ENGINEERING ANALYSIS

WHC-SD-WM-ANAL-036, REV. 0

241-SY MODULAR EXHAUSTER
PAD ANALYSIS

FACILITY SYSTEMS

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September 1994

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1.0 INTRODUCTION

The purpose of this document is to show the analytical results which were reached in analyzing the new 241-SY modular exhaustor concrete pad and retaining wall. The requirements that were used to perform the analysis are located in the Design Basis and Requirements document WHC-SD-WM-DB-024.

This analysis was performed in accordance with applicable parts of DOE Order 6430.1A, WHC-CM-6-1, WHC-CM-1-3 MRP 5.46, and SDC-4.1 for Westinghouse Hanford Safety Class 2. All Assumptions are stated in the analysis located in Appendix A.

2.0 SCOPE

The analysis was performed for all the requirements listed in WHC-SD-WM-DB-024, Rev. 0.

The analysis, attached in Appendix A, covers wind loading (80 mph), an equivalent static load due to a seismic event, and from those two results, a determination of the pad thickness and the location and size of reinforcement bar was made. The analysis of the exhaustor assembly and sampling cabinet evaluated overturning of the assemblies as a whole. An analysis was then performed for the bolting requirements for these two assemblies. The reason why this was broken up into components was to determine if the individual components could take the load exerted by the worst case loading condition, whether it be wind or seismic.

The retaining wall that will be located near the new concrete pad was also analyzed. The retaining wall was evaluated to determine the area of reinforcement required, the location of reinforcement, as well as the mass and configuration of the wall to prevent overturning or sliding. The wall was considered Non-Safety Class 4.

Additional piping was required to tie-in the new exhaustor to the existing primary ventilation ductwork. The design for the tie-in includes two butterfly valves, a "tee" fitting, elbows, flanges, straight pipe sections, and two new pipe supports to accommodate the additional weight. The valves will enable the new and existing exhaustors to be isolated independently. Per the design, the tie-in is facilitated by two compression-type fittings. These eliminate the need for field welding, and minimize the duration of an outage to perform the tie-in. The ductwork, couplings, and supports were analyzed for structural adequacy given Safety Class 2 loads.

3.0 RESULTS

The results of the analysis are located and labeled in Appendix A. Brief descriptions of the results are given below:

No dome loading analysis was completed because no dome loading will occur where the new system is being installed.

It was determined that the ventilation assembly and stack sampling cabinet will not overturn due to the SC-2 wind loading or seismic event. The results are located and labeled in Appendix A.

The worst case condition determined in the analysis was the wind loading of 80 mph. Therefore, the loading in the bolts, the pad thickness and reinforcement for the pad were all determined from the force applied by the wind loading. As is stated and labeled in the analysis, the above components did handle the loading.

It was shown in the analysis that the retaining wall would not overturn due to the moment generated from the soil. Also, the retaining wall would not slide due to the force of the soil acting against the wall.

It was shown by analysis that the existing pipe supports in the vicinity of the new exhauster tie-in, with the addition of two new pipe supports, are adequate to support the additional weight of piping during normal operation as well as a seismic event; by inspection it was judged that wind loads on the piping would be negligible compared with normal and seismic loads.

4.0 CONCLUSION

In conclusion, the analysis shows the ventilation assembly, stack sampling cabinet and pipe supports will withstand the wind loading and seismic event. Furthermore, the analysis shows the retaining wall will withstand the forces exerted against the wall due to the soil it is holding back.

All data, assumptions and related conclusions to the analysis are located and labeled in Appendix A. Information concerning equations and tables, which were used in the analysis are located in Appendix B. The analysis, which was prepared for the design and fabrication contractor, is located in Appendix C.

5.0 REFERENCES

- ACI, 1992, *Building Code Requirements for Reinforced Concrete*, ACI 318-89 (Revised 1992), American Concrete Institute, Detroit, Michigan.
- Ambrose, J., and H. Parker, 1991, *Simplified Design of Concrete Structures*, Sixth Edition, John Wiley & Sons Inc., New York, New York.
- DOE, 1989, *General Design Criteria*, DOE Order 6430.1A, U.S. Department of Energy, Washington D.C.
- Kidder, R.J., 1993, *Double Shell Tank Interim Safety Equipment List*, WHC-SD-WM-SEL-026, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Kriskovich, J.R., 1994a, *Design Basis and Requirements for 241-SY Modular Exhauster Concrete Pad and Retaining Wall*, WHC-SD-WM-DB-024, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Kriskovich, J.R., 1994b, *Design Basis and Requirements for 241-SY Modular Exhauster Mechanical Installation design*, WHC-SD-WM-DB-025, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- SDC, 1993, "Design Loads for Facilities," SDC-4.1, Rev. 12, in: *Standard Arch-Civil Design Criteria*, Westinghouse Hanford Company, Richland, Washington.
- Strickler, J.K., 1993, *Specification for a Replacement Exhauster for 241-SY Tank Farm*, WHC-S-0193, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- UBC, 1991, *Uniform Building Code*, UBC-91, International Conference of Building Officials, Whittier, California.
- WHC, 1991, "Safety Classification of Systems, Components, and Structures," MRP 5.46, Rev. 4, in: *Management Requirements and Procedures*, WHC-CM-1-3, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-WM-ANAL-036
REVISION 0

APPENDIX A

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WIK-SD-WOT ANAL-036 (3) Page 1 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator VIM KEISKUICH Jim Hummel Date _____
 (9) Checker E.G. Culligan Date 9-6-94

- (10) *THIS ANALYSIS IS BEING PERFORMED TO DETERMINE THE PAD THICKNESS AND RE-BAR FOR THE CONCRETE PAD TO BE USED FOR THE SY-MODULAR EXHAUSTER. THE SKETCH BELOW DEPICTS HOW THE EXHAUSTER WILL SIT ON THE PAD. THIS IS A SIMPLIFIED SKETCH.*

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WIN-ANAL-086 (3) Page 2 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SV-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator VIM KRISTOVICH Jim Kristovich Date _____
 (9) Checker H. A. Lechman Date 9-6-94

- (10) DETERMINE CONCRETE SLAB THICKNESS (MINIMUM) AND SIZE, QUANTITY AND LOCATION OF THE REINFORCEMENT BAR OR WIRE. VERIFY THAT CONCRETE SHEAR AND SOIL BEARING PRESSURE ARE BELOW ALLOWABLE.

ASSUMPTIONS:

1. CONCRETE STRENGTH, $f_c = 4000 \text{ PSI}$
2. SPECIFIC WEIGHT OF CONCRETE = 150 LB/FT^3
3. MINIMUM STRENGTH OF REINFORCEMENT BAR OR WIRE $f_y = 60 \text{ KSI}$
4. CENTER OF GRAVITY OF VENT TRAIN = $30.5''$ FROM ACI-318 AND SIMPLIFIED DESIGN OF CONCRETE STRUCTURES, SIXTH EDITION.

FROM ACI 318, SECTION 7.7.1, FOR CAST IN-PLACE NON STRESSED CONCRETE, AND SIMPLIFIED DESIGN..., PAGE 25426:

$C_b = 3''$ FOR CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.

$C_t = 1\frac{1}{2}''$ FOR REINFORCEMENT BAR $\leq 5''$, FOR CONCRETE EXPOSED TO EARTH OR WEATHER.

REINFORCEMENT BAR/WIRE LOCATION, d (TO CENTROID OF BAR/WIRE PATTERN)

$$d = C_t + \phi_{\text{BAR}} \Rightarrow \text{ASSUME } \#4 (1\frac{1}{2}'') \text{ BAR}$$

$$d = 1\frac{1}{2}'' + 1\frac{1}{2}'' = 2'' \text{ MINIMUM (FOR } \#4 \text{ BAR)}$$

(CONCRETE THICKNESS, t , MINIMUM (JUST TO PROTECT REINFORCEMENT))

$$t = C_t + 2\phi_{\text{BAR}} + C_b + \text{TOLERANCE FOR } d \text{ (ASSUME } +\frac{1}{2}'', -0)$$

$$t = 1\frac{1}{2}'' + 2(1\frac{1}{2}'') + 3'' + 1\frac{1}{2}'' = 6'' \text{ MINIMUM (FOR } \#4 \text{ BAR)}$$

DESIGN CALCULATION

WNC-SD-WA-ANAL-036

(1) Drawing _____ (2) Doc. No. _____ (3) Page 3 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject 51-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator JIM KRISKOVICH Date _____
 (9) Checker H.A. R. L. L. Date 9-6-94

(10)

ASSUME: CONCRETE PAD WILL BE LONGER THAN THE 216" SHOWN ON PREVIOUS PAGE. IT WILL BE APPROXIMATELY 25' (300"). HOWEVER, STACK SAMPLING CABINETS WILL BE PLACED ON THE OTHER/EXTRA AREA OF THE SLAB. THEREFORE, IT WILL BE ASSUMED THAT THE WEIGHT OF THESE ARE NEGLIGIBLE AND NO ANALYSIS WILL BE COMPLETED ON THAT AREA OF THE PAD.

FROM SIMPLIFIED DESIGN..., PAGE 14Y.
 FOR CONSERVATISM IT WILL BE ASSUMED THAT THIS PAD WILL BE SIMPLY SUPPORTED. THIS IS A VERY CONSERVATIVE ASSUMPTION SINCE THE SOIL SHOULD PROVIDE A DISTRIBUTED REACTIVE FORCE RATHER THAN SIMPLY SUPPORTED. FROM PAGE 14Y, TABLE 7.2, ASSUME BOTH ENDS CONTINUOUS:

$$L = \frac{4}{28} = \frac{216}{28} = 7.7"$$

ASSUME FOR THIS CALC.

$$L = 8" \leftarrow$$

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WM-AWAK-036 (3) Page 7 of _____
 (4) Building _____ (5) Rev. _____ (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator LIM KRISKOVICH Date _____
 (9) Checker H.A. Pichay Date 9-6-94

(10) CONCRETE DESIGN STRENGTH, M_N

$M_N \phi$ SHALL BE $\geq M_u$ (FROM ACI-318)

WHERE ϕ , REDUCTION FACTOR, = 0.9 FOR FLEXURE
 (FROM ACI-318, P. 90)

M_u = REQUIRED STRENGTH (FACTORED MOMENT)

IS THE GREATER OF THE FOLLOWING:

FOR THIS ANALYSIS NO LIVE LOADS WILL
 BE EVALUATED.

FROM ACI-318, THE FOLLOWING EQUATIONS WILL
 BE USED:

FOR DEAD LOAD ONLY:

$$= 1.4 M_D \text{ (EQUATION 9-1)}$$

FOR WIND LOADING:

$$= 1.05 M_D + 1.28 M_W \text{ (EQUATION 9-2)}$$

AND

$$= 0.9 M_D + 1.3 M_W \text{ (EQUATION 9-3)}$$

FOR EARTHQUAKE LOADING:

$$= 1.05 M_D + 1.40 M_E \text{ (EQUATION 9-2)}$$

AND

$$= 0.9 M_D + 1.43 M_E \text{ (EQUATION 9-3)}$$

DESIGN CALCULATION

WMC-SD-WM-AWAL-036
 (1) Drawing _____ (2) Doc. No. _____ (3) Page 5 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator LIM KRISKOVICH Date _____
 (9) Checker H. G. P. L. K. A. Date 9-6-94

(10) DETERMINE WIND LOAD:

- SC-2 80 MPH (SDC-4.1)

EQUATION:

$$q_z = 0.00256 K_z (IV)^2 \quad \text{FROM ANSI A-58.1} \\ \text{\& ANSI/ASCE 7-88}$$

q_z = VELOCITY PRESSURE AT HEIGHT z (PSF)

K_z = VELOCITY EXPOSURE COEFFICIENT FOR
 TERRAIN & HEIGHT ABOVE GROUND

I = IMPORTANCE FACTOR

V = BASIC DESIGN WIND SPEED (MPH)

$$K_z = 0.8 \text{ FROM FIG. 2-1 (ASSUMED)}$$

$$I = 1.0 \text{ FROM SDC-4.1}$$

$$V = 80 \text{ MPH FROM SDC-4.1 FOR SC-2.}$$

$$\begin{aligned} q_z &= 0.00256 K_z (IV)^2 \\ &= 0.00256 (.8)(1 \times 80)^2 \\ &= \underline{\underline{13.11 \text{ PSF}}} \end{aligned}$$

PUT PRESSURE LOAD INTO FORCE LOAD.

$$F = q_z G_A C_f A_f \quad \text{FROM ANSI A58.1}$$

q_z = VELOCITY PRESSURE (PSF)

G_A = VALUE FOR STRUCTURE HEIGHT

C_f = FACTOR FOR PARALLEL OR NORMAL

A_f = PROJECTED AREA NORMAL TO WIND
 EXCEPT WHEN C_f IS GIVEN FOR THE
 SURFACE AREA.

$$q_z = 13.11 \text{ PSF}$$

$$G_A = 1.32 \text{ FROM TABLE 8}$$

$$C_f = 1.2 \text{ FROM TABLE 13}$$

$$A_f = \text{SEE FOLLOWING PAGE.}$$

A-6

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WNC-SD-WA-ANAL-036 (3) Page 6 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim HEISKOVICH Jim KUMMEL Date _____
 (9) Checker A. Q. LeLien Date 9-6-94

(10) FROM TABLE 13 ANSI A58.1-1982

ASSUME ENTIRE LENGTH OF VENTILATION TRAIN
 WILL SEE WIND LOAD.

- ASSUME THIS TO ACT AS A SOLID SIGN (SEE NOTE 1 UNDER TABLE 13)
- ASSUME THIS TO BE "ABOVE GROUND LEVEL"

$$M/N = \frac{\text{LARGER DIM. OF SIGN}}{\text{SMALLER DIM OF SIGN}} \quad \text{ASSUME WIDTH DIM. TO BE 59"}$$

$$= 204/59 = 3.46$$

FROM TABLE 13.

$$C_f = 1.2$$

$$\begin{aligned} A_f &= 204" \times 61" \\ &= 12444 \text{ in}^2 \times \frac{1 \text{ FT}^2}{144 \text{ in}^2} \\ &= 86.42 \text{ FT}^2 \end{aligned}$$

$$\begin{aligned} F &= 8.26 C_f A_f \\ &= (8.26 \text{ PSF})(1.2)(86.42 \text{ FT}^2) \\ &= 1794.6 \text{ LB} \end{aligned}$$

WIND LOAD FORCE

$$W_F = 1794.6 \text{ LB}$$

A-7

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WHA-ANAL-036 (3) Page 7 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject SY MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim KRISYUKA Jim Kuntz Date _____
 (9) Checker H.A. Reinken Date 9-6-94

- (10) DETERMINE IF ANCHOR BOLTS SIZES ARE SUFFICIENT.

ASSUME WIND & SEISMIC LOAD WILL ACT IN THE ABOVE ORIENTATION. THIS IS THE CONSERVATIVE APPROACH SINCE IT IS THE "SHORT" SIDE OF THE VENT SYSTEM THAT WILL BE OPPOSING THE LOADS.

WIND LOADING: ASSUME IT ACTS AT CG. (FROM WILLIAMS & MERRELL CALC.) APP. C

DESIGN CALCULATION

WNC-SD-WIN-ANAL-036

(1) Drawing _____ (2) Doc. No. _____ (3) Page 8 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator JIM KRISKOVICH JIM KUNIMOTO Date _____
 (9) Checker J.G. Leschke Date 9-6-94

(10) ASSUME WIREST CASE WIND LOADING CONDITION:

$$\sum M_A = 0 + \downarrow$$

$$0 = 4681.56(28.4) + 1794.6(30.25) - R_1(56.8)$$

$$R_1 = 3297 \text{ lbs.}$$

$$\sum F_y = 0$$

$$0 = R_2 + 3297 - 4681.56$$

$$R_2 = \underline{\underline{1384.6 \text{ lbs.}}}$$

ALL REACTIONS ARE ACTING UPWARD, THEREFORE THE BOLTS WILL BE IN COMPRESSION.

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WNC-SD-WA-ANAK-036 (3) Page 9 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject SV-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim Kriskovich Date _____
 (9) Checker Ed. Lelukan Date 9-6-94

- (10) DETERMINE SEISMIC FORCE. FOR THIS ANALYSIS IT WILL BE A STATIC EQUIVALENT SC-2. FOR SC-2 EQUIVALENT STATIC SDC 4.1, REV 12, PAGE 40 THE FOLLOWING COMBINATION OF LOADING WILL BE CONSIDERED:

100% LOAD IN MOST CRITICAL DIRECTION

+

40% OF THE ABOVE LOAD APPLIED IN THE PERPENDICULAR HORIZONTAL DIRECTION

+

2/3 (40%) OF THE ABOVE LOAD APPLIED IN THE VERTICAL DIRECTION.

EQUATION:

$$F_p = Z I C_p W_p$$

F_p = FORCE DUE TO EARTH QUAKE

Z = 0.12 & FROM SDC-4.1

I = IMPORTANCE FACTOR

= 1.25 FROM SDC-4.1

C_p = RIGIDITY COEFFICIENT

= 0.75 (FROM TABLE 23-P UBC-1988 #4)

W_p = WEIGHT OF STRUCTURE

= SKID = 1045.56 lbs } (FROM WILLIAM

EQUIP = 3636 lbs } (MERRELL CALCULATION

TOTAL WT = 4681.56 lbs. } (IN DESIGN PACKET PAGE 3
APP. C

$$F_p = Z I C_p W_p$$

$$= (0.12)(1.25)(0.75)(4681.56)$$

$$= 527 \text{ lbs}$$

$$F_{p2} = 40\%(527) = 211 \text{ lbs}$$

$$F_v = 2/3(40\%)(527) = 140 \text{ lbs}$$

$$F_p = \sqrt{F_{p1} + F_{p2}} = 568 \text{ lbs}$$

FOR THIS ANALYSIS NEGLECT THE VERTICAL FORCE $F_v = 140 \text{ lbs}$.

A-10

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WM-ANAL-036 (3) Page 10 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject 5Y MODULAR EXHAUSTER PAD DESIGN
 (8) Originator LIM KRISKOVICH Date _____
 (9) Checker H. Q. Lubin Date 9-6-94

(10) WIND LOAD CONT'D:

BASED ON THE ANALYSIS FROM THE PREVIOUS PAGES ALL ANCHORS WILL BE IN COMPRESSION DUE TO THE WIND LOADING. THEREFORE, SINCE NO LOADING WILL OCCUR ON THE BOLTS THE FOLLOWING SIZE WILL BE USED:

$\frac{3}{4}" \text{ } \phi$, HILTI KWIK BOLT II, EMBEDMENT $4\frac{3}{4}"$

DETERMINE THE SHEAR IN THE BOLT:

FROM PREVIOUS FREE BODY DIAGRAM THE SHEAR DUE TO THE WIND WILL ACT ON THE BOLT. (ASSUME SINGLE SHEAR).

FROM HILTI CATALOG, P. 51

FOR $\frac{3}{4}"$, EMBEDMENT $4\frac{3}{4}"$, $f_c = 4000 \text{ PSI}$

$S_{ALL} \approx 4400 \text{ LBS.}$

$$S_{ACT} = \frac{1794.616}{8 \text{ BOLTS}}$$

$$= 224.3 \text{ LBS/BOLT}$$

$$F.S. = \frac{4400 \text{ LBS}}{224.3} = 21.4$$

THE FOLLOWING SHOULD BE LESS THAN 1.

$L = \text{TENSION}$

$$= \frac{L_{ACT}}{L_{ALL}} + \frac{S_{ACT}}{S_{ALL}}$$

$$= 0 + \frac{224.3}{4400}$$

$$= 0.05$$

A-11

DESIGN CALCULATION

WHC-SD-WM-ANAL-036

(1) Drawing _____ (2) Doc. No. _____ (3) Page 11 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator JIM KRISNOVICH Date _____
 (9) Checker J.A. LeBlanc Date 9-6-94

(10) DETERMINE:

- IF BOLT LOCATIONS WILL CAUSE
 PULL OUT DUE TO CONCRETE SHEAR CONE

NO PULL OUT WILL OCCUR BECAUSE
 ALL BOLTS ARE IN COMPRESSION. (SEE PAGE 8
 OF THIS ANALYSIS)

FROM HILTI CATALOG LOCATION OF BOLTS (P. 44),

TORQUE REQUIREMENTS = 200 FT. LB

EDGE DISTANCE = $9\frac{3}{4}$ (TO OBTAIN MAX WORKING)

LOAD
 BASED ON THIS, THE CONCRETE PAD WILL
 HAVE TO BE 10" FROM EDGE OF SKID.

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. KHC-SD-WM-ANAL-036 (3) Page 12 of _____
(4) Building _____ (5) Rev. Ø (6) Job No. _____
(7) Subject SY-MODULAR EXHAUSTER HAD DESIGN
(8) Originator Jim KRISKOVICH Jim Burkett Date _____
(9) Checker H.A. Serlikov Date 9-6-94

(10) CONTINUATION FROM PAGE 2:

EVALUATE SYSTEM FROM FRONT SIDE VIEW &
SIDE VIEW. THIS IS SHOWN BELOW:

DESIGN CALCULATION

WMC-SD-WM-ANAL-036
 (1) Drawing _____ (2) Doc. No. _____ (3) Page 13 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SV- MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim KRISKOVICH Jim Sundt Date _____
 (9) Checker H. Q. Lubken Date 9-6-94

(10)

ASSUME FOR THIS ANALYSIS THE WEIGHT OF THE VENT SYSTEM WILL BE EVENLY DISTRIBUTED ON THE TWO LEGS/BEAMS OF THE SKID UNIT. SEE BARNEY & SUTCLIFFE DRAWING 24592. THEREFORE, DETERMINE DEAD LOAD MOMENT FOR SHORT SIDE / FRONT VIEW. FOR THIS ANALYSIS ONLY THE CONCRETE DIRECTLY UNDER THE SKID WILL BE ANALYZED.

$$\Sigma M_A = 0 + \downarrow$$

$$0 = 2340.78(59) - F(29.5)$$

$$F = 4641.56 \text{ lb}$$

$$\frac{4641.56}{59} = 79.31 \text{ lb/in}$$

V (lb)

M (in-lb)

-34,526.5

A-14

DESIGN CALCULATION

WMC-SD-WM-FINAL-036

- (1) Drawing _____ (2) Doc. No. _____ (3) Page 15 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SV MODULAR EXHAUSTER PAD DESIGN.
 (8) Originator JIM KRISTOVICH Date _____
 (9) Checker J. A. LeVine Date 9-6-94

(10) M_w , MAXIMUM MOMENT DUE TO WIND LOADING

ASSUME FOR CALCULATIONS, PAD IS AS WIDE AS SKID ONLY.

CONVERT THE MOMENT INTO A STATIC FORCE ACTING ON THE BEAM. ASSUME THIS FORCE TO ACT $\frac{2}{3}$ FROM THE LEFT EDGE.

ASSUME THE OPPOSING REACTIVE FORCE WILL ACT IN THE SAME LOCATION, AND THE FORCE P WILL BE APPLIED TO THE WEIGHT OF THE SKID. $\frac{2}{3}$ SEND APPLIED TO THE RIGHT EDGE AND THE REMAINING $\frac{1}{3}$ TO THE LEFT EDGE.

$$1794.6(30.25) = P(39.3)$$

$$P = 1381.3$$

$$2340.78 + 160$$

$$2340.78 + 921$$

$$2800.8$$

$$1381.3$$

$$3261.8$$

$$79.3 \text{ lb/in}$$

$$\frac{2340.78 + 2340.78}{55} = 79.3 \text{ lb/in}$$

V (lbs)

M (in-lbs)

A-15

DESIGN CALCULATION

WHL-SD-WM-ANAL-036
 (1) Drawing _____ (2) Doc. No. _____ (3) Page 15 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject SY-INDUSTRIAL EXHAUSTER FAN DESIGN
 (8) Originator JIM BRADY Date _____
 (9) Checker D.A. Resniko Date 9-6-94

(10) M_E , MAXIMUM MOMENT DUE TO SEISMIC (SHORT SIDE/ELEVATION VIEW)

THIS LOAD ACTS AT THE CG OF THE VENT SYSTEM AS DID THE PREVIOUS ANALYSIS FOR THE WIND LOAD. THEREFORE, SINCE THE SEISMIC LOAD IS SUBSTANTIALLY LESS THAN THE WIND, BUT ACTS IN THE SAME LOCATION, THE ANALYSIS FOR THE MAXIMUM MOMENT DUE TO SEISMIC WILL NOT BE COMPLETED.

MAXIMUM MOMENT

FROM ANALYSIS ON PREVIOUS PAGE, THE MAXIMUM MOMENT IS DUE TO WIND LOADING:

$$M_W = 49,434 \text{ IN-LBS}$$

FROM ACI 318 PAGE 27:

$$\phi M_N \leq M_u$$

M_u = CALCULATED STRENGTH
 M_N = REQUIRED DESIGN STRENGTH
 ϕ = STRENGTH REDUCTION FACTOR (ACI 318, P. 12)
 = 0.90

FROM PAGE OF THIS ANALYSIS
 FOR WORST CASE WIND LOADING

$$M_u = 1.05 M_D + 1.28 M_W \text{ AND } M_u = 0.9 M_N + 1.3 M_W$$

$$= 1.05 (34,528.3) + 1.28 (49,434) = 0.9 (84,528.3) + 1.3 (49,434)$$

$$= 99,528.3 \text{ IN-LBS} = 95,338 \text{ IN-LBS}$$

$$M_N = \frac{M_u}{0.9}$$

$$= \frac{99,528.3}{0.9}$$

$$M_N = \underline{\underline{110,587 \text{ IN-LBS.}}}$$

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WM-ANAL-036 (3) Page 16 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject 54- MODULAR EXHAUSTER PAD DESIGN
 (8) Originator LIM KRISTOVICH Date _____
 (9) Checker L.A. R. P. K. K. Date 9-6-94

(10)

BASED ON MAX MOMENT FROM PREVIOUS PAGE
DETERMINE REQUIRED AREA OF REINFORCEMENT
FROM PAGE 11, SIMPLIFIED DESIGN...

$$A_s = \rho b d$$

TO DETERMINE EFFECTIVE DEPTH d USE

$$M_u = R b d^2$$

$$R = 1.041 \text{ ksi/in}^2 \text{ (UNITS IN TABLE 6.2 ARE INCORRECT. PERFORM UNIT ANALYSIS ON EQ 7, P. 109)}$$

$$b = 204'' \text{ (WIDTH OF CONC. CURVED ZONE)}$$

$$M_u = 110,587 \text{ IN-LB}$$

$$d^2 = \frac{110,587 \text{ IN-LB}}{1.041 \times 10^3 \text{ ksi/in}^2 \times 204''}$$

$$d = 0.72$$

DETERMINE STEEL AREA

$$A_s = \rho b d$$

FROM SIMPLIFIED DESIGN...
PAGE 110, TABLE 6.2

$$= (0.0214)(204)(0.72)$$

$$\rho = 0.0214$$

$$= 3.14 \text{ IN}^2$$

MINIMUM RATIO REQUIRED FROM ACI 318 AND
SIMPLIFIED DESIGN.... PAGE 112

$$\rho_{\min} = \frac{200}{f_y} = \frac{200}{63,000} = 0.0033$$

$$\text{AREA REQUIRED} = 3.14 \text{ IN}^2$$

FROM PAGE 2 OF THIS ANALYSIS $C_d = 3''$ ON BOTH
SIDES. THEREFORE WIDTH OF REBAR = 204
FROM SIMPLIFIED DESIGN...., TABLE 6.4 PAGE 132
FOR #4 BAR @ 12" CENTERS

$$= 0.20 \text{ IN}^2/\text{FT}$$

$$= 0.2 \text{ IN}^2/\text{FT} \times \frac{204''}{12} = 3.4 \text{ IN}^2$$

$$A = 17$$

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WNC-SD-WM-ANAL-036 (3) Page 17 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SV-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator JIM KRISOVICH Date _____
 (9) Checker H.A. Lehtinen Date 9-6-94

- (10) CHECK DEAD LOAD MOMENT. ASSUME WEIGHT IS EVENLY DISTRIBUTED OVER ENTIRE LENGTH OF SKID. (LONGSIDE/SIDE VIEW).

$$\frac{4800}{204} = 23.15 \text{ IN}$$

REACTIVE FORCE DUE TO SOIL WILL ACT EQUAL & OPPOSITE, THEREFORE, NO DEAD LOAD MOMENT. HOWEVER, FOR THIS ANALYSIS TO BE CONSERVATIVE ASSUME A DEAD LOAD MOMENT OF 10,100 IN-IBS.

DESIGN CALCULATION

WNC-SD-WA-ANAL-036

- (1) Drawing _____ (2) Doc. No. _____ (3) Page 18 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject 54 MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim Kriskovich Jim Kunkel Date _____
 (9) Checker H. Q. Lestibac Date 9-6-94

(10) CHECK MAX MOMENT DUE TO WIND (LONG SIDE/SIDE VIEW)

FIND EQUIVALENT FORCE AT P FOR MOMENT SHOWN.

$$\sum M_A = 0 \rightarrow$$

$$1794.615(30.25) = P(2/3 \cdot 204")$$

$$P = 400 \text{ lb.}$$

ASSUME REACTIVE FORCE WILL ACT IN OPPOSITE DIRECTION. ALSO ASSUME THAT THIS REACTIVE FORCE WILL BE SPLIT BY $2/3$ TO POINT B & $1/3$ TO POINT A.

THE DISTRIBUTED LOAD AND REACTIVE FORCES ARE DUE TO THE WEIGHT OF THE SKID.

$$\frac{4061}{204} = 25 \text{ lb/in}$$

133

-267

18044 IN-LBS.

A-19

DESIGN CALCULATION

WHI-SD-WM-ANAL-036

(1) Drawing _____ (2) Doc. No. _____ (3) Page 19 of _____

(4) Building _____ (5) Rev. Ø (6) Job No. _____

(7) Subject SY-MODULAR EXHAUSTER FAN DESIGN

(8) Originator Jim BERTONICH Date _____

(9) Checker S. G. Lesikar Date 9-6-94

(10)

$$\begin{aligned} \mu_u &= 0.9\mu_d + 1.3\mu_w \\ &= 0.9(10,000 \text{ in-lb}) + 1.3(150 \text{ ft in-lb}) \\ &= 32,517 \text{ in-lb} \end{aligned}$$

$$M_N = \frac{K_u}{\phi} = \frac{32,514}{0.9} = 36,127 \text{ IN-LBS}$$

BASED ON MAX MOMENT DETERMINE REQUIRED AREA OF REINFORCEMENT FROM P. III, SIMPLIFIED DESIGN...

$$A_2 = pbd$$

TO DETERMINE EFFECTIVE DEPTH & USE FROM
SIMPLIFIED DESIGN.... P. 109 EQ. 6

$$K_N = R \omega^2$$

$R = 1.041 \text{ KIPS/IN}^2$ (SEE PAGE OF THIS ANALYSIS FOR EXPLANATION.)

$$b = 59.4$$

$\mu_n = 36,127$ IN-165 δ $\frac{36,127}{1.041 \times 10^3} \text{ IN}^2 = .59''$

d. 0.76 in

DETERMINE STEEL AREA

$$A_3 = pbd$$

FROM SIMPLIFIED DESIGN....

P. 110, TABLE 6.2

$$= (0.0214 \times 59 \times 0.76)$$

$$\rho = 0.0214$$

$$A_3 = 0.96 \text{ m}^2$$

FROM PAGE 2 OF THIS ANALYSIS $C_b = 3"$ ON BOTH SIDES.
THEREFORE, WIDTH OF REBAR SECTION = $59"$
FROM SIMPLIFIED DESIGN..., TABLE 6.4 PAGE 132 FOR
#4 BAR @ $12"$ CENTERS

$$= 0.20 \text{ in}^2/\text{FT}$$

$$= 0.20 \text{ in}^2/\text{ft} \times \frac{59}{12} = \underline{\underline{0.98 \text{ in}^2}}$$

A-20

DESIGN CALCULATION

WHL-SD-WM-ANAL-03.6
(1) Drawing _____ (2) Doc. No. _____ (3) Page 20 of _____
(4) Building _____ (5) Rev. Ø (6) Job No. _____
(7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
(8) Originator JIM KRISKOVICH Date _____
(9) Checker H.A. Lulikal Date 9-6-94

(10)

CONCLUSIONS.

CONCRETE STRENGTH = 4000 PSI (MINIMUM)

PAD THICKNESS = 8" IN.

REBAR: #4 (1/2")

LOCATIONS:

FROM EDGES = 3"

FROM TOP = 1 1/2" MIN.

