

SEP 30 1997

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ENGINEERING DATA TRANSMITTAL

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2. To: (Receiving Organization) DISTRIBUTION	3. From: (Originating Organization) SGN Eurisys Service Corp	4. Related EDT No.: n/a
5. Proj./Prog./Dept./Div.: Characterization	6. Design Authority/ Design Agent/Cog. Engr.: K.A. White/B.L. Philipp/M.F. Erhart	7. Purchase Order No.:
8. Originator Remarks: <i>For approval / Release</i>		9. Equip./Component No.: n/a
		10. System/Bldg./Facility: 200G
11. Receiver Remarks: 11A. Design Baseline Document? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		12. Major Assm. Dwg. No.: n/a
		13. Permit/Permit Application No.: n/a
		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	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	HNF-SD-WM-DA-238	<i>2</i>	O	SHMS-E+ Portable Platform Design Analyses	SQ	1	1	/

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	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 Approval Designator for required signatures)

(G) Reason	(H) Disp.	(I) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(I) Name	(K) Signature	(L) Date	(M) MSIN
/	/	Design Authority	<i>K.A. White</i>	9/17/97	S5-13	1	1	T.S. Hundal B4-51	<i>T.S. Hundal</i>	9/17/97	
/	/	Design Agent	<i>B.L. Philipp</i>	9/16/97	L6-37	3	6	T.C. Schneider L6-37	<i>T.C. Schneider</i>	9/18/97	
/	/	Cog. Eng.	<i>M.F. Erhart</i>	9/15/97	R1-56						
/	/	Cog. Mgr.	<i>R.L. Schlosser</i>	9/15/97	R1-56						
/	/	QA	<i>J.J. Verderber</i>	9/29/97	S5-15						
/	/	Safety	<i>S.U. Zaman</i>	9/17/97	S5-32						
		Env.									

18. Signature of EDT Originator <i>B.L. Philipp</i>	19. Authorized Representative for Receiving Organization <i>[Signature]</i>	20. Design Authority/Cognizant Manager <i>[Signature]</i>	21. DOE APPROVAL (if required) Ctrl. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
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SHMS-E+ PORTABLE PLATFORM DESIGN ANALYSES

T. S. Hunda1

SGN Eurisys Services Corporation, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: No. 606756 UC: 2030
Org Code: S1200 Charge Code: N2064
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Key Words: Standard Hydrogen Monitoring System (SHMS) Portable Platform

Abstract:

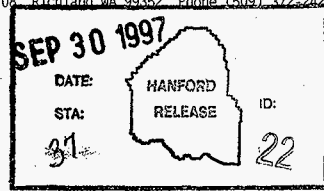
Standard-E analytical system design analyses for the Portable Platform.

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Christine Willingham
Release Approval

9-30-97
Date



Release Stamp

Approved for Public Release

SHMS-E+ PORTABLE PLATFORM DESIGN ANALYSES

August 1997

T. S. Hundal

SGN Eurisys Services Corporation

ANALYTICAL CALCULATIONS

Page 1 of 15

Subject Standard Hydrogen Measuring System (SHMS-E+) Portable Platform Design
Originator T. S. Hundal T. S. Hundal Date 8-27-97
Checker MA Scott MA Scott Date 8-27-97

PROBLEM:

Design the portable Standard Hydrogen Monitoring System (SHMS-E+) Platform with installed Bottle Racks, Pump stand, Transformer, Chiller, and SHMS-E test cabinet. This equipment is mounted on the platform. Both Gas Bottle Racks should be designed to withstand seismic loads with adequate anchorage to the platform and the platform itself should be capable of withstanding the applicable wind and seismic loads. The platform with mounted equipment should have lifting lugs to be transported to different test sites within the tank farms.

DESIGN BASIS:

See References on page 2.

ASSUMPTIONS:

All equipment other than the Gas Bottle Racks, mounted on the platform will not fail or collapse when subjected to seismic and wind forces and due to transportation loads.

CONCLUSIONS AND RECOMMENDATIONS:

Use platform details shown on page 3 and as shown on Drawing H-14-102407, SHMS(E+) Platform Assembly.

