

DESIGN CALCULATION COVER SHEET								
Project	Detailed Design on Port Reactivation Project in La Union Province.			Project Code	JC1N004			
Section	BUILDING WORKS			Calc. File No.				
Sub-Section	GENERAL			Calc. Index No.				
Subject:								
STRUCTURAL DESIGN GENERAL NOTES								
Calculation Objective:								
<u>References, Calculation Notes and Comments</u>								
Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
O	Rubén Martínez	Jul-02	4	A. MORIOKA	Jul-02	西 5F	14 Aug 02	
A	<i>[Signature]</i>			<i>[Signature]</i>				
B								
C								

PROJECT: Detailed Design on Port Reactivation Project in La Union Province	Calc. File No.		Prepared by	R.Martinez
SECTION: Structural Design	Calc. Index No.		Checked by	A.MORIOKA
SUBJECT: General Notes	Date	July-02	Page	1 / 4

1. GENERAL

This document includes the structural design of the buildings of the project: " Detailed Design on Port Reactivation Project in La Union Province". All the building's main structure is supported by driven precast prestressed concrete piles, and the type of structure is described below:

Building	Type of Structure
Port Administration Building	Reinforced concrete frames
Container Freight Station (C.F.S.)	Structural steel frames
Maintenance & Repair Shop	Structural steel frames
Container and Cargo Gate	Reinforced concrete frames and structural steel for roof
Power Supply Station	Reinforced concrete frames

2. DESIGN CODES

All Structural Design conforms to Local and American Standards:

- A) Technical Specification for Seismic Design, Ministry of Public Works, El Salvador, 2001.
- B) Technical Specification for Wind Design, Ministry of Public Works, El Salvador, 1997.
- C) Building Code Requirements for Structural Concrete (318M-99), American Concrete Institute (ACI).
- D) UBC, Uniform Building Code, Volume 2: Structural Engineering Design Provisions, 1997.
- E) AISC, American Institute of Steel Construction, ninth Edition, 1989.
- F) Standard Specifications of the American Society for Testing Materials.

3. DESIGN CALCULATIONS.

All the structural analysis is performed only considering the stiffness of the steel or concrete frames, and is carry out by the use of the software: "STAAD-III rev 21.1W, RESEARCH ENGINEERS, Inc."

The design calculations are presented by the use of MICROSOFT EXCEL worksheets constructed for the project, the design methods considerer are as follows:

Type of Structure	Design Method
Reinforced Concrete	Load Factor
Prestressed Concrete	Allowable Stress
Structural Steel	Allowable Stress

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4. BASIC DESIGN DATA

a) Dead Load

Concrete, 2400 kg/m³
Structural Steel, 7800 kg/cm³

b) Live Load

ROOM	LIVE LOAD (kg/m ²)	
	W _m	W _i
OFFICE	250	180
AUDITORIUM	350	150
HALLWALK	350	150
TOILET	170	120
MACHINE ROOM	600	125
MAINT. & REPAIR SHOP 1ST FLOOR	2000	1800
ROOF SLOPE < 5 %	100	50
ROOF SLOPE > 5 %	20	0

W_m : For gravity analysis

W_i : For Seismic analysis

c) Seismic Load

$$V = C_s W \quad C_s = A I C_o (T_o/T)^{2/3} \quad (\text{Local code})$$

Coefficient of acceleration, a=0.40 (zone I)

Importance factor, I=1.0 (1.2 for port administration building)

Coefficient of site, C_o=3.0 T_o=0.9

C_o=2.75 T_o=0.5 (FOR CONTAINER FREIGHT STATION)

Response modification factor, R=12.00 (System A)

Natural period of the structure, T, calculated by the computer program.

d) Wind Load

$$P = C_p C_z K P_o \quad (\text{Local code})$$

Basic pressure, P_o=30 kg/m²

Correction factor for zone, K = 1.60

Correction factor for height

$$C_z = 1.0 \text{ FOR } H < 10 \text{ m}$$

$$C_z = (H/10)^{2/a} \text{ FOR } H > 10 \text{ m, } a = 7.0 \text{ (ZONE C)}$$

Factor for shape, C_p (SEE Technical Specification for WIND Design)

For steel walls, C_p = 0.80. For Steel roofs, C_p = 0.70.

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e) Load Factors

Load Combination	β	Load Factors				
		DL	LL	SL	WL	E
1	1	1.4	1.7	0	0	0
2	0.75	1.4	1.7	1.87	0	0
3	1	0.9	0	1.43	0	0
4	0.75	1.4	1.7	0	1.7	0
5	1	0.9	0	0	1.3	0
6	1	1.4	1.7	0	0	1.7
7	1	0.9	0	0	0	1.7
8	0.75	1.4	1.7	0	0	0
9	1	1.4	0	0	0	0

Load Combination = $\beta (DL + LL + SL + WL + E)$

DL	Dead Load	WL	Wind Load
LL	Live Load	E	Earth Pressure
SL	Seismic Load		

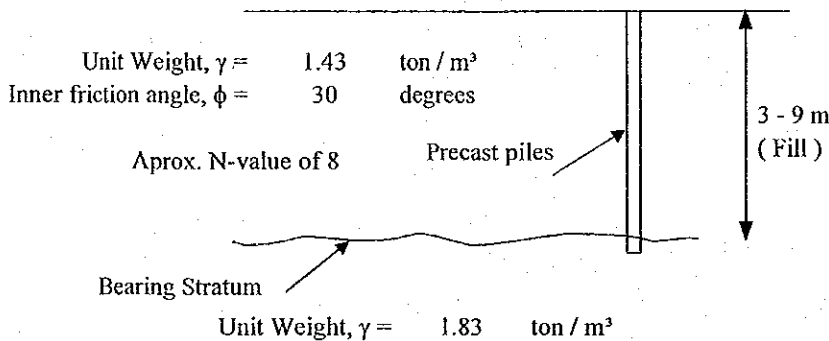
a) Example for group 1: $1.00(1.4DL+1.70LL)$

b) For service load method (Allowable Stress) all the factors are equal to 1.

f) Soil Conditions

The buildings will be constructed on a fill, so the foundations have to extend to the bearing layer by the use of precast piles, the soil conditions and the bearing capacity of piles are as follows:

- Soil Conditions



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- Bearing Capacity of piles

BUILDING	BEARING LAYER	PILE LENGHT	PILE BEARING CAPACITY (Ton)		
			40x40 (cm)	45x45 (cm)	50x50 (cm)
PORT ADMINISTRATION	Silty sand with N50	5 m	-	74.00	91.30
CONTAINER FREIGHT STATION	Silty sand with N50	7 m	80.60	101.90	-
MAINTENANCE & REPAIR SHOP	Silty sand with N50	4 m	47.40	60.00	-
CONTAINER GATE	Silty sand with N50	5 m	58.40	74.00	-
CARGO GATE	Gravelly sand with N30	10 m	46.60	65.20	-
POWER SUPPLY STATION	Silty sand with N50	7 m	80.60	-	-

f) Materials

- Concrete compressive strength (f_c)

Type of Concrete	f_c
Precast prestressed concrete piles	350 kg/cm ²
Release strenght for piles	280 kg/cm ²
Foundations (Below first floor level)	210 kg/cm ²
Slabs, columns, beams & walls	280 kg/cm ²
Precast prestressed slab	350 kg/cm ²
Lean concrete	180 kg/cm ²

- Reinforcing Steel

Deformed Bar, ASTM A-615 Grade 60 ($f_y = 4200 \text{ kg/cm}^2$)

- Prestressing steel for piles.

Uncoated seven wire stress relieved strands for prestressed concrete, grade 1750, (Ultimate strength $f_{pu} = 7,500 \text{ kg/cm}^2$). Tension force to apply = 0.70 f_{pu} .
Nominal diameter = 12.7 mm.

- Structural steel

ASTM A-36 ($F_y = 2520 \text{ kg/cm}^2$)
ASTM A-325

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Section	BUILDING WORKS			Calc. File No.				
Sub-Section	CONTAINER FREIGHT STATION			Calc. Index No.				
Subject: <p style="text-align: center; font-weight: bold; margin: 10px 0;">STRUCTURAL DESIGN</p>								
Calculation Objective: <p style="text-align: center;">The objective of the calculation is to provide a safe structure for the occupation of the building, by the use of the Republic of El Salvador and American design standards.</p>								
<u>References. Calculation Notes and Comments</u> <p>The Structural Analysis has been made using the program: "STAAD-III rev 21.1W, RESEARCH ENGINEERS, Inc.". The analysis of the structure considers only the steel frames with the steel braces to resist the lateral forces, not considering the walls in the model.</p> <p>One model for the structure have been constructed:</p> <p style="margin-left: 20px;">1- For the calculation of the Dead & Live load.</p> <p>The Key for the STAAD-III rev 21.1W program is attached for future convinience.</p> <p>All the design has been made by calculations sheet created for the project in Microsoft Excel, and based in the following bibliography:</p> <ol style="list-style-type: none"> 1. Building Code Requirements for Structural Concrete (318M-99), American Concrete Institute (ACI). 2. Technical Specification for Seismic Design, Ministry of Public Works, El Salvador, 2001. 3. AISC, American Institute of Steel Construction, ninth Edition, 1989. 4. Technical Specification for Wind Design, Ministry of Public Works, El Salvador, 1997. 5. UBC, Uniform Building Code, Volume 2: Structural Engineering Design Provisions, 1997. 								
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	by	Date		by	Date	by	Date	
O	H. WATANABE	Jul-02	50	A. MORIOKA	Jul-02	<i>WA FF</i>	<i>WAG</i>	
A				<i>LOPA</i>				
B								
C								

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Loads

- Roof Loads

a) Dead Load

Metalic Roof	10 kg/m ²
Electric Instalations	10 kg/m ²
Drainage Instalations	10 kg/m ²
C channel ("Polin C")	10 kg/m ²
	40 kg/m ² *

* The selfweight for the Columns & Beams calculated by the MultiFrame structural Analisis Program.

b) Live Load

$$W_m = 20 \text{ kg/m}^2 \text{ for roof with slope } > 5\%$$

- Second floor (office) Loads

a) Dead Load

Slab System (th=0.20m)	345 kg/m ²
Floor finish (ceramic)	60 kg/m ²
Ceiling	20 kg/m ²
Electric Instalations	10 kg/m ²
Sub-beams	0 kg/m ²
	435 kg/m ² *

* The selfweight for the Columns & Beams are calculated by the STAAD-III Structural Analysis Program.

b) Live Load

$$W_m = 250 \text{ kg/m}^2 \text{ for office}$$

$$\text{For deflection } W = 100 \text{ kg/m}^2$$

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SEISMIC FORCES

$V = C_s W$

$C_s = (A I C_o / R) (T_o / T)^{2/3}$

Coefficient of Acceleration, $A =$

Importance Factor, $I =$

Response Modification Factor, $R =$

Soil Conditions Factors

$C_o =$

$T_o =$

Period of the Structure, $T = C_t h_n^{3/4}$

Type of structure coefficient, $C_t =$

Structure height, $h_n =$

$T =$ 0.366 seg

$C_s =$ 0.182

	self-weight	DL1	DL	LL
RF	153.1	213.7	366.8	88.2
2F	35.25	108.3	143.55	56.1
			510.35	144.3

$C =$ 0.182 $V =$ 92.9 t
 $V_{LL} =$ 26.3

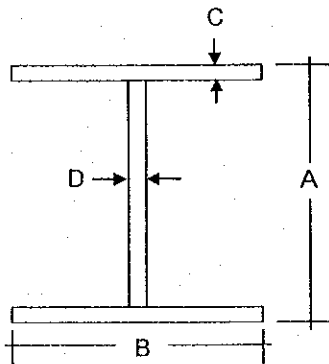
	w	h	F	w	F	Q
RF	366.8	7	77.7	88.2	19.9	97.6
2F	143.55	3.5	15.2	56.1	6.3	21.5
	510.35		92.9			119.1

$wh =$ 3070
 $wh =$ 814

RF	node No.	154
	Q/node	0.634 t
2F	node No.	10
	Q/node	2.15

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UPPER BEAM (TRUSS) B1



Beam type = **W12X58**

A = **12.19** in

B = **10.01** in

C = **0.64** in

D = **0.360** in

Area = **16.740** in²

I = **466.71** in⁴

Yc = **6.095** in

S = **76.57** in³

Pd = **30.10** ton

Md = **8.80** ton-m

PL = **6.80** ton

ML = **2.00** ton-m

Ps = **2.50** ton

Ms = **6.30** ton-m

$P/A(d+L)$ 341.66
 $P/A(d+L+s)$ 273.61
 $Md+L/S =$ 860.69
 $Ms+d+L/S =$ 1022.07

Fy = **36** ksi

1295.68 kg/cm²

0.6 Fy = 1512.00 kg/cm² **o.k.!!**

- Shear

Max. Shear = **4200.0** kg

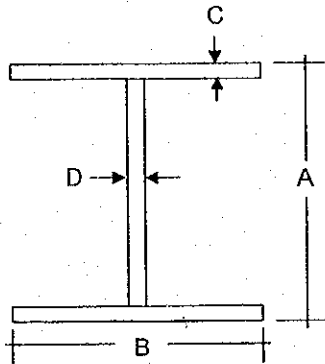
Fv = V / (h tw) = **148.35** kg/cm²

0.4 Fy = **1008.00** kg/cm² **o.k.!!**

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INFERIOR BEAM (TRUSS)

B4



Beam type = **W10X54**

A = **10.09** in

B = **10.03** in

C = **0.615** in

D = **0.370** in

Area = 15.615 in²

I = 298.72 in⁴

Yc = 5.045 in

S = 59.21 in³

Pd = **33.60** ton

Md = **0.70** ton-m from analysis

PL = **7.70** ton

Ml = **0.20** ton-m

Ps = **1.80** ton

Ms = **0.60** ton-m

$P/A(d+L) = 409.96$
 $P/A(d+L+s) = 320.87$
 $Md+L/S = 92.75$
 $Ms+d+L/S = 115.94$

Fy = **36** ksi

436.81 kg/cm²

0.6 Fy = 1512.00 kg/cm² o.k.!!

- Shear

Max. Shear = 200.0 kg

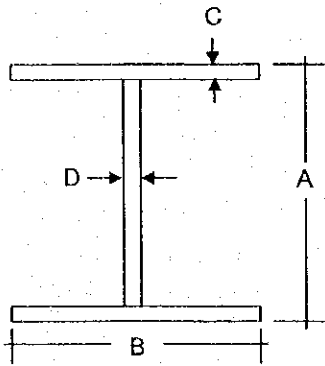
$F_v = V / (h tw) = 8.30$ kg/cm²

0.4 Fy = 1008.00 kg/cm² o.k.!!

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2ND BEAM

B5



Beam type = **W14X61**

A = **13.89** in

B = **9.995** in

C = **0.645** in

D = **0.375** in

Area = **17.619** in²

I = **628.44** in⁴

Yc = **6.945** in

S = **90.49** in³

Pd = **0.00** ton

Md = **12.10** ton-m

PL = **0.00** ton

ML = **6.60** ton-m

Ps = **0.00** ton

Ms = **0.00** ton-m

P/A(d+L)	0.00	}
P/A(d+L+s)	0.00	
Md+ L/S	1261.10	
Ms+d+L/S	945.83	

Fy = **36** ksi

1261.10 kg/cm²

0.6 Fy = 1512.00 kg/cm² **o.k.!!**

- Shear

Max. Shear = **9900.0** kg

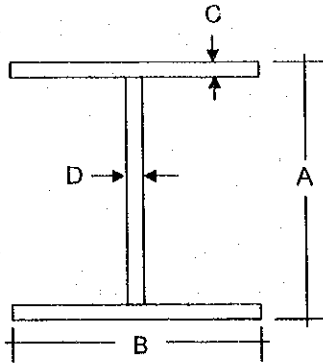
Fv = V / (h tw) = **294.60** kg/cm²

0.4 Fy = **1008.00** kg/cm² **o.k.!!**

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2ND BEAM

B6



Beam type = **W18X55**

A = **18.11** in

B = **7.53** in

C = **0.63** in

D = **0.390** in

Area = 16.059 in²

I = 880.55 in⁴

Yc = 9.055 in

S = 97.24 in³

Pd = **0.00** ton

Md = **14.30** ton-m

PL = **0.00** ton

Ml = **7.40** ton-m

Ps = **0.00** ton

Ms = **0.10** ton-m

$\left. \begin{array}{l} P/A(d+L) = 0.00 \\ P/A(d+L+s) = 0.00 \\ Md + L/S = 1361.74 \\ Ms+d+L/S = 1026.01 \end{array} \right\}$