SPACING: SEE BELOW

STRENGTH OF REBAR
= 60 KSI (MINIMUM)

PAD MINIMUM WIDTH DIMENSION FROM PAGE 11
= 80"

A-21

DESIGN CALCULATION

WNC-SD-WM-ANAL-036
 (1) Drawing _____ (2) Doc. No. _____ (3) Page 21 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SV-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator LIM KRISOVICHAN KUNWAL Date _____
 (9) Checker HA. Kerkikan Date 9-6-94

(10) DETERMINE WIND LOAD & SEISMIC LOAD ON
 STACK SAMPLING CABINET.

WEIGHT OF CABINET = 1400 LBS.

EQUATION:

$q_z = 0.00256 K_z (IV)^2$ FROM ANSI A-58.1
 & ANSI/ASCE 7-88
 q_z = VELOCITY PRESSURE AT HEIGHT z (PSF)
 K_z = VELOCITY EXPOSURE COEFFICIENT FOR
 TERRAIN & HEIGHT ABOVE GROUND
 I = IMPORTANCE FACTOR
 V = BASIC DESIGN WIND SPEED (MPH)

$K_z = 0.8$ FROM FIG 2-1 (ASSUMED)

$I = 1.0$ FROM SDC-4.1

$V = 80$ MPH FROM SDC-4.1 FOR SC-2

$$\begin{aligned} q_z &= 0.00256 K_z (IV)^2 \\ &= 0.00256 (0.8) (1 \times 80)^2 \\ &= 13.11 \text{ PSF} \end{aligned}$$

PUT PRESSURE LOAD INTO FORCE LOAD.

$F = q_z G_A C_f A_f$ FROM ANSI A58.1

q_z = VELOCITY PRESSURE (PSF)

G_A = VALUE FOR STRUCTURE HEIGHT

C_f = FACTOR FOR PARALLEL OR NORMAL

A_f = PROJECTED AREA NORMAL TO WIND
 EXCEPT WHEN C_f IS GIVEN FOR THE
 SURFACE AREA.

$q_z = 13.11 \text{ PSF}$

$G_A = 1.32$ FROM TABLE 4

$C_f = 1.2$ FROM TABLE 13

A_f = SEE FOLLOWING PAGE

A-22

DESIGN CALCULATION

WNC-SD-WN-ANAL-036

- (1) Drawing _____ (2) Doc. No. _____ (3) Page 22 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SV-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator LIM KRISAJUICH Date _____
 (9) Checker H. A. Lesliken Date 9-6-94

- (10) ASSUME ENTIRE FACE OF AIR SAMPLING CABINET WILL SEE WIND LOAD. THIS WILL BE WORST CASE!

$$AREA = (90 \times 72) = \frac{6480 IN^2}{144} = 45 FT^2$$

$$F = (13.11) \times (1.32) \times (1.2) \times (45)$$

$$= \underline{937.5 LBS.}$$

A-23

DESIGN CALCULATION

WNC-SD-WM-ANAL-036

- (1) Drawing _____ (2) Doc. No. _____ (3) Page 23 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject 54 MODULAR EXHAUSTER PAD DESIGN
 (8) Originator JIM KRISNICH Date _____
 (9) Checker L. A. Lesliken Date 9-6-94

- (10) ASSUME CG OF STACK SAMPLING CABINET IS AT CENTER OF CABINET, AND WIND LOAD ACTS AT THIS CG. OF THE FACE OF THE CABINET

A-24

DESIGN CALCULATION

WNC-SD-WA-ANAL-036

- (1) Drawing _____ (2) Doc. No. _____ (3) Page 2 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator VIM KRISKOUGH Date _____
 (9) Checker J.A. Leslaker Date 9-6-94

(10)

$$\Sigma M_A = 0 \rightarrow$$

$$0 = 943.5(45) + 1800(12) - R_1(24)$$

$$R_1 = 2669.1 \text{ lbs.}$$

$$\Sigma F_y = 0$$

$$0 = 2669.1 - 1800 \text{ lbs.} + R_2$$

$$R_2 = -869.1 \text{ lbs.}$$

THE REACTION AT R_2 IS IN TENSION, THIS WILL ACT ON THE BOLT.

DETERMINE THE SEISMIC LOAD ON THE CABINET.

100% OF LOAD IN MOST CRITICAL DIRECTION

+
40% OF THE ABOVE LOAD APPLIED IN THE PERPENDICULAR HORIZONTAL DIRECTION

+
3/3(40%) OF THE ABOVE LOAD APPLIED IN THE VERTICAL DIRECTION.

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WM-ANAL-086 (3) Page 25 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SV-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim KRISKOVICH Date _____
 (9) Checker J. A. Leslika Date 9-6-94

(10)

EQUATION:

$$F_p = Z I C_p W_p$$

F_p = FORCE DUE TO EARTH QUAKE

Z = 0.126 FROM SDC-4.1

I = IMPORTANCE FACTOR
 = 1.25 FROM SDC-4.1

C_p = RIGIDITY COEFFICIENT
 = 0.75 (FROM TABLE 23-PUBC-1988 #4)

W_p = WEIGHT OF CABINET
 = 1800 lbs.

$$F_p = (0.126)(1.25)(0.75)(1800) \\ = 202.5 \text{ lbs.}$$

$$F_{p2} = (400)(202.5) = 81 \text{ lbs.}$$

$$F_v = \frac{2}{3}(400)(202.5) = 54 \text{ lbs.}$$

$$F_p = \sqrt{F_{p1}^2 + F_{p2}^2} = 218.1 \text{ lbs.}$$

NEGLECT THIS LOAD SINCE THE WIND LOAD IS LARGER.

DETERMINE IF BOLTING IS ADEQUATE.

USE $\frac{1}{2}$ " DIA. HILTI KWIK BOLT II, EMBEDMENT $3\frac{1}{2}$ "

ASSUME ONE BOLT FOR THIS ANALYSIS.

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WM-SD-WM-ANAK-036 (3) Page 26 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator LIA KRISHNICHIAI Date _____
 (9) Checker H.A. Lealukar Date 9-6-94

(10)

FROM HILTI CATALOG, P. 51 WORKING LOADS
FOR $\frac{1}{2}$ " $3\frac{1}{2}$ " EMBEDMENT, $f_c = 4000$ PSI

ASSUME FOR CONSERVATISM THAT ONE BOLT
WILL HANDLE ENTIRE LOAD

$$L_{ALL} = 2130 \text{ PSI}$$

$$F.S. = \frac{L_{ALL}}{L_{ACT}} = \frac{2130 \text{ LBS}}{869 \text{ LBS.}}$$

$$= 2.5 \leftarrow$$

DETERMINE SHEAR IN POUNDS (ASSUME SINGLE
SHEAR)

$$S_{ALL} = 2220$$

$$F.S. = \frac{S_{ALL}}{S_{KT}} = \frac{2220}{943.5}$$

$$= 2.4 \leftarrow$$

THE FOLLOWING SHOULD BE LESS THAN 1.

$$= \frac{869}{2130} + \frac{943.5}{2220}$$

$$= .83 \leftarrow$$

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WNC-SD-WA-ANAL-036 (3) Page 27 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject SV-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim Krissauich Jim Burkhardt Date _____
 (9) Checker J.A. Tuck James A. Tuck Date 29 SEPT. '94

- (10) DETERMINE SIZE OF FOOTING FOR GUY CABLES WHICH ARE SUPPORTING THE STACK.

FROM WILLIAM MERRELL, P. 11 (APP. C), THE FORCES IN THE GUY WIRES ARE:

$$F = 267 \text{ lbs.}$$

FREE BODY DIAGRAM:

$$F_y = 267 \text{ lbs} \sin 45^\circ$$

$$F_y = 188.8 \text{ lbs}$$

$$F_x = 267 \cos 45^\circ$$

$$F_x = 188.8 \text{ lbs}$$

A-28

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WING-SD-WA-ANAL-036 (3) Page 28 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator JIM KRISKOVIK Date _____
 (9) Checker JAMON A. TUCK Date 29 SEPT 94

(10) DETERMINE SIZE OF FOOTING:

ASSUME FOOTING WILL BE 1' DIAMETER & 2' DEEP:

WEIGHT OF FOOTING:

FOR 4000 PSI CONCRETE:

SPECIFIC WEIGHT OF CONCRETE = 150 LB/FT³

VOLUME OF THE ABOVE CYLINDER

$$\begin{aligned} V &= \frac{\pi D^2}{4} \times L \\ &= \frac{\pi (1)^2}{4} \times 2 \\ &= 1.57 \text{ FT}^3 \end{aligned}$$

WEIGHT =

$$\begin{aligned} &= 1.57 \text{ FT}^3 \times 150 \text{ LB/FT}^3 \\ &= \underline{\underline{235.5 \text{ LBS.}}} \end{aligned}$$

VERTICAL FORCE ON FOOTING:

A-29

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WNC-SD-WM-ANAL-036 (3) Page 29 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject 5K MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim KRISKOVICH Date _____
 (9) Checker Wanda H. Tull Date 29 SEPT. 99

(10) DETERMINE IF DEPTH IS ADEQUATE TO RESIST LATERAL FORCE OF 188.8 LBS.

FROM UBC-1991, PAGE 583

$$d = \frac{A}{2} \left(1 + \sqrt{1 + \frac{4.36A}{b}} \right)$$

$$A = \frac{2.34P}{S_b}$$

P = APPLIED LATERAL FORCE IN POUNDS

S_b = ALLOWABLE LATERAL SOIL-BEARING PRESS.
FROM TABLE NO. 29-B BASED ON A DEPTH
OF ONE THIRD THE DEPTH OF EMBEDMENT.

b = DIAMETER OF ROUND FOOTING (FEET)

h = DISTANCE IN FEET FROM GROUND SURFACE
TO POINT OF APPLICATION OF LATERAL
FORCE "P." 6" WORST CASE.

d = DEPTH OF EMBEDMENT IN EARTH (FT)

$$A = \frac{2.34P}{S_b} = \frac{2.34(188.8)}{(75)(1)} = 5.89$$

ALLOWABLE BEARING PRESS.
FROM TABLE 29-B.
= 150 LB/FT²/FT

$$S_b = \frac{150 \text{ LB}}{\text{FT}^2 \cdot \text{FT}} \times \frac{1}{3} (1.5 \text{ FT}) = 75 \text{ LB/FT}^2$$

$$\begin{aligned} d &= \frac{A}{2} \left(1 + \sqrt{1 + \frac{4.36A}{b}} \right) \\ &= \frac{5.89}{2} \left(1 + \sqrt{1 + \frac{4.36(5.89)}{5.89}} \right) \\ &= \frac{5.89}{2} (1 + \sqrt{1.37}) \\ &= \underline{\underline{6.39 \text{ FT.}}} \end{aligned}$$

ASSUME LATERAL LOAD
IS ACTING AT THE TOP
OF THE FOOTING ∴ h = 6" = 0.5'

DESIGN CALCULATION

WHC-SD-WM-ANAL-036

(1) Drawing _____ (2) Doc. No. _____ (3) Page 30 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject 54-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator LIN KRISKOVIK Date _____
 (9) Checker JANIS TALL Date 29 SEPT. 94

(10) FOOTING SIZE NEEDS TO BE INCREASED.

$$A = \frac{7.34P}{S_b}$$

$$= \frac{7.34(148.8)}{(75)(2)}$$

$$= 2.95$$

$$S_b = 150 \times \frac{1}{3}(1.5) = 75 \text{ lb/ft}^2$$

$$d = \frac{A}{2} \left(1 + \sqrt{1 + \frac{4.36(A')}{A}} \right)$$

$$= \frac{2.95}{2} \left(1 + \sqrt{1 + \frac{4.36(0.5)}{2.95}} \right)$$

$$d = \underline{\underline{3.42 \text{ FT.}}}$$

INCREASE OVERALL DIMENSIONS OF FOOTING TO THE FOLLOWING:

$$A = \frac{7.34(148.8)}{(100)(2.5)}$$

$$= 1.77$$

$$S_b = 150 \times \frac{1}{3}(2) = 100 \text{ lb/ft}^2$$

$$d = \frac{1.77}{2} \left(1 + \sqrt{1 + \frac{4.36(0.5)}{1.77}} \right)$$

$$d = \underline{\underline{2.21'}}$$

A-31

DESIGN CALCULATION

W4C-SD-WM-ANAL-036
(1) Drawing _____ (2) Doc. No. _____ (3) Page 3/ of _____
(4) Building _____ (5) Rev. Ø (6) Job No. _____
(7) Subject SV-MODULAR EXHAUSTER PAD DESIGN
(8) Originator Jim KRISKOUGH Jim Kullman Date 1
(9) Checker JAMONA TULL Date 29 SEPT. 94

(10)

BASED ON THE ANALYSIS FROM THE PREVIOUS PAGES THE FOLLOWING SIZED FOOTING WILL BE USED:

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WA-ANAL-036 (3) Page 32 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SV-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator LIA KRISOVICH LIA BURTON Date _____
 (9) Checker JANITA TACK Date 29 SEPT. 94

- (10) DETERMINE THE SIZE OF THE EYE BOLT FOR THE FOOTING AND GUY WIRE INTERFACE.

FORCE ACTING ON EYE BOLT IS 267 LBS ACTING AT A 45° ANGLE

FROM THE DOE HOISTING & RIGGING MANUAL DOE-RL-92-36

WORKING LOAD FOR A 1/2" EYE BOLT = 1440 LBS.
 FOR A FORCE APPLIED AT A 60° ANGLE FROM VERTICAL (THIS WILL BE USED SINCE THE TABLE DOES NOT INCLUDE 45°)
 = 520 LBS (APP. B)

$$F.S. = \frac{ALL}{ACT.} = \frac{520 LBS}{267 LBS} = \underline{\underline{2.0}}$$

THIS FACTOR OF SAFETY IS ACCEPTABLE. FURTHERMORE, THE ALLOWABLE IS AT 60° (CONSERVATIVE RATHER THAN 45°).

NO ANALYSIS FOR PULL OUT & SHEAR CONE OF CONCRETE WILL BE PERFORMED BECAUSE THE APPLIED LOAD IS SO SMALL.

∴ USE 1/2" DIA. X 8" LONG.

DESIGN CALCULATION

WAC-SD-WM-ANAL-036

- (1) Drawing _____ (2) Doc. No. _____ (3) Page 33 of _____
(4) Building _____ (5) Rev. Ø (6) Job No. _____
(7) Subject 5Y-MODULAR EXHAUSTER PAD DESIGN
(8) Originator LIA KRISKOVA Date 10-13-94
(9) Checker VANNA TUCK Date 13 Oct. 94

- (10) DETERMINE REINFORCEMENT REQUIRED FOR
RETAINING WALL:

A-34

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WM-ANAK-036 (3) Page 3 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject 54-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim KRISKOVIK / Jim KUMMEL Date 10-13-94
 (9) Checker JAMES A. TUCK Date 13 Oct. 94

(10)

MAX. HEIGHT OF RETAINING WALL = $2'-8"$
 ABOVE LOWER GRADE. ASSUME WORST CASE FOR
 ANALYSIS OF $2'-8"$

SOIL PRESSURE: FROM UBC-91 PG. 590 (TABLE 29-B)
 ASSUME SAND

LATERAL BEARING PRESS = $150 \text{ LB/FT}^2/\text{FT OF DEPTH}$

REINFORCEMENT = $f_y = 60,000 \text{ PSI}$, #4 BAR

ACTIVE SOIL PRESSURE = $30 \text{ LB/FT}^2/\text{FT OF DEPTH}$ (SDC-4.1 P. 21)

DENSITY OF SOIL = 110 LB/FT^3

EARTH PRESSURE COEFFICIENT = $K_0 = 0.27$

$$P = 30 \text{ LB/FT}^2/\text{FT} \times 3'-4" \\ = 100 \text{ LB/FT}^2$$

A-35

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WM-ANAL-036 (3) Page 35 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject 54 MODULAR EXHAUSTER PAD DESIGN
 (8) Originator VIM KRISKOVIK / in SUMMER Date 10-13-94
 (9) Checker JAMON A. TWA Date 13 Oct. 94

(10)

$$H_1 = \frac{1}{2} (10015/\text{FT}^2) (3'-4'') = 167 \text{ lbs.}$$

$$\frac{1}{3} (3'-4'')$$

MOMENT AT BASE OF WALL (A)

$$M = (167 \text{ lbs}) (3'-4'')^{\frac{1}{3}} \\ = 2226.7 \text{ IN-LBS.}$$

DETERMINE REINFORCEMENT AREA:

$$A_s = \frac{M}{f_s j} \quad \left\{ \text{FROM SIMPLIFIED DESIGN P. 279} \right.$$

M = MOMENT

f_s = TENSILE STRESS IN REINFORCEMENT

j = BALANCED SECTION FACTOR

d = EFFECTIVE DEPTH OF THE SECTION FOR STRESS ANALYSIS; FROM THE CENTROID OF THE STEEL TO THE EDGE OF THE COMPRESSION ZONE.

Assume: d = 4

j = 0.16 (TABLE 6.1 SIMPLIFIED DESIGN...)

$$f_s = 0.5 f_y = 0.5 (60,000) = 30,000 \text{ PSI}$$

$$A_s = \frac{2226.7 \text{ IN-LBS}}{(30,000)(0.16)(4)}$$

$$= 0.02 \text{ IN}^2/\text{FT.} \quad \leftarrow$$

FROM SIMPLIFIED DESIGN... TABLE 6.4

USE #4 REBAR ON 12 INCH CENTERS = 0.20 IN²/FT.

OVERDESIGNED = $\frac{0.2}{0.02} = 10 \text{ TIMES} \quad \leftarrow$

A-36

DESIGN CALCULATION

WNC-SD-WA-ANAL-036

(1) Drawing _____ (2) Doc. No. _____ (3) Page 36 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator JIM KRISOVICH / JIM BULLMAN Date 10-13-94
 (9) Checker JAMONA TALK Date 13 Oct. 94

(10) DETERMINE IF OVERTURNING WILL OCCUR.

$$P_2 = (150 \text{ LB/FT}^3)(1.33') = 200 \text{ LB/FT}^2$$

$$H_1 = \frac{1}{2}(200 \times 1.33)$$

$$H_1 = 133 \text{ lbs}$$

$$H_2 = \frac{1}{2}(120 \times 4.0)$$

$$= 240 \text{ lbs}$$

$$P_1 = 30 \text{ LB/FT}^3(4.0') = 120 \text{ LB/FT}^2$$

DENSITY OF CONCRETE = 150 LB/FT³

$$W_1 = (3'-4'')(8'') 150 \text{ LB/FT}^3 = 333 \text{ lbs.}$$

$$W_2 = (8'') \times 2'-2'' \times 150 \text{ LB/FT}^3 = 267 \text{ lbs}$$

SOIL DENSITY = 110 LB/FT³

$$W_3 = (1'-0'')(3'-4'') 110 \text{ LB/FT}^3 = 367 \text{ lbs.}$$

$$W_4 = (2'') \times 1'-0'' (110 \text{ LB/FT}^3) = 73.3 \text{ lbs.}$$

OVERTURNING MOMENT:

$$= H_2 \left(\frac{1}{3} \right) (4.0) = 240 \left(\frac{1}{3} \right) (4.0 \times 12) = 3840 \text{ IN-LBS.}$$

$$= 3840 \text{ IN-LBS.}$$

RESTORING MOMENT:

$$= 333(16'') + 267(16'') + 367(22'') + 73.3(4'') = 18113.8 \text{ IN-LBS.}$$

$$= 18113.8 \text{ IN-LBS.}$$

WALL WILL NOT OVERTURN

$$\text{OVER DESIGN} = \frac{18113.8}{3840}$$

$$= 4.7 \text{ TIMES}$$

A-37

DESIGN CALCULATION

W4C-SD-WM-ANAL-036
 (1) Drawing _____ (2) Doc. No. _____ (3) Page 32 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject 5Y-MODULAR EXHAUSTOR PAD DESIGN
 (8) Originator Jim Kriskovich Jim Sullivan Date 10-13-94
 (9) Checker James A. Trich Date 13 Oct. 94

(10) DETERMINING IF SLIDING WILL OCCUR. $\rightarrow +$
 FROM PREVIOUS PAGE:

$W_1 = 333 \text{ lbs}$
 $W_2 = 267 \text{ lbs}$
 $W_3 = 367 \text{ lbs}$
 $W_4 = 73.3 \text{ lbs}$

EARTH PRESSURE COEFFICIENT
 $K_0 = 0.27$

SLIDING FORCE: $H_2 = 240 \text{ lbs}$
 RESISTING FORCE: $(333 + 267 + 367 + 73.3) 0.27 + 133$
 $= 413.9 \text{ lbs}$

OVERDESIGN = $\frac{413.9 \text{ lbs}}{240 \text{ lbs}}$
 $= 1.7 \text{ TIMES}$

TO INCREASE OVERDESIGN THE FOOTING WILL BE INCREASED AS SHOWN BELOW:

A-38

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WHC-SD-WM-ANAL-126 (3) Page 38 of _____
 (4) Building _____ (5) Rev. 0 (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator IAN KRISKOVICH Date 10-13-94
 (9) Checker JANIS A. TUCK Date 13 Oct. 94

(10) RE-DETERMINE SLIDING:

$$\begin{aligned} W_1 &= (3'-4" \times 8") 150 \text{ lb/ft}^3 = 333 \text{ lb} \\ W_2 &= (8" \times 3'-2") 150 \text{ lb/ft}^3 = 316 \text{ lb} \\ W_3 &= (1'-6" \times 3'-4") 110 \text{ lb/ft}^3 = 550 \text{ lb} \\ W_4 &= (1'-0" \times 8") 110 \text{ lb/ft}^3 = 73.3 \text{ lb} \end{aligned}$$

$$\text{SLIDING FORCE: } H_2 = 240 \text{ lb.}$$

RESISTING FORCE:

$$\begin{aligned} &(333 + 316 + 550 + 73.3) 0.27 + 133 \\ &= 476.5 \text{ lbs.} \end{aligned}$$

$$\text{OVERDESIGN} = \frac{476.5 \text{ lbs.}}{240 \text{ lbs.}}$$

$$= \underline{\underline{2.0 \text{ TIMES}}}$$

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. WNC-SD-WM-AHAK-036 (3) Page 39 of _____
 (4) Building _____ (5) Rev. Ø (6) Job No. _____
 (7) Subject SY-MODULAR EXHAUSTER PAD DESIGN
 (8) Originator Jim KRISKOVICH Date 10-13-94
 (9) Checker WANDA TUCK Date 13 Oct. 94

- (10) DETERMINE AREA OF STEEL/REINFORCEMENT TO CONCRETE.

ACI 318 P. 7.2 SECTION 7.12 RATIO MUST BE GREATER THAN 0.018

VERTICAL RE-BAR ON 12" CENTERS = 0.2 IN²/FT

$$12 \times 8 = 96 \text{ IN}^2$$

$$\frac{0.2 \text{ IN}^2}{96 \text{ IN}^2} = 0.0021 > 0.0018$$

HORIZONTAL BARS ON 12" CENTERS = 0.2 IN²/FT.

$$12 \times 8 = 96 \text{ IN}^2$$

$$\frac{0.2 \text{ IN}^2}{96 \text{ IN}^2} = 0.0021 > 0.0018$$

APPENDIX B

Table 10-1. Safe Working Load for Carbon Steel
Shouldered Eyebolts (ANSI/ASME B18.5).

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Nominal size (inch)	Inside diameter of eye (inch)	Safe Working Load per Shouldered Eyebolt (lb)			
		Vertical	30° from vertical	60° from vertical	90° from vertical
1/4	0.69	400	75	NR*	NR*
3/8	0.94	1,000	400	220	180
1/2	1.12	1,840	850	520	440
5/8	1.31	2,940	1,410	890	740
3/4	1.44	4,340	2,230	1,310	1,140
1	1.69	7,880	3,850	2,630	2,320
1-1/4	2.12	12,600	6,200	4,125	3,690
1-1/2	2.44	18,260	9,010	6,040	5,460
2	3.06	32,500	15,970	10,910	9,740

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Limiting Conditions:

- To attain the rated capacity for threaded hole applications, minimum thread shank length of engagement depends upon parent material and must be as follows:
Steel: 1 thread diameter
Cast iron, brass, bronze: 1.5 X thread diameter
Aluminum, magnesium, zinc, plastic: 2 X thread diameter
- To attain the rated capacity for untapped through-hole applications, use shouldered eyebolts, steel washer, and a nut with required thread engagement.
- Under vertical load Type 1, Straight Shank (nonshouldered) eyebolts have the same Safe Working Load as shouldered eyebolts. Angular loading is restricted, reference para 10.4.2, "Eyebolts--Rigging Hardware."
- Capacities shown in this table are good between 30 °F (-1°C) and 275 °F (135 °C). Carbon steel is subject to failure from shock loading at temperatures below 30°F and loses strength at temperatures above 275 °F.
- Eyebolts from selected manufacturers may have higher SWL. Regardless of SWL, ensure that eyebolts have a design factor of 5.

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*NR means Not Recommended.

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APPENDIX C

William W. Merrell, P.E.

Management and Engineering Services

March 5, 1994

Art Soma
Arneby & Sutcliffe
P.O. Box 2526
Columbus, Ohio 43216

RE: WHC - Replacement Exhauster

Dear Art,

The design calculations for the replacement exhauster skid are attached for your records.

The calculations are organized, as required by the various contract specifications, as follows:

Part "A": Objective

Part "B": Design Input

Part "C": Calculations

Attached pages 1 through 16 cover the analysis of the skid for dead, snow and wind loads.

The seismic qualification calculations, starting on page 17, have been sent to you under separate cover.

Complete computer output for the seismic calculations is attached to the seismic calculations.

Part "D": Findings and Conclusions:

This section includes an engineering sketch of the skid showing basic dimensions and member sizes. The sketch references specific page numbers in the calculation that contain connection design data.

A sketch of the arrangement of the lifting device is also included along with references to specific calculations pages that contain lift device component sizes and analyses.

Section D3 lists works that must be performed by others.

Please call me at 1-614-487-3286 should you have questions or comments.

Yours truly,

Bill

William W. Merrell

BARNEBY & SUTCLIFFE CORP.

WHC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION DOCUMENTATION

PART A: OBJECTIVE

DESIGN SKID STRUCTURE IN ACCORDANCE WITH ALL APPLICABLE SPECIFICATIONS FOR VARIOUS COMBINATIONS OF DEAD, WIND, SNOW, RAIN AND SEISMIC LOADING.

PART B: DESIGN INPUT:

B1. CRITERIA AND SOURCE:

CLIENT SPECIFICATION: WHC-S-0193, REV. 0

HANFORD PLANT STANDARDS: GENERAL DESIGN CRITERIA (SDC-1.3)

HANFORD SITE HOISTING AND RIGGING MANUAL (DOE-RL-92-36, REV. 0)

DESIGN AND EVALUATION GUIDELINES
FOR DEPARTMENT OF ENERGY FACILITIES
SUBJECTED TO NATURAL PHENOMENA HAZARDS
(UCRL - 15910, JUNE 1990)

B2: GIVEN DATA:

B&S SKID CONFIGURATION DRAWING

B&S COMPONENT PARTS LIST AND WEIGHTS

B3: ASSUMPTIONS:

COMPONENT PART BASE PLATES OR SUPPORT LUGS
TRANSFER STRUCTURAL LOADS TO SKID STRUCTURE.

B4: METHODS USED:

SEISMIC RESPONSE BASED ON UBC EQUIVALENT
STATIC LOADS. SEISMIC ANALYSIS PERFORMED USING
COMPUTER PROGRAM WITH MODIFIED STIFFNESS ANALYSIS
METHODS.

WORST CASE CONDITIONS FOR DEAD, WIND AND SNOW
LOADS BASED ON HORIZONTAL AND VERTICAL SUPPORT
PROVIDED AT SKID ENDS. ACTUAL SUPPORT AT
INTERMEDIATE POINTS ALONG SKID WILL RESULT IN
INCREASED SAFETY FACTORS.

DEAD, WIND AND SNOW LOAD ANALYSES PERFORMED
USING CLASSICAL STRUCTURAL ANALYSIS METHODS
WITHOUT THE USE OF COMPUTER PROGRAMS.

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SKID DESIGN AND SEISMIC QUALIFICATION DOCUMENTATION

B5: COMPUTER PROGRAMS:

SEISMIC ANALYSIS USING PROGRAM, "IMAGES 3D";
VERSION 2.0.

B6: REFERENCE SOURCES:

STEEL MATERIALS:

ASTM A36

STEEL DESIGN SPECIFICATION:

AISC, 9TH EDITION

STEEL WELDING:

AWS, D1.1 AND AISC 9TH EDITION

UNISTRUT PRODUCTS:

UNISTRUT GENERAL ENGINEERING

CATALOG NO. 12

LIFTING PRODUCTS:

ALPS WIRE ROPE 1989 GENERAL CATALOG

PART C: CALCULATIONS

(ATTACHED)

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SKID DESIGN AND SEISMIC QUALIFICATION DOCUMENTATION

PART D: FINDINGS AND CONCLUSIONS:

D1: SKID DESIGN:

THE SKID, AS SKEMATICALLY SHOWN BELOW, HAS THE STRUCTURAL INTEGRITY TO WITHSTAND THE SPECIFIED DEAD, SNOW, WIND AND SEISMIC LOADS.

D2: SKID RIGGING FOR LIFT:

THE CALCULATIONS SHOW THAT THE RIGGING FOR LIFTING THE SKID, WHEN PLACED AS SCHEMATICALLY SHOWN BELOW, HAS A SAFETY FACTOR OF AT LEAST 5.

* FIELD CONFIRM C.G.

WHC-SD-WHY-1111-036
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WHC -- REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION DOCUMENTATION

D3: WORK BY OTHERS:

1. FOUNDATION SLAB
2. GUY WIRE ANCHORS: TO BE SIZED FOR 1/2 TON
GUY CABLE FORCE.
3. PANEL DESIGN: DEAD, WIND AND SEISMIC LOADS
TO BE DELIVERED BY PANELS
TO TOP OF SKID STRUCTURE.

WHC-SD-WM-APP-036
Rev. 6

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WHC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

1. COMPONENT PART DEAD LOADS AND LOCATIONS

ORIGIN AT LOWER LEFT CORNER OF SKID

X = LONGITUDINAL AXIS

Y = VERTICAL AXIS

Z = TRANSVERSE AXIS

$$M_{cgi} = P_i \cdot (X_{cg} - X_i) \quad \text{FOR } X_i < X_{cg}$$

$$D_{ei} \cdot I_x = P_i \cdot (X_{cg} - X_i)^2 \cdot (2 \cdot X_{cg} + X_i) / (6 \cdot E) \quad \text{FOR } X_i < X_{cg}$$

$$E = 2.9E+07 \quad \text{PSI}$$

$$M_{xi} = P_i \cdot (117 - X_i) \quad \text{FOR } X_i < 117$$

PART	P DEAD LOAD (LBS)	X (IN)	Y (IN)	Z (IN)	Mp Pi*Xi (IN-LBS)	Mcgi (IN-LBS)	Di*Ix (IN^5)	Mxi (IN-LBS)
INLET	50	8	30	17	400	5,211	0.73	5450
MIST ELIMINATOR	80	22	30	17	1,760	7,217	0.92	7600
HEATER UNIT	360	46	30	17	16,560	23,838	2.45	25560
FILTER UNIT	550	102	30	17	56,100	5,619	0.11	8250
OUTLET	50	153	30	17	7,650	0	0.00	0
FAN CASINGS	45	173	30	17	7,785	0	0.00	0
FAN MOTOR	200	189	23	17	37,800	0	0.00	0
STACK	225	173	138	23	38,925	0	0.00	0
STACK FLOW STATION	100	173	132	23	17,300	0	0.00	0
SEAL IN MOTOR	150	27	6	17	4,050	12,783	1.57	13500
	50	40	14	37	2,000	3,611	0.40	3850
HEATER PANEL	300	75	21	45	22,500	11,165	0.72	12600
POWER PANEL	976	117	42	50	114,192	0	0.00	0
ALARM PANEL	500	162	24	50	81,000	0	0.00	0
TOTAL DEAD LOAD:	3636							

$$\text{TOTAL MOMENT} = M_p = 408,022$$

$$X_{cg} = \text{LOCATION OF CG} = M_p / T_{DL} = 112 \text{ IN}$$

$$\text{TOTAL } M_{cg} = 69,445$$

$$\text{TOTAL } D \cdot I_x = 6.89$$

$$\text{TOTAL } M_x = 76810$$

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WBC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

WHL-SD-WM-ANAL-036
REV. 0

2. WORST CASE DEAD LOAD ANALYSIS:

A. CASE 1 - VERTICAL SUPPORT AT C.G.:

SKID STRINGER DATA:

Size	MC6x12
I_x	18.7 IN ⁴
S_x	6.24 IN ³
F_y	36,000 PSI

SKID STRINGER STRENGTH CONSIDERATIONS:

$f_{bx} = .5 \cdot W_{cg} / S_x =$	5,564 PSI
$F_{bx} = .6 \cdot F_y =$	21,600 PSI
CHECK: $f_{bx} < F_{bx} ?$	O.K.