ANALYTICAL CALCULATIONS

Page 2 of 15Subject Standard Hydrogen Measuring System (SHMS-E+) Portable Platform DesignOriginator T. S. HundalDate 8-27-97Checker M. S. S. M. O. A.Date 8-27-97

REFERENCES:

1. Engineering Specifications for Portable Standard Hydrogen Monitoring System (SHMS-E+) Platform. (Draft Dated 6/10/97).
2. GC-LOAD-01, A/E Civil/Structural Standard Design Criteria, Design Loads for Facilities. (SDC 4.1, Rev. 12)
3. American Institute of Steel Construction, AISC Manual (9th Edition).
4. International Conference of Building Officials Uniform Building Code (UBC), 1991.
5. American Society of Civil Engineers (ASCE) 7-88, Minimum Design Loads for Buildings and other Structures.
6. SM International, Metals Handbook (Vol. 1, Tenth Edition).
7. American Welding Society (AWS) D1.1-96, Structural Welding Code-Steel.
8. Quimby & Associates (Q&A # AK9502), Control Skid Structural Calculations
9. DOE-RL-92-36, Hanford Site Hoisting and Rigging Manual, January 15, 1993.
10. 101-SY Hydrogen Monitor Gas Bottle Rack, Seismic Analysis, WHC-SD-WM-DA-085, pp 64 thru 78.
11. Seismic/Wind Analysis for Enclosure, WHC-SD-WM-SDD-001, Rev. 0, pp A77 thru A87. (Support Analysis for 101-SY Hydrogen Monitoring System).
12. Drawings: H-14-100837-Sh.1 thru 9, H-2-818214-Sh.1 & 2, H-14-100844-Sh.1 thru 9, H-14-100845-Sh.1 & 2, H-2-85626, H-14-102047 Sh. 1 & 2.
13. Standard Handbook for Mechanical Engineers, by T. Baumeister and L.S. Marks, Seventh Edition.

ANALYTICAL CALCULATIONS

Page 3 of 15

Subject SHMS(E+) PORTABLE PLATFORM

Originator: *IS [Signature]*

Date 8-27-97

Date 8-27-97

Checker: *m [Signature]*

Date 8-27-97

Date 8-27-97

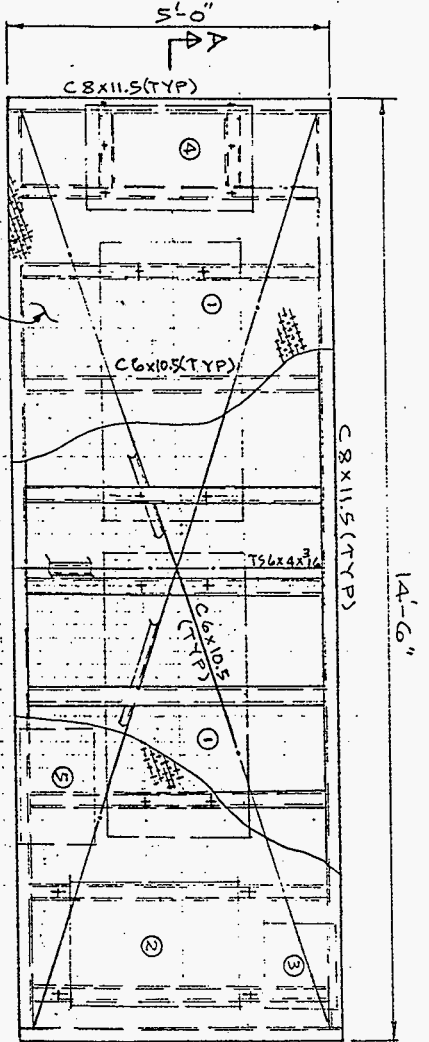
PRELIM.

- ① GAS BOTTLE RACK
- ② SHMS CABINET
- ③ PUMP & STAND
- ④ CHILLER BASE
- ⑤ TRANSFORMER



PLAN

1/4" CHAIR



14'-6"

C8x11.5(TYP)

C6x10.5(TYP)

T56x4x1/2

C6x10.5(TYP)

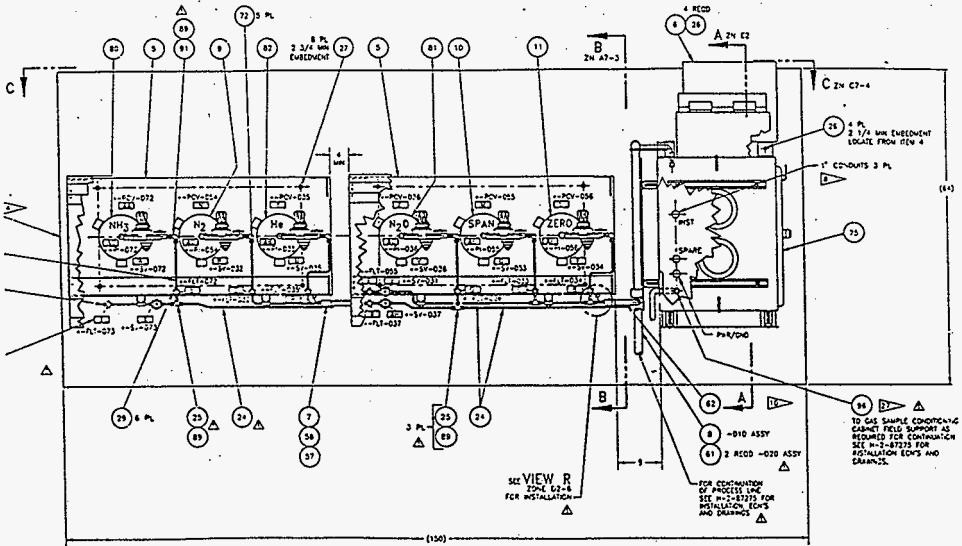
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Originator T. S. Hundal

