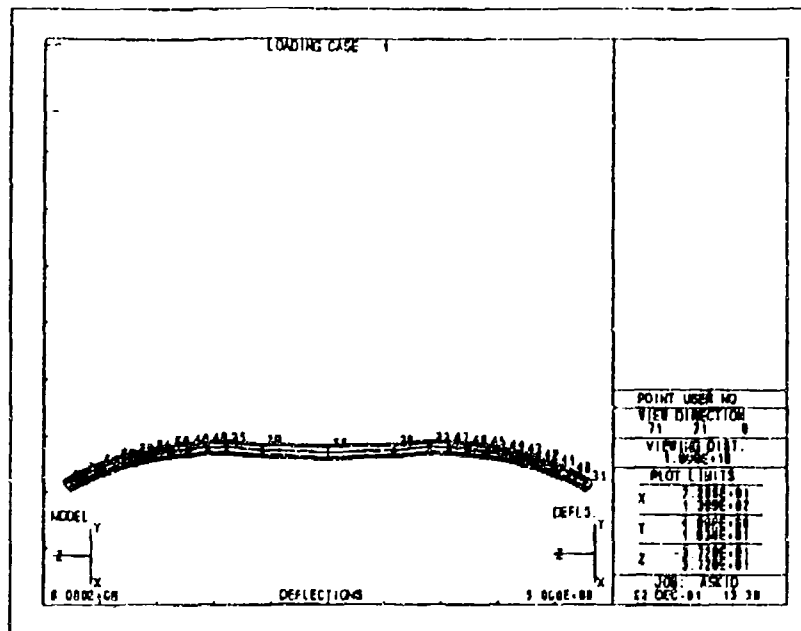


Figure D23.2: Deflected Crosstube

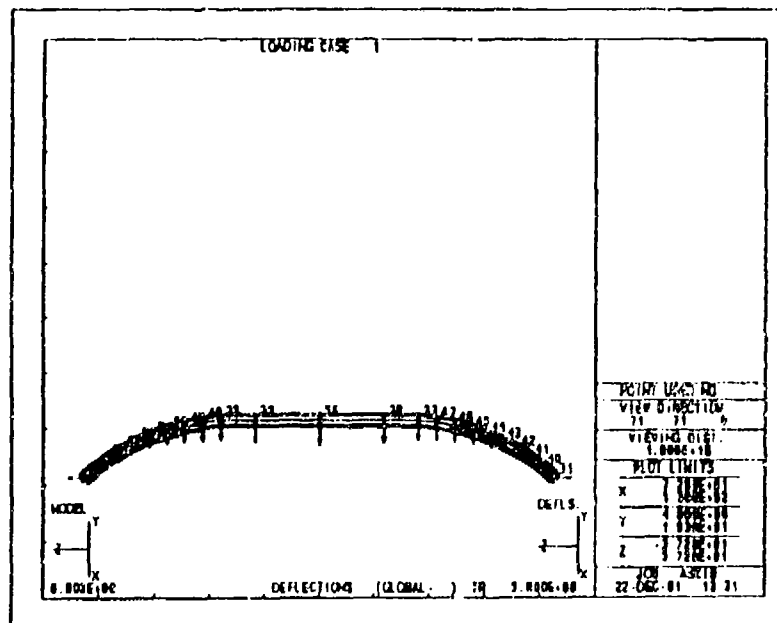


Figure D23.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
ELE NO.	STR PT.	S11
1	1	-7.3564E+03
2	1	-1.3993E+04
3	1	-2.1333E+04
4	1	-2.9309E+04
5	1	-3.7812E+04
6	1	-4.6743E+04
7	1	-5.6001E+04
8	1	-6.5492E+04
9	1	-7.5131E+04
10	1	-7.5130E+04
11	1	-6.5492E+04
12	1	-5.6000E+04
13	1	-4.6743E+04
14	1	-3.7812E+04
15	1	-2.9309E+04
16	1	-2.1332E+04
17	1	-1.3982E+04
18	1	-7.3562E+03
19	1	-9.3765E+04
20	1	-9.3765E+04
21	1	-9.3766E+04
22	1	-9.3766E+04

Table D24.2. Principal Stresses

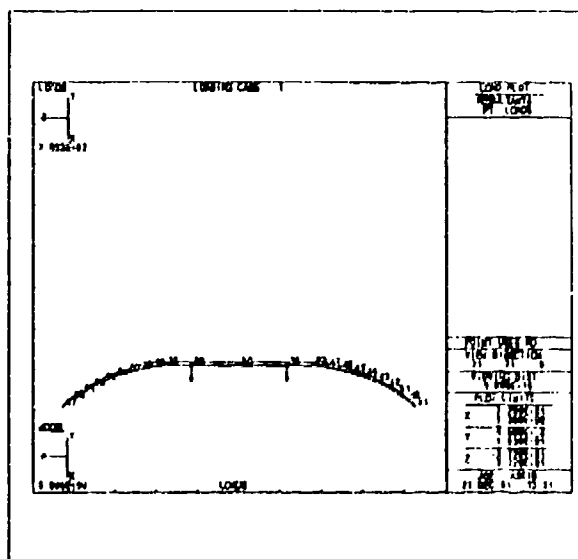


Figure D24.1: Point Location

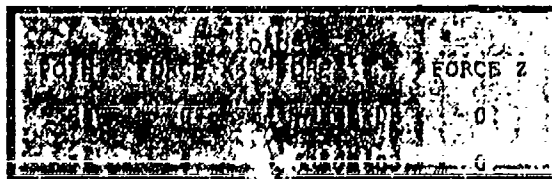


Table D24.1: Applied Loads

POINT	DISPLACEMENT INFORMATION					
	U	V	W	RX	RY	RZ
31	0.000E+00	0.000E+00	-2.296E+00	1.970E-01	0.000E+00	0.000E+00
33	0.000E+00	-3.679E+00	1.288E-15	1.215E-01	0.000E+00	0.000E+00
35	0.000E+00	-3.679E+00	-1.086E-15	-1.215E-01	0.000E+00	0.000E+00
37	0.000E+00	0.000E+00	2.296E+00	-1.970E-01	0.000E+00	0.000E+00
38	0.000E+00	-4.243E+00	8.338E-16	0.218E-02	0.000E+00	0.000E+00
39	0.000E+00	-4.243E+00	-7.089E-16	-8.218E-02	0.000E+00	0.000E+00
40	0.000E+00	-3.584E-01	-1.865E+00	1.962E-01	0.000E+00	0.000E+00
41	0.000E+00	-7.497E-01	-1.470E+00	1.938E-01	0.000E+00	0.000E+00
42	0.000E+00	-1.167E+00	-1.115E+00	1.897E-01	0.000E+00	0.000E+00
43	0.000E+00	-1.602E+00	-8.071E-01	1.837E-01	0.000E+00	0.000E+00
44	0.000E+00	-2.044E+00	-5.476E-01	1.756E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.484E+00	-3.385E-01	1.655E-01	0.000E+00	0.000E+00
46	0.000E+00	-2.911E+00	-1.793E-01	1.531E-01	0.000E+00	0.000E+00
47	0.000E+00	-3.313E+00	-6.796E-02	1.384E-01	0.000E+00	0.000E+00
48	0.000E+00	-3.313E+00	6.796E-02	-1.384E-01	0.000E+00	0.000E+00
49	0.000E+00	-2.911E+00	1.793E-01	-1.531E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.484E+00	3.385E-01	-1.655E-01	0.000E+00	0.000E+00
51	0.000E+00	-2.044E+00	5.476E-01	-1.756E-01	0.000E+00	0.000E+00
52	0.000E+00	-1.602E+00	8.071E-01	-1.837E-01	0.000E+00	0.000E+00
53	0.000E+00	-1.167E+00	1.115E+00	-1.897E-01	0.000E+00	0.000E+00
54	0.000E+00	-7.497E-01	1.470E+00	-1.938E-01	0.000E+00	0.000E+00
55	0.000E+00	-3.584E-01	1.865E+00	-1.962E-01	0.000E+00	0.000E+00
56	0.000E+00	-4.664E+00	0.000E+00	-4.680E-11	0.000E+00	0.000E+00

Table D24.3: Deflections

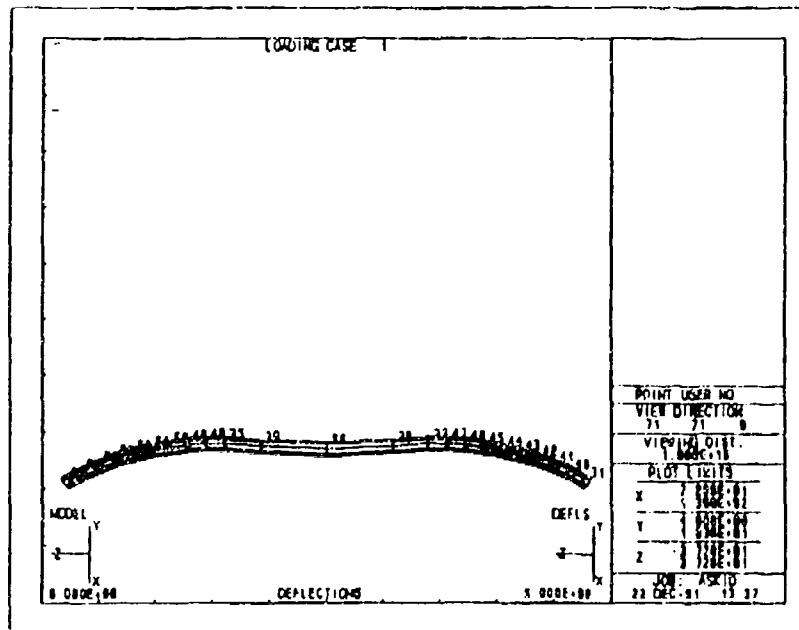


Figure D24.2: Deflected Crosstube

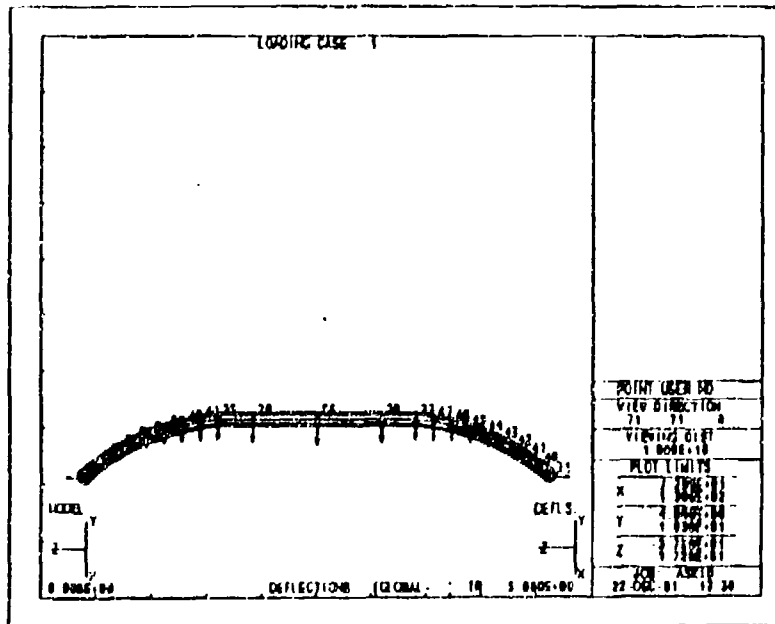


Figure D24.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE			
ELE NO.	STR PT.	S11	
1	1	-7.5675E+03	
2	1	-1.4381E+04	
3	1	-2.1943E+04	
4	1	-3.0145E+04	
5	1	-3.8893E+04	
6	1	-4.8077E+04	
7	1	-5.7601E+04	
8	1	-6.7363E+04	
9	1	-7.7276E+04	
10	1	-7.7277E+04	
11	1	-6.7362E+04	
12	1	-5.7601E+04	
13	1	-4.8077E+04	
14	1	-3.8893E+04	
15	1	-3.0147E+04	
16	1	-2.1941E+04	
17	1	-1.4381E+04	
18	1	-7.5667E+03	
19	1	-9.6445E+04	
20	1	-9.6445E+04	
21	1	-9.6444E+04	
22	1	-9.6445E+04	

Table D25.2: Principal Stresses

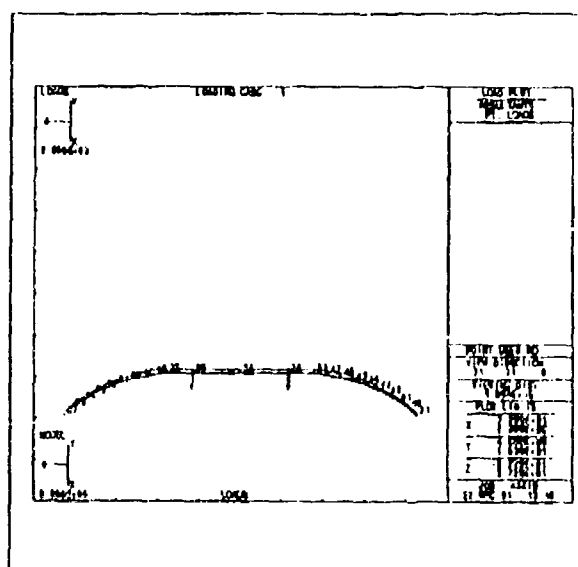


Figure D25.1: Point Location

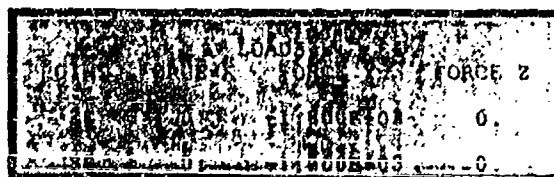


Table D25.1: Applied Loads

POINT	DISPLACEMENT INFORMATION						
	U	V	W	RX	RY	RZ	
31	0.000E+00	0.000E+00	-2.361E+00	2.026E-01	0.000E+00	0.000E+00	
33	0.000E+00	-3.784E+00	1.324E-15	1.249E-01	0.000E+00	0.000E+00	
35	0.000E+00	-3.784E+00	-1.116E-15	-1.249E-01	0.000E+00	0.000E+00	
37	0.000E+00	0.000E+00	2.361E+00	-2.026E-01	0.000E+00	0.000E+00	
38	0.000E+00	-4.364E+00	8.586E-16	8.453E-02	0.000E+00	0.000E+00	
39	0.000E+00	-4.364E+00	-7.284E-16	-8.453E-02	0.000E+00	0.000E+00	
40	0.000E+00	-3.686E-01	-1.918E+00	2.018E-01	0.000E+00	0.000E+00	
41	0.000E+00	-7.711E-01	-1.512E+00	1.994E-01	0.000E+00	0.000E+00	
42	0.000E+00	-1.200E+00	-1.147E+00	1.951E-01	0.000E+00	0.000E+00	
43	0.000E+00	-1.547E+00	-8.302E-01	1.889E-01	0.000E+00	0.000E+00	
44	0.000E+00	-2.103E+00	-5.633E-01	1.807E-01	0.000E+00	0.000E+00	
45	0.000E+00	-2.555E+00	-3.481E-01	1.702E-01	0.000E+00	0.000E+00	
46	0.000E+00	-2.994E+00	-1.845E-01	1.575E-01	0.000E+00	0.000E+00	
47	0.000E+00	-3.408E+00	-6.990E-02	1.424E-01	0.000E+00	0.000E+00	
48	0.000E+00	-3.408E+00	6.990E-02	-1.424E-01	0.000E+00	0.000E+00	
49	0.000E+00	-2.994E+00	1.845E-01	-1.575E-01	0.000E+00	0.000E+00	
50	0.000E+00	-2.555E+00	3.481E-01	-1.702E-01	0.000E+00	0.000E+00	
51	0.000E+00	-2.103E+00	5.633E-01	-1.807E-01	0.000E+00	0.000E+00	
52	0.000E+00	-1.647E+00	8.302E-01	-1.889E-01	0.000E+00	0.000E+00	
53	0.000E+00	-1.200E+00	1.147E+00	-1.951E-01	0.000E+00	0.000E+00	
54	0.000E+00	-7.711E-01	1.512E+00	-1.994E-01	0.000E+00	0.000E+00	
55	0.000E+00	-3.686E-01	1.918E+00	-2.018E-01	0.000E+00	0.000E+00	
56	0.000E+00	-4.797E+00	0.000E+00	-4.014E-11	0.000E+00	0.000E+00	