STIFFNESS CONSIDERATIONS:

$\Delta_e = \text{TOTAL } .5 \cdot \Delta \cdot I_x / I_x =$	0.184 IN
$\Delta_m = 2 \cdot W_{cg} / 360 =$	0.623 IN
CHECK: $\Delta_e < \Delta_m ?$	O.K.

B. CASE 2 - SIMPLE SUPPORT AT ENDS:

$L =$	204 IN
$R_r = W_p / L =$	2,000 LBS
$R_l = \text{TOTAL DEAD LOAD} - R_r =$	1,636 LBS

SKID STRINGER STRENGTH CONSIDERATIONS:

$X_v = \text{LOCATION OF MAXIMUM MOMENT}$	
$X_v \text{ AT } R_l - \sum (P_i) < 0 =$	117 IN

$M_{xt} \text{ FOR } (117 - X_i) > 0$	
$M_{xt} = R_l \cdot 117 - H_x =$	114,589 IN-LBS

$f_{bx} = .5 \cdot M_{xt} / S_x =$	9,182 PSI
$F_{bx} = .6 \cdot F_y =$	21,600 PSI
CHECK: $f_{bx} < F_{bx} ?$	O.K.

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WHC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

WHC-SD-WHM-NHHL-036
REV.0

STIFFNESS CONSIDERATIONS:

w1 = EQUIVALENT UNIFORM LOAD

w2 = EQUIVALENT VARYING LOAD

$$\begin{aligned} R_r &= .5*w1*L + w2*L/3 = 2000 \text{ LBS} \\ R_l &= .5*w1*L + w2*L/6 = 1636 \text{ LBS} \\ w2 &= (R_r - R_l) * (6/L) = 10.71 \text{ PLI} \\ w1 &= (R_r - w2*L/3) * (2/L) = 12.47 \text{ PLI} \end{aligned}$$

$$\begin{aligned} D_c &= .5*5*w1*L^4 / (384*E*I_x) + .5*w2*.5*L^4*(K1)/(K2) \\ K1 &= 3*.5^4*L^4*10.25 = 3.3E+09 \\ K2 &= 180*E*I_x*L^2 = 4.1E+15 \end{aligned}$$

$$\begin{aligned} D_c &= 0.260 \text{ IN} \\ D_m &= L/360 = 0.567 \text{ IN} \\ \text{CHECK: } D_c &< D_m ? & \text{O.K.} \end{aligned}$$

3. WORST CASE PICK ANALYSIS:
CHECK FLEXURAL STRESSES FOR ONE POINT PICK AT C.G.:
(STACK NOT INSTALLED)

$$M_{xi} = P_i * (X_{cg} - X_i) \text{ FOR } X_i < X_{cg}$$

$$D_{xi} * I_x = P_i * (X_{cg} - X_i)^2 * (2 * X_{cg} + X_i) / (6 * E) \text{ FOR } X_i < X_{cg}$$

PART	P DEAD LOAD (LBS)	X (IN)	Y (IN)	Z (IN)	Mp Pi*Xi (IN-LBS)	Mxi (IN-LBS)	Di*Ix (IN^5)
INLET	50	8	30	17	400	4913	0.61
MIST ELIMINATOR	80	22	30	17	1,760	6740	0.77
HEATER UNIT	360	46	30	18	16,560	21690	1.94
FILTER UNIT	550	102	30	17	56,100	2338	0.02
OUTLET	50	153	30	17	7,650	0	0.00
FAN CASINGS	45	173	30	17	7,785	0	0.00
FAN MOTOR	200	189	23	17	37,800	0	0.00
STACK	0	173	138	23	0	0	0.00
STACK HAW STATION	0	173	132	23	0	0	0.00
SEAL POT	150	27	6	17	4,050	11888	1.30
MOTOR	50	40	14	37	2,000	3313	0.32
HEATER PANEL	300	75	21	45	22,500	9375	0.48
POWER PANEL	976	117	42	50	114,192	0	0.00
ALARM PANEL	500	162	24	50	81,000	0	0.00

TOTAL DEAD LOAD: 3311

$$\begin{aligned} \text{TOTAL MOMENT} &= M_p = 351,797 \\ \text{TOTAL } M_x &= 60,257 \\ \text{TOTAL } D_{xi} &= 5.44 \end{aligned}$$

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WMC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM

SKID DESIGN AND SEISMIC QUALIFICATION

WMC SD WA 241-SY TANK FARM
REV. C

$$X_{cg} = H_p / T_{dl} = 106.3 \text{ IN}$$

SKID STRINGER DATA:

Size HC6x12
I_x 18.7 IN⁴
S_x 6.24 IN³
F_y 36,000 PSI

SKID STRINGER STRENGTH CONSIDERATIONS:

f_{bx} = .5 * M_x / S_x = 4,828 PSI
F_{bx} = .6 * F_y = 21,600 PSI
CHECK: f_{bx} < F_{bx} ? O.K.

SKID STRINGER STIFFNESS CONSIDERATIONS:

D_e = TOTAL .5 * D_i * I_x / I_x = 0.145
D_m = 2 * X_{cg} / 360 = 0.767
CHECK: D_e < D_m ? CALL O.K.

CONCLUSION: SKID COULD BE PICKED AT CG WITHOUT STRESS OR DEFLECTION PROBLEMS.
ACTUAL PICK TWO POINT PICK - EACH SIDE OF CG - WILL RESULT IN
LOWER STRESSES AND DEFLECTIONS.

4. WORST CASE DEAD LOAD PLUS SNOW LOAD ON TRANVERSE SUPPORT MEMBERS:

SNOW LOAD = 14 IN
SPECIFIC GRAVITY 0.125
(REFER TO AISC MANUAL PAGE 6-8)

W_s = UNIT WEIGHT = .125 * 62.4 = 7.8 PCF
S_n = SNOW DESIGN LOAD = 14 / 12 * W_s = 9.1 PSF

HEAVIEST PART WEIGHT (PWR PANEL) 976 LBS
SNOW AREA OF PWR PANEL = 50 * 15 = 750 IN²
W_l = SNOW WT = S_n * 750 / 144 = 47 LBS

PANEL DEAD LOAD PLUS SNOW WT = 1023 LBS

ASSUME SUPPORT AT EACH END OF PANEL

R = .5 * 1023 = 512 LBS

FOR WORST CASE ASSUME TRANSVERSE MEMBER SUPPORTS TWO PARTS

R_t = 2 * R = 1023 LBS

FOR WORST CASE ASSUME R_t APPLIED AT CENTER OF TRANSVERSE MEMBER

L_t = LENGTH OF TRANSVERSE MEMBER = 59 IN
M_x = R_t * L_t / 4 = 15,095 IN-LBS

TRANSVERSE MEMBER DATA:

Size C4x5.4
I_x 3.85 IN⁴
S_x 1.93 IN³
F_y 36,000 PSI

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WHC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

WHC-50-WM-ANIL-036
REV. 0

STRENGTH CONSIDERATIONS:

$f_{bx} = M_x/S_x =$ 7,821 PSI
 $F_{bx} = .6*F_y =$ 21,600 PSI
CHECK: $f_{bx} < F_{bx} ?$ O.K.

STIFFNESS CONSIDERATIONS:

$\Delta_e = R_t * L_t^3 / (48 * E * I_x) =$ 0.039 IN
 $\Delta_m = L_t / 360 =$ 0.164 IN
CHECK: $\Delta_e < \Delta_m ?$ O.K.

CONNECTION TO SKID STRINGER:

$L_w =$ WELD LENGTH 2 IN
 $W_e =$ WELD SIZE 0.125 IN
 $A_w = 2 * L_w * W_e / 2^{.5} =$ 0.35 IN²
 $f_w =$ WELD STRESS = $.5 * R_t / A_w$ 1,447 PSI
 $F_{wt} =$ WELD TENSILE STRENGTH 70,000 PSI
 $F_w = .3 * F_{wt}$ 21,000 PSI
CHECK: $f_w < F_w ?$ O.K.

5. WORST CASE DEAD LOAD PLUS WIND ON TRANSVERSE SUPPORT MEMBERS:

DESIGN DATA:

WIND GROUND VELOCITY 80 MPH
WIND CODE: ANSI A58.1 (ASCE 7-88)

ASCE 7-88 Wind Specification:
Exposure "C"

$F = q_z * G_h * C_f * A_f$
 $q_z = .00256 * k_z * (I * V)^2$
 k_z : Table 6, Exposure C
 $I = 1.07$, Importance factor, Table 5
 $V = 80$ mph

$q_z = .00256 * k_z * (1.07 * 80)^2$
 G_h : Table 8, Exposure C
 $C_f = 1.8$,

$F_i = .00256 * k_z * (1.07 * 80)^2 * G_h * 1.8 * A_f$
 $F_i / (k_z * G_h * A_f) =$ 33.76
 $A_f = H * W$

Part	Height Above Ground	H (ft)	W (ft)	A_f (ft ²)	k_z (Tbl.6)	G_h (Tbl.8)	F_i (lbs)
PWR PANEL	3	6	4.2	25	0.80	1.32	891

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SKID DESIGN AND SEISMIC QUALIFICATION

WBC-SD-WM-ANAL-036

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D_p = PWR PANEL DEPTH 15 IN
 M_o = OVERTURNING MOMENT = $3 \cdot F_i$ 2,674 FT-LBS
 R_{po} = $.5 \cdot 12 \cdot M_o / D_p$ 1,070 LBS

 R_v = BASE SHEAR AT SUPPORT = $F_i / 4$ 223 LBS

 P = PWR PANEL WEIGHT 976 LBS
 R_{pd} = $.25 \cdot P$ 244 LBS

WORST CASE CONSIDERATIONS FOR UNISTRUT SUPPORT MEMBERS:

PART TO UNISTRUT:

R_{pu} = UPLIFT REACTION = $R_{po} - R_{pd}$ 826 LBS
 R_{pc} = COMPR. REACTION = $R_{po} + R_{pd}$ 1,314 LBS
 R_{vu} = R_v = 223 LBS

UNISTRUT NUT AND BOLT CAPACITIES:

(UNISTRUT GENERAL ENGINEERING CATALOG; PG 69)

BOLT DIAMETER 1/2 IN
 T_b = TENSION CAPACITY 2000 LBS
 T_v = SHEAR CAPACITY 1500 LBS

$I_{cb} = R_{pu} / T_b + R_{vu} / T_v = 0.56$
CHECK: $I_{cb} < 1$? O.K.

UNISTRUT CAPACITY:

TYPE P1000
 S_u = 0.202 IN³
 L_u = SPAN 24 IN
 M = $.5 M_o$ = 1,337 IN-LBS
 P_u = $.5 \cdot P$ = 488 LBS

$R_{ul} = .5 \cdot P_u - M / L_u = 188$ LBS
 $R_{ur} = .5 \cdot P_u + M / L_u = 300$ LBS
 $M_u = R_{ur} \cdot .5 \cdot L = 3,596$ IN-LBS

$f_{bu} = M_u / S_u = 17,804$ PSI
 $F_{bu} = 25,000$ PSI
CHECK: $f_{bu} < F_{bu}$? O.K.

UNISTRUT TO TRANSVERSE MEMBER CONNECTION:

USE 1/2" UNISTRUT NUT AND BOLT
(NUT AND BOLT DESIGN GOVERNED BY CONNECTION
OF PART TO UNISTRUT)

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WBC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

WNC-SD-WM-A111-036
REV. 0

DESIGN TRANSVERSE MEMBER FOR:

MOMENT AT CENTER = $M_o = 2,674$ FT-LBS
GRAVITY LOAD AT CENTER = $P = 976$ LBS
BASE SHEAR = $2 \cdot R_v = 446$ LBS

TRANSVERSE MEMBER DATA:

Size C4x5.4
 $I_x = 3.85$ IN⁴
 $S_x = 1.93$ IN³
 $F_y = 36,000$ PSI

STRENGTH CONSIDERATIONS:

$L_t = \text{LENGTH OF TRANSVERSE MEMBER} = 59$ IN
 $R_r = (P \cdot 0.5 \cdot L_t + M_o) / L_t = 533$ LBS
 $R_l = P - R_r = 443$ LBS
 $M_x = R_l \cdot 0.5 \cdot L_t = 13,059$ IN-LBS

$f_{bx} = M_x / S_x = 6,766$ PSI
 $F_{bx} = 0.6 \cdot F_y = 21,600$ PSI
CHECK: $f_{bx} < F_{bx} ?$ O.K.

STIFFNESS CONSIDERATIONS:

$\Delta_e = P \cdot L_t^3 / (48 \cdot E \cdot I_x) = 0.037$ IN
 $\Delta_m = L_t / 360 = 0.164$ IN
CHECK: $\Delta_e < \Delta_m ?$ O.K.

CONNECTION TO SKID STRINGER:

$L_w = \text{WELD LENGTH} = 2$ IN
 $W_e = \text{WELD SIZE} = 0.125$ IN
 $A_w = 2 \cdot L_w \cdot W_e / 2^{0.5} = 0.35$ IN²
 $f_{wy} = \text{WELD STRESS} = R_r / A_w = 1,508$ PSI
 $f_{wz} = R_v / A_w = 1,260$ PSI
 $f_{wr} = (f_{wy}^2 + f_{wz}^2)^{0.5} = 1,966$ PSI

$F_{wut} = \text{WELD TENSILE STRENGTH} = 70,000$ PSI
 $F_w = 0.3 \cdot F_{wut} = 21,000$ PSI
CHECK: $f_{wr} < F_w ?$ O.K.

6. WORST CASE DEAD LOAD PLUS SNOW ON SKID STRINGERS:

A. CASE 1 - SIMPLE SUPPORT AT ENDS

SNOW LOAD = 14 IN
SPECIFIC GRAVITY 0.125
(REFER TO AISC MANUAL PAGE 6-8)

CONSIDER SNOW OVER ENTIRE AREA

$L_t = \text{SKID WIDTH} = 59$ IN
 $L = \text{SKID LENGTH} = 204$ IN

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REV. C

$$\begin{aligned} W_s &= \text{UNIT WEIGHT} = .125 \times 62.4 = 7.8 \text{ PCF} \\ S_n &= \text{SNOW DESIGN LOAD} = 14/12 \times W_s = 9.1 \text{ PSF} \end{aligned}$$

$$\begin{aligned} w_s &= \text{UNIFORM SNOW LOAD FOR EACH SKID CHANNEL} \\ w_s &= (S_n/144) \times .5 \times L_t = 1.86 \text{ PLF} \end{aligned}$$

$$R_{ls} = .5 \times w_s \times L = 190 \text{ LBS}$$

$$\begin{aligned} &\text{FROM SECTION 2, ABOVE:} \\ M_{xt} \text{ AT } X_i = 117 &= 114,589 \text{ IN-LBS} \end{aligned}$$

$$\begin{aligned} M_{xs} &= R_{ls} \times 117 - w_s \times 117^2 \times .5 = 9,488 \text{ IN-LBS} \\ M &= .5 \times M_{xt} + M_{xs} = 66,783 \text{ IN-LBS} \end{aligned}$$

SKID STRINGER DATA:

$$\begin{aligned} \text{Size} &= \text{MC6x12} \\ I_x &= 18.7 \text{ IN}^4 \\ S_x &= 6.24 \text{ IN}^3 \\ F_y &= 36,000 \text{ PSI} \end{aligned}$$

SKID STRINGER STRENGTH CONSIDERATIONS:

$$\begin{aligned} f_{bx} &= M/S_x = 10,702 \text{ PSI} \\ F_{bx} &= .6 \times F_y = 21,600 \text{ PSI} \\ \text{CHECK: } f_{bx} &< F_{bx} ? \quad \text{O.K.} \end{aligned}$$

STIFFNESS CONSIDERATIONS:

$$\begin{aligned} &\text{FROM SECTION 2, ABOVE:} \\ D_c &= 0.260 \text{ IN} \end{aligned}$$

D_s = ADDITIONAL DEFLECTION FROM SNOW

$$\begin{aligned} D_s &= 5 \times w_s \times L^4 / (384 \times E \times I_x) = 0.078 \text{ IN} \\ D_{ms} &= D_c + D_s = 0.337 \text{ IN} \\ D_m &= L/360 = 0.567 \text{ IN} \\ \text{CHECK: } D_{ms} &< D_m ? \quad \text{O.K.} \end{aligned}$$

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SKID DESIGN AND SEISMIC QUALIFICATION

WHC-SD-WM-APPL-036
REV. 0

7. WORST CASE DEAD LOAD PLUS WIND ON SKID STRINGERS:

DESIGN DATA:

WIND GROUND VELOCITY 80 MPH
WIND CODE: ANSI A58.1
(ASCE 87)

ASCE 7-88 Wind Specification:
Exposure "C"

$$F = qz \cdot Gh \cdot Cf \cdot Af$$

$$qz = .00256 \cdot kz \cdot (1 \cdot V)^2$$

kz: Table 6, Exposure C

I = 1.07, Importance factor, Table 5

V = 80 mph

$$qz = .00256 \cdot kz \cdot (1.07 \cdot 80)^2$$

Gh: Table 8, Exposure C

Cf = 1.8,

$$Fi = .00256 \cdot kz \cdot (1.07 \cdot 80)^2 \cdot Gh \cdot 1.8 \cdot Af$$

$$Fi / (kz \cdot Gh \cdot Af) = 33.76$$

$$Af = H \cdot W$$

Part	Height Above Ground	H (ft)	W (ft)	Af (ft ²)	kz (Tbl.6)	Gh (Tbl.8)	Fi (lbs)
Unit	3	6	17	102	0.80	1.32	3,636
Stack	11.92	15.83	0.67	11	0.8	1.32	378

UNIFORM UPLIFT LOADING ON ONE SKID CHANNEL:

$$Lt = 59 \text{ IN}$$

$$L = 204 \text{ IN}$$

$$wu = Fi \cdot 36 / (Lt \cdot L)$$

$$wu = 10.88 \text{ PLI}$$

GRAVITY ON ONE SKID CHANNEL:

$$Rn = .75P \cdot (W - Y) / W$$

$$Rf = .75P - Rn$$

$$Rrn = Rn \cdot X / L$$

$$Rln = Rn - Rrn$$

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PART	P DEAD LOAD (LBS)	X (IN)	Y (IN)	Z (IN)	Rn (LBS)	Rf (LBS)	Rrn (LBS)	Rln (LBS)	Rrf (LBS)	Rlf (LBS)
INLET	50	8	30	17	18	19	1	18	1	18
MIST ELIMINATOR	80	22	30	17	29	31	3	26	3	27
HEATER UNIT	360	46	30	17	133	137	30	103	31	106
FILTER UNIT	550	102	30	17	203	210	101	101	105	105
OUTLET	50	153	30	17	18	19	14	5	14	5
FAN CASINGS	45	173	30	17	17	17	14	3	15	3
FAN MOTOR	200	189	23	17	92	58	85	7	54	4
SEAL POT	150	27	6	17	101	11	13	88	2	10
MOTOR	50	40	14	37	29	9	6	23	2	7
HEATER PANEL	300	75	21	45	145	80	53	92	29	51
POWER PANEL	976	117	42	50	211	521	121	90	299	222
ALARM PANEL	500	162	24	50	222	153	177	46	121	31

TOTAL SKID REACTIONS:

618 600 676 590

WIND UPLIFT:

$U = w_u * L = 2219$ LBS

$R_{nu} = .5 * U = 1109$ LBS

NET UPLIFT WITH WIND + .75*DEAD LOAD:

$R_{rnt} = R_{nu} - R_{rn} = 492$ LBS

$R_{lnt} = R_{nu} - R_{ln} = 509$ LBS

$R_{rft} = R_{nu} - R_{rf} = 434$ LBS

$R_{lft} = R_{nu} - R_{lf} = 520$ LBS

HORIZONTAL WIND SHEAR REACTIONS:

$R_v = w_u * L * .5 * .5 = 555$ LBS

GOVERNING REACTIONS:

$R_{lnt} = \text{UPLIFT} = 509$ LBS

$R_v = \text{SHEAR} = 555$ LBS

ANCHOR BOLT DESIGN:

ANCHOR BOLT DATA (from Hilti: Product Technical Guide):

Type Hilti HVA Adhesive Anchor (Or Equal)

Anchor Rod Type Hilti HAS

Rod Diameter 5/8"

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WHC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
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Tu = Uplift Capacity
Tu = 9430 LBS
V = Shear Capacity
V = 5632 LBS

Ic = $R_{int}/T_u + R_v/V$
Ic = 0.15
Check: Ic < 1 ? O.K.

8. CHECK STACK SUPPORT:

WIND LOADING:

Pi = WIND LOAD = 378 LBS
Rt = Rb = .5*Pi = 189 LBS

GUY CABLE FORCES:

Cf = $R_t \times 2^{.5}$ = 267 LBS

INITIAL GUY CABLE TENSION:

Ci = (Assumed) 250 LBS

SELECT GUY CABLE SIZE AND TYPE:

(Refer to 1889 ALPS Wire Rope General Catalog)

Type: Vinyl Coated G.A.C. (P.V.C.)
Diameter: 3/16x1/4
Construction: 7x19
Capacity: 2000 LBS
Safety Factor: 7.5

CHECK STACK BENDING STRESSES:

Stack Data:

D = Diameter 8.00 IN
Wt = Wall Thickness 0.1581 IN
At = Area = $PI \times D \times Wt$ = 3.9735 IN²
I.D. = $D - 2 \times Wt$ 7.68 IN

Unit Weight 13.52 PLF
I = $PI(D^4 - I.D.^4)/64$ 29.95 IN⁴
S = $PI(D^4 - I.D.^4)/(32 \times D)$ 7.49 IN³

ww = $378/190$ = 1.99 PLF
H = $ww \times 190^2/8$ = 8,978 IN-LBS
fb = H/S = 1,199 PSI
Fb = 21,600 PSI
CHECK: fb < Fb ? O.K.

STACK BASE SUPPORT:

B = Transverse Width of Base Support
B = 28 IN
Rb = Shear = 189 LBS

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WHC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

WHC-SD-WM-AWH-056
REV. 0

$T_u = 9430 \text{ LBS}$
 $V = \text{Shear Capacity}$
 $V = 5632 \text{ LBS}$

$I_c = R_{int}/T_u + R_v/V$
 $I_c = 0.20$
Check: $I_c < 1 ?$ O.K.

8. CHECK STACK SUPPORT:

WIND LOADING:

$F_i = \text{WIND LOAD} = 378 \text{ LBS}$
 $R_t = R_b = .5 * F_i = 189 \text{ LBS}$

GUY CABLE FORCES:

$C_f = R_t * 2^{.5} = 267 \text{ LBS}$

INITIAL GUY CABLE TENSION:

$C_i = (\text{Assumed}) 250 \text{ LBS}$

SELECT GUY CABLE SIZE AND TYPE:

(Refer to 1889 ALPS Wire Rope General Catalog)

Type: Vinyl Coated G.A.C. (P.V.C.)
Diameter: $3/16 \times 1/4$
Construction: 7×19
Capacity: 2000 LBS
Safety Factor: 7.5

CHECK STACK BENDING STRESSES:

Stack Data:

$D = \text{Diameter} = 8.00 \text{ IN}$
 $W_t = \text{Wall Thickness} = 0.1581 \text{ IN}$
 $A_t = \text{Area} = \pi * D * W_t = 3.9735 \text{ IN}^2$
 $I.D. = D - 2 * W_t = 7.68 \text{ IN}$

Unit Weight 13.52 PLF
 $I = \pi(D^4 - I.D.^4)/64 = 29.95 \text{ IN}^4$
 $S = \pi(D^4 - I.D.^4)/(32 * D) = 7.49 \text{ IN}^3$

$w_w = 378/190 = 1.99 \text{ PLI}$
 $H = w_w * 190^2/8 = 8,978 \text{ IN-LBS}$
 $f_b = H/S = 1,199 \text{ PSI}$
 $F_b = 21,600 \text{ PSI}$
CHECK: $f_b < F_b ?$ O.K.

STACK BASE SUPPORT:

$B = \text{Transverse Width of Base Support}$
 $B = 28 \text{ IN}$

$R_b = \text{Shear} = 189 \text{ LBS}$

BARNEBY & SUTCLIFFE CORP.

WBC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

WBC-SD-WM-ANPL-056
REV. 0

R_y = Vertical Reaction at Base of Stack From Guy Cables
 P_s = Stack Weight 225 LBS
 P_{sf} = Stack Flow Sta. Weight 100 LBS
 $R_y = 4 \cdot C_i / 2 \cdot 5 + P_s + P_{sf} =$ 1032 LBS

Y = Height Above Grade = 38 IN
 $M_1 = .5 \cdot R_b \cdot Y$ 3,591 IN-LBS

P_a = Vertical Load in Angle
 $P_a = .25 \cdot R_y + .5 \cdot R_b \cdot Y / B =$ 386 LBS

P_{au} = Uplift in Angle Leg
 $P_{au} = .5 \cdot R_b \cdot 38 / B - .25 \cdot R_y > 0$ 0 LBS

CHECK STRESSES IN ANGLE LEG:

Angle Data:

Size 13x3x.25
 $S_x =$ 0.577 IN³
 $A =$ 1.44 IN²
 $r_z =$ 0.59 IN
 P_y = Yield Strength 36,000 PSI

$K =$ 2
 $K \cdot Y / r_z =$ 129
 $F_a = 12 \cdot \pi^2 \cdot E / (23 \cdot (K \cdot Y / r_z)^2)$
 $F_a =$ 9,000 PSI
 $f_a = P_a / A =$ 268 PSI
CHECK: $f_a < F_a ?$ O.K.

$F_b = .6 \cdot P_y$ 21,600 PSI
 $f_b = M_1 / S_x =$ 6,224 PSI
CHECK: $f_b < F_b ?$ O.K.

COMBINED STRESSES:

$I_c = f_a / F_a + f_b / F_b =$ 0.32
CHECK: $I_c < 1 ?$ O.K.

CHECK STRESSES IN HORIZONTAL MEMBER:

$M_2 = B \cdot .25 \cdot R_y / 4 =$ 1,806 IN-LBS

Angle Data:

Size 13x3x.25
 $S_x =$ 0.577 IN³
 $A =$ 1.44 IN²
 P_y = Yield Strength 36,000 PSI

$f_b = M_2 / S_x =$ 3,130 PSI
 $F_b = .6 \cdot P_y =$ 21,600 PSI
CHECK: $f_b < F_b ?$ O.K.

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WBC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

WNC-SD-WM-ANAL-C26
REV. 0

CONNECTION OF HORIZONTAL MEMBER TO LEG MEMBER:

WELD DATA:

Lw = WELD LENGTH 2 IN
We = WELD SIZE 0.1875 IN
Aw = Lw*We/2*.5 0.26517 IN²

LOADING:

A = AXIAL = Rb = 189 LBS
M1 = MOMENT = 3,591 IN-LBS
V = SHEAR = Pa = 386 LBS

fw1 = V/(2*Aw) = 728 PSI
fw2 = (M1/2+.5*A)/Aw 7,128 PSI
fwr = (fw1²+fw2²)^{.5} 7,165 PSI
Fw = 21,600 PSI
CHECK: fwr < Fw ? O.K.

CONNECTION OF LEG TO BASE CHANNELS:

USE SAME WELD DATA

9. LIFTING DEVICE CABLE CAPACITIES:

MAXIMUM FORCES IN LIFTING CABLES:

EQUIPMENT WT = 3311 LBS
PROVISION FOR SKID DEAD LOAD = 1000 LBS
Ps = TOTAL WEIGHT = 4311 LBS

Vs = VERTICAL LOAD = .25*Ps = 1078 LBS

CHOKERS TO BE SLOPED AT MINIMUM OF 2/1

Lc = MINIMUM CHOKER LENGTH 80 IN
CABLE LOAD = C1 = Vs*Lc/72 1198 LBS

CHOKER DATA:

DIAMETER 0.375 IN
CLASSIFICATION 6x19
CORE FIBRE
GRADE 110/120
BREAKING LOAD 12,000 LBS
SAFETY FACTOR = 12,000/1,205 = 11.1

SHACKLE DATA:

(REFER TO ALPS WIRE ROPE GENERAL CATALOG, 1989, PG. 20)

SIZE 3/8 IN
WORKING LOAD 1 TON
DESIGN FACTOR 6
U1 = ULTIMATE LOAD = 6*1*2000 = 12,000 LBS
Pm = MAXIMUM LOAD = 2*1205 = 2,395 LBS
SAFETY FACTOR = U1/Pm = 5.0

Grind heel to
clear fillet
weld

Section 5-2

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WBC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

WBC - 5D - WBC - 11111 - 136
R.U.O.

ds = PIN DIAMETER 7/16 IN
Bl = BALANCE BEAM LENGTH 50 IN
Pl = Pr = .5*4311 = 2,156 LBS
Mb = .5*Bl*Pl = 53,888 IN-LBS

BALANCE BEAM DATA:

SIZE W8x18
Sx = 15.2 IN³
Fy = 36,000 PSI
Fu = 58,000 PSI
fbx = Mb/Sx = 3,545 PSI
Fbx = 21,600 PSI
F.S. OVER AISD ALLOWABLE = 6.09
CHECK: F.S. > 5 ? O.K.

LIFT PLATE "A" CHECK:

tp = PLATE THICKNESS 0.375 IN
Wp = WIDTH AT PIN HOLE = 3 IN
Ag = Wp*tp = 1.13 IN²
An = (Wp-(ds+1/8))*tp = 0.91 IN²

MAXIMUM LIFT = Ps = 4311 LBS
ftg = Ps/Ag = 3,832 PSI
Ftg = .6*Fy = 21,600 PSI
F.S. = Ftg/ftg = 5.64
CHECK: F.S. > 5 O.K.

ftn = Ps/An = 4,716 PSI
Ftn = .5*Fu = 29,000 PSI
F.S. = Ftn/ftn = 6.15
CHECK: F.S. > 5 ? O.K.

CONNECTION OF PLATE "A" TO BEAM:

Lw = WELD LENGTH 5 IN
We = WELD SIZE 0.1875 IN
Aw = 2*Lw*Aw/2*.5 1.33 IN²
fw = Ps/Aw = 3,252 PSI
Fw = 21,000 PSI
F.S. = Fw/fw = 6.46
CHECK: F.S. > 5 ? O.K.

7" Hole for 5" Shackle
with 2" x 1/2"

WFO SD-UM-APP. 196
REV. C

REV. C.

Lw = WELD LENGTH	3 IN
We = WELD SIZE	0.1875 IN
Aw = 2*Lw*We/2^.5 =	0.80 IN^2
fw = Cl/Aw =	1,505 PSI
Fw =	21,000 PSI
F.S. = Fw/fw =	13.95
CHECK: F.S. > 5 ?	O.K.

Lw = WELD LENGTH	3 IN
We = WELD SIZE	0.1875 IN
Aw = 2*Lw*We/2^.5 =	0.80 IN^2
fw = Cl/Aw =	1,505 PSI
Fw =	21,000 PSI
F.S. = Fw/fw =	13.95
CHECK: F.S. > 5 ?	O.K.

