

OEST ASSOCIATES, INC.

PREPARED BY J. Walker
 CALCULATIONS CHECKED BY _____
 SUBJECT Double Tree Equipment Platform

DATE 9/13/03 PROJECT NO. 390.01.01
 DATE _____ SHEET NO. 6 OF 6

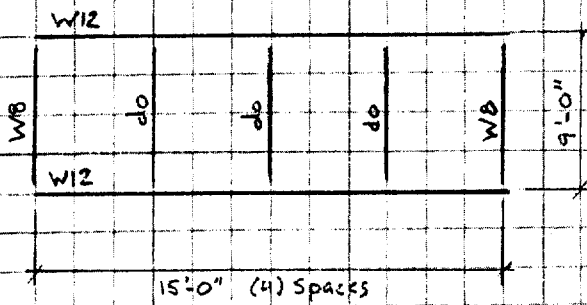
Equipment Platform Design:

Loads:

Equipment $\Rightarrow 2,400\# @ 30" \times 42" = 275\text{ psf}$

LIVE $\Rightarrow 40\text{ psf} = 40\text{ psf}$

Platform Design:



Grating \Rightarrow Use $1\frac{1}{2}" \times \frac{3}{16}"$ Steel Bearing Bars @ $1\frac{3}{16}"$ o.c. $w_{cap} = 370\text{ psf}$ (OK)

WB $\Rightarrow L = 9'$ $w = DL = 10\text{ psf} (3.75') = 37.5\text{ plf}$
 $= LL = 275\text{ psf} (3.75') = 1,031\text{ plf}$

Try $W8 \times 10 \Rightarrow M = \frac{1,069\text{ plf} (9')^2}{8} = 10,824\#-ft$ $f_b = \frac{10.8\text{ K-ft} (12)}{7.8\text{ in}^3} = 16.6\text{ KS}$ (OK)
 $V = \frac{1,069\text{ plf} (9')}{2} = 4,811\#$ $f_v = \frac{4.8\text{ K}}{7.69\text{ in}^2} = 3.56\text{ KS}$ (OK)

W12 $\Rightarrow L = 15'$ $w = DL = 10\text{ psf} (1\frac{1}{2}') = 45\text{ plf}$
 $= LL = 275\text{ psf} (1\frac{1}{2}') = 1,123\text{ plf}$

Try $W12 \times 19 \Rightarrow M = \frac{1,283\text{ plf} (15')^2}{8} = 36,084\#-ft$ $f_b = \frac{36.08\text{ K-ft} (12)}{2.13\text{ in}^3} = 20.7\text{ KS}$ (OK)
 $V = \frac{1,283\text{ plf} (15')}{2} = 9,623\#$ $f_v = \frac{9.6\text{ K}}{12.16\text{ in}^2} = 3.36\text{ KS}$ (OK)

VERTICAL PRODUCT DATA SHEETS



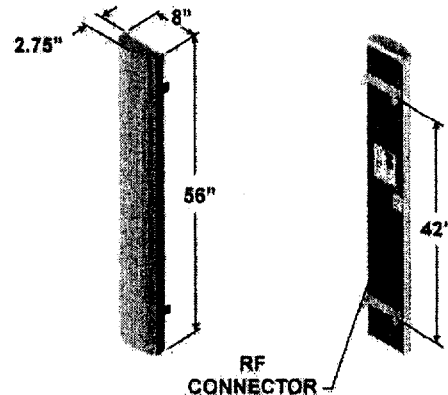
FV65-17-XXDP

Vertical Polarization
1850 MHz - 1990 MHz

OptiFill™

Electrical Specifications

Azimuth Beamwidth	65°
Elevation Beamwidth	7°
Gain	16.5 dBi (14.4 dBd)
Polarization	Linear, Vertical
Front-to-Back Ratio	≥ 25 dB (≥ 30 dB Typ.)
Electrical Downtilt Options	0°, 2°, 4°
VSWR	1.35:1 Max
Connectors	1; 7-16 DIN (female)
Power Handling	250 Watts CW
Passive Intermodulation	≤ -150 dBc [2 x 20W (+ 43 dBm)]
Lightning Protection	Chassis Ground