Table D25.3: Deflections

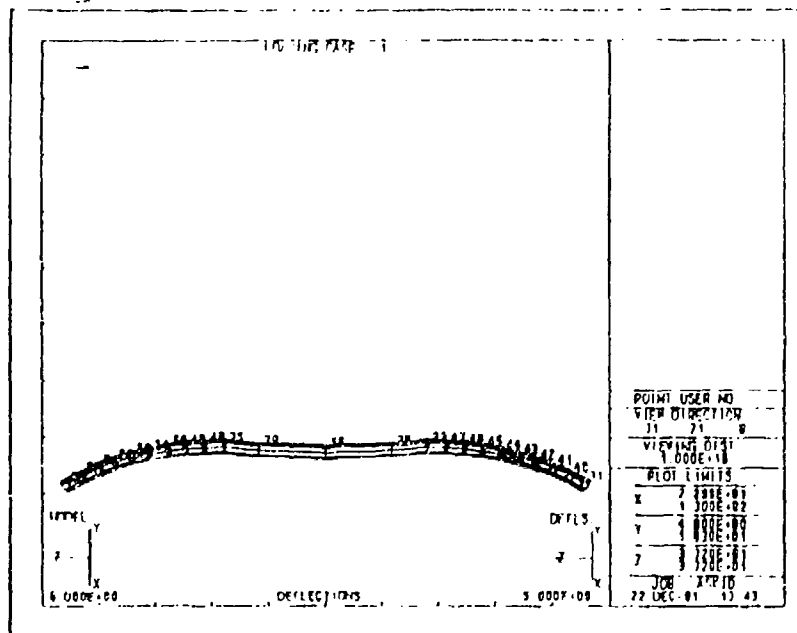


Figure D25.2: Deflected Crosstube

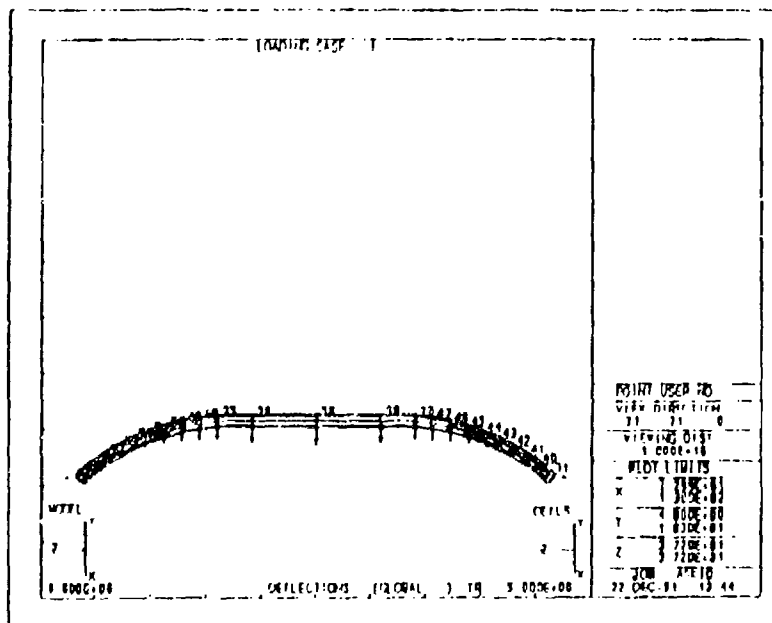


Figure D25.3: Crosstube Deflections Indicated by Vectors

PRINCIPAL STRESSES ENVELOPE		
FILE	SIP	
NO.	PT.	S11
1	1	-7.9029E+03
2	1	-1.5021E+01
3	1	-2.2917E+01
4	1	-3.1485E+01
5	1	-4.0621E+01
6	1	-5.0215E+01
7	1	-6.0159E+01
8	1	-7.0356E+01
9	1	-8.0712E+01
10	1	-8.0713E+01
11	1	-7.0356E+01
12	1	-6.0159E+01
13	1	-5.0214E+01
14	1	-4.0621E+01
15	1	-3.1485E+01
16	1	-2.2917E+01
17	1	-1.5021E+01
18	1	-7.9024E+03
19	1	-1.0073E+05
20	1	-1.0073E+05
21	1	-1.0073E+05
22	1	-1.0073E+05

Table D26.2: Principal Stresses

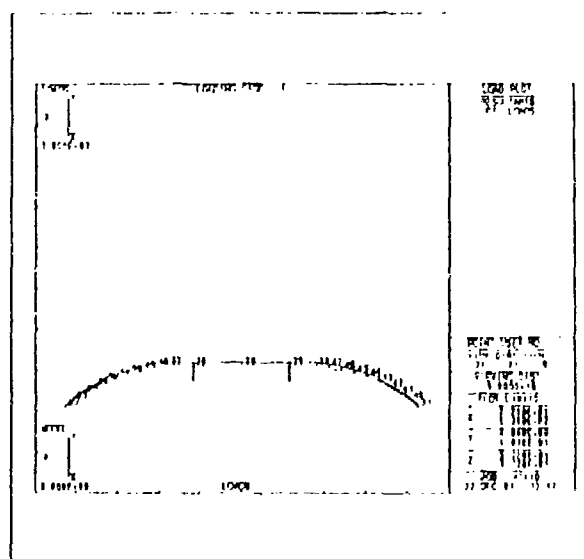


Figure D26.1: Point Location

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
38	0.	-1.880E+03	0.
39	0.	-1.880E+03	0.

Table D26.1: Applied Loads

DISPLACEMENT INFORMATION						
POINT	U	V	W	PX	PY	PZ
31	0.000E+00	0.000E+00	-2.466E+00	2.116E-01	0.000E+00	0.000E+00
33	0.000E+00	-3.952E+00	1.388E-15	1.305E-01	0.000E+00	0.000E+00
35	0.000E+00	-3.952E+00	-1.168E-15	-1.305E-01	0.000E+00	0.000E+00
37	0.000E+00	0.000E+00	2.466E+00	-2.116E-01	0.000E+00	0.000E+00
39	0.000E+00	-4.558E+00	8.969E-16	8.829E-02	0.000E+00	0.000E+00
37	0.000E+00	-4.558E+00	-7.626E-16	-8.829E-02	0.000E+00	0.000E+00
19	0.000E+00	-3.859E-01	-2.003E+00	2.108E-01	0.000E+00	0.000E+00
41	0.000E+00	-8.054E-01	-1.579E+00	2.082E-01	0.000E+00	0.000E+00
43	0.000E+00	-1.721E+00	-8.671E-01	1.973E-01	0.000E+00	0.000E+00
11	0.000E+00	-2.196E+00	5.883E-01	1.887E-01	0.000E+00	0.000E+00
45	0.000E+00	-2.669E+00	-3.636E-01	1.778E-01	0.000E+00	0.000E+00
16	0.000E+00	-3.127E+00	-1.926E-01	1.645E-01	0.000E+00	0.000E+00
17	0.000E+00	-3.559E+00	-7.301E-02	1.487E-01	0.000E+00	0.000E+00
19	0.000E+00	-3.559E+00	7.301E-02	-1.487E-01	0.000E+00	0.000E+00
13	0.000E+00	-3.127E+00	1.926E-01	-1.645E-01	0.000E+00	0.000E+00
50	0.000E+00	-2.669E+00	3.636E-01	-1.778E-01	0.000E+00	0.000E+00
51	0.000E+00	-2.196E+00	5.883E-01	-1.887E-01	0.000E+00	0.000E+00
52	0.000E+00	-1.721E+00	8.671E-01	-1.973E-01	0.000E+00	0.000E+00
53	0.000E+00	-1.254E+00	1.198E+00	-2.038E-01	0.000E+00	0.000E+00
54	0.000E+00	-8.054E-01	1.579E+00	-2.082E-01	0.000E+00	0.000E+00
55	0.000E+00	-3.859E-01	2.003E+00	-2.108E-01	0.000E+00	0.000E+00
56	0.000E+00	-5.010E+00	0.000E+00	-5.028E-11	0.000E+00	0.000E+00

Table D26.3: Deflections

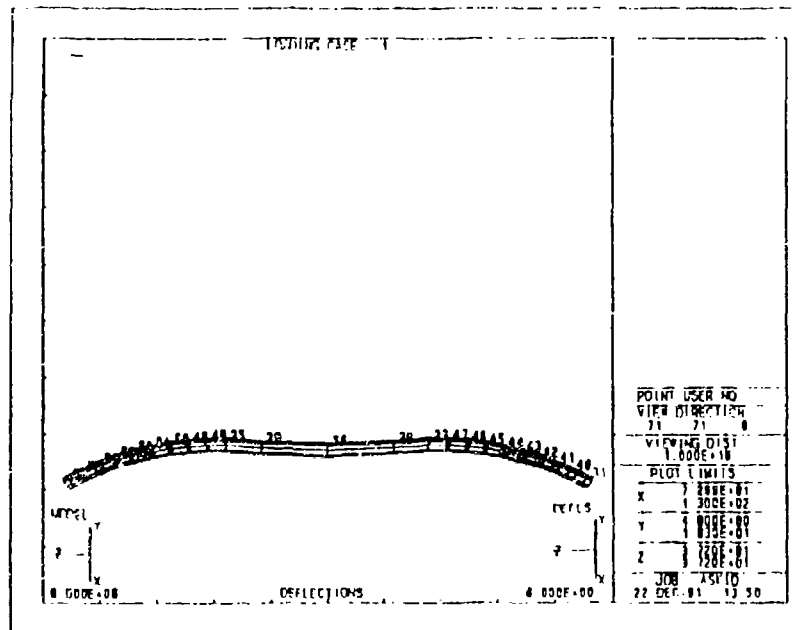


Figure D26.2: Deflected Crosstube

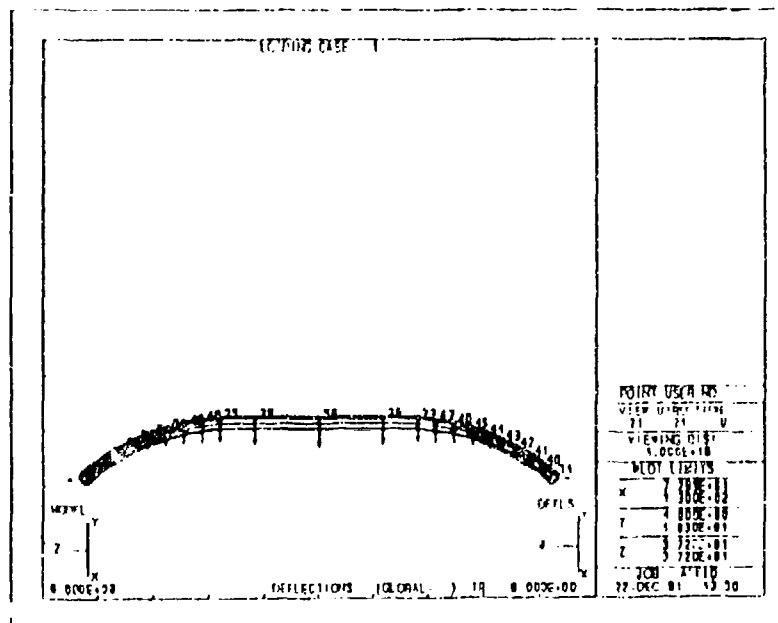


Figure D26.3: Crosstube Deflections Indicated by Vectors

Appendix E

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-2.000E+02	0.
30	0.	-2.000E+02	0.
112	0.	-1.550E+02	0.
115	0.	-2.000E+02	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	-3.525E-05	-3.578E-01	0.00
110	-7.836E-14	-3.603E-01	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	1.904E+03	1.009E+04
100	-2.917E+02	1.041E+03
105	-3.579E+03	3.488E+03
105	-1.649E+03	3.261E+03
74	4.507E+01	1.518E+01
81	-7.040E+01	5.560E+01
66	-1.000E+02	6.503E+01
42	-1.062E+03	4.572E+01

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.000E+02	0.
30	0.	-4.000E+02	0.
112	0.	-1.550E+02	0.
115	0.	-4.000E+02	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	1.775E-04	-6.723E-01	0.00
110	-1.329E-13	-6.112E-01	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-2.494E+03	1.694E+04
100	-4.952E+02	1.766E+03
105	-6.071E+03	5.866E+03
105	-2.813E+03	5.392E+03
74	-1.711E+02	8.084E+01
81	5.097E+02	3.284E+02
66	3.484E+02	2.793E+02
42	-1.996E+03	8.607E+01

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-6.000E+02	0.
30	0.	-5.850E+02	0.
112	0.	-1.550E+02	0.
115	0.	-5.200E+02	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	4.984E-04	-9.546E-01	0.00
110	-1.743E-13	-8.015E-01	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-4.856E+03	2.218E+04
100	-6.499E+02	2.316E+03
105	-8.001E+03	7.680E+03
105	-3.732E+03	7.035E+03
74	-5.186E+02	1.161E+02
81	1.324E+03	8.934E+02
66	1.085E+03	8.109E+02
42	-2.835E+03	1.221E+02

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-8.000E+02	0.
30	0.	-5.850E+02	0.
112	0.	-1.550E+02	0.
115	0.	-5.200E+02	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	7.648E-04	-1.084E+00	0.00
110	-1.863E-13	-8.564E-01	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-4.506E+03	2.372E+04
100	-6.949E+02	2.475E+03
105	-8.601E+03	8.213E+03
105	-4.037E+03	7.536E+03
74	-8.204E+02	5.041E+01
81	1.964E+03	1.427E+03
66	1.732E+03	1.192E+03
42	-3.221E+03	1.387E+02

3200 lbs Aft Right, Center of Gravity

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.000E+03	0.
30	0.	-5.850E+02	0.
112	0.	-1.550E+02	0.
115	0.	-5.200E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	1.031E-03	-1.213E+00	0.00
110	-1.982E-13	-9.113E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-4.156E+03	2.526E+04
100	-7.398E+02	2.633E+03
105	-9.201E+03	8.746E+03
105	-4.343E+03	8.038E+03
74	-1.122E+03	2.010E+01
81	2.604E+03	1.960E+03
66	2.380E+03	1.571E+03
42	-3.605E+03	1.553E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.200E+03	0.
30	0.	-5.850E+02	0.
112	0.	-1.550E+02	0.
115	0.	-5.200E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	1.298E-03	-1.342E+00	0.00
110	-2.101E-13	-9.661E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-3.806E+03	2.680E+04
100	-7.831E+02	2.792E+03
105	-9.801E+03	9.279E+03
105	-4.648E+03	8.539E+03
74	-1.424E+03	8.821E+01
81	3.245E+03	2.489E+03
66	3.028E+03	1.951E+03
42	-3.991E+03	1.723E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.400E+03	0.
30	0.	-5.850E+02	0.
112	0.	-1.550E+02	0.
115	0.	-5.200E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	1.564E-03	-1.472E+00	0.00
110	-2.221E-13	-1.021E+00	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-3.456E+03	2.834E+04
100	-8.263E+02	2.950E+03
105	-1.040E+04	9.812E+03
105	-4.954E+03	9.041E+03
74	-1.726E+03	1.563E+02
81	3.885E+03	3.021E+03
66	3.676E+03	2.332E+03
42	-4.377E+03	1.886E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.600E+03	0.
30	0.	-5.850E+02	0.
112	0.	-1.550E+02	0.
115	0.	-5.200E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	1.830E-03	-1.601E+00	0.00
110	-2.340E-13	-1.076E+00	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-3.106E+03	2.988E+04
100	-8.712E+02	3.102E+03
105	-1.100E+04	1.034E+04
105	-5.259E+03	9.542E+03
74	-2.027E+03	2.221E+02
81	4.525E+03	3.551E+03
66	4.324E+03	2.708E+03
42	-4.763E+03	2.055E+02

3200 lbs Aft Right, Center of Gravity

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.800E+03	0.
30	0.	-5.850E+02	0.
112	0.	-1.550E+02	0.
115	0.	-5.200E+02	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	2.097E-03	-1.730E+00	0.00
110	-2.459E-13	-1.131E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-2.755E+03	3.143E+04
100	-9.179E+02	3.267E+03
105	-1.160E+04	1.088E+04
105	-5.564E+03	1.004E+04
74	-2.329E+03	2.902E+02
81	5.165E+03	4.084E+03
66	4.971E+03	3.089E+03
42	-5.149E+03	2.221E+02

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.945E+03	0.
30	0.	-5.850E+02	0.
112	0.	-1.550E+02	0.
115	0.	-5.200E+02	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	2.290E-03	-1.824E+00	0.00
110	-2.546E-13	-1.171E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-2.503E+03	3.254E+04
100	-9.490E+02	3.383E+03
105	-1.204E+04	1.126E+04
105	-5.786E+03	1.041E+04
74	-2.548E+03	3.379E+02
81	5.629E+03	4.469E+03
66	5.441E+03	3.368E+03
42	-5.428E+03	2.342E+02

3200 lbs Aft Right, Center of Gravity

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-2.000E+02	0.
30	0.	-2.000E+02	0.
112	0.	-2.000E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	4.752E-06	-3.508E-01	0.00
110	-7.452E-14	-3.426E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.	NORMAL STRESS	SHEAR STRESS
112	5.541E+03	9.703E+03
100	-2.774E+02	9.901E+02
105	-3.441E+03	3.351E+03
105	-1.595E+03	3.195E+03
74	-1.365E+01	2.395E+01
81	-1.156E+01	2.188E+00
66	3.453E+01	1.522E+01
42	-1.041E+03	4.492E+01