Date 8-27-97

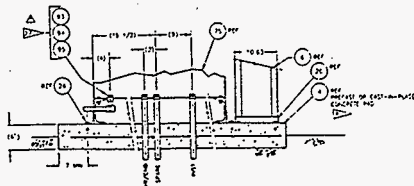
Checker MA SCOTT

Date 8-27-97



PLAN VIEW

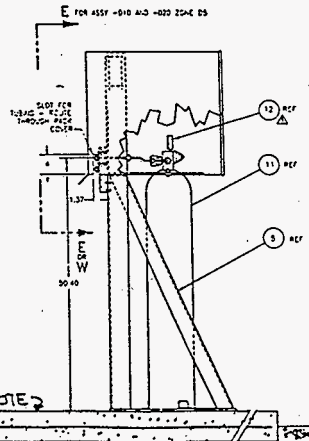
① ANALYTIC EQPT ARRANGEMENT DUAL PROCESS LINE
SCALE 1/8"



SECTION A-A - SLAB PENETRATION & ANCHOR DETAIL
SCALE 1/2"

NOTE

CONC. PAD IS FOR REF. ONLY &
TAKEN FROM DWG H-14-100844.
ENCLOSURE



SEE NOTE

VIEW D-D

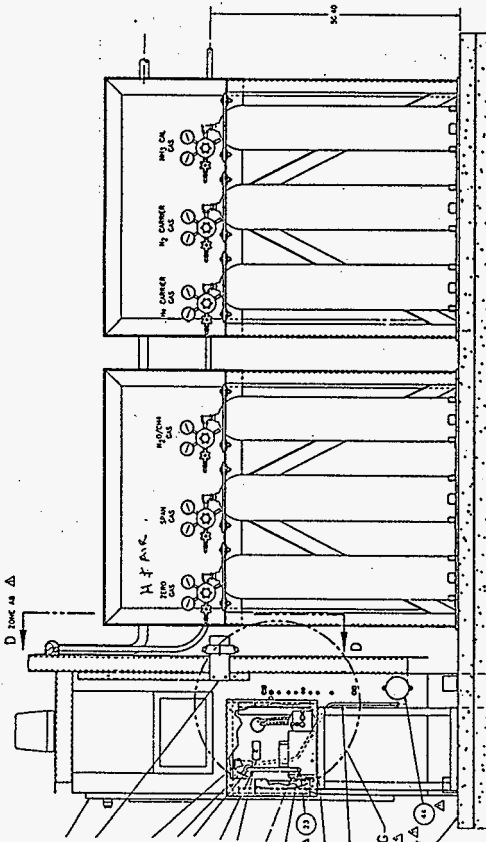
Subject Standard Hydrogen Measuring System (SHMS-F+) Portable Platform Design

Originator T. S. Hundal

Date 8-27-97

Checker MA Scott

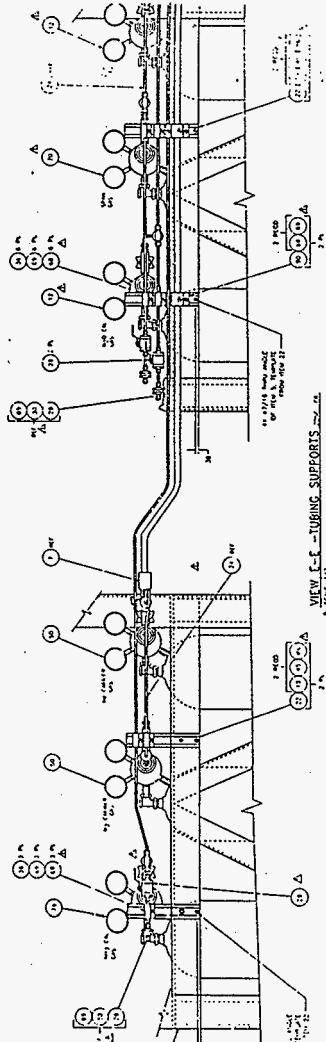
Date 8-27-97



SEE NOTE ON PAGE 4

VIEW C-C LINE B-B Δ

NOTE: SEE PAGE 4 FOR PORT IDENTIFICATION AND SUPPORT FOR CARRY



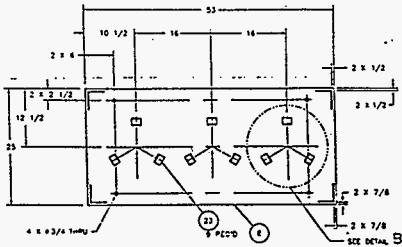
ANALYTICAL CALCULATIONS

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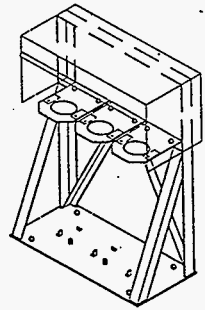
Subject Standard Hydrogen Measuring System (SHMS-E+) Portable Platform Design