Mechanical Specifications

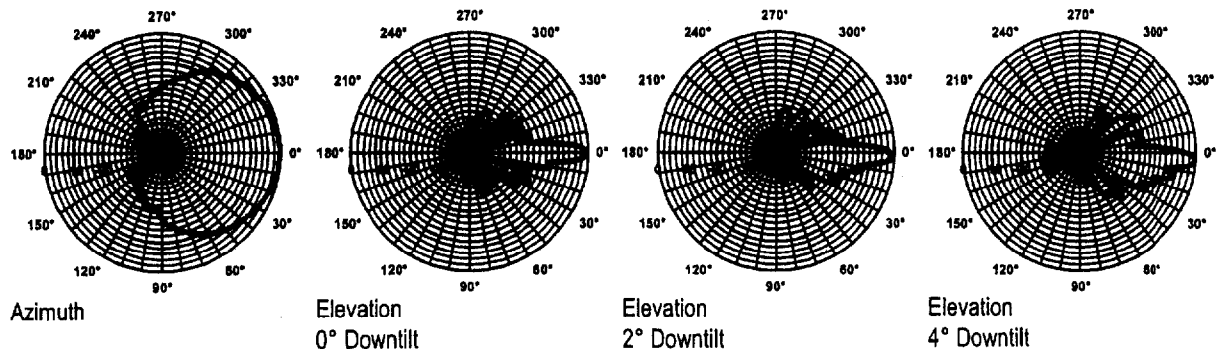
Dimensions (L x W x D)	56 in x 8 in x 2.75 in (142 cm x 20.3 cm x 7.0 cm)
Rated Wind Velocity	150 mph (241 km/hr)
Equivalent Flat Plate Area	3.1ft ² (.29 m ²)
Front Wind Load @ 100 mph (161 kph)	90 lbs (400 N)
Side Wind Load @ 100 mph (161 kph)	31 lbs (139 N)
Weight	18 lbs (8.2 kg)



Mounting Options

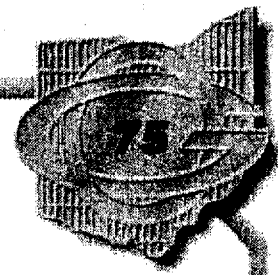
MTG-P00-10, MTG-S02-10, MTG-DXX-20*, MTG-CXX-10*, MTG-C02-10, MTG-TXX-10*

Note: *Model number shown represents a series of products. See Mounting Options section for specific model number.



Revised 05/15/02

LIGHT DUTY WELDED STEEL W SERIES



Ohio Gratings is a major stocking and fabricating distributor of electroforge welded carbon steel bar grating. Bearing bars range from $\frac{1}{4}'' \times \frac{3}{16}''$ through $2\frac{1}{2}'' \times \frac{3}{16}''$ in $\frac{1}{4}''$ increments. Bearing bar spacings of $1\frac{3}{16}''$, $\frac{1}{2}''$ and $\frac{11}{16}''$ are available with cross rods on 4" or 2" centers. The bearing bar surface may be provided plain, or with serrations for maximum skid resistance.

Electroforge welded steel grating is ideal for pedestrian traffic, and for light, rubber pneumatic tired rolling traffic (carts, dollies and hand trucks). For other rolling loads (forklifts, cars, trucks, etc.) see the Heavy Duty Steel Grating section, page 47.

How to Specify:

1. Grating: Light Duty Welded Steel W Series by Ohio Gratings, Inc., or approved equal.
2. Bearing Bars: Rectangular Bar on $1\frac{3}{16}''$ centers maximum. (Note: Other spacings may be specified at the discretion of the architect/engineer.)
3. Cross Bars: Electroforge welded at right angles to bearing bars at 4" centers maximum. (Note: 2" cross bar centers may be specified at the discretion of the architect/engineer.)
4. Surface: Plain. (Note: A serrated surface may be specified for maximum skid resistance.)
5. Loading: Grating to carry a pedestrian loading equal to 100# per square foot over the required clear span with deflection not to exceed $\frac{1}{4}''$. (Note: Alternate loading requirements may be specified at the discretion of the architect/engineer.)
6. Finish: (Galvanized or manufacturer's standard black paint at the discretion of the architect/engineer.)
7. Fabrication and Tolerances: In accordance with the NAAMM Metal Bar Grating Manual.