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.000E+02	0.
30	0.	-4.000E+02	0.
112	0.	-4.000E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	2.175E-04	-6.653E-01	0.00
110	-1.291E-13	-5.935E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.	NORMAL STRESS	SHEAR STRESS
112	1.444E+04	1.626E+04
100	-4.814E+02	1.715E+03
105	-6.040E+03	5.850E+03
105	-2.829E+03	5.658E+03
74	-2.772E+02	8.850E+01
81	4.369E+02	3.456E+02
66	6.147E+02	3.987E+02
42	-1.974E+03	8.525E+01

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.850E+02	0.
30	0.	-6.000E+02	0.
112	0.	-5.450E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	3.651E-04	-8.900E-01	0.00
110	-1.684E-13	-7.741E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.	NORMAL STRESS	SHEAR STRESS
112	2.090E+04	2.217E+04
100	-6.275E+02	2.237E+03
105	-7.909E+03	7.649E+03
105	-3.716E+03	7.432E+03
74	-4.600E+02	9.823E+01
81	7.482E+02	5.408E+02
66	1.017E+03	7.083E+02
42	-2.640E+03	1.139E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.850E+02	0.
30	0.	-8.000E+02	0.
112	0.	-5.450E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	6.216E-04	-1.019E+00	0.00
110	-1.803E-13	-8.289E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.	NORMAL STRESS	SHEAR STRESS
112	2.131E+04	2.372E+04
100	-6.716E+02	2.395E+03
105	-8.507E+03	8.182E+03
105	-4.019E+03	7.935E+03
74	-7.588E+02	3.167E+01
81	1.396E+03	9.203E+02
66	1.657E+03	1.240E+03
42	-3.022E+03	1.303E+02

3200 lbs Aft Left, Center of Gravity

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.850E+02	0.
30	0.	-1.000E+03	0.
112	0.	-5.450E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	8.980E-04	-1.148E+00	0.00
110	-1.922E-13	-8.838E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	2.173E+04	2.526E+04
100	-7.156E+02	2.553E+03
105	-9.104E+03	8.716E+03
105	-4.322E+03	8.438E+03
74	-1.058E+03	3.727E+01
81	2.044E+03	1.300E+03
66	2.297E+03	1.772E+03
42	-3.403E+03	1.467E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.850E+02	0.
30	0.	-1.200E+03	0.
112	0.	-5.450E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	1.164E-03	-1.278E+00	0.00
110	-2.041E-13	-9.387E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	2.215E+04	2.681E+04
100	-7.606E+02	2.712E+03
105	-9.702E+03	9.250E+03
105	-4.625E+03	8.942E+03
74	-1.357E+03	1.050E+02
81	2.692E+03	1.679E+03
66	2.937E+03	2.305E+03
42	-3.784E+03	1.632E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.850E+02	0.
30	0.	-1.400E+03	0.
112	0.	-5.450E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	1.431E-03	-1.407E+00	0.00
110	-2.161E-13	-9.936E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	2.256E+04	2.835E+04
100	-8.072E+02	2.871E+03
105	-1.030E+04	9.783E+03
105	-4.929E+03	9.445E+03
74	-1.655E+03	.704E+02
81	3.339E+03	2.051E+03
66	3.577E+03	2.836E+03
42	-4.166E+03	1.796E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.850E+02	0.
30	0.	-1.600E+03	0.
112	0.	-5.450E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	1.697E-03	-1.536E+00	0.00
110	-2.280E-13	-1.048E+00	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	2.298E+04	2.989E+04
100	-8.505E+02	3.029E+03
105	-1.090E+04	1.032E+04
105	-5.232E+03	9.948E+03
74	-1.954E+03	2.429E+02
81	3.987E+03	2.441E+03
66	4.217E+03	3.368E+03
42	-4.548E+03	1.952E+02

3200 lbs Aft Left, Center of Gravity

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.850E+02	0.
30	0.	-1.800E+03	0.
112	0.	-5.450E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	1.964E-03	-1.665E+00	0.00
110	-2.400E-13	-1.103E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	2.340E+04	3.144E+04
100	-8.937E+02	3.188E+03
105	-1.150E+04	1.085E+04
105	-5.535E+03	1.045E+04
74	-2.253E+03	3.059E+02
81	4.635E+03	2.820E+03
66	4.857E+03	3.902E+03
42	-4.930E+03	2.127E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.850E+02	0.
30	0.	-2.000E+03	0.
112	0.	-5.450E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	2.230E-03	-1.795E+00	0.00
110	-2.519E-13	-1.158E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	2.382E+04	3.298E+04
100	-9.369E+02	3.348E+03
105	-1.209E+04	1.138E+04
105	-5.838E+03	1.095E+04
74	-2.552E+03	3.760E+02
81	5.283E+03	3.202E+03
66	5.497E+03	4.431E+03
42	-5.312E+03	2.293E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.850E+02	0.
30	0.	-2.040E+03	0.
112	0.	-5.450E+02	0.
115	0.	-1.300E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	2.283E-03	-1.820E+00	0.00
110	-2.543E-13	-1.169E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	2.390E+04	3.329E+04
100	-9.490E+02	3.379E+03
105	-1.221E+04	1.149E+04
105	-5.899E+03	1.106E+04
74	-2.612E+03	5.896E+02
81	5.412E+03	3.273E+03
66	5.625E+03	4.538E+03
42	-5.387E+03	2.323E+02

3200 lbs Aft Left, Center of Gravity

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-2.000E+02	0.
30	0.	-2.000E+02	0.
112	0.	-2.000E+02	0.
115	0.	-2.000E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-1.073E-04	-3.704E-01	0.00
110	-8.527E-14	-3.920E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.		
112	3.733E+03	1.102E+04
100	-3.181E+02	1.133E+03
105	-3.894E+03	3.810E+03
105	-1.790E+03	3.589E+03
74	1.209E+02	2.912E-01
81	-2.593E+02	1.834E+02
66	-2.593E+02	1.835E+02
42	-1.100E+03	4.738E+01

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.000E+02	0.
30	0.	-4.000E+02	0.
112	0.	-4.000E+02	0.
115	0.	-4.000E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-2.145E-04	-7.408E-01	0.00
110	-1.705E-13	-7.841E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.		
112	7.466E+03	2.205E+04
100	-6.361E+02	2.265E+03
105	-7.783E+03	7.621E+03
105	-3.579E+03	7.179E+03
74	2.418E+02	5.824E-01
81	-5.185E+02	3.668E+02
66	-5.185E+02	3.671E+02
42	-2.199E+03	9.475E+01

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-6.000E+02	0.
30	0.	-6.000E+02	0.
112	0.	-5.600E+02	0.
115	0.	-5.600E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-1.938E-04	-1.089E+00	0.00
110	-2.435E-13	-1.120E+00	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.		
112	1.061E+04	3.148E+04
100	-9.075E+02	3.236E+03
105	-1.114E+04	1.088E+04
105	-5.133E+03	1.025E+04
74	2.184E+02	1.169E+00
81	-4.684E+02	3.321E+02
66	-4.684E+02	3.319E+02
42	-3.232E+03	1.394E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-8.000E+02	0.
30	0.	-8.000E+02	0.
112	0.	-5.600E+02	0.
115	0.	-5.600E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	3.391E-04	-1.347E+00	0.00
110	-2.674E-13	-1.229E+00	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.		
112	1.137E+04	3.457E+04
100	-9.957E+02	3.552E+03
105	-1.234E+04	1.195E+04
105	-5.741E+03	1.126E+04
74	-3.822E+02	8.504E-01
81	8.195E+02	5.799E+02
66	8.195E+02	5.807E+02
42	-3.999E+03	1.726E+02

3200 lbs Centerline, Center of Gravity

-LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.000E+03	0.
30	0.	-1.000E+03	0.
112	0.	-5.600E+02	0.
115	0.	-5.600E+02	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	8.719E-04	-1.606E+00	0.00
110	-2.913E-13	-1.339E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	1.214E+04	3.765E+04
100	-1.086E+03	3.870E+03
105	-1.354E+04	1.302E+04
105	-6.350E+03	1.226E+04
74	-9.828E+02	4.815E-01
81	2.107E+03	1.492E+03
66	2.107E+03	1.491E+03
42	-4.767E+03	2.058E+02

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.040E+03	0.
30	0.	-1.040E+03	0.
112	0.	-5.600E+02	0.
115	0.	-5.600E+02	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	9.785E-04	-1.657E+00	0.00
110	-2.960E-13	-1.361E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	1.229E+04	3.827E+04
100	-1.105E+03	3.933E+03
105	-1.378E+04	1.323E+04
105	-6.472E+03	1.246E+04
74	-1.103E+03	1.363E+00
81	2.365E+03	1.675E+03
66	2.365E+03	1.674E+03
42	-4.921E+03	2.121E+02

3200 lbs Centerline, Center of Gravity

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-2.000E+02	0.
30	0.	-2.000E+02	0.
112	0.	-2.000E+02	0.
115	0.	-2.000E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-1.073E-04	-3.704E-01	0.00
110	-8.527E-14	-3.920E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.	NORMAL STRESS	SHEAR STRESS
112	3.733E+03	1.102E+04
100	-3.181E+02	1.133E+03
105	-3.894E+03	3.810E+03
105	-1.790E+03	3.589E+03
74	1.209E+02	2.912E-01
81	-2.593E+02	1.834E+02
66	-2.593E+02	1.835E+02
42	-1.100E+03	4.738E+01

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-3.100E+02	0.
30	0.	-4.000E+02	0.
112	0.	-4.000E+02	0.
115	0.	-3.100E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-1.904E-04	-6.575E-01	0.00
110	-1.513E-13	-6.959E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.	NORMAL STRESS	SHEAR STRESS
112	9.632E+03	1.966E+04
100	-5.644E+02	2.010E+03
105	-6.935E+03	6.791E+03
105	-3.192E+03	6.446E+03
74	2.046E+02	2.179E+00
81	-4.881E+02	3.679E+02
66	-4.323E+02	2.832E+02
42	-1.951E+03	8.420E+01

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-3.100E+02	0.
30	0.	-6.000E+02	0.
112	0.	-6.000E+02	0.
115	0.	-3.100E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-2.440E-04	-8.427E-01	0.00
110	-1.939E-13	-8.919E-01	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.	NORMAL STRESS	SHEAR STRESS
112	1.818E+04	2.527E+04
100	-7.243E+02	2.578E+03
105	-8.934E+03	8.757E+03
105	-4.120E+03	8.408E+03
74	2.428E+02	2.170E+00
81	-6.797E+02	5.564E+02
66	-5.000E+02	2.785E+02
42	-2.497E+03	1.077E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-3.100E+02	0.
30	0.	-8.000E+02	0.
112	0.	-8.000E+02	0.
115	0.	-3.100E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-2.977E-04	-1.028E+00	0.00
110	-2.366E-13	-1.088E+00	0.00

ELEM NORMAL STRESS SHEAR STRESS

NO.	NORMAL STRESS	SHEAR STRESS
112	2.673E+04	3.108E+04
100	-8.816E+02	3.143E+03
105	-1.093E+04	1.072E+04
105	-5.049E+03	1.037E+04
74	2.210E+02	2.162E+00
81	-8.713E+02	7.438E+02
66	-5.676E+02	2.761E+02
42	-3.046E+03	1.317E+02

3200 lbs Forward Left, Center of Gravity

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-3.100E+02	0.
30	0.	-1.000E+03	0.
112	0.	-1.000E+03	0.
115	0.	-3.100E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-3.513E-04	-1.213E+00	0.00
110	-2.792E-13	-1.284E+00	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	3.527E+04	3.679E+04
100	-1.041E+03	3.709E+03
105	-1.293E+04	1.269E+04
105	-5.978E+03	1.233E+04
74	3.192E+02	4.542E+00
81	-1.063E+03	9.300E+02
66	-6.353E+02	2.713E+02
42	-3.593E+03	1.549E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-3.100E+02	0.
30	0.	-1.200E+03	0.
112	0.	-1.200E+03	0.
115	0.	-3.100E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-4.049E-04	-1.398E+00	0.00
110	-3.219E-13	-1.480E+00	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	4.382E+04	4.250E+04
100	-1.198E+03	4.277E+03
105	-1.493E+04	1.465E+04
105	-6.907E+03	1.429E+04
74	3.574E+02	6.922E+00
81	-1.254E+03	1.120E+03
66	-7.029E+02	2.678E+02
42	-4.119E+03	1.789E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-3.100E+02	0.
30	0.	-1.290E+03	0.
112	0.	-1.290E+03	0.
115	0.	-3.100E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-4.291E-04	-1.482E+00	0.00
110	-3.411E-13	-1.568E+00	0.00

ELEM NORMAL STRESS SHEAR STRESS

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	4.767E+04	4.507E+04
100	-1.272E+03	4.530E+03
105	-1.583E+04	1.554E+04
105	-7.325E+03	1.518E+04
74	3.746E+02	7.038E+00
81	-1.341E+03	1.200E+03
66	-7.334E+02	2.630E+02
42	-4.787E+03	1.889E+02

3200 lbs Forward Left, Center of Gravity

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-2.000E+02	0.
30	0.	-2.000E+02	0.
112	0.	-2.000E+02	0.
115	0.	-2.000E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-1.073E-04	-3.704E-01	0.00
110	-8.527E-14	-3.920E-01	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	3.733E+03	1.102E+04
100	-3.181E+02	1.133E+03
105	-3.894E+03	3.810E+03
105	-1.790E+03	3.589E+03
74	1.209E+02	2.912E-01
81	-2.593E+02	1.834E+02
66	-2.593E+02	1.835E+02
42	-1.100E+03	4.738E+01

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-4.000E+02	0.
30	0.	-3.700E+02	0.
112	0.	-3.700E+02	0.
115	0.	-4.000E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-2.065E-04	-7.131E-01	0.00
110	-1.641E-13	-7.547E-01	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	6.184E+03	2.119E+04
100	-6.111E+02	2.181E+03
105	-7.488E+03	7.326E+03
105	-3.440E+03	6.884E+03
74	2.361E+02	2.525E-01
81	-4.896E+02	3.389E+02
66	-5.084E+02	3.671E+02
42	-2.117E+03	9.117E+01

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-6.000E+02	0.
30	0.	-3.700E+02	0.
112	0.	-3.700E+02	0.
115	0.	-6.000E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-2.601E-04	-8.983E-01	0.00
110	-2.068E-13	-9.507E-01	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	1.369E+03	2.650E+04
100	-7.710E+02	2.747E+03
105	-9.383E+03	9.170E+03
105	-4.301E+03	8.512E+03
74	3.188E+02	1.117E+00
81	-5.574E+02	3.349E+02
66	-7.000E+02	5.542E+02
42	-2.669E+03	1.153E+02

LOADS

POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-8.000E+02	0.
30	0.	-3.700E+02	0.
112	0.	-3.700E+02	0.
115	0.	-8.000E+02	0.

DISPLACEMENT INFORMATION

POINT	U	V	W
31	-3.138E-04	-1.093E+00	0.00
110	-2.494E-13	-1.147E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-3.444E+03	3.182E+04
100	-9.300E+02	3.314E+03
105	-1.128E+04	1.101E+04
105	-5.161E+03	1.014E+04
74	4.015E+02	3.236E+00
81	-6.251E+02	3.310E+02
66	-8.916E+02	7.425E+02
42	-3.221E+03	1.382E+02

3200 lbs Forward Right, Center of Gravity

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.000E+03	0.
30	0.	-3.700E+02	0.
112	0.	-3.700E+02	0.
115	0.	-1.000E+03	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	-3.674E-04	-1.269E+00	0.00
110	-2.920E-13	-1.343E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-8.259E+03	3.713E+04
100	-1.089E+03	3.880E+03
105	-1.317E+04	1.286E+04
105	-6.022E+03	1.177E+04
74	4.842E+02	2.935E+00
81	-6.928E+02	3.258E+02
66	-1.083E+03	9.307E+02
42	-3.774E+03	1.625E+02

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.200E+03	0.
30	0.	-3.700E+02	0.
112	0.	-3.700E+02	0.
115	0.	-1.200E+03	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	-4.210E-04	-1.454E+00	0.00
110	-3.346E-13	-1.539E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-1.307E+04	4.244E+04
100	-1.248E+03	4.446E+03
105	-1.507E+04	1.470E+04
105	-6.883E+03	1.340E+04
74	5.669E+02	6.218E+00
81	-7.604E+02	3.242E+02
66	-1.275E+03	1.118E+03
42	-4.324E+03	1.864E+02

LOADS			
POINT	FORCE X	FORCE Y	FORCE Z
15	0.	-1.230E+03	0.
30	0.	-3.700E+02	0.
112	0.	-3.700E+02	0.
115	0.	-1.230E+03	0.