Originator T. S. Hunda *T. S. Hunda* Date 8-27-97

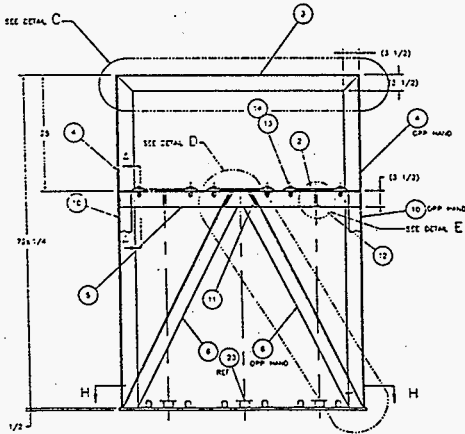
Checker MA SCOTT *MA Scott* Date 8-27-97



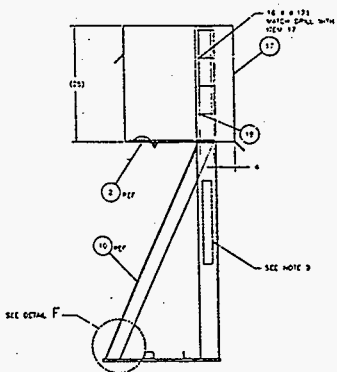
SECTION H-H
NOTE: ITEM NUMBER 6 NOT SHOWN



GAS BOTTLE RACK ISOMETRIC



NOTE: ITEM NUMBER 17 NOT SHOWN



GAS BOTTLE RACK DETAILS

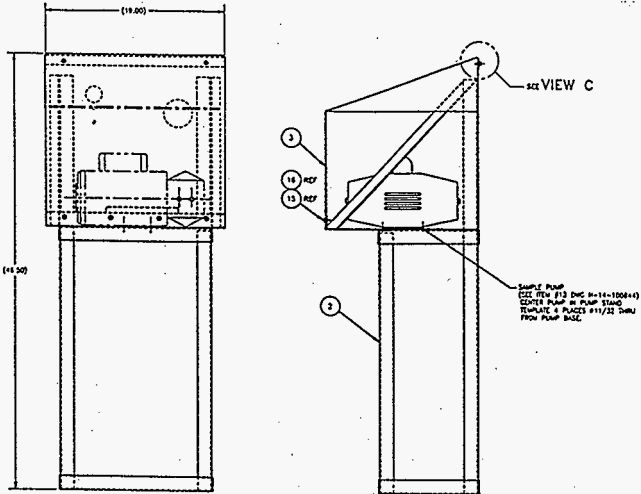
ANALYTICAL CALCULATIONS

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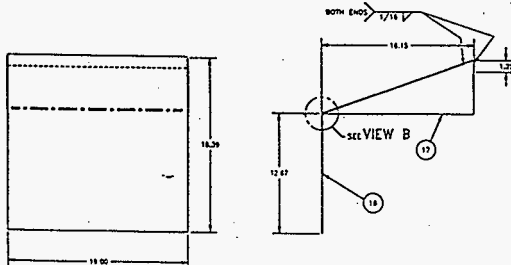
Subject Standard Hydrogen Measuring System (SHMS-F+) Portable Platform Design

Originator T. S. Hundal Date 8-27-97

Checker MA SCOTT Date 8-27-97



① SAMPLE PUMP STAND ASSEMBLY
SCALE: 1/4"



Subject SHMS (E+) PORTABLE PLATFORM

Originator T. Standish Date 8-27-97

Checker MA SCOTT Date 8-27-97

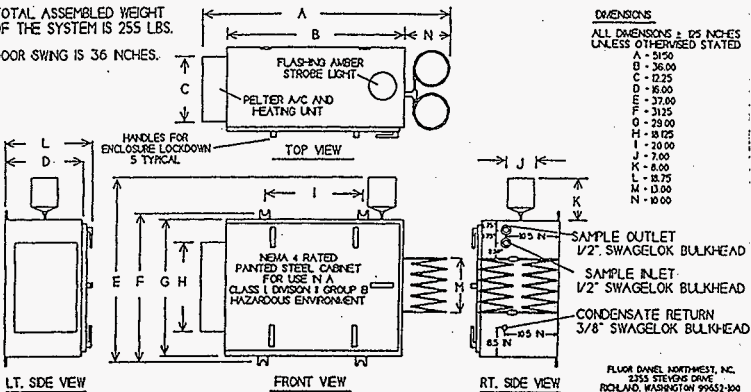
TOTAL ASSEMBLED WEIGHT OF THE SYSTEM IS 255 LBS.