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WHC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

WHC-SD-WM-ANAL-036
REV. 0

PLATE "A" SHACKLE:

SIZE	5/8 IN
WORKING LOAD	3.25 TON
DESIGN FACTOR	6
U1 = ULTIMATE LOAD = $6 \times 3.25 \times 2000 =$	39,000 LBS
Ps = MAXIMUM LOAD =	4,311 LBS
SAFETY FACTOR = $U1/P_m =$	9.0
ds = PIN DIAMETER	3/4 IN

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WHC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

10. SEISMIC QUALIFICATION

PROCEDURE USED: DESIGN & EVALUATIONS FOR DOE FACILITIES UCRL - 15910

JUNE 1990

TABLE 4-3 (EARTHQUAKE DESIGN/EVALUATION PROCEDURES FOR
GENERAL USE AND IMPORTANT OR LOW HAZARD DOE FACILITIES)

SEISMIC HAZARD EXPOSURE GROUP: 1

SEISMIC PERFORMANCE CATEGORY: B (AV=0.09 - TABLE 4-4 HANFORD PROJECT SITE)

SOIL PROFILE = 2.0 (UBC & DOE) (CONSERVATIVE ESTIMATE)

STRUCTURAL SYSTEM = STEEL FRAME

BASE SHEAR EQUATION DETERMINATION

$$V = (Z \cdot I \cdot C \cdot W) / R_w \quad (\text{DOE EQU 4-1}) \quad \text{USE LARGER RESULT FROM THESE}$$
$$V = I \cdot C_s \cdot W \quad (\text{UBC SECT 1612.4.1}) \quad 2 \text{ EQUATIONS}$$

V = BASE SHEAR

Z = PEAK GROUND ACCELERATION

I = IMPORTANCE FACTOR

W = DEAD LOAD OF EQUIPMENT & FRAME

R_w = REDUCTION COEFFICIENT (DEPENDENT ON FRAME TYPE)

C_s = SEISMIC DESIGN COEFFICIENT (EQUIVALENT TO ZC IN DOE EQUATION)

A_v = COEFFICIENT REPRESENTING EFFECTIVE PEAK VELOCITY RELATED ACCELERATION

S = COEFFICIENT FOR SOIL PROFILE CHARACTERISTICS

R = RESPONSE MODIFICATION FACTOR

T = FUNDAMENTAL PERIOD OF BUILDING

A_a = SEISMIC COEFFICIENT REPRESENTING EFFECTIVE PEAK ACCELERATION

T_a = APPROXIMATE FUNDAMENTAL PERIOD

C_a = COEFFICIENT ON UPPER LIMIT ON CALCULATED PERIOD

H_n = HEIGHT IN FEET FROM BASE TO HIGHEST LEVEL OF STRUCTURE

C_t = COEFFICIENT FOR FRAME TYPE

DOE EQU 4-1

$$V = (Z \cdot I \cdot C \cdot W) / R_w$$

$$I = 1.0 \quad (\text{GENERAL USE})$$

$$R_w = 6.0 \quad (\text{REDUCTION COEFFICIENT FOR ORDINARY STEEL FRAME})$$

$$ZC = 1.04 \quad (\text{FIGURE 4-3 DOE})$$

$$V = (1.04) (1.0) (W) / (6.0) = 0.17333W$$

WMC 500 GPM - 4400 GPD
3200 G

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WMC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATION

URC SECTION 1612.4.1

$$V = I * C_s * W$$

$$I = 1.0 \quad (\text{GENERAL USE})$$

W = DEAD LOAD OF EQUIPMENT AND FRAME

$$R_w = 4.5 \quad (\text{TABLE 1612.3.3})$$

$$C_s = (1.2 * A_v * S) / (R_w * T^{0.75} * .67) < \text{or} = (2.5 * A_a) / R_w$$

$$T < \text{or} = T_a * C_a$$

$$T_a = C_1 * H_n^{0.75}$$

$$C_1 = 0.035 * 18^{0.75} = 0.30586$$

$$C_a = 1.7 \quad (\text{FROM TABLE 1612.4.1.2, } A_v = .09)$$

$$T_{max} = T_a * C_a = 0.035 * 1.7 = 0.51996$$

$$C_s = (1.2 * 0.08 * 2) / (4.5 * 0.51996^{0.75} * .67) = 0.06599$$

$$C_s (\text{MAX}) = (2.5 * .07) / 4.5 = 0.03111$$

$$V = 0.03111 * W$$

USE LARGER OF DOE AND URC BASE SHEAR FOR CALCULATIONS

$$V = 0.17333W \quad (\text{DOE EQN 1-1})$$

LOADING COMBINATIONS USED:

- 1) D.L.
- 2) D.L. + 100% EQ Z AXIS + 30% EQ X AXIS
- 3) D.L. + 100% EQ X AXIS + 30% EQ Z AXIS

LOADS ARE DISTRIBUTED FROM EQUIPMENT TO THE FRAME THROUGH A SYSTEM SUPPORTED BY TRANSVERSE MEMBERS OF FRAME. BASE SHEAR LOADS ARE DISTRIBUTED IN PROPORTION TO THE WEIGHT OF THE INDIVIDUAL PIECES OF EQUIPMENT SUPPORTED BY THE FRAME. EQUIPMENT WIDTHS OF 12 INCHES ALONG THE Z-AXIS ARE ASSIGNED TO FOR TRANSFER OF FORCE COUPLES TO THE FRAME. SEE ATTACHMENTS FOR FRAME NOMENCLATURE, LOADING DIAGRAMS, AND ANALYSIS RESULTS.

DEMAND EVALUATION:

LOAD CASE 2 PRODUCED THE CRITICAL LOADING IN MEMBER 21.
(C4X5.4 - 59 INCHES LONG - FIXED CONNECTIONS)

$$V_x = 662.4 \text{ lb}$$

$$V_y = 251.4 \text{ lb}$$

$$V_z = 0 \text{ lb}$$

$$M_x = 0 \text{ lb} \cdot \text{ft} \quad (\text{torsion})$$

$$M_y = 4876 \text{ in} \cdot \text{lb} \quad (\text{bending about y-axis})$$

$$M_z = 3008 \text{ ft} \cdot \text{lb} \quad (\text{bending about x-axis})$$

WHC-SD-WA-RANK-056
REV. 0

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WHC - REPLACEMENT EXHAUSTER FOR 241-SY TANK FARM
SKID DESIGN AND SEISMIC QUALIFICATIONS

CHECK ALLOWABLE STRESSES (AISC 9TH EDITION)

$$KL/Ry = (0.75)(59)/(0.449) = 98.55$$
$$Cc = 126.1 \quad (\text{EQN E2-2 A36 STEEL})$$

EVALUATE F_a USING EQN E2-1

$$F_a = 13.1 \text{ KSI}$$

$$f_a = f_x/\text{area} = (0.662K)/(1.59\text{IN}^2) = 0.416 \text{ KSI}$$

$$f_a/F_a = (0.416\text{KSI})/(13.1\text{KSI}) = 0.032 < 0.15$$

USE EQN H1-3 TO EVALUATE COMBINED STRESSES

$$L_u \text{ FOR C4X5.4} = 65 \text{ IN} + 59 \text{ IN} \quad F_{bx} \text{ and } F_{by} = 21.6 \text{ KSI}$$

ALLOW 1/3 STRESS INCREASE FOR EARTHQUAKE LOADING

$$\text{USE } F_{bx} \text{ and } F_{by} = (21.6)(1.33) = 28.73 \text{ KSI}$$

$$f_{bx} = M_x/S_x = (3008)/(1.93) = 1.56 \text{ KSI}$$

$$f_{by} = M_y/S_y = (4876)/(0.283) = 17.2 \text{ KSI}$$

$$(f_a/F_a) + (f_{bx}/F_{bx}) + (f_{by}/F_{by}) \leq 1 \quad \text{EQN H1-3}$$
$$(0.416/13.1) + (1.56/28.73) + (17.2/28.73) = 0.032 + 0.054 + 0.60 = 0.686 < 1 \quad (\text{OK})$$

CHECK SHEAR STRESSES

$$F_v = 14.4 \text{ KSI} \quad (\text{F4-1})$$

$$V_x = 254 \text{ lb}$$

$$V_y = 479 \text{ lb}$$

$$f_v = (3/2)(V)/(\text{AREA WEB})$$

$$f_{vx} = (1.5)(0.254)/((4)(0.184)) = 0.517 \text{ KSI}$$

$$f_{vy} = (1.5)(0.479)/((2)(1.584)(0.296)) = 0.766 \text{ KSI}$$

$$f_v = ((0.517^2) + (0.766^2))^{0.5} = 0.924 \text{ KSI} < 14.4 \text{ KSI} \quad (\text{OK})$$

CAPACITY VS. DEMAND OF FRAME

COMBINED AXIAL AND BENDING STRESSES PRODUCE THE HIGHEST STRESSED CONDITION AT THE CRITICAL MEMBER IN THE FRAME (MEMBER 21, LOAD CASE 2)

EQN H1-3 INDICATES THE DEMAND ON THIS MEMBER IS ONLY 68% OF CAPACITY, ALLOWING APPROXIMATELY A 47% INCREASE IN THE LOADING BEFORE CAPACITY IS REACHED.

WHC-SD-UM-ANAL-036
REV. 0

FRAME JOINT MEMBER NUMBERS

30 - CENTER OF MASS ABOVE (111.3 TYPE)

LOADING ON EQUIP RM @ Y=24

LOADING ON EQUIP RM @ Y=37

W/H-C-5D-CUM-ANAL-036

PHC-SD-WM-ANHL-036
REV. 0

LOAD CASE 2: DL+EQ (100% X-AXIS, 30% Z-AXIS)

WHC SD-WM ANAL-036
REV. 0

Ludd Case 3: DL+EQ (100% Z-AXIS, 20% X-AXIS)

B&S
Nodes

WAC-SD-WM-HHHI-036
REV.0

1)	0	0	0
2)	0	17	0
	0	37	0
	0	59	0
5)	25.5	59	0
6)	25.5	37	0
7)	25.5	17	0
8)	25.5	0	0
9)	51	0	0
10)	51	17	0
11)	51	37	0
12)	51	59	0
13)	68	59	0
14)	76.5	59	0
15)	76.5	37	0
16)	76.5	17	0
17)	68	0	0
18)	76.5	0	0
19)	102	0	0
20)	102	17	0
21)	102	37	0
22)	102	59	0
23)	127.5	59	0
24)	127.5	37	0
25)	127.5	17	0
26)	127.5	0	0
27)	136	0	0
	153	0	0
	153	17	0
	153	24	0
31)	153	37	0
32)	136	59	0
33)	153	59	0
34)	178.5	59	0
35)	178.5	37	0
36)	178.5	24	0
37)	178.5	17	0
38)	178.5	0	0
39)	204	0	0
40)	204	17	0
41)	204	37	0
42)	204	59	0

MS

Beam and Truss Elements

WMC-SD-WM-24001-056
Rev. 0

Beam 1)	1	2	0	2	1	0	0
.000000E+00	2	3	0	2	1	0	0
Beam 2)	3	4	0	2	1	0	0
.000000E+00	4	5	0	1	1	0	0
Beam 3)	5	6	0	2	1	0	0
.000000E+00	6	7	0	2	1	0	0
Beam 4)	7	8	0	2	1	0	0
.000000E+00	8	9	0	1	1	0	0
Beam 5)	9	10	0	2	1	0	0
.000000E+00	10	11	0	2	1	0	0
Beam 6)	11	12	0	2	1	0	0
.000000E+00	12	13	0	1	1	0	0
Beam 7)	13	14	0	1	1	0	0
.000000E+00	14	15	0	2	1	0	0
Beam 8)	15	16	0	2	1	0	0
.000000E+00	16	17	0	2	1	0	0
Beam 9)	17	18	0	1	1	0	0
.000000E+00	18	19	0	1	1	0	0
Beam 10)	19	20	0	2	1	0	0
.000000E+00	20	21	0	2	1	0	0
Beam 11)	21	22	0	1	1	0	0
.000000E+00	22	23	0	1	1	0	0
Beam 12)	23	24	0	2	1	0	0
.000000E+00	24	25	0	2	1	0	0
Beam 13)	25	26	0	2	1	0	0
.000000E+00	26	27	0	1	1	0	0
Beam 14)	27	28	0	1	1	0	0
.000000E+00	28	29	0	1	1	0	0
Beam 15)	29	30	0	1	1	0	0
.000000E+00	30	31	0	1	1	0	0
Beam 16)	31	32	0	1	1	0	0
.000000E+00	32	33	0	1	1	0	0
Beam 17)	33	34	0	1	1	0	0
.000000E+00	34	35	0	1	1	0	0
Beam 18)	35	36	0	1	1	0	0
.000000E+00	36	37	0	1	1	0	0
Beam 19)	37	38	0	1	1	0	0
.000000E+00	38	39	0	1	1	0	0
Beam 20)	39	40	0	1	1	0	0
.000000E+00	40	41	0	1	1	0	0
Beam 21)	41	42	0	1	1	0	0
.000000E+00	42	43	0	1	1	0	0
Beam 22)	43	44	0	1	1	0	0
.000000E+00	44	45	0	1	1	0	0
Beam 23)	45	46	0	1	1	0	0
.000000E+00	46	47	0	1	1	0	0
Beam 24)	47	48	0	1	1	0	0
.000000E+00	48	49	0	1	1	0	0
Beam 25)	49	50	0	1	1	0	0
.000000E+00	50	51	0	1	1	0	0
Beam 26)	51	52	0	1	1	0	0
.000000E+00	52	53	0	1	1	0	0
Beam 27)	53	54	0	1	1	0	0
.000000E+00	54	55	0	1	1	0	0
Beam 28)	55	56	0	1	1	0	0
.000000E+00	56	57	0	1	1	0	0
Beam 29)	57	58	0	1	1	0	0
.000000E+00	58	59	0	1	1	0	0
Beam 30)	59	60	0	1	1	0	0
.000000E+00	60	61	0	1	1	0	0

B&S

WHL-5D WM-1742-036
REV. C

Beam 30)	27	28	0	1	1	0	0
.0000000E+00		.0000000E+00					
Beam 31)	28	29	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 32)	29	30	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 33)	30	31	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 34)	31	33	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 35)	32	33	0	1	1	0	0
.0000000E+00		.0000000E+00					
Beam 36)	33	34	0	1	1	0	0
.0000000E+00		.0000000E+00					
Beam 37)	34	35	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 38)	35	36	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 39)	36	37	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 40)	37	38	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 41)	28	38	0	1	1	0	0
.0000000E+00		.0000000E+00					
Beam 42)	38	39	0	1	1	0	0
.0000000E+00		.0000000E+00					
Beam 43)	39	40	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 44)	40	41	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 45)	41	42	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 46)	34	42	0	1	1	0	0
.0000000E+00		.0000000E+00					
Beam 47)	5	12	0	2	1	0	0
.0000000E+00		.0000000E+00					
Beam 48)	14	22	0	1	1	0	0
.0000000E+00		.0000000E+00					
Beam 49)	23	32	0	1	1	0	0
.0000000E+00		.0000000E+00					

Properties

WNC-SD-WM-12-12-136
REV. C

REPLACEMENT EXHAUSTER SKID SEISMIC ANALYSIS: PAGE 9 3/5/94

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SOLVE DISPLACEMENTS

Version 2.0 07/01/90

BLOWER SKID

L O A D C A S E 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

Node	T r a n s l a t i o n s			/	R o t a t i o n s		
	X	Y	Z		X	Y	Z
41	.6254E-03	.8238E-06	-.3938E-03	/	.8191E-05	.2363E-04	-.7338E-04
42	.0000E+00	.0000E+00	.0000E+00	/	.2160E-04	-.4597E-04	.1822E-03

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SOLVE DISPLACEMENTS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

DISPLACEMENTS

Node	T r a n s l a t i o n s			/	R o t a t i o n s		
	X	Y	Z		X	Y	Z
1	.0000E+00	.0000E+00	.0000E+00	/	-.3862E-05	-.9858E-04	-.1725E-03
2	.9362E-03	.9213E-06	-.5998E-04	/	-.2856E-05	-.1497E-04	.3408E-04
3	-.4686E-03	-.1905E-05	-.7168E-04	/	.1817E-05	.8339E-04	.6766E-04
4	.0000E+00	.0000E+00	.0000E+00	/	.3658E-05	.1916E-03	-.1569E-03
5	.2884E-06	-.3705E-02	-.4319E-02	/	-.3446E-04	.1228E-03	-.1087E-03
6	-.6885E-03	-.3752E-02	-.3200E-02	/	-.8606E-04	.7142E-04	.2380E-04
7	.4048E-04	-.3722E-02	-.6914E-03	/	-.1520E-03	.2472E-04	.3056E-04
8	-.1347E-06	-.3617E-02	.1825E-02	/	-.1387E-03	-.1498E-04	-.4886E-04
9	.3556E-06	-.2226E-02	.6991E-03	/	-.1035E-03	.7669E-04	.1189E-03
10	-.5370E-03	-.2328E-02	-.1258E-02	/	-.1165E-03	.1038E-04	-.3358E-04
11	.5912E-03	-.2295E-02	-.2633E-02	/	-.4280E-05	-.6763E-04	-.4888E-04
12	-.4581E-06	-.2190E-02	-.1633E-02	/	.6643E-04	-.1534E-03	.1392E-03
13	.0000E+00	.0000E+00	.0000E+00	/	.1511E-04	.1181E-04	.5481E-04
14	.2200E-07	.9449E-05	-.6455E-03	/	-.1055E-04	.1193E-03	-.9494E-05
15	-.3960E-04	-.4745E-04	-.1797E-03	/	-.3675E-04	.2741E-04	.3378E-05
16	.3781E-04	-.2895E-04	.5304E-03	/	-.2598E-04	-.5617E-04	.2276E-05
17	.0000E+00	.0000E+00	.0000E+00	/	-.4170E-04	-.4249E-04	.5825E-04
18	-.2200E-07	.2078E-04	.8022E-03	/	-.1082E-04	-.1272E-03	-.8249E-05
19	-.1766E-07	.9213E-03	.3693E-02	/	.1896E-04	-.1203E-04	-.4956E-05
20	.2461E-04	-.1041E-02	.2958E-02	/	-.9675E-04	.2243E-06	.1190E-05
21	-.1909E-04	-.1088E-02	-.4581E-03	/	-.2092E-03	.1464E-04	.1990E-05
22	.1766E-07	-.9377E-03	-.3812E-02	/	-.1067E-03	.3049E-04	-.5161E-05
23	-.2679E-07	-.1448E-03	-.1299E-02	/	-.4490E-04	-.1671E-03	.1629E-04
24	.6254E-04	-.3173E-03	.6854E-03	/	-.1411E-03	-.4933E-04	-.6137E-05
25	-.7387E-04	-.2479E-03	.2304E-02	/	.1493E-04	.5772E-04	-.3802E-05
26	.2679E-07	-.1247E-03	.1038E-02	/	.9768E-04	.1487E-03	.1520E-04
27	.0000E+00	.0000E+00	.0000E+00	/	.8196E-04	.6015E-04	-.5130E-04
28	.2166E-07	-.2279E-02	.8821E-03	/	.5051E-04	-.1044E-03	-.1261E-03
29	.7938E-03	-.2384E-02	.1534E-02	/	.9963E-05	-.6270E-04	.1775E-04
30	.5398E-03	-.2412E-02	.1517E-02	/	-.1854E-04	-.4553E-04	.5182E-04
31	-.2764E-03	-.2441E-02	.8992E-03	/	-.5557E-04	-.1364E-04	.5855E-04
32	.0000E+00	.0000E+00	.0000E+00	/	-.3456E-04	-.1048E-03	-.5068E-04
33	.6394E-06	-.2295E-02	.1689E-03	/	-.1390E-04	.4034E-04	-.1256E-03
34	.4265E-06	-.3817E-02	-.7418E-03	/	-.4826E-04	.6271E-05	.5060E-04
35	.7444E-03	-.3967E-02	.6033E-03	/	-.7900E-04	.1023E-04	.9410E-05
36	.5897E-03	-.3995E-02	.1653E-02	/	-.6951E-04	.1257E-04	-.3598E-04
37	.2700E-03	-.3972E-02	.2085E-02	/	-.5245E-04	.1383E-04	-.4903E-04
38	.7454E-06	-.3851E-02	.2563E-02	/	-.1469E-04	.1689E-04	.4914E-04
39	.0000E+00	.0000E+00	.0000E+00	/	-.1437E-04	.1407E-03	.1844E-03
40	-.9507E-03	.9477E-05	-.2814E-03	/	-.1631E-04	.8690E-04	-.4112E-04

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SOLVE REACTIONS

Version 2.0 07/01/90

BLOWER SKID

Load Case 1:DL

REACTIONS

Node	Fx	Fy	Fz	Mx	My	Mz
1	.5126E+01	.2087E+03	.0000E+00	.0000E+00	.0000E+00	.0000E+00
4	-.5670E+01	.9743E+02	.0000E+00	.0000E+00	.0000E+00	.0000E+00
13	.1985E+01	.6838E+03	.0000E+00	.0000E+00	.0000E+00	.0000E+00
17	-.1441E+01	.7931E+03	.0000E+00	.0000E+00	.0000E+00	.0000E+00
27	.1602E+01	.9725E+03	.0000E+00	.0000E+00	.0000E+00	.0000E+00
32	-.1602E+01	.1011E+04	.0000E+00	.0000E+00	.0000E+00	.0000E+00
39	-.5066E+01	.1783E+03	.0000E+00	.0000E+00	.0000E+00	.0000E+00
42	.5066E+01	.2011E+03	.0000E+00	.0000E+00	.0000E+00	.0000E+00

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SOLVE REACTIONS

Version 2.0 07/01/90

BLOWER SKID

Load Case 2:DL+EQ(100% X-AXIS, 30% Z-AXIS)

REACTIONS

Node	Fx	Fy	Fz	Mx	My	Mz
1	.5737E+01	.2076E+03	-.5161E+01	.0000E+00	.0000E+00	.0000E+00
4	-.6363E+01	.1032E+03	.2315E+01	.0000E+00	.0000E+00	.0000E+00
13	.2884E+01	.6583E+03	.3662E+02	.0000E+00	.0000E+00	.0000E+00
17	-.2258E+01	.8135E+03	-.3383E+02	.0000E+00	.0000E+00	.0000E+00
27	-.5113E+01	.1146E+04	-.6316E+02	.0000E+00	.0000E+00	.0000E+00
32	-.7637E+01	.1193E+04	.5600E+02	.0000E+00	.0000E+00	.0000E+00
39	-.1678E+02	.3205E+03	-.1005E+02	.0000E+00	.0000E+00	.0000E+00
42	.1533E+01	.3244E+03	.4270E+01	.0000E+00	.0000E+00	.0000E+00

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SOLVE REACTIONS

Version 2.0 07/01/90

BLOWER SKID

Load Case 3:DL+EQ(100% Z-AXIS, 30% X-AXIS)

REACTIONS

Node	Fx	Fy	Fz	Mx	My	Mz
1	.5994E+01	.2482E+03	-.1573E+02	.0000E+00	.0000E+00	.0000E+00
4	-.6634E+01	.1266E+03	.1317E+02	.0000E+00	.0000E+00	.0000E+00
13	.2584E+01	.7566E+03	.1206E+03	.0000E+00	.0000E+00	.0000E+00
17	-.1944E+01	.8923E+03	-.1126E+03	.0000E+00	.0000E+00	.0000E+00
27	-.4695E+00	.1103E+04	-.1780E+03	.0000E+00	.0000E+00	.0000E+00
32	-.3655E+01	.1146E+04	.1569E+03	.0000E+00	.0000E+00	.0000E+00
39	-.9148E+01	.2455E+03	-.2865E+02	.0000E+00	.0000E+00	.0000E+00
42	.4273E+01	.2662E+03	.1630E+02	.0000E+00	.0000E+00	.0000E+00

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SOLVE DISPLACEMENTS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 1

DL

DISPLACEMENTS

Node	T r a n s l a t i o n s			/	R o t a t i o n s		
	X	Y	Z		X	Y	Z
1	.0000E+00	.0000E+00	.0000E+00	/	.0000E+00	.0000E+00	-.1479E-03
2	.8045E-03	-.2865E-06	.0000E+00	/	.0000E+00	.0000E+00	.2909E-04
3	-.3982E-03	-.9059E-06	.0000E+00	/	.0000E+00	.0000E+00	.5800E-04
4	.0000E+00	.0000E+00	.0000E+00	/	.0000E+00	.0000E+00	-.1342E-03
5	.2443E-06	-.3177E-02	.0000E+00	/	.0000E+00	.0000E+00	-.9278E-04
6	-.5911E-03	-.3231E-02	.0000E+00	/	.0000E+00	.0000E+00	.2007E-04
7	.2835E-04	-.3209E-02	.0000E+00	/	.0000E+00	.0000E+00	.2615E-04
8	-.1136E-06	-.3107E-02	.0000E+00	/	.0000E+00	.0000E+00	-.4097E-04
9	.3031E-06	-.1874E-02	.0000E+00	/	.0000E+00	.0000E+00	.1019E-03
10	-.4653E-03	-.1969E-02	.0000E+00	/	.0000E+00	.0000E+00	-.2830E-04
11	.4939E-03	-.1935E-02	.0000E+00	/	.0000E+00	.0000E+00	-.4178E-04
12	-.3903E-06	-.1832E-02	.0000E+00	/	.0000E+00	.0000E+00	.1179E-03
13	.0000E+00	.0000E+00	.0000E+00	/	.0000E+00	.0000E+00	.4051E-04
14	.3607E-07	-.7102E-04	.0000E+00	/	.0000E+00	.0000E+00	-.1687E-04
15	-.6658E-04	-.1317E-03	.0000E+00	/	.0000E+00	.0000E+00	.6246E-05
16	.7355E-04	-.1059E-03	.0000E+00	/	.0000E+00	.0000E+00	.3973E-05
17	.0000E+00	.0000E+00	.0000E+00	/	.0000E+00	.0000E+00	.4401E-04
18	-.3607E-07	-.5576E-04	.0000E+00	/	.0000E+00	.0000E+00	-.1540E-04
19	-.1633E-07	-.1050E-02	.0000E+00	/	.0000E+00	.0000E+00	-.4697E-05
20	.2372E-04	-.1173E-02	.0000E+00	/	.0000E+00	.0000E+00	.1092E-05
21	-.1712E-04	-.1226E-02	.0000E+00	/	.0000E+00	.0000E+00	.1878E-05
22	.1633E-07	-.1070E-02	.0000E+00	/	.0000E+00	.0000E+00	-.4778E-05
23	-.4098E-07	-.2128E-03	.0000E+00	/	.0000E+00	.0000E+00	.2332E-04
24	.8765E-04	-.3745E-03	.0000E+00	/	.0000E+00	.0000E+00	-.8910E-05
25	-.1090E-03	-.3079E-03	.0000E+00	/	.0000E+00	.0000E+00	-.5407E-05
26	.4098E-07	-.1926E-03	.0000E+00	/	.0000E+00	.0000E+00	.2213E-04
27	.0000E+00	.0000E+00	.0000E+00	/	.0000E+00	.0000E+00	-.3635E-04
28	-.3386E-06	-.1882E-02	.0000E+00	/	.0000E+00	.0000E+00	-.1062E-03
29	.5446E-03	-.1977E-02	.0000E+00	/	.0000E+00	.0000E+00	.2391E-04
30	.2841E-03	-.2001E-02	.0000E+00	/	.0000E+00	.0000E+00	.4690E-04
31	-.3665E-03	-.2026E-02	.0000E+00	/	.0000E+00	.0000E+00	.4229E-04
32	.0000E+00	.0000E+00	.0000E+00	/	.0000E+00	.0000E+00	-.3556E-04
33	.3386E-06	-.1892E-02	.0000E+00	/	.0000E+00	.0000E+00	-.1056E-03
34	.6640E-08	-.3215E-02	.0000E+00	/	.0000E+00	.0000E+00	.4128E-04
35	.1471E-03	-.3357E-02	.0000E+00	/	.0000E+00	.0000E+00	-.1629E-04
36	-.1048E-03	-.3387E-02	.0000E+00	/	.0000E+00	.0000E+00	-.1824E-04
37	-.2066E-03	-.3366E-02	.0000E+00	/	.0000E+00	.0000E+00	-.9420E-05
38	-.6640E-08	-.3251E-02	.0000E+00	/	.0000E+00	.0000E+00	.4076E-04
39	.0000E+00	.0000E+00	.0000E+00	/	.0000E+00	.0000E+00	.1554E-03
40	-.8016E-03	.1555E-04	.0000E+00	/	.0000E+00	.0000E+00	-.3460E-04

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SOLVE DISPLACEMENTS

Version 2.0 07/01/90

BLOWER SKID

L O A D C A S E .1

DL

Node	T r a n s l a t i o n s			/	R o t a t i o n s		
	X	Y	Z		X	Y	Z
41	.5257E-03	.8046E-05	.0000E+00	/	.0000E+00	.0000E+00	-.6182E-04
42	.0000E+00	.0000E+00	.0000E+00	/	.0000E+00	.0000E+00	.1533E-03

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SOLVE DISPLACEMENTS Version 2.0 07/01/90

BLOWER SKID

L O A D C A S E 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

DISPLACEMENTS

Node	T r a n s l a t i o n s			/	R o t a t i o n s		
	X	Y	Z		X	Y	Z
1	.0000E+00	.0000E+00	.0000E+00	/	.2768E-05	-.3028E-04	-.1640E-03
2	.8889E-03	.9477E-05	.4662E-04	/	.2191E-05	-.5062E-05	.3254E-04
3	-.4490E-03	.5424E-05	.6442E-04	/	-.1065E-05	.2461E-04	.6437E-04
4	.0000E+00	.0000E+00	.0000E+00	/	-.3676E-05	.5724E-04	-.1496E-03
5	.2857E-06	-.3542E-02	-.1295E-02	/	-.1201E-04	.3723E-04	-.1054E-03
6	-.6557E-03	-.3580E-02	-.9276E-03	/	-.2678E-04	.2135E-04	.2381E-04
7	.5876E-04	-.3548E-02	-.1665E-03	/	-.4523E-04	.6909E-05	.2940E-04
8	-.1353E-06	-.3458E-02	.5668E-03	/	-.4028E-04	-.5362E-05	-.4963E-04
9	.3441E-06	-.2229E-02	.2389E-03	/	-.2942E-04	.2380E-04	.1145E-03
10	-.5081E-03	-.2333E-02	-.3243E-03	/	-.3434E-04	.3305E-05	-.3315E-04
11	.5910E-03	-.2293E-02	-.7609E-03	/	-.3987E-05	-.2081E-04	-.4724E-04
12	-.4443E-06	-.2198E-02	-.5162E-03	/	.1783E-04	-.4733E-04	.1366E-03
13	.0000E+00	.0000E+00	.0000E+00	/	.3942E-05	.2169E-05	.6411E-04
14	-.8906E-08	.1456E-03	-.1842E-03	/	-.3000E-05	.3496E-04	.5647E-05
15	.1665E-04	.1047E-03	-.4992E-04	/	-.1061E-04	.8583E-05	-.2448E-05
16	-.3404E-04	.1060E-03	.1511E-03	/	-.7066E-05	-.1540E-04	-.1222E-05
17	.0000E+00	.0000E+00	.0000E+00	/	-.1151E-04	-.1045E-04	.6699E-04
18	.8906E-08	.1472E-03	.2204E-03	/	-.2556E-05	-.3579E-04	.6248E-05
19	-.1154E-07	-.4585E-03	.1040E-02	/	-.4189E-05	-.2621E-05	-.2422E-05
20	.1106E-04	-.5611E-03	.8427E-03	/	-.2776E-04	.7835E-06	.6720E-06
21	-.1173E-04	-.5928E-03	-.1554E-03	/	-.6127E-04	.4789E-05	.9927E-06
22	.1154E-07	-.4639E-03	-.1127E-02	/	-.3049E-04	.9194E-05	-.2800E-05
23	.1129E-07	.4931E-04	-.3787E-03	/	-.3172E-04	-.4967E-04	-.3921E-05
24	-.1043E-04	-.1279E-03	.5910E-03	/	-.4676E-04	-.1581E-04	.1771E-05
25	.2551E-04	-.6157E-04	.9483E-03	/	.1847E-04	.1498E-04	.8269E-06
26	-.1129E-07	.6510E-04	.2662E-03	/	.4824E-04	.4115E-04	-.4557E-05
27	.0000E+00	.0000E+00	.0000E+00	/	.3968E-04	.9417E-05	-.7562E-04
28	.8419E-06	-.2734E-02	.4802E-03	/	.2255E-04	-.4323E-04	-.1467E-03
29	.1193E-02	-.2852E-02	.7777E-03	/	.4668E-05	-.2629E-04	.1160E-05
30	.9992E-03	-.2885E-02	.7695E-03	/	-.9408E-05	-.1931E-04	.5321E-04
31	-.3099E-04	-.2926E-02	.4397E-03	/	-.3173E-04	-.6357E-05	.8341E-04
32	.0000E+00	.0000E+00	.0000E+00	/	-.2538E-04	-.2796E-04	-.7569E-04
33	.1201E-05	-.2763E-02	-.4524E-04	/	-.1272E-04	.1557E-04	-.1465E-03
34	.1319E-05	-.4459E-02	-.2725E-03	/	-.2817E-04	-.1426E-05	.6202E-04
35	.1995E-02	-.4631E-02	.4068E-03	/	-.3310E-04	.3014E-05	.6790E-04
36	.2101E-02	-.4648E-02	.8070E-03	/	-.2448E-04	.5638E-05	-.7020E-04
37	.1335E-02	-.4619E-02	.9514E-03	/	-.1684E-04	.7051E-05	-.1320E-03
38	.2347E-05	-.4481E-02	.1079E-02	/	-.2824E-05	.1048E-04	.5853E-04
39	.0000E+00	.0000E+00	.0000E+00	/	-.4782E-05	.5762E-04	.2139E-03
40	-.1102E-02	-.4056E-05	-.9118E-04	/	-.5034E-05	.3667E-04	-.4779E-04

