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A NASTRAN VIBRATION MODEL OF THE AH-1G HELICOPTER AIRFRAME. VOLUME I

James D. Cronkhite, et al

Bell Helicopter Company

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report documents a NASTRAN finite element model of the AH-1G helicopter airframe. The model was developed for the purpose of representing the low frequency vibration response of the airframe and the structure deflections due to weapon firing. The NASTRAN input data deck for the model is included in the documentation as well as a Normal Modes run on Level 15.1 of the program.

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The documentation is aimed at assuring that the government can independently use and modify the model to reflect actual or proposed changes in design. It is assumed that government personnel using this model and documentation have a good understanding of the NASTRAN computer program.

The documentation consists mainly of drawings and sketches of the idealized NASTRAN model with supporting instructions. In addition, the actual structure is identified and the idealization of the structure as a finite element model is explained. The NASTRAN input data deck serves as a major portion of the documentation.

FOREWORD

This report, "A NASTRAN Vibration Model of the Bell AH-1G Helicopter Airframe," was prepared by Bell Helicopter Company, Fort Worth, Texas, for the U. S. Army Armament Command, Rock Island, Illinois, under contract DAAF03-73-C-0122. Messrs. Carl E. Swindlehurst, Jr. (USAAMRDL-Langley) and Eugene C. Naumann (NASA-Langley) were the contracting officer's technical representatives.

The authors acknowledge the help of Bell Helicopter Company's Mr. David L. Kidd, Dynamics Group Engineer, for his contributions to the study.

TABLE OF CONTENTS

	Page
DD FORM 1473.	i
FOREWORD	iii
VOLUME I	
LIST OF ILLUSTRATIONS.	x
LIST OF TABLES	xi
1. INTRODUCTION	1-1
1.1 Background	1-1
1.2 How to Use This Report	1-1
2. PREFACE	2-1
2.1 Description of the AH-1G Helicopter Airframe Structure. .	2-1
2.2 Idealization of the Airframe Structure	2-11
2.3 Modeling Philosophy	2-16
2.4 Introduction to the Stiffness Modeling	2-19
2.4.1 Symbols and Notation Used in the Stiffness Modeling.	2-19
2.4.2 Techniques Used Repetitively in the Stiffness Modeling.	2-26
2.4.2.1 Types of Rod and Shear Panel Modeling Techniques	2-26
2.4.2.2 Rules for Multi-Point Constraints (MPC) .	2-27
2.4.2.3 Rules for Single Point Constraints (SPC) .	2-27
2.4.2.4 Rules for Guyan Reduction (OMIT). . . .	2-27
3. STIFFNESS MODELING - FINAL ASSEMBLY.	3-1
3.1 Fuselage Major Assembly	3-2
3.1.1 Nose Subassembly	3-3
3.1.1.1 Bulkhead Sta. 33. Detail	3-4
3.1.1.2 Bulkhead Sta. 46. Detail	3-5
3.1.1.3 Right Gunner's Floor, Frame, and Battery Shelf (Sta. 33-61) Detail	3-7
3.1.1.4 Left Gunner's Floor, Frame, and Battery Shelf (Sta. 33-61) Detail	3-10
3.1.1.5 Right Shell Assembly Detail	3-13
3.1.1.6 Left Shell Assembly Detail.	3-16
3.1.1.7 Right Lower Shell Assembly Detail . . .	3-19
3.1.1.8 Left Lower Shell Assembly Detail. . . .	3-21

		Page
3.1.2	Forward Fuselage Subassembly	3-23
3.1.2.1	Right Main Beam (Sta. 61-93) Detail . .	3-24
3.1.2.2	Left Main Beam (Sta. 61-93) Detail. . .	3-29
3.1.2.3	Right Main Beam (Sta. 93-138) Detail . .	3-34
3.1.2.4	Left Main Beam (Sta. 93-138) Detail . .	3-37
3.1.2.5	Right Main Beam (Sta. 138-148) Detail. .	3-40
3.1.2.6	Left Main Beam (Sta. 138-148) Detail . .	3-44
3.1.2.7	Bulkhead Sta. 61.25 Detail	3-48
3.1.2.8	Bulkhead Sta. 93. Detail	3-51
3.1.2.9	Bulkhead Sta. 138.7 Detail	3-55
3.1.2.10	Right Side Panels Under Canopy (Sta. 61-93) Detail.	3-59
3.1.2.11	Left Side Panels Under Canopy (Sta. 61-93) Detail.	3-61
3.1.2.12	Right Side Panels Under Canopy (Sta. 93-138) Detail	3-63
3.1.2.13	Left Side Panels Under Canopy (Sta. 93-138) Detail	3-65
3.1.2.14	Right Side Panels Under Canopy (Sta. 138-148) Detail	3-67
3.1.2.15	Left Side Panels Under Canopy (Sta. 138-148) Detail	3-69
3.1.2.16	Ammo Floor (Sta. 93-138, W.L. 27) Detail.	3-71
3.1.2.17	Ammo Cover (Sta. 93-138, W.L. 46) Detail.	3-73
3.1.2.18	Gunner's Floor (Sta. 61-93, W.L. 46) Detail	3-77
3.1.2.19	Turret and Support Fittings Detail. . .	3-83
3.1.2.20	Extension of Ammo Cover (Sta. 138-148, W.L. 35.97) Detail	3-85
3.1.2.21	Pilot's Floor (Sta. 93-148, W.L. 55) Detail	3-86
3.1.2.22	Right and Left Upper Gunner's Shelves (Sta. 61-93) Detail.	3-90
3.1.2.23	Right and Left Upper Pilot's Shelves (Sta. 93-148) Detail	3-93
3.1.2.24	Right Lower Skins Under Ammo Floor (Sta. 93-148) Detail	3-96
3.1.2.25	Left Lower Skins Under Ammo Floor (Sta. 93-148) Detail	3-99
3.1.3	Center Fuselage Subassembly	3-102
3.1.3.1	Right Main Beam (Sta. 148-186) Detail. .	3-103
3.1.3.2	Left Main Beam (Sta. 148-186) Detail . .	3-108
3.1.3.3	Right Main Beam (Sta. 186-213) Detail. .	3-112
3.1.3.4	Left Main Beam (Sta. 186-213) Detail . .	3-116
3.1.3.5	Bulkhead Sta. 148.5 Detail	3-120
3.1.3.6	Partial Belly Bulkhead Sta. 156.41 Detail	3-125
3.1.3.7	Bulkhead Sta. 186.25 Detail	3-127

Page

3.1.3.8 Right Side Panels Under Canopy (Sta. 148-186) Detail 3-133
3.1.3.9 Left Side Panels Under Canopy (Sta. 148-186) Detail 3-136
3.1.3.10 Forward Fuel Cell Floor (Sta. 148-186, W.L. 35.97) Detail 3-139
3.1.3.11 Forward Fuel Cell Cover (Sta. 148-186, W.L. 77.57) Detail 3-144
3.1.3.12 Lower Floor Under Pylon (Sta. 186-213, W.L. 35.97) Detail 3-149
3.1.3.13 Right and Left Upper Shelves (Sta. 148-186) Detail 3-153
3.1.3.14 Right Belly Skins (Sta. 156-218) Detail . 3-155
3.1.3.15 Left Belly Skins (Sta. 156-218) Detail . 3-158

3.1.4 Aft Fuselage Subassembly 3-161

3.1.4.1 Right Main Beam (Sta. 213-250) Detail. . 3-162
3.1.4.2 Left Main Beam (Sta. 213-250) Detail . . 3-165
3.1.4.3 Right Main Beam (Sta. 250-299) Detail. . 3-168
3.1.4.4 Left Main Beam (Sta. 250-299) Detail . . 3-172
3.1.4.5 Bulkhead Sta. 213.94 Detail 3-176
3.1.4.6 Partial Belly Bulkhead Sta. 218.97 Detail 3-179
3.1.4.7 Partial Belly Bulkhead Sta. 227.62 Detail 3-180
3.1.4.8 Bulkhead Sta. 250. Detail. 3-181
3.1.4.9 Bulkhead Sta. 268.25 Detail 3-184
3.1.4.10 Tailboom Junction Bulkhead Sta. 299. Detail 3-187
3.1.4.11 Aft Fuel Cell Floor (Sta. 213-250, W.L. 35.97) Detail 3-189
3.1.4.12 Floor Panel (Sta. 250-268, W.O. 35.97) Detail 3-196
3.1.4.13 Floor Panel (Sta. 268-299, W.L. 35.97) Detail 3-198
3.1.4.14 Engine Deck (Sta. 213-250) Detail . . . 3-200
3.1.4.15 Engine Deck (Sta. 250-299) Detail . . . 3-203
3.1.4.16 Right Belly Skins (Sta. 227-299) Detail . 3-207
3.1.4.17 Left Belly Skins (Sta. 227-299) Detail . 3-210

3.1.5 Main Rotor Pylon Subassembly 3-213

3.1.5.1 Main Rotor Mast, Transmission, Mounts, Lift Link - Detail 3-214
3.1.5.2 Main Rotor Pylon Support Structure - Detail 3-218

3.1.6 Landing Gear Subassembly 3-221

		Page
3.1.6.1	Landing Gear and Mounts - Detail . . .	3-222
3.1.6.2	Landing Gear Attach Point Support Structure - Detail	3-225
3.1.7	Engine Mounting Subassembly	3-228
3.1.7.1	Engine Mounts - Detail.	3-229
3.2	Wing and Carry Through - Major Assembly.	3-231
3.2.1	Carry Through Subassembly	3-232
3.2.1.1	Forward Carry Through Detail.	3-233
3.2.1.2	Center Carry Through Detail	3-239
3.2.1.3	Aft Carry Through Detail	3-243
3.2.2	Right and Left Wing Subassemblies	3-245
3.2.2.1	Right Wing Ribs - Detail	3-246
3.2.2.2	Left Wing Ribs - Detail	3-250
3.2.2.3	Right Wing Spars - Detail.	3-254
3.2.2.4	Left Wing Spars - Detail	3-260
3.2.2.5	Right Wing Skins - Detail.	3-266
3.2.2.6	Left Wing Skins - Detail	3-269
3.2.2.7	Right Wing Lugs - Detail	3-272
3.2.2.8	Left Wing Lugs - Detail	3-275
3.3	Tailboom and Vertical Fin Major Assembly	3-278
3.3.1	Tailboom Subassembly and Detail	3-279
3.3.1.1	Tailboom Section Properties and Stiffness Distribution	3-281
3.3.1.2	Tailboom Bending Stiffness Distributions for Maneuver Conditions	3-288
3.3.2	Vertical Fin Subassembly and Detail.	3-292
3.3.2.1	Vertical Fin Stiffness Distribution . .	3-294
3.3.3	Elevator Subassembly and Detail	3-296
3.3.4	Tail Rotor Mast Subassembly and Detail.	3-298
4.	WEIGHTS MODELING	4-1
4.1	Automatic Weight Distribution Program (SDSN02)	4-1
4.1.1	Weight Regions and NASTRAN Weights Data (CONM2). .	4-2

Page

4.2 Distribution of Large Weights and Useful Loads 4-2

4.2.1 Lycoming T53-L13 Engine 4-2
4.2.2 XM-28 Gun Turret 4-3
4.2.3 Main Rotor and Tail Rotor 4-3
4.2.4 Useful Weight Items 4-4

5. NASTRAN STRUCTURAL ELEMENT AND GRID POINT INDEX. 5-1

6. LITERATURE CITED 6-1

7. DISTRIBUTION 7-1

VOLUME II

8. NASTRAN DATA 8-1

8.1 Input Data Deck. 8-1

8.1.1 Organization of the Unsorted Bulk Data Deck . . . 8-1
8.1.2 Listing of the Unsorted Bulk Data Deck. 8-9

8.2 Normal Modes Output - Rigid Format 3. 8-146

8.2.1 NASTRAN Output. 8-146
8.2.2 Normal Mode Plots. 8-620

LIST OF ILLUSTRATIONS

Figure		Page
1-1	Bell Model AH-1G Helicopter	1-2
2-1	AH-1G Helicopter - Basic Structural Lines.	2-2
2-2	Bending Sections of the Fuselage Structure	2-3
2-3	Gun Turret Attachment Fittings	2-5
2-4	Main Rotor Pylon Mounts and Lift Link	2-6
2-5	Engine Mounts	2-7
2-6	Skid Landing Gear.	2-8
2-7	Wing and Carry Through Structure.	2-9
2-8	Tailboom and Vertical Fin Structure.	2-10
2-9	Elevator Structure	2-12
2-10	NASTRAN Model of the AH-1G Helicopter Airframe	2-13
2-11	Exploded View Showing Major Areas of the NASTRAN Model . .	2-15
3-1	SFCR02 Input Geometry for a Typical Tailboom Structure . .	3-290
4-1	Automatic Weight Distribution Program SDSN02.	4-6
4-2	Distribution of Useful Weight Items with Artificial Trusses	4-35
8-1	NASTRAN Normal Mode Plots	8-621

LIST OF TABLES

Table		Page
2-1	Element Symbols Used in the Detail Drawings.	2-20
2-2	ID Numbering Conventions Used in the Modeling	2-21
3-1	Tailboom Bending Stiffness for Maneuver Conditions . . .	3-291
4-1	Fuselage Section - Regions and CONM2 Data	4-7
4-2	Tailboom and Wings - Regions and CONM2 Data.	4-25
4-3	Main Rotor Pylon - Regions and CONM2 Data	4-31
4-4	Basic Mission Useful Weight Items	4-33
4-5	Rod Element Data for Distribution of Useful Weight Items .	4-36
4-6	Grid Point Constraint Data for Distribution of Useful Weight Items	4-37
8-1	ID Numbering Conventions Used in the Modeling	8-4

1. INTRODUCTION

1.1 BACKGROUND

The two principal goals of the work reported herein are

1) to produce a NASTRAN model of the AH-1G helicopter, Figure 1-1, which will enable the government to determine time dependent deformations of the airframe structure produced by on-board weapon systems, as well as rotor induced vibrations, and

2) to provide documentation which is clear and altogether comprehensible, showing in what manner and upon what judgements the actual helicopter is idealized as a NASTRAN finite element model.

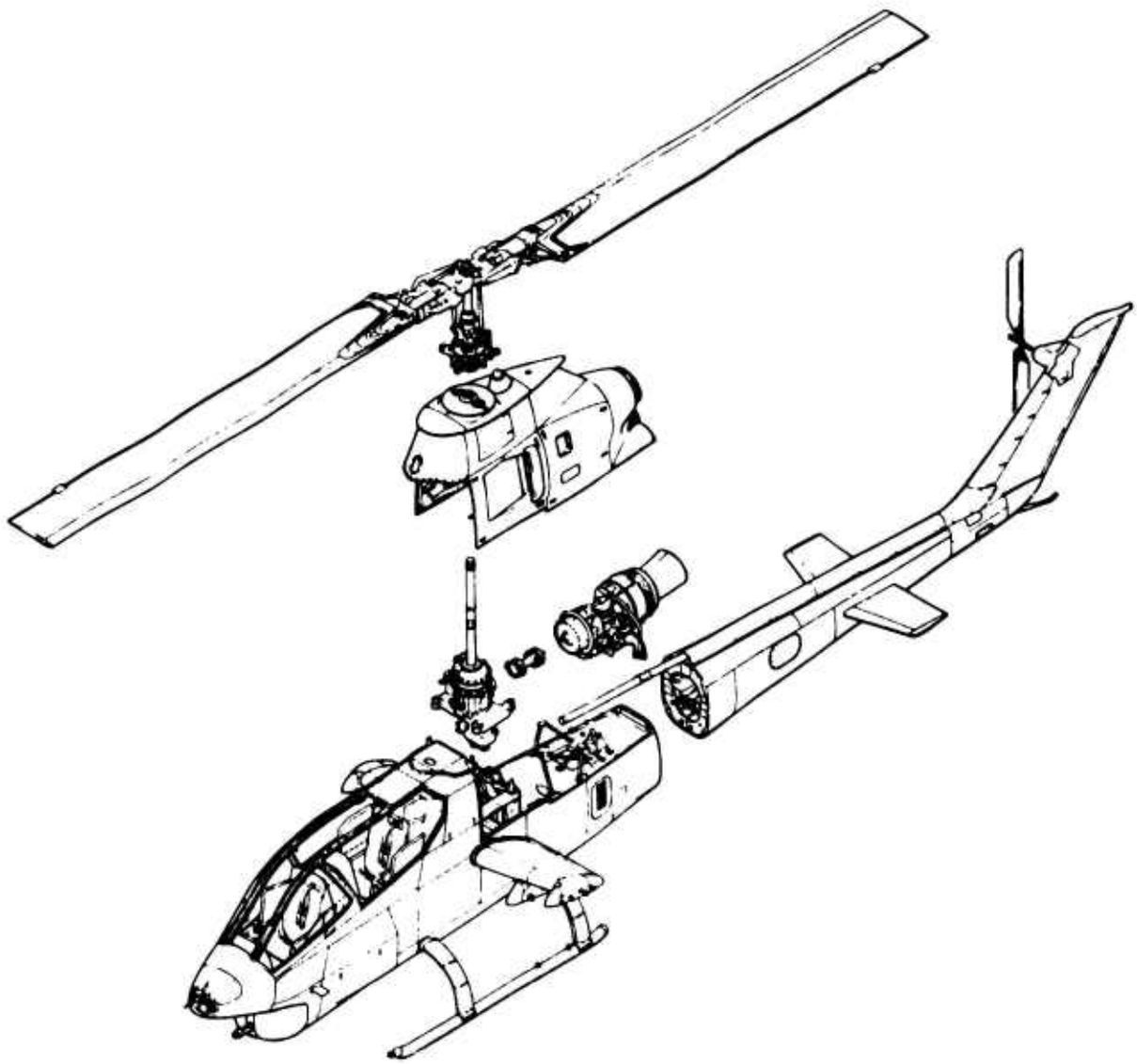
Both of these goals satisfy needs stemming from experiences in which results of modern analysis and computation fell short of realizeable desires or targets owing to poor analysis management. There has been little aversion to applying scientific management to large hardware programs. But there has been an aversion to applying it to the development and use of large, complex analyses, the NASTRAN development being a notable exception. As a result, many analyses serve only medially for a short time in the locale where they are developed, rather than serving well over a long period and a wide geographical area.

History has shown that a major weapon system which does a good job and can grow stays in the DOD inventory for a long time; 20 years is common. During this period, the system is the object of study and experiment many times. At different times and places many groups are involved representing the prime contractor, subcontractors, and the government. Sometimes the common data being coordinated is as simple as the latest drawing. Increasingly, however, the common data should be a sophisticated computer program, for instance, a NASTRAN model for computing the stress, sighting error, and comfort degradation produced by a larger caliber machine gun on the AH-1G. This procedure can coordinate widely separated teams and "system optimization" becomes a meaningful word and exercise.

Such a program must be rational, visible, teachable, changeable, useable, and accurate; and it must be developed, disseminated, and maintained efficiently. We are well into the period in which such modeling is possible; however, it is not yet commonplace. The study of this report takes two major steps toward this goal.

1.2 HOW TO USE THIS REPORT

The input data deck for the AH-1G airframe model is systematically arranged to be easily used by someone familiar with NASTRAN. The unsorted Bulk Data listing is included in Section 8. of this report and is preceded by an outline describing the organization of the deck. Together, the outline and input data listing should enable someone familiar with NASTRAN to use the model or modify it with a minimum need for reference to the body of this report.



Exploded View

Figure 1-1. Bell Model AH-1G Helicopter

Supplementary computer programs used in developing input data for the NASTRAN model are (1) the weight distribution program, described in Reference 1, and (2) BANDIT, a grid point resequencing program described in Reference 2.

The organization of the report is outlined below.

(1) The Preface serves as an introduction to the detailed documentation of the stiffness model and includes the following:

(a) identification of the actual AH-1G airframe structure used in the modeling,

(b) a general discussion of the idealization of parts of the airframe structure into a finite element model,

(c) a discussion of modeling philosophy and techniques and assumptions used in the modeling, and

(d) a listing of symbols and modeling techniques used in the detailed description of the stiffness model.

(2) Stiffness Modeling - The stiffness model is described in detail by drawings and sketches organized in a manner similar to the design drawings for the helicopter, however depicting the finite element model instead of the actual structure. The Table of Contents serves as an index to the drawings describing the stiffness model. The drawings are organized as follows:

(a) FINAL ASSEMBLY - includes a NASTRAN plot of the complete airframe model showing the major assemblies of the model: Fuselage, Wings and Carry Through, and Tailboom and Vertical Fin.

(b) MAJOR ASSEMBLY - includes a NASTRAN plot of the major assembly with subassemblies identified; also included is an illustration of the actual structure represented by the major assembly.

(c) SUBASSEMBLY - includes a NASTRAN plot showing the location of the subassembly in the actual structure and is used for reference in locating the detail drawings.

(d) DETAIL - refers to a subassembly drawing and includes a symbolized sketch of structural elements and grid points in the model followed by tabular listings of the element properties, grid points and constraints.

(3) Weights Modeling

(a) The weight distribution program used to generate CONM2 cards for the NASTRAN model is described and the data created by the program is listed.

(b) The separate distribution of large weight items to the grid points of the model is described.

(4) A Structural Element and Grid Point Index serves as a cross reference for locating where an element or grid point in the NASTRAN data deck is described in the Stiffness Modeling section of the report.

(5) The Unsorted Input Data Listing for the NASTRAN model and a normal modes run on Rigid Format 3 (see Section 3.1 of the User's Manual, Reference 3) are included in Section 8. Also included are deformed plots of the computed elastic modes below 30 Hertz.

2. PREFACE

In the following sections the actual structure is described, the idealization of the structure is discussed in general, and assumptions and modeling philosophy used in the idealization are presented. Modeling techniques used repetitively are listed and are referenced later in the stiffness modeling section.

2.1 DESCRIPTION OF THE AH-1G HELICOPTER AIRFRAME STRUCTURE

The actual structure for the latest production configuration of the AH-1G helicopter (identified as FY71 AH-1G ship number 21123) is described in this section. The descriptions are intended to be brief with a liberal use of figures to identify the basic structure used in the analysis. The reader can find more detailed descriptions in References 4 through 6. For reference, a basic lines drawing of the AH-1G helicopter is shown in Figure 2-1.

The areas of the airframe structure in the order they are discussed are

(1) the fuselage,

(2) the wings and carry through, and

(3) the tailboom and vertical fin.

2.1.1 Fuselage

The fuselage structure with panels removed is illustrated in Figure 2-2. The section cuts between bulkheads show the basic structure used in the stiffness modeling. Structure assumed not effective in the stiffness of the fuselage follows:

(1) the canopy

(2) cowling around the engine and main rotor pylon

(3) access panels at contour (FS 61.25 to 213.94)

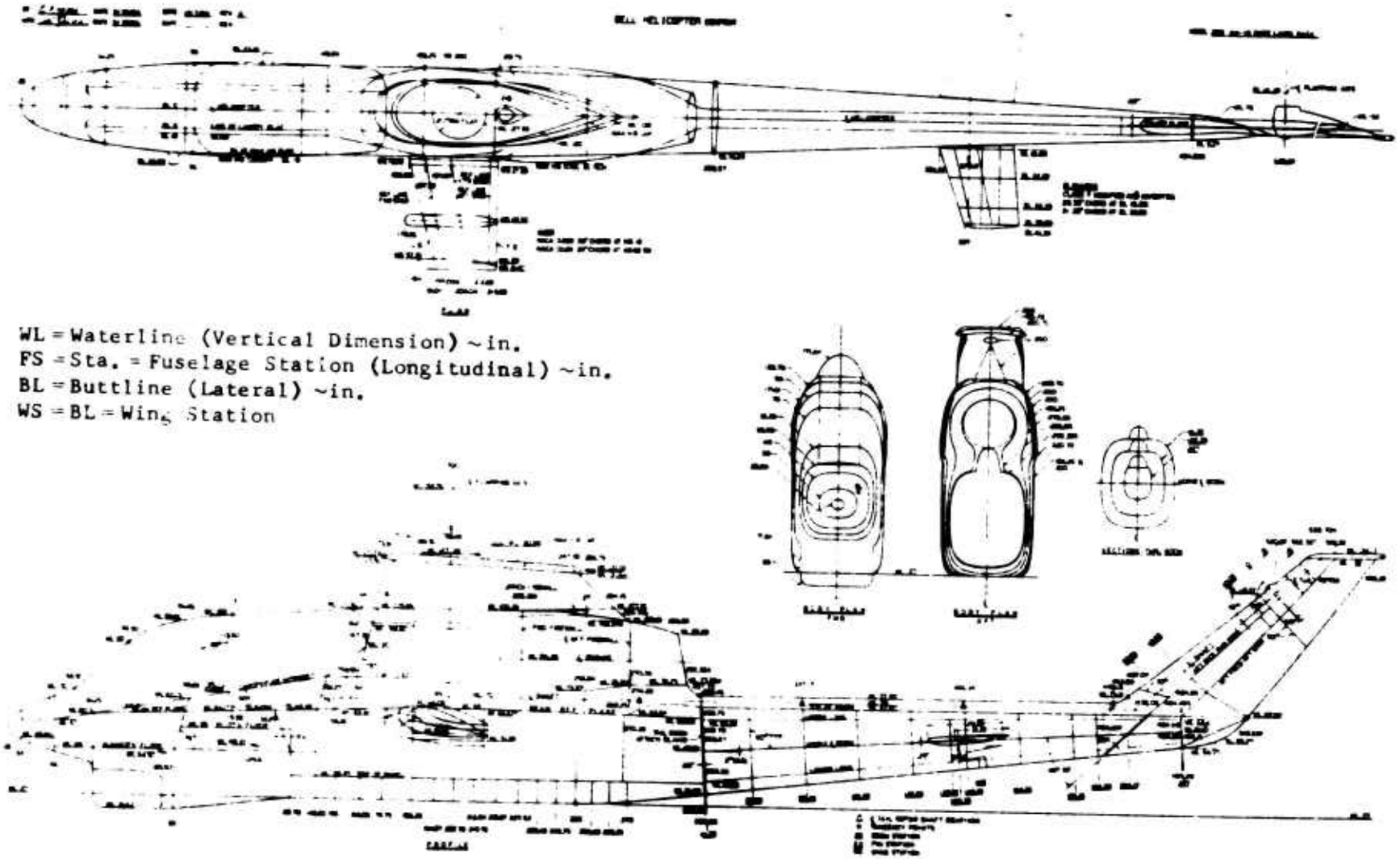
(4) doors on the ammo bay (FS 93. to 138.7)

(5) top access door on the nose (FS 33 to 46)

(6) drive shaft connection of the engine to the main transmission

These assumptions are based on experience with the AH-1G structure and on results from the testing and analysis of the AH-1J helicopter (similar to the AH-1G) described in Reference 7.

The structure is built around the main beams running the length of the fuselage (FS 61 to 300). The beams are made up of vertical webs and upper and lower caps. The left-hand main beam is shown by the shaded area in Figure 2-2. The main beams give the primary vertical bending stiffness in the fuselage structure and differential bending of the main beams provides torsional stiffness in the open sections of the forward fuselage (FS 61 to 138).



WL = Waterline (Vertical Dimension) ~in.
FS = Sta. = Fuselage Station (Longitudinal) ~in.
BL = Buttline (Lateral) ~in.
WS = BL = Wing Station

Figure 2-1. AH-1G Helicopter - Basic Lines

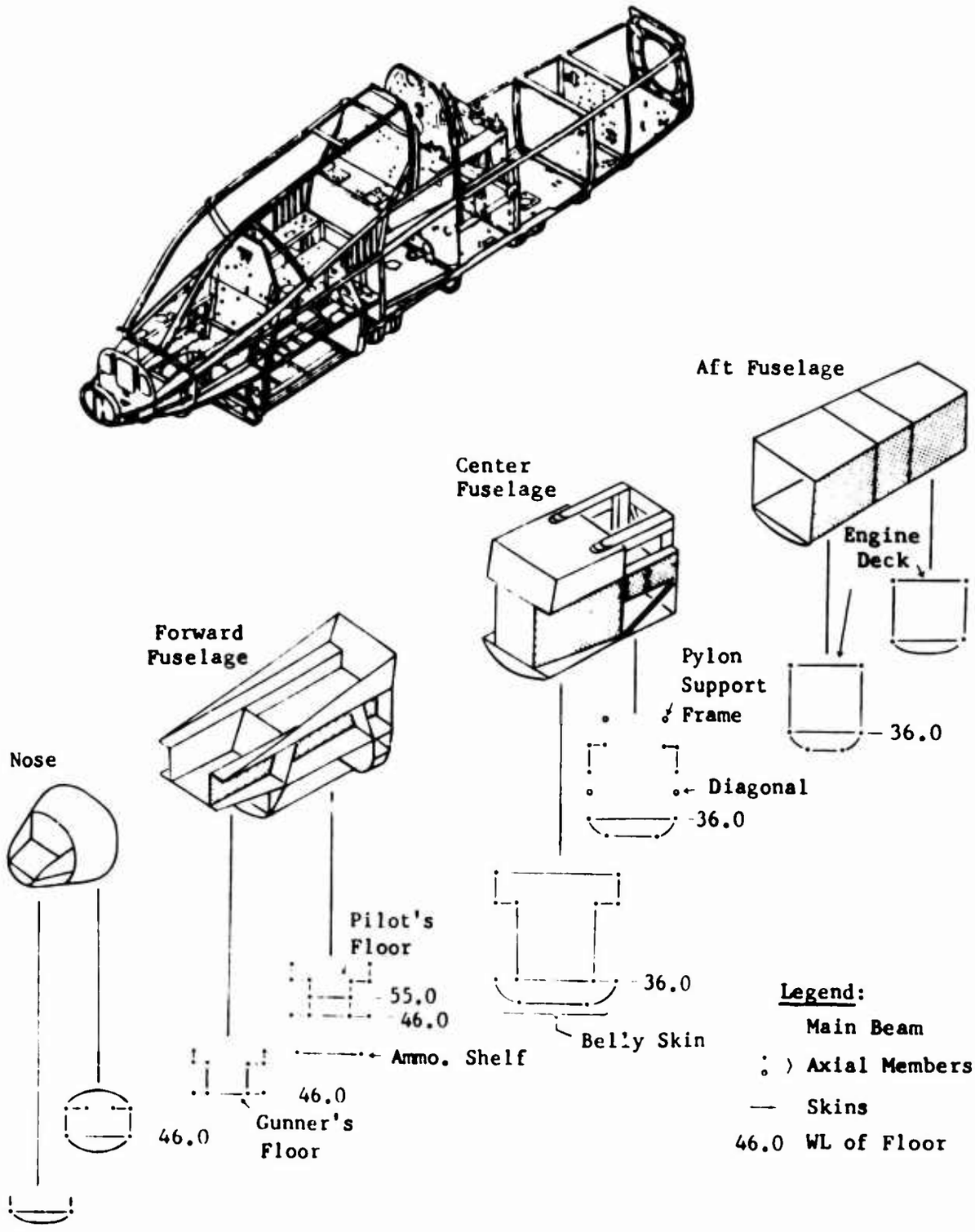


Figure 2-2. Bending Sections of the Fuselage Structure

The main beams are tied together by the lower horizontal floors (FS 46 to 138, WL 46; FS 93 to 138, WL 55; FS 138 to 300, WL 35.97), the forward fuel cell cover (FS 152 to 186, WL 77.), and the engine deck (FS 213 to 300, WL 65) to give the fuselage lateral stiffness. The torsion sections are closed in the forward fuel cell area (FS 148.5 to 186) and the aft fuselage (FS 213 to 300) but open on top of the main beams in the main rotor pylon and wing area (FS 186 to 213).

The ammo shelf (FS 93 to 138, WL 27) does not significantly affect the vertical or lateral bending stiffness of the fuselage structure but does influence the torsional stiffness because of the shear tie at the FS 93 bulkhead.

The XM-28 gun turret shown in Figure 2-3 is mounted under the gunner's floor (FS 61.25 to 93.). Four fittings distribute the recoil loads into the main beams.

The main rotor pylon located at FS 200 above WL 65 provides the structural tie between the main rotor and the fuselage. It is attached to the fuselage through five elastomeric mounts and a lift link. The mounting arrangement is shown in Figure 2-4. This lift link is the primary vertical load path and is pinned to the center wing carry through beam or "lift beam." The elastomeric mounts are designed to produce low pylon rocking frequencies to isolate the main rotor in-plane vibratory loads from the fuselage and to react the main rotor torque.

The engine mounting on the WL 65 deck of the fuselage (FS 228. to 268.) is shown in Figure 2-5. The mounting is statically determinant with a single strut at the forward left-hand mounting pad, a tripod at the aft left-hand mounting pad and a bipod at the right-hand aft mounting pad.

The landing gear connected to the fuselage at FS 152. and 223. is shown in Figure 2-6. It consists of two energy absorbing cross tubes and skids. The skid gear is attached to the fuselage with pinned connections on the cross tubes at BL ±13.5.

2.1.2 Wing and Carry Through

The wings on the AH-1G are designed primarily as stores supports, not as aerodynamic lifting surfaces. The wings and carry through structure are shown in Figure 2-7. The stores attachment points are at BL 42.5 and 60.

The wing is a two-cell box structure having aluminum skins, three spars and three ribs. The carry through consists of three beams that are attached to the three wing spars by pinned connections at the fuselage contour. The forward carry through beam is attached to the FS 186.25 bulkhead. The center carry through beam or "lift beam" is attached at the fuselage contour and is pin connected in the center to the lift link. The aft spar carry through is attached to the FS 213.94 bulkhead.

2.1.3 Tailboom and Vertical Fin

The tailboom and vertical fin structure are shown in Figure 2-8. The tailboom is bolted to the fuselage at four attachment fittings located at the four main longerons of the tailboom and the four main beam caps of the fuselage.

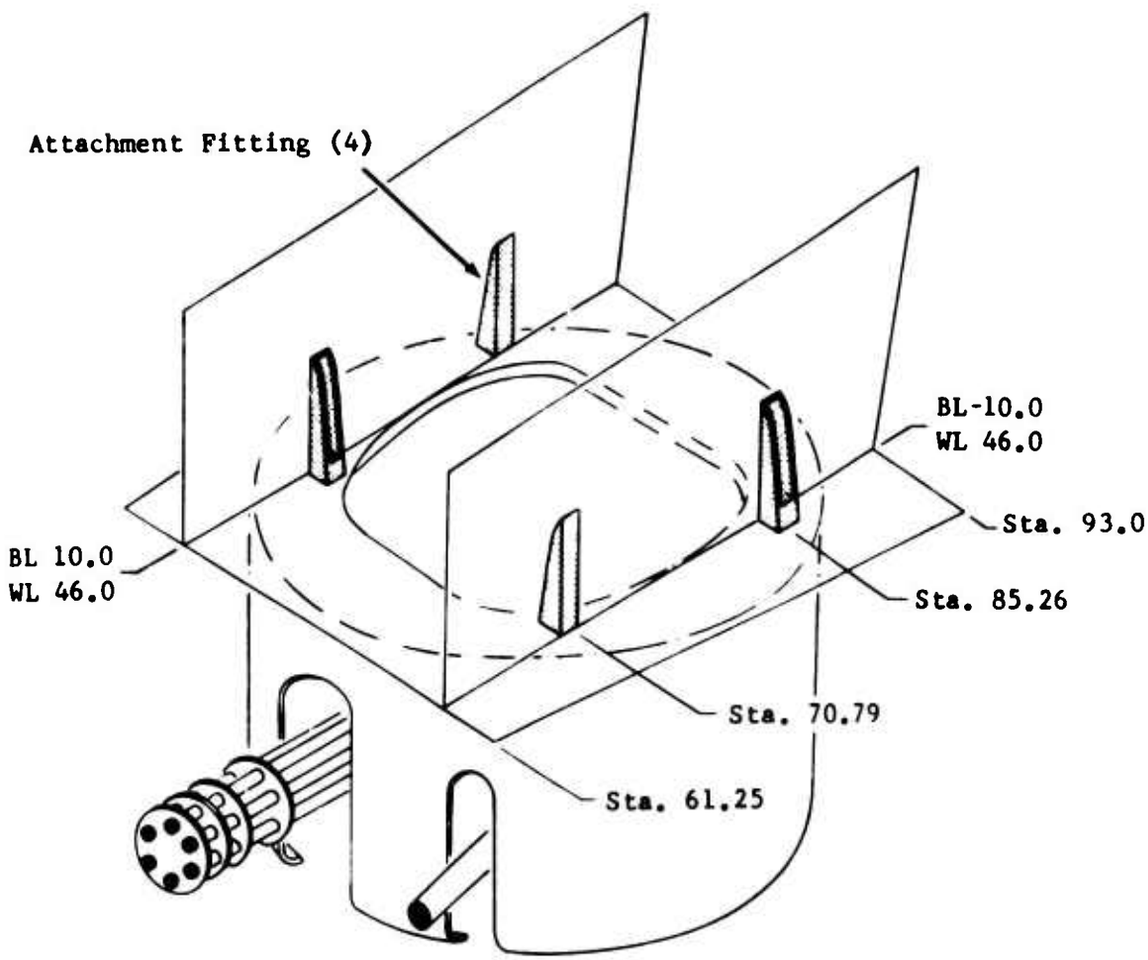


Figure 2-3. Gun Turret Attachment Fittings

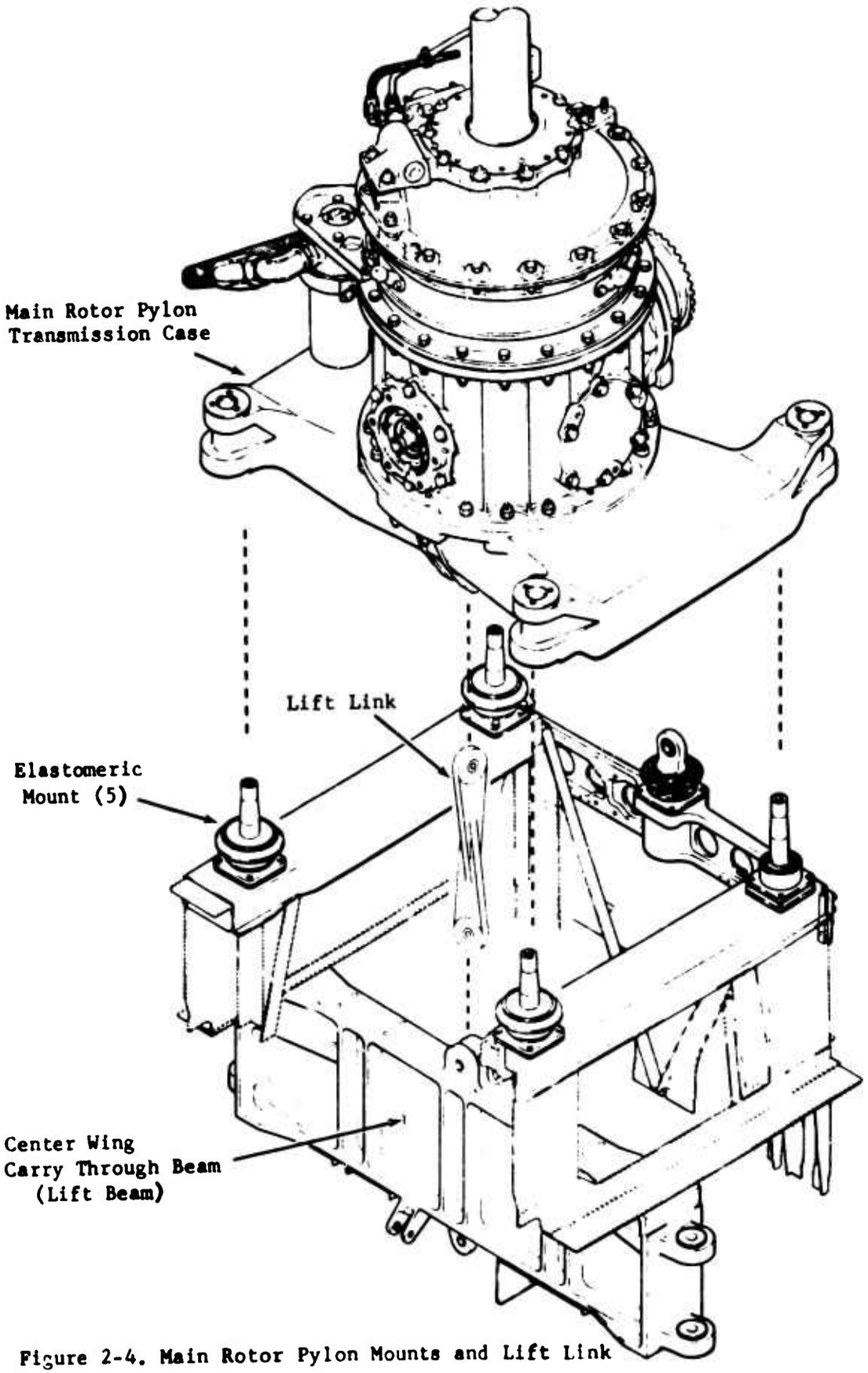


Figure 2-4. Main Rotor Pylon Mounts and Lift Link

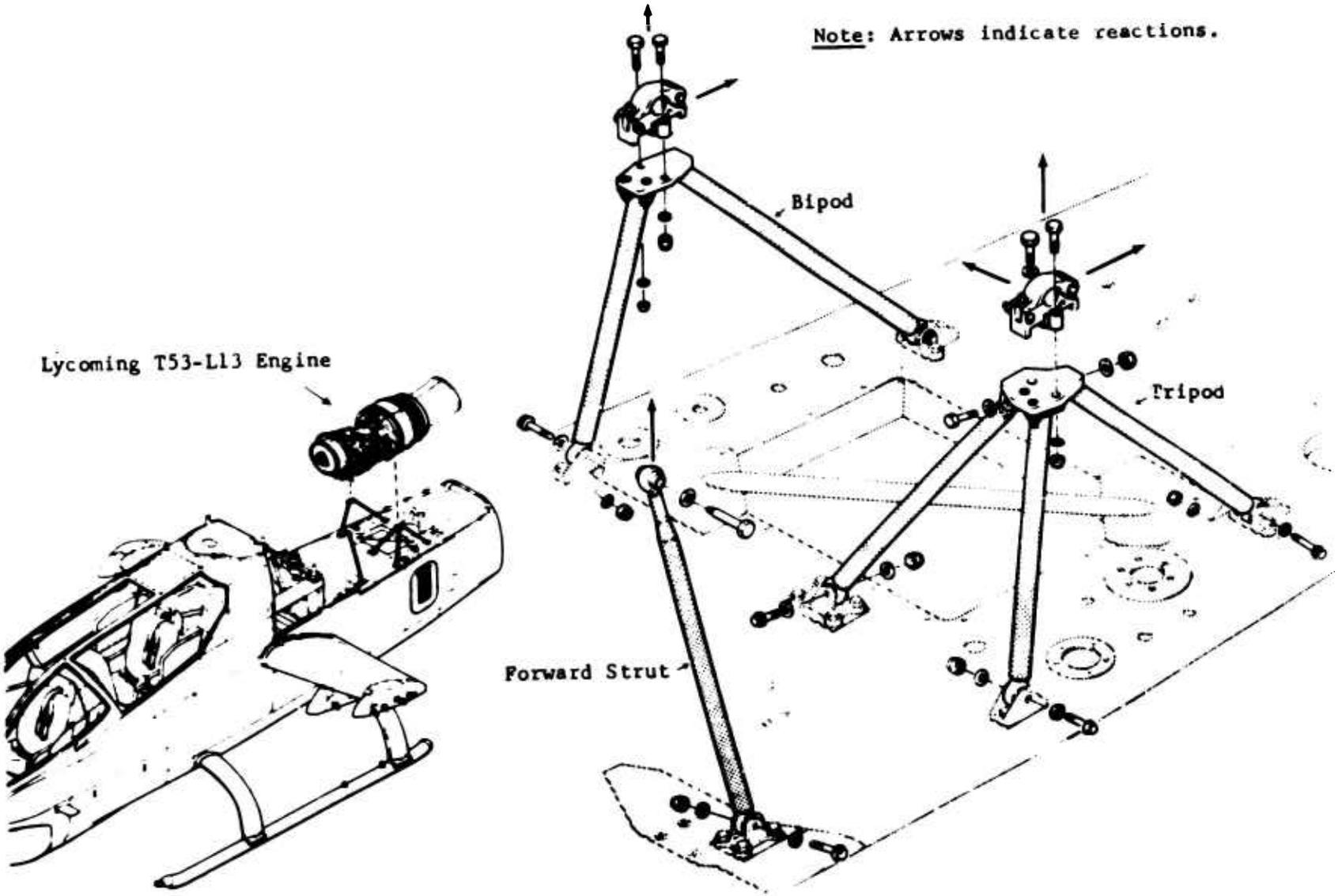


Figure 2-5. Engine Mounts

Note: Arrows indicate attachment points to the fuselage.

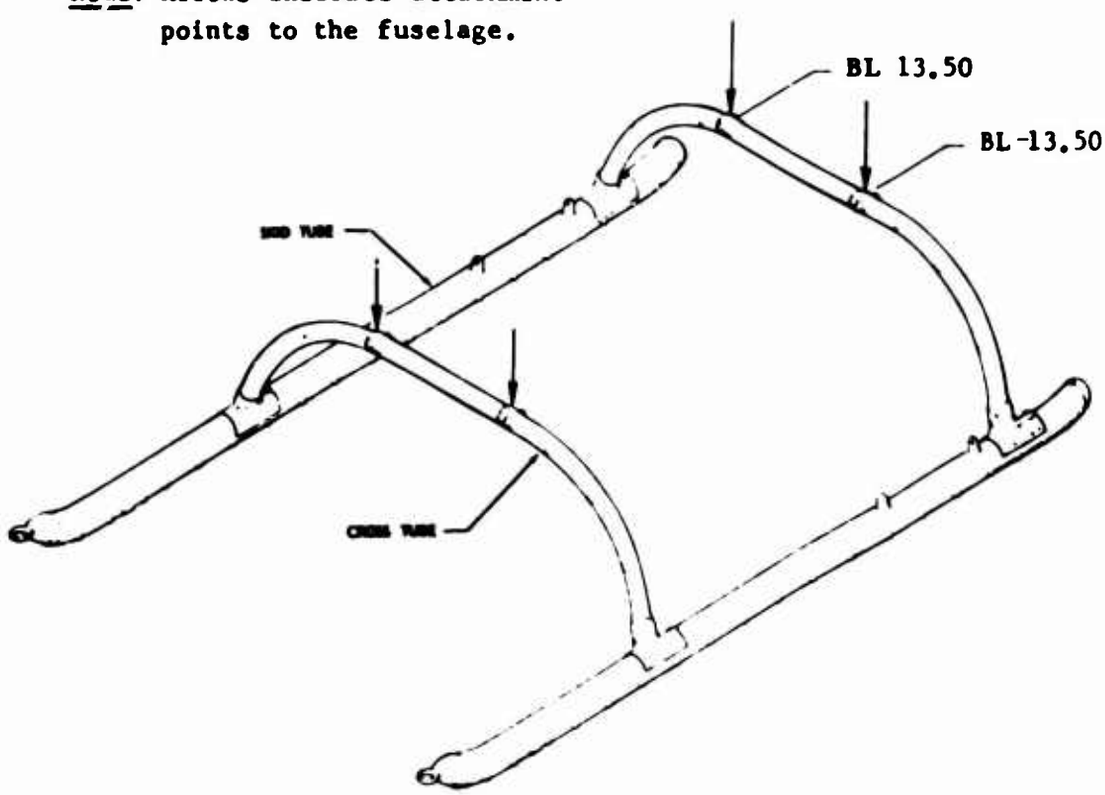


Figure 2-6. Skid Landing Gear

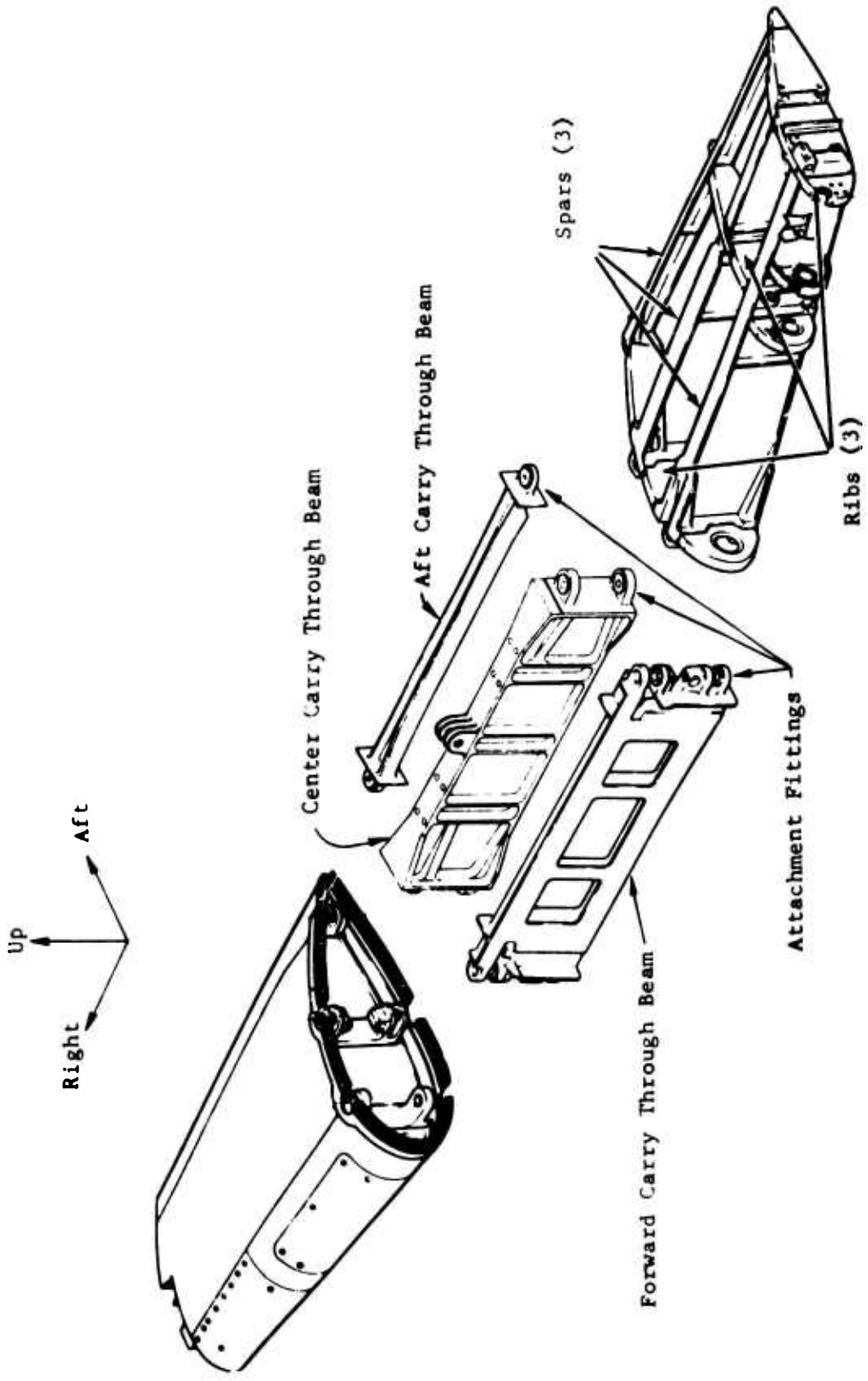


Figure 2-7. Wing and Carry Through Structure

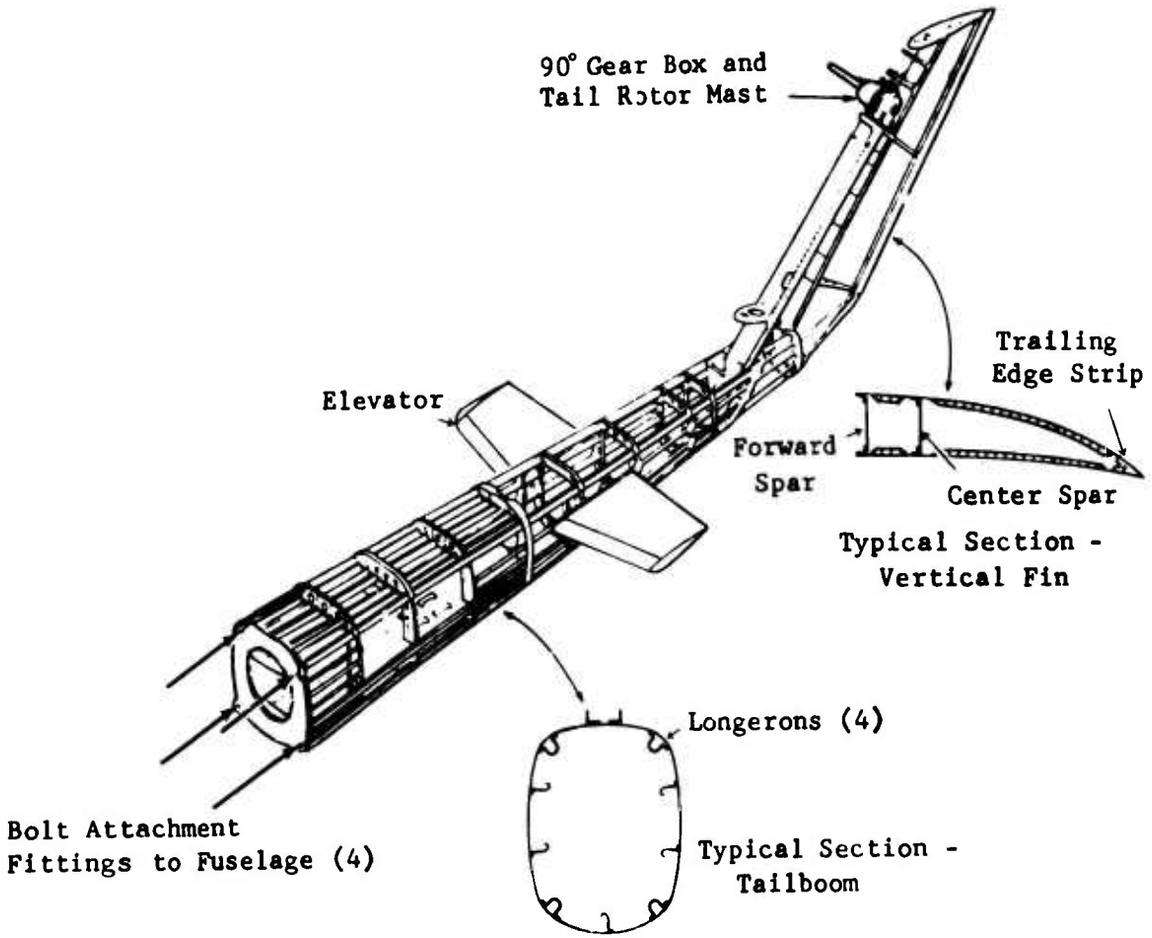


Figure 2-8. Tailboom and Vertical Fin

The tailboom is of semimonocoque construction having aluminum skins, stringers and longerons. The longerons and stringers are supported by bulkhead frames spaced down the length of the boom. A typical cross section of the tailboom is shown in Figure 2-8. The hinged tail rotor drive shaft cover on top of the boom is assumed nonstructural.

The vertical fin has a two cell cambered airfoil section with two spars and a trailing edge strip. The hinged tail rotor drive shaft cover on the front of the fin is assumed nonstructural as well as the top portion of the fin which extends above the 90 degree gearbox. A typical fin cross section is shown in Figure 2-8. The 90 degree gearbox and the tail rotor mast shown in Figure 2-8 provide the connection between the tail rotor and the top of the vertical fin structure. The tail rotor mast is supported on bearings inside the gearbox and the gearbox is bolted to the top of the fin.

The movable elevator is connected to the tailboom by pitch bearings at BS 140.35. The elevator and carry through are shown in Figure 2-9. The elevator and carry through structure consists of a single tubular spar. Four ribs covered by a sheet skin making up each elevator surface are connected to the spar.

2.2 IDEALIZATION OF THE AIRFRAME STRUCTURE

This section contains a basic description of the idealization of the airframe structure into a finite element model. The details of the idealization are presented in the stiffness modeling section.

The emphasis in the idealization is on developing a model adequately representing the low frequency vibration modes of the airframe with the fewest degrees of freedom possible. Representation of the fuselage and wing structures in the areas of the XM-28 gun turret and the wing stores is given special attention. The gun turret and stores themselves are represented as rigid masses, as are the main and tail rotors, the engine, and useful weight items such as the crew, fuel and ammunition.

The complete model, shown in Figure 2-10, consists of structural elements from the NASTRAN library (see section 1.3 of the User's Manual) such as scalar springs, rods, bars, shear panels, triangular and quadrilateral membranes. There was no use of General Elements, substructuring, or DMAPing in the model. Symmetry could not be used because of unsymmetrical sections in the fuselage and the tail rotor offset to the right side. The table below shows the degrees of freedom before and after constraints and partitioning were applied (see section 1.4 of the User's Manual).

Stiffness Matrix	Degrees of Freedom	Description
K_{gg}	2940	Unreduced size
K_{nn}	2699	After applying MPC equations
K_{ff}	1714	After applying SPC's
K_{aa}	241	After partitioning with OMIT's
K_{ll}	235	After applying free body SUPORTs

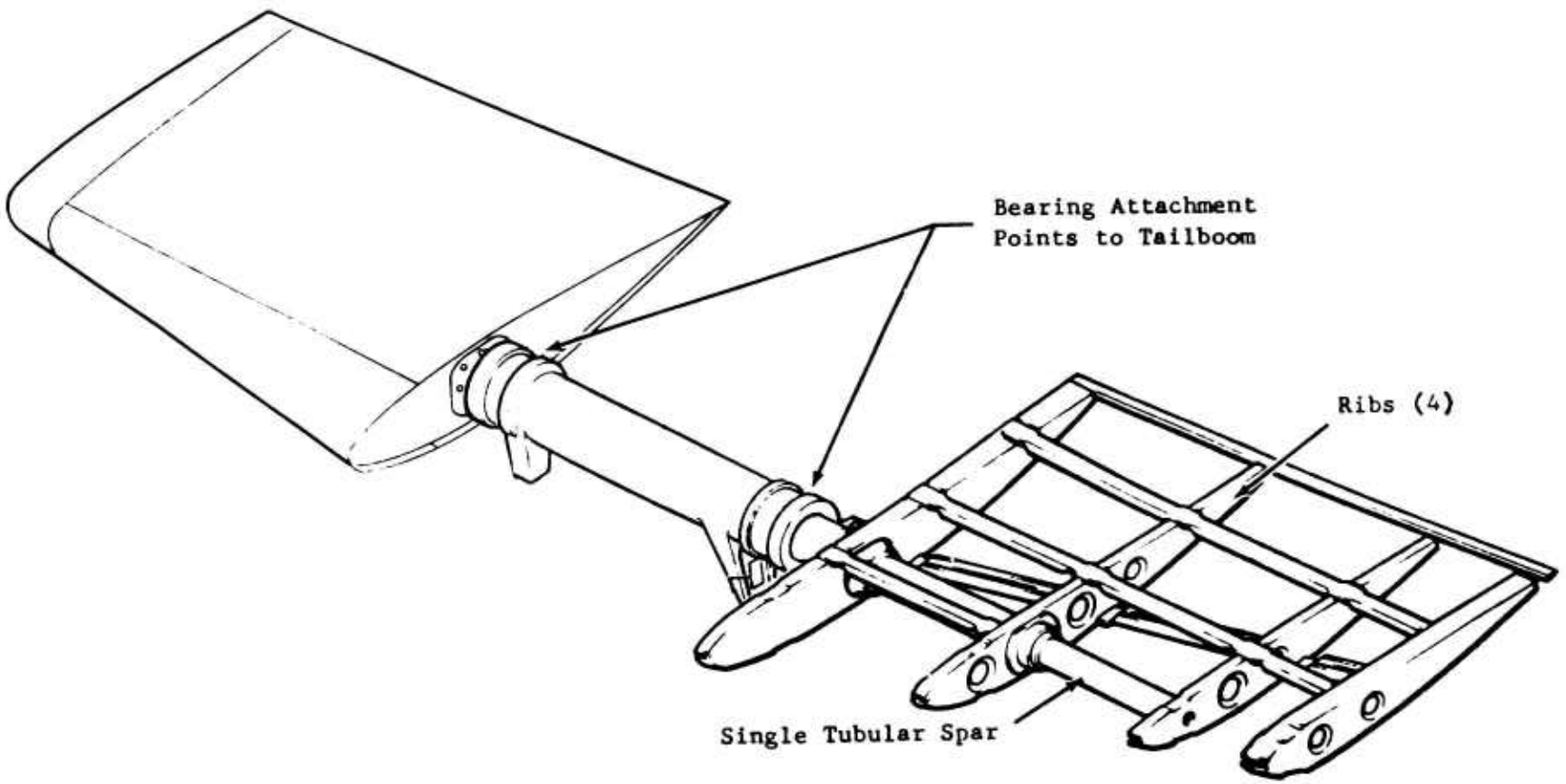


Figure 2-9. Elevator Structure

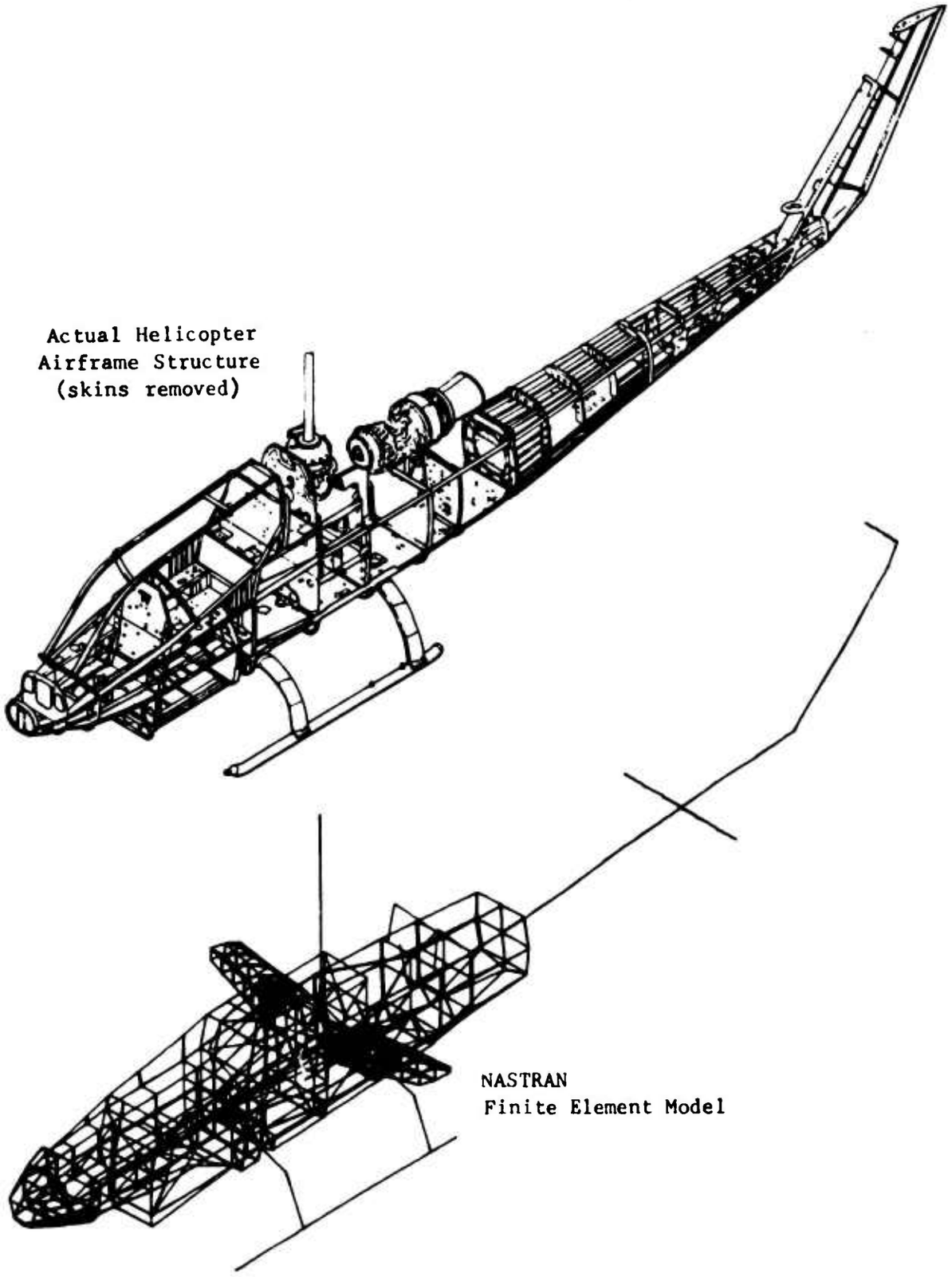


Figure 2-10. NASTRAN Model of the AH-1G Helicopter Airframe

Idealization of major portions of the airframe structure shown in Figure 2-11 are described below.

- The fuselage is a built-up idealization using primarily rods and shear panels in the bending sections. Instead of using an elastic line or 'beam' representation, build-up modeling is used because of the complex structure in the foward and center fuselage areas. The forward fuselage has open sections making it difficult to calculate the elastic axis and torsional stiffness properties important in determining the structural response to lateral gunfiring. In the center fuselage, where the wing carry through, pylon support and fuselage structures intersect, built-up modeling is required to represent the complex redundant structure. The primary fuselage bending structure is modeled with rods and shear panels. The belly structure is also modeled with rods and shear panels except where triangular membranes are required due to geometry. The nose structure skins are modeled with membranes, and bulkheads are modeled with membranes surrounded by rods. MPC equations representing rigid elements are used to tie the landing gear, tailboom and gun turret mass to the fuselage. Bar elements are used only for the pylon support structure.

- The wings and carry through are built-up idealizations because of the complex interface between these structures involving pinned connections at the fuselage contour. The wing spar caps, carry through beam caps and attachment lugs are modeled with bars and the spar and beam webs with shear panels and rods. The wing skins are representated by quadrilateral membranes which preserve the beamwise (vertical) bending and torsional stiffness but are somewhat too stiff in chordwise (fore-and-aft) bending. The pinned connections at the attachment lugs are modeled with MPC equations.

- The tailboom and vertical fin are modeled as elastic lines using bar elements with calculated bending and torsional stiffness properties. The elastic axis is assumed to be on the geometric center of the tailboom and along the center spar of the vertical fin (refer to Figure 2-8 for typical sections). In the stiffness calculations, all skins are assumed effective. The change in bending section properties for the tailboom under severe maneuver conditions is also calculated and shown in the Stiffness Modeling section. By using an elastic line model, the bending stiffness changes for maneuver conditions can easily be incorporated by changing only the nine bar property cards representing the tailboom. The effective skin for the vertical fin having sandwich panels will not change for maneuver conditions.

- The elevator is modeled with bars and is pin connected to the tailboom at the bearing locations. Stiff bars are used to tie the tailboom elastic line to the bearing supports.

- The tail rotor mast is modeled with bars and pinned at the bearing supports in the 90 degree gearbox. Stiff bars are used to tie the fin elastic line to the bearing supports.

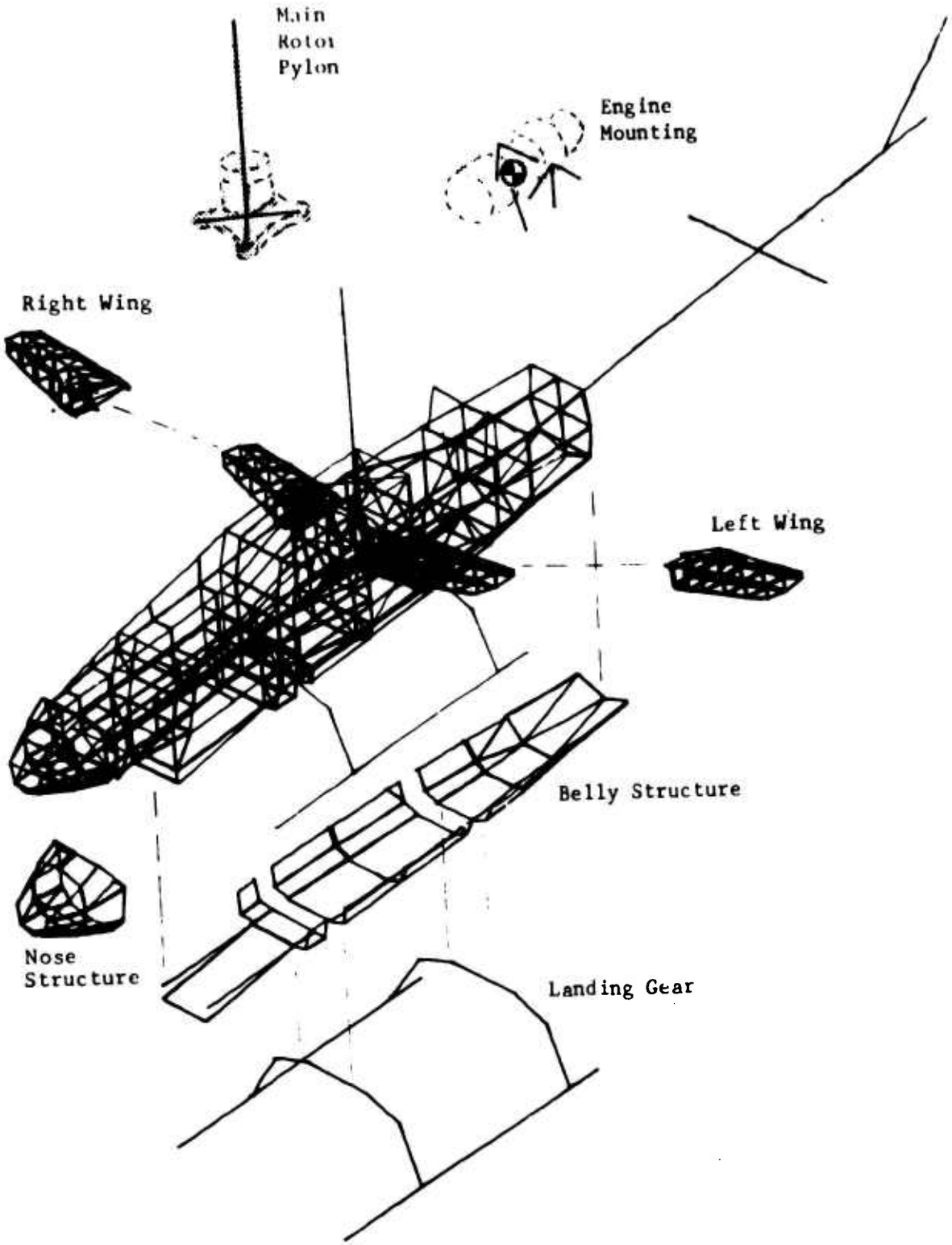


Figure 2-11. Exploded View Showing Major Areas of the NASTRAN Model

- The main rotor pylon is modeled as an elastic line using bar elements. The mast is pinned to the transmission case at mast bearing locations. The elastomeric pylon mounts are modeled with scalar spring elements, and MPC equations are used to tie the transmission elastic line to the mount locations. The lift link is represented with a bar, pinned and rigidly offset from grid points on the transmission and lift beam.

- The engine mounting is modeled with rods and MPC equations. The elastic mounts are represented by rods and tied to the rigid engine c.g. with MPC equations. The bottom attachments of the mounts are related to motions of the plane of the engine deck by MPC equations.

- The landing gear is modeled with bar elements representing the cross tubes and skid tubes. The cross tubes are tied to the fuselage with MPC equations.

The weights modeling is discussed under Modeling Philosophy and the actual mass data (CONM2 cards) and modeling techniques are described in the Weights Modeling Section.

2.3 MODELING PHILOSOPHY

The objectives in the modeling are to preserve the low frequency (below 35 Hertz) vibration modes of the AH-1G airframe and to predict structure deflections when firing the XM-28 gun turret and wing stores.

To meet these objectives it is important that the stiffness of the structure be accurately modeled. This means that much of the stress analysis documentation on the AH-1G cannot be used. A stress model can be conservative without representing the structure stiffness accurately but a dynamic model cannot be. The structure documented in stress analysis reports often does not include such things as

(1) effective stiffness areas of axial members (usually minimum areas are used),

(2) doublers,

(3) angles or flanges tied to primary structure caps or axial members used for attaching nonstructural fairings, cowlings, covers, etc., and

(4) secondary structure such as: equipment shelves, external structure used to distribute airloads to primary structure, removable panels, etc.

The sections effective in the stiffness of the fuselage structure could be derived only by referring directly to the design drawings rather than using stress reports. The tailboom sections, however, are taken directly from an AH-1G stress report, Reference 5, with all skins effective in the stiffness calculations.

It is difficult to explain all the judgments made in the stiffness idealization of the structure because the basis for each of the judgments often depends on the artistic skill of the modeler and what has been found to work from past experience; an example would be determining how fine the model must be so that an adequate representation is achieved without causing excessive loss of numerical accuracy due to unnecessary computations. However, some guidelines and techniques generally used in the modeling and requiring some explanation are discussed below.

- In the built-up modeling of the fuselage, grid points are located at the intersection of panels. This is done since the axial members (rods) are generally easier to relocate to the grid point than shear panels or membranes.

- In bending sections, such as the main beams, relocating rods with centroids offset from the grid point is done by calculating an effective area that preserves the area moment of inertia of the beam about its neutral axis.

- In sections of the fuselage where the offset of the rod centroid affects both lateral and vertical bending stiffness, the effective rod area is calculated to preserve the vertical bending stiffness. The vertical stiffness which directly affects the vertical vibration of the crew as well as the vertical and pitch vibration of the wing stores is considered more critical than the lateral. Also, preserving the torsional stiffness (primarily differential vertical bending of the main beams) in the open sections of the forward fuselage is important for the structural response to lateral firing of the XM-28 gun turret.

- When modeling bulkheads, where preserving the bending stiffness in the plane of the bulkhead is not significant in the overall airframe bending stiffness, axial members around the periphery were relocated to the grid points with no change in area.

- For caps or axial members with varying cross sectional areas between grid points, average areas were used as the effective rod areas.

- When modeling panels with rods and hear panels, effective rod areas are calculated to preserve either the inplane bending inertia or the total cross sectional area of the panel, or both. The methods used for calculating the rod areas are described under Stiffness Modeling Techniques Used Repetitively.

- When modeling panels where it is important to represent the inplane bending stiffness adequately, shear panels surrounded by rods are used instead of quadrilateral membranes. The shear panel elements in NASTRAN contribute no significant inplane bending stiffness and react only shears. The inplane bending stiffness of the panel is represented by the surrounding rods. The quadrilateral membrane element, on the other hand, is considerably too stiff for inplane bending unless many elements are used. For example, at least three elements are used across the width of a beam or spar web and, as a general rule, the aspect ratio of the element is kept less than 2.0. Triangular membranes are used where geometry prohibits the use of quadrilateral elements.

- The inner skins of joggled sandwich panels are added to the outer skin without considering the offset. The skin in the joggled portion is assumed not effective.

In determining the undamped free vibration modes of the helicopter airframe structure, the weight distribution must be modeled properly as well as the stiffness distribution. The distribution of the hundreds of weight items in the helicopter to the grid points of the finite element model can be a very tedious operation; therefore, the distribution of most of the weight items is done automatically by an in-house computer program (Reference 1). Large weight items that significantly affect the low frequency vibration modes of the airframe are distributed separately by the modeler. These large weight items include the gun turret, main and tail rotors, main transmission, engine, and useful weights such as the crew, fuel, ammunition and stores. A more detailed discussion of the distribution of weights is included in the Weights Modeling section.

After idealizing the structure into a stiffness model and distributing the weights to grid points, constraints are applied to the unreduced NASTRAN model to reduce the number of degrees of freedom to an acceptable analysis size for the Givens eigenvalue solution. Constraints and partitioning techniques (reference Section 1.4 of the User's Manual) applied to the model are summarized below.

(1) SPC's are applied, removing degrees of freedom having no stiffness.

(2) MPC equations representing rigid elements, pin connections, etc. remove the dependent degrees of freedom of the equations from the model.

(3) Guyan Reduction (described in section 3.5.4 of the Theoretical Manual, Reference 8) performed via OMIT cards condenses out degrees of freedom with zero inertia properties or whose inertia properties can be rationally redistributed to others.

After reducing the degrees of freedom sufficiently, the Givens or Tridiagonal method of eigenvalue extraction (explained in the Theoretical Manual, Section 10.2) is used to compute the natural vibration modes and frequencies of the airframe. The Givens method which extracts all the eigenvalues of the analysis set requires a reduction to below 250 degrees of freedom for efficient run times on the IBM 360/65 computer at BHC.

The Inverse Power eigenvalue extraction method (discussed in the Theoretical Manual, Section 10.4) does not require the Guyan Reduction procedure; however, it operates on an analysis size six to ten times larger than Givens and extracts only one mode at a time. The time spent in Guyan Reduction, which is performed only once in an analysis, becomes comparatively small when several modes are required; the AH-1G airframe model has more than 40 modes below 50 Hertz.

A problem, however, lies in the reduction of the large system to the smaller without significant loss in accuracy of the dynamic characteristics of the model. Guidelines for using the Guyan Reduction technique in the modeling are listed under Stiffness Modeling Techniques Used Repetitively.

2.4 INTRODUCTION TO THE STIFFNESS MODELING

2.4.1 Symbols and Notation Used in the Stiffness Modeling

Use of the detailed documentation included in the Stiffness Modeling section has already been described briefly in Section 1.2; however, an explanation of the special symbols and notations used is required for easy reference and use of the detail drawings.

The detail drawings and corresponding data tables provide information about each structural element in the model and constraints at each grid point. The drawings show grid points and structural elements for a local area of the model. The symbols used on the drawing for different types of elements are shown in Table 2-1. The elements are marked with letters referring to one or more specific elements in the following element data tables. In addition to the element data tables, grid point tables provide information about constraints or reduction of specific degrees of freedom. Conventions used for numbering grid point and element ID's are defined in Table 2-2.

The following data tables are used in conjunction with the detail drawings.

(1) Rod Element tables include the CONROD element identification number (ID), a type, the actual cross sectional area, offsets of the area centroid from the grid point, and the final area used in the model. The types of Rod Elements are the following:

(a) Cap - axial load carrying member in a beam or spar
(b) RSP1, RSP2, RSP3 - rod used with a shear panel (explained in Section 2.4.2)
(c) Doubler
(d) Frame - used primarily around bulkheads
(e) Fitting - used for the gun turret attachment fittings

(2) The Shear Panel and Membrane Element tables include CSHEAR, CTRMEM, and CQDMEM element ID's, type, and thickness. The types used are the following.

(a) Inner skin
(b) Outer skin
(c) Interior skin (or doubler)
} for sandwich panels
(d) Bulkhead
(e) Web
(f) Skin

(3) The Bar Element tables include the CBAR element ID, cross sectional area, area moments of inertia, and torsional stiffness constant. References to notes following the tables are used to indicate bar offsets or pin flags.

(4) The Scalar Spring Element tables include the CELAS2 element ID, the direction of the element, and spring rate.

TABLE 2-1. ELEMENT SYMBOLS USED IN THE DETAIL DRAWINGS

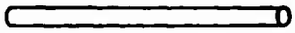
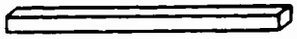
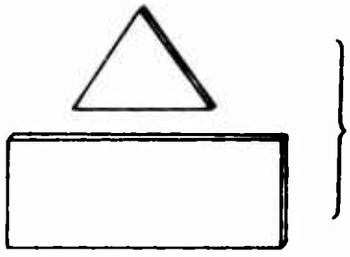
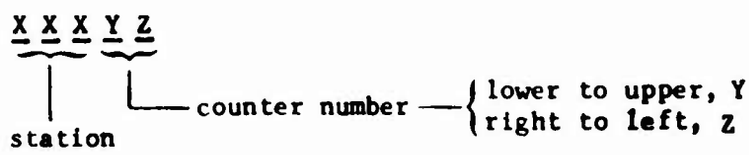
Symbol	Description
	Grid Point (GRID)
	Rod Element (CONROD)
	Bar Element (CBAR)
	Shear Panel Element (CSHEAR)
	Membrane Plate Element (CQDMEM / CTRMEM)
	Scalar Spring Element (CELAS2)
	Rigid Element (MPC)

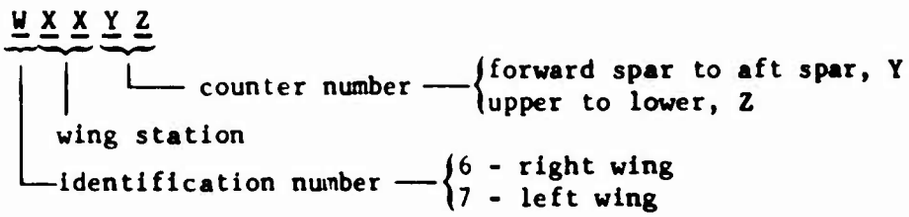
TABLE 2-2. ID NUMBERING CONVENTIONS USED IN THE MODELING

I. GRID POINTS

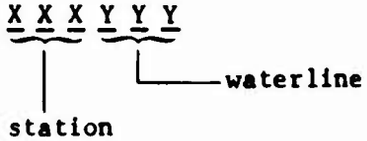
A. Fuselage, tailboom, vertical fin, elevator



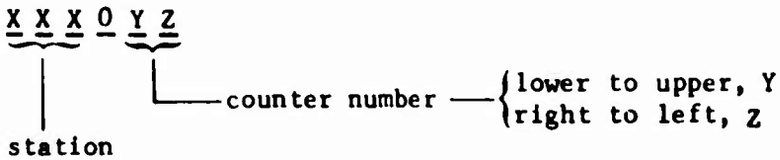
B. Wings



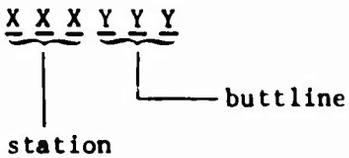
C. Main rotor mast/transmission



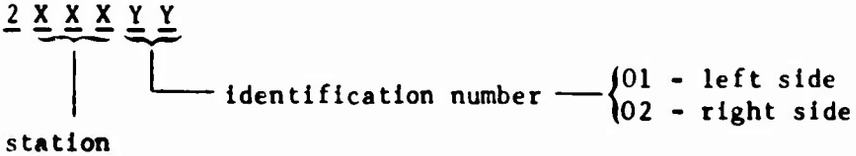
D. Main rotor transmission case support



E. Tail rotor mast/gearbox



F. Skid landing gear



G. Engine mounts

1 X X X Y Z

- X X X: station
- Y: counter number — lower to upper, Y
- Z: counter number — right to left, Z

H. Engine

1 X X X 0 0

- X X X: station

I. Useful load cg's

X X X 0 0

- X X X: station

II. STRUCTURAL ELEMENTS

A. Fuselage

1. Doublers, caps, skins, useful load trusses, main rotor mast/ transmission, skid landing gear, engine mounts

X X X X X X Y

- X X X X X X: Last six digits of part number
- Y: counter number

2. Rods for shear panels

X X X X X Y Y

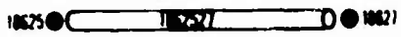
- X X X X X: Last five digits of shear panel part number
- Y Y: counter number

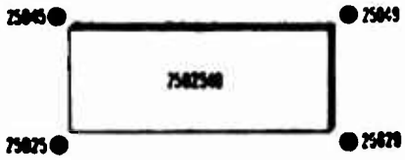
3. Bulkheads

X X X Y Y Z Z

- X X X: station
- Y Y: grid point counter number
- Z Z: grid point counter number

Examples:





4. Wing lugs

X X X Y Y 0 0

- XXX: station
- YY: grid point counter number
- 00: (fixed)

5. Main rotor pylon mount springs

X X X Y Y Z

- XXX: station
- YY: grid point counter number
- Z: coordinate (1 = X, 2 = Y = 3 = Z)

B. Empennage

1. Tailboom/vertical fin

X X X Y Y Y 0

- XXX: forward station
- YYY: aft station
- 0: (fixed)

2. Elevator - see II.A.3.

3. Tail rotor mast/gearbox - see II.A.1.

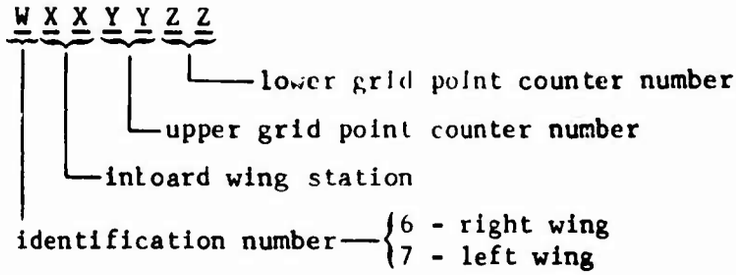
C. Wings

1. Spars caps

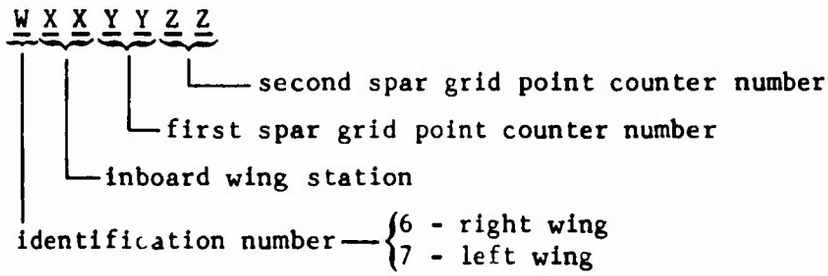
W X X Y Y Z Z

- W: identification number — 6 - right wing; 7 - left wing
- XX: inboard wing station
- YY: outboard wing station
- ZZ: grid point counter number

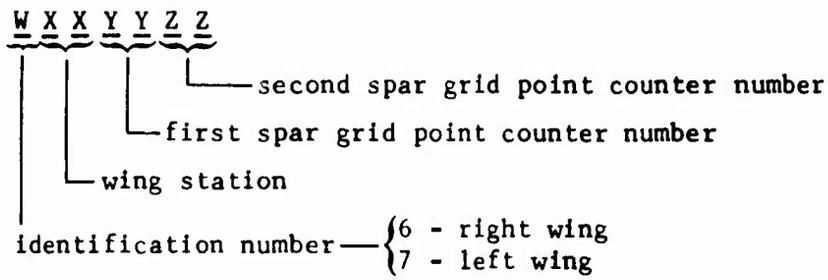
2. Spars webs



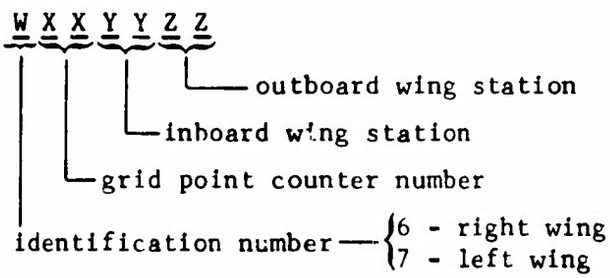
3. Skins



4. Ribs



5. Lugs



III. MISCELLANEOUS

A. Shear panel/membrane properties

1. Primary

X X X Y Y Y Y

material identification number

skin thickness in thousandths of an inch

2. Secondary

X X X X X

skin thickness in hundred-thousandths of an inch

B. Bar properties

X X X X X X X

bar element identification number

C. Materials

1. Primary

X X X X

alloy number

2. Secondary

X X

counter number

D. Coordinate systems for SPC's

X X X X X

grid point at which SPC's applied

(5) The Grid Point tables include information about SPC's, MPC's and OMIT's for the degrees of freedom at the grid points shown on the detail drawing. Rules listed in Section 2.4.2 are referred to in these tables.

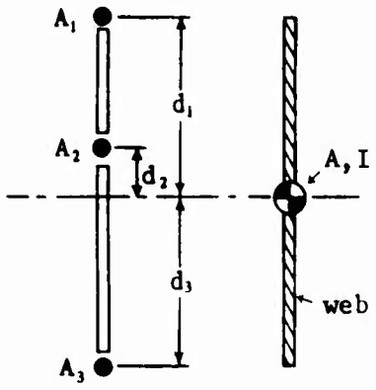
Notes are located on the detail drawing or after the data tables to explain modeling techniques that are not clear or need special explanation beyond that given in the tables.

2.4.2 Techniques Used Repetitively in the Stiffness Modeling

2.4.2.1 Types of Rod and Shear Panel Modeling Techniques

Shear panels surrounded by rods are used extensively in the modeling. Since the shear panels can only react shear loads in the plane of the panel, rods are required to react inplane bending and axial loads. Three types of modeling are used to calculate the rod areas surrounding the shear panel:

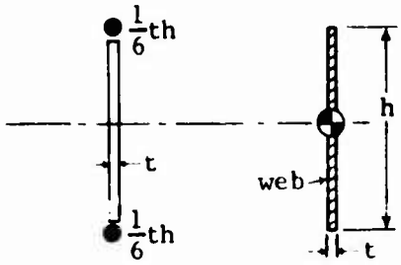
(1) RSP1 - is used when a beam web is represented with three rods and two shear panels. The rod areas are calculated to preserve the area, cg and moment of inertia of the web as follows:



$$\begin{Bmatrix} A_1 \\ A_2 \\ A_3 \end{Bmatrix} = \begin{bmatrix} 1 & 1 & 1 \\ d_1 & d_2 & d_3 \\ d_1^2 & d_2^2 & d_3^2 \end{bmatrix}^{-1} \begin{Bmatrix} A \\ 0 \\ I \end{Bmatrix}$$

(2) RSP2 - The shear panel cross sectional area is lumped at the rods to preserve the axial stiffness of the panel.

(3) RSP3 - The inplane bending moment of inertia of the shear panel or $1/12th^3$ is preserved by giving the rods an area of 1/6th.



Note that two different types of modeling are often used on one panel.

2.4.2.2 Rules for Multi-Point Constraints (MPC)

Two common rules for using multi-point constraint equations in the modeling are

- A , representation of rigid bar or rod elements, and
- B , representation of pin connections between parts of the structure.

The rule refers to the dependent coordinate in the MPC equation.

2.4.2.3 Rules for Single Point Constraints (SPC)

The rules for using single point constraints in the modeling are

- A , elimination of degrees of freedom with zero stiffness, and
- B , representation of boundary conditions.

Rule B is not used in the modeling of the free helicopter airframe modes. In order to use rule A for eliminating degrees of freedom that are not aligned with the basic coordinate system a coordinate system is defined in the direction of the constraint.

When applying rule A it is important that the structure is not actually constrained by the SPC. As a check on this, the SPC reactions are printed out in the Normal Modes NASTRAN run and checked to ensure that they are negligible.

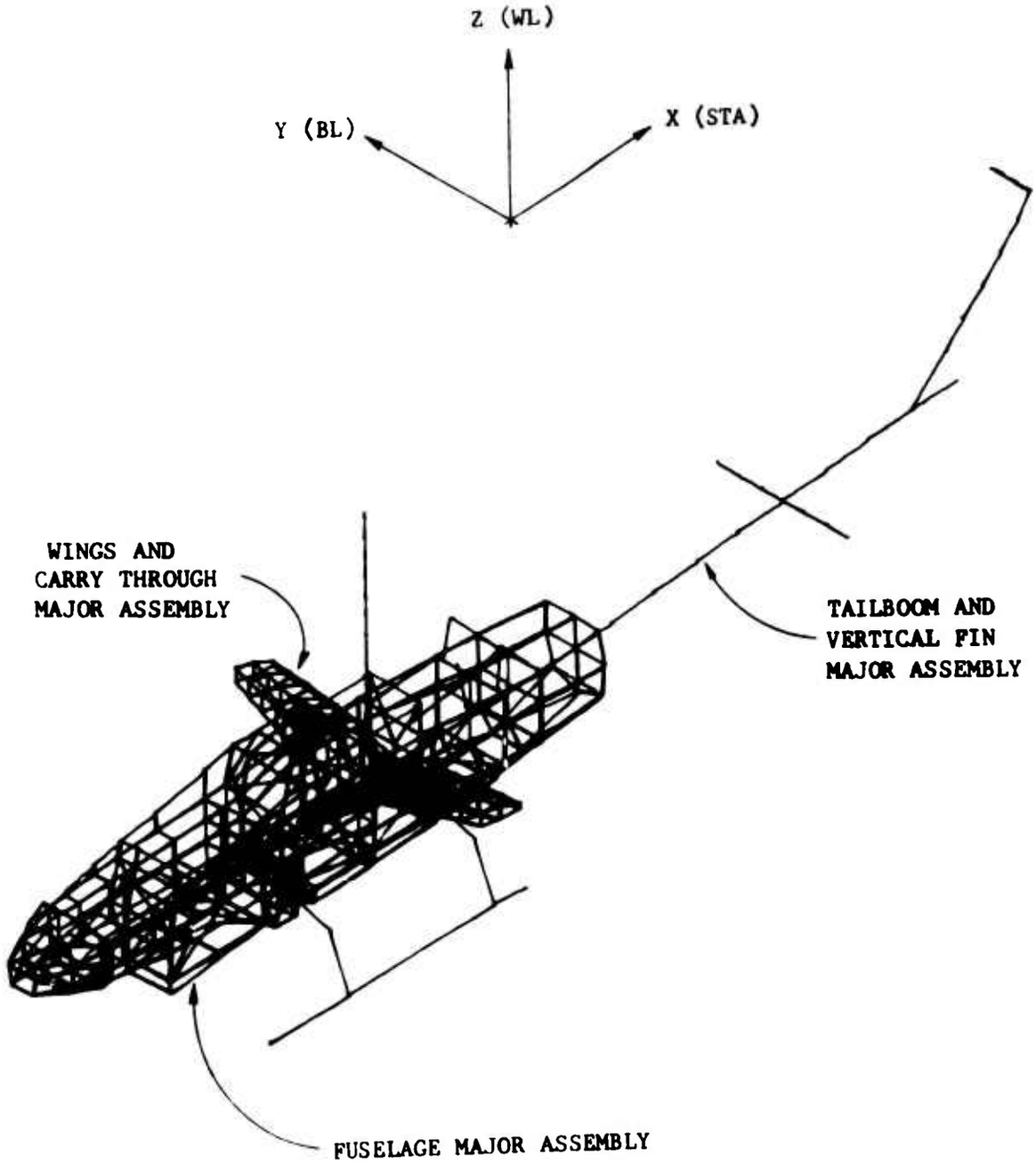
2.4.2.4 Rules for Guyan Reduction (OMIT)

The Guyan Reduction technique, described in Section 3.5.4 of the Theoretical Manual, is used to condense the degrees of freedom down to a practical size for the Givens eigenvalue solution. As explained in Section 2.3, degrees of freedom are omitted that have negligible inertia properties or whose inertia properties can be rationally redistributed to others. The rules used for omitting degrees of freedom are

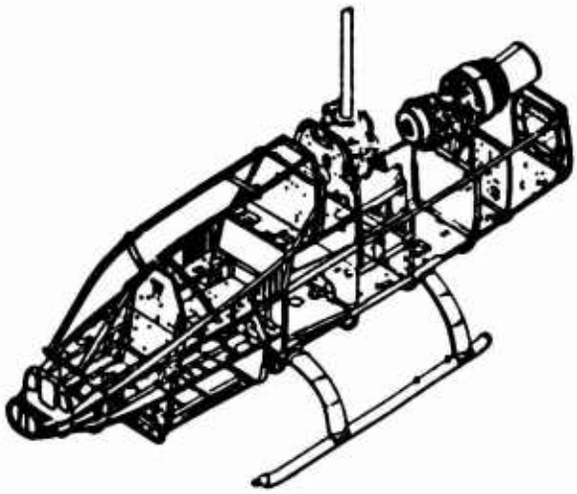
- A , the inertia properties are negligible,
- B , for a relatively uniform mass distribution uniform omitting is used which preserves the distribution,
- C , for structure such as panels where relative inplane deflections are insignificant many of the inplane degrees of freedom are omitted, and
- D , knowledge of the mode shapes of importance and the relative stiffness in certain areas of the structure.