DOOR SWING IS 36 INCHES.

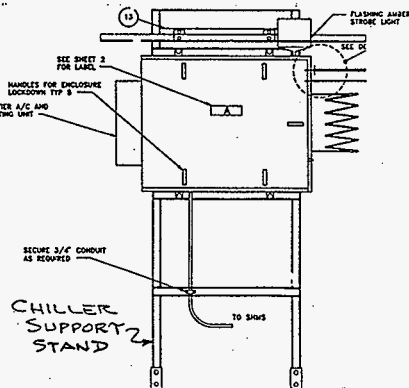
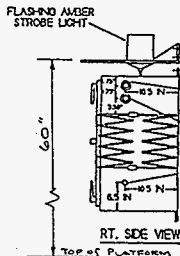
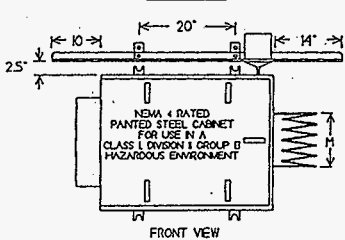
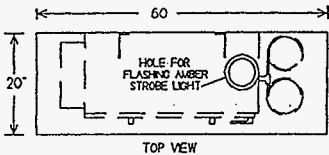
DIMENSIONS

ALL DIMENSIONS ± .05 INCHES UNLESS OTHERWISE STATED

- A - 34.50
- B - 36.00
- C - 12.25
- D - 6.00
- E - 37.00
- F - 31.25
- G - 28.00
- H - 38.125
- I - 20.00
- J - 7.00
- K - 8.00
- L - 28.75
- M - 10.00
- N - 10.00



FLUOR DANIEL NORTHWEST, INC.
2353 STEVENS DRIVE
ROLAND, WASHINGTON 98353-100
HAF-GRD PROJECT
P.O. NO. PD-1-580-00215



CHILLER INFO.

ANALYTICAL CALCULATIONS

Page 9 of 15Subject SHMS (E+) PORTABLE PLATFORMOriginator J. Stauder Date 8-27-97Checker NA SCOTT Date 8-27-97

CHECK C6x10.5 $l = 14.5'$, $S = 5.06$, $I = 15.2$
 (EXIST. DWG. H-2-85426 SH.2)

TOTAL LOADS ON PLATFORMDL (ESTIMATE)

SHMS CABINET	= 900 #
2 BOTTLE RACKS W/BOTTLES = 2 X 630	= 1260
PUMP & STAND	= 100
CHILLER & STAND	= 250
TRANSFORMER (EST)	= 300
PLATFORM 15 PSF (EST)	= 1100
MISC.	= 500

TOTAL DL = 4410 #

LL

25 PSF = $25 \times 14.5 \times 5$ = 1820 #

TOTAL DL+LL = 6230 #

DYNAMIC LOADS

DURING TRANSPORTATION, 50% = 3115 #
 (ASSUME)

\therefore TOTAL DESIGN LOAD = 9345 # \leftarrow

\therefore LOAD/LONG. CG = $\frac{9345}{2} \times 1.15 = 5.4 \text{ k}$ $> 5.2 \text{ k}$ \therefore NG
 REF. 3 p. 2-87

TRY C8x11.5

* 15% FOR ASSUMED ASYMMETRY

ALLOW. LOAD = $8.4 \text{ k} > 5.4 \text{ k}$ \therefore OK

REF 3, p. 2-85

USE C8x11.5

ANALYTICAL CALCULATIONS

Page 10 of 15Subject SHMS (E+) PORTABLE PLATFORMOriginator R. RandallDate 8-27-97Checker [Signature]Date 8-27-97SEISMIC:CHECK GAS BOTTLE RACK FOR SEISMIC LOADS

(REF. 10), (REF. 2), (REF. 4)

SHMS SYSTEM IS GENERAL SERVICE (SC-4) (REF. 1)
BUT IT COULD INTERACT WITH SC-1 SSC.