DISPLACEMENT INFORMATION			
POINT	U	V	W
31	-4.291E-04	-1.482E+00	0.00
110	-3.417E-13	-1.568E+00	0.00

ELEM NO.	NORMAL STRESS	SHEAR STRESS
112	-1.379E+04	4.324E+04
100	-1.272E+03	4.530E+03
105	-1.535E+04	1.498E+04
105	-7.013E+03	1.364E+04
74	5.793E+02	5.159E+00
81	-7.706E+02	3.215E+02
66	-1.304E+03	1.147E+03
42	-4.408E+03	1.903E+02

3200 lbs Forward Right, Center of Gravity

Appendix F

Constants				Constants			
		Deflection	0.75			Deflection	1
		FWD				FWD	
		AFT	0.4375			AFT	0.65625
		Corrected	Load Values			Corrected	Load Values
Loads	150 150	200	200	Loads	350 350	400	400
	150 150	200	200		350 155	400	205
Strains				Strains			
		-25	0.000025			-123	0.000123
		205	0.000205			353	0.000353
		45	0.000045			75	0.000075
Nose (r4)	Lateral	-414	0.000414	Nose (r4)	Lateral	-427	0.000427
Wheel (r5)	45 Deg	133	0.000133	Wheel (r5)	45 Deg	206	0.000206
Tube (r6)	Long	380	0.000380	Tube (r6)	Long	587	0.000587
		-25	0.000025			-37	0.000037
		-123	0.000123			-157	0.000157
		-81	0.000081			-134	0.000134
Cross (Y10)	Lateral	553	0.000553	Cross (Y10)	Lateral	881	0.000881
Tube (R1)	45 Deg	105	0.000105	Tube (R1)	45 Deg	200	0.000200
Center (R2)	Long	-90	0.000090	Center (R2)	Long	-145	0.000145
		10	0.000010			20	0.000020
		110	0.000110			150	0.000150
Right (R1)	Lateral	5	0.000005	Right (R1)	Lateral	15	0.000015
Cross (R2)	45 Deg	30	0.000030	Cross (R2)	45 Deg	40	0.000040
Tube (R3)	Long	45	0.000045	Tube (R3)	Long	65	0.000065
		0	0			-15	-0.000015
		35	0.000035			55	0.000055
		75	0.000075			135	0.000135
Principal	Strain	Stresses		Principal	Strain	Stresses	
	0.0001881	-2.81E+03	MAT 3		0.000414	-6.90E+03	
	0.0002081	3.44E+03	ELE 112		0.0003558	5.38E+03	
Nose	Lateral	-0.0004306	-7.65E+03	Nose	Lateral	-0.000502	-6.65E+03
Wheel	45 Deg	0.0003566	5.98E+03	Wheel	45 Deg	0.0006621	1.17E+04
Tube	Long	-0.0002312	-6.38E+03	Tube	Long	-0.000333	-9.37E+03
	0.0001252	1.83E+03	ELE 105		0.0001618	2.62E+03	
Cross	Lateral	-0.0003242	-3.43E+03	Cross	Lateral	-0.000563	-6.56E+03
Tube	45 Deg	0.0007296	2.09E+04	Tube	45 Deg	0.0012062	3.42E+04
Center	Long	2.174E+05	6.52E+02	Center	Long	4.348E+05	1.30E+03
	0.0002096	6.29E+03	ELE 81		0.0002858	8.57E+03	
Right	Lateral	-0.0001221	-7.08E+02	Right	Lateral	-0.00016	-4.14E+02
Cross	45 Deg	0.0003331	9.78E+03	Cross	45 Deg	0.000489	1.45E+04
Tube	Long	-0.0001697	-8.45E+02	Tube	Long	-0.000302	-2.17E+03
	0.0004582	1.35E+04	ELE 42		0.0007511	2.18E+04	

3200 lbs Aft Right, Center of Gravity

Constants			Deflection		Load Values		Constants			Deflection		Load Values	
			FWD	1 9375						FWD	1 4375		
			AFT	1						AFT	1 3125		
Loads			Corrected				Loads			Corrected			
	550	550	600	600				750	750	800	800		
	520	155	570	205				520	155	570	205		
Strains							Strains						
			-207	-0 000207						-184	-0 000184		
			507	0 000507						496	0 000496		
			94	0 000094						104	0 000104		
Nose	(Y4)	Lateral	-184	-0 000184	Material		Nose	(Y4)	Lateral	-66	-0 000066		
Wheel	(Y5)	45 Deg	-292	-0 000292	Poisson		Wheel	(Y5)	45 Deg	-273	-0 000273		
Tube	(Y6)	Long	819	0 000819	Young's		Tube	(Y6)	Long	777	0 000777		
			-60	-0 000060						-40	-0 000040		
			216	0 000216	6150					199	0 000199		
			-182	-0 000182	0 315					-181	0 000181		
Cross-	(Y10)	Lateral	1410	0 001410	3 00E+07		Cross-	(Y10)	Lateral	1844	0 001844		
Tube	(R1)	45 Deg	-305	-0 000305			Tube	(R1)	45 Deg	-390	-0 000390		
Center	(R2)	Long	-245	-0 000245	4130		Center	(R2)	Long	-335	-0 000335		
			35	0 000035	0 302					45	0 000045		
					3 00E+07								
			200	0 000200						240	0 000240		
Right	(R1)	Lateral	20	0 000020	4340		Right	(R1)	Lateral	30	0 000030		
Cross	(R2)	45 Deg	-50	-0 000050	0 3333		Cross	(R2)	45 Deg	-55	-0 000055		
Tube	(R3)	Long	80	0 000080	2 10E+07		Tube	(R3)	Long	90	0 000090		
			-25	-0 000025						-35	-0 000035		
			-120	-0 000120						-110	-0 000110		
			205	0 000205						270	0 000270		
Principal			Strain	Stresses			Principal			Strain	Stresses		
			-0 0006398	-1 10E+04	MAT 3					-0 000595	-1 00E+04		
			0 0005268	7 41E+03	ELE 112					0 000515	7 48E+03		
Nose	Lateral		-0 0004718	-2 43E+03	MAT 3		Nose	Lateral		-0 000401	-7 21E+02		
Wheel	45 Deg		0 0011068	2 24E+04	ELE 100		Wheel	45 Deg		0 0011123	2 31E+04		
Tube	Long						Tube	Long					
			-0 0004635	-1 31E+04	MAT 2					-0 000428	-1 21E+04		
			0 0002215	2 69E+03	ELE 105					0 0002069	2 56E+03		
Cross-	Lateral		0 0008891	-1 04E+04	MAT 2		Cross-	Lateral		-0 001161	-1 38E+04		
Tube	45 Deg		0 0018975	5 38E+04	ELE 74		Tube	45 Deg		0 0024563	6 95E+04		
Center	Long						Center	Long					
			7 609E-05	2 28E+03	MAT 2					9 783E-05	2 93E+03		
			0 000381	1 14E+04	ELE 81					0 0004572	1 37E+04		
Right	Lateral		-0 0001387	-4 96E+02	MAT 2		Right	Lateral		-0 000215	-1 28E+02		
Cross	45 Deg		0 000608	1 81E+04	ELE 65		Cross	45 Deg		0 0006984	2 09E+04		
Tube	Long						Tube	Long					
			-0 0005809	-6 20E+03	MAT 1					-0 000612	-4 77E+03		
			0 001253	3 55E+04	ELE 42					0 0014875	4 31E+04		

3200 lbs Aft Right, Center of Gravity

Constants		Deflection		Load Values		Constants		Deflection		Load Values	
		FWD	1 59375					FWD	1 625		
		AFT	1 5625					AFT	1 5625		
Loads		Corrected				Loads		Corrected			
	950	585	1000		635		1150	585	1200		635
	520	155	570		205		520	155	570		205
Strains						Strains					
			-164		0 000164				-153		0 000153
			494		0 000494				491		0 000491
			103		0 000103				102		0 000102
Nose (Y4)	Lateral		-135		0 000135	Nose (Y4)	Lateral		-96		0 000096
Wheel (Y5)	45 Deg		-272		0 000272	Wheel (Y5)	45 Deg		-266		0 000266
Tube (Y6)	Long		763		0 000763	Tube (Y6)	Long		746		0 000746
			-30		0 000030				-27		0 000027
			193		0 000193				191		0 000191
			-180		0 000180				-178		0 000178
Cross (Y10)	Lateral		2129		0 002129	Cross (Y10)	Lateral		2157		0 002157
Tube (R1)	45 Deg		-455		0 000455	Tube (R1)	45 Deg		-460		0 000460
Center (R2)	Long		-400		0 000400	Center (R2)	Long		-405		0 000405
			60		0 000060				60		0 000060
			260		0 000260				260		0 000260
Right (R1)	Lateral		40		0 000040	Right (R1)	Lateral		35		0 000035
Cross (R2)	45 Deg		-65		0 000065	Cross (R2)	45 Deg		-60		0 000060
Tube (R3)	Long		95		0 000095	Tube (R3)	Long		95		0 000095
			-50		0 000050				-55		0 000055
			-135		0 000135				-135		0 000135
			235		0 000235				340		0 000340
Principal		Strain		Stresses		Principal		Strain		Stresses	
			-0 0005717		-9 49E+03				-0 000558		-9 18E+03
			0 0005107		7 56E+03				0 0005065		7 58E+03
Nose	Lateral		-0 0004242		-1 74E+03	Nose	Lateral		-0 000401		-1 19E+03
Wheel	45 Deg		0 0010522		2 15E+04	Wheel	45 Deg		0 0010506		2 17E+04
Tube	Long		-0 0004123		-1 16E+04	Tube	Long		-0 000406		-1 14E+04
			0 0002023		2 57E+03				0 0002006		2 58E+03
Cross	Lateral		-0 0013572		-1 56E+04	Cross	Lateral		-0 001373		-1 68E+04
Tube	45 Deg		0 0028306		7 99E+04	Tube	45 Deg		0 0028667		8 09E+04
Center	Long		0 0001304		3 91E+03	Center	Long		0 0001304		3 91E+03
			0 0004953		1 49E+04				0 0004953		1 49E+04
Right	Lateral		-0 000245		-3 01E+02	Right	Lateral		-0 000231		-1 35E+02
Cross	45 Deg		0 0007812		2 33E+04	Cross	45 Deg		0 0007519		2 25E+04
Tube	Long		-0 0006908		-8 72E+03	Tube	Long		0 000779		6 74E+03
			0 0013621		3 81E+04				0 0018311		5 28E+04

3200 lbs Aft Right, Center of Gravity

Constants				Deflection		Constants				Deflection		
				FWD	1.625					FWD	1.6875	
				AFT	1.625					AFT	1.875	
Loads				Corrected	Load Values	Loads				Corrected	Load Values	
1350 585				1400	635	1550 585				1600	635	
520 155				570	205	520 155				570	205	
Strains						Strains						
				-163	-0.000153					-176	-0.000176	
				490	0.00049					475	0.000475	
				103	0.000103					100	0.0001	
Nose	(Y4)	Lateral	-141	-0.000141	Material	Nose	(Y4)	Lateral	-163	-0.000163		
Wheel	(Y5)	45 Deg	-262	-0.000262	Poisson	Wheel	(Y5)	45 Deg	-261	-0.000261		
Tube	(Y6)	Long	742	0.000742	Youngs	Tube	(Y6)	Long	761	0.000761		
				-25	-0.000025					-35	-0.000035	
				189	0.000189					183	0.000183	
				-179	-0.000179					-175	-0.000175	
Cross-	(Y10)	Lateral	2326	0.002326	3.00E+07	Cross-	(Y10)	Lateral	2583	0.002583		
Tube	(R1)	45 Deg	-495	-0.00089991		Tube	(R1)	45 Deg	-560	-0.00101808		
Center	(R2)	Long	-430	-0.00070477	4130	Center	(R2)	Long	-495	-0.00081131		
				60	0.00013044	0.302					70	0.00015218
					0	3.00E+07						0
				270	0.00051435					275	0.00052388	
Right	(R1)	Lateral	45	0.000138465	4340	Right	(R1)	Lateral	45	0.00013847		
Cross	(R2)	45 Deg	-65	-0.00022412	0.3333	Cross	(R2)	45 Deg	-65	-0.00022412		
Tube	(R3)	Long	100	0.0004348	2.10E+07	Tube	(R3)	Long	100	0.0004348		
				-60	-0.00027906					-65	-0.00030232	
				-250	-0.0009615					-165	-0.00063459	
				370	0.00142302					415	0.00159609	
Principal				Strain	Stresses	Principal				Strain	Stresses	
				-0.0005667	-9.40E+03	MAT 3					-0.000569	-9.56E+03
				0.0005067	7.51E+03	ELE 112					0.0004932	7.17E+03
Nose	Lateral	-0.0004146	-1.80E+03	MAT 3	Nose	Lateral	-0.000427	-2.02E+03				
Wheel	45 Deg	0.0010156	2.07E+04	ELE 100	Wheel	45 Deg	0.001025	2.09E+04				
Tube	Long				Tube	Long						
				-0.000403	-1.13E+04	MAT 2					-0.000401	-1.13E+04
				0.000199	2.55E+03	ELE 105					0.0001914	2.32E+03
Cross-	Lateral	-0.0014746	-1.78E+04	MAT 2	Cross-	Lateral	-0.001665	-2.07E+04				
Tube	45 Deg	0.0030958	8.75E+04	ELE 74	Tube	45 Deg	0.0034364	9.68E+04				
Center	Long				Center	Long						
				0.0001304	3.91E+03	MAT 2					0.0001522	4.57E+03
				0.0005144	1.54E+04	ELE 81					0.0005239	1.57E+04
Right	Lateral	-0.0002452	6.58E+01	MAT 2	Right	Lateral	-0.000245	6.58E+01				
Cross	45 Deg	0.0008184	2.46E+04	ELE 66	Cross	45 Deg	0.0008184	2.46E+04				
Tube	Long				Tube	Long						
				-0.0011818	-1.50E+04	MAT 1					-0.000948	-8.05E+03
				0.0023258	6.51E+04	ELE 42					0.0022416	6.47E+04

3200 lbs Aft Right, Center of Gravity

Constants			Deflection		Constants			Deflection		
			FWD	1.75				FWD	1.875	
			AFT	2.0625				AFT	2.25	
Loads			Corrected	Load Values	Loads			Corrected	Load Values	
1750 585			1100	635	1945 585			1995	635	
520 155			170	205	520 155			570	205	
Strains					Strains					
			165	-0.000165				-152	-0.000152	
			507	0.000507				510	0.00051	
			97	0.000097				87	0.000087	
Nose (Y4)	Lateral		1192	0.001192	Material	Nose (Y4)	Lateral	1037	0.001037	
Wheel (Y5)	45 Deg		-265	-0.000265	Poisson	Wheel (Y5)	45 Deg	-261	-0.000261	
Tube (Y6)	Long		781	0.000781	Young's	Tube (Y6)	Long	781	0.000781	
			-34	-0.000034				-38	-0.000038	
			185	0.000185				187	0.000187	
			-181	-0.000181				-181	-0.000181	
Cross- (Y10)	Lateral		2802	0.002802	3.00E+07	Cross- (Y10)	Lateral	2973	0.002973	
Tube (R1)	45 Deg		-595	-0.00108171		Tube (R1)	45 Deg	-615	-0.0011807	
Center (R2)	Long		-550	-0.00090145	4130	Center (R2)	Long	-615	-0.00100799	
			75	0.00016305	0.302				80	0.00017392
				0	3.00E+07					0
			285	0.000542025					290	0.00055245
Right (R1)	Lateral		50	0.00015385	4340	Right (R1)	Lateral	55	0.00016924	
Cross (R2)	45 Deg		-60	-0.00020688	0.3333	Cross (R2)	45 Deg	-55	-0.00018964	
Tube (R3)	Long		100	0.0004340	2.10E+07	Tube (R3)	Long	100	0.0004348	
			-75	-0.000348825					-80	-0.00037208
			-205	-0.00078843					-200	-0.0007692
			465	0.00178839					490	0.00188454
Principal			Strain	Stresses	Principal			Strain	Stresses	
			-0.0005906	-9.84E+03	MAT 3				-0.000588	-9.77E+03
			0.0005226	7.70E+03	ELE 112				0.000523	7.73E+03
Nose	Lateral		-0.0002818	1.11E+04	MAT 3	Nose	Lateral	-0.000268	1.01E+04	
Wheel	45 Deg		0.0022548	5.10E+04	ELE 100	Wheel	45 Deg	0.002086	4.72E+04	
Tube	Long					Tube	Long			
			-0.0004091	-1.16E+04	MAT 2				-0.000414	-1.17E+04
			0.0001941	2.33E+03	ELE 105				0.0001955	2.32E+03
Cross- Tube	Lateral		-0.0017989	-2.25E+04	MAT 2	Cross- Tube	Lateral	-0.001911	-2.45E+04	
Center	45 Deg		0.0036994	1.04E+05	ELE 74	Center	45 Deg	0.0038764	1.09E+05	
			0.0001631	4.89E+03	MAT 2				0.0001739	5.22E+03
			0.0005429	1.63E+04	ELE 81				0.0005525	1.66E+04
Right	Lateral		-0.0002262	6.57E+02	MAT 2	Right	Lateral	-0.000207	1.25E+03	
Cross	45 Deg		0.0008148	2.46E+04	ELE 66	Cross	45 Deg	0.0008113	2.47E+04	
Tube	Long					Tube	Long			
			-0.0011286	-1.06E+04	MAT 1				-0.001141	-1.02E+04
			0.0025682	7.37E+04	ELE 42				0.0026536	7.64E+04