Fy = **36** ksi

1361.74 kg/cm²

0.6 Fy = 1512.00 kg/cm² **o.k.!!**

- Shear

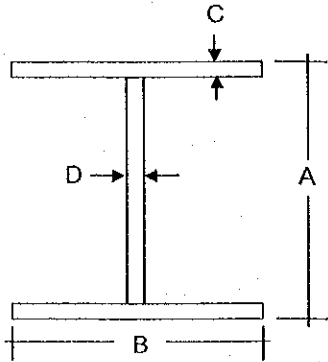
Max. Shear = 11100.0 kg

$F_v = V / (h \cdot t_w) = 243.60$ kg/cm²

0.4 Fy = 1008.00 kg/cm² **o.k.!!**

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ROOF SUB BEAM B2



Beam type = **W10X30**
 A = **10.47** in
 B = **5.81** in
 C = **0.51** in
 D = **0.300** in

Area = 8.761 in² I = 168.20 in⁴
 Yc = 5.235 in S = 32.13 in³
 Pd = **0.00** ton Md = **3.50** ton-m
 PL = **0.00** ton ML = **1.00** ton-m
 Ps = **0.00** ton Ms = **0.10** ton-m

P/A(d+L) = 0.00	} Fy = 36 ksi
P/A(d+L+s) = 0.00	
Md+ L/S = 854.69	
Ms+d+L/S = 655.26	

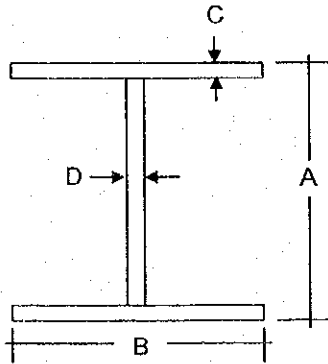
854.69 kg/cm²
 0.6 Fy = 1512.00 kg/cm² **o.k.!!**

- Shear

Max. Shear = 1500.0 kg
 $F_v = V / (h tw) = 74.02 \text{ kg/cm}^2$
 0.4 Fy = 1008.00 kg/cm² **o.k.!!**

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ROOF SUB BEAM B3



Beam type = **W8X31**

A = **8** in

B = **7.995** in

C = **0.435** in

D = **0.285** in

Area = 8.988 in² I = 108.23 in⁴

Yc = 4.000 in S = 27.06 in³

Pd = **0.40** ton Md = **1.40** ton-m

PL = **0.20** ton ML = **0.60** ton-m

Ps = **2.10** ton Ms = **0.00** ton-m

$\left. \begin{array}{l} P/A(d+L) = 10.35 \\ P/A(d+L+s) = 34.92 \\ Md+L/S = 451.05 \\ Ms+d+L/S = 338.29 \end{array} \right\}$	$F_y = \mathbf{36}$ ksi 461.39 kg/cm ² 0.6 F _y = 1512.00 kg/cm ² o.k.!!
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- Shear

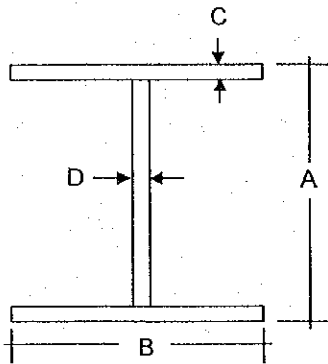
Max. Shear = 1000.0 kg

$F_v = V / (h tw) = 67.98$ kg/cm²

0.4 F_y = 1008.00 kg/cm² **o.k.!!**

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ROOF SUB BEAM B8



Beam type = **W6X15**
 A = **5.99** in
 B = **5.99** in
 C = **0.26** in
 D = **0.230** in

Area = **4.373** in²

I = **28.72** in⁴

Yc = **2.995** in

S = **9.59** in³

Pd = **6.30** ton

Md = **0.20** ton-m

PL = **1.30** ton

ML = **0.00** ton-m

Ps = **1.50** ton

Ms = **0.00** ton-m

$P/A(d+L) = 269.39$
 $P/A(d+L+s) = 241.92$
 $Md + L/S = 127.27$
 $Ms + d + L/S = 95.45$

$F_y = \mathbf{36}$ ksi
 396.65 kg/cm²
 $0.6 F_y = 1512.00$ kg/cm² **o.k.!!**

- Shear

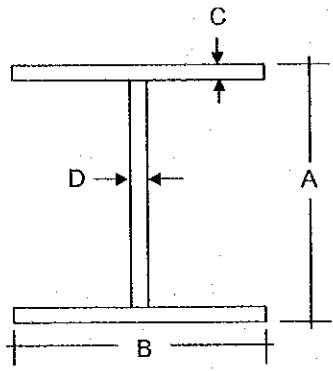
Max. Shear = **300.0** kg

$F_v = V / (h tw) = \mathbf{33.75}$ kg/cm²

$0.4 F_y = \mathbf{1008.00}$ kg/cm² **o.k.!!**

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COLUMN C1



Column type = **W18x86**

A = **18.39** in

B = **11.09** in

C = **0.77** in

D = **0.480** in

Area = 25.167 in²

Yc = 9.195 in

Pd = **22.60** ton

Pl = **8.50** ton

Ps = **22.40** ton

I = 1517.78 in⁴

S = 165.07 in³

Md = **11.70** ton-m

ML = **5.80** ton-m

Ms = **6.30** ton-m

P/A(d+L) 191.54

P/A(d+L+s) 329.50

Md+L/S = 646.96

Ms+d+L/S = 879.87

}

Fy = **36** ksi

1209.37 kg/cm²

0.6 Fy = 1512.00 kg/cm² **o.k.!!**

- Shear

Vdead = **5000** kg

Vlive = **2500** kg

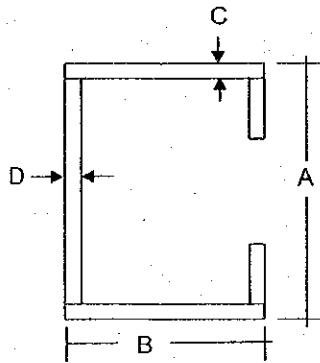
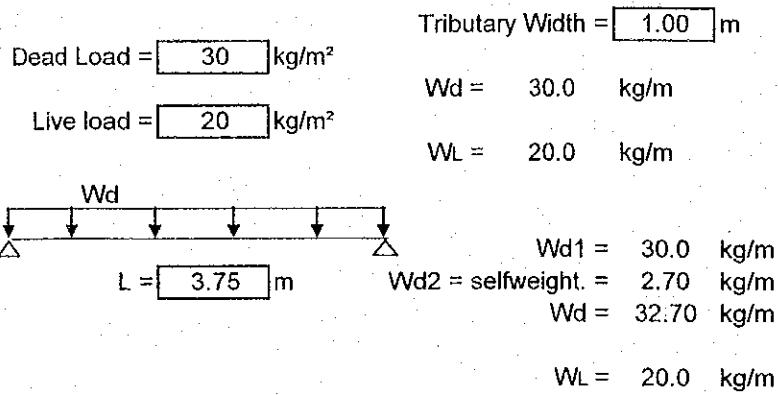
Max. Shear = 7500 kg

Fv = V / (h tw) = 131.70 kg/cm²

0.4 Fy = 1008.00 kg/cm² **o.k.!!**

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Polin



Beam type = C4x1/16
 A = 4 in
 B = 2 in
 C = 0.0625 in
 D = 0.0625 in

Area = 0.530 in²
 Yc = 2.000 in
 Fy = 36 ksi
 I = 1.38 in⁴
 S = 0.69 in³
 Md = 0.06 ton-m
 ML = 0.04 ton-m

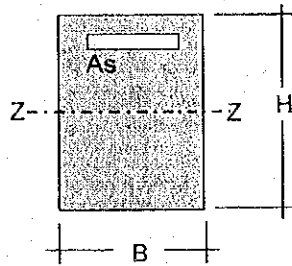
Md / S = 509.84 } 821.66 kg/cm²
 ML / S = 311.83 } 0.6 Fy = 1512.00 kg/cm² o.k.!!

- Deflection

$\delta_{adm} = L/360 = 1.04$ cm
 E = 2.0E+10 kg/m²
 $\delta_{dead} = 0.72$ cm
 $\delta_{Total} = 0.72$ cm o.k.!!

PROJECT: Detailed Design on Port Reactivation Project in La Union Province	Calc. File No.	Prepared by	H.WATANABE
SECTION: Container Freight Station	Calc. Index No.	Checked by	A.MORIOKA
SUBJECT: Foundation beam design	Date	July-02	Page 12 / 50

**FOUNDATION BEAM FB-1
BEAM DESIGN**



$H = 120.00$ cm
 $b = 35.00$ cm
 $f_c = 210$ kg/cm²
 $f_y = 4200$ kg/cm²

Forces and Moments, from Structural Analysis (ton , m) :

TYPE OF LOAD	MOMENT Mz-z
-----------------	----------------

Dead Load	0.60
Live Load	0.10
Seismic x	27.00
Seismic y	0.00

COMBINATION	Mu z-z
C1=1.4 DL+1.7 LL	1.01
= 0.75(1.4DL+1.7LL+1.87	38.63
= 0.75(1.4DL+1.7LL+1.87	0.76

Force for design: $M_u z-z = 38.63$ ton-m

$d = 112.46$ cm Clear cover = 5.00 cm

$$f_y^2/1.7b f_c A_s^2 - f_y d A_s + M_u/\phi = 0.90$$

$$1411.76 A_s^2 - 472332 A_s + 4292222 = 0 \quad A_s = 9.35 \text{ cm}^2$$

$A_{smin} = (4/3)A_{sreq}$:

$$\left. \begin{aligned} (4/3)A_{sreq} &= 12.46 \text{ cm}^2 \\ (14/f_y) b d &= 13.12 \text{ cm}^2 \end{aligned} \right\} A_{smin} = 12.46 \text{ cm}^2$$

$$A_{smax} : \quad \rho_b = 0.0345 \quad A_{smax} (0.75\rho_b) = 101.73 \text{ cm}^2$$

$$A_s = 12.46 \text{ cm}^2 \quad \text{o.k!! } A_s < A_{max}$$

Bar denomination, N = 8 Bar Area (A_v) = 5.07 cm²

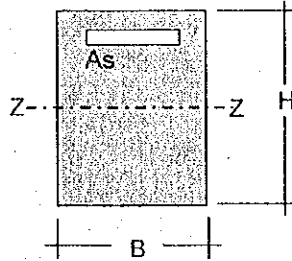
Number of bars = 2.46 **Use3 - N8**

Minimum Base Required:

Max. bars per layer = 3 Minimum Base = 27.78 cm

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**FOUNDATION BEAM FB-2
BEAM DESIGN**



H = 120.00 cm
 b = 30.00 cm
 $f_c = 210 \text{ kg/cm}^2$
 $f_y = 4200 \text{ kg/cm}^2$

Forces and Moments, from Structural Analysis (ton , m) :

TYPE OF LOAD	MOMENT Mz-z
--------------	----------------

Dead Load	5.40
Live Load	2.60
Seismic x	0.00
Seismic y	16.30

COMBINATION	Mu z-z
C1=1.4 DL+1.7 LL	11.98
= 0.75(1.4DL+1.7LL+1.87)	8.99
= 0.75(1.4DL+1.7LL+1.87)	31.85

Force for design: $M_u \text{ z-z} = 23.62 \text{ ton-m}$

$d = 112.46 \text{ cm}$ Clear cover = 5.00 cm

$$f_y^2 / 1.7 b f_c A_s^2 - f_y d A_s + M_u / \phi = 0.90$$

$$1647.06 A_s^2 - 472332 A_s + 2624444 = 0 \quad A_s = 5.67 \text{ cm}^2$$

$A_{smin} = (4/3)A_{sreq}$:

$$\left. \begin{aligned} (4/3)A_{sreq} &= 7.56 \text{ cm}^2 \\ (14/f_y) b d &= 11.25 \text{ cm}^2 \end{aligned} \right\} A_{smin} = 7.56 \text{ cm}^2$$

$$A_{smax} : \quad \rho b = 0.0345 \quad A_{smax} (0.75\rho b) = 87.20 \text{ cm}^2$$

$$A_s = 7.56 \text{ cm}^2 \quad \text{o.k!! } A_s < A_{max}$$

Bar denomination, N = 8 Bar Area (A_v) = 5.07 cm^2

Number of bars = 1.49 Use 2 - N8

Minimum Base Required:

Max. bars per layer = 3 Minimum Base = 27.78 cm

PROJECT: Detailed Design on Port Reactivation Project In La Union Province	Calc. File No.	Prepared by	H.WATANABE
SECTION: Container Freight Station	Calc. Index No.	Checked by	A.MORIOKA
SUBJECT: Vertical reaction	Date	July-02	Page <i>14</i> / 150

Reaction of upper structure

	1	2	3	4	5-9	10	11
A	14.3	16.8	16.9	19.1	20.3	18.5	7.0
	4.7	5.2	3.6	4.0	4.3	3.9	1.3
	19.0	22.0	20.5	23.1	24.6	22.4	8.3
B	21.7	23.1					7.0
	8.6	8.5					1.4
	30.3	31.6					8.4
C	23.0	30.9					10.6
	8.8	10.0					2.2
	31.8	40.9					12.8
D	21.7	23.0					7.3
	8.6	8.5					1.5
	30.3	31.5					8.8
E	14.0	17.1	16.9	19.1	20.2	18.2	7.5
	4.7	5.2	3.6	4.0	4.3	3.9	1.4
	18.7	22.3	20.5	23.1	24.5	22.1	8.9

upper line DL
 middle line LL
 lower line TL=DL+LL

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SUBJECT: FOUNDATION	Page	Date	Jul-02/ 50

AF

Reaction of foundation

	1	2	3	4	5-9	10	11
A	8.3	12.1	5.1	1.9	1.9	1.9	5.1
	3.8	3.3	3.3	3.3	3.3	3.3	3.8
	12.1	15.4	8.4	5.2	5.2	5.2	8.9
B	13.7	16.5					8.3
	3.3	3.3					3.3
	17.1	19.8					11.6
C	13.7	16.5					8.3
	3.3	3.3					3.3
	17.1	19.8					11.6
D	12.4	11.0					8.3
	3.3	3.3					3.3
	15.7	14.3					11.6
E	8.3	8.3	5.1	1.9	1.9	1.9	5.1
	9.3	9.3					
	3.8	3.3	3.3	3.3	3.3	3.3	3.8
	21.4	20.9	8.4	5.2	5.2	5.2	8.9

1st line wall
 2nd line slab
 3rd line cover concrete column
 4th line total weigh

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SUBJECT: FOUNDATION	Page	16	Date Jul-02/ 50

Reaction							
	1	2	3	4	5-9	10	11
A	19.0	22.0	20.5	23.1	24.6	22.4	8.3
	12.1	15.4	8.4	5.2	5.2	5.2	8.9
	31.1	37.4	28.9	28.3	29.8	27.6	17.2
B	30.3	31.6					8.4
	17.1	19.8					11.6
	47.4	51.4					20.0
C	31.8	40.9					12.8
	17.1	19.8					11.6
	48.9	60.7					24.4
D	30.3	31.5					8.8
	15.7	14.3					11.6
	46.0	45.8					20.4
E	18.7	22.3	20.5	23.1	24.5	22.1	8.9
	21.4	20.9	8.4	5.2	5.2	5.2	8.9
	40.1	43.2	28.9	28.3	29.7	27.3	17.8

1st line	upper weight
2nd line	foundation weight
3rd line	total weight

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Number of Pile

	1	2	3	4	5-9	10	11
A	2-40	2-40	2-40	2-40	2-40	2-40	2-40
B	2-40	2-40					2-40
C	2-40	2-40					2-40
D	2-40	2-40					2-40
E	2-40	2-40					2-40

Pile bearing strength

diameter (cm)	strength (t)	strength (exclude foundation)
40	80.6	78 t
45	101.9	101 t

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PILE SEISMIC STRESS
 Based on chung equation

mark	size (cm)	length (m)	I (cm ⁴)	kh (kg/cm ³)	(cm-1) (cm-1)	L	I 3
P1	40	7	2.13E+05	3.169	0.00472	3.3	0.022
P2	45	7	3.42E+05	2.901	0.00422	3.0	0.026

N of piles	ni 3	Q (t)	Q (t/n)	y0 (cm)	M0 (t m)	Mmax (t m)	lm (m)
56	1.254	106.0	1.9	0.1	2.0	0.4	3.3
6	0.155	13.1	2.2	0.1	2.6	0.5	3.7

Σ= 62 1.408 119.1

Young's Modulus, E = 3.00E+05 kg/cm²
 Seismic force, Q = 119.1 t

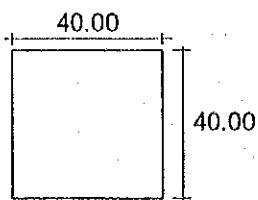
N = 9
 E0 = 63

40 x 40		
L (cm)	M (t m)	Q (t)
0	2.0	1.9
-50	1.2	1.5
-100	0.5	1.1
-150	0.1	0.7
-200	-0.2	0.4
-250	-0.3	0.2
-300	-0.4	0.1
-350	-0.4	0.0
-400	-0.4	-0.1
-450	-0.3	-0.1
-500	-0.3	-0.1
-550	-0.2	-0.1
-600	-0.1	-0.1
-650	-0.1	-0.1
-700	-0.1	-0.1
-750	0.0	-0.1

50 x 50		
L (cm)	M (t m)	Q (t)
0	2.6	2.2
-50	1.6	1.7
-100	0.8	1.3
-150	0.3	0.9
-200	-0.1	0.6
-250	-0.3	0.4
-300	-0.5	0.2
-350	-0.5	0.0
-400	-0.5	0.0
-450	-0.5	-0.1
-500	-0.4	-0.1
-550	-0.4	-0.1
-600	-0.3	-0.1
-650	-0.2	-0.1
-700	-0.2	-0.1
-750	-0.1	-0.1

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PILE DESIGN



$f_c = 350.00 \text{ kg/cm}^2$

At release, $f_c = 280.00 \text{ kg/cm}^2$

Section Area = 1600 cm^2

Section Inertia = 213333.33 cm^4

- Prestressing Force

Cables.