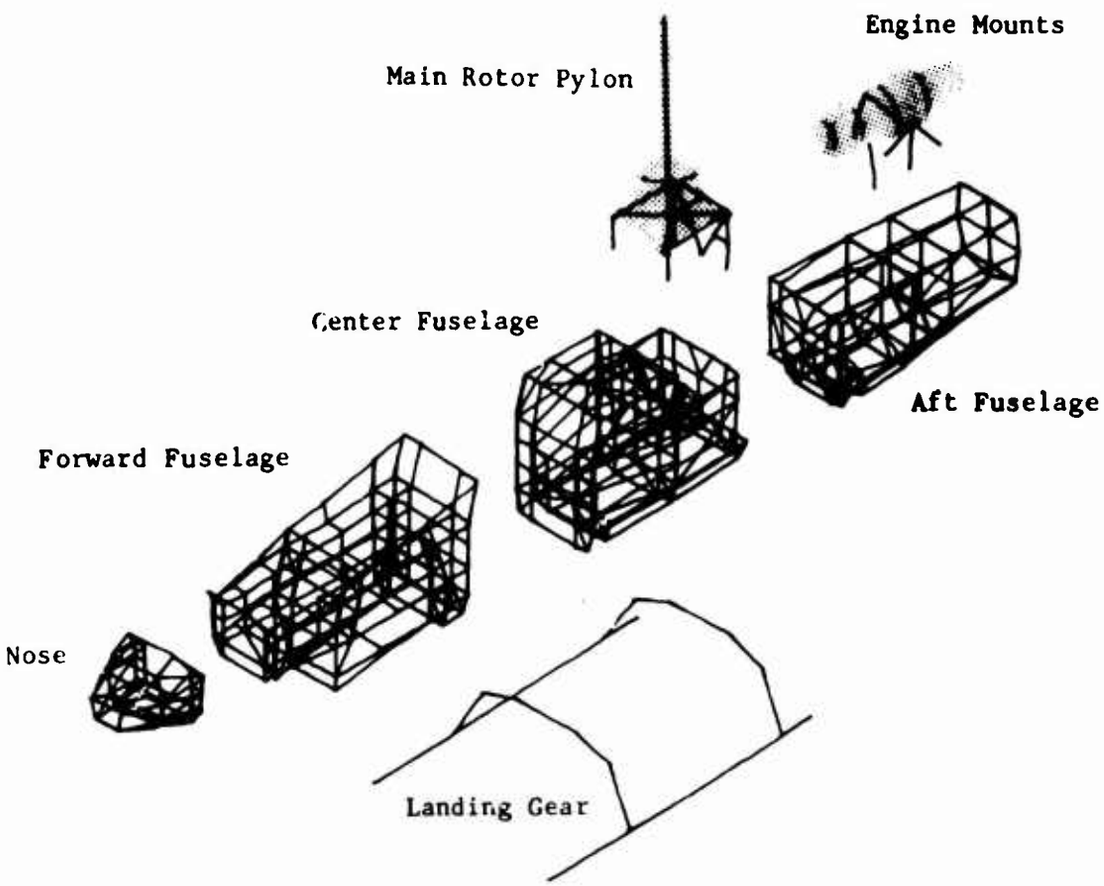
Use of rule D depends on knowledge of the relative stiffness and significant mode shapes of the structure. Degrees of freedom in low response areas of a particular mode will not develop inertia loads as large as high response areas and can be omitted without a significant effect on that mode. Degrees of freedom may also be omitted in high stiffness areas where relative deflections are small and inertia loads redistributed to degrees of freedom not omitted will still give accurate results.

3. STIFFNESS MODELING - FINAL ASSEMBLY

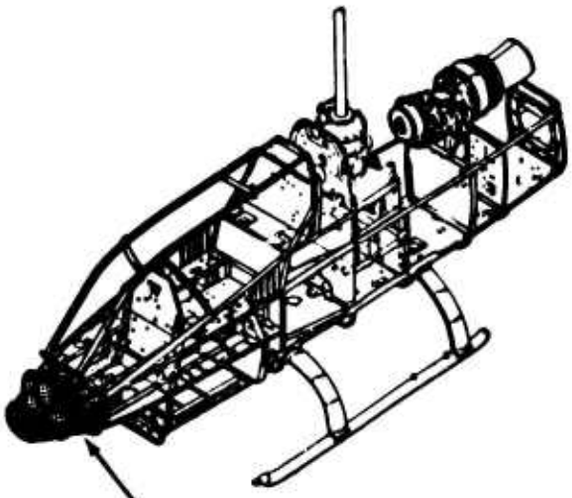


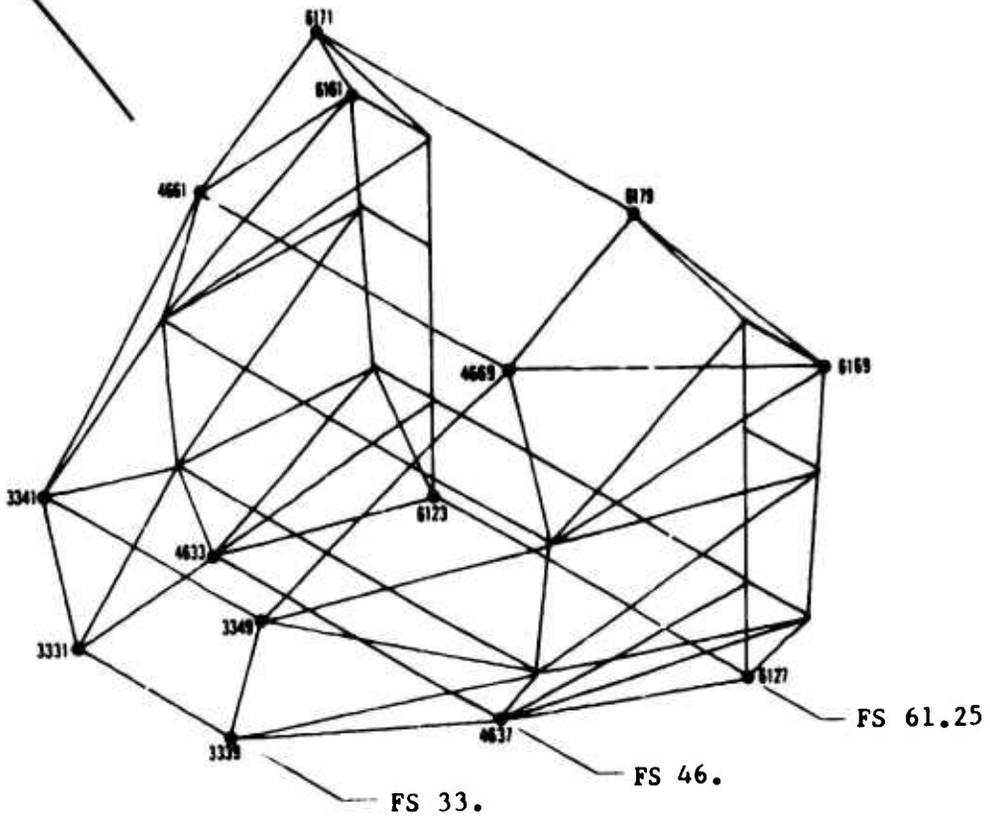
3.1 FUSELAGE MAJOR ASSEMBLY



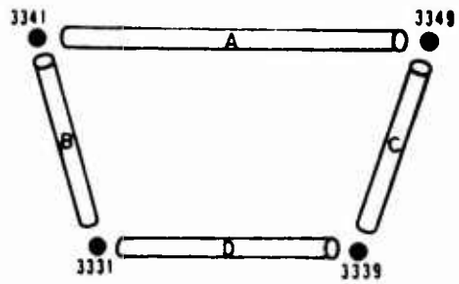


3.1.1 Nose Subassembly





3.1.1.1 Bulkhead Sta. 33. Detail



View looking aft

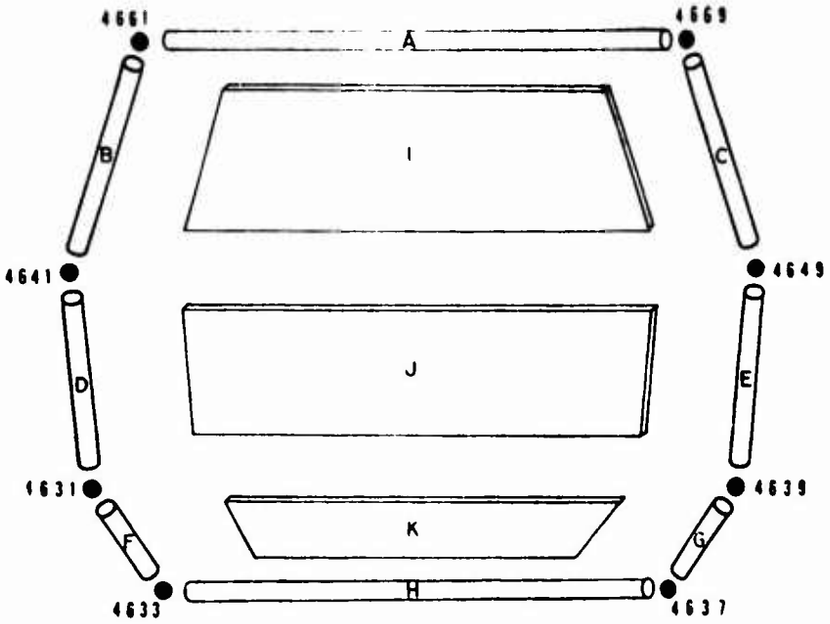
GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
3331	456	AAA	-	-	2	C
3339	456	AAA	-	-	1	D
3341	456	AAA	-	-	13	DC
3349	456	AAA	-	-	23	CC

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	334149	Frame	0.092	-	-	0.092
	5850754	Doubler	0.035	-	-	0.035
B	333141	Frame	0.092	-	-	0.092
	5850751	Doubler	0.035	-	-	0.035
C	333949	Frame	0.092	-	-	0.092
	5850753	Doubler	0.035	-	-	0.035
D	333931	Frame	0.092	-	-	0.092
	5850752	Doubler	0.035	-	-	0.035

3.1.1.2 Bulkhead Sta. 46. Detail



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
4631	456	AAA	-	-	123	DCC
4633	456	AAA	-	-	13	DC
4637	456	AAA	-	-	23	CC
4639	456	AAA	-	-	123	DCC
4641	456	AAA	-	-	12	DC
4649	456	AAA	-	-	12	DC
4661	456	AAA	-	-	23	CC
4669	456	AAA	-	-	13	DC

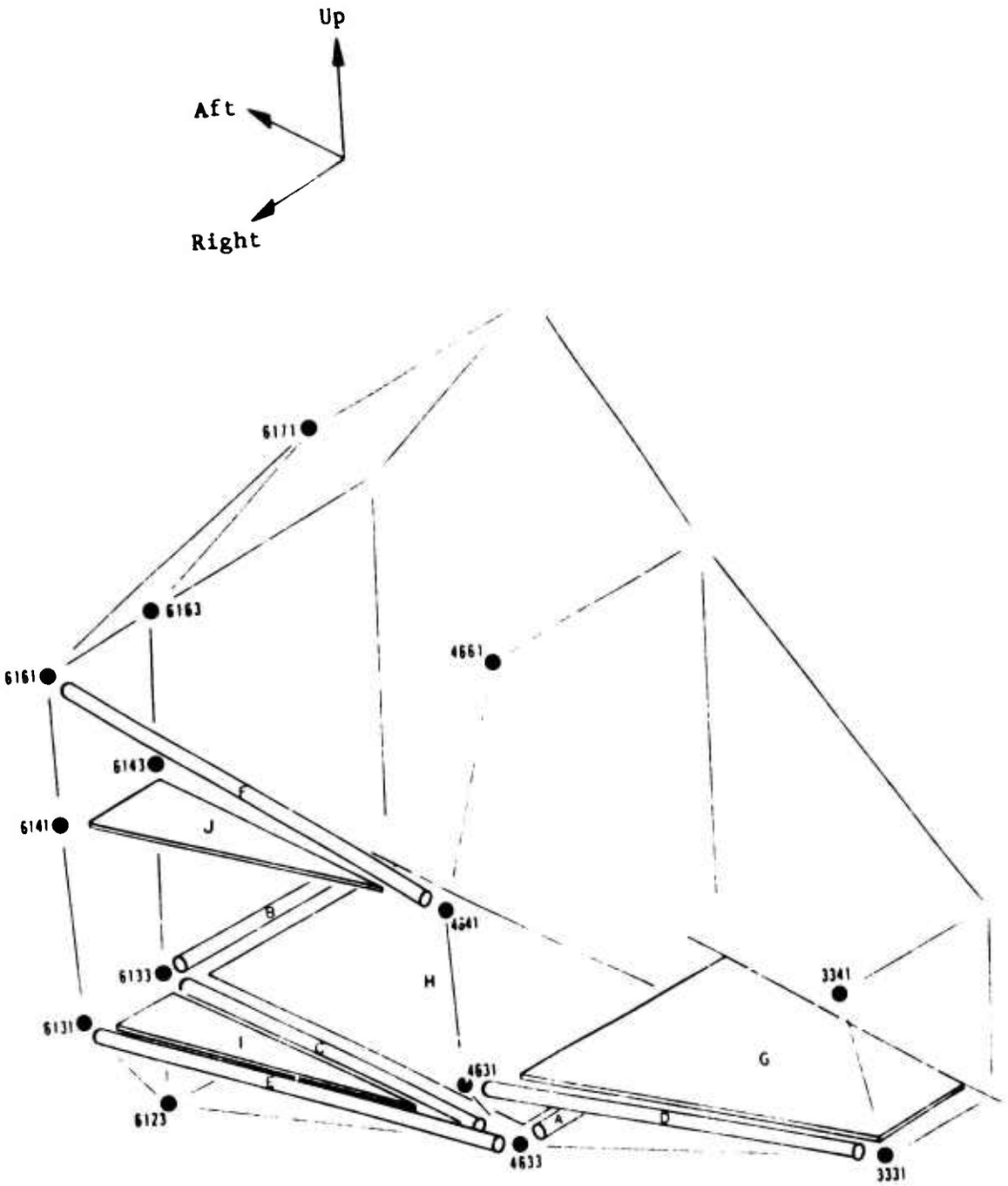
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	5850818	Doubler	0.053	-	-	0.053
B	5850811	Doubler	0.053	-	-	0.053
C	5850817	Doubler	0.053	-	-	0.053
D	5850812	Doubler	0.053	-	-	0.053
E	5850816	Doubler	0.053	-	-	0.053
F	5850813	Doubler	0.053	-	-	0.053
G	5850815	Doubler	0.053	-	-	0.053
H	5850814	Doubler	0.053	-	-	0.053

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
I	464169	Bulkhead	.025
J	463149	Bulkhead	.025
K	463137	Bulkhead	.025

3.1.1.3 Right Gunner's Floor, Frame, and Battery Shelf (Sta. 33-61) Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
3331	456	AAA	-	-	2	C
3341	456	AAA	-	-	13	DC
4631	456	AAA	-	-	123	DCC
4633	456	AAA	-	-	13	DC
4641	456	AAA	-	-	12	DC
4661	456	AAA	-	-	23	CC
6123	456	AAA	-	-	123	DCC
6131	456	AAA	-	-	123	DCC
6133	456	AAA	-	-	23	CC
6141	456	AAA	-	-	123	DCC
6143	456	AAA	-	-	12	DC
6161	456	AAA	-	-	123	DCC
6163	456	AAA	-	-	123	DCC
6171	456	AAA	-	-	13	DC

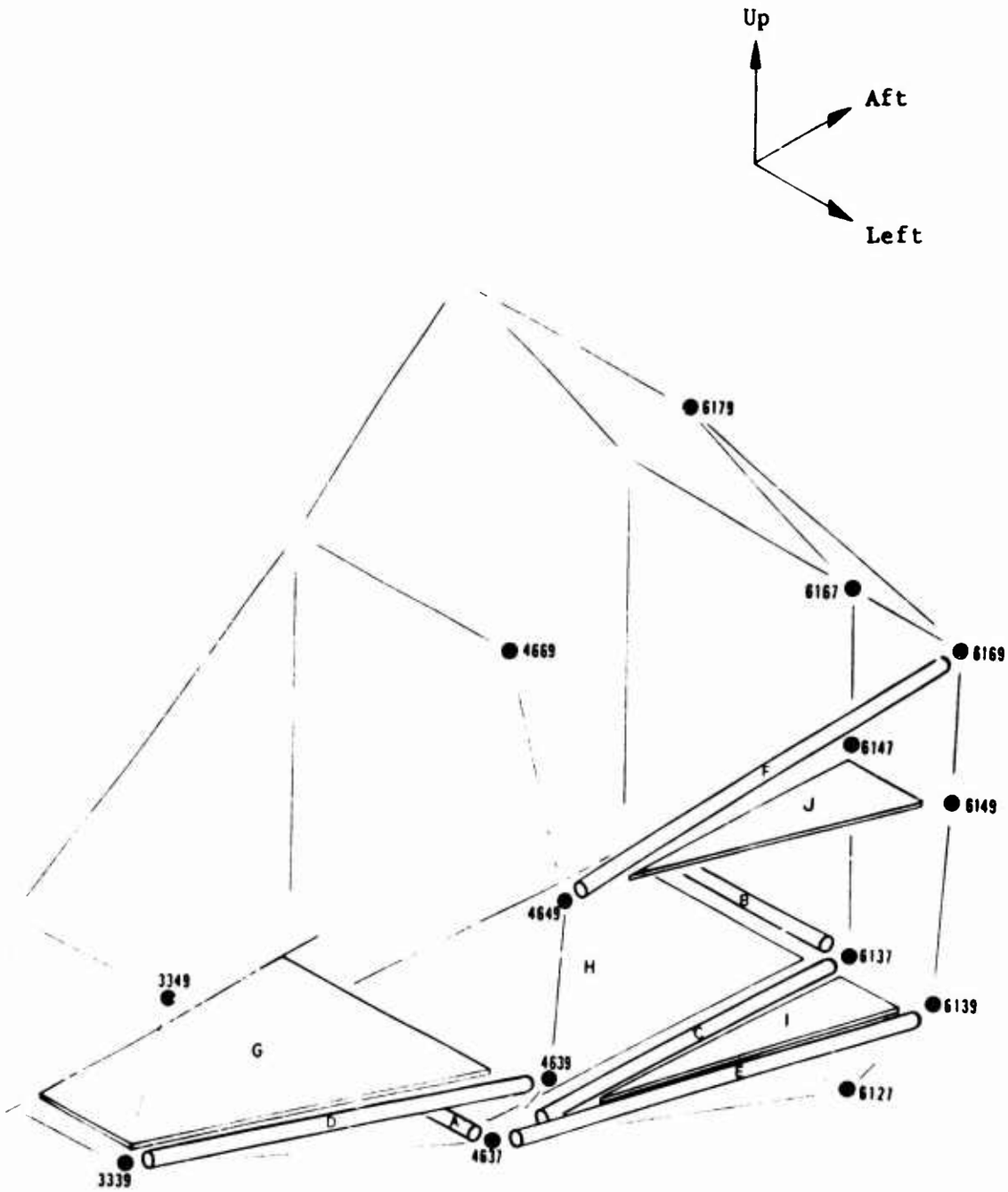
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
G	5950211	Shelf	.012
	5950271	Shelf	.020
H	2010672	Lower Skin	.012
	2010692	Upper Skin	.020
I	2010671	Lower Skin	.012
	2010691	Upper Skin	.020
J	5940041	Frame	.032

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2016703	R/SP2	.079	-	-	.079
	2016903	R/SP2	.151	-	-	.151
	2010211	Doubler	.022	0.0	-0.85	.024
B	2016704	R/SP2	.079	-	-	.079
	2016904	R/SP2	.151	-	-	.151
C	2016701	R/SP2	.029	-	-	.029
	2016901	R/SP2	.062	-	-	.062
D	5850771	Doubler	.057	-	-	.057
	5810351	Doubler	.054	-	-	.054
E	2110101	Cap	.059	-	-	.059
	585C790	Doubler	.059	-	-	.059
	2010191	Doubler	.021	0.0	-0.85	.018
F	5850851	Doubler	.053	-	-	.053

3.1.1.4 Left Gunner's Floor, Frame, and Battery Shelf (Sta. 33-61) Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
3339	456	AAA	-	-	1	D
3349	456	AAA	-	-	23	CC
4637	456	AAA	-	-	23	CC
4639	456	AAA	-	-	123	DCC
4649	456	AAA	-	-	12	DC
4669	456	AAA	-	-	13	DC
6127	456	AAA	-	-	13	DC
6137	456	AAA	-	-	123	DCC
6139	456	AAA	-	-	123	DCC
6147	456	AAA	-	-	12	DC
6149	456	AAA	-	-	123	DCC
6167	456	AAA	-	-	23	CC
6169	456	AAA	-	-	123	DCC
6179	456	AAA	-	-	123	DCC

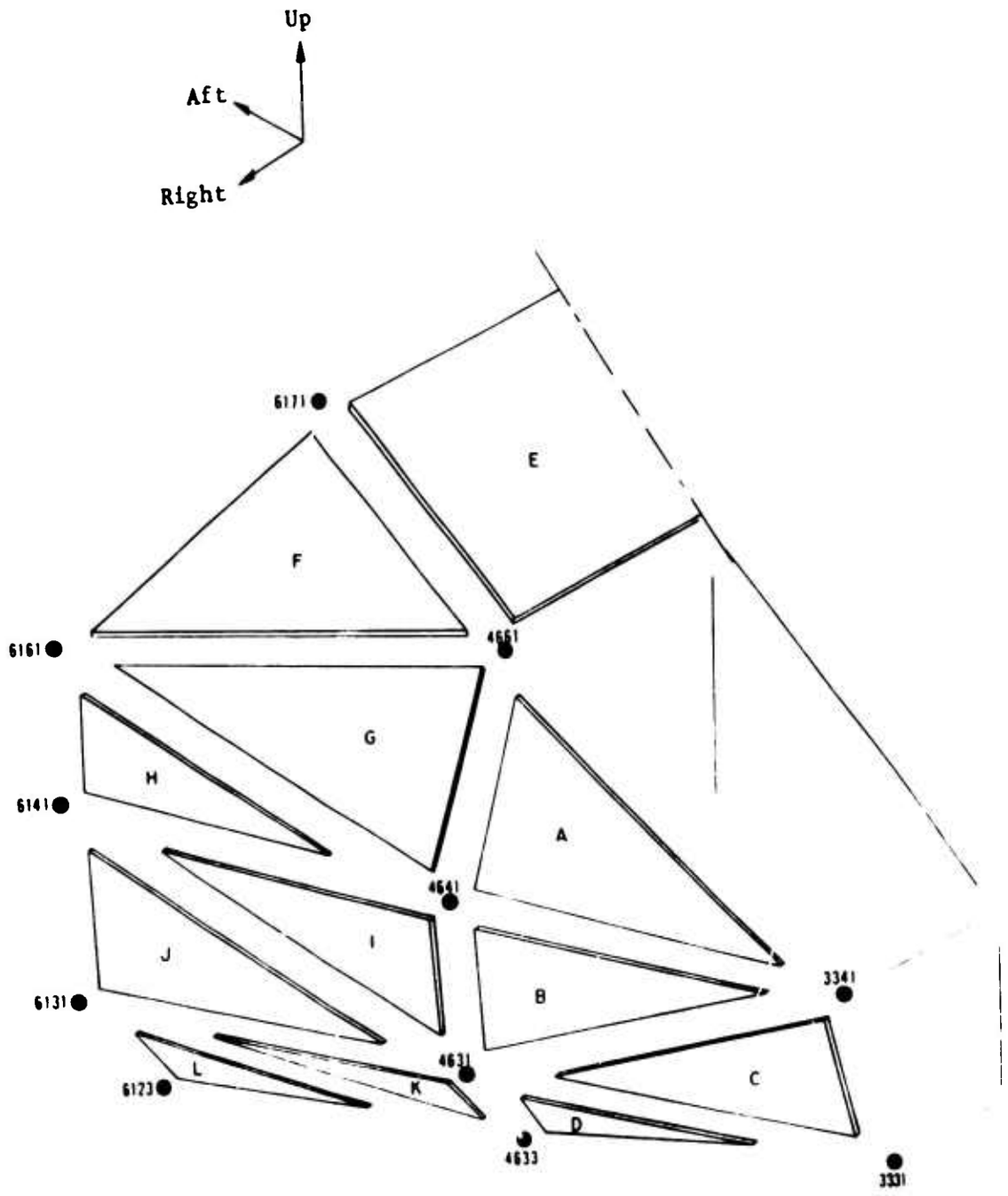
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
D	5950211	Shelf	.012
	5950271	Shelf	.020
E	2010672	Lower Skin	.012
	2010692	Upper Skin	.020
F	2010673	Lower Skin	.012
	2010693	Upper Skin	.020
G	5940171	Frame	.032

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2016703	R/SP2	.079	-	-	.079
	2016903	R/SP2	.151	-	-	.151
	2010211	Doubler	.022	0.0	0.85	.024
B	2016704	R/SP2	.079	-	-	.079
	2016904	R/SP2	.151	-	-	.151
C	2016702	R/SP2	.029	-	-	.029
	2016902	R/SP2	.062	-	-	.062
D	5850772	Doubler	.057	-	-	.057
	5810251	Doubler	.054	-	-	.054
E	2110531	Cap	.059	-	-	.059
	5850791	Doubler	.059	-	-	.059
	2010192	Doubler	.021	0.0	0.85	.018
F	5850852	Doubler	.053	-	-	.053

3.1.1.5 Right Shell Assembly Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
3331	456	AAA	-	-	2	C
3341	456	AAA	-	-	13	DC
4631	456	AAA	-	-	123	DCC
4633	456	AAA	-	-	13	DC
4641	456	AAA	-	-	12	DC
4661	456	AAA	-	-	23	CC
6123	456	AAA	-	-	123	DCC
6131	456	AAA	-	-	123	DCC
6141	456	AAA	-	-	123	DCC
6161	456	AAA	-	-	123	DCC
6171	456	AAA	-	-	13	DC

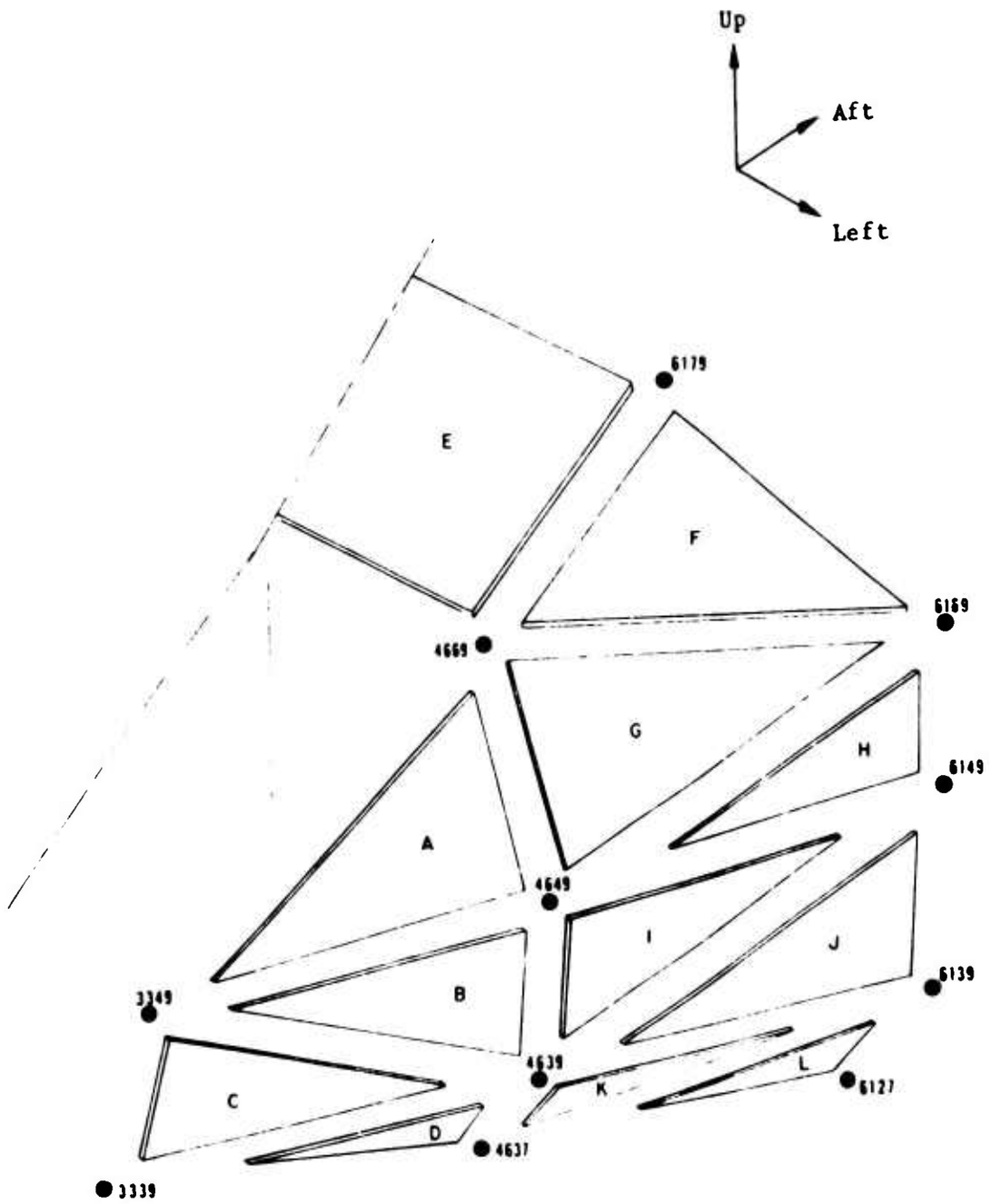
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	5858901	Inner Skin	.010
	5850501	Interior Skin	.010
	5850301	Outer Skin	.010
B	5858902	Inner Skin	.010
	5850502	Interior Skin	.010
	5850302	Outer Skin	.010
C	5858903	Inner Skin	.010
	5850503	Interior Skin	.010
	5850303	Outer Skin	.010
D	5858904	Inner Skin	.010
	5850504	Interior Skin	.010
	5850304	Outer Skin	.010
E	5858921	Inner Skin	.010
	5850521	Interior Skin	.010
	5850321	Outer Skin	.010

SHEAR PANEL/MEMBRANE ELEMENT DATA (CONT.)

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
F	5858922	Inner Skin	.010
	5850522	Interior Skin	.010
	5850322	Outer Skin	.010
G	5858923	Inner Skin	.010
	5850523	Interior Skin	.010
	5850323	Outer Skin	.010
H	5858924	Inner Skin	.010
	5850524	Interior Skin	.010
	5850324	Outer Skin	.010
I	5858925	Inner Skin	.010
	5850525	Interior Skin	.010
	5850325	Outer Skin	.010
J	5858926	Inner Skin	.010
	5850526	Interior Skin	.010
	5850326	Outer Skin	.010
K	5858927	Inner Skin	.010
	5850527	Interior Skin	.010
	5850327	Outer Skin	.010
L	5858928	Inner Skin	.010
	5850528	Interior Skin	.010
	5850328	Outer Skin	.010

3.1.1.6 Left Shell Assembly Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
3339	456	AAA	-	-	1	D
3349	456	AAA	-	-	23	CC
4637	456	AAA	-	-	23	CC
4639	456	AAA	-	-	123	DCC
4649	456	AAA	-	-	12	DC
4669	456	AAA	-	-	13	DC
6127	456	AAA	-	-	13	DC
6139	456	AAA	-	-	123	DCC
6149	456	AAA	-	-	123	DCC
6169	456	AAA	-	-	123	DCC
6179	456	AAA	-	-	123	DCC

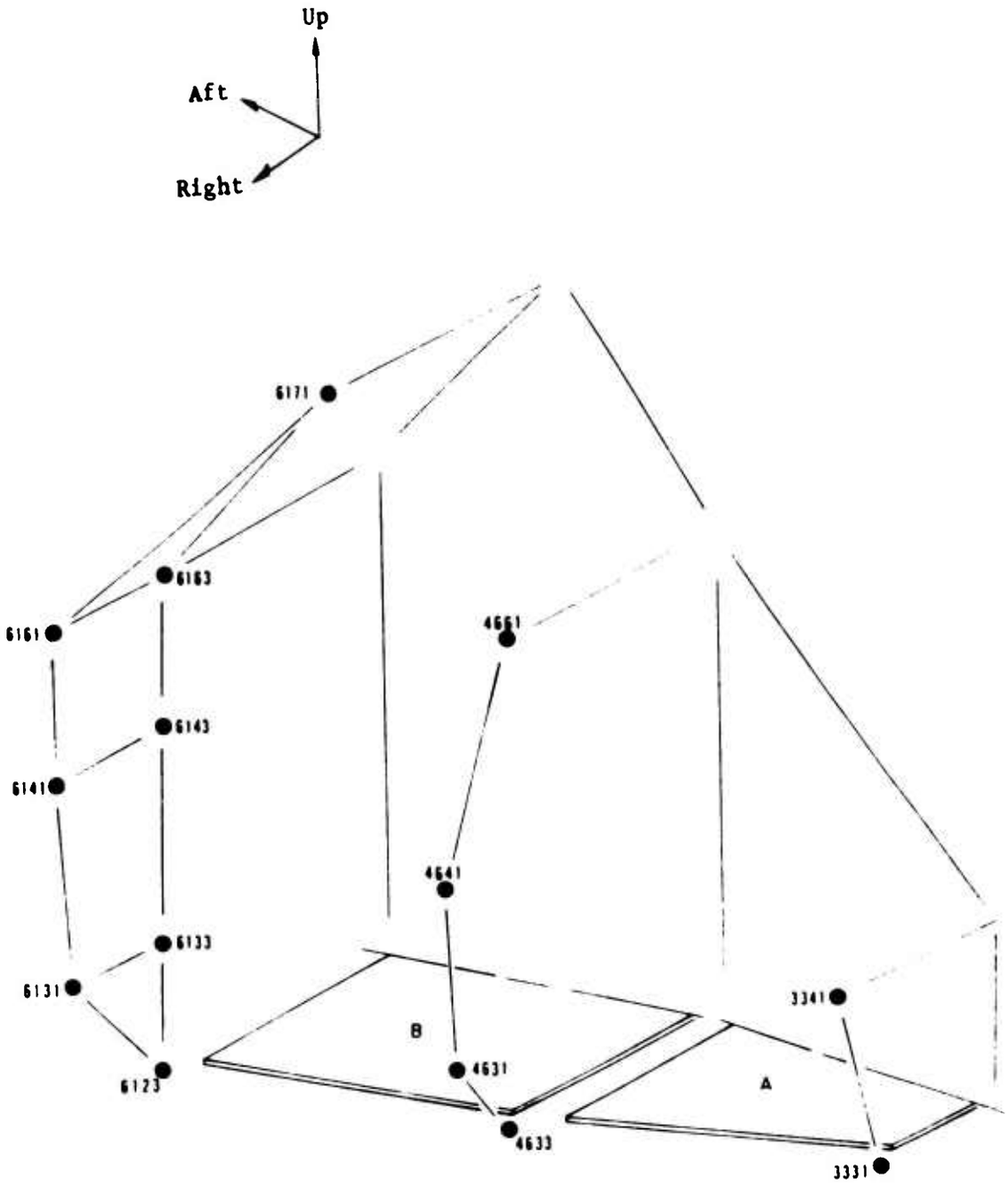
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	5858909	Inner Skin	.010
	5850509	Interior Skin	.010
	5850309	Outer Skin	.010
B	5858908	Inner Skin	.010
	5850508	Interior Skin	.010
	5850308	Outer Skin	.010
C	5858907	Inner Skin	.010
	5850507	Interior Skin	.010
	5850307	Outer Skin	.010
D	5858906	Inner Skin	.010
	5850506	Interior Skin	.010
	5850306	Outer Skin	.010
E	5858921	Inner Skin	.010
	5850521	Interior Skin	.010
	5850321	Outer Skin	.010

SHEAR PANEL/MEMBRANE ELEMENT DATA (CONT.)

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
F	5858936	Inner Skin	.010
	5850536	Interior Skin	.010
	5850336	Outer Skin	.010
G	5858935	Inner Skin	.010
	5850535	Interior Skin	.010
	5850335	Outer Skin	.010
H	5858934	Inner Skin	.010
	5850534	Interior Skin	.010
	5850334	Outer Skin	.010
I	5858933	Inner Skin	.010
	5850533	Interior Skin	.010
	5850333	Outer Skin	.010
J	5858932	Inner Skin	.010
	5850532	Interior Skin	.010
	5850332	Outer Skin	.010
K	5858931	Inner Skin	.010
	5850531	Interior Skin	.010
	5850331	Outer Skin	.010
L	5858930	Inner Skin	.010
	5850530	Interior Skin	.010
	5850330	Outer Skin	.010

3.1.1.7 Right Lower Shell Assembly Detail



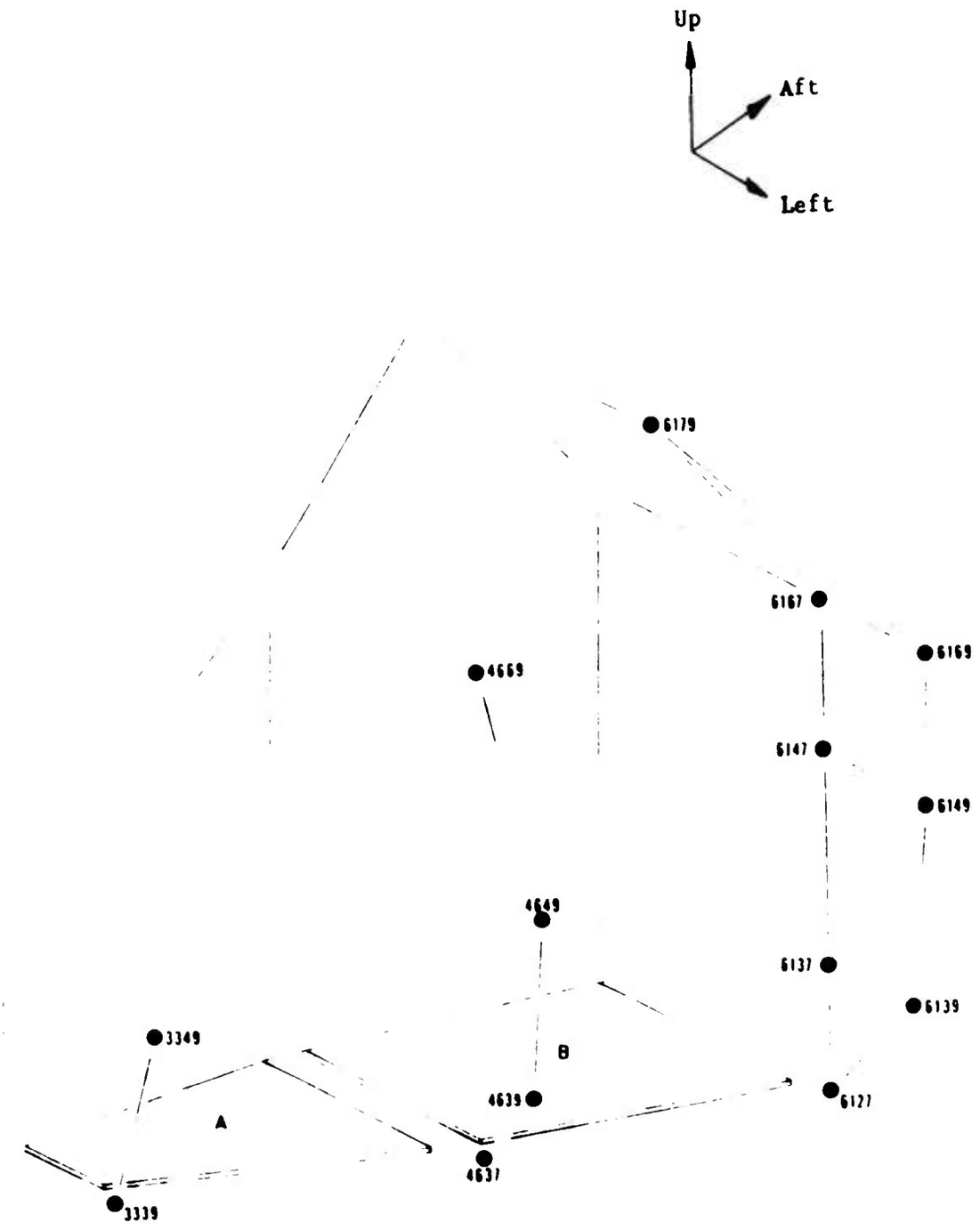
GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
3331	456	AAA	-	-	2	C
3341	456	AAA	-	-	13	DC
4631	456	AAA	-	-	123	DCC
4633	456	AAA	-	-	13	DC
4641	456	AAA	-	-	12	DC
4661	456	AAA	-	-	23	CC
6123	456	AAA	-	-	123	DCC
6131	456	AAA	-	-	123	DCC
6133	456	AAA	-	-	23	CC
6141	456	AAA	-	-	123	DCC
6143	456	AAA	-	-	12	DC
6161	456	AAA	-	-	123	DCC
6163	456	AAA	-	-	123	DCC
6171	456	AAA	-	-	13	DC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	5858905	Inner Skin	.010
	5850505	Interior Skin	.010
	5850305	Outer Skin	.010
B	5858929	Inner Skin	.010
	5850529	Interior Skin	.010
	5850329	Outer Skin	.010

3.1.1.8 Left Lower Shell Assembly Detail



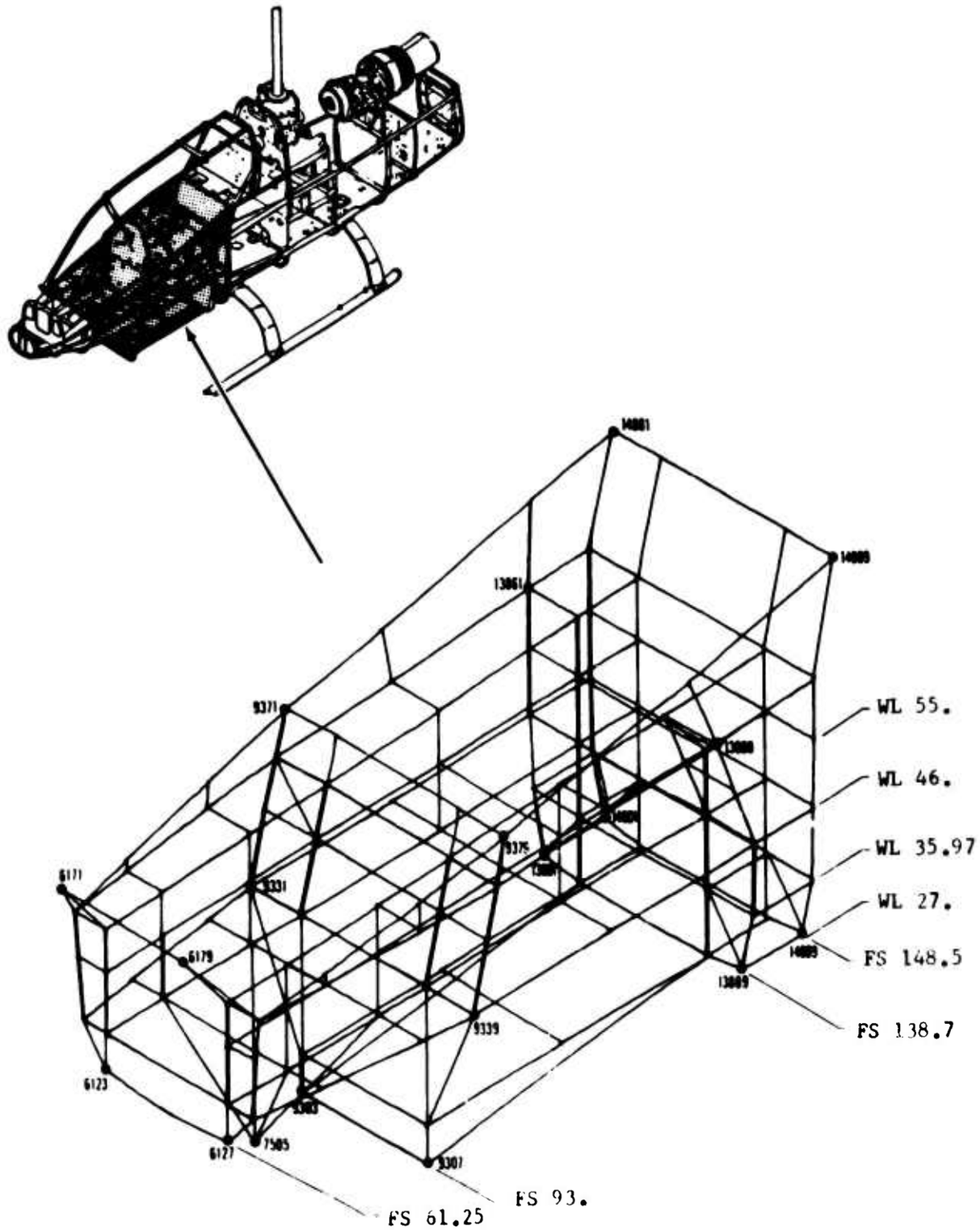
GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
3339	456	AAA	-	-	1	D
3349	456	AAA	-	-	23	CC
4637	456	AAA	-	-	23	CC
4639	456	AAA	-	-	123	DCC
4649	456	AAA	-	-	12	DC
4669	456	AAA	-	-	13	DC
6127	456	AAA	-	-	13	DC
6137	456	AAA	-	-	123	DCC
6139	456	AAA	-	-	123	DCC
6147	456	AAA	-	-	12	DC
6149	456	AAA	-	-	123	DCC
6167	456	AAA	-	-	23	CC
6169	456	AAA	-	-	123	DCC
6179	456	AAA	-	-	123	DCC

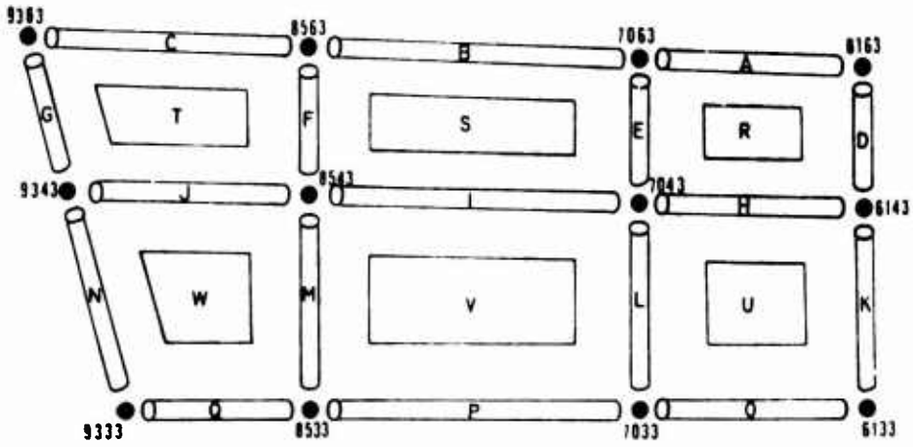
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	5858905	Inner Skin	.010
	5850505	Interior Skin	.010
	5850305	Outer Skin	.010
B	5858929	Inner Skin	.010
	5850529	Interior Skin	.010
	5850329	Outer Skin	.010

3.1.2 Forward Fuselage Subassembly



3.1.2.1 Right Main Beam (Sta. 61-93) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
6133	456	AAA	-	-	23	CC
6143	456	AAA	-	-	12	DC
6163	456	AAA	-	-	123	DCC
7033	456	AAA	123	AAA	-	-
7043	2456	AAAA	-	-	1	D
7063	456	AAA	-	-	23	CC
8533	456	AAA	123	AAA	-	-
8543	2456	AAAA	-	-	1	D
8563	456	AAA	-	-	13	DC
9333	456	AAA	-	-	1	D
9343	456	AAA	-	-	123	DCC
9363	456	AAA	-	-	2	C

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
R	1292091	Inner Skin	.025
	1291832	Outer Skin	.016
S	1292093	Inner Skin	.025
	1290412	Interior Skin	.016
	1291592	Interior Skin	.016
	1291834	Outer Skin	.016
T	1292095	Inner Skin	.025
	1291836	Outer Skin	.016
U	1292090	Inner Skin	.025
	1291831	Outer Skin	.016
V	1292092	Inner Skin	.025
	1290411	Interior Skin	.016
	1291591	Interior Skin	.016
	1291833	Outer Skin	.016
W	1292094	Inner Skin	.025
	1291835	Outer Skin	.016

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	1570031	Cap	.213	-0.26	0.0	.198
	1290231	Doubler	.068	-1.12	0.0	.048
	1290904	R/SP1	.033	-	-	.033
	1298304	R/SP1	.003	-	-	.003
B	1570032	Cap	.213	-0.29	0.0	.195
	1290232	Doubler	.068	-1.12	0.0	.047
	1290924	R/SP1	.034	-	-	.034
	1294124	R/SP1	.001	-	-	.001
	1295904	R/SP1	.001	-	-	.001
	1298324	R/SP1	.003	-	-	.003

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
C	1570033	Cap	.213	-0.33	0.0	.192
	1290233	Doubler	.068	-1.12	0.0	.046
	1290944	R/SP1	.035	-	-	.035
	1298344	R/SP1	.007	-	-	.007
D	1290212	Doubler	.029	-1.12	0.0	.035
	1290912	R/SP2	.118	-	-	.118
	1298312	R/SP2	.065	-	-	.065
E	1290914	R/SP2	.118	-	-	.118
	1290932	R/SP2	.181	-	-	.181
	1294132	R/SP2	.116	-	-	.116
	1295912	R/SP2	.116	-	-	.116
	1298314	R/SP2	.065	-	-	.065
	1298332	R/SP2	.116	-	-	.116
F	1290934	R/SP2	.181	-	-	.181
	1290952	R/SP2	.123	-	-	.123
	1294134	R/SP2	.116	-	-	.116
	1295914	R/SP2	.116	-	-	.116
	1298334	R/SP2	.116	-	-	.116
	1298352	R/SP2	.062	-	-	.062
G	1290272	Doubler	.084	-1.12	0.0	.098
	1290954	R/SP2	.123	-	-	.123
	1298354	R/SP2	.062	-	-	.062
H	1290902	R/SP1	.122	-	-	.122
	1290903	R/SP1	.122	-	-	.122
	1298302	R/SP1	.071	-	-	.071
	1298303	R/SP1	.071	-	-	.071

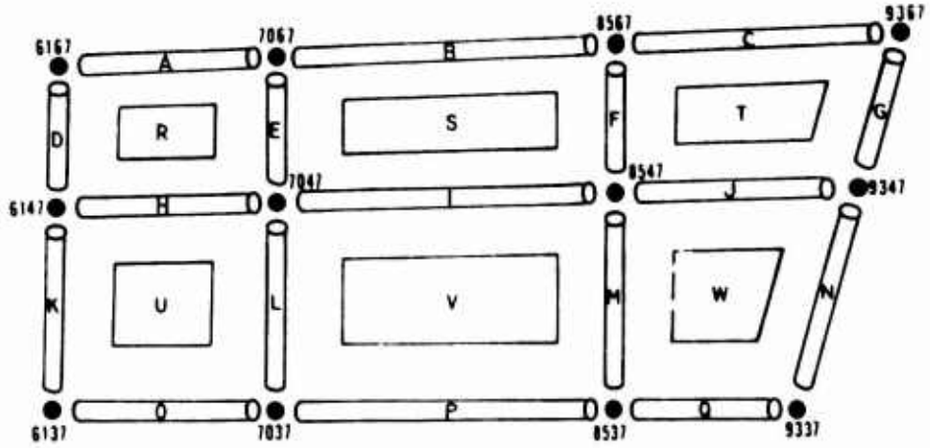
ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
I	1290922	R/SP1	.126	-	-	.126
	1290923	R/SP1	.126	-	-	.126
	1294122	R/SP1	.057	-	-	.057
	1294123	R/SP1	.057	-	-	.057
	1295902	R/SP1	.071	-	-	.071
	1295903	R/SP1	.071	-	-	.071
	1298322	R/SP1	.074	-	-	.074
	1298323	R/SP1	.074	-	-	.074
J	1290942	R/SP1	.130	-	-	.130
	1290943	R/SP1	.130	-	-	.130
	1298342	R/SP1	.079	-	-	.079
	1298343	R/SP1	.079	-	-	.079
K	1290211	Doubler	.029	1.12	0.0	.035
	1290911	R/SP2	.118	-	-	.118
	1298311	R/SP2	.065	-	-	.065
L	1290913	R/SP2	.118	-	-	.118
	1290931	R/SP2	.181	-	-	.181
	1294131	R/SP2	.116	-	-	.116
	1295911	R/SP2	.116	-	-	.116
	1298313	R/SP2	.065	-	-	.065
	1298331	R/SP2	.116	-	-	.116
M	1290933	R/SP2	.181	-	-	.181
	1290951	R/SP2	.123	-	-	.123
	1294133	R/SP2	.116	-	-	.116
	1295913	R/SP2	.116	-	-	.116
	1298333	R/SP2	.116	-	-	.116
	1298351	R/SP2	.062	-	-	.062
N	1290271	Doubler	.084	1.12	0.0	.098
	1290953	R/SP2	.123	-	-	.123
	1298353	R/SP2	.062	-	-	.062

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
O	1580041	Cap	.269	0.30	0.0	.247
	1290251	Doubler	.101	1.12	0.0	.072
	1290901	R/SP1	.073	-	-	.073
	1298301	R/SP1	.026	-	-	.026
P	1580042	Cap	.269	0.32	0.0	.248
	1290252	Doubler	.101	1.12	0.0	.075
	1290921	R/SP1	.076	-	-	.076
	1294121	R/SP1	.011	-	-	.011
	1295901	R/SP1	.024	-	-	.024
	1298321	R/SP1	.028	-	-	.028
Q	1580043	Cap	.269	0.34	0.0	.249
	1290253	Doubler	.101	1.12	0.0	.077
	1290941	R/SP1	.078	-	-	.078
	1298341	R/SP1	.033	-	-	.033

3.1.2.2 Left Main Beam (Sta. 61-93) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
6137	456	AAA	-	-	123	DCC
6147	456	AAA	-	-	12	DC
6167	456	AAA	-	-	23	CC
7037	456	AAA	123	AAA	-	-
7047	2456	AAAA	-	-	1	D
7067	456	AAA	-	-	13	DC
8537	456	AAA	123	AAA	-	-
8547	2456	AAAA	-	-	1	D
8567	456	AAA	-	-	23	CC
9337	456	AAA	-	-	2	C
9347	456	AAA	-	-	123	DCC
9367	456	AAA	-	-	1	D

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
R	1292051	Inner Skin	.025
	1290752	Interior Skin	.016
	1292012	Outer Skin	.016
S	1292053	Inner Skin	.025
	1290753	Interior Skin	.016
	1290771	Interior Skin	.012
	1292014	Outer Skin	.016
T	1292055	Inner Skin	.025
	1292016	Outer Skin	.016
U	1292050	Inner Skin	.025
	1290751	Interior Skin	.016
	1292011	Outer Skin	.016
V	1292052	Inner Skin	.025
	1292013	Outer Skin	.016
W	1292054	Inner Skin	.025
	1292015	Outer Skin	.016

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	1570011	Cap	.213	-0.26	0.0	.198
	1290754	Doubler	.047	-1.13	0.0	.033
	1290504	R/SP1	.033	-	-	.033
	1297504	R/SP1	.001	-	-	.001
	1290104	R/SP1	.002	-	-	.002
B	1570012	Cap	.213	-0.29	0.0	.194
	1290755	Doubler	.047	-1.05	0.0	.033
	1290524	R/SP1	.034	-	-	.034
	1297522	R/SP1	.011	-	-	.011
	1297702	R/SP1	.008	-	-	.008
	1290124	R/SP1	.003	-	-	.003

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
C	1570013	Cap	.213	-0.33	0.0	.191
	1290731	Doubler	.047	-0.96	0.0	.034
	1290544	R/SP1	.035	-	-	.035
	1290144	R/SP1	.003	-	-	.003
D	1290758	Doubler	.029	-1.17	0.0	.035
	1290512	R/SP2	.118	-	-	.118
	1297512	R/SP2	.061	-	-	.061
	1290112	R/SP2	.065	-	-	.065
E	1290514	R/SP2	.118	-	-	.118
	1290532	R/SP2	.181	-	-	.181
	1297514	R/SP2	.061	-	-	.061
	1297523	R/SP2	.102	-	-	.102
	1297703	R/SP2	.058	-	-	.058
	1290114	R/SP2	.065	-	-	.065
	1290132	R/SP2	.116	-	-	.116
F	1290534	R/SP2	.181	-	-	.181
	1290552	R/SP2	.123	-	-	.123
	1297524	R/SP2	.102	-	-	.102
	1297704	R/SP2	.058	-	-	.058
	1290134	R/SP2	.116	-	-	.116
	1290152	R/SP2	.062	-	-	.062
G	1290792	Doubler	.105	-0.93	0.0	.122
	1290554	R/SP2	.123	-	-	.123
	1290154	R/SP2	.062	-	-	.062
H	1290502	R/SP1	.122	-	-	.122
	1290503	R/SP1	.122	-	-	.122
	1297502	R/SP1	.069	-	-	.069
	1297503	R/SP1	.069	-	-	.069
	1290102	R/SP1	.071	-	-	.071
	1290103	R/SP1	.071	-	-	.071

ROD ELEMENT DATA (CONT.)

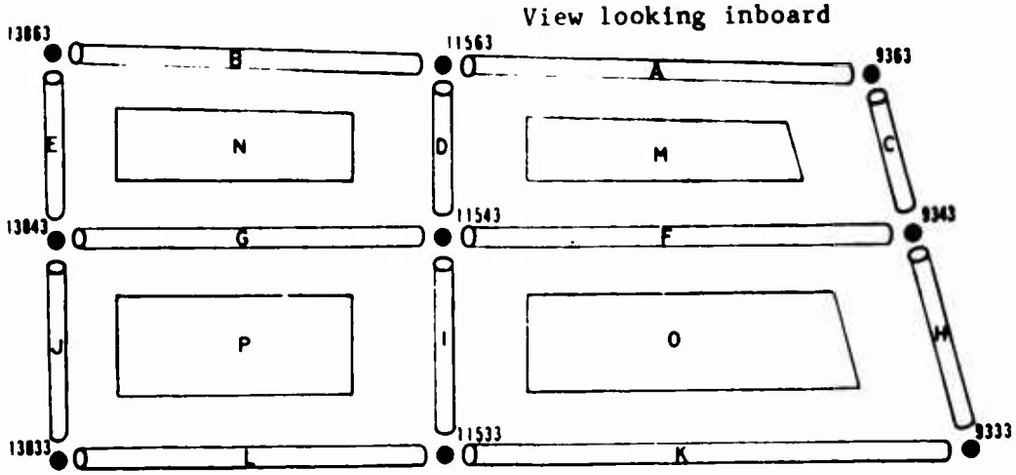
LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
I	1290522	R/SP1	.126	-	-	.126
	1290523	R/SP1	.126	-	-	.126
	1297521	R/SP1	.011	-	-	.011
	1297701	R/SP1	.008	-	-	.008
	1290122	R/SP1	.074	-	-	.074
	1290123	R/SP1	.074	-	-	.074
J	1290542	R/SP1	.130	-	-	.130
	1290543	R/SP1	.130	-	-	.130
	1290142	R/SP1	.077	-	-	.077
	1290143	R/SP1	.077	-	-	.077
K	1290757	Doubler	.029	1.18	0.0	.035
	1290511	R/SP2	.118	-	-	.118
	1297511	R/SP2	.061	-	-	.061
	1290111	R/SP2	.065	-	-	.065
L	1290513	R/SP2	.118	-	-	.118
	1290531	R/SP2	.181	-	-	.181
	1297513	R/SP2	.061	-	-	.061
	1290113	R/SP2	.065	-	-	.065
	1290131	R/SP2	.116	-	-	.116
M	1290533	R/SP2	.181	-	-	.181
	1290551	R/SP2	.123	-	-	.123
	1290133	R/SP2	.116	-	-	.116
	1290151	R/SP2	.062	-	-	.062
N	1290791	Doubler	.105	1.18	0.0	.122
	1290553	R/SP2	.123	-	-	.123
	1290153	R/SP2	.062	-	-	.062

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
O	1580031	Cap	.269	0.30	0.0	.247
	1290756	Doubler	.056	1.18	0.0	.039
	1290501	R/SP1	.072	-	-	.072
	1297501	R/SP1	.023	-	-	.023
	1290101	R/SP1	.026	-	-	.026
P	1580032	Cap	.269	0.32	0.0	.248
	1290991	Doubler	.056	1.18	0.0	.041
	1290521	R/SP1	.075	-	-	.075
	1290121	R/SP1	.028	-	-	.028
Q	1580033	Cap	.269	0.34	0.0	.249
	1290992	Doubler	.056	1.18	0.0	.042
	1290541	R/SP1	.078	-	-	.078
	1290141	R/SP1	.029	-	-	.029

3.1.2.3 Right Main Beam (Sta 93-138) Detail

View looking inboard



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9333	456	AAA	-	-	1	D
9343	456	AAA	-	-	123	DCC
9363	456	AAA	-	-	2	C
11533	456	AAA	-	-	23	CC
11543	456	AAA	-	-	12	DC
11563	456	AAA	-	-	13	DC
13833	456	AAA	-	-	12	DC
13843	456	AAA	-	-	123	DCC
13863	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
M	1292097	Inner Skin	.025
	1291492	Outer Skin	.016
N	1292099	Inner Skin	.025
	1291494	Outer Skin	.016
O	1292096	Inner Skin	.025
	1291491	Outer Skin	.016
P	1292098	Inner Skin	.025
	1291493	Outer Skin	.016

ROD ELEMENT DATA

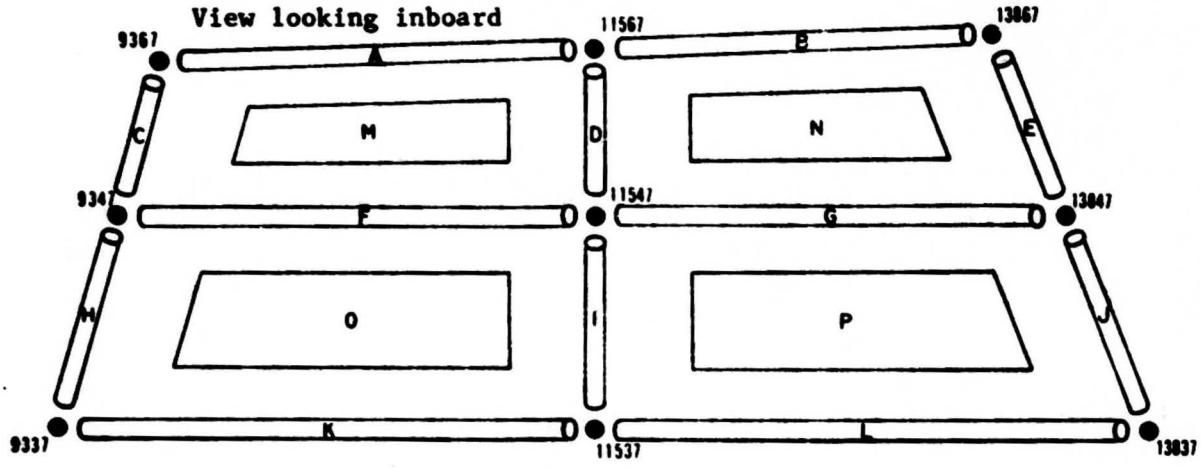
LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	1570034	Cap	.364	-0.34	0.0	.325
	1290234	Doubler	.036	-1.12	0.0	.024
	1290964	R/SP1	.042	-	-	.042
	1294904	R/SP1	.007	-	-	.007
B	1570035	Cap	.319	-0.33	0.0	.284
	1290235	Doubler	.036	-1.12	0.0	.024
	1290984	R/SP1	.054	-	-	.054
	1294924	R/SP1	.014	-	-	.014
C	1290274	Doubler	.037	-1.12	0.0	.043
	1290972	R/SP2	.256	-	-	.256
	1294912	R/SP2	.155	-	-	.155
D	1290974	R/SP2	.256	-	-	.256
	1290994	R/SP2	.289	-	-	.289
	1294914	R/SP2	.155	-	-	.155
	1294932	R/SP2	.176	-	-	.176
E	1291374	Doubler	.047	-1.12	0.0	.054
	1290996	R/SP2	.289	-	-	.289
	1294934	R/SP2	.176	-	-	.176
F	1290331	Doubler	.090	0.0	0.0	.090
	1290962	R/SP1	.134	-	-	.134
	1290963	R/SP1	.134	-	-	.134
	1294902	R/SP1	.080	-	-	.080
	1294903	R/SP1	.080	-	-	.080
G	1291972	Doubler	.090	0.0	0.0	.090
	1290982	R/SP1	.140	-	-	.140
	1290983	R/SP1	.140	-	-	.140
	1294922	R/SP1	.084	-	-	.084
	1294923	R/SP1	.084	-	-	.084
H	1290273	Doubler	.037	1.12	0.0	.043
	1290971	R/SP1	.256	-	-	.256
	1294911	R/SP2	.155	-	-	.155

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
I	1290973	R/SP2	.256	-	-	.256
	1290993	R/SP2	.289	-	-	.289
	1294913	R/SP2	.155	-	-	.155
	1294931	R/SP2	.176	-	-	.176
J	1291373	Doubler	.047	1.12	0.0	.054
	1290995	R/SP2	.289	-	-	.289
	1294933	R/SP2	.176	-	-	.176
K	1580044	Cap	.370	0.34	0.0	.344
	1290254	Doubler	.057	1.12	0.0	.046
	1290961	R/SP1	.079	-	-	.079
	1294901	R/SP1	.030	-	-	.030
L	1580045	Cap	.370	0.34	0.0	.347
	1291971	Doubler	.057	1.12	0.0	.044
	1290981	R/SP1	.077	-	-	.077
	1294921	R/SP1	.028	-	-	.028

3.1.2.4 Left Main Beam (Sta. 93-138) Detail

View looking inboard



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9337	456	AAA	-	-	2	C
9347	456	AAA	-	-	123	DCC
9367	456	AAA	-	-	1	D
11537	456	AAA	-	-	13	DC
11547	456	AAA	-	-	12	DC
11567	456	AAA	-	-	3	C
13837	456	AAA	-	-	12	DC
13847	456	AAA	-	-	13	DC
13867	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
M	1292057	Inner Skin	.025
	1291371	Outer Skin	.016
N	1292059	Inner Skin	.025
	1291372	Outer Skin	.016
O	1292056	Inner Skin	.025
	1291851	Outer Skin	.016
P	1292058	Inner Skin	.025
	1291852	Outer Skin	.016

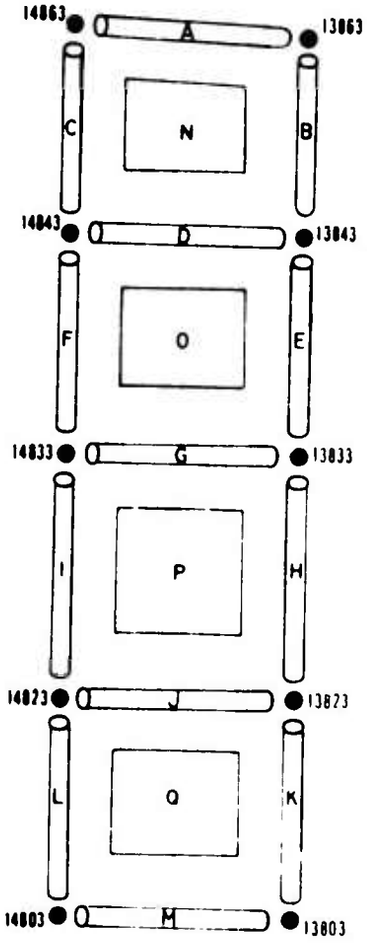
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1570014	Cap	.364	-0.33	0.0	.325
	1290732	Doubler	.068	-1.19	0.0	.044
	1290564	R/SP1	.041	-	-	.041
	1293702	R/SP1	.012	-	-	.012
B	1570015	Cap	.319	-0.33	0.0	.285
	1290733	Doubler	.068	-1.19	0.0	.044
	1290584	R/SP1	.052	-	-	.052
	1293712	R/SP1	.011	-	-	.011
C	1290794	Doubler	.047	-1.19	0.0	.056
	1290572	R/SP2	.256	-	-	.256
	1293703	R/SP2	.159	-	-	.159
D	1290574	R/SP2	.256	-	-	.256
	1290592	R/SP2	.249	-	-	.249
	1293704	R/SP2	.159	-	-	.159
	1293713	R/SP2	.154	-	-	.154
E	1290692	Doubler	.050	-1.19	0.0	.058
	1290594	R/SP2	.249	-	-	.249
	1293714	R/SP2	.154	-	-	.154
F	1291431	Doubler	.093	0.0	0.0	.093
	1290562	R/SP1	.134	-	-	.134
	1290563	R/SP1	.134	-	-	.134
	1298502	R/SP1	.028	-	-	.028
	1293701	R/SP1	.012	-	-	.012
G	1291432	Doubler	.093	0.0	0.0	.093
	1290582	R/SP1	.139	-	-	.139
	1290583	R/SP1	.139	-	-	.139
	1298512	R/SP1	.031	-	-	.031
	1293711	R/SP1	.011	-	-	.011
H	1290793	Doubler	.047	1.21	0.0	.056
	1290571	R/SP2	.256	-	-	.256
	1298503	R/SP2	.159	-	-	.159

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
I	1290572	R/SP2	.256	-	-	.256
	1290591	R/SP2	.249	-	-	.249
	1298504	R/SP2	.159	-	-	.159
	1298513	R/SP2	.154	-	-	.154
J	1290591	Doubler	.050	1.21	0.0	.058
	1290593	R/SP2	.249	-	-	.249
	1298514	R/SP2	.154	-	-	.154
K	1580034	Cap	.370	0.34	0.0	.344
	1291111	Doubler	.068	1.21	0.0	.052
	1290561	R/SP1	.078	-	-	.078
	1298501	R/SP1	.028	-	-	.028
L	1580035	Cap	.370	0.34	0.0	.346
	1291112	Doubler	.068	1.21	0.0	.052
	1290581	R/SP1	.076	-	-	.076
	1298511	R/SP1	.031	-	-	.031

3.1.2.5 Right Main Beam (Sta. 138-148) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
13803	456	AAA	-	-	123	DCC
13823	456	AAA	-	-	13	DC
13833	456	AAA	-	-	12	DC
13843	456	AAA	-	-	123	DCC
13863	456	AAA	-	-	123	DCC
14803	456	AAA	123	AAA	-	-
14823	456	AAA	123	AAA	-	-
14833	456	AAA	-	-	123	DCC
14843	456	AAA	-	-	123	DCC
14863	456	AAA	-	-	-	-

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
N	1292104	Inner Skin	.025
	1290171	Outer Skin	.016
O	1292103	Inner Skin	.025
	1291983	Interior Skin	.040
	1290191	Outer Skin	.016
P	1292102	Inner Skin	.025
	1291982	Interior Skin	.040
	1291272	Outer Skin	.020
Q	1292101	Inner Skin	.025
	1291981	Interior Skin	.040
	1291271	Outer Skin	.020

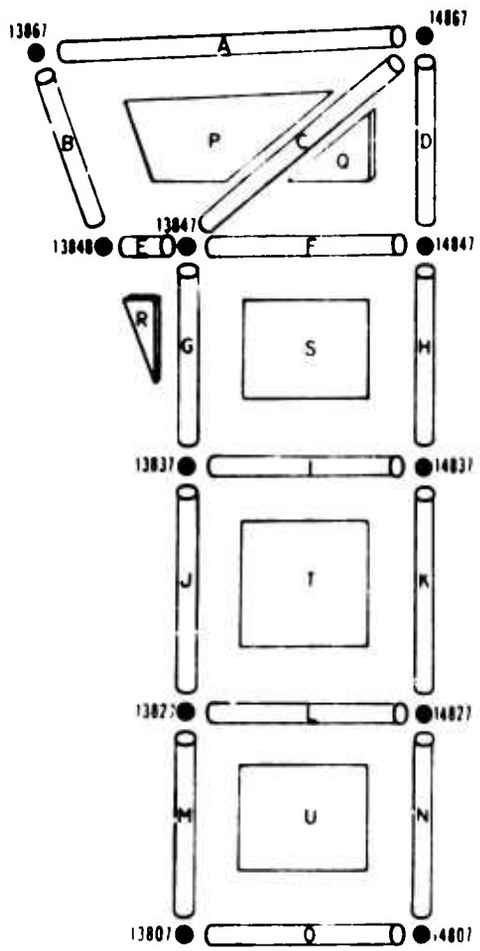
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT Z	OFFSETS FROM GRIDPOINT Y	FINAL AREA ($in.^2$)
A	1570036	Cap	.215	-0.33	0.0	.301
	1291985	Doubler	.090	-1.25	0.0	.075
	1291008	R/SP1	.063	-	-	.063
	1291702	R/SP1	.035	-	-	.035
B	1291986	Doubler	.080	-0.77	0.0	.087
	1291014	R/SP2	.120	-	-	.120
	1291703	R/SP2	.055	-	-	.055
C	1291987	Doubler	.071	-1.31	0.0	.083
	1291018	R/SP2	.120	-	-	.120
	1291704	R/SP2	.055	-	-	.055
D	1291984	Doubler	.179	-0.31	0.0	.163
	1291006	R/SP1	.144		-	.144
	1291007	R/SP1	.144	-	-	.144
	1299806	R/SP1	.142	-	-	.142
	1291701	R/SP1	.035	-	-	.035
	1291902	R/SP1	.013	-	-	.013
E	1291274	Doubler	.041	-0.48	0.0	.044
	1291013	R/SP2	.120	-	-	.120
	1299813	R/SP2	.191	-	-	.191
	1291903	R/SP2	.055	-	-	.055
F	1291275	Doubler	.036	0.0	0.0	.036
	1291017	R/SP2	.120	-	-	.120
	1299816	R/SP2	.191	-	-	.191
	1291904	R/SP2	.055	-	-	.055
G	1580046	Cap	.291	0.33	0.0	.227
	1291273	Doubler	.084	0.0	0.0	.084
	1291004	R/SP1	.088	-	-	.088
	1291005	R/SP1	.078	-	-	.078
	1299804	R/SP1	.201	-	-	.201
	1299805	R/SP1	.142	-	-	.142
	1292704	R/SP1	.034	-	-	.034
	1291901	R/SP1	.013	-	-	.013

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
H	1291012	R/SP2	.120	-	-	.120
	1299812	R/SP2	.191	-	-	.191
	1292712	R/SP2	.096	-	-	.096
I	1291016	R/SP2	.120	-	-	.120
	1299815	R/SP2	.191	-	-	.191
	1292714	R/SP2	.096	-	-	.096
J	1590071	Cap	.278	0.34	0.0	.264
	1291002	R/SP1	.158	-	-	.158
	1291003	R/SP1	.158	-	-	.158
	1299802	R/SP1	.167	-	-	.167
	1299803	R/SP1	.201	-	-	.201
	1292702	R/SP1	.122	-	-	.122
	1292703	R/SP1	.122	-	-	.122
K	1291011	R/SP2	.120	-	-	.120
	1299811	R/SP2	.191	-	-	.191
	1292711	R/SP2	.096	-	-	.096
L	1291015	R/SP2	.120	-	-	.120
	1299814	R/SP2	.191	-	-	.191
	1292713	R/SP2	.096	-	-	096
M	1291001	R/SP1	.056	-	-	.056
	1299801	R/SP1	.167	-	-	.167
	1292701	R/SP1	.047	-	-	.047

3.1.2.6 Left Main Beam (Sta. 138-148) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
13807	456	AAA	-	-	123	DCC
13827	456	AAA	-	-	123	DCC
13837	456	AAA	-	-	12	DC
13847	456	AAA	-	-	13	DC
13848	456	AAA	-	-	123	DCC
13867	456	AAA	-	-	123	DCC
14807	456	AAA	123	AAA	-	-
14827	456	AAA	123	AAA	-	-
14837	456	AAA	-	-	123	DCC
14847	456	AAA	-	-	123	DCC
14867	456	AAA	-	-	12	DC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
P	1291415	Inner Skin	.025
	1290591	Outer Skin	.025
Q	1291416	Inner Skin	.025
	1290592	Outer Skin	.025
R	1291413	Inner Skin	.025
	1290693	Interior Skin	.040
S	1291414	Inner Skin	.025
	1290694	Interior Skin	.040
	1290571	Outer Skin	.016
T	1291412	Inner Skin	.025
	1290692	Interior Skin	.040
	1291252	Outer Skin	.020
U	1291411	Inner Skin	.025
	1290691	Interior Skin	.040
	1291251	Outer Skin	.020

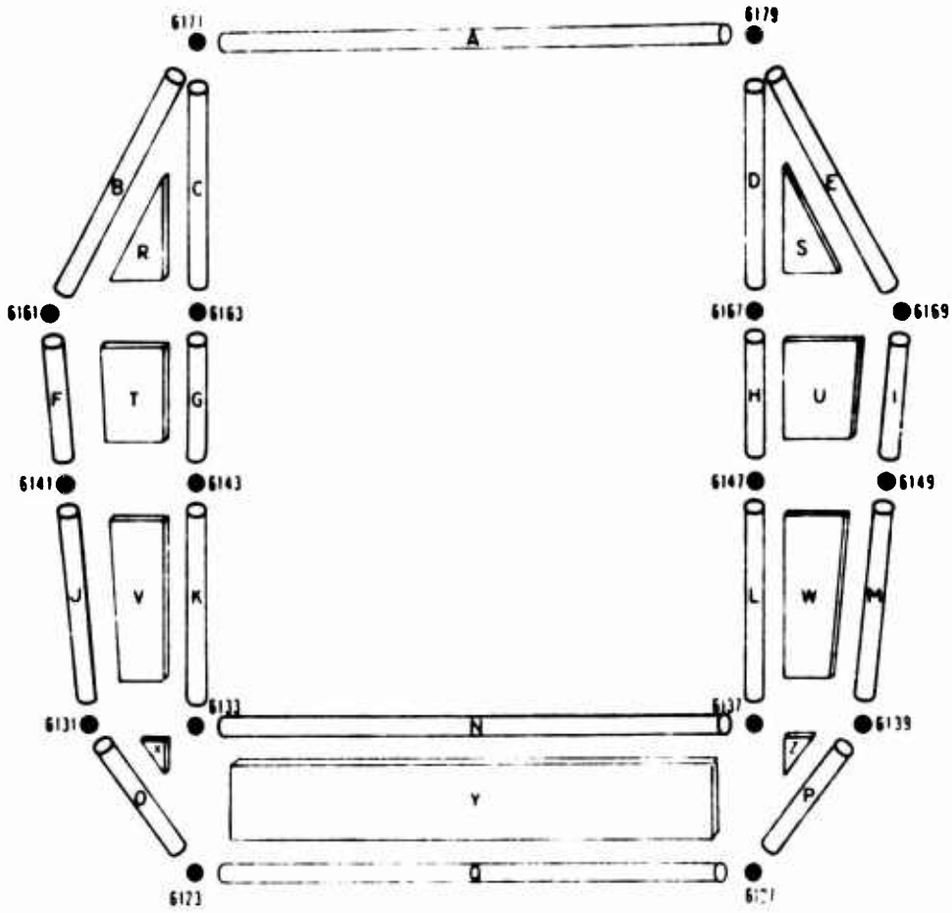
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1570016	Cap	.288	-0.33	0.0	.275
	1290695	Doubler	.116	-1.25	0.0	.097
	1294108	R/SP1	.061	-	-	.061
	1295922	R/SP1	.053	-	-	.053
B	1290698	Doubler	.080	-1.25	0.0	.090
	1294114	R/SP2	.122	-	-	.122
	1295923	R/SP2	.094	-	-	.094
C	1294118	R/SP2	.122	-	-	.122
	1295924	R/SP2	.094	-	-	.094
D	1290699	Doubler	.072	-1.25	0.0	.081
E	1290696	Doubler	.117	-0.35	0.0	.104
	1294107	R/SP1	.143	-	-	.143
	1295921	R/SP1	.053	-	-	.053
F	1290697	Doubler	.117	-0.35	0.0	.104
	1294106	R/SP1	.143	-	-	.143
	1296906	R/SP1	.151	-	-	.151
	1295702	R/SP1	.014	-	-	.014
G	1291254	Doubler	.041	0.0	0.0	.041
	1294113	R/SP2	.121	-	-	.121
	1296913	R/SP2	.194	-	-	.194
	1295703	R/SP2	.056	-	-	.056
H	1291255	Doubler	.037	0.0	0.0	.037
	1294117	R/SP2	.121	-	-	.121
	1296916	R/SP2	.194	-	-	.194
	1295704	R/SP2	.056	-	-	.056
I	1580036	Cap	.291	0.33	0.0	.221
	1291253	Doubler	.090	0.0	0.0	.090
	1294104	R/SP1	.088	-	-	.088
	1294105	R/SP1	.078	-	-	.078
	1296904	R/SP1	.201	-	-	.201
	1296905	R/SP1	.151	-	-	.151
	1292504	R/SP1	.033	-	-	.033
	1295701	R/SP1	.014	-	-	.014

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
J	1294112	R/SP2	.120	-	-	.120
	1296912	R/SP2	.191	-	-	.191
	1292512	R/SP2	.096	-	-	.096
K	1294116	R/SP2	.120	-	-	.120
	1296915	R/SP2	.191	-	-	.191
	1292514	R/SP2	.096	-	-	.096
L	1590051	Cap	.290	0.35	0.0	.274
	1294102	R/SP1	.158	-	-	.158
	1294103	R/SP1	.158	-	-	.158
	1296902	R/SP1	.169	-	-	.169
	1296903	R/SP1	.201	-	-	.201
	1292502	R/SP1	.122	-	-	.122
	1292503	R/SP1	.122	-	-	.122
M	1294111	R/SP2	.120	-	-	.120
	1296911	R/SP2	.191	-	-	.191
	1292511	R/SP2	.096	-	-	.096
N	1294115	R/SP2	.120	-	-	.120
	1296914	R/SP2	.191	-	-	.191
	1292513	R/SP2	.096	-	-	.096
O	1294101	R/SP1	.057	-	-	.057
	1296901	R/SP1	.169	-	-	.169
	1292501	R/SP1	.048	-	-	.048

3.1.2.7 Bulkhead Sta. 61.25 Detail



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
6123	456	AAA	-	-	123	DCC
6127	456	AAA	-	-	13	DC
6131	456	AAA	-	-	123	DCC
6133	456	AAA	-	-	23	CC
6137	456	AAA	-	-	123	DCC
6139	456	AAA	-	-	123	DCC
6141	456	AAA	-	-	123	DCC
6143	456	AAA	-	-	12	DC
6147	456	AAA	-	-	12	DC
6149	456	AAA	-	-	123	DCC
6161	456	AAA	-	-	123	DCC
6163	456	AAA	-	-	123	DCC
6167	456	AAA	-	-	23	CC
6169	456	AAA	-	-	123	DCC
6171	456	AAA	-	-	13	DC
6179	456	AAA	-	-	123	DCC

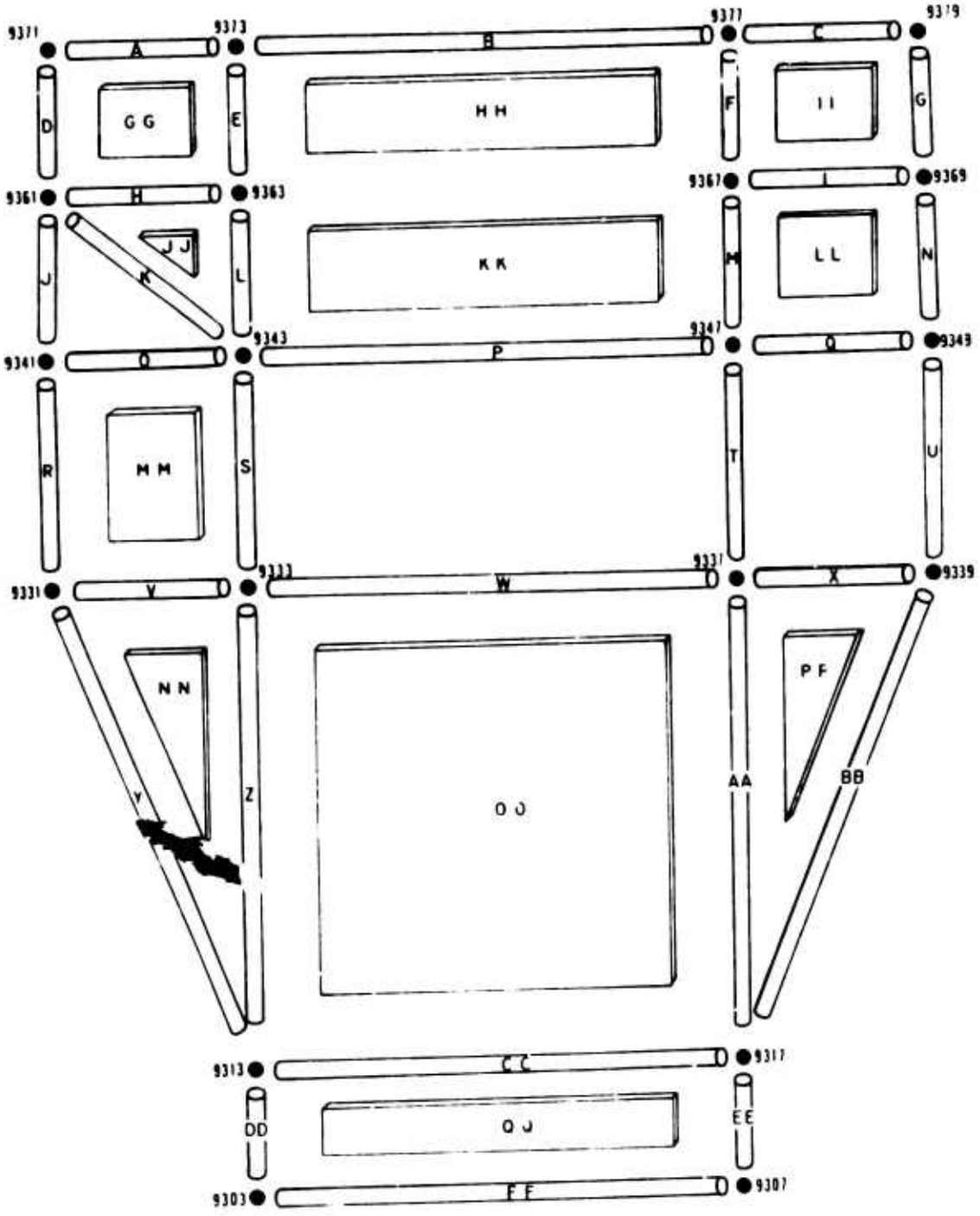
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
R	617161	Bulkhead	.040
S	616779	Bulkhead	.040
T	614163	Bulkhead	.040
U	614769	Bulkhead	.040
V	613143	Bulkhead	.040
W	613749	Bulkhead	.040
X	612331	Bulkhead	.040
Y	612337	Bulkhead	.040
Z	612737	Bulkhead	.040

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	5850871	Doubler	0.044	-	-	0.044
	617179	Frame	0.282	-	-	0.282
B	5850872	Doubler	0.044	-	-	0.044
	616171	Frame	0.282	-	-	0.282
C	616371	Frame	0.012	-	-	0.012
D	617967	Frame	0.012	-	-	0.012
E	5850873	Doubler	0.044	-	-	0.044
	616979	Frame	0.282	-	-	0.282
F	5850792	Doubler	0.034	-	-	0.034
	614161	Frame	0.064	-	-	0.064
G	614363	Frame	0.030	-	-	0.030
H	614767	Frame	0.030	-		0.030
I	5850798	Doubler	0.034	-	-	0.034
	614969	Frame	0.064	-	-	0.064
J	5850793	Doubler	0.034	-	-	0.034
	613141	Frame	0.064	-	-	0.064
K	613343	Frame	0.030	-	-	0.030
L	613747	Frame	0.030		-	0.030
M	5850797	Doubler	0.034	-	-	0.034
	613949	Frame	0.064	-	-	0.064
N	613337	Frame	0.055	-	-	0.055
O	5850794	Doubler	0.034	-	-	0.034
	613123	Frame	0.030	-	-	0.030
P	5850796	Doubler	0.034	-	-	0.034
	612739	Frame	0.030	-	-	0.030
Q	5850795	Doubler	0.034	-	-	0.034
	612327	Frame	0.108	-	-	0.108

3.1.2.8 Bulkhead Sta. 93. Detail



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9303	456	AAA	-	-	123	DCC
9307	456	AAA	-	-	123	DCC
9313	456	AAA	-	-	123	DCC
9317	456	AAA	-	-	13	DC
9331	456	AAA	-	-	123	DC
9333	456	AAA	-	-	1	D
9337	456	AAA	-	-	2	C
9339	456	AAA	-	-	123	DCC
9341	1456	AAAA	-	-	23	CC
9343	456	AAA	-	-	123	DCC
9347	456	AAA	-	-	123	DCC
9349	1456	AAAA	-	-	23	CC
9361	456	AAA	-	-	123	DCC
9363	456	AAA	-	-	2	C
9367	456	AAA	-	-	1	D
9369	456	AAA	-	-	123	DCC
9371	456	AAA	-	-	123	DCC
9373	1456	AAAA	-	-	23	CC
9377	1456	AAAA	-	-	23	CC
9379	456	AAA	-	-	123	DCC

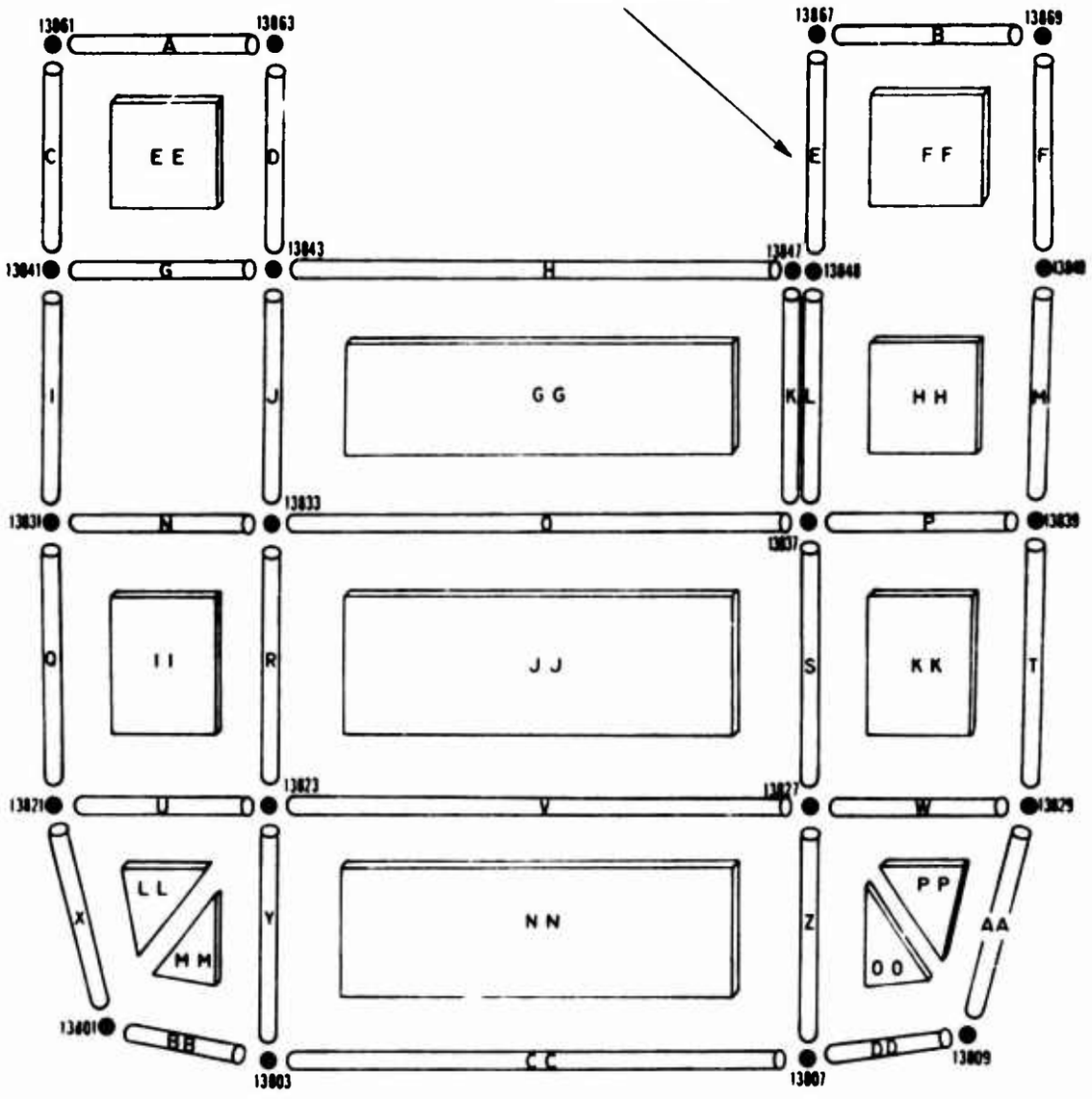
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
GG	936173	Bulkhead	.049
HH	936377	Bulkhead	.024
II	936779	Bulkhead	.049
JJ	934361	Bulkhead	.040
KK	934367	Bulkhead	.024
LL	934769	Bulkhead	.040
MM	933143	Bulkhead	.085
NN	931331	Bulkhead	.024
OO	931337	Bulkhead	.024
PP	931737	Bulkhead	.024
QQ	930317	Bulkhead	.025

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	937173	Frame	.202	-	-	.202
B	937377	Frame	.188	-	-	.188
C	937779	Frame	.202	-	-	.202
D	936171	Frame	.092	-	-	.092
E	936373	Frame	.100	-	-	.100
F	936777	Frame	.100	-	-	.100
G	936979	Frame	.092	-	-	.092
H	936163	Frame	.194	-	-	.194
I	936769	Frame	.194	-	-	.194
J	934161	Frame	.333	-	-	.333
K	936143	Frame	.191	-	-	.191
L	934363	Frame	.242	-	-	.242
M	934767	Frame	.374	-	-	.374
N	934969	Frame	.188	-	-	.188
O	934143	Frame	.242	-	-	.242
P	934347	Frame	.374	-	-	.374
Q	934749	Frame	.357	-	-	.357
R	933141	Frame	.333	-	-	.333
S	933343	Frame	.333	-	-	.333
T	933747	Frame	.510	-	-	.510
U	933949	Frame	.314	-	-	.314
V	933133	Frame	.397	-	-	.397
W	933337	Frame	.167	-	-	.167
X	933739	Frame	.261	-	-	.261
Y	933113	Frame	.080	-	-	.080
Z	931333	Frame	.209	-	-	.209
AA	933717	Frame	.209	-	-	.209
BB	931739	Frame	.080	-	-	.080
CC	931317	Frame	.151	-	-	.151
DD	930313	Frame	.051	-	-	.051
EE	930717	Frame	.051	-	-	.051
FF	930307	Frame	.095	-	-	.095

