Structural Mount Analysis Report

V-FRAME SECTOR MOUNT

AT&T | Tolland Central Site | CTL05331 | FA 10071279

Tolland, Connecticut

October 16, 2020

MEI PROJECT ID: CT00983S-20V2

MALOUF ENGINEERING INTL., INC.

STRUCTURAL CONSULTANTS

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PROFESSIONAL MEMBER

ACEC MEMBER

MALOUF ENGINEERING INTL., INC.

STRUCTURAL CONSULTANTS

October 16, 2020

Mr. Miguel Nobre
Vertical Resources Group
Auburn, MA 01501

STRUCTURAL MOUNT ANALYSIS

Mount/Make/Model:	12.67ft **Mount - V-Frame**		Commscope / SFG22-12-4-96	
Client/Site Name/#:	**Vertical Resources Group | AT&T**		**Tolland Central Site CTL05331 | FA 10071279**	
MEI Project ID:	**CT00983S-20V2**			
Location:	130 Bald Hill Rd Tolland, CT 06084		Tolland County FCC #N/A	
	LAT	41-52-59.13 N	LON	72-22-32.52 W

EXECUTIVE SUMMARY:

Malouf Engineering Int'l (MEI), as requested, has performed a structural mount analysis of the referenced mount to assess the impact of the appurtenances configuration as noted in Table 1.

Based on the stress analysis performed, the mount **is in conformance** with the Int'l Building Code (IBC) / ANSI/TIA-**222-G** Standard for the loading considered under the criteria listed and referenced in the report sections.

	Max. Stress Ratio CSR	Findings
Proposed New Mount (replace existing)	**97.0 %**	**Pass**

The subject mount is structurally acceptable to support the appurtenances configuration as noted in Table 1. Refer to the Recommendations section for details.

MEI appreciates the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or other projects, please contact us.

Respectfully submitted,

MALOUF ENGINEERING INT'L, INC.

Analysis performed by:

Krishna Manda, PE
Sr. Project Engineer

Reviewed & Approved by:

STATE OF CONNECTICUT MARK MALOUF No. 17715 LICENSED PROFESSIONAL ENGINEER

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10/16/2020

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1. INTRODUCTION & SCOPE

A mount structural analysis was performed by Malouf Engineering Int'l (MEI), as requested and authorized by Mr. Miguel Nobre, Vertical Resources Group, on behalf of AT&T, to determine whether the subject support mount will be in compliance with the referenced code/standard(s) when supporting the proposed appurtenances configuration loading. The different report sections detail the applicable information used in this analysis, relating to the mount data, the appurtenances configuration and the loading considered.

The different report sections detail the applicable information used in this evaluation, relating to the mount data, the appurtenances configuration and the wind and ice loading considered.

2. SOURCE OF DATA

The following information has been used in this evaluation as source data that accurately represent the mount and the related appurtenances:

	Source	Information	Reference
STRUCTURE			
Mount Information	Vertical Resources Group Miguel Nobre / MEI Records	Commscope Mount Drawings & Additional data from MEI Records	Received 10/15/2020
Tower Information	MEI Records	Tower Analysis / Mods	MEI ID CT00983S-20V1 Dated 08/19/2020
Material Grade	As per manufacturer provided typical mount details – Refer to Appendix.		
APPURTENANCES CONFIGURATION			
	Vertical Resources Group Miguel Nobre	Email Instruction	Dated 10/15/2020
PRIOR MOUNT STRUCTURAL MODIFICATIONS	None		

3. ANALYSIS CRITERIA

The structural analysis performed used the following criteria:

CODE / STANDARD	2018 CT SBC / 2015 Int'l Building Code / ANSI/TIA-222-G-4 Standard	
LOADING CASES	*Full Wind*:	134 Mph Ultimate gust [equiv. 104 Mph (3-sec gust)] w/No Radial Ice**
	Iced Case:	50 Mph + 1.0" Radial Ice
	Service:	60 Mph
	Seismic:	S_s = 0.175 / S_1 = 0.064 / Site Class: D – Stiff Soil
STRUCTURE CRITERIA	*Risk Category (Structural Class)*: 3	
	Exposure Category: 'B' – *Topographic Category*: 5 - Hill – Crest Height 275ft	

Appurtenances Configuration

The following appurtenances configuration is denoted by Table 1:

Table 1: Appurtenances Configuration Considered

Elev. (ft) C.L.	Sector	Position	Ant Qty.	Appurtenance Model	Behind Panel / Location
170.00	Typical All Sectors			12.67 ft. V-Frame Mount (CommScope SFG22-12-4-96)	
170.00		1	1	TPA65R-BU8D Panel Antenna	
170.00		2	1	RRUS-4478 B14 Box	
170.00		2	1	RRUS-32 B30 Box	
170.00		3	1	RRUS-4449 B5/B12 Box	
170.00		3	1	RRUS-8843 B2/B66A Box	
170.00		4	1	DMP65R-BU8DA Panel Antenna	

Notes:

1. **Pipe Mount Positions above are labeled from right to left when looking from the front of the antennas.**
2. **Please refer to Appendix 2 for layout details provided.**
3. **As per 2015 IBC for ultimate 3-sec gust wind speed converted to nominal 3-sec gust wind speed as per Sect. 1609.3.1 as required to be used in ANSI/TIA-222-G Standard per exception 5 of Sect. 1609.1.1.
4. All elevations are measured from tower base.
5. The above appurtenances represent MEI's understanding of the appurtenances configuration. If different than above, the analysis is invalid. Please contact MEI if any discrepancies are found.

4. ANALYSIS PROCEDURE

The subject mount is analyzed for feasibility of the installation of the appurtenances configuration previously noted. The data records furnished were reviewed and a computer stress analysis was performed in accordance with the TIA-222 Standard provisions and with the agreed scope of work terms and the results of this analysis are reported.

Analysis Program

The computer program used to model the structure is STAADPro FEA Program (Connect ver. 22), a commercially available general purpose structural finite element program by Bentley Systems, Carlsbad, CA.

Assumptions

This engineering study is based on the theoretical capacity of the structural members and the available connections data and is not a condition assessment. This analysis is based on information available or obtained, and therefore, its results are based on and as accurate as that data.

- This mount is assumed to have been properly maintained and to be in good condition with no structural defects and with no deterioration to its member capacities.
- The member sizes and configuration are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated.
- The appurtenances configuration is as supplied and/or as stated in the report.
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
- Ring clamps and localized pole shaft or tower legs, as applicable, are not included in this scope.

If any of the above assumptions are not valid or have been made in error, this analysis results may be invalided, MEI should be contacted to review any contradictory information to determine its effect.

5. ANALYSIS RESULTS

The results of the structural stress analysis based on data available and with the previous listed criteria, indicated the following:

[Note: The Wind loading controls over the Seismic loading.]

Table 2: Stress Analysis Results

Support Description	Member Type	Max. Stress Ratio	Pass/Fail	Comments
SIDE SUPPORT / OUTRIGGER FRAME	HORIZONTALS	**97.0%**	**Pass**	End Plate
	BRACING	36.6%	**Pass**	Vertical brace
MAIN SUPPORT FRAME (FACE)	**HORIZONTALS**	73.5%	**Pass**	Top horizontal
	BRACINGS	-	**N/A**	
	PIPE SUPPORTS	42.8%	**Pass**	

Table 3: Mount Service Wind Deflection

	Maximum Value (in)	Comment
MAX. DEFLECTION	0.301	

Notes:

1. The Maximum Stress Ratio is the percentage that the maximum load in the member is relative to the allowable load as determined by Code requirements.
2. Refer to the Appendix 1 for more details on the member loads.
3. A maximum stress ratio between 100% and 105% may be considered as *Acceptable* according to industry standard practice.

6. FINDINGS & RECOMMENDATIONS

- Based on the stress analysis performed, the mount **is in conformance** with the Int'l Building Code / ANSI/TIA **222-G** Standard for the loading considered under the criteria listed and referenced in the report sections.
- ***The subject mount is structurally acceptable to support the appurtenances configuration as noted in Table 1***.
- *Install proposed new mounts as per the manufacturer instructions and locate the antenna support pipe mounts as per the VRG Construction Drawings Ref. #CT5331-LTE4C5G Dated 10/06/2020. Locate the tie-back either onto the outrigger vertical next to Antenna Position 2 or alternately onto the antenna pipe position 1 center between the top and bottom rail. Refer to appendix for details. We recommend that all bolted connections should be tightened as required*

Rigging and temporary supports required for the erection/modification shall be determined, documented, furnished and installed by the erector/contractor accounting for the loads imposed on the structure due to the proposed construction method.