Uncoated seven wire stress relieved strands.
 $\phi = 12.7 \text{ mm}$. Area = 92.90 mm^2 .

Ultimate Strength, $F_{pu} = 17,500.0 \text{ kg/cm}^2$

of strands to use = 6 Prestressing force, $P_o = 0.70 F_{pu} A = 68.28 \text{ ton}$

Allowable stress

At service

$0.4 f_c = 140 \text{ kg/cm}^2$

At release

$0.4 f_c = 112 \text{ kg/cm}^2$

a) Stress at release

Axial Load, $P_a = 0.00 \text{ ton}$

Excentricity, $e = 0.00 \text{ cm}$

Moment, $M_a = 0.00 \text{ ton-m}$

$c = 20.00 \text{ cm}$

$(P_a + P_o) / A \pm (P_o e c / I + M_a c / I)$

42.68 ± 0.00

Stress 1 = 42.68 $\text{kg/cm}^2 < 0.4f_c \text{ o.k!!!}$

Stress 2 = 42.68 $\text{kg/cm}^2 < 0.4f_c \text{ o.k!!!}$

b) Stress at Service

Axial Load, $P_a = 80.60 \text{ ton}$

Excentricity, $e = 0.00 \text{ cm}$

Moment, $M_a = 2.01 \text{ ton-m}$

Prestress force, $P_e = 58.04 \text{ cm (15% losses)}$

$(P_a + P_e) / A \pm (P_e e c / I + M_a c / I)$

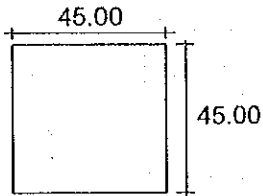
86.65 ± 18.82

Stress 1 = 105.47 $\text{kg/cm}^2 < 0.4f_c \text{ o.k!!!}$

Stress 2 = 67.84 $\text{kg/cm}^2 < 0.4f_c \text{ o.k!!!}$

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PILE DESIGN



$f_c =$ kg/cm^2

At release, $f_c =$ kg/cm^2

Section Area = cm^2

Section Inertia = cm^4

- Prestressing Force

Cables.

Uncoated seven wire stress relieved strands.

Ultimate Strenght, $F_{pu} =$ kg/cm^2

$\phi = 12.7 \text{ mm. Area} = 92.90 \text{ mm}^2.$

of strands to use =

Prestressing force, $P_o = 0.70 F_{pu} A =$ ton

Allowable stress

At service

$0.4 f_c =$ kg/cm^2

At release

$0.4 f_c =$ kg/cm^2

a) Stress at release

Axial Load, $P_a =$ ton

Excentricity, $e =$ cm

Moment, $M_a =$ ton-m

$c =$ cm

$(P_a + P_o) / A \pm (P_o e c / I + M_a c / I)$

33.72 ± 0.00

Stress 1 = $33.72 \text{ kg/cm}^2 < 0.4f_c \text{ o.k!!!}$

Stress 2 = $33.72 \text{ kg/cm}^2 < 0.4f_c \text{ o.k!!!}$

b) Stress at Service

Axial Load, $P_a =$ ton

Excentricity, $e =$ cm

Moment, $M_a =$ ton-m

Prestress force, $P_e =$ cm (15% losses)

$(P_a + P_e) / A \pm (P_e e c / I + M_a c / I)$

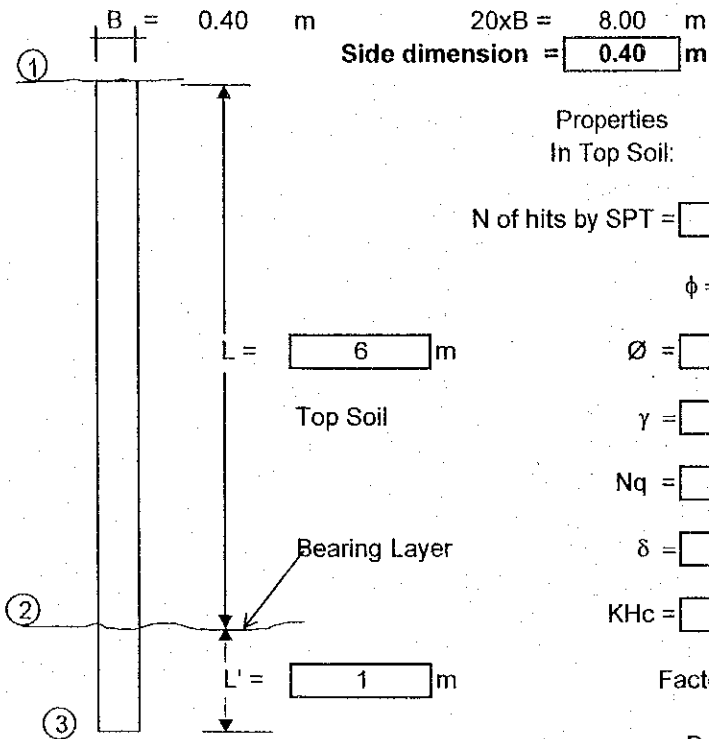
78.98 ± 16.97

Stress 1 = $95.96 \text{ kg/cm}^2 < 0.4f_c \text{ o.k!!!}$

Stress 2 = $62.01 \text{ kg/cm}^2 < 0.4f_c \text{ o.k!!!}$

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BEARING CAPACITY OF SQUARE DRIVEN CONCRETE PILES



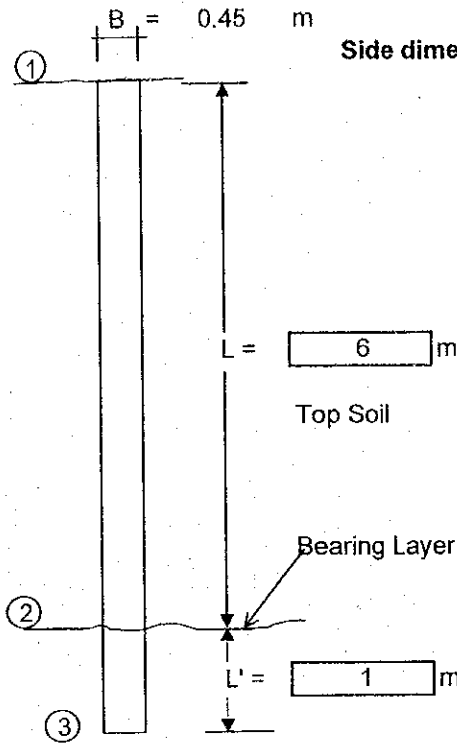
Properties In Top Soil:	Properties In Bearing Stratum:
N of hits by SPT = <input type="text" value="8"/> N	<input type="text" value="50"/> N
$\phi = \sqrt{12N} + 20$	
$\phi =$ <input type="text" value="29.80"/> °	<input type="text" value="42.39"/> °
$\gamma =$ <input type="text" value="1.430"/> ton/m ³	<input type="text" value="1.840"/> ton/m ³
$N_q =$ <input type="text" value="21"/>	<input type="text" value="145"/>
$\delta =$ <input type="text" value="22.35"/> °	<input type="text" value="31.79"/> °
$KH_c =$ <input type="text" value="1"/>	<input type="text" value="1"/>
Factor of safety (F.S.) = <input type="text" value="3"/>	

Pressure due to soil:

Qult = Qt + Qf		
- Tip Resistance (Qt)		$P_1 =$ <input type="text" value="0.00"/> ton/m ²
$Q_p = P_t \times N_q \times A_t$	$P_t = P_3 =$ 10.42 ton/m ²	$P_2 =$ 8.58 ton/m ²
Pile Area = 0.160 m ²	Qp = 241.81 ton	$P_3 =$ 10.42 ton/m ²
- Friction Capacity (Qf)	Consider Friction? <input type="text" value="N"/> Y/N	
$Q_f = \sum(KH_c) \times P_o \times \tan(\delta) \times S$		
$S_1 = 2BLD$	$S_1 =$ 4.80 m ²	$P_{o1} = (P_1 + P_2)/2$
$S_2 = 2BL'D$	$S_2 =$ 0.80 m ²	$P_{o2} = (P_2 + P_3)/2$
$P_{o1} =$ 4.293 ton/m ²	$P_{o2} =$ 9.503 ton/m ²	Qf = 0.00 ton
Qult = Qt + Qf	Qult = 241.81 ton	
$Q_{adm} = Q_{ult} / F.S.$	Qadm = 80.60 ton	

PROJECT: Detailed Design on Port Reactivation Project in La Union Province	Calc. File No.	Prepared by	R. Martinez
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BEARING CAPACITY OF SQUARE DRIVEN CONCRETE PILES



20xB = 9.00 m
Side dimension = **0.45** m

Properties
In Top Soil:

Properties
In Bearing Stratum:

N of hits by SPT = **8** N **50** N

$$\phi = \sqrt{12N + 20}$$

$\phi =$ **29.80** ° **44.49** °

$\gamma =$ **1.430** ton/m³ **1.840** ton/m³

Nq = **21** **145**

$\delta =$ **22.35** ° **33.37** °

KHc = **1** **1**

Factor of safety (F.S.) = **3**

Pressure due to soil:

$$Q_{ult} = Q_t + Q_f$$

- Tip Resistance (Qt)

P1 = **0.00** ton/m³

$$Q_p = P_t \times N_q \times A_t \quad P_t = P_3 = 10.42 \text{ ton/m}^2$$

P2 = **8.58** ton/m³

P3 = **10.42** ton/m³

Pile Area = **0.203** m²

Qp = 305.96 ton

- Friction Capacity (Qf)

Consider Friction ? **n** Y/N

$$Q_f = \sum (KHc) \times P_{ox} \times \tan(\delta) \times S$$

S1 = 2BLD S1 = **5.40** m²

$$P_{o1} = (P_1 + P_2)/2$$

S2 = 2BL'D S2 = **0.90** m²

$$P_{o2} = (P_2 + P_3)/2$$

Po1 = **4.290** ton/m²

Po2 = **9.500** ton/m²

Qf = 0.00 ton

$$Q_{ult} = Q_t + Q_f$$

Qult = 305.96 ton

$$Q_{adm} = Q_{ult} / F.S.$$

Qadm = 101.99 ton

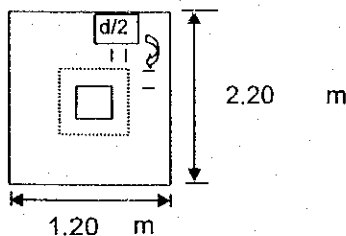
PROJECT: Detailed Design on Port Reactivation Project In La Union Province	Calc. File No.	Prepared by	R.Martinez
SECTION: Container Freight Station	Calc. Index No.	Checked by	A.MORIOKA
SUBJECT: Foundation design	Date	July-02	Page 23 / 50

FOOTING DESIGN

Design for foundation F-1

a) Punching

For Column



Th = cm

fc = kg/cm²
20.59 Mpa

φ = 0.85

Dead load PD =	<input type="text" value="40.10"/>	ton
Live load PL =	<input type="text" value="8.80"/>	ton
Seismic Ps =	<input type="text" value="12.03"/>	ton
1.4D + 1.7L =	<input type="text" value="71.10"/>	ton
0.75(1.4D + 1.7L + 1.87S) =	<input type="text" value="70.20"/>	ton
Pu =	<input type="text" value="71.10"/>	ton
d =	<input type="text" value="59.03"/>	cm
Column width =	<input type="text" value="72.00"/>	cm
Column base =	<input type="text" value="63.50"/>	cm
bo=4(c+d)=	<input type="text" value="524.12"/>	cm

Concrete shear strength, Vc ACI 11.12

βc = 1.134
Vc1 = φ(1+2/βc)√fc bod/6 = 560.75 ton

αs =
Vc2 = φ(2+αsd/bo)√fc bod/12 = 248.59 ton

Vc3 = φ(1/3)√fc bod = 405.77

Vc = 248.59 > 71.10 o.k!!!

For Pile

φ = 0.85

Distance from edge = cm

βc = 1

αs =

Dead load PD =	<input type="text" value="22.27"/>	ton/pile
Live load PL =	<input type="text" value="4.40"/>	ton/pile
Carga sismica Ps =	<input type="text" value="6.02"/>	ton/pile
1.4D + 1.7L =	<input type="text" value="38.65"/>	ton
0.75(1.4D + 1.7L + 1.87S) =	<input type="text" value="37.43"/>	ton
Pu =	<input type="text" value="38.65"/>	ton
d =	<input type="text" value="33.73"/>	cm
Pile width =	<input type="text" value="40.00"/>	cm
Pile base =	<input type="text" value="40.00"/>	cm
bo=4(c+d)=	<input type="text" value="294.92"/>	cm

Vc1 = φ(1+2/βc)√fc bod/6 = 195.70 ton

Vc2 = φ(2+αsd/bo)√fc bod/12 = 232.13 ton

Vc3 = φ(1/3)√fc bod = 130.47

Vc = 130.47 > 38.65 o.k!!!