3.1.2.9 Bulkhead Sta. 138.7 Detail



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
13801	456	AAA	-	-	123	DCC
13803	456	AAA	-	-	123	DCC
13807	456	AAA	-	-	123	DCC
13809	456	AAA	-	-	123	DCC
13821	456	AAA	-	-	123	DCC
13823	456	AAA	-	-	13	DC
13827	456	AAA	-	-	123	DCC
13829	456	AAA	-	-	123	DCC
13831	456	AAA	-	-	123	DCC
13833	456	AAA	-	-	12	DC
13837	456	AAA	-	-	12	DC
13839	456	AAA	-	-	123	DCC
13841	1456	AAAA	-	-	23	CC
13843	456	AAA	-	-	123	DCC
13847	456	AAA	-	-	13	DC
13848	456	AAA	-	-	123	DCC
13849	1456	AAAA	-	-	23	CC
13861	456	AAA	-	-	123	DCC
13863	456	AAA	-	-	123	DCC
13867	456	AAA	-	-	123	DCC
13869	456	AAA	-	-	123	DCC
13871	2456	AAAA	-	-	13	DC
13879	2456	AAAA	-	-	13	DC

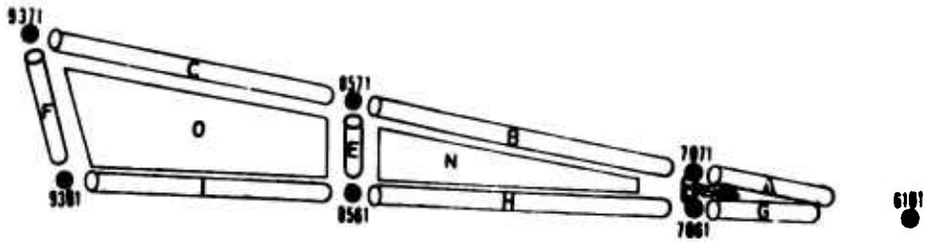
SHEAR PANEL/MEMBRANE ELEMENT DATA

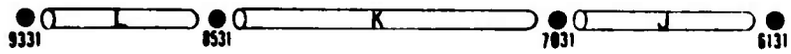
Letter Designation	NASTRAN EID	Type	Thickness (IN.)
EE	1384163	Bulkhead	.032
FF	1384869	Bulkhead	.032
GG	1383347	Bulkhead	.040
HH	1383749	Bulkhead	.032
II	1382133	Bulkhead	.040
JJ	1382337	Bulkhead	.040
KK	1382739	Bulkhead	.040
LL	1380121	Bulkhead	.040
MM	1380123	Bulkhead	.040
NN	1380327	Bulkhead	.040
OO	1380727	Bulkhead	.040
PP	1380927	Bulkhead	.040

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	1386163	Frame	.056	-	-	.056
B	1386769	Frame	.047	-	-	.047
C	1384161	Frame	.104	-	-	.104
D	1384363	Frame	.128	-	-	.128
E	1384867	Frame	.128	-	-	.128
F	1384969	Frame	.104	-	-	.104
G	1384143	Frame	.056	-	-	.056
H	1384347	Frame	.108	-	-	.108
I	1383141	Frame	.104	-	-	.104
J	1383343	Frame	.244	-	-	.244
K	1383747	Frame	.116	-	-	.116
L	1383748	Frame	.128	-	-	.128
M	1383949	Frame	.104	-	-	.104
N	1383133	Frame	.168	-	-	.168
O	1383337	Frame	.168	-	-	.168
P	1383739	Frame	.224	-	-	.224
Q	1382131	Frame	.057	-	-	.057
R	1382333	Frame	.116	-	-	.116
S	1382737	Frame	.116	-	-	.116
T	1382939	Frame	.061	-	-	.061
U	1382123	Frame	.070	-	-	.070
V	1382327	Frame	.130	-	-	.130
W	1382729	Frame	.070	-	-	.070
X	1382101	Frame	.078	-	-	.078
Y	1380323	Frame	.863	-	-	.863
Z	1382707	Frame	.116	-	-	.116
AA	1380929	Frame	.078	-	-	.078
BB	1380103	Frame	.078	-	-	.078
CC	1380307	Frame	.184	-	-	.184
DD	1380709	Frame	.078	-	-	.078

3.1.2.10 Right Side Panels Under Canopy (Sta. 61-93) Detail





View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
6131	456	AAA	-	-	123	DCC
6161	456	AAA	-	-	123	DCC
7031	3456	AAAA	-	-	12	DC
7061	456	AAA	-	-	123	DCC
7071	2456	AAAA	-	-	13	DC
8531	3456	AAAA	-	-	12	DC
8561	456	AAA	-	-	123	DCC
8571	2456	AAAA	-	-	13	DC
9331	456	AAA	-	-	123	DCC
9361	456	AAA	-	-	123	DCC
9371	456	AAA	-	-	123	DCC

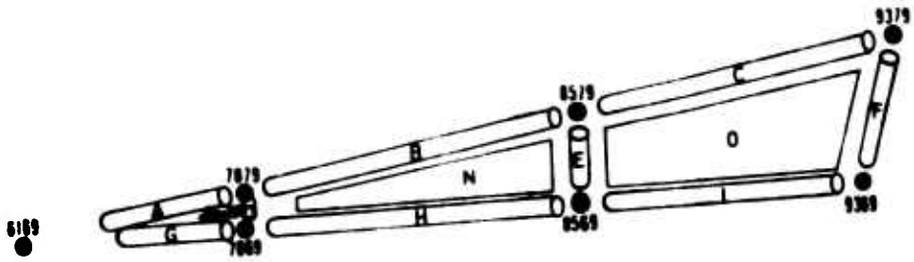
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
M	1791611	Skin	.032
N	1791612	Skin	.032
O	1791613	Skin	.032

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	5003111	Frame	.211	0.41	0.0	.234
B	5003112	Frame	.211	0.41	0.0	.230
	1796102	R/SP3	.040	-	-	.040
C	5003113	Frame	.211	0.41	0.0	.227
	1796112	R/SP3	.072	-	-	.072
D	1796103	R/SP2	.232	-	-	.232
E	1796104	R/SP2	.232	-	-	.232
	1796113	R/SP2	.202	-	-	.202
F	1796114	R/SP2	.202	-	-	.202
G	2500171	Cap	.059	-0.27	0.0	.054
H	2500172	Cap	.059	-0.27	0.0	.054
	1796101	R/SP3	.040	-	-	.040
I	2500173	Cap	.059	-0.27	0.0	.054
	1796111	R/SP3	.072	-	-	.072
J	2110102	Cap	.226	0.67	0.0	.187
K	2110103	Cap	.226	0.68	0.0	.189
L	2110104	Cap	.226	0.68	0.0	.193

3.1.2.11 Left Side Panels Under Canopy (Sta. 61-93) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
6139	456	AAA	-	-	123	DCC
6169	456	AAA	-	-	123	DCC
7039	3456	AAAA	-	-	12	DC
7069	456	AAA	-	-	123	DCC
7079	2456	AAAA	-	-	13	DC
8539	3456	AAAA	-	-	12	DC
8569	456	AAA	-	-	123	DCC
8579	2456	AAAA	-	-	13	DC
9339	456	AAA	-	-	123	DCC
9369	456	AAA	-	-	123	DCC
9379	456	AAA	-	-	123	DCC

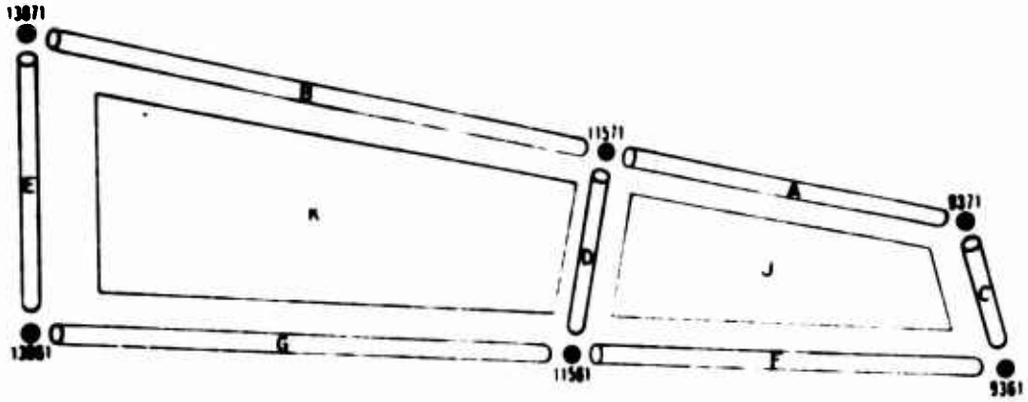
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
M	1791631	Skin	.032
N	1791632	Skin	.032
O	1791633	Skin	.032

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT Z	OFFSETS FROM GRIDPOINT Y	FINAL AREA ($in.^2$)
A	5003091	Frame	.197	-0.12	0.0	.191
B	5003092	Frame	.197	-0.12	0.0	.192
	1796302	R/SP3	.040	-	-	.040
C	5003093	Frame	.197	-0.12	0.0	.193
	1796312	R/SP3	.072	-	-	.072
D	1796303	R/SP2	.232	-	-	.232
E	1796304	R/SP2	.232	-	-	.232
	1796313	R/SP2	.202	-	-	.202
F	1796314	R/SP2	.202	-	-	.202
G	2100451	Cap	.059	-0.27	0.0	.055
H	2100452	Cap	.059	-0.27	0.0	.054
	1796301	R/SP3	.040	-	-	.040
I	2100453	Cap	.059	-0.27	0.0	.054
	1796311	R/SP3	.072	-	-	.072
J	2110532	Cap	.226	0.66	0.0	.187
K	2110533	Cap	.226	0.67	0.0	.190
L	2110534	Cap	.226	0.68	0.0	.193

3.1.2.12 Right Side Panels Under Canopy (Sta. 93-138) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9331	456	AAA	-	-	123	DCC
9361	456	AAA	-	-	123	DCC
9371	456	AAA	-	-	123	DCC
11531	3456	AAAA	-	-	12	DC
11561	456	AAA	-	-	123	DCC
11571	2456	AAAA	-	-	13	DC
13831	456	AAA	-	-	123	DCC
13861	456	AAA	-	-	123	DCC
13871	2456	AAAA	-	-	13	DC

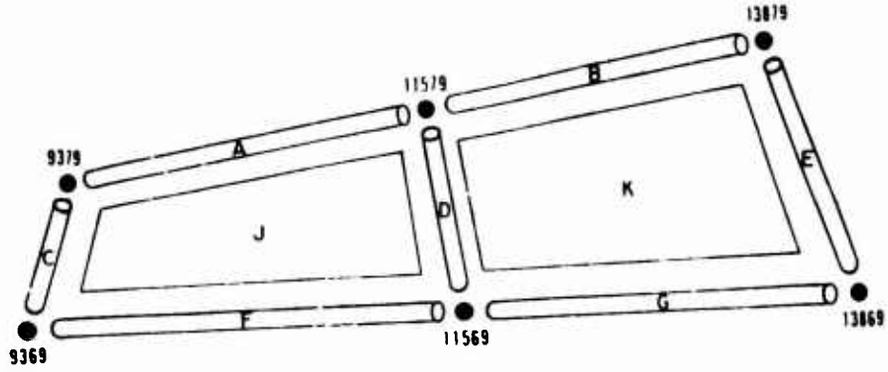
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
J	1791614	Skin	.032
K	1791615	Skin	.032

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	5003114	Frame	.201	0.20	0.0	.213
	1796122	R/SP3	.102	-	-	.102
B	5003115	Frame	.201	0.0	0.0	.201
	1796132	R/SP3	.104	-	-	.140
C	1796123	R/SP2	.270	-	-	.270
D	1796124	R/SP2	.270	-	-	.270
	1796133	R/SP2	.382	-	-	.382
E	1796134	R/SP2	.382	-	-	.382
F	2500911	Cap	.059	-0.28	0.0	.053
	1796121	R/SP3	.102	-	-	.102
G	2500912	Cap	.059	-0.30	0.0	.050
	1796131	R/SP3	.140	-	-	.140
H	2110105	Cap	.281	0.67	0.0	.243
I	2110106	Cap	.281	0.65	0.0	.248

3.1.2.13 Left Side Panels Under Canopy (Sta. 93-138) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9339	456	AAA	-	-	123	DCC
9369	456	AAA	-	-	123	DCC
9379	456	AAA	-	-	123	DCC
11539	3456	AAAA	-	-	12	DC
11569	456	AAA	-	-	123	DCC
11579	2456	AAAA	-	-	13	DC
13839	456	AAA	-	-	123	DCC
13869	456	AAA	-	-	123	DCC
13879	2456	AAAA	-	-	13	DC

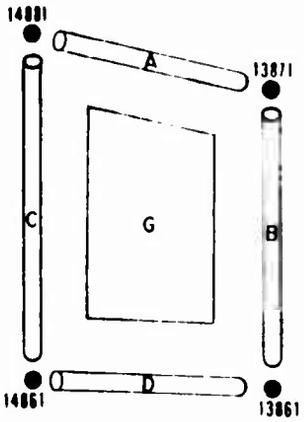
SHEAR PANEL/MEMBRANE ELEMENT DATA

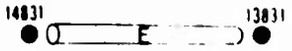
Letter Designation	NASTRAN EID	Type	Thickness (IN.)
J	1791634	Skin	.032
K	1791635	Skin	.032

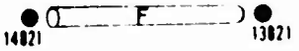
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	5003094	Frame	.208	-0.06	0.0	.206
	1796322	R/SP3	.102	-	-	.102
B	5003095	Frame	.208	0.0	0.0	.208
	1796332	R/SP3	.130	-	-	.130
C	1796323	R/SP2	.270	-	-	.270
D	1796324	R/SP2	.270	-	-	.270
	1796333	R/SP2	.248	-	-	.248
E	1796334	R/SP2	.248	-	-	.248
F	2100551	Cap	.059	-0.27	0.0	.054
	1796321	R/SP3	.102	-	-	.102
G	2100552	Cap	.059	-0.27	0.0	.054
	1796331	R/SP3	.130	-	-	.130
H	2110535	Cap	.281	0.67	0.0	.243
I	2110536	Cap	.281	0.65	0.0	.247

3.1.2.14 Right Side Panels Under Canopy (Sta. 138-148) Detail







View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
13821	456	AAA	-	-	123	DCC
13831	456	AAA	-	-	123	DCC
13861	456	AAA	-	-	123	DCC
13871	2456	AAAA	-	-	13	DC
14821	456	AAA	-	-	123	DCC
14831	456	AAA	-	-	123	DCC
14861	456	AAA	-	-	123	DCC
14881	456	AAA	-	-	123	DCC

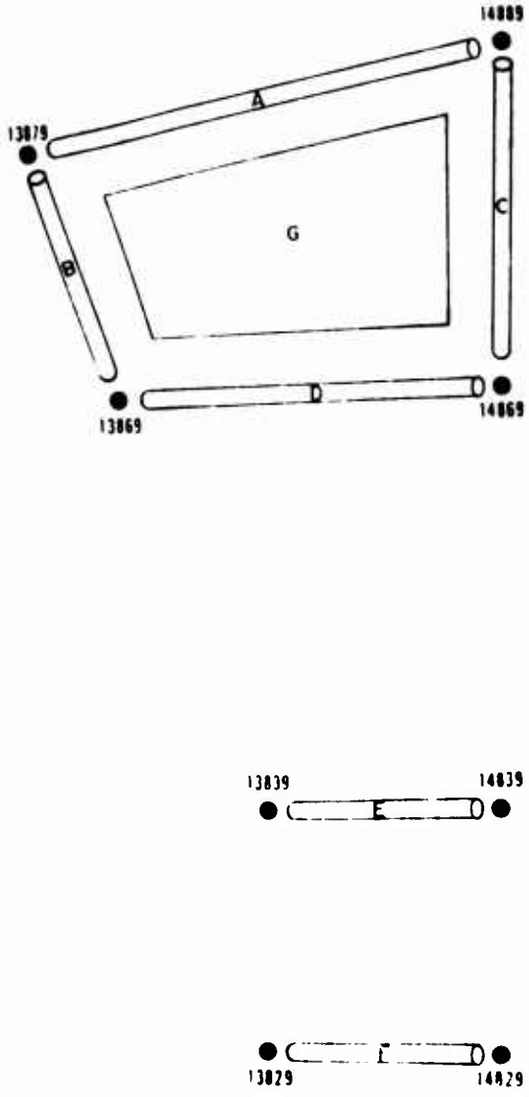
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
G	1791616	Skin	.032

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	5003116	Frame	.201	-0.06	0.0	.200
	1796142	R/SP3	.195	-	-	.195
B	1796143	R/SP2	.187	-	-	.187
C	1796144	R/SP2	.187	-	-	.187
D	2500913	Cap	.070	-0.37	0.0	.067
	1796141	R/SP3	.195	-	-	.195
E	2110107	Cap	.252	0.47	0.0	.174
F	1610151	Cap	.130	0.11	0.0	.128

3.1.2.15 Left Side Panels Under Canopy (Sta. 138-148) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
13829	456	AAA	-	-	123	DCC
13839	456	AAA	-	-	123	DCC
13869	456	AAA	-	-	123	DCC
13879	2456	AAAA	-	-	13	DC
14829	456	AAA	-	-	123	DCC
14839	456	AAA	-	-	123	DCC
14869	456	AAA	-	-	123	DCC
14889	456	AAA	-	-	123	DCC

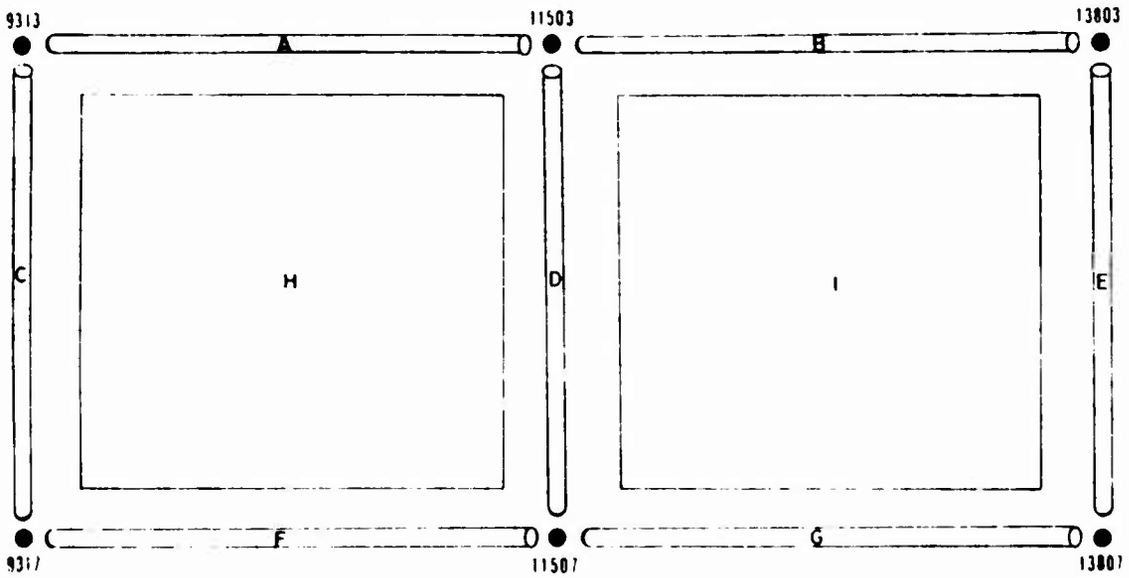
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
G	1791636	Skin	.032

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	5003096	Frame	.208	-0.20	0.0	.205
	1796342	R/SP3	.183	-	-	.183
B	1796343	R/SP2	.321	-	-	.321
C	1796344	R/SP2	.321	-	-	.321
D	2100553	Cap	.066	-0.24	0.0	.064
	1796341	R/SP3	.183	-	-	.183
E	2110537	Cap	.252	0.47	0.0	.166
F	1610131	Cap	.130	0.11	0.0	.128

3.1.2.16 Ammo. Floor (Sta. 93-138, W. L. 27) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9313	456	AAA	-	-	123	DCC
9317	456	AAA	-	-	13	DC
11503	3456	AAAA	-	-	12	DC
11507	3456	AAAA	-	-	12	DC
13803	456	AAA	-	-	123	DCC
13807	456	AAA	-	-	123	DCC

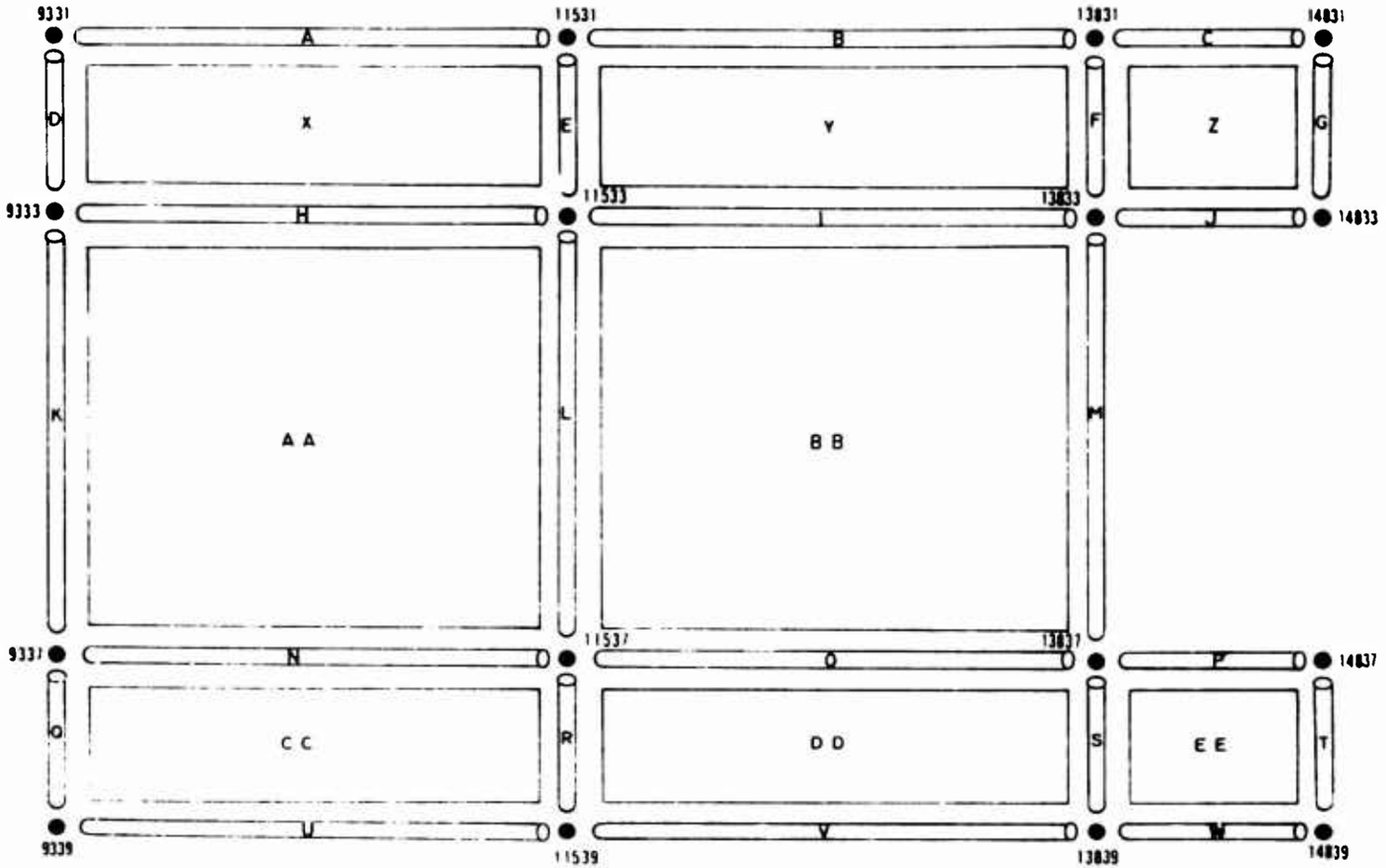
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
H	2190151	Lower Skin	.020
	2190191	Upper Skin	.025
I	2190152	Lower Skin	.020
	2190192	Upper Skin	.025

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2190311	Doubler	.151	0.0	1.38	.196
	2191503	R/SP3	.186	-	-	.186
	2191903	R/SP3	.044	-	-	.044
B	2190312	Doubler	.151	0.0	1.38	.196
	2191507	R/SP3	.186	-	-	.186
	2191907	R/SP3	.044	-	-	.044
C	2190271	Doubler	.052	0.0	2.72	.046
	2191501	R/SP2	.233	-	-	.233
	2191901	R/SP2	.272	-	-	.272
D	2191502	R/SP2	.233	-	-	.233
	2191505	R/SP2	.238	-	-	.238
	2191902	R/SP2	.272	-	-	.272
	2191905	R/SP2	.279	-	-	.279
E	2190431	Doubler	.054	0.0	2.72	.047
	2191506	R/SP2	.238	-	-	.238
	2191906	R/SP2	.279	-	-	.279
F	2190313	Doubler	.151	0.0	-1.38	.196
	2191504	R/SP3	.186	-	-	.186
	2191904	R/SP3	.044	-	-	.044
G	2190314	Doubler	.151	0.0	-1.38	.196
	2191508	R/SP3	.186	-	-	.186
	2191908	R/SP3	.044	-	-	.044

3.1.2.17 Ammo. Cover (Sta. 93-148, W. L. 46) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9331	456	AAA	-	-	123	DCC
9333	456	AAA	-	-	1	D
9337	456	AAA	-	-	2	C
9339	456	AAA	-	-	123	DCC
11531	3456	AAAA	-	-	12	DC
11533	456	AAA	-	-	23	CC
11537	456	AAA	-	-	13	DC
11539	3456	AAAA	-	-	12	DC
13831	456	AAA	-	-	123	DCC
13833	456	AAA	-	-	12	DC
13837	456	AAA	-	-	12	DC
13839	456	AAA	-	-	123	DCC
14831	456	AAA	-	-	123	DCC
14833	456	AAA	-	-	123	DCC
14837	456	AAA	-	-	123	DCC
14839	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
X	2110071	Skin	.032
Y	2110072	Skin	.032
Z	2110073	Skin	.032
AA	2170111	Lower Skin	.016
	2170331	Upper Skin	.012
BB	2170112	Lower Skin	.016
	2170332	Upper Skin	.012
CC	2110051	Skin	.032
DD	2110052	Skin	.032
EE	2110053	Skin	.032

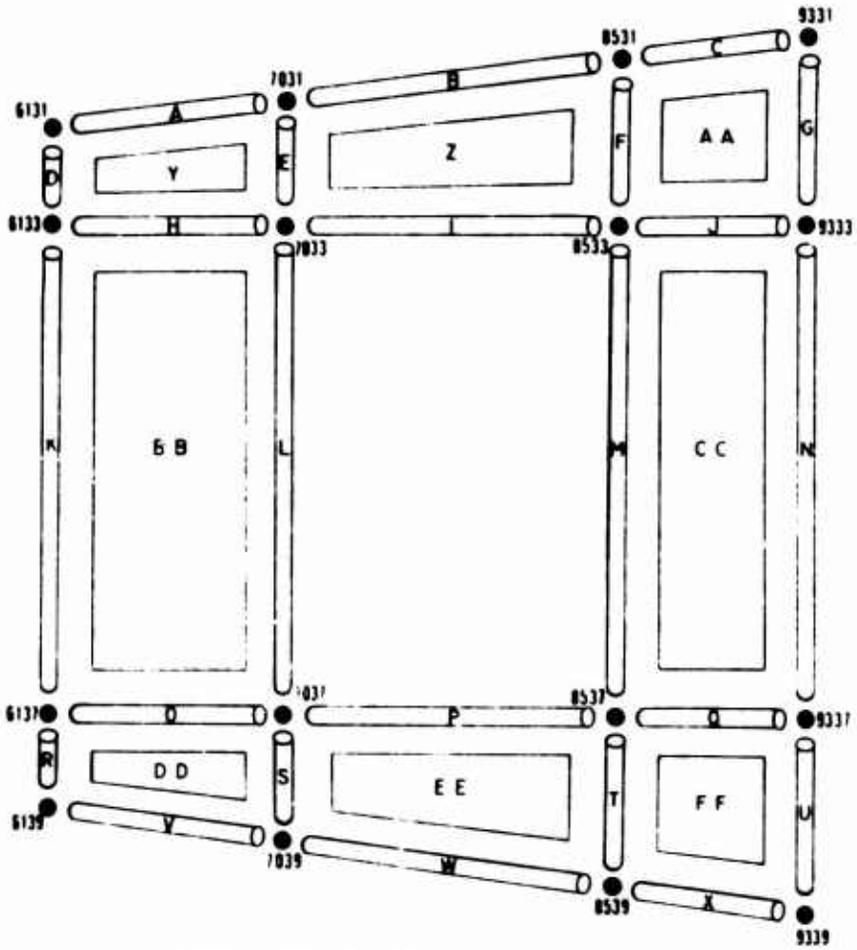
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2110701	R/SP2	.109	-	-	.109
B	2110702	R/SP2	.109	-	-	.109
C	2110703	R/SP2	.109	-	-	.109
D	2110707	R/SP2	.361	-	-	.361
E	2110708	R/SP2	.361	-	-	.361
	2110709	R/SP2	.370	-	-	.370
F	2110710	R/SP2	.370	-	-	.370
	2110711	R/SP2	.157	-	-	.157
G	2110712	R/SP2	.157	-	-	.157
H	2170171	Doubler	.030	0.0	-0.60	.027
	2170101	Doubler	.054	0.0	-0.18	.052
	2110704	R/SP2	.109	-	-	.109
	2171101	R/SP2	.053	-	-	.053
	2173301	R/SP2	.028	-	-	.028
I	2170172	Doubler	.030	0.0	-0.60	.027
	2170102	Doubler	.054	0.0	-0.18	.052
	2110705	R/SP2	.109	-	-	.109
	2171102	R/SP2	.053	-	-	.053
	2173302	R/SP2	.028	-	-	.028
J	2110706	R/SP2	.109	-	-	.109
K	2170191	Doubler	.030	0.0	-1.20	.032
	2360031	Doubler	.108	0.0	-0.36	.108
	2171105	R/SP2	.109	-	-	.109
	2173305	R/SP2	.075	-	-	.075
L	2171106	R/SP2	.109	-	-	.109
	2171107	R/SP2	.183	-	-	.183
	2173306	R/SP2	.075	-	-	.075
	2173307	R/SP2	.131	-	-	.131
M	2170271	Doubler	.030	0.0	-1.20	.032
	2171108	R/SP2	.183	-	-	.183
	2173308	R/SP2	.131	-	-	.131

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
N	2170291	Doubler	.030	0.0	0.60	.027
	2170091	Doubler	.054	0.0	0.18	.052
	2110501	R/SP2	.109	-	-	.109
	2171103	R/SP2	.053	-	-	.053
	2173303	R/SP2	.028	-	-	.028
O	2170292	Doubler	.030	0.0	0.60	.027
	2170092	Doubler	.054	0.0	0.18	.052
	2110502	R/SP2	.109	-	-	.109
	2171104	R/SP2	.053	-	-	.053
	2173304	R/SP2	.028	-	-	.028
P	2110503	R/SP2	.109	-	-	.109
Q	2110507	R/SP2	.361	-	-	.361
R	2110508	R/SP2	.361	-	-	.361
	2110509	R/SP2	.370	-	-	.370
S	2110510	R/SP2	.370	-	-	.370
	2110511	R/SP2	.157	-	-	.157
T	2110512	R/SP2	.157	-	-	.157
U	2110504	R/SP2	.109	-	-	.109
V	2110505	R/SP2	.109	-	-	.109
W	2110506	R/SP2	.109	-	-	.109

3.1.2.18 Gunner's Floor (Sta. 61-93, W. L. 46) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
6131	456	AAA	-	-	123	DCC
6133	456	AAA	-	-	23	CC
6137	456	AAA	-	-	123	DCC
6139	456	AAA	-	-	123	DCC
7031	3456	AAAA	-	-	12	DC
7033	456	AAA	123	AAA	-	-
7037	456	AAA	123	AAA	-	-
7039	3456	AAAA	-	-	12	DC
8531	3456	AAAA	-	-	12	DC
8533	456	AAA	123	AAA	-	-
8537	456	AAA	123	AAA	-	-
8539	3456	AAAA	-	-	12	DC
9331	456	AAA	-	-	123	DCC
9333	456	AAA	-	-	1	D
9337	456	AAA	-	-	2	C
9339	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
Y	2010851	Lower Skin	.032
	2010531	Interior Skin	.016
	2010694	Upper Skin	.020
Z	2010854	Lower Skin	.032
	2010534	Interior Skin	.016
	2010697	Upper Skin	.020
AA	2010857	Lower Skin	.032
	2010537	Interior Skin	.016
	2010701	Upper Skin	.020
BB	2010852	Lower Skin	.032
	2010532	Interior Skin	.016
	2010695	Upper Skin	.020
CC	2010858	Lower Skin	.032
	2010538	Interior Skin	.016
	2010702	Upper Skin	.020
DD	2010853	Lower Skin	.032
	2010533	Interior Skin	.016
	2010696	Upper Skin	.020
EE	2010856	Lower Skin	.032
	2010536	Interior Skin	.016
	2010699	Upper Skin	.020
FF	2010859	Lower Skin	.032
	2010539	Interior Skin	.016
	2010703	Upper Skin	.020

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2018501	R/SP2	.032	-	-	.032
	2015301	R/SP2	.029	-	-	.029
	2016911	R/SP2	.036	-	-	.036
B	2018521	R/SP2	.062	-	-	.062
	2015321	R/SP2	.044	-	-	.044
	2016931	R/SP2	.055	-	-	.055
C	2018531	R/SP2	.082	-	-	.082
	2015331	R/SP2	.054	-	-	.054
	2017001	R/SP2	.067	-	-	.067
D	2018507	R/SP2	.127	-	-	.127
	2015307	R/SP2	.076	-	-	.076
	2016917	R/SP2	.095	-	-	.095
E	2018510	R/SP2	.127	-	-	.127
	2018525	R/SP2	.232	-	-	.232
	2015310	R/SP2	.076	-	-	.076
	2015325	R/SP2	.116	-	-	.116
	2016920	R/SP2	.095	-	-	.095
	2016935	R/SP2	.148	-	-	.148
F	2018527	R/SP2	.232	-	-	.232
	2018537	R/SP2	.098	-	-	.098
	2015327	R/SP2	.116	-	-	.116
	2015337	R/SP2	.062	-	-	.062
	2016937	R/SP2	.148	-	-	.148
	2017007	R/SP2	.077	-	-	.077
G	2018540	R/SP2	.098	-	-	.098
	2015343	R/SP2	.062	-	-	.062
	2017010	R/SP2	.077	-	-	.077
H	2018502	R/SP2	.032	-	-	.032
	2018503	R/SP2	.320	-	-	.320
	2015302	R/SP2	.029	-	-	.029
	2015303	R/SP2	.160	-	-	.160

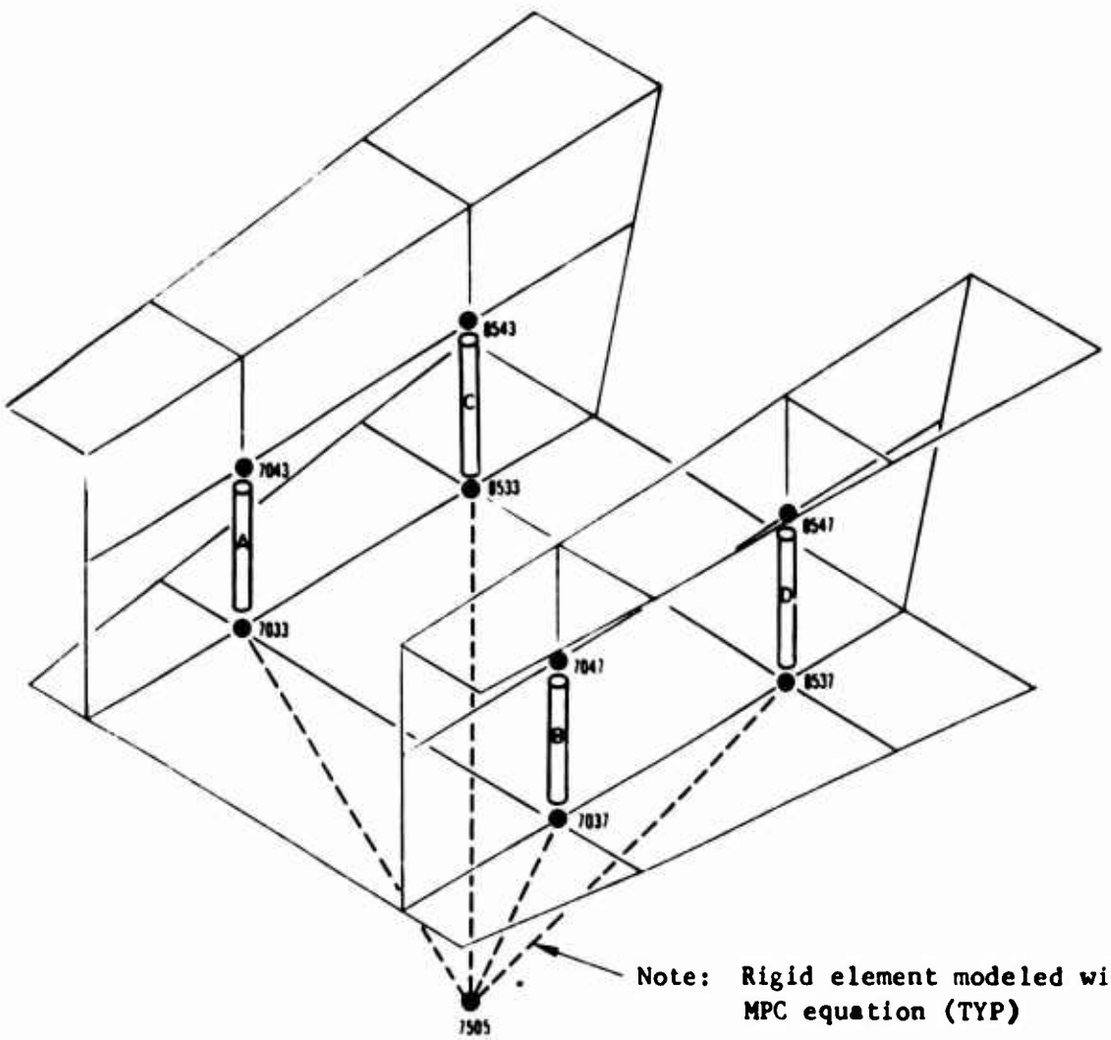
ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
H(cont.)	2016912	R/SP2	.036	-	-	.036
	2016913	R/SP2	.200	-	-	.200
I	2018522	R/SP2	.062	-	-	.062
	2015322	R/SP2	.044	-	-	.044
	2016932	R/SP2	.055	-	-	.055
J	2018532	R/SP2	.082	-	-	.082
	2018533	R/SP2	.320	-	-	.320
	2015332	R/SP2	.054	-	-	.054
	2015333	R/SP2	.160	-	-	.160
	2017002	R/SP2	.067	-	-	.067
	2017003	R/SP2	.200	-	-	.200
K	2018508	R/SP2	.127	-	-	.127
	2015308	R/SP2	.076	-	-	.076
	2016918	R/SP2	.095	-	-	.095
L	2018511	R/SP2	.127	-	-	.127
	2015311	R/SP2	.076	-	-	.076
	2016921	R/SP2	.095	-	-	.095
M	2018538	R/SP2	.098	-	-	.098
	2015338	R/SP2	.062	-	-	.062
	2017008	R/SP2	.077	-	-	.077
N	2018541	R/SP2	.098	-	-	.098
	2015341	R/SP2	.062	-	-	.062
	2017011	R/SP2	.077	-	-	.077
O	2018504	R/SP2	.320	-	-	.320
	2018505	R/SP2	.032	-	-	.032
	2015304	R/SP2	.160	-	-	.160
	2015305	R/SP2	.029	-	-	.029
	2016914	R/SP2	.200	-	-	.200
	2016915	R/SP2	.036	-	-	.036
P	2018523	R/SP2	.062	-	-	.062
	2015323	R/SP2	.044	-	-	.044
	2016933	R/SP2	.055	-	-	.055

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
Q	2018534	R/SP2	.320	-	-	.320
	2018535	R/SP2	.082	-	-	.082
	2015334	R/SP2	.160	-	-	.160
	2015335	R/SP2	.054	-	-	.054
	2017004	R/SP2	.200	-	-	.200
	2017005	R/SP2	.067	-	-	.067
R	2018509	R/SP2	.127	-	-	.127
	2015309	R/SP2	.076	-	-	.076
	2016919	R/SP2	.095	-	-	.095
S	2018512	R/SP2	.127	-	-	.127
	2018526	R/SP2	.232	-	-	.232
	2015312	R/SP2	.076	-	-	.076
	2015326	R/SP2	.116	-	-	.116
	2016922	R/SP2	.095	-	-	.095
	2016936	R/SP2	.148	-	-	.148
T	2018528	R/SP2	.232	-	-	.232
	2018539	R/SP2	.098	-	-	.098
	2015328	R/SP2	.116	-	-	.116
	2015339	R/SP2	.062	-	-	.062
	2016938	R/SP2	.148	-	-	.148
	2017009	R/SP2	.077	-	-	.077
U	2018542	R/SP2	.098	-	-	.098
	2015342	R/SP2	.062	-	-	.062
	2017012	R/SP2	.077	-	-	.077
V	2018506	R/SP2	.032	-	-	.032
	2015306	R/SP2	.029	-	-	.029
	2016916	R/SP2	.036	-	-	.036
W	2018524	R/SP2	.062	-	-	.062
	2015324	R/SP2	.044	-	-	.044
	2016934	R/SP2	.055	-	-	.055
X	2018536	R/SP2	.082	-	-	.082
	2015336	R/SP2	.054	-	-	.054
	2017006	R/SP2	.067	-	-	.067

3.1.2.19 Turret and Support Fittings Detail



GRID POINT DATA

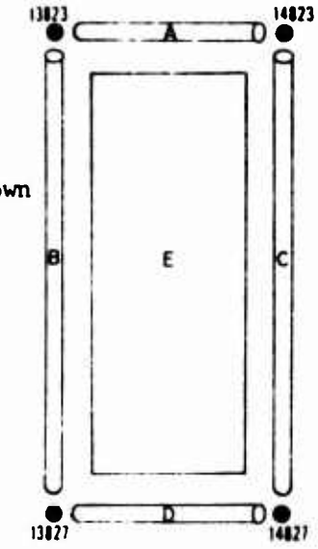
GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
7033	456	AAA	123	AAA	-	-
7037	456	AAA	123	AAA	-	-
7043	2456	AAAA	-	-	1	D
7047	2456	AAAA	-	-	1	D
7505	-	-	-	-	456	AAA
8533	456	AAA	123	AAA	-	-
8537	456	AAA	123	AAA	-	-
8543	2456	AAAA	-	-	1	D
8547	2456	AAAA	-	-	1	D

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2510021	Fitting	.527	0.830	0.0	.585
B	2510022	Fitting	.495	0.830	0.0	.549
C	1870031	Fitting	.503	1.170	0.0	.581
D	1870032	Fitting	.497	1.170	0.0	.574

3.1.2.20 Extension of Ammo Cover (Sta. 138-148, W. L. 35.97) Detail

View looking down



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
13823	456	AAA	-	-	13	DC
13827	456	AAA	-	-	123	DCC
14823	456	AAA	123	AAA	-	-
14827	456	AAA	123	AAA	-	-

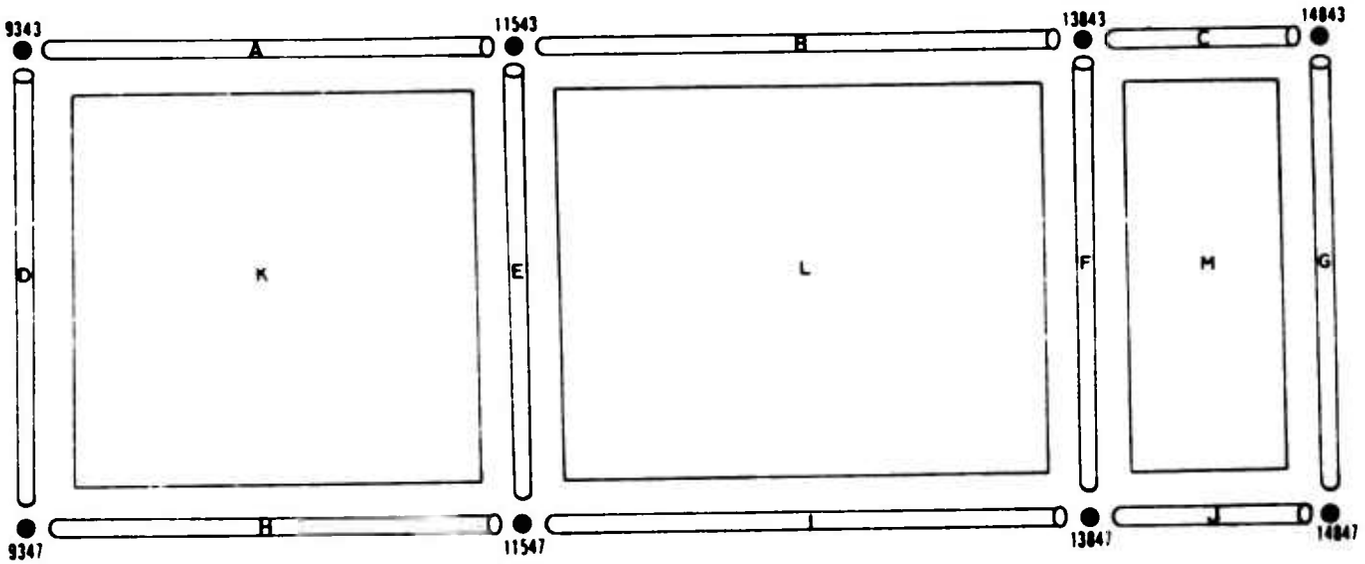
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
E	2120011	Skin	.040

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2120101	R/SP3	.133	-	-	.133
B	2120103	R/SP2	.392	-	-	.392
C	2120104	R/SP2	.392	-	-	.392
D	2120102	R/SP3	.133	-	-	.133

3.1.2.21 Pilot's Flcor (Sta. 93-148, W. L. 55) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9343	456	AAA	-	-	123	DCC
9347	456	AAA	-	-	123	DCC
11543	456	AAA	-	-	12	DC
11547	456	AAA	-	-	12	DC
13843	456	AAA	-	-	123	DCC
13847	456	AAA	-	-	13	DC
14843	456	AAA	-	-	123	DCC
14847	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
K	2070771	Lower Skin	.016
	2020731	Upper Skin	.020
L	2070772	Lower Skin	.016
	2020732	Upper Skin	.020
M	2070773	Lower Skin	.016
	2020733	Upper Skin	.020

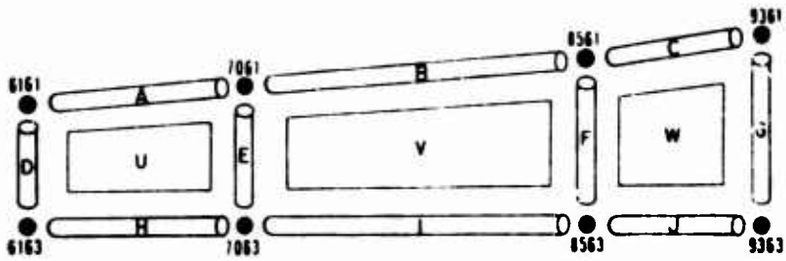
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2020291	Doubler	.032	0.0	-0.77	.027
	1560041	Doubler	.138	0.0	-0.22	.132
	2077701	R/SP3	.034	-	-	.034
	2027301	R/SP3	.065	-	-	.065
B	2020292	Doubler	.032	0.0	-0.88	.026
	1560042	Doubler	.138	0.0	-0.31	.130
	2077702	R/SP3	.031	-	-	.031
	2027302	R/SP3	.065	-	-	.065
C	2020293	Doubler	.036	0.0	-0.93	.030
	1560043	Doubler	.205	0.0	-0.27	.194
	2077703	R/SP3	.029	-	-	.029
	2027303	R/SP3	.065	-	-	.065
D	2020171	Doubler	.170	0.0	1.44	.183
	2077707	R/SP2	.050	-	-	.150
	2027307	R/SP2	.200	-	-	.200
E	2077708	R/SP2	.150	-	-	.150
	2077709	R/SP2	.175	-	-	.175
	2027308	R/SP2	.200	-	-	.200
	2027309	R/SP2	.231	-	-	.231
F	2020172	Doubler	.037	0.0	1.86	.041
	2077710	R/SP2	.175	-	-	.175
	2077711	R/SP2	.063	-	-	.063
	2027310	R/SP2	.231	-	-	.231
	2027311	R/SP2	.097	-	-	.097
G	2020173	Doubler	.024	0.0	1.86	.027
	2077712	R/SP2	.063	-	-	.063
	2027312	R/SP2	.097	-	-	.097
H	2020271	Doubler	.032	0.0	0.77	.027
	1560031	Doubler	.130	0.0	0.22	.124
	2077704	R/SP3	.034	-	-	.034
	2027304	R/SP3	.065	-	-	.065

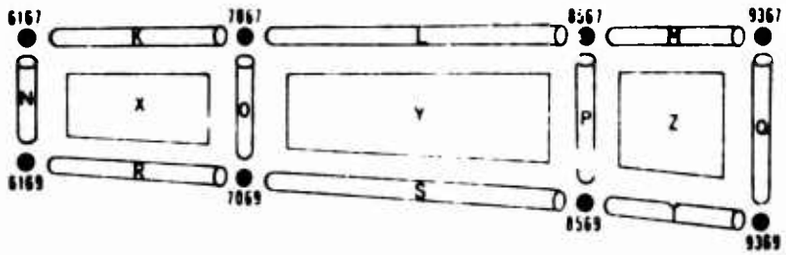
ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
I	2020272	Doubler	.032	0.0	0.88	.026
	1560032	Doubler	.130	0.0	0.30	.122
	2077705	R/SP3	.031	-	-	.031
	2027305	R/SP3	.065	-	-	.065
J	2020273	Doubler	.036	0.0	0.93	.030
	1560033	Doubler	.211	0.0	0.26	.200
	2077706	R/SP3	.029	-	-	.029
	2027306	R/SP3	.065	-	-	.065

3.1.2.22 Right and Left Upper Gunner's Shelves (Sta. 61-93) Detail



View looking down



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
6161	456	AAA	-	-	123	DCC
6163	456	AAA	-	-	123	DCC
6167	456	AAA	-	-	23	CC
6169	456	AAA	-	-	123	DCC
7061	456	AAA	-	-	123	DCC
7063	456	AAA	-	-	23	CC
7067	456	AAA	-	-	13	DC
7069	456	AAA	-	-	123	DCC
8561	456	AAA	-	-	123	DCC
8563	456	AAA	-	-	13	DC
8567	456	AAA	-	-	23	CC
8569	456	AAA	-	-	123	DCC
9361	456	AAA	-	-	123	DCC
9363	456	AAA	-	-	2	C
9367	456	AAA	-	-	1	D
9369	456	AAA	-	-	123	DCC

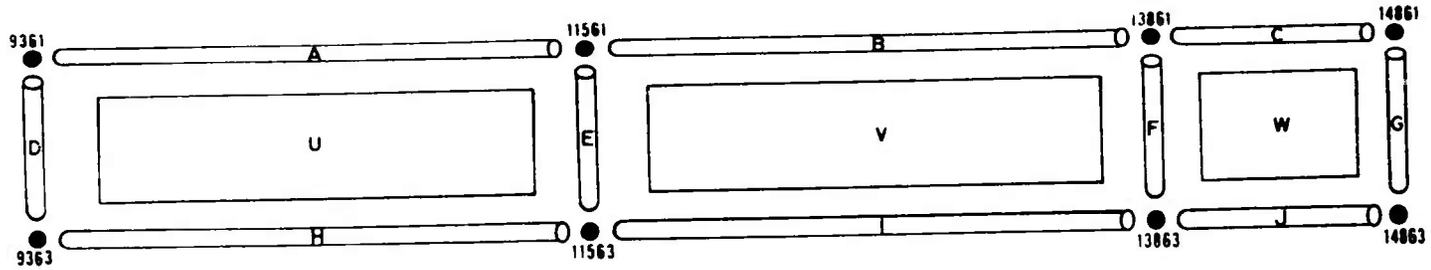
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
U	2501771	Skin	.032
V	2501772	Skin	.032
W	2501773	Skin	.032
X	2100891	Skin	.032
Y	2100892	Skin	.032
Z	2100893	Skin	.032

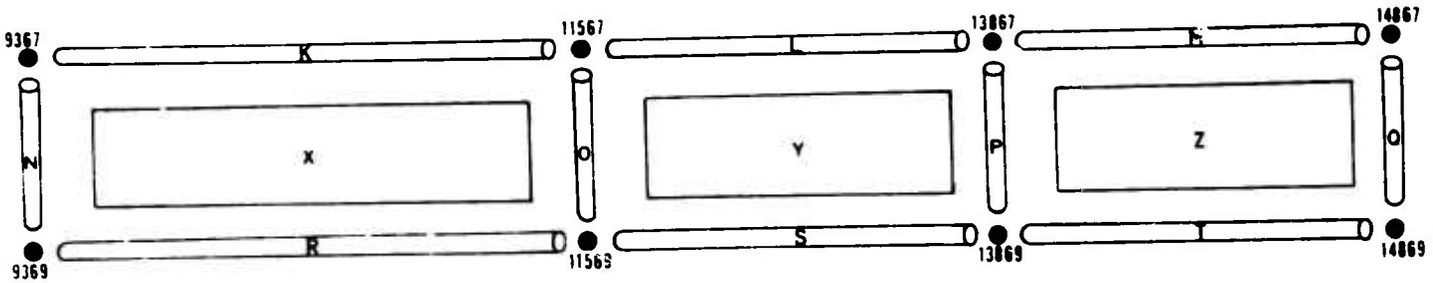
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2507701	R/SP3	.084	-	-	.084
B	2507702	R/SP3	.098	-	-	.098
C	2507703	R/SP3	.113	-	-	.113
D	2507713	R/SP2	.153	-	-	.153
E	2507714	R/SP2	.153	-	-	.153
	2507715	R/SP2	.232	-	-	.232
F	2507716	R/SP2	.232	-	-	.232
	2507717	R/SP2	.190	-	-	.190
G	2507718	R/SP2	.190	-	-	.190
H	2507707	R/SP3	.084	-	-	.084
I	2507708	R/SP3	.098	-	-	.098
J	2507709	R/SP3	.113	-	-	.113
K	2108901	R/SP3	.084	-	-	.084
L	2108902	R/SP3	.098	-	-	.098
M	2108903	R/SP3	.113	-	-	.113
N	2108913	R/SP2	.153	-	-	.153
O	2108914	R/SP2	.153	-	-	.153
	2108915	R/SP2	.232	-	-	.232
P	2108916	R/SP2	.232	-	-	.232
	2108917	R/SP2	.190	-	-	.190
Q	2108918	R/SP2	.190	-	-	.190
R	2108907	R/SP3	.084	-	-	.084
S	2108908	R/SP3	.098	-	-	.098
T	2108909	R/SP3	.113	-	-	.113

3.1.2.23 Right and Left Upper Pilot's Shelves (Sta. 93-148) Detail



View looking down



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9361	456	AAA	-	-	123	DCC
9363	456	AAA	-	-	2	C
9367	456	AAA	-	-	1	D
9369	456	AAA	-	-	123	DCC
11561	456	AAA	-	-	123	DCC
11563	456	AAA	-	-	13	DC
11567	456	AAA	-	-	3	C
11569	456	AAA	-	-	123	DCC
13861	456	AAA	-	-	123	DCC
13863	456	AAA	-	-	123	DCC
13867	456	AAA	-	-	123	DCC
13869	456	AAA	-	-	123	DCC
14861	456	AAA	-	-	123	DCC
14863	456	AAA	-	-	-	-
14867	456	AAA	-	-	12	DC
14869	456	AAA	-	-	123	DCC

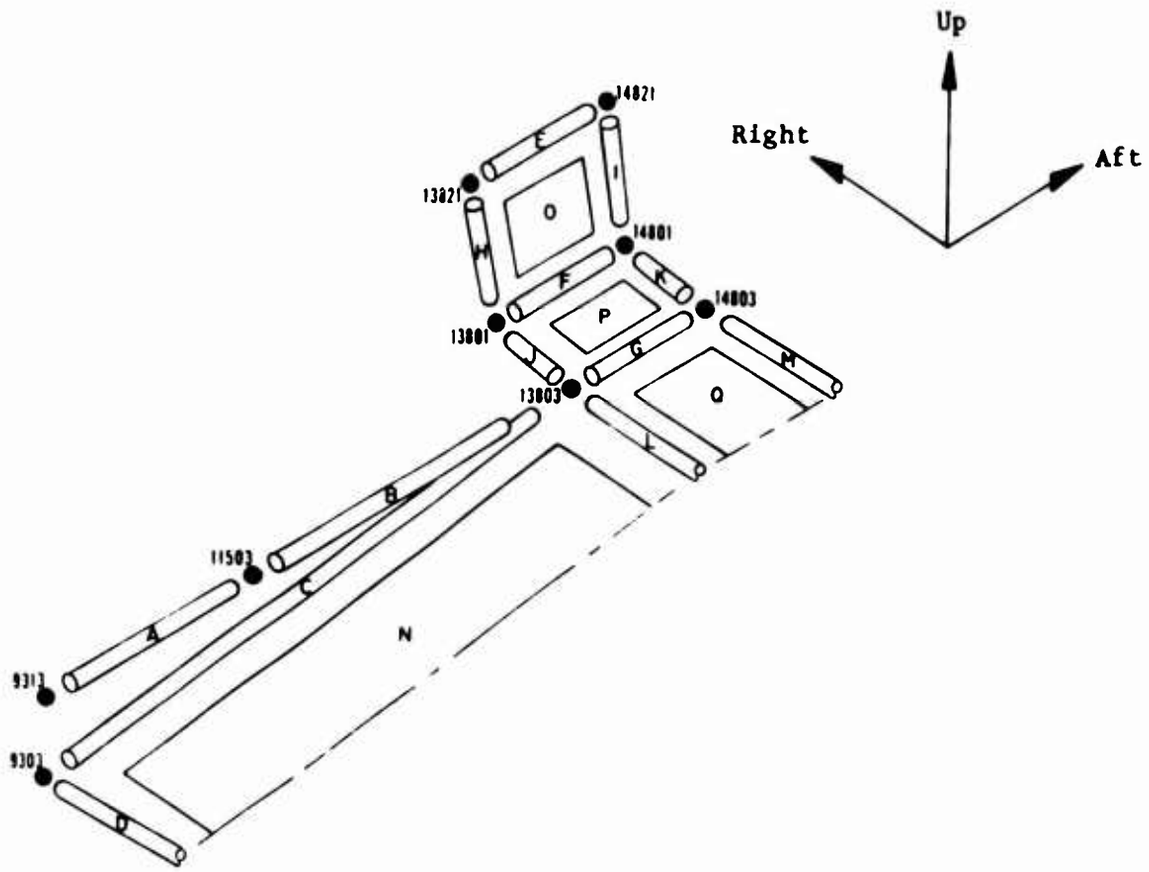
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
U	2501774	Skin	.032
V	2501775	Skin	.032
W	2501776	Skin	.032
X	2100894	Skin	.032
Y	2100895	Skin	.032
Z	2100896	Skin	.032

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2507704	R/SP3	.120	-	-	.120
B	2507705	R/SP3	.121	-	-	.121
C	2507706	R/SP3	.121	-	-	.121
D	2507719	R/SP2	.295	-	-	.295
E	2507720	R/SP2	.295	-	-	.295
	2507721	R/SP2	.370	-	-	.370
F	2507722	R/SP2	.370	-	-	.370
	2507723	R/SP2	.157	-	-	.157
G	2507724	R/SP2	.157	-	-	.157
H	2507710	R/SP3	.120	-	-	.120
I	2507711	R/SP3	.121	-	-	.121
J	2507712	R/SP3	.121	-	-	.121
K	2108904	R/SP3	.120	-	-	.120
L	2108905	R/SP3	.121	-	-	.121
M	2108906	R/SP3	.121	-	-	.121
N	2108919	R/SP2	.295	-	-	.295
O	2108920	R/SP2	.295	-	-	.295
	2108921	R/SP2	.267	-	-	.267
P	2108922	R/SP2	.267	-	-	.267
	2108923	R/SP2	.260	-	-	.260
Q	2108924	R/SP2	.260	-	-	.260
R	2108910	R/SP3	.120	-	-	.120
S	2108911	R/SP3	.121	-	-	.121
T	2108912	R/SP3	.121	-	-	.121

3.1.2.24 Right Lower Skins Under Ammo Floor (Sta. 93-148) Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9303	456	AAA	-	-	123	DCC
9313	456	AAA	-	-	123	DCC
11503	3456	AAAA	-	-	12	DC
13801	456	AAA	-	-	123	DCC
13803	456	AAA	-	-	123	DCC
13821	456	AAA	-	-	123	DCC
14801	456	AAA	-	-	123	DCC
14803	456	AAA	123	AAA	-	-
14821	456	AAA	-	-	123	DCC

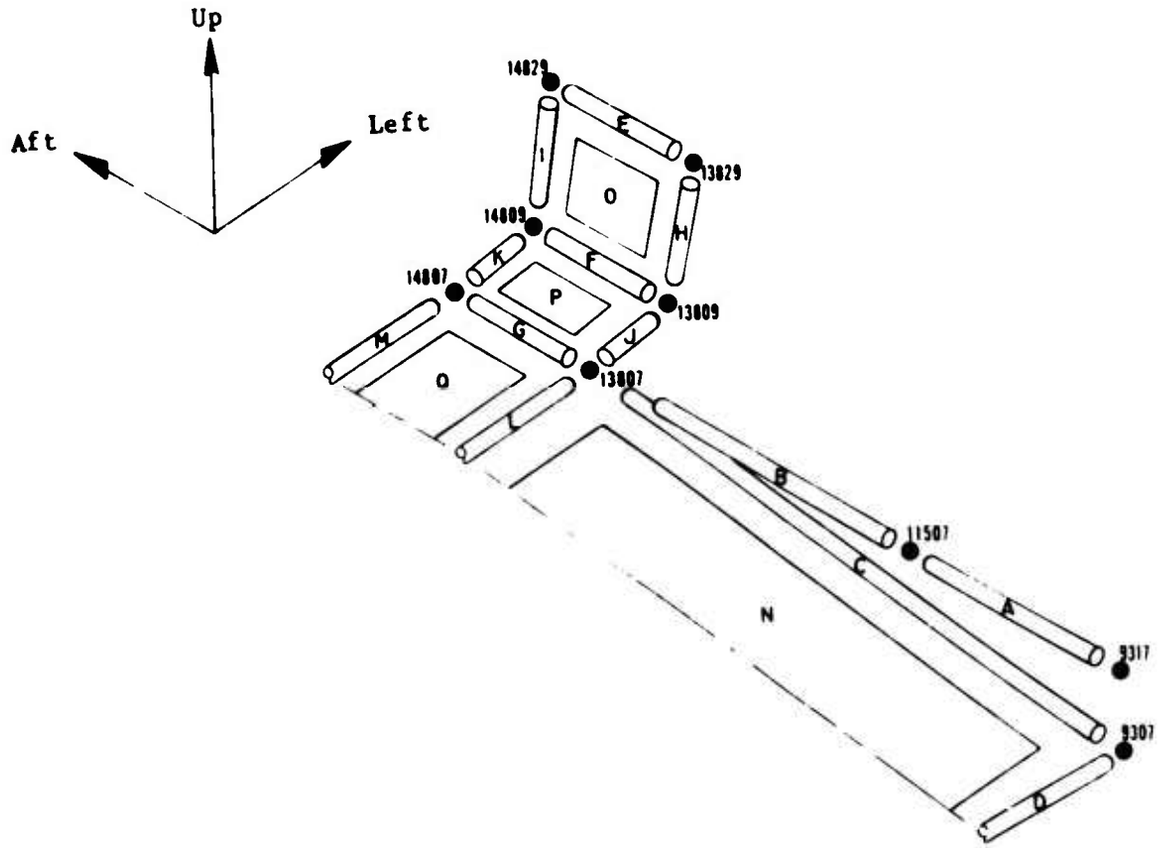
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
N	2030291	Skin	.025
O	2200621	Skin	.032
P	2201011	Skin	.025
Q	2201012	Skin	.025

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2030521	Doubler	.302	-	-	.302
B	2030522	Doubler	.302	-	-	.302
C	2030523	Doubler	.065	-	-	.065
	2032901	R/SP3	.250	-	-	.250
D	2032903	R/SP2	.575	-	-	.575
E	2206201	R/SP2	.131	-	-	.131
F	2200441	Doubler	.046	-	-	.046
	2206202	R/SP2	.131	-	-	.131
	2200101	R/SP2	.074	-	-	.074
G	1160311	Doubler	.521	-	-	.521
	2200102	R/SP2	.074	-	-	.074
	2200111	R/SP2	.250	-	-	.250
H	2206203	R/SP2	.157	-	-	.157
I	2206204	R/SP2	.157	-	-	.157
J	2200103	R/SP2	.123	-	-	.123
K	2200104	R/SP2	.123	-	-	.123
L	2032904	R/SP2	.575	-	-	.575
	2200113	R/SP2	.123	-	-	.123
M	2200114	R/SP2	.123	-	-	.123

3.1.2.25 Left Lower Skins Under Ammo Floor (Sta. 93-148) Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
9307	456	AAA	-	-	123	DCC
9317	456	AAA	-	-	13	DC
11507	3456	AAAA	-	-	12	DC
13807	456	AAA	-	-	123	DCC
13809	456	AAA	-	-	123	DCC
13829	456	AAA	-	-	123	DCC
14807	456	AAA	123	AAA	-	-
14809	456	AAA	-	-	123	DCC
14829	456	AAA	-	-	123	DCC

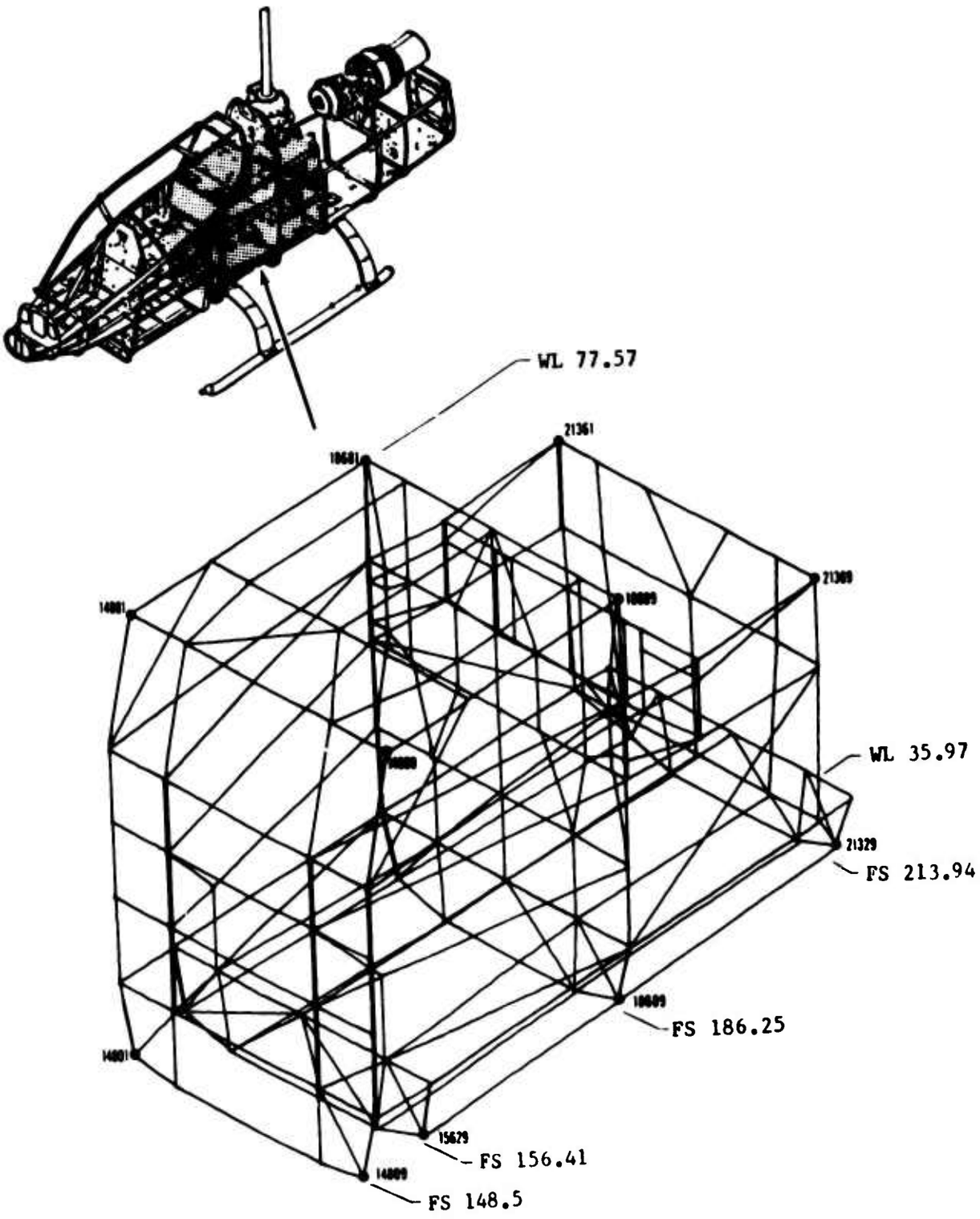
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
N	2030291	Skin	.025
O	2200611	Skin	.032
P	2201013	Skin	.025
Q	2201012	Skin	.025

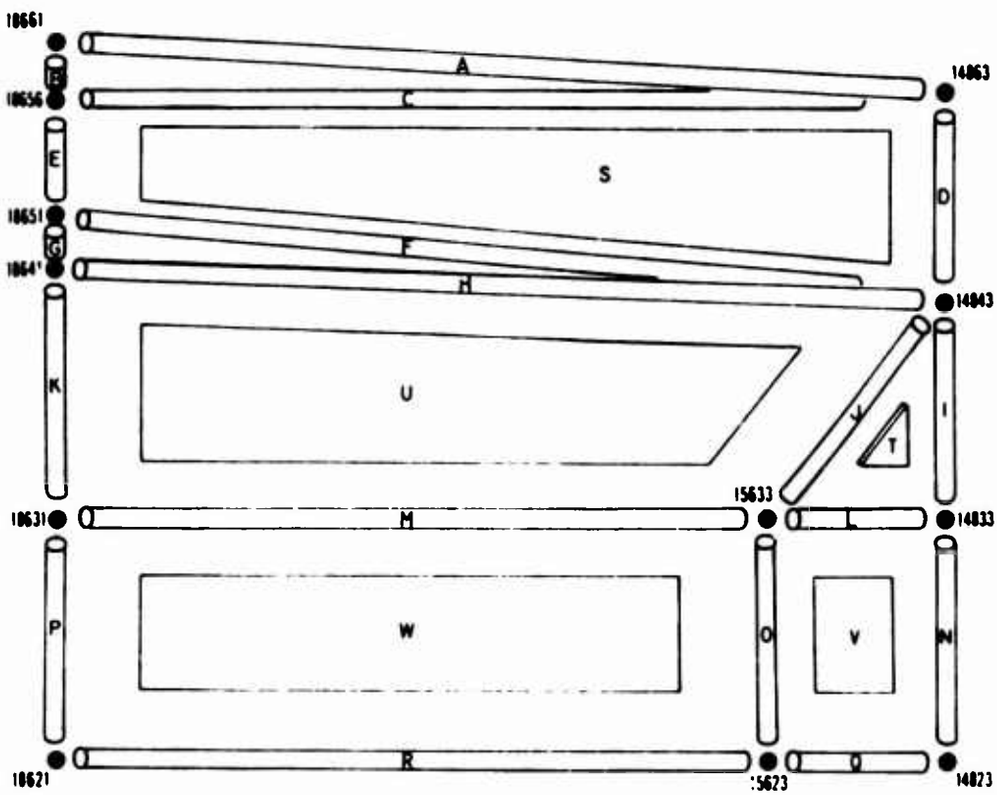
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2030511	Doubler	.302	-	-	.302
B	2030512	Doubler	.302	-	-	.302
C	2030513	Doubler	.065	-	-	.065
	2032902	R/SP3	.250	-	-	.250
D	2032903	R/SP2	.575	-	-	.575
E	2206102	R/SP2	.131	-	-	.131
F	2200431	Doubler	.046	-	-	.046
	2200122	R/SP2	.074	-	-	.074
	2206101	R/SP2	.131	-	-	.131
G	1150231	Doubler	.455	-	-	.455
	2200112	R/SP2	.250	-	-	.250
	2200121	R/SP2	.074	-	-	.074
H	2206103	R/SP2	.157	-	-	.157
I	2206104	R/SP2	.157	-	-	.157
J	2200123	R/SP2	.123	-	-	.123
K	2200124	R/SP2	.123	-	-	.123
L	2032904	R/SP2	.575	-	-	.575
	2200113	R/SP2	.123	-	-	.123
M	2200114	R/SP2	.123	-	-	.123

3.1.3 Center Fuselage Subassembly



3.1.3.1 Right Main Beam (Sta. 148-186) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
14823	456	AAA	123	AAA	-	-
14833	456	AAA	-	-	123	DCC
14843	456	AAA	-	-	123	DCC
14863	456	AAA	-	-	-	-
15623	456	AAA	123	AAA	-	-
15633	2456	AAAA	-	-	13	DC
18621	456	AAA	-	-	123	DCC
18631	456	AAA	-	-	123	DCC
18641	-	-	-	-	12456	DCAAA
18651	-	-	-	-	123456	DCCAAA
18656	-	-	-	-	123456	DCCAAA
18661	-	-	-	-	123456	DCCAAA

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
S	1300395	Inner Skin	.020
	1300335	Outer Skin	.012
T	1300393	Inner Skin	.020
	1300333	Outer Skin	.012
U	1300394	Inner Skin	.020
	1300334	Outer Skin	.012
V	1300391	Inner Skin	.020
	1300291	Interior Skin	.025
	1300351	Interior Skin	.032
	1300331	Outer Skin	.012
W	1300392	Inner Skin	.020
	1300332	Outer Skin	.012

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1570037	Cap	.337	-0.70	0.0	.285
	1300231	Doubler	.098	-1.74	0.0	.062
B	1300215	Doubler	.098	0.23	0.0	.108
C	1303916	R/SP2	.083	-	-	.083
	1303316	R/SP2	.050	-	-	.050
D	1300412	Doubler	.098	0.86	0.0	.109
	1303923	R/SP2	.357	-	-	.357
	1303323	R/SP2	.214	-	-	.214
E	1300214	Doubler	.098	0.44	0.0	.108
	1303926	R/SP2	.357	-	-	.357
	1303326	R/SP2	.214	-	-	.214
F	1303915	R/SP2	.083	-	-	.083
	1303315	R/SP2	.050	-	-	.050
G	1300213	Doubler	.098	0.20	0.0	.108
H	1303914	R/SP2	.096	-	-	.096
	1303314	R/SP2	.058	-	-	.058
I	1300411	Doubler	.098	0.91	0.0	.109
J	1303922	R/SP2	.320	-	-	.320
	1303322	R/SP2	.192	-	-	.192
K	1300212	Doubler	.098	0.94	0.0	.108
	1303925	R/SP2	.320	-	-	.320
	1303325	R/SP2	.192	-	-	.192

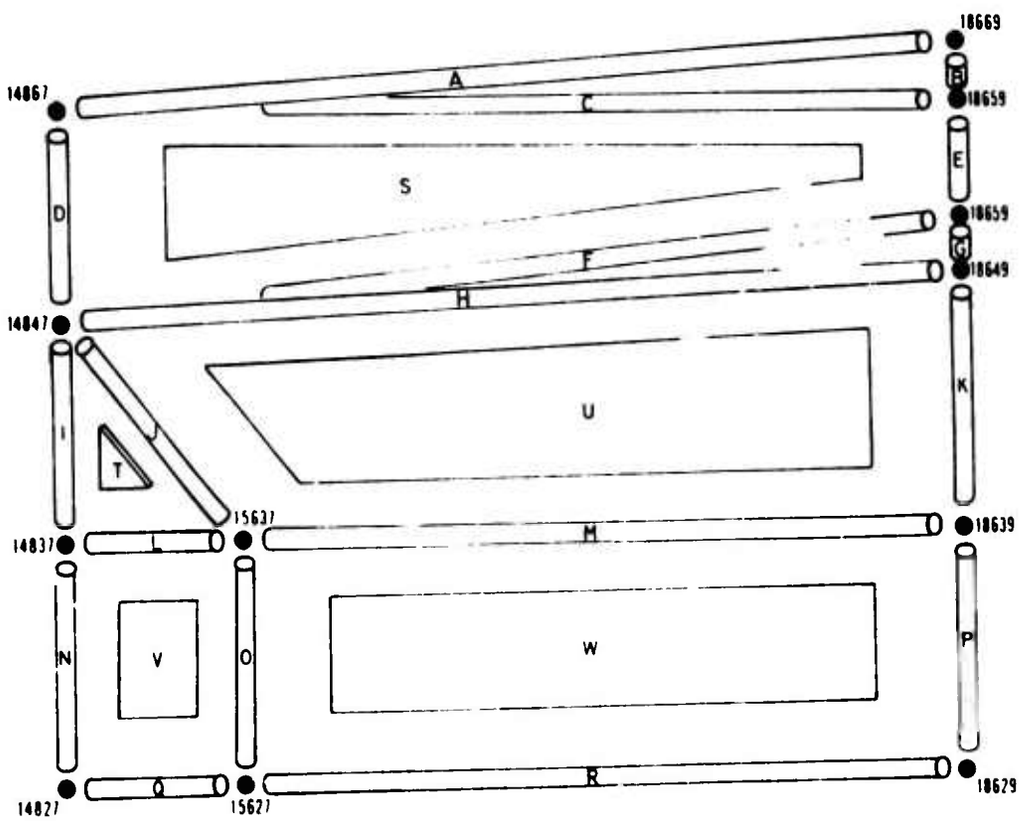
ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
L	1303902	R/SP2	.096	-	-	.096
	1302902	R/SP2	.050	-	-	.050
	1303502	R/SP2	.089	-	-	.089
	1303302	R/SP2	.057	-	-	.057
M	1303912	R/SP2	.096	-	-	.096
	1303913	R/SP2	.096	-	-	.096
	1303312	R/SP2	.057	-	-	.057
	1303313	R/SP2	.058	-	-	.058
N	1300353	Doubler	.098	1.01	0.0	.109
	1303903	R/SP2	.074	-	-	.074
	1302903	R/SP2	.044	-	-	.044
	1303503	R/SP2	.090	-	-	.090
	1303303	R/SP2	.045	-	-	.045
O	1303904	R/SP2	.074	-	-	.074
	1303921	R/SP2	.282	-	-	.282
	1302904	R/SP2	.044	-	-	.044
	1303504	R/SP2	.090	-	-	.090
	1303304	R/SP2	.045	-	-	.045
	1303321	R/SP2	.169	-	-	.169
P	1300211	Doubler	.098	0.93	0.0	.108
	1303924	R/SP2	.282	-	-	.282
	1303324	R/SP2	.169	-	-	.169
Q	1590072	Cap	.297	0.35	0.0	.285
	1300352	Doubler	.112	1.38	0.0	.095
	1303901	R/SP2	.096	-	-	.096
	1302901	R/SP2	.050	-	-	.050
	1303501	R/SP2	.089	-	-	.089
	1303301	R/SP2	.057	-	-	.057

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
R	1590073	Cap	.319	0.33	0.0	.309
	1300271	Doubler	.112	1.38	0.0	.097
	1303911	R/SP2	.096	-	-	.096
	1303311	R/SP2	.057	-	-	.057

3.1.3.2 Left Main Beam (Sta. 148-186) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
14827	456	AAA	123	AAA	-	-
14837	456	AAA	-	-	123	DCC
14847	456	AAA	-	-	123	DCC
14867	456	AAA	-	-	12	DC
15627	456	AAA	123	AAA	-	-
15637	2456	AAAA	-	-	13	DC
18629	456	AAA	-	-	123	DCC
18639	456	AAA	-	-	123	DCC
18649	-	-	-	-	12456	DCAAA
18654	-	-	-	-	123456	DCCAAA
18659	-	-	-	-	123456	DCCAAA
18669	-	-	-	-	123456	DCCAAA

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
S	1380415	Inner Skin	.020
	1380455	Outer Skin	.012
T	1380413	Inner Skin	.020
	1380453	Outer Skin	.012
U	1380414	Inner Skin	.020
	1380454	Outer Skin	.012
V	1380411	Inner Skin	.020
	1380351	Interior Skin	.016
	1380431	Interior Skin	.040
	1380451	Outer Skin	.012
W	1380412	Inner Skin	.020
	1380452	Outer Skin	.012

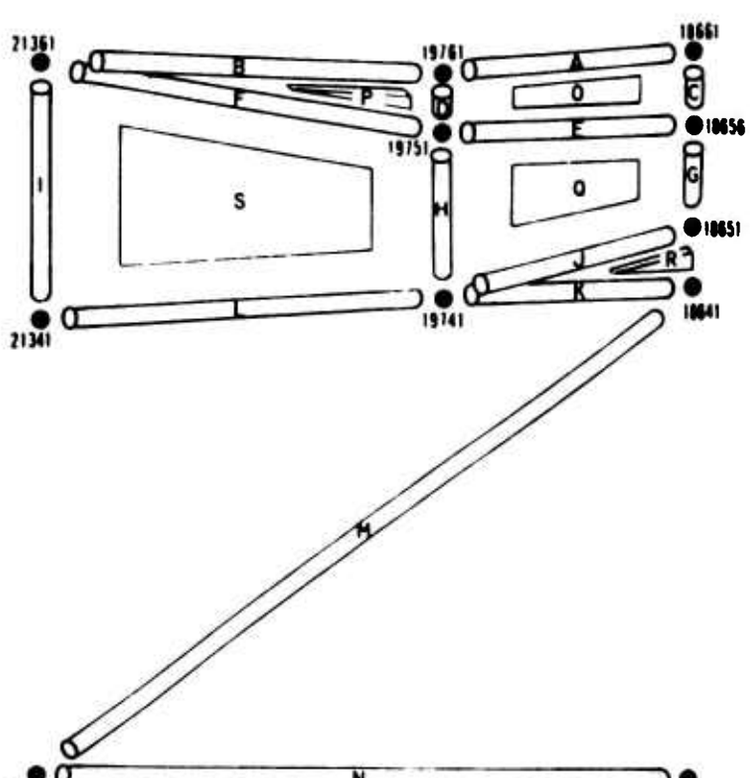
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1570017	Cap	.385	-0.57	0.0	.346
	1380291	Doubler	.212	-2.01	0.0	.139
B	1380195	Doubler	.055	0.53	0.0	.070
C	1384116	R/SP2	.075	-	-	.075
	1384516	R/SP2	.045	-	-	.045
D	1380492	Doubler	.061	1.58	0.0	.075
	1384123	R/SP2	.369	-	-	.369
	1384523	R/SP2	.221	-	-	.221
E	1380194	Doubler	.055	1.01	0.0	.070
	1384126	R/SP2	.369	-	-	.369
	1384526	R/SP2	.221	-	-	.221
F	1384115	R/SP2	.075	-	-	.075
	1384515	R/SP2	.045	-	-	.045
G	1380193	Doubler	.055	0.47	0.0	.070
H	1384114	R/SP2	.096	-	-	.096
	1384514	R/SP2	.058	-	-	.058
I	1380491	Doubler	.061	1.68	0.0	.075
J	1384122	R/SP2	.334	-	-	.334
	1384522	R/SP2	.200	-	-	.200
K	1380192	Doubler	.055	2.19	0.0	.070
	1384125	R/SP2	.334	-	-	.334
	1384525	R/SP2	.200	-	-	.200
L	1384102	R/SP2	.088	-	-	.088
	1383502	R/SP2	.031	-	-	.031
	1384302	R/SP2	.096	-	-	.096
	1384502	R/SP2	.053	-	-	.053

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
M	1384112	R/SP2	.088	-	-	.088
	1384113	R/SP2	.096	-	-	.096
	1384512	R/SP2	.053	-	-	.053
	1384513	R/SP2	.058	-	-	.058
N	1380432	Doubler	.061	1.87	0.0	.075
	1384103	R/SP2	.071	-	-	.071
	1383503	R/SP2	.066	-	-	.066
	1384303	R/SP2	.183	-	-	.183
	1384503	R/SP2	.042	-	-	.042
O	1384104	R/SP2	.071	-	-	.071
	1384121	R/SP2	.298	-	-	.298
	1383504	R/SP2	.066	-	-	.066
	1384304	R/SP2	.183	-	-	.183
	1384504	R/SP2	.042	-	-	.042
	1384521	R/SP2	.179	-	-	.179
P	1380191	Doubler	.055	2.15	0.0	.070
	1384124	R/SP2	.298	-	-	.298
	1384524	R/SP2	.179	-	-	.179
Q	1590052	Cap	.316	0.36	0.0	.303
	1380433	Doubler	.226	1.69	0.0	.182
	1384101	R/SP2	.088	-	-	.088
	1383501	R/SP2	.031	-	-	.031
	1384301	R/SP2	.096	-	-	.096
	1384501	R/SP2	.053	-	-	.053
R	1590053	Cap	.326	0.33	0.0	.315
	1380311	Doubler	.226	1.75	0.0	.186
	1384111	R/SP2	.088	-	-	.088
	1384511	R/SP2	.053	-	-	.053

3.1.3.3 Right Main Beam (Sta. 186-213) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
18621	456	AAA	-	-	123	DCC
18641	-	-	-	-	12456	DCAAA
18651	-	-	-	-	123456	DCCAAA
18656	-	-	-	-	123456	DCCAAA
18661	-	-	-	-	123456	DCCAAA
19741	-	-	-	-	123456	DCCAAA
19751	-	-	-	-	12456	DCAAA
19761	-	-	-	-	123456	DCCAAA
21321	456	AAA	-	-	23	CC
21341	-	-	-	-	12456	DCAAA
21361	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
O	1370363	Inner Skin	.040
	1370063	Outer Skin	.040
P	1370242	Inner Skin	.012
	1370065	Outer Skin	.040
Q	1370362	Inner Skin	.040
	1370062	Outer Skin	.040
R	1370361	Inner Skin	.040
	1370061	Outer Skin	.040
S	1370241	Inner Skin	.012
	1370064	Outer Skin	.040

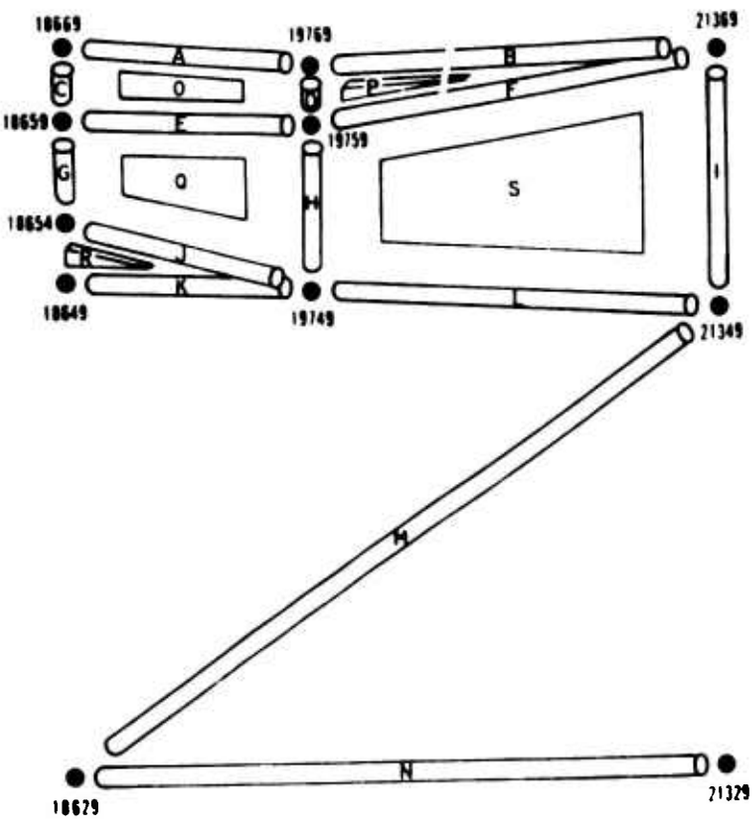
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1600091	Cap	.463	-0.53	0.0	.411
	1360711	Cap	.294	1.08	0.0	.378
	1210321	Cap	.241	0.0	0.0	.241
	1373604	R/SP1	.001	-	-	.001
	1370604	R/SP1	.109	-	-	.109
B	1600092	Cap	.463	-0.19	0.0	.444
	1360712	Cap	.294	1.38	0.0	.399
	1210322	Cap	.241	0.0	0.0	.241
	1370365	Doubler	.085	-0.94	0.0	.067
C	1373612	R/SP2	.213	-	-	.213
	1370612	R/SP2	.213	-	-	.213
D	1370367	Doubler	.178	-0.35	0.0	.156
	1373614	R/SP2	.213	-	-	.213
	1370614	R/SP2	.213	-	-	.213
E	1373602	R/SP1	.117	-	-	.117
	1373603	R/SP1	.117	-	-	.117
	1370602	R/SP1	.095	-	-	.095
	1370603	R/SP1	.095	-	-	.095
F	1372402	R/SP3	.020	-	-	.020
	1370622	R/SP3	.148	-	-	.148
G	1373611	R/SP2	.213	-	-	.213
	1370611	R/SP2	.213	-	-	.213
H	1370366	Doubler	.178	-0.95	0.0	.156
	1372403	R/SP2	.076	-	-	.076
	1373613	R/SP2	.213	-	-	.213
	1370613	R/SP2	.213	-	-	.213
	1370623	R/SP2	.341	-	-	.341
I	1370368	Doubler	.082	0.78	0.0	.089
	1372404	R/SP2	.076	-	-	.076
	1370624	R/SP2	.341	-	-	.341
J	1373601	R/SP1	.139	-	-	.139
	1370601	R/SP1	.143	-	-	.143

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
K	1820051	Cap	.288	0.0	0.0	.288
L	1820052	Cap	.288	0.0	0.0	.288
	1370364	Doubler	.089	0.0	0.0	.089
	1372401	R/SP3	.020	-	-	.020
	1370621	R/SP3	.148	-	-	.148
M	1800191	Brace	.491	-	-	.491
N	1610291	Cap	.521	0.41	0.0	.513

3.1.3.4 **Left Main Beam (Sta. 186-213) Detail**



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
18629	456	AAA	-	-	123	DCC
18649	-	-	-	-	12456	DCAAA
18654	-	-	-	-	123456	DCCAAA
18659	-	-	-	-	123456	DCCAAA
18669	-	-	-	-	123456	DCCAAA
19749	-	-	-	-	123456	DCCAAA
19759	-	-	-	-	12456	DCAAA
19769	-	-	-	-	123456	DCCAAA
21329	456	AAA	-	-	123	DCC
21349	-	-	-	-	12456	DCAAA
21369	456	AAA	-	-	23	CC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
O	1370353	Inner Skin	.040
	1370053	Outer Skin	.040
P	1370232	Inner Skin	.012
	1370055	Outer Skin	.040
Q	1370352	Inner Skin	.040
	1370052	Outer Skin	.040
R	1370351	Inner Skin	.040
	1370051	Outer Skin	.040
S	1370231	Inner Skin	.012
	1370054	Outer Skin	.040

ROD ELEMENT DATA

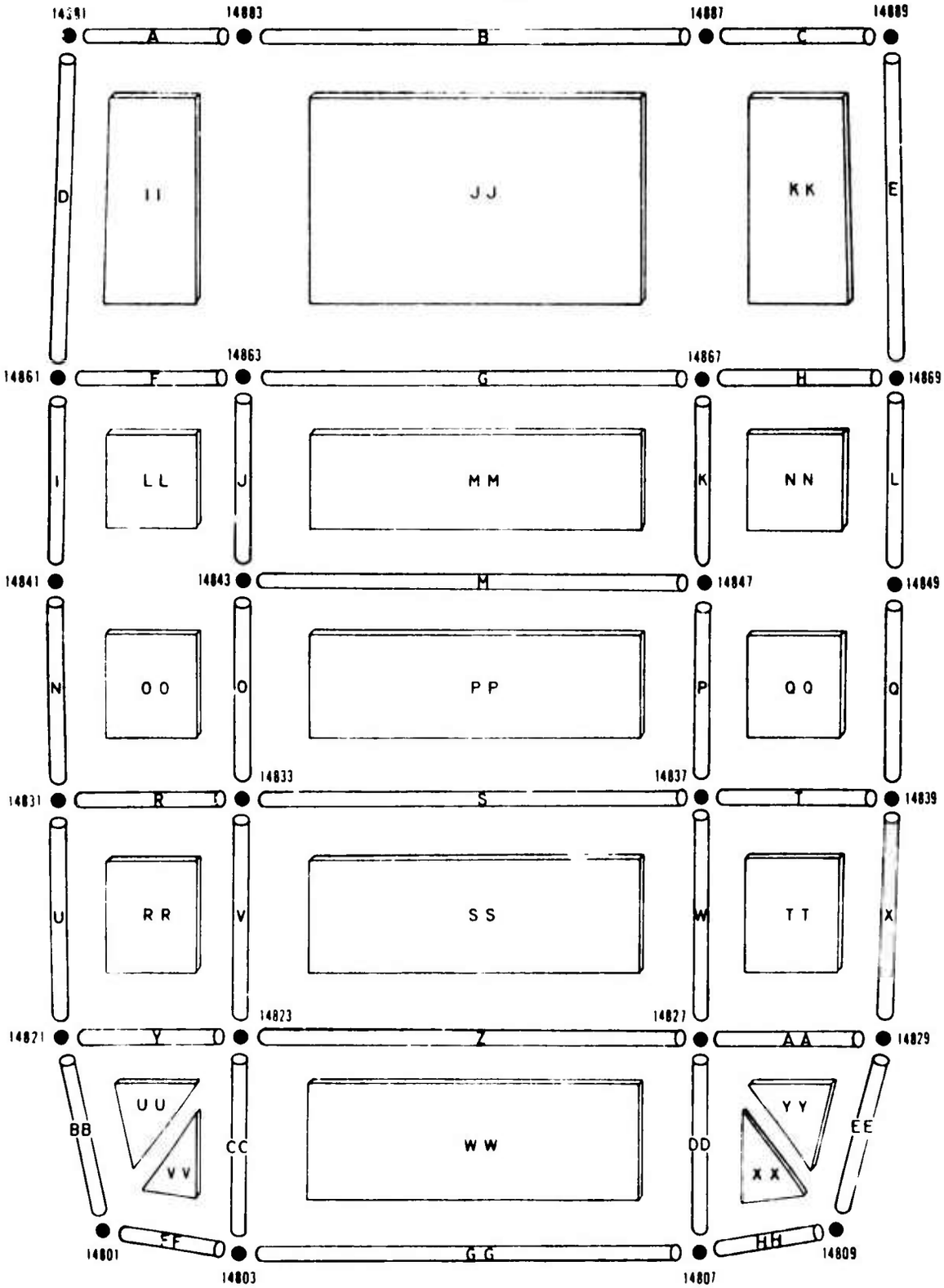
LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1600051	Cap	.463	-0.53	0.0	.407
	1360691	Cap	.294	1.07	0.0	.386
	1210311	Cap	.241	0.0	0.0	.241
	1373504	R/SP1	.001	-	-	.001
	1370504	R/SP1	.109	-	-	.109
B	1600052	Cap	.463	-0.19	0.0	.441
	1360692	Cap	.294	1.38	0.0	.411
	1210312	Cap	.241	0.0	0.0	.241
	1370355	Doubler	.085	-1.01	0.0	.064
C	1373512	R/SP2	.213	-	-	.213
	1370512	R/SP2	.213	-	-	.213
D	1370357	Doubler	.178	-0.35	0.0	.156
	1373514	R/SP2	.213	-	-	.213
	1370514	R/SP2	.213	-	-	.213
E	1373502	R/SP1	.117	-	-	.117
	1373503	R/SP1	.117	-	-	.117
	1370502	R/SP1	.095	-	-	.095
	1370503	R/SP1	.095	-	-	.095
F	1372302	R/SP3	.016	-	-	.016
	1370522	R/SP3	.143	-	-	.143
G	1373511	R/SP2	.213	-	-	.213
	1370511	R/SP2	.213	-	-	.213
H	1370356	Doubler	.176	-0.95	0.0	.156
	1372303	R/SP2	.076	-	-	.076
	1373513	R/SP2	.213	-	-	.213
	1370513	R/SP2	.213	-	-	.213
	1370523	R/SP2	.341	-	-	.341
I	1370358	Doubler	.082	0.78	0.0	.089
	1372304	R/SP2	.076	-	-	.076
	1370524	R/SP2	.341	-	-	.341
J	1373501	R/SP1	.139	-	-	.139
	1370501	R/SP1	.143	-	-	.143
K	1820011	Cap	.288	0.0	0.0	.288