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SOLVE DISPLACEMENTS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

Node	T r a n s l a t i o n s			/	R o t a t i o n s		
	X	Y	Z		X	Y	Z
41	.7280E-03	-.1065E-04	-.1190E-03	/	.2805E-05	.1203E-04	-.8513E-04
42	.0000E+00	.0000E+00	.0000E+00	/	.6272E-05	-.1508E-04	.2116E-03

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WHL-SD-00-ANAL-156
REV. 0

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 1:DL

BEAM LOADS AND/OR STRESSES

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
BEAM NO. 1							
Stress	1	-.2905E+01	.0000E+00	.8511E+01	.0000E+00	.4930E+03	.0000E+00
Stress	1	.4901E+03	-.4959E+03	.2480E+03			
Stress	2	.1894E+01	.0000E+00	.8511E+01	.0000E+00	.2135E+03	.0000E+00
Stress	2	.2154E+03	-.2116E+03	.1077E+03			
BEAM NO. 2							
Stress	2	-.3752E+01	.0000E+00	.8511E+01	.0000E+00	.2135E+03	.0000E+00
Stress	2	.2097E+03	-.2172E+03	.1086E+03			
Stress	3	.1894E+01	.0000E+00	.8511E+01	.0000E+00	-.1154E+03	.0000E+00
Stress	3	.1173E+03	-.1135E+03	.5865E+02			
BEAM NO. 3							
Stress	3	-.1870E+01	.0000E+00	.8511E+01	.0000E+00	-.1154E+03	.0000E+00
Stress	3	.1135E+03	-.1173E+03	.5864E+02			
Stress	4	.4341E+01	.0000E+00	.8511E+01	.0000E+00	-.4772E+03	.0000E+00
Stress	4	.4815E+03	-.4728E+03	.2408E+03			
BEAM NO. 4							
Stress	4	.2874E+00	.5778E+02	.0000E+00	.0000E+00	.0000E+00	-.2164E+02
Stress	4	.2193E+02	-.2135E+02	.1096E+02			
Stress	5	.2874E+00	.4150E+02	.0000E+00	.0000E+00	.0000E+00	.2961E+03
Stress	5	.2964E+03	-.2958E+03	.1482E+03			
BEAM NO. 5							
Stress	5	.7581E+02	.0000E+00	.4035E+01	.0000E+00	.2598E+03	.0000E+00
Stress	5	.3356E+03	-.1840E+03	.1678E+03			
Stress	6	.6960E+02	.0000E+00	.4035E+01	.0000E+00	.8826E+02	.0000E+00
Stress	6	.1579E+03	-.1866E+02	.7893E+02			
BEAM NO. 6							
Stress	6	-.2953E+02	.0000E+00	.4035E+01	.0000E+00	.8826E+02	.0000E+00
Stress	6	.5873E+02	-.1178E+03	.5889E+02			
Stress	7	-.3517E+02	.0000E+00	.4035E+01	.0000E+00	-.6766E+02	.0000E+00
Stress	7	.3249E+02	-.1028E+03	.5142E+02			
BEAM NO. 7							
Stress	7	-.1776E+03	.0000E+00	.4035E+01	.0000E+00	-.6766E+02	.0000E+00
Stress	7	-.1099E+03	-.2452E+03	.1226E+03			
Stress	8	-.1824E+03	.0000E+00	.4035E+01	.0000E+00	-.2002E+03	.0000E+00
Stress	8	.1781E+02	-.3826E+03	.1913E+03			
BEAM NO. 8							
Stress	1	-.1336E+00	.1303E+03	.0000E+00	.0000E+00	.0000E+00	-.2236E+02
Stress	1	.2223E+02	-.2249E+02	.1125E+02			

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 1:DL

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	8	-.1336E+00	.1140E+03	.0000E+00	.0000E+00	.0000E+00	.7595E+03
Stress	8	.7594E+03	-.7597E+03	.3798E+03			
BEAM NO. 9							
Stress	8	.4903E+00	-.7157E+02	.0000E+00	.0000E+00	.0000E+00	.7504E+03
Stress	8	.7509E+03	-.7500E+03	.3755E+03			
Stress	9	.4903E+00	-.8785E+02	.0000E+00	.0000E+00	.0000E+00	.2401E+03
Stress	9	.2406E+03	-.2396E+03	.1203E+03			
BEAM NO. 10							
Stress	9	-.1695E+03	.0000E+00	-.6630E+01	.0000E+00	-.3688E+03	.0000E+00
Stress	9	.1992E+03	-.5383E+03	.2691E+03			
Stress	10	-.1647E+03	.0000E+00	-.6630E+01	.0000E+00	-.1510E+03	.0000E+00
Stress	10	-.1376E+02	-.3157E+03	.1579E+03			
BEAM NO. 11							
ress	10	.4794E+02	.0000E+00	-.6630E+01	.0000E+00	-.1510E+03	.0000E+00
stress	10	.1989E+03	-.1030E+03	.9946E+02			
Stress	11	.5359E+02	.0000E+00	-.6630E+01	.0000E+00	.1052E+03	.0000E+00
Stress	11	.1588E+03	-.5164E+02	.7941E+02			
BEAM NO. 12							
Stress	11	.1377E+03	.0000E+00	-.6630E+01	.0000E+00	.1052E+03	.0000E+00
Stress	11	.2429E+03	.3242E+02	.1214E+03			
Stress	12	.1439E+03	.0000E+00	-.6630E+01	.0000E+00	.3871E+03	.0000E+00
Stress	12	.5309E+03	-.2432E+03	.2655E+03			
BEAM NO. 13							
Stress	12	.6887E+00	-.1983E+03	.0000E+00	.0000E+00	.0000E+00	.2169E+02
Stress	12	.2238E+02	-.2100E+02	.1119E+02			
Stress	13	.6887E+00	-.2091E+03	.0000E+00	.0000E+00	.0000E+00	-.8477E+03
Stress	13	.8484E+03	-.8470E+03	.4242E+03			
BEAM NO. 14							
Stress	13	.1273E+00	.2273E+03	.0000E+00	.0000E+00	.0000E+00	-.8477E+03
Stress	13	.8479E+03	-.8476E+03	.4239E+03			
Stress	14	.1273E+00	.2219E+03	.0000E+00	.0000E+00	.0000E+00	-.3684E+03
Stress	14	.3685E+03	-.3682E+03	.1842E+03			
BEAM NO. 15							
Stress	14	.8579E+02	.0000E+00	.9736E+00	.0000E+00	.5634E+02	.0000E+00
Stress	14	.1421E+03	.2945E+02	.7107E+02			
Stress	15	.7958E+02	.0000E+00	.9736E+00	.0000E+00	.1496E+02	.0000E+00
Stress	15	.9454E+02	.6463E+02	.4727E+02			
BEAM NO. 16							
ress	15	-.3585E+02	.0000E+00	.9736E+00	.0000E+00	.1496E+02	.0000E+00
ress	15	-.2090E+02	-.5081E+02	.2540E+02			

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 1:DL

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	16	-.4150E+02	.0000E+00	.9736E+00	.0000E+00	-.2267E+02	.0000E+00
Stress	16	-.1883E+02	-.6416E+02	.3208E+02			
BEAM NO. 17							
Stress	16	-.8604E+02	.0000E+00	.9736E+00	.0000E+00	-.2267E+02	.0000E+00
Stress	16	-.6337E+02	-.1087E+03	.5435E+02			
Stress	18	-.9084E+02	.0000E+00	.9736E+00	.0000E+00	-.5464E+02	.0000E+00
Stress	18	-.3619E+02	-.1455E+03	.7274E+02			
BEAM NO. 18							
Stress	9	-.5350E+00	-.2603E+03	.0000E+00	.0000E+00	.0000E+00	.2569E+03
Stress	9	.2563E+03	-.2574E+03	.1287E+03			
Stress	17	-.5350E+00	-.2712E+03	.0000E+00	.0000E+00	.0000E+00	-.8774E+03
Stress	17	.8769E+03	-.8779E+03	.4390E+03			
BEAM NO. 19							
Stress	17	-.1273E+00	.2351E+03	.0000E+00	.0000E+00	.0000E+00	-.8774E+03
Stress	17	.8773E+03	-.8775E+03	.4388E+03			
Stress	18	-.1273E+00	.2296E+03	.0000E+00	.0000E+00	.0000E+00	-.3816E+03
Stress	18	.3815E+03	-.3817E+03	.1909E+03			
BEAM NO. 20							
Stress	18	.2323E-01	.1372E+03	.0000E+00	.0000E+00	.0000E+00	-.3841E+03
Stress	18	.3841E+03	-.3841E+03	.1920E+03			
Stress	19	.2323E-01	.1209E+03	.0000E+00	.0000E+00	.0000E+00	.4422E+03
Stress	19	.4422E+03	-.4422E+03	.2211E+03			
BEAM NO. 21							
Stress	19	-.2200E+03	.0000E+00	.2858E+00	.0000E+00	.1624E+02	.0000E+00
Stress	19	-.2038E+03	-.2363E+03	.1181E+03			
Stress	20	-.2152E+03	.0000E+00	.2858E+00	.0000E+00	.6856E+01	.0000E+00
Stress	20	-.2084E+03	-.2221E+03	.1110E+03			
BEAM NO. 22							
Stress	20	-.8159E+02	.0000E+00	.2858E+00	.0000E+00	.6856E+01	.0000E+00
Stress	20	-.7473E+02	-.8844E+02	.4422E+02			
Stress	21	-.7594E+02	.0000E+00	.2858E+00	.0000E+00	-.4189E+01	.0000E+00
Stress	21	-.7175E+02	-.8013E+02	.4007E+02			
BEAM NO. 23							
Stress	21	.2089E+03	.0000E+00	.2858E+00	.0000E+00	-.4189E+01	.0000E+00
Stress	21	.2131E+03	.2047E+03	.1065E+03			
Stress	22	.2151E+03	.0000E+00	.2858E+00	.0000E+00	-.1634E+02	.0000E+00
Stress	22	.2314E+03	.1987E+03	.1157E+03			
BEAM NO. 24							
Stress	22	-.6742E-01	-.1005E+03	.0000E+00	.0000E+00	.0000E+00	.4381E+03
Stress	22	.4381E+03	-.4382E+03	.2191E+03			

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 1:DL

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	23	-.6742E-01	-.1168E+03	.0000E+00	.0000E+00	.0000E+00	-.2573E+03
Stress	23	.2572E+03	-.2574E+03	.1287E+03			
BEAM NO. 25							
Stress	23	.2235E+03	.0000E+00	-.1371E+01	.0000E+00	-.7884E+02	.0000E+00
Stress	23	.3024E+03	.1447E+03	.1512E+03			
Stress	24	.2173E+03	.0000E+00	-.1371E+01	.0000E+00	-.2055E+02	.0000E+00
Stress	24	.2379E+03	.1968E+03	.1189E+03			
BEAM NO. 26							
Stress	24	-.9698E+02	.0000E+00	-.1371E+01	.0000E+00	-.2055E+02	.0000E+00
Stress	24	-.7643E+02	-.1175E+03	.5877E+02			
Stress	25	-.1026E+03	.0000E+00	-.1371E+01	.0000E+00	.3244E+02	.0000E+00
Stress	25	-.7019E+02	-.1351E+03	.6753E+02			
BEAM NO. 27							
Stress	25	-.2011E+03	.0000E+00	-.1371E+01	.0000E+00	.3244E+02	.0000E+00
Stress	25	-.1687E+03	-.2336E+03	.1168E+03			
Stress	26	-.2059E+03	.0000E+00	-.1371E+01	.0000E+00	.7748E+02	.0000E+00
Stress	26	-.1284E+03	-.2834E+03	.1417E+03			
BEAM NO. 28							
Stress	19	.6742E-01	-.1029E+03	.0000E+00	.0000E+00	.0000E+00	.4415E+03
Stress	19	.4415E+03	-.4414E+03	.2208E+03			
Stress	26	.6742E-01	-.1192E+03	.0000E+00	.0000E+00	.0000E+00	-.2696E+03
Stress	26	.2696E+03	-.2695E+03	.1348E+03			
BEAM NO. 29							
Stress	26	-.1446E+00	-.3287E+03	.0000E+00	.0000E+00	.0000E+00	-.2661E+03
Stress	26	.2659E+03	-.2662E+03	.1331E+03			
Stress	27	-.1446E+00	-.3341E+03	.0000E+00	.0000E+00	.0000E+00	-.9733E+03
Stress	27	.9732E+03	-.9735E+03	.4867E+03			
BEAM NO. 30							
Stress	27	-.5976E+00	.2866E+03	.0000E+00	.0000E+00	.0000E+00	-.9733E+03
Stress	27	.9727E+03	-.9739E+03	.4870E+03			
Stress	28	-.5976E+00	.2757E+03	.0000E+00	.0000E+00	.0000E+00	.2267E+03
Stress	28	.2261E+03	-.2273E+03	.1136E+03			
BEAM NO. 31							
Stress	28	-.1711E+03	.0000E+00	.6390E+01	.0000E+00	.3645E+03	.0000E+00
Stress	28	.1935E+03	-.5356E+03	.2678E+03			
Stress	29	-.1663E+03	.0000E+00	.6390E+01	.0000E+00	.1547E+03	.0000E+00
Stress	29	-.1162E+02	-.3209E+03	.1605E+03			
BEAM NO. 32							
Stress	29	-.1042E+03	.0000E+00	.6390E+01	.0000E+00	.1547E+03	.0000E+00
Stress	29	.5049E+02	-.2588E+03	.1294E+03			

***** CONSTRUCTION *****
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03/06/94
 16:18:21

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 1:DL

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	30	-.1022E+03	.0000E+00	.6390E+01	.0000E+00	.6822E+02	.0000E+00
Stress	30	-.3396E+02	-.1704E+03	.8521E+02			
		BEAM NO. 33					
Stress	30	-.5827E+02	.0000E+00	.6390E+01	.0000E+00	.6822E+02	.0000E+00
Stress	30	.9950E+01	-.1265E+03	.6325E+02			
Stress	31	-.5460E+02	.0000E+00	.6390E+01	.0000E+00	-.9229E+02	.0000E+00
Stress	31	.3768E+02	-.1469E+03	.7344E+02			
		BEAM NO. 34					
Stress	31	.1794E+03	.0000E+00	.6390E+01	.0000E+00	-.9229E+02	.0000E+00
Stress	31	.2717E+03	.8711E+02	.1358E+03			
Stress	33	.1856E+03	.0000E+00	.6390E+01	.0000E+00	-.3639E+03	.0000E+00
Stress	33	.5495E+03	-.1783E+03	.2748E+03			
		BEAM NO. 35					
Stress	32	.5976E+00	.2957E+03	.0000E+00	.0000E+00	.0000E+00	-.9940E+03
Stress	32	.9946E+03	-.9934E+03	.4973E+03			
Stress	33	.5976E+00	.2848E+03	.0000E+00	.0000E+00	.0000E+00	.2448E+03
Stress	33	.2454E+03	-.2442E+03	.1227E+03			
		BEAM NO. 36					
Stress	33	-.3906E+00	.9598E+02	.0000E+00	.0000E+00	.0000E+00	.2283E+03
Stress	33	.2279E+03	-.2287E+03	.1143E+03			
Stress	34	-.3906E+00	.7971E+02	.0000E+00	.0000E+00	.0000E+00	.7907E+03
Stress	34	.7903E+03	-.7911E+03	.3955E+03			
		BEAM NO. 37					
Stress	34	.1964E+03	.0000E+00	-.2475E+01	.0000E+00	-.1414E+03	.0000E+00
Stress	34	.3378E+03	.5501E+02	.1689E+03			
Stress	35	.1902E+03	.0000E+00	-.2475E+01	.0000E+00	-.3617E+02	.0000E+00
Stress	35	.2264E+03	.1540E+03	.1132E+03			
		BEAM NO. 38					
Stress	35	.7224E+02	.0000E+00	-.2475E+01	.0000E+00	-.3617E+02	.0000E+00
Stress	35	.1084E+03	.3607E+02	.5421E+02			
Stress	36	.6857E+02	.0000E+00	-.2475E+01	.0000E+00	.2600E+02	.0000E+00
Stress	36	.9458E+02	.4257E+02	.4729E+02			
		BEAM NO. 39					
Stress	36	-.9140E+02	.0000E+00	-.2475E+01	.0000E+00	.2600E+02	.0000E+00
Stress	36	-.6540E+02	-.1174E+03	.5870E+02			
Stress	37	-.9338E+02	.0000E+00	-.2475E+01	.0000E+00	.5948E+02	.0000E+00
Stress	37	-.3390E+02	-.1529E+03	.7643E+02			
		BEAM NO. 40					
Stress	37	-.2000E+03	.0000E+00	-.2475E+01	.0000E+00	.5948E+02	.0000E+00
Stress	37	-.1405E+03	-.2595E+03	.1298E+03			

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Run ID=NN58712

UNAC-3D-WM-ANAL-036
REV. 0

16:18:25

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 1:DL

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	38	-.2048E+03	.0000E+00	-.2475E+01	.0000E+00	.1408E+03	.0000E+00
Stress	38	-.6404E+02	-.3456E+03	.1728E+03			
BEAM NO. 41							
Stress	28	.3906E+00	.1017E+03	.0000E+00	.0000E+00	.0000E+00	.2101E+03
Stress	28	.2105E+03	-.2097E+03	.1053E+03			
Stress	38	.3906E+00	.8541E+02	.0000E+00	.0000E+00	.0000E+00	.8090E+03
Stress	38	.8094E+03	-.8086E+03	.4047E+03			
BEAM NO. 42							
Stress	38	.7811E-02	-.1230E+03	.0000E+00	.0000E+00	.0000E+00	.8154E+03
Stress	38	.8154E+03	-.8154E+03	.4077E+03			
Stress	39	.7811E-02	-.1393E+03	.0000E+00	.0000E+00	.0000E+00	-.2413E+02
Stress	39	.2414E+02	-.2412E+02	.1207E+02			
BEAM NO. 43							
Stress	39	.2504E+02	.0000E+00	-.9315E+01	.0000E+00	-.5321E+03	.0000E+00
Stress	39	.5572E+03	-.5071E+03	.2786E+03			
Stress	40	.2984E+02	.0000E+00	-.9315E+01	.0000E+00	-.2262E+03	.0000E+00
Stress	40	.2560E+03	-.1963E+03	.1280E+03			
BEAM NO. 44							
Stress	40	-.1408E+02	.0000E+00	-.9315E+01	.0000E+00	-.2262E+03	.0000E+00
Stress	40	.2121E+03	-.2402E+03	.1201E+03			
Stress	41	-.8431E+01	.0000E+00	-.9315E+01	.0000E+00	.1338E+03	.0000E+00
Stress	41	.1254E+03	-.1422E+03	.7112E+02			
BEAM NO. 45							
Stress	41	-.1408E+02	.0000E+00	-.9315E+01	.0000E+00	.1338E+03	.0000E+00
Stress	41	.1197E+03	-.1479E+03	.7394E+02			
Stress	42	-.7866E+01	.0000E+00	-.9315E+01	.0000E+00	.5297E+03	.0000E+00
Stress	42	.5219E+03	-.5376E+03	.2688E+03			
BEAM NO. 46							
Stress	34	-.7811E-02	-.1201E+03	.0000E+00	.0000E+00	.0000E+00	.7971E+03
Stress	34	.7971E+03	-.7971E+03	.3985E+03			
Stress	42	-.7811E-02	-.1364E+03	.0000E+00	.0000E+00	.0000E+00	-.2402E+02
Stress	42	.2402E+02	-.2403E+02	.1202E+02			
BEAM NO. 47							
Stress	5	-.7466E+00	-.8945E+02	.0000E+00	.0000E+00	.0000E+00	.9193E+03
Stress	5	.9186E+03	-.9201E+03	.4600E+03			
Stress	12	-.7466E+00	-.1303E+03	.0000E+00	.0000E+00	.0000E+00	.1338E+02
Stress	12	.1263E+02	-.1413E+02	.7063E+01			
BEAM NO. 48							
Stress	14	-.2323E-01	.1346E+03	.0000E+00	.0000E+00	.0000E+00	-.3709E+03
Stress	14	.3709E+03	-.3709E+03	.1855E+03			

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Run ID=NN58712

UHG-SD-WM-ANAL-086

REV. 0

16:18:29

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 1:DL

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	22	-.2323E-01	.1184E+03	.0000E+00	.0000E+00	.0000E+00	.4389E+03
Stress	22	.4388E+03	-.4389E+03	.2194E+03			
BEAM NO. 49							
Stress	23	.1446E+00	-.3442E+03	.0000E+00	.0000E+00	.0000E+00	-.2537E+03
Stress	23	.2539E+03	-.2536E+03	.1269E+03			
Stress	32	.1446E+00	-.3496E+03	.0000E+00	.0000E+00	.0000E+00	-.9940E+03
Stress	32	.9942E+03	-.9939E+03	.4971E+03			

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Run ID=NN58712

WHL 5D-UM ANAL-036

05/00/94

16:18:30

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 1:DL

MAXIMUM STRESS SUMMARY FOR BEAMS/TRUSSES
 WITHIN SPECIFIED RANGE 1- 49

Maximum (absolute) Stress = .9946E+03 at BEAM 35

Beam	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
35	.5976E+00	.2957E+03	.0000E+00	.0000E+00	.0000E+00	-.9940E+03
	Maximum	Minimum	Cmb. Shear			
	.9946E+03	-.9934E+03	.4973E+03			

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Run ID=NN58712

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 2:DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM LOADS AND/OR STRESSES

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
BEAM NO. 1							
Stress	1	.1193E+02	-.1290E+01	.9463E+01	.5067E+01	.5477E+03	.1515E+01
Stress	1	.5611E+03	-.5372E+03	.2806E+03			
Stress	2	.2152E+02	-.1290E+01	.9463E+01	.5067E+01	.2368E+03	-.5575E+01
Stress	2	.2639E+03	-.2209E+03	.1321E+03			
BEAM NO. 2							
Stress	2	-.1173E+02	-.1290E+01	.9463E+01	.5067E+01	.2368E+03	-.5575E+01
Stress	2	.2307E+03	-.2541E+03	.1272E+03			
Stress	3	-.4333E+00	-.1290E+01	.9463E+01	.5067E+01	-.1288E+03	-.1392E+02
ress	3	.1423E+03	-.1432E+03	.7177E+02			
BEAM NO. 3							
ress	3	-.1361E+02	.1915E+01	.9463E+01	.5067E+01	-.1288E+03	-.1392E+02
Stress	3	.1291E+03	-.1564E+03	.7835E+02			
Stress	4	-.1186E+01	.1915E+01	.9463E+01	.5067E+01	-.5311E+03	-.2933E+00
Stress	4	.5302E+03	-.5326E+03	.2663E+03			
BEAM NO. 4							
Stress	4	.3361E+00	.6709E+02	.2920E+01	-.1414E+01	.6584E+00	-.2408E+02
Stress	4	.2508E+02	-.2441E+02	.1262E+02			
Stress	5	.3361E+00	.3454E+02	.2920E+01	-.1414E+01	.8540E+02	.3012E+03
Stress	5	.3870E+03	-.3863E+03	.1935E+03			
BEAM NO. 5							
Stress	5	.5766E+02	.1274E+02	.4677E+01	.2465E+01	.2986E+03	.5730E+00
Stress	5	.3569E+03	-.2416E+03	.1785E+03			
Stress	6	.4524E+02	.3130E+01	.4677E+01	.2465E+01	.9984E+02	.6325E+02
Stress	6	.2083E+03	-.1178E+03	.1042E+03			
BEAM NO. 6							
Stress	6	-.4196E+02	.3130E+01	.4677E+01	.2465E+01	.9984E+02	.6325E+02
Stress	6	.1211E+03	-.2051E+03	.1026E+03			
Stress	7	-.5325E+02	-.1930E+02	.4677E+01	.2465E+01	-.8089E+02	.1095E+02
Stress	7	.3859E+02	-.1451E+03	.7259E+02			
BEAM NO. 7							
Stress	7	-.1536E+03	-.1930E+02	.4677E+01	.2465E+01	-.8089E+02	.1095E+02
Stress	7	-.6179E+02	-.2455E+03	.1228E+03			
Stress	8	-.1632E+03	.1274E+02	.4677E+01	.2465E+01	-.2345E+03	-.1897E+01
Stress	8	.7318E+02	-.3996E+03	.1998E+03			
BEAM NO. 8							
ress	1	-.1592E+00	.1447E+03	-.3624E+01	-.7305E+01	-.6584E+00	-.2484E+02
ress	1	.2534E+02	-.2565E+02	.1476E+02			

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 2:DL+EQ(100% X-AXIS, 30% Z-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	8	-.1592E+00	.1121E+03	-.3624E+01	-.7305E+01	.1061E+03	.7970E+03
Stress	8	.9030E+03	-.9033E+03	.4517E+03			
BEAM NO. 9							
Stress	8	.5640E+00	-.5398E+02	.2993E+01	.1843E+01	.1058E+03	.7864E+03
Stress	8	.8928E+03	-.8916E+03	.4464E+03			
Stress	9	.5640E+00	-.8653E+02	.2993E+01	.1843E+01	.1762E+02	.3366E+03
Stress	9	.3548E+03	-.3537E+03	.1774E+03			
BEAM NO. 10							
Stress	9	-.1874E+03	-.1912E+02	-.7574E+01	-.4118E+01	-.4190E+03	-.5630E+00
Stress	9	.2322E+03	-.6070E+03	.3035E+03			
Stress	10	-.1778E+03	.2735E+02	-.7574E+01	-.4118E+01	-.1702E+03	.2959E+02
Stress	10	.2201E+02	-.3776E+03	.1889E+03			
BEAM NO. 11							
Stress	10	.5430E+02	.2735E+02	-.7574E+01	-.4118E+01	-.1702E+03	.2959E+02
Stress	10	.2541E+03	-.1455E+03	.1271E+03			
Stress	11	.6560E+02	-.6297E+01	-.7574E+01	-.4118E+01	.1224E+03	.9767E+02
Stress	11	.2857E+03	-.1545E+03	.1429E+03			
BEAM NO. 12							
Stress	11	.1239E+03	-.6297E+01	-.7574E+01	-.4118E+01	.1224E+03	.9767E+02
Stress	11	.3440E+03	-.9617E+02	.1721E+03			
Stress	12	.1364E+03	-.1912E+02	-.7574E+01	-.4118E+01	.4444E+03	-.1013E+01
Stress	12	.5818E+03	-.3091E+03	.2909E+03			
BEAM NO. 13							
Stress	12	.7841E+00	-.1954E+03	-.1362E+02	-.3534E+01	.2333E+02	.4912E+02
Stress	12	.7323E+02	-.7166E+02	.3679E+02			
Stress	13	.7841E+00	-.2171E+03	-.1362E+02	-.3534E+01	.2910E+03	-.8313E+03
Stress	13	.1123E+04	-.1121E+04	.5615E+03			
BEAM NO. 14							
Stress	13	-.3143E-01	.2031E+03	.1684E+02	-.3534E+01	.2910E+03	-.8313E+03
Stress	13	.1122E+04	-.1122E+04	.5611E+03			
Stress	14	-.3143E-01	.1922E+03	.1684E+02	-.3534E+01	.1255E+03	-.4095E+03
Stress	14	.5350E+03	-.5351E+03	.2676E+03			
BEAM NO. 15							
Stress	14	.6192E+02	.8837E+01	-.3589E+00	.4096E+01	-.2011E+02	-.2346E+00
Stress	14	.8226E+02	.4157E+02	.4133E+02			
Stress	15	.4949E+02	-.8789E+01	-.3589E+00	.4096E+01	-.4855E+01	.1134E+02
Stress	15	.6568E+02	.3330E+02	.3310E+02			
BEAM NO. 16							
Stress	15	.3697E+01	-.8789E+01	-.3589E+00	.4096E+01	-.4855E+01	.1134E+02
Stress	15	.1989E+02	-.1249E+02	.1075E+02			

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Run ID=NN58712

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 2:DL+EQ(100% X-AXIS, 30% Z-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	16	-.7596E+01	-.7771E+00	-.3589E+00	.4096E+01	.9013E+01	-.1960E+02
Stress	16	.2101E+02	-.3620E+02	.1856E+02			
BEAM NO. 17							
Stress	16	-.6782E+02	-.7771E+00	-.3589E+00	.4096E+01	.9013E+01	-.1960E+02
Stress	16	-.3921E+02	-.9643E+02	.4839E+02			
Stress	18	-.7742E+02	.8837E+01	-.3589E+00	.4096E+01	.2080E+02	.1003E+01
Stress	18	-.5562E+02	-.9922E+02	.4978E+02			
BEAM NO. 18							
Stress	9	-.6072E+00	-.2772E+03	.1292E+02	.4558E+01	.1816E+02	.3556E+03
Stress	9	.3732E+03	-.3744E+03	.1872E+03			
Stress	17	-.6072E+00	-.2989E+03	.1292E+02	.4558E+01	-.2357E+03	-.8739E+03
Stress	17	.1109E+04	-.1110E+04	.5551E+03			
BEAM NO. 19							
Stress	17	.3143E-01	.2203E+03	-.1523E+02	.4558E+01	-.2357E+03	-.8739E+03
Stress	17	.1110E+04	-.1109E+04	.5548E+03			
Stress	18	.3143E-01	.2095E+03	-.1523E+02	.4558E+01	-.8606E+02	-.4152E+03
Stress	18	.5013E+03	-.5012E+03	.2507E+03			
BEAM NO. 20							
Stress	18	-.2406E-01	.1307E+03	-.1064E+02	-.2771E+00	-.8659E+02	-.4143E+03
Stress	18	.5008E+03	-.5009E+03	.2504E+03			
Stress	19	-.2406E-01	.9817E+02	-.1064E+02	-.2771E+00	.2270E+03	.3184E+03
Stress	19	.5453E+03	-.5454E+03	.2727E+03			
BEAM NO. 21							
Stress	19	-.1858E+03	-.3804E+02	.1575E+00	.6839E+00	.8762E+01	-.1903E+01
Stress	19	-.1751E+03	-.1964E+03	.9822E+02			
Stress	20	-.1762E+03	-.7592E+01	.1575E+00	.6839E+00	.3587E+01	-.1224E+03
Stress	20	-.5019E+02	-.3021E+03	.1511E+03			
BEAM NO. 22							
Stress	20	-.5321E+02	-.7592E+01	.1575E+00	.6839E+00	.3587E+01	-.1224E+03
Stress	20	.7277E+02	-.1792E+03	.8959E+02			
Stress	21	-.4192E+02	.5009E+02	.1575E+00	.6839E+00	-.2500E+01	.1504E+02
Stress	21	-.2438E+02	-.5945E+02	.2973E+02			
BEAM NO. 23							
Stress	21	.1695E+03	.5009E+02	.1575E+00	.6839E+00	-.2500E+01	.1504E+02
Stress	21	.1870E+03	.1520E+03	.9352E+02			
Stress	22	.1819E+03	-.3804E+02	.1575E+00	.6839E+00	-.9195E+01	.9243E+00
Stress	22	.1920E+03	.1718E+03	.9602E+02			
BEAM NO. 24							
Stress	22	-.2987E-03	-.8845E+02	-.7494E+01	-.2081E+00	-.2350E+03	.3139E+03
Stress	22	.5489E+03	-.5489E+03	.2745E+03			