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b) Shear Reinforcement

$$\text{Base} = \boxed{120} \text{ cm} \quad f_y = \boxed{4200} \text{ kg/cm}^2$$

$$d = \boxed{70.00} \text{ cm}$$

$$V_c = (1/6) \sqrt{f_c} b o d = 64.80 \text{ ton}$$

$$V_n = V_c + V_s \quad V_s = V_u / \phi - V_c \quad \phi = 0.85$$

$$V_u = 38.65 \text{ ton}$$

$$V_s = (19,328.6) \text{ kg}$$

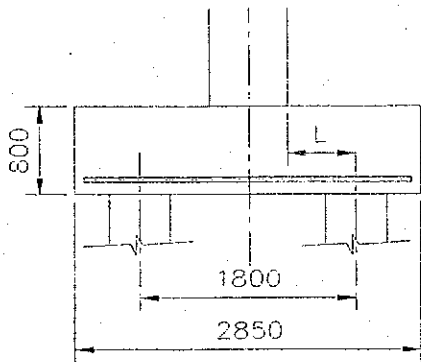
$$\text{Bar denomination} = \boxed{4} \quad \text{Bar area} = 1.27 \text{ cm}^2$$

$$\# \text{ of legs} = \boxed{2} \quad \text{Spacing, } S_{req} = -38.54 \text{ cm}$$

Use 2 legs of N 4 @ 30 cm

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c) Reinforcing Steel



$f_y = 4200 \text{ kg/cm}^2$

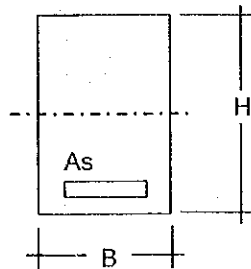
Moment generated by pile reaction

$M = P_p \times L$

$L = 0.50 \text{ m}$

$M_1 = 1.4D + 1.7L = 19.33 \text{ ton-m}$

$M_2 = 0.75(1.4D + 1.7L + 1.87S) = 18.71 \text{ ton-m}$



$H = 70.00 \text{ cm}$

$b = 120.00 \text{ cm}$

$f_c = 280 \text{ kg/cm}^2$

$f_y = 4200 \text{ kg/cm}^2$

Force for design: $M_u \text{ z-z} = 19.33 \text{ ton-m}$

$d = 52.78 \text{ cm}$

Clear cover = 5.00 cm

$f_y^2 / 1.7b f_c A_s^2 - f_y d A_s + M_u / \phi = 0 \quad \phi = 0.90$

$308.82 A_s^2 - 221666 A_s + 2147480 = 0 \quad A_s = 9.82 \text{ cm}^2$

$A_{smin} = (4/3)A_{sreq}$
 $(4/3)A_{sreq} = 13.10 \text{ cm}^2$
 $(14/f_y) b d = 21.11 \text{ cm}^2$

$A_{smin} = 13.10 \text{ cm}^2$

$A_{smax} : \quad \rho b = 0.0459 \quad A_{smax} (0.75\rho b) = 218.25 \text{ cm}^2$

$A_s = 13.10 \text{ cm}^2 \quad \text{o.k!! } A_s < A_{max}$

Bar denomination, $N = 6 \quad \text{Bar Area } (A_v) = 2.85 \text{ cm}^2$

Number of bars = 4.59 Use 5 - N6

Pitch = 26.39 cm $6 @ 26 \text{ cm}$

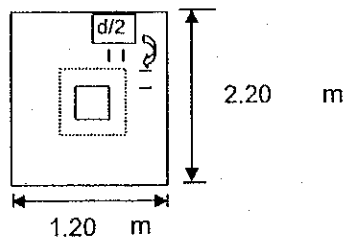
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FOOTING DESIGN

Design for foundation F-2

a) Punching

For Column



$\phi = 0.85$

Dead load Pd =	50.70	ton
Live load PL =	10.00	ton
Seismic Ps =	15.21	ton
1.4D + 1.7L =	87.98	ton
0.75(1.4D + 1.7L + 1.87S) =	87.32	ton
Pu =	87.98	ton
d =	59.03	cm
Column width =	72.00	cm
Column base =	63.50	cm
bo = 4(c+d) =	524.12	cm

Th = 70 cm

fc = 210 kg/cm²
20.59 Mpa

Concrete shear strength, Vc ACI 11.12

$V_{c1} = \phi(1+2/\beta_c)\sqrt{f_c} \text{ bod}/6 = 560.75 \text{ ton}$

$\beta_c = 1.134$

$V_{c2} = \phi(2+\alpha_s d/b_o)\sqrt{f_c} \text{ bod}/12 = 248.59 \text{ ton}$

$\alpha_s = \text{ 40 }$

$V_{c3} = \phi(1/3)\sqrt{f_c} \text{ bod} = 405.77$

$V_c = 248.59 > 87.98 \text{ o.k!!!}$

For Pile

$\phi = 0.85$

Distance from edge = 37.50 cm

Dead load Pd =	27.57	ton/pile
Live load PL =	5.00	ton/pile
Carga sismica Ps =	7.61	ton/pile
1.4D + 1.7L =	47.09	ton
0.75(1.4D + 1.7L + 1.87S) =	45.99	ton
Pu =	47.09	ton
d =	38.73	cm
Pile width =	45.00	cm
Pile base =	45.00	cm
bo = 4(c+d) =	334.92	cm

$\beta_c = 1$

$\alpha_s = \text{ 20 }$

$V_{c1} = \phi(1+2/\beta_c)\sqrt{f_c} \text{ bod}/6 = 255.19 \text{ ton}$

$V_{c2} = \phi(2+\alpha_s d/b_o)\sqrt{f_c} \text{ bod}/12 = 303.03 \text{ ton}$

$V_{c3} = \phi(1/3)\sqrt{f_c} \text{ bod} = 170.12$

$V_c = 170.12 > 47.09 \text{ o.k!!!}$

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b) Shear Reinforcement

Base = cm $f_y =$ kg/cm²

d = cm

$V_c = (1/6) \sqrt{f_c} b o d =$ 64.80 ton

$V_n = V_c + V_s$ $V_s = V_u / \phi - V_c$ $\phi = 0.85$

$V_u =$ 47.09 ton

$V_s =$ (9,399.2) kg

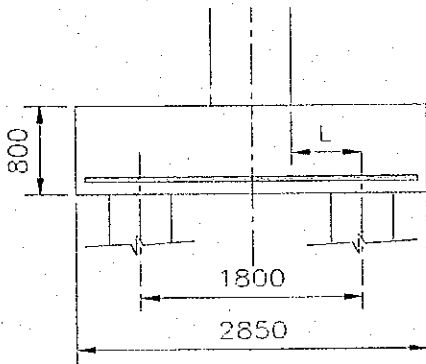
Bar denomination = Bar area = 1.27 cm²

of legs = Spacing, $S_{req} =$ -79.25 cm

Use 2 legs of N 4 @ 30 cm

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c) Reinforcing Steel



$$f_y = 4200 \text{ kg/cm}^2$$

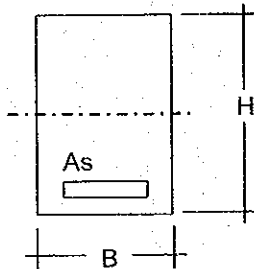
Moment generated by pile reaction

$$M = P_p \times L$$

$$L = 0.50 \text{ m}$$

$$M_1 = 1.4D + 1.7L = 23.55 \text{ ton-m}$$

$$M_2 = 0.75(1.4D + 1.7L + 1.87S) = 22.99 \text{ ton-m}$$



$$H = 70.00 \text{ cm}$$

$$b = 120.00 \text{ cm}$$

$$f_c = 280 \text{ kg/cm}^2$$

$$f_y = 4200 \text{ kg/cm}^2$$

Force for design: $M_u \text{ z-z} = 23.55 \text{ ton-m}$

$$d = 52.78 \text{ cm}$$

Clear cover = 5.00 cm

$$f_y^2 / 1.7b f_c A_s^2 - f_y d A_s + M_u / \phi = \phi = 0.90$$

$$308.82 A_s^2 - 221666 A_s + 2616368.9 = 0 \quad A_s = 12.00 \text{ cm}^2$$

$$\left. \begin{aligned} A_{smin} &= (4/3)A_{sreq} \\ (4/3)A_{sreq} &= 16.01 \text{ cm}^2 \\ (14/f_y) b d &= 21.11 \text{ cm}^2 \end{aligned} \right\} A_{smin} = 16.01 \text{ cm}^2$$

$$A_{smax} : \quad \rho_b = 0.0459 \quad A_{smax} (0.75\rho_b) = 218.25 \text{ cm}^2$$

$$A_s = 16.01 \text{ cm}^2 \quad \text{o.k!! } A_s < A_{max}$$

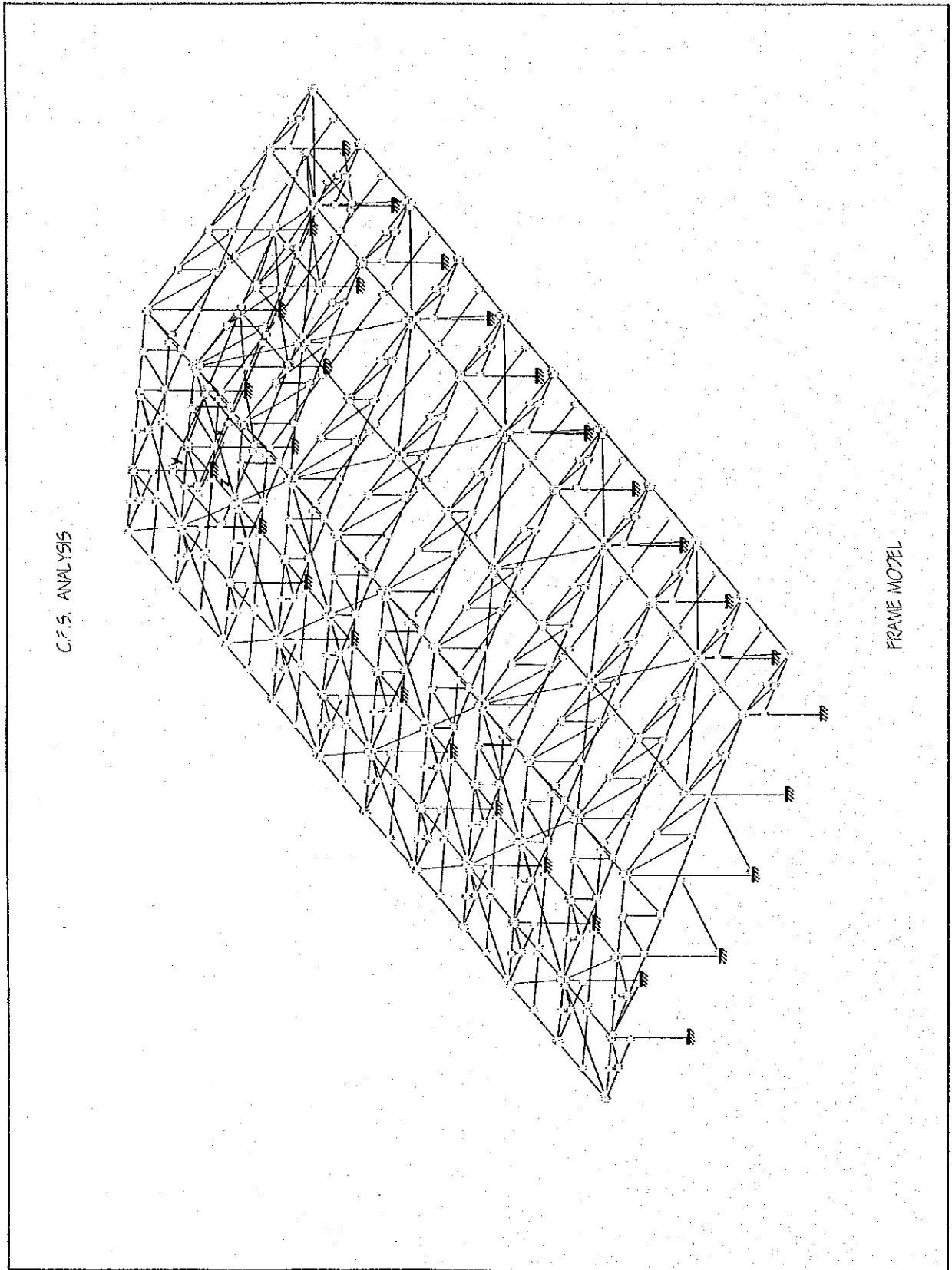
Bar denomination, N = 6

Bar Area (A_v) = 2.85 cm²

Number of bars = 5.62 Use 6 - N6

Pitch = 21.11 cm 6 @ 21 cm

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Container Freight Station Model

Input for Structural Model

Node Coordinate

Node No.	x (m)	y (m)	z (m)	Node No.	x (m)	y (m)	z (m)
1	0	0	0	51	32.85	6.075	7.5
2	0	7	0	52	32.85	5.15	7.5
3	15	11.874	0	53	0	0	15
4	30	7	0	54	0	7	15
5	30	0	0	55	15	11.874	15
6	15	7	0	56	30	7	15
7	3.75	7	0	57	30	0	15
8	7.5	7	0	58	15	7	15
9	11.25	7	0	59	3.75	7	15
10	18.75	7	0	60	7.5	7	15
11	22.5	7	0	61	11.25	7	15
12	26.25	7	0	62	18.75	7	15
13	3.75	8.218	0	63	22.5	7	15
14	7.5	9.437	0	64	26.25	7	15
15	11.25	10.655	0	65	3.75	8.218	15
16	18.75	10.655	0	66	7.5	9.437	15
17	22.5	9.437	0	67	11.25	10.655	15
18	26.25	8.218	0	68	18.75	10.655	15
19	-5.7	5.15	0	69	22.5	9.437	15
20	0	5.15	0	70	26.25	8.218	15
21	35.7	5.15	0	71	-5.7	5.15	15
22	30	5.15	0	72	0	5.15	15
23	-2.85	6.075	0	73	35.7	5.15	15
24	-2.85	5.15	0	74	30	5.15	15
25	32.85	6.075	0	75	-2.85	6.075	15
26	32.85	5.15	0	76	-2.85	5.15	15
27	0	0	7.5	77	32.85	6.075	15
28	0	7	7.5	78	32.85	5.15	15
29	15	11.874	7.5	79	0	0	22.5
30	30	7	7.5	80	0	7	22.5
31	30	0	7.5	81	15	11.874	22.5
32	15	7	7.5	82	30	7	22.5
33	3.75	7	7.5	83	30	0	22.5
34	7.5	7	7.5	84	15	7	22.5
35	11.25	7	7.5	85	3.75	7	22.5
36	18.75	7	7.5	86	7.5	7	22.5
37	22.5	7	7.5	87	11.25	7	22.5
38	26.25	7	7.5	88	18.75	7	22.5
39	3.75	8.218	7.5	89	22.5	7	22.5
40	7.5	9.437	7.5	90	26.25	7	22.5
41	11.25	10.655	7.5	91	3.75	8.218	22.5
42	18.75	10.655	7.5	92	7.5	9.437	22.5
43	22.5	9.437	7.5	93	11.25	10.655	22.5
44	26.25	8.218	7.5	94	18.75	10.655	22.5
45	-5.7	5.15	7.5	95	22.5	9.437	22.5
46	0	5.15	7.5	96	26.25	8.218	22.5
47	35.7	5.15	7.5	97	-5.7	5.15	22.5
48	30	5.15	7.5	98	0	5.15	22.5
49	-2.85	6.075	7.5	99	35.7	5.15	22.5
50	-2.85	5.15	7.5	100	30	5.15	22.5

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Node No.	x (m)	y (m)	z (m)	Node No.	x (m)	y (m)	z (m)
101	-2.85	6.075	22.5	157	0	7	33.75
102	-2.85	5.15	22.5	158	0	7	26.25
103	32.85	6.075	22.5	159	0	7	18.75
104	32.85	5.15	22.5	160	0	7	11.25
105	0	0	30	161	0	7	3.75
106	0	7	30	162	30	7	33.75
107	15	11.874	30	163	30	7	26.25
108	30	7	30	164	30	7	18.75
109	30	0	30	165	30	7	11.25
110	15	7	30	166	30	7	3.75
111	3.75	7	30	167	-5.7	5.15	33.75
112	7.5	7	30	168	-5.7	5.15	26.25
113	11.25	7	30	169	-5.7	5.15	18.75
114	18.75	7	30	170	-5.7	5.15	11.25
115	22.5	7	30	171	-5.7	5.15	3.75
116	26.25	7	30	172	35.7	5.15	33.75
117	3.75	8.218	30	173	35.7	5.15	26.25
118	7.5	9.437	30	174	35.7	5.15	18.75
119	11.25	10.655	30	175	35.7	5.15	11.25
120	18.75	10.655	30	176	35.7	5.15	3.75
121	22.5	9.437	30	177	15	11.874	33.75
122	26.25	8.218	30	178	15	11.874	26.25
123	-5.7	5.15	30	179	15	11.874	18.75
124	0	5.15	30	180	15	11.874	11.25
125	35.7	5.15	30	181	15	11.874	3.75
126	30	5.15	30	182	22.5	9.437	33.75
127	-2.85	6.075	30	183	22.5	9.437	26.25
128	-2.85	5.15	30	184	22.5	9.437	18.75
129	32.85	6.075	30	185	22.5	9.437	11.25
130	32.85	5.15	30	186	22.5	9.437	3.75
131	0	0	37.5	187	7.5	9.437	3.75
132	0	7	37.5	188	7.5	9.437	11.25
133	15	11.874	37.5	189	7.5	9.437	18.75
134	30	7	37.5	190	7.5	9.437	26.25
135	30	0	37.5	191	7.5	9.437	33.75
136	15	7	37.5	192	0	0	45
137	3.75	7	37.5	193	0	7	45
138	7.5	7	37.5	194	15	11.874	45
139	11.25	7	37.5	195	30	7	45
140	18.75	7	37.5	196	30	0	45
141	22.5	7	37.5	197	15	7	45
142	26.25	7	37.5	198	3.75	7	45
143	3.75	8.218	37.5	199	7.5	7	45
144	7.5	9.437	37.5	200	11.25	7	45
145	11.25	10.655	37.5	201	18.75	7	45
146	18.75	10.66	37.50	202	22.5	7	45
147	22.50	9.44	37.50	203	26.25	7	45
148	26.25	8.22	37.50	204	3.75	8.218	45
149	-5.7	5.15	37.5	205	7.5	9.437	45
150	0	5.15	37.5	206	11.25	10.655	45
151	35.7	5.15	37.5	207	18.75	10.655	45
152	30	5.15	37.5	208	22.5	9.437	45
153	-2.85	6.075	37.5	209	26.25	8.218	45
154	-2.85	5.15	37.5	210	-5.7	5.15	45
155	32.85	6.075	37.5	211	0	5.15	45
156	32.85	5.15	37.5	212	35.7	5.15	45