3200 lbs Aft Right, Center of Gravity

Constants			Deflection		Constants			Deflection		
			FWD	1 875				FWD	1 8125	
			AFT	2 375				AFT	2 25	
Loads			Corrected	Load Values	Loads			Corrected	Load Values	
			1700	635				1500	635	
			570	205				570	205	
Strains					Strains					
			-173	-0 000173				-138	-0 000138	
			512	0 000512				528	0 000528	
			90	0 000090				88	0 000088	
Nose	(Y4)	Lateral	939	0 000939	Material	Nose	(Y4)	Lateral	898	0 000898
Wheel	(Y5)	45 Deg	-266	-0 000266	Poisson	Wheel	(Y5)	45 Deg	-250	-0 00025
Tube	(Y6)	Long	804	0 000804	Young's	Tube	(Y6)	Long	815	0 000815
			-43	-0 000043				-47	-0 000047	
			191	0 000191	6150				188	0 000188
			-183	-0 000183	0 315				-184	-0 000184
Cross-	(Y10)	Lateral	2924	0 002924	3 00E+07	Cross-	(Y10)	Lateral	2670	0 00267
Tube	(R1)	45 Deg	-605	-0 00109989		Tube	(R1)	45 Deg	-590	0 00107262
Center	(R2)	Long	-605	-0 000991595	4130	Center	(R2)	Long	-595	0 00097521
			80	0 00017392	0 302				80	0 00017392
				0	3 00E+07					0
			290	0 0005245				285	0 00054293	
Right	(R1)	Lateral	50	0 00015385	4340	Right	(R1)	Lateral	50	0 00015385
Cross	(R2)	45 Deg	-60	-0 00020688	0 3333	Cross	(R2)	45 Deg	60	0 00020688
Tube	(R3)	Long	100	0 0004348	2 10E+07	Tube	(R3)	Long	100	0 0004348
			-80	-0 00037208				-70	-0 00032557	
			-190	-0 00073074				-175	0 00067305	
			480	0 00184608				440	0 00169224	
Principal			Strain	Stresses	Principal			Strain	Stresses	
			-0 0006104	-1 03E+03 MAT 3				-0 000589	-9 68E+03	
			0 0005274	7 65E+03 ELE 112				0 0005394	8 10E+03	
Nose	Lateral		-0 000268	9 50E+03 MAT 3	Nose	Lateral		-0 000251	9 54E+03	
Wheel	45 Deg		0 002011	4 54E+04 ELE 100	Wheel	45 Deg		0 0019638	4 44E+04	
Tube	Long		-0 000425	-1 20E+04 MAT 2	Tube	Long		-0 000427	-1 21E+04	
			0 000199	2 33E+03 ELE 105				0 0001956	2 20E+03	
Cross-	Lateral		-0 0018801	-2 41E+04 MAT 2	Cross-	Lateral		-0 001841	-2 35E+04	
Tube	45 Deg		0 0038126	1 07E+05 ELE 74	Tube	45 Deg		0 0037361	1 05E+05	
Center	Long		0 0001739	5 22E+03 MAT 2	Center	Long		0 0001739	5 22E+03	
			0 0005525	1 66E+04 ELE 81				0 0005429	1 63E+04	
Right	Lateral		-0 0002262	6 57E+03 MAT 2	Right	Lateral		-0 000226	6 57E+03	
Cross	45 Deg		0 0008148	2 46E+04 ELE 66	Cross	45 Deg		0 0008148	2 46E+04	
Tube	Long		-0 0011027	-9 69E+03 MAT 1	Tube	Long		-0 001007	-8 64E+03	
			0 0025767	7 42E+04 ELE 42				0 0023738	6 85E+04	

3200 lbs Aft Right, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	2.8125			FWD	1.75
		AFT	2.0625			AFT	1.9375
Loads		Corrected	Load Values	Loads		Corrected	Load Values
1250	585	1300	635	1050	585	1100	635
520	155	570	205	520	155	570	205
Strains				Strains			
		-15	0.000152			-144	0.000144
		511	0.000541			566	0.000566
		5	0.000096			111	0.000111
Nose (Y4)	Lateral	957	0.000957	Nose (Y4)	Lateral	838	0.000838
Wheel (Y5)	45 Deg	79	0.000279	Wheel (Y5)	45 Deg	294	0.000294
Tube (Y6)	Long	310	0.00084	Tube (Y6)	Long	859	0.000859
		-45	0.000045			-45	0.000045
		200	0.0002			209	0.000209
		-189	0.000189			-191	0.000191
Cross- (Y10)	Lateral	2710	0.00271	Cross- (Y10)	Lateral	2439	0.002439
Tube (R1)	45 Deg	-545	0.0009001	Tube (R1)	45 Deg	-485	0.00088173
Center (R2)	Long	-560	0.00091784	Center (R2)	Long	-515	0.00084409
		75	0.00016305			65	0.00014131
		280	0.0005334			270	0.00051435
Right (R1)	Lateral	50	0.0001539	Right (R1)	Lateral	40	0.00012308
Cross (R2)	45 Deg	-60	0.00020688	Cross (R2)	45 Deg	-60	0.00020688
Tube (R3)	Long	100	0.0004348	Tube (R3)	Long	95	0.00041305
		-65	0.000302315			-30	0.00027905
		-170	0.0005382			-150	0.0005759
		420	0.00161532			370	0.00142302
Principal				Principal			
		Strain	Stresses			Strain	Stresses
		-0.0005164	-1.01E+03 MAT 3			-0.000513	-9.91E+03
		0.0005544	6.25E+03 ELE 112			0.0005198	8.87E+03
Nose	Lateral	-0.0002805	9.73E+03 MAT 3	Nose	Lateral	-0.000294	8.73E+03
Wheel	45 Deg	0.0020775	4.69E+04 ELE 100	Wheel	45 Deg	0.001991	4.47E+04
Tube	Long	-0.0004421	1.25E+04 MAT 2	Tube	Long	-0.000453	1.28E+04
		0.0002061	2.46E+03 ELE 105			0.000217	2.65E+03
Cross	Lateral	-0.0017213	2.18E+04 MAT 2	Cross	Lateral	-0.001551	1.95E+04
Tube	45 Deg	0.0035135	9.88E+04 ELE 74	Tube	45 Deg	0.0031457	8.84E+04
Center	Long	0.0001631	4.89E+03 MAT 2	Center	Long	0.0001413	4.24E+03
		0.0005334	1.60E+04 ELE 81			0.0005144	1.54E+04
Right	Lateral	-0.0002262	6.57E+03 MAT 2	Right	Lateral	-0.000229	7.95E+03
Cross	45 Deg	0.0008148	2.44E+04 ELE 66	Cross	45 Deg	0.0007647	2.30E+04
Tube	Long	-0.0005672	8.29E+03 MAT 1	Tube	Long	-0.000558	7.57E+03
		0.0027862	6.58E+04 ELE 42			0.0020017	5.77E+04

3200 lbs Aft Right, Center of Gravity

Constants			Deflection			Constants			Deflection		
			FWD	1.75					FWD	1.6875	
			AFT	1.625					AFT	1.5	
Loads			Corrected	Load Values		Loads			Corrected	Load Values	
	850	585	700	635			650	585	700	635	
	520	155	570	205			520	155	570	205	
Strains						Strains					
			143	-0.000143					-147	-0.000147	
			589	0.000589					619	0.000619	
			123	0.000123					136	0.000136	
Nose	(Y4)	Lateral	89	0.000789	Material	Nose	(Y4)	Lateral	673	0.000673	
Wheel	(Y5)	45 Deg	316	-0.000316	Poisson	Wheel	(Y5)	45 Deg	-350	-0.00035	
Tube	(Y6)	Long	878	0.000878	Young's	Tube	(Y6)	Long	910	0.00091	
			-47	-0.000047					-57	-0.000057	
			220	0.00022	6150				238	0.000238	
			-194	-0.000194	0.315				-196	-0.000196	
Cross-	(Y10)	Lateral	2167	0.002167	3.00E+07	Cross-	(Y10)	Lateral	1869	0.001869	
Tube	(R1)	45 Deg	-415	-0.00075447		Tube	(R1)	45 Deg	-345	0.00062721	
Center	(R2)	Long	-460	-0.00075394	4130	Center	(R2)	Long	-400	-0.0006556	
			55	0.00011957	0.302				45	0.00009783	
				0	3.00E+07					0.000045	
			250	0.00047625					235	0.00044768	
Right	(R1)	Lateral	40	0.00012308	4340	Right	(R1)	Lateral	35	0.0001077	
Cross	(R2)	45 Deg	-60	-0.00020688	0.3332	Cross	(R2)	45 Deg	-60	-0.00020688	
Tube	(R3)	Long	95	0.00041306	2.10E+07	Tube	(R3)	Long	90	0.00039132	
			-45	-0.000209295					-40	-0.00018604	
			-130	-0.00049998					-105	-0.00040383	
			210	0.00080766					260	0.00099996	
Principal			Strain	Stresses		Principal			Strain	Stresses	
			-0.0006236	-9.98E+03	MAT 3				-0.000646	-1.03E+04	
			0.0006036	9.35E+03	ELE 112				0.0006348	9.91E+03	
Nose	Lateral		-0.0003169	8.14E+03	MAT 3	Nose	Lateral		-0.000356	6.86E+03	
Wheel	45 Deg		0.0019839	4.44E+04	ELE 100	Wheel	45 Deg		0.0019391	4.30E+04	
Tube	Long					Tube	Long				
			-0.0004688	-1.32E+04	MAT 2				-0.000498	-1.40E+04	
			0.0002278	2.85E+03	ELE 105				0.0002446	3.11E+03	
Cross-	Lateral		-0.0013593	-1.72E+04	MAT 2	Cross-	Lateral		-0.001159	-1.46E+04	
Tube	45 Deg		0.0027723	7.80E+04	ELE 74	Tube	45 Deg		0.0023719	6.67E+04	
Center	Long					Center	Long				
			0.0001196	3.59E+03	MAT 2				9.783E-05	2.93E+03	
			0.0004763	1.43E+04	ELE 81				0.0004477	1.34E+04	
Right	Lateral		-0.0002285	7.95E+01	MAT 2	Right	Lateral		-0.000228	-2.88E+02	
Cross	45 Deg		0.0007647	2.30E+04	ELE 66	Cross	45 Deg		0.0007274	2.17E+04	
Tube	Long					Tube	Long				
			-0.000648	-8.51E+03	MAT 1				-0.000598	-5.09E+03	
			0.0012464	3.47E+04	ELE 42				0.0014115	4.07E+04	

3200 lbs At Right, Center of Gravity

Constants			Deflection		Constants			Deflection		
			FWD	1.5				FWD	1.0625	
			AFT	1.0625				AFT	0.75	
Loads			Corrected	Load Values	Loads			Corrected	Load Values	
	450	450	500	500		250	250	300	300	
	450	155	500	205		250	155	300	205	
Strains					Strains					
			-143	-0.000143				-65	-0.000065	
			559	0.000559				400	0.0004	
			124	0.000124				108	0.000108	
Nose	(Y4)	Lateral	665	0.000665	Material	Nose	(Y4)	Lateral	250	
Wheel	(Y5)	45 Deg	-315	-0.000315	Poisson	Wheel	(Y5)	45 Deg	-213	
Tube	(Y6)	Long	870	0.000870	Young's	Tube	(Y6)	Long	648	
			-59	-0.000059				-50	-0.00005	
			223	0.000223				172	0.000172	
			-182	-0.000182				-132	-0.000132	
Cross-	(Y10)	Lateral	1419	0.001419	3.00E+07	Cross-	(Y10)	Lateral	903	
Tube	(R1)	45 Deg	-260	-0.000260	0.315	Tube	(R1)	45 Deg	-150	
Center	(R2)	Long	-310	-0.000310	4130	Center	(R2)	Long	-205	
			25	0.000025	0.302				15	
			195	0.000195	3.00E+07				120	
Right	(R1)	Lateral	20	0.000020	4340	Right	(R1)	Lateral	15	
Cross	(R2)	45 Deg	-50	-0.000050	0.3333	Cross	(R2)	45 Deg	-35	
Tube	(R3)	Long	80	0.000080	2.10E+07	Tube	(R3)	Long	60	
			-25	-0.000025				-10	-0.00001	
			-80	-0.000080				-50	-0.00005	
			195	0.000195				120	0.00012	
Principal			Strain	Stresses	Principal			Strain	Stresses	
			-0.0005935	-9.50E+03	MAT 3				-0.000367	-5.44E+03
			0.0005745	8.90E+03	ELE 112				0.0004098	6.79E+03
Nose	Lateral		-0.0003198	-7.05E+03	MAT 3	Nose	Lateral		-0.000241	-3.36E+03
Wheel	45 Deg		0.0018548	4.13E+04	ELE 100	Wheel	45 Deg		0.0011486	2.52E+04
Tube	Long		-0.0004695	-1.32E+04	MAT 2	Tube	Long		-0.000357	-1.00E+04
			0.0002285	2.86E+03	ELE 105				0.0001752	2.22E+03
Cross-	Lateral		-0.0008824	-1.13E+04	MAT 2	Cross-	Lateral		-0.000549	-7.00E+03
Tube	45 Deg		0.0017933	5.04E+04	ELE 74	Tube	45 Deg		0.0011161	3.14E+04
Center	Long		5.435E-05	1.63E+03	MAT 2	Center	Long		3.261E-05	9.78E+02
			0.0003715	1.11E+04	ELE 81				0.0002286	6.95E+03
Right	Lateral		-0.0001987	-4.95E+02	MAT 2	Right	Lateral		-0.000141	-1.87E+02
Cross	45 Deg		0.000608	1.81E+04	ELE 68	Cross	45 Deg		0.000448	1.34E+04
Tube	Long		-0.0004432	-3.46E+03	MAT 1	Tube	Long		-0.000266	-1.72E+03
			0.0010769	3.12E+04	ELE 42				0.0006812	1.99E+04

3200 lbs Aft Right, Center of Gravity

Constants			Deflection			Load Values			Constants			Deflection			Load Values		
			FWD		1.25							FWD					
			AFT		0.938							AFT					
Loads			Corrected									Corrected					
	0	0	50		50							50					
	0	0	50		50							50					
Strains																	

Constants			Deflection		Load Values		Constants			Deflection		Load Values	
			FWD	0.9375						FWD	1.3125		
			AFT	0.25						AFT	0.75		
Loads			Corrected				Loads			Corrected			
350	350		100	400			485	750		535	800		
130	350		180	400			130	545		180	595		
Strains							Strains						
			-23	-0.000323						20	0.00002		
			412	0.000412						652	0.000652		
			68	0.00058						72	0.000072		
Nose	(Y4)	Lateral	166	0.000166	Material		Nose	(Y4)	Lateral	45	0.000045		
Wheel	(Y5)	45 Deg	124	-0.000124	Poisson		Wheel	(Y5)	45 Deg	79	-0.000079		
Tube	(Y6)	Long	611	0.000611	Young's		Tube	(Y6)	Long	797	0.000797		
			-44	-0.000044						-58	-0.000058		
			-152	0.000152	6150					-186	0.000186		
			-131	-0.000131	0.315					-179	-0.000179		
Cross-	(Y10)	Lateral	860	0.00086	3.00E+07		Cross-	(Y10)	Lateral	1536	0.001536		
Tube	(R1)	45 Deg	210	-0.00038178			Tube	(R1)	45 Deg	320	-0.00058176		
Center	(R2)	Long	-210	-0.00034419	4130		Center	(R2)	Long	-250	-0.00040975		
			30	0.00006522	0.302					50	0.0001087		
			170	0.00032365	3.00E+07					235	0.00044758		
Right	(R1)	Lateral	5	0.000015385	4340		Right	(R1)	Lateral	15	4.6155E-05		
Cross	(R2)	45 Deg	35	-0.00012058	0.3333		Cross	(R2)	45 Deg	45	-0.00015516		
Tube	(R3)	Long	60	0.00026088	2.10E+07		Tube	(R3)	Long	80	0.00034784		
			-15	-0.000069765						-20	-0.00009302		
			40	-0.00015384						70	-0.00026922		
			105	0.00040383						170	0.00065382		
Principal			Strain	Stresses	MAT 3		Principal			Strain	Stresses	MAT 3	
			-0.0003696	-5.47E+03	ELE 112					-0.000561	-8.10E+03		
			0.0004146	6.89E+03						0.0006526	1.10E+04		
Nose	Lateral		-0.0001702	3.44E+03	MAT 3		Nose	Lateral		-0.000205	3.41E+03		
Wheel	45 Deg		0.0009472	2.10E+04	ELE 100		Wheel	45 Deg		0.0010466	2.31E+04		
Tube	Long		-0.0003309	-9.37E+03	MAT 2		Tube	Long		-0.000429	-1.22E+04		
			0.0001559	1.85E+03	ELE 105					0.000192	2.06E+03		
Cross-	Lateral		-0.0006206	-9.16E+03	MAT 2		Cross-	Lateral		-0.000939	-1.04E+04		
Tube	45 Deg		0.0011364	3.13E+04	ELE 74		Tube	45 Deg		0.0020655	5.88E+04		
Center	Long		6.522E-05	1.96E+03	MAT 2		Center	Long		0.0001087	3.26E+03		
			0.0003239	9.72E+03	ELE 81					0.0004477	1.34E+04		
Right	Lateral		-0.0001483	-6.63E+02	MAT 2		Right	Lateral		-0.000185	-3.60E+02		
Cross	45 Deg		0.0004246	1.25E+04	ELE 66		Cross	45 Deg		0.0005801	1.73E+04		
Tube	Long		-0.0002318	-1.78E+03	MAT 1		Tube	Long		-0.000384	-2.88E+03		
			0.0005658	1.64E+04	ELE 42					0.0009449	2.74E+04		