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
L	1820012	Cap	.288	0.0	0.0	.288
	1370354	Doubler	.089	-0.64	0.0	.158
	1372301	R/SP3	.016	-	-	.016
	1370521	R/SP3	.143	-	-	.143
M	1800171	Brace	.491	-	-	.491
N	1610191	Cap	.427	0.38	0.0	.412

3.1.3.5 Bulkhead Sta. 148.5 Detail

View looking aft



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
14801	456	AAA	-	-	123	DCC
14803	456	AAA	123	AAA	-	-
14807	456	AAA	123	AAA	-	-
14809	456	AAA	-	-	123	DCC
14821	456	AAA	-	-	123	DCC
14823	456	AAA	123	AAA	-	-
14827	456	AAA	123	AAA	-	-
14829	456	AAA	-	-	123	DCC
14831	456	AAA	-	-	123	DCC
14833	456	AAA	-	-	123	DCC
14837	456	AAA	-	-	123	DCC
14839	456	AAA	-	-	123	DCC
14841	1456	AAAA	-	-	23	CC
14843	456	AAA	-	-	123	DCC
14847	456	AAA	-	-	123	DCC
14849	1456	AAAA	-	-	23	CC
14861	456	AAA	-	-	123	DCC
14863	456	AAA	-	-	-	-
14867	456	AAA	-	-	12	DC
14869	456	AAA	-	-	123	DCC
14881	456	AAA	-	-	123	DCC
14883	456	AAA	-	-	123	DCC
14887	456	AAA	-	-	123	DCC
14889	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
II	1486183	Bulkhead	.022
JJ	1486387	Bulkhead	.022
KK	1486789	Bulkhead	.022
LL	1484163	Bulkhead	.032
MM	1484367	Bulkhead	.016
NN	1484769	Bulkhead	.032
OO	1483143	Bulkhead	.032
PP	1483347	Bulkhead	.016
QQ	1483749	Bulkhead	.032
RR	1482133	Bulkhead	.032
SS	1482337	Bulkhead	.016
TT	1482739	Bulkhead	.032
UU	1480121	Bulkhead	.072
VV	1480123	Bulkhead	.072
WW	1480327	Bulkhead	.072
XX	1480727	Bulkhead	.072
YY	1480927	Bulkhead	.072

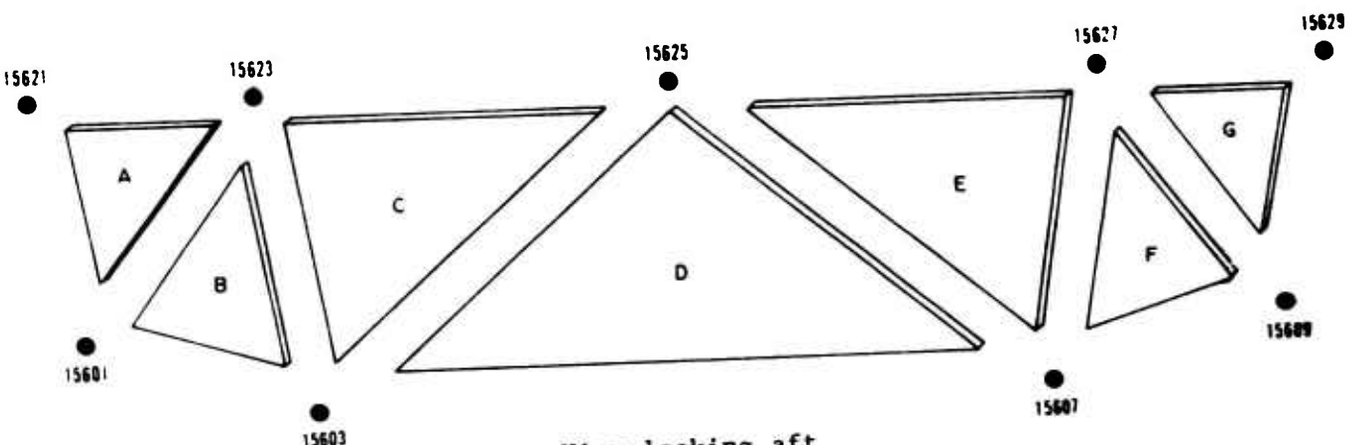
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1488183	Frame	.155	-	-	.155
B	1488387	Frame	.155	-	-	.155
C	1488789	Frame	.155	-	-	.155
D	1486181	Frame	.121	-	-	.121
E	1486989	Frame	.121	-	-	.121
F	1486163	Frame	.277	-	-	.277
G	1486367	Frame	.249	-	-	.249
H	1486769	Frame	.277	-	-	.277
I	1484161	Frame	.130	-	-	.130
J	1484363	Frame	.334	-	-	.334
K	1484767	Frame	.342	-	-	.342
L	1484969	Frame	.130	-	-	.130
M	1484347	Frame	.152	-	-	.152
N	1483141	Frame	.130	-	-	.130
O	1483343	Frame	.334	-	-	.334
P	1483747	Frame	.342	-	-	.342
Q	1483949	Frame	.130	-	-	.130
R	1483133	Frame	.155	-	-	.155
S	1483337	Frame	.265	-	-	.265
T	1483739	Frame	.155	-	-	.155
U	1482131	Frame	.130	-	-	.130
V	1482333	Frame	.284	-	-	.284
W	1482737	Frame	.292	-	-	.292
X	1482939	Frame	.130	-	-	.130
Y	1482123	Frame	.293	-	-	.293
Z	1482327	Frame	.316	-	-	.316
AA	1482729	Frame	.293	-	-	.293
BB	1482101	Frame	.130	-	-	.130
CC	1480323	Frame	.234	-	-	.234
DD	1482707	Frame	.234	-	-	.234
EE	1480929	Frame	.130	-	-	.130

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
FF	1480103	Frame	.130	-	-	.130
GG	1480307	Frame	.130	-	-	.130
HH	1480709	Frame	.130	-	-	.130

3.1.3.6 Partial Belly Bulkhead Sta. 156.41 - Detail



View looking aft

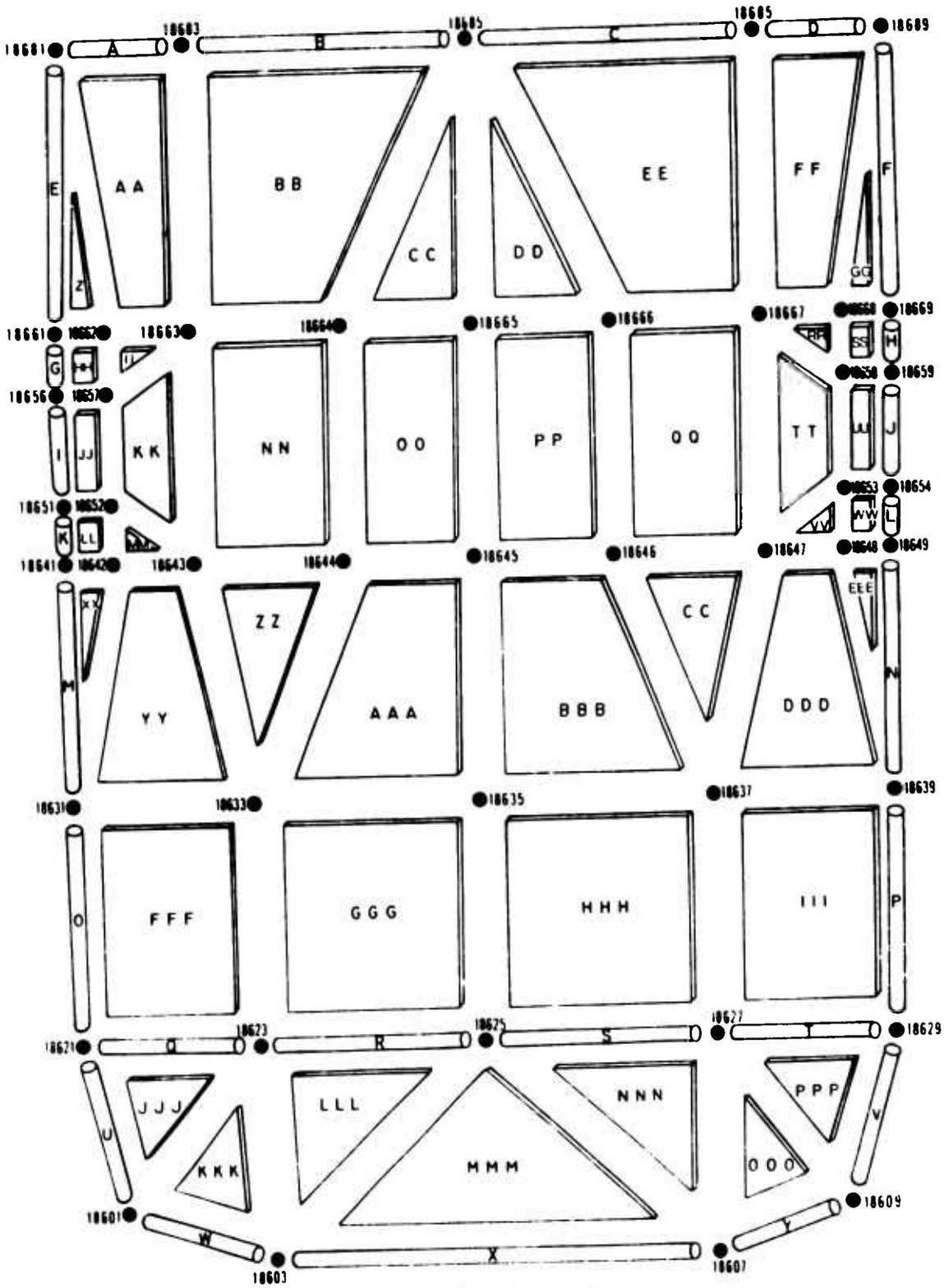
GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
15601	456	AAA	-	-	123	DCC
15603	456	AAA	123	AAA	-	-
15607	456	AAA	123	AAA	-	-
15609	456	AAA	-	-	123	DCC
15621	456	AAA	-	-	123	DCC
15623	456	AAA	123	AAA	-	-
15625	456	AAA	-	-	-	-
15627	456	AAA	123	AAA	-	-
15629	456	AAA	-	-	123	DCC
15633	2456	AAAA	-	-	13	DC
15637	2456	AAAA	-	-	13	DC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	1560121	Bulkhead	.032
B	1560123	Bulkhead	.032
C	1560323	Bulkhead	.032
D	1560325	Bulkhead	.032
E	1560725	Bulkhead	.032
F	1560727	Bulkhead	.032
G	1560927	Bulkhead	.032

3.1.3.7 Bulkhead Sta. 186.25 Detail



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
18601	456	AAA	-	-	123	DCC
18603	456	AAA	-	-	123	DCC
18607	456	AAA	-	-	123	DCC
18609	456	AAA	-	-	123	DCC
18621	456	AAA	-	-	123	DCC
18623	456	AAA	-	-	123	DCC
18625	456	AAA	-	-	3	C
18627	456	AAA	-	-	123	DCC
18629	456	AAA	-	-	123	DCC
18631	456	AAA	-	-	123	DCC
18633	1456	AAAA	-	-	23	CC
18635	1456	AAAA	-	-	23	CC
18637	1456	AAAA	-	-	23	CC
18639	456	AAA	-	-	123	DCC
18641	-	-	-	-	12456	DCAAA
18642	-	-	-	-	23456	CCAAA
18643	4	A	-	-	12356	DCCAA
18644	45	AA	-	-	1236	DCCA
18645	45	AA	-	-	126	DCA
18646	45	AA	-	-	1236	DCCA
18647	4	A	-	-	12356	DCCAA
18648	-	-	-	-	23456	CCAAA
18649	-	-	-	-	12456	DCAAA
18651	-	-	-	-	123456	DCCAAA
18652	-	-	-	-	23456	CCAAA
18653	-	-	-	-	23456	CCAAA
18654	-	-	-	-	123456	DCCAAA
18656	-	-	-	-	123456	DCCAAA
18657	-	-	-	-	23456	CCAAA
18658	-	-	-	-	23456	CCAAA
18659	-	-	-	-	123456	DCCAAA

GRID POINT DATA (CONT.)

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
18661	-	-	-	-	123456	DCCAAA
18662	-	-	-	-	23456	CCAAA
18663	-	-	-	-	123456	DCCAAA
18664	45	AA	-	-	1236	DCCA
18665	45	AA	-	-	1236	DCCA
18666	45	AA	-	-	1236	DCCA
18667	-	-	-	-	123456	DCCAAA
18668	-	-	-	-	23456	CCAAA
18669	-	-	-	-	123456	DCCAAA
18681	456	AAA	-	-	123	DCC
18683	-	-	6	A	1245	DCAA
18685	456	AAA	-	-	13	DC
18687	-	-	6	A	1245	DCAA
18689	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
Z	1866181	Bulkhead	.095
AA	1866283	Bulkhead	.095
BB	1866385	Bulkhead	.012
CC	1866485	Bulkhead	.012
DD	1866585	Bulkhead	.012
EE	1866687	Bulkhead	.012
FF	1866789	Bulkhead	.095
GG	1866889	Bulkhead	.095
HH	1865662	Bulkhead	.032
II	1865762	Bulkhead	.032
JJ	1865157	Bulkhead	.032
KK	1865263	Bulkhead	.032
LL	1864152	Bulkhead	.032
MM	1864252	Bulkhead	.032
NN	1864364	Bulkhead	.032
OO	1864465	Bulkhead	.032
PP	1864566	Bulkhead	.032
QQ	1864667	Bulkhead	.032
RR	1865867	Bulkhead	.032
SS	1865869	Bulkhead	.032
TT	1864758	Bulkhead	.032
UU	1865359	Bulkhead	.032
VV	1864753	Bulkhead	.032
WW	1864854	Bulkhead	.032
XX	1863141	Bulkhead	.012
YY	1863143	Bulkhead	.012
ZZ	1863343	Bulkhead	.012
AAA	1863345	Bulkhead	.012
BBB	1863546	Bulkhead	.012
CCC	1863746	Bulkhead	.012
DDD	1863748	Bulkhead	.012
EEE	1863948	Bulkhead	.012
FFF	1862133	Bulkhead	.012

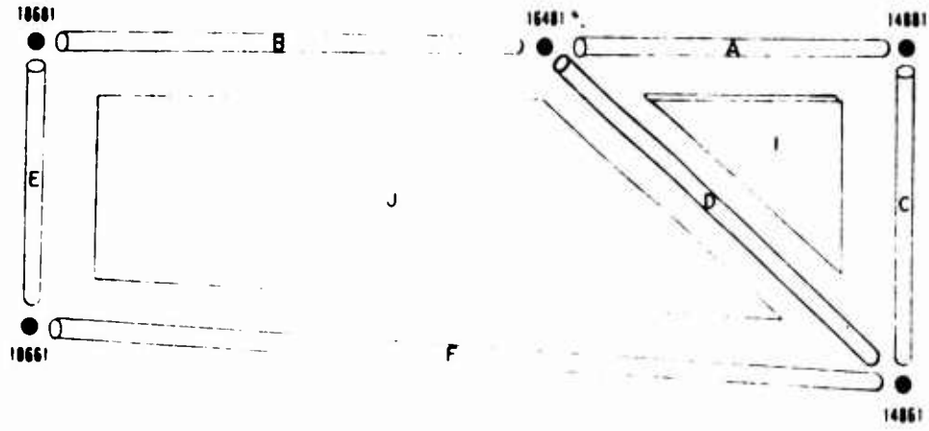
SHEAR PANEL/MEMBRANE ELEMENT DATA (CONT.)

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
GGG	1862335	Bulkhead	.012
HHH	1862537	Bulkhead	.012
III	1862739	Bulkhead	.012
JJJ	1860121	Bulkhead	.012
KKK	1860123	Bulkhead	.012
LLL	1860323	Bulkhead	.012
MMM	1860325	Bulkhead	.012
NNN	1860725	Bulkhead	.012
OOO	1860727	Bulkhead	.012
PPP	1860927	Bulkhead	.012

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1868183	Frame	.328	-	-	.328
B	1868385	Frame	.328	-	-	.328
C	1868587	Frame	.328	-	-	.328
D	1868789	Frame	.328	-	-	.328
E	1866181	Frame	.203	-	-	.203
F	1866989	Frame	.203	-	-	.203
G	1865661	Frame	.548	-	-	.548
H	1865969	Frame	.588	-	-	.588
I	1865156	Frame	.548	-	-	.548
J	1865459	Frame	.588	-	-	.588
K	1864151	Frame	.548	-	-	.548
L	1864954	Frame	.588	-	-	.588
M	1863141	Frame	.652	-	-	.652
N	1863949	Frame	.487	-	-	.487
O	1862131	Frame	.652	-	-	.652
P	1862939	Frame	.487	-	-	.487
Q	1862123	Frame	.278	-	-	.278
R	1862325	Frame	.278	-	-	.278
S	1862527	Frame	.278	-	-	.278
T	1862729	Frame	.278	-	-	.278
U	1862101	Frame	.123	-	-	.123
V	1860929	Frame	.123	-	-	.123
W	1860103	Frame	.123	-	-	.123
X	1860307	Frame	.123	-	-	.123
Y	1860709	Frame	.123	-	-	.123

3.1.3.8 Right Side Panel Under Canopy (Sta. 148-186) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
14821	456	AAA	-	-	123	DCC
14861	456	AAA	-	-	123	DCC
14881	456	AAA	-	-	123	DCC
15621	456	AAA	-	-	123	DCC
16481	456	AAA	-	-	123	DCC
18621	456	AAA	-	-	123	DCC
18661	-	-	-	-	123456	DCCAAA
18681	456	AAA	-	-	123	DCC

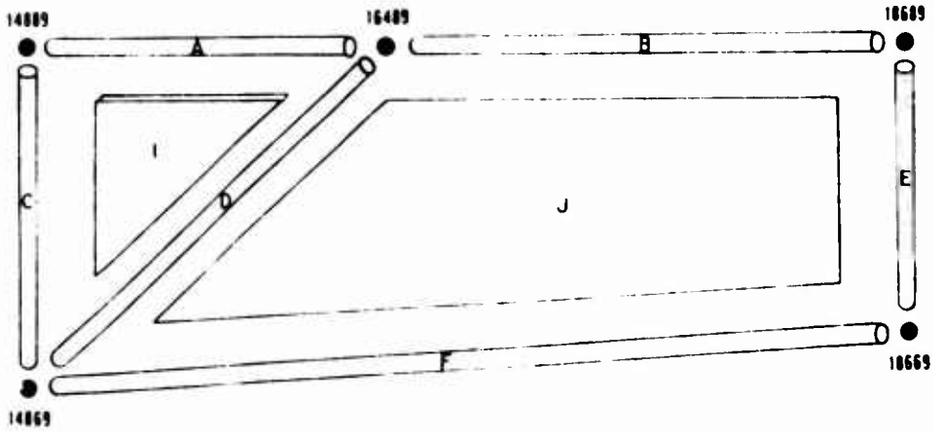
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
I	1250271	Inner Skin	.008
	3790011	Outer Skin	.021
J	1250272	Inner Skin	.008
	3790012	Outer Skin	.021

ROD ELEMENT DATA

LETTER DESIGNATION	NASTR EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	1250571	Cap	.117	-0.20	0.0	.115
	1251571	Doubler	.121	-0.88	0.0	.112
B	[illegible]	Cap	.117	-0.20	0.0	.115
	[illegible]2	Doubler	.121	-0.88	0.0	.111
	1252702	R/SP3	.035	-	-	.035
	3790102	R/SP3	.121	-	-	.121
C	1251511	Doubler	.121	0.0	0.0	.121
D	1252703	R/SP2	.120	-	-	.120
	3790103	R/SP2	.315	-	-	.315
E	1251551	Doubler	.121	0.0	0.0	.121
	1252704	R/SP2	.120	-	-	.120
	3790104	R/SP2	.315	-	-	.315
F	2501711	Cap	.118	-0.47	0.0	.104
	1251491	Doubler	.121	0.67	0.0	.140
	1252701	R/SP3	.035	-	-	.035
	3790101	R/SP3	.121	-	-	.121
G	1610152	Cap	.130	0.11	0.0	.128
H	1610153	Cap	.130	0.11	0.0	.128

3.1.3.9 Left Side Panel Under Canopy (Sta. 148-186) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
14829	456	AAA	-	-	123	DCC
14869	456	AAA	-	-	123	DCC
[illegible]	456	AAA	-	-	123	DCC
15629	456	AAA	-	-	123	DCC
16489	456	AAA	-	-	123	DCC
18629	456	AAA	-	-	123	DCC
18669	-	-	-	-	123456	DCCAAA
18689	456	AAA	-	-	123	DCC

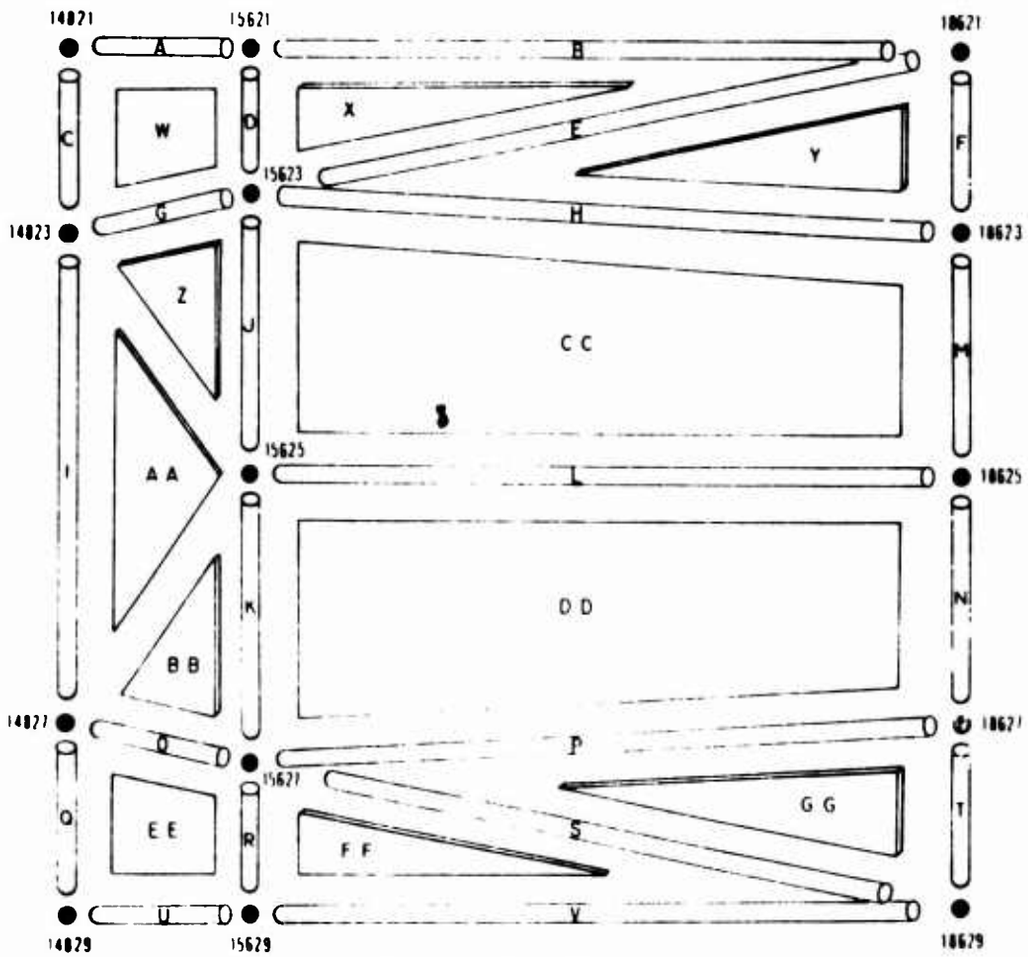
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
I	1250231	Inner Skin	.008
	1250911	Outer Skin	.016
J	1250232	Inner Skin	.008
	1250912	Outer Skin	.016

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	1250771	Cap	.117	-0.20	0.0	.115
	1250131	Doubler	.070	-1.10	0.0	.064
B	1250772	Cap	.117	-0.20	0.0	.115
	1250132	Doubler	.070	-1.10	0.0	.064
	1252302	R/SP3	.035	-	-	.035
	1259102	R/SP3	.098	-	-	.098
C	1250171	Doubler	.070	0.0	0.0	.070
D	1252303	R/SP2	.120	-	-	.120
	1259103	R/SP2	.240	-	-	.240
E	1250151	Doubler	.070	0.0	0.0	.070
	1252304	R/SP2	.120	-	-	.120
	1259104	R/SP2	.240	-	-	.240
F	2100711	Cap	.127	-0.40	0.0	.119
	1250971	Doubler	.070	0.89	0.0	.084
	1252301	R/SP3	.035	-	-	.035
	1259101	R/SP3	.098	-	-	.098
G	1610132	Cap	.130	0.11	0.0	.128
H	1610133	Cap	.130	0.11	0.0	.128

3.1.3.10 Forward Fuel Cell Floor (Sta. 148-186, W.L. 35.97) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
14821	456	AAA	-	-	123	DCC
14823	456	AAA	123	AAA	-	-
14827	456	AAA	123	AAA	-	-
14829	456	AAA	-	-	123	DCC
15621	456	AAA	-	-	123	DCC
15623	456	AAA	123	AAA	-	-
15625	456	AAA	-	-	-	-
15627	456	AAA	123	AAA	-	-
15629	456	AAA	-	-	123	DCC
18621	456	AAA	-	-	123	DCC
18623	456	AAA	-	-	123	DCC
18625	456	AAA	-	-	3	C
18627	456	AAA	-	-	123	DCC
18629	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
W	2040811	Lower Skin	.016
	2040471	Interior Skin	.050
X	2040821	Skin	.016
Y	2040822	Lower Skin	.016
	2040794	Upper Skin	.020
Z	2040812	Lower Skin	.016
	2040791	Upper Skin	.020
AA	2040813	Lower Skin	.016
	2040792	Upper Skin	.020
BB	2040814	Lower Skin	.016
	2040793	Upper Skin	.020
CC	2040823	Lower Skin	.016
	2040795	Upper Skin	.020
DD	2040824	Lower Skin	.016
	2040796	Upper Skin	.020
EE	2040815	Lower Skin	.016
	2040472	Interior Skin	.050
FF	2040826	Skin	.016
GG	2040825	Lower Skin	.016
	2040797	Upper Skin	.020

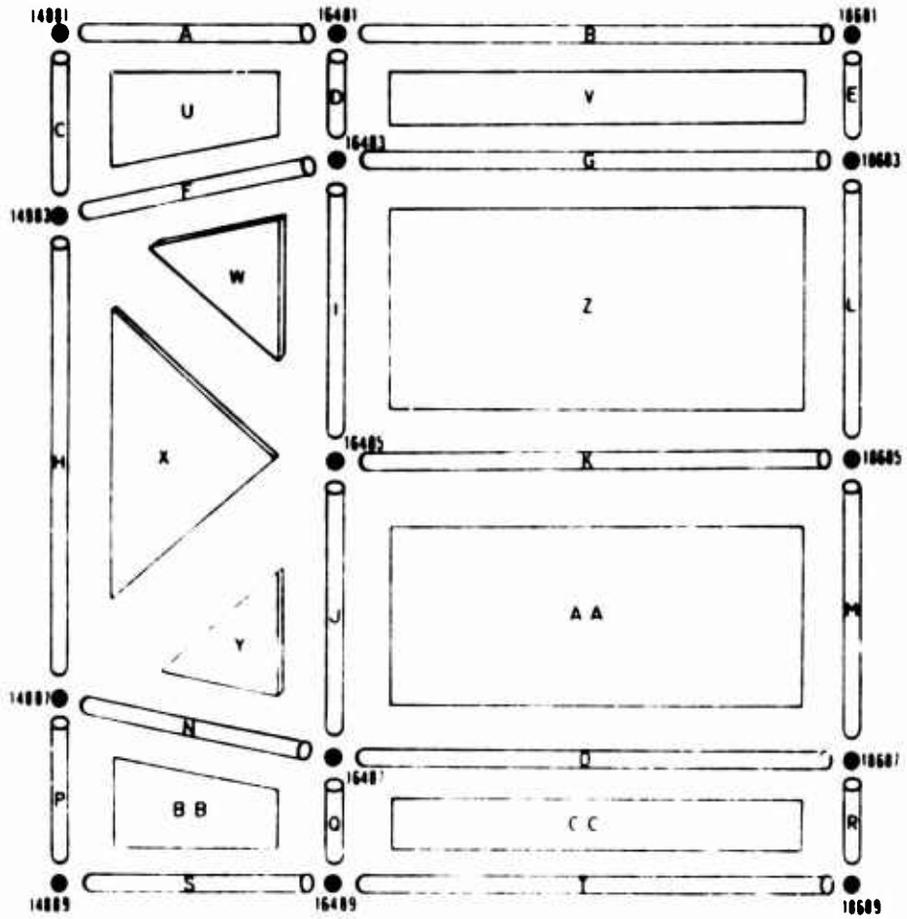
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2044711	Doubler	.020	0.0	-0.54	.019
	2048101	R/SP3	.050	-	-	.050
	2044701	R/SP3	.152	-	-	.152
B	2044720	Doubler	.053	0.0	-0.54	.050
C	2048105	R/SP2	.062	-	-	.062
	2044705	R/SP2	.195	-	-	.195
D	2044716	Doubler	.285	0.0	0.23	.296
	2048107	R/SP2	.062	-	-	.062
	2044707	R/SP2	.195	-	-	.195
E	2044721	Doubler	.213	0.0	-0.68	.195
F	2044724	Doubler	.174	0.0	0.25	.180
G	2044712	Doubler	.213	0.0	-0.22	.205
	2048102	R/SP3	.050	-	-	.050
	2044702	R/SP3	.152	-	-	.152
H	2048201	R/SP1	.057	-	-	.057
	2047901	R/SP1	.072	-	-	.072
I	2044715	Doubler	.174	0.0	0.24	.176
J	2044717	Doubler	.285	0.0	0.43	.294
	2048205	R/SP2	.238	-	-	.238
	2047905	R/SP2	.298	-	-	.298
K	2044718	Doubler	.285	0.0	0.43	.294
	2048206	R/SP2	.238	-	-	.238
	2047906	R/SP2	.298	-	-	.298
L	2048202	R/SP1	.115	-	-	.115
	2048203	R/SP1	.115	-	-	.115
	2047902	R/SP1	.144	-	-	.144
	2047903	R/SP1	.144	-	-	.144
M	2044725	Doubler	.174	0.0	0.33	.180
	2048207	R/SP2	.238	-	-	.238
	2047907	R/SP2	.298	-	-	.298

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
N	2044726	Doubler	.174	0.0	0.33	.180
	2048208	R/SP2	.238	-	-	.238
	2047908	R/SP2	.298	-	-	.298
O	2044713	Doubler	.213	0.0	0.22	.205
	2048103	R/SP3	.050	-	-	.050
	2044703	R/SP3	.152	-	-	.152
P	2048204	R/SP1	.057	-	-	.057
	2047904	R/SP1	.072	-	-	.072
Q	2048106	R/SP2	.062	-	-	.062
	2044706	R/SP2	.195	-	-	.195
R	2044719	Doubler	.285	0.0	0.23	.296
	2048108	R/SP2	.062	-	-	.062
	2044708	R/SP2	.195	-	-	.195
S	2044722	Doubler	.213	0.0	0.68	.195
T	2044727	Doubler	.174	0.0	0.25	.180
U	2044714	Doubler	.020	0.0	0.54	.019
	2048104	R/SP3	.050	-	-	.050
	2044704	R/SP3	.152	-	-	.152
V	2044723	Doubler	.053	0.0	0.54	.050

3.1.3.11 Forward Fuel Cell Cover (Sta. 148-186, W.L. 77.57) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
14881	456	AAA	-	-	123	DCC
14883	456	AAA	-	-	123	DCC
14887	456	AAA	-	-	123	DCC
14889	456	AAA	-	-	123	DCC
16481	456	AAA	-	-	123	DCC
16483	3456	AAAA	-	-	12	DC
16485	3456	AAAA	-	-	12	DC
16487	3456	AAAA	-	-	12	DC
16489	456	AAA	-	-	123	DCC
18681	456	AAA	-	-	123	DCC
18683	-	-	-	-	12456	DCAAA
18685	456	AAA	-	-	13	DC
18687	-	-	-	-	12456	DCAAA
18689	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
U	2080791	Upper Skin	.016
V	2080131	Lower Skin	.008
	2080796	Upper Skin	.016
W	2080111	Lower Skin	.008
	2080792	Upper Skin	.016
X	2080112	Lower Skin	.008
	2080793	Upper Skin	.016
Y	2080113	Lower Skin	.008
	2080794	Upper Skin	.016
Z	2080132	Lower Skin	.008
	2080797	Upper Skin	.016
AA	2080133	Lower Skin	
	2080798	Upper Skin	
BB	2080114	Lower Skin	
	2080795	Upper Skin	
CC	2080134	Lower Skin	.008
	2080799	Upper Skin	.016

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2084501	Doubler	.052	0.0	-1.30	.045
	2087901	R/SP3	.047	-	-	.047
B	2084502	Doubler	.052	0.0	-1.30	.045
	2081301	R/SP1	.014	-	-	.014
	2087921	R/SP1	.040	-	-	.040
C	2084521	Doubler	.072	0.0	0.59	.078
	2087905	R/SP2	.093	-	-	.093

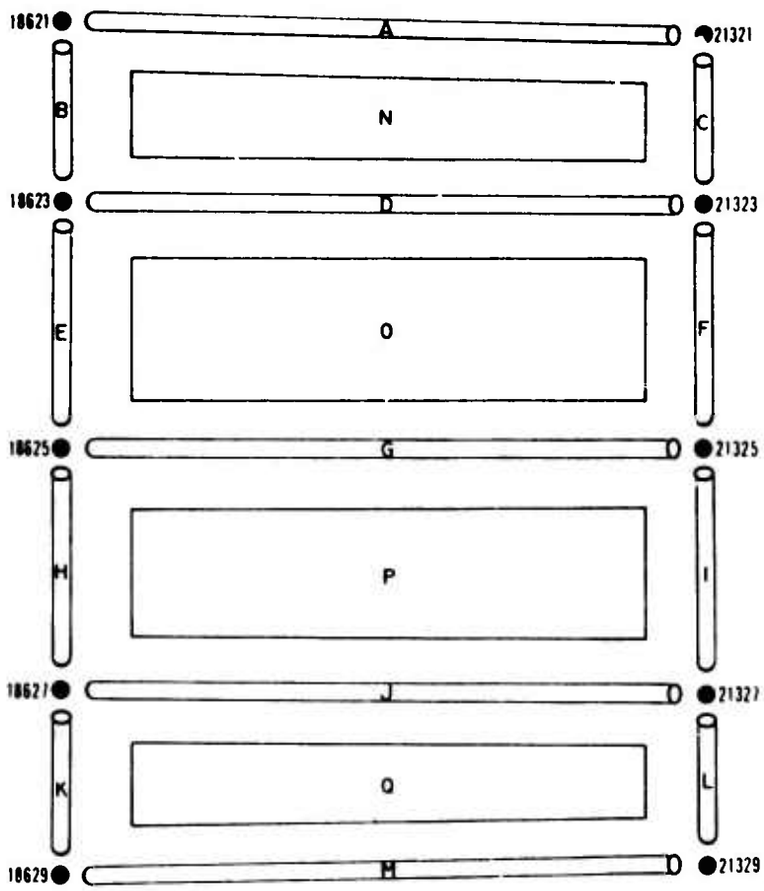
ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
D	2084531	Doubler	.083	0.0	0.41	.090
	2081309	R/SP2	.075	-	-	.075
	2087907	R/SP2	.093	-	-	.093
	2087929	R/SP2	.175	-	-	.175
E	2084541	Doubler	.050	0.0	0.39	.054
	2081313	R/SP2	.075	-	-	.075
	2087933	R/SP2	.175	-	-	.175
F	2087902	R/SP3	.047	-	-	.047
G	2080231	Doubler	.475	-	-	.475
	2081302	R/SP1	.014	-	-	.014
	2081303	R/SP1	.050	-	-	.050
	2087922	R/SP1	.040	-	-	.040
	2087923	R/SP1	.062	-	-	.062
H	2084522	Doubler	.072	0.0	1.54	.078
I	2084532	Doubler	.083	0.0	0.96	.090
	2081310	R/SP2	.075	-	-	.075
	2087930	R/SP2	.175	-	-	.175
J	2084533	Doubler	.083	0.0	0.96	.090
	2081311	R/SP2	.075	-	-	.075
	2087931	R/SP2	.175	-	-	.175
K	2081304	R/SP1	.050	-	-	.050
	2081305	R/SP1	.050	-	-	.050
	2087924	R/SP1	.062	-	-	.062
	2087925	R/SP1	.062	-	-	.062
L	2084542	Doubler	.050	0.0	0.92	.054
	2081314	R/SP2	.075	-	-	.075
	2087934	R/SP2	.175	-	-	.175

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
M	2084543	Doubler	.050	0.0	0.92	.054
	2081315	R/SP2	.075	-	-	.075
	2087935	R/SP2	.175	-	-	.175
N	2081101	R/SP3	.016	-	-	.016
	2087903	R/SP3	.047	-	-	.047
O	2080232	Doubler	.475	-	-	.475
	2081306	R/SP1	.050	-	-	.050
	2081307	R/SP1	.014	-	-	.014
	2087926	R/SP1	.062	-	-	.062
	2087927	R/SP1	.040	-	-	.040
P	2084523	Doubler	.072	0.0	0.59	.078
	2081103	R/SP2	.036	-	-	.036
	2087906	R/SP2	.093	-	-	.093
Q	2084534	Doubler	.083	0.0	0.41	.090
	2081104	R/SP2	.036	-	-	.036
	2081312	R/SP2	.075	-	-	.075
	2087908	R/SP2	.093	-	-	.093
	2087932	R/SP2	.175	-	-	.175
R	2084544	Doubler	.050	0.0	0.39	.054
	2081316	R/SP2	.075	-	-	.075
	2087936	R/SP2	.175	-	-	.175
S	2084511	Doubler	.052	0.0	1.30	.044
	2081102	R/SP3	.016	-	-	.016
	2087904	R/SP3	.047	-	-	.047
T	2084512	Doubler	.052	0.0	1.30	.045
	2081308	R/SP1	.014	-	-	.014
	2087928	R/SP1	.040	-	-	.040

3.1.3.12 Lower Floor Under Pylon (Sta. 186-213, W.L. 35.97) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
18621	456	AAA	-	-	123	DCC
18623	456	AAA	-	-	123	DCC
18625	456	AAA	-	-	3	C
18627	456	AAA	-	-	123	DCC
18629	456	AAA	-	-	123	DCC
21321	456	AAA	-	-	23	CC
21323	456	AAA	-	-	123	DCC
21325	456	AAA	-	-	13	DC
21327	456	AAA	-	-	123	DCC
21329	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
N	2050551	Lower Skin	.016
	2050631	Upper Skin	.012
O	2050552	Lower Skin	.016
	2050632	Upper Skin	.012
P	2050553	Lower Skin	.016
	2050633	Upper Skin	.012
Q	2050554	Lower Skin	.016
	2050634	Upper Skin	.012

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2050431	Doubler	.028	0.0	-1.46	.024
	2055501	R/SP1	.018	-	-	.018
	2056301	R/SP1	.004	-	-	.004
B	2050432	Doubler	.032	0.0	1.48	.040
	2055511	R/SP2	.221	-	-	.221
	2056311	R/SP2	.145	-	-	.145
C	2050436	Doubler	.084	0.0	1.32	.104
	2055515	R/SP2	.221	-	-	.221
	2056315	R/SP2	.145	-	-	.145
D	2055502	R/SP1	.094	-	-	.094
	2055503	R/SP1	.094	-	-	.094
	2056302	R/SP1	.069	-	-	.069
	2056303	R/SP1	.069	-	-	.069
E	2050433	Doubler	.032	0.0	2.00	.040
	2055512	R/SP2	.221	-	-	.221
	2056312	R/SP2	.145	-	-	.145
F	2050437	Doubler	.084	0.0	1.92	.104
	2055516	R/SP2	.221	-	-	.221
	2056316	R/SP2	.145	-	-	.145
G	2055504	R/SP1	.059	-	-	.059
	2055505	R/SP1	.059	-	-	.059
	2056304	R/SP1	.045	-	-	.045
	2056305	R/SP1	.045	-	-	.045
H	2050434	Doubler	.032	0.0	2.00	.040
	2055513	R/SP2	.221	-	-	.221
	2056313	R/SP2	.145	-	-	.145
I	2050438	Doubler	.084	0.0	1.92	.104
	2055517	R/SP2	.221	-	-	.221
	2056317	R/SP2	.145	-	-	.145

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
J	2050651	Doubler	.124	0.0	-1.96	.193
	2055506	R/SP1	.094	-	-	.094
	2055507	R/SP1	.094	-	-	.094
	2056306	R/SP1	.069	-	-	.069
	2056307	R/SP1	.069	-	-	.069
K	2050435	Doubler	.032	0.0	1.48	.040
	2055514	R/SP2	.221	-	-	.221
	2056314	R/SP2	.145	-	-	.145
L	2050439	Doubler	.084	0.0	1.32	.104
	2055518	R/SP2	.221	-	-	.221
	2056318	R/SP2	.145	-	-	.145
M	2050652	Doubler	.124	0.0	5.18	.053
	2055508	R/SP1	.018	-	-	.018
	2056308	R/SP1	.005	-	-	.005

3.1.3.13 Right and Left Upper Shelves (Sta. 148-186) Detail

View looking down

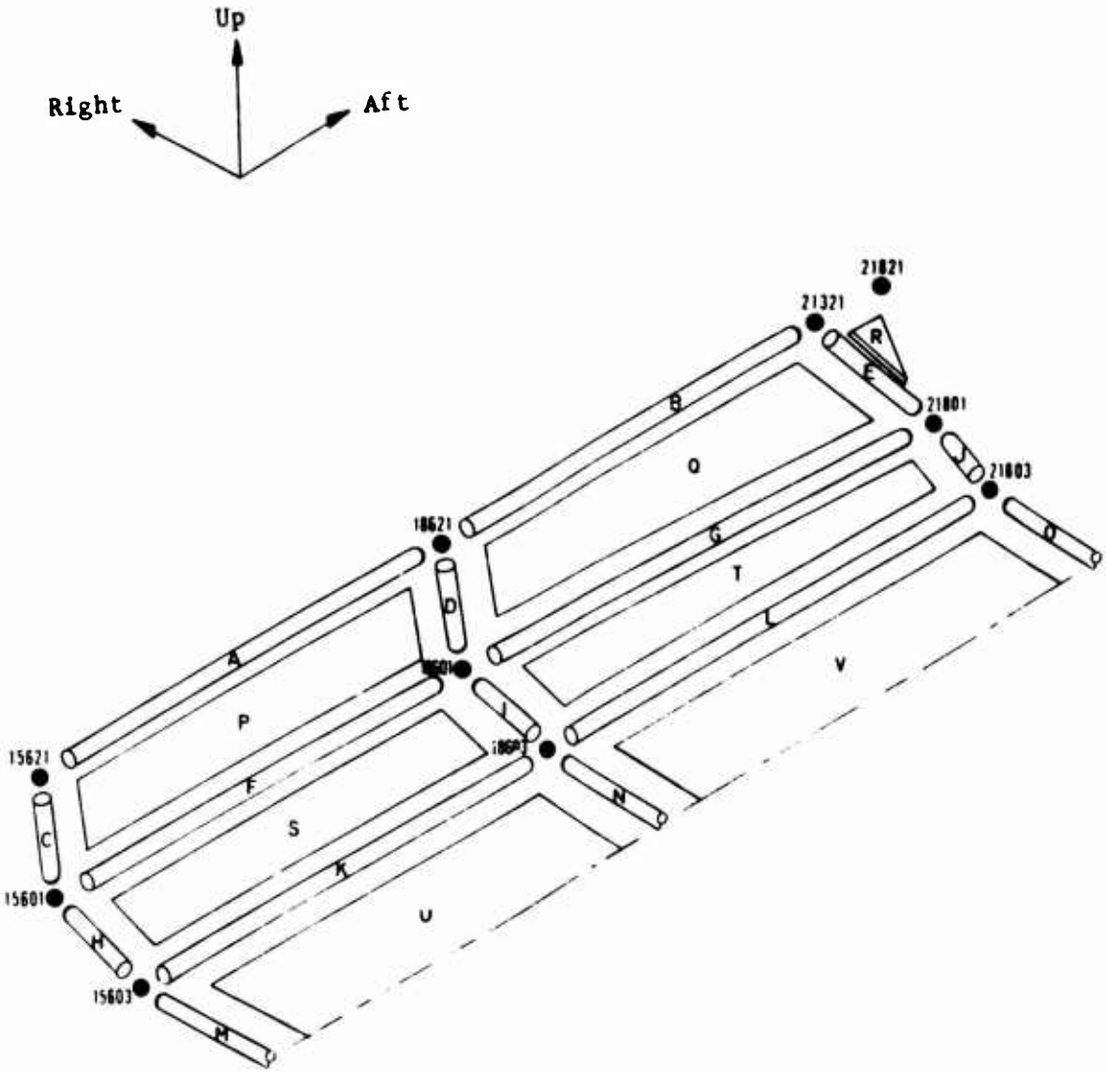
GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
14861	456	AAA	-	-	123	DCC
14863	456	AAA	-	-	-	-
14867	456	AAA	-	-	12	DC
14869	456	AAA	-	-	123	DCC
18661	-	-	-	-	123456	DCCAAA
18669	-	-	-	-	123456	DCCAAA

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	2501777	Skin	.032
B	2100897	Skin	.032

3.1.3.14 Right Belly Skins (Sta. 156-218) Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
15601	456	AAA	-	-	123	DCC
15603	456	AAA	123	AAA	-	-
15621	456	AAA	-	-	123	DCC
18601	456	AAA	-	-	123	DCC
18603	456	AAA	-	-	123	DCC
18621	456	AAA	-	-	123	DCC
21321	456	AAA	-	-	23	CC
21801	456	AAA	-	-	123	DCC
21803	456	AAA	-	-	123	DCC
21821	456	AAA	-	-	123	DCC

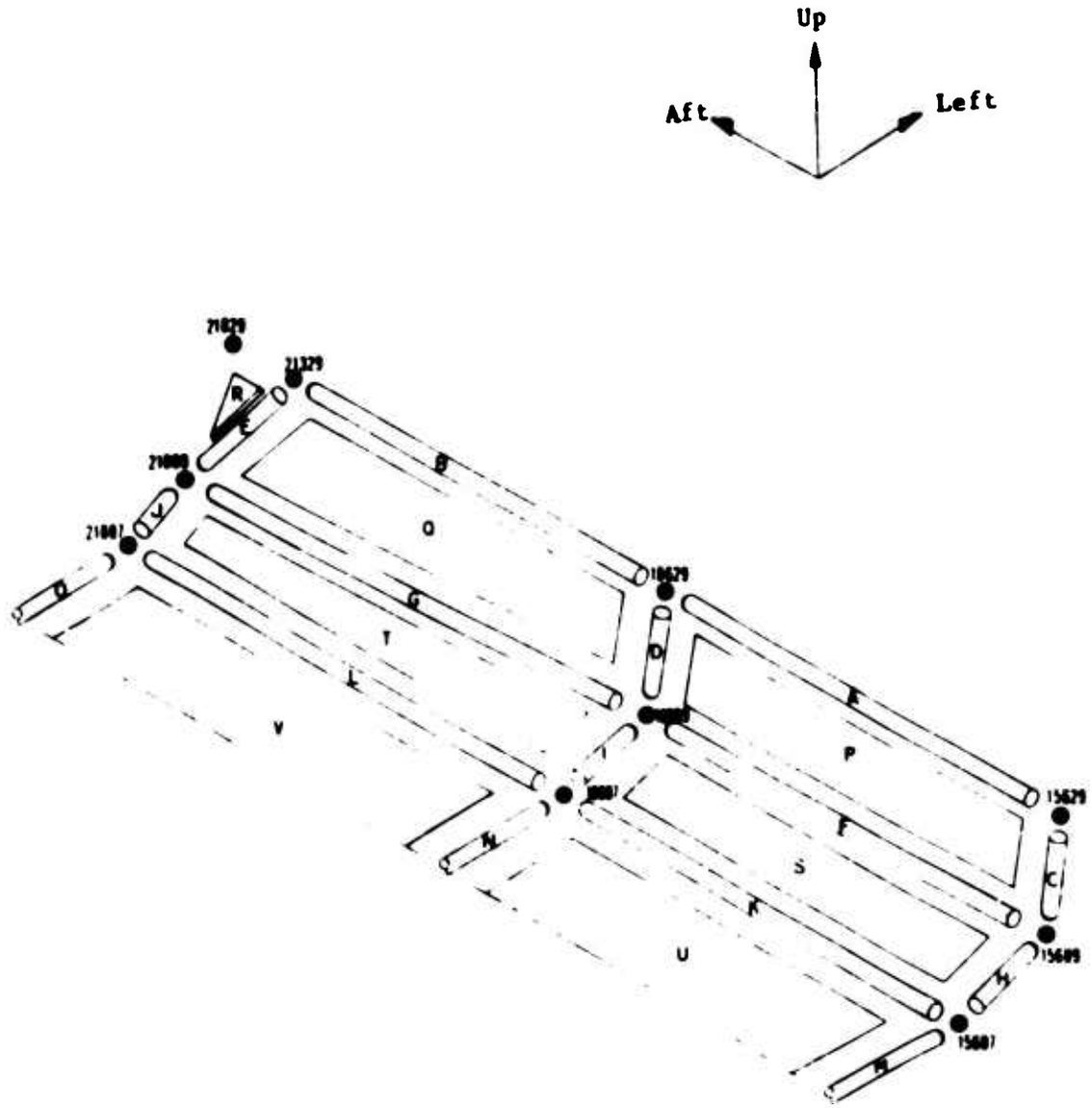
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
P	2200771	Skin	.025
Q	2200721	Skin	.025
R	2200722	Skin	.025
S	2200772	Skin	.025
T	2200723	Skin	.025
U	2200773	Skin	.025
V	2570011	Skin	.024

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2207701	R/SP2	.089	-	-	.089
B	2207201	R/SP2	.092	-	-	.092
C	2207703	R/SP2	.373	-	-	.373
D	2207704	R/SP2	.373	-	-	.373
	2207203	R/SP2	.378	-	-	.378
E	2207204	R/SP2	.378	-	-	.378
F	2207702	R/SP2	.089	-	-	.089
	2207711	R/SP2	.083	-	-	.083
G	2207202	R/SP2	.092	-	-	.092
	2207211	R/SP2	.077	-	-	.077
H	2207713	R/SP2	.373	-	-	.373
I	2207714	R/SP2	.373	-	-	.373
	2207213	R/SP2	.409	-	-	.409
J	2207214	R/SP2	.409	-	-	.409
K	2200561	Doubler	.117	-	-	.117
	2207712	R/SP2	.083	-	-	.083
	2207721	R/SP2	.241	-	-	.241
L	2200601	Doubler	.117	-	-	.117
	2207212	R/SP2	.077	-	-	.077
	2570101	R/SP2	.215	-	-	.215
M	2207723	R/SP2	.373	-	-	.373
N	2207724	R/SP2	.373	-	-	.373
	2570103	R/SP2	.393	-	-	.393
O	2570104	R/SP2	.393	-	-	.393

3.1.3.15 Left Belly Skins (Sta. 156-218) Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
15607	456	AAA	123	AAA	-	-
15609	456	AAA	-	-	123	DCC
15629	456	AAA	-	-	123	DCC
18607	456	AAA	-	-	123	DCC
18609	456	AAA	-	-	123	DCC
18629	456	AAA	-	-	123	DCC
21329	456	AAA	-	-	123	DCC
21807	456	AAA	-	-	123	DCC
21809	456	AAA	-	-	123	DCC
21829	456	AAA	-	-	123	DCC

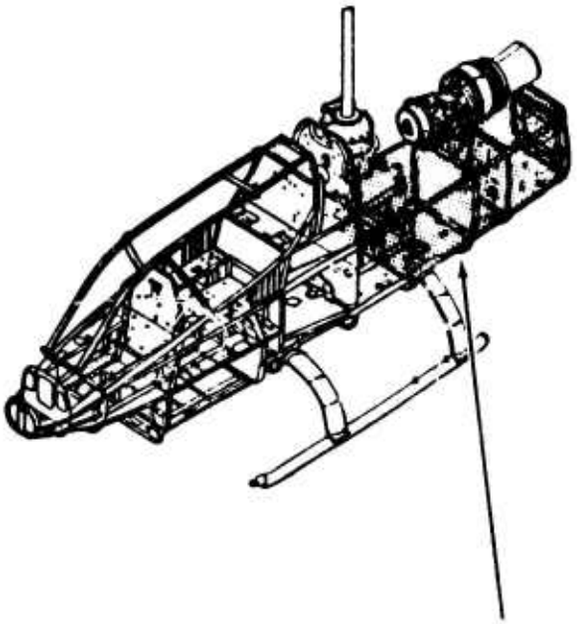
SHEAR PANEL/MEMBRANE ELEMENT DATA

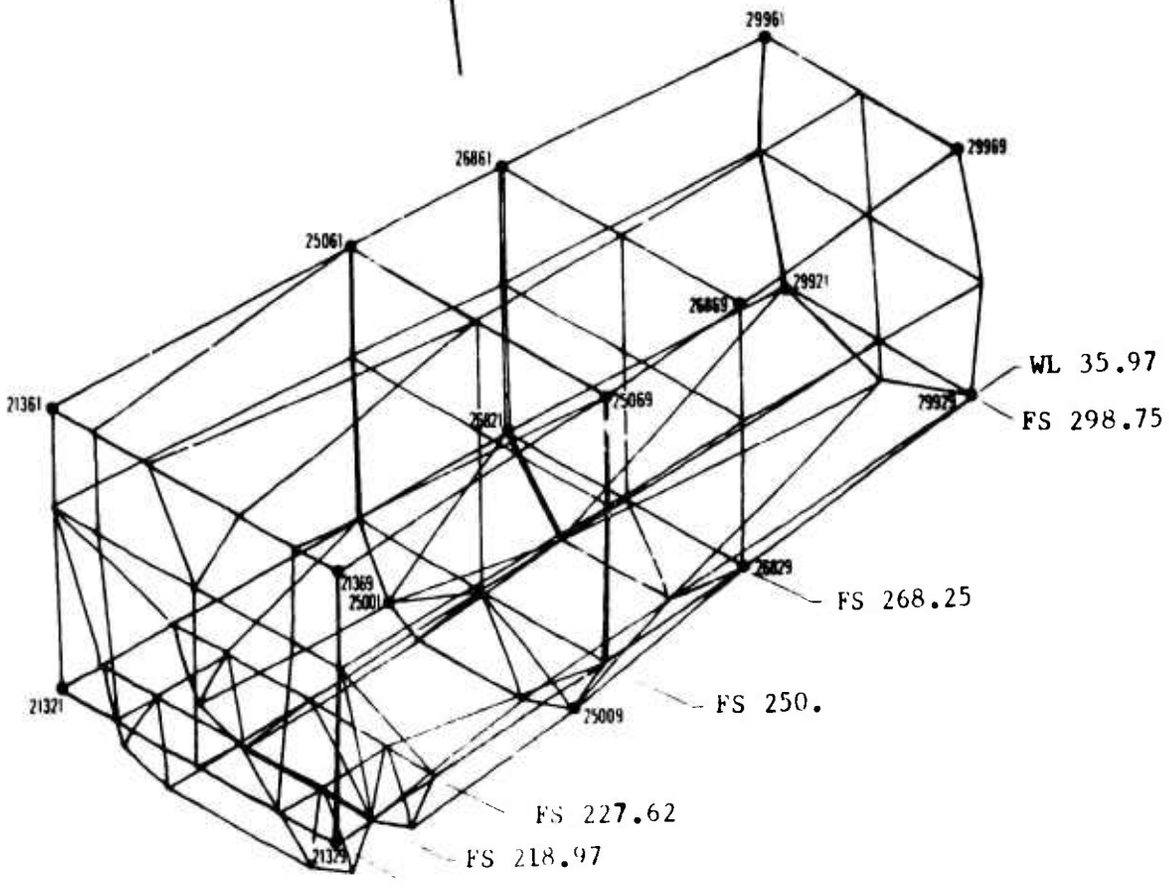
Letter Designation	NASTRAN EID	Type	Thickness (IN.)
P	2200775	Skin	.025
Q	2200711	Skin	.025
R	2200712	Skin	.025
S	2200774	Skin	.025
T	2200713	Skin	.025
U	2200773	Skin	.025
V	2570011	Skin	.024

ROD ELEMENT DATA

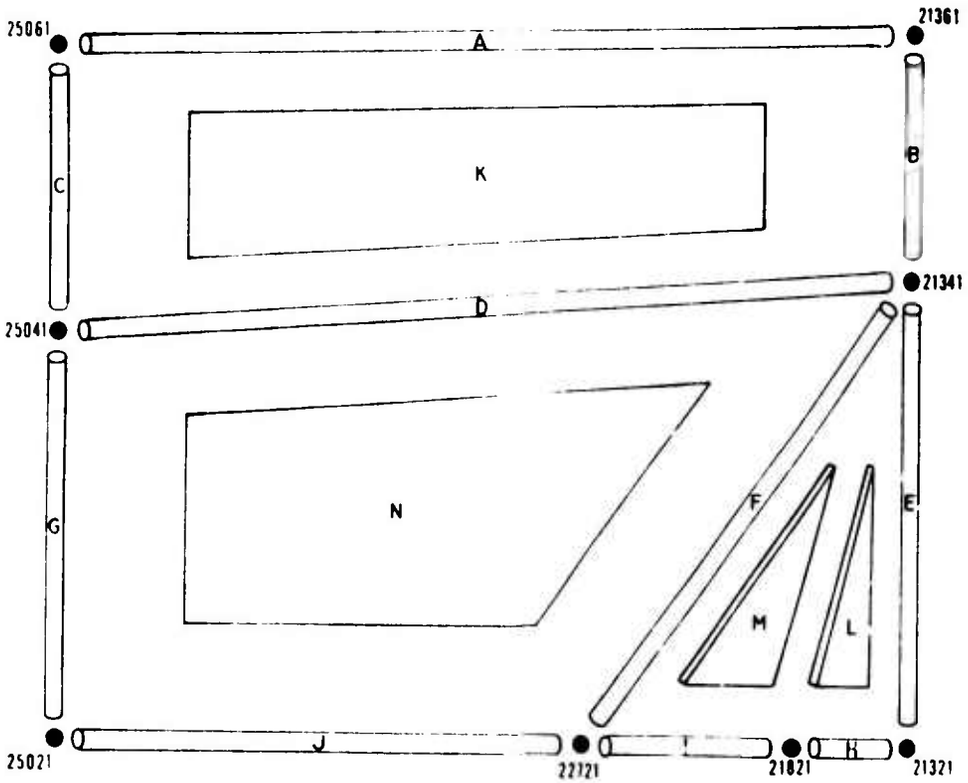
LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2207742	R/SP2	.089	-	-	.089
B	2207112	R/SP2	.092	-	-	.092
C	2207743	R/SP2	.373	-	-	.373
D	2207744	R/SP2	.373	-	-	.373
	2207113	R/SP2	.378	-	-	.378
E	2207114	R/SP2	.378	-	-	.378
F	2207732	R/SP2	.083	-	-	.083
	2207741	R/SP2	.089	-	-	.089
G	2207102	R/SP2	.077	-	-	.077
	2207111	R/SP2	.092	-	-	.092
H	2207733	R/SP2	.373	-	-	.373
I	2207734	R/SP2	.373	-	-	.373
	2207103	R/SP2	.409	-	-	.409
J	2207104	R/SP2	.409	-	-	.409
K	2200551	Doubler	.117	-	-	.117
	2207722	R/SP2	.241	-	-	.241
	2207731	R/SP2	.083	-	-	.083
L	2200591	Doubler	.117	-	-	.117
	2570102	R/SP2	.215	-	-	.215
	2207101	R/SP2	.077	-	-	.077
M	2207723	R/SP2	.241	-	-	.241
N	2207724	R/SP2	.373	-	-	.373
	2570103	R/SP2	.393	-	-	.393
O	2570104	R/SP2	.393	-	-	.393

3.1.4 Aft Fuselage Subassembly





3.1.4.1 Right Main Beam (Sta. 213-250) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
21321	456	AAA	-	-	23	CC
21341	-	-	-	-	12456	DCAAA
21361	456	AAA	-	-	123	DCC
21821	456	AAA	-	-	123	DCC
22721	456	AAA	-	-	123	DCC
25021	456	AAA	-	-	123	DCC
25041	456	AAA	-	-	12	DC
25061	456	AAA	-	-	23	CC

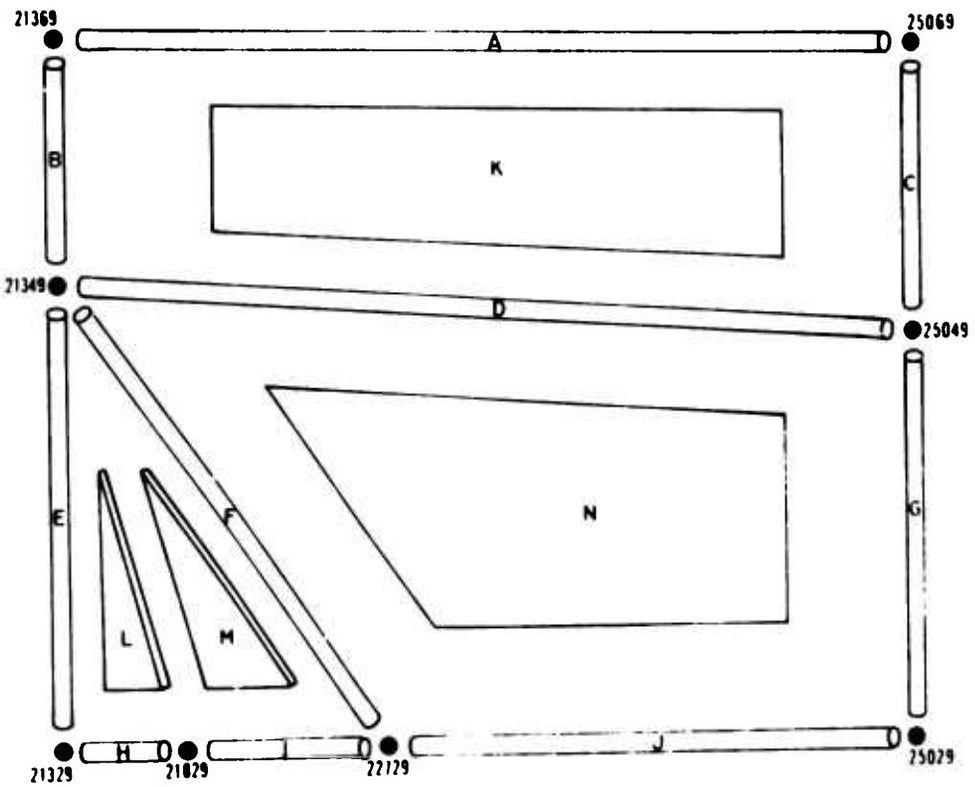
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
K	1200074	Inner Skin	.020
	1200114	Outer Skin	.016
L	1200071	Inner Skin	.020
	1200131	Interior Skin	.032
	1200111	Outer Skin	.016
M	1200072	Inner Skin	.020
	1200132	Interior Skin	.032
	1200112	Outer Skin	.016
N	1200073	Inner Skin	.020
	1200113	Outer Skin	.016

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	1600093	Cap	.425	-0.35	0.0	.404
	1360713	Cap	.162	0.0	0.0	.162
	1200151	Doubler	.254	-0.47	0.0	.238
	1200704	R/SP1	.034	-	-	.034
	1201104	R/SP1	.027	-	-	.027
B	1200137	Doubler	.153	1.44	0.0	.178
	1200712	R/SP2	.361	-	-	.361
	1201112	R/SP2	.288	-	-	.288
C	1200092	Doubler	.153	0.70	0.0	.163
	1200714	R/SP2	.361	-	-	.361
	1201114	R/SP2	.288	-	-	.288
D	1200702	R/SP1	.203	-	-	.203
	1200703	R/SP1	.203	-	-	.203
	1201102	R/SP1	.162	-	-	.162
	1201103	R/SP1	.162	-	-	.162
E	1200136	Doubler	.153	2.64	0.0	.178
F	1200711	R/SP2	.292	-	-	.292
	1201111	R/SP2	.234	-	-	.234
G	1200091	Doubler	.153	1.02	0.0	.163
	1200713	R/SP2	.292	-	-	.292
	1201113	R/SP2	.234	-	-	.234
H	1610292	Cap	.594	0.65	0.0	.545
	1200133	Doubler	.475	3.45	0.0	.279
I	1610293	Cap	.740	0.98	0.0	.640
	1200134	Doubler	.475	2.99	0.0	.294
J	1610294	Cap	.461	0.63	0.0	.420
	1200135	Doubler	.475	1.95	0.0	.351
	1200701	R/SP1	.131	-	-	.131
	1201101	R/SP1	.105	-	-	.105

3.1.4.2 Left Main Beam (Sta. 213-250) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
21329	456	AAA	-	-	123	DCC
21349	-	-	-	-	12456	DCAAA
21369	456	AAA	-	-	23	CC
21829	456	AAA	-	-	123	DCC
22729	456	AAA	-	-	123	DCC
25029	456	AAA	-	-	123	DCC
25049	456	AAA	-	-	12	DC
25069	456	AAA	-	-	123	DCC

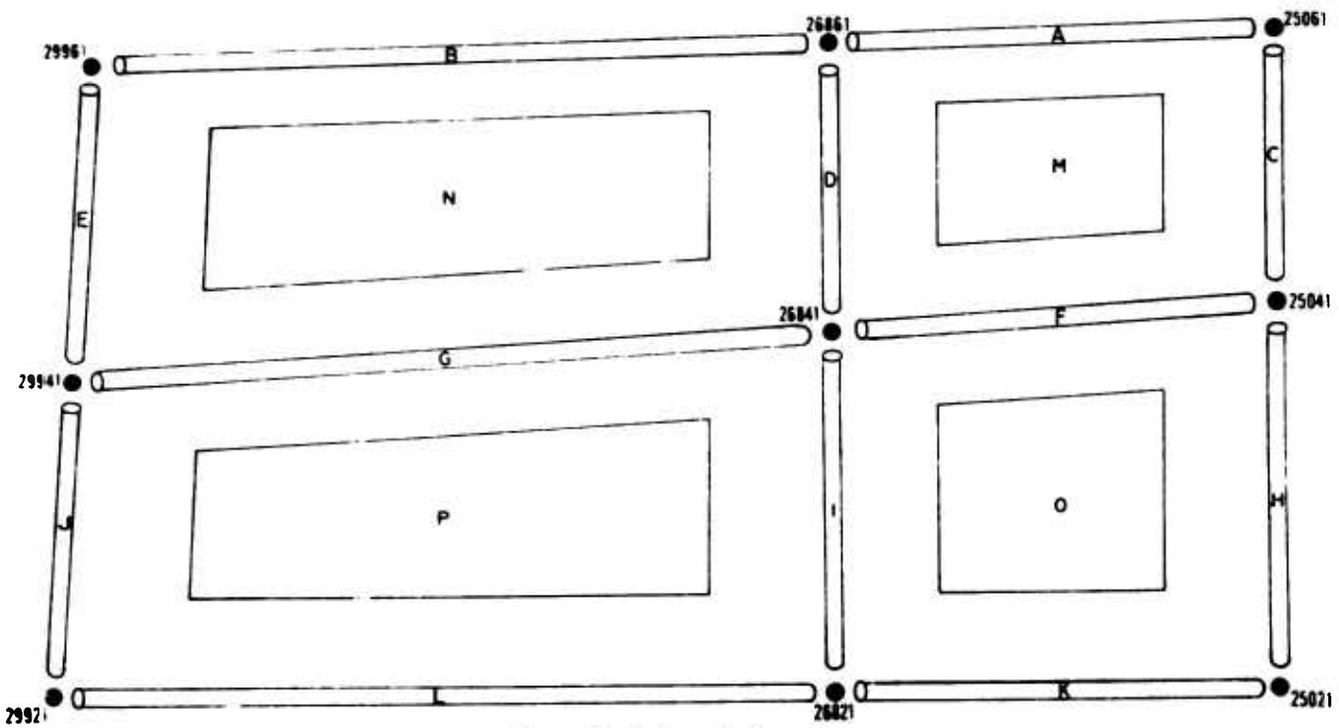
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
K	1190094	Inner Skin	.020
	1190054	Outer Skin	.016
L	1190091	Inner Skin	.020
	1190131	Interior Skin	.032
	1190051	Outer Skin	.016
M	1190092	Inner Skin	.020
	1190132	Interior Skin	.032
	1190052	Outer Skin	.016
N	1190093	Inner Skin	.020
	1190053	Outer Skin	.016

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1600053	Cap	.412	-0.35	0.0	.392
	1360693	Cap	.162	0.0	0.0	.162
	1190211	Doubler	.254	-0.82	0.0	.229
	1190904	R/SP1	.034	-	-	.034
	1190504	R/SP1	.027	-	-	.027
B	1190232	Doubler	.153	1.44	0.0	.178
	1190912	R/SP2	.361	-	-	.361
	1190512	R/SP2	.288	-	-	.288
C	1190192	Doubler	.153	0.96	0.0	.167
	1190914	R/SP2	.361	-	-	.361
	1190514	R/SP2	.288	-	-	.288
D	1190902	R/SP1	.203	-	-	.203
	1190903	R/SP1	.203	-	-	.203
	1190502	R/SP1	.162	-	-	.162
	1190503	R/SP1	.162	-	-	.162
E	1190231	Doubler	.153	2.64	0.0	.178
F	1190911	R/SP2	.292	-	-	.292
	1190511	R/SP2	.234	-	-	.234
G	1190191	Doubler	.153	1.39	0.0	.167
	1190913	R/SP2	.292	-	-	.292
	1190513	R/SP2	.234	-	-	.234
H	1610192	Cap	.482	0.60	0.0	.445
	1190171	Doubler	.475	3.45	0.0	.284
I	1610193	Cap	.597	0.94	0.0	.522
	1190172	Doubler	.475	2.99	0.0	.300
J	1610194	Cap	.379	0.60	0.0	.348
	1190173	Doubler	.475	1.95	0.0	.353
	1190901	R/SP1	.131	-	-	.131
	1190501	R/SP1	.105	-	-	.105

3.1.4.3 Right Main Beam (Sta. 250-299) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
25021	456	AAA	-	-	123	DCC
25041	456	AAA	-	-	12	DC
25061	456	AAA	-	-	23	CC
26821	456	AAA	-	-	23	CC
26841	456	AAA	-	-	12	DC
26861	456	AAA	-	-	123	DCC
29921	456	AAA	123	AAA	-	-
29941	456	AAA	-	-	123	DCC
29961	456	AAA	123	AAA	-	-

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
M	1180712	Inner Skin	.008
	1180692	Outer Skin	.071
N	1180452	Inner Skin	.008
	1180694	Outer Skin	.071
O	1180711	Inner Skin	.008
	1180691	Outer Skin	.071
P	1180451	Inner Skin	.008
	1180693	Outer Skin	.071

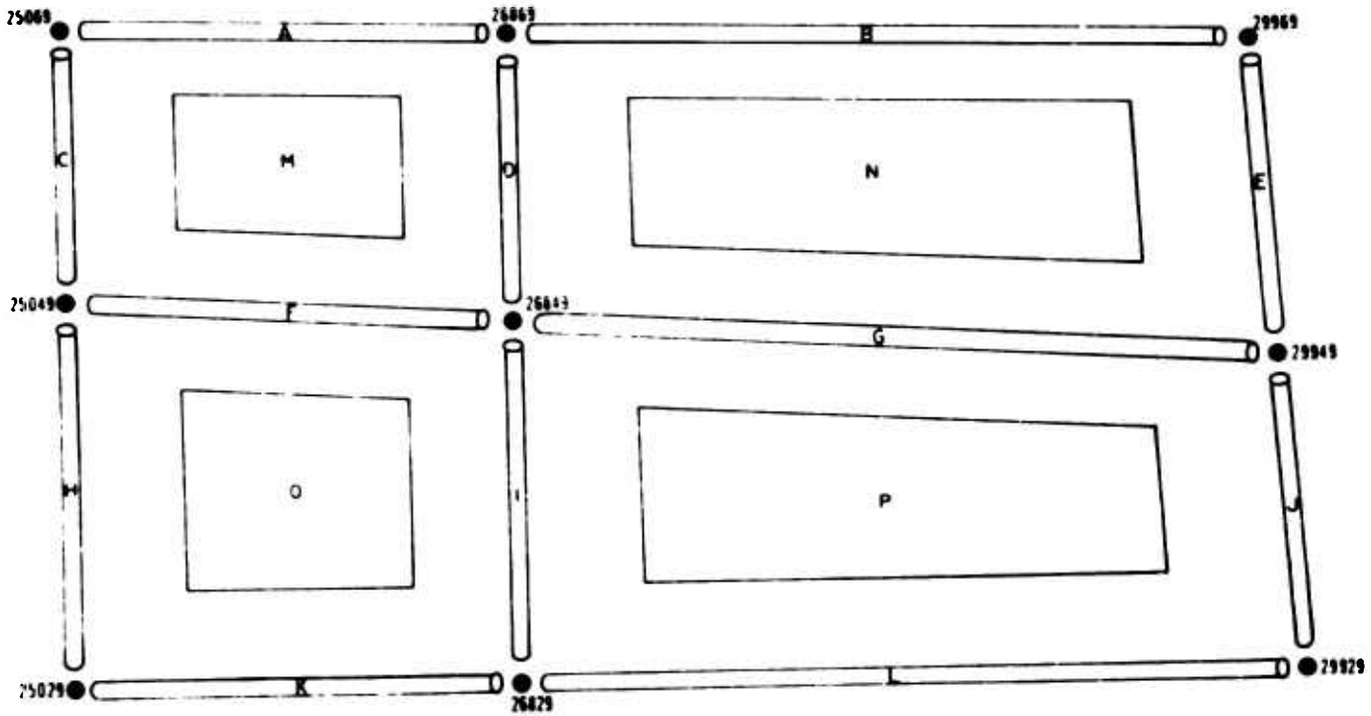
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1600094	Cap	.411	-0.35	0.0	.390
	1360714	Cap	.079	0.24	0.0	.082
	1187104	R/SP1	.011	-	-	.011
	1186904	R/SP1	.209	-	-	.209
B	1600095	Cap	.710	-0.56	0.0	.647
	1360715	Cap	.069	0.22	0.0	.071
	1184504	R/SP1	.014	-	-	.014
	1186924	R/SP1	.276	-	-	.276
C	1187112	R/SP2	.061	-	-	.061
	1186912	R/SP2	.646	-	-	.646
D	1187114	R/SP2	.061	-	-	.061
	1184512	R/SP2	.118	-	-	.118
	1186914	R/SP2	.646	-	-	.646
	1186932	R/SP2	1.109	-	-	1.109
E	1184514	R/SP2	.118	-	-	.118
	1186934	R/SP2	1.109	-	-	1.109
F	1187102	R/SP1	.074	-	-	.074
	1187103	R/SP1	.074	-	-	.074
	1186902	R/SP1	.676	-	-	.676
	1186903	R/SP1	.676	-	-	.676
G	1184502	R/SP1	.069	-	-	.069
	1184503	R/SP1	.069	-	-	.069
	1186922	R/SP1	.649	-	-	.649
	1186923	R/SP1	.649	-	-	.649
H	1187111	R/SP2	.061	-	-	.061
	1186911	R/SP2	.646	-	-	.646
I	1187113	R/SP2	.061	-	-	.061
	1184511	R/SP2	.118	-	-	.118
	1186913	R/SP2	.646	-	-	.646
	1186931	R/SP2	1.109	-	-	1.109

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
J	1184513	R/SP2	.118	-	-	.118
	1186933	R/SP2	1.109	-	-	1.109
K	1610295	Cap	.427	0.28	0.0	.410
	1187101	R/SP1	.034	-	-	.034
	1186901	R/SP1	.415	-	-	.415
L	1610296	Cap	.436	0.27	0.0	.450
	1184501	R/SP1	.023	-	-	.023
	1186921	R/SP1	.356	-	-	.356

3.1.4.4 Left Main Beam (Sta. 250-299) Detail



View looking inboard

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
25029	456	AAA	-	-	123	DCC
25049	456	AAA	-	-	12	DC
25069	456	AAA	-	-	123	DCC
26829	456	AAA	-	-	123	DCC
26849	456	AAA	-	-	12	DC
26869	456	AAA	-	-	23	CC
29929	456	AAA	123	AAA	-	-
29949	456	AAA	-	-	123	DCC
29969	456	AAA	123	AAA	-	-

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
M	1170112	Inner Skin	.016
	1170512	Interior Skin	.040
	1170052	Outer Skin	.016
N	1170392	Inner Skin	.008
	1170054	Outer Skin	.016
O	1170111	Inner Skin	.016
	1170511	Interior Skin	.040
	1170051	Outer Skin	.016
P	1170391	Inner Skin	.008
	1170053	Outer Skin	.016

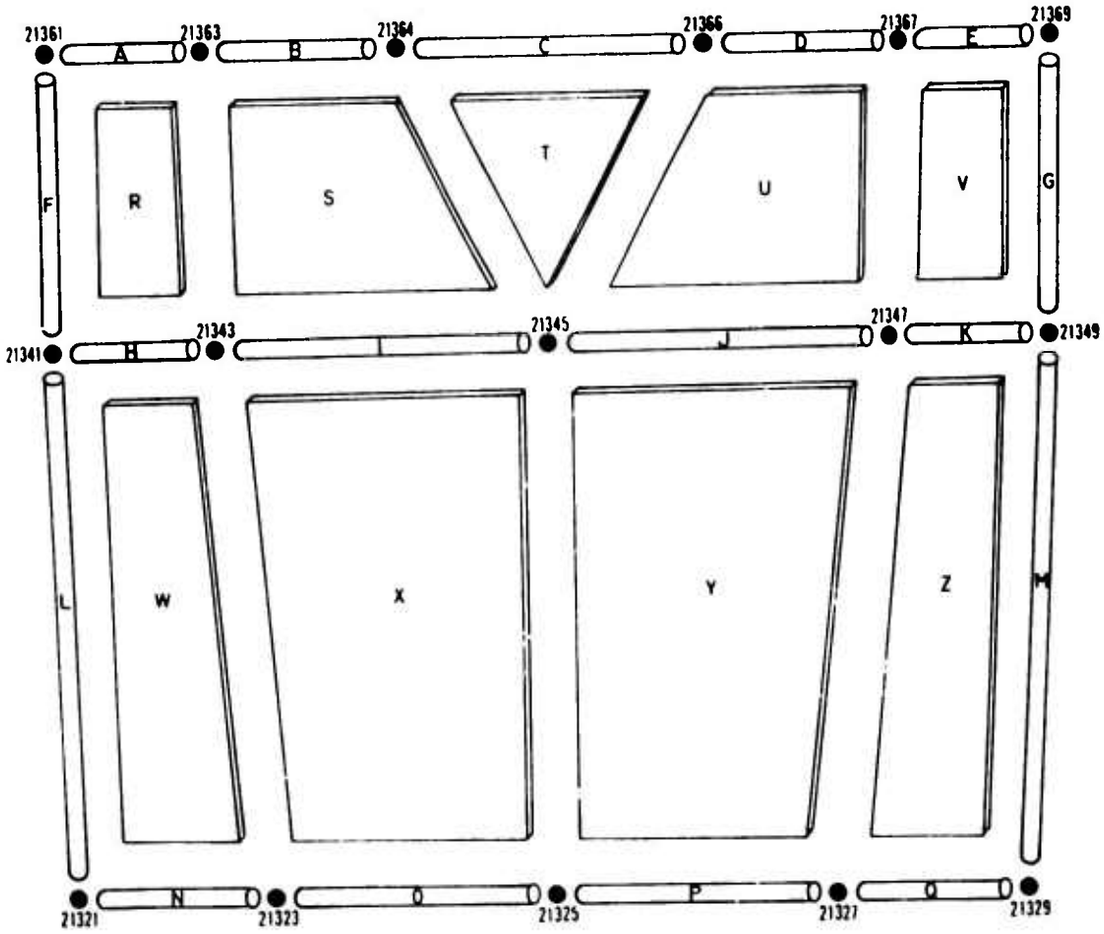
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	1600054	Cap	.411	-0.35	0.0	.390
	1360694	Cap	.079	0.24	0.0	.082
	1171104	R/SP1	.020	-	-	.020
	1175104	R/SP1	.118	-	-	.118
	1170504	R/SP1	.047	-	-	.047
B	1600055	Cap	.710	-0.56	0.0	.638
	1360695	Cap	.069	0.22	0.0	.071
	1170191	Doubler	.090	-1.37	0.0	.069
	1173904	R/SP1	.014	-	-	.014
	1170524	R/SP1	.062	-	-	.062
C	1171112	R/SP2	.118	-	-	.118
	1175112	R/SP2	.365	-	-	.365
	1170514	R/SP2	.146	-	-	.146
D	1170512	Doubler	.043	0.0	0.0	.043
	1171114	R/SP2	.118	-	-	.118
	1173912	R/SP2	.116	-	-	.116
	1175114	R/SP2	.365	-	-	.365
	1170516	R/SP2	.146	-	-	.146
	1170532	R/SP2	.250	-	-	.250
E	1170232	Doubler	.046	1.77	0.0	.053
	1173914	R/SP2	.116	-	-	.116
	1170534	R/SP2	.250	-	-	.250
F	1171102	R/SP1	.148	-	-	.148
	1171103	R/SP1	.148	-	-	.148
	1175102	R/SP1	.381	-	-	.381
	1175103	R/SP1	.381	-	-	.381
	1170502	R/SP1	.152	-	-	.152
	1170503	R/SP1	.152	-	-	.152
G	1173902	R/SP1	.069	-	-	.069
	1173903	R/SP1	.069	-	-	.069
	1170522	R/SP1	.146	-	-	.146
	1170523	R/SP1	.146	-	-	.146

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
H	1171111	R/SP2	.118	-	-	.118
	1175111	R/SP2	.365	-	-	.365
	1170513	R/SP2	.146	-	-	.146
I	1170511	Doubler	.043	0.0	0.0	.043
	1171113	R/SP2	.118	-	-	.118
	1173911	R/SP2	.116	-	-	.116
	1175113	R/SP2	.365	-	-	.365
	1170515	R/SP2	.146	-	-	.146
	1170531	R/SP2	.250	-	-	.250
J	1170231	Doubler	.046	1.77	0.0	.053
	1173913	R/SP2	.116	-	-	.116
	1170533	R/SP2	.250	-	-	.250
K	1610195	Cap	.353	0.25	0.0	.341
	1171101	R/SP1	.066	-	-	.066
	1175101	R/SP1	.235	-	-	.235
	1170501	R/SP1	.094	-	-	.094
L	1610196	Cap	.361	0.24	0.0	.351
	1170211	Doubler	.082	1.46	0.0	.068
	1173901	R/SP1	.023	-	-	.023
	1170521	R/SP1	.081	-	-	.081

3.1.4.5 Bulkhead Sta. 213.94 Detail



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
21321	456	AAA	-	-	23	CC
21323	456	AAA	-	-	123	DCC
21325	456	AAA	-	-	13	DC
21327	456	AAA	-	-	123	DCC
21329	456	AAA	-	-	123	DCC
21341	-	-	-	-	12456	DCAAA
21343	4	A	-	-	12356	DCCAA
21345	4	A	-	-	12356	DCCAA
21347	4	A	-	-	12356	DCCAA
21349	-	-	-	-	12456	DCAAA
21361	456	AAA	-	-	123	DCC
21363	6	A	-	-	12345	DCCAA
21364	456	AAA	-	-	123	DCC
21366	456	AAA	-	-	123	DCC
21367	6	A	-	-	12345	DCCAA
21369	456	AAA	-	-	23	CC
21383	-	-	-	-	12456	DCAAA
21387	-	-	-	-	12456	DCAAA

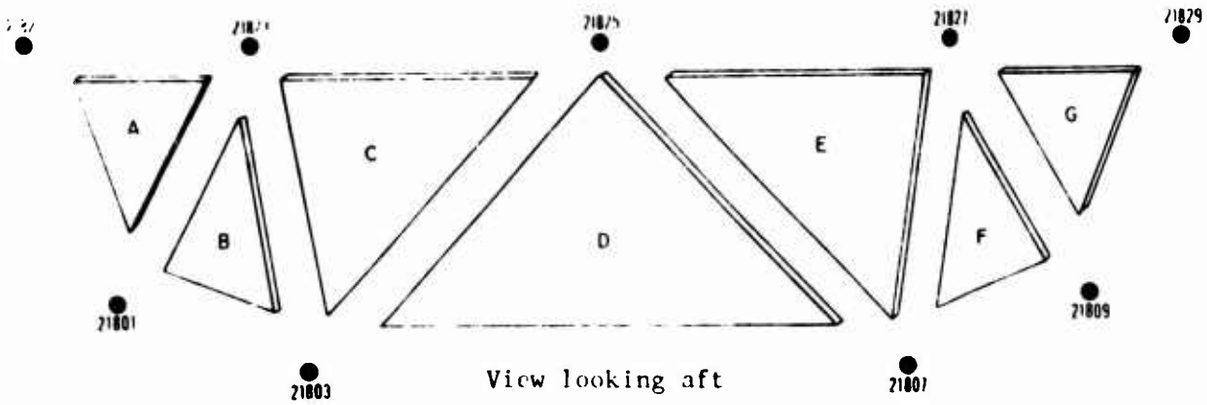
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
R	2134163	Bulkhead	.100
S	2134364	Bulkhead	.050
T	2134564	Bulkhead	.050
U	2134567	Bulkhead	.050
V	2134769	Bulkhead	.100
W	2132143	Bulkhead	.012
X	2132345	Bulkhead	.012
Y	2132547	Bulkhead	.012
Z	2132749	Bulkhead	.012

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2136163	Frame	.101	-	-	.101
B	2136364	Frame	.101	-	-	.101
C	2136466	Frame	.101	-	-	.101
D	2136667	Frame	.101	-	-	.101
E	2136769	Frame	.101	-	-	.101
F	2134161	Frame	.182	-	-	.182
G	2134969	Frame	.182	-	-	.182
H	2134143	Frame	.131	-	-	.131
I	2134345	Frame	.131	-	-	.131
J	2134547	Frame	.131	-	-	.131
K	2134749	Frame	.131	-	-	.131
L	2132141	Frame	.309	-	-	.309
M	2132949	Frame	.309	-	-	.309
N	2132123	Frame	.302	-	-	.302
O	2132325	Frame	.302	-	-	.302
P	2132527	Frame	.302	-	-	.302
Q	2132729	Frame	.302	-	-	.302

3.1.4.6 Partial Belly Bulkhead Sta. 218.97 Detail



View looking aft

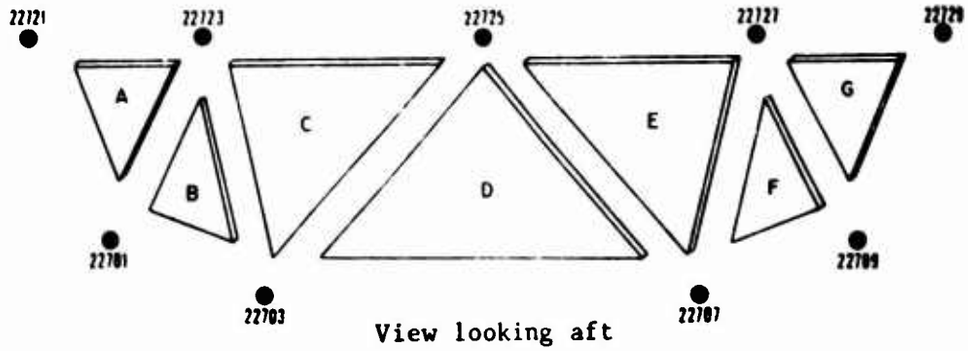
GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
21801	456	AAA	-	-	123	DCC
21803	456	AAA	-	-	123	DCC
21807	456	AAA	-	-	123	DCC
21809	456	AAA	-	-	123	DCC
21821	456	AAA	-	-	123	DCC
21823	456	AAA	-	-	123	DCC
21825	456	AAA	-	-	-	-
21827	456	AAA	-	-	123	DCC
21829	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	2180121	Bulkhead	.025
B	2180123	Bulkhead	.025
C	2180323	Bulkhead	.025
D	2180325	Bulkhead	.025
E	2180725	Bulkhead	.025
F	2180727	Bulkhead	.025
G	2180927	Bulkhead	.025

3.1.4.7 Partial Belly Bulkhead Sta. 227.62 Detail



View looking aft

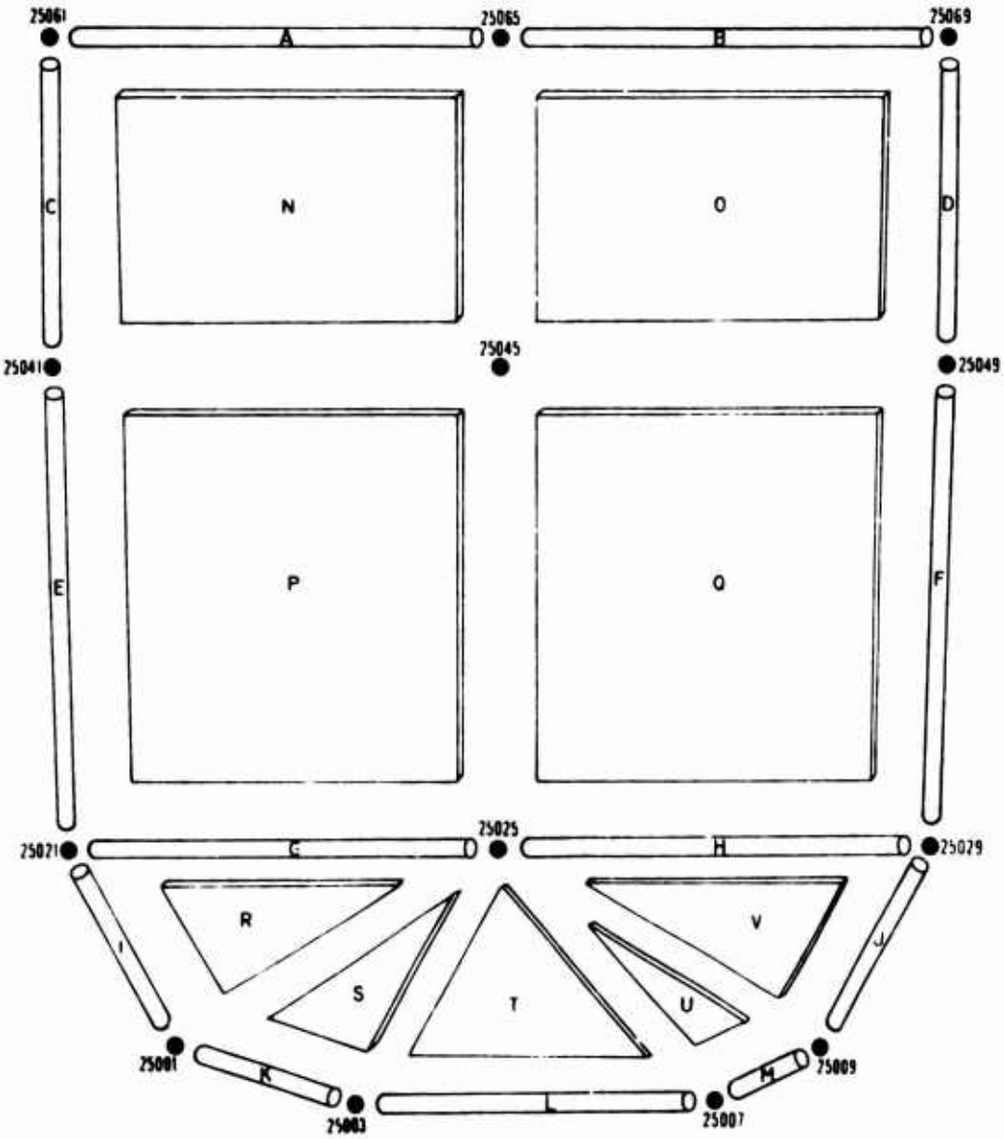
GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
22701	456	AAA	-	-	123	DCC
22703	456	AAA	-	-	123	DCC
22707	456	AAA	-	-	123	DCC
22709	456	AAA	-	-	123	DCC
22721	456	AAA	-	-	123	DCC
22773	456	AAA	-	-	123	DCC
22725	456	AAA	-	-	-	-
22727	456	AAA	-	-	123	DCC
22729	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	2270121	Bulkhead	.025
B	2270123	Bulkhead	.025
C	2270323	Bulkhead	.025
D	2270325	Bulkhead	.025
E	2270725	Bulkhead	.025
F	2270727	Bulkhead	.025
G	2270927	Bulkhead	.025