∴ IT IS A 4/1 SITUATION

USE REF. 2 { USE UBC METHOD WITH SC-1 SEISMIC DEMAND }

2.2. EQUIV. LATERAL FORCE $F_p = ZIC_pW_p$
(REF. 4)

$$= .43 \times 1.25 \times 1.5 \times W_p$$

$$= .81 W_p$$

Z = .43 (REF. 2, FIG. 3)

I = 1.25 (REF. 2)

 $C_p = 2 \times .75 = 1.5$ (REF. 4)USE REF. 10 RESULTS TO MODIFY THE FINAL FORCES
& STRESSES AS FOLLOWS:

$$\text{MODIFICATION FACTOR, } M_f = \frac{.81}{.5} = 1.62$$

4 x 3 1/2 x 3 3/8

$f_a = 14 \times 1.62 = 23 \text{ psi}$

$f_{vy} = 7 \times 1.62 = 11 \text{ psi}$

$f_{vz} = 7 \times 1.62 = 11 \text{ psi}$

$f_{bx} = 108 \times 1.62 = 175 \text{ psi}$

$f_{by} = 110 \times 1.62 = 178 \text{ psi}$

$f_{bz} = 230 \times 1.62 = 373 \text{ psi}$

4 3/2 x 3 1/2 x 5 1/6

$f_a = 100 \times 1.62 = 162 \text{ psi}$

$f_{vy} = 6 \times 1.62 = 10 \text{ psi}$

$f_{vz} = 31 \times 1.62 = 50 \text{ psi}$

$f_{bx} = 53 \times 1.62 = 86 \text{ psi}$

$f_{by} = 107 \times 1.62 = 173 \text{ psi}$

$f_{bz} = 994 \times 1.62 = 1610 \text{ psi}$

4 3 x 3 x 1 1/4

$f_a = 46 \times 1.62 = 75 \text{ psi}$

$f_{vy} = 9 \times 1.62 = 15 \text{ psi}$

$f_{vz} = 4 \times 1.62 = 7 \text{ psi}$

$f_{bx} = 154 \times 1.62 = 249 \text{ psi}$

$f_{by} = 324 \times 1.62 = 525 \text{ psi}$

$f_{bz} = 304 \times 1.62 = 492 \text{ psi}$

1/2" R

$T_x = 382 \times 1.62 = 619 \text{ psi}$

$T_y = 44 \times 1.62 = 71 \text{ psi}$

$T_{xy} = 97 \times 1.62 = 157 \text{ psi}$

$T_z = 509 \times 1.62 = 825 \text{ psi}$

VON MISES = $448 \times 1.62 = 726 \text{ psi}$

NOTE: BY INSPECTION, STRESSES ARE WELL WITHIN ALLOWABLE LIMITS.

REACTIONS

$F_x = 28.5 \times 1.62 = 46 \text{ #}$, $F_y = 26.2 \times 1.62 = 42 \text{ #}$, $F_z = 203.8 \times 1.62 = 330 \text{ #}$

∴ ok

USE $5/8"$ A307 BOLTS

ANALYTICAL CALCULATIONS

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Subject SHMS (E+) PORTABLE PLATFORM
 Originator Standa Date 8-27-97
 Checker [Signature] Date 8-27-97

WT. COMPUTATIONS (ACTUAL)PLATFORM FRAMING

2-C8x11.5	(14.5+5)11.5 x 2	= 449	
2-C6x10.5	15.3x10.5 x 2	= 322	
9-C6x10.5	4.625x10.5x9	= 437	
1-T56x4x ³ / ₁₆	4.625x11.97	= 55	
1-R 14.5'x5'x ¹ / ₄ "	14.5x5x10.2	= 740	
		= 2003	= 2000#

GAS BOTTLE RACK W/BOTTLES

FRAME

R 53x25x ¹ / ₂	$\frac{53 \times 25}{144} \times 20.4$	= 188	
2-L 4x3 ¹ / ₂ x3 ³ / ₈	2x6'x9.1'	= 109	
1-L 4x3 ¹ / ₂ x3 ³ / ₈	53 ¹¹ / ₁₂ x9.1'	= 40	
4-L 3x3x ¹ / ₄	4x4.33x4.9'	= 85	
1-3 ¹ / ₂ x3 ¹ / ₂ x ⁵ / ₁₆	53 ¹¹ / ₁₂ x7.2'	= 32	= 670#
3-R ^s 14"x20"x3 ³ / ₈	$\frac{3 \times 14 \times 20}{144} \times 15.3$	= 89	
9-L 1 ¹ / ₂ x1 ¹ / ₂ x3 ³ / ₁₆ x2	9x ³ / ₁₂ x1.8	= 3	

14 GAGE GAL. COVER SHY.

$$\left\{ [(23+6+3) + (25+3)] \frac{53 + 2 \times 25 \times 23}{144} \right\} \frac{3.75}{144} = 113$$

BOLTS + MISC

= 10

= 667.