Plain Surface

Serrated Surface

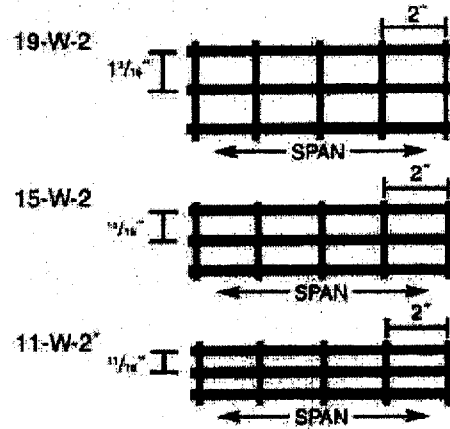
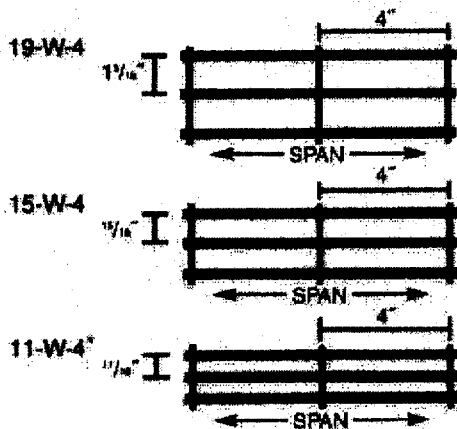
Stainless Steel

(Shown for comparison only; not available from Ohio Gratings)

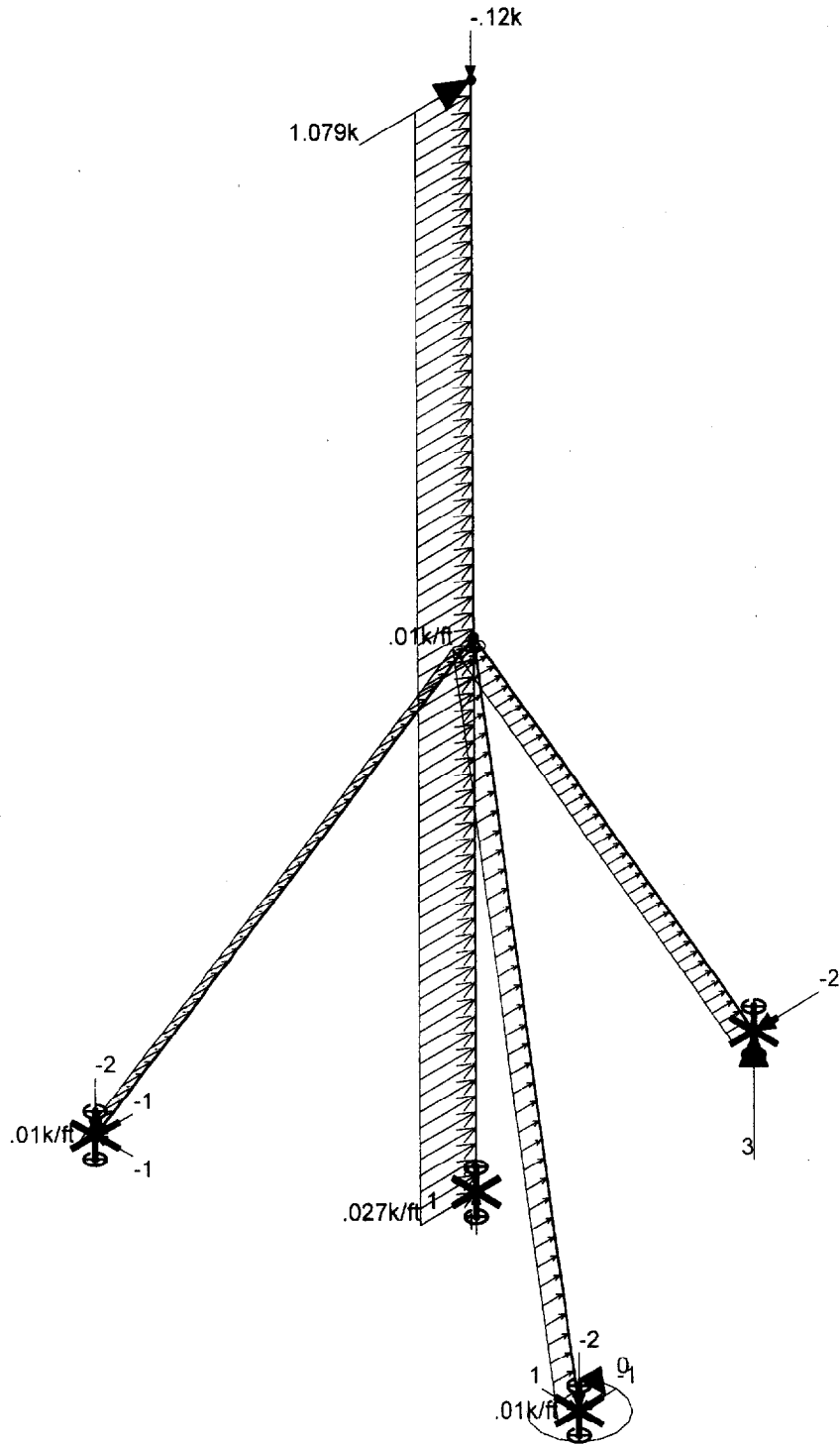
For those areas requiring the corrosion resistance of stainless steel, Ohio Gratings stocks $1'' \times \frac{3}{16}''$, $1\frac{1}{2}'' \times \frac{3}{16}''$ and $1\frac{1}{2}'' \times \frac{3}{16}''$ 19-SGSS-4 Type 304 Swaged Stainless Steel grating (see page 93). Swaged Stainless eliminates the warping, twisting and discoloration inherent in the electroforging process, and provides an excellent choice for those severe industrial corrosion applications. The SGSS Series is also available in ADA (July 1991) compliant spacings.