3.1.4.8 Bulkhead Sta. 250. Detail



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
25001	456	AAA	-	-	123	DCC
25003	456	AAA	-	-	123	DCC
25007	456	AAA	-	-	123	DCC
25009	456	AAA	-	-	123	DCC
25021	456	AAA	-	-	123	DCC
25025	456	AAA	-	-	13	DC
25029	456	AAA	-	-	123	DCC
25041	456	AAA	-	-	12	DC
25045	1456	AAAA	-	-	23	CC
25049	456	AAA	-	-	12	DC
25061	456	AAA	-	-	23	CC
25065	456	AAA	-	-	13	DC
25069	456	AAA	-	-	123	DCC

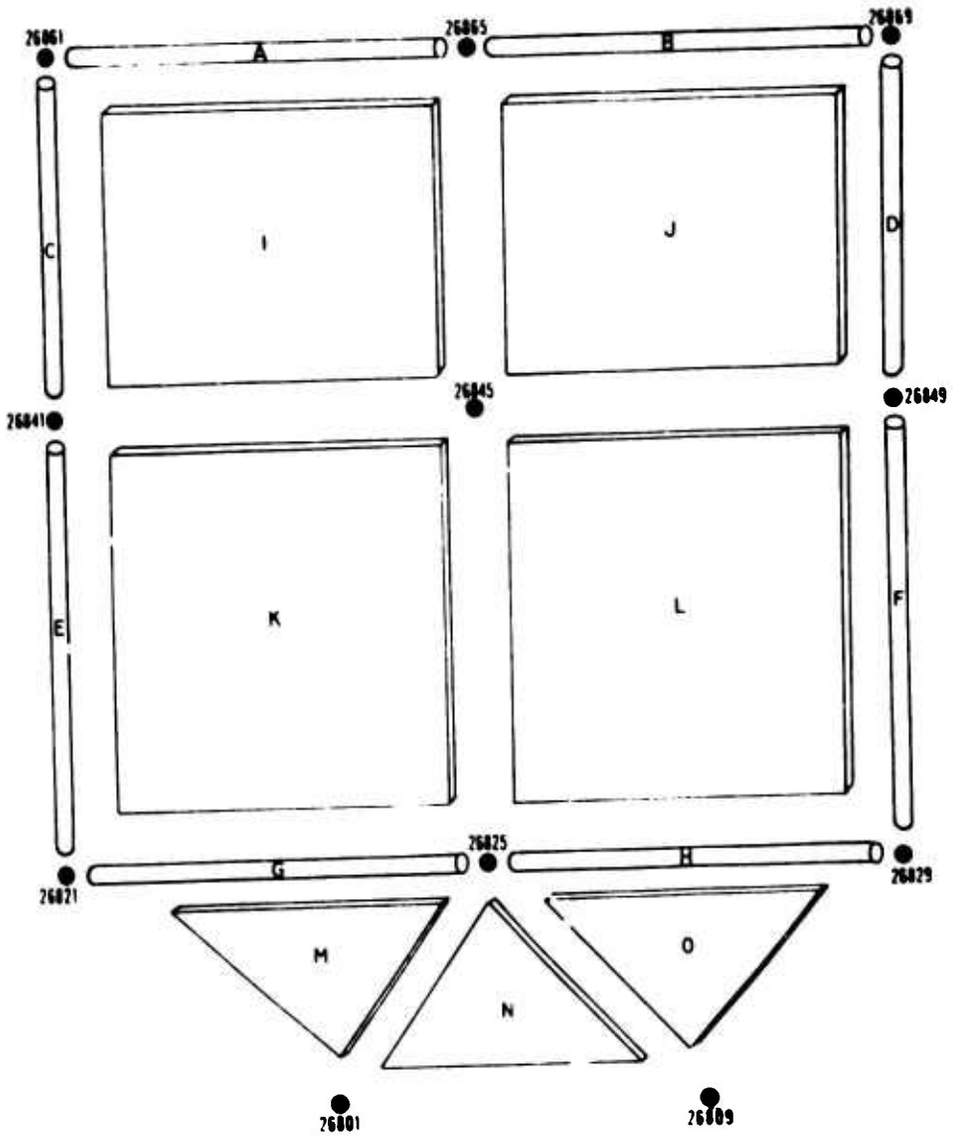
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
N	2504165	Bulkhead	.012
O	2504569	Bulkhead	.012
P	2502145	Bulkhead	.012
Q	2502549	Bulkhead	.012
R	2500121	Bulkhead	.025
S	2500125	Bulkhead	.025
T	2500325	Bulkhead	.025
U	2500725	Bulkhead	.025
V	2500925	Bulkhead	.025

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2506165	Frame	.489	-	-	.489
B	2506569	Frame	.489	-	-	.489
C	2504161	Frame	.266	-	-	.266
D	2504969	Frame	.266	-	-	.266
E	2502141	Frame	.266	-	-	.266
F	2502949	Frame	.266	-	-	.266
G	2502125	Frame	.299	-	-	.299
H	2502529	Frame	.299	-	-	.299
I	2502101	Frame	.039	-	-	.039
J	2500929	Frame	.039	-	-	.039
K	2500103	Frame	.039	-	-	.039
L	2500307	Frame	.039	-	-	.039
M	2500709	Frame	.039	-	-	.039

3.1.4.9 **Bulkhead Sta. 268.25 Detail**



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
26801	456	AAA	-	-	123	DCC
26809	456	AAA	-	-	123	DCC
26821	456	AAA	-	-	23	CC
26825	456	AAA	-	-	13	DC
26829	456	AAA	-	-	123	DCC
26841	456	AAA	-	-	12	DC
26845	1456	AAAA	-	-	23	CC
26849	456	AAA	-	-	12	DC
26861	456	AAA	-	-	123	DCC
26865	456	AAA	-	-	13	DC
26869	456	AAA	-	-	23	CC

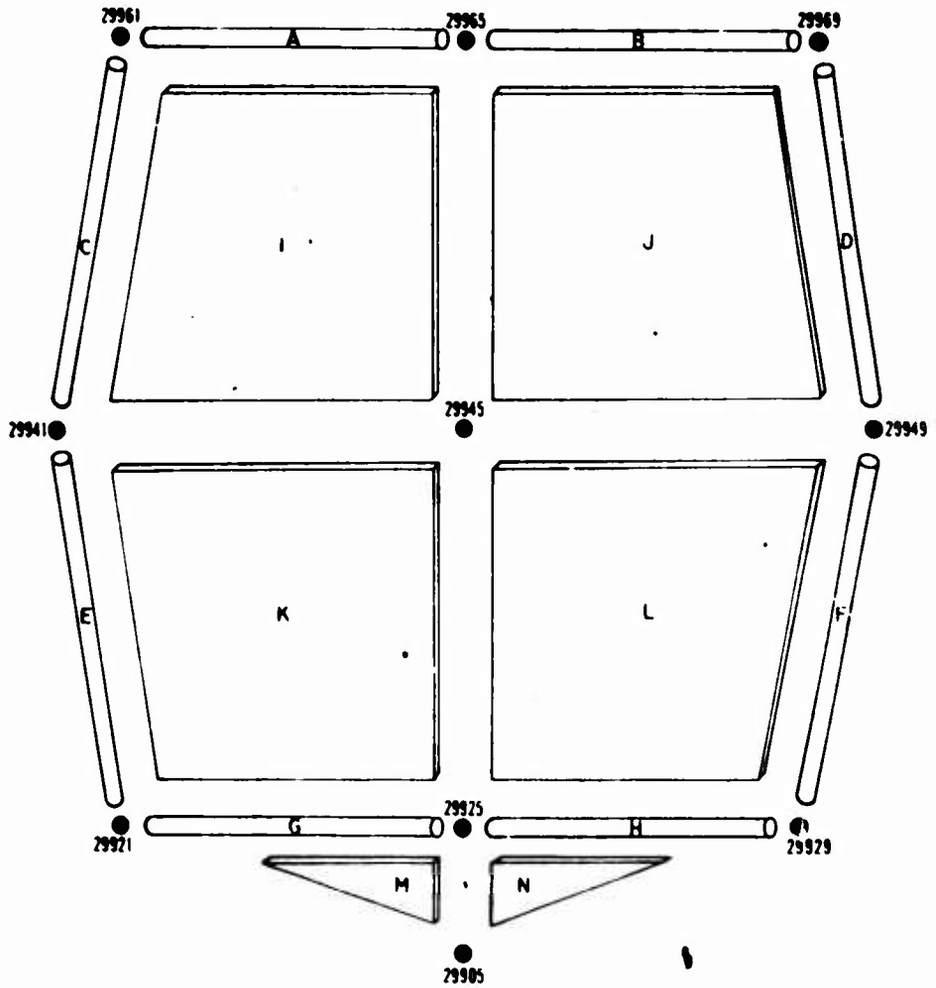
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
I	2684165	Bulkhead	.028
J	2684569	Bulkhead	.028
K	2682145	Bulkhead	.028
L	2682549	Bulkhead	.028
M	2680121	Bulkhead	.028
N	2680125	Bulkhead	.028
O	2680925	Bulkhead	.028

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2686165	Frame	.446	-	-	.446
B	2686569	Frame	.446	-	-	.446
C	2684161	Frame	.072	-	-	.072
D	2684969	Frame	.072	-	-	.072
E	2682141	Frame	.072	-	-	.072
F	2682949	Frame	.072	-	-	.072
G	2682125	Frame	.225	-	-	.225
H	2682529	Frame	.225	-	-	.225

3.1.4.10 Tailboom Junction Bulkhead Sta. 299, Detail



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
29905	456	AAA	-	-	123	DCC
29921	456	AAA	123	AAA	-	-
29925	456	AAA	-	-	123	DCC
29929	456	AAA	123	AAA	-	-
29941	456	AAA	-	-	123	DCC
29945	1456	AAAA	-	-	23	CC
29949	456	AAA	-	-	123	DCC
29961	456	AAA	123	AAA	-	-
29965	456	AAA	-	-	123	DCC
29969	456	AAA	123	AAA	-	-

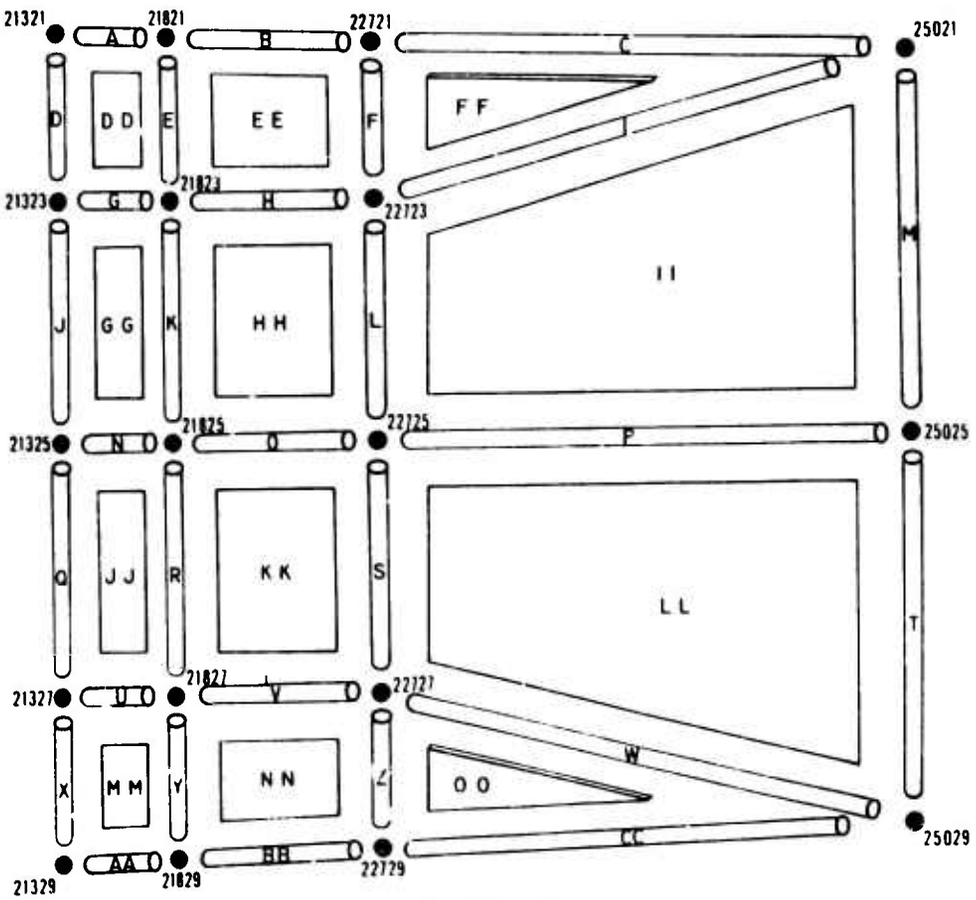
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
I	2994165	Bulkhead	.032
J	2994569	Bulkhead	.032
K	2992145	Bulkhead	.032
L	2992549	Bulkhead	.032
M	2990521	Bulkhead	.032
N	2990525	Bulkhead	.032

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2996165	Frame	.480	-	-	.480
B	2996569	Frame	.480	-	-	.480
C	2994161	Frame	.335	-	-	.335
D	2994969	Frame	.335	-	-	.335
E	2992141	Frame	.335	-	-	.335
F	2992949	Frame	.605	-	-	.605
G	2992125	Frame	.285	-	-	.285
H	2992529	Frame	.285	-	-	.285

3.1.4.11 Aft Fuel Cell Floor (Sta. 213-250, W.L. 35.97) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
21321	456	AAA	-	-	23	CC
21323	456	AAA	-	-	123	DCC
21325	456	AAA	-	-	13	DC
21327	456	AAA	-	-	123	DCC
21329	456	AAA	-	-	123	DCC
21821	456	AAA	-	-	123	DCC
21823	456	AAA	-	-	123	DCC
21825	456	AAA	-	-	-	-
21827	456	AAA	-	-	123	DCC
21829	456	AAA	-	-	123	DCC
22721	456	AAA	-	-	123	DCC
22723	456	AAA	-	-	123	DCC
22725	456	AAA	-	-	-	-
22727	456	AAA	-	-	123	DCC
22729	456	AAA	-	-	123	DCC
25021	456	AAA	-	-	123	DCC
25025	456	AAA	-	-	13	DC
25029	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
DD	2060871	Lower Skin	.016
	2060911	Interior Skin	.010
	2060891	Upper Skin	.020
EE	2060875	Lower Skin	.016
	2060895	Upper Skin	.020
FF	2060881	Lower Skin	.016
	2060901	Upper Skin	.020
GG	2060872	Lower Skin	.016
	2060912	Interior Skin	.010
	2060892	Upper Skin	.020
HH	2060876	Lower Skin	.016
	2060896	Upper Skin	.020
II	2060882	Lower Skin	.016
	2060902	Upper Skin	.020
JJ	2060873	Lower Skin	.016
	2060913	Interior Skin	.010
	2060893	Upper Skin	.020
KK	2060877	Lower Skin	.016
	2060897	Upper Skin	.020
LL	2060883	Lower Skin	.016
	2060903	Upper Skin	.020
MM	2060874	Lower Skin	.016
	2060914	Interior Skin	.010
	2060894	Upper Skin	.020
NN	2060878	Lower Skin	.016
	2060898	Upper Skin	.020
OO	2060884	Lower Skin	.016
	2060904	Upper Skin	.020

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2060850	Doubler	.262	0.0	-2.86	.180
	2068701	R/SP1	.017	-	-	.017
	2069101	R/SP1	.011	-	-	.011
	2068901	R/SP1	.021	-	-	.021
B	2060501	Doubler	.250	0.0	-2.75	.174
	2068721	R/SP1	.014	-	-	.014
	2068921	R/SP1	.018	-	-	.018
C	2060211	Doubler	.100	0.0	-1.36	.084
D	2060852	Doubler	.170	0.0	1.17	.205
	2068711	R/SP2	.040	-	-	.040
	2069111	R/SP2	.025	-	-	.025
	2068911	R/SP2	.050	-	-	.050
E	2060856	Doubler	.201	0.0	1.14	.242
	2068715	R/SP2	.040	-	-	.040
	2068731	R/SP2	.069	-	-	.069
	2069115	R/SP2	.025	-	-	.025
	2068915	R/SP2	.050	-	-	.050
	2068931	R/SP2	.087	-	-	.087
F	2060231	Doubler	.133	0.0	0.53	.145
	2068735	R/SP2	.069	-	-	.069
	2068935	R/SP2	.087	-	-	.087
G	2068702	R/SP1	.093	-	-	.093
	2068703	R/SP1	.093	-	-	.093
	2069102	R/SP1	.058	-	-	.058
	2069103	R/SP1	.058	-	-	.058
	2068902	R/SP1	.116	-	-	.116
	2068903	R/SP1	.116	-	-	.116
H	2068722	R/SP1	.092	-	-	.092
	2068723	R/SP1	.092	-	-	.092
	2068922	R/SP1	.115	-	-	.115
	2068923	R/SP1	.115	-	-	.115

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
I	2068801	R/SP1	.065	-	-	.065
	2069001	R/SP1	.081	-	-	.081
J	2060853	Doubler	.170	0.0	1.71	.205
	2068712	R/SP2	.040	-	-	.040
	2069112	R/SP2	.025	-	-	.025
	2068912	R/SP2	.050	-	-	.050
K	2060857	Doubler	.201	0.0	1.69	.242
	2068716	R/SP2	.040	-	-	.040
	2068732	R/SP2	.069	-	-	.069
	2069116	R/SP2	.025	-	-	.025
	2068916	R/SP2	.050	-	-	.050
	2068932	R/SP2	.087	-	-	.087
L	2060232	Doubler	.133	0.0	0.83	.145
	2068736	R/SP2	.069	-	-	.069
	2068811	R/SP2	.179	-	-	.179
	2068936	R/SP2	.087	-	-	.087
	2069011	R/SP2	.224	-	-	.224
M	2060391	Doubler	.101	0.0	1.40	.111
	2068813	R/SP2	.179	-	-	.179
	2069013	R/SP2	.224	-	-	.224
N	2068704	R/SP1	.059	-	-	.059
	2068705	R/SP1	.059	-	-	.059
	2069104	R/SP1	.037	-	-	.037
	2069105	R/SP1	.037	-	-	.037
	2068904	R/SP1	.074	-	-	.074
	2068905	R/SP1	.074	-	-	.074
O	2068724	R/SP1	.059	-	-	.059
	2068725	R/SP1	.059	-	-	.059
	2068924	R/SP1	.074	-	-	.074
	2068925	R/SP1	.074	-	-	.074
P	2068802	R/SP1	.136	-	-	.136

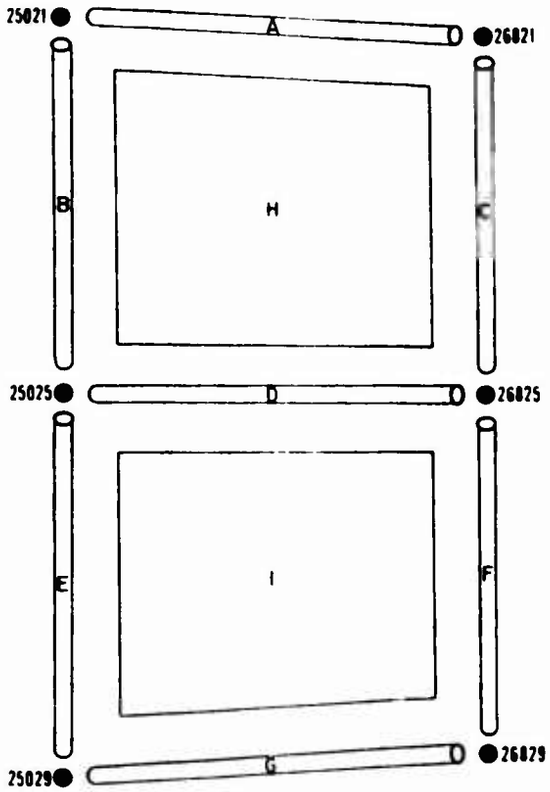
ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
	2068803	R/SP1	.136	-	-	.136
	2069002	R/SP1	.170	-	-	.170
	2069003	R/SP1	.170	-	-	.170
Q	2060854	Doubler	.170	0.0	1.71	.205
	2068713	R/SP2	.040	-	-	.040
	2069113	R/SP2	.025	-	-	.025
	2068913	R/SP2	.050	-	-	.050
R	2060858	Doubler	.201	0.0	1.69	.242
	2068717	R/SP2	.040	-	-	.040
	2068733	R/SP2	.069	-	-	.069
	2069117	R/SP2	.025	-	-	.025
	2068917	R/SP2	.050	-	-	.050
	2068933	R/SP2	.087	-	-	.087
S	2060233	Doubler	.133	0.0	0.83	.145
	2068737	R/SP2	.069	-	-	.069
	2068812	R/SP2	.179	-	-	.179
	2068937	R/SP2	.087	-	-	.087
	2069012	R/SP2	.224	-	-	.224
T	2060392	Doubler	.101	0.0	1.40	.111
	2068814	R/SP2	.179	-	-	.179
	2069014	R/SP2	.224	-	-	.224
U	2068706	R/SP1	.093	-	-	.093
	2068707	R/SP1	.093	-	-	.093
	2069106	R/SP1	.058	-	-	.058
	2069107	R/SP1	.058	-	-	.058
	2068906	R/SP1	.116	-	-	.116
	2068907	R/SP1	.116	-	-	.116
V	2068726	R/SP1	.092	-	-	.092
	2068727	R/SP1	.092	-	-	.092
	2068926	R/SP1	.115	-	-	.115
	2068927	R/SP1	.115	-	-	.115

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
W	2068804	R/SP1	.065	-	-	.065
	2069004	R/SP1	.081	-	-	.081
X	2060855	Doubler	.170	0.0	1.17	.205
	2068714	R/SP2	.040	-	-	.040
	2069114	R/SP2	.025	-	-	.025
	2068914	R/SP2	.050	-	-	.050
Y	2060859	Doubler	.201	0.0	1.14	.242
	2068718	R/SP2	.040	-	-	.040
	2068734	R/SP2	.069	-	-	.069
	2069118	R/SP2	.025	-	-	.025
	2068918	R/SP2	.050	-	-	.050
	2068934	R/SP2	.087	-	-	.087
Z	2060234	Doubler	.133	0.0	0.53	.145
	2068738	R/SP2	.069	-	-	.069
	2068938	R/SP2	.087	-	-	.087
AA	2060851	Doubler	.262	0.0	2.86	.180
	2068708	R/SP1	.017	-	-	.017
	2069108	R/SP1	.011	-	-	.011
	2068908	R/SP1	.021	-	-	.021
BB	2060271	Doubler	.250	0.0	2.75	.174
	2068728	R/SP1	.014	-	-	.014
	2068928	R/SP1	.018	-	-	.018
CC	2060191	Doubler	.100	0.0	1.36	.084

3.1.4.12 Floor Panel (Sta. 250-268, W.L. 35.97) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
25021	456	AAA	-	-	123	DCC
25025	456	AAA	-	-	13	DC
25029	456	AAA	-	-	123	DCC
26821	456	AAA	-	-	23	CC
26825	456	AAA	-	-	13	DC
26829	456	AAA	-	-	123	DCC

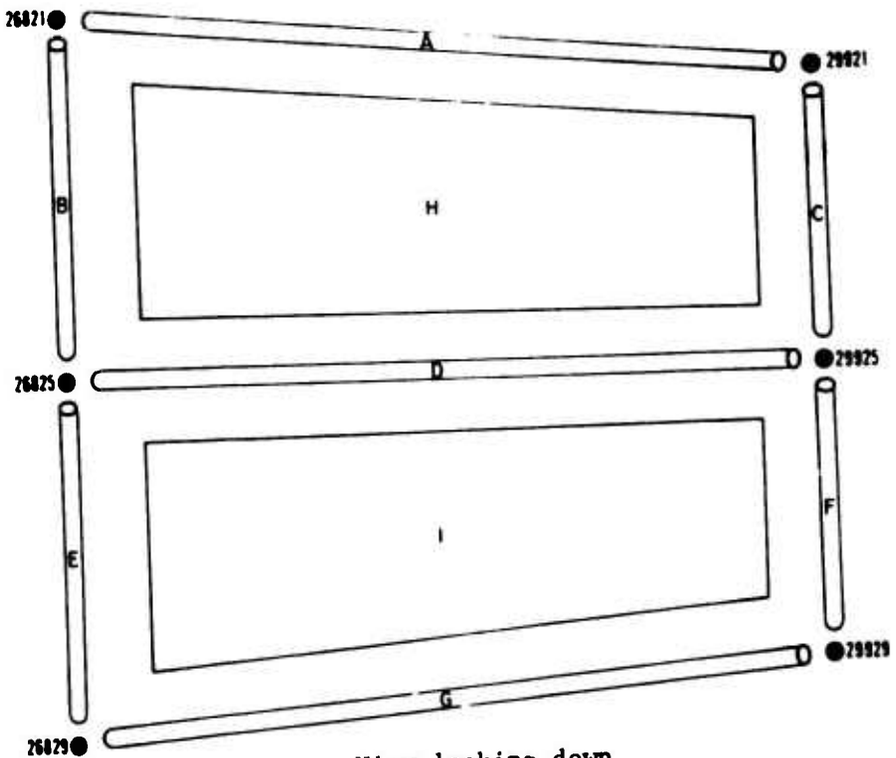
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
H	2070271	Lower Skin	.016
	2070811	Upper Skin	.012
I	2070272	Lower Skin	.016
	2070812	Upper Skin	.012

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2070091	Doubler	.030	0.0	-1.43	.025
	2072701	R/SP1	.073	-	-	.073
	2078101	R/SP1	.040	-	-	.040
B	2070231	Doubler	.034	0.0	3.53	.044
	2072711	R/SP2	.144	-	-	.144
	2078111	R/SP2	.090	-	-	.090
C	2070551	Doubler	.032	0.0	3.20	.041
	2072713	R/SP2	.144	-	-	.144
	2078113	R/SP2	.090	-	-	.090
D	2072702	R/SP1	.160	-	-	.160
	2072703	R/SP1	.160	-	-	.160
	2078102	R/SP1	.118	-	-	.118
	2078103	R/SP1	.118	-	-	.118
E	2070232	Doubler	.034	0.0	3.53	.044
	2072712	R/SP2	.144	-	-	.144
	2078112	R/SP2	.090	-	-	.090
F	2070552	Doubler	.032	0.0	3.20	.041
	2072714	R/SP2	.144	-	-	.144
	2078114	R/SP2	.090	-	-	.090
G	2070511	Doubler	.175	0.0	5.19	.068
	2072704	R/SP1	.073	-	-	.073
	2078104	R/SP1	.040	-	-	.040

3.1.4.13 Floor Panel (Sta. 268-299, W.L. 35.97) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
26821	456	AAA	-	-	23	CC
26825	456	AAA	-	-	13	DC
26829	456	AAA	-	-	123	DCC
29921	456	AAA	123	AAA	-	-
29925	456	AAA	-	-	123	DCC
29929	456	AAA	123	AAA	-	-

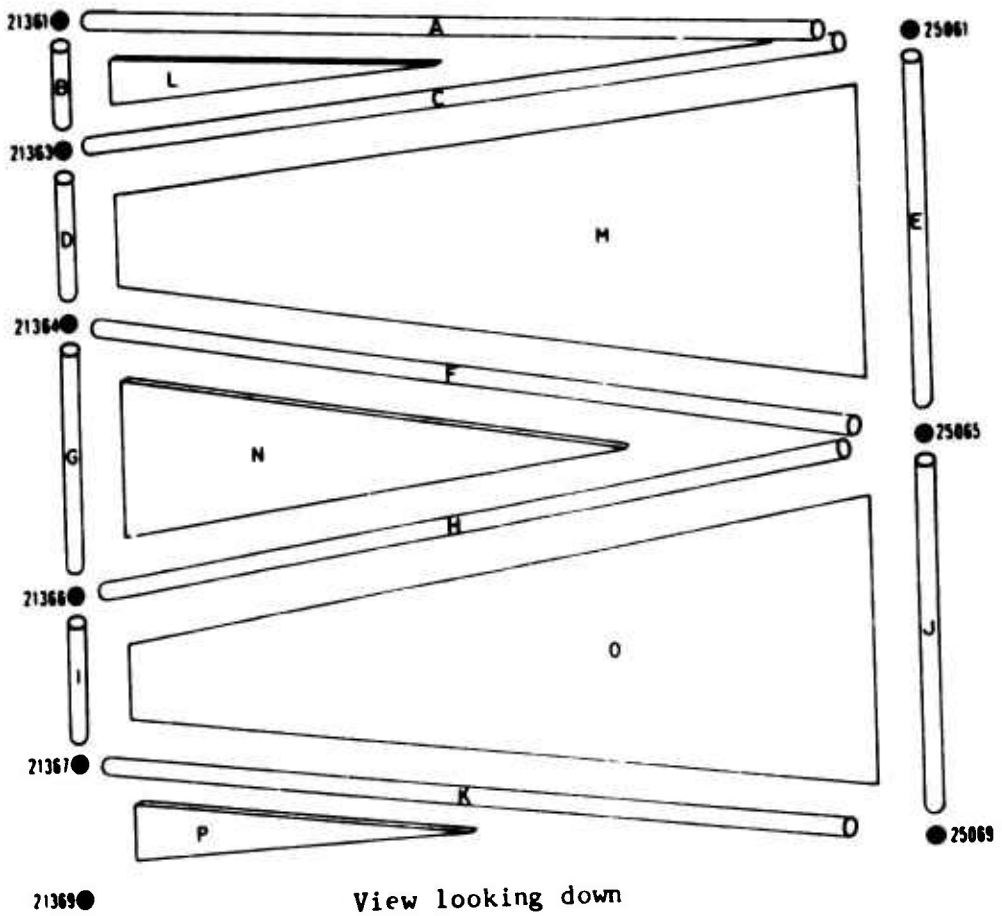
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
H	2070651	Lower Skin	.008
	2070871	Upper Skin	.016
I	2070652	Lower Skin	.008
	2070872	Upper Skin	.016

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2070571	Doubler	.236	0.0	-1.92	.156
	2076501	R/SP1	.019	-	-	.019
	2078701	R/SP1	.063	-	-	.063
B	2070131	Doubler	.037	0.0	1.42	.041
	2076511	R/SP2	.111	-	-	.111
	2078711	R/SP2	.248	-	-	.248
C	2070211	Doubler	.031	0.0	2.45	.039
	2076513	R/SP2	.111	-	-	.111
	2078713	R/SP2	.248	-	-	.248
D	2076502	R/SP1	.065	-	-	.065
	2076503	R/SP1	.065	-	-	.065
	2078702	R/SP1	.141	-	-	.141
	2078703	R/SP1	.141	-	-	.141
E	2070132	Doubler	.037	0.0	1.42	.041
	2076512	R/SP2	.111	-	-	.111
	2078712	R/SP2	.248	-	-	.248
F	2070212	Doubler	.031	0.0	2.45	.039
	2076514	R/SP2	.111	-	-	.111
	2078714	R/SP2	.248	-	-	.248
G	2070151	Doubler	.036	0.0	1.91	.028
	2076504	R/SP1	.013	-	-	.013
	2078704	R/SP1	.063	-	-	.063

3.1.4.14 Engine Deck (Sta. 213-250) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
21361	456	AAA	-	-	123	DCC
21363	6	A	-	-	12345	DCCAA
21364	456	AAA	-	-	123	DCC
21366	456	AAA	-	-	123	DCC
21367	6	A	-	-	12345	DCCAA
21369	456	AAA	-	-	23	CC
25061	456	AAA	-	-	23	CC
25065	456	AAA	-	-	13	DC
25069	456	AAA	-	-	123	DCC

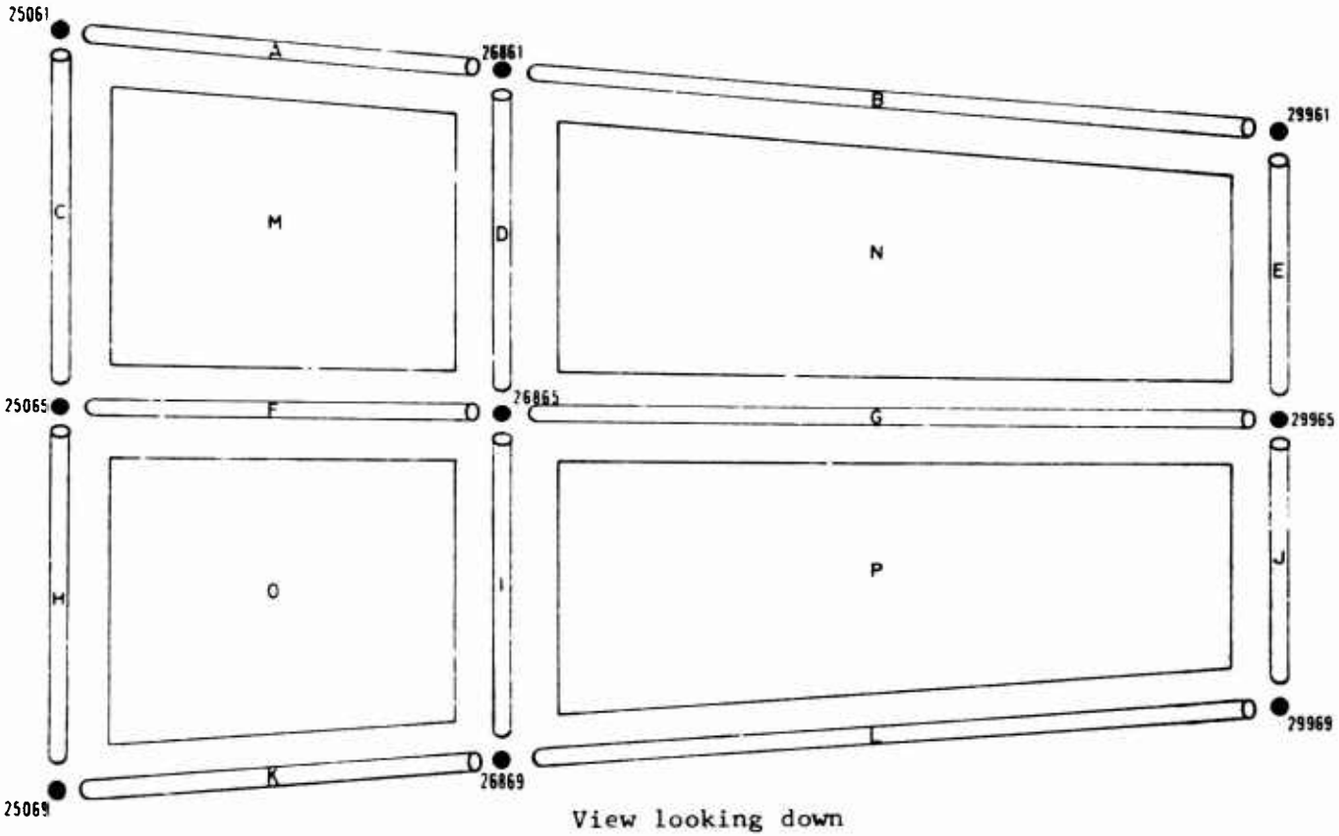
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
L	2091291	Lower Skin	.020
	2091251	Upper Skin	.016
M	2091292	Lower Skin	.020
	2091252	Upper Skin	.016
N	2091293	Lower Skin	.020
	2091253	Upper Skin	.016
O	2091294	Lower Skin	.020
	2091254	Upper Skin	.016
P	2091295	Lower Skin	.020
	2091255	Upper Skin	.016

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2091270	Doubler	.044	0.0	-1.31	.038
B	2091272	Doubler	.168	0.0	0.0	.168
C	2092901	R/SP3	.085	-	-	.085
	2092501	R/SP3	.068	-	-	.068
D	2091273	Doubler	.168	0.0	0.0	.168
	2092911	R/SP2	.359	-	-	.359
	2092511	R/SP2	.287	-	-	.287
E	2091276	Doubler	.047	0.0	1.27	.051
	2092913	R/SP2	.359	-	-	.359
	2092513	R/SP2	.287	-	-	.287
F	2092902	R/SP3	.085	-	-	.085
	2092502	R/SP3	.068	-	-	.068
G	2091274	Doubler	.168	0.0	0.0	.168
H	2092903	R/SP3	.080	-	-	.080
	2092503	R/SP3	.064	-	-	.064
I	2091275	Doubler	.168	0.0	0.0	.168
	2092912	R/SP2	.359	-	-	.359
	2092512	R/SP2	.287	-	-	.287
J	2091277	Doubler	.047	0.0	1.27	.051
	2092914	R/SP2	.359	-	-	.359
	2092514	R/SP2	.287	-	-	.287
K	2091271	Doubler	.102	0.0	0.67	.094
	2092904	R/SP3	.080	-	-	.080
	2092504	R/SP3	.064	-	-	.064

3.1.4.15 Engine Deck (Sta. 250-299) Detail



View looking down

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
25061	456	AAA	-	-	23	CC
25065	456	AAA	-	-	13	DC
25069	456	AAA	-	-	123	DCC
26861	456	AAA	-	-	123	DCC
26865	456	AAA	-	-	13	DC
26869	456	AAA	-	-	23	CC
29961	456	AAA	123	AAA	-	-
29965	456	AAA	-	-	123	DCC
29969	456	AAA	123	AAA	-	-

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
M	2091296	Lower Skin	.020
	2091256	Upper Skin	.016
	2091278	Upper Skin	.012
N	2091298	Lower Skin	.020
	2091258	Upper Skin	.016
O	2091297	Lower Skin	020
	2091257	Upper Skin	.016
	2091279	Upper Skin	.012
P	2091299	Lower Skin	.020
	2091259	Upper Skin	.016

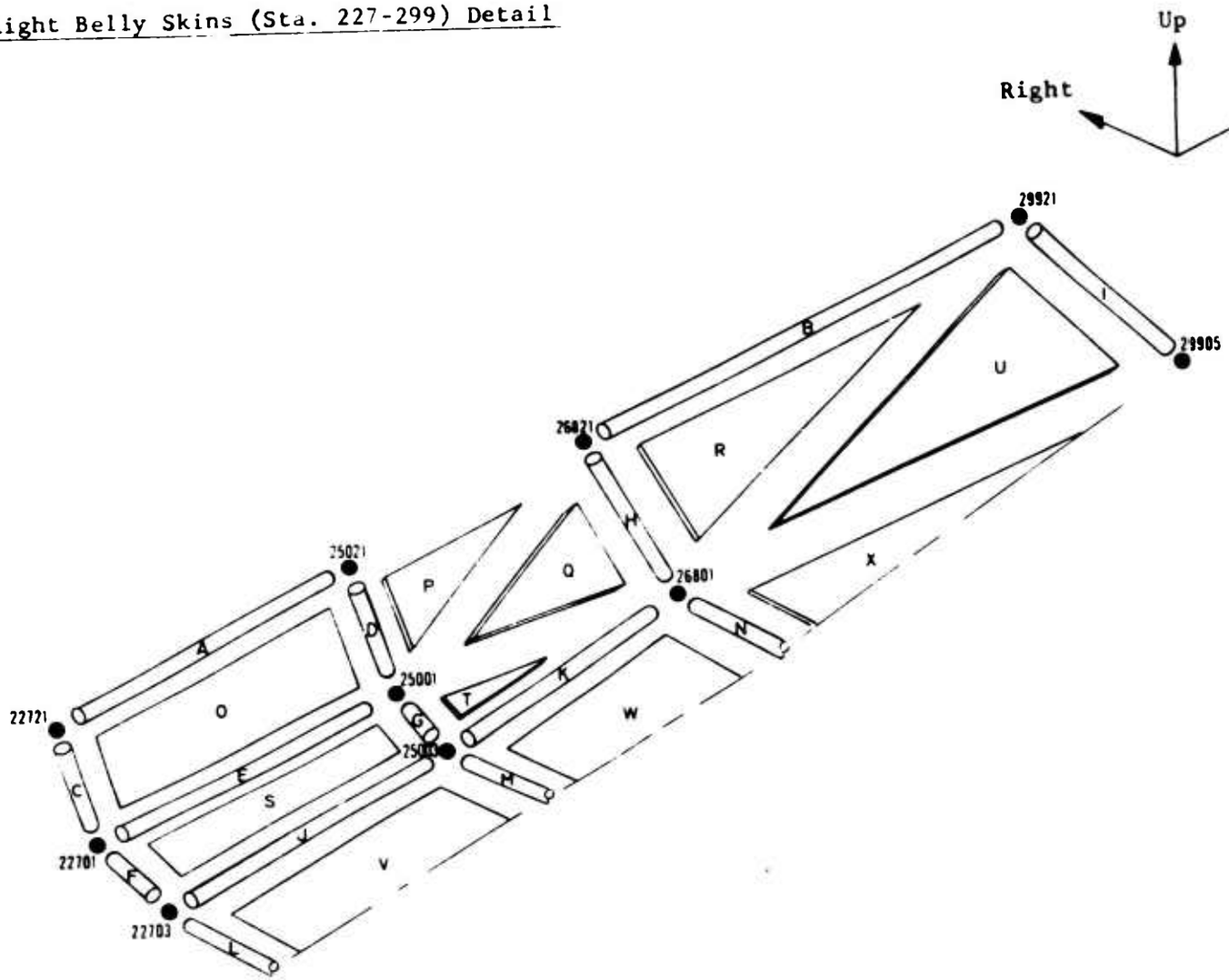
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	2091031	Doubler	.229	0.0	-6.25	.071
	2090051	Doubler	.116	0.0	-6.25	.036
	2092921	R/SP1	.099	-	-	.099
	2092521	R/SP1	.079	-	-	.079
	2092701	R/SP1	.060	-	-	.060
B	2091281	Doubler	.047	0.0	-1.77	.031
	2092941	R/SP1	.086	-	-	.086
	2092541	R/SP1	.069	-	-	.069
C	2090411	Doubler	.197	0.0	8.38	.408
	2090055	Doubler	.137	0.0	8.36	.283
	2092931	R/SP2	.183	-	-	.183
	2092531	R/SP2	.146	-	-	.146
	2092711	R/SP2	.110	-	-	.110
D	2090431	Doubler	.197	0.0	4.12	.273
	2090057	Doubler	.137	0.0	6.94	.258
	2091283	Doubler	.049	0.0	1.37	.054
	2092933	R/SP2	.183	-	-	.183
	2092951	R/SP2	.303	-	-	.303
	2092533	R/SP2	.146	-	-	.146
	2092551	R/SP2	.242	-	-	.242
	2092713	R/SP2	.110	-	-	.110
E	2091285	Doubler	.030	0.0	2.05	.036
	2092953	R/SP2	.303	-	-	.303
	2092553	R/SP2	.242	-	-	.242
F	2091032	Doubler	.229	0.0	9.25	.071
	2090052	Doubler	.116	0.0	9.25	.036
	2091011	Doubler	.229	0.0	-6.39	.049
	2090053	Doubler	.116	0.0	-6.39	.025
	2092922	R/SP1	.207	-	-	.207
	2092923	R/SP1	.207	-	-	.207
	2092522	R/SP1	.165	-	-	.165

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
	2092523	R/SP1	.165	-	-	.165
	2092702	R/SP1	.124	-	-	.124
	2092703	R/SP1	.124	-	-	.124
G	2092942	R/SP1	.181	-	-	.181
	2092943	R/SP1	.181	-	-	.181
	2092542	R/SP1	.145	-	-	.145
	2092543	R/SP1	.145	-	-	.145
H	2090412	Doubler	.197	0.0	8.38	.408
	2090056	Doubler	.137	0.0	8.36	.283
	2092932	R/SP2	.183	-	-	.183
	2092532	R/SP2	.146	-	-	.146
	2092712	R/SP2	.110	-	-	.110
I	2090432	Doubler	.197	0.0	4.12	.273
	2090058	Doubler	.137	0.0	6.94	.258
	2091284	Doubler	.049	0.0	1.37	.054
	2092934	R/SP2	.183	-	-	.183
	2092952	R/SP2	.303	-	-	.303
	2092534	R/SP2	.146	-	-	.146
	2092552	R/SP2	.242	-	-	.242
	2092714	R/SP2	.110	-	-	.110
J	2091286	Doubler	.030	0.0	2.05	.036
	2092954	R/SP2	.303	-	-	.303
	2092554	R/SP2	.242	-	-	.242
K	2091012	Doubler	.229	0.0	6.25	.049
	2090054	Doubler	.116	0.0	6.25	.025
	2092924	R/SP1	.099	-	-	.099
	2092524	R/SP1	.079	-	-	.079
	2092704	R/SP1	.060	-	-	.060
L	2091282	Doubler	.058	0.0	1.62	.047
	2092944	R/SP1	.086	-	-	.086
	2092544	R/SP1	.069	-	-	.069

3.1.4.16 Right Belly Skins (Sta. 227-299) Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
22701	456	AAA	-	-	123	DCC
22703	456	AAA	-	-	123	DCC
22721	456	AAA	-	-	123	DCC
25001	456	AAA	-	-	123	DCC
25003	456	AAA	-	-	123	DCC
25021	456	AAA	-	-	123	DCC
26801	456	AAA	-	-	123	DCC
26821	456	AAA	-	-	23	CC
29905	456	AAA	-	-	123	DCC
29921	456	AAA	123	AAA	-	-

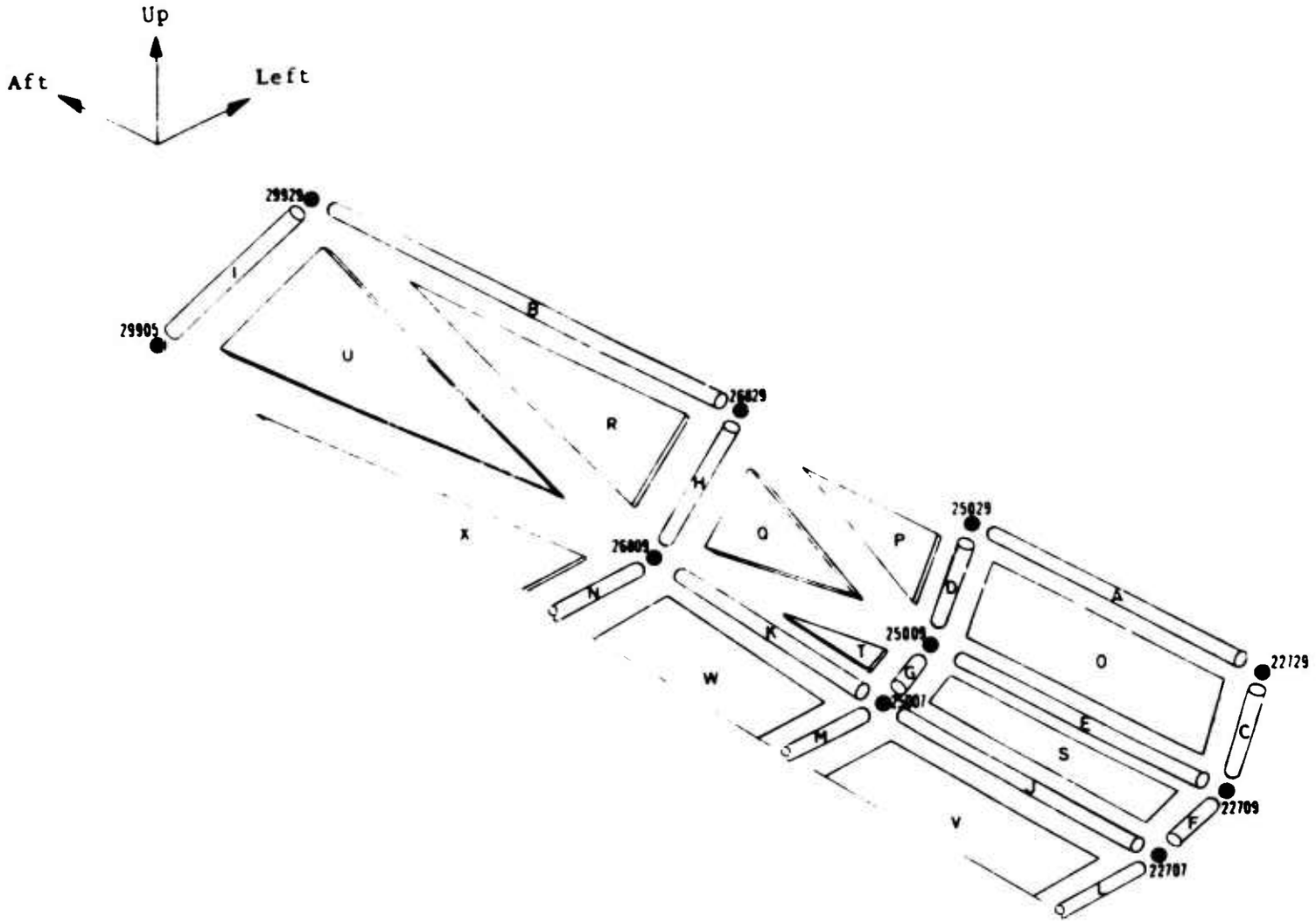
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
O	2200671	Skin	.025
P	2200675	Skin	.025
Q	2200676	Skin	.025
R	1330011	Skin	.025
S	2200672	Skin	.025
T	2200677	Skin	.025
U	1330012	Skin	.025
V	2590011	Skin	.024
W	1201211	Skin	.032
X	1330013	Skin	.025

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2206701	R/SP2	.097	-	-	.097
B	1330104	Doubler	.055	-	-	.055
C	2206703	R/SP2	.280	-	-	.280
D	2206704	R/SP2	.280	-	-	.280
E	2206702	R/SP2	.097	-	-	.097
	2206711	R/SP2	.064	-	-	.064
F	2206713	R/SP2	.280	-	-	.280
G	2206714	R/SP2	.280	-	-	.280
H	1330101	Doubler	.055	-	-	.055
I	1330106	Doubler	.055	-	-	.055
J	2200581	Doubler	.117	-	-	.117
	2206712	R/SP2	.064	-	-	.064
	2590101	R/SP2	.172	-	-	.172
K	2201171	Doubler	.116	-	-	.116
	1202101	R/SP3	.208	-	-	.208
L	2590103	R/SP2	.269	-	-	.269
M	2201151	Doubler	.119	-	-	.119
	2590104	R/SP2	.269	-	-	.269
	1202103	R/SP2	.292	-	-	.292
N	1330102	Doubler	.055	-	-	.055
	1202104	R/SP2	.292	-	-	.292

3.1.4.17 Left Belly Skins (Sta. 227-299) Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
22707	456	AAA	-	-	123	DCC
22709	456	AAA	-	-	123	DCC
22729	456	AAA	-	-	123	DCC
25007	456	AAA	-	-	123	DCC
25009	456	AAA	-	-	123	DCC
25029	456	AAA	-	-	123	DCC
26809	456	AAA	-	-	123	DCC
26829	456	AAA	-	-	123	DCC
29905	456	AAA	-	-	123	DCC
29929	456	AAA	123	AAA	-	-

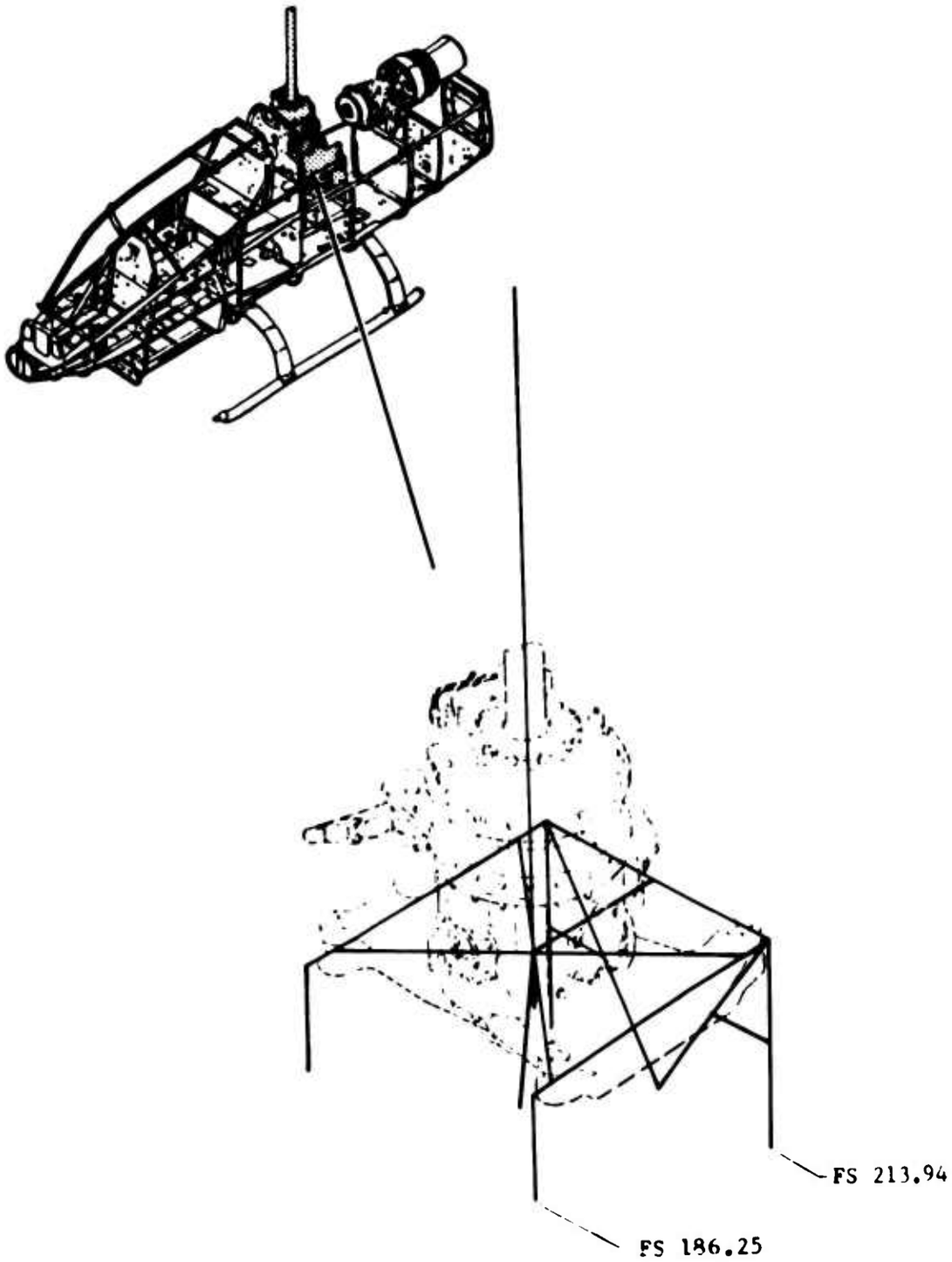
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
O	2201031	Skin	.025
P	2201035	Skin	.025
Q	2201036	Skin	.025
R	1330015	Skin	.025
S	2201032	Skin	.025
T	2201037	Skin	.025
U	1330014	Skin	.025
V	2590011	Skin	.024
W	1201211	Skin	.032
X	1330013	Skin	.025

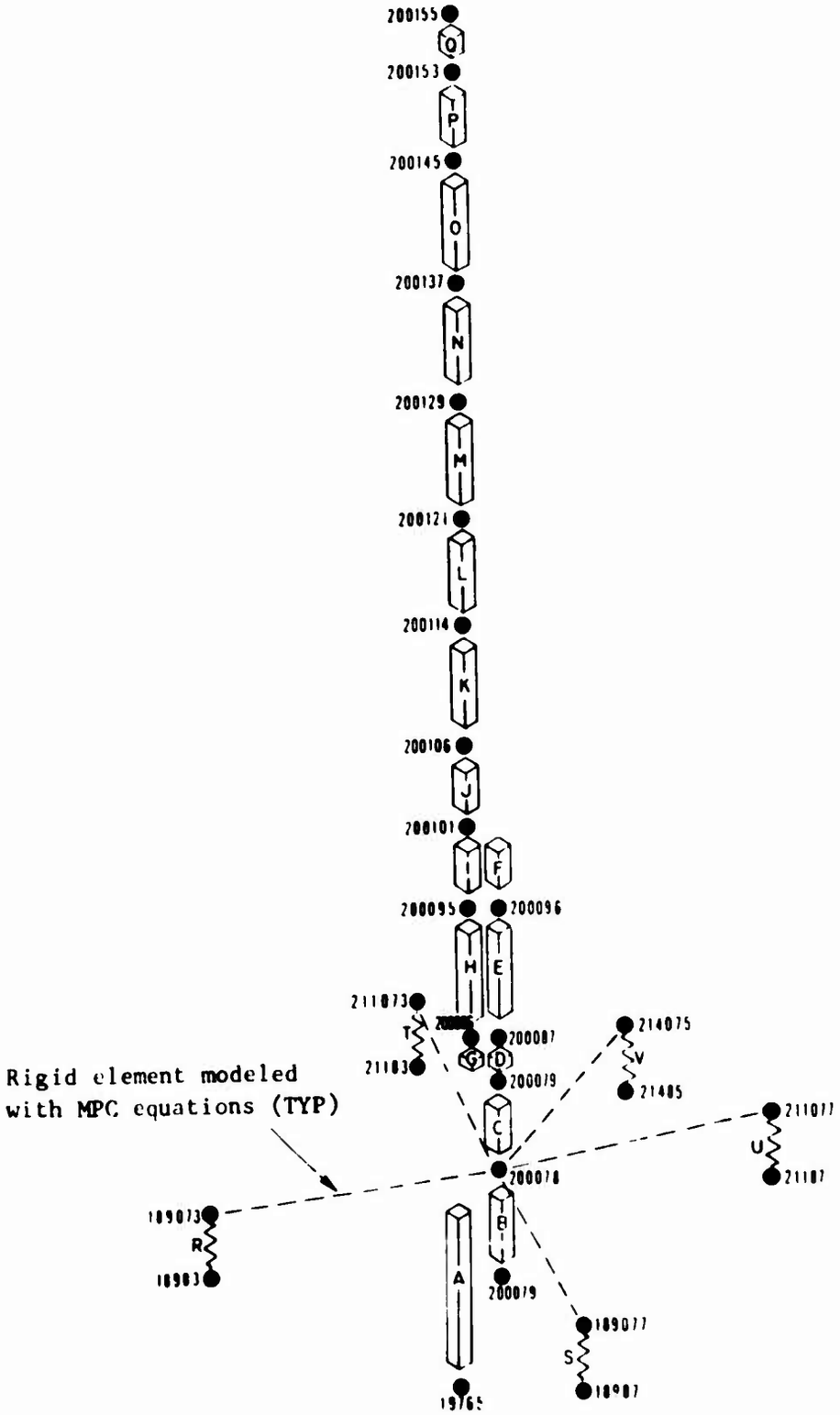
ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	2200312	R/SP2	.097	-	-	.097
B	1330105	Doubler	.055	-	-	.055
C	2200313	R/SP2	.280	-	-	.280
D	2200314	R/SP2	.280	-	-	.280
E	2200302	R/SP2	.079	-	-	.079
	2200311	R/SP2	.097	-	-	.097
F	2200303	R/SP2	.280	-	-	.280
G	2200304	R/SP2	.280	-	-	.280
H	1330103	Doubler	.055	-	-	.055
I	1330107	Doubler	.055	-	-	.055
J	2200571	Doubler	.117	-	-	.117
	2590102	R/SP2	.172	-	-	.172
	2200301	R/SP2	.079	-	-	.079
K	2201191	Doubler	.116	-	-	.116
	1202102	R/SP3	.208	-	-	.208
L	2590103	R/SP2	.269	-	-	.269
M	2201151	Doubler	.119	-	-	.119
	2590104	R/SP2	.269	-	-	.269
	1202103	R/SP2	.292	-	-	.292
N	1330102	Doubler	.055	-	-	.055
	1202104	R/SP2	.292	-	-	.292

3.1.5 Main Rotor Pylon Subassembly



3.1.5.1 Main Rotor Mast, Transmission, Mounts, Lift Link - Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
18983	4	A	-	-	12356	AAAAA
18987	4	A	-	-	12356	AAAAA
19765	45	AA	-	-	16	DA
21183	4	A	-	-	12356	AAAAA
21187	4	A	-	-	12356	AAAAA
21485	156	AAA	-	-	34	AA
189073	-	-	123456	AAAAAA	-	-
189077	-	-	123456	AAAAAA	-	-
211073	-	-	123456	AAAAAA	-	-
211077	-	-	123456	AAAAAA	-	-
214075	-	-	123456	AAAAAA	-	-
200070	-	-	-	-	123456	BBDAAA
200078	-	-	-	-	3456	DAAA
200079	-	-	-	-	123456	BBDAAA
200086	-	-	-	-	13456	BDAAA
200087	-	-	-	-	23456	BDAAA
200095	-	-	-	-	23456	BDAAA
200096	-	-	-	-	13456	BDAAA
200101	-	-	-	-	123456	BBDAAA
200106	-	-	-	-	3456	DAAA
200114	-	-	-	-	123456	BBDAAA
200121	-	-	-	-	3456	DAAA
200129	-	-	-	-	12456	BBAAA
200137	-	-	-	-	3456	DAAA
200145	-	-	-	-	123456	BBDAAA
200153	-	-	-	-	3456	DAAA
200155	-	-	-	-	123456	BBDAAA

CBAR ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A (1)	3570001	0.890	0.0	0.0	0.0
B	3530251	3.448	67.241	67.241	134.55
C	3530252	↓	↓	↓	↓
D	3530253				
E	3530254				
F (2)	3530255				
G (3)	4500050		4.140	4.140	8.28
H	4500070		↓	↓	↓
I	4500071				
J	4500072				
K	4500073				
L	4500074				
M	4500075				
N	4500076				
O	4500077				
P	4500078				
Q	4500079	↓	↓	↓	↓

NOTES -

(1) Offsets at End A: x=-3.1 in., y=0.0 in., z=-1.67 in.
Offsets at End B: x= 0.0 in., y=0.0 in., z= 1.52 in.

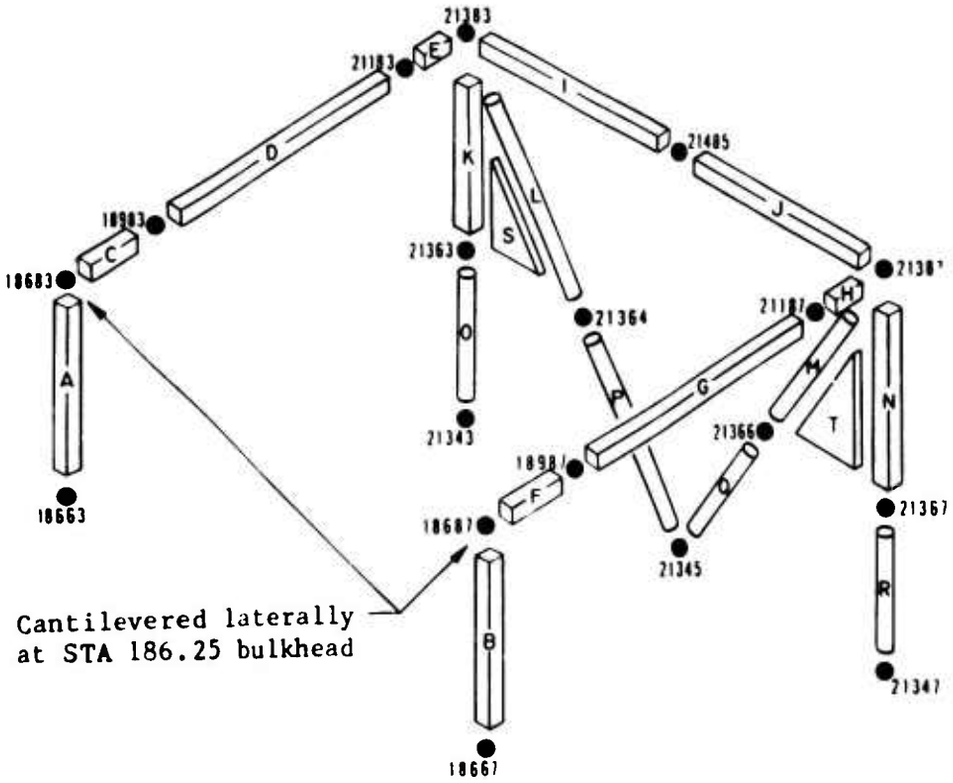
(2) Pin flags at End B: 456

(3) Pin flags at End A: 56

SPRING ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	COORDINATE	SPRING RATE (lb/in.)
R	189831	1	28125
	189832	2	28125
	189833	3	4500
S	189871	1	28125
	189872	2	28125
	189873	3	4500
T	211831	1	28125
	211832	2	28125
	211833	3	4500
U	211871	1	28125
	211872	2	28125
	211873	3	4500
V	214853	3	20000

3.1.5.2 Main Rotor Pylon Support Structure - Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
18663	-	-	-	-	123456	DCCAAA
18667	-	-	-	-	123456	DCCAAA
18683	-	-	6	A	1245	DCAA
18687	-	-	6	A	1245	DCAA
18983	4	A	-	-	12356	AAAAA
18987	4	A	-	-	12356	AAAAA
21183	4	A	-	-	12356	AAAAA
21187	4	A	-	-	12356	AAAAA
21343	4	A	-	-	12356	DCCAA
21345	4	A	-	-	12356	DCCAA
21347	4	A	-	-	12356	DCCAA
21363	6	A	-	-	12345	DCCAA
21364	456	AAA	-	-	123	DCC
21366	456	AAA	-	-	123	DCC
21367	6	A	-	-	12345	DCCAA
21383	-	-	-	-	12456	DCAAA
21387	-	-	-	-	12456	DCAAA
21485	156	AAA	-	-	34	AA

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
S	1210590	Web	.050
T	1210470	Web	.050

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT Z	OFFSETS FROM GRIDPOINT Y	FINAL AREA ($in.^2$)
L	1210592	Brace	.137	-	-	.137
M	1210472	Brace	.137	-	-	.137
O	1210102	Brace	.473	-	-	.473
P	1210591	Brace	.137	-	-	.137
Q	1210471	Brace	.137	-	-	.137
R	1210092	Brace	.707	-	-	.707

CBAR ELEMENT DATA

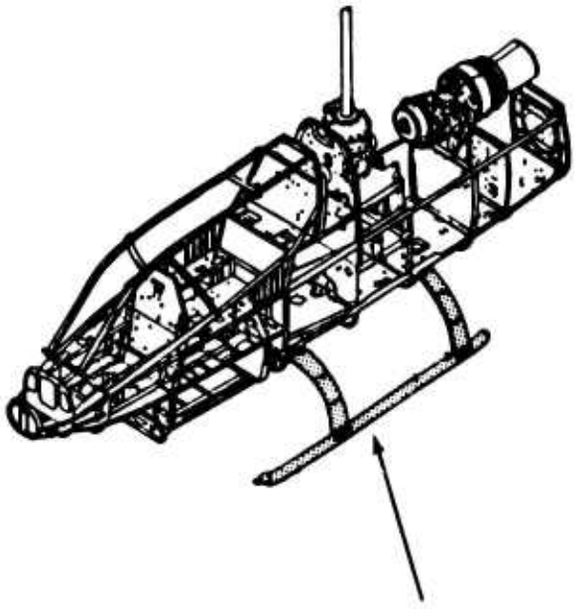
LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	1070321	2.100	13.035	6.442	0.0
B	1070311	2.100	13.035	6.442	0.0
C	1210611	0.643	0.342	2.081	0.0
D	1210612	0.643	0.342	2.081	0.0
E	1210613	0.643	0.342	2.081	0.0
F	1210211	0.643	0.342	2.081	0.0
G	1210212	0.643	0.342	2.081	0.0
H	1210213	0.643	0.342	2.081	0.0
I △1	3440011	1.405	2.216	0.0	0.0
J △2	3440012	1.405	2.216	0.0	0.0
K	1210101	1.643	5.770	5.205	0.0
N	1210091	1.643	5.770	5.205	0.0

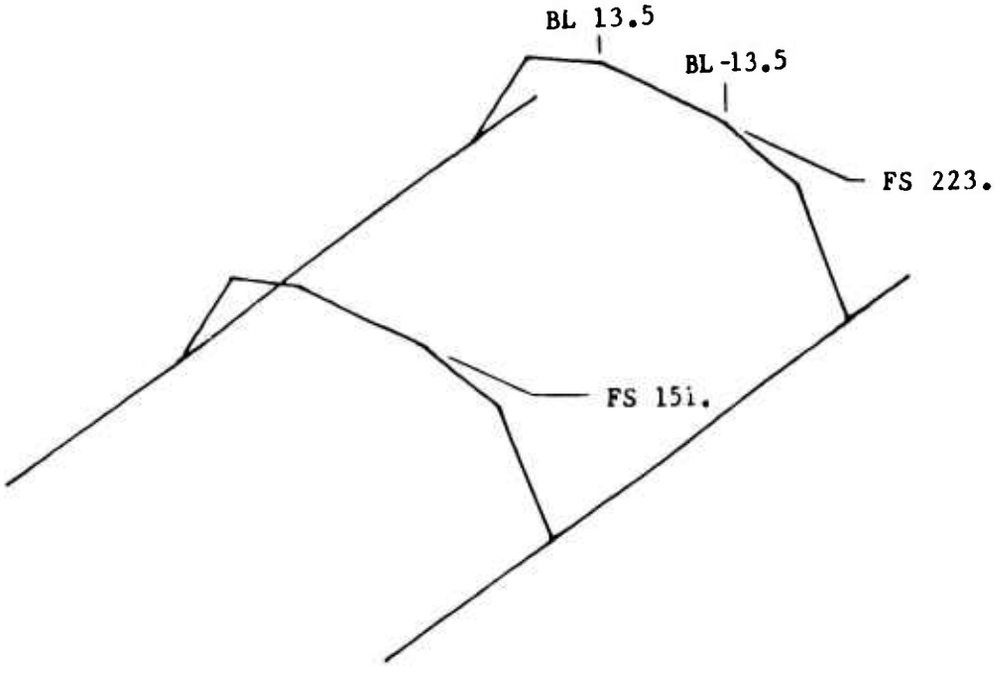
NOTES -

△1 Offsets at End A: x=0.56 in., y=0.0 in., z=-2.96 in.
Offsets at End B: x=0.0 in., y=0.0 in., z=-2.96 in.

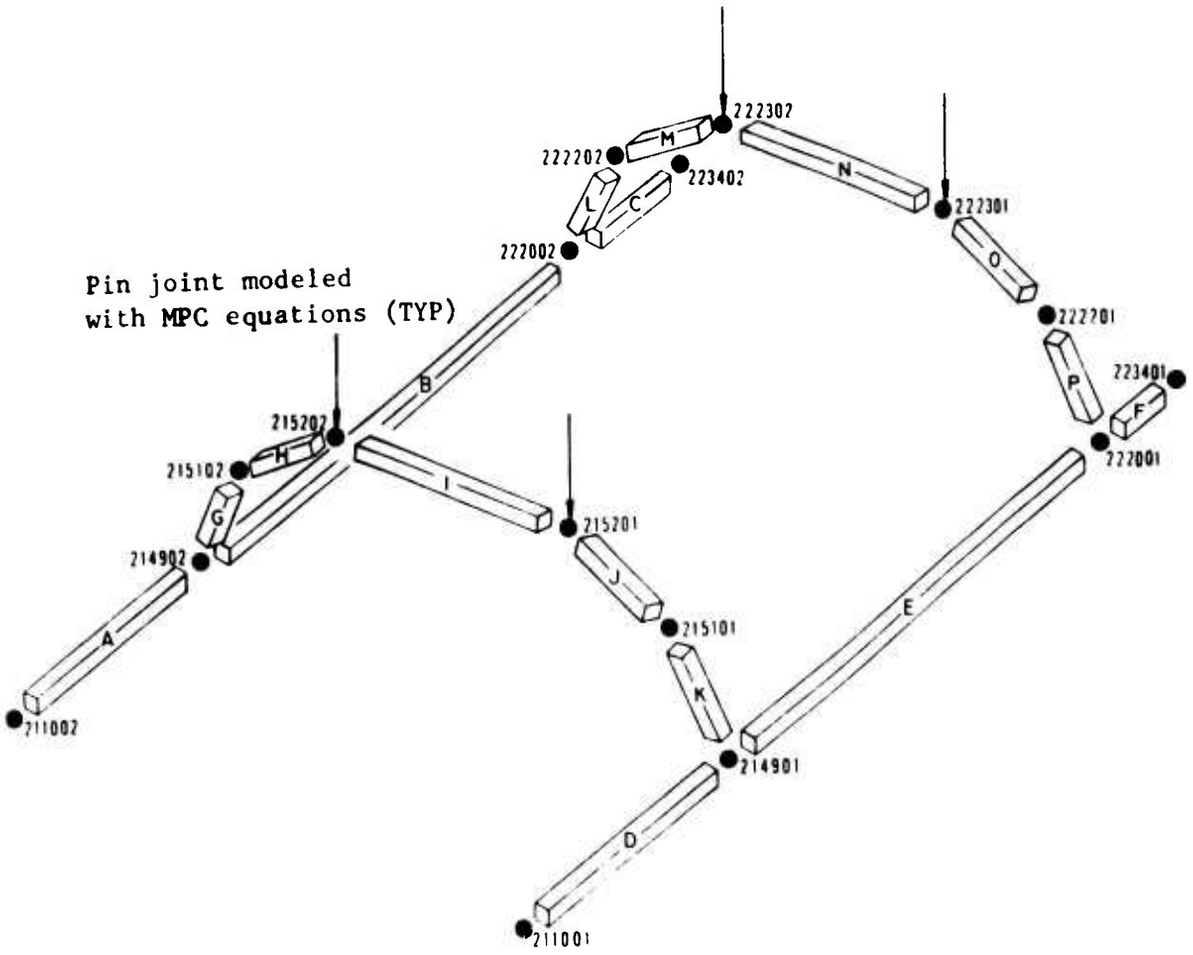
△2 Offsets at End A: x=0.0 in., y=0.0 in., z=-2.96 in.
Offsets at End B: x=0.56 in., y=0.0 in., z=-2.96 in.

3.1.6 Landing Gear Subassembly





3.1.6.1 Landing Gear and Mounts - Detail



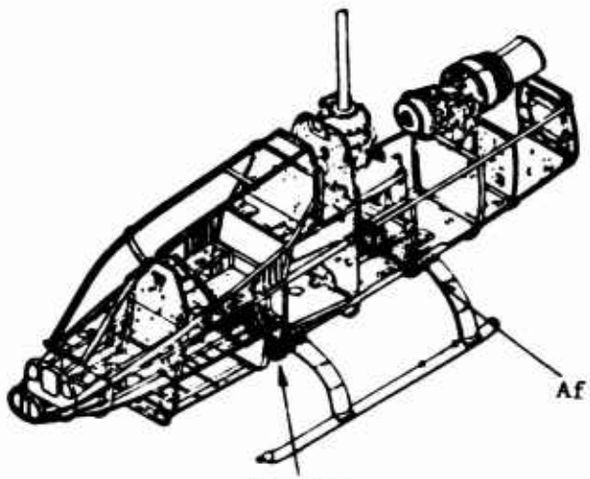
GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
211001	-	-	-	-	123456	DDDAAA
211002	-	-	-	-	123456	DDDAAA
214901	-	-	-	-	456	AAA
214902	-	-	-	-	456	AAA
215101	-	-	-	-	123456	DDDAAA
215102	-	-	-	-	123456	DDDAAA
215201	-	-	-	-	123456	DDDAAA
215202	-	-	-	-	123456	DDDAAA
222001	-	-	-	-	456	AAA
222002	-	-	-	-	456	AAA
222201	-	-	-	-	123456	DDDAAA
222202	-	-	-	-	123456	DDDAAA
222301	-	-	-	-	123456	DDDAAA
222302	-	-	-	-	123456	DDDAAA
223401	-	-	-	-	123456	DDDAAA
223402	-	-	-	-	123456	DDDAAA

CBAR ELEMENT DATA

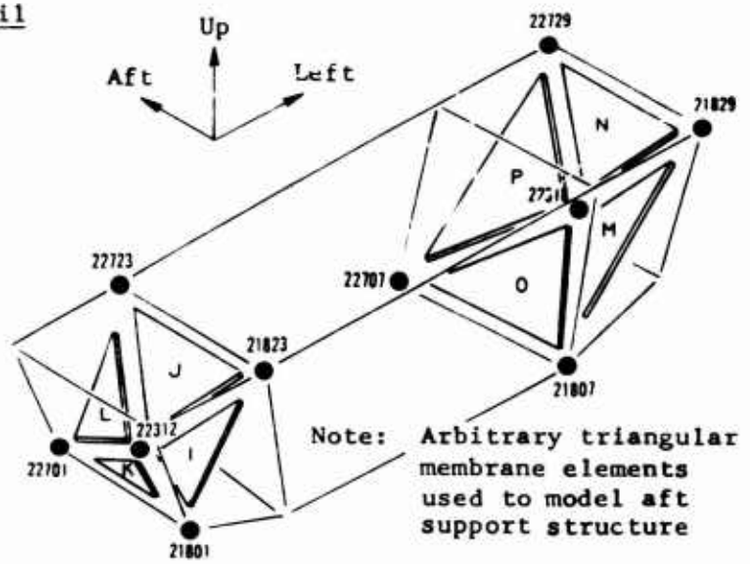
LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	0020521	0.779	1.510	1.510	3.020
B	0020522	↓	↓	↓	↓
C	0020523	↓	↓	↓	↓
D	0020511	↓	↓	↓	↓
E	0020512	↓	↓	↓	↓
F	0020513	↓	↓	↓	↓
G	0020451	1.132	0.836	0.836	1.672
H	0020452	1.686	1.312	1.312	2.624
I	0020453	1.964	1.549	1.549	3.098
J	0020454	1.686	1.312	1.312	2.624
K	0020455	1.132	0.836	0.836	1.672
L	0020411	1.516	1.090	1.090	2.180
M	0020412	2.371	1.712	1.712	3.424
N	0020413	2.798	2.022	2.022	4.044
O	0020414	2.371	1.712	1.712	3.424
P	0020415	1.516	1.090	1.090	2.180

3.1.6.2 Landing Gear Attach Point Support Structure - Detail

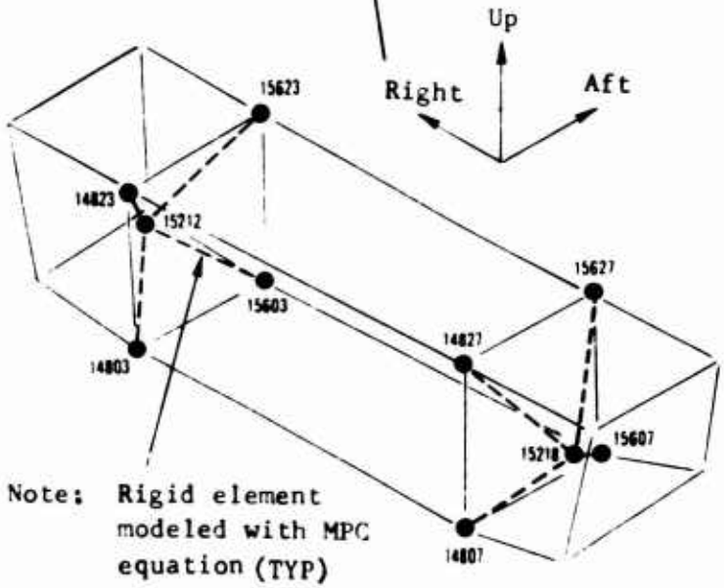


Forward

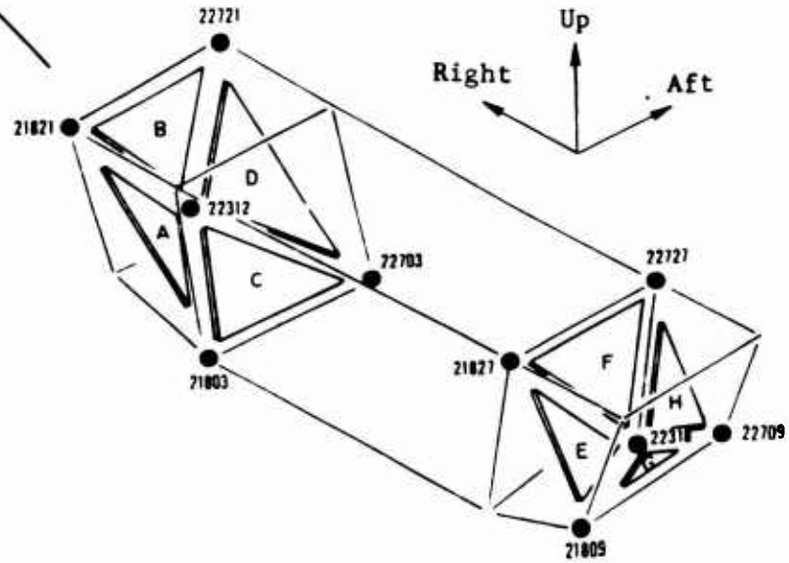
Aft



Note: Arbitrary triangular membrane elements used to model aft support structure



Note: Rigid element modeled with MPC equation (TYP)



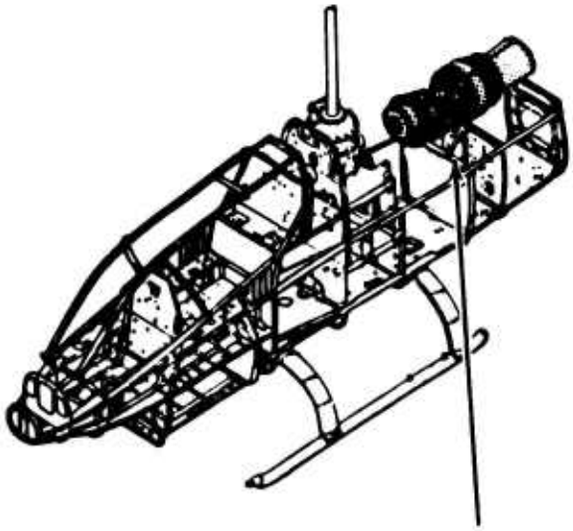
GRID POINT DATA

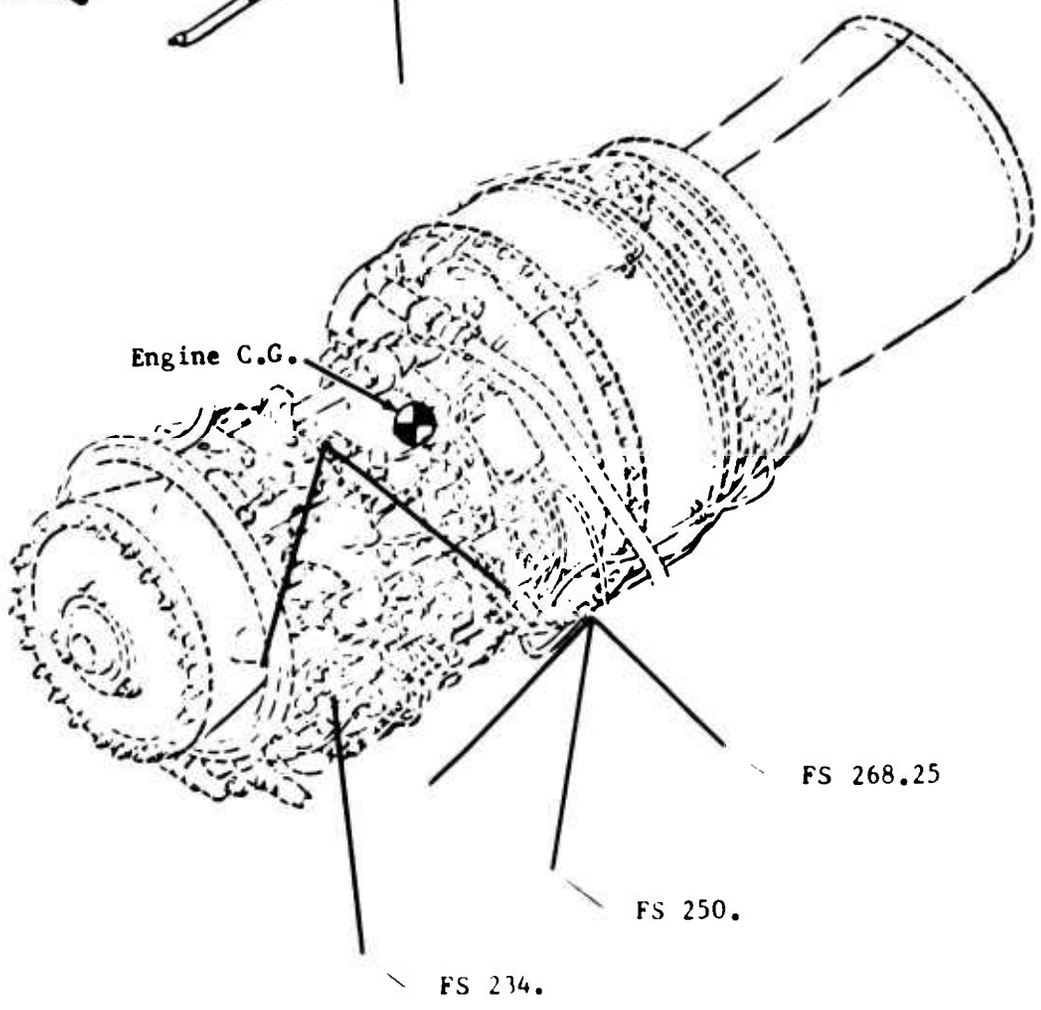
GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
14803	456	AAA	123	AAA	-	-
14807	456	AAA	123	AAA	-	-
14823	456	AAA	123	AAA	-	-
14827	456	AAA	123	AAA	-	-
15212	-	-	123	BBB	456	AAA
15218	-	-	123	BBB	456	AAA
15603	456	AAA	123	AAA	-	-
15607	456	AAA	123	AAA	-	-
15623	456	AAA	123	AAA	-	-
15627	456	AAA	123	AAA	-	-
21801	456	AAA	-	-	123	DCC
21803	456	AAA	-	-	123	DCC
21807	456	AAA	-	-	123	DCC
21809	456	AAA	-	-	123	DCC
21821	456	AAA	-	-	123	DCC
21823	456	AAA	-	-	123	DCC
21827	456	AAA	-	-	123	DCC
21829	456	AAA	-	-	123	DCC
22312	456	AAA	123	BBB	-	-
22318	456	AAA	123	BBB	-	-
22701	456	AAA	-	-	123	DCC
22703	456	AAA	-	-	123	DCC
22707	456	AAA	-	-	123	DCC
22709	456	AAA	-	-	123	DCC
22721	456	AAA	-	-	123	DCC
22723	456	AAA	-	-	123	DCC
22727	456	AAA	-	-	123	DCC
22729	456	AAA	-	-	123	DCC

SHEAR PANEL/MEMBRANE ELEMENT DATA

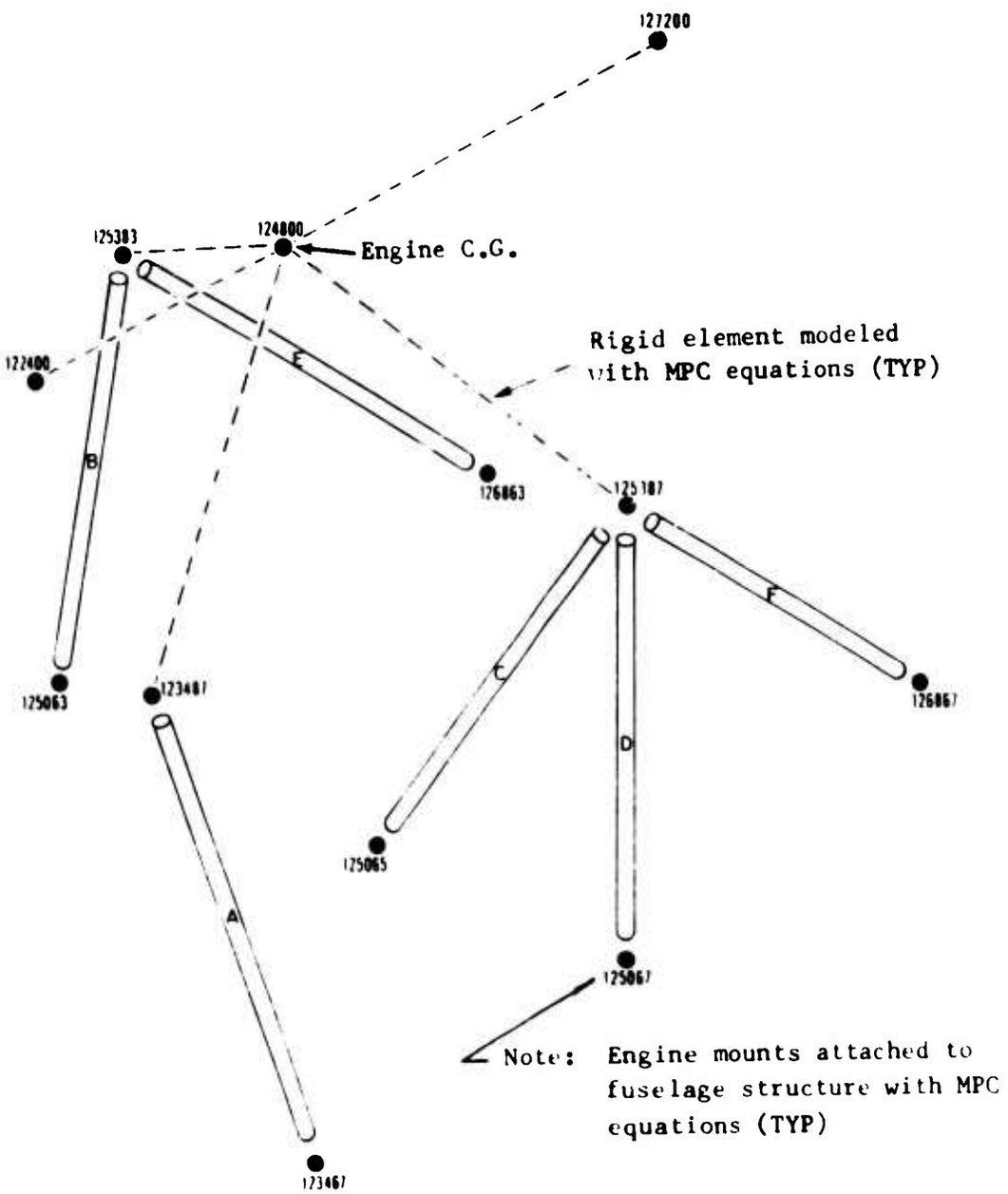
Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	1720021	Fitting	0.155
B	1720022	Fitting	0.155
C	1720024	Fitting	0.155
D	1720023	Fitting	0.155
E	1720015	Fitting	0.155
F	1720016	Fitting	0.155
G	1720018	Fitting	0.155
H	1720017	Fitting	0.155
I	1720025	Fitting	0.155
J	1720026	Fitting	0.155
K	1720028	Fitting	0.155
L	1720027	Fitting	0.155
M	1720011	Fitting	0.155
N	1720012	Fitting	0.155
O	1720014	Fitting	0.155
P	1720013	Fitting	0.155

3.1.7 Engine Mounting Subassembly





3.1.7.1 Engine Mounts - Detail



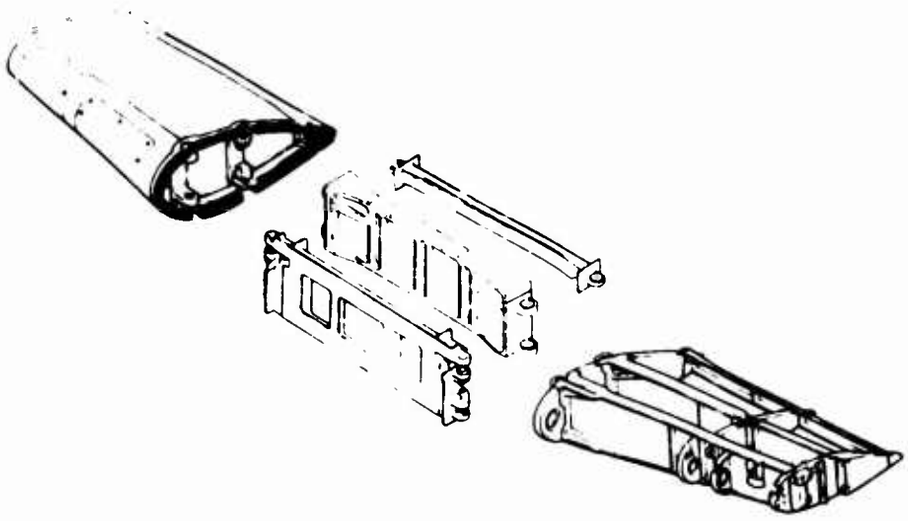
GRID POINT DATA

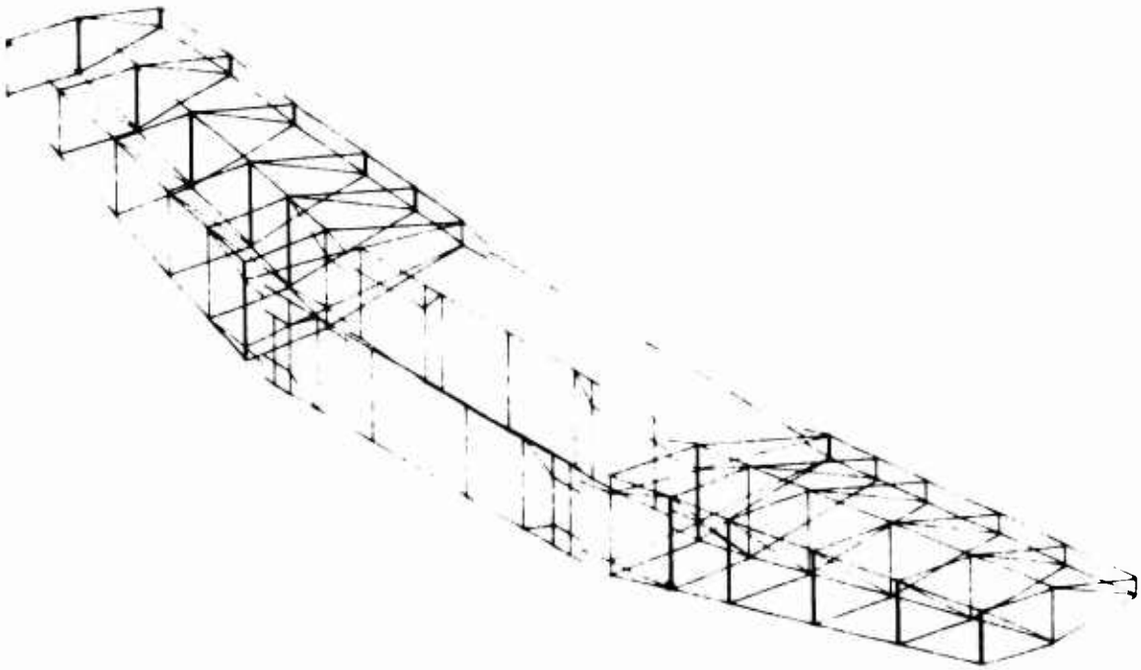
GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
123467	456	AAA	123	AAA	-	-
123487	456	AAA	123	AAA	-	-
125063	456	AAA	123	AAA	-	-
125065	456	AAA	123	AAA	-	-
125067	456	AAA	123	AAA	-	-
125383	456	AAA	123	AAA	-	-
125387	456	AAA	123	AAA	-	-
126863	456	AAA	123	AAA	-	-
126867	456	AAA	123	AAA	-	-
122400	-	-	123456	AAAAAA	-	-
124800	-	-	-	-	-	-
127200	-	-	123456	AAAAAA	-	-

ROD ELEMENT DATA

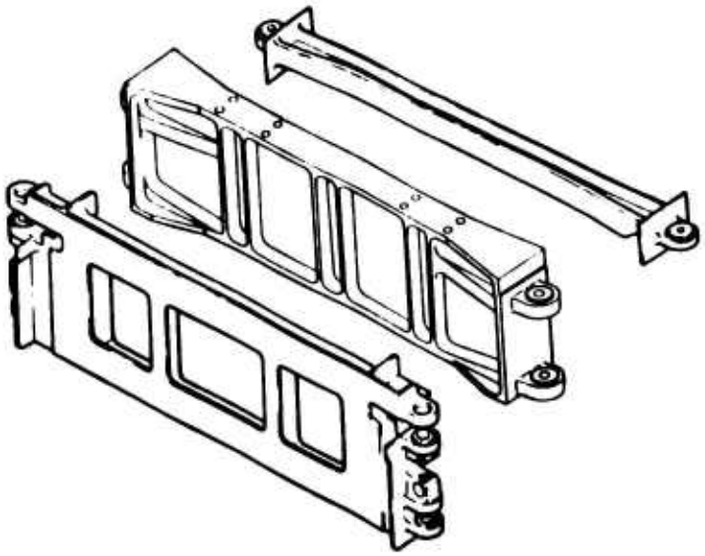
LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	109001	Mount	.0887	-	-	.0887
B	1070012	Mount	.1261	-	-	.1261
C	1[illegible]001	Mount	.1261	-	-	.1261
D	1070011	Mount	.1261	-	-	.1261
E	1060012	Mount	.1261	-	-	.1261
F	1060011	Mount	.1261	-	-	.1261

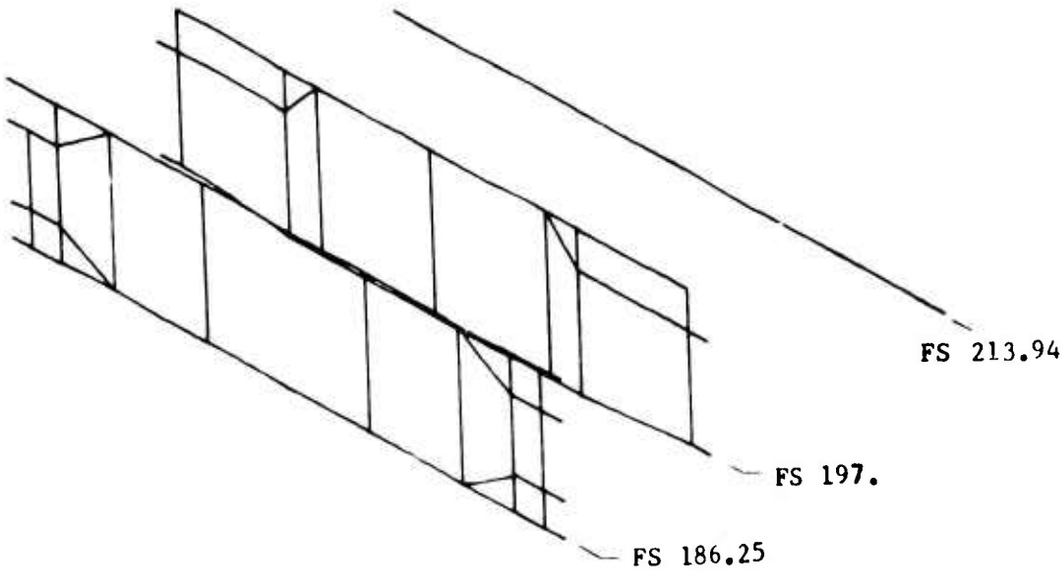
3.2 WINGS AND CARRY THROUGH MAJOR ASSEMBLY



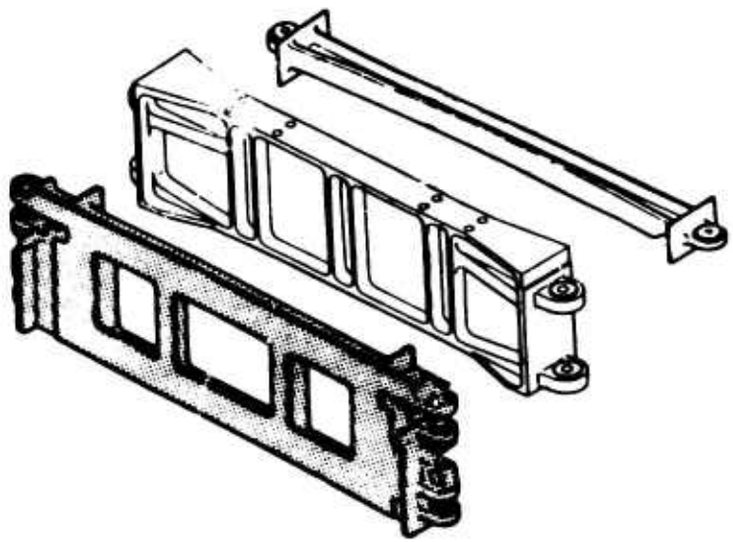


3.2.1 Carry Through Subassembly

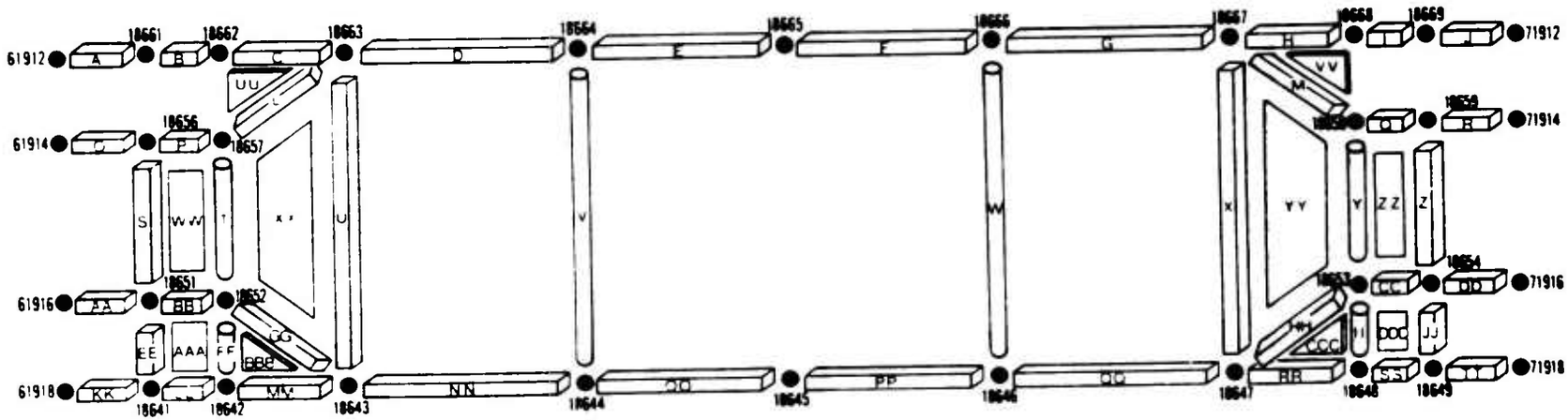




3.2.1.1 Forward Carry Through Detail



View looking aft



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
18641	-	-	-	-	12456	DCAAA
18642	-	-	-	-	23456	CCAAA
18643	4	A	-	-	12356	DCCAA
18644	45	AA	-	-	1236	DCCA
18645	45	AA	-	-	126	DCA
18646	45	AA	-	-	1236	DCCA
18647	4	A	-	-	12356	DCCAA
18648	-	-	-	-	23456	CCAAA
18649	-	-	-	-	12456	DCAAA
18651	-	-	-	-	123456	DCCAAA
18652	-	-	-	-	23456	CCAAA
18653	-	-	-	-	23456	CCAAA
18654	-	-	-	-	123456	DCCAAA
18656	-	-	-	-	123456	DCCAAA
18657	-	-	-	-	23456	CCAAA
18658	-	-	-	-	23456	CCAAA
18659	-	-	-	-	123456	DCCAAA
18661	-	-	-	-	123456	DCCAAA
18662	-	-	-	-	23456	CCAAA
18663	-	-	-	-	123456	DCCAAA
18664	45	AA	-	-	1236	DCCA
18665	45	AA	-	-	1236	DCCA
18666	45	AA	-	-	1236	DCCA
18667	-	-	-	-	123456	DCCAAA
18668	-	-	-	-	23456	CCAAA
18669	-	-	-	-	123456	DCCAAA
61912	-	-	345	AAA	126	DDA
61914	-	-	345	AAA	126	DDA
61916	-	-	345	AAA	126	DDA
61918	-	-	345	AAA	126	DDA
71912	-	-	345	AAA	126	DDA

GRID POINT DATA (CONT.)