3200 lbs Aft Left, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	1.375			FWD	1.5
		AFT	1.0625			AFT	1.3125
Loads		Corrected	Load Values	Loads		Corrected	Load Values
485	1150	535	1200	485	1550	535	1600
130	545	180	595	130	545	180	595
Strains				Strains			
		38	0.000038			43	0.000043
		618	0.000618			641	0.000641
		46	0.000046			59	0.000059
Nose (Y4)	Lateral	114	0.000114	Nose (Y4)	Lateral	-105	-0.000105
Wheel (Y5)	45 Deg	47	0.000047	Wheel (Y5)	45 Deg	50	0.000050
Tube (Y6)	Long	749	0.000749	Tube (Y6)	Long	785	0.000785
		-47	-0.000047			-60	-0.000060
		-167	-0.000167			-176	-0.000176
		-175	-0.000175			-175	-0.000175
Cross- (Y10)	Lateral	1985	0.001985	Cross- (Y10)	Lateral	2372	0.002372
Tube (R1)	45 Deg	405	-0.00073629	Tube (R1)	45 Deg	470	-0.00085446
Center (R2)	Long	-340	-0.00055726	Center (R2)	Long	-420	-0.00068838
		65	0.00014131			80	0.00017392
			0				0
		265	0.000504825			275	0.00052388
Right (R1)	Lateral	25	0.000076925	Right (R1)	Lateral	30	0.00009231
Cross (R2)	45 Deg	50	-0.0001724	Cross (R2)	45 Deg	45	-0.00015516
Tube (R3)	Long	85	0.00036958	Tube (R3)	Long	85	0.00036958
		-25	-0.000116275			-30	-0.00013953
		80	-0.00030768			95	-0.00036537
		205	0.00078943			240	0.00092304
Principal				Principal			
		Strain	Stresses			Strain	Stresses
		-0.000534	-7.75E+03			-0.000539	-7.69E+03
		0.000618	1.04E+04			0.000641	1.09E+04
Nose	Lateral	-0.0001428	4.55E+03	Nose	Lateral	-0.000252	1.39E+03
Wheel	45 Deg	0.0010658	2.26E+04	Wheel	45 Deg	0.0009317	2.00E+04
Tube	Long			Tube	Long		
		-0.0003963	-1.13E+04			-0.000417	-1.19E+04
		0.0001743	1.80E+03			0.0001816	1.84E+03
Cross- Tube	Lateral	-0.0012145	-1.38E+04	Cross- Tube	Lateral	-0.001443	-1.65E+04
Center	45 Deg	0.0026423	7.51E+04	Center	45 Deg	0.0031263	8.86E+04
		0.0001413	4.24E+03			0.0001739	5.22E+03
		0.0005048	1.51E+04			0.0005239	1.57E+04
Right	Lateral	-0.0001986	-1.25E+02	Right	Lateral	-0.000179	4.73E+02
Cross	45 Deg	0.0006451	1.93E+04	Cross	45 Deg	0.0006412	1.94E+04
Tube	Long			Tube	Long		
		-0.0004507	-3.23E+03			-0.000533	-3.94E+03
		0.0011229	3.27E+04			0.0013167	3.83E+04

3200 lbs Aft Left, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	1 6875			FWD	1 75
		AFT	1 625			AFT	1 8125
Loads		Corrected	Load Values	Loads		Corrected	Load Values
485	1950	5	2000	485	2040	535	2090
130	545	180	595	130	545	180	595
Strains				Strains			
		77	0 000077			91	0 000091
		688	0 000688			682	0 000682
		49	0 000049			46	0 000046
Nose (Y4)	Lateral	76	0 000076	Nose (Y4)	Lateral	70	0 000070
Wheel (Y5)	45 Deg	33	-0 000033	Wheel (Y5)	45 Deg	16	-0 000016
Tube (Y6)	Long	820	0 000820	Tube (Y6)	Long	799	0 000799
		-63	-0 000063			-63	-0 000063
		-178	0 000178			-173	0 000173
		-184	-0 000184			-182	-0 000182
Cross- (Y10)	Lateral	2816	0 002816	Cross- (Y10)	Lateral	2967	0 002967
Tube (R1)	45 Deg	550	-0 000550	Tube (R1)	45 Deg	570	0 000570
Center (R2)	Long	-520	-0 000520	Center (R2)	Long	-560	-0 000560
		100	0 000100			105	0 000105
		290	0 000290			290	0 000290
Right (R1)	Lateral	50	0 000050	Right (R1)	Lateral	40	0 000040
Cross (R2)	45 Deg	45	-0 000045	Cross (R2)	45 Deg	45	-0 000045
Tube (R3)	Long	90	0 000090	Tube (R3)	Long	90	0 000090
		-40	-0 000040			-40	-0 000040
		110	-0 000110			120	-0 000120
		275	0 000275			290	0 000290
Principal				Principal			
		Strain	Stresses			Strain	Stresses
		-0 0005622	-7 86E+03			-0 000545	-7 51E+03
		0 0006882	1 18E+04			0 0006824	1 18E+04
Nose	Lateral	-0 0001601	4 53E+03	Nose	Lateral	-0 000145	4 56E+03
Wheel	45 Deg	0 00010561	2 37E+04	Wheel	45 Deg	0 0001014	2 28E+04
Tube	Long	-0 000431	-1 24E+04	Tube	Long	-0 000424	-1 22E+04
		0 000184	1 78E+03			0 0001789	1 68E+03
Cross- Tube	Lateral	0 00017184	-2 00E+04	Cross- Tube	Lateral	-0 0001607	-2 12E+04
Center	45 Deg	0 0003821	1 04E+05	Center	45 Deg	0 00038566	1 09E+05
		0 0002174	6 52E+03			0 0002283	6 85E+03
		0 0005525	1 66E+04			0 0005525	1 66E+04
Right	Lateral	-0 0001713	1 49E+03	Right	Lateral	-0 000176	1 06E+03
Cross	45 Deg	0 0007165	2 19E+04	Cross	45 Deg	0 0006908	2 10E+04
Tube	Long	-0 0006245	-5 10E+03	Tube	Long	-0 000667	-5 47E+03
		0 00014962	4 33E+04			0 00015955	4 62E+04

3200 lbs Aft Left, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	1.625			FWD	1.625
		AFT	1.75			AFT	1.5625
Loads		Corrected	Load Values	Loads		Corrected	Load Values
485	1750	535	1800	485	1350	535	1400
130	545	180	595	130	545	180	595
Strains				Strains			
		83	0.000063			92	0.000092
		665	0.000665			703	0.000703
		40	0.00004			79	0.000079
Nose (Y4)	Lateral	42	0.000042	Nose (Y4)	Lateral	-107	-0.000107
Wheel (Y5)	45 Deg	54	-0.000054	Wheel (Y5)	45 Deg	100	-0.0001
Tube (Y6)	Long	819	0.000819	Tube (Y6)	Long	869	0.000869
		-60	-0.00006			-58	-0.000058
		-175	0.000175			-189	0.000189
		-180	-0.00018			-188	-0.000188
Cross- (Y10)	Lateral	2888	0.002888	Cross- (Y10)	Lateral	2573	0.002573
Tube (R1)	45 Deg	580	-0.00105444	Tube (R1)	45 Deg	490	-0.00089082
Center (R2)	Long	-540	-0.00088506	Center (R2)	Long	-480	-0.00078672
		100	0.0002174			85	0.00018473
		0	0			0	0
		290	0.00055245			280	0.0005334
Right (R1)	Lateral	40	0.00012308	Right (R1)	Lateral	35	0.0001077
Cross (R2)	45 Deg	45	-0.00015516	Cross (R2)	45 Deg	50	-0.0001724
Tube (R3)	Long	90	0.00039132	Tube (R3)	Long	90	0.00039132
		-45	-0.000209295			-40	-0.00018604
		115	-0.00044229			115	0.00044229
		295	0.00113457			275	0.00105765
Principal		Strain	Stresses	Principal		Strain	Stresses
		-0.0005424	-7.57E+03			-0.000532	-7.03E+03
		0.0006654	1.14E+04			0.000703	1.24E+04
Nose	Lateral	-0.0001905	3.78E+03	Nose	Lateral	-0.000304	1.21E+03
Wheel	45 Deg	0.0010515	2.33E+04	Wheel	45 Deg	0.0010662	2.28E+04
Tube	Long	-0.000421	-1.21E+04	Tube	Long	-0.000442	-1.26E+04
		0.000181	1.78E+03			0.0001957	2.06E+03
Cross- Tube	Lateral	-0.0017888	-2.12E+04	Cross- Tube	Lateral	-0.001557	-1.81E+04
Center	45 Deg	0.0037918	1.07E+05	Center	45 Deg	0.0033435	9.48E+04
		0.0002174	6.52E+03			0.0001848	5.54E+03
		0.0005525	1.96E+04			0.0005334	1.60E+04
Right	Lateral	-0.0001764	1.05E+03	Right	Lateral	-0.000195	4.68E+02
Cross	45 Deg	0.0006908	2.10E+04	Cross	45 Deg	0.0006946	2.10E+04
Tube	Long	-0.0006645	-5.45E+03	Tube	Long	-0.00064	-5.46E+03
		0.0015898	4.60E+04			0.0015118	4.36E+04

3200 lbs Aft Left, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	1 5625			FWD	1 5
		AFT	1 125			AFT	0 875
Loads		Corrected	Load Values	Loads		Corrected	Load Values
485	950	535	1000	485	550	535	600
130	545	180	595	130	545	180	595
Strains				Strains			
		70	0 00007			25	0 000025
		751	0 000751			744	0 000744
		120	0 00012			111	0 000111
Nose	(Y4) Lateral	165	0 000165	Nose	(Y4) Lateral	-131	-0 000131
Wheel	(Y5) 45 Deg	156	-0 000156	Wheel	(Y5) 45 Deg	171	-0 000171
Tube	(Y6) Long	933	0 000933	Tube	(Y6) Long	959	0 000959
		-63	-0 000063			-68	-0 000068
		-218	0 000218			-222	0 000222
		-200	-0 0002			-201	-0 000201
Cross-	(Y10) Lateral	2055	0 002055	Cross-	(Y10) Lateral	1592	0 001592
Tube	(R1) 45 Deg	385	-0 00069993	Tube	(R1) 45 Deg	310	-0 00056358
Center	(R2) Long	-380	-0 00062282	Center	(R2) Long	-290	-0 00047531
		65	0 00014131			50	0 0001087
		255	0 000405775			225	0 00042863
Right	(R1) Lateral	30	0 00009231	Right	(R1) Lateral	20	0 00006154
Cross	(R2) 45 Deg	55	-0 00018964	Cross	(R2) 45 Deg	50	-0 0001724
Tube	(R3) Long	90	0 00039132	Tube	(R3) Long	80	0 00034784
		-30	-0 00013953			-25	-0 00011628
		95	-0 00036537			75	-0 00028845
		230	0 00088458			195	0 00074997
Principal		Strain	Stresses	Principal		Strain	Stresses
		-0 0005615	-7 35E+03			-0 000609	-8 53E+03
		0 0007515	1 33E+04			0 0007454	1 28E+04
Nose	Lateral	-0 0002538	4 65E+03	Nose	Lateral	-0 000386	4 47E+02
Wheel	45 Deg	0 0013518	2 99E+04	Wheel	45 Deg	0 0012135	2 56E+04
Tube	Long	-0 0004876	-1 39E+04	Tube	Long	-0 000497	-1 41E+04
		0 0002246	2 55E+03			0 0002281	2 58E+03
Cross-	Lateral	-0 0012327	-1 41E+04	Cross-	Lateral	-0 000967	-1 12E+04
Tube	45 Deg	0 0026649	7 57E+04	Tube	45 Deg	0 0020838	5 91E+04
Center	Long	0 0001413	4 24E+03	Center	Long	0 0001087	3 26E+03
		0 0004858	1 46E+04			0 0004286	1 29E+04
Right	Lateral	-0 0002148	-1 28E+02	Right	Lateral	-0 000199	-4 95E+02
Cross	45 Deg	0 0006984	2 09E+04	Cross	45 Deg	0 000608	1 81E+04
Tube	Long	0 0005256	-4 18E+03	Tube	Long	-0 000427	-3 10E+03
		0 0012707	3 68E+04			0 0010611	3 09E+04

3200 lbs Aft Left, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	0.5625			FWD	0.0625
		AFT	0.0625			AFT	0
Loads		Corrected	Load Values	Loads		Corrected	Load Values
150	150	2.0	200	0	0	50	50
150	150	2.0	200	0	0	50	50
Strains				Strains			
		-3	-0.000003			19	0.000019
		264	0.000264			8	0.000008
		64	0.000064			13	0.000013
Nose (Y4)	Lateral	-274	-0.000274	Nose (Y4)	Lateral	0	0
Wheel (Y5)	45 Deg	105	-0.000105	Wheel (Y5)	45 Deg	5	-0.000005
Tube (Y6)	Long	456	0.000456	Tube (Y6)	Long	59	0.000059
		-30	-0.000030			-4	-0.000004
		-121	0.000121			-22	0.000022
		-95	-0.000095			-15	-0.000015
Cross- (Y10)	Lateral	480	0.000480	Cross- (Y10)	Lateral	-15	-0.000015
Tube (R1)	45 Deg	125	-0.00022725	Tube (R1)	45 Deg	0	0
Center (R2)	Long	-70	-0.00011473	Center (R2)	Long	0	0
		10	0.00002174			0	0
		100	0.0001905			0	0
Right (R1)	Lateral	5	0.000015385	Right (R1)	Lateral	0	0
Cross (R2)	45 Deg	20	-0.00006896	Cross (R2)	45 Deg	0	0
Tube (R3)	Long	35	0.00015218	Tube (R3)	Long	0	0
		0	0			0	0
		30	-0.00011538			0	0
		70	0.00026922			0	0
Principal		Strain	Stresses	Principal		Strain	Stresses
		-0.0002054	-2.75E+03 MAT 3			7.45E-06	3.69E+02
		0.0002664	4.68E+03 ELE 112			2.454E-05	6.39E+02
Nose	Lateral	-0.0003233	-3.65E+03 MAT 3	Nose	Lateral	-1.59E-05	2.14E+02
Wheel	45 Deg	0.0005053	9.39E+03 ELE 100	Wheel	45 Deg	7.489E-05	1.64E+03
Tube	Long	-0.0002489	-6.98E+03 MAT 2	Tube	Long	-4.15E-05	-1.15E+03
		0.0001239	1.61E+03 ELE 105			2.248E-05	3.28E+02
Cross- Tube	Lateral	-0.0003238	-3.82E+03 MAT 2	Cross- Tube	Lateral	-1.81E-05	-5.67E+02
Center	45 Deg	0.000689	1.95E+04 ELE 74	Center	45 Deg	3.107E-06	-7.80E+01
		2.174E-05	6.52E+02 MAT 2			0	0.00E+00
		0.0001905	5.72E+03 ELE 81			0	0.00E+00
Right	Lateral	-8.357E-05	-2.55E+02 MAT 2	Right	Lateral	0	0.00E+00
Cross	45 Deg	0.0002511	7.46E+03 ELE 68	Cross	45 Deg	0	0.00E+00
Tube	Long	-0.0001493	-5.82E+02 MAT 1	Tube	Long	0	0.00E+00
		0.0004185	1.24E+04 ELE 42			0	0.00E+00