Note: For complete GSI Three-Part Section Format guide specification information, refer to page 113.

Grating Types - Light Duty Welded Steel W Series



*Note: Conforms with the spacing requirements of ADA (July 1991) when installed with the elongated opening perpendicular to the dominant direction of travel. See Inside Front Cover for further information.



Loads: LC 1, DL+WL
 Results for LC 1, DL+WL
 Reaction units are k and k-ft

OEST Associates. Inc.
 Jeff Walker
 390.01.01

Doubletree Hotel Antenna Frame

September 22, 2003
 6:00 PM
 pole.R3D

Materials (General)

Material Label	Young's Modulus (ksi)	Shear Modulus (ksi)	Poisson's Ratio	Thermal Coef. (per 10^5 F)	Weight Density (k/ft^3)	Yield Stress (ksi)
STL	29000	11154	.3	.65	49	36

Sections

Section Label	Database Shape	Material Label	Area (in)^2	SA(yy)	SA(zz)	I y-y (in^4)	I z-z (in^4)	J (Torsion) (in^4)	T/C Only
POST	PIPE 12.0	STL	14.579	1.2	1.2	279.335	279.335	558.67	
BRACE	L3.5X3.5X5	STL	2.09	1.2	1.2	2.45	2.45	0.73	

Joint Coordinates

Joint Label	X Coordinate (ft)	Y Coordinate (ft)	Z Coordinate (ft)	Joint Temperature (F)	Detach from Diaphragm
N1	5.192433	8.775669	0	0	No
N2	10.192433	0.115415	0	0	No
N3	0.192433	0.115415	0	0	No
N4	5.192433	3.002166	10	0	No
N5	5.192433	3.002166	0	0	No
N6	5.192433	3.002166	20	0	No

Boundary Conditions

Joint Label	X Translation (k/in)	Y Translation (k/in)	Z Translation (k/in)	MX Rotation (k-ft/rad)	MY Rotation (k-ft/rad)	MZ Rotation (k-ft/rad)
N5	Reaction	Reaction	Reaction			Reaction
N3	Reaction	Reaction	Reaction			Reaction
N2	Reaction	Reaction	Reaction			Reaction
N1	Reaction	Reaction	Reaction			Reaction

Member Data

Member Label	I Joint	J Joint	K Joint	X-Axis Rotate (degrees)	Shape / Section Set	Material Set	Phys Memb	End Releases I-End J-End xyz xyz	End Offsets I-End J-End (in) (in)	Inactive Code Length (ft)
M1	N4	N1			BRACE	STL		BenPIN		11.547
M2	N2	N4			BRACE	STL		BenPIN		11.547
M3	N3	N4			BRACE	STL		BenPIN		11.547
M4	N5	N6			POST	STL	Y			20

Basic Load Case Data

BLC No.	Basic Load Case Description	Category Code	Category Description	Gravity			Load Type Totals				
				X	Y	Z	Joint	Point	Direct Dist.	Area	Surf.
1	Dead	None				1					
2	Ice	None				1		4			
3	Wind	None				1		4			
4	Wind(Ice)	None				1		4			