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Run ID=NN58712

UHC-SID-WA-ANAL-56

REV. 0

16:18:42

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 2:DL+EQ(100% X-AXIS, 30% Z-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	23	-.2987E-03	-.1210E+03	-.7494E+01	-.2081E+00	-.1416E+02	-.3566E+03
Stress	23	.3707E+03	-.3707E+03	.1854E+03			
BEAM NO. 25							
Stress	23	.2479E+03	.4544E+02	.2558E+00	-.5258E+01	.1421E+02	.7118E+00
Stress	23	.2628E+03	.2330E+03	.1315E+03			
Stress	24	.2355E+03	-.5231E+02	.2558E+00	-.5258E+01	.3341E+01	-.8695E+02
Stress	24	.3258E+03	.1452E+03	.1630E+03			
BEAM NO. 26							
Stress	24	-.9389E+02	-.5231E+02	.2558E+00	-.5258E+01	.3341E+01	-.8695E+02
Stress	24	-.3598E+01	-.1842E+03	.9224E+02			
Stress	25	-.1052E+03	.2300E+02	.2558E+00	-.5258E+01	-.6543E+01	-.1817E+03
Stress	25	.8308E+02	-.2934E+03	.1468E+03			
BEAM NO. 27							
Stress	25	-.2187E+03	.2300E+02	.2558E+00	-.5258E+01	-.6543E+01	-.1817E+03
Stress	25	-.3048E+02	-.4070E+03	.2036E+03			
Stress	26	-.2283E+03	.4544E+02	.2558E+00	-.5258E+01	-.1494E+02	.2749E+01
Stress	26	-.2106E+03	-.2460E+03	.1231E+03			
BEAM NO. 28							
Stress	19	.2987E-03	-.9084E+02	.9109E+01	.8897E+01	.2269E+03	.3180E+03
Stress	19	.5449E+03	-.5449E+03	.2726E+03			
Stress	26	.2987E-03	-.1234E+03	.9109E+01	.8897E+01	.4159E+02	-.3678E+03
Stress	26	.4094E+03	-.4094E+03	.2049E+03			
BEAM NO. 29							
Stress	26	.3985E-01	-.3557E+03	.3270E+02	-.4359E+01	-.4090E+02	-.3685E+03
Stress	26	.4094E+03	-.4093E+03	.2047E+03			
Stress	27	.3985E-01	-.3666E+03	.3270E+02	-.4359E+01	-.3621E+03	-.1139E+04
Stress	27	.1501E+04	-.1501E+04	.7507E+03			
BEAM NO. 30							
Stress	27	.1486E+01	.3649E+03	-.1985E+02	-.4359E+01	-.3621E+03	-.1139E+04
Stress	27	.1503E+04	-.1500E+04	.7514E+03			
Stress	28	.1486E+01	.3432E+03	-.1985E+02	-.4359E+01	.2784E+02	.3720E+03
Stress	28	.4013E+03	-.3984E+03	.2007E+03			
BEAM NO. 31							
Stress	28	-.2141E+03	-.2695E+02	.1844E+01	.3404E+01	.3253E+03	-.1106E-01
Stress	28	.1111E+03	-.5394E+03	.2697E+03			
Stress	29	-.2045E+03	-.1253E+02	.1844E+01	.3404E+01	.2647E+03	-.1062E+03
Stress	29	.1663E+03	-.5754E+03	.2877E+03			
BEAM NO. 32							
Stress	29	-.1443E+03	-.1253E+02	.1844E+01	.3404E+01	.2647E+03	-.1062E+03
Stress	29	.2266E+03	-.5152E+03	.2576E+03			

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BLOWER SKID

Load Case 2:DL+EQ(100% X-AXIS, 30% Z-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	30	-.1404E+03	-.1253E+02	.1844E+01	.3404E+01	.2398E+03	-.1345E+03
Stress	30	.2339E+03	-.5147E+03	.2574E+03			
BEAM NO. 33							
Stress	30	-.9646E+02	-.1253E+02	.1282E+02	.3404E+01	.2398E+03	-.1345E+03
Stress	30	.2779E+03	-.4708E+03	.2354E+03			
Stress	31	-.8912E+02	.4516E+02	.1282E+02	.3404E+01	-.8215E+02	-.1934E+02
Stress	31	.1237E+02	-.1906E+03	.9536E+02			
BEAM NO. 34							
Stress	31	.2151E+03	.4516E+02	.1282E+02	.3404E+01	-.8215E+02	-.1934E+02
Stress	31	.3166E+03	.1137E+03	.1584E+03			
Stress	33	.2276E+03	-.2695E+02	.1282E+02	.3404E+01	-.6269E+03	-.1212E+01
Stress	33	.8557E+03	-.4006E+03	.4279E+03			
BEAM NO. 35							
Stress	32	.2120E+01	.3777E+03	.1551E+02	.3224E+01	.2905E+03	-.1165E+04
Stress	32	.1458E+04	-.1454E+04	.7289E+03			
Stress	33	.2120E+01	.3560E+03	.1551E+02	.3224E+01	-.1412E+02	.4004E+03
Stress	33	.4166E+03	-.4124E+03	.2083E+03			
BEAM NO. 36							
Stress	33	.1381E+00	.1244E+03	.1513E+01	-.2622E+01	.1368E+02	.3719E+03
Stress	33	.3857E+03	-.3855E+03	.1929E+03			
Stress	34	.1381E+00	.9187E+02	.1513E+01	-.2622E+01	-.5826E+02	.1064E+04
Stress	34	.1123E+04	-.1122E+04	.5613E+03			
BEAM NO. 37							
Stress	34	.2411E+03	.6763E+01	.1093E+02	-.6894E+00	.2413E+03	.1756E+01
Stress	34	.4841E+03	-.1944E+01	.2421E+03			
Stress	35	.2287E+03	-.1407E+02	.1093E+02	-.6894E+00	-.2231E+03	-.1075E+02
Stress	35	.4626E+03	-.5230E+01	.2313E+03			
BEAM NO. 38							
Stress	35	.4298E+02	-.1407E+02	.1093E+02	-.6894E+00	-.2231E+03	-.1075E+02
Stress	35	.2769E+03	-.1909E+03	.1384E+03			
Stress	36	.3564E+02	-.1086E+02	.1093E+02	-.6894E+00	-.4976E+03	-.6574E+02
Stress	36	.5990E+03	-.5277E+03	.2995E+03			
BEAM NO. 39							
Stress	36	-.1243E+03	.3536E+00	-.2931E+02	-.6894E+00	-.4976E+03	-.6574E+02
Stress	36	.4390E+03	-.6877E+03	.3438E+03			
Stress	37	-.1283E+03	.3536E+00	-.2931E+02	-.6894E+00	-.1012E+03	-.6494E+02
Stress	37	.3784E+02	-.2944E+03	.1472E+03			
BEAM NO. 40							
Stress	37	-.2387E+03	.3536E+00	-.2931E+02	-.6894E+00	-.1012E+03	-.6494E+02
Stress	37	-.7258E+02	-.4048E+03	.2024E+03			

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BLOWER SKID

Load Case 2:DL+EQ(100% X-AXIS, 30% Z-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	38	-.2483E+03	.2439E+02	-.2931E+02	-.6894E+00	.8615E+03	-.8241E+00
Stress	38	.6140E+03	-.1111E+04	.5553E+03			
BEAM NO. 41							
Stress	28	.1771E+01	.1253E+03	-.5856E+01	-.4306E+01	.2740E+02	.3572E+03
Stress	28	.3864E+03	-.3829E+03	.1933E+03			
Stress	38	.1771E+01	.9277E+02	-.5856E+01	-.4306E+01	.2000E+03	.1055E+04
Stress	38	.1257E+04	-.1254E+04	.6286E+03			
BEAM NO. 42							
Stress	38	-.2761E+01	-.1599E+03	.6807E+01	-.3323E+00	.2001E+03	.1094E+04
Stress	38	.1292E+04	-.1297E+04	.6486E+03			
Stress	39	-.2761E+01	-.1924E+03	.6807E+01	-.3323E+00	-.5468E+00	-.3324E+02
Stress	39	.3103E+02	-.3655E+02	.1828E+02			
BEAM NO. 43							
Stress	39	-.1196E+02	-.2993E+01	-.1284E+02	-.4208E+01	-.7330E+03	-.6891E-01
Stress	39	.7211E+03	-.7450E+03	.3725E+03			
Stress	40	-.2358E+01	.6621E+01	-.1284E+02	-.4208E+01	-.3114E+03	.1146E+02
Stress	40	.3205E+03	-.3252E+03	.1626E+03			
BEAM NO. 44							
Stress	40	-.1553E+02	.6621E+01	-.1284E+02	-.4208E+01	-.3114E+03	.1146E+02
Stress	40	.3073E+03	-.3384E+03	.1692E+03			
Stress	41	-.4240E+01	-.2993E+01	-.1284E+02	-.4208E+01	.1847E+03	.2008E+02
Stress	41	.2005E+03	-.2090E+03	.1046E+03			
BEAM NO. 45							
Stress	41	.8307E+01	-.2993E+01	-.1284E+02	-.4208E+01	.1847E+03	.2008E+02
Stress	41	.2131E+03	-.1965E+03	.1066E+03			
Stress	42	.2073E+02	-.2993E+01	-.1284E+02	-.4208E+01	.7304E+03	-.1212E+01
Stress	42	.7523E+03	-.7108E+03	.3762E+03			
BEAM NO. 46							
Stress	34	-.1551E+01	-.1534E+03	-.1999E+01	.5844E+01	-.5835E+02	.1053E+04
Stress	34	.1110E+04	-.1113E+04	.5567E+03			
Stress	42	-.1551E+01	-.1860E+03	-.1999E+01	.5844E+01	.5468E+00	-.3312E+02
Stress	42	.3212E+02	-.3522E+02	.1855E+02			
BEAM NO. 47							
Stress	5	-.8588E+00	-.6058E+02	-.8126E+01	.3996E+01	-.3127E+03	.9301E+03
Stress	5	.1242E+04	-.1244E+04	.6218E+03			
Stress	12	-.8588E+00	-.1423E+03	-.8126E+01	.3996E+01	.8770E+02	.9365E+02
Stress	12	.1805E+03	-.1822E+03	.9119E+02			
BEAM NO. 48							
Stress	14	.2406E-01	.1292E+03	.1225E+02	-.4665E+01	.1260E+03	-.4086E+03
Stress	14	.5347E+03	-.5346E+03	.2674E+03			

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BLOWER SKID

Load Case 2:DL+EQ(100% X-AXIS, 30% Z-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	22	.2406E-01	.9665E+02	.1225E+02	-.4665E+01	-.2351E+03	.3143E+03
Stress	22	.5495E+03	-.5494E+03	.2748E+03			
BEAM NO. 49							
Stress	23	-.3985E-01	-.3732E+03	-.3108E+02	.3224E+01	-.1484E+02	-.3572E+03
Stress	23	.3720E+03	-.3721E+03	.1861E+03			
Stress	32	-.3985E-01	-.3841E+03	-.3108E+02	.3224E+01	.2905E+03	-.1165E+04
Stress	32	.1456E+04	-.1456E+04	.7279E+03			

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

. BLOWER SKID

Load Case 2:DL+EQ(100% X-AXIS, 30% Z-AXIS)

MAXIMUM STRESS SUMMARY FOR BEAMS/TRUSSES
 WITHIN SPECIFIED RANGE 1- 49

Maximum (absolute) Stress = .1503E+04 at BEAM 30

Beam	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
30	.1486E+01	.3649E+03	-.1985E+02	-.4359E+01	-.3621E+03	-.1139E+04
	Maximum	Minimum	Cmb. Shear			
	.1503E+04	-.1500E+04	.7514E+03			

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 3:DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM LOADS AND/OR STRESSES

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
BEAM NO. 1							
Stress	1	-.3173E+01	-.1786E+01	.9938E+01	.1680E+02	.5754E+03	.4746E+01
Stress	1	.5770E+03	-.5833E+03	.2921E+03			
Stress	2	.6425E+01	.3021E+01	.9938E+01	.1680E+02	.2490E+03	.8919E+01
Stress	2	.2643E+03	-.2515E+03	.1332E+03			
BEAM NO. 2							
Stress	2	-.9886E+01	.3021E+01	.9938E+01	.1680E+02	.2490E+03	.8919E+01
Stress	2	.2480E+03	-.2678E+03	.1349E+03			
Stress	3	.1406E+01	-.1786E+01	.9938E+01	.1680E+02	-.1351E+03	.1136E+02
Stress	3	.1478E+03	-.1450E+03	.7580E+02			
BEAM NO. 3							
Stress	3	-.3613E+01	-.1786E+01	.9938E+01	.1680E+02	-.1351E+03	.1136E+02
Stress	3	.1428E+03	-.1500E+03	.7688E+02			
Stress	4	.8809E+01	-.1786E+01	.9938E+01	.1680E+02	-.5575E+03	-.1341E+01
Stress	4	.5677E+03	-.5500E+03	.2843E+03			
BEAM NO. 4							
Stress	4	.3393E+00	.7182E+02	.1003E+02	-.6468E+01	.2183E+01	-.2528E+02
Stress	4	.2781E+02	-.2713E+02	.1533E+02			
Stress	5	.3393E+00	.3927E+02	.1003E+02	-.6468E+01	-.2934E+03	.3303E+03
Stress	5	.6241E+03	-.6234E+03	.3121E+03			
BEAM NO. 5							
Stress	5	.6983E+02	.4446E+02	.4755E+01	.7975E+01	.3054E+03	.2288E+01
Stress	5	.3776E+03	-.2379E+03	.1889E+03			
Stress	6	.5740E+02	.1081E+02	.4755E+01	.7975E+01	.1033E+03	.2206E+03
Stress	6	.3814E+03	-.2666E+03	.1908E+03			
BEAM NO. 6							
Stress	6	-.3921E+02	.1081E+02	.4755E+01	.7975E+01	.1033E+03	.2206E+03
Stress	6	.2847E+03	-.3632E+03	.1818E+03			
Stress	7	-.5050E+02	-.6130E+02	.4755E+01	.7975E+01	-.8040E+02	.5739E+02
Stress	7	.8729E+02	-.1883E+03	.9448E+02			
BEAM NO. 7							
Stress	7	-.1804E+03	-.6130E+02	.4755E+01	.7975E+01	-.8040E+02	.5739E+02
Stress	7	-.4257E+02	-.3182E+03	.1593E+03			
Stress	8	-.1900E+03	.4446E+02	.4755E+01	.7975E+01	-.2366E+03	-.5986E+01
Stress	8	.5260E+02	-.4325E+03	.2164E+03			
BEAM NO. 8							
Stress	1	-.1584E+00	.1552E+03	-.1216E+02	-.2288E+02	-.2183E+01	-.2610E+02
Stress	1	.2812E+02	-.2844E+02	.2694E+02			

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SOLVE BEAM LOADS/STRESSES Version 2.0 07/01/90

BLOWER SKID

Load Case 3:DL+EQ(100% Z-AXIS, 30% X-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	8	-.1584E+00	.1227E+03	-.1216E+02	-.2288E+02	.3561E+03	.8633E+03
Stress	8	.1219E+04	-.1220E+04	.6102E+03			
		BEAM NO. 9					
Stress	8	.5768E+00	-.7062E+02	.1093E+02	.5982E+01	.3550E+03	.8526E+03
Stress	8	.1208E+04	-.1207E+04	.6041E+03			
Stress	9	.5768E+00	-.1032E+03	.1093E+02	.5982E+01	.3299E+02	.2963E+03
Stress	9	.3298E+03	-.3287E+03	.1650E+03			
		BEAM NO. 10					
Stress	9	-.1848E+03	-.5994E+02	-.7788E+01	-.1332E+02	-.4323E+03	-.2019E+01
Stress	9	.2494E+03	-.6191E+03	.3098E+03			
Stress	10	-.1752E+03	.9709E+02	-.7788E+01	-.1332E+02	-.1764E+03	.1255E+03
Stress	10	.1266E+03	-.4771E+03	.2389E+03			
		BEAM NO. 11					
Stress	10	.4496E+02	.9709E+02	-.7788E+01	-.1332E+02	-.1764E+03	.1255E+03
Stress	10	.3468E+03	-.2569E+03	.1739E+03			
Stress	11	.5625E+02	-.3110E+02	-.7788E+01	-.1332E+02	.1245E+03	.3388E+03
Stress	11	.5196E+03	-.4071E+03	.2601E+03			
		BEAM NO. 12					
Stress	11	.1365E+03	-.3110E+02	-.7788E+01	-.1332E+02	.1245E+03	.3388E+03
Stress	11	.5999E+03	-.3268E+03	.3002E+03			
Stress	12	.1490E+03	-.5994E+02	-.7788E+01	-.1332E+02	.4556E+03	-.3655E+01
Stress	12	.6082E+03	-.3103E+03	.3044E+03			
		BEAM NO. 13					
Stress	12	.8084E+00	-.2159E+03	-.4418E+02	-.1306E+02	.9065E+02	.2953E+02
Stress	12	.1210E+03	-.1194E+03	.6189E+02			
Stress	13	.8084E+00	-.2376E+03	-.4418E+02	-.1306E+02	.9586E+03	-.9382E+03
Stress	13	.1898E+04	-.1896E+04	.9489E+03			
		BEAM NO. 14					
Stress	13	.7766E-01	.2453E+03	.5616E+02	-.1306E+02	.9586E+03	-.9382E+03
Stress	13	.1897E+04	-.1897E+04	.9486E+03			
Stress	14	.7766E-01	.2345E+03	.5616E+02	-.1306E+02	.4069E+03	-.4263E+03
Stress	14	.8333E+03	-.8331E+03	.4168E+03			
		BEAM NO. 15					
Stress	14	.8380E+02	.3015E+02	.5353E+00	.1427E+02	.3123E+02	-.6743E+00
Stress	14	.1157E+03	.5190E+02	.5958E+02			
Stress	15	.7137E+02	-.2914E+02	.5353E+00	.1427E+02	.8472E+01	.4127E+03
Stress	15	.1211E+03	.2163E+02	.6222E+02			
		BEAM NO. 16					
Stress	15	-.2210E+02	-.2914E+02	.5353E+00	.1427E+02	.8472E+01	.4127E+03
Stress	15	.2764E+02	-.7184E+02	.3865E+02			

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BLOWER SKID

Load Case 3:DL+EQ(100% Z-AXIS, 30% X-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	16	-.3339E+02	-.3500E+01	.5353E+00	.1427E+02	-.1221E+02	-.6426E+02
Stress	16	.4308E+02	-.1099E+03	.5676E+02			
BEAM NO. 17							
Stress	16	-.8295E+02	-.3500E+01	.5353E+00	.1427E+02	-.1221E+02	-.6426E+02
Stress	16	-.6483E+01	-.1594E+03	.8098E+02			
Stress	18	-.9255E+02	.3015E+02	.5353E+00	.1427E+02	-.2979E+02	.3547E+01
Stress	18	-.5921E+02	-.1259E+03	.6454E+02			
BEAM NO. 18							
Stress	9	-.6276E+00	-.2912E+03	.4205E+02	.1572E+02	.3472E+02	.3159E+03
Stress	9	.3500E+03	-.3512E+03	.1763E+03			
Stress	17	-.6276E+00	-.3129E+03	.4205E+02	.1572E+02	-.7915E+03	-.9735E+03
Stress	17	.1764E+04	-.1766E+04	.8829E+03			
BEAM NO. 19							
ess	17	-.7766E-01	.2566E+03	-.5162E+02	.1572E+02	-.7915E+03	-.9735E+03
Stress	17	.1765E+04	-.1765E+04	.8827E+03			
Stress	18	-.7766E-01	.2457E+03	-.5162E+02	.1572E+02	-.2844E+03	-.4375E+03
Stress	18	.7218E+03	-.7219E+03	.3613E+03			
BEAM NO. 20							
Stress	18	.5108E-02	.1516E+03	-.3597E+02	-.1381E+01	-.2862E+03	-.4388E+03
Stress	18	.7251E+03	-.7250E+03	.3625E+03			
Stress	19	.5108E-02	.1190E+03	-.3597E+02	-.1381E+01	.7738E+03	.4273E+03
Stress	19	.1201E+04	-.1201E+04	.6006E+03			
BEAM NO. 21							
Stress	19	-.2155E+03	-.1259E+03	.3052E+00	.2461E+01	.1728E+02	-.4391E+01
Stress	19	-.1938E+03	-.2371E+03	.1186E+03			
Stress	20	-.2059E+03	-.2656E+02	.3052E+00	.2461E+01	.7253E+01	-.4073E+03
Stress	20	.2087E+03	-.6205E+03	.3102E+03			
BEAM NO. 22							
Stress	20	-.7600E+02	-.2656E+02	.3052E+00	.2461E+01	.7253E+01	-.4073E+03
Stress	20	.3386E+03	-.4906E+03	.2453E+03			
Stress	21	-.6471E+02	.1673E+03	.3052E+00	.2461E+01	-.4540E+01	.4784E+02
Stress	21	-.1233E+02	-.1171E+03	.5859E+02			
BEAM NO. 23							
Stress	21	.1982E+03	.1673E+03	.3052E+00	.2461E+01	-.4540E+01	.4784E+02
Stress	21	.2505E+03	.1458E+03	.1253E+03			
Stress	22	.2106E+03	-.1259E+03	.3052E+00	.2461E+01	-.1751E+02	.5558E+01
Stress	22	.2336E+03	.1875E+03	.1168E+03			
BEAM NO. 24							
ess	22	-.5230E-01	-.9758E+02	-.2486E+02	.1049E+02	-.7846E+03	.4227E+03
ess	22	.1207E+04	-.1207E+04	.6038E+03			

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BLOWER SKID

Load Case 3:DL+EQ(100% Z-AXIS, 30% X-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	23	-.5230E-01	-.1301E+03	-.2486E+02	.1049E+02	-.5179E+02	-.3062E+03
Stress	23	.3579E+03	-.3580E+03	.1793E+03			
BEAM NO. 25							
Stress	23	.2414E+03	.1283E+03	-.9498E+00	-.1828E+02	-.5476E+02	-.1084E+01
Stress	23	.2973E+03	.1856E+03	.1498E+03			
Stress	24	.2290E+03	-.1970E+03	-.9498E+00	-.1828E+02	-.1439E+02	-.3479E+02
Stress	24	.2782E+03	.1798E+03	.1403E+03			
BEAM NO. 26							
Stress	24	-.9847E+02	-.1970E+03	-.9498E+00	-.1828E+02	-.1439E+02	-.3479E+02
Stress	24	-.4929E+02	-.1476E+03	.7605E+02			
Stress	25	-.1098E+03	.5623E+02	-.9498E+00	-.1828E+02	.2231E+02	-.4898E+03
Stress	25	.4024E+03	-.6219E+03	.3115E+03			
BEAM NO. 27							
Stress	25	-.2126E+03	.5623E+02	-.9498E+00	-.1828E+02	.2231E+02	-.4898E+03
Stress	25	.2995E+03	-.7248E+03	.3628E+03			
Stress	26	-.2222E+03	.1283E+03	-.9498E+00	-.1828E+02	.5351E+02	.5765E+01
Stress	26	-.1630E+03	-.2815E+03	.1419E+03			
BEAM NO. 28							
Stress	19	.5230E-01	-.1002E+03	.2940E+02	.1979E+02	.7735E+03	.4265E+01
Stress	19	.1200E+04	-.1200E+04	.6004E+03			
Stress	26	.5230E-01	-.1328E+03	.2940E+02	.1979E+02	-.9304E+02	-.3191E+01
Stress	26	.4122E+03	-.4121E+03	.2071E+03			
BEAM NO. 29							
Stress	26	-.9456E-01	-.3589E+03	.9603E+02	-.8005E+01	-.9067E+02	-.3167E+01
Stress	26	.4073E+03	-.4075E+03	.2039E+03			
Stress	27	-.9456E-01	-.3697E+03	.9603E+02	-.8005E+01	-.1034E+04	-.1094E+01
Stress	27	.2128E+04	-.2128E+04	.1064E+04			
BEAM NO. 30							
Stress	27	.3823E-01	.3345E+03	-.5208E+02	-.8005E+01	-.1034E+04	-.1094E+01
Stress	27	.2128E+04	-.2128E+04	.1064E+04			
Stress	28	.3823E-01	.3128E+03	-.5208E+02	-.8005E+01	-.1080E+02	.2873E+01
Stress	28	.2982E+03	-.2981E+03	.1493E+03			
BEAM NO. 31							
Stress	28	-.1901E+03	-.6520E+02	.5259E+01	.8379E+01	.3734E+03	.6344E+01
Stress	28	.1840E+03	-.5641E+03	.2822E+03			
Stress	29	-.1805E+03	-.1873E+02	.5259E+01	.8379E+01	.2007E+03	-.2225E+01
Stress	29	.2427E+03	-.6037E+03	.3019E+03			
BEAM NO. 32							
Stress	29	-.1184E+03	-.1873E+02	.5259E+01	.8379E+01	.2007E+03	-.2225E+01
Stress	29	.3048E+03	-.5415E+03	.2709E+03			

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Load Case 3:DL+EQ(100% Z-AXIS, 30% X-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	30	-.1144E+03	-.1873E+02	.5259E+01	.8379E+01	.1295E+03	-.2649E+03
Stress	30	.2800E+03	-.5089E+03	.2546E+03			
BEAM NO. 33							
Stress	30	-.7049E+02	-.9116E+01	.8917E+01	.8379E+01	.1295E+03	-.2649E+03
Stress	30	.3240E+03	-.4649E+03	.2326E+03			
Stress	31	-.6315E+02	.8222E+02	.8917E+01	.8379E+01	-.9443E+02	-.7915E+01
Stress	31	.3920E+02	-.1655E+03	.8317E+02			
BEAM NO. 34							
Stress	31	.1922E+03	.8222E+02	.8917E+01	.8379E+01	-.9443E+02	-.7915E+01
Stress	31	.2945E+03	.8983E+02	.1475E+03			
Stress	33	.2046E+03	-.5559E+02	.8917E+01	.8379E+01	-.4735E+03	-.2300E+01
Stress	33	.6804E+03	-.2712E+03	.3403E+03			
BEAM NO. 35							
Stress	32	.1128E+01	.3450E+03	.3906E+02	.5260E+01	.8447E+03	-.1117E+04
Stress	32	.1963E+04	-.1961E+04	.9815E+03			
Stress	33	.1128E+01	.3233E+03	.3906E+02	.5260E+01	.7717E+02	.3091E+03
Stress	33	.3873E+03	-.3851E+03	.1937E+03			
BEAM NO. 36							
Stress	33	-.2505E+00	.1151E+03	.1020E+02	-.5830E+01	.7826E+02	.2876E+03
Stress	33	.3656E+03	-.3661E+03	.1831E+03			
Stress	34	-.2505E+00	.8259E+02	.1020E+02	-.5830E+01	-.2225E+03	.9205E+03
Stress	34	.1143E+04	-.1143E+04	.5716E+03			
BEAM NO. 37							
Stress	34	.2111E+03	.3429E+02	.1624E+01	-.6145E+00	-.2898E+02	.3667E+01
Stress	34	.2437E+03	.1784E+03	.1219E+03			
Stress	35	.1986E+03	-.3622E+02	.1624E+01	-.6145E+00	-.9804E+02	.4240E+02
Stress	35	.3391E+03	.5821E+02	.1695E+03			
BEAM NO. 38							
Stress	35	.6941E+02	-.3622E+02	.1624E+01	-.6145E+00	-.9804E+02	.4240E+02
Stress	35	.2098E+03	-.7102E+02	.1049E+03			
Stress	36	.6207E+02	-.4423E+02	.1624E+01	-.6145E+00	-.1388E+03	-.1357E+03
Stress	36	.3367E+03	-.2125E+03	.1683E+03			
BEAM NO. 39							
Stress	36	-.9790E+02	-.8977E+01	-.1118E+02	-.6145E+00	-.1388E+03	-.1357E+03
Stress	36	.1767E+03	-.3725E+03	.1862E+03			
Stress	37	-.1019E+03	-.8977E+01	-.1118E+02	-.6145E+00	.1233E+02	-.1561E+03
Stress	37	.6654E+02	-.2703E+03	.1351E+03			
BEAM NO. 40							
Stress	37	-.2098E+03	-.8977E+01	-.1118E+02	-.6145E+00	.1233E+02	-.1561E+03
Stress	37	-.4136E+02	-.3782E+03	.1891E+03			

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BLOWER SKID

Load Case 3:DL+EQ(100% Z-AXIS, 30% X-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	38	-.2194E+03	.6954E+02	-.1118E+02	-.6145E+00	.3795E+03	-.2306E+01
Stress	38	.1624E+03	-.6011E+03	.3006E+03			
BEAM NO. 41							
Stress	28	.8515E+00	.1194E+03	-.1823E+02	-.1106E+02	-.1189E+02	.2704E+03
Stress	28	.2831E+03	-.2814E+03	.1420E+03			
Stress	38	.8515E+00	.8689E+02	-.1823E+02	-.1106E+02	.5254E+03	.9309E+03
Stress	38	.1457E+04	-.1455E+04	.7286E+03			
BEAM NO. 42							
Stress	38	-.8770E+00	-.1363E+03	.1788E+02	.5554E-01	.5254E+03	.9481E+03
Stress	38	.1473E+04	-.1474E+04	.7372E+03			
Stress	39	-.8770E+00	-.1688E+03	.1788E+02	.5554E-01	-.1404E+01	-.2865E+02
Stress	39	.2918E+02	-.3093E+02	.1546E+02			
BEAM NO. 43							
Stress	39	.1193E+02	-.1148E+02	-.1106E+02	-.1080E+02	-.6317E+03	.1152E-01
Stress	39	.6436E+03	-.6198E+03	.3220E+03			
Stress	40	.2152E+02	.2057E+02	-.1106E+02	-.1080E+02	-.2684E+03	.3016E+02
Stress	40	.3201E+03	-.2770E+03	.1604E+03			
BEAM NO. 44							
Stress	40	-.1863E+02	.2057E+02	-.1106E+02	-.1080E+02	-.2684E+03	.3016E+02
Stress	40	.2799E+03	-.3172E+03	.1590E+03			
Stress	41	-.7334E+01	-.8277E+01	-.1106E+02	-.1080E+02	.1590E+03	.6989E+02
Stress	41	.2215E+03	-.2362E+03	.1186E+03			
BEAM NO. 45							
Stress	41	-.7334E+01	-.8277E+01	-.1106E+02	-.1080E+02	.1590E+03	.6989E+02
Stress	41	.2215E+03	-.2362E+03	.1186E+03			
Stress	42	.5087E+01	-.1148E+02	-.1106E+02	-.1080E+02	.6291E+03	-.2458E+01
Stress	42	.6366E+03	-.6265E+03	.3185E+03			
BEAM NO. 46							
Stress	34	-.5017E+00	-.1322E+03	-.7599E+01	.1185E+02	-.2225E+03	.9218E+03
Stress	34	.1144E+04	-.1145E+04	.5725E+03			
Stress	42	-.5017E+00	-.1647E+03	-.7599E+01	.1185E+02	.1404E+01	-.2853E+02
Stress	42	.2943E+02	-.3044E+02	.1929E+02			
BEAM NO. 47							
Stress	5	-.8783E+00	-.7976E+02	-.2870E+02	.1351E+02	-.1074E+04	.1023E+04
Stress	5	.2097E+04	-.2098E+04	.1049E+04			
Stress	12	-.8783E+00	-.1615E+03	-.2870E+02	.1351E+02	.3395E+03	.2869E+02
Stress	12	.3673E+03	-.3690E+03	.1850E+03			
BEAM NO. 48							
Stress	14	-.5108E-02	.1492E+03	.4050E+02	-.1631E+02	.4088E+03	-.4277E+03
Stress	14	.8365E+03	-.8365E+03	.4186E+03			

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BLOWER SKID

Load Case 3:DL+EQ(100% Z-AXIS, 30% X-AXIS)

LLoads	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
Stress	Node	Maximum	Minimum	Cmb. Shear			
Stress	22	-.5108E-02	.1167E+03	.4050E+02	-.1631E+02	-.7849E+03	.4235E+03
Stress	22	.1208E+04	-.1208E+04	.6044E+03			
BEAM NO. 49							
Stress	23	.9456E-01	-.3758E+03	-.9149E+02	.5260E+01	-.5416E+02	-.3037E+03
Stress	23	.3580E+03	-.3578E+03	.1791E+03			
Stress	32	.9456E-01	-.3866E+03	-.9149E+02	.5260E+01	.8447E+03	-.1117E+04
Stress	32	.1962E+04	-.1962E+04	.9810E+03			

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BLOWER SKID

Load Case 3:DL+EQ(100% Z-AXIS, 30% X-AXIS)

MAXIMUM STRESS SUMMARY FOR BEAMS/TRUSSES
 WITHIN SPECIFIED RANGE 1- 49

Maximum (absolute) Stress = .2128E+04 at BEAM 29

Beam	Axial	Y-Shear	Z-Shear	Torsion	Y-Bending	Z-Bending
29	-.9456E-01	-.3697E+03	.9603E+02	-.8005E+01	-.1034E+04	-.1094E+04
	Maximum	Minimum	Cmb. Shear			
	.2128E+04	-.2128E+04	.1064E+04			

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 1

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1901E+02	-.8049E+00	.5174E+01	.6847E+00	-.1550E+03	.2924E+01
.4250E+01	.2283E+02	-.8049E+00	.5174E+01	.6847E+00	-.1330E+03	-.4967E+00
.8500E+01	.2666E+02	-.8049E+00	.5174E+01	.6847E+00	-.1110E+03	-.3918E+01
.1275E+02	.3048E+02	-.8049E+00	.5174E+01	.6847E+00	-.8901E+02	-.7339E+01
.1700E+02	.3431E+02	-.8049E+00	.5174E+01	.6847E+00	-.6702E+02	-.1076E+02