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
71914	-	-	345	AAA	126	DDA
71916	-	-	345	AAA	126	DDA
71918	-	-	345	AAA	126	DDA

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
UU	1875763	Web	.125
VV	1875868	Web	.125
WW	1875256	Web	.125
XX	1874357	Web	.125
YY	1875847	Web	.125
ZZ	1875953	Web	.125
AAA	1874251	Web	.125
BBB	1874352	Web	.125
CCC	1874853	Web	.125
DDD	1875448	Web	.125

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
L	1876357	R/SP3	.147	-	-	.147
M	1875867	R/SP3	.147	-	-	.147
P	1875756	R/SP1	.099	-	-	.099
Q	1875958	R/SP1	.099	-	-	.099
S	1875651	R/SP2	.125	-	-	.125
T	1875752	R/SP2	.342	-	-	.342
U	1876343	R/SP2	.217	-	-	.217
V	1874464	Frame	.681	-	-	.681
W	1874666	Frame	.681	-	-	.681
X	1876747	R/SP2	.217	-	-	.217
Y	1875853	R/SP2	.342	-	-	.342
Z	1875954	R/SP2	.125	-	-	.125
BB	1875251	R/SP1	.144	-	-	.144
CC	1875453	R/SP1	.144	-	-	.144
EE	1875141	R/SP2	.125	-	-	.125
FF	1875242	R/SP2	.125	-	-	.125
GG	1874352	R/SP3	.147	-	-	.147
HH	1875347	R/SP3	.147	-	-	.147
II	1875348	R/SP2	.125	-	-	.125
JJ	1875449	R/SP2	.125	-	-	.125
LL	1874241	R/SP1	.046	-	-	.046
SS	1874948	R/SP1	.046	-	-	.046

CBAR ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	1866100	0.424	0.070	0.500	0.215
B	1876162	1.828	0.087	0.574	0.260
C (1)	1876263	2.133	0.537	1.937	0.453
D	1876364	1.133	0.0	0.497	0.0
E	1876465	1.036	0.0	0.403	0.0
F	1876566	1.036	0.0	0.403	0.0
G	1876667	1.133	0.0	0.497	0.0
H (2)	1876768	2.133	0.537	1.937	0.453
I	1876869	1.828	0.087	0.574	0.260
J	1866900	0.424	0.070	0.500	0.215
L (3)	1875763	1.500	0.070	0.500	0.215
M (4)	1876758	1.500	0.070	0.500	0.215
O	1865600	0.424	0.070	0.500	0.215
P	1875657	1.500	0.070	0.500	0.215
Q	1875859	1.500	0.070	0.500	0.215
R	1865900	0.424	0.070	0.500	0.215
S	1875156	0.858	0.004	1.070	0.015
T	1875257	0.512	0.003	0.179	0.010
U	1874363	0.512	0.0	0.179	0.0
X	1874767	0.512	0.0	0.179	0.0
Y	1875358	0.512	0.003	0.179	0.010
Z	1875459	0.858	0.004	1.070	0.015
AA	1865100	0.424	0.070	0.500	0.215
BB	1875152	1.500	0.070	0.500	0.215
CC	1875354	1.500	0.070	0.500	0.215
DD	1865400	0.424	0.070	0.500	0.215
EE	1874151	0.569	0.001	0.981	0.003
GG (3)	1875243	1.500	0.070	0.500	0.215
HH (4)	1874753	1.500	0.070	0.500	0.215
JJ	1874954	0.569	0.001	0.981	0.003
KK	1864100	0.367	0.046	0.433	0.146
LL	1874142	1.828	0.087	0.574	0.260

CBAR ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
MM (1)	1874243	2.133	0.537	1.937	0.453
NN	1874344	0.928	0.0	0.407	0.0
OO	1874445	0.928	0.0	0.407	0.0
PP	1874546	0.928	0.0	0.407	0.0
QQ	1874647	0.928	0.0	0.407	0.0
RR (2)	1874748	2.133	0.537	1.937	0.453
SS	1874849	1.828	0.087	0.574	0.260
TT	1864900	0.367	0.046	0.433	0.146

NOTES -

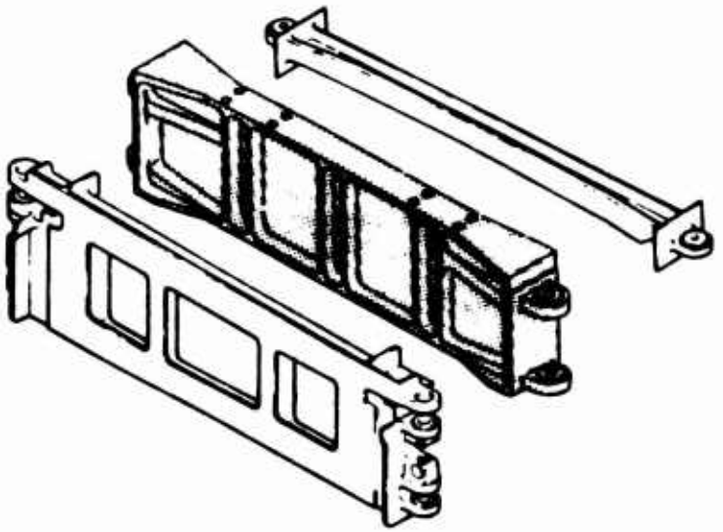
(1) Pin flags at End B: 6

(2) Pin flags at End A: 6

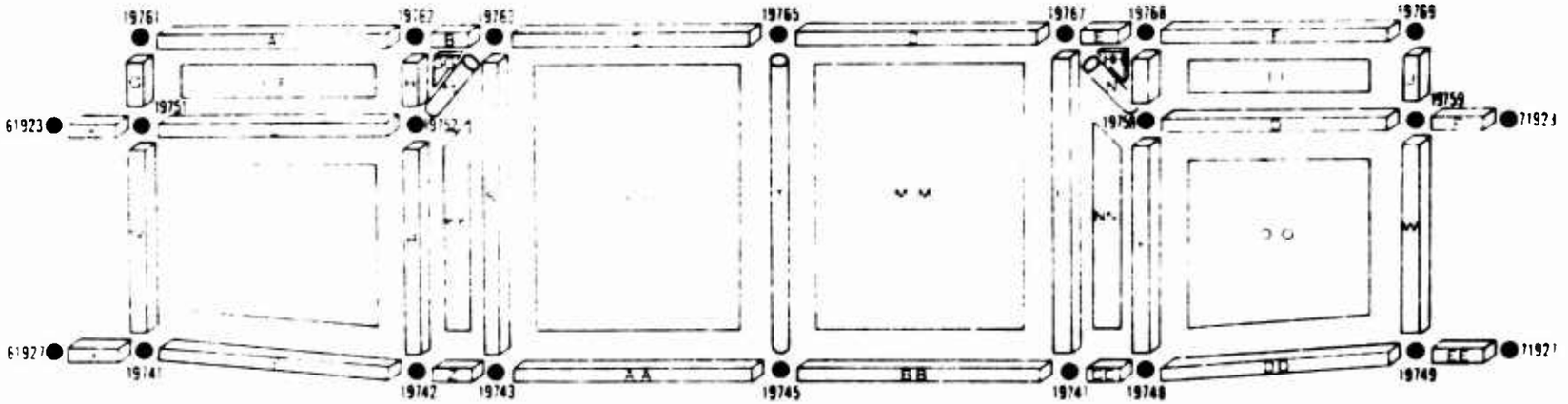
(3) Pin flags at End B: 456

(4) Pin flags at End A: 456

3.2.1.2 Center Carry Through Detail



View looking aft



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
19741	-	-	-	-	123456	DCCAAA
19742	-	-	-	-	23456	CCAAA
19743	4	A	-	-	12356	DCCAA
19745	45	AA	-	-	136	DCA
19747	4	A	-	-	12356	DCCAA
19748	-	-	-	-	23456	CCAAA
19749	-	-	-	-	123456	DCCAAA
19751	-	-	-	-	12456	DCAAA
19752	-	-	-	-	23456	CCAAA
19758	-	-	-	-	23456	CCAAA
19759	-	-	-	-	12456	DCAAA
19761	-	-	-	-	123456	DCCAAA
19762	-	-	-	-	23456	CCAAA
19763	4	A	-	-	12356	DCCAA
19765	45	AA	-	-	16	DA
19767	4	A	-	-	12356	DCCAA
19768	-	-	-	-	23456	CCAAA
19769	-	-	-	-	123456	DCCAAA
61923	-	-	1245	AAAA	36	DA
61927	-	-	1245	AAAA	36	DA
71923	-	-	1245	AAAA	36	DA
71927	-	-	1245	AAAA	36	DA

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
FF	1975162	Web	0.400
GG	1975263	Web	0.200
HH	1975867	Web	0.200
II	1975869	Web	0.400
JJ	1974152	Web	0.200
KK	1974352	Web	0.200
LL	1974365	Web	0.200

SHEAR PANEL/MEMBRANE ELEMENT DATA (CONT.)

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
MM	1974567	Web	0.200
NN	1974758	Web	0.200
OO	1974859	Web	0.200

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	1976261	R/SP1	.165	-	-	.165
C	1976563	R/SP1	.329	-	-	.329
D	1976765	R/SP1	.329	-	-	.329
F	1976968	R/SP1	.165	-	-	.165
G	1976151	R/SP2	1.528	-	-	1.528
H	1976252	R/SP2	1.528	-	-	1.528
I	1976858	R/SP2	1.528	-	-	1.528
J	1976959	R/SP2	1.528	-	-	1.528
L	1975251	R/SP1	0.412	-	-	0.412
M	1976352	R/SP3	0.288	-	-	0.288
N	1975867	R/SP3	0.288	-	-	0.288
O	1975958	R/SP1	0.412	-	-	0.412
Q	1975141	R/SP2	0.764	-	-	0.764
R	1975242	R/SP2	0.981	-	-	0.981
S	1976343	R/SP2	1.009	-	-	1.009
T	1974565	Doubler	0.825	-	-	0.825
	1976545	R/SP2	1.584	-	-	1.584
U	1976747	R/SP2	1.009	-	-	1.009
V	1975848	R/SP2	0.981	-	-	0.981
W	1975949	R/SP2	0.764	-	-	0.764
Y	1974241	R/SP1	0.247	-	-	0.247
Z	1974342	R/SP3	0.288	-	-	0.288
AA	1974543	R/SP1	0.329	-	-	0.329
BB	1974745	R/SP1	0.329	-	-	0.329
CC	1974847	R/SP3	0.288	-	-	0.288
DD	1974948	R/SP1	0.247	-	-	0.247

CBAR ELEMENT DATA

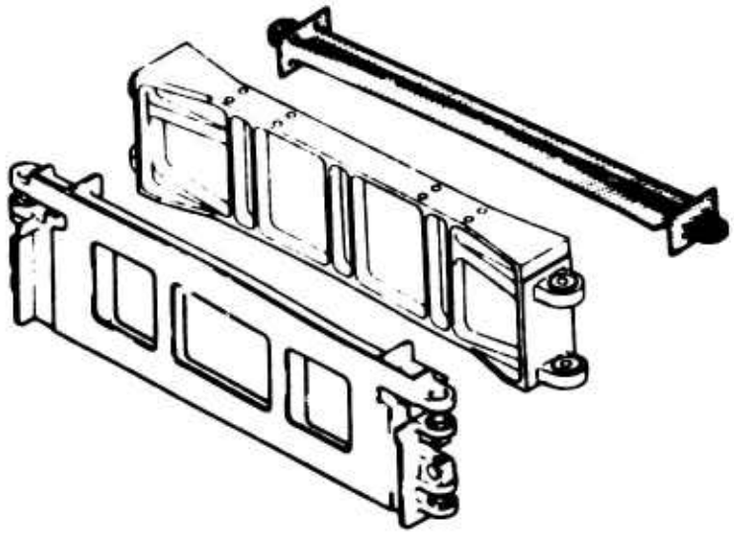
LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	1976162	2.019	0.437	13.573	0.174
B (1)	1976263	2.063	0.097	1.300	0.320
C	1976365	2.063	0.0	1.300	0.0
D	1976567	2.063	0.0	1.300	0.0
E (2)	1976768	2.063	0.097	1.300	0.320
F	1976869	2.019	0.437	13.573	0.174
G	1975161	1.845	0.026	3.113	0.103
H	1975262	0.825	0.006	0.520	0.023
I	1975868	0.825	0.006	0.520	0.023
J	1975969	1.845	0.026	3.113	0.103
K	1975100	0.694	0.208	1.302	0.624
L	1975152	1.283	0.113	2.156	0.075
O	1975859	1.283	0.113	2.156	0.0[illegible]
P	1975900	0.694	0.208	1.302	0.[illegible]
Q	1974151	1.845	0.026	3.113	0.10[illegible]
R	1974252	0.825	0.006	0.520	0.023
S	1974363	0.825	0.0	0.520	0.0
U	1974767	0.825	0.0	0.520	0.0
V	1974858	0.825	0.006	0.520	0.023
W	1974959	1.845	0.026	3.113	0.103
X	1974100	0.694	0.208	1.302	0.624
Y	1974142	2.453	0.965	10.405	0.497
Z (1)	1974243	1.650	0.050	1.040	0.171
AA	1974345	1.650	0.0	1.040	0.0
BB	1974547	1.650	0.0	1.040	0.0
CC (2)	1974748	1.650	0.050	1.040	0.171
DD	1974849	2.453	0.965	10.405	0.497
EE	1974900	0.694	0.208	1.302	0.624

NOTES -

(1) Pin flags at End B: 6

(2) Pin flags at End A: 6

3.2.1.3 Aft Carry Through Detail



View looking aft

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
21341	-	-	-	-	12456	DCAAA
21343	4	A	-	-	12356	DCCAA
21345	4	A	-	-	12356	DCCAA
21347	4	A	-	-	12356	DCCAA
21349	-	-	-	-	12456	DCAAA
61935	-	-	1245	AAAA	36	DA
71935	-	-	1245	AAAA	36	DA

CBAR ELEMENT DATA

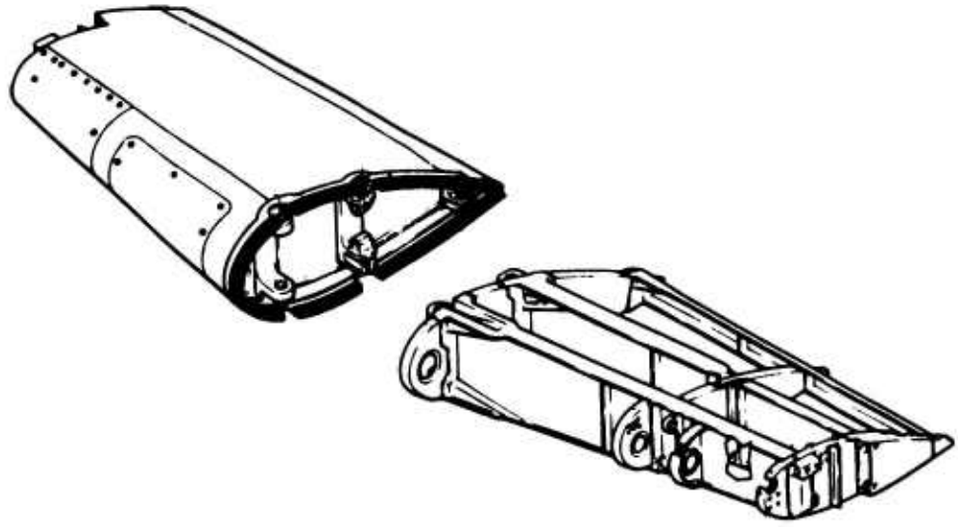
LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	2134100	0.469	0.047	0.899	0.164
B (1)	2124143	1.562	0.725	1.422	0.063
C	2124345	0.812	0.0	0.343	0.008
D	2124547	0.812	0.0	0.343	0.008
E	2124749	1.562	0.725	1.422	0.063
F (2)	2134900	0.469	0.047	0.899	0.161

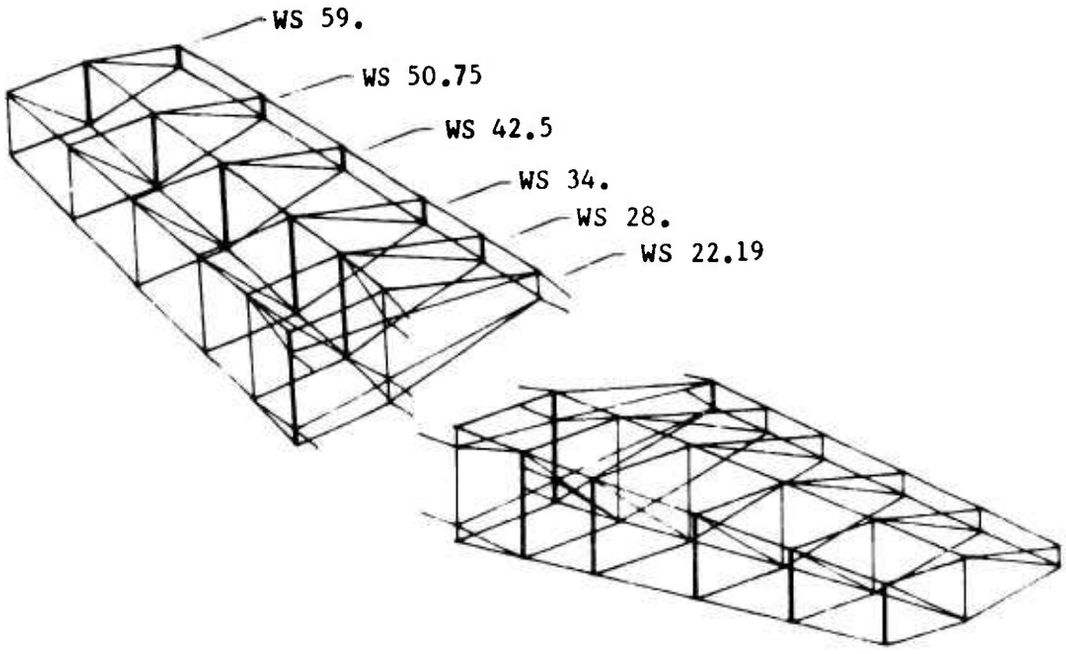
NOTES -

(1) Pin flags at End B: 6

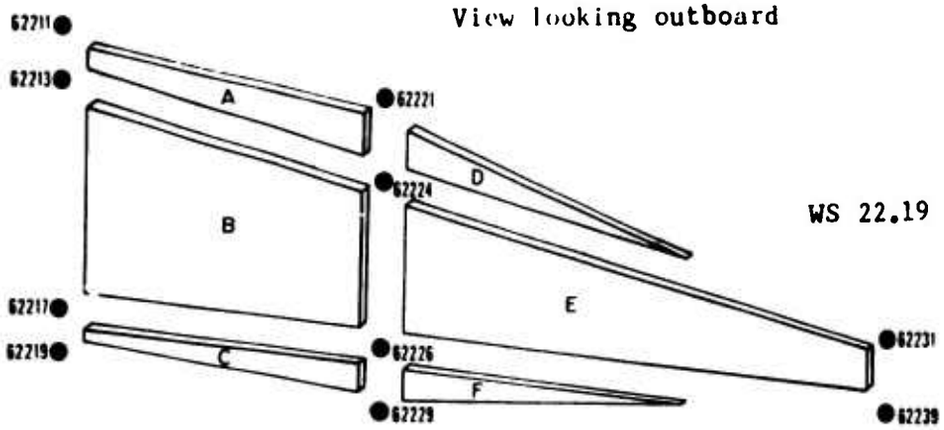
(2) Pin flags at End A: 6

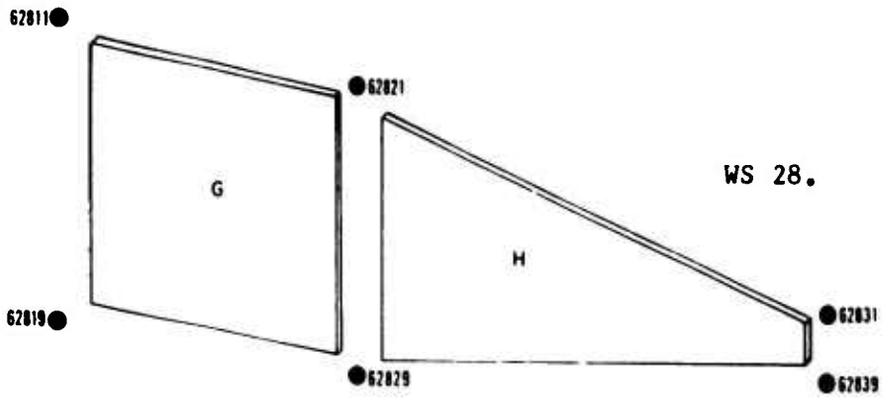
3.2.2 Right and Left Wing Subassemblies

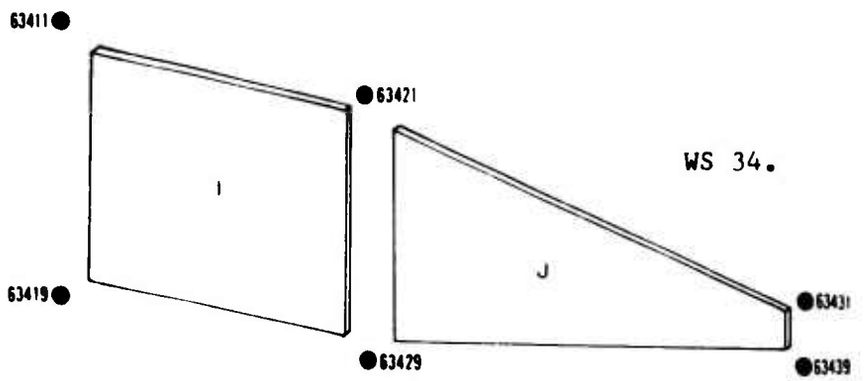




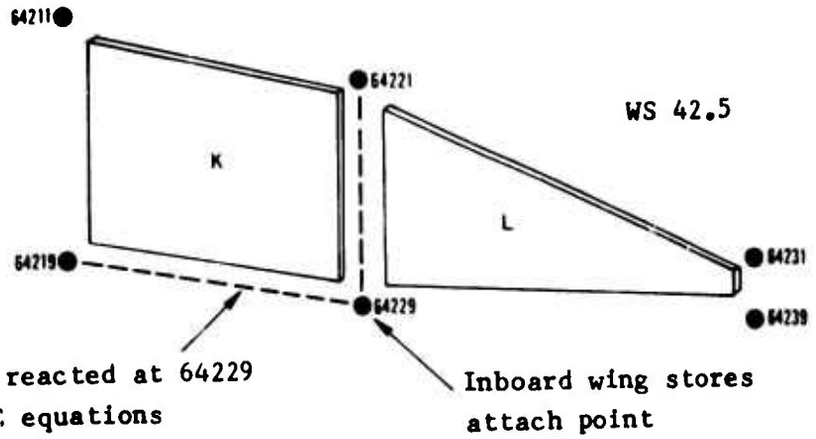
3.2.2.1 Right Wing Ribs - Detail

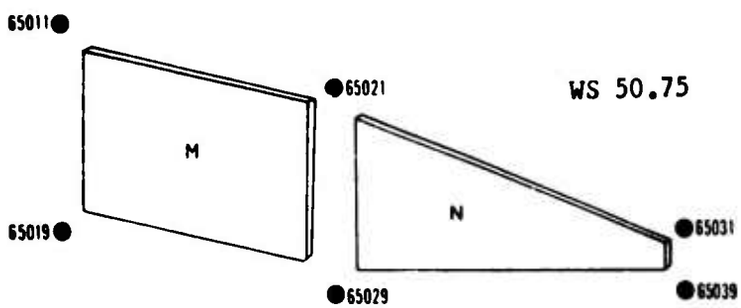


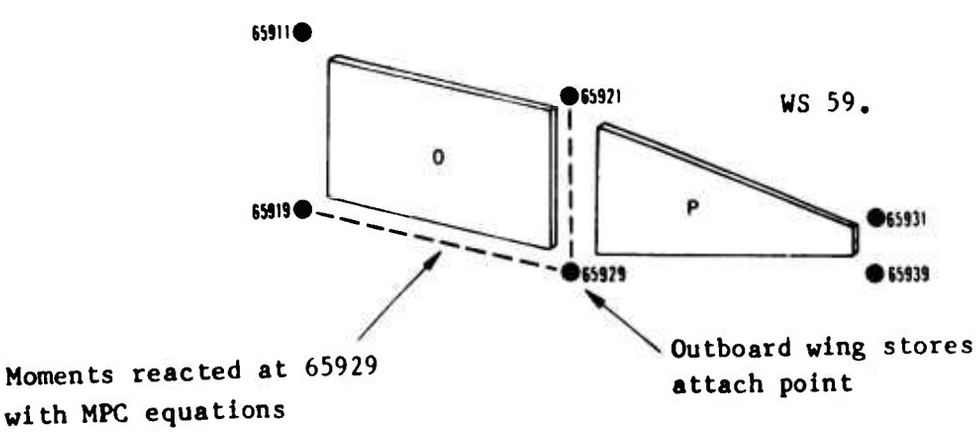




View looking outboard







GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
62211	456	AAA	-	-	123	DDD
62213	-	-	-	-	123456	DDDAAA
62217	-	-	-	-	123456	DDDAAA
62219	456	AAA	-	-	123	DDD
62221	-	-	-	-	123456	DDDAAA
62224	-	-	-	-	123456	DDDAAA
62226	-	-	-	-	123456	DDDAAA
62229	-	-	-	-	123456	DDDAAA
62231	-	-	-	-	123456	DDDAAA
62239	-	-	-	-	123456	DDDAAA
62811	456	AAA	-	-	123	CDC
62819	456	AAA	-	-	12	CD
62821	456	AAA	-	-	123	CDC
62829	456	AAA	-	-	3	C
62831	456	AAA	-	-	123	CDC
62839	456	AAA	-	-	12	CD
63411	456	AAA	-	-	123	CDC
63419	456	AAA	-	-	123	CDC
63421	456	AAA	-	-	3	C
63429	456	AAA	-	-	12	CD
63431	456	AAA	-	-	123	CDC
63439	456	AAA	-	-	123	CDC
64211	456	AAA	-	-	123	CDC
64219	456	AAA	-	-	12	CD
64221	456	AAA	-	-	123	CDC
64229	-	-	456	AAA	-	-
64231	456	AAA	-	-	123	CDC
64239	456	AAA	-	-	12	CD
65011	456	AAA	-	-	123	CDC
65019	456	AAA	-	-	123	CDC
65021	456	AAA	-	-	3	C

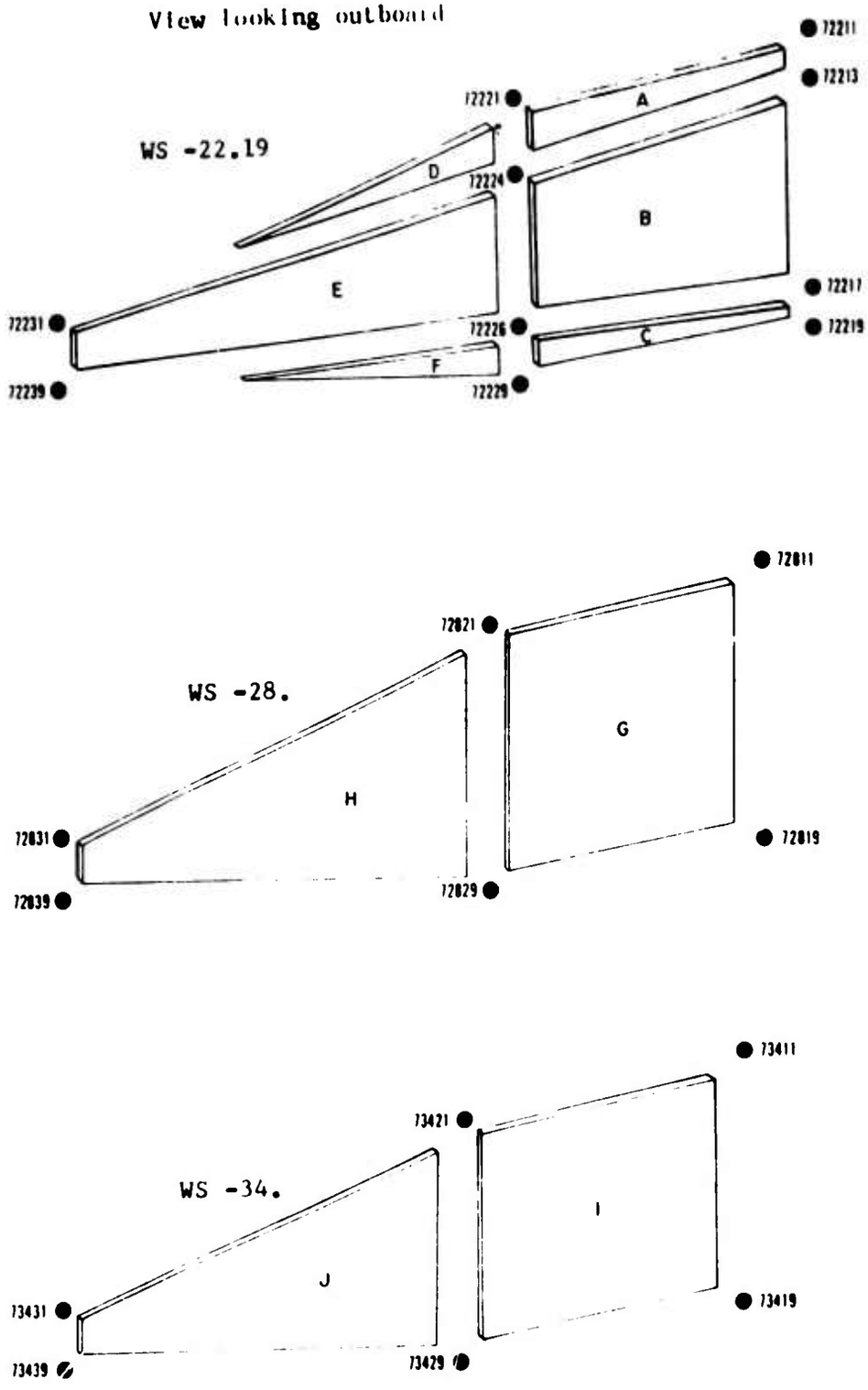
GRID POINT DATA (CONT.)

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
65029	456	AAA	-	-	12	CD
65031	456	AAA	-	-	123	CDC
65039	456	AAA	-	-	123	CDC
65911	456	AAA	-	-	123	CDC
65919	456	AAA	-	-	12	CD
65921	456	AAA	-	-	123	CDC
65929	-	-	456	AAA	-	-
65931	456	AAA	-	-	123	CDC
65939	456	AAA	-	-	12	CD

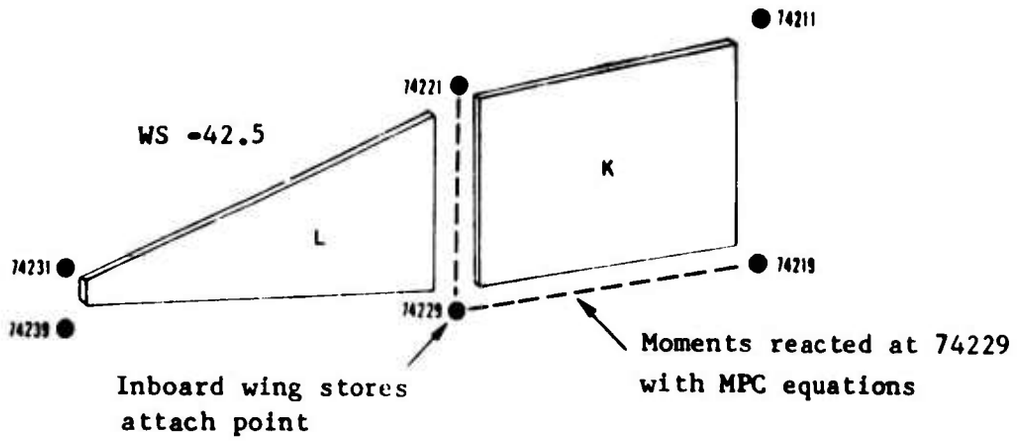
SHEAR PANEL/MEMBRANE ELEMENT DATA

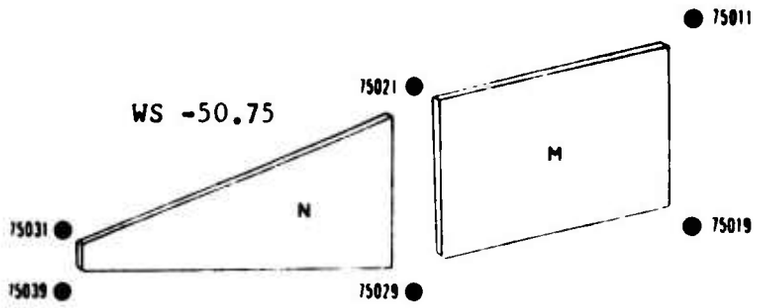
Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	6221124	Bulkhead	.125
B	6221326	Bulkhead	.125
C	6221729	Bulkhead	.125
D	6222431	Bulkhead	.125
E	6222439	Bulkhead	.125
F	6222639	Bulkhead	.125
G	6281129	Bulkhead	.125
H	6282139	Bulkhead	.125
I	6341129	Bulkhead	.125
J	6342139	Bulkhead	.125
K	6421129	Bulkhead	.125
L	6422139	Bulkhead	.125
M	6501129	Bulkhead	.125
N	6502139	Bulkhead	.125
O	6591129	Bulkhead	.125
P	6592139	Bulkhead	.125

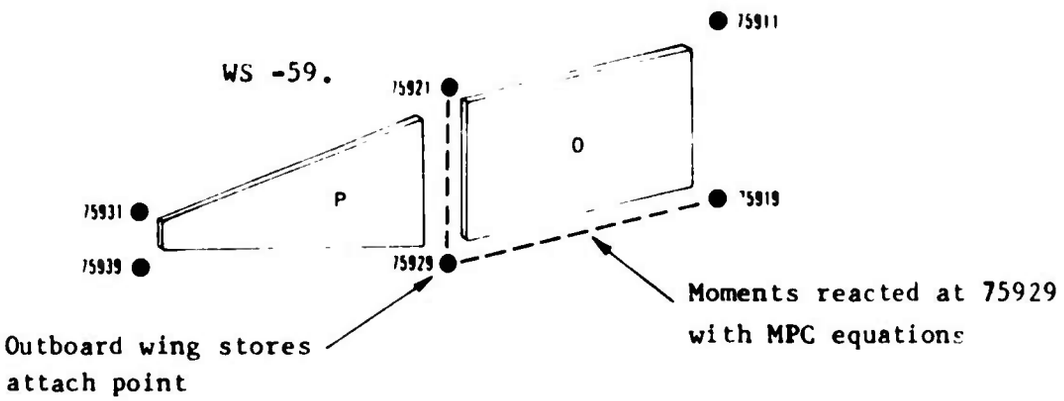
3.2.2.2 Left Wing Ribs - Detail



View looking outboard







GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
72211	456	AAA	-	-	123	DDD
72213	-	-	-	-	123456	DDDAAA
72217	-	-	-	-	123456	DDDAAA
72219	456	AAA	-	-	123	CDC
72221	-	-	-	-	123456	DDDAAA
72224	-	-	-	-	123456	DDDAAA
72226	-	-	-	-	123456	DDDAAA
72229	-	-	-	-	123456	DDDAAA
72231	-	-	-	-	123456	DDDAAA
72239	-	-	-	-	123456	DDDAAA
72811	456	AAA	-	-	123	DDD
72819	456	AAA	-	-	12	CD
72821	456	AAA	-	-	123	CDC
72829	456	AAA	-	-	3	C
72831	456	AAA	-	-	123	CDC
72839	456	AAA	-	-	12	CD
73411	456	AAA	-	-	123	CDC
73419	456	AAA	-	-	123	CDC
73421	456	AAA	-	-	3	C
73429	456	AAA	-	-	12	CD
73431	456	AAA	-	-	123	CDC
73439	456	AAA	-	-	123	CDC
74211	456	AAA	-	-	123	CDC
74219	456	AAA	-	-	12	CD
74221	456	AAA	-	-	123	CDC
74229	-	-	456	AAA	-	-
74231	456	AAA	-	-	123	CDC
74239	456	AAA	-	-	12	CD
75011	456	AAA	-	-	123	CDC
75019	456	AAA	-	-	123	CDC
75021	456	AAA	-	-	3	C
75029	456	AAA	-	-	12	CD
75031	456	AAA	-	-	123	CDC

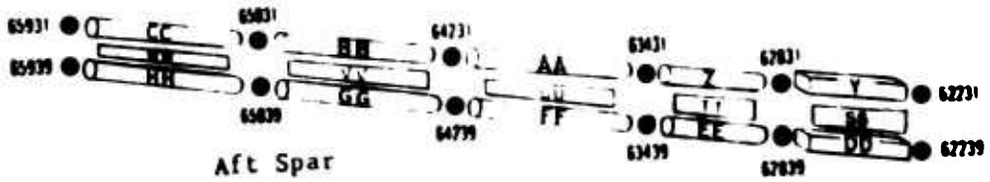
GRID POINT DATA (CONT.)

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
75039	456	AAA	-	-	123	CDC
75911	456	AAA	-	-	123	CDC
75919	456	AAA	-	-	12	CD
75921	456	AAA	-	-	123	CDC
75929	-	-	456	AAA	-	-
75931	456	AAA	-	-	123	CDC
75939	456	AAA	-	-	12	CD

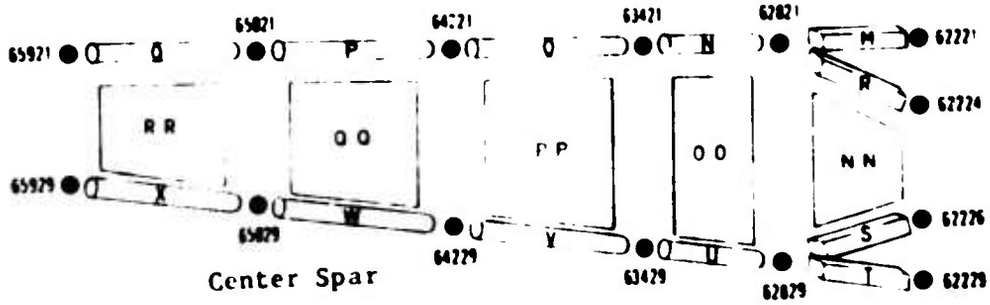
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	7221124	Bulkhead	.125
B	7221326	Bulkhead	.125
C	7221729	Bulkhead	.125
D	7222431	Bulkhead	.125
E	7222439	Bulkhead	.125
F	7222639	Bulkhead	.125
G	7281129	Bulkhead	.125
H	7282139	Bulkhead	.125
I	7341129	Bulkhead	.125
J	7342139	Bulkhead	.125
K	7421129	Bulkhead	.125
L	7422139	Bulkhead	.125
M	7501129	Bulkhead	.125
N	7502139	Bulkhead	.125
O	7591129	Bulkhead	.125
P	7592139	Bulkhead	.125

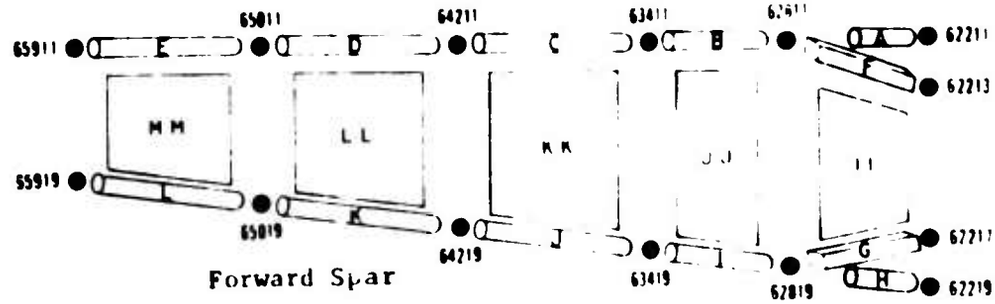
3.2.2.3 Right Wing Spars Detail



Aft Spar



Center Spar



Forward Spar

View looking aft

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
62211	456	AAA	-	-	123	DDD
62213	-	-	-	-	123456	DDDAAA
62217	-	-	-	-	123456	DDDAAA
62219	456	AAA	-	-	123	DDD
62221	-	-	-	-	123456	DDDAAA
62224	-	-	-	-	123456	DDDAAA
62226	-	-	-	-	123456	DDDAAA
62229	-	-	-	-	123456	DDDAAA
62231	-	-	-	-	123456	DDDAAA
62239	-	-	-	-	123456	DDDAAA
62811	456	AAA	-	-	123	CDC
62819	456	AAA	-	-	12	CD
62821	456	AAA	-	-	123	CDC
62829	456	AAA	-	-	3	C
62831	456	AAA	-	-	123	CDC
62839	456	AAA	-	-	12	CD
63411	456	AAA	-	-	123	CDC
63419	456	AAA	-	-	123	CDC
63421	456	AAA	-	-	3	C
63429	456	AAA	-	-	12	CD
63431	456	AAA	-	-	123	CDC
63439	456	AAA	-	-	123	CDC
64211	456	AAA	-	-	123	CDC
64219	456	AAA	-	-	12	CD
64221	456	AAA	-	-	123	CDC
64229	-	-	456	AAA	-	-
64231	456	AAA	-	-	123	CDC
64239	456	AAA	-	-	12	CD
65011	456	AAA	-	-	123	CDC
65019	456	AAA	-	-	123	CDC
65021	456	AAA	-	-	3	C
65029	456	AAA	-	-	12	CD

GRID POINT DATA (CONT.)

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
65031	456	AAA	-	-	123	CDC
65039	456	AAA	-	-	123	CDC
65911	456	AAA	-	-	123	CDC
65919	456	AAA	-	-	12	CD
65921	456	AAA	-	-	123	CDC
65929	-	-	456	AAA	-	-
65931	456	AAA	-	-	123	CDC
65939	456	AAA	-	-	12	CD

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
II	6221119	Web	.150
JJ	6281119	Web	.130
KK	6341119	Web	.127
LL	6421119	Web	.124
MM	6501119	Web	.119
NN	6222129	Web	.182
OO	6282129	Web	.177
PP	6342129	Web	.175
QQ	6422129	Web	.174
RR	6502129	Web	.171
SS	6223139	Web	.064
TT	6283139	Web	.075
UU	6343139	Web	.074
VV	6423139	Web	.073
WW	6503139	Web	.071

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	6222611	Cap	.506	-0.22	0.0	.438
B	6283411	Cap	.506	-0.22	0.0	.412
	6283412	R/SP3	.193	-	-	.193
C	6344211	Cap	.506	-0.22	0.0	.407
	6344212	R/SP3	.170	-	-	.170
D	6425011	Cap	.506	-0.22	0.0	.401
	6425012	R/SP3	.144	-	-	.144
E	6505911	Cap	.506	-0.22	0.0	.392
	6505912	R/SP3	.118	-	-	.118
F	6222812	R/SP3	.188	-	-	.188
G	6222818	R/SP3	.188	-	-	.188
H	6222819	Cap	.506	0.21	0.0	.437
I	6283418	R/SP3	.193	-	-	.193
	6283419	Cap	.506	0.21	0.0	.408
J	6344218	R/SP3	.170	-	-	.170
	6344219	Cap	.506	0.21	0.0	.404
K	6425018	R/SP3	.144	-	-	.144
	6425019	Cap	.506	0.21	0.0	.399
L	6505918	R/SP3	.118	-	-	.118
	6505919	Cap	.506	0.21	0.0	.391
N	6283421	Cap	1.608	-0.41	0.0	1.240
	6283422	R/SP3	.260	-	-	.260
O	6344221	Cap	1.275	-0.55	0.0	.944
	6344222	R/SP3	.232	-	-	.232
P	6425021	Cap	.705	-0.30	0.0	.501
	6425022	R/SP3	.202	-	-	.202
Q	6505921	Cap	.579	-0.21	0.0	.436
	6505922	R/SP3	.171	-	-	.171
R	6222822	R/SP3	.216	-	-	.216
S	6222828	R/SP3	.216	-	-	.216
U	6283428	R/SP3	.260	-	-	.260
	6283429	Cap	1.608	1.10	0.0	1.234

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
V	6344228	R/SP3	.232	-	-	.232
	6344229	Cap	1.[illegible]10	0.42	0.0	.966
W	6425028	R/SP3	.202	-	-	.202
	6425029	Cap	.748	0.34	0.0	.535
X	6505928	R/SP3	.171	-	-	.171
	6505929	Cap	.595	0.24	0.0	.443
Y	6222832	R/SP3	.026	-	-	.026
Z	6283431	Cap	.150	-0.12	0.0	.103
	6283432	R/SP3	.028	-	-	.028
AA	6344231	Cap	.150	-0.12	0.0	.102
	6344232	R/SP3	.026	-	-	.026
BB	6425031	Cap	.150	-0.12	0.0	.101
	6425032	R/SP3	.025	-	-	.025
CC	6505931	Cap	.150	-0.12	0.0	.100
	6505932	R/SP3	.023	-	-	.023
DD	6222838	R/SP3	.026	-	-	.026
EE	6283438	R/SP3	.028	-	-	.028
	6283439	Cap	.200	0.11	0.0	.154
FF	6344238	R/SP3	.026	-	-	.026
	6344239	Cap	.200	0.11	0.0	.152
GG	6425038	R/SP3	.025	-	-	.025
	6425039	Cap	.200	0.11	0.0	.150
HH	6505938	R/SP3	.023	-	-	.023
	6505939	Cap	.200	0.11	0.0	.149

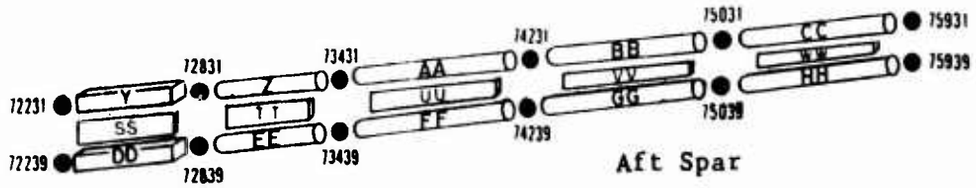
CBAR ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
F (1)	6222813	1.790	0.209	1.023	0.100
G (1)	6222817	1.355	0.072	0.680	0.046
M (1)	6222821	1.341	0.523	0.100	0.009
R (1)	6222824	1.450	0.147	0.635	0.009
S (1)	6222826	1.410	0.150	0.656	0.009
T (1)	6222829	0.979	0.217	0.863	0.009
Y (1)	6222831	0.423	0.044	0.321	0.009
DD (1)	6222839	0.259	0.012	0.117	0.014

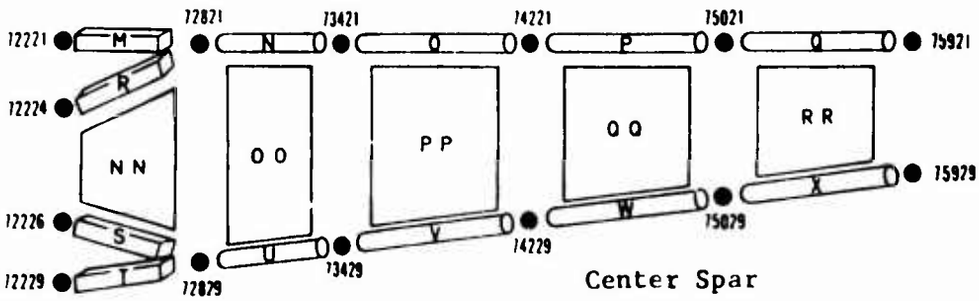
NOTES -

(1) Pin flags at End B: 456

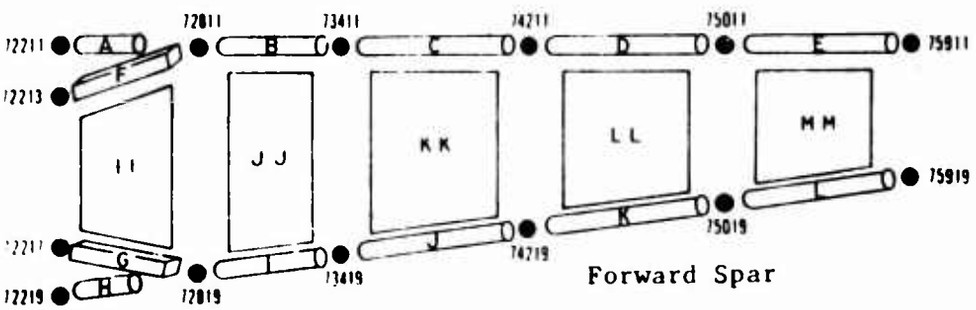
3.2.2.4 Left Wing Spars Detail



Aft Spar



Center Spar



Forward Spar

View looking aft

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
72211	456	AAA	-	-	123	DDD
72213	-	-	-	-	123456	DDDAAA
72217	-	-	-	-	123456	DDDAAA
72219	456	AAA	-	-	123	DDD
72221	-	-	-	-	123456	DDDAAA
72224	-	-	-	-	123456	DDDAAA
72226	-	-	-	-	123456	DDDAAA
72229	-	-	-	-	123456	DDDAAA
72231	-	-	-	-	123456	DDDAAA
72239	-	-	-	-	123456	DDDAAA
72811	456	AAA	-	-	123	CDC
72819	456	AAA	-	-	12	CD
72821	456	AAA	-	-	123	CDC
72829	456	AAA	-	-	3	C
72831	456	AAA	-	-	123	CDC
72839	456	AAA	-	-	12	CD
73411	456	AAA	-	-	123	CDC
73419	456	AAA	-	-	123	CDC
73421	456	AAA	-	-	3	C
73429	456	AAA	-	-	12	CD
73431	456	AAA	-	-	123	CDC
73439	456	AAA	-	-	123	CDC
74211	456	AAA	-	-	123	CDC
74219	456	AAA	-	-	12	CD
74221	456	AAA	-	-	123	CDC
74229	-	-	456	AAA	-	-
74231	456	AAA	-	-	123	CDC
74239	456	AAA	-	-	12	CD
75011	456	AAA	-	-	123	CDC
75019	456	AAA	-	-	123	CDC
75021	456	AAA	-	-	3	C
75029	456	AAA	-	-	12	CD
75031	456	AAA	-	-	123	CDC

GRID POINT DATA (CONT.)

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
75039	456	AAA	-	-	123	CDC
75911	456	AAA	-	-	123	CDC
75919	456	AAA	-	-	12	CD
75921	456	AAA	-	-	123	CDC
75929	-	-	456	AAA	-	-
75931	456	AAA	-	-	123	CDC
75939	456	AAA	-	-	12	CD

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
II	7221119	Web	.150
JJ	7281119	Web	.130
KK	7341119	Web	.127
LL	7421119	Web	.124
MM	7501119	Web	.119
NN	7222129	Web	.182
OO	7282129	Web	.177
PP	7342129	Web	.175
QQ	7422129	Web	.174
RR	7502129	Web	.171
SS	7223139	Web	.064
TT	7283139	Web	.075
UU	7343139	Web	.074
VV	7423139	Web	.073
WW	7503139	Web	.071

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA (in.^{2})	OFFSETS FROM GRIDPOINT		FINAL AREA (in.^{2})
				Z	Y	
A	7222811	Cap	.506	-0.22	0.0	.438
B	7283411	Cap	.506	-0.22	0.0	.412
	7283412	R/SP3	.193	-	-	.193
C	7344211	Cap	.506	-0.22	0.0	.407
	7344212	R/SP3	.170	-	-	.170
D	7425011	Cap	.506	-0.22	0.0	.401
	7425012	R/SP3	.144	-	-	.144
E	7505911	Cap	.506	-0.22	0.0	.392
	7505912	R/SP3	.118	-	-	.118
F	7222812	R/SP3	.188	-	-	.188
G	7222818	R/SP3	.188	-	-	.188
H	7222819	Cap	.506	0.21	0.0	.437
I	7283418	R/SP3	.193	-	-	.193
	7283419	Cap	.506	0.21	0.0	.408
J	7344218	R/SP3	.170	-	-	.170
	7344219	Cap	.506	0.21	0.0	.404
K	7425018	R/SP3	.144	-	-	.144
	7425019	Cap	.506	0.21	0.0	.399
L	7505918	R/SP3	.118	-	-	.118
	7505919	Cap	.506	0.21	0.0	.391
N	7283421	Cap	1.608	-0.41	0.0	1.240
	7283422	R/SP3	.260	-	-	.260
O	7344221	Cap	1.275	-0.55	0.0	.944
	7344222	R/SP3	.232	-	-	.232
P	7425021	Cap	.705	-0.30	0.0	.501
	7425022	R/SP3	.202	-	-	.202
Q	7505921	Cap	.579	-0.21	0.0	.436
	7505922	R/SP3	.171	-	-	.171
R	7222822	R/SP3	.216	-	-	.216
S	7222828	R/SP3	.216	-	-	.216
U	7283428	R/SP3	.260	-	-	.260
	7283429	Cap	1.608	1.10	0.0	1.234

ROD ELEMENT DATA (CONT.)

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
V	7344228	R/SP3	.232	-	-	.232
	7344229	Cap	1.310	0.42	0.0	.966
W	7425028	R/SP3	.202	-	-	.202
	7425029	Cap	.748	0.34	0.0	.535
X	7505928	R/SP3	.171	-	-	.171
	7505929	Cap	.595	0.24	0.0	.443
Y	7222832	R/SP3	.026	-	-	.026
Z	7283431	Cap	.150	-0.12	0.0	.103
	7283432	R/SP3	.028	-	-	.028
AA	7344231	Cap	.150	-0.12	0.0	.102
	7344232	R/SP3	.026	-	-	.026
BB	7425031	Cap	.150	-0.12	0.0	.101
	7425032	R/SP3	.025	-	-	.025
CC	7505931	Cap	.150	-0.12	0.0	.100
	7505932	R/SP3	.023	-	-	.023
DD	7222838	R/SP3	.026	-	-	.026
EE	7283438	R/SP3	.028	-	-	.028
	7283439	Cap	.200	0.11	0.0	.154
FF	7344238	R/SP3	.026	-	-	.026
	7344239	Cap	.200	0.11	0.0	.152
GG	7425038	R/SP3	.025	-	-	.025
	7425039	Cap	.200	0.11	0.0	.150
HH	7505938	R/SP3	.023	-	-	.023
	7505939	Cap	.200	0.11	0.0	.149

CBAR ELEMENT DATA

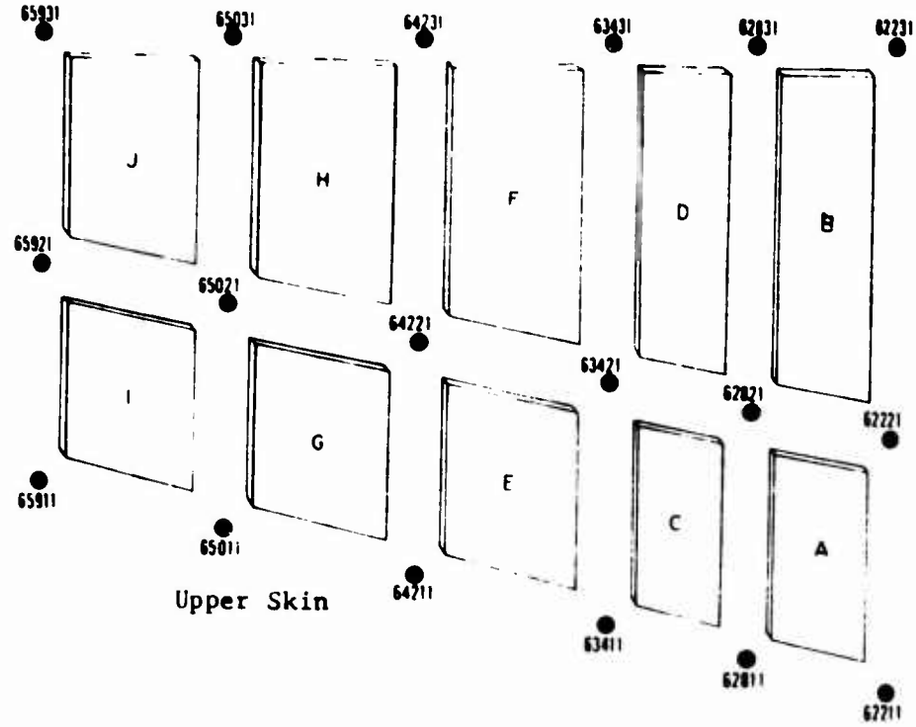
LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
F (1)	7222813	1.790	0.209	1.023	0.100
G (1)	7222817	1.355	0.072	0.680	0.046
M (1)	7222821	1.341	0.523	0.996	0.009
R (1)	7222824	1.450	0.147	0.635	0.009
S (1)	7222826	1.410	0.150	0.656	0.009
T (1)	7222829	0.979	0.217	0.863	0.009
Y (1)	7222831	0.423	0.044	0.321	0.009
DD (1)	7222839	0.259	0.012	0.117	0.014

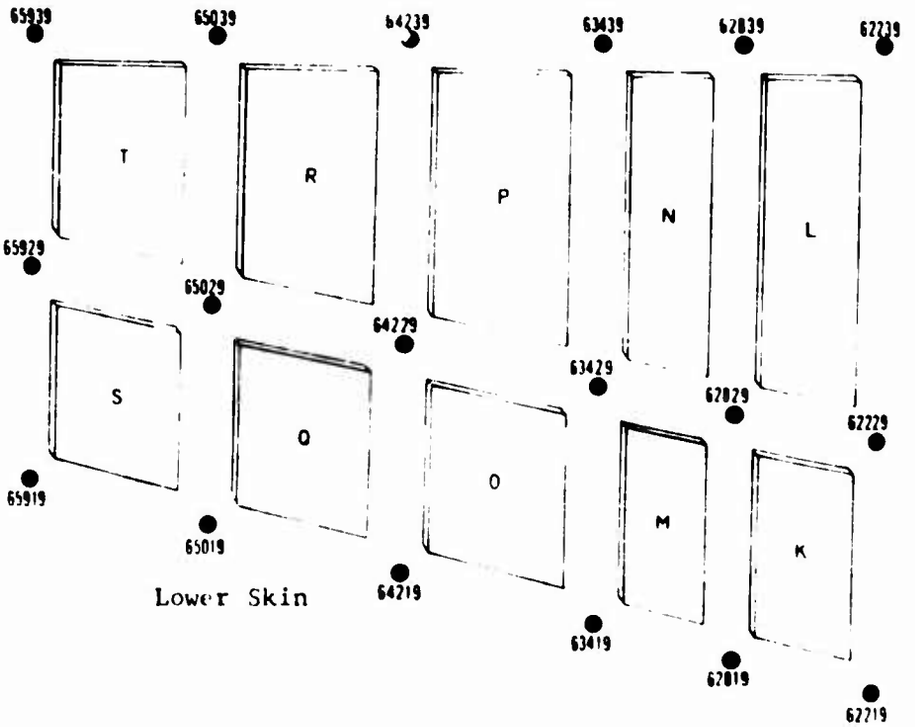
NOTES -

(1) Pin flags at End B: 456

3.2.2.5 Right Wing Skins Detail

View looking down





GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
62211	456	AAA	-	-	123	DDD
62219	456	AAA	-	-	123	DDD
62221	-	-	-	-	123456	DDDAAA
62229	-	-	-	-	123456	DDDAAA
62231	-	-	-	-	123456	DDDAAA
62239	-	-	-	-	123456	DDDAAA
62811	456	AAA	-	-	123	CDC
62819	456	AAA	-	-	12	CD
62821	456	AAA	-	-	123	CDC
62829	456	AAA	-	-	3	C
62831	456	AAA	-	-	123	CDC
62839	456	AAA	-	-	12	CD
63411	456	AAA	-	-	123	CDC
63419	456	AAA	-	-	123	CDC
63421	456	AAA	-	-	3	C
63429	456	AAA	-	-	12	CD
63431	456	AAA	-	-	123	CDC
63439	456	AAA	-	-	123	CDC
64211	456	AAA	-	-	123	CDC
64219	456	AAA	-	-	12	CD
64221	456	AAA	-	-	123	CDC
64229	-	-	456	AAA	-	-
64231	456	AAA	-	-	123	CDC
64239	456	AAA	-	-	12	CD
65021	456	AAA	-	-	123	CDC
65019	456	AAA	-	-	123	CDC
65021	456	AAA	-	-	3	C
65029	456	AAA	-	-	12	CD
65031	456	AAA	-	-	123	CDC
65039	456	AAA	-	-	123	CDC
65911	456	AAA	-	-	123	CDC
65919	456	AAA	-	-	12	CD
65921	456	AAA	-	-	123	CDC

GRID POINT DATA (CONT.)

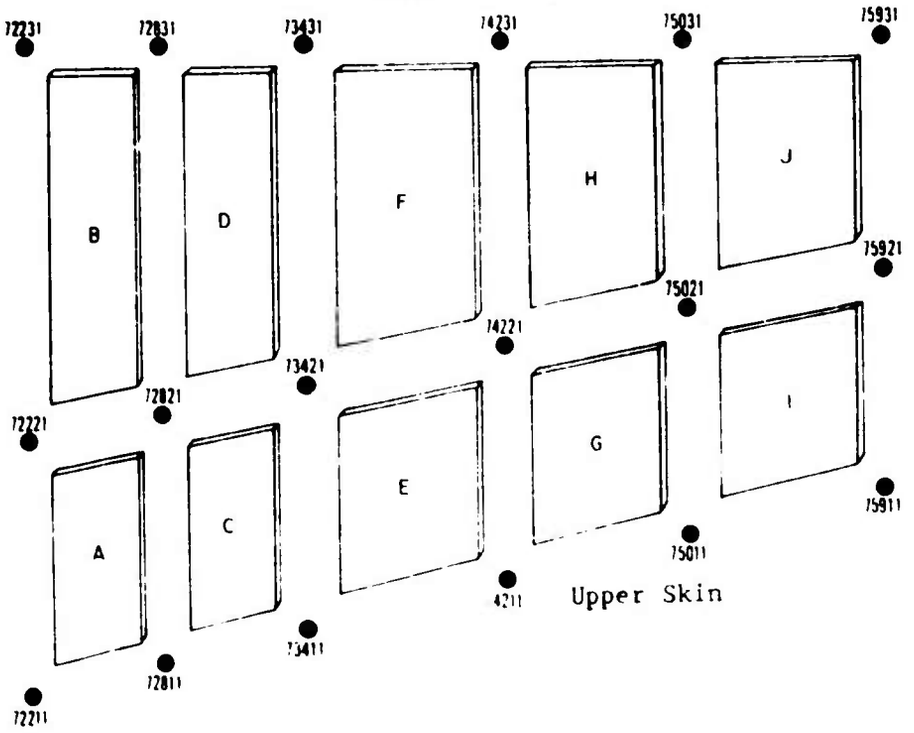
GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
65929	-	-	456	AAA	-	-
65931	456	AAA	-	-	123	CDC
65939	456	AAA	-	-	12	CD

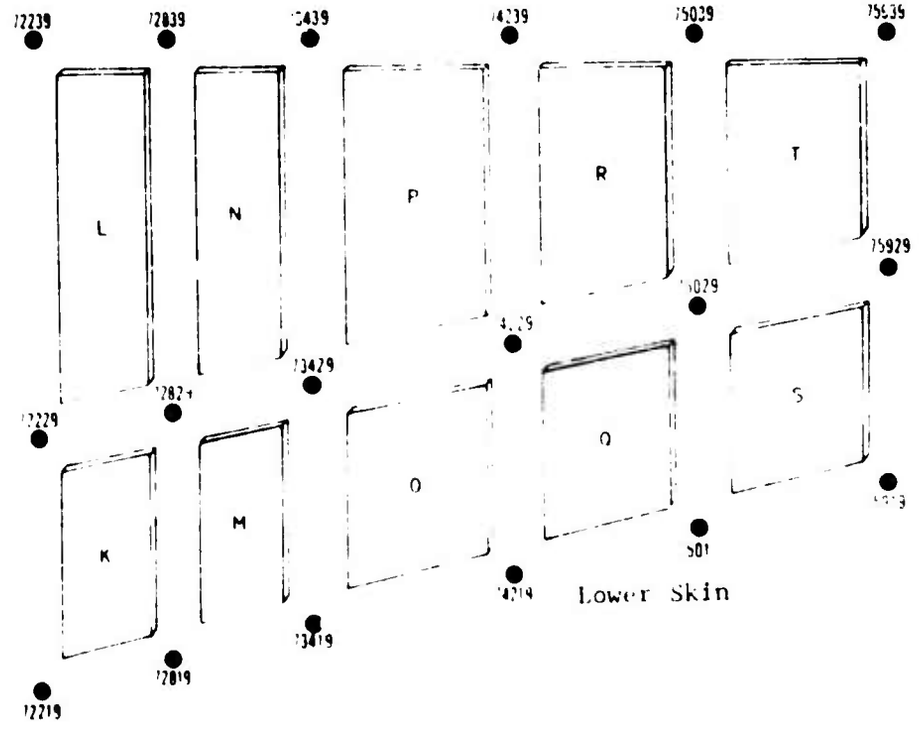
SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	6221121	Upper Skin	.063
B	6222131	Upper Skin	.063
C	6281121	Upper Skin	.063
D	6282131	Upper Skin	.063
E	6341121	Upper Skin	.063
F	6342131	Upper Skin	.063
G	6421121	Upper Skin	.063
H	6422131	Upper Skin	.063
I	6501121	Upper Skin	.063
J	6502131	Upper Skin	.063
K	6221929	Lower Skin	.063
L	6222939	Lower Skin	.063
M	6281929	Lower Skin	.063
N	6282939	Lower Skin	.063
O	6341929	Lower Skin	.063
P	6342939	Lower Skin	.063
Q	6421929	Lower Skin	.063
R	6422939	Lower Skin	.063
S	6501929	Lower Skin	.063
T	6502939	Lower Skin	.063

3.2.2.6 Left Wing Skins Detail

View looking down





GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
72211	456	AAA	-	-	123	DDD
72219	456	AAA	-	-	123	DDD
72221	-	-	-	-	123456	DDDAAA
72229	-	-	-	-	123456	DDDAAA
72231	-	-	-	-	123456	DDDAAA
72239	-	-	-	-	123456	DDDAAA
72811	456	AAA	-	-	123	CDC
72819	456	AAA	-	-	12	CD
72821	456	AAA	-	-	123	CDC
72829	456	AAA	-	-	3	C
72831	456	AAA	-	-	123	CDC
72839	456	AAA	-	-	12	CD
73411	456	AAA	-	-	123	CDC
73419	456	AAA	-	-	123	CDC
73421	456	AAA	-	-	3	C
73429	456	AAA	-	-	12	CD
73431	456	AAA	-	-	123	CDC
73439	456	AAA	-	-	123	CDC
74211	456	AAA	-	-	123	CDC
74219	456	AAA	-	-	12	CD
74221	456	AAA	-	-	123	CDC
74229	-	-	456	AAA	-	-
74231	456	AAA	-	-	123	CDC
74239	456	AAA	-	-	12	CD
75011	456	AAA	-	-	123	CDC
75019	456	AAA	-	-	123	CDC
75021	456	AAA	-	-	3	C
75029	456	AAA	-	-	12	CD
75031	456	AAA	-	-	123	CDC
75039	456	AAA	-	-	123	CDC
75911	456	AAA	-	-	123	CDC
75919	456	AAA	-	-	12	CD
75921	456	AAA	-	-	123	CDC

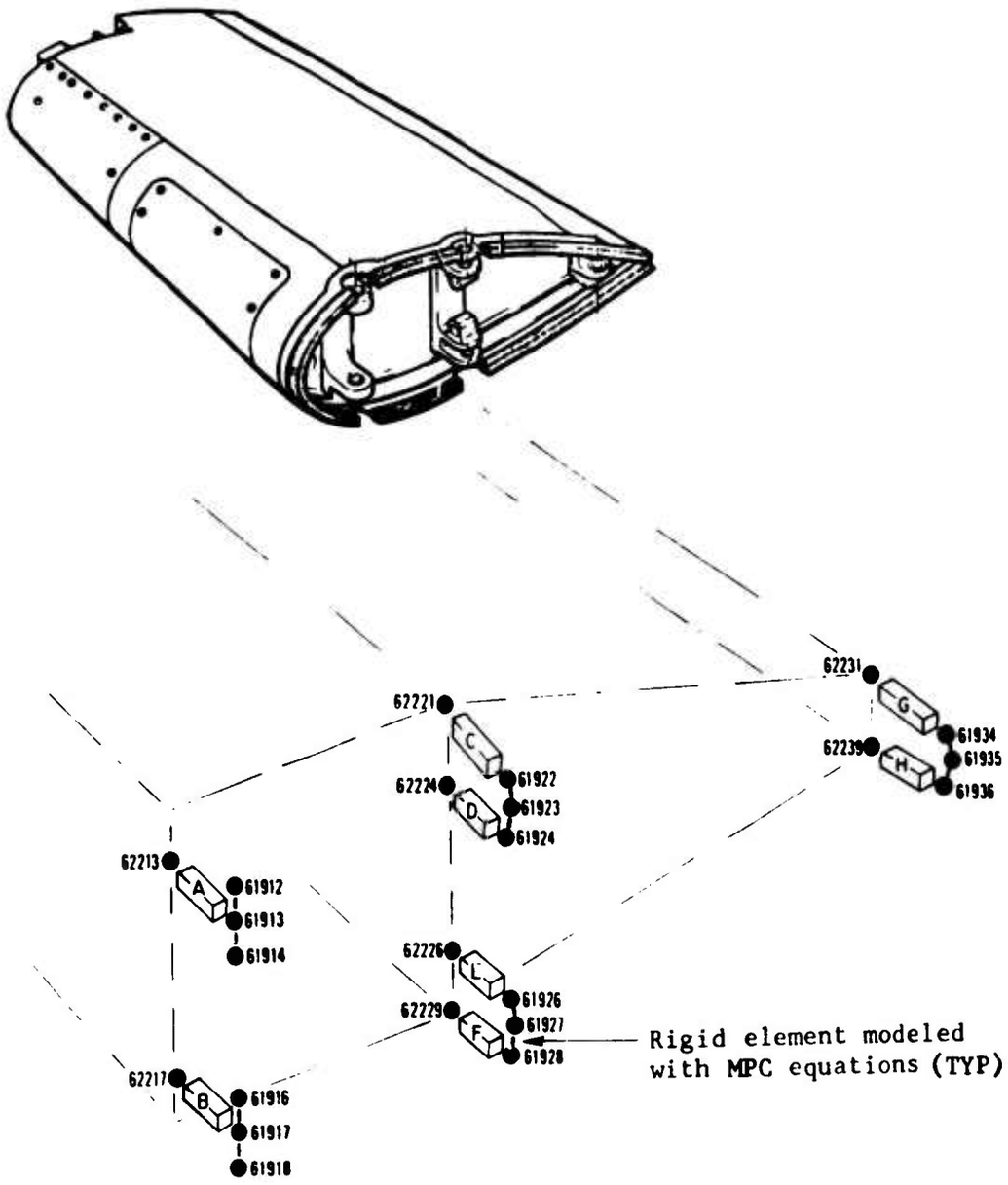
GRID POINT DATA (CONT.)

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
75929	-	-	456	AAA	-	-
75931	456	AAA	-	-	123	CDC
75939	456	AAA	-	-	12	CD

SHEAR PANEL/MEMBRANE ELEMENT DATA

Letter Designation	NASTRAN EID	Type	Thickness (IN.)
A	7221121	Upper Skin	.063
B	7222131	Upper Skin	.063
C	7281121	Upper Skin	.063
D	7282131	Upper Skin	.063
E	7341121	Upper Skin	.063
F	7342131	Upper Skin	.063
G	7421121	Upper Skin	.063
H	7422131	Upper Skin	.063
I	7501121	Upper Skin	.063
J	7502131	Upper Skin	.063
K	7221929	Lower Skin	.063
L	7222939	Lower Skin	.063
M	7281929	Lower Skin	.063
N	7282939	Lower Skin	.063
O	7341929	Lower Skin	.063
P	7342939	Lower Skin	.063
Q	7421929	Lower Skin	.063
R	7422939	Lower Skin	.063
S	7501929	Lower Skin	.063
T	7502939	Lower Skin	.063

3.2.2.7 Right Wing Lugs Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
61912	-	-	345	AAA	126	DDA
61913	-	-	1245	AAAA	36	DA
61914	-	-	345	AAA	126	DDA
61916	-	-	345	AAA	126	DDA
61917	-	-	1245	AAAA	36	DA
61918	-	-	345	AAA	126	DDA
61922	-	-	345	AAA	126	DDA
61923	-	-	1245	AAAA	36	DA
61924	-	-	345	AAA	126	DDA
61926	-	-	345	AAA	126	DDA
61927	-	-	1245	AAAA	36	DA
61928	-	-	345	AAA	126	DDA
61934	-	-	345	AAA	126	DDA
61935	-	-	1245	AAAA	36	DA
61936	-	-	345	AAA	126	DDA
62213	-	-	-	-	123456	DDDAAA
62217	-	-	-	-	123456	DDDAAA
62221	-	-	-	-	123456	DDDAAA
62224	-	-	-	-	123456	DDDAAA
62226	-	-	-	-	123456	DDDAAA
62229	-	-	-	-	123456	DDDAAA
62231	-	-	-	-	123456	DDDAAA
62239	-	-	-	-	123456	DDDAAA

CBAR ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	6131922	1.321	0.433	0.916	0.995
B	6171922	1.550	0.166	0.666	0.457
C (1)	6221922	0.543	0.026	0.651	0.091
D	6241922	0.543	0.026	0.651	0.091
E	6261922	0.833	0.026	0.651	0.091
F (2)	6281922	0.833	0.026	0.651	0.091
G (3)	6341922	0.532	0.028	0.320	0.091
H	6361922	0.986	0.043	0.371	0.137

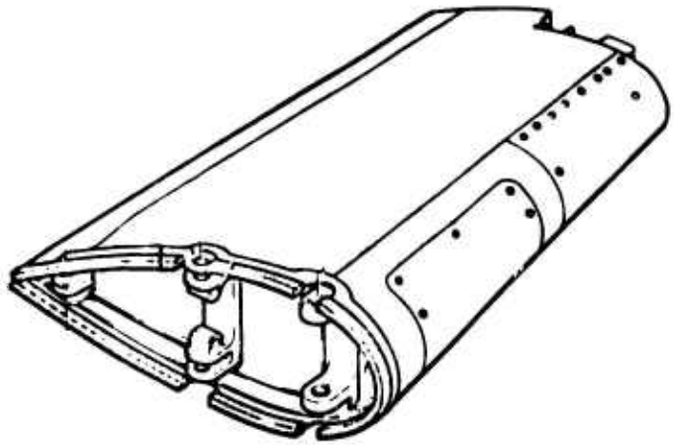
NOTES -

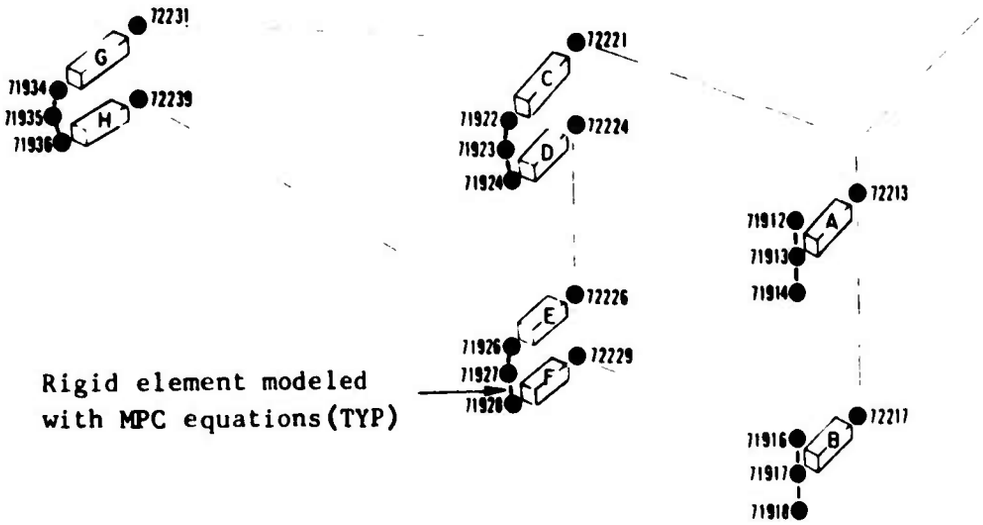
(1) Offsets at End B: x=0.0 in., y=0.0 in., z=-0.91 in.

(2) Offsets at End B: x=0.0 in., y=0.0 in., z= 0.27 in.

(3) Offsets at End B: x=0.0 in., y=0.0 in., z=-0.93 in.

3.2.2.8 Left Wing Lugs Detail





Rigid element modeled with MPC equations (TYP)

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
71912	-	-	345	AAA	126	DDA
71913	-	-	1245	AAAA	36	DA
71914	-	-	345	AAA	126	DDA
71916	-	-	345	AAA	126	DDA
71917	-	-	1245	AAAA	36	DA
71918	-	-	345	AAA	126	DDA
71922	-	-	345	AAA	126	DDA
71923	-	-	1245	AAAA	36	DA
71924	-	-	345	AAA	126	DDA
71926	-	-	345	AAA	126	DDA
71927	-	-	1245	AAAA	36	DA
71928	-	-	345	AAA	126	DDA
71934	-	-	345	AAA	126	DDA
71935	-	-	1245	AAAA	36	DA
71936	-	-	345	AAA	126	DDA
72213	-	-	-	-	123456	DDDAAA
72217	-	-	-	-	123456	DDDAAA
72221	-	-	-	-	123456	DDDAAA
72224	-	-	-	-	123456	DDDAAA
72226	-	-	-	-	123456	DDDAAA
72229	-	-	-	-	123456	DDDAAA
72231	-	-	-	-	123456	DDDAAA
72239	-	-	-	-	123456	DDDAAA

CBAR ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	7131922	1.321	0.433	0.916	0.995
B	7171922	1.550	0.166	0.666	0.457
C (1)	7221922	0.543	0.026	0.651	0.091
D	7241922	0.543	0.026	0.651	0.091
E	7261922	0.833	0.026	0.651	0.091
F (2)	7281922	0.833	0.026	0.651	0.091
G (3)	7341922	0.532	0.028	0.320	0.091
H	7361922	0.986	0.043	0.371	0.137

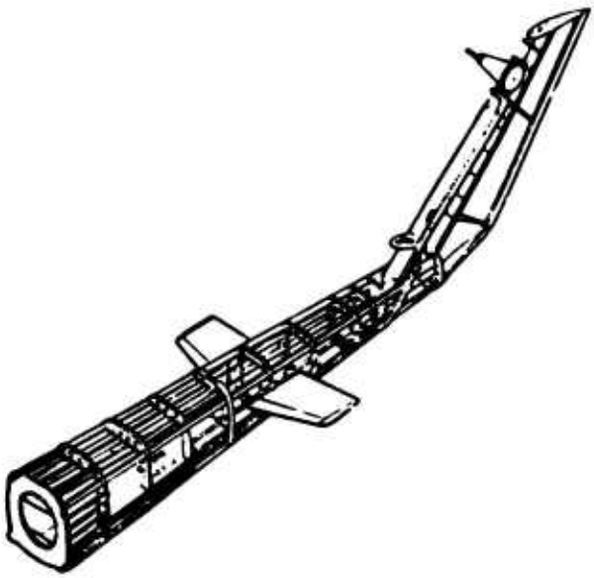
NOTES -

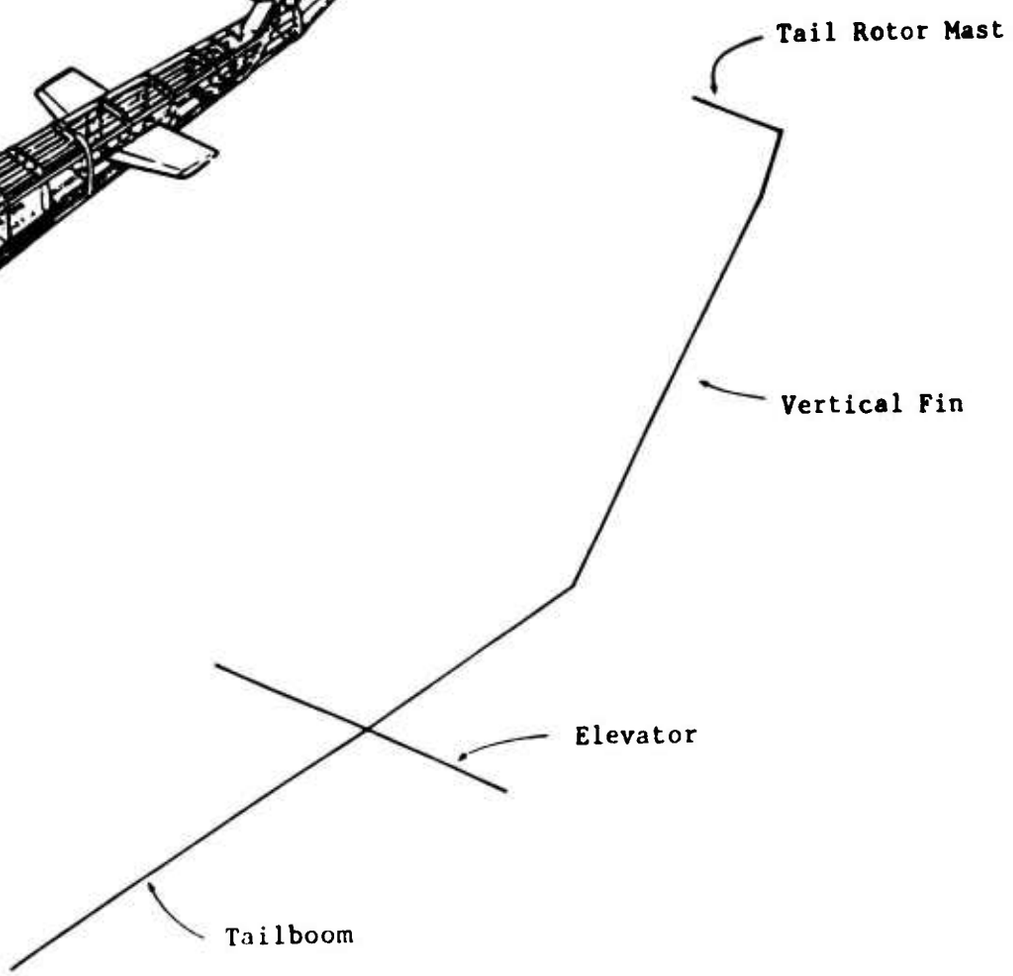
(1) Offsets at End B: x=0.0 in., y=0.0 in., z=-0.91 in.

(2) Offsets at End B: x=0.0 in., y=0.0 in., z= 0.27 in.

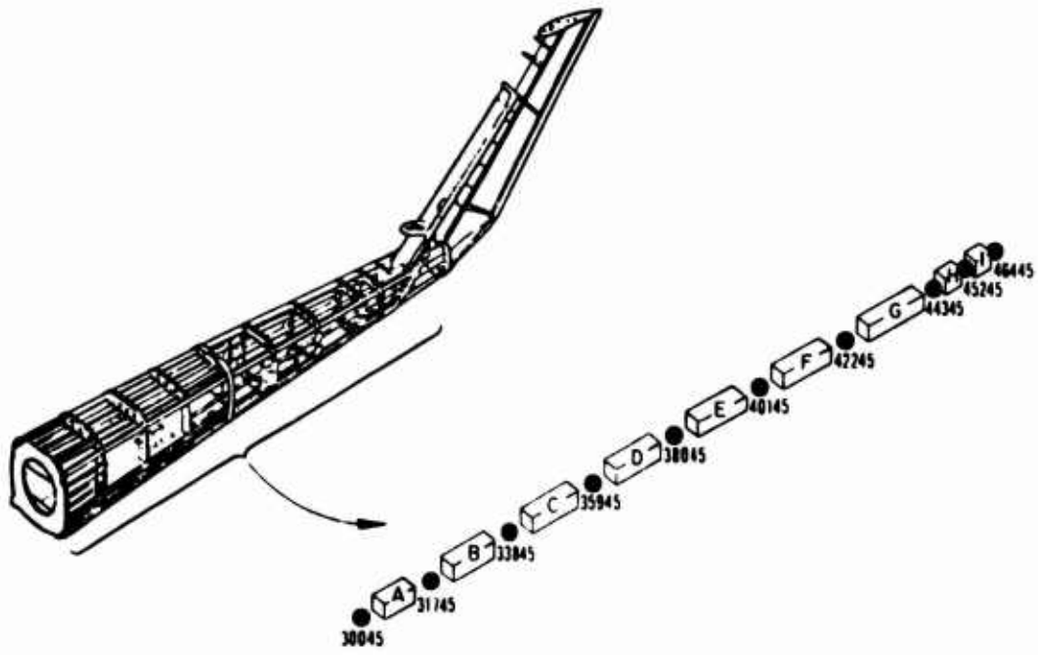
(3) Offsets at End B: x=0.0 in., y=0.0 in., z=-0.93 in.