3 BOTTLES/RACK 3x122 = 366

say 370#

RACK & BOTTLES WT. 670+370 = 1040#

* FULL BOTTLE

BOTTLE WT. = 115# + 7# CONTENTS

ANALYTICAL CALCULATIONS

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Subject SHMS(E+) PORTABLE PLATFORM
 Originator [Signature] Date 8-27-97
 Checker [Signature] Date 8-27-97

REVISED LOADS ON PLATFORM (DL)

- SHMS CABINET = 900#
- 2-BOTTLE RACKS 2x1040 = 2080
- PUMP & STAND = 100
- CHILLER & STAND = 250
- TRANSFORMER = 300
- PLATFORM = 2000
- MISC. = 100

TOTAL DL = 5730 #

LL @ 25 ppsf = 25 x 14.5 x 5 = 1820 #

TOTAL DL+LL = 7550 #

DYNAMIC LOADS

DURING TRANSPORTATION, (ASSUME 50% DL) = 2865 #

∴ DESIGN LOAD = 5730 + 2865 = 8595 #

ASSUME LOAD ON TWO LIFT POINTS = $\frac{8595}{2} = 4298 \#$

ASSUME 15% ASYMMETRY { REF. 9 }
{ SEC. 9.2.1.2 }

∴ MAX. LOAD @ A LIFT POINT = 4298 x 1.15

= 4942 # Say 5000 #

CHECK ACTUAL ASYMMETRY (SEE P. 14)

@ X AXIS $Y = \frac{100 \times 18 - (900 \times 6 + 300 \times 20)}{5730} = 1.68 \text{ SAY } 2 \text{''}$

@ Y AXIS

$X = \frac{2000 \times 87 + 250 \times 10 + 1040(53.5 + 110.5) + 300 \times 128 + 900 \times 159 + 100 \times 163}{5730} = 95 \text{''}$

∴ ASYMMETRY = 95 - 87 = 8" → 9.2% < 15% ASSUMED

544260

ANALYTICAL CALCULATIONS

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Subject SHMS (E+) PORTABLE PLATFORM

Originator [Signature]

Date 8-27-97

Checker [Signature]

Date 8-27-97

LIFTING LUG CONN.

MAX. LOAD @ A LIFT POINT = 5000 #

USE A SPREADER BEAM W/ SLING ANGLE = 60° (MIN.)

$$A_w = 2(6 + 7.25 + 2) = 30.5 \text{ in}$$

$$x = \frac{2.5 \times 7.25 - (1 \times 7.25 + 2 \times 2 \times 2)}{2(7.25 + 2)} = .16 \text{ in}$$

$$S_x = 6 \times 8 + 2 \times 7.25 + \frac{7.25^2}{3} = 80 \text{ in}^2$$

$$J_w = \frac{6^3 + 3 \times 6 \times 8^2}{6} + \frac{7.25^3 + 3 \times 7.25 \times 3.5^2}{6} + \frac{2^3 + 3 \times 2 \times 7.25^2}{6} = 389.8 \text{ in}^4$$

$$f_x = \frac{2.9}{30.5} + \frac{2.9 \times 6(4)}{389.8} = .27 \text{ k/in}$$

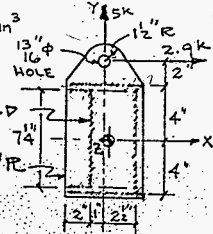
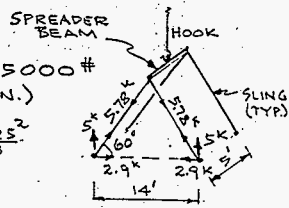
$$f_z = \frac{2.9}{30.5} + \frac{2.9 \times 6}{80} = .31 \text{ k/in}$$

$$f_y = \frac{5}{30.5} + \frac{5 \times .16 \times 3.16}{389.8} = .17 \text{ k/in}$$

* ASSUME NO SPREADER BEAM

$$f_r = \sqrt{(.27)^2 + (.17)^2 + (.31)^2} = .64 \text{ k/in} < 3.6 \text{ k/in}$$

∴ OK



USE $\frac{3}{4}$ " ϕ SHACKLES W/ 3 TON MIN. CAPACITY

1" WELD CAPACITY
14.4 x .25 = 3.6 k/in

CHECK R

ALLOW. BEARING LOAD = .9F_y A_p

REF. 3, J8, p. 5-79

$$f_b = \frac{2.9 \times 2}{6 \times (.75)^2} = 10.3 \text{ ksi} < 29 \text{ ksi}$$

∴ OK

$$= .9 \times 36 \times (.75 \times .75) = 18.2 \text{ k} > 5.78 \text{ k}$$

∴ OK

CROSS BEAM (C 6 X 10.5)

l = 5' ALLOW. UDL = 15 k ∴ OK BY INSPECTION

CHECK OVERTURNING DUE TO SEISMIC LOADS

LATERAL SEISMIC LOAD = .81g

FOR FLEXIBLE EQUIP. ON GROUND = .81 x 5730 = 4641 #

$$C.G. = \frac{2000 \times 6.3 + 2(670 \times 36 + 370 \times 2) + 900 \times 9.8 + 100 \times 5.6 + 250(28 + 16) + 300 \times 14 + 100 \times 3.8}{5730} = 26.07 \text{ ft}$$

$$F.O.S. = \frac{.25 \times 5730 \times 28}{4641 \times 26.07} = 1.12 > 1.0 \therefore \text{OK}$$