BEAM No. 2

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	-.1869E+02	-.8049E+00	.5174E+01	.6847E+00	-.6702E+02	-.1076E+02
.05E+01	-.1419E+02	-.8049E+00	.5174E+01	.6847E+00	-.4115E+02	-.1478E+02
.1000E+02	-.9691E+01	-.8049E+00	.5174E+01	.6847E+00	-.1528E+02	-.1881E+02
.1500E+02	-.5191E+01	-.8049E+00	.5174E+01	.6847E+00	.1059E+02	-.2283E+02
.2000E+02	-.6907E+00	-.8049E+00	.5174E+01	.6847E+00	.3646E+02	-.2686E+02

BEAM No. 3

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.2169E+02	.1195E+01	.5174E+01	.6847E+00	.3646E+02	-.2686E+02
.5500E+01	-.1674E+02	.1195E+01	.5174E+01	.6847E+00	.6492E+02	-.2028E+02
.1100E+02	-.1179E+02	.1195E+01	.5174E+01	.6847E+00	.9338E+02	-.1371E+02
.1650E+02	-.6841E+01	.1195E+01	.5174E+01	.6847E+00	.1218E+03	-.7139E+01
.2200E+02	-.1891E+01	.1195E+01	.5174E+01	.6847E+00	.1503E+03	-.5660E+00

BEAM No. 4

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1188E+01	.1051E+03	.3510E+01	-.5660E+00	-.6847E+00	-.1503E+03
.6375E+01	.1188E+01	.9236E+02	.3510E+01	-.5660E+00	.2169E+02	.4791E+03
.1275E+02	.1188E+01	.7961E+02	.3510E+01	-.5660E+00	.4407E+02	.1027E+04
.1913E+02	.1188E+01	.6686E+02	.3510E+01	-.5660E+00	.6644E+02	.1494E+04
.2550E+02	.1188E+01	.5411E+02	.3510E+01	-.5660E+00	.8882E+02	.1880E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 5

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.9191E+02	.7953E+01	.2557E+01	.3331E+00	-.8452E+02	.1106E+01
.5500E+01	.8696E+02	.7953E+01	.2557E+01	.3331E+00	-.7045E+02	.4485E+02
.1100E+02	.8201E+02	.7953E+01	.2557E+01	.3331E+00	-.5639E+02	.8859E+02
.1650E+02	.7706E+02	.1953E+01	.2557E+01	.3331E+00	-.4232E+02	.1113E+03
.2200E+02	.7211E+02	.1953E+01	.2557E+01	.3331E+00	-.2826E+02	.1221E+03

BEAM No. 6

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	-.6689E+02	.1953E+01	.2557E+01	.3331E+00	-.2826E+02	.1221E+03
.00E+01	-.7139E+02	.1953E+01	.2557E+01	.3331E+00	-.1547E+02	.1318E+03
.100E+02	-.7589E+02	.1953E+01	.2557E+01	.3331E+00	-.2682E+01	.1416E+03
.1500E+02	-.8039E+02	-.1205E+02	.2557E+01	.3331E+00	.1010E+02	.8137E+02
.2000E+02	-.8489E+02	-.1205E+02	.2557E+01	.3331E+00	.2289E+02	.2114E+02

BEAM No. 7

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.2449E+03	-.1205E+02	.2557E+01	.3331E+00	.2289E+02	.2114E+02
.4250E+01	-.2487E+03	-.1205E+02	.2557E+01	.3331E+00	.3376E+02	-.3006E+02
.8500E+01	-.2525E+03	.7953E+01	.2557E+01	.3331E+00	.4463E+02	-.7126E+02
.1275E+02	-.2564E+03	.7953E+01	.2557E+01	.3331E+00	.5550E+02	-.3746E+02
.1700E+02	-.2602E+03	.7953E+01	.2557E+01	.3331E+00	.6637E+02	-.3662E+01

BEAM No. 8

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.5630E+00	.2266E+03	-.4356E+01	-.2924E+01	.6847E+00	-.1550E+03
.6375E+01	-.5630E+00	.2139E+03	-.4356E+01	-.2924E+01	-.2708E+02	.1249E+04
.1275E+02	-.5630E+00	.2011E+03	-.4356E+01	-.2924E+01	-.5485E+02	.2572E+04
.1913E+02	-.5630E+00	.1884E+03	-.4356E+01	-.2924E+01	-.8262E+02	.3813E+04
.2550E+02	-.5630E+00	.1756E+03	-.4356E+01	-.2924E+01	-.1104E+03	.4974E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 9

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1994E+01	-.8456E+02	.3597E+01	.7379E+00	-.1101E+03	.4907E+04
.6375E+01	.1994E+01	-.9731E+02	.3597E+01	.7379E+00	-.8712E+02	.4327E+04
.1275E+02	.1994E+01	-.1101E+03	.3597E+01	.7379E+00	-.6419E+02	.3666E+04
.1913E+02	.1994E+01	-.1228E+03	.3597E+01	.7379E+00	-.4126E+02	.2924E+04
.2550E+02	.1994E+01	-.1356E+03	.3597E+01	.7379E+00	-.1833E+02	.2101E+04

BEAM No. 10

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0E+00	-.2987E+03	-.1193E+02	-.4142E+01	-.5564E+00	.1186E+03	-.1087E+01
.0E+01	-.2949E+03	-.1193E+02	-.4142E+01	-.5564E+00	.1010E+03	-.5179E+02
.8500E+01	-.2911E+03	.1707E+02	-.4142E+01	-.5564E+00	.8338E+02	-.8799E+02
.1275E+02	-.2873E+03	.1707E+02	-.4142E+01	-.5564E+00	.6578E+02	-.1544E+02
.1700E+02	-.2834E+03	.1707E+02	-.4142E+01	-.5564E+00	.4818E+02	.5710E+02

BEAM No. 11

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.8656E+02	.1707E+02	-.4142E+01	-.5564E+00	.4818E+02	.5710E+02
.5000E+01	.9106E+02	.1707E+02	-.4142E+01	-.5564E+00	.2747E+02	.1425E+03
.1000E+02	.9556E+02	.1707E+02	-.4142E+01	-.5564E+00	.6764E+01	.2278E+03
.1500E+02	.1001E+03	-.3930E+01	-.4142E+01	-.5564E+00	-.1394E+02	.2082E+03
.2000E+02	.1046E+03	-.3930E+01	-.4142E+01	-.5564E+00	-.3465E+02	.1885E+03

BEAM No. 12

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1976E+03	-.3930E+01	-.4142E+01	-.5564E+00	-.3465E+02	.1885E+03
.5500E+01	.2025E+03	-.3930E+01	-.4142E+01	-.5564E+00	-.5743E+02	.1669E+03
.1100E+02	.2075E+03	-.1193E+02	-.4142E+01	-.5564E+00	-.8021E+02	.1293E+03
.1650E+02	.2124E+03	-.1193E+02	-.4142E+01	-.5564E+00	-.1030E+03	.6366E+02
.2200E+02	.2174E+03	-.1193E+02	-.4142E+01	-.5564E+00	-.1258E+03	-.1955E+01

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FORCE/MOMENT DIAGRAMS

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BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 13

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.2773E+01	-.3062E+03	-.1637E+02	-.1415E+01	-.2426E+02	.3065E+03
.4250E+01	.2773E+01	-.3147E+03	-.1637E+02	-.1415E+01	-.9385E+02	-.1013E+04
.8500E+01	.2773E+01	-.3232E+03	-.1637E+02	-.1415E+01	-.1634E+03	-.2368E+04
.1275E+02	.2773E+01	-.3317E+03	-.1637E+02	-.1415E+01	-.2330E+03	-.3760E+04
.1700E+02	.2773E+01	-.3402E+03	-.1637E+02	-.1415E+01	-.3026E+03	-.5187E+04

BEAM No. 14

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	-.1111E+00	.3181E+03	.2024E+02	-.1415E+01	-.3026E+03	-.5187E+04
.5E+01	-.1111E+00	.3139E+03	.2024E+02	-.1415E+01	-.2596E+03	-.4516E+04
.4250E+01	-.1111E+00	.3096E+03	.2024E+02	-.1415E+01	-.2166E+03	-.3853E+04
.6375E+01	-.1111E+00	.3054E+03	.2024E+02	-.1415E+01	-.1735E+03	-.3200E+04
.8500E+01	-.1111E+00	.3011E+03	.2024E+02	-.1415E+01	-.1305E+03	-.2556E+04

BEAM No. 15

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.9869E+02	.5515E+01	-.1962E+00	.5535E+00	.5691E+01	-.4528E+00
.5500E+01	.9374E+02	.5515E+01	-.1962E+00	.5535E+00	.4612E+01	.2988E+02
.1100E+02	.8879E+02	.5515E+01	-.1962E+00	.5535E+00	.3532E+01	.6021E+02
.1650E+02	.8384E+02	-.5485E+01	-.1962E+00	.5535E+00	.2453E+01	.5205E+02
.2200E+02	.7889E+02	-.5485E+01	-.1962E+00	.5535E+00	.1374E+01	.2188E+02

BEAM No. 16

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.5893E+01	-.5485E+01	-.1962E+00	.5535E+00	.1374E+01	.2188E+02
.5000E+01	.1393E+01	-.5485E+01	-.1962E+00	.5535E+00	.3928E+00	-.5546E+01
.1000E+02	-.3107E+01	-.5485E+01	-.1962E+00	.5535E+00	-.5884E+00	-.3297E+02
.1500E+02	-.7607E+01	-.4849E+00	-.1962E+00	.5535E+00	-.1569E+01	-.3540E+02
.2000E+02	-.1211E+02	-.4849E+00	-.1962E+00	.5535E+00	-.2551E+01	-.3782E+02

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 17

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1081E+03	-.4849E+00	-.1962E+00	.5535E+00	-.2551E+01	-.3782E+02
.4250E+01	-.1119E+03	-.4849E+00	-.1962E+00	.5535E+00	-.3385E+01	-.3988E+02
.8500E+01	-.1158E+03	-.4849E+00	-.1962E+00	.5535E+00	-.4219E+01	-.4194E+02
.1275E+02	-.1196E+03	.5515E+01	-.1962E+00	.5535E+00	-.5052E+01	-.2150E+02
.1700E+02	-.1234E+03	.5515E+01	-.1962E+00	.5535E+00	-.5886E+01	.1936E+01

BEAM No. 18

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
0E+00	-.2147E+01	-.4343E+03	.1553E+02	.1825E+01	-.1888E+02	.2219E+04
.0E+01	-.2147E+01	-.4428E+03	.1553E+02	.1825E+01	.4711E+02	.3553E+03
.8500E+01	-.2147E+01	-.4513E+03	.1553E+02	.1825E+01	.1131E+03	-.1545E+04
.1275E+02	-.2147E+01	-.4598E+03	.1553E+02	.1825E+01	.1791E+03	-.3481E+04
.1700E+02	-.2147E+01	-.4683E+03	.1553E+02	.1825E+01	.2451E+03	-.5453E+04

BEAM No. 19

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1111E+00	.3452E+03	-.1830E+02	.1825E+01	.2451E+03	-.5453E+04
.2125E+01	.1111E+00	.3410E+03	-.1830E+02	.1825E+01	.2062E+03	-.4724E+04
.4250E+01	.1111E+00	.3367E+03	-.1830E+02	.1825E+01	.1673E+03	-.4004E+04
.6375E+01	.1111E+00	.3325E+03	-.1830E+02	.1825E+01	.1284E+03	-.3293E+04
.8500E+01	.1111E+00	.3282E+03	-.1830E+02	.1825E+01	.8950E+02	-.2591E+04

BEAM No. 20

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.8508E-01	.2048E+03	-.1279E+02	-.1109E+00	.9005E+02	-.2585E+04
.6375E+01	-.8508E-01	.1920E+03	-.1279E+02	-.1109E+00	.8524E+01	-.1320E+04
.1275E+02	-.8508E-01	.1793E+03	-.1279E+02	-.1109E+00	-.7300E+02	-.1366E+03
.1913E+02	-.8508E-01	.1665E+03	-.1279E+02	-.1109E+00	-.1545E+03	.9657E+03
.2550E+02	-.8508E-01	.1538E+03	-.1279E+02	-.1109E+00	-.2361E+03	.1987E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 21

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.2961E+03	-.2374E+02	.8613E-01	.9242E-01	-.2480E+01	-.3672E+01
.4250E+01	-.2923E+03	-.2374E+02	.8613E-01	.9242E-01	-.2113E+01	-.1046E+03
.8500E+01	-.2885E+03	-.4738E+01	.8613E-01	.9242E-01	-.1747E+01	-.1959E+03
.1275E+02	-.2846E+03	-.4738E+01	.8613E-01	.9242E-01	-.1381E+01	-.2161E+03
.1700E+02	-.2808E+03	-.4738E+01	.8613E-01	.9242E-01	-.1015E+01	-.2362E+03

BEAM No. 22

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	-.8481E+02	-.4738E+01	.8613E-01	.9242E-01	-.1015E+01	-.2362E+03
.00E+01	-.8031E+02	-.4738E+01	.8613E-01	.9242E-01	-.5846E+00	-.2599E+03
.1000E+02	-.7581E+02	-.4738E+01	.8613E-01	.9242E-01	-.1539E+00	-.2836E+03
.1500E+02	-.7131E+02	.3126E+02	.8613E-01	.9242E-01	.2767E+00	-.1273E+03
.2000E+02	-.6681E+02	.3126E+02	.8613E-01	.9242E-01	.7074E+00	.2902E+02

BEAM No. 23

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.2702E+03	.3126E+02	.8613E-01	.9242E-01	.7074E+00	.2902E+02
.5500E+01	.2751E+03	.3126E+02	.8613E-01	.9242E-01	.1181E+01	.2010E+03
.1100E+02	.2801E+03	-.2374E+02	.8613E-01	.9242E-01	.1655E+01	.2629E+03
.1650E+02	.2850E+03	-.2374E+02	.8613E-01	.9242E-01	.2129E+01	.1323E+03
.2200E+02	.2900E+03	-.2374E+02	.8613E-01	.9242E-01	.2602E+01	.1784E+01

BEAM No. 24

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1056E-02	-.1386E+03	-.9008E+01	-.8330E-01	.2444E+03	.1959E+04
.6375E+01	-.1056E-02	-.1513E+03	-.9008E+01	-.8330E-01	.1870E+03	.1035E+04
.1275E+02	-.1056E-02	-.1641E+03	-.9008E+01	-.8330E-01	.1296E+03	.2950E+02
.1913E+02	-.1056E-02	-.1768E+03	-.9008E+01	-.8330E-01	.7215E+02	-.1057E+04
.2550E+02	-.1056E-02	-.1896E+03	-.9008E+01	-.8330E-01	.1472E+02	-.2225E+04

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FORCE/MOMENT DIAGRAMS

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BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 25

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.3951E+03	.2835E+02	.1399E+00	-.7105E+00	-.4022E+01	.1374E+01
.5500E+01	.3902E+03	.2835E+02	.1399E+00	-.7105E+00	-.3253E+01	.1573E+03
.1100E+02	.3852E+03	-.3265E+02	.1399E+00	-.7105E+00	-.2484E+01	.1913E+03
.1650E+02	.3803E+03	-.3265E+02	.1399E+00	-.7105E+00	-.1715E+01	.1173E+02
.2200E+02	.3753E+03	-.3265E+02	.1399E+00	-.7105E+00	-.9455E+00	-.1678E+03

BEAM No. 26

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0E+00	-.1497E+03	-.3265E+02	.1399E+00	-.7105E+00	-.9455E+00	-.1678E+03
.1E+01	-.1542E+03	-.3265E+02	.1399E+00	-.7105E+00	-.2462E+00	-.3310E+03
.1000E+02	-.1587E+03	-.3265E+02	.1399E+00	-.7105E+00	.4531E+00	-.4943E+03
.1500E+02	-.1632E+03	.1435E+02	.1399E+00	-.7105E+00	.1152E+01	-.4225E+03
.2000E+02	-.1677E+03	.1435E+02	.1399E+00	-.7105E+00	.1852E+01	-.3507E+03

BEAM No. 27

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.3487E+03	.1435E+02	.1399E+00	-.7105E+00	.1852E+01	-.3507E+03
.4250E+01	-.3525E+03	.1435E+02	.1399E+00	-.7105E+00	.2446E+01	-.2897E+03
.8500E+01	-.3563E+03	.1435E+02	.1399E+00	-.7105E+00	.3040E+01	-.2287E+03
.1275E+02	-.3601E+03	.2835E+02	.1399E+00	-.7105E+00	.3635E+01	-.1152E+03
.1700E+02	-.3640E+03	.2835E+02	.1399E+00	-.7105E+00	.4229E+01	.5306E+01

BEAM No. 28

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1056E-02	-.1423E+03	.1095E+02	.3561E+01	-.2360E+03	.1984E+04
.6375E+01	.1056E-02	-.1551E+03	.1095E+02	.3561E+01	-.1662E+03	.1036E+04
.1275E+02	.1056E-02	-.1678E+03	.1095E+02	.3561E+01	-.9636E+02	.7206E+01
.1913E+02	.1056E-02	-.1806E+03	.1095E+02	.3561E+01	-.2655E+02	-.1103E+04
.2550E+02	.1056E-02	-.1933E+03	.1095E+02	.3561E+01	.4325E+02	-.2295E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

L O A D C A S E 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 29

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1409E+00	-.5573E+03	.3930E+02	-.1745E+01	.4254E+02	-.2299E+04
.2125E+01	.1409E+00	-.5615E+03	.3930E+02	-.1745E+01	.1261E+03	-.3488E+04
.4250E+01	.1409E+00	-.5658E+03	.3930E+02	-.1745E+01	.2096E+03	-.4686E+04
.6375E+01	.1409E+00	-.5700E+03	.3930E+02	-.1745E+01	.2931E+03	-.5893E+04
.8500E+01	.1409E+00	-.5743E+03	.3930E+02	-.1745E+01	.3766E+03	-.7108E+04

BEAM No. 30

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0E+00	.5254E+01	.5717E+03	-.2386E+02	-.1745E+01	.3766E+03	-.7108E+04
.0E+01	.5254E+01	.5632E+03	-.2386E+02	-.1745E+01	.2752E+03	-.4697E+04
.8500E+01	.5254E+01	.5547E+03	-.2386E+02	-.1745E+01	.1738E+03	-.2321E+04
.1275E+02	.5254E+01	.5462E+03	-.2386E+02	-.1745E+01	.7244E+02	.1810E+02
.1700E+02	.5254E+01	.5377E+03	-.2386E+02	-.1745E+01	-.2895E+02	.2321E+04

BEAM No. 31

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.3414E+03	-.1682E+02	.1008E+01	.4600E+00	-.9205E+02	-.2135E-01
.4250E+01	-.3375E+03	-.1682E+02	.1008E+01	.4600E+00	-.8776E+02	-.7150E+02
.8500E+01	-.3337E+03	-.7819E+01	.1008E+01	.4600E+00	-.8348E+02	-.1385E+03
.1275E+02	-.3299E+03	-.7819E+01	.1008E+01	.4600E+00	-.7920E+02	-.1717E+03
.1700E+02	-.3261E+03	-.7819E+01	.1008E+01	.4600E+00	-.7491E+02	-.2049E+03

BEAM No. 32

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.2301E+03	-.7819E+01	.1008E+01	.4600E+00	-.7491E+02	-.2049E+03
.1750E+01	-.2285E+03	-.7819E+01	.1008E+01	.4600E+00	-.7315E+02	-.2186E+03
.3500E+01	-.2269E+03	-.7819E+01	.1008E+01	.4600E+00	-.7138E+02	-.2323E+03
.5250E+01	-.2253E+03	-.7819E+01	.1008E+01	.4600E+00	-.6962E+02	-.2460E+03
.7000E+01	-.2238E+03	-.7819E+01	.1008E+01	.4600E+00	-.6786E+02	-.2597E+03

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 33

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1538E+03	-.7819E+01	.7008E+01	.4600E+00	-.6786E+02	-.2597E+03
.3250E+01	-.1508E+03	-.7819E+01	.7008E+01	.4600E+00	-.4508E+02	-.2851E+03
.6500E+01	-.1479E+03	.2818E+02	.7008E+01	.4600E+00	-.2230E+02	-.2205E+03
.9750E+01	-.1450E+03	.2818E+02	.7008E+01	.4600E+00	.4720E+00	-.1289E+03
.1300E+02	-.1421E+03	.2818E+02	.7008E+01	.4600E+00	.2325E+02	-.3732E+02

BEAM No. 34

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
0E+00	.3429E+03	.2818E+02	.7008E+01	.4600E+00	.2325E+02	-.3732E+02
0E+01	.3479E+03	.2818E+02	.7008E+01	.4600E+00	.6179E+02	.1177E+03
.1100E+02	.3528E+03	-.1682E+02	.7008E+01	.4600E+00	.1003E+03	.1827E+03
.1650E+02	.3578E+03	-.1682E+02	.7008E+01	.4600E+00	.1389E+03	.9016E+02
.2200E+02	.3627E+03	-.1682E+02	.7008E+01	.4600E+00	.1774E+03	-.2340E+01

BEAM No. 35

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.7496E+01	.5917E+03	.1864E+02	.1291E+01	-.3022E+03	-.7271E+04
.4250E+01	.7496E+01	.5832E+03	.1864E+02	.1291E+01	-.2229E+03	-.4775E+04
.8500E+01	.7496E+01	.5747E+03	.1864E+02	.1291E+01	-.1437E+03	-.2314E+04
.1275E+02	.7496E+01	.5662E+03	.1864E+02	.1291E+01	-.6453E+02	.1101E+03
.1700E+02	.7496E+01	.5577E+03	.1864E+02	.1291E+01	.1468E+02	.2498E+04

BEAM No. 36

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.4883E+00	.1949E+03	.1818E+01	-.1049E+01	.1422E+02	.2321E+04
.6375E+01	.4883E+00	.1822E+03	.1818E+01	-.1049E+01	.2582E+02	.3523E+04
.1275E+02	.4883E+00	.1694E+03	.1818E+01	-.1049E+01	.3741E+02	.4644E+04
.1913E+02	.4883E+00	.1567E+03	.1818E+01	-.1049E+01	.4900E+02	.5683E+04
.2550E+02	.4883E+00	.1439E+03	.1818E+01	-.1049E+01	.6059E+02	.6641E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 37

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.3843E+03	.4221E+01	.5974E+01	-.9316E-01	-.6828E+02	.3389E+01
.5500E+01	.3794E+03	.4221E+01	.5974E+01	-.9316E-01	-.3542E+02	.2660E+02
.1100E+02	.3744E+03	.4221E+01	.5974E+01	-.9316E-01	-.2566E+01	.4982E+02
.1650E+02	.3695E+03	-.8779E+01	.5974E+01	-.9316E-01	.3029E+02	.2753E+02
.2200E+02	.3645E+03	-.8779E+01	.5974E+01	-.9316E-01	.6315E+02	-.2076E+02

BEAM No. 38

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.000E+00	.6850E+02	-.8779E+01	.5974E+01	-.9316E-01	.6315E+02	-.2076E+02
.50E+01	.6558E+02	-.8779E+01	.5974E+01	-.9316E-01	.8257E+02	-.4929E+02
.500E+01	.6265E+02	-.8779E+01	.5974E+01	-.9316E-01	.1020E+03	-.7782E+02
.9750E+01	.5973E+02	-.6779E+01	.5974E+01	-.9316E-01	.1214E+03	-.1049E+03
.1300E+02	.5680E+02	-.6779E+01	.5974E+01	-.9316E-01	.1408E+03	-.1269E+03

BEAM No. 39

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1982E+03	.2207E+00	-.1603E+02	-.9316E-01	.1408E+03	-.1269E+03
.1750E+01	-.1998E+03	.2207E+00	-.1603E+02	-.9316E-01	.1128E+03	-.1265E+03
.3500E+01	-.2013E+03	.2207E+00	-.1603E+02	-.9316E-01	.8473E+02	-.1261E+03
.5250E+01	-.2029E+03	.2207E+00	-.1603E+02	-.9316E-01	.5668E+02	-.1257E+03
.7000E+01	-.2045E+03	.2207E+00	-.1603E+02	-.9316E-01	.2864E+02	-.1253E+03

BEAM No. 40

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.3805E+03	.2207E+00	-.1603E+02	-.9316E-01	.2864E+02	-.1253E+03
.4250E+01	-.3843E+03	.2207E+00	-.1603E+02	-.9316E-01	-.3947E+02	-.1244E+03
.8500E+01	-.3881E+03	.2207E+00	-.1603E+02	-.9316E-01	-.1076E+03	-.1235E+03
.1275E+02	-.3920E+03	.1522E+02	-.1603E+02	-.9316E-01	-.1757E+03	-.6628E+02
.1700E+02	-.3958E+03	.1522E+02	-.1603E+02	-.9316E-01	-.2438E+03	-.1591E+01

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BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 41

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.6262E+01	.1963E+03	-.7039E+01	-.1724E+01	-.2849E+02	.2229E+04
.6375E+01	.6262E+01	.1836E+03	-.7039E+01	-.1724E+01	-.7337E+02	.3440E+04
.1275E+02	.6262E+01	.1708E+03	-.7039E+01	-.1724E+01	-.1182E+03	.4570E+04
.1913E+02	.6262E+01	.1581E+03	-.7039E+01	-.1724E+01	-.1631E+03	.5619E+04
.2550E+02	.6262E+01	.1453E+03	-.7039E+01	-.1724E+01	-.2080E+03	.6586E+04

BEAM No. 42

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	-.9764E+01	-.2505E+03	.8182E+01	-.1330E+00	-.2081E+03	.6829E+04
.3E+01	-.9764E+01	-.2632E+03	.8182E+01	-.1330E+00	-.1559E+03	.5192E+04
.1275E+02	-.9764E+01	-.2760E+03	.8182E+01	-.1330E+00	-.1038E+03	.3474E+04
.1913E+02	-.9764E+01	-.2887E+03	.8182E+01	-.1330E+00	-.5159E+02	.1674E+04
.2550E+02	-.9764E+01	-.3015E+03	.8182E+01	-.1330E+00	.5687E+00	-.2074E+03

BEAM No. 43

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1906E+02	-.1868E+01	-.7019E+01	-.5687E+00	.2074E+03	-.1330E+00
.4250E+01	-.1523E+02	-.1868E+01	-.7019E+01	-.5687E+00	.1776E+03	-.8072E+01
.8500E+01	-.1141E+02	.4132E+01	-.7019E+01	-.5687E+00	.1478E+03	-.1301E+02
.1275E+02	-.7583E+01	.4132E+01	-.7019E+01	-.5687E+00	.1179E+03	.4551E+01
.1700E+02	-.3758E+01	.4132E+01	-.7019E+01	-.5687E+00	.8812E+02	.2211E+02

BEAM No. 44

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.2476E+02	.4132E+01	-.7019E+01	-.5687E+00	.8812E+02	.2211E+02
.5000E+01	-.2026E+02	.4132E+01	-.7019E+01	-.5687E+00	.5302E+02	.4277E+02
.1000E+02	-.1576E+02	-.1868E+01	-.7019E+01	-.5687E+00	.1792E+02	.5743E+02
.1500E+02	-.1126E+02	-.1868E+01	-.7019E+01	-.5687E+00	-.1717E+02	.4809E+02
.2000E+02	-.6758E+01	-.1868E+01	-.7019E+01	-.5687E+00	-.5227E+02	.3875E+02

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BLOWER SKID

LOAD CASE 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 45

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1324E+02	-.1868E+01	-.7019E+01	-.5687E+00	-.5227E+02	.3875E+02
.5500E+01	.1819E+02	-.1868E+01	-.7019E+01	-.5687E+00	-.9087E+02	.2848E+02
.1100E+02	.2314E+02	-.1868E+01	-.7019E+01	-.5687E+00	-.1295E+03	.1821E+02
.1650E+02	.2809E+02	-.1868E+01	-.7019E+01	-.5687E+00	-.1681E+03	.7934E+01
.2200E+02	.3304E+02	-.1868E+01	-.7019E+01	-.5687E+00	-.2067E+03	-.2339E+01

BEAM No. 46

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	-.5486E+01	-.2404E+03	-.2402E+01	.2339E+01	.6069E+02	.6573E+04
.5E+01	-.5486E+01	-.2531E+03	-.2402E+01	.2339E+01	.4537E+02	.5000E+04
.1275E+02	-.5486E+01	-.2659E+03	-.2402E+01	.2339E+01	.3006E+02	.3346E+04
.1913E+02	-.5486E+01	-.2786E+03	-.2402E+01	.2339E+01	.1475E+02	.1610E+04
.2550E+02	-.5486E+01	-.2914E+03	-.2402E+01	.2339E+01	-.5687E+00	-.2067E+03

BEAM No. 47

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1369E+01	-.3781E+02	-.4443E+01	.5400E+00	.8848E+02	.1795E+04
.6375E+01	-.1369E+01	-.5056E+02	-.4443E+01	.5400E+00	.6016E+02	.1513E+04
.1275E+02	-.1369E+01	-.6331E+02	-.4443E+01	.5400E+00	.3183E+02	.1151E+04
.1913E+02	-.1369E+01	-.7606E+02	-.4443E+01	.5400E+00	.3507E+01	.7063E+03
.2550E+02	-.1369E+01	-.8881E+02	-.4443E+01	.5400E+00	-.2482E+02	.1807E+03

BEAM No. 48

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.8508E-01	.2024E+03	.1473E+02	-.1867E+01	-.1311E+03	-.2550E+04
.6375E+01	.8508E-01	.1897E+03	.1473E+02	-.1867E+01	-.3718E+02	-.1300E+04
.1275E+02	.8508E-01	.1769E+03	.1473E+02	-.1867E+01	.5672E+02	-.1317E+03
.1913E+02	.8508E-01	.1642E+03	.1473E+02	-.1867E+01	.1506E+03	.9555E+03
.2550E+02	.8508E-01	.1514E+03	.1473E+02	-.1867E+01	.2445E+03	.1961E+04

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FORCE/MOMENT DIAGRAMS

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BLOWER SKID

L O A D C A S E 2

DL+EQ(100% X-AXIS, 30% Z-AXIS)

BEAM No. 49

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1409E+00	-.5847E+03	-.3736E+02	.1291E+01	.1543E+02	-.2229E+04
.2125E+01	-.1409E+00	-.5890E+03	-.3736E+02	.1291E+01	-.6396E+02	-.3476E+04
.4250E+01	-.1409E+00	-.5932E+03	-.3736E+02	.1291E+01	-.1434E+03	-.4732E+04
.6375E+01	-.1409E+00	-.5975E+03	-.3736E+02	.1291E+01	-.2228E+03	-.5997E+04
.8500E+01	-.1409E+00	-.6017E+03	-.3736E+02	.1291E+01	-.3022E+03	-.7271E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 1

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.5058E+01	-.1114E+01	.5434E+01	.2270E+01	-.1628E+03	.9159E+01
.4250E+01	-.1233E+01	-.1114E+01	.5434E+01	.2270E+01	-.1397E+03	.4423E+01
.8500E+01	.2592E+01	.1886E+01	.5434E+01	.2270E+01	-.1167E+03	.1187E+01
.1275E+02	.6417E+01	.1886E+01	.5434E+01	.2270E+01	-.9356E+02	.9201E+01
.1700E+02	.1024E+02	.1886E+01	.5434E+01	.2270E+01	-.7046E+02	.1721E+02

BEAM No. 2

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	-.1576E+02	.1886E+01	.5434E+01	.2270E+01	-.7046E+02	.1721E+02
.50E+01	-.1126E+02	.1886E+01	.5434E+01	.2270E+01	-.4329E+02	.2664E+02
.1000E+02	-.6758E+01	-.1114E+01	.5434E+01	.2270E+01	-.1612E+02	.3307E+02
.1500E+02	-.2258E+01	-.1114E+01	.5434E+01	.2270E+01	.1105E+02	.2750E+02
.2000E+02	.2242E+01	-.1114E+01	.5434E+01	.2270E+01	.3822E+02	.2193E+02

BEAM No. 3

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.5758E+01	-.1114E+01	.5434E+01	.2270E+01	.3822E+02	.2193E+02
.5500E+01	-.8085E+00	-.1114E+01	.5434E+01	.2270E+01	.6811E+02	.1580E+02
.1100E+02	.4142E+01	-.1114E+01	.5434E+01	.2270E+01	.9800E+02	.9669E+01
.1650E+02	.9092E+01	-.1114E+01	.5434E+01	.2270E+01	.1279E+03	.3540E+01
.2200E+02	.1404E+02	-.1114E+01	.5434E+01	.2270E+01	.1578E+03	-.2589E+01