7. REPORT DISCLAIMER

The engineering services rendered by **M**alouf **E**ngineering **I**nternational*,* Inc. *('MEI') in connection with this Structural Analysis are limited to a computer analysis of the structural component. MEI does not analyze the fabrication, including welding and connection capacities, except as included in this Report.*
The analysis performed, and the conclusions contained herein are based on the assumption listed.

Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae. MALOUF ENGINEERING INTERNATIONAL, INC. assumes no obligation to revise any of the information or conclusions contained in this Report in the event that such engineering and analysis procedures and formulae are hereafter modified or revised. In addition, under no circumstances will MALOUF ENGINEERING INTERNATIONAL, INC. have any obligation or responsibility whatsoever for or on account of consequential or incidental damages sustained by any person, firm or organization as a result of any information or conclusions contained in the Report, and the maximum liability of MALOUF ENGINEERING INTERNATIONAL, INC., if any, pursuant to this Report shall be limited to the total funds actually received by MALOUF ENGINEERING INTERNATIONAL, INC. for preparation of this Report.

Customer has requested MALOUF ENGINEERING INTERNATIONAL, INC. to prepare and submit to Customer an engineering analysis with respect to the subject structural component and has further requested MALOUF ENGINEERING INTERNATIONAL, INC. to make appropriate recommendations regarding suggested structural modifications and changes. In making such request of MALOUF ENGINEERING INTERNATIONAL, INC., Customer has informed MALOUF ENGINEERING INTERNATIONAL, INC. that Customer will make a determination as to whether or not to implement any of the changes or modifications which may be suggested by MALOUF ENGINEERING INTERNATIONAL, INC. and that Customer will have any such changes or modifications made by riggers, erectors and other subcontractors of Customer's choice. MALOUF ENGINEERING INTERNATIONAL, INC. shall have the right to rely upon the accuracy of the information supplied by the customer and shall not be held responsible for the Customer's misrepresentation or omission of relevant fact whether intentional or otherwise.

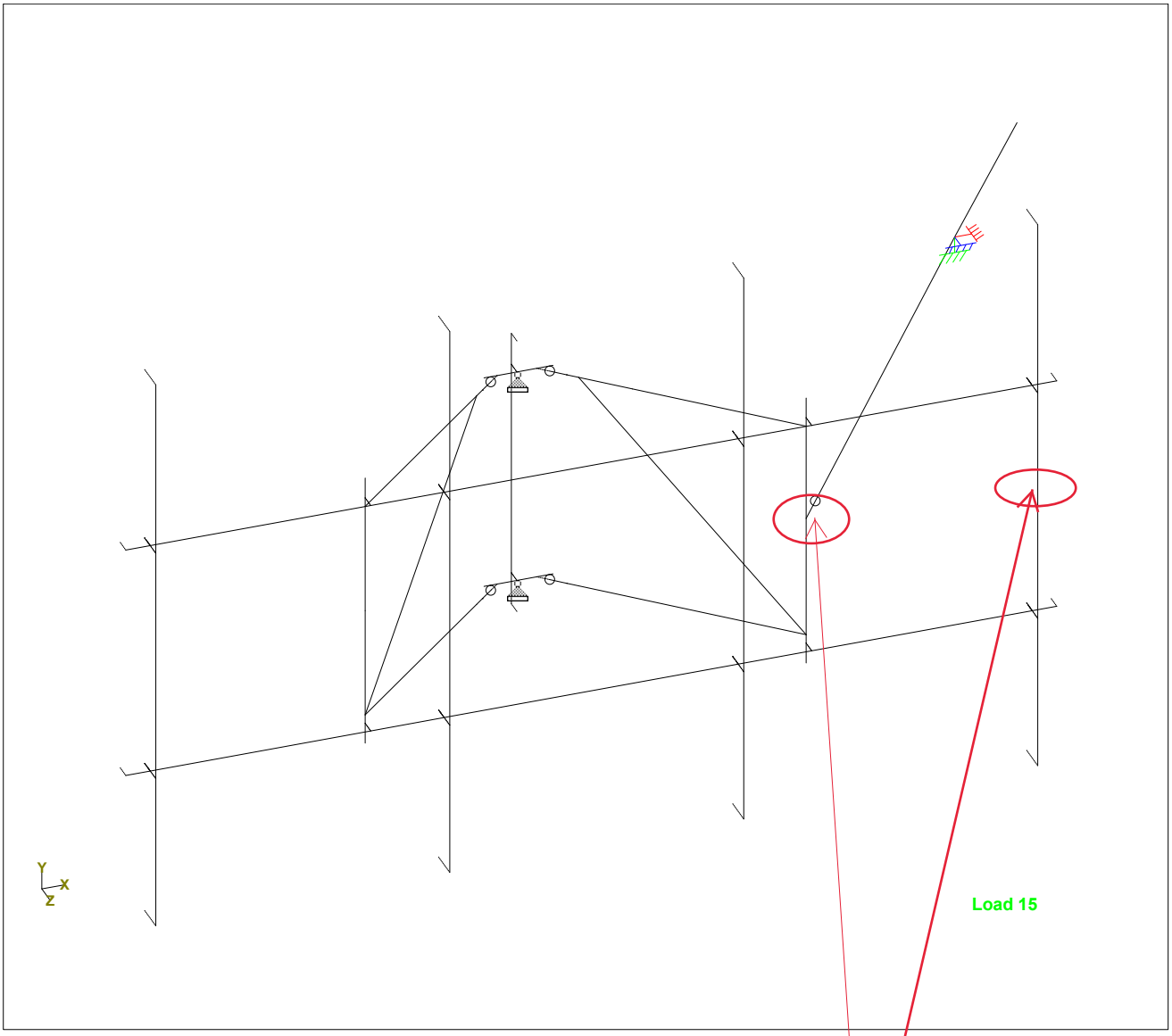
Customer hereby agrees and acknowledges that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than MALOUF ENGINEERING INTERNATIONAL, INC. in connection with the implementation of services including but not limited to any services rendered for Customer or for others by riggers, erectors or other subcontractors. Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer and to others for the quality of work performed by them and that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability or responsibility whatsoever as a result of any negligence or breach of contract by any such rigger, erector or subcontractor and that Customer and rigger, erector, or subcontractor will provide MALOUF ENGINEERING INTERNATIONAL, INC. with a Certificate of Insurance naming MALOUF ENGINEERING INTERNATIONAL, INC. as additional insured.