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Node No.	x (m)	y (m)	z (m)	Node No.	x (m)	y (m)	z (m)
213	30	5.15	45	269	32.85	5.15	60
214	-2.85	6.075	45	270	0	0	67.5
215	-2.85	5.15	45	271	0	7	67.5
216	32.85	6.075	45	272	15	11.874	67.5
217	32.85	5.15	45	273	30	7	67.5
218	0	0	52.5	274	30	0	67.5
219	0	7	52.5	275	15	7	67.5
220	15	11.874	52.5	276	3.75	7	67.5
221	30	7	52.5	277	7.5	7	67.5
222	30	0	52.5	278	11.25	7	67.5
223	15	7	52.5	279	18.75	7	67.5
224	3.75	7	52.5	280	22.5	7	67.5
225	7.5	7	52.5	281	26.25	7	67.5
226	11.25	7	52.5	282	3.75	8.218	67.5
227	18.75	7	52.5	283	7.5	9.437	67.5
228	22.5	7	52.5	284	11.25	10.655	67.5
229	26.25	7	52.5	285	18.75	10.655	67.5
230	3.75	8.218	52.5	286	22.5	9.437	67.5
231	7.5	9.437	52.5	287	26.25	8.218	67.5
232	11.25	10.655	52.5	288	-5.7	5.15	67.5
233	18.75	10.655	52.5	289	0	5.15	67.5
234	22.5	9.437	52.5	290	35.7	5.15	67.5
235	26.25	8.218	52.5	291	30	5.15	67.5
236	-5.7	5.15	52.5	292	-2.85	6.075	67.5
237	0	5.15	52.5	293	-2.85	5.15	67.5
238	35.7	5.15	52.5	294	32.85	6.075	67.5
239	30	5.15	52.5	295	32.85	5.15	67.5
240	-2.85	6.075	52.5	296	0	0	75
241	-2.85	5.15	52.5	297	0	7	75
242	32.85	6.075	52.5	298	15	11.874	75
243	32.85	5.15	52.5	299	30	7	75
244	0	0	60	300	30	0	75
245	0	7	60	301	15	7	75
246	15	11.874	60	302	3.75	7	75
247	30	7	60	303	7.5	7	75
248	30.00	0.00	60.00	304	11.25	7	75
249	15.00	7.00	60.00	305	18.75	7	75
250	3.75	7	60	306	22.5	7	75
251	7.5	7	60	307	26.25	7	75
252	11.25	7	60	308	3.75	8.218	75
253	18.75	7	60	309	7.5	9.437	75
254	22.5	7	60	310	11.25	10.655	75
255	26.25	7	60	311	18.75	10.655	75
256	3.75	8.218	60	312	22.5	9.437	75
257	7.5	9.437	60	313	26.25	8.218	75
258	11.25	10.655	60	314	-5.7	5.15	75
259	18.75	10.655	60	315	0	5.15	75
260	22.5	9.437	60	316	35.7	5.15	75
261	26.25	8.218	60	317	30	5.15	75
262	-5.7	5.15	60	318	-2.85	6.075	75
263	0	5.15	60	319	-2.85	5.15	75
264	35.7	5.15	60	320	32.85	6.075	75
265	30	5.15	60	321	32.85	5.15	75
266	-2.85	6.075	60	322	-5.7	5.15	41.25
267	-2.85	5.15	60	323	35.7	5.15	41.25
268	32.85	6.075	60	324	-5.7	5.15	48.75

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Node No.	x (m)	y (m)	z (m)	Node No.	x (m)	y (m)	z (m)
325	35.7	5.15	48.75	353	30	7	71.25
326	-5.7	5.15	56.25	354	15	11.874	71.25
327	35.7	5.15	56.25	355	22.5	9.437	71.25
328	-5.7	5.15	63.75	356	7.5	9.437	71.25
329	35.7	5.15	63.75	357	15	0	75
330	-5.7	5.15	71.25	358	7.5	0	75
331	35.7	5.15	71.25	359	22.5	0	75
332	0	7	41.25	360	15	0	0
333	30	7	41.25	361	7.5	0	0
334	15	11.874	41.25	362	22.5	0	0
335	22.5	9.437	41.25	363	15	0	7.5
336	7.5	9.437	41.25	364	7.5	0	7.5
337	0	7	48.75	365	22.5	0	7.5
338	30	7	48.75	366	15	3.5	0
339	15	11.874	48.75	367	7.5	3.5	0
340	22.5	9.437	48.75	368	22.5	3.5	0
341	7.5	9.437	48.75	369	30	3.5	0
342	0	7	56.25	370	0	3.5	0
343	30	7	56.25	371	30	3.5	7.5
344	15	11.874	56.25	372	0	3.5	7.5
345	22.5	9.437	56.25	373	15	3.5	7.5
346	7.5	9.437	56.25	374	7.5	3.5	7.5
347	0	7	63.75	375	22.5	3.5	7.5
348	30	7	63.75	376	30	3.5	3.75
349	15	11.874	63.75	377	0	3.5	3.75
350	22.50	9.44	63.75	378	7.5	3.5	3.75
351	7.50	9.44	63.75	379	15	3.5	3.75
352	0	7	71.25	380	22.5	3.5	3.75

Element data							
Member No	node 1	node 2	length (m)	Member No.	node 1	node 2	length (m)
1	1	370	3.5	23	10	16	3.655
2	2	13	3.943	24	11	17	2.437
3	3	16	3.943	25	12	18	1.218
4	5	369	3.5	26	19	23	2.996
5	2	7	3.75	27	20	2	1.85
6	6	10	3.75	28	19	24	2.85
7	7	8	3.75	29	4	25	2.996
8	8	9	3.75	30	22	4	1.85
9	9	6	3.75	31	22	26	2.85
10	10	11	3.75	32	23	2	2.996
11	11	12	3.75	33	24	20	2.85
12	12	4	3.75	34	25	21	2.996
13	13	14	3.943	35	26	21	2.85
14	14	15	3.943	36	24	23	0.925
15	15	3	3.943	37	26	25	0.925
16	16	17	3.943	38	24	2	3.398
17	17	18	3.943	39	7	14	4.472
18	18	4	3.943	40	8	15	5.237
19	7	13	1.218	41	9	3	6.15
20	8	14	2.437	42	3	10	6.15
21	9	15	3.655	43	16	11	5.237
22	6	3	4.874	44	17	12	4.472

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Member No	node 1	node 2	length (m)	Member No.	node 1	node 2	length (m)
45	4	26	3.398	99	61	58	3.75
46	27	372	3.5	100	62	63	3.75
47	28	39	3.943	101	63	64	3.75
48	29	42	3.943	102	64	56	3.75
49	31	371	3.5	103	65	66	3.943
50	28	33	3.75	104	66	67	3.943
51	32	36	3.75	105	67	55	3.943
52	33	34	3.75	106	68	69	3.943
53	34	35	3.75	107	69	70	3.943
54	35	32	3.75	108	70	56	3.943
55	36	37	3.75	109	59	65	1.218
56	37	38	3.75	110	60	66	2.437
57	38	30	3.75	111	61	67	3.655
58	39	40	3.943	112	58	55	4.874
59	40	41	3.943	113	62	68	3.655
60	41	29	3.943	114	63	69	2.437
61	42	43	3.943	115	64	70	1.218
62	43	44	3.943	116	71	75	2.996
63	44	30	3.943	117	72	54	1.85
64	33	39	1.218	118	71	76	2.85
65	34	40	2.437	119	56	77	2.996
66	35	41	3.655	120	74	56	1.85
67	32	29	4.874	121	74	78	2.85
68	36	42	3.655	122	75	54	2.996
69	37	43	2.437	123	76	72	2.85
70	38	44	1.218	124	77	73	2.996
71	45	49	2.996	125	78	73	2.85
72	46	28	1.85	126	76	75	0.925
73	45	50	2.85	127	78	77	0.925
74	30	51	2.996	128	76	54	3.398
75	48	30	1.85	129	59	66	4.472
76	48	52	2.85	130	60	67	5.237
77	49	28	2.996	131	61	55	6.15
78	50	46	2.85	132	55	62	6.15
79	51	47	2.996	133	68	63	5.237
80	52	47	2.85	134	69	64	4.472
81	50	49	0.925	135	56	78	3.398
82	52	51	0.925	136	79	98	5.15
83	50	28	3.398	137	80	91	3.943
84	33	40	4.472	138	81	94	3.943
85	34	41	5.237	139	83	100	5.15
86	35	29	6.15	140	80	85	3.75
87	29	36	6.15	141	84	88	3.75
88	42	37	5.237	142	85	86	3.75
89	43	38	4.472	143	86	87	3.75
90	30	52	3.398	144	87	84	3.75
91	53	72	5.15	145	88	89	3.75
92	54	65	3.943	146	89	90	3.75
93	55	68	3.943	147	90	82	3.75
94	57	74	5.15	148	91	92	3.943
95	54	59	3.75	149	92	93	3.943
96	58	62	3.75	150	93	81	3.943
97	59	60	3.75	151	94	95	3.943
98	60	61	3.75	152	95	96	3.943

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Member No	node 1	node 2	length (m)	Member No.	node 1	node 2	length (m)
153	96	82	3.943	207	124	106	1.85
154	85	91	1.218	208	123	128	2.85
155	86	92	2.437	209	108	129	2.996
156	87	93	3.655	210	126	108	1.85
157	84	81	4.874	211	126	130	2.85
158	88	94	3.655	212	127	106	2.996
159	89	95	2.437	213	128	124	2.85
160	90	96	1.218	214	129	125	2.996
161	97	101	2.996	215	130	125	2.85
162	98	80	1.85	216	128	127	0.925
163	97	102	2.85	217	130	129	0.925
164	82	103	2.996	218	128	106	3.398
165	100	82	1.85	219	111	118	4.472
166	100	104	2.85	220	112	119	5.237
167	101	80	2.996	221	113	107	6.15
168	102	98	2.85	222	107	114	6.15
169	103	99	2.996	223	120	115	5.237
170	104	99	2.85	224	121	116	4.472
171	102	101	0.925	225	108	130	3.398
172	104	103	0.925	226	131	150	5.15
173	102	80	3.398	227	132	143	3.943
174	85	92	4.472	228	133	146	3.943
175	86	93	5.237	229	135	152	5.15
176	87	81	6.15	230	132	137	3.75
177	81	88	6.15	231	136	140	3.75
178	94	89	5.237	232	137	138	3.75
179	95	90	4.472	233	138	139	3.75
180	82	104	3.398	234	139	136	3.75
181	105	124	5.15	235	140	141	3.75
182	106	117	3.943	236	141	142	3.75
183	107	120	3.943	237	142	134	3.75
184	109	126	5.15	238	143	144	3.943
185	106	111	3.75	239	144	145	3.943
186	110	114	3.75	240	145	133	3.943
187	111	112	3.75	241	146	147	3.943
188	112	113	3.75	242	147	148	3.943
189	113	110	3.75	243	148	134	3.943
190	114	115	3.75	244	137	143	1.218
191	115	116	3.75	245	138	144	2.437
192	116	108	3.75	246	139	145	3.655
193	117	118	3.943	247	136	133	4.874
194	118	119	3.943	248	140	146	3.655
195	119	107	3.943	249	141	147	2.437
196	120	121	3.943	250	142	148	1.218
197	121	122	3.943	251	149	153	2.996
198	122	108	3.943	252	150	132	1.85
199	111	117	1.218	253	149	154	2.85
200	112	118	2.437	254	134	155	2.996
201	113	119	3.655	255	152	134	1.85
202	110	107	4.874	256	152	156	2.85
203	114	120	3.655	257	153	132	2.996
204	115	121	2.437	258	154	150	2.85
205	116	122	1.218	259	155	151	2.996
206	123	127	2.996	260	156	151	2.85

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Member No	node 1	node 2	length (m)	Member No.	node 1	node 2	length (m)
261	154	153	0.925	315	166	4	3.75
262	156	155	0.925	316	167	123	3.75
263	154	132	3.398	317	168	97	3.75
264	137	144	4.472	318	169	71	3.75
265	138	145	5.237	319	170	45	3.75
266	139	133	6.15	320	171	19	3.75
267	133	140	6.15	321	172	125	3.75
268	146	141	5.237	322	173	99	3.75
269	147	142	4.472	323	174	73	3.75
270	134	156	3.398	324	175	47	3.75
271	132	157	3.75	325	176	21	3.75
272	106	158	3.75	326	177	107	3.75
273	80	159	3.75	327	178	81	3.75
274	54	160	3.75	328	179	55	3.75
275	28	161	3.75	329	180	29	3.75
276	134	162	3.75	330	181	3	3.75
277	108	163	3.75	331	182	121	3.75
278	82	164	3.75	332	183	95	3.75
279	56	165	3.75	333	184	69	3.75
280	30	166	3.75	334	185	43	3.75
281	149	167	3.75	335	186	17	3.75
282	123	168	3.75	336	187	14	3.75
283	97	169	3.75	337	188	40	3.75
284	71	170	3.75	338	189	66	3.75
285	45	171	3.75	339	190	92	3.75
286	151	172	3.75	340	191	118	3.75
287	125	173	3.75	341	171	161	5.993
288	99	174	3.75	342	161	187	7.886
289	73	175	3.75	343	187	181	7.886
290	47	176	3.75	344	181	186	7.886
291	133	177	3.75	345	186	166	7.886
292	107	178	3.75	346	166	176	5.993
293	81	179	3.75	347	170	160	5.993
294	55	180	3.75	348	160	188	7.886
295	29	181	3.75	349	188	180	7.886
296	147	182	3.75	350	180	185	7.886
297	121	183	3.75	351	185	165	7.886
298	95	184	3.75	352	165	175	5.993
299	69	185	3.75	353	169	159	5.993
300	43	186	3.75	354	159	189	7.886
301	40	187	3.75	355	189	179	7.886
302	66	188	3.75	356	179	184	7.886
303	92	189	3.75	357	184	164	7.886
304	118	190	3.75	358	164	174	5.993
305	144	191	3.75	359	168	158	5.993
306	157	106	3.75	360	158	190	7.886
307	158	80	3.75	361	190	178	7.886
308	159	54	3.75	362	178	183	7.886
309	160	28	3.75	363	183	163	7.886
310	161	2	3.75	364	163	173	5.993
311	162	108	3.75	365	167	157	5.993
312	163	82	3.75	366	157	191	7.886
313	164	56	3.75	367	191	177	7.886
314	165	30	3.75	368	177	182	7.886