BEAM No. 4

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1200E+01	.1125E+03	.1206E+02	-.2589E+01	-.2270E+01	-.1578E+03
.6375E+01	.1200E+01	.9977E+02	.1206E+02	-.2589E+01	.7458E+02	.5189E+03
.1275E+02	.1200E+01	.8702E+02	.1206E+02	-.2589E+01	.1514E+03	.1114E+04
.1913E+02	.1200E+01	.7427E+02	.1206E+02	-.2589E+01	.2283E+03	.1628E+04
.2550E+02	.1200E+01	.6152E+02	.1206E+02	-.2589E+01	.3051E+03	.2061E+04

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BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 5

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1113E+03	.2775E+02	.2600E+01	.1078E+01	-.8644E+02	.4415E+01
.5500E+01	.1064E+03	.2775E+02	.2600E+01	.1078E+01	-.7214E+02	.1570E+03
.1100E+02	.1014E+03	.2775E+02	.2600E+01	.1078E+01	-.5784E+02	.3096E+03
.1650E+02	.9645E+02	.6746E+01	.2600E+01	.1078E+01	-.4354E+02	.3887E+03
.2200E+02	.9150E+02	.6746E+01	.2600E+01	.1078E+01	-.2924E+02	.4258E+03

BEAM No. 6

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0E+00	-.6250E+02	.6746E+01	.2600E+01	.1078E+01	-.2924E+02	.4258E+03
.1E+01	-.6700E+02	.6746E+01	.2600E+01	.1078E+01	-.1624E+02	.4596E+03
.1000E+02	-.7150E+02	.6746E+01	.2600E+01	.1078E+01	-.3244E+01	.4933E+03
.1500E+02	-.7600E+02	-.3825E+02	.2600E+01	.1078E+01	.9755E+01	.3020E+03
.2000E+02	-.8050E+02	-.3825E+02	.2600E+01	.1078E+01	.2275E+02	.1108E+03

BEAM No. 7

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.2875E+03	-.3825E+02	.2600E+01	.1078E+01	.2275E+02	.1108E+03
.4250E+01	-.2913E+03	-.3825E+02	.2600E+01	.1078E+01	.3380E+02	-.5182E+02
.8500E+01	-.2951E+03	-.3825E+02	.2600E+01	.1078E+01	.4485E+02	-.2144E+03
.1275E+02	-.2990E+03	.2775E+02	.2600E+01	.1078E+01	.5590E+02	-.1295E+03
.1700E+02	-.3028E+03	.2775E+02	.2600E+01	.1078E+01	.6695E+02	-.1155E+02

BEAM No. 8

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.5602E+00	.2432E+03	-.1461E+02	-.9159E+01	.2270E+01	-.1628E+03
.6375E+01	-.5602E+00	.2304E+03	-.1461E+02	-.9159E+01	-.9088E+02	.1347E+04
.1275E+02	-.5602E+00	.2177E+03	-.1461E+02	-.9159E+01	-.1840E+03	.2775E+04
.1913E+02	-.5602E+00	.2049E+03	-.1461E+02	-.9159E+01	-.2772E+03	.4122E+04
.2550E+02	-.5602E+00	.1922E+03	-.1461E+02	-.9159E+01	-.3703E+03	.5387E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 9

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.2040E+01	-.1106E+03	.1313E+02	.2395E+01	-.3692E+03	.5320E+04
.6375E+01	.2040E+01	-.1234E+03	.1313E+02	.2395E+01	-.2855E+03	.4574E+04
.1275E+02	.2040E+01	-.1361E+03	.1313E+02	.2395E+01	-.2018E+03	.3747E+04
.1913E+02	.2040E+01	-.1489E+03	.1313E+02	.2395E+01	-.1180E+03	.2839E+04
.2550E+02	.2040E+01	-.1616E+03	.1313E+02	.2395E+01	-.3431E+02	.1849E+04

BEAM No. 10

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0E+00	-.2946E+03	-.3741E+02	-.4259E+01	-.1800E+01	.1223E+03	-.3898E+01
.0E+01	-.2908E+03	-.3741E+02	-.4259E+01	-.1800E+01	.1042E+03	-.1629E+03
.8500E+01	-.2870E+03	.6059E+02	-.4259E+01	-.1800E+01	.8613E+02	-.2729E+03
.1275E+02	-.2832E+03	.6059E+02	-.4259E+01	-.1800E+01	.6803E+02	-.1537E+02
.1700E+02	-.2793E+03	.6059E+02	-.4259E+01	-.1800E+01	.4993E+02	.2421E+03

BEAM No. 11

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.7166E+02	.6059E+02	-.4259E+01	-.1800E+01	.4993E+02	.2421E+03
.5000E+01	.7616E+02	.6059E+02	-.4259E+01	-.1800E+01	.2864E+02	.5451E+03
.1000E+02	.8066E+02	.6059E+02	-.4259E+01	-.1800E+01	.7345E+01	.8480E+03
.1500E+02	.8516E+02	-.1941E+02	-.4259E+01	-.1800E+01	-.1395E+02	.7510E+03
.2000E+02	.8966E+02	-.1941E+02	-.4259E+01	-.1800E+01	-.3524E+02	.6540E+03

BEAM No. 12

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.2177E+03	-.1941E+02	-.4259E+01	-.1800E+01	-.3524E+02	.6540E+03
.5500E+01	.2226E+03	-.1941E+02	-.4259E+01	-.1800E+01	-.5866E+02	.5472E+03
.1100E+02	.2276E+03	-.3741E+02	-.4259E+01	-.1800E+01	-.8209E+02	.4044E+03
.1650E+02	.2325E+03	-.3741E+02	-.4259E+01	-.1800E+01	-.1055E+03	.1987E+03
.2200E+02	.2375E+03	-.3741E+02	-.4259E+01	-.1800E+01	-.1289E+03	-.7055E+01

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WHC-SD-WM-ANAL 036

REV. 0

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 13

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.2859E+01	-.3382E+03	-.5310E+02	-.5229E+01	-.9427E+02	.1843E+03
.4250E+01	.2859E+01	-.3467E+03	-.5310E+02	-.5229E+01	-.3200E+03	-.1271E+04
.8500E+01	.2859E+01	-.3552E+03	-.5310E+02	-.5229E+01	-.5456E+03	-.2763E+04
.1275E+02	.2859E+01	-.3637E+03	-.5310E+02	-.5229E+01	-.7713E+03	-.4291E+04
.1700E+02	.2859E+01	-.3722E+03	-.5310E+02	-.5229E+01	-.9970E+03	-.5855E+04

BEAM No. 14

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.2746E+00	.3844E+03	.6750E+02	-.5229E+01	-.9970E+03	-.5855E+04
.4250E+01	.2746E+00	.3801E+03	.6750E+02	-.5229E+01	-.8535E+03	-.5042E+04
.8500E+01	.2746E+00	.3759E+03	.6750E+02	-.5229E+01	-.7101E+03	-.4239E+04
.1275E+02	.2746E+00	.3716E+03	.6750E+02	-.5229E+01	-.5667E+03	-.3445E+04
.1700E+02	.2746E+00	.3674E+03	.6750E+02	-.5229E+01	-.4232E+03	-.2660E+04

BEAM No. 15

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1336E+03	.1882E+02	.2927E+00	.1929E+01	-.8837E+01	-.1301E+01
.5500E+01	.1286E+03	.1882E+02	.2927E+00	.1929E+01	-.7227E+01	.1022E+03
.1100E+02	.1237E+03	.1882E+02	.2927E+00	.1929E+01	-.5617E+01	.2057E+03
.1650E+02	.1187E+03	-.1818E+02	.2927E+00	.1929E+01	-.4007E+01	.1797E+03
.2200E+02	.1138E+03	-.1818E+02	.2927E+00	.1929E+01	-.2398E+01	.7965E+02

BEAM No. 16

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.3523E+02	-.1818E+02	.2927E+00	.1929E+01	-.2398E+01	.7965E+02
.5000E+01	-.3973E+02	-.1818E+02	.2927E+00	.1929E+01	-.9343E+00	-.1127E+02
.1000E+02	-.4423E+02	-.1818E+02	.2927E+00	.1929E+01	.5291E+00	-.1022E+03
.1500E+02	-.4873E+02	-.2184E+01	.2927E+00	.1929E+01	.1993E+01	-.1131E+03
.2000E+02	-.5323E+02	-.2184E+01	.2927E+00	.1929E+01	.3456E+01	-.1240E+03

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 17

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1322E+03	-.2184E+01	.2927E+00	.1929E+01	.3456E+01	-.1240E+03
.4250E+01	-.1361E+03	-.2184E+01	.2927E+00	.1929E+01	.4700E+01	-.1333E+03
.8500E+01	-.1399E+03	-.2184E+01	.2927E+00	.1929E+01	.5944E+01	-.1426E+03
.1275E+02	-.1437E+03	.1882E+02	.2927E+00	.1929E+01	.7188E+01	-.7312E+02
.1700E+02	-.1475E+03	.1882E+02	.2927E+00	.1929E+01	.8432E+01	.6845E+01

BEAM No. 18

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	-.2219E+01	-.4563E+03	.5054E+02	.6292E+01	-.3611E+02	.1971E+04
.50E+01	-.2219E+01	-.4648E+03	.5054E+02	.6292E+01	.1787E+03	.1386E+02
.8500E+01	-.2219E+01	-.4733E+03	.5054E+02	.6292E+01	.3935E+03	-.1980E+04
.1275E+02	-.2219E+01	-.4818E+03	.5054E+02	.6292E+01	.6083E+03	-.4009E+04
.1700E+02	-.2219E+01	-.4903E+03	.5054E+02	.6292E+01	.8231E+03	-.6075E+04

BEAM No. 19

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.2746E+00	.4020E+03	-.6205E+02	.6292E+01	.8231E+03	-.6075E+04
.2125E+01	-.2746E+00	.3977E+03	-.6205E+02	.6292E+01	.6913E+03	-.5225E+04
.4250E+01	-.2746E+00	.3935E+03	-.6205E+02	.6292E+01	.5594E+03	-.4384E+04
.6375E+01	-.2746E+00	.3892E+03	-.6205E+02	.6292E+01	.4276E+03	-.3553E+04
.8500E+01	-.2746E+00	.3850E+03	-.6205E+02	.6292E+01	.2957E+03	-.2730E+04

BEAM No. 20

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1806E-01	.2375E+03	-.4323E+02	-.5528E+00	.2977E+03	-.2738E+04
.6375E+01	.1806E-01	.2247E+03	-.4323E+02	-.5528E+00	.2206E+02	-.1265E+04
.1275E+02	.1806E-01	.2120E+03	-.4323E+02	-.5528E+00	-.2535E+03	.1267E+03
.1913E+02	.1806E-01	.1992E+03	-.4323E+02	-.5528E+00	-.5291E+03	.1437E+04
.2550E+02	.1806E-01	.1865E+03	-.4323E+02	-.5528E+00	-.8048E+03	.2667E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 21

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.3434E+03	-.7857E+02	.1669E+00	.3326E+00	-.4890E+01	-.8476E+01
.4250E+01	-.3396E+03	-.7857E+02	.1669E+00	.3326E+00	-.4180E+01	-.3424E+03
.8500E+01	-.3358E+03	-.1657E+02	.1669E+00	.3326E+00	-.3471E+01	-.6453E+03
.1275E+02	-.3320E+03	-.1657E+02	.1669E+00	.3326E+00	-.2762E+01	-.7158E+03
.1700E+02	-.3281E+03	-.1657E+02	.1669E+00	.3326E+00	-.2053E+01	-.7862E+03

BEAM No. 22

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0E+00	-.1211E+03	-.1657E+02	.1669E+00	.3326E+00	-.2053E+01	-.7862E+03
.0E+01	-.1166E+03	-.1657E+02	.1669E+00	.3326E+00	-.1218E+01	-.8691E+03
.1000E+02	-.1121E+03	-.1657E+02	.1669E+00	.3326E+00	-.3840E+00	-.9519E+03
.1500E+02	-.1076E+03	.1044E+03	.1669E+00	.3326E+00	.4504E+00	-.4298E+03
.2000E+02	-.1031E+03	.1044E+03	.1669E+00	.3326E+00	.1285E+01	.9233E+02

BEAM No. 23

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.3159E+03	.1044E+03	.1669E+00	.3326E+00	.1285E+01	.9233E+02
.5500E+01	.3208E+03	.1044E+03	.1669E+00	.3326E+00	.2203E+01	.6667E+03
.1100E+02	.3258E+03	-.7857E+02	.1669E+00	.3326E+00	.3120E+01	.8750E+03
.1650E+02	.3307E+03	-.7857E+02	.1669E+00	.3326E+00	.4038E+01	.4429E+03
.2200E+02	.3357E+03	-.7857E+02	.1669E+00	.3326E+00	.4956E+01	.1073E+02

BEAM No. 24

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1849E+00	-.1529E+03	-.2989E+02	.4198E+01	.8160E+03	.2638E+04
.6375E+01	-.1849E+00	-.1656E+03	-.2989E+02	.4198E+01	.6255E+03	.1623E+04
.1275E+02	-.1849E+00	-.1784E+03	-.2989E+02	.4198E+01	.4349E+03	.5261E+03
.1913E+02	-.1849E+00	-.1911E+03	-.2989E+02	.4198E+01	.2444E+03	-.6516E+03
.2550E+02	-.1849E+00	-.2039E+03	-.2989E+02	.4198E+01	.5386E+02	-.1911E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 25

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.3848E+03	.8009E+02	-.5193E+00	-.2471E+01	.1550E+02	-.2092E+01
.5500E+01	.3799E+03	.8009E+02	-.5193E+00	-.2471E+01	.1264E+02	.4384E+03
.1100E+02	.3749E+03	.8009E+02	-.5193E+00	-.2471E+01	.9784E+01	.8789E+03
.1650E+02	.3700E+03	-.1229E+03	-.5193E+00	-.2471E+01	.6928E+01	.6089E+03
.2200E+02	.3650E+03	-.1229E+03	-.5193E+00	-.2471E+01	.4072E+01	-.6715E+02

BEAM No. 26

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.70E+00	-.1570E+03	-.1229E+03	-.5193E+00	-.2471E+01	.4072E+01	-.6715E+02
.70E+01	-.1615E+03	-.1229E+03	-.5193E+00	-.2471E+01	.1475E+01	-.6817E+03
.1000E+02	-.1660E+03	-.1229E+03	-.5193E+00	-.2471E+01	-.1121E+01	-.1296E+04
.1500E+02	-.1705E+03	.3509E+02	-.5193E+00	-.2471E+01	-.3718E+01	-.1121E+04
.2000E+02	-.1750E+03	.3509E+02	-.5193E+00	-.2471E+01	-.6314E+01	-.9454E+03

BEAM No. 27

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.3390E+03	.3509E+02	-.5193E+00	-.2471E+01	-.6314E+01	-.9454E+03
.4250E+01	-.3428E+03	.3509E+02	-.5193E+00	-.2471E+01	-.8521E+01	-.7963E+03
.8500E+01	-.3466E+03	.3509E+02	-.5193E+00	-.2471E+01	-.1073E+02	-.6471E+03
.1275E+02	-.3504E+03	.8009E+02	-.5193E+00	-.2471E+01	-.1294E+02	-.3292E+03
.1700E+02	-.3543E+03	.8009E+02	-.5193E+00	-.2471E+01	-.1514E+02	.1113E+02

BEAM No. 28

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1849E+00	-.1570E+03	.3534E+02	.7923E+01	-.8044E+03	.2662E+04
.6375E+01	.1849E+00	-.1697E+03	.3534E+02	.7923E+01	-.5791E+03	.1620E+04
.1275E+02	.1849E+00	-.1825E+03	.3534E+02	.7923E+01	-.3538E+03	.4977E+03
.1913E+02	.1849E+00	-.1952E+03	.3534E+02	.7923E+01	-.1285E+03	-.7062E+03
.2550E+02	.1849E+00	-.2080E+03	.3534E+02	.7923E+01	.9677E+02	-.1991E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 29

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.3344E+00	-.5622E+03	.1154E+03	-.3204E+01	.9429E+02	-.1976E+04
.2125E+01	-.3344E+00	-.5665E+03	.1154E+03	-.3204E+01	.3396E+03	-.3176E+04
.4250E+01	-.3344E+00	-.5707E+03	.1154E+03	-.3204E+01	.5849E+03	-.4384E+04
.6375E+01	-.3344E+00	-.5750E+03	.1154E+03	-.3204E+01	.8302E+03	-.5601E+04
.8500E+01	-.3344E+00	-.5792E+03	.1154E+03	-.3204E+01	.1075E+04	-.6828E+04

BEAM No. 30

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	.1352E+00	.5241E+03	-.6260E+02	-.3204E+01	.1075E+04	-.6828E+04
.20E+01	.1352E+00	.5156E+03	-.6260E+02	-.3204E+01	.8094E+03	-.4618E+04
.8500E+01	.1352E+00	.5071E+03	-.6260E+02	-.3204E+01	.5433E+03	-.2445E+04
.1275E+02	.1352E+00	.4986E+03	-.6260E+02	-.3204E+01	.2773E+03	-.3080E+03
.1700E+02	.1352E+00	.4901E+03	-.6260E+02	-.3204E+01	.1124E+02	.1793E+04

BEAM No. 31

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.3030E+03	-.4069E+02	.2876E+01	.1132E+01	-.1057E+03	.1224E+01
.4250E+01	-.2991E+03	-.4069E+02	.2876E+01	.1132E+01	-.9345E+02	-.1717E+03
.8500E+01	-.2953E+03	-.1169E+02	.2876E+01	.1132E+01	-.8123E+02	-.3301E+03
.1275E+02	-.2915E+03	-.1169E+02	.2876E+01	.1132E+01	-.6901E+02	-.3798E+03
.1700E+02	-.2877E+03	-.1169E+02	.2876E+01	.1132E+01	-.5679E+02	-.4295E+03

BEAM No. 32

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1887E+03	-.1169E+02	.2876E+01	.1132E+01	-.5679E+02	-.4295E+03
.1750E+01	-.1871E+03	-.1169E+02	.2876E+01	.1132E+01	-.5176E+02	-.4499E+03
.3500E+01	-.1855E+03	-.1169E+02	.2876E+01	.1132E+01	-.4672E+02	-.4704E+03
.5250E+01	-.1839E+03	-.1169E+02	.2876E+01	.1132E+01	-.4169E+02	-.4909E+03
.7000E+01	-.1824E+03	-.1169E+02	.2876E+01	.1132E+01	-.3666E+02	-.5113E+03

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Run ID=NN58712

REV. 0

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 33

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1124E+03	-.5689E+01	.4876E+01	.1132E+01	-.3666E+02	-.5113E+03
.3250E+01	-.1094E+03	.5131E+02	.4876E+01	.1132E+01	-.2081E+02	-.5156E+03
.6500E+01	-.1065E+03	.5131E+02	.4876E+01	.1132E+01	-.4967E+01	-.3488E+03
.9750E+01	-.1036E+03	.5131E+02	.4876E+01	.1132E+01	.1088E+02	-.1820E+03
.1300E+02	-.1007E+03	.5131E+02	.4876E+01	.1132E+01	.2672E+02	-.1528E+02

BEAM No. 34

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.3063E+03	.5131E+02	.4876E+01	.1132E+01	.2672E+02	-.1528E+02
.3250E+01	.3113E+03	.5131E+02	.4876E+01	.1132E+01	.5354E+02	.2669E+03
.6500E+01	.3162E+03	-.3469E+02	.4876E+01	.1132E+01	.8036E+02	.3771E+03
.9750E+01	.3212E+03	-.3469E+02	.4876E+01	.1132E+01	.1072E+03	.1864E+03
.1300E+02	.3261E+03	-.3469E+02	.4876E+01	.1132E+01	.1340E+03	-.4439E+01

BEAM No. 35

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.3990E+01	.5405E+03	.4695E+02	.2106E+01	-.8785E+03	-.6971E+04
.4250E+01	.3990E+01	.5320E+03	.4695E+02	.2106E+01	-.6789E+03	-.4692E+04
.8500E+01	.3990E+01	.5235E+03	.4695E+02	.2106E+01	-.4794E+03	-.2449E+04
.1275E+02	.3990E+01	.5150E+03	.4695E+02	.2106E+01	-.2798E+03	-.2422E+03
.1700E+02	.3990E+01	.5065E+03	.4695E+02	.2106E+01	-.8025E+02	.1929E+04

BEAM No. 36

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.8858E+00	.1804E+03	.1226E+02	-.2334E+01	-.8139E+02	.1795E+04
.6375E+01	-.8858E+00	.1676E+03	.1226E+02	-.2334E+01	-.3200E+01	.2904E+04
.1275E+02	-.8858E+00	.1549E+03	.1226E+02	-.2334E+01	.7499E+02	.3932E+04
.1913E+02	-.8858E+00	.1421E+03	.1226E+02	-.2334E+01	.1532E+03	.4879E+04
.2550E+02	-.8858E+00	.1294E+03	.1226E+02	-.2334E+01	.2314E+03	.5744E+04

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE. 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 37

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.3364E+03	.2140E+02	.8883E+00	-.8304E-01	.8202E+01	.7078E+01
.5500E+01	.3315E+03	.2140E+02	.8883E+00	-.8304E-01	.1309E+02	.1248E+03
.1100E+02	.3265E+03	.2140E+02	.8883E+00	-.8304E-01	.1797E+02	.2425E+03
.1650E+02	.3216E+03	-.2260E+02	.8883E+00	-.8304E-01	.2286E+02	.2061E+03
.2200E+02	.3166E+03	-.2260E+02	.8883E+00	-.8304E-01	.2774E+02	.8183E+02

BEAM No. 38

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
0E+00	.1106E+03	-.2260E+02	.8883E+00	-.8304E-01	.2774E+02	.8183E+02
0E+01	.1077E+03	-.2760E+02	.8883E+00	-.8304E-01	.3063E+02	.7123E+01
.6500E+01	.1048E+03	-.2760E+02	.8883E+00	-.8304E-01	.3352E+02	-.8258E+02
.9750E+01	.1019E+03	-.2760E+02	.8883E+00	-.8304E-01	.3640E+02	-.1723E+03
.1300E+02	.9894E+02	-.2760E+02	.8883E+00	-.8304E-01	.3929E+02	-.2620E+03

BEAM No. 39

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1561E+03	-.5602E+01	-.6112E+01	-.8304E-01	.3929E+02	-.2620E+03
.1750E+01	-.1576E+03	-.5602E+01	-.6112E+01	-.8304E-01	.2860E+02	-.2718E+03
.3500E+01	-.1592E+03	-.5602E+01	-.6112E+01	-.8304E-01	.1790E+02	-.2816E+03
.5250E+01	-.1608E+03	-.5602E+01	-.6112E+01	-.8304E-01	.7205E+01	-.2914E+03
.7000E+01	-.1624E+03	-.5602E+01	-.6112E+01	-.8304E-01	-.3491E+01	-.3012E+03

BEAM No. 40

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.3344E+03	-.5602E+01	-.6112E+01	-.8304E-01	-.3491E+01	-.3012E+03
.4250E+01	-.3382E+03	-.5602E+01	-.6112E+01	-.8304E-01	-.2947E+02	-.3250E+03
.8500E+01	-.3420E+03	-.5602E+01	-.6112E+01	-.8304E-01	-.5544E+02	-.3488E+03
.1275E+02	-.3458E+03	.4340E+02	-.6112E+01	-.8304E-01	-.8142E+02	-.1889E+03
.1700E+02	-.3497E+03	.4340E+02	-.6112E+01	-.8304E-01	-.1074E+03	-.4451E+01

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REV. 0

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FORCE/MOMENT DIAGRAMS

Version 2.0 07/01/90

BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 41

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.3011E+01	.1871E+03	-.2191E+02	-.4429E+01	.1237E+02	.1687E+04
.6375E+01	.3011E+01	.1744E+03	-.2191E+02	-.4429E+01	-.1273E+03	.2840E+04
.1275E+02	.3011E+01	.1616E+03	-.2191E+02	-.4429E+01	-.2670E+03	.3911E+04
.1913E+02	.3011E+01	.1489E+03	-.2191E+02	-.4429E+01	-.4067E+03	.4900E+04
.2550E+02	.3011E+01	.1361E+03	-.2191E+02	-.4429E+01	-.5464E+03	.5809E+04

BEAM No. 42

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
0E+00	-.3101E+01	-.2135E+03	.2149E+02	.2223E-01	-.5464E+03	.5916E+04
5E+01	-.3101E+01	-.2263E+03	.2149E+02	.2223E-01	-.4095E+03	.4514E+04
.1275E+02	-.3101E+01	-.2390E+03	.2149E+02	.2223E-01	-.2725E+03	.3031E+04
.1913E+02	-.3101E+01	-.2518E+03	.2149E+02	.2223E-01	-.1355E+03	.1467E+04
.2550E+02	-.3101E+01	-.2645E+03	.2149E+02	.2223E-01	.1460E+01	-.1788E+03

BEAM No. 43

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.1901E+02	-.7166E+01	-.6048E+01	-.1460E+01	.1788E+03	.2223E-01
.4250E+01	.2283E+02	-.7166E+01	-.6048E+01	-.1460E+01	.1531E+03	-.3043E+02
.8500E+01	.2666E+02	.1283E+02	-.6048E+01	-.1460E+01	.1274E+03	-.5088E+02
.1275E+02	.3048E+02	.1283E+02	-.6048E+01	-.1460E+01	.1017E+03	.3662E+01
.1700E+02	.3431E+02	.1283E+02	-.6048E+01	-.1460E+01	.7596E+02	.5821E+02

BEAM No. 44

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.2969E+02	.1283E+02	-.6048E+01	-.1460E+01	.7596E+02	.5821E+02
.5000E+01	-.2519E+02	.1283E+02	-.6048E+01	-.1460E+01	.4572E+02	.1224E+03
.1000E+02	-.2069E+02	.1283E+02	-.6048E+01	-.1460E+01	.1549E+02	.1866E+03
.1500E+02	-.1619E+02	-.5166E+01	-.6048E+01	-.1460E+01	-.1475E+02	.1607E+03
.2000E+02	-.1169E+02	-.5166E+01	-.6048E+01	-.1460E+01	-.4499E+02	.1349E+03

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BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 45

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1169E+02	-.5166E+01	-.6048E+01	-.1460E+01	-.4499E+02	.1349E+03
.5500E+01	-.6741E+01	-.5166E+01	-.6048E+01	-.1460E+01	-.7825E+02	.1065E+03
.1100E+02	-.1791E+01	-.7166E+01	-.6048E+01	-.1460E+01	-.1115E+03	.7408E+02
.1650E+02	.3159E+01	-.7166E+01	-.6048E+01	-.1460E+01	-.1448E+03	.3467E+02
.2200E+02	.8109E+01	-.7166E+01	-.6048E+01	-.1460E+01	-.1780E+03	-.4745E+01

BEAM No. 46

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.00E+00	-.1774E+01	-.2071E+03	-.9133E+01	.4745E+01	.2314E+03	.5752E+04
.5E+01	-.1774E+01	-.2198E+03	-.9133E+01	.4745E+01	.1732E+03	.4392E+04
.1275E+02	-.1774E+01	-.2326E+03	-.9133E+01	.4745E+01	.1150E+03	.2950E+04
.1913E+02	-.1774E+01	-.2453E+03	-.9133E+01	.4745E+01	.5677E+02	.1426E+04
.2550E+02	-.1774E+01	-.2581E+03	-.9133E+01	.4745E+01	-.1460E+01	-.1780E+03

BEAM No. 47

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1400E+01	-.4978E+02	-.1569E+02	.1826E+01	.3041E+03	.1975E+04
.6375E+01	-.1400E+01	-.6253E+02	-.1569E+02	.1826E+01	.2040E+03	.1617E+04
.1275E+02	-.1400E+01	-.7528E+02	-.1569E+02	.1826E+01	.1040E+03	.1178E+04
.1913E+02	-.1400E+01	-.8803E+02	-.1569E+02	.1826E+01	.3960E+01	.6572E+03
.2550E+02	-.1400E+01	-.1008E+03	-.1569E+02	.1826E+01	-.9607E+02	.5536E+02

BEAM No. 48

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	-.1806E-01	.2338E+03	.4869E+02	-.6530E+01	-.4252E+03	-.2669E+04
.6375E+01	-.1806E-01	.2210E+03	.4869E+02	-.6530E+01	-.1148E+03	-.1219E+04
.1275E+02	-.1806E-01	.2083E+03	.4869E+02	-.6530E+01	.1956E+03	.1496E+03
.1913E+02	-.1806E-01	.1955E+03	.4869E+02	-.6530E+01	.5060E+03	.1437E+04
.2550E+02	-.1806E-01	.1828E+03	.4869E+02	-.6530E+01	.8163E+03	.2643E+04

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Run ID=NN58712

Rev. 0

16:30:16

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BLOWER SKID

LOAD CASE 3

DL+EQ(100% Z-AXIS, 30% X-AXIS)

BEAM No. 49

X-Coord.	Fx	Fy	Fz	Mx	My	Mz
.0000E+00	.3344E+00	-.5887E+03	-.1100E+03	.2106E+01	.5633E+02	-.1895E+04
.2125E+01	.3344E+00	-.5930E+03	-.1100E+03	.2106E+01	-.1774E+03	-.3151E+04
.4250E+01	.3344E+00	-.5972E+03	-.1100E+03	.2106E+01	-.4111E+03	-.4415E+04
.6375E+01	.3344E+00	-.6015E+03	-.1100E+03	.2106E+01	-.6448E+03	-.5689E+04
.8500E+01	.3344E+00	-.6057E+03	-.1100E+03	.2106E+01	-.8785E+03	-.6971E+04

5

NOV 16 1994

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT

607344

2. To: (Receiving Organization) Installation & Testing		3. From: (Originating Organization) FACILITY SYSTEMS		4. Related EDT No.: N/A	
5. Proj./Prog./Dept./Div.: 7EA50/N2DBC		6. Cog. Engr.: JIM KRISKOVICH		7. Purchase Order No.: N/A	
8. Originator Remarks: ETN-94-0147, THIS DOCUMENT IS THE ANALYSIS COMPLETED FOR THE NEW 241-SY MODULAR EXHAUSTER INSTALLATION.				9. Equip./Component No.: N/A	
				10. System/Bldg./Facility: 241-SY	
11. Receiver Remarks:				12. Major Assm. Dwg. No.:	
				13. Permit/Permit Application No.:	
				14. Required Response Date:	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-ANAL-036		0	241-SY MODULAR EXHAUSTER PAD ANALYSIS	SQ	1		

16. KEY					
Impact Level (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
1, 2, 3, or 4 (see MRP 5.43)		1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)		1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged	

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)									
(G)	(H)	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN
Reason	Disp.								
1	1	Cog. Eng. JIM KRISKOVICH	<i>[Signature]</i>	10/16/94	S2-24	R. W. REED			R1-51
1	1	Cog. Mgr. W. W. JENKINS	<i>[Signature]</i>	11/2/94	S2-24	M. D. VANDERZANDEN			S2-24
1	1	QA D. C. BOARD	<i>[Signature]</i>	11/2/94	S1-57	R. V. FILKOWSKI			S2-45
1	1	Safety M. N. ISLAM	<i>[Signature]</i>	11/2/94	R3-08	W. H. CLEMANS		13 Oct '94	S2-45
3		Env. L. P. Diediker	<i>[Signature]</i>		T1-30	JATUCK	<i>[Signature]</i>		S2-24
1		J. MCCLEES	<i>[Signature]</i>	11/2/94	R1-51	Central Files			L8-04
						O. S. T. I. (2)			L8-07

18. J. R. KRISKOVICH <i>[Signature]</i> Signature of EDT Date 10-13-94 Originator		19. R. W. REED Authorized Representative Date for Receiving Organization		20. W. W. JENKINS <i>[Signature]</i> Cognizant/Project Date 10/19/94 Engineer's Manager		21. DOE APPROVAL (if required) Ltr. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-ANAL-036, REV 0

Document Title: 241-SY MODULAR EXHAUSTER PAD ANALYSIS

Release Date: 11/16/94

**This document was reviewed following the
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November 16, 1994

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5. Key Words 241-SY, MODULAR EXHAUSTER, ANALYSIS	6. Author Name: J. R. KRISKOVICH <i>[Signature]</i> Signature Organization/Charge Code 7EA50/N2DBC	
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7. Abstract This document is for the analysis performed on the concrete pad for the new 241-SY modular exhauster.	
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