APPENDIX 1 – FEM ANALYSIS PRINTOUT

Malouf Engineering International Inc.
17950 Preston Rd. Suite 720
Dallas, Texas 75252 / p (972) 783-2575
maloufengineering.com

Software licensed to MEI IT
CONNECTED User: Krishna Manda

Job No	CT00983S-20V	Sheet No	1
Rev			
Part			
Job Title	12.67ft V-Frame Mount (SFG22-12-4-96)/TOLLAND CENTRAL SITE #CT5331	Ref	Ant. CL 170 ft.
By	KM	Date	16-Oct-20
Chd	MDG		
Client	AT&T	File	CT00983S-20V2_12.67ft_
Date/Time	16-Oct-2020 15:29		



Whole Structure w/ Tie Back Recommendation

Locate Tie-back onto the Antenna Pipe Position 1 between top and bottom rail or onto outrigger vertical as shown

MEI project ID # CT00983S-20V2 | Engineer KM | Check MDG | App. MM | Date 10/15/2020

Site Details

Structure classification (T2-1,T2-3)		3	
Exposure type (T2-4)		B	
Topographic Category (T2-5)		5	
County Design Ice thickness		1.00	***in.***
Design wind speed w/o Ice		103.80	***Mph*** *134 Mph (Ult)*
Wind speed w/ Ice		50.00	***Mph*** *Risk 3*
Height of Crest above terrain		275.00	***ft.***

Tolland Central Site #CT5331
FA 10071279

Structure Details

Tower type (1=MNP, 2=SST , 3=GT)		2	
Tower shape (0=Other,3=Tri,4=Rect)		3	
Tower overall height		180.00	***ft.***
Wind direction Factor (T2-2)	**Kd**	0.95	*per TIA-222-G*
Gust Effect Factor	**Gh**	1.00	*per TIA-222-G*
Topographic Factor	**Kzt**	1.27	
Shielding Factor	**Ka**	0.90	

Mount / Platform

Centerline +/-		170.00	***ft.***
Ice Thickness @ Mount height	**tiz**	3.202	***in.***

Note: Wind Forces have NOT been factored. (i.e. 1.6 factor is applied in FEA)