3.3 TAILBOOM AND VERTICAL FIN MAJOR ASSEMBLY





3.3.2 Tailboom Subassembly and Detail



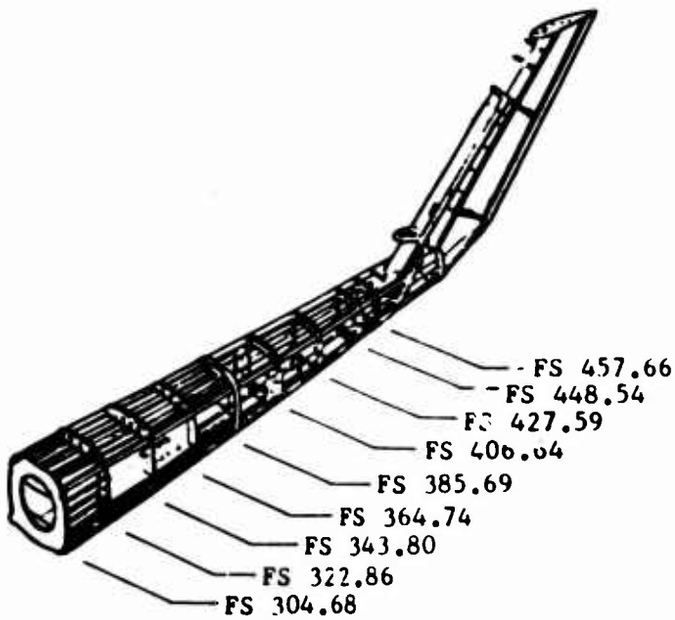
GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
30045	-	-	-	-	456	AAA
31745	-	-	-	-	12456	DBAAA
33845	-	-	-	-	13456	DBAAA
35945	-	-	-	-	12456	DBAAA
38045	-	-	-	-	13456	DBAAA
40145	-	-	-	-	456	AAA
42245	-	-	-	-	12456	DBAAA
44345	-	-	-	-	13456	DBAAA
45245	-	-	-	-	12456	DBAAA
46445	-	-	-	-	456	AAA

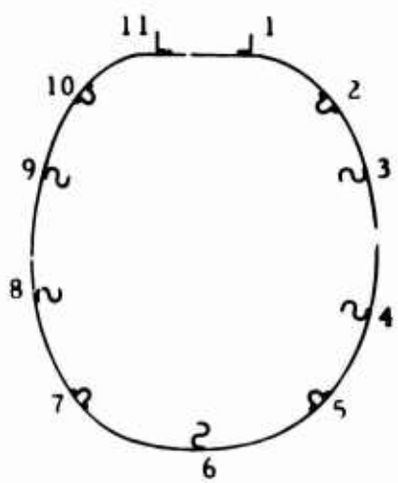
CBAR ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	3003170	4.070	594.72	489.37	831.65
B	3173380	4.520	600.01	446.37	596.95
C	3383590	3.951	442.91	321.60	466.00
D	3593800	3.690	316.50	266.43	355.73
E	3804010	3.577	219.23	230.38	278.33
F	4014220	3.497	169.75	182.84	220.43
G	4224430	3.311	125.97	135.12	158.63
H	4434520	3.294	107.66	104.24	117.30
I	4524640	3.386	110.39	96.00	107.1

3.3.2.1 Tailboom Section Properties and Stiffness Distribution



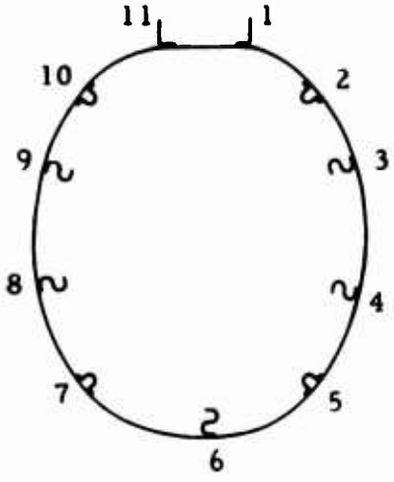
BOOM STATION 41.32 FS 304.68
REF AXIS AT W.L. 49.590 AND B.L. 0.0



ELEMENT NUMBER	AREA	Z'	Y'
1	0.0	19.674	3.887
2	0.6602	13.274	12.278
3	0.0	5.174	14.128
4	0.0	-3.276	14.108
5	0.8990	-11.476	12.078
6	0.0	-16.576	0.452
7	3.8230	-11.476	-11.422
8	0.0	-3.276	-13.452
9	0.0	5.174	-13.472
10	0.8250	13.274	-11.622
11	0.0	19.194	-3.262

SECTION PROPERTIES
AREA = 3.2052
IY = 488.25
IZ = 449.22
J = 995.51

BOOM STATION 59.50 FS 322.86
REF AXIS AT W.L. 50.714 AND B.L. 0.0

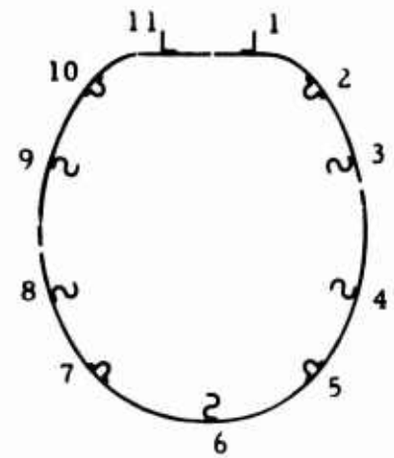


ELEMENT NUMBER	AREA	Z'	Y'
1	0.3259	16.808	2.869
2	0.5746	11.478	10.560
3	0.3380	3.978	12.200
4	0.3381	-4.067	12.220
5	0.8175	-11.772	10.330
6	0.3892	-16.652	-0.566
7	0.7385	-11.792	-11.740
8	0.3381	-4.067	-13.600
9	0.0	3.978	-13.580
10	0.7403	11.438	-11.860
11	0.3355	16.928	-4.280

SECTION PROPERTIES

AREA = 4.9358
IY = 701.20
IZ = 529.52
J = 667.80

BOOM STATION 80.44 FS 343.80
REF AXIS AT W.L. 52.015 AND B.L. 0.0

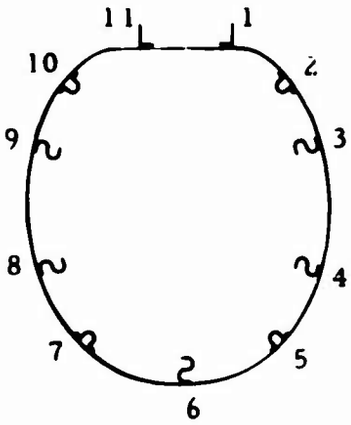


ELEMENT NUMBER	AREA	Z'	Y'
1	0.3083	15.288	2.250
2	0.5494	10.408	9.011
3	0.3229	3.538	10.561
4	0.3233	-3.912	10.596
5	0.5980	-11.082	8.871
6	0.3635	-15.582	-1.185
7	0.5601	-11.082	-11.489
8	0.3233	-3.912	-13.214
9	0.0	3.538	-13.179
10	0.4381	10.398	-11.619
11	0.3179	15.408	-4.899

SECTION PROPERTIES

AREA = 4.1048
IY = 498.81
IZ = 363.22
J = 526.11

BOOM STATION 101.38 FS 364.74
REF AXIS AT W.L. 53.314 AND B.L. 0.0

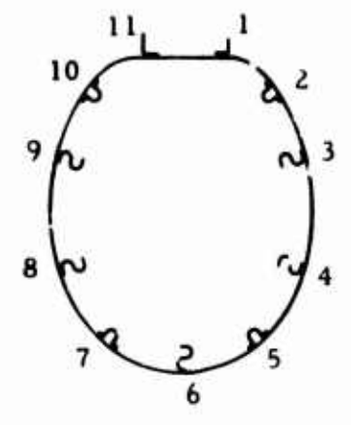


ELEMENT NUMBER	AREA	Z'	Y'
1	0.2912	14.082	2.222
2	0.5246	9.672	8.063
3	0.3076	3.392	9.513
4	0.3083	-3.468	9.563
5	0.5400	-10.038	7.963
6	0.3381	-14.178	-1.213
7	0.5400	-10.038	-10.637
8	0.3083	-3.468	-12.237
9	0.0	3.392	-12.187
10	0.3392	9.672	-10.737
11	0.3008	14.212	-4.927

SECTION PROPERTIES

AREA = 3.7979
IY = 387.02
IZ = 279.98
J = 405.83

BOOM STATION 122.33 FS 385.69
REF AXIS AT W.L. 54.613 AND B.L. 0.0

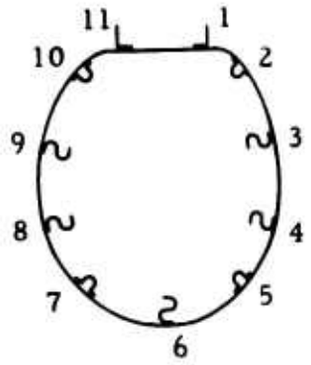


ELEMENT NUMBER	AREA	Z'	Y'
1	0.2736	11.397	3.129
2	0.4993	7.467	8.100
3	0.2925	1.797	9.425
4	0.2935	-4.453	9.445
5	0.5198	-10.473	7.960
6	0.0	-14.268	-0.306
7	0.5198	-10.473	-8.820
8	0.2935	-4.453	-10.305
9	0.2925	1.797	-10.285
10	0.3139	7.467	-8.960
11	0.2832	11.517	-4.020

SECTION PROPERTIES

AREA = 3.5816
IY = 245.99
IZ = 252.87
J = 305.58

BOOM STATION 143.28 FS 406.64
REF AXIS AT W.L. 55.912 AND B.L. 0.0

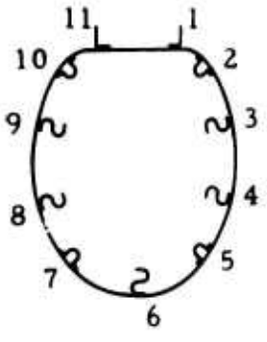


ELEMENT NUMBER	AREA	Z'	Y'
1	0.2565	10.461	3.308
2	0.4316	7.001	7.389
3	0.3167	1.911	8.599
4	0.3185	-3.719	8.629
5	0.5198	-9.159	7.244
6	0.0	-12.609	-0.127
7	0.5198	-9.159	-7.746
8	0.3185	-3.719	-9.131
9	0.3167	1.911	-9.101
10	0.3087	7.001	-7.891
11	0.2661	10.581	-3.841

SECTION PROPERTIES

AREA = 3.5728
IY = 192.47
IZ = 207.90
J = 251.09

BOOM STATION 164.23 FS 427.59
REF AXIS AT W.L. 57.210 AND B.L. 0.0

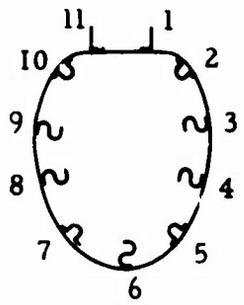


ELEMENT NUMBER	AREA	Z'	Y'
1	0.2389	9.420	3.325
2	0.4044	6.470	6.616
3	0.2972	1.950	7.601
4	0.2996	-3.070	7.626
5	0.5269	-7.950	6.376
6	0.0	-11.055	-0.110
7	0.5268	-7.950	-6.944
8	0.2996	-3.070	-8.094
9	0.2972	1.950	-8.069
10	0.2815	6.470	-7.094
11	0.2485	9.540	-3.824

SECTION PROPERTIES

AREA = 3.4206
IY = 147.03
IZ = 157.77
J = 189.76

BOOM STATION 185.18 FS 448.54
REF AXIS AT W.L. 58.510 AND B.L. 0.0

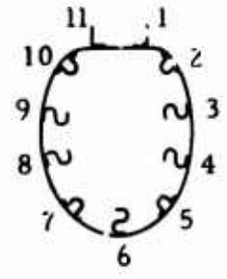


ELEMENT NUMBER	AREA	Z'	Y'
1	0.2217	8.227	3.347
2	0.3774	5.687	5.658
3	0.2779	1.827	6.618
4	0.2804	-2.588	6.658
5	0.5008	-6.903	3.498
6	0.0	-9.643	-0.088
7	0.5008	-6.903	-5.922
8	0.2804	-2.588	-7.082
9	0.2779	1.827	-7.042
10	0.2545	5.687	-6.082
11	0.2313	8.352	-3.802

SECTION PROPERTIES

AREA = 3.2031
IY = 104.92
IZ = 112.47
J = 127.49

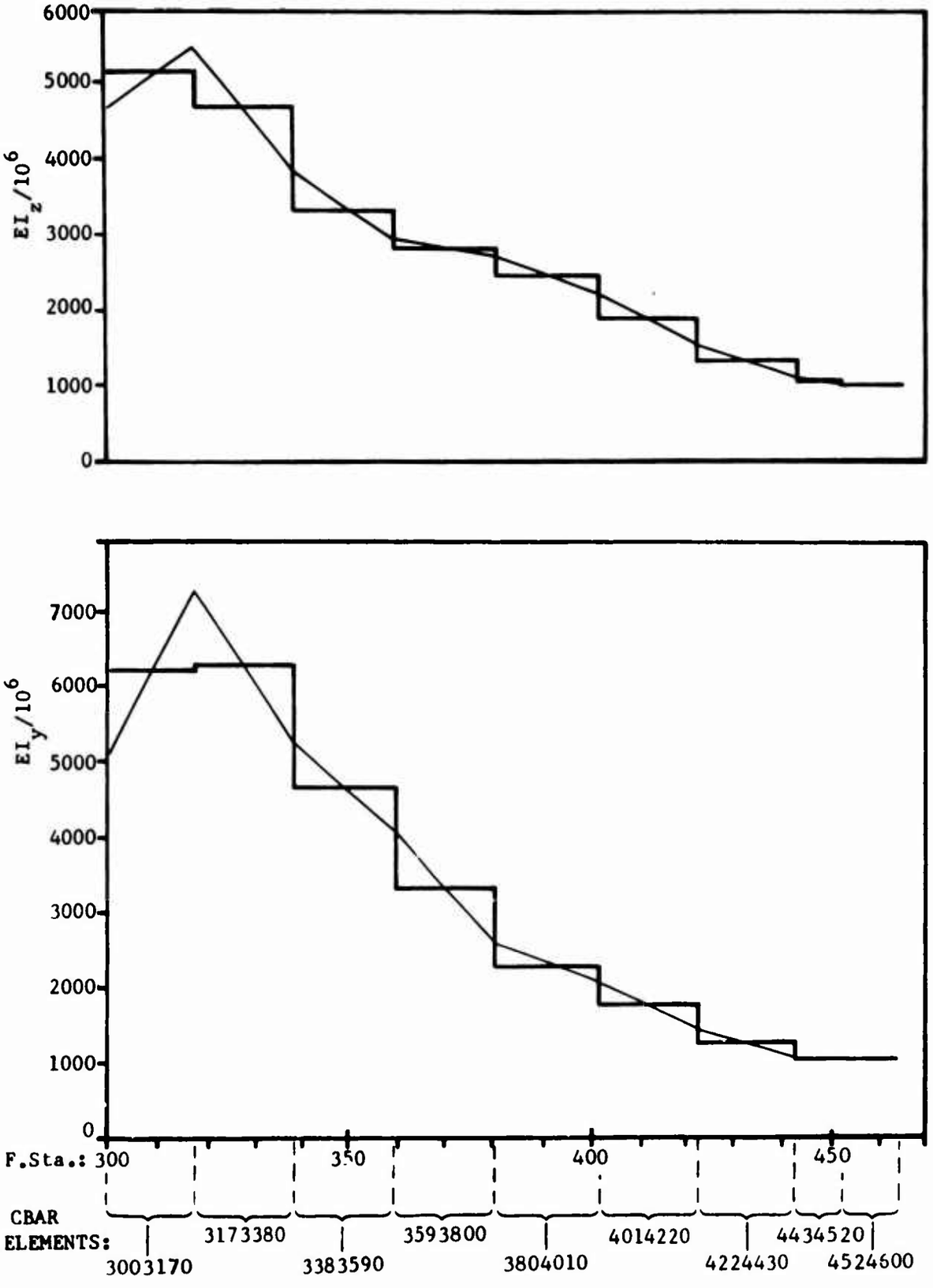
BOOM STATION 194.30 FS 457.66
REF AXIS AT W.L. 59.075 AND B.L. 0.0

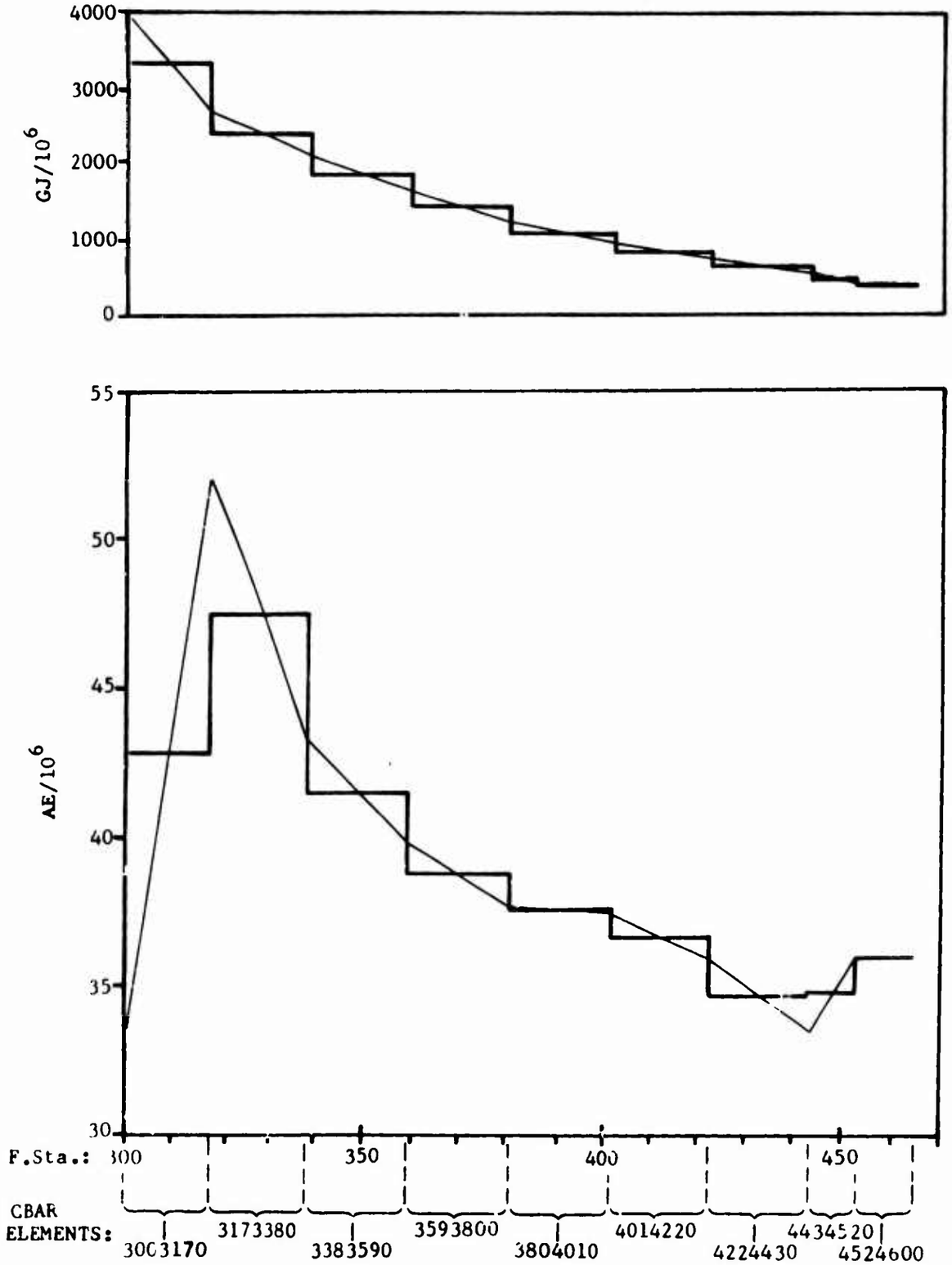


ELEMENT NUMBER	AREA	Z'	Y'
1	0.2142	8.435	3.362
2	0.3657	6.130	5.278
3	0.2695	2.490	6.178
4	0.2729	-1.665	6.233
5	0.4907	-5.725	5.128
6	0.2729	-8.310	-0.073
7	0.4907	-5.725	-5.522
8	0.2729	-1.665	-6.627
9	0.2695	2.490	-6.572
10	0.2428	6.130	-5.672
11	0.2238	8.565	-3.787

SECTION PROPERTIES

AREA = 3.3854
IY = 110.39
IZ = 96.00
J = 107.09


6000
5000
4000
3000
2000
1000
0
$EI_z/10^6$
7000
6000
5000
4000
3000
2000
1000
0
$EI_y/10^6$
F.Sta.: 300
350
400
450
CBAR
ELEMENTS:
3003170
3173380
3383590
3593800
3804010
4014220
4224430
4434520
4524600


4000
3000
2000
1000
0
GJ/10^6
55
50
45
40
35
30
AE/10^6
F.Sta.: 300
350
400
450
CBAR
ELEMENTS:
3003170
3173380
3383590
3593800
3804010
4014220
4224430
4434520
4524600

3.3.2.2 Tailboom Bending Stiffness for Maneuver Conditions

A computer program SFCR02 described in Reference 9, calculates the bending stiffness section properties for a given shear and bending moment distribution due to flight maneuver loads. The tailboom, constructed of longerons, stringers, and aluminum skin, has some skin width on either side of the axial members effective in reacting bending loads. All of the skin is assumed effective when the axial member is in tension and the amount of effective skin decreases as the compressive load in the member increases.

The program determines the section properties, unsymmetrical bending stresses, element loads and shear flows for a single cell torque box. Figure 3-1 shows typical input geometry data defining the skin contour and centroids of axial members (stringers and longerons). Section properties are computed from the input geometry. This includes mounted axis location, shear center location, moments of inertia about the neutral axes, maximum and minimum moments of inertia, angle to principal axis and torsional stiffness. The skin area is lumped at the centroid of the axial members in the neutral axis and moment of inertia calculations which would result in the bending stiffness being slightly low since the skin area should be acting at contour. Bending moments are computed at the neutral axis and torsion is computed at the reference axis for the first condition. Bending stresses are computed by use of the standard unsymmetrical bending equation:

$$f_b = \frac{M'_y I_{yz} - M'_z I_y}{I_y I_z - I_{yz}^2} \cdot Y + \frac{M'_z I_{yz} - M'_y I_z}{I_y I_z - I_{yz}^2} \cdot Z' \qquad \text{Ref. (10)}$$

Element loads are then computed at this station. The same process is repeated at the next station aft.

Using the previously calculated stress levels, an effective skin width, W, on either side of each element is found by using the following equation:

$$W = .85t \sqrt{\frac{E_c}{f_c}} \qquad \text{Ref. (10)}$$

Where $E_c = 10.5 \times 10^6$ psi (entire structure based on aluminum)

f_c = Computed compression stress

t = Skin thickness in equivalent aluminum

This equation is based on flat sheets and should be conservative for the curved tailboom skin resulting in the bending stiffness calculations being low. A limit of W equals one-half of the arc length between elements is applied to this equation. If f_b is tension (+) then W equals one-half the arc length. New areas are computed for each element and section properties and bending stresses are calculated. New effective skin widths are found, based on the new stress levels, and compared with the previous widths. If a five percent (5%) difference is evident the process continues up to a maximum of ten (10) iterations.

The computed vertical and lateral bending stiffnesses for the tailboom are listed in Table 3-1 for the following maneuver conditions.

(1) Maximum speed - power on

(2) Symmetric pullout

(3) Rolling pullout - tail rotor thrust, right

(4) Rolling pullout - tail rotor thrust, left

(5) Yaw +15° (nose right) and recover - forward cg

(6) Yaw -15° (nose left) and recover - forward cg

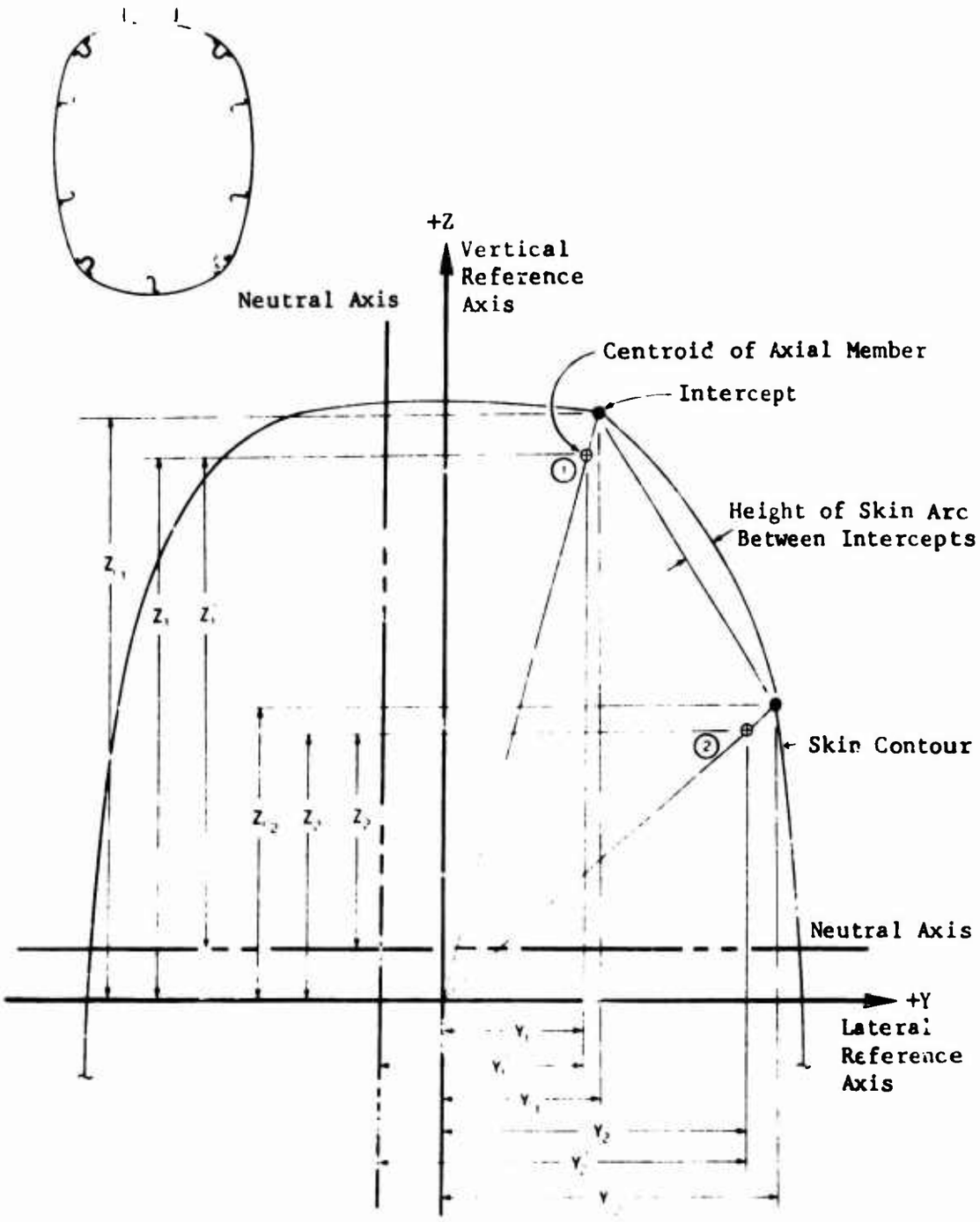


Figure 3-1. SFCR02 Input Geometry for a Typical Tailboom Section

TABLE 3-1. TAILBOOM BENDING STIFFNESS FOR MANEUVER CONDITIONS

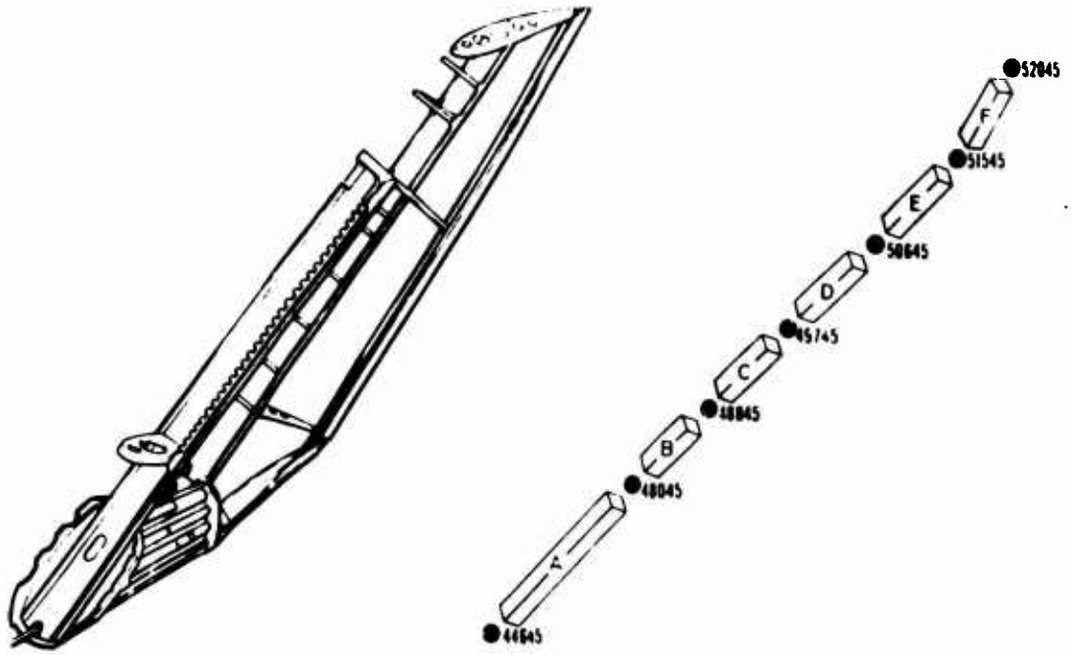
$EI_y/10^6$ (Lateral Stiffness)

FLT. CONDITION \ STATION	299.570	317.715	338.614	359.514	380.424	401.333	422.243	443.153	452.255
BASELINE	5126.63	7362.60	5237.51	4063.71	2582.90	2020.94	1543.82	1101.62	1124.45
MAXSPEED	4381.86	5974.33	4022.03	3168.80	2303.18	1835.19	1428.32	1044.33	1090.85
SYMMETRIC PULLOUT	4130.19	5451.60	3659.57	2920.26	2126.88	1759.49	1396.82	1035.51	1027.85
ROLLING PULLOUT TAIL ROTOR THRUST RT.	4215.65	5750.85	3925.64	3085.85	2264.33	1720.95	1335.81	969.99	965.69
ROLLING PULLOUT TAIL ROTOR THRUST LFT.	4169.34	5460.32	3647.70	2930.97	2154.39	1808.00	1434.09	1048.43	1058.61
YAW +15° AND RECOVER FWD cg	4129.44	5200.13	3572.52	2815.68	2043.51	1602.20	1248.56	916.23	913.19
YAW -15° AND RECOVER-FWD cg	4187.30	5511.35	3692.83	2717.51	2031.96	1608.92	1253.49	921.38	938.49

$EI_z/10^6$ (Vertical Stiffness)

FLT. CONDITION \ STATION	299.570	317.715	338.614	359.514	380.424	401.333	422.243	443.153	452.255
BASELINE	4716.81	5559.96	3813.81	2939.79	2655.14	2182.95	1656.59	1180.94	1008.00
MAXSPEED	3959.97	4532.85	3086.06	2420.57	2218.34	1877.72	1482.39	1102.40	963.27
SYMMETRIC PULLOUT	3861.38	4436.04	2991.87	2342.34	2187.05	1866.48	1470.95	1094.52	953.19
ROLLING PULLOUT TAIL ROTOR THRUST RT.	3697.79	4366.22	2970.66	2333.94	2131.92	1753.50	1376.55	1020.08	887.57
ROLLING PULLOUT TAIL ROTOR THRUST LFT.	3891.72	4507.97	2955.02	2326.80	2203.11	1935.89	1520.51	1115.21	967.68
YAW +15° AND RECOVER-FWD cg	3524.12	4177.32	2959.36	2247.80	2039.84	1666.88	1308.83	973.14	848.82
YAW -15° AND RECOVER-FWD cg	3718.47	4347.74	2619.33	1997.94	1914.47	1619.31	1277.64	956.86	838.22

3.3.2 Vertical Fin Subassembly and Detail

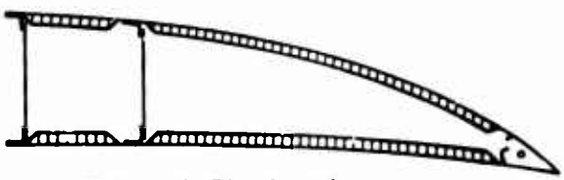


GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
46445	-	-	-	-	456	AAA
48045	-	-	-	-	23456	DDAAA
48845	-	-	-	-	1456	DAAA
49745	-	-	-	-	3456	DAAA
50645	-	-	-	-	12456	DDAAA
51545	-	-	-	-	3456	DAAA
52045	-	-	-	-	456	AAA

CBAR ELEMENT DATA

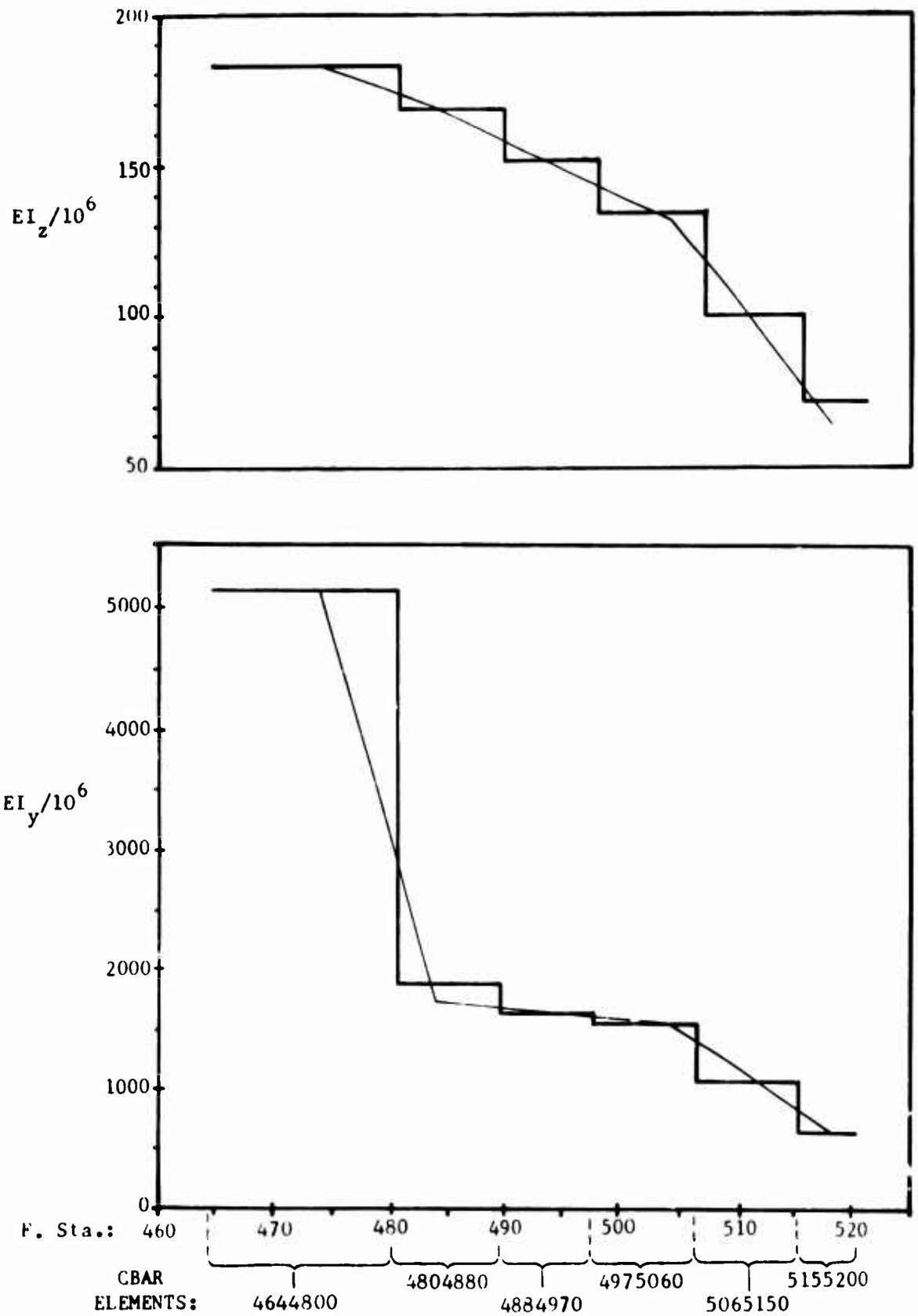
LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	4644800	3.667	490.48	30.50	28.375
B	4804880	3.346	180.95	28.00	20.300
C	4884970	3.114	154.29	25.33	17.250
D	4975060	2.881	146.67	22.50	14.200
E	5065150	2.652	100.95	16.83	12.125
F	5155200	2.424	61.90	12.00	10.925

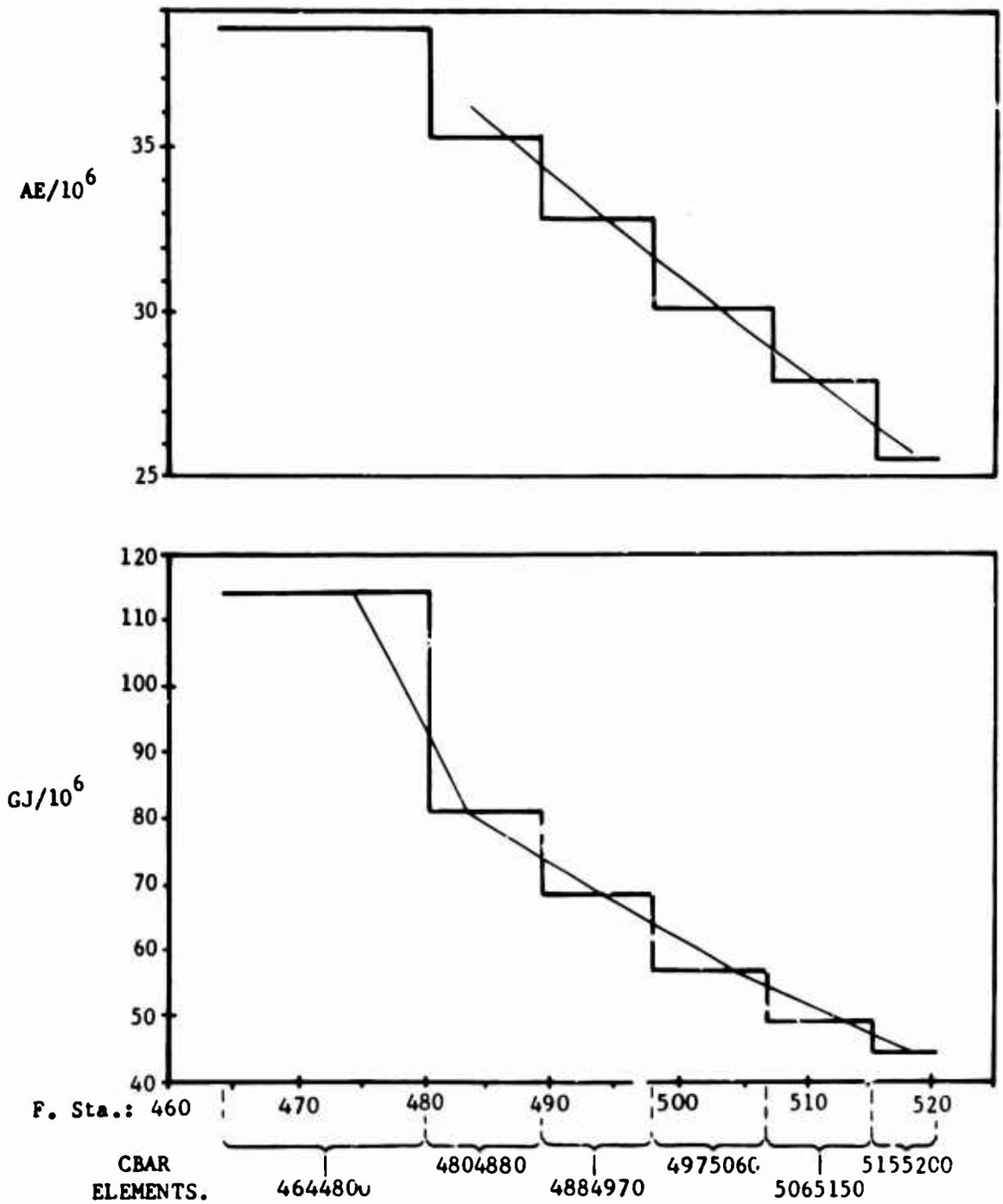


Typical Fin Section

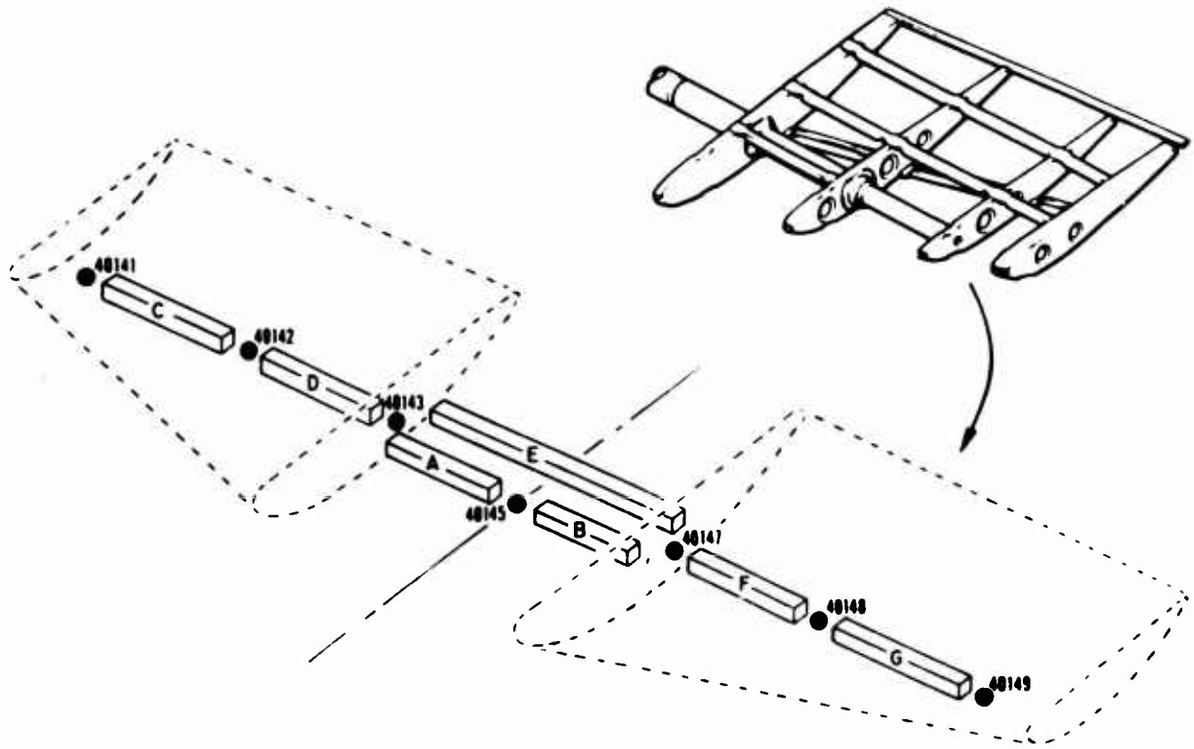
Bending Section Used for Stiffness Calculations

3.3.2.1 Vertical Fin Stiffness Distribution




AE/10^6
35
30
25
GJ/10^6
120
110
100
90
80
70
60
50
40
F. Sta.: 460
470
480
490
500
510
520
CBAR ELEMENTS.
4644800
4804880
4884970
4975060
5065150
5155200

3.3.3 Elevator Subassembly and Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
40141	-	-	-	-	2456	DAAA
40142	-	-	-	-	123456	BDBAAA
40143	-	-	-	-	123456	BDBAAA
40145	-	-	-	-	456	AAA
40147	-	-	-	-	123456	BDBAAA
40148	-	-	-	-	123456	BDBAAA
40149	-	-	-	-	2456	DAAA

CBAR ELEMENT DATA

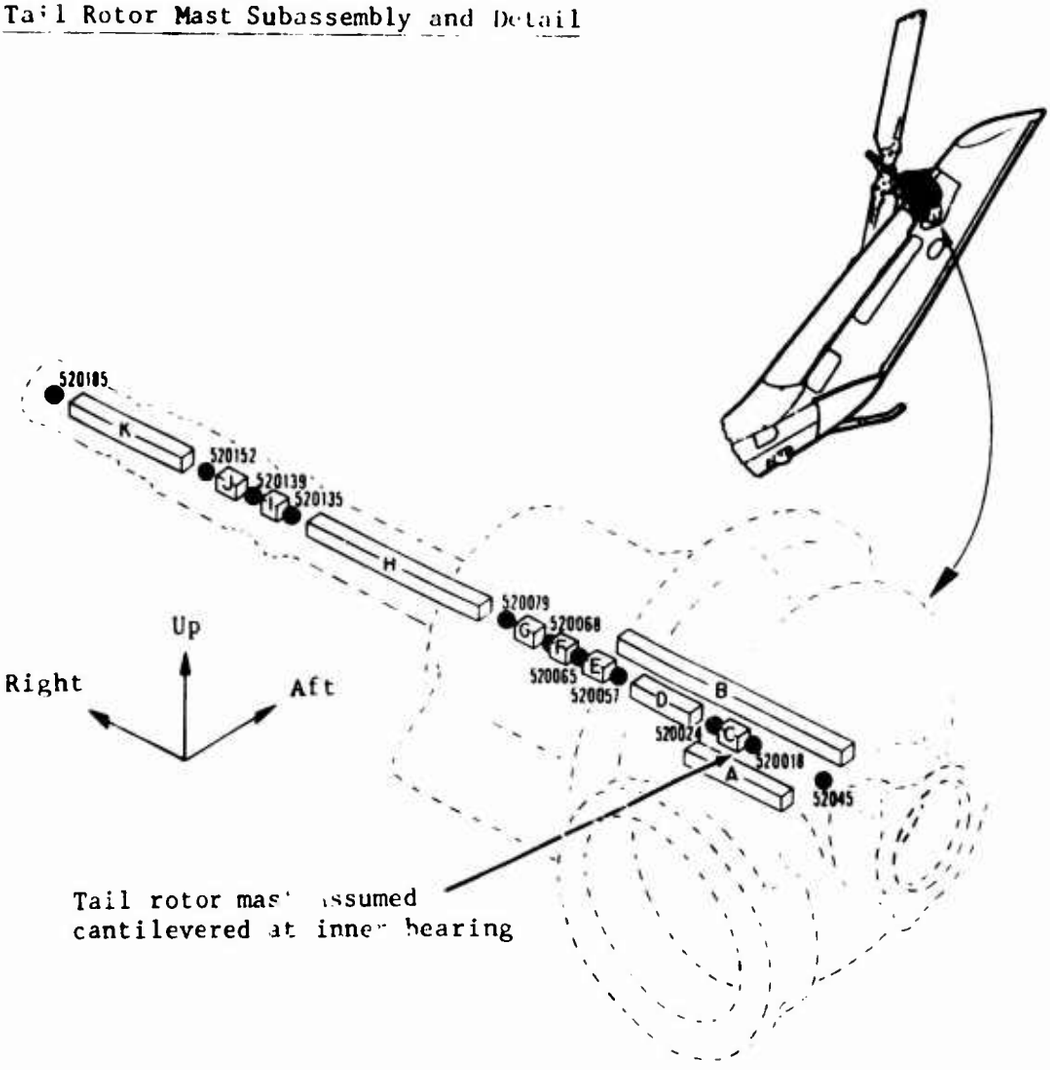
LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A (1)	4014345	2.314	1.353	1.353	2.706
B (2)	4014547	2.314	1.353	1.353	2.706
C	4014142	0.947	0.451	0.451	0.901
D	4014243	1.675	0.894	0.894	1.788
E	4014347	2.314	1.353	1.353	2.706
F	4014748	1.675	0.894	0.894	1.788
G	4014849	0.947	0.451	0.451	0.901

NOTES -

(1) Pin flags at End A: 56

(2) Pin flags at End B: 56

3.3.4 Tail Rotor Mast Subassembly and Detail



GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
52045	-	-	-	-	456	AAA
520018	-	-	-	-	2456	DAAA
520024	-	-	-	-	123456	BDBAAA
520057	-	-	-	-	2456	DAAA
520065	-	-	-	-	123456	BDBAAA
520068	-	-	-	-	123456	BDBAAA
520079	-	-	-	-	2456	DAAA
520135	-	-	-	-	123456	BDBAAA

GRID POINT DATA (CONT.)

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE	D.O.F.	RULE	D.O.F.	RULE
520139	-	-	-	-	2456	DAAA
520152	-	-	-	-	456	AAA
520185	-	-	-	-	123456	BDBAAA

CBAR ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	SECTION PROPERTIES			
		AREA ($in.^2$)	INERTIA-PLANE 1 ($in.^4$)	INERTIA-PLANE 2 ($in.^4$)	TORSION ($in.^4$)
A	4000071	10.000	3.250	3.250	6.500
B (1)	4000072	10.000	3.250	3.250	6.500
C	4020091	1.109	0.239	0.239	0.479
D	4020092	0.936	0.191	0.191	0.382
E	4020093	0.944	0.164	0.164	0.327
F	4020094	1.003	0.179	0.179	0.358
G	4020095	1.124	0.184	0.184	0.368
H	4020096	0.818	0.115	0.115	0.230
I	4020097	0.644	0.079	0.079	0.159
J	4020098	0.651	0.081	0.081	0.162
K	4020099	0.651	0.081	0.081	0.162

NOTES -

(1) Pin flags at End B: 45o

4. WEIGHTS MODELING

Most of the approximately 5700 weight items in the helicopter are distributed automatically to the grid points of the NASTRAN model; however, useful loads and some large weight items are distributed separately. This section describes a computer program used to generate NASTRAN weights data and methods used for the allocation of useful loads and large weight items in the modeling.

4.1 AUTOMATIC WEIGHT DISTRIBUTION PROGRAM (SDSN02)

The program SDSN02 (Reference 1) computes the distribution of helicopter weight items to grid points in the model and generates NASTRAN concentrated mass data in the form of CONM2 cards. Using the program involves first dividing the helicopter into regions or boxes. Data defining these regions along with the GRID data from the model and the detailed weights tape are input to SDSN02. The center of gravity of all the weight items that lie within each region is computed and the total region weight is distributed to the grid points in the region. The weights distributed to each grid point are summed for all regions and resulting weights are punched on CONM2 cards. The flow of the program is shown schematically in Figure 4-1.

The formula for distributing the total region weight to the j^{th} grid point in the region is given below.

$$W_j = \frac{W_r/L_j}{\sum_{i=1}^{n} (1/L_i)}$$

where:

W_r = region weight

L_j = distance from region cg to grid point j

L_i = distance from region cg to grid point i

n = number of grid points in the region

This formula preserves the total weight of the region and distributes the weight to each grid point based on its proximity to the cg, i.e., the closer the grid point, the larger the weight. The formula does not necessarily preserve the cg of the region. However, this is not considered to be a problem provided the regions are kept small and are chosen to include a balanced set of grid points within the region.

The detailed weights tape for the FY'71 Model AH-1G used in the modeling is being kept on permanent file at BHC. The tape is identified as follows: Weights Group Data File for the Model 209 (AH-1G) Sorted by AN (Army/Navy) Code - File Number SDSN01-F1G.

4.1.1 Weight Regions and NASTRAN Weights Data (CONM2)

Because of the model size, the AH-1G NASTRAN dynamic model is divided into three major sections, each requiring a separate SDSN02 data deck.

(1) Fuselage excluding wings and main rotor pylon

(2) Tailboom and wings

(3) Main rotor pylon

The fuselage section includes the built-up fuselage structure (station 28 to 300) and skid landing gear and is divided into 194 regions. The engine and XM-28 gun turret weights are not processed with SDSN02. The distribution of these weight items is discussed in Section 4.2. The region locations, grid points within each region, and CONM2 cards generated for this section are listed in Table 4-1.

The tailboom and wings section consists of 48 regions encompassing the tailboom, vertical fin, elevator, tail rotor mast, and wings. The regions, associated grid points and CONM2 cards created for this section are listed in Table 4-2.

The main rotor pylon section has 16 regions and includes the rotating controls, main transmission, and mast. The regions, associated grid points and CONM2 cards generated for this section are listed in Table 4-3.

4.2 DISTRIBUTION OF LARGE WEIGHTS AND USEFUL LOADS

Weight items on the helicopter that are not automatically distributed by the weights program are the following:

- Lycoming T53-L13 Engine
- XM-28 Gun Turret
- Main Rotor and Tail Rotor
- Useful Weights

4.2.1 Lycoming T53-L13 Engine

The engine weight items and corresponding Army/Navy (AN) code number are listed below.

- Engine (AN 24051)	=	530.00 lb
- Starter-Generator (AN 27225)	=	48.00 lb
- Residual Fluid (AN 24061)	=	5.00 lb
- One-Half Drive Shaft (AN 30051)	=	1.55 lb
- Transmitter Dual Tachometer (AN 32054)	=	0.80 lb
Total Engine Weight	=	585.35 lb

The weight moments of inertia about the cg of the engine are given below.

I_{roll} = 17,800 (lb-in^2)

I_{pitch} = 109,500 (lb-in^2)

I_{yaw} = 94,300 (lb-in^2)

The total weight and inertias of the engine are lumped at grid point 124800 located at the engine cg (station 248., WL 86. and BL 0.). This grid point is tied rigidly to the elastic engine mounts by MPC equations, as explained in Section 3.1.7 of the Stiffness Modeling.

4.2.2 XM-28 Gun Turret

The weight items included in the gun turret system are listed below.

- Turret Fluid (AN 38051)	=	1.00 lb
- Turret (AN 38051)	=	124.50 lb
- Turret Closure, Right Side (AN 38051)	=	2.30 lb
- Turret Closure, Left Side (AN 38051)	=	2.30 lb
- Turret Rub Strip (AN 38051)	=	0.10 lb
- Launcher (AN 38061)	=	40.80 lb
- Cradle (AN 38061)	=	10.30 lb
- Gearbox and Motor (AN 38061)	=	9.10 lb
- Minigun (AN 38061)	=	48.30 lb
- Cable (AN 38061)	=	1.00 lb
- Gearbox (AN 38061)	=	1.50 lb
- Motor (AN 38061)	=	7.70 lb
- Feed Tray (AN 38061)	=	4.50 lb
Total Gun Turret Weight	=	253.4 lb

The total weight of the gun turret system represented as a rigid body is concentrated at grid point 7505 located at the turret cg (station 75.5, WL 29. and BL 0.). Grid point 7505 is tied to the turret attachment fittings on the fuselage by MPC equations as shown in Section 3.1.4.19 of the Stiffness Modeling. Moments due to turret rigid body motions are represented by the cg offset from the fuselage structure.

4.2.3 Main Rotor and Tail Rotor

The weights of the main rotor and tail rotor as given below.

- Blade Inertia Weights (AN 2486)	=	110.0 lb
- Blade Assembly (AN 2546)	=	348.0 lb
- Hub Assembly (AN 3041-3501)	=	489.5 lb
Total Main Rotor Weight	=	947.5 lb
- Tail Rotor Blades (AN 8105)	=	14.3 lb
- Tail Rotor Hub (AN 8206)	=	16.5 lb
Total Tail Rotor Weight	=	30.8 lb

The main rotor weight is lumped at grid point 200153 located at the rotor cg (station 200., WL 153., and BL 0.). The tail rotor blade weight is lumped at its cg location at grid point 520152 (station 520.67, WL 118.27, and BL 15.19), and the tail rotor hub weight is lumped at its cg location at grid point 520139 (station 520.67, WL 118.27, and BL 13.85). Rotor flapping inertias are not included with the rotor weights because of the Bell teetering hinge rotor system which does not transfer flapping moments to the airframe.

4.2.4 Useful Weight Items

The weight items discussed up to this point, including the weight distributed automatically and those previously mentioned in this section, constitute the empty weight items of the helicopter. The total empty weight of the AH-1G is 5760 lb.

The Basic Mission configuration was selected as a representative flyable weight configuration to be used in the modeling. The useful loads for this configuration total 3173 lb and include crew, fuel, wing stores and ammo. This gives a Basic Mission gross weight of 8933 lb. The useful weight items, their locations, associated grid points and offsets (if any) are listed in Table 4-4.

The Basic Mission total weight, cg, and inertias from the grid point weight generator table in NASTRAN are compared with actual weights tape data below.

Parameter	NASTRAN	Weights Tape
Center of Gravity - Station (in.)	193.2	193.9
WL (in.)	69.4	71.4
BL (in.)	.001	0.
Total Weight (lb)	8916.15	8930.77
Roll Inertia ($lb\text{-}in^2$)	13.41×10^6	13.49×10^6
Pitch Inertia ($lb\text{-}in^2$)	62.14×10^6	61.64×10^6
Yaw Inertia ($lb\text{-}in^2$)	53.78×10^6	53.06×10^6

The discrepancy of about 19 lb in the total weight comes from the portion of the empty weights generated by the computer program and is possibly due to accumulated error resulting from processing the thousands of weight items and distributing them to the grid points.

Grid points associated with the crew, fuel, and ammo are located at their respective cg's and each is tied to the fuselage by four rods as shown in Figure 4-2. This is done to represent the inertia loads distributed into the structure for these particular weight items. For example, the inertia loads due to the weight of the pilot are distributed into the bulkhead at station 148.50 through the seat support structure. The rods properly distribute loads and moments into the bulkhead caused by fore-and-aft, lateral and vertical accelerations of the weight cg offset forward of the bulkhead.

The wing stores consisting of smoke grenades and XM-157A rockets are offset from grid points at the left and right wing tip ribs, grid points 65929 and 75929. MPC equations are used to distribute moments into the wing structure due to the weight offsets and are shown in Section 3.2.2 of the Stiffness Modeling.

The NASTRAN data deck listing and normal modes run included in Section 8, have included the Basic Mission useful weights; however, the useful weights can be readily changed to another weight configuration. The useful weights are all grouped together in one section of the unsorted Bulk Data deck. In addition, all the CONM2 cards representing Basic Mission useful loads have comments in field 10 indicating the weight configuration. These cards can then be easily located and removed and another set of useful load cards inserted. The useful load data cards for the 9500 lb gross weight HOG II configuration which has a heavier wing stores loading than the Basic Mission are included after the Bulk Data deck and can be interchanged with the Basic Mission cards if the user desires.

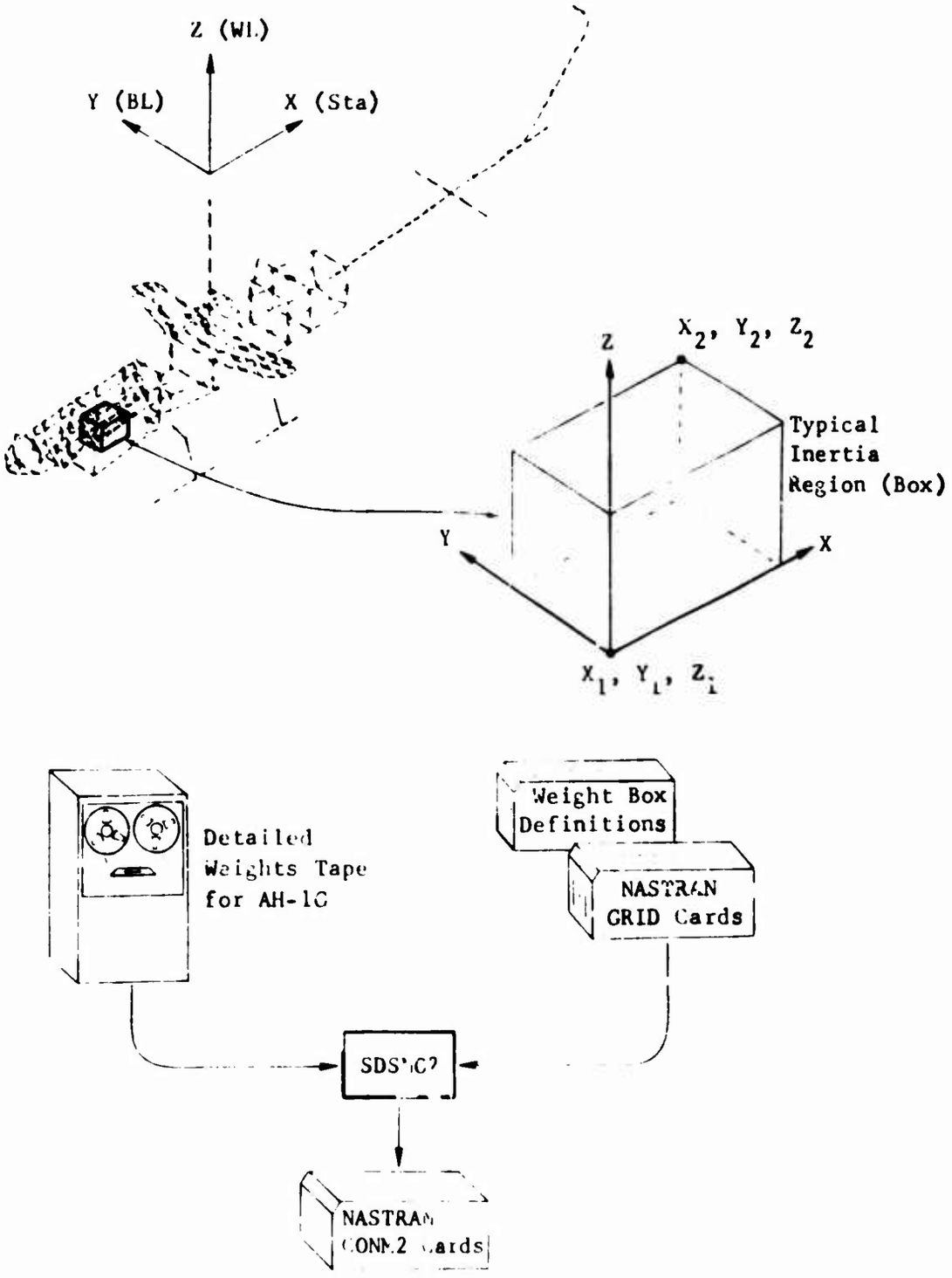


Figure 4-1. Automatic Weight Distribution Program SDSN02

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS

REGION	STATION X1	TO	X2	BUTTLINE Y1	TO	Y2	WATERLINE Z1	TO	Z2
1	-50.00		33.00	-100.00		0.0	-50.00		49.60
2	-50.00		33.00	0.0		100.00	-50.00		49.60
3	-50.00		33.00	-100.00		0.0	49.60		56.85
4	-50.00		33.00	0.0		100.00	49.60		56.85
5	-50.00		33.00	-100.00		0.0	56.85		200.00
6	-50.00		33.00	0.0		100.00	56.85		200.00
7	33.00		46.00	-100.00		0.0	-50.00		49.60
8	33.00		46.00	0.0		100.00	-50.00		49.60
9	33.00		46.00	-100.00		0.0	49.60		56.85
10	33.00		46.00	0.0		100.00	49.60		56.85
11	33.00		46.00	-100.00		0.0	56.85		200.00
12	33.00		46.00	0.0		100.00	56.85		200.00
13	46.00		61.25	-100.00		-10.00	-50.00		46.00
14	46.00		61.25	-10.00		0.0	-50.00		46.00
15	46.00		61.25	0.0		10.00	-50.00		46.00
16	46.00		61.25	10.00		100.00	-50.00		46.00
17	46.00		61.25	-100.00		-10.00	46.00		57.00
18	46.00		61.25	-10.00		0.0	46.00		57.00
19	46.00		61.25	0.0		10.00	46.00		57.00
20	46.00		61.25	10.00		100.00	46.00		57.00
21	46.00		61.25	-100.00		-10.00	57.00		69.42
22	46.00		61.25	-10.00		0.0	57.00		69.42
23	46.00		61.25	0.0		10.00	57.00		69.42
24	46.00		61.25	10.00		100.00	57.00		69.42
25	46.00		61.25	-100.00		-10.00	69.42		200.00
26	46.00		61.25	-10.00		0.0	69.42		200.00
27	46.00		61.25	0.0		10.00	69.42		200.00
28	46.00		61.25	10.00		100.00	69.42		200.00
29	61.25		93.00	-100.00		-10.00	-50.00		46.00
30	61.25		93.00	-10.00		10.00	-50.00		46.00
31	61.25		93.00	10.00		100.00	-50.00		46.00
32	61.25		70.79	-100.00		-10.00	46.00		54.16
33	61.25		70.79	-10.00		10.00	46.00		54.16
34	61.25		70.79	10.00		100.00	46.00		54.16
35	61.25		70.79	-100.00		-10.00	54.16		60.00
36	61.25		70.79	-10.00		10.00	54.16		60.00
37	61.25		70.79	10.00		100.00	54.16		60.00
38	61.25		70.79	-100.00		-10.00	60.00		200.00
39	61.25		70.79	-10.00		10.00	60.00		200.00
40	61.25		70.79	10.00		100.00	60.00		200.00
41	70.79		85.26	-100.00		-10.00	46.00		54.38
42	70.79		85.26	-10.00		10.00	46.00		54.38
43	70.79		85.26	10.00		100.00	46.00		54.38
44	70.79		85.26	-100.00		-10.00	54.38		60.38
45	70.79		85.26	-10.00		10.00	54.38		60.38
46	70.79		85.26	10.00		100.00	54.38		60.38
47	70.79		85.26	-100.00		-10.00	60.38		200.00
48	70.79		85.26	-10.00		10.00	60.38		200.00

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

49	70.79	85.26	10.00	100.00	60.33	200.00
50	85.26	93.00	-100.00	-10.00	46.00	54.72
51	85.26	93.00	-10.00	10.00	46.00	54.72
52	85.26	93.00	10.00	100.00	46.00	54.72
53	85.26	93.00	-100.00	-10.00	54.72	60.96
54	85.26	93.00	-10.00	10.00	54.72	60.96
55	85.26	93.00	10.00	100.00	54.72	60.96
56	85.26	93.00	-100.00	-10.00	60.96	200.00
57	85.26	93.00	-10.00	10.00	60.96	200.00
58	85.26	93.00	10.00	100.00	60.96	200.00
59	93.00	250.00	-100.00	0.0	-50.00	15.00
60	93.00	250.00	0.0	100.00	-50.00	15.00
61	93.00	138.70	-100.00	-10.00	15.00	27.00
62	93.00	138.70	-10.00	10.00	15.00	27.00
63	93.00	138.70	10.00	100.00	15.00	27.00
64	93.00	138.70	-100.00	-10.00	27.00	46.00
65	93.00	138.70	-10.00	10.00	27.00	46.00
66	93.00	138.70	10.00	100.00	27.00	46.00
67	93.00	115.58	-100.00	-10.00	46.00	55.00
68	93.00	115.58	-10.00	10.00	46.00	55.00
69	93.00	115.58	10.00	100.00	46.00	55.00
70	93.00	115.58	-100.00	-10.00	55.00	61.44
71	93.00	115.58	-10.00	10.00	55.00	61.44
72	93.00	115.58	10.00	100.00	55.00	61.44
73	93.00	115.58	-100.00	-10.00	61.44	67.23
74	93.00	115.58	-10.00	10.00	61.44	67.23
75	93.00	115.58	10.00	100.00	61.44	67.23
76	93.00	115.58	-100.00	-10.00	67.23	200.00
77	93.00	115.58	-10.00	10.00	67.23	200.00
78	93.00	115.58	10.00	100.00	67.23	200.00
79	115.58	138.70	-100.00	-10.00	46.00	54.90
80	115.58	138.70	-10.00	10.00	46.00	54.90
81	115.58	138.70	10.00	100.00	46.00	54.90
82	115.58	138.70	-100.00	-10.00	54.90	62.17
83	115.58	138.70	-10.00	10.00	54.90	62.17
84	115.58	138.70	10.00	100.00	54.90	62.17
85	115.58	138.70	-100.00	-10.00	62.17	200.00
86	115.58	138.70	-10.00	10.00	62.17	200.00
87	115.58	138.70	10.00	100.00	62.17	200.00
88	136.70	148.50	-100.00	-10.00	15.00	27.00
89	138.70	146.50	-10.00	10.00	15.00	27.00
90	138.70	148.50	10.00	100.00	15.00	27.00
91	138.70	148.50	-100.00	-10.00	27.00	35.97
92	138.70	148.50	-10.00	10.00	27.00	35.97
93	138.70	148.50	10.00	100.00	27.00	35.97
94	138.70	148.50	-100.00	-10.00	35.97	46.00
95	138.70	148.50	-10.00	10.00	35.97	46.00
96	138.70	148.50	10.00	100.00	35.97	46.00
97	138.70	148.50	-100.00	-10.00	46.00	54.90
98	138.70	148.50	-10.00	10.00	46.00	54.90
99	138.70	148.50	10.00	100.00	46.00	54.90
100	138.70	149.50	-100.00	-10.00	54.00	62.84

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

101	138.70	148.50	-10.00	10.00	54.90	62.84
102	138.70	148.50	10.00	100.00	54.90	62.84
103	138.70	148.50	-100.00	-10.00	62.84	200.00
104	138.70	148.50	-10.00	10.00	62.84	200.00
105	138.70	148.50	10.00	100.00	62.84	200.00
106	148.50	156.41	-100.00	-10.00	15.00	27.00
107	148.50	156.41	-10.00	10.00	15.00	27.00
108	148.50	156.41	10.00	100.00	15.00	27.00
109	148.50	156.41	-100.00	-10.00	27.00	35.97
110	148.50	156.41	-10.00	10.00	27.00	35.97
111	148.50	156.41	10.00	100.00	27.00	35.97
112	156.41	186.25	-100.00	-10.00	15.00	27.00
113	156.41	186.25	-10.00	10.00	15.00	27.00
114	156.41	186.25	10.00	100.00	15.00	27.00
115	156.41	186.25	-100.00	-10.00	27.00	35.97
116	156.41	186.25	-10.00	10.00	27.00	35.97
117	156.41	186.25	10.00	100.00	27.00	35.97
118	186.25	218.97	-100.00	-10.00	15.00	27.00
119	186.25	218.97	-10.00	10.00	15.00	27.00
120	186.25	218.97	10.00	100.00	15.00	27.00
121	186.25	218.97	-100.00	-10.00	27.00	35.97
122	186.25	218.97	-10.00	10.00	27.00	35.97
123	186.25	218.97	10.00	100.00	27.00	35.97
124	218.97	227.62	-100.00	-10.00	15.00	27.00
125	218.97	227.62	-10.00	10.00	15.00	27.00
126	218.97	227.62	10.00	100.00	15.00	27.00
127	218.97	227.62	-100.00	-10.00	27.00	35.97
128	218.97	227.62	-10.00	10.00	27.00	35.97
129	218.97	227.62	10.00	100.00	27.00	35.97
130	227.62	250.00	-100.00	-10.00	15.00	27.00
131	227.62	250.00	-10.00	10.00	15.00	27.00
132	227.62	250.00	10.00	100.00	15.00	27.00
133	227.62	250.00	-100.00	-10.00	27.00	35.97
134	227.62	250.00	-10.00	10.00	27.00	35.97
135	227.62	250.00	10.00	100.00	27.00	35.97
136	148.50	186.25	-19.00	-10.00	35.97	46.00
137	148.50	186.25	-10.00	10.00	35.97	46.00
138	148.50	186.25	10.00	19.00	35.97	46.00
139	148.50	186.25	-19.00	-10.00	46.00	55.00
140	148.50	186.25	-10.00	10.00	46.00	55.00
141	148.50	186.25	10.00	19.00	46.00	55.00
142	148.50	186.25	-19.00	-10.00	55.00	63.49
143	148.50	186.25	-10.00	10.00	55.00	63.49
144	148.50	186.25	10.00	19.00	55.00	63.49
145	148.50	186.25	-19.00	-10.00	63.49	77.57
146	148.50	186.25	-10.00	10.00	63.49	77.57
147	148.50	186.25	10.00	19.00	63.49	77.57
148	148.50	186.25	-19.00	-10.00	77.57	200.00
149	148.50	186.25	-10.00	10.00	77.57	200.00
150	148.50	186.25	10.00	19.00	77.57	200.00
151	186.25	213.94	-19.00	-10.00	35.97	54.74
152	186.25	213.94	-10.00	0.0	35.97	54.74

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

153	186.25	213.94	0.0	10.00	35.97	54.74
154	186.25	213.94	10.00	19.00	35.97	54.74
155	186.25	196.90	-19.00	-12.38	54.74	64.64
156	186.25	196.90	-12.38	0.0	54.74	64.64
157	186.25	196.90	0.0	12.38	54.74	64.64
158	186.25	196.90	12.38	19.00	54.74	64.64
159	196.90	213.94	-19.00	-12.38	54.74	64.64
160	196.90	213.94	-12.38	0.0	54.74	64.64
161	196.90	213.94	0.0	12.38	54.74	64.64
162	196.90	213.94	12.38	19.00	54.74	64.64
163	186.25	213.94	-19.00	-12.38	64.64	77.57
164	186.25	213.94	-12.38	0.0	64.64	77.57
165	186.25	213.94	0.0	12.38	64.64	77.57
166	186.25	213.94	12.38	19.00	64.64	77.57
167	186.25	213.94	-19.00	-12.38	77.57	200.00
168	186.25	213.94	-12.38	0.0	77.57	200.00
169	186.25	213.94	0.0	12.38	77.57	200.00
170	186.25	213.94	12.38	19.00	77.57	200.00
171	213.94	250.00	-19.00	0.0	35.97	52.59
172	213.94	250.00	0.0	19.00	35.97	52.59
173	213.94	250.00	-19.00	0.0	52.59	64.07
174	213.94	250.00	0.0	19.00	52.59	64.07
175	213.94	250.00	-19.00	0.0	64.07	200.00
176	213.94	250.00	0.0	19.00	64.07	200.00
177	250.00	268.25	-100.00	-10.00	-50.00	35.97
178	250.00	268.25	-10.00	10.00	-50.00	35.97
179	250.00	268.25	10.00	100.00	-50.00	35.97
180	250.00	268.25	-100.00	0.0	35.97	51.49
181	250.00	268.25	0.0	100.00	35.97	51.49
182	250.00	268.25	-100.00	0.0	51.49	63.59
183	250.00	268.25	0.0	100.00	51.49	63.59
184	250.00	268.25	-100.00	0.0	63.59	200.00
185	250.00	268.25	0.0	100.00	63.59	200.00
186	268.25	306.00	-100.00	-10.00	-50.00	35.97
187	268.25	308.00	-10.00	10.00	-50.00	35.97
188	268.25	308.00	10.00	100.00	-50.00	35.97
189	268.25	308.00	-100.00	0.0	35.97	49.38
190	268.25	308.00	0.0	100.00	35.97	49.38
191	268.25	308.00	-100.00	0.0	49.38	62.80
192	268.25	308.00	0.0	100.00	49.38	62.80
193	268.25	308.00	-100.00	0.0	62.80	200.00
194	268.25	308.00	0.0	100.00	62.80	200.00

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

REG	#GPTS	GRID POINTS:
1	1	3339
2	1	3331
3	2	3339 3349
4	2	3331 3341
5	1	3349
6	1	3341
7	3	3339 4637 4639
8	3	3331 4631 4633
9	3	3339 3349 4639
10	3	3331 3341 6431
11	3	3349 4649 4669
12	4	3341 4641 4661
13	3	6127 6137 6139
14	3	4637 6127 6137
15	3	4633 6123 6133
16	3	6123 6131 6133
17	6	4639 4649 6137 6139 6147 6149
18	3	4637 6137 6147
19	3	4633 6133 6143
20	6	4631 4641 6131 6133 6141 6143
21	4	4649 6167 6169 6179
22	3	4669 6167 6179
23	3	4661 6163 6171
24	4	4641 6161 6163 6171

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

25	1	6179
26	1	6179
27	1	6171
28	1	6171
29	11	6127 6137 6139 7037 7039 8537 8539 9307 9317 9337 9339
30	15	6123 6125 6127 6133 6137 7033 7037 8533 8537 9303 9307 9313 9317 9333 9337
31	11	6123 6131 6133 7031 7033 8531 8533 9303 9313 9331 9333
32	6	6137 6139 6147 6149 7037 7039
33	6	6133 6137 6143 6147 7033 7037
34	6	6131 6133 6141 6143 7031 7033
35	5	6147 6149 6167 6169 7047
36	6	6143 6147 6163 6167 7043 7047
37	5	6141 6143 6161 6163 7043
38	5	6167 6169 7067 7069 7079
39	4	6163 6167 7063 7067
40	5	6161 6163 7061 7063 7071
41	5	7037 7039 7047 8537 8539
42	6	7033 7037 7043 7047 8533 8537
43	5	7031 7033 7043 8531 8533
44	4	7047 7067 7069 8547
45	6	7043 7047 7063 7067 8543 8547
46	4	7043 7061 7063 8543
47	6	7067 7063 7079 8567 8569 8579
48	4	7063 7067 8563 8567
49	6	7061 7063 7071 8561 8563 8571
50	5	8537 8539 8547 9337 9339

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

51	6	8533 8537 8543 8547 9333 9337
52	5	8531 8533 8543 9331 9333
53	3	8547 8567 8569
54	4	8543 8547 8563 8567
55	3	8543 8561 8563
56	3	8567 8569 8579
57	2	8563 8567
58	3	8561 8563 8571
59	4	211001 214901 222001 223401
60	4	211002 214902 222002 223402
61	4	9307 9317 11507 13807
62	8	9303 9307 9313 9317 11503 11507 13803 13807
63	4	9303 9313 11503 13803
64	12	9317 9337 9339 11507 11537 11539 13807 13809 13827 13829 13837 13839
65	14	9313 9317 9333 93337 11503 11507 11533 11537 13803 13807 13823 13827 13833 13837
66	12	9313 9331 9333 11503 11531 11533 13801 13803 13821 13823 13831 13833
67	7	9337 9339 9347 9349 11537 11539 11547
68	8	9333 9337 9343 9347 11533 11537 11543 11547
69	7	9331 9333 9341 9343 11531 11533 11543
70	5	9347 9349 9367 9369 11547
71	6	9343 9347 9363 9367 11543 11547
72	5	9341 9343 9361 9363 11543
73	6	9367 9369 9377 9379 11567 11569
74	6	9363 9367 9373 9377 11563 11567
75	6	9361 9363 9371 9373 11561 11563
76	3	9377 9379 11579

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

77	2	9373 9377
78	3	9371 9373 11571
79	4	11537 11539 13837 13839
80	4	11533 11537 13833 13837
81	4	11531 11533 13831 13833
82	6	11547 11567 11569 13847 13848 13849
83	7	11543 11547 11563 11567 13843 13847 13848
84	5	11543 11561 11563 13841 13843
85	5	11567 11569 13867 13869 13879
86	4	11563 11567 13863 13867
87	5	11561 11563 13861 13863 13871
88	2	13807 14807
89	4	13803 13807 14803 14807
90	2	13803 14803
91	8	13807 13809 13827 13829 14807 14809 14827 14829
92	8	13803 13807 13823 13827 14803 14807 14823 14827
93	8	13801 13803 13821 13823 14801 14803 14821 14823
94	8	13827 13829 13837 13839 14827 14829 14837 14839
95	8	13823 13827 13833 13837 14823 14827 14833 14837
96	8	13821 13823 13831 13833 14821 14823 14831 14833
97	4	13837 13839 14837 14839
98	4	13833 13837 14833 14837
99	4	13831 13833 14831 14833
100	3	13847 14847 14849
101	4	13843 13847 14843 14847
102	4	13841 13843 14841 14843

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

103	2	14867 14869
104	3	13863 14863 14867
105	5	13861 13863 13871 14861 14863
106	3	14807 15607 215101
107	4	14803 14807 15603 15607
108	3	14803 15603 215102
109	9	14807 14809 14827 14829 15607 15609 15627 15629 215201
110	7	14803 14807 14823 14827 15603 15607 15625
111	9	14801 14803 14821 14823 15601 15603 15621 15623 215202
112	1	15607
113	4	15603 15607 18603 18607
114	1	15603
115	7	15607 15609 15627 15629 18609 18627 18629
116	8	15603 15607 15625 18603 18607 18625 18625 18627
117	7	15601 15603 15621 15623 18601 18621 18623
118	0	No Grid Points
119	4	18603 18607 21803 21807
120	0	No Grid Points
121	8	18609 18627 18629 21327 21329 21809 21827 21829
122	13	18603 18607 18625 18625 18627 21323 21325 21327 21803 21807 21823 21825 21827
123	8	18601 18621 18623 21321 21323 21801 21821 21823
124	1	222201
125	4	21803 21807 22703 22707
126	1	222202
127	7	21809 21827 21829 22709 22727 227292 22301
128	10	21803 21807 21823 21825 21827 22702 22707 22723 22725 22727
129	7	21801 21821 21823 22701 22721 22?232 22302

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

130	0	No Grid Points
131	4	22703 22707 25003 25007
132	0	No Grid Points
133	5	22709 22727 22729 25009 25029
134	8	22703 22707 22723 22725 22727 25003 25007 25025
135	5	22701 22721 22723 25001 25021
136	11	14827 14829 14837 14839 15627 15629 15637 18627 18629 18637 18639
137	11	14823 14827 14833 14837 15625 18623 18625 18627 18633 18635 18637
138	11	14821 14823 14831 14833 15621 15623 15633 18621 18623 18631 18633
139	7	14837 14839 14847 14849 15637 18637 18639
140	7	14833 14837 14843 14847 18633 18635 18637
141	7	14831 14833 14841 14843 15633 18631 18633
142	11	14847 14849 14867 14869 18647 18649 18649 18653 18654 18658 18659
143	7	14843 14847 14863 14867 18644 18645 18646
144	11	14841 14843 14861 14863 18641 18642 18643 18651 18652 18656 18657
145	11	14867 14869 14887 14889 16487 16489 18667 18668 18669 18687 18689
146	9	14863 14867 14883 14887 16485 18664 18665 18666 18685
147	11	14861 14863 14881 14883 16481 16483 18661 18662 18663 18681 18683
148	6	14887 14889 16487 16489 18687 18689
149	4	14883 14887 16485 18685
150	6	14881 14883 16481 16483 18681 18683
151	6	18627 18629 18637 18639 21327 21329
152	6	18625 18627 18635 18637 21325 21327
153	6	18623 18625 18633 18635 21323 21325
154	6	18621 18623 18631 18633 21321 21323
155	10	18647 18648 18649 18653 18654 18658 18659 19749 19759 17969
156	10	18645 18646 18647 19745 19747 19748 19758 19765 19767 19768

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

157	10	18643 18644 18645 19742 19743 19745 19752 19762 19763 19765
158	10	18641 18642 18643 18651 18652 18656 18657 19741 19751 19761
159	4	19749 19759 19769 21349
160	9	19745 19747 19748 19758 19765 19767 19768 21345 21347
161	9	19742 19743 19745 19752 19762 19763 19765 21343 21345
162	4	19741 19751 19761 21341
163	8	18667 18668 18669 18687 18689 21367 21369 21387
164	8	18665 18666 18667 18685 18687 21366 21367 21387
165	8	18663 18664 18665 18683 18685 21365 21364 21383
166	8	18661 18662 18663 18681 18683 21361 21363 21383
167	3	18687 18689 21387
168	3	18685 18687 21387
169	3	18683 18685 21383
170	3	18681 18683 21383
171	13	21325 21327 21329 21825 21827 21829 22725 22727 22729 25025 25029 25045 25049
172	13	21321 21323 21325 21821 21823 21825 22721 22723 22725 25021 25025 25041 25045
173	7	21345 21347 21349 25045 25049 25065 25069
174	7	21341 21343 21345 25041 25045 25061 25065
175	6	21366 21367 21369 21387 25065 25069
176	6	21361 21363 21364 21383 25061 25065
177	3	25009 25029 26829
178	6	25003 25007 25025 26801 26809 26825
179	3	25001 25021 26821
180	6	25025 25029 26825 26829 26845 26849
181	6	25021 25025 26821 26825 26841 26845
182	6	25045 25049 26845 26849 26865 26869

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

183	6	25041 25045 26841 26845 26861 26865
184	4	25065 25069 26865 26869
185	4	25061 25065 26861 26865
186	2	26829 29929
187	5	26801 26809 26825 29905 29925
188	2	26821 29921
189	6	26825 26829 29925 29929 29945 29949
190	6	26821 26825 29921 29925 29941 29945
191	7	26845 26849 29945 29949 29965 29969 30045
192	7	26841 26845 29941 29945 29961 29965 30045
193	4	26865 26869 29965 29969
194	4	26861 26865 29961 29965

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

TYPE	NASTRAN EID	GRID POINT	WEIGHT (lb)
CONM2	93331	3331	1.892
CONM2	93339	3339	3.221
CONM2	93341	3341	1.962
CONM2	93349	3349	2.701
CONM2	94631	4631	0.922
CONM2	94633	4633	4.425
CONM2	94637	4637	5.541
CONM2	94639	4639	2.676
CONM2	94641	4641	0.621
CONM2	94649	4649	0.925
CONM2	94661	4661	8.249
CONM2	94669	4669	6.663
CONM2	96123	6123	3.694
CONM2	96127	6127	3.545
CONM2	96131	6131	1.113
CONM2	96133	6133	6.058
CONM2	96137	6137	5.058
CONM2	96139	6139	0.755
CONM2	96141	6141	1.950
CONM2	96143	6143	5.711
CONM2	96147	6147	3.897
CONM2	96149	6149	0.821
CONM2	96161	6161	2.947
CONM2	96163	6163	9.863
CONM2	96167	6167	6.505
CONM2	96169	6169	2.029
CONM2	96171	6171	7.551
CONM2	96179	6179	5.502
CONM2	97031	7031	2.284
CONM2	97033	7033	8.434
CONM2	97037	7037	6.885
CONM2	97039	7039	1.452
CONM2	97043	7043	9.812
CONM2	97047	7047	7.798
CONM2	97061	7061	3.578
CONM2	97063	7063	14.650
CONM2	97067	7067	13.585
CONM2	97069	7069	2.574
CONM2	97071	7071	2.916
CONM2	97079	7079	1.882
CONM2	98531	8531	2.399
CONM2	98533	8533	10.570
CONM2	98537	8537	9.864
CONM2	98539	8539	2.403
CONM2	98543	8543	9.724
CONM2	98547	8547	8.931
CONM2	98561	8561	4.317
CONM2	98563	8563	22.532
CONM2	98567	8567	24.136
CONM2	98569	8569	5.718
CONM2	98571	8571	6.222

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

CONM2	98579	8579	8.408
CONM2	99303	9303	3.970
CONM2	99307	9307	3.957
CONM2	99313	9313	8.087
CONM2	99317	9317	8.088
CONM2	99331	9331	3.170
CONM2	99333	9333	13.973
CONM2	99337	9337	13.744
CONM2	99339	9339	3.147
CONM2	99341	9341	2.554
CONM2	99343	9343	11.084
CONM2	99347	9347	10.863
CONM2	99349	9349	2.147
CONM2	99361	9361	2.380
CONM2	99363	9363	8.351
CONM2	99367	9367	9.072
CONM2	99369	9369	2.335
CONM2	99371	9371	6.511
CONM2	99373	9373	49.161
CONM2	99377	9377	54.894
CONM2	99379	9379	12.037
CONM2	101503	11503	9.083
CONM2	101507	11507	9.128
CONM2	101531	11531	5.859
CONM2	101533	11533	19.722
CONM2	101537	11537	21.508
CONM2	101539	11539	7.873
CONM2	101543	11543	14.344
CONM2	101547	11547	14.791
CONM2	101561	11561	9.470
CONM2	101563	11563	21.696
CONM2	101567	11567	18.154
CONM2	101569	11569	5.917
CONM2	101571	11571	5.538
CONM2	101579	11579	8.826
CONM2	103801	13801	1.113
CONM2	103803	13803	5.138
CONM2	103807	13807	5.002
CONM2	103809	13809	1.052
CONM2	103821	13821	1.512
CONM2	103823	13823	5.508
CONM2	103827	13827	5.708
CONM2	103829	13829	1.649
CONM2	103831	13831	3.656
CONM2	103833	13833	13.472
CONM2	103837	13837	15.662
CONM2	103839	13839	8.126
CONM2	103841	13841	1.887
CONM2	103843	13843	7.291
CONM2	103847	13847	9.530
CONM2	103848	13848	4.869
CONM2	103849	13849	2.018
CONM2	103861	13861	9.669

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

CONM2	103863	13863	40.094
CONM2	103867	13867	14.571
CONM2	103869	13869	3.301
CONM2	103871	13871	16.714
CONM2	103879	13879	10.322
CONM2	104801	14801	1.098
CONM2	104803	14803	4.057
CONM2	104807	14807	4.022
CONM2	104809	14809	1.092
CONM2	104821	14821	1.980
CONM2	104823	14823	7.770
CONM2	104827	14827	8.254
CONM2	104829	14829	2.424
CONM2	104831	14831	4.886
CONM2	104833	14833	14.738
CONM2	104837	14837	15.388
CONM2	104839	14839	5.566
CONM2	104841	14841	3.991
CONM2	104843	14843	15.512
CONM2	104847	14847	17.832
CONM2	104849	14849	5.932
CONM2	104861	14861	5.066
CONM2	104863	14863	33.238
CONM2	104867	14867	36.138
CONM2	104869	14869	8.171
CONM2	104881	14881	4.845
CONM2	104883	14883	17.626
CONM2	104887	14887	18.186
CONM2	104889	14889	5.338
CONM2	105601	15601	1.680
CONM2	105603	15603	6.578
CONM2	105607	15607	7.003
CONM2	105609	15609	2.088
CONM2	105621	15621	2.569
CONM2	105623	15623	2.463
CONM2	105625	15625	10.568
CONM2	105627	15627	3.439
CONM2	105629	15629	3.449
CONM2	105633	15633	5.611
CONM2	105637	15637	5.916
CONM2	106481	16481	8.756
CONM2	106483	16483	8.759
CONM2	106485	16485	20.106
CONM2	106487	16487	10.054
CONM2	106489	16489	9.779
CONM2	108501	18601	1.073
CONM2	108603	18603	4.685
CONM2	108607	18607	4.556
CONM2	108609	18609	1.986
CONM2	108621	18621	3.665
CONM2	108623	18623	13.694
CONM2	108625	18625	20.981

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

CONM2	108627	18627	22.897
CONM2	108629	18629	5.552
CONM2	108631	18631	5.946
CONM2	108633	18633	16.895
CONM2	108635	18635	22.634
CONM2	108637	18637	26.279
CONM2	108639	18639	7.945
CONM2	108641	18641	1.269
CONM2	108642	18642	1.285
CONM2	108643	18643	2.285
CONM2	108644	18644	8.294
CONM2	108645	18645	8.560
CONM2	108646	18646	8.135
CONM2	108647	18647	2.578
CONM2	108648	18648	1.705
CONM2	108649	18649	1.670
CONM2	108651	18651	1.396
CONM2	108652	18652	1.415
CONM2	108653	18653	1.854
CONM2	108654	18654	1.813
CONM2	108656	18656	1.288
CONM2	108657	18657	1.305
CONM2	108658	18658	1.739
CONM2	108659	18659	1.703
CONM2	108661	18661	2.124
CONM2	108662	18662	2.138
CONM2	108663	18663	7.944
CONM2	108664	18664	8.778
CONM2	10865	18665	13.016
CONM2	108666	18665	8.161
CONM2	108667	18667	7.302
CONM2	108668	18668	2.013
CONM2	108669	18669	1.998
CONM2	108681	18681	8.693
CONM2	108683	18683	32.324
CONM2	108685	18685	60.323
CONM2	108687	18687	27.285
CONM2	108689	18689	9.604
CONM2	109741	19741	2.346
CONM2	109742	19742	4.409
CONM2	109743	19743	5.156
CONM2	109745	19745	11.232
CONM2	109747	19747	4.231
CONM2	109748	19748	3.642
CONM2	109749	19749	2.399
CONM2	109751	19751	2.757
CONM2	109752	19752	5.133
CONM2	109758	19758	3.995
CONM2	109759	19759	2.844
CONM2	109761	19761	2.221
CONM2	109762	19762	4.633
CONM2	109763	19763	5.632

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

CONM2	109765	19765	12.896
CONM2	109767	19767	4.155
CONM2	109768	19768	3.600
CONM2	109769	19769	2.303
CONM2	111321	21321	6.659
CONM2	111323	21323	9.994
CONM2	111325	21325	20.033
CONM2	111327	21327	18.946
CONM2	111329	21329	7.634
CONM2	111341	21341	4.530
CONM2	111343	21343	5.686
CONM2	111345	21345	11.857
CONM2	111347	21347	5.713
CONM2	111349	21349	4.679
CONM2	111361	21361	17.866
CONM2	111363	21363	23.858
CONM2	111364	21364	23.001
CONM2	111366	21366	27.471
CONM2	111367	21367	28.406
CONM2	111369	21369	21.681
CONM2	111383	21383	48.827
CONM2	111387	21387	54.371
CONM2	111801	21801	1.894
CONM2	111803	21803	3.639
CONM2	111807	21807	3.893
CONM2	111809	21809	1.953
CONM2	111821	21821	5.997
CONM2	111823	21823	7.188
CONM2	111825	21825	10.613
CONM2	111827	21827	7.871
CONM2	111829	21829	6.220
CONM2	112701	22701	2.043
CONM2	112703	22703	3.691
CONM2	112707	22707	3.687
CONM2	112709	22709	1.998
CONM2	112721	22721	7.817
CONM2	112723	22723	11.522
CONM2	112725	22725	15.296
CONM2	112727	22727	12.589
CONM2	112729	22729	7.921
CONM2	115001	25001	1.933
CONM2	115003	25003	2.877
CONM2	115007	25007	3.006
CONM2	115009	25009	1.526
CONM2	115021	25021	6.318
CONM2	115025	25025	12.767
CONM2	115029	25029	6.632
CONM2	115041	25041	10.475
CONM2	115045	25045	22.769
CONM2	115049	25049	10.010
CONM2	115061	25061	25.414
CONM2	115065	25065	56.155

TABLE 4-1. FUSELAGE SECTION - REGIONS AND CONM2 CARDS (CONT'D)

CONM2	115069	25069	31.959
CONM2	116801	26801	2.583
CONM2	116809	26809	2.896
CONM2	116821	26821	7.919
CONM2	116825	26825	26.633
CONM2	116829	26829	16.380
CONM2	116841	26841	7.840
CONM2	116845	26845	17.307
CONM2	116849	26849	8.427
CONM2	116861	26861	17.663
CONM2	116865	26865	37.880
CONM2	116869	26869	17.941
CONM2	119905	29905	2.139
CONM2	119921	29921	8.430
CONM2	119925	29925	22.915
CONM2	119929	29929	13.202
CONM2	119941	29941	10.447
CONM2	119945	29945	27.421
CONM2	119949	29949	15.273
CONM2	119961	29961	10.173
CONM2	119965	29965	21.300
CONM2	119969	29969	10.763
CONM2	301002	211002	4.953
CONM2	304902	214902	13.024
CONM2	312002	222002	6.744
CONM2	313402	223402	5.142
CONM2	305102	215102	3.158
CONM2	305202	215202	0.961
CONM2	312202	222202	6.554
CONM2	312302	222302	1.635
CONM2	301001	211001	4.953
CONM2	304901	214901	13.024
CONM2	312001	222001	6.744
CONM2	313401	223401	5.142
CONM2	305101	215101	3.676
CONM2	305201	215201	0.952
CONM2	312201	222201	6.554
CONM2	312301	222301	1.619