Joint Loads/Enforced Displacements, Category : None, BLC 1 : Dead

Joint Label	[L]oad, [M]ass, or [D]isplacement	Direction	Magnitude (k, k-ft, in, rad, k*s^2/ft)
N6	L	Z	-12

Joint Loads/Enforced Displacements, Category : None, BLC 2 : Ice

Joint Label	[L]oad, [M]ass, or [D]isplacement	Direction	Magnitude (k, k-ft, in, rad, k*s^2/ft)
N6	L	Z	-12

Joint Loads/Enforced Displacements, Category : None, BLC 3 : Wind

Joint Label	[L]oad,[M]ass,or [D]isplacement	Direction	Magnitude (k, k-ft, in, rad, k*s^2/ft)
N6	L	Y	1.079

Joint Loads/Enforced Displacements, Category : None, BLC 4 : Wind(Ice)

Joint Label	[L]oad,[M]ass,or [D]isplacement	Direction	Magnitude (k, k-ft, in, rad, k*s^2/ft)
N6	L	Y	1.24

Member Direct Distributed Loads, Category : None, BLC 2 : Ice

Member Label	Direction	Start Magnitude (k/ft, F)	End Magnitude (k/ft, F)	Start Location (ft or %)	End Location (ft or %)
M4	Z	-008	-008	0	0
M3	Z	-003	-003	0	0
M2	Z	-003	-003	0	0
M1	Z	-003	-003	0	0

Member Direct Distributed Loads, Category : None, BLC 3 : Wind

Member Label	Direction	Start Magnitude (k/ft, F)	End Magnitude (k/ft, F)	Start Location (ft or %)	End Location (ft or %)
M4	Y	.027	.027	0	0
M3	Y	.01	.01	0	0
M2	Y	.01	.01	0	0
M1	Y	.01	.01	0	0

Member Direct Distributed Loads, Category : None, BLC 4 : Wind(Ice)

Member Label	Direction	Start Magnitude (k/ft, F)	End Magnitude (k/ft, F)	Start Location (ft or %)	End Location (ft or %)
M4	Y	.029	.029	0	0
M3	Y	.01	.01	0	0
M2	Y	.01	.01	0	0
M1	Y	.01	.01	0	0

Load Combinations

Num	Description	Env	WS	PD	SRSS	CD	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	DL+WL	y				1	1	1	Z	-1	3	1		
2	DL+0.75WL+I >	y				1	1	1	Z	-1	4	.75	2	1
3	DL+0.75WL+I <	y				1	1	1	Z	-1	4	-.75	2	1

Joint Displacements, By Combination

LC	Joint Label	X Translation (in)	Y Translation (in)	Z Translation (in)	X Rotation (radians)	Y Rotation (radians)	Z Rotation (radians)
1	N1	0	0	0	-1.134e-3	-7.016e-4	0
1	N2	0	0	0	-2.242e-3	9.837e-4	0
1	N3	0	0	0	-3.093e-3	1.692e-3	0
1	N4	0	.018	0	-8.542e-4	0	6.383e-8
1	N5	0	0	0	1.849e-4	0	0
1	N6	0	.205	0	-1.893e-3	0	6.383e-8
2	N1	0	0	0	-3.805e-4	-1.978e-4	0
2	N2	0	0	0	-1.651e-3	4.223e-4	0
2	N3	0	0	0	-2.858e-3	1.783e-3	0
2	N4	0	.015	0	-7.303e-4	0	1.248e-8
2	N5	0	0	0	1.608e-4	0	0

Joint Displacements, By Combination, (continued)

LC	Joint Label	X Translation (in)	Y Translation (in)	Z Translation (in)	X Rotation (radians)	Y Rotation (radians)	Z Rotation (radians)
2	N6	0	.175	0	-1.621e-3	0	1.248e-8
3	N1	0	0	0	2.413e-3	1.588e-3	0
3	N2	0	0	0	1.838e-3	-1.765e-3	0
3	N3	0	0	0	6.355e-4	3.97e-4	0
3	N4	0	-.015	0	7.303e-4	0	-1.623e-7
3	N5	0	0	0	-1.608e-4	0	0
3	N6	0	-.175	0	1.621e-3	0	-1.623e-7