No.	Elev. ft. (C.L.)	Position	Appurtenance Model	Appurtenance Mechanical Properties					Ca (No Ice)		No Ice	*Wind Force (No Ice)*		Iced	Ca (Iced)		*Wind Force (Iced)*	
	170.00		12.67 ft. V-Frame Mount (SFG22-12-4-96)	Ht (in.)	Wd. (in.)	Depth (in.)	Wt. (lb.)	Iced Wt. (lb)	Front	Side	qz*Gh*Ka(psf)	F_N	F_T	qz*Gh*Ka(psf)	Front	Side	F_{Ni}	F_{Ti}
1	170.00	1	TPA65R-BU8D Panel Antenna	96	20.7	7.7	102	864.6	1.30	1.58	34.44	615.5	279.7	7.99	1.26	1.41	193.6	112.9
2	170.00	2	RRUS-4478 B14	15	13.2	7.4	60	190.4	1.20	1.20	34.44	31.9	56.8	7.99	1.20	1.20	19.7	27.9
3	170.00	2	RRUS-32 B30	27.2	12.1	7	60	246.2	1.20	1.26	34.44	57.5	94.5	7.99	1.20	1.20	30.0	41.4
4	170.00	3	RRUS-4449 B5/B12	17.9	13.2	9.5	71	231.2	1.20	1.20	34.44	48.8	67.8	7.99	1.20	1.20	25.7	31.7
5	170.00	3	RRUS-8843 B2/B66A	14.9	13.2	10.9	72	222.3	1.20	1.20	34.44	46.6	56.4	7.99	1.20	1.20	24.6	27.8
6	170.00	4	DMP65R-BU8DA Panel Antenna	96	20.7	7.7	135	897.6	1.30	1.58	34.44	615.5	279.7	7.99	1.26	1.41	193.6	112.9
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30	170.00		12.67 ft. V-Frame Mount (SFG22-12-4-96)								34.44			7.99				

Job Information

	Engineer	Checked	Approved
Name:	KM	MDG	MM
Date:	16-Oct-20	16-Oct-20	16-Oct-20

Project ID	
Project Name	

Comments

12.67ft V-Frame Mount Analysis (SFG22-12-4-96)
TOLLAND CENTRAL SITE #CT5331 / FA #10071279
Checked Per 2018 CT SBC / 2015 IBC / TIA-222-G
134 Mph Ult (Equiv. 104 Mph 3-Sec) / 50 Mph + 1" Ice
60 Mph Service Wind
RISK/CLASS 3 / EXP. "B" / TOPO 5 - Hill - Crest Ht 275ft

Structure Type	SPACE FRAME

Number of Nodes	58	Highest Node	102
Number of Elements	67	Highest Beam	503

Number of Basic Load Cases	-2
Number of Combination Load Cases	55

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	MOUNT DEAD WT.
Primary	2	MOUNT ICED WT.
Primary	3	ANTENNA DEAD LOADS
Primary	4	ANTENNA ICE WEIGHT LOADS
Primary	5	FRONT WIND LOADS
Primary	6	BACK WIND LOADS
Primary	7	SIDE WIND LOADS
Primary	8	FRONT ICED WIND LOADS
Primary	9	BACK ICED WIND LOADS
Primary	10	SIDE ICED WIND LOADS
Primary	11	MAN LV LOAD 1
Primary	12	MAN LV LOAD 2
Primary	13	MAN LM LOAD 1
Primary	14	MAN LM LOAD 2
Combination	15	GENERATED COMBO 1) 0 DEG(1.2D + 1
Combination	16	GENERATED COMBO 1) 30 DEG(1.2D +
Combination	17	GENERATED COMBO 1) 60 DEG(1.2D +
Combination	18	GENERATED COMBO 1) 90 DEG(1.2D +

Job Information Cont...