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Member No	node 1	node 2	length (m)	Member No.	node 1	node 2	length (m)
369	182	162	7.886	423	225	226	3.75
370	162	172	5.993	424	226	223	3.75
371	192	211	5.15	425	227	228	3.75
372	193	204	3.943	426	228	229	3.75
373	194	207	3.943	427	229	221	3.75
374	196	213	5.15	428	230	231	3.943
375	193	198	3.75	429	231	232	3.943
376	197	201	3.75	430	232	220	3.943
377	198	199	3.75	431	233	234	3.943
378	199	200	3.75	432	234	235	3.943
379	200	197	3.75	433	235	221	3.943
380	201	202	3.75	434	224	230	1.218
381	202	203	3.75	435	225	231	2.437
382	203	195	3.75	436	226	232	3.655
383	204	205	3.943	437	223	220	4.874
384	205	206	3.943	438	227	233	3.655
385	206	194	3.943	439	228	234	2.437
386	207	208	3.943	440	229	235	1.218
387	208	209	3.943	441	236	240	2.996
388	209	195	3.943	442	237	219	1.85
389	198	204	1.218	443	236	241	2.85
390	199	205	2.437	444	221	242	2.996
391	200	206	3.655	445	239	221	1.85
392	197	194	4.874	446	239	243	2.85
393	201	207	3.655	447	240	219	2.996
394	202	208	2.437	448	241	237	2.85
395	203	209	1.218	449	242	238	2.996
396	210	214	2.996	450	243	238	2.85
397	211	193	1.85	451	241	240	0.925
398	210	215	2.85	452	243	242	0.925
399	195	216	2.996	453	241	219	3.398
400	213	195	1.85	454	224	231	4.472
401	213	217	2.85	455	225	232	5.237
402	214	193	2.996	456	226	220	6.15
403	215	211	2.85	457	220	227	6.15
404	216	212	2.996	458	233	228	5.237
405	217	212	2.85	459	234	229	4.472
406	215	214	0.925	460	221	243	3.398
407	217	216	0.925	461	244	263	5.15
408	215	193	3.398	462	245	256	3.943
409	198	205	4.472	463	246	259	3.943
410	199	206	5.237	464	248	265	5.15
411	200	194	6.15	465	245	250	3.75
412	194	201	6.15	466	249	253	3.75
413	207	202	5.237	467	250	251	3.75
414	208	203	4.472	468	251	252	3.75
415	195	217	3.398	469	252	249	3.75
416	218	237	5.15	470	253	254	3.75
417	219	230	3.943	471	254	255	3.75
418	220	233	3.943	472	255	247	3.75
419	222	239	5.15	473	256	257	3.943
420	219	224	3.75	474	257	258	3.943
421	223	227	3.75	475	258	246	3.943
422	224	225	3.75	476	259	260	3.943

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Member No	node 1	node 2	length (m)	Member No.	node 1	node 2	length (m)
477	260	261	3.943	531	288	292	2.996
478	261	247	3.943	532	289	271	1.85
479	250	256	1.218	533	288	293	2.85
480	251	257	2.437	534	273	294	2.996
481	252	258	3.655	535	291	273	1.85
482	249	246	4.874	536	291	295	2.85
483	253	259	3.655	537	292	271	2.996
484	254	260	2.437	538	293	289	2.85
485	255	261	1.218	539	294	290	2.996
486	262	266	2.996	540	295	290	2.85
487	263	245	1.85	541	293	292	0.925
488	262	267	2.85	542	295	294	0.925
489	247	268	2.996	543	293	271	3.398
490	265	247	1.85	544	276	283	4.472
491	265	269	2.85	545	277	284	5.237
492	266	245	2.996	546	278	272	6.15
493	267	263	2.85	547	272	279	6.15
494	268	264	2.996	548	285	280	5.237
495	269	264	2.85	549	286	281	4.472
496	267	266	0.925	550	273	295	3.398
497	269	268	0.925	551	296	315	5.15
498	267	245	3.398	552	297	308	3.943
499	250	257	4.472	553	298	311	3.943
500	251	258	5.237	554	300	317	5.15
501	252	246	6.15	555	297	302	3.75
502	246	253	6.15	556	301	305	3.75
503	259	254	5.237	557	302	303	3.75
504	260	255	4.472	558	303	304	3.75
505	247	269	3.398	559	304	301	3.75
506	270	289	5.15	560	305	306	3.75
507	271	282	3.943	561	306	307	3.75
508	272	285	3.943	562	307	299	3.75
509	274	291	5.15	563	308	309	3.943
510	271	276	3.75	564	309	310	3.943
511	275	279	3.75	565	310	298	3.943
512	276	277	3.75	566	311	312	3.943
513	277	278	3.75	567	312	313	3.943
514	278	275	3.75	568	313	299	3.943
515	279	280	3.75	569	302	308	1.218
516	280	281	3.75	570	303	309	2.437
517	281	273	3.75	571	304	310	3.655
518	282	283	3.943	572	301	298	4.874
519	283	284	3.943	573	305	311	3.655
520	284	272	3.943	574	306	312	2.437
521	285	286	3.943	575	307	313	1.218
522	286	287	3.943	576	314	318	2.996
523	287	273	3.943	577	315	297	1.85
524	276	282	1.218	578	314	319	2.85
525	277	283	2.437	579	299	320	2.996
526	278	284	3.655	580	317	299	1.85
527	275	272	4.874	581	317	321	2.85
528	279	285	3.655	582	318	297	2.996
529	280	286	2.437	583	319	315	2.85
530	281	287	1.218	584	320	316	2.996

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Member No	node 1	node 2	length (m)	Member No.	node 1	node 2	length (m)
585	321	316	2.85	639	260	345	3.75
586	319	318	0.925	640	257	346	3.75
587	321	320	0.925	641	342	219	3.75
588	319	297	3.398	642	343	221	3.75
589	302	309	4.472	643	344	220	3.75
590	303	310	5.237	644	345	234	3.75
591	304	298	6.15	645	346	231	3.75
592	298	305	6.15	646	271	347	3.75
593	311	306	5.237	647	273	348	3.75
594	312	307	4.472	648	272	349	3.75
595	299	321	3.398	649	286	350	3.75
596	210	322	3.75	650	283	351	3.75
597	212	323	3.75	651	347	245	3.75
598	322	149	3.75	652	348	247	3.75
599	323	151	3.75	653	349	246	3.75
600	236	324	3.75	654	350	260	3.75
601	238	325	3.75	655	351	257	3.75
602	324	210	3.75	656	297	352	3.75
603	325	212	3.75	657	299	353	3.75
604	262	326	3.75	658	298	354	3.75
605	264	327	3.75	659	312	355	3.75
606	326	236	3.75	660	309	356	3.75
607	327	238	3.75	661	352	271	3.75
608	288	328	3.75	662	353	273	3.75
609	290	329	3.75	663	354	272	3.75
610	328	262	3.75	664	355	286	3.75
611	329	264	3.75	665	356	283	3.75
612	314	330	3.75	666	322	332	5.993
613	316	331	3.75	667	332	336	7.886
614	330	288	3.75	668	336	334	7.886
615	331	290	3.75	669	334	335	7.886
616	193	332	3.75	670	335	333	7.886
617	195	333	3.75	671	333	323	5.993
618	194	334	3.75	672	324	337	5.993
619	208	335	3.75	673	337	341	7.886
620	205	336	3.75	674	341	339	7.886
621	332	132	3.75	675	339	340	7.886
622	333	134	3.75	676	340	338	7.886
623	334	133	3.75	677	338	325	5.993
624	335	147	3.75	678	326	342	5.993
625	336	144	3.75	679	342	346	7.886
626	219	337	3.75	680	346	344	7.886
627	221	338	3.75	681	344	345	7.886
628	220	339	3.75	682	345	343	7.886
629	234	340	3.75	683	343	327	5.993
630	231	341	3.75	684	328	347	5.993
631	337	193	3.75	685	347	351	7.886
632	338	195	3.75	686	351	349	7.886
633	339	194	3.75	687	349	350	7.886
634	340	208	3.75	688	350	348	7.886
635	341	205	3.75	689	348	329	5.993
636	245	342	3.75	690	330	352	5.993
637	247	343	3.75	691	352	356	7.886
638	246	344	3.75	692	356	354	7.886

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Member No	node 1	node 2	length (m)	Member No.	node 1	node 2	length (m)
693	354	355	7.886	747	29	366	11.241
694	355	353	7.886	748	43	368	9.565
695	353	331	5.993	749	30	369	8.276
696	357	301	7	750	297	270	10.259
697	358	303	7	751	314	271	9.6
698	359	306	7	752	271	309	10.883
699	357	306	10.259	753	271	262	9.6
700	358	301	10.259	754	271	257	10.883
701	360	366	3.5	755	257	219	10.883
702	361	367	3.5	756	219	262	9.6
703	362	368	3.5	757	219	205	10.883
704	363	373	3.5	758	219	210	9.6
705	364	374	3.5	759	257	272	10.883
706	365	375	3.5	760	257	220	10.883
707	366	6	3.5	761	220	205	10.883
708	367	8	3.5	762	205	132	10.883
709	368	11	3.5	763	132	210	9.6
710	369	22	1.65	764	118	132	10.883
711	370	20	1.65	765	132	123	9.6
712	371	48	1.65	766	80	123	9.6
713	372	46	1.65	767	80	118	10.883
714	373	32	3.5	768	80	66	10.883
715	374	34	3.5	769	80	71	9.6
716	375	37	3.5	770	66	28	10.883
717	368	369	7.5	771	28	71	9.6
718	366	368	7.5	772	28	19	9.6
719	367	366	7.5	773	28	14	10.883
720	370	367	7.5	774	66	29	10.883
721	375	371	7.5	775	66	81	10.883
722	373	375	7.5	776	81	118	10.883
723	374	373	7.5	777	118	133	10.883
724	372	374	7.5	778	133	205	10.883
725	371	376	3.75	779	21	30	9.6
726	372	377	3.75	780	30	73	9.6
727	374	378	3.75	781	30	186	8.732
728	373	379	3.75	782	30	69	10.883
729	375	380	3.75	783	69	82	10.883
730	376	369	3.75	784	82	73	9.6
731	377	370	3.75	785	82	125	9.6
732	378	367	3.75	786	82	121	10.883
733	379	366	3.75	787	69	29	10.883
734	380	368	3.75	788	69	81	10.883
735	380	376	7.5	789	81	121	10.883
736	379	380	7.5	790	125	134	9.6
737	378	379	7.5	791	134	121	10.883
738	377	378	7.5	792	134	212	9.6
739	361	366	8.276	793	134	208	10.883
740	360	368	8.276	794	208	221	10.883
741	362	369	8.276	795	221	212	9.6
742	374	361	8.276	796	221	264	9.6
743	373	360	8.276	797	221	260	10.883
744	375	362	8.276	798	260	273	10.883
745	371	5	8.276	799	273	264	9.6
746	40	367	9.565	800	273	316	9.6

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Member No	node 1	node 2	length (m)	Member No.	node 1	node 2	length (m)
801	273	312	10.883	803	260	220	10.883
802	260	272	10.883	804	220	208	10.883
Section							
Member	group	section	direction	Member	group	section	direction
1	Custom 1	w18x86	0	49	ustom	w18x86	0
2	Custom 1	w12x58	0	50	ustom	w10x54	0
3	Custom 1	w12x58	0	51	ustom	w10x54	0
4	Custom 1	w18x86	0	52	ustom	w10x54	0
5	Custom 1	w10x54	0	53	ustom	w10x54	0
6	Custom 1	w10x54	0	54	ustom	w10x54	0
7	Custom 1	w10x54	0	55	ustom	w10x54	0
8	Custom 1	w10x54	0	56	ustom	w10x54	0
9	Custom 1	w10x54	0	57	ustom	w10x54	0
10	Custom 1	w10x54	0	58	ustom	w12x58	0
11	Custom 1	w10x54	0	59	ustom	w12x58	0
12	Custom 1	w10x54	0	60	ustom	w12x58	0
13	Custom 1	w12x58	0	61	ustom	w12x58	0
14	Custom 1	w12x58	0	62	ustom	w12x58	0
15	Custom 1	w12x58	0	63	ustom	w12x58	0
16	Custom 1	w12x58	0	64	ustom	2c-10x30	0
17	Custom 1	w12x58	0	65	ustom	w18x86	90
18	Custom 1	w12x58	0	66	ustom	2c-10x30	0
19	Custom 1	2c-10x30	0	67	ustom	w18x86	90
20	Custom 1	w18x86	0	68	ustom	2c-10x30	0
21	Custom 1	2c-10x30	0	69	ustom	w18x86	90
22	Custom 1	w18x86	90	70	ustom	2c-10x30	0
23	Custom 1	2c-10x30	0	71	ustom	w10x30	0
24	Custom 1	w18x86	90	72	ustom	w18x86	0
25	Custom 1	2c-10x30	0	73	ustom	w6x15	0
26	Custom 1	w10x30	0	74	ustom	w10x30	0
27	Custom 1	w18x86	0	75	ustom	w18x86	0
28	Custom 1	w6x15	0	76	ustom	w6x15	0
29	Custom 1	w10x30	0	77	ustom	w10x30	0
30	Custom 1	w18x86	0	78	ustom	w6x15	0
31	Custom 1	w6x15	0	79	ustom	w10x30	0
32	Custom 1	w10x30	0	80	ustom	w6x15	0
33	Custom 1	w6x15	0	81	ustom	2c-10x30	0
34	Custom 1	w10x30	0	82	ustom	2c-10x30	0
35	Custom 1	w6x15	0	83	ustom	L-4x3/8	0
36	Custom 1	2c-10x30	0	84	ustom	L-4x3/8	0
37	Custom 1	2c-10x30	0	85	ustom	L-4x3/8	0
38	Custom 1	L-4x3/8	0	86	ustom	L-4x3/8	0
39	Custom 1	L-4x3/8	0	87	ustom	L-4x3/8	0
40	Custom 1	L-4x3/8	0	88	ustom	L-4x3/8	0
41	Custom 1	L-4x3/8	0	89	ustom	L-4x3/8	0
42	Custom 1	L-4x3/8	0	90	ustom	L-4x3/8	0
43	Custom 1	L-4x3/8	0	91	ustom	w18x86	0
44	Custom 1	L-4x3/8	0	92	ustom	w12x58	0
45	Custom 1	L-4x3/8	0	93	ustom	w12x58	0
46	Custom 1	w18x86	0	94	ustom	w18x86	0
47	Custom 1	w12x58	0	95	ustom	w10x54	0
48	Custom 1	w12x58	0	96	ustom	w10x54	0

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Section							
Member	group	section	direction	Member	group	section	direction
97	Custom 1	w10x54	0	150	ustom	w12x58	0
98	Custom 1	w10x54	0	151	ustom	w12x58	0
99	Custom 1	w10x54	0	152	ustom	w12x58	0
100	Custom 1	w10x54	0	153	ustom	w12x58	0
101	Custom 1	w10x54	0	154	ustom	2c-10x30	0
102	Custom 1	w10x54	0	155	ustom	2c-10x30	0
103	Custom 1	w12x58	0	156	ustom	2c-10x30	0
104	Custom 1	w12x58	0	157	ustom	2c-10x30	0
105	Custom 1	w12x58	0	158	ustom	2c-10x30	0
106	Custom 1	w12x58	0	159	ustom	2c-10x30	0
107	Custom 1	w12x58	0	160	ustom	2c-10x30	0
108	Custom 1	w12x58	0	161	ustom	w10x30	0
109	Custom 1	2c-10x30	0	162	ustom	w18x86	0
110	Custom 1	2c-10x30	0	163	ustom	w6x15	0
111	Custom 1	2c-10x30	0	164	ustom	w10x30	0
112	Custom 1	2c-10x30	0	165	ustom	w18x86	0
113	Custom 1	2c-10x30	0	166	ustom	w6x15	0
114	Custom 1	2c-10x30	0	167	ustom	w10x30	0
115	Custom 1	2c-10x30	0	168	ustom	w6x15	0
116	Custom 1	w10x30	0	169	ustom	w10x30	0
117	Custom 1	w18x86	0	170	ustom	w6x15	0
118	Custom 1	w6x15	0	171	ustom	2c-10x30	0
119	Custom 1	w10x30	0	172	ustom	2c-10x30	0
120	Custom 1	w18x86	0	173	ustom	L-4x3/8	0
121	Custom 1	w6x15	0	174	ustom	L-4x3/8	0
122	Custom 1	w10x30	0	175	ustom	L-4x3/8	0
123	Custom 1	w6x15	0	176	ustom	L-4x3/8	0
124	Custom 1	w10x30	0	177	ustom	L-4x3/8	0
125	Custom 1	w6x15	0	178	ustom	L-4x3/8	0
126	Custom 1	2c-10x30	0	179	ustom	L-4x3/8	0
127	Custom 1	2c-10x30	0	180	ustom	L-4x3/8	0
128	Custom 1	L-4x3/8	0	181	ustom	w18x86	0
129	Custom 1	L-4x3/8	0	182	ustom	w12x58	0
130	Custom 1	L-4x3/8	0	183	ustom	w12x58	0
131	Custom 1	L-4x3/8	0	184	ustom	w18x86	0
132	Custom 1	L-4x3/8	0	185	ustom	w10x54	0
133	Custom 1	L-4x3/8	0	186	ustom	w10x54	0
134	Custom 1	L-4x3/8	0	187	ustom	w10x54	0
135	Custom 1	L-4x3/8	0	188	ustom	w10x54	0
136	Custom 1	w18x86	0	189	ustom	w10x54	0
137	Custom 1	w12x58	0	190	ustom	w10x54	0
138	Custom 1	w12x58	0	191	ustom	w10x54	0
139	Custom 1	w18x86	0	192	ustom	w10x54	0
140	Custom 1	w10x54	0	193	ustom	w12x58	0
141	Custom 1	w10x54	0	194	ustom	w12x58	0
142	Custom 1	w10x54	0	195	ustom	w12x58	0
143	Custom 1	w10x54	0	196	ustom	w12x58	0
144	Custom 1	w10x54	0	197	ustom	w12x58	0
145	Custom 1	w10x54	0	198	ustom	w12x58	0
146	Custom 1	w10x54	0	199	ustom	2c-10x30	0
147	Custom 1	w10x54	0	200	ustom	2c-10x30	0
148	Custom 1	w12x58	0	201	ustom	2c-10x30	0
149	Custom 1	w12x58	0	202	ustom	2c-10x30	0