REF. 4, SECT. 2337(a)

SLIDING

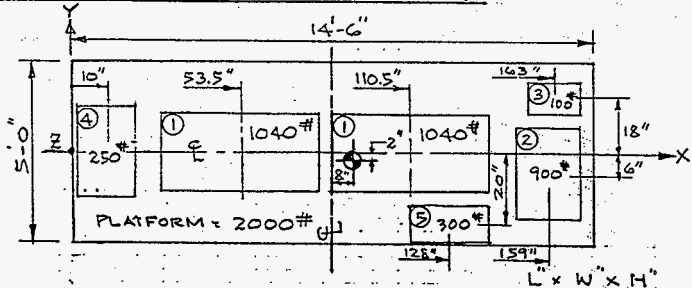
SINCE NO CREDIT CAN BE TAKEN FOR FRICTION FOR SEISMIC LOADING, SET THIS SKID AT LEAST 12" FROM ANY NEARBY

ANALYTICAL CALCULATIONS

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Subject SHMS (E+) PORTABLE PLATFORM
 Originator T. Sturdal Date 8-27-97
 Checker [Signature] Date 8-27-97

CHECK PLATFORM AGAINST WIND SAFETY



WIND SPEED

$V = 80 \text{ mph}$

IMPORTANCE FACTOR $I = 1.0$

EXPOSURE CLASS = C

USE REF. 5 (ASCE 7-88)

DESIGN WIND FORCE, $F = q_z G_h C_s A_g$ (TABLE 4)

where: $q_z = 0.00256 K_z (IV)^2$
 $= 0.00256 (1.8) (1 \times 80)^2$
 $= 13.1 \text{ psf}$

$G_h = 1.32$ (TABLE 8)

$C_s = 1.4$ (TABLE 12)

A_g = PROJECTED AREA

WIND LOAD IN Y-DIRECTION

$A_{g1} = \left[\frac{53 \times 72}{144} \times 0.75 \right] 2 = 40 \text{ SF}$ @ 47", (72" - 25") SEE p. 6

$A_{g2} = \frac{24 \times 96}{144} = 16 \text{ SF}$ @ 48"

$A_{g3} = \frac{19 \times 47 \times 0.5}{144} = 3 \text{ SF}$ @ 38", (47" - 9") SEE p. 7

$A_{g4} = \frac{19 \times 60 \times 0.5}{144} = 4 \text{ SF}$ @ 44", $\left\{ 60 - \frac{(29+3)}{2} \right\}$ SEE p. 8

$A_{g5} = \frac{20 \times 27}{144} = 4 \text{ SF}$ @ 14" * APPROX. SURFACE AREA

ANALYTICAL CALCULATIONS

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Subject SHMS (E+) PORTABLE PLATFORM
 Originator [Signature] Date 8-27-97
 Checker [Signature] Date 8-27-97

$$F = 13.1 \times 1.32 \times 1.4 \times 67 = 1622 \#$$

C.G. of PROJECTED AREAS

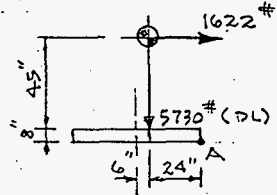
$$Z = \frac{2(20 \times 47) + 16 \times 48 + 3 \times 38 + 4 \times 44 + 4 \times 14}{20 + 20 + 16 + 3 + 4 + 4} = \frac{3014}{67} = 45 \#$$

CHECK OVERTURNING

ASSUME C.G. OF PLATFORM WITH EQUIP. MOUNTED IS
 6" OFF Φ . (NOTE: 2" ACTUAL, SEE P. 12 & 14)

$$F.O.S. = \frac{5730 \times 24}{1622 \times 53} = 1.60 > 1.0 \therefore \text{OK}$$

(REF. 4 SECT. 2317)

CHECK SLIDINGCO-EFFICIENT OF FRICTION, $\mu = 0.4$

(.3 to .7)

SLIDING FORCE, $S_f = 1622 \#$

IRON ON STONE

REF. 13

P. 3-38

RESISTING FORCE, $R_f = .4 \times 5730 = 2292 \#$

$$F.O.S. = \frac{2292}{1622} = 1.41 > 1.0 \therefore \text{OK}$$

DISTRIBUTION SHEET

To DISTRIBUTION	From B.L. Philipp SESC	Page 1 of 1
Project Title/Work Order SHMS-E+ Portable Platform Design Analyses		Date 8/29/97
		EDT No. 606756
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