Type	L/C	Name
Combination	22	GENERATED COMBO 1) 210 DEG(1.2D +
Combination	23	GENERATED COMBO 1) 240 DEG(1.2D +
Combination	24	GENERATED COMBO 1) 270 DEG(1.2D +
Combination	25	GENERATED COMBO 1) 300 DEG(1.2D +
Combination	26	GENERATED COMBO 1) 330 DEG(1.2D +
Combination	27	GENERATED COMBO 2) 0 DEG(0.9D + 1
Combination	28	GENERATED COMBO 2) 30 DEG(0.9D +
Combination	29	GENERATED COMBO 2) 60 DEG(0.9D +
Combination	30	GENERATED COMBO 2) 90 DEG(0.9D +
Combination	31	GENERATED COMBO 2) 120 DEG(0.9D +
Combination	32	GENERATED COMBO 2) 150 DEG(0.9D +
Combination	33	GENERATED COMBO 2) 180 DEG(0.9D +
Combination	34	GENERATED COMBO 2) 210 DEG(0.9D +
Combination	35	GENERATED COMBO 2) 240 DEG(0.9D +
Combination	36	GENERATED COMBO 2) 270 DEG(0.9D +
Combination	37	GENERATED COMBO 2) 300 DEG(0.9D +
Combination	38	GENERATED COMBO 2) 330 DEG(0.9D +
Combination	39	GENERATED COMBO 3) 0 DEG(1.2D + 1
Combination	40	GENERATED COMBO 3) 30 DEG(1.2D +
Combination	41	GENERATED COMBO 3) 60 DEG(1.2D +
Combination	42	GENERATED COMBO 3) 90 DEG(1.2D +
Combination	43	GENERATED COMBO 3) 120 DEG(1.2D +
Combination	44	GENERATED COMBO 3) 150 DEG(1.2D +
Combination	45	GENERATED COMBO 3) 180 DEG(1.2D +
Combination	46	GENERATED COMBO 3) 210 DEG(1.2D +
Combination	47	GENERATED COMBO 3) 240 DEG(1.2D +
Combination	48	GENERATED COMBO 3) 270 DEG(1.2D +
Combination	49	GENERATED COMBO 3) 300 DEG(1.2D +
Combination	50	GENERATED COMBO 3) 330 DEG(1.2D +
Combination	51	MAINTENANCE DEAD LOAD CASE
Combination	52	MAINTENANCE LOAD LM CASE 1 (0 DE(
Combination	53	MAINTENANCE LOAD LM CASE 1 (180 D
Combination	54	MAINTENANCE LOAD LM CASE 2 (0 DE(
Combination	55	MAINTENANCE LOAD LM CASE 2 (180 D
Combination	56	GENERATED COMBO 6) 1.0 MAN 1
Combination	57	GENERATED COMBO 6) 1.0 MAN 2
Combination	58	SERVICE COMBO 7) 0 DEG(1.0D + 1.0 W
Combination	59	SERVICE COMBO 7) 30 DEG(1.0D + 1.0 '
Combination	60	SERVICE COMBO 7) 60 DEG(1.0D + 1.0 '
Combination	61	SERVICE COMBO 7) 90 DEG(1.0D + 1.0 '
Combination	62	SERVICE COMBO 7) 120 DEG(1.0D + 1.0
Combination	63	SERVICE COMBO 7) 150 DEG(1.0D + 1.0
Combination	64	SERVICE COMBO 7) 180 DEG(1.0D + 1.0
Combination	65	SERVICE COMBO 7) 210 DEG(1.0D + 1.0
Combination	66	SERVICE COMBO 7) 240 DEG(1.0D + 1.0

Job Information Cont...

Type	L/C	Name
Combination	67	SERVICE COMBO 7) 270 DEG(1.0D + 1.0
Combination	68	SERVICE COMBO 7) 300 DEG(1.0D + 1.0
Combination	69	SERVICE COMBO 7) 330 DEG(1.0D + 1.0

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	PIPE	1.729	2.409	2.409	4.819	STEEL
2	FB-0.5X6-IN	3.000	0.063	9.000	0.250	STEEL
3	FB-0.375X5-IN	1.875	0.022	3.906	0.088	STEEL
4	PIPE	0.850	0.542	0.542	1.084	STEEL
5	0.75-IN-SR	0.442	0.016	0.016	0.031	STEEL
6	PIPE	0.850	0.542	0.542	1.084	STEEL
7	PIPE	0.850	0.542	0.542	1.084	STEEL
8	PIPS20	1.020	0.627	0.627	1.262	STEEL
9	PIPE	0.850	0.542	0.542	1.084	STEEL

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6E -6
2	STAINLESSSTEEL	28E+3	0.300	0.000	10E -6
3	ALUMINUM	10E+3	0.330	0.000	13E -6
4	CONCRETE	3.15E+3	0.170	0.000	5E -6