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Section							
Member	group	section	direction	Member	group	section	direction
203	Custom 1	2c-10x30	0	256	ustom	w6x15	0
204	Custom 1	2c-10x30	0	257	ustom	w10x30	0
205	Custom 1	2c-10x30	0	258	ustom	w6x15	0
206	Custom 1	w10x30	0	259	ustom	w10x30	0
207	Custom 1	w18x86	0	260	ustom	w6x15	0
208	Custom 1	w6x15	0	261	ustom	2c-10x30	0
209	Custom 1	w10x30	0	262	ustom	2c-10x30	0
210	Custom 1	w18x86	0	263	ustom	L-4x3/8	0
211	Custom 1	w6x15	0	264	ustom	L-4x3/8	0
212	Custom 1	w10x30	0	265	ustom	L-4x3/8	0
213	Custom 1	w6x15	0	266	ustom	L-4x3/8	0
214	Custom 1	w10x30	0	267	ustom	L-4x3/8	0
215	Custom 1	w6x15	0	268	ustom	L-4x3/8	0
216	Custom 1	2c-10x30	0	269	ustom	L-4x3/8	0
217	Custom 1	2c-10x30	0	270	ustom	L-4x3/8	0
218	Custom 1	L-4x3/8	0	271	ustom	w10x30	0
219	Custom 1	L-4x3/8	0	272	ustom	w10x30	0
220	Custom 1	L-4x3/8	0	273	ustom	w10x30	0
221	Custom 1	L-4x3/8	0	274	ustom	w10x30	0
222	Custom 1	L-4x3/8	0	275	ustom	w10x30	0
223	Custom 1	L-4x3/8	0	276	ustom	w10x30	0
224	Custom 1	L-4x3/8	0	277	ustom	w10x30	0
225	Custom 1	L-4x3/8	0	278	ustom	w10x30	0
226	Custom 1	w18x86	0	279	ustom	w10x30	0
227	Custom 1	w12x58	0	280	ustom	w10x30	0
228	Custom 1	w12x58	0	281	ustom	w10x30	0
229	Custom 1	w18x86	0	282	ustom	w10x30	0
230	Custom 1	w10x54	0	283	ustom	w10x30	0
231	Custom 1	w10x54	0	284	ustom	w10x30	0
232	Custom 1	w10x54	0	285	ustom	w10x30	0
233	Custom 1	w10x54	0	286	ustom	w10x30	0
234	Custom 1	w10x54	0	287	ustom	w10x30	0
235	Custom 1	w10x54	0	288	ustom	w10x30	0
236	Custom 1	w10x54	0	289	ustom	w10x30	0
237	Custom 1	w10x54	0	290	ustom	w10x30	0
238	Custom 1	w12x58	0	291	ustom	w10x30	0
239	Custom 1	w12x58	0	292	ustom	w10x30	0
240	Custom 1	w12x58	0	293	ustom	w10x30	0
241	Custom 1	w12x58	0	294	ustom	w10x30	0
242	Custom 1	w12x58	0	295	ustom	w10x30	0
243	Custom 1	w12x58	0	296	ustom	w10x30	0
244	Custom 1	2c-10x30	0	297	ustom	w10x30	0
245	Custom 1	2c-10x30	0	298	ustom	w10x30	0
246	Custom 1	2c-10x30	0	299	ustom	w10x30	0
247	Custom 1	2c-10x30	0	300	ustom	w10x30	0
248	Custom 1	2c-10x30	0	301	ustom	w10x30	0
249	Custom 1	2c-10x30	0	302	ustom	w10x30	0
250	Custom 1	2c-10x30	0	303	ustom	w10x30	0
251	Custom 1	w10x30	0	304	ustom	w10x30	0
252	Custom 1	w18x86	0	305	ustom	w10x30	0
253	Custom 1	w6x15	0	306	ustom	w10x30	0
254	Custom 1	w10x30	0	307	ustom	w10x30	0
255	Custom 1	w18x86	0	308	ustom	w10x30	0

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Section							
Member	group	section	direction	Member	group	section	direction
309	Custom 1	w10x30	0	362	ustom	w8x31	0
310	Custom 1	w10x30	0	363	ustom	w8x31	0
311	Custom 1	w10x30	0	364	ustom	w8x31	0
312	Custom 1	w10x30	0	365	ustom	w8x31	0
313	Custom 1	w10x30	0	366	ustom	w8x31	0
314	Custom 1	w10x30	0	367	ustom	w8x31	0
315	Custom 1	w10x30	0	368	ustom	w8x31	0
316	Custom 1	w10x30	0	369	ustom	w8x31	0
317	Custom 1	w10x30	0	370	ustom	w8x31	0
318	Custom 1	w10x30	0	371	ustom	w18x86	0
319	Custom 1	w10x30	0	372	ustom	w12x58	0
320	Custom 1	w10x30	0	373	ustom	w12x58	0
321	Custom 1	w10x30	0	374	ustom	w18x86	0
322	Custom 1	w10x30	0	375	ustom	w10x54	0
323	Custom 1	w10x30	0	376	ustom	w10x54	0
324	Custom 1	w10x30	0	377	ustom	w10x54	0
325	Custom 1	w10x30	0	378	ustom	w10x54	0
326	Custom 1	w10x30	0	379	ustom	w10x54	0
327	Custom 1	w10x30	0	380	ustom	w10x54	0
328	Custom 1	w10x30	0	381	ustom	w10x54	0
329	Custom 1	w10x30	0	382	ustom	w10x54	0
330	Custom 1	w10x30	0	383	ustom	w12x58	0
331	Custom 1	w10x30	0	384	ustom	w12x58	0
332	Custom 1	w10x30	0	385	ustom	w12x58	0
333	Custom 1	w10x30	0	386	ustom	w12x58	0
334	Custom 1	w10x30	0	387	ustom	w12x58	0
335	Custom 1	w10x30	0	388	ustom	w12x58	0
336	Custom 1	w10x30	0	389	ustom	2c-10x30	0
337	Custom 1	w10x30	0	390	ustom	2c-10x30	0
338	Custom 1	w10x30	0	391	ustom	2c-10x30	0
339	Custom 1	w10x30	0	392	ustom	2c-10x30	0
340	Custom 1	w10x30	0	393	ustom	2c-10x30	0
341	Custom 1	w8x31	0	394	ustom	2c-10x30	0
342	Custom 1	w8x31	0	395	ustom	2c-10x30	0
343	Custom 1	w8x31	0	396	ustom	w10x30	0
344	Custom 1	w8x31	0	397	ustom	w18x86	0
345	Custom 1	w8x31	0	398	ustom	w6x15	0
346	Custom 1	w8x31	0	399	ustom	w10x30	0
347	Custom 1	w8x31	0	400	ustom	w18x86	0
348	Custom 1	w8x31	0	401	ustom	w6x15	0
349	Custom 1	w8x31	0	402	ustom	w10x30	0
350	Custom 1	w8x31	0	403	ustom	w6x15	0
351	Custom 1	w8x31	0	404	ustom	w10x30	0
352	Custom 1	w8x31	0	405	ustom	w6x15	0
353	Custom 1	w8x31	0	406	ustom	2c-10x30	0
354	Custom 1	w8x31	0	407	ustom	2c-10x30	0
355	Custom 1	w8x31	0	408	ustom	L-4x3/8	0
356	Custom 1	w8x31	0	409	ustom	L-4x3/8	0
357	Custom 1	w8x31	0	410	ustom	L-4x3/8	0
358	Custom 1	w8x31	0	411	ustom	L-4x3/8	0
359	Custom 1	w8x31	0	412	ustom	L-4x3/8	0
360	Custom 1	w8x31	0	413	ustom	L-4x3/8	0
361	Custom 1	w8x31	0	414	ustom	L-4x3/8	0

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Section							
Member	group	section	direction	Member	group	section	direction
415	Custom 1	L-4x3/8	0	468	ustom	w10x54	0
416	Custom 1	w18x86	0	469	ustom	w10x54	0
417	Custom 1	w12x58	0	470	ustom	w10x54	0
418	Custom 1	w12x58	0	471	ustom	w10x54	0
419	Custom 1	w18x86	0	472	ustom	w10x54	0
420	Custom 1	w10x54	0	473	ustom	w12x58	0
421	Custom 1	w10x54	0	474	ustom	w12x58	0
422	Custom 1	w10x54	0	475	ustom	w12x58	0
423	Custom 1	w10x54	0	476	ustom	w12x58	0
424	Custom 1	w10x54	0	477	ustom	w12x58	0
425	Custom 1	w10x54	0	478	ustom	w12x58	0
426	Custom 1	w10x54	0	479	ustom	2c-10x30	0
427	Custom 1	w10x54	0	480	ustom	2c-10x30	0
428	Custom 1	w12x58	0	481	ustom	2c-10x30	0
429	Custom 1	w12x58	0	482	ustom	2c-10x30	0
430	Custom 1	w12x58	0	483	ustom	2c-10x30	0
431	Custom 1	w12x58	0	484	ustom	2c-10x30	0
432	Custom 1	w12x58	0	485	ustom	2c-10x30	0
433	Custom 1	w12x58	0	486	ustom	w10x30	0
434	Custom 1	2c-10x30	0	487	ustom	w18x86	0
435	Custom 1	2c-10x30	0	488	ustom	w6x15	0
436	Custom 1	2c-10x30	0	489	ustom	w10x30	0
437	Custom 1	2c-10x30	0	490	ustom	w18x86	0
438	Custom 1	2c-10x30	0	491	ustom	w6x15	0
439	Custom 1	2c-10x30	0	492	ustom	w10x30	0
440	Custom 1	2c-10x30	0	493	ustom	w6x15	0
441	Custom 1	w10x30	0	494	ustom	w10x30	0
442	Custom 1	w18x86	0	495	ustom	w6x15	0
443	Custom 1	w6x15	0	496	ustom	2c-10x30	0
444	Custom 1	w10x30	0	497	ustom	2c-10x30	0
445	Custom 1	w18x86	0	498	ustom	L-4x3/8	0
446	Custom 1	w6x15	0	499	ustom	L-4x3/8	0
447	Custom 1	w10x30	0	500	ustom	L-4x3/8	0
448	Custom 1	w6x15	0	501	ustom	L-4x3/8	0
449	Custom 1	w10x30	0	502	ustom	L-4x3/8	0
450	Custom 1	w6x15	0	503	ustom	L-4x3/8	0
451	Custom 1	2c-10x30	0	504	ustom	L-4x3/8	0
452	Custom 1	2c-10x30	0	505	ustom	L-4x3/8	0
453	Custom 1	L-4x3/8	0	506	ustom	w18x86	0
454	Custom 1	L-4x3/8	0	507	ustom	w12x58	0
455	Custom 1	L-4x3/8	0	508	ustom	w12x58	0
456	Custom 1	L-4x3/8	0	509	ustom	w18x86	0
457	Custom 1	L-4x3/8	0	510	ustom	w10x54	0
458	Custom 1	L-4x3/8	0	511	ustom	w10x54	0
459	Custom 1	L-4x3/8	0	512	ustom	w10x54	0
460	Custom 1	L-4x3/8	0	513	ustom	w10x54	0
461	Custom 1	w18x86	0	514	ustom	w10x54	0
462	Custom 1	w12x58	0	515	ustom	w10x54	0
463	Custom 1	w12x58	0	516	ustom	w10x54	0
464	Custom 1	w18x86	0	517	ustom	w10x54	0
465	Custom 1	w10x54	0	518	ustom	w12x58	0
466	Custom 1	w10x54	0	519	ustom	w12x58	0
467	Custom 1	w10x54	0	520	ustom	w12x58	0

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Section							
Member	group	section	direction	Member	group	section	direction
521	Custom 1	w12x58	0	574	ustom	w18x86	90
522	Custom 1	w12x58	0	575	ustom	2c-10x30	0
523	Custom 1	w12x58	0	576	ustom	w10x30	0
524	Custom 1	2c-10x30	0	577	ustom	w18x86	0
525	Custom 1	2c-10x30	0	578	ustom	w6x15	0
526	Custom 1	2c-10x30	0	579	ustom	w10x30	0
527	Custom 1	2c-10x30	0	580	ustom	w18x86	0
528	Custom 1	2c-10x30	0	581	ustom	w6x15	0
529	Custom 1	2c-10x30	0	582	ustom	w10x30	0
530	Custom 1	2c-10x30	0	583	ustom	w6x15	0
531	Custom 1	w10x30	0	584	ustom	w10x30	0
532	Custom 1	w18x86	0	585	ustom	w6x15	0
533	Custom 1	w6x15	0	586	ustom	2c-10x30	0
534	Custom 1	w10x30	0	587	ustom	2c-10x30	0
535	Custom 1	w18x86	0	588	ustom	L-4x3/8	0
536	Custom 1	w6x15	0	589	ustom	L-4x3/8	0
537	Custom 1	w10x30	0	590	ustom	L-4x3/8	0
538	Custom 1	w6x15	0	591	ustom	L-4x3/8	0
539	Custom 1	w10x30	0	592	ustom	L-4x3/8	0
540	Custom 1	w6x15	0	593	ustom	L-4x3/8	0
541	Custom 1	2c-10x30	0	594	ustom	L-4x3/8	0
542	Custom 1	2c-10x30	0	595	ustom	L-4x3/8	0
543	Custom 1	L-4x3/8	0	596	ustom	w10x30	0
544	Custom 1	L-4x3/8	0	597	ustom	w10x30	0
545	Custom 1	L-4x3/8	0	598	ustom	w10x30	0
546	Custom 1	L-4x3/8	0	599	ustom	w10x30	0
547	Custom 1	L-4x3/8	0	600	ustom	w10x30	0
548	Custom 1	L-4x3/8	0	601	ustom	w10x30	0
549	Custom 1	L-4x3/8	0	602	ustom	w10x30	0
550	Custom 1	L-4x3/8	0	603	ustom	w10x30	0
551	Custom 1	w18x86	0	604	ustom	w10x30	0
552	Custom 1	w12x58	0	605	ustom	w10x30	0
553	Custom 1	w12x58	0	606	ustom	w10x30	0
554	Custom 1	w18x86	0	607	ustom	w10x30	0
555	Custom 1	w10x54	0	608	ustom	w10x30	0
556	Custom 1	w10x54	0	609	ustom	w10x30	0
557	Custom 1	w10x54	0	610	ustom	w10x30	0
558	Custom 1	w10x54	0	611	ustom	w10x30	0
559	Custom 1	w10x54	0	612	ustom	w10x30	0
560	Custom 1	w10x54	0	613	ustom	w10x30	0
561	Custom 1	w10x54	0	614	ustom	w10x30	0
562	Custom 1	w10x54	0	615	ustom	w10x30	0
563	Custom 1	w12x58	0	616	ustom	w10x30	0
564	Custom 1	w12x58	0	617	ustom	w10x30	0
565	Custom 1	w12x58	0	618	ustom	w10x30	0
566	Custom 1	w12x58	0	619	ustom	w10x30	0
567	Custom 1	w12x58	0	620	ustom	w10x30	0
568	Custom 1	w12x58	0	621	ustom	w10x30	0
569	Custom 1	2c-10x30	0	622	ustom	w10x30	0
570	Custom 1	w18x86	90	623	ustom	w10x30	0
571	Custom 1	2c-10x30	0	624	ustom	w10x30	0
572	Custom 1	w18x86	90	625	ustom	w10x30	0
573	Custom 1	2c-10x30	0	626	ustom	w10x30	0