Reactions, By Combination

LC	Joint Label	X Force (k)	Y Force (k)	Z Force (k)	X Moment (k-ft)	Y Moment (k-ft)	Z Moment (k-ft)
1	N5	0	1.079	1.02	0	0	0
1	N3	-.793	-.516	-1.545	0	0	0
1	N2	.793	-.516	-1.545	0	0	0
1	N1	0	-2.013	3.428	0	0	0
1	Totals:	0	-1.965	1.359			
1	COG (ft):	X: 5.192	Y: 2.973	Z: 14.178			
2	N5	0	.93	1.288	0	0	0
2	N3	-.663	-.421	-1.249	0	0	0
2	N2	.653	-.421	-1.249	0	0	0
2	N1	0	1.714	2.962	0	0	0
2	Totals:	0	-1.625	1.742			
2	COG (ft):	X: 5.192	Y: 2.965	Z: 14.497			
3	N5	0	-.93	1.288	0	0	0
3	N3	.747	.474	1.552	0	0	0
3	N2	-.747	.474	1.552	0	0	0
3	N1	0	1.606	2.649	0	0	0
3	Totals:	0	1.625	1.742			
3	COG (ft):	X: 5.192	Y: 3.025	Z: 15.002			

Member Section Forces, By Combination

LC	Member Label	Section	Axial (k)	Shear y-y (k)	Shear z-z (k)	Torque (k-ft)	Moment y-y (k-ft)	Moment z-z (k-ft)
1	M1	1	3.847	-.029	0	0	0	0
		2	3.976	.029	0	0	0	0
1	M2	1	-1.81	-.065	-.018	0	0	0
		2	-1.852	.065	.018	0	0	0
1	M3	1	-1.81	-.065	.018	0	0	0
		2	-1.852	.065	-.018	0	0	0
1	M4	1	1.02	1.079	0	0	0	0
		2	1.2	-1.079	0	0	0	0
2	M1	1	3.269	-.008	0	0	0	0
		2	3.413	.008	0	0	0	0
2	M2	1	-1.469	-.055	-.026	0	0	0
		2	-1.549	.055	.026	0	0	0
2	M3	1	-1.469	-.055	.026	0	0	0
		2	-1.549	.055	-.026	0	0	0
2	M4	1	1.288	.93	0	0	0	0
		2	1.24	-.93	0	0	0	0
3	M1	1	-3.155	.067	0	0	0	0
		2	-3.097	-.067	0	0	0	0
3	M2	1	1.785	.029	-.026	0	0	0
		2	1.663	-.029	.026	0	0	0
3	M3	1	1.785	.029	.026	0	0	0
		2	1.663	-.029	-.026	0	0	0
3	M4	1	1.288	-.93	0	0	0	0

Member Section Forces, By Combination, (continued)

LC	Member Label	Section	Axial (k)	Shear y-y (k)	Shear z-z (k)	Torque (k-ft)	Moment y-y (k-ft)	Moment z-z (k-ft)
		2	24	93	0	0	0	0

Member Stresses, By Combination

LC	Member Label	Section	Axial (ksi)	Shear y-y (ksi)	Shear z-z (ksi)	Bending y-top (ksi)	Bending y-bot (ksi)	Bending z-top (ksi)	Bending z-bot (ksi)
1	M1	1	1.841	-.032	0	0	0	0	0
		2	1.902	.032	0	0	0	-.001	.001
1	M2	1	-.866	-.071	-.02	.002	-.002	.001	-.001
		2	-.886	.071	.02	0	0	0	0
1	M3	1	-.866	-.071	.02	0	0	.002	-.002
		2	.886	.071	-.02	0	0	0	0
1	M4	1	.07	.089	0	0	0	0	0
		2	.008	-.089	0	0	0	0	0
2	M1	1	1.564	-.009	0	0	0	0	0
		2	1.633	.009	0	0	0	0	0
2	M2	1	-.703	-.06	-.029	0	0	0	0
		2	.741	.06	.029	0	0	0	0
2	M3	1	-.703	-.06	.029	0	0	.002	-.002
		2	.741	.06	-.029	0	0	0	0
2	M4	1	.088	.077	0	0	0	0	0
		2	.016	-.077	0	0	0	0	0
3	M1	1	-1.509	.073	0	0	0	0	0
		2	-1.482	-.073	0	-.001	.001	.002	-.003
3	M2	1	.854	.032	-.029	-.002	.002	-.001	.001
		2	.796	-.032	.029	0	0	0	0
3	M3	1	.854	.032	.029	0	0	0	0
		2	.796	-.032	-.029	0	0	0	0
3	M4	1	.088	-.077	0	0	0	0	0
		2	.016	.077	0	0	0	0	0

Member Section Torsion, By Combination

LC	Member Label	Section	Torque (k-ft)	Torsion Shear (ksi)	y-y Warp Shear (ksi)	z-z Warp Shear (ksi)	z-Bot Warp Bend (ksi)	z-Top Warp Bend (ksi)
1	M1	1	0	.009	NC	NC	NC	NC
		2	0	.009	NC	NC	NC	NC
1	M2	1	0	.021	NC	NC	NC	NC
		2	0	.021	NC	NC	NC	NC
1	M3	1	0	-.014	NC	NC	NC	NC
		2	0	-.014	NC	NC	NC	NC
1	M4	1	0	0	NC	NC	NC	NC
		2	0	0	NC	NC	NC	NC
2	M1	1	0	.002	NC	NC	NC	NC
		2	0	.002	NC	NC	NC	NC
2	M2	1	0	.013	NC	NC	NC	NC
		2	0	.013	NC	NC	NC	NC
2	M3	1	0	-.012	NC	NC	NC	NC
		2	0	-.012	NC	NC	NC	NC
2	M4	1	0	0	NC	NC	NC	NC
		2	0	0	NC	NC	NC	NC
3	M1	1	0	-.02	NC	NC	NC	NC
		2	0	-.02	NC	NC	NC	NC
3	M2	1	0	-.023	NC	NC	NC	NC
		2	0	-.023	NC	NC	NC	NC
3	M3	1	0	.001	NC	NC	NC	NC
		2	0	.001	NC	NC	NC	NC
3	M4	1	0	0	NC	NC	NC	NC
		2	0	0	NC	NC	NC	NC

Company : OEST Associates, Inc.
 Designer : Jeff Walker
 Job Number : 390.01.01

Doubletree Hotel Antenna Frame

September 22, 2003
 6:03 PM
 Checked By: _____

Member AISC ASD 9th Code Checks, By Combination

LC	Member Label	Code Chk	Loc (ft)	Shear Chk	Loc (ft)	Dir	ASD Eqn.	Message
1	M1	.514	11.547	.003	0	y		- Code check based on z-z Axial..
1	M2	.041	11.547	.006	0	y		- Code check based on z-z Axial..
1	M3	.041	11.547	.006	0	y		- Code check based on z-z Axial..
1	M4	.140	10.101	.008	9.899		H1-2	
2	M1	.441	11.547	.001	0	y		- Code check based on z-z Axial..
2	M2	.034	11.547	.005	0	y		- Code check based on z-z Axial..
2	M3	.034	11.547	.005	0	y		- Code check based on z-z Axial..
2	M4	.121	10.101	.007	9.899		H1-2	
3	M1	.070	0	.006	0	y		- Code check based on z-z Axial..
3	M2	.231	0	.004	0	y		- Code check based on z-z Axial..
3	M3	.231	0	.002	0	y		- Code check based on z-z Axial..
3	M4	.121	10.101	.007	9.899		H1-2	

Member AISC ASD 9th Code Details, By Combination

LC	Member Label	Fa (ksi)	Ft (ksi)	Fb y-y (ksi)	Fb z-z (ksi)	Cb	Cm y-y	Cm z-z
1	M1	3.703	21.6	- Code check based on z-z Axial ONLY -				
1	M2	3.703	21.6	- Code check based on z-z Axial ONLY -				
1	M3	3.703	21.6	- Code check based on z-z Axial ONLY -				
1	M4	17.916	21.6	23.76	23.76	1	6	85
2	M1	3.703	21.6	- Code check based on z-z Axial ONLY -				
2	M2	3.703	21.6	- Code check based on z-z Axial ONLY -				
2	M3	3.703	21.6	- Code check based on z-z Axial ONLY -				
2	M4	17.916	21.6	23.76	23.76	1	6	85
3	M1	3.703	21.6	- Code check based on z-z Axial ONLY -				
3	M2	3.703	21.6	- Code check based on z-z Axial ONLY -				
3	M3	3.703	21.6	- Code check based on z-z Axial ONLY -				
3	M4	17.916	21.6	23.76	23.76	1	6	85