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	96	18:GENERATE	**0.334**	-0.083	-0.154	0.377	-0.001	0.006	-0.006
Min X	93	24:GENERATE	**-0.353**	-0.096	-0.089	0.376	-0.000	-0.004	0.006
Max Y	58	39:GENERATE	-0.001	**0.082**	-0.001	0.082	0.001	0.000	0.002
Min Y	81	39:GENERATE	0.022	**-0.453**	-0.184	0.489	-0.001	-0.007	0.005
Max Z	96	21:GENERATE	0.040	0.030	**1.394**	1.395	0.018	-0.032	0.000
Min Z	96	27:GENERATE	-0.016	-0.132	**-1.372**	1.379	-0.017	0.032	-0.001
Max rX	96	21:GENERATE	0.040	0.030	1.394	1.395	**0.018**	-0.032	0.000
Min rX	93	27:GENERATE	0.052	-0.149	-1.261	1.271	**-0.017**	-0.030	0.002
Max rY	72	24:GENERATE	-0.000	-0.012	0.409	0.409	0.001	**0.076**	0.003
Min rY	74	30:GENERATE	0.000	-0.004	0.246	0.246	0.000	**-0.076**	-0.002
Max rZ	72	39:GENERATE	-0.000	-0.053	0.005	0.053	0.005	0.001	**0.013**
Min rZ	75	42:GENERATE	0.000	-0.060	0.158	0.169	0.005	-0.027	**-0.013**

Node Displacement Summary Cont...

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max Rst	96	21:GENERATE	0.040	0.030	1.394	**1.395**	0.018	-0.032	0.000

Reaction Summary

			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	FX (lb)	FY (lb)	FZ (lb)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
Max FX	102	36:GENERATE	**915.439**	20.234	-1.19E+3	-0.008	0.071	-0.005
Min FX	102	18:GENERATE	**-915.447**	27.019	1.19E+3	-0.010	-0.072	-0.013
Max FY	80	39:GENERATE	20.856	**6.16E+3**	-3.83E+3	0.000	0.000	0.000
Min FY	57	39:GENERATE	-12.502	**-1.01E+3**	4.91E+3	0.000	0.000	0.000
Max FZ	57	39:GENERATE	-12.502	-1.01E+3	**4.91E+3**	0.000	0.000	0.000
Min FZ	80	45:GENERATE	11.570	6.1E+3	**-5.02E+3**	0.000	0.000	0.000
Max MX	102	11:MAN LV LO	0.001	-0.016	0.001	**0.003**	0.000	-0.002
Min MX	102	48:GENERATE	340.261	182.909	-422.808	**-0.063**	0.025	-0.061
Max MY	102	36:GENERATE	915.439	20.234	-1.19E+3	-0.008	**0.071**	-0.005
Min MY	102	18:GENERATE	-915.447	27.019	1.19E+3	-0.010	**-0.072**	-0.013
Max MZ	102	6:BACK WIND	8.174	-0.013	-66.252	0.000	-0.005	**0.002**
Min MZ	102	42:GENERATE	-340.306	182.918	422.769	-0.062	-0.030	**-0.063**

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	PIPE	PIPE	0.000	1.000	0.000	SHEAR-Z	15	1.729	2.409	2.409	4.819
2	PIPE	PIPE	0.066	1.000	0.066	LRFD-H1-1B-	45	1.729	2.409	2.409	4.819
3	PIPE	PIPE	0.000	1.000	0.000	SHEAR-Z	15	1.729	2.409	2.409	4.819
4	FB-0.5X6-IN	FB-0.5X6-IN	0.001	1.000	0.001	SHEAR-Z	39	3.000	9.000	0.063	0.250
5	FB-0.5X6-IN	FB-0.5X6-IN	0.090	1.000	0.090	LRFD-H1-1B-	39	3.000	9.000	0.063	0.250
6	FB-0.5X6-IN	FB-0.5X6-IN	0.097	1.000	0.097	LRFD-H1-1B-	48	3.000	9.000	0.063	0.250
7	FB-0.5X6-IN	FB-0.5X6-IN	0.001	1.000	0.001	SHEAR-Z	39	3.000	9.000	0.063	0.250
8	FB-0.5X6-IN	FB-0.5X6-IN	0.001	1.000	0.001	SHEAR-Z	39	3.000	9.000	0.063	0.250
9	FB-0.5X6-IN	FB-0.5X6-IN	0.965	1.000	0.965	LRFD-H1-1B-	45	3.000	9.000	0.063	0.250
10	FB-0.5X6-IN	FB-0.5X6-IN	0.970	1.000	0.970	LRFD-H1-1B-	42	3.000	9.000	0.063	0.250
11	FB-0.5