3200 lbs Aft Left, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	1.25			FWD	2.25
		AFT	0.6875			AFT	1.4375
Loads		Corrected	Load Values	Loads		Corrected	Load Values
350	350	400	400	750	750	800	800
350	350	400	400	560	560	610	610
Strains				Strains			
		-15.6	-0.000154			-209	-0.000209
		56.2	0.000562			1022	0.001022
		82	0.00082			120	0.00012
Nose (Y4)	Lateral	-372	-0.000372	Nose (Y4)	Lateral	-570	-0.00057
Wheel (Y5)	45 Deg	191	0.000191	Wheel (Y5)	45 Deg	318	0.000318
Tube (Y6)	Long	770	0.00077	Tube (Y6)	Long	1302	0.001302
		-50	-0.00005			-99	-0.000099
		19.2	0.000192			-304	0.000304
		173	0.000173			-284	-0.000284
Cross- (Y10)	Lateral	9.5	0.000955	Cross- (Y10)	Lateral	1975	0.001975
Tube (R1)	45 Deg	205	-0.00037269	Tube (R1)	45 Deg	400	-0.0007277
Center (R2)	Long	-160	-0.00026224	Center (R2)	Long	-360	-0.00059004
		225	0.00048915			55	0.00011957
			0				0
		170	0.00032305			260	0.0004953
Right (R1)	Lateral	5	0.000015385	Right (R1)	Lateral	20	0.00006154
Cross (R2)	45 Deg	40	-0.00013792	Cross (R2)	45 Deg	55	-0.00018964
Tube (R3)	Long	60	0.00026088	Tube (R3)	Long	80	0.00034784
		-20	-0.00009302			-45	-0.0002093
		40	0.00015384			90	0.00034614
		110	0.00042306			235	0.00090381
Principal	Strain		Stresses	Principal	Strain		Stresses
		-0.0006455	-1.07E+04			-0.001124	-1.84E+04
		0.0005735	8.47E+03			0.0010346	1.56E+04
Nose	Lateral	-0.0004925	-4.62E+03	Nose	Lateral	-0.000793	-6.73E+03
Wheel	45 Deg	0.0008905	1.72E+04	Wheel	45 Deg	0.0015253	2.98E+04
Tube	Long			Tube	Long		
		-0.0002154	-3.74E+03			-0.000696	-1.98E+04
		0.0003384	9.02E+03			0.0003126	3.38E+03
Cross- Tube	Lateral	-0.0005957	-6.82E+03	Cross- Tube	Lateral	-0.001221	-1.43E+04
Center	45 Deg	0.0012884	3.66E+04	Center	45 Deg	0.0026057	7.38E+04
	Long				Long		
		0.0004892	1.47E+04			0.0011196	3.59E+03
		0.0003239	9.72E+03			0.0004953	1.49E+04
Right	Lateral	-0.000164	-1.02E+03	Right	Lateral	-0.000215	-8.69E+02
Cross	45 Deg	0.0004402	1.29E+04	Cross	45 Deg	0.0006242	1.85E+04
Tube	Long			Tube	Long		
		-0.0002452	-2.13E+03			0.000542	-5.08E+03
		0.0005752	1.66E+04			0.0012364	3.55E+04

3200 lbs Centerline, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	2 5			FWD	2 4375
		AFT	1 9375			AFT	1 875
Loads		Corrected	Load Values	Loads		Corrected	Load Values
1040	1040	1090	1050	950	950	1000	1000
560	560	610	610	560	560	610	610
Strains				Strains			
		-226	-0 000226			-214	-0 000214
		1123	0 001123			1091	0 001091
		150	0 00015			143	0 000143
Nose	(Y4) Lateral	-370	-0 00037	Nose	(Y4) Lateral	-171	-0 000171
Wheel	(Y5) 45 Deg	360	-0 00036	Wheel	(Y5) 45 Deg	360	0 00036
Tube	(Y6) Long	1430	0 00143	Tube	(Y6) Long	1415	0 001415
		-117	-0 000117			-115	-0 000115
		-319	0 000319			-312	0 000312
		-302	-0 000302			-296	0 000296
Cross-	(Y10) Lateral	2623	0 002623	Cross-	(Y10) Lateral	2582	0 002582
Tube	(R1) 45 Deg	545	-0 00099081	Tube	(R1) 45 Deg	520	-0 00094536
Center	(R2) Long	-495	0 000811305	Center	(R2) Long	-480	0 00078672
		75	0 00016305			70	0 00015218
		280	0 0005334			280	0 0005334
Right	(R1) Lateral	40	0 00012302	Right	(R1) Lateral	30	0 00009231
Cross	(R2) 45 Deg	50	-0 0001724	Cross	(R2) 45 Deg	50	-0 0001724
Tube	(R3) Long	90	0 00039132	Tube	(R3) Long	90	0 00039132
		-80	-0 00037208			-65	-0 00030232
		130	-0 00049998			130	-0 00049998
		350	0 0013461			340	0 00130764
Principal		Strain	Stresses	Principal		Strain	Stresses
		-0 0012141	-1 97E+04 MAT 3			-0 001176	-1 91E+04
		0 0011381	1 73E+04 ELE 112			0 0011051	1 68E+04
Nose	Lateral	-0 0007357	-3 24E+03 MAT 3	Nose	Lateral	-0 00064	-2 88E+02
Wheel	45 Deg	0 0017957	3 66E+04 ELE 100	Wheel	45 Deg	0 0018842	3 95E+04
Tube	Long	0 000746	2 14E+04 MAT 2	Tube	Long	-0 000731	-2 09E+04
		0 000327	3 36E+03 ELE 105			0 0003199	3 27E+03
Cross-	Lateral	-0 0016527	-2 00E+04 MAT 2	Cross-	Lateral	-0 001599	-1 89E+04
Tube	45 Deg	0 0034643	9 79E+04 ELE 74	Tube	45 Deg	0 0033944	9 61E+04
Center	Long	0 0001631	4 89E+03 MAT 2	Center	Long	0 0001522	4 57E+03
		0 0005334	1 60E+04 ELE 81			0 0005334	1 60E+04
Right	Lateral	-0 0001928	6 85E+02 MAT 2	Right	Lateral	-0 000199	2 46E+02
Cross	45 Deg	0 0007072	2 14E+04 ELE 66	Cross	45 Deg	0 0006822	2 05E+04
Tube	Long	-0 0008215	-8 52E+03 MAT 1	Tube	Long	-0 000783	-7 32E+03
		0 0017955	5 12E+04 ELE 42			0 0017885	5 13E+04

3200 lbs Centerline, Center of Gravity

Constants			Deflection		Load Values		Constants			Deflection		Load Values	
			FWD	2 3125						FWD	0 8125		
			AFT	1 375						AFT	0 5		
Loads			Corrected	600	600		Loads			Corrected	200	200	
550	550			600	600		150	150			200	200	
550	550			600	600		150	150			200	200	
Strains							Strains						
			-255	0 000255						-47	0 000047		
			1130	0 00113						303	0 000303		
			163	0 000163						62	0 000062		
Nose	(Y4)	Lateral	-744	0 000744	Material		Nose	(Y4)	Lateral	-389	0 000389		
Wheel	(Y5)	45 Deg	381	0 000381	Poisson		Wheel	(Y5)	45 Deg	124	0 000124		
Tube	(Y6)	Long	1491	0 001491	Young's		Tube	(Y6)	Long	498	0 000498		
			-125	0 000125						-31	0 000031		
			-319	0 000319	6150					-116	0 000116		
			-300	0 0003	0 315					-92	0 000092		
Cross	(Y10)	Lateral	1774	0 001774	3 00E+07		Cross	(Y10)	Lateral	458	0 000458		
Tube	(R1)	45 Deg	365	0 00066357			Tube	(R1)	45 Deg	100	0 0001818		
Center	(R2)	Long	-340	0 00055726	4130		Center	(R2)	Long	-90	0 00014751		
			45	0 00009783	0 302					5	0 00001087		
				0	3 00E+07						0		
			220	0 0004191						90	0 00017145		
Right	(R1)	Lateral	15	0 000046155	4340		Right	(R1)	Lateral	0	0		
Cross	(R2)	45 Deg	55	0 0001896	0 3333		Cross	(R2)	45 Deg	20	0 00006896		
Tube	(R3)	Long	85	0 00036958	2 10E+07		Tube	(R3)	Long	30	0 00013044		
			-40	0 00018604						-10	0 00004651		
			90	0 00034614						25	0 00009615		
			225	0 00086535						60	0 00023076		
Principal			Strain	Stresses			Principal			Strain	Stresses		
			-0 0012404	-2 03E+04	MAT 3					-0 000293	-4 50E+03		
			0 0011484	1 74E+04	ELE 112					0 000308	4 97E+03		
Nose	Lateral		-0 0009749	-9 47E+03	MAT 3		Nose	Lateral		-0 000424	-5 81E+03		
Wheel	45 Deg		0 0017219	3 30E+04	ELE 100		Wheel	45 Deg		0 0005326	9 25E+03		
Tube	Long						Tube	Long					
			-0 0007512	-2 15E+04	MAT 2					-0 000242	-6 79E+03		
			0 0003262	3 28E+03	ELE 105					0 0001186	1 51E+03		
Cross	Lateral		-0 0011169	-1 36E+04	MAT 2		Cross	Lateral		-0 000298	-3 77E+03		
Tube	45 Deg		0 0023336	6 59E+04	ELE 74		Tube	45 Deg		0 0006083	1 71E+04		
Center	Long						Center	Long					
			9 783E-05	2 93E+03	MAT 2					1 087E-05	3 26E+02		
			0 0004191	1 26E+04	ELE 81					0 0001715	5 14E+03		
Right	Lateral		-0 0002213	-9 54E+03	MAT 2		Right	Lateral		-8 4E-05	-6 34E+02		
Cross	45 Deg		0 000637	1 88E+04	ELE 66		Cross	45 Deg		0 0002144	6 24E+03		
Tube	Long						Tube	Long					
			-0 0005244	-4 84E+03	MAT 1					-0 000142	-1 30E+03		
			0 0012038	3 46E+04	ELE 42					0 0003259	9 37E+03		

3200 lbs Centerline, Center of Gravity

Constants			Deflection			Constants			Deflection		
			FWD	-0.125					FWD		
			AFT	0					AFT		
Loads			Corrected	Load Values		Loads			Corrected	Load Values	
	0	0	50	50					50	50	
	0	0	50	50					50	50	
Strains						Strains					
			-28	-0.000028							0
			-23	-0.000023							0
			6	0.000006							0
Nose	(Y4)	Lateral	-179	-0.000179	Material	Nose	(Y4)	Lateral			0
Wheel	(Y5)	45 Deg	-1	0.000001	Poisson	Wheel	(Y5)	45 Deg			0
Tube	(Y6)	Long	-27	-0.000027	Young's	Tube	(Y6)	Long			0
			13	0.000013							0
			15	-0.000015	6150						0
			8	0.000008	0.315						0
Cross-	(Y10)	Lateral	-45	-0.000045	3.00E+07	Cross-	(Y10)	Lateral			0
Tube	(R1)	45 Deg	0	0		Tube	(R1)	45 Deg			0
Center	(R2)	Long	0	0	4130	Center	(R2)	Long			0
			0	0	0.302						0
					3.00E+07						0
			0	0							0
Right	(R1)	Lateral	0	0	4340	Right	(R1)	Lateral			0
Cross	(R2)	45 Deg	0	0	0.3333	Cross	(R2)	45 Deg			0
Tube	(R3)	Long	0	0	2.10E+07	Tube	(R3)	Long			0
			0	0							0
			0	0							0
			0	0							0
Principal			Strain	Stresses		Principal			Strain	Stresses	
			-3.181E-05	-6.74E+02	MAT 3				0	0.00E+00	
			9.809E-06	-1.87E+01	ELE 112				0	0.00E+00	
Nose	Lateral		-0.0002318	-5.27E+03	MAT 3	Nose	Lateral		0	0.00E+00	
Wheel	45 Deg		2.581E-05	-1.22E+03	ELE 100	Wheel	45 Deg		0	0.00E+00	
Tube	Long		-1.512E-05	-1.39E+02	MAT 2	Tube	Long		0	0.00E+00	
			3.612E-05	1.04E+03	ELE 105				0	0.00E+00	
Cross-	Lateral		-5.432E-05	-1.70E+03	MAT 2	Cross-	Lateral		0	0.00E+00	
Tube	45 Deg		9.32E-06	-2.34E+02	ELE 74	Tube	45 Deg		0	0.00E+00	
Center	Long					Center	Long				
			0	0.00E+00	MAT 2				0	0.00E+00	
			0	0.00E+00	ELE 81				0	0.00E+00	
Right	Lateral		0	0.00E+00	MAT 2	Right	Lateral		0	0.00E+00	
Cross	45 Deg		0	0.00E+00	ELE 66	Cross	45 Deg		0	0.00E+00	
Tube	Long		0	0.00E+00	MAT 1	Tube	Long		0	0.00E+00	
			0	0.00E+00	ELE 42				0	0.00E+00	

3200 lbs Centerline, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	0.688			FWD	
		AFT	0.625			AFT	1
Loads		Corrected	Load Values	Loads		Corrected	Load Values
150	150	200	200	260	350	310	400
150	150	200	200	260	350	310	400
Strains				Strains			
			-9				-130
			287				570
			64				81
Nose (x4)	Lateral		-134	Nose (x4)	Lateral		-295
Wheel (x5)	45 Deg		97	Wheel (x5)	45 Deg		209
Tube (x6)	Long		356	Tube (x6)	Long		764
			-40				-82
			-66				-156
			-82				-169
Cross (x10)	Lateral		649	Cross (x10)	Lateral		1123
Tube (R1)	45 Deg		120	Tube (R1)	45 Deg		230
Center (R2)	Long		-80	Center (R2)	Long		-165
			25				40
			125				190
Right (R1)	Lateral		0	Right (R1)	Lateral		10
Cross (R2)	45 Deg		25	Cross (R2)	45 Deg		40
Tube (R3)	Long		40	Tube (R3)	Long		65
			-5				-20
			35				60
			75				145
Principal	Strain	Stresses		Principal	Strain	Stresses	
	-0.0002346	3.26E+03 MAT 3			-0.000628	1.03E+04	
	0.0002895	4.90E+03 ELE 112			0.0005793	8.74E+03	
Nose	Lateral	-1.57E+03 MAT 3		Nose	Lateral	-0.000456	3.49E+03
Wheel	45 Deg	8.56E+03 ELE 100		Wheel	45 Deg	0.0009252	1.83E+04
Tube	Long	0.0001897	5.59E+03 MAT 2	Tube	Long	-0.00041	1.20E+04
	0.772E-05	3.44E+02 ELE 105			0.0001593	1.17E+03	
Cross	Lateral	-3.07E+03 MAT 2		Cross	Lateral	-0.000658	6.90E+03
Tube	45 Deg	0.0000752	2.53E+04 ELE 74	Tube	45 Deg	0.001521	4.35E+04
Center	Long	5.435E-05	1.63E+03 MAT 2	Center	Long	8.596E-05	2.61E+03
	0.0002361	7.14E+03 ELE 81			0.000362	1.09E+04	
Right	Lateral	0.0001058	7.27E+02 MAT 2	Right	Lateral	0.000164	6.48E+02
Cross	45 Deg	0.0002807	8.20E+03 ELE 66	Cross	45 Deg	0.0004771	1.41E+04
Tube	Long	0.0001767	1.25E+03 MAT 1	Tube	Long	-0.000334	2.74E+03
	0.0004419	1.29E+04 ELE 42			0.0007983	2.31E+04	

3200 lbs Forward Left, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	1 593			FWD	2 75
		AFT	1 25			AFT	1 25
Loads		Corrected	Load Values	Loads		Corrected	Load Values
250	750	310	800	250	950	310	1000
260	750	310	800	260	950	310	1000
Strains				Strains			
		-64	-0 000064			-69	-0 000069
		1312	0 001312			1458	0 001458
		83	0 000083			99	0 000099
Nose (Y4)	Lateral	-520	-0 00062	Nose (Y4)	Lateral	-644	-0 000644
Wheel (Y5)	45 Deg	215	-0 000215	Wheel (Y5)	45 Deg	164	-0 000164
Tube (Y6)	Long	1658	0 001658	Tube (Y6)	Long	1768	0 001768
		-191	-0 000191			-192	-0 000192
		-255	0 000255			-270	0 00027
		311	-0 000311			-347	-0 000347
Cross- (Y10)	Lateral	1579	0 001579	Cross- (Y10)	Lateral	1731	0 001731
Tube (R1)	45 Deg	270	-0 00049086	Tube (R1)	45 Deg	295	0 00053631
Center (R2)	Long	-310	-0 00050809	Center (R2)	Long	-320	-0 00052448
		35	0 00007609			45	0 00009783
			0				0
		195	0 000371475			205	0 00039053
Right (R1)	Lateral	20	0 00006154	Right (R1)	Lateral	25	7 5925E 05
Cross (R2)	45 Deg	30	-0 00010344	Cross (R2)	45 Deg	40	-0 00013792
Tube (R3)	Long	60	0 00026088	Tube (R3)	Long	65	0 00028252
		-15	0 000069765			-15	6 9765E 05
		80	-0 00030768			60	-0 00023076
		150	0 0005769			145	0 00055767
Principal		Strain	Stresses	Principal		Strain	Stresses
		-0 0012951	-2 02E+04 MAT 3			-0 00143	-2 23E+04
		0 0013141	2 08E+04 ELE 112			0 0014604	2 32E+04
Nose	Lateral	-0 000636	-4 99E+03 MAT 3	Nose	Lateral	-0 000846	-4 47E+03
Wheel	45 Deg	0 001874	3 77E+04 ELE 100	Wheel	45 Deg	0 0019697	3 99E+04
Tube	Long			Tube	Long		
		-0 0007605	-2 25E+04 MAT 2			-0 000815	-2 41E+04
		0 0002585	9 53E+02 ELE 105			0 0002755	9 75E+02
Cross-	Lateral	-0 0009282	-1 07E+04 MAT 2	Cross-	Lateral	-0 001	-1 10E+04
Tube	45 Deg	0 0019991	5 67E+04 ELE 74	Tube	45 Deg	0 0022065	6 29E+04
Center	Long			Center	Long		
		7 609E 05	2 28E+03 MAT 2			9 783E 05	2 93E+03
		0 0003715	1 11E+04 ELE 81			0 0003905	1 17E+04
Right	Lateral	-0 0001216	4 13E+02 MAT 2	Right	Lateral	-0 000154	3 25E+01
Cross	45 Deg	0 000444	1 34E+04 ELE 56	Cross	45 Deg	0 0005137	1 54E+04
Tube	Long			Tube	Long		
		-0 0003942	-3 67E+03 MAT 1			-0 000325	-2 30E+03
		5 0009013	2 59E+04 ELE 42			0 000813	2 37E+04

3200 lbs Forward Left, Center of Gravity

Constants			Deflection		Constants			Deflection			
			FWD	2 313				FWD			
			AFT	1				AFT			
Loads			Corrected	Load Values	Loads			Corrected	Load Values		
260	550		310	600			50	50			
260	550		310	600			50	50			
Strains						Strains					
			-88	-0.000088							
			1055	0.001055							
			98	0.000098							
Nose	(Y4)	Lateral	-579	-0.000579	Material	Nose	(Y4)	Lateral			
Wheel	(Y5)	45 Deg	246	-0.000246	Poisson	Wheel	(Y5)	45 Deg			
Tube	(r6)	Long	1448	0.001448	Young's	Tube	(r6)	Long			
			-150	-0.000150							
			-221	0.000221	6150						
			-268	-0.000268	0.315						
Cross-	(Y10)	Lateral	1353	0.001353	3.00E+07	Cross-	(Y10)	Lateral			
Tube	(R1)	45 Deg	235	-0.00042723		Tube	(R1)	45 Deg			
Center	(R2)	Long	-265	-0.000434335	4130	Center	(R2)	Long			
			30	0.00006522	0.302						
				0	3.00E+07						
			160	0.0003040							
Right	(R1)	Lateral	30	0.00009231	4340	Right	(R1)	Lateral			
Cross	(R2)	45 Deg	35	-0.00012068	0.3333	Cross	(R2)	45 Deg			
Tube	(R3)	Long	55	0.00023914	2.10E+07	Tube	(R3)	Long			
			-15	0.000069765							
			55	-0.00021153							
			140	0.00053844							
Principal			Strain	Stresses		Principal			Strain	Stresses	
			-0.0010491	-1.64E+04	MAT 3				0	0.00E+00	
			0.0010591	1.68E+04	ELE 112				0	0.00E+00	
Nose	Lateral		-0.0007863	-5.54E+03	MAT 3	Nose	Lateral		0	0.00E+00	
Wheel	45 Deg		0.0016553	3.29E+04	ELE 100	Wheel	45 Deg		0	0.00E+00	
Tube	Long		-0.000643	-1.90E+04	MAT 2	Tube	Long		0	0.00E+00	
			0.000225	1.02E+03	ELE 105				0	0.00E+00	
Cross-	Lateral		-0.0007995	-9.26E+03	MAT 2	Cross-	Lateral		0	0.00E+00	
Tube	45 Deg		0.0017182	4.87E+04	ELE 74	Tube	45 Deg		0	0.00E+00	
Center	Long		6.522E-05	1.96E+03	MAT 2	Center	Long		0	0.00E+00	
			0.0003048	9.14E+03	ELE 81				0	0.00E+00	
Right	Lateral		-0.0001299	-3.10E+02	MAT 2	Right	Lateral		0	0.00E+00	
Cross	45 Deg		0.0004614	1.39E+04	ELE 66	Cross	45 Deg		0	0.00E+00	
Tube	Long		-0.0003054	-2.05E+03	MAT 1	Tube	Long		0	0.00E+00	
			0.000774	2.26E+04	ELE 42				0	0.00E+00	

3200 lbs Forward Left, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	1 4375			FWD	2 3125
		AFT	0 8125			AFT	1 25
Loads		Corrected	Load Values	Loads		Corrected	Load Values
350	350	400	400	750	370	800	420
350	350	400	400	750	370	800	420
Strains				Strains			
		-142	-0 000142			-307	-0 000307
		627	0 000627			988	0 000988
		86	0 000086			138	0 000138
Nose (Y4)	Lateral	-353	-0 000353	Nose (Y4)	Lateral	-560	-0 000560
Wheel (Y5)	45 Deg	203	-0 000203	Wheel (Y5)	45 Deg	424	-0 000424
Tube (Y6)	Long	047	0 000047	Tube (Y6)	Long	1427	0 001427
		-66	-0 000066			-124	-0 000124
		-208	0 000208			-326	0 000326
		-189	-0 000189			-293	-0 000293
Cross- (Y10)	Lateral	1015	0 001015	Cross- (Y10)	Lateral	1562	0 001562
Tube (R1)	45 Deg	215	-0 000215	Tube (R1)	45 Deg	325	-0 000325
Center (R2)	Long	-170	-0 000170	Center (R2)	Long	-280	-0 000280
		15	0 000015			30	0 000030
		170	0 000170			220	0 000220
Right (R1)	Lateral	5	0 000005	Right (R1)	Lateral	15	0 000015
Cross (R2)	45 Deg	35	-0 000035	Cross (R2)	45 Deg	50	-0 000050
Tube (R3)	Long	60	0 000060	Tube (R3)	Long	80	0 000080
		-20	-0 000020			-40	-0 000040
		50	0 000050			95	0 000095
		125	0 000125			230	0 000230
Principal				Principal			
		Strain	Stresses			Strain	Stresses
		-0 0006993	1 15E+04			-0 00118	1 99E+04
		0 0006373	9 55E+03			0 0010108	1 46E+04
Nose	Lateral	-0 0005231	3 56E+03	Nose	Lateral	-0 000879	7 02E+03
Wheel	45 Deg	0 0011171	2 23E+04	Wheel	45 Deg	0 0017459	3 43E+04
Tube	Long	-0 0004688	1 33E+04	Tube	Long	-0 00075	2 14E+04
		0 0002136	2 38E+03			0 0003326	3 51E+03
Cross- Tube	Lateral	-0 0006291	7 15E+03	Cross- Tube	Lateral	-0 000974	1 14E+04
Center	45 Deg	0 0013654	3 88E+04	Center	45 Deg	0 0020767	5 88E+04
		3 261E-05	9 78E+02			6 522E-05	1 95E+03
		0 0003239	9 72E+03			0 0004191	1 25E+04
Right	Lateral	-0 0001483	6 63E+02	Right	Lateral	-0 000202	7 27E+02
Cross	45 Deg	0 0004246	1 25E+04	Cross	45 Deg	0 000596	1 77E+04
Tube	Long	-0 0002872	2 48E+03	Tube	Long	-0 000544	5 07E+03
		0 0006745	1 95E+04			0 0012422	3 57E+04

3200 lbs Forward Right, Center of Gravity

Constants			Deflection			Constants			Deflection		
			FWD	3 25					FWD	3 6875	
			AFT	1 6875					AFT	1 25	
Loads			Corrected	Load Values		Loads			Corrected	Load Values	
	1150	370	1200	420			1230	370	1280	420	
	1150	370	1200	420			1230	370	1280	420	
Strains						Strains					
			-570	-0 00057					-654	-0 000654	
			1410	0 00141					1586	0 001586	
			209	0 000209					226	0 000226	
Nose	(Y4)	Lateral	-828	-0 000828	Material	Nose	(Y4)	Lateral	-911	-0 000911	
Wheel	(Y5)	45 Deg	675	-0 000675	Poisson	Wheel	(Y5)	45 Deg	739	-0 000739	
Tube	(Y6)	Long	2073	0 002073	Young's	Tube	(Y6)	Long	2280	0 00228	
			-210	-0 00021					-187	-0 000187	
			-449	0 000449	6150				-482	0 000482	
			-410	-0 00041	0 315				-447	-0 000447	
Cross-	(Y10)	Lateral	2229	0 002229	3 00E+07	Cross-	(Y10)	Lateral	2318	0 002318	
Tube	(R1)	45 Deg	480	-0 00087264		Tube	(R1)	45 Deg	500	-0 000909	
Center	(R2)	Long	-415	-0 000680185	4130	Center	(R2)	Long	-435	-0 00071297	
			45	0 00009783	0 302				50	0 0001087	
				0	3 00E+07					0	
			255	0 000485778					255	0 00048578	
Right	(R1)	Lateral	35	0 000107695	4340	Right	(R1)	Lateral	35	0 0001077	
Cross	(R2)	45 Deg	55	-0 00018964	0 3333	Cross	(R2)	45 Deg	55	-0 00018964	
Tube	(R3)	Long	90	0 00039132	2 10E+07	Tube	(R3)	Long	90	0 00039132	
			-65	-0 000302315					-65	-0 00030232	
			145	-0 00055761					150	-0 0005769	
			370	0 00142302					370	0 00142302	
Principal			Strain	Stresses		Principal			Strain	Stresses	
			-0 001818	-3 15E+04	MAT 3				-0 002067	-3 59E+04	
			0 001457	2 01E+04	ELE 112				0 001639	2 24E+04	
Nose	Lateral		-0 0013236	-1 10E+04	MAT 3	Nose	Lateral		-0 001454	-1 21E+04	
Wheel	45 Deg		0 0025686	5 03E+04	ELE 100	Wheel	45 Deg		0 0028227	5 52E+04	
Tube	Long		-0 0010756	-3 10E+04	MAT 2	Tube	Long		-0 001127	-3 23E+04	
			0 0004556	4 32E+03	ELE 105				0 0004925	5 03E+03	
Cross-	Lateral		-0 001423	-1 73E+04	MAT 2	Cross-	Lateral		-0 001494	-1 82E+04	
Tube	45 Deg		0 0029718	8 39E+04	ELE 74	Tube	45 Deg		0 0030886	8 72E+04	
Center	Long		9 783E-05	2 93E+03	MAT 2	Center	Long		0 0001087	3 26E+03	
			0 0004858	1 46E+04	ELE 81				0 0004858	1 46E+04	
Right	Lateral		-0 000212	9 07E+01	MAT 2	Right	Lateral		-0 000212	9 07E+01	
Cross	45 Deg		0 000711	2 14E+04	ELE 66	Cross	45 Deg		0 000711	2 14E+04	
Tube	Long		-0 0008518	-7 68E+03	MAT 1	Tube	Long		-0 000867	-8 02E+03	
			0 0019725	5 68E+04	ELE 42				0 0019878	5 71E+04	

3200 lbs Forward Right, Center of Gravity

Constants				Constants			
		Deflection				Deflection	
		FWD	3.4375			FWD	3.25
		AFT	1.625			AFT	1.25
Loads		Corrected	Load Values	Loads		Corrected	Load Values
950	370	1000	420	550	370	600	420
950	370	1000	420	550	370	600	420
Strains				Strains			
		-491	-0.000491			-281	-0.000281
		1383	0.001383			1131	0.001131
		199	0.000199			153	0.000153
Nose (Y4)	Lateral	-784	-0.000784	Nose (Y4)	Lateral	-633	-0.000633
Wheel (Y5)	45 Deg	579	0.000579	Wheel (Y5)	45 Deg	377	0.000377
Tube (Y6)	Long	2022	0.002022	Tube (Y6)	Long	1682	0.001682
		-142	-0.000142			-113	-0.000113
		-398	0.000398			-308	0.000308
		-385	0.000385			-306	0.000306
Cross- (Y10)	Lateral	2146	0.002146	Cross- (Y10)	Lateral	1657	0.001657
Tube (R1)	45 Deg	460	-0.000460	Tube (R1)	45 Deg	350	-0.000350
Center (R2)	Long	-400	-0.000400	Center (R2)	Long	-305	-0.000305
		45	0.000045			25	0.000025
		250	0.000250			205	0.000205
Right (R1)	Lateral	30	0.000030	Right (R1)	Lateral	25	0.000025
Cross (R2)	45 Deg	50	-0.000050	Cross (R2)	45 Deg	30	-0.000030
Tube (R3)	Long	80	0.000080	Tube (R3)	Long	65	0.000065
		-60	-0.000060			-35	-0.000035
		130	0.000130			90	0.000090
		310	0.000310			205	0.000205
Principal				Principal			
		Strain	Stresses			Strain	Stresses
		-0.0017134	-2.93E+04			-0.001279	-2.11E+04
		0.0014214	2.01E+04			0.0011505	1.71E+04
Nose	Lateral	-0.0012259	-9.56E+03	Nose	Lateral	-0.000943	-6.59E+03
Wheel	45 Deg	0.0024639	4.86E+04	Wheel	45 Deg	0.0019916	3.96E+04
Tube	Long	0.0009361	2.68E+04	Tube	Long	-0.000736	-2.11E+04
		0.0004091	4.17E+03			0.0003169	3.13E+03
Cross- Tube	Lateral	-0.0013675	-1.67E+04	Cross- Tube	Lateral	-0.001046	-1.26E+04
Center	45 Deg	0.0028579	8.07E+04	Center	45 Deg	0.002203	6.23E+04
		9.783E-05	2.93E+03			5.435E-05	1.63E+03
		0.0004763	1.43E+04			0.0003905	1.17E+04
Right	Lateral	-0.0001927	-5.15E+01	Right	Lateral	-0.000122	-7.84E+02
Cross	45 Deg	0.0006328	1.90E+04	Cross	45 Deg	0.0004811	1.47E+04
Tube	Long	0.0007501	7.53E+03	Tube	Long	-0.00005	-4.84E+03
		0.0016633	4.75E+04			0.0011255	3.27E+04

3200 lbs Forward Right, Center of Gravity

Constants			Deflection		Load Values	Constants			Deflection		Load Values	
			FWD	AFT					FWD	AFT		
Loads			Corrected			Loads			Corrected			
150	150		200		200	0	0		50		50	
150	150		200		200	0	0		50		50	
Strains						Strains						
			-51		-0.000051				-15		-0.000015	
			367		0.000367				2		0.000002	
			72		0.000072				-9		-0.000009	
Nose	(Y4)	Lateral	-223		-0.000223	Material	Nose	(Y4)	Lateral	-23		-0.000023
Wheel	(Y5)	45 Deg	125		-0.000125	Poisson	Wheel	(Y5)	45 Deg	23		-0.000023
Tube	(Y6)	Long	598		0.000598	Young's	Tube	(Y6)	Long	81		0.000081
			-55		-0.000055				-20		-0.000020	
			-109		0.000109				3		-0.000003	
			-118		-0.000118				-17		-0.000017	
Cross-	(Y10)	Lateral	668		0.000668		Cross-	(Y10)	Lateral	27		0.000027
Tube	(R1)	45 Deg	140		-0.00025452		Tube	(R1)	45 Deg	-10		0.00001818
Center	(R2)	Long	-100		-0.0001639		Center	(R2)	Long	0		0
			0		0				-10		-0.00002174	
			110		0.0002095				5		9.525E-05	
Right	(R1)	Lateral	5		0.000015385		Right	(R1)	Lateral	0		0
Cross	(R2)	45 Deg	20		-0.00006896		Cross	(R2)	45 Deg	0		0
Tube	(R3)	Long	35		0.00015218		Tube	(R3)	Long	0		0
			-10		-0.00004651				0		0	
			30		-0.00011538				0		0	
			80		0.00030768				0		0	
Principal			Strain		Stresses	Principal			Strain		Stresses	
			-0.0003513		-5.37E+03	MAT 3			-2.63E-05		-6.03E+02	
			0.0003723		6.03E+03	ELE 112			2.318E-06		-1.52E+02	
Nose	Lateral		-0.0003284		-2.22E+03	MAT 3	Nose	Lateral	-4.45E-05		-2.45E+02	
Wheel	45 Deg		0.0007034		1.40E+04	ELE 100	Wheel	45 Deg	0.0001025		2.07E+03	
Tube	Long		-0.0002845		-8.28E+03	MAT 2	Tube	Long	-3.41E-05		-1.15E+03	
			0.0001115		8.45E+02	ELE 105			-2.93E-06		-4.36E+02	
Cross-	Lateral		-0.0004034		-4.27E+03	MAT 2	Cross-	Lateral	-7.88E-07		2.51E+02	
Tube	45 Deg		0.0009075		2.59E+04	ELE 74	Tube	45 Deg	2.779E-05		9.09E+07	
Center	Long		0		0.00E+00	MAT 2	Center	Long	-2.17E-05		-6.52E+02	
			0.0002095		6.29E+03	ELE 81			9.525E-06		2.85E+02	
Right	Lateral		-8.357E-05		-2.55E+02	MAT 2	Right	Lateral	0		0.00E+00	
Cross	45 Deg		0.0002511		7.46E+03	ELE 66	Cross	45 Deg	0		0.00E+00	
Tube	Long		-0.0001725		-1.20E+03	MAT 1	Tube	Long	0		0.00E+00	
			0.0004337		1.26E+04	ELE 42			0		0.00E+00	

3200 lbs Forward Right, Center of Gravity

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