TABLE 4-2. TAILBOOM AND WINGS - REGIONS AND CONM2 CARDS

REGION	STATION X1	TO	X2	BUTTLINE Y1	TO	Y2	WATERLINE Z1	TO	Z2
1	308.00		317.71	-100.00		100.00	-50.00		200.00
2	317.71		338.61	-100.00		100.00	-50.00		200.00
3	338.61		359.51	-100.00		100.00	-50.00		200.00
4	359.51		380.42	-100.00		100.00	-50.00		200.00
5	380.42		401.33	-9.68		9.68	-50.00		200.00
6	401.33		422.24	-9.68		9.68	-50.00		200.00
7	422.24		443.15	-100.00		100.00	-50.00		200.00
8	443.15		452.25	-100.00		100.00	-50.00		200.00
9	452.25		464.10	-100.00		100.00	-50.00		200.00
10	464.10		484.89	-100.00		100.00	-50.00		67.50
11	484.89		600.00	-100.00		100.00	-50.00		67.50
12	380.42		422.24	-100.00		-31.25	-50.00		200.00
13	380.42		422.24	-31.25		-20.87	-50.00		200.00
14	380.42		422.24	-20.87		-9.68	-50.00		200.00
15	380.42		422.24	9.68		20.87	-50.00		200.00
16	380.42		422.24	20.87		31.25	-50.00		200.00
17	380.42		422.24	31.25		100.00	-50.00		200.00
18	464.10		600.00	-100.00		100.00	67.50		75.40
19	464.10		600.00	-100.00		100.00	75.40		83.92
20	464.10		600.00	-100.00		100.00	83.82		92.37
21	464.10		600.00	-100.00		100.00	92.37		100.91
22	464.10		600.00	-100.00		100.00	100.91		109.46
23	464.10		600.00	-100.00		0.0	109.46		200.00
24	464.10		600.00	0.0		1.80	109.46		200.00
25	464.10		600.00	1.80		2.42	109.46		200.00
26	464.10		600.00	2.42		5.69	109.46		200.00
27	464.10		600.00	5.69		6.45	109.46		200.00
28	464.10		600.00	6.45		6.82	109.46		200.00
29	464.10		600.00	6.82		7.90	109.46		200.00
30	464.10		600.00	7.90		13.47	109.46		200.00
31	464.10		600.00	13.47		13.88	109.46		200.00
32	464.10		600.00	13.88		15.19	109.46		200.00
33	464.10		600.00	15.19		18.49	109.46		200.00
34	464.10		600.00	18.49		100.00	109.46		200.00
35	148.00		250.00	-100.00		-59.00	35.97		200.00
36	148.00		250.00	-59.00		-50.75	35.97		200.00
37	148.00		250.00	-50.75		-42.50	35.97		200.00
38	148.00		250.00	-42.50		-34.00	35.97		200.00
39	148.00		250.00	-34.00		-28.00	35.97		200.00
40	148.00		250.00	-28.00		-22.19	35.97		200.00
41	148.00		250.00	-22.19		-19.19	35.97		200.00
42	148.00		250.00	19.19		22.19	35.97		200.00
43	148.00		250.00	22.19		28.00	35.97		200.00
44	148.00		250.00	28.00		34.00	35.97		200.00
45	148.00		250.00	34.00		42.50	35.97		200.00
46	148.00		250.00	42.50		50.75	35.97		200.00
47	148.00		250.00	50.75		59.00	35.97		200.00
48	148.00		250.00	59.00		100.00	35.97		200.00

TABLE 4-2. TAILBOOM AND WINGS - REGIONS AND CONM2 CARDS (CONT'D)

REG	#GPTS	GRID POINTS:
1	1	31745
2	2	31745 33845
3	2	33845 35945
4	2	35945 38045
5	4	38045 40145 40143 40147
6	2	40145 42245
7	2	42245 44345
8	2	44345 45245
9	2	45245 46445
10	2	46445 48445
11	1	48445
12	1	40149
13	2	40148 40149
14	2	40147 40148
15	2	40142 40143
16	2	40141 40142
17	1	40141
18	1	48045
19	2	48045 48845
20	2	48845 49745
21	2	49745 50645
22	2	50645 51545
23	2	51545 52045
24	3	51545 52045 520018
25	2	520018 520024

TABLE 4-2. TAILBOOM AND WINGS - REGIONS AND CONM2 CARDS (CONT'D)

26	2	520024 520057
27	2	520057 520065
28	2	520065 520068
29	2	520068 520079
30	2	520079 520135
31	2	520135 520139
32	2	520139 520152
33	2	520152 520185
34	1	520185
35	6	75911 75919 75921 75929 75931 75939
36	12	75011 75019 75021 75029 75031 75039 75911 75919 75921 75929 75931 75939
37	12	74211 74219 74221 74229 74231 74239 75011 75019 75021 75029 75031 75039
38	12	73411 73419 73421 73429 73431 73439 74211 74219 74221 74229 74231 74239
39	12	72811 72819 72821 72829 72831 72839 73411 73419 73421 73429 73431 73439
40	16	72211 72213 72217 72219 72221 72224 72226 72229 72231 72239 72811 72819 72821 72829 72831 72839
41	25	71912 71913 71914 71916 71917 71918 71922 71923 71924 72224 72226 72229 72231 72239 71926 71927 71928 71934 71935 71936 72211 72213 72217 72219 72221
42	25	61912 61913 61914 61916 61917 61918 61922 61923 61924 62224 62226 62229 62231 62239 61926 61927 61928 61934 61935 61936 62211 62213 62217 62219 62221
43	16	62211 62213 62217 62219 62221 62224 62226 62229 62231 62239 62811 62819 62821 62829 62831 62839
44	12	62811 62819 62821 62829 62831 62839 63411 63419 63421 63429 63431 63439
45	12	63411 63419 63421 63429 63431 63439 64211 64219 64221 64229 64231 64239
46	12	64211 64219 64221 64229 64231 64239 65011 65019 65021 65029 65031 65039
47	12	65011 65019 65021 65029 65031 65039 65911 65919 65921 65929 65931 65939
48	6	65911 65919 65921 65929 65931 65939

TABLE 4-[illegible] TAILBOOM AND WINGS - REGIONS AND CONM2 CARDS (CONT'D)

[illegible]	NASTRAN EID	GRID POINT	WEIGHT (lb)
CONM2	120045	30045	8.020
CONM2	121745	31745	33.300
CONM2	123845	33845	43.991
CONM2	125945	35945	60.542
CONM2	128045	38045	33.770
CONM2	130145	40145	20.830
CONM2	132245	42245	19.695
CONM2	134345	44345	9.748
CONM2	[illegible]5	45245	10.218
CONM2	[illegible]5	46445	18.052
CONM2	[illegible]445	48445	16.465
CONM2	138045	48045	23.604
CONM2	138845	48845	6.526
CONM2	139745	49745	12.117
CONM2	140645	50645	8.474
CONM2	141545	51545	5.845
CONM2	142045	52045	17.591
CONM2	130141	40141	3.541
CONM2	130142	40142	5.937
CONM2	130143	40143	10.107
CONM2	130147	40147	9.503
CONM2	130148	40148	5.887
CONM2	130149	40149	3.541
CONM2	151912	61912	0.201
CONM2	151913	61913	0.201
CONM2	151914	61914	0.201
CONM2	151916	61916	0.184
CONM2	151917	61917	0.179
CONM2	151918	61918	0.172
CONM2	151922	61922	0.774
CONM2	151923	61923	0.689
CONM2	151924	61924	0.610
CONM2	151926	61926	0.305
CONM2	151927	61927	0.285
CONM2	151928	61928	0.259
CONM2	151934	61934	0.164
CONM2	151935	61935	0.160
CONM2	151936	61936	0.157
CONM2	152211	62211	0.463
CONM2	152213	62213	0.480
CONM2	152217	62217	0.476
CONM2	152219	62219	0.462
CONM2	152221	62221	1.537
CONM2	152224	62224	1.539
CONM2	152226	62226	1.135
CONM2	152229	62229	0.865
CONM2	152231	62231	0.393
CONM2	152239	62239	0.374
CONM2	152811	62811	0.960
CONM2	152819	62819	1.111
CONM2	152821	62821	1.904

TABLE 4-2. TAILBOOM AND WINGS - REGIONS AND CONM2 CARDS (CONT'D)

CONM2	152829	62829	1.798
CONM2	152831	62831	0.612
CONM2	152839	62839	0.595
CONM2	153411	63411	1.969
CONM2	153419	63419	2.323
CONM2	153421	63421	3.041
CONM2	153429	63429	2.881
CONM2	153431	63431	1.144
CONM2	153439	63439	1.118
CONM2	154211	64211	2.314
CONM2	154219	64219	3.090
CONM2	154221	64221	3.275
CONM2	154229	64229	3.561
CONM2	154231	64231	1.265
CONM2	154239	64239	1.243
CONM2	155011	65011	1.382
CONM2	155019	65019	2.036
CONM2	155021	65021	1.737
CONM2	155029	65029	2.148
CONM2	155031	65031	0.796
CONM2	155039	65039	0.790
CONM2	155911	65911	0.693
CONM2	155919	65919	0.967
CONM2	155921	65921	1.009
CONM2	155929	65929	1.298
CONM2	155931	65931	0.517
CONM2	155939	65939	0.509
CONM2	161912	71912	0.251
CONM2	161913	71913	0.249
CONM2	161914	71914	0.245
CONM2	161916	71916	0.216
CONM2	161917	71917	0.208
CONM2	161918	71918	0.199
CONM2	161922	71922	0.866
CONM2	161923	71923	0.723
CONM2	161924	71924	0.623
CONM2	161926	71926	0.314
CONM2	161927	71927	0.294
CONM2	161928	71928	0.269
CONM2	161934	71934	0.171
CONM2	161935	71935	0.167
CONM2	161936	71936	0.164
CONM2	162211	72211	0.517
CONM2	162213	72213	0.530
CONM2	162217	72217	0.506
CONM2	162219	72219	0.488
CONM2	162221	72221	1.708
CONM2	162224	72224	1.528
CONM2	162226	72226	1.141
CONM2	162229	72229	0.874

TABLE 4-2. TAILBOOM AND WINGS - REGIONS AND CONM2 CARDS (CONT'D)

CONM2	162231	72231	0.400
CONM2	162239	72239	0.381
CONM2	162811	72811	0.960
CONM2	162819	72819	1.111
CONM2	162821	72821	1.904
CONM2	162829	72829	1.798
CONM2	162831	72831	0.612
CONM2	162839	72839	0.595
CONM2	163411	73411	1.969
CONM2	163419	73419	2.323
CONM2	163421	73421	3.041
CONM2	163429	73429	2.881
CONM2	163431	73431	1.144
CONM2	163439	73439	1.118
CONM2	164211	74211	2.314
CONM2	164219	74219	3.090
CONM2	164221	74221	3.275
CONM2	164229	74229	3.561
CONM2	164231	74231	1.265
CONM2	164239	74239	1.243
CONM2	165011	75011	1.382
CONM2	165019	75019	2.036
CONM2	165021	75021	1.737
CONM2	165029	75029	2.148
CONM2	165031	75031	0.796
CONM2	165039	75039	0.790
CONM2	165911	75911	0.693
CONM2	165919	75919	0.967
CONM2	165921	75921	1.009
CONM2	165929	75929	1.298
CONM2	165931	75931	0.517
CONM2	165939	75939	0.509
CONM2	610018	520018	5.662
CONM2	610024	520024	5.937
CONM2	610057	520057	4.420
CONM2	610065	520065	0.0
CONM2	610068	520068	0.819
CONM2	610079	520079	4.374
CONM2	610135	520135	1.007
CONM2	610139	520139	16.749
CONM2	610152	520152	14.868
CONM2	610185	520185	1.583

TABLE 4-3. MAIN ROTOR PYLON - REGIONS AND CONM2 CARDS

REGION	STATION X1	TO	X2	BUTTLINE Y1	TO	Y2	WATERLINE Z1	TO	Z2
1	187.00		213.00	-13.00		13.00	75.00		76.00
2	187.00		213.00	-13.00		13.00	76.00		77.57
3	187.00		213.00	-13.00		13.00	77.57		79.05
4	187.00		213.00	-13.00		13.00	79.05		86.25
5	187.00		213.00	-13.00		13.00	86.25		95.00
6	187.00		213.00	-13.00		13.00	95.00		100.67
7	187.00		213.00	-13.00		13.00	100.67		106.00
8	187.00		213.00	-13.00		13.00	106.00		114.00
9	187.00		213.00	-13.00		13.00	114.00		121.00
10	187.00		213.00	-13.00		13.00	121.00		129.00
11	187.00		213.00	-13.00		13.00	129.00		137.00
12	187.00		213.00	-13.00		13.00	137.00		145.00
13	187.00		213.00	-13.00		13.00	145.00		152.76
14	187.00		213.00	-13.00		13.00	152.76		154.00
15	187.00		213.00	-13.00		13.00	154.00		154.97
16	187.00		213.00	-13.00		13.00	154.97		200.00

REG	#GPTS	GRID POINTS:
1	1	200070
2	2	200070 200078
3	2	200078 200079
4	2	200079 200086
5	2	200086 200095
6	2	200095 200101
7	2	200101 200106
8	2	200106 200114
9	2	200114 200121
10	2	200121 200129
11	2	200129 200137
12	2	200137 200145

TABLE 4-3. MAIN ROTOR PYLON - REGIONS AND CONM2 CARDS (CONT'D)

13	2	200145 200153
14	1	200153
15	1	200155
16	1	200155

TYPE	NASTRAN EID	GRID POINT	WEIGHT (lb)
CONM2	290070	200070	34.465
CONM2	290078	200078	22.740
CONM2	290079	200079	51.048
CONM2	290086	200086	60.052
CONM2	290087	200087	60.052
CONM2	290095	200095	64.933
CONM2	290096	200096	64.933
CONM2	290101	200101	57.277
CONM2	290106	200106	47.013
CONM2	290114	200114	66.626
CONM2	290121	200121	54.350
CONM2	290129	200129	13.810
CONM2	290137	200137	9.253
CONM2	290145	200145	12.065
CONM2	290153	200153	953.352
CONM2	290155	200155	6.124

TABLE 4-4. BASIC MISSION USEFUL WEIGHT ITEMS

Description	A/N Code	Weight (lb)	Grid Point	Location			Offset Distances		
				Sta	BL	WL	ΔSta	ΔBL	ΔWL
Pilot	60061	200.00	13500	135.00	0.0	78.00	-	-	-
Gunner	60071	200.00	8300	83.00	0.0	70.00	-	-	-
Forward Fuel	60151	775.00	17100	169.00	0.0	53.00	-	-	-
Aft Fuel	60151	825.00	23100	231.00	0.0	51.00	-	-	-
Trapped Fuel	60161	4.25	17100	169.00	0.0	53.00	-	-	-
		4.25	23100	231.00	0.0	51.00	-	-	-
Engine Oil	60181	26.70	24800	248.00	0.0	86.00	-	-	-
Trapped Engine Oil	60191	2.20	24800	248.00	0.0	86.00	-	-	-
Main Transmission Oil	60211	26.10	20070	200.00	0.0	70.00	-	-	-
42° Gearbox Oil	60211	0.30	46445	464.10	0.0	59.81	-	-	-
90° Gearbox Oil	60211	0.40	52045	520.07	0.0	118.27	-	-	-
40mm Drum and Pallet	60251	75.00	11300	113.60	10.00	37.00	-	-	-
Grenades 250 Rounds	60261	190.00	11300	113.60	10.00	37.00	-	-	-
Smoke Grenade Dispenser, Right Wing	60321	17.80	65929	204.04	59.00	58.45	-2.74	0.0	-16.05
Smoke Grenade Dispenser, Left Wing	60321	17.80	75929	204.04	-59.00	58.45	-2.74	0.0	-16.05
Smoke Grenades, Right Wing	60331	22.00	65929	204.04	59.00	58.45	-2.74	0.0	-16.05
Smoke Grenades, Left Wing	60331	22.00	75929	204.04	-59.00	58.45	-2.74	0.0	-16.05
Mamee Drum, 7.62mm	60381	63.30	11700	115.80	-7.20	36.00	-	-	-
Ammo, 4000 rounds	60391	260.00	11700	115.80	-7.20	36.00	-	-	-
Outboard Pylon Assembly, Left Wing	60441	17.80	75929	204.04	-59.00	58.45	-	-	-
Outboard Pylon Assembly, Right Wing	60441	17.80	65929	204.04	59.00	58.45	-	-	-
XM-157A Pod, Left Wing	60491	57.00	75929	204.04	-59.00	58.45	-7.04	0.0	-7.45

TABLE 4-4. Continued

Description	A/N Code	Weight (lb)	Grid Point	Location			Offset Distances		
				Sta	BL	WL	ΔSta	ΔBL	ΔWL
XM-157A Pod, Right Wing	60491	57.00	65929	204.04	59.00	58.45	-7.04	0.0	-7.45
M-151/XM429 Rockets, Left Wing	60501	145.70	75929	204.04	-59.00	58.45	-7.04	0.0	-7.45
M-151/XM429 Rockets Right Wing	60501	145.70	65929	204.04	59.00	58.45	-7.04	0.0	-7.45

Note: Elements A through X are CONROD's; ID's and areas are defined in Table 4-5, and constraints at numbered grid points are listed in Table 4-6. Useful weights and their locations are given in Table 4-4.

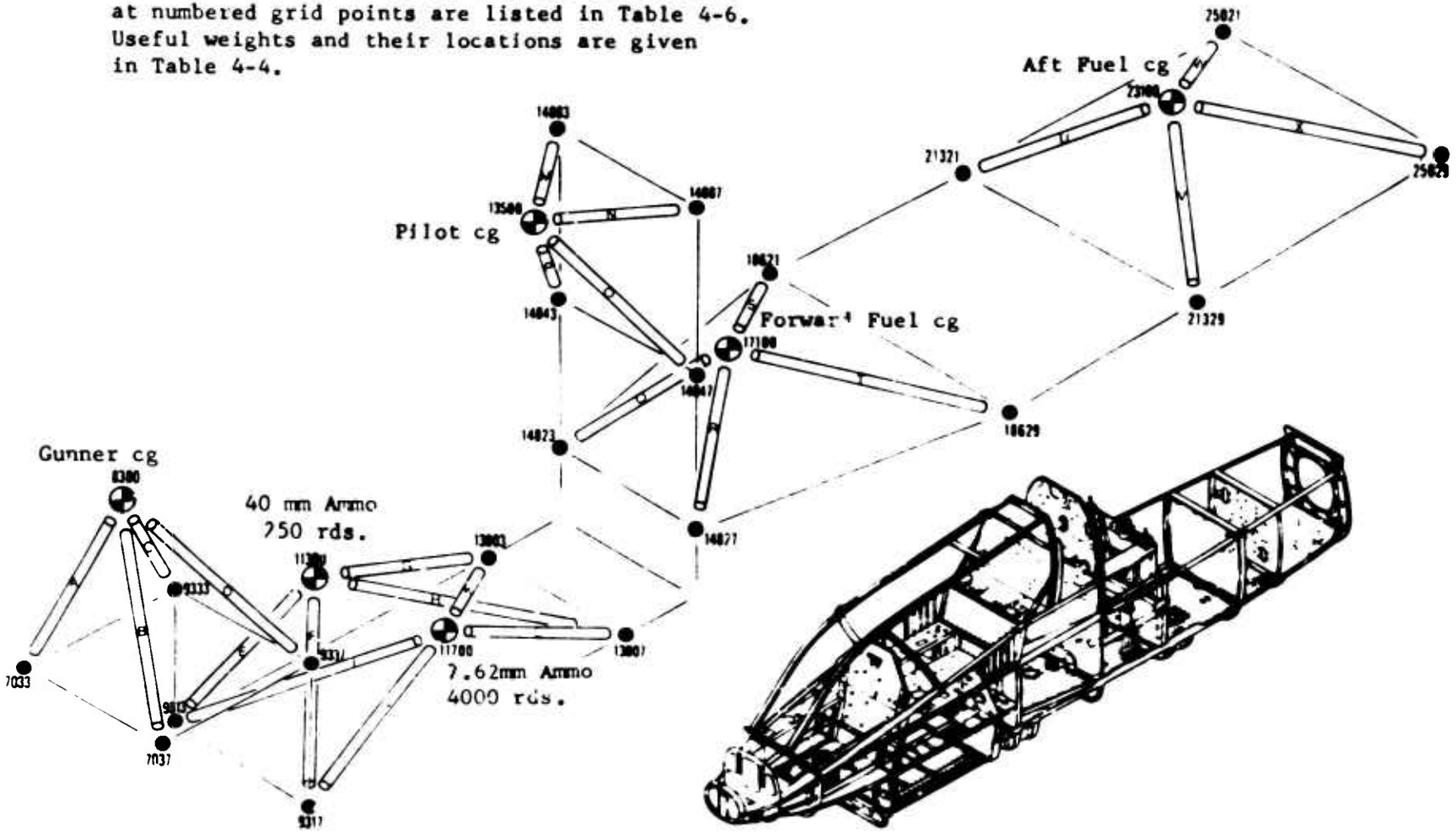


Figure 4-2. Distribution of Useful Weight Items

Table 4-5. Rod Element Data for Distribution of Useful Weight Items

ROD ELEMENT DATA

LETTER DESIGNATION	NASTRAN EID	TYPE	ACTUAL AREA ($in.^2$)	OFFSETS FROM GRIDPOINT		FINAL AREA ($in.^2$)
				Z	Y	
A	20081	Truss	1.0	-	-	1.0
B	20082	Truss	1.0	-	-	1.0
C	20083	Truss	1.0	-	-	1.0
D	20084	Truss	1.0	-	-	1.0
E	150151	Truss	1.0	-	-	1.0
F	150152	Truss	1.0	-	-	1.0
G	150153	Truss	1.0	-	-	1.0
H	150154	Truss	1.0	-	-	1.0
I	150201	Truss	1.0	-	-	1.0
J	150202	Truss	1.0	-	-	1.0
K	150203	Truss	1.0	-	-	1.0
L	150204	Truss	1.0	-	-	1.0
M	10093	Truss	1.0	-	-	1.0
N	10094	Truss	1.0	-	-	1.0
O	10092	Truss	1.0	-	-	1.0
P	10091	Truss	1.0	-	-	1.0
Q	31071	Truss	1.0	-	-	1.0
R	31072	Truss	1.0	-	-	1.0
S	31073	Truss	1.0	-	-	1.0
T	31074	Truss	1.0	-	-	1.0
U	31081	Truss	1.0	-	-	1.0
V	31082	Truss	1.0	-	-	1.0
W	31083	Truss	1.0	-	-	1.0
X	31084	Truss	1.0	-	-	1.0

Table 4-6. Grid Point Constraint Data for Distribution of Useful Weight Items

GRID POINT DATA

GRID POINT	SPC		MPC		OMIT	
	D.O.F.	RULE*	D.O.F.	RULE*	D.O.F.	RULE*
7033	456	AAA	123	AAA	-	-
7037	456	AAA	123	AAA	-	-
8300	-	-	-	-	-	-
9313	456	AAA	-	-	123	DCC
9317	456	AAA	-	-	13	DC
9333	456	AAA	-	-	1	D
9337	456	AAA	-	-	2	C
11300	-	-	-	-	-	-
11700	-	-	-	-	-	-
13500	-	-	-	-	-	-
13803	456	AAA	-	-	123	DCC
13807	456	AAA	-	-	123	DCC
14823	456	AAA	123	AAA	-	-
14827	456	AAA	123	AAA	-	-
14843	456	AAA	-	-	123	DCC
14847	456	AAA	-	-	123	DCC
14883	456	AAA	-	-	123	DCC
14887	456	AAA	-	-	123	DCC
17100	-	-	-	-	-	-
18621	456	AAA	-	-	123	DCC
18629	456	AAA	-	-	123	DCC
21321	456	AAA	-	-	23	CC
21329	456	AAA	-	-	123	DCC
23100	-	-	-	-	-	-
25021	456	AAA	-	-	123	DCC
25029	456	AAA	-	-	123	DCC

* Reference Section 2.4.2

5. NASTRAN STRUCTURAL ELEMENT AND GRID POINT INDEX

BAR ELEMENT (CBAR) INDEX

NASTRAN EID	PAGE
20411	3-224
20412	3-224
20413	3-224
20414	3-224
20415	3-224
20451	3-224
20452	3-224
20453	3-224
20454	3-224
20455	3-224
20511	3-224
20512	3-224
20513	3-224
20521	3-224
20527	3-224
20523	3-224
1070311	3-220
1070321	3-220
1210091	3-220
1210101	3-220
1210211	3-220
1210212	3-220
1210213	3-220
1210611	3-220
1210612	3-220
1210613	3-220
1864100	3-237
1864900	3-238
1865100	3-237
1865400	3-237
1865600	3-237
1865900	3-237
1866100	3-237
1866900	3-237
1874142	3-237
1874151	3-237
1874243	3-238
1874344	3-238
1874363	3-237
1874445	3-238
1874546	3-238
1874647	3-238
1874748	3-238
1874753	3-237
1874767	3-237

NASTRAN EID	PAGE
1874849	3-238
1874954	3-237
1875152	3-237
1875156	3-237
1875243	3-237
1875257	3-237
1875354	3-237
1875358	3-237
1875459	3-237
1875657	3-237
1875763	3-237
1875859	3-237
1876162	3-237
1876263	3-237
1876364	3-237
1876465	3-237
1876566	3-237
1876667	3-237
1876758	3-237
1876768	3-237
1876869	3-237
1974100	3-242
1974142	3-242
1974151	3-242
1974243	3-242
1974252	3-242
1974345	3-242
1974363	3-242
1974547	3-242
1974748	3-242
1974767	3-242
1974849	3-242
1974858	3-242
1974900	3-242
1974959	3-242
1975100	3-242
1975152	3-242
1975161	3-242
1975262	3-242
1975859	3-242
1975868	3-242
1975900	3-242
1975969	3-242
1976162	3-242
1976263	3-242

BAR ELEMENT (CBAR) INDEX (CONT.)

NASTRAN EID	PAGE
1976365	3-242
1976567	3-242
1976768	3-242
1976869	3-242
2124143	3-244
2124345	3-244
2124547	3-244
2124749	3-244
2134100	3-244
2134900	3-244
3003170	3-280
3173380	3-280
3383590	3-280
3440011	3-220
3440012	3-220
3530251	3-216
3530252	3-216
3530253	3-216
3530254	3-216
3530255	3-216
3570001	3-216
3593800	3-280
3804010	3-280
4000071	3-299
4000072	3-299
4014142	3-297
4014220	3-280
4014243	3-297
4014345	3-297
4014347	3-297
4014547	3-297
4014748	3-297
4014849	3-297
4020091	3-299
4020092	3-299
4020093	3-299
4020094	3-299
4020095	3-299
4020096	3-299
4020097	3-299
4020098	3-299
4020099	3-299
4224430	3-280
4434520	3-280
4500050	3-216

NASTRAN EID	PAGE
4500070	3-216
4500071	3-216
4500072	3-216
4500073	3-216
4500074	3-216
4500075	3-216
4500076	3-216
4500077	3-216
4500078	3-216
4500079	3-216
4524640	3-280
4644800	3-293
4804880	3-293
4884970	3-293
4975060	3-293
5065150	3-293
5155200	3-293
6131922	3-274
6171922	3-274
6221922	3-274
6222813	3-259
6222817	3-259
6222821	3-259
6222824	3-259
6222826	3-259
6222829	3-259
6222831	3-259
6222839	3-259
6241922	3-274
6261922	3-274
6281922	3-274
6341922	3-274
6361922	3-274
7131922	3-277
7171922	3-277
7221922	3-277
7222813	3-265
7222817	3-265
7222821	3-265
7222824	3-265
7222826	3-265
7222829	3-265
7222831	3-265
7222839	3-265

BAR ELEMENT (CBAR) INDEX (CONT.)

NASTRAN EID	PAGE
7241922	3-277
7261922	3-277
7281922	3-277
7341922	3-277
7361922	3-277

SCALAR SPRING ELEMENT (CELAS2) INDEX

NASTRAN EID	PAGE
189831	3-217
189832	3-217
189833	3-217
189871	3-217
189872	3-217
189873	3-217
211831	3-217
211832	3-217
211833	3-217
211871	3-217
211872	3-217
211873	3-217
214853	3-217

ROD ELEMENT (CONROD) INDEX

NASTRAN EID	PAGE
10091	4-35
10092	4-35
10093	4-35
10094	4-35
20081	4-35
20082	4-35
20083	4-35
20084	4-35
31071	4-35
31072	4-35
31073	4-35
31074	4-35
31081	4-35
31082	4-35
31083	4-35
31084	4-35
108001	3-230
109001	3-230
150151	4-35
150152	4-35
150153	4-35
150154	4-35
150201	4-35
150202	4-35
150203	4-35
150204	4-35
333141	3-4
333931	3-4
333949	3-4
334149	3-4
612327	3-50
612739	3-50
613123	3-50
613141	3-50
613337	3-50
613343	3-50
613747	3-50
613949	3-50
614161	3-50
614363	3-50
614767	3-50
614969	3-50
616171	3-50
616371	3-50
616979	3-50

NASTRAN EID	PAGE
617179	3-50
617967	3-50
930307	3-54
930313	3-54
930717	3-54
931317	3-54
931333	3-54
931739	3-54
933113	3-54
933133	3-54
933141	3-54
933337	3-54
933343	3-54
933717	3-54
933739	3-54
933747	3-54
933949	3-54
934143	3-54
934161	3-54
934347	3-54
934363	3-54
934749	3-54
934767	3-54
934969	3-54
936143	3-54
936163	3-54
936171	3-54
936373	3-54
936769	3-54
936777	3-54
936979	3-54
937173	3-54
937377	3-54
937779	3-54
1060011	3-230
1060012	3-230
1070011	3-230
1070012	3-230
1150231	3-101
1160311	3-98
1170191	3-174
1170211	3-175
1170231	3-175
1170232	3-174
1170501	3-175

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1170502	3-174
1170503	3-174
1170504	3-174
1170511	3-175
1170512	3-174
1170513	3-175
1170514	3-174
1170515	3-175
1170516	3-174
1170521	3-175
1170522	3-174
1170523	3-174
1170524	3-174
1170531	3-175
1170532	3-174
1170533	3-175
1170534	3-174
1171101	3-175
1171102	3-174
1171103	3-174
1171104	3-174
1171111	3-175
1171112	3-174
1171113	3-175
1171114	3-174
1173901	3-175
1173902	3-174
1173903	3-174
1173904	3-174
1173911	3-175
1173912	3-174
1173913	3-175
1173914	3-174
1175101	3-175
1175102	3-174
1175103	3-174
1175104	3-174
1175111	3-175
1175112	3-174
1175113	3-175
1175114	3-174
1184501	3-171
1184502	3-170
1184503	3-170
1184504	3-170

NASTRAN EID	PAGE
1184511	3-170
1184512	3-170
1184513	3-171
1184514	3-170
1186901	3-171
1186902	3-170
1186903	3-170
1186904	3-170
1186911	3-170
1186912	3-170
1186913	3-170
1186914	3-170
1186921	3-171
1186922	3-170
1186923	3-170
1186924	3-170
1186931	3-170
1186932	3-170
1186933	3-171
1186934	3-170
1187101	3-171
1187102	3-170
1187103	3-170
1187104	3-170
1187111	3-170
1187112	3-170
1187113	3-170
1187114	3-170
1190171	3-167
1190172	3-167
1190173	3-167
1190191	3-167
1190192	3-167
1190211	3-167
1190231	3-167
1190232	3-167
1190501	3-167
1190502	3-167
1190503	3-167
1190504	3-167
1190511	3-167
1190512	3-167
1190513	3-167
1190514	3-167
1190901	3-167

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1190902	3-167
1190903	3-167
1190904	3-167
1190911	3-167
1190912	3-167
1190913	3-167
1190914	3-167
1200091	3-164
1200092	3-164
1200133	3-164
1200134	3-164
1200135	3-164
1200136	3-164
1200137	3-164
1200151	3-164
1200701	3-164
1200702	3-164
1200703	3-164
1200704	3-164
1200711	3-164
1200712	3-164
1200713	3-164
1200714	3-164
1201101	3-164
1201102	3-164
1201103	3-164
1201104	3-164
1201111	3-164
1201112	3-164
1201113	3-164
1201114	3-164
1202101	3-209
1202102	3-212
1202103	3-209,212
1202104	3-209,212
1210092	3-220
1210102	3-220
1210311	3-118
1210312	3-118
1210321	3-114
1210322	3-114
1210471	3-220
1210472	3-220
1210591	3-220
1210592	3-220

NASTRAN EID	PAGE
1250131	3-138
1250132	3-138
1250151	3-138
1250171	3-138
1250571	3-135
1250572	3-135
1250771	3-138
1250772	3-138
1250971	3-138
1251491	3-135
1251511	3-135
1251551	3-135
1251571	3-135
1251572	3-135
1252301	3-138
1252302	3-138
1252303	3-138
1252304	3-138
1252701	3-135
1252702	3-135
1252703	3-135
1252704	3-135
1259101	3-138
1259102	3-138
1259103	3-138
1259104	3-138
1290101	3-33
1290102	3-31
1290103	3-31
1290104	3-30
1290111	3-32
1290112	3-31
1290113	3-32
1290114	3-31
1290121	3-33
1290122	3-32
1290123	3-32
1290124	3-30
1290131	3-32
1290132	3-31
1290133	3-32
1290134	3-31
1290141	3-33
1290142	3-32
1290143	3-32

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1290144	3-31
1290151	3-32
1290152	3-31
1290153	3-32
1290154	3-31
1290211	3-27
1290212	3-26
1290231	3-25
1290232	3-25
1290233	3-26
1290234	3-35
1290235	3-35
1290251	3-28
1290252	3-28
1290253	3-28
1290254	3-36
1290271	3-27
1290272	3-26
1290273	3-35
1290274	3-35
1290331	3-35
1290501	3-33
1290502	3-31
1290503	3-31
1290504	3-30
1290511	3-32
1290512	3-31
1290513	3-32
1290514	3-31
1290521	3-33
1290522	3-32
1290523	3-32
1290524	3-30
1290531	3-32
1290532	3-31
1290533	3-32
1290534	3-31
1290541	3-33
1290542	3-32
1290543	3-32
1290544	3-31
1290551	3-32
1290552	3-31
1290553	3-32
1290554	3-31

NASTRAN EID	PAGE
1290561	3-39
1290562	3-38
1290563	3-38
1290564	3-38
1290571	3-38
1290572	3-38
1290573	3-39
1290574	3-38
1290581	3-39
1290582	3-38
1290583	3-38
1290584	3-38
1290591	3-39
1290592	3-38
1290593	3-39
1290594	3-38
1290691	3-39
1290692	3-38
1290695	3-46
1290696	3-46
1290697	3-46
1290698	3-46
1290699	3-46
1290731	3-31
1290732	3-38
1290733	3-38
1290754	3-30
1290755	3-30
1290756	3-33
1290757	3-32
1290758	3-31
1290791	3-32
1290792	3-31
1290793	3-38
1290794	3-38
1290901	3-28
1290902	3-26
1290903	3-26
1290904	3-25
1290911	3-27
1290912	3-26
1290913	3-27
1290914	3-26
1290921	3-28
1290922	3-27

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1290923	3-27
1290924	3-25
1290931	3-27
1290932	3-26
1290933	3-27
1290934	3-26
1290941	3-28
1290942	3-27
1290943	3-27
1290944	3-26
1290951	3-27
1290952	3-26
1290953	3-27
1290954	3-26
1290961	3-36
1290962	3-35
1290963	3-35
1290964	3-35
1290971	3-35
1290972	3-35
1290973	3-36
1290974	3-35
1290981	3-36
1290982	3-35
1290983	3-35
1290984	3-35
1290991	3-33
1290992	3-33
1290993	3-36
1290994	3-35
1290995	3-36
1290996	3-35
1291001	3-43
1291002	3-43
1291003	3-43
1291004	3-42
1291005	3-42
1291006	3-42
1291007	3-42
1291008	3-42
1291011	3-43
1291012	3-43
1291013	3-42
1291014	3-42
1291015	3-43

NASTRAN EID	PAGE
1291016	3-43
1291017	3-42
1291018	3-42
1291111	3-39
1291112	3-39
1291253	3-46
1291254	3-46
1291255	3-46
1291273	3-42
1291274	3-42
1291275	3-42
1291373	3-36
1291374	3-35
1291431	3-38
1291432	3-38
1291701	3-42
1291702	3-42
1291703	3-42
1291704	3-42
1291901	3-42
1291902	3-42
1291903	3-42
1291904	3-42
1291971	3-36
1291972	3-35
1291984	3-42
1291985	3-42
1291986	3-42
1291987	3-42
1292501	3-47
1292502	3-47
1292503	3-47
1292504	3-46
1292511	3-47
1292512	3-47
1292513	3-47
1292514	3-47
1292701	3-43
1292702	3-43
1292703	3-43
1292704	3-42
1292711	3-43
1292712	3-43
1292713	3-43
1292714	3-43

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1293701	3-38
1293702	3-38
1293703	3-38
1293704	3-38
1293711	3-38
1293712	3-38
1293713	3-38
1293714	3-38
1294101	3-47
1294102	3-47
1294103	3-47
1294104	3-46
1294105	3-46
1294106	3-46
1294107	3-46
1294108	3-46
1294111	3-47
1294112	3-47
1294113	3-46
1294114	3-46
1294115	3-47
1294116	3-47
1294117	3-46
1294118	3-46
1294121	3-28
1294122	3-27
1294123	3-27
1294124	3-25
1294131	3-27
1294132	3-26
1294133	3-27
1294134	3-26
1294901	3-36
1294902	3-35
1294903	3-35
1294904	3-35
1294911	3-35
1294912	3-35
1294913	3-36
1294914	3-35
1294921	3-36
1294922	3-35
1294923	3-35
1294924	3-35
1294931	3-36

NASTRAN EID	PAGE
1294932	3-35
1294933	3-36
1294934	3-35
1295701	3-46
1295702	3-46
1295703	3-46
1295704	3-46
1295901	3-28
1295902	3-27
1295903	3-27
1295904	3-25
1295911	3-27
1295912	3-26
1295913	3-27
1295914	3-26
1295921	3-46
1295922	3-46
1295923	3-46
1295924	3-46
1296901	3-47
1296902	3-47
1296903	3-47
1296904	3-46
1296905	3-46
1296906	3-46
1296911	3-47
1296912	3-47
1296913	3-46
1296914	3-47
1296915	3-47
1296916	3-46
1297501	3-33
1297502	3-31
1297503	3-31
1297504	3-30
1297511	3-32
1297512	3-31
1297513	3-32
1297514	3-31
1297521	3-32
1297522	3-30
1297523	3-31
1297524	3-31
1297701	3-32
1297702	3-30

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1297703	3-31
1297704	3-31
1298301	3-28
1298302	3-26
1298303	3-26
1298304	3-25
1298311	3-27
1298312	3-26
1298313	3-27
1298314	3-26
1298321	3-28
1298322	3-27
1298323	3-27
1298324	3-25
1298331	3-27
1298332	3-26
1298333	3-27
1298334	3-26
1298341	3-28
1298342	3-27
1298343	3-27
1298344	3-26
1298351	3-27
1298352	3-26
1298353	3-27
1298354	3-26
1298501	3-39
1298502	3-38
1298503	3-38
1298504	3-39
1298511	3-39
1298512	3-38
1298513	3-39
1298514	3-39
1299801	3-43
1299802	3-43
1299803	3-43
1299804	3-42
1299805	3-42
1299806	3-42
1299811	3-43
1299812	3-43
1299813	3-42
1299814	3-43
1299815	3-43

NASTRAN EID	PAGE
1299816	3-42
1300211	3-106
1300212	3-105
1300213	3-105
1300214	3-105
1300215	3-105
1300231	3-105
1300271	3-107
1300352	3-106
1300353	3-106
1300411	3-105
1300412	3-105
1302901	3-106
1302902	3-106
1302903	3-106
1302904	3-106
1303301	3-106
1303302	3-106
1303303	3-106
1303304	3-106
1303311	3-107
1303312	3-106
1303313	3-106
1303314	3-105
1303315	3-105
1303316	3-105
1303321	3-106
1303322	3-105
1303323	3-105
1303324	3-106
1303325	3-105
1303326	3-105
1303501	3-106
1303502	3-106
1303503	3-106
1303504	3-106
1303901	3-106
1303902	3-106
1303903	3-106
1303904	3-106
1303911	3-107
1303912	3-106
1303913	3-106
1303914	3-105
1303915	3-105

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1303916	3-105
1303921	3-106
1303922	3-105
1303923	3-105
1303924	3-106
1303925	3-105
1303926	3-105
1330101	3-209
1330102	3-209,212
1330103	3-212
1330104	3-209
1330105	3-212
1330106	3-209
1330107	3-212
1360691	3-118
1360692	3-118
1360693	3-167
1360694	3-174
1360695	3-174
1360711	3-114
1360712	3-114
1360713	3-164
1360714	3-170
1360715	3-170
1370354	3-119
1370355	3-118
1370356	3-118
1370357	3-118
1370358	3-118
1370364	3-115
1370365	3-114
1370366	3-114
1370367	3-114
1370368	3-114
1370501	3-118
1370502	3-118
1370503	3-118
1370504	3-118
1370511	3-118
1370512	3-118
1370513	3-118
1370514	3-118
1370521	3-119
1370522	3-118
1370523	3-118

NASTRAN EID	PAGE
1370524	3-118
1370601	3-114
1370602	3-114
1370603	3-114
1370604	3-114
1370611	3-114
1370612	3-114
1370613	3-114
1370614	3-114
1370621	3-115
1370622	3-114
1370623	3-114
1370624	3-114
1372301	3-119
1372302	3-118
1372303	3-118
1372304	3-118
1372401	3-115
1372402	3-114
1372403	3-114
1372404	3-114
1373501	3-118
1373502	3-118
1373503	3-118
1373504	3-118
1373511	3-118
1373512	3-118
1373513	3-118
1373514	3-118
1373601	3-114
1373602	3-114
1373603	3-114
1373604	3-114
1373611	3-114
1373612	3-114
1373613	3-114
1373614	3-114
1380103	3-58
1380191	3-111
1380192	3-110
1380193	3-110
1380194	3-110
1380195	3-110
1380291	3-110
1380307	3-58

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1380311	3-111
1380323	3-58
1380432	3-111
1380433	3-111
1380491	3-110
1380492	3-110
1380709	3-58
1380929	3-58
1382101	3-58
1382123	3-58
1382131	3-58
1382327	3-58
1382333	3-58
1382707	3-58
1382729	3-58
1382737	3-58
1382939	3-58
1383133	3-58
1383141	3-58
1383337	3-58
1383343	3-58
1383501	3-111
1383502	3-110
1383503	3-111
1383504	3-111
1383739	3-58
1383747	3-58
1383748	3-58
1383949	3-58
1384101	3-111
1384102	3-110
1384103	3-111
1384104	3-111
1384111	3-111
1384112	3-111
1384113	3-111
1384114	3-110
1384115	3-110
1384116	3-110
1384121	3-111
1384122	3-110
1384123	3-110
1384124	3-111
1384125	3-110
1384126	3-110

NASTRAN EID	PAGE
1384143	3-58
1384161	3-58
1384301	3-111
1384302	3-110
1384303	3-111
1384304	3-111
1384347	3-58
1384363	3-58
1384501	3-111
1384502	3-110
1384503	3-111
1384504	3-111
1384511	3-111
1384512	3-111
1384513	3-111
1384514	3-110
1384515	3-110
1384516	3-110
1384521	3-111
1384522	3-110
1384523	3-110
1384524	3-111
1384525	3-110
1384526	3-110
1384867	3-58
1384969	3-58
1386163	3-58
1386769	3-58
1480103	3-124
1480307	3-124
1480323	3-123
1480709	3-124
1480929	3-123
1482101	3-123
1482123	3-123
1482131	3-123
1482327	3-123
1482333	3-123
1482707	3-123
1482729	3-123
1482737	3-123
1482939	3-123
1483133	3-123
1483141	3-123
1483337	3-123

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1483343	3-123
1483739	3-123
1483747	3-123
1483949	3-123
1484161	3-123
1484347	3-123
1484363	3-123
1484767	3-123
1484969	3-123
1486163	3-123
1486181	3-123
1486367	3-123
1486769	3-123
1486989	3-123
1488183	3-123
1488387	3-123
1488789	3-123
1560031	3-88
1560032	3-89
1560033	3-89
1560041	3-88
1560042	3-88
1560043	3-88
1570011	3-30
1570012	3-30
1570013	3-31
1570014	3-38
1570015	3-38
1570016	3-46
1570017	3-110
1570031	3-25
1570032	3-25
1570033	3-26
1570034	3-35
1570035	3-35
1570036	3-42
1570037	3-105
1580031	3-33
1580032	3-33
1580033	3-33
1580034	3-39
1580035	3-39
1580036	3-46
1580041	3-20
1580042	3-28

NASTRAN EID	PAGE
1580043	3-28
1580044	3-36
1580045	3-36
1580046	3-42
1590051	3-47
1590052	3-111
1590053	3-111
1590071	3-43
1590072	3-106
1590073	3-107
1600051	3-118
1600052	3-118
1600053	3-167
1600054	3-174
1600055	3-174
1600091	3-114
1600092	3-114
1600093	3-164
1600094	3-170
1600095	3-170
1610131	3-70
1610132	3-138
1610133	3-138
1610151	3-68
1610152	3-135
1610153	3-135
1610191	3-119
1610192	3-167
1610193	3-167
1610194	3-167
1610195	3-175
1610196	3-175
1610291	3-115
1610292	3-164
1610293	3-164
1610294	3-164
1610295	3-171
1610296	3-171
1796101	3-60
1796102	3-60
1796103	3-60
1796104	3-60
1796111	3-60
1796112	3-60
1796113	3-60

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1796114	3-60
1796121	3-64
1796122	3-64
1796123	3-64
1796124	3-64
1796131	3-64
1796132	3-64
1796133	3-64
1796134	3-64
1796141	3-68
1796142	3-68
1796143	3-68
1796144	3-68
1796301	3-62
1796302	3-62
1796303	3-62
1796304	3-62
1796311	3-62
1796312	3-62
1796313	3-62
1796314	3-62
1796321	3-66
1796322	3-66
1796323	3-66
1796324	3-66
1796331	3-66
1796332	3-66
1796333	3-66
1796334	3-66
1796341	3-70
1796342	3-70
1796343	3-70
1796344	3-70
1800171	3-119
1800191	3-115
1820011	3-118
1820012	3-119
1820051	3-115
1820052	3-115
1860103	3-132
1860307	3-132
1860709	3-132
1860929	3-132
1862101	3-132
1862123	3-132

NASTRAN EID	PAGE
1862131	3-132
1862325	3-132
1862527	3-132
1862729	3-132
1862939	3-132
1863141	3-132
1863949	3-132
1864151	3-132
1864954	3-132
1865156	3-132
1865459	3-132
1865661	3-132
1865969	3-132
1866181	3-132
1866989	3-132
1868183	3-132
1868385	3-132
1868587	3-132
1868789	3-132
1870031	3-84
1870032	3-84
1874241	3-236
1874352	3-236
1874464	3-236
1874666	3-236
1874948	3-236
1875141	3-236
1875242	3-236
1875251	3-236
1875347	3-236
1875348	3-236
1875449	3-236
1875453	3-236
1875651	3-236
1875752	3-236
1875756	3-236
1875853	3-236
1875867	3-236
1875954	3-236
1875958	3-236
1876343	3-236
1876357	3-236
1876747	3-236
1974241	3-241
1974342	3-241

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
1974543	3-241
1974565	3-241
1974745	3-241
1974847	3-241
1974948	3-241
1975141	3-241
1975242	3-241
1975251	3-241
1975848	3-241
1975867	3-241
1975949	3-241
1975958	3-241
1976151	3-241
1976252	3-241
1976261	3-241
1976343	3-241
1976352	3-241
1976545	3-241
1976563	3-241
1976747	3-241
1976765	3-241
1976858	3-241
1976959	3-241
1976968	3-241
2010191	3-9
2010192	3-12
2010211	3-9,12
2015301	3-80
2015302	3-80
2015303	3-80
2015304	3-81
2015305	3-81
2015306	3-82
2015307	3-80
2015308	3-81
2015309	3-82
2015310	3-80
2015311	3-81
2015312	3-82
2015321	3-80
2015322	3-81
2015323	3-81
2015324	3-82
2015325	3-80
2015326	3-82

NASTRAN EID	PAGE
2015327	3-80
2015328	3-82
2015331	3-80
2015332	3-81
2015333	3-81
2015334	3-82
2015335	3-82
2015336	3-82
2015337	3-80
2015338	3-81
2015339	3-82
2015341	3-81
2015342	3-82
2015343	3-80
2016701	3-9
2016702	3-12
2016703	3-9,12
2016704	3-9,12
2016901	3-9
2016902	3-12
2016903	3-9,12
2016904	3-9,12
2016911	3-80
2016912	3-81
2016913	3-81
2016914	3-81
2016915	3-81
2016916	3-82
2016917	3-80
2016918	3-81
2016919	3-82
2016920	3-80
2016921	3-81
2016922	3-82
2016931	3-80
2016932	3-81
2016933	3-81
2016934	3-82
2016935	3-80
2016936	3-82
2016937	3-80
2016938	3-82
2017001	3-80
2017002	3-81
2017003	3-81

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
2017004	3-82
2017005	3-82
2017006	3-82
2017007	3-80
2017008	3-81
2017009	3-82
2017010	3-80
2017011	3-81
2017012	3-82
2018501	3-80
2018502	3-80
2018503	3-80
2018504	3-81
2018505	3-81
2018506	3-82
2018507	3-80
2018508	3-81
2018509	3-82
2018510	3-80
2018511	3-81
2018512	3-82
2018521	3-80
2018522	3-81
2018523	3-81
2018524	3-82
2018525	3-80
2018526	3-82
2018527	3-80
2018528	3-82
2018531	3-80
2018532	3-81
2018533	3-81
2018534	3-82
2018535	3-82
2018536	3-82
2018537	3-80
2018538	3-81
2018539	3-82
2018540	3-80
2018541	3-81
2018542	3-82
2020171	3-88
2020172	3-88
2020173	3-88
2020271	3-88

NASTRAN EID	PAGE
2020272	3-89
2020273	3-89
2020291	3-88
2020292	3-88
2020293	3-88
2027301	3-88
2027302	3-88
2027303	3-88
2027304	3-88
2027305	3-89
2027306	3-89
2027307	3-88
2027308	3-88
2027309	3-88
2027310	3-88
2027311	3-88
2027312	3-88
2030511	3-101
2030512	3-101
2030513	3-101
2030521	3-98
2030522	3-98
2030523	3-98
2032901	3-98
2032902	3-101
2032903	3-98,101
2032904	3-98,101
2044701	3-142
2044702	3-142
2044703	3-143
2044704	3-143
2044705	3-142
2044706	3-143
2044707	3-142
2044708	3-143
2044711	3-142
2044712	3-142
2044713	3-143
2044714	3-143
2044715	3-142
2044716	3-142
2044717	3-142
2044718	3-142
2044719	3-143
2044720	3-142

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
2044721	3-142
2044722	3-143
2044723	3-143
2044724	3-142
2044725	3-142
2044726	3-143
2044727	3-143
2047901	3-142
2047902	3-142
2047903	3-142
2047904	3-143
2047905	3-142
2047906	3-142
2047907	3-142
2047908	3-143
2048101	3-142
2048102	3-142
2048103	3-143
2048104	3-143
2048105	3-142
2048106	3-143
2048107	3-142
2048108	3-143
2048201	3-142
2048202	3-142
2048203	3-142
2048204	3-143
2048205	3-142
2048206	3-142
2048207	3-142
2048208	3-143
2050431	3-151
2050432	3-151
2050433	3-151
2050434	3-151
2050435	3-152
2050436	3-151
2050437	3-151
2050438	3-151
2050439	3-152
2050651	3-152
2050652	3-152
2055501	3-151
2055502	3-151
2055503	3-151

NASTRAN EID	PAGE
2055504	3-151
2055505	3-151
2055506	3-152
2055507	3-152
2055508	3-152
2055511	3-152
2055512	3-151
2055513	3-151
2055514	3-152
2055515	3-151
2055516	3-151
2055517	3-151
2055518	3-152
2056301	3-151
2056302	3-151
2056303	3-151
2056304	3-151
2056305	3-151
2056306	3-152
2056307	3-152
2056308	3-152
2056311	3-151
2056312	3-151
2056313	3-151
2056314	3-152
2056315	3-151
2056316	3-151
2056317	3-151
2056318	3-152
2060191	3-195
2060211	3-192
2060231	3-192
2060232	3-193
2060233	3-194
2060234	3-195
2060271	3-195
2060391	3-193
2060392	3-194
2060501	3-192
2060850	3-192
2060851	3-195
2060852	3-192
2060853	3-193
2060854	3-194
2060855	3-195

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
2060856	3-192
2060857	3-193
2060858	3-194
2060859	3-195
2068701	3-192
2068702	3-192
2068703	3-192
2068704	3-193
2068705	3-193
2068706	3-194
2068707	3-194
2068708	3-195
2068711	3-192
2068712	3-193
2068713	3-194
2068714	3-195
2068715	3-192
2068716	3-193
2068717	3-194
2068718	3-195
2068721	3-192
2068722	3-192
2068723	3-192
2068724	3-193
2068725	3-193
2068726	3-194
2068727	3-194
2068728	3-195
2068731	3-192
2068732	3-193
2068733	3-194
2068734	3-195
2068735	3-192
2068736	3-193
2068737	3-194
2068738	3-195
2068801	3-193
2068802	3-193
2068803	3-194
2068804	3-195
2068811	3-193
2068812	3-194
2068813	3-193
2068814	3-194
2068901	3-192

NASTRAN EID	PAGE
2068902	3-192
2068903	3-192
2068904	3-193
2068905	3-193
2068906	3-194
2068907	3-194
2068908	3-195
2068911	3-192
2068912	3-193
2068913	3-194
2068914	3-195
2068915	3-192
2068916	3-193
2068917	3-194
2068918	3-195
2068921	3-192
2068922	3-192
2068923	3-193
2068924	3-193
2068925	3-193
2068926	3-194
2068927	3-194
2068928	3-195
2068931	3-192
2068932	3-193
2068933	3-194
2068934	3-195
2068935	3-192
2068936	3-193
2068937	3-194
2068938	3-195
2069001	3-193
2069002	3-194
2069003	3-194
2069004	3-195
2069011	3-193
2069012	3-194
2069013	3-194
2069014	3-194
2069101	3-192
2069102	3-192
2069103	3-192
2069104	3-193
2069105	3-193
2069106	3-194

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
2069107	3-194
2069108	3-195
2069111	3-192
2069112	3-193
2069113	3-194
2069114	3-195
2069115	3-192
2069116	3-193
2069117	3-194
2069118	3-195
2070091	3-197
2070131	3-199
2070132	3-199
2070151	3-199
2070211	3-199
2070212	3-199
2070231	3-197
2070232	3-197
2070511	3-197
2070551	3-197
2070552	3-197
2070571	3-199
2072701	3-197
2072702	3-197
2072703	3-197
2072704	3-197
2072711	3-197
2072712	3-197
2072713	3-197
2072714	3-197
2076501	3-199
2076502	3-199
2076503	3-199
2076504	3-199
2076511	3-199
2076512	3-199
2076513	3-199
2076514	3-199
2077701	3-88
2077702	3-88
2077703	3-88
2077704	3-88
2077705	3-89
2077706	3-89
2077707	3-88

NASTRAN EID	PAGE
2077708	3-88
2077709	3-88
2077710	3-88
2077711	3-88
2077712	3-88
2078101	3-197
2078102	3-197
2078103	3-197
2078104	3-197
2078111	3-197
2078112	3-197
2078113	3-197
2078114	3-197
2078701	3-199
2078702	3-199
2078703	3-199
2078704	3-199
2078711	3-199
2078712	3-199
2078713	3-199
2078714	3-199
2080231	3-147
2080232	3-148
2081101	3-148
2081102	3-148
2081103	3-148
2081104	4-148
2081301	3-146
2081302	3-147
2081303	3-147
2081304	3-147
2081305	3-147
2081306	3-148
2081307	3-148
2081308	3-148
2081309	3-147
2081310	3-147
2081311	3-147
2081312	3-148
2081313	3-147
2081314	3-147
2081315	3-148
2081316	3-148
2084501	3-146
2084502	3-146

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
2084511	3-148
2084512	3-148
2084521	3-146
2084522	3-147
2084523	3-148
2084531	3-147
2084532	3-147
2084533	3-147
2084534	3-148
2084541	3-147
2084542	3-147
2084543	3-148
2084544	3-148
2087901	3-146
2087902	3-147
2087903	3-148
2087904	3-148
2087905	3-146
2087906	3-148
2087907	3-147
2087908	3-148
2087921	3-146
2087922	3-147
2087923	3-147
2087924	3-147
2087925	3-147
2087926	3-148
2087927	3-148
2087928	3-148
2087929	3-147
2087930	3-147
2087931	3-147
2087932	3-148
2087933	3-147
2087934	3-147
2087935	3-148
2087936	3-148
2090051	3-205
2090052	3-205
2090053	3-205
2090054	3-206
2090055	3-205
2090056	3-206
2090057	3-205
2090058	3-206

NASTRAN EID	PAGE
2090411	3-205
2090412	3-206
2090431	3-205
2090432	3-206
2091011	3-205
2091012	3-206
2091031	3-205
2091032	3-205
2091270	3-202
2091271	3-202
2091272	3-202
2091273	3-202
2091274	3-202
2091275	3-202
2091276	3-202
2091277	3-202
2091281	3-205
2091282	3-206
2091283	3-205
2091284	3-206
2091285	3-205
2091286	3-206
2092501	3-202
2092502	3-202
2092503	3-202
2092504	3-202
2092511	3-202
2092512	3-202
2092513	3-202
2092514	3-202
2092521	3-205
2092522	3-205
2092523	3-206
2092524	3-206
2092531	3-205
2092532	3-206
2092533	3-205
2092534	3-206
2092541	3-205
2092542	3-206
2092543	3-206
2092544	3-205
2092551	3-205
2092552	3-206
2092553	3-205

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
2092554	3-206
2092701	3-205
2092702	3-206
2092703	3-206
2092704	3-206
2092711	3-205
2092712	3-206
2092713	3-205
2092714	3-206
2092901	3-202
2092902	3-202
2092903	3-202
2092904	3-202
2092911	3-202
2092912	3-202
2092913	3-202
2092914	3-202
2092921	3-205
2092922	3-205
2092923	3-205
2092924	3-206
2092931	3-205
2092932	3-206
2092933	3-205
2092934	3-206
2092941	3-205
2092942	3-206
2092943	3-206
2092944	3-206
2092951	3-205
2092952	3-206
2092953	3-205
2092954	3-206
2100451	3-62
2100452	3-62
2100453	3-62
2100551	3-66
2100552	3-66
2100553	3-70
2100711	3-138
2108901	3-92
2108902	3-92
2108903	3-92
2108904	3-95
2108905	3-95

NASTRAN EID	PAGE
2108906	3-95
2108907	3-92
2108908	3-92
2108909	3-92
2108910	3-95
2108911	3-95
2108912	3-95
2108913	3-92
2108914	3-92
2108915	3-92
2108916	3-92
2108917	3-92
2108918	3-92
2108919	3-95
2108920	3-95
2108921	3-95
2108922	3-95
2108923	3-95
2108924	3-95
2110101	3-9
2110102	3-60
2110103	3-60
2110104	3-60
2110105	3-64
2110106	3-64
2110107	3-68
2110501	3-76
2110502	3-76
2110503	3-76
2110504	3-76
2110505	3-76
2110506	3-76
2110507	3-76
2110508	3-76
2110509	3-76
2110510	3-76
2110511	3-76
2110512	3-76
2110531	3-12
2110532	3-12
2110533	3-62
2110534	3-62
2110535	3-66
2110536	3-66
2110537	3-70

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
2110701	3-75
2110702	3-75
2110703	3-75
2110704	3-75
2110705	3-75
2110706	3-75
2110707	3-75
2110708	3-75
2110709	3-75
2110710	3-75
2110711	3-75
2110712	3-75
2120101	3-85
2120102	3-85
2120103	3-85
2120104	3-85
2132123	3-178
2132141	3-178
2132325	3-178
2132527	3-178
2132729	3-178
2132949	3-178
2134143	3-178
2134161	3-178
2134345	3-178
2134547	3-178
2134749	3-178
2134969	3-178
2136163	3-178
2136364	3-178
2136466	3-178
2136667	3-178
2136769	3-178
2170091	3-76
2170092	3-76
2170101	3-75
2170102	3-75
2170171	3-75
2170172	3-75
2170191	3-75
2170271	3-75
2170291	3-76
2170292	3-76
2171101	3-75
2171102	3-75

NASTRAN EID	PAGE
2171103	3-76
2171104	3-76
2171105	3-75
2171106	3-75
2171107	3-75
2171108	3-75
2173301	3-75
2173302	3-75
2173303	3-76
2173304	3-76
2173305	3-75
2173306	3-75
2173307	3-75
2173308	3-75
2190271	3-72
2190311	3-72
2190312	3-72
2190313	3-72
2190314	3-72
2190431	3-72
2191501	3-72
2191502	3-72
2191503	3-72
2191504	3-72
2191505	3-72
2191506	3-72
2191507	3-72
2191508	3-72
2191901	3-72
2191902	3-72
2191903	3-72
2191904	3-72
2191905	3-72
2191906	3-72
2191907	3-72
2191908	3-72
2200101	3-98
2200102	3-98
2200103	3-98
2200104	3-98
2200111	3-98
2200112	3-101
2200113	3-98,101
2200114	3-98,101
2200121	3-101

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
2200122	3-101
2200123	3-101
2200124	3-101
2200301	3-212
2200302	3-212
2200303	3-212
2200304	3-212
2200311	3-212
2200312	3-212
2200313	3-212
2200314	3-212
2200431	3-101
2200441	3-98
2200551	3-160
2200561	3-157
2200571	3-212
2200581	3-209
2200591	3-160
2200601	3-157
2201151	3-209,212
2201171	3-209
2201191	3-212
2206101	3-101
2206102	3-101
2206103	3-101
2206104	3-101
2206201	3-98
2206202	3-98
2206203	3-98
2206204	3-98
2206701	3-209
2206702	3-209
2206703	3-209
2206704	3-209
2206711	3-209
2206712	3-209
2206713	3-209
2206714	3-209
2207101	3-160
2207102	3-160
2207103	3-160
2207104	3-160
2207111	3-160
2207112	3-160
2207113	3-160

NASTRAN EID	PAGE
2207114	3-160
2207201	3-157
2207202	3-157
2207203	3-157
2207204	3-157
2207211	3-157
2207212	3-157
2207213	3-157
2207214	3-157
2207701	3-157
2207702	3-157
2207703	3-157
2207704	3-157
2207711	3-157
2207712	3-157
2207713	3-157
2207714	3-157
2207721	3-157
2207722	3-160
2207723	3-157,160
2207724	3-157,160
2207731	3-160
2207732	3-160
2207733	3-160
2207734	3-160
2207741	3-160
2207742	3-160
2207743	3-160
2207744	3-160
2360031	3-75
2500103	3-183
2500171	3-60
2500172	3-60
2500173	3-60
2500307	3-183
2500709	3-183
2500911	3-64
2500912	3-64
2500913	3-68
2500929	3-135
2501711	3-183
2502101	3-183
2502125	3-183
2502141	3-183
2502529	3-183

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
2502949	3-183
2504161	3-183
2504969	3-183
2506165	3-183
2506569	3-183
2507701	3-92
2507702	3-92
2507703	3-92
2507704	3-95
2507705	3-95
2507706	3-95
2507707	3-92
2507708	3-92
2507709	3-92
2507710	3-95
2507711	3-95
2507712	3-95
2507713	3-92
2507714	3-92
2507715	3-92
2507716	3-92
2507717	3-92
2507718	3-92
2507719	3-95
2507720	3-95
2507721	3-95
2507722	3-95
2507723	3-95
2507724	3-95
2510021	3-84
2510022	3-84
2570101	3-157
2570102	3-160
2570103	3-157,160
2570104	3-157,160
2590101	3-209
2590102	3-212
2590103	3-209,212
2590104	3-209,212
2682125	3-186
2682141	3-186
2682529	3-186
2682949	3-186
2684161	3-186
2684969	3-186

NASTRAN EID	PAGE
2686165	3-186
2686569	3-186
2992125	3-188
2992141	3-188
2992529	3-188
2992949	3-188
2994161	3-188
2994969	3-188
2996165	3-188
2996569	3-188
3790101	3-135
3790102	3-135
3790103	3-135
3790104	3-135
5003091	3-62
5003092	3-62
5003093	3-62
5003094	3-66
5003095	3-66
5003096	3-70
5003111	3-60
5003112	3-60
5003113	3-60
5003114	3-64
5003115	3-64
5003116	3-68
5810251	3-12
5810351	3-9
5850751	3-4
5850752	3-4
5850753	3-4
5850754	3-4
5850771	3-9
5850772	3-12
5850790	3-9
5850791	3-12
5850792	3-50
5850793	3-50
5850794	3-50
5850795	3-50
5850796	3-50
5850797	3-50
5850798	3-50
5850811	3-6
5850812	3-6

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
5850813	3-6
5850814	3-6
5850815	3-6
5850816	3-6
5850817	3-6
5850818	3-6
5850851	3-9
5850852	3-12
5850871	3-50
5850872	3-50
5850873	3-50
6222811	3-257
6222812	3-257
6222818	3-257
6222819	3-257
6222822	3-257
6222828	3-257
6222832	3-258
6222838	3-258
6283411	3-257
6283412	3-257
6283418	3-257
6283419	3-257
6283421	3-257
6283422	3-257
6283428	3-257
6283429	3-257
6283431	3-258
6283432	3-258
6283438	3-258
6283439	3-258
6344211	3-257
6344212	3-257
6344218	3-257
6344219	3-257
6344221	3-257
6344222	3-257
6344228	3-258
6344229	3-258
6344231	3-258
6344232	3-258
6344238	3-258
6344239	3-258
6425011	3-257
6425012	3-257

NASTRAN EID	PAGE
6425018	3-257
6425019	3-257
6425021	3-257
6425022	3-257
6425028	3-258
6425029	3-258
6425031	3-258
6425032	3-258
6425038	3-258
6425039	3-258
6505911	3-257
6505912	3-257
6505918	3-257
6505919	3-257
6505921	3-257
6505922	3-257
6505928	3-258
6505929	3-258
6505931	3-258
6505932	3-258
6505938	3-258
6505939	3-258
7222811	3-263
7222812	3-263
7222818	3-263
7222819	3-263
7222822	3-263
7222828	3-268
7222832	3-264
7222838	3-264
7283411	3-263
7283412	3-263
7283418	3-263
7283419	3-263
7283421	3-263
7283422	3-263
7283428	3-263
7283429	3-263
7283431	3-264
7283432	3-264
7283438	3-264
7283439	3-264
7344211	3-263
7344212	3-263
7344218	3-263

ROD ELEMENT (CONROD) INDEX (CONT.)

NASTRAN EID	PAGE
7344219	3-263
7344221	3-263
7344222	3-263
7344228	3-264
7344229	3-264
7344231	3-264
7344232	3-264
7344238	3-264
7344239	3-264
7425011	3-263
7425012	3-263
7425018	3-263
7425019	3-263
7425021	3-263
7425022	3-263
7425028	3-264
7425029	3-264
7425031	3-264
7425032	3-264
7425038	3-264
7425039	3-264
7505911	3-263
7505912	3-263
7505918	3-263
7505919	3-263
7505921	3-263
7505922	3-263
7505928	3-264
7505929	3-264
7505931	3-264
7505932	3-264
7505938	3-264
7505939	3-264

QUADRILATERAL MEMBRANE PLATE ELEMENT (CQDMEM) INDEX

NASTRAN EID	PAGE
463137	3-6
463149	3-6
464169	3-6
612337	3-49
613143	3-49
613749	3-49
614163	3-49
614769	3-49
930317	3-53
931337	3-53
933143	3-53
934367	3-53
934769	3-53
936173	3-53
936377	3-53
936779	3-57
1380327	3-57
1382133	3-57
1382337	3-57
1382739	3-57
1383347	3-57
1383749	3-57
1384163	3-57
1384869	3-57
1480327	3-122
1482133	3-122
1482337	3-122
1482739	3-122
1483143	3-122
1483347	3-122
1483749	3-122
1484163	3-122
1484367	3-122
1484769	3-122
1486183	3-122
1486387	3-122
1486789	3-122
1862133	3-130
1862335	3-131
1862537	3-131
1862739	3-131
1863143	3-130
1863345	3-130
1863546	3-130
1863748	3-130

NASTRAN EID	PAGE
1864152	3-130
1864364	3-130
1864465	3-130
1864566	3-130
1864667	3-130
1864758	3-130
1864854	3-130
1865157	3-130
1865263	3-130
1865359	3-130
1865462	3-130
1865869	3-130
1866283	3-130
1866385	3-130
1866687	3-130
1866789	3-177
2132143	3-177
2132345	3-177
2132547	3-177
2132749	3-177
2134163	3-177
2134364	3-177
2134567	3-177
2134769	3-177
2502145	3-182
2502549	3-182
2504165	3-182
2504569	3-182
2682145	3-185
2682549	3-185
2684165	3-185
2684569	3-185
2992145	3-188
2992549	3-188
2994165	3-188
2994569	3-188
5850305	3-20,22
5850321	3-14,17
5850329	3-20,22
5850505	3-20,22
5850521	3-14,17
5850529	3-20,22
5858905	3-20,22
5858921	3-14,17
5858929	3-20,22

QUADRILATERAL MEMBRANE PLATE ELEMENT (CQDMEM) INDEX (CONT.)

NASTRAN EID	PAGE
5950211	3-8, 11
5950271	3-8, 11
6221121	3-268
6221124	3-249
6221326	3-249
6221729	3-249
6221929	3-268
6222131	3-268
6222439	3-249
6222939	3-268
6281121	3-268
6281129	3-249
6281929	3-268
6282131	3-268
6282139	3-249
6282939	3-268
6341121	3-268
6341129	3-249
6341929	3-268
6342131	3-268
6342139	3-249
6342939	3-268
6421121	3-268
6421129	3-249
6421929	3-268
6422131	3-268
6422139	3-249
6422939	3-268
6501121	3-268
6501129	3-249
6501929	3-268
6502131	3-268
6502139	3-249
6502939	3-268
6591129	3-249
6592139	3-249
7221121	3-271
7221124	3-253
7221326	3-253
7221729	3-253
7221929	3-271
7222131	3-271
7222439	3-253
7222939	3-271
7281121	3-271

NASTRAN EID	PAGE
7281129	3-253
7281929	3-271
7282131	3-271
7282139	3-253
7282939	3-271
7341121	3-271
7341129	3-253
7341929	3-271
7342131	3-271
7342139	3-253
7342939	3-271
7421121	3-271
7421129	3-253
7421929	3-271
7422131	3-271
7422139	3-253
7422939	3-271
7501121	3-271
7501129	3-253
7501929	3-271
7502131	3-271
7502139	3-253
7502939	3-271
7591129	3-253
7592139	3-253

SHEAR PANEL ELEMENT (CSHEAR) INDEX

NASTRAN EID	PAGE
1170051	3-173
1170052	3-173
1170053	3-173
1170054	3-173
1170111	3-173
1170112	3-173
1170391	3-173
1170392	3-173
1170511	3-173
1170512	3-173
1180451	3-169
1180452	3-169
1180691	3-169
1180692	3-169
1180693	3-169
1180694	3-169
1180711	3-169
1180712	3-169
1190053	3-166
1190054	3-166
1190093	3-166
1190094	3-166
1200073	3-163
1200074	3-163
1200113	3-163
1200114	3-163
1201211	3-208,211
1250232	3-137
1250272	3-134
1250912	3-137
1290171	3-41
1290191	3-41
1290411	3-25
1290412	3-25
1290571	3-45
1290591	3-45
1290691	3-45
1290692	3-45
1290694	3-45
1290751	3-30
1290752	3-30
1290753	3-30
1290771	3-30
1291251	3-45
1291252	3-45

NASTRAN EID	PAGE
1291271	3-41
1291272	3-41
1291371	3-37
1291372	3-37
1291411	3-45
1291412	3-45
1291414	3-45
1291415	3-45
1291491	3-34
1291492	3-34
1291493	3-34
1291494	3-34
1291591	3-25
1291592	3-25
1291831	3-25
1291832	3-25
1291833	3-25
1291834	3-25
1291835	3-25
1291836	3-25
1291851	3-37
1291852	3-37
1291981	3-41
1291982	3-41
1291983	3-41
1292011	3-30
1292012	3-30
1292013	3-30
1292014	3-30
1292015	3-30
1292016	3-30
1292050	3-30
1292051	3-30
1292052	3-30
1292053	3-30
1292054	3-30
1292055	3-37
1292056	3-37
1292057	3-37
1292058	3-37
1292059	3-37
1292090	3-25
1292091	3-25
1292092	3-25
1292093	3-25

SHEAR PANEL ELEMENT (CSHEAR) INDEX (CONT.)

NASTRAN EID	PAGE
1292094	3-25
1292095	3-25
1292096	3-34
1292097	3-34
1292098	3-34
1292099	3-34
1292101	3-41
1292102	3-41
1292103	3-41
1292104	3-41
1300291	3-104
1300331	3-104
1300332	3-104
1300334	3-104
1300335	3-104
1300351	3-104
1300391	3-104
1300392	3-104
1300394	3-104
1300395	3-104
1370052	3-117
1370053	3-117
1370054	3-117
1370062	3-113
1370063	3-113
1370064	3-113
1370231	3-117
1370241	3-113
1370352	3-117
1370353	3-117
1370362	3-113
1370363	3-113
1380351	3-109
1380411	3-109
1380412	3-109
1380414	3-109
1380415	3-109
1380431	3-109
1380451	3-109
1380452	3-109
1380454	3-109
1380455	3-109
1791612	3-60
1791613	3-60
1791614	3-64

NASTRAN EID	PAGE
1791615	3-64
1791616	3-68
1791632	3-62
1791633	3-62
1791634	3-66
1791635	3-66
1791636	3-66
1874251	3-235
1874357	3-235
1875256	3-235
1875448	3-235
1875847	3-235
1875953	3-235
1974152	3-240
1974352	3-240
1974365	3-240
1974567	3-241
1974758	3-241
1974859	3-241
1975162	3-240
1975869	3-240
2010531	3-79
2010532	3-79
2010533	3-79
2010534	3-79
2010536	3-79
2010537	3-79
2010538	3-79
2010539	3-79
2010672	3-8, 11
2010692	3-8, 11
2010694	3-79
2010695	3-79
2010696	3-79
2010697	3-79
2010699	3-79
2010701	3-79
2010702	3-79
2010703	3-79
2010851	3-79
2010852	3-79
2010853	3-79
2010854	3-79
2010856	3-79
2010857	3-79

SHEAR PANEL ELEMENT (CSHEAR) INDEX (CONT.)

NASTRAN EID	PAGE
2010858	3-79
2010859	3-79
2020731	3-87
2020732	3-87
2020733	3-87
2030291	3-97,100
2040471	3-141
2040472	3-141
2040795	3-141
2040796	3-141
2040811	3-141
2040815	3-141
2040823	3-141
2040824	3-141
2050551	3-150
2050552	3-150
2050553	3-150
2050554	3-150
2050631	3-150
2050632	3-150
2050633	3-150
2050634	3-150
2060871	3-191
2060872	3-191
2060873	3-191
2060874	3-191
2060875	3-191
2060876	3-191
2060877	3-191
2060878	3-191
2060882	3-191
2060883	3-191
2060891	3-191
2060892	3-191
2060893	3-191
2060894	3-191
2060895	3-191
2060896	3-191
2060897	3-191
2060898	3-191
2060902	3-191
2060903	3-191
2060911	3-191
2060912	3-191
2060913	3-191

NASTRAN EID	PAGE
2060914	3-191
2070271	3-197
2070272	3-197
2070651	3-199
2070652	3-199
2070771	3-87
2070772	3-87
2070773	3-87
2070811	3-197
2070812	3-197
2070871	3-199
2070872	3-199
2080114	3-146
2080131	3-146
2080132	3-146
2080133	3-146
2080134	3-146
2080791	3-146
2080795	3-146
2080796	3-146
2080797	3-146
2080798	3-146
2080799	3-146
2091252	3-201
2091254	3-201
2091256	3-204
2091257	3-204
2091258	3-204
2091259	3-204
2091278	3-204
2091279	3-204
2091292	3-201
2091294	3-201
2091296	3-204
2091297	3-204
2091298	3-204
2091299	3-204
2100891	3-91
2100892	3-91
2100893	3-91
2100894	3-94
2100895	3-94
2100896	3-94
2110051	3-74
2110052	3-74

SHEAR PANEL ELEMENT (CSHEAR) INDEX (CONT.)

NASTRAN EID	PAGE
2110053	3-74
2110071	3-74
2110072	3-74
2110073	3-74
2120011	3-85
2170111	3-74
2170112	3-74
2170331	3-74
2170332	3-74
2190151	3-72
2190152	3-72
2190191	3-72
2190192	3-72
2200611	3-100
2200621	3-97
2200671	3-208
2200672	3-208
2200711	3-159
2200713	3-159
2200721	3-156
2200723	3-156
2200771	3-156
2200772	3-156
2200773	3-156,159
2200774	3-159
2200775	3-159
2201011	3-97
2201012	3-97, 100
2201013	3-100
2201031	3-211
2201032	3-211
2501771	3-91
2501772	3-91
2501773	3-91
2501774	3-94
2501775	3-94
2501776	3-94
2570011	3-156,159
2590011	3-208,211
3790012	3-134
6221119	3-256
6222129	3-256
6223139	3-256
6281119	3-256
6282129	3-256
6283139	3-256
6341119	3-256
6342129	3-256
6343139	3-256
6421119	3-256
6422129	3-256
6423139	3-256
6501119	3-256
6502129	3-256
6503139	3-256
7221119	3-262
7222129	3-262
7223139	3-262
7281119	3-262
7282129	3-262
7283139	3-262
7341119	3-262
7342129	3-262
7343139	3-262
7421119	3-262
7422129	3-262
7423139	3-262
7501119	3-262
7502129	3-262
7503139	3-262

TRIANGULAR MEMBRANE PLATE ELEMENT (CTRMEM) INDEX

NASTRAN EID	PAGE
612331	3-49
612737	3-49
616779	3-49
617161	3-49
931331	3-53
931737	3-53
934361	3-53
1190051	3-166
1190052	3-166
1190091	3-166
1190092	3-166
1190131	3-166
1190132	3-166
1200071	3-163
1200072	3-163
1200111	3-163
1200112	3-163
1200131	3-163
1200132	3-163
1210470	3-219
1210590	3-219
1250231	3-137
1250271	3-134
1250911	3-137
1290592	3-45
1290693	3-45
1291413	3-45
1291416	3-45
1300333	3-104
1300393	3-104
1330011	3-208
1330012	3-208
1330013	3-208, 211
1330014	3-211
1330015	3-211
1370051	3-117
1370055	3-117
1370061	3-113
1370065	3-113
1370232	3-117
1370242	3-113
1370351	3-117
1370361	3-113
1380121	3-57
1380123	3-57

NASTRAN EID	PAGE
1380413	3-109
1380453	3-109
1380727	3-57
1380927	3-57
1480121	3-122
1480123	3-122
1480727	3-122
1480927	3-122
1560121	3-126
1560123	3-126
1560323	3-126
1560325	3-126
1560725	3-126
1560727	3-126
1560927	3-126
1720011	3-227
1720012	3-227
1720013	3-227
1720014	3-227
1720015	3-227
1720016	3-227
1720017	3-227
1720018	3-227
1720021	3-227
1720022	3-227
1720023	3-227
1720024	3-227
1720025	3-227
1720026	3-227
1720027	3-227
1720028	3-227
1791611	3-60
1791631	3-62
1860121	3-131
1860123	3-131
1860323	3-131
1860325	3-131
1860725	3-131
1860727	3-131
1860927	3-131
1863141	3-130
1863343	3-130
1863746	3-130
1863948	3-130
1864252	3-130

TRIANGULAR MEMBRANE PLATE ELEMENT (CTRMEM) INDEX (CONT.)

NASTRAN EID	PAGE
1864753	3-130
1865762	3-130
1865867	3-130
1866181	3-130
1866485	3-130
1866585	3-130
1866889	3-130
1874352	3-235
1874853	3-235
1875763	3-235
1875868	3-235
1975263	3-240
1975867	3-240
2010671	3-8
2010673	3-11
2010691	3-8
2010693	3-11
2040791	3-141
2040792	3-141
2040793	3-141
2040794	3-141
2040797	3-141
2040812	3-141
2040813	3-141
2040814	3-141
2040821	3-141
2040822	3-141
2040825	3-141
2040826	3-141
2060881	3-191
2060884	3-191
2060901	3-191
2060904	3-191
2080111	3-146
2080112	3-146
2080113	3-146
2080792	3-146
2080793	3-146
2080794	3-146
2091251	3-201
2091253	3-201
2091255	3-201
2091291	3-201
2091293	3-201
2091295	3-201

NASTRAN EID	PAGE
2100897	3-154
2134564	3-177
2180121	3-179
2180123	3-179
2180323	3-179
2180325	3-179
2180725	3-179
2180727	3-179
2180927	3-179
2200675	3-208
2200676	3-208
2200677	3-208
2200712	3-159
2200722	3-156
2201035	3-211
2201036	3-211
2201037	3-211
2270121	3-180
2270123	3-180
2270323	3-180
2270325	3-180
2270725	3-180
2270727	3-180
2270927	3-180
2500121	3-182
2500125	3-182
2500325	3-182
2500725	3-182
2500925	3-182
2501777	3-154
2680121	3-185
2680125	3-185
2680925	3-185
2990521	3-188
2990525	3-188
3790011	3-134
5850301	3-14
5850302	3-14
5850303	3-14
5850304	3-14
5850306	3-17
5850307	3-17
5850308	3-17
5850309	3-17
5850322	3-15

NASTRAN EID	PAGE
5850323	3-15
5850324	3-15
5850325	3-15
5850326	3-15
5850327	3-15
5850328	3-15
5850330	3-18
5850331	3-18
5850332	3-18
5850333	3-18
5850334	3-18
5850335	3-18
5850336	3-18
5850501	3-14
5850502	3-14
5850503	3-14
5850504	3-14
5850506	3-17
5850507	3-17
5850508	3-17
5850509	3-17
5850522	3-17
5850523	3-15
5850524	3-15
5850525	3-15
5850526	3-15
5850527	3-15
5850528	3-15
5850530	3-18
5850531	3-18
5850532	3-18
5850533	3-18
5850534	3-18
5850535	3-18
5850536	3-18
5858901	3-14
5858902	3-14
5858903	3-14
5858904	3-14
5858906	3-17
5858907	3-17
5858908	3-17
5858909	3-17
5858922	3-15
5858923	3-15

NASTRAN EID	PAGE
5858924	3-15
5858925	3-15
5858926	3-15
5858927	3-15
5858928	3-15
5858930	3-18
5858931	3-18
5858932	3-18
5858933	3-18
5858934	3-18
5858935	3-18
5858936	3-18
5940041	3-8
5940171	3-11
6222431	3-249
6222639	3-249
7222431	3-253
7222639	3-253

GRID POINT INDEX

NASTRAN ID	PAGE
3331	3-4,8,14,20
3339	3-4,11,17,22
3341	3-4,8,14,20
3349	3-4,11,17,22
4631	3-5,8,14,20
4633	3-5,8,14
4637	3-5,11,17,22
4639	3-5,11,17,22
4641	3-5,8,14,20
4649	3-5,11,17,22
4661	3-5,8,14
4669	3-5,11,22
6123	3-8,14,20,49
6127	3-11,17,22,49
6131	3-8,14,20,49,59,78
6133	3-8,20,24,49,78
6137	3-11,22,29,49,78
6139	3-11,17,22,49,61,78
6141	3-8,14,20,49
6143	3-8,20,24,49
6147	3-11,22,29,49
6149	3-11,17,22,49
6161	3-8,14,20,49,59,91
6163	3-8,20,24,49,91
6167	3-11,22,29,49,91
6169	3-11,17,22,49,61,91
6171	3-8,14,20,49
6179	3-11,17,22,49
7031	3-59,78
7033	3-59,78,84
7037	3-24,78,84
7039	3-61,78
7043	3-24,84
7047	3-29,84
7061	3-59,91
7063	3-24,91
7067	3-29,91
7069	3-61,91
7071	3-59
7079	3-61
7505	3-84
8300	4-36
8531	3-59,78
8533	3-24,78,84
8537	3-29,78,84
8539	3-61,78
8543	3-24,84
8547	3-29,84
8561	3-59,91
8563	3-24,91
8567	3-29,91
8569	3-61,91
8571	3-59
8579	3-61
9303	3-52,97
9307	3-52,97,100
9313	3-52,71
9317	3-52,71,100
9331	3-52,59,63,74,78
9333	3-24,34,52,74,78
9337	3-29,37,52,74,78
9339	3-52,61,65,74,78
9341	3-52
9343	3-24,34,52,87
9347	3-29,37,52,87
9349	3-52
9361	3-52,59,63,91,94
9363	3-24,34,52,91,94
9367	3-29,37,52,91,94
9369	3-52,61,65,91,94
9371	3-52,59,63
9373	3-52
9377	3-52
9379	3-52,61,65
11300	4-36
11503	3-71,97
11507	3-71,100
11531	3-63,74
11533	3-34,74
11537	3-37,74
11539	3-65,74
11543	3-34,87
11547	3-37,87
11561	3-63,94
11563	3-34,94
11567	3-37,94
11569	3-65,94
11571	3-63
11579	3-65
11700	4-36

GRID POINT INDEX (CONT.)

NASTRAN ID	PAGE
13500	4-36
13801	3-56,97
13803	3-41,56,71,97
13807	3-45,56,71,100
13809	3-56,100
13821	3-56,68,97
13823	3-41,56,85
13827	3-45,56,85
13829	3-56,70,100
13831	3-56,63,68,74
13833	3-34,41,56,74
13837	3-37,45,56,74
13839	3-56,65,70,74
13841	3-56
13843	3-34,41,56,87
13847	3-37,45,56,87
13848	3-45,56
13849	3-56
13861	3-56,63,68,94
13863	3-34,41,56,94
13867	3-37,45,56,94
13869	3-56,65,70,94
13871	3-56,63,68
13879	3-56,65,70
14801	3-97,121
14803	3-41,97,121,226
14807	3-45,100,121,226
14809	3-100,121
14821	3-68,97,121,134,140
14823	3-41,85,104,121,140,226
14827	3-45,85,109,121,140,226
14829	3-70,100,121,137,140
14831	3-68,74,121
14833	3-41,74,104,121
14837	3-45,74,109,121
14839	3-70,74,121
14841	3-121
14843	3-41,87,104,121
14847	3-45,87,109,121
14849	3-121
14861	3-68,94,121,134,154
14863	3-41,94,121,154
14867	3-45,94,109,121,154
14869	3-70,94,121,137,154
14881	3-68,121,134,145
14883	3-121,145
14887	3-121,145
14889	3-70,121,137,145
15212	3-226
15218	3-226
15601	3-126,156
15603	3-126,156,226
15607	3-126,159,226
15609	3-126,159
15621	3-126,134,140,156
15623	3-104,126,140,226
15625	3-126,140
15627	3-109,126,140,226
15629	3-126,137,140,159
15633	3-104,126
15637	3-109,126
16481	3-134,145
16483	3-145
16485	3-145
16487	3-145
16489	3-137,145
17100	4-36
18601	3-128,156
18603	3-128,156
18607	3-128,159
18609	3-128,159
18621	3-104,113,128,134,140,150,156
18623	3-128,140,150
18625	3-128,140,150
18627	3-128,140,150
18629	3-109,117,128,137,140,150,159
18631	3-104,128
18633	3-128
18635	3-128
18637	3-128
18639	3-109,128
18641	3-104,113,128,234
18642	3-128,234
18643	3-128,234
18644	3-128,234
18645	3-128,234
18646	3-128,234
18647	3-128,234
18648	3-128,234
18649	3-109,117,128,234

GRID POINT INDEX (CONT.)

NASTRAN ID	PAGE
18651	3-104,113,128,234
18652	3-128,234
18653	3-128,234
18654	3-109,117,128234
18656	3-104,113,128,234
18657	3-128,234
18658	3-128,234
18659	3-109,117,128,234
18661	3-104,113,129,134,154,234
18662	3-129,234
18663	3-129,219,234
18664	3-129,234
18665	3-129,234
18666	3-129,234
18667	3-129,219,234
18668	3-129,234
18669	3-109,117,129,137,154,234
18681	3-129,134,145
18683	3-129,145,219
18685	3-129,145
18687	3-129,145,219
18689	3-129,137,145
18983	3-215,219
18987	3-215,219
19741	3-113,240
19742	3-240
19743	3-240
19745	3-240
19747	3-240
19748	3-240
19749	3-117,240
19751	3-113,240
19752	3-240
19758	3-240
19759	3-117,240
19761	3-113,240
19762	3-240
19763	3-240
19765	3-215,240
19767	3-240
19768	3-240
19769	3-117,240
21183	3-215,219
21187	3-215,219
21321	3-113,150,156,163,177,190
21323	3-150,177,190
21325	3-150,177,190
21327	3-150,177,190
21329	3-117,150,159,166,177,190
21341	3-113,163,177,244
21343	3-177,219,244
21345	3-177,219,244
21347	3-177,219,244
21349	3-117,166,177,244
21361	3-113,163,177,201
21363	3-177,201,219
21364	3-177,201,219
21366	3-177,201,219
21367	3-177,201,219
21369	3-117,166,177,201
21383	3-177,219
21387	3-177,219
21485	3-215,219
21801	3-156,179,226
21803	3-156,179,226
21807	3-159,179,226
21809	3-159,179,226
21821	3-156,163,179,190,226
21823	3-179,190,226
21825	3-179,190
21827	3-179,190,226
21829	3-159,166,179,190,226
22312	3-226
22318	3-226
22701	3-180,208,226
22703	3-180,208,226
22707	3-180,211,226
22709	3-180,211,226
22721	3-163,180,190,208,226
22723	3-180,190,226
22725	3-180,190
22727	3-180,190,226
22729	3-166,180,190,211,226
23100	4-36
25001	3-182,208
25003	3-182,208
25007	3-182,211
25009	3-182,211
25021	3-163,169,182,190,196,208
25025	3-182,190,196

GRID POINT INDEX (CONT.)

NASTRAN ID	PAGE
25029	3-166,173,182,190,196,211
25041	3-163,169,182
25045	3-182
25049	3-166,173,182
25061	3-163,169,182,201,204
25065	3-182,201,204
25069	3-166,173,182,201,204
26801	3-185,208
26809	3-185,211
26821	3-169,185,196,198,208
26825	3-185,196,198
26829	3-173,185,196,198,211
26841	3-169,185
26845	3-185
26849	3-173,185
26861	3-169,185,204
26865	3-185,204
26869	3-173,185,204
29905	3-188,208,211
29921	3-169,188,198,208
29925	3-188,198
29929	3-173,188,198,211
29941	3-169,188
29945	3-188
29949	3-173,188
29961	3-169,188,204
29965	3-188,204
29969	3-173,188,204
30045	3-279
31745	3-279
33845	3-279
35945	4-379
38045	3-279
40141	3-296
40142	3-296
40143	3-296
40145	3-279,296
40147	3-296
40148	3-296
40149	3-296
42245	3-279
44345	3-279
45245	3-279
46445	3-279,292
48045	3-292
48845	3-292
49745	3-292
50645	3-292
51545	3-292
52045	3-292,298
61912	3-234,273
61913	3-273
61914	3-234,273
61916	3-234,273
61917	3-273
61918	3-234,273
61922	3-273
61923	3-240,273
61924	3-273
61926	3-273
61927	3-240,273
61928	3-273
61934	3-273
61935	3-244,273
61936	3-273
62211	3-248,255,267
62213	3-248,255,273
62217	3-248,255,273
62219	3-248,255,267
62221	3-248,255,267,273
62224	3-248,255,273
62226	3-248,255,273
62229	3-248,255,267,273
62231	3-248,255,267,273
62239	3-248,255,267,273
62811	3-248,255,267
62819	3-248,255,267
62821	3-248,255,267
62829	3-248,255,267
62831	3-248,255,267
62839	3-248,255,267
63411	3-248,255,267
63419	3-248,255,267
63421	3-248,255,267
63429	3-248,255,267
63431	3-248,255,267
63439	3-248,255,267
64211	3-248,255,267
64219	3-248,255,267
64221	3-248,255,267

GRID POINT INDEX (CONT.)

NASTRAN ID	PAGE
64229	3-248,255,267
64231	3-248,255,267
64239	3-248,255,267
65011	3-248,255,267
65019	3-248,255,267
65021	3-248,255,267
65029	3-249,255,267
65031	3-249,256,267
65039	3-249,256,267
65911	3-249,256,267
65919	3-249,256,267
65921	3-249,256,267
65929	3-249,256,268
65931	3-249,256,268
65939	3-249,256,268
71912	3-234,276
71913	3-276
71914	3-235,276
71916	3-235,276
71917	3-276
71918	3-235,276
71922	3-276
71923	3-240,276
71924	3-276
71926	3-276
71927	3-240,276
71928	3-276
71934	3-276
71935	3-244,276
71936	3-276
72211	3-252,261,270
72213	3-252,261,276
72217	3-252,261,276
72219	3-252,261,270
72221	3-252,261,270,276
72224	3-252,261,276
72226	3-252,261,276
72229	3-252,261,270,276
72231	3-252,261,270,276
72239	3-252,261,270,276
72811	3-252,261,270
72819	3-252,261,270
72821	3-252,261,270
72829	3-252,261,270
72831	3-252,261,270

NASTRAN ID	PAGE
72839	3-252,261,270
73411	3-252,261,270
73419	3-252,261,270
73421	3-252,261,270
73429	3-252,261,270
73431	3-252,261,270
73439	3-252,261,270
74211	3-252,261,270
74219	3-252,261,270
74221	3-252,261,270
74229	3-252,261,270
74231	3-252,261,270
74239	3-252,261,270
75011	3-252,261,270
75019	3-252,261,270
75021	3-252,261,270
75029	3-252,261,270
75031	3-252,261,270
75039	3-253,262,270
75911	3-253,262,270
75919	3-253,262,270
75921	3-253,262,270
75929	3-253,262,271
75931	3-253,262,271
75939	3-253,262,271
122400	3-230
123467	3-230
123487	3-230
124800	3-230
125063	3-230
125065	3-230
125067	3-230
125383	3-230
125387	3-230
126863	3-230
126867	3-230
127200	3-230
189073	3-215
189077	3-215
200070	3-215
200078	3-215
200079	3-215
200086	3-215
200087	3-215
200095	3-215

GRID POINT INDEX (CONT.)

NASTRAN ID	PAGE
200096	3-215
200101	3-215
200106	3-215
200114	3-215
200121	3-215
200129	3-215
200137	3-215
200145	3-215
200153	3-215
200155	3-215
211001	3-223
211002	3-223
211073	3-215
211077	3-215
214075	3-215
214901	3-223
214902	3-223
215101	3-223
215102	3-223
215201	3-223
215202	3-223
222001	3-223
222002	3-223
222201	3-223
222202	3-223
222301	3-223
222302	3-223
223401	3-223
223402	3-223
520018	3-298
520024	3-298
520057	3-298
520065	3-298
520068	3-298
520079	3-298
520135	3-298
520139	3-299
520152	3-299
520185	3-299

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