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627	Custom 1	w10x30	0	680	ustom	w8x31	0
628	Custom 1	w10x30	0	681	ustom	w8x31	0
629	Custom 1	w10x30	0	682	ustom	w8x31	0
630	Custom 1	w10x30	0	683	ustom	w8x31	0
631	Custom 1	w10x30	0	684	ustom	w8x31	0
632	Custom 1	w10x30	0	685	ustom	w8x31	0
633	Custom 1	w10x30	0	686	ustom	w8x31	0
634	Custom 1	w10x30	0	687	ustom	w8x31	0
635	Custom 1	w10x30	0	688	ustom	w8x31	0
636	Custom 1	w10x30	0	689	ustom	w8x31	0
637	Custom 1	w10x30	0	690	ustom	w8x31	0
638	Custom 1	w10x30	0	691	ustom	w8x31	0
639	Custom 1	w10x30	0	692	ustom	w8x31	0
640	Custom 1	w10x30	0	693	ustom	w8x31	0
641	Custom 1	w10x30	0	694	ustom	w8x31	0
642	Custom 1	w10x30	0	695	ustom	w8x31	0
643	Custom 1	w10x30	0	696	ustom	w18x86	90
644	Custom 1	w10x30	0	697	ustom	w18x86	90
645	Custom 1	w10x30	0	698	ustom	w18x86	90
646	Custom 1	w10x30	0	699	ustom	L-4x3/8	0
647	Custom 1	w10x30	0	700	ustom	L-4x3/8	0
648	Custom 1	w10x30	0	701	ustom	w18x86	270
649	Custom 1	w10x30	0	702	ustom	w18x86	270
650	Custom 1	w10x30	0	703	ustom	w18x86	270
651	Custom 1	w10x30	0	704	ustom	w18x86	270
652	Custom 1	w10x30	0	705	ustom	w18x86	270
653	Custom 1	w10x30	0	706	ustom	w18x86	270
654	Custom 1	w10x30	0	707	ustom	w18x86	270
655	Custom 1	w10x30	0	708	ustom	w18x86	270
656	Custom 1	w10x30	0	709	ustom	w18x86	270
657	Custom 1	w10x30	0	710	ustom	w18x86	0
658	Custom 1	w10x30	0	711	ustom	w18x86	0
659	Custom 1	w10x30	0	712	ustom	w18x86	0
660	Custom 1	w10x30	0	713	ustom	w18x86	0
661	Custom 1	w10x30	0	714	ustom	w18x86	270
662	Custom 1	w10x30	0	715	ustom	w18x86	270
663	Custom 1	w10x30	0	716	ustom	w18x86	270
664	Custom 1	w10x30	0	717	ustom	w14x61	0
665	Custom 1	w10x30	0	718	ustom	w14x61	0
666	Custom 1	w8x31	0	719	ustom	w14x61	0
667	Custom 1	w8x31	0	720	ustom	w14x61	0
668	Custom 1	w8x31	0	721	ustom	w14x61	0
669	Custom 1	w8x31	0	722	ustom	w14x61	0
670	Custom 1	w8x31	0	723	ustom	w14x61	0
671	Custom 1	w8x31	0	724	ustom	w14x61	0
672	Custom 1	w8x31	0	725	ustom	w18x55	0
673	Custom 1	w8x31	0	726	ustom	w18x55	0
674	Custom 1	w8x31	0	727	ustom	w18x55	0
675	Custom 1	w8x31	0	728	ustom	w18x55	0
676	Custom 1	w8x31	0	729	ustom	w18x55	0
677	Custom 1	w8x31	0	730	ustom	w18x55	0
678	Custom 1	w8x31	0	731	ustom	w18x55	0
679	Custom 1	w8x31	0	732	ustom	w18x55	0

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733	Custom 1	w18x55	0	767	ustom	L-4x0.5	0
734	Custom 1	w18x55	0	768	ustom	L-4x0.5	0
735	Custom 1	w14x61	0	769	ustom	L-4x0.5	0
736	Custom 1	w14x61	0	770	ustom	L-4x0.5	0
737	Custom 1	w14x61	0	771	ustom	L-4x0.5	0
738	Custom 1	w14x61	0	772	ustom	L-4x0.5	0
739	Custom 1	L-4x3/8	0	773	ustom	L-4x0.5	0
740	Custom 1	L-4x3/8	0	774	ustom	L-4x0.5	0
741	Custom 1	L-4x3/8	0	775	ustom	L-4x0.5	0
742	Custom 1	L-4x3/8	0	776	ustom	L-4x0.5	0
743	Custom 1	L-4x3/8	0	777	ustom	L-4x0.5	0
744	Custom 1	L-4x3/8	0	778	ustom	L-4x0.5	0
745	Custom 1	L-4x3/8	0	779	ustom	L-4x0.5	0
746	Custom 1	L-4x3/8	0	780	ustom	L-4x0.5	0
747	Custom 1	L-4x3/8	0	781	ustom	L-4x0.5	0
748	Custom 1	L-4x3/8	0	782	ustom	L-4x0.5	0
749	Custom 1	L-4x3/8	0	783	ustom	L-4x0.5	0
750	Custom 1	L-4x3/8	0	784	ustom	L-4x0.5	0
751	Custom 1	L-4x0.5	0	785	ustom	L-4x0.5	0
752	Custom 1	L-4x0.5	0	786	ustom	L-4x0.5	0
753	Custom 1	L-4x0.5	0	787	ustom	L-4x0.5	0
754	Custom 1	L-4x0.5	0	788	ustom	L-4x0.5	0
755	Custom 1	L-4x0.5	0	789	ustom	L-4x0.5	0
756	Custom 1	L-4x0.5	0	790	ustom	L-4x0.5	0
757	Custom 1	L-4x0.5	0	791	ustom	L-4x0.5	0
758	Custom 1	L-4x0.5	0	792	ustom	L-4x0.5	0
759	Custom 1	L-4x0.5	0	793	ustom	L-4x0.5	0
760	Custom 1	L-4x0.5	0	794	ustom	L-4x0.5	0
761	Custom 1	L-4x0.5	0	795	ustom	L-4x0.5	0
762	Custom 1	L-4x0.5	0	796	ustom	L-4x0.5	0
763	Custom 1	L-4x0.5	0	797	ustom	L-4x0.5	0
764	Custom 1	L-4x0.5	0	798	ustom	L-4x0.5	0
765	Custom 1	L-4x0.5	0	799	ustom	L-4x0.5	0
766	Custom 1	L-4x0.5	0	800	ustom	L-4x0.5	0

Section			
Member	group	section	direction
801	Custom 1	L-4x0.5	0
802	Custom 1	L-4x0.5	0
803	Custom 1	L-4x0.5	0
804	Custom 1	L-4x0.5	0

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REACTION

DL Node	Rx	Ry	Rz	Mx	My	Mz
1	-0.039	13.952	0.004	0.025	0	0.639
5	-0.363	14.333	0.466	0.024	0	0.329
27	-0.061	17.108	0.003	0.024	0	0.6
31	-0.039	16.846	0.002	0.013	0	-0.18
53	-0.783	16.859	0.002	0.017	0	0.838
57	0.716	16.89	0.001	0.007	0	-0.507
79	-0.457	19.115	0.001	0.01	0	-0.14
83	0.396	19.144	0	0.001	0	0.441
105	-0.539	19.078	0	0.001	0	0.031
109	0.489	19.047	-0.001	-0.006	0	0.246
131	-0.385	20.195	-0.001	-0.007	0	-0.328
135	0.207	20.286	-0.002	-0.013	0	1.091
192	-0.516	19.02	-0.002	-0.015	0	-0.098
196	0.535	18.956	-0.003	-0.019	0	0.048
218	-0.375	19.693	-0.003	-0.022	0	-0.481
222	0.38	19.691	-0.004	-0.026	0	0.45
244	-0.522	18.947	-0.004	-0.029	0	-0.079
248	0.524	18.946	-0.005	-0.034	0	0.067
270	-0.419	18.185	-0.434	-0.036	0	-0.23
274	0.418	18.512	-0.006	-0.042	0	0.235
296	-1.614	7.537	-0.005	-0.033	0	3.445
300	1.607	6.998	-0.006	-0.041	0	-3.408
357	-0.014	10.649	-0.006	-0.151	0	0.005
358	0.346	7.322	0.004	0.062	0	-0.042
359	-0.019	6.958	0.004	0.069	0	0.052
360	0.2	22.954	4.641	4.658	0	0.056
361	-0.107	21.679	5.356	5.363	0	0.137
362	0.444	21.705	5.306	5.32	0	-0.024
363	-0.003	30.903	-5.331	-6.505	0	0.021
364	-0.093	23.044	-4.983	-5.75	0	0.147
365	0.088	23.123	-4.997	-5.787	0	-0.106

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REACTION						
LL Node	Rx	Ry	Rz	Mx	My	Mz
1	-0.029	4.677	0.001	0.004	0	0.173
5	-0.089	4.705	0.075	-0.002	0	0.108
27	-0.019	5.211	0	0.004	0	0.146
31	-0.009	5.162	-0.002	-0.004	0	-0.033
53	-0.134	3.543	0	0.002	0	0.1
57	0.117	3.551	0	-0.001	0	-0.012
79	-0.098	4.024	0	0	0	-0.04
83	0.082	4.031	0	-0.002	0	0.118
105	-0.079	4.039	0	-0.002	0	-0.084
109	0.065	4.045	-0.001	-0.004	0	0.157
131	-0.08	4.282	0	-0.003	0	-0.089
135	0.037	4.304	-0.001	-0.005	0	0.272
192	-0.073	4.026	-0.001	-0.005	0	-0.116
196	0.076	4.024	-0.001	-0.007	0	0.109
218	-0.079	4.154	-0.001	-0.007	0	-0.121
222	0.08	4.153	-0.001	-0.008	0	0.115
244	-0.074	4.01	-0.001	-0.008	0	-0.113
248	0.075	4.01	-0.001	-0.01	0	0.108
270	-0.086	3.783	-0.132	-0.01	0	-0.075
274	0.086	3.904	-0.002	-0.012	0	0.072
296	-0.327	1.43	-0.001	-0.009	0	0.693
300	0.326	1.292	-0.002	-0.012	0	-0.691
357	-0.003	2.169	-0.002	-0.041	0	0.001
358	0.081	1.453	0	0.006	0	-0.012
359	-0.005	1.37	0	0.005	0	0.013
360	0.07	8.85	2.44	2.498	0	0.017
361	0.008	8.563	2.593	2.644	0	0.036
362	0.082	8.563	2.581	2.634	0	-0.001
363	-0.001	10.045	-2.579	-3.061	0	0.006
364	-0.021	8.48	-2.479	-2.864	0	0.033
365	0.019	8.488	-2.483	-2.873	0	-0.022

REACTION						
Seismic X Node	Rx	Ry	Rz	Mx	My	Mz
1	-0.03	0.363	-2.405	-5.576	0	-0.21
5	0.037	-19.897	-24.706	-3.222	0.001	-0.239
27	-0.058	0.272	-2.415	-5.587	-0.001	0.142
31	0.009	20.344	-0.987	-2.743	0.001	0.097
53	-0.089	-0.302	-0.193	-1.347	-0.002	0.382
57	-0.047	-0.234	-0.177	-1.238	0.002	0.225
79	-0.074	-0.183	-0.192	-1.343	-0.002	0.422
83	-0.108	-0.099	-0.184	-1.288	0.002	0.46
105	-0.121	-0.309	-0.192	-1.341	-0.002	0.538
109	-0.077	-0.214	-0.19	-1.329	0.002	0.378
131	-0.099	-0.274	-0.191	-1.334	-0.002	0.483
135	-0.07	-0.197	-0.195	-1.364	0.002	0.362
192	-0.102	-0.167	-0.189	-1.319	-0.002	0.457
196	-0.078	-0.079	-0.199	-1.392	0.002	0.373
218	-0.066	-0.098	-0.186	-1.297	-0.002	0.324
222	-0.064	-0.037	-0.202	-1.414	0.002	0.302

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REACTION						
Seismic X						
Node	Rx	Ry	Rz	Mx	My	Mz
244	-0.041	-0.064	-0.179	-1.251	-0.002	0.131
248	-0.011	-0.034	-0.205	-1.43	0.002	0.054
270	0.04	-20.214	-21.909	-1.198	-0.001	-0.162
274	0.019	0.045	-0.206	-1.44	0.002	-0.103
296	-0.002	19.927	-0.153	-1.073	-0.001	-0.046
300	0.049	-0.282	-0.207	-1.444	0.002	-0.221
357	0.332	0.249	-0.369	-4.217	0	-0.024
358	0.294	0.718	-0.646	-6.156	-0.001	-0.008
359	0.008	-0.476	-0.708	-6.697	0.001	-0.029
360	0.064	-18.668	-14.508	-12.302	0	-0.014
361	0.108	-21.967	-19.12	-16.257	0	-0.014
362	0.175	-21.198	-18.348	-15.593	0	-0.018
363	0.001	19.213	-4.532	-10.949	0	0.009
364	-0.005	22.356	-5.893	-14.299	0	0.016
365	0.006	21.507	-5.661	-13.728	0	0.005

REACTION						
Seismic Y						
Node	Rx	Ry	Rz	Mx	My	Mz
1	-0.13	-3.209	0.014	0.1	0	8.906
5	2.401	5.946	-3.012	-0.388	0	4.068
27	-8.905	0.126	0.014	0.1	0	27.012
31	-8.718	4.21	-0.106	-0.32	0	26.852
53	-3.766	-0.529	0.015	0.105	0	17.429
57	-3.781	0.745	-0.022	-0.156	0	17.488
79	-3.72	-0.609	0.016	0.109	0	17.214
83	-3.73	0.618	-0.021	-0.15	0	17.238
105	-3.629	-0.573	0.017	0.116	0	16.741
109	-3.628	0.567	-0.022	-0.156	0	16.737
131	-3.476	-0.468	0.018	0.124	0	16.015
135	-3.494	0.537	-0.023	-0.163	0	16.062
192	-3.274	-0.472	0.019	0.129	0	14.993
196	-3.258	0.331	-0.024	-0.171	0.001	14.941
218	-3.01	-0.301	0.019	0.135	0	13.723
222	-3.009	0.261	-0.026	-0.179	0.001	13.716
244	-2.679	-0.147	0.019	0.133	0.001	12.087
248	-2.679	0.111	-0.026	-0.183	0.001	12.081
270	-2.305	2.151	2.329	0.132	0.001	10.118
274	-2.298	-0.079	-0.027	-0.188	0.001	10.091
296	-1.411	-4.277	0.017	0.118	0.001	5.933
300	-1.424	2.937	-0.027	-0.188	0.001	5.903
357	-8.928	-1.469	-0.003	-0.041	0	0.775
358	-8.94	-8.467	-0.011	-0.13	0	0.834
359	-0.216	9.073	-0.008	-0.05	0	0.793
360	-11.36	-1.471	0.019	-0.002	-0.074	0.23
361	-12.227	-3.243	1.337	1.155	-0.073	0.501
362	-11.211	-1.958	-0.685	-0.585	-0.074	0.059
363	-0.907	0.721	-0.009	-0.001	0.069	3.045
364	-0.877	-1.174	0.398	0.972	0.069	2.996
365	-0.858	0.111	-0.197	-0.484	0.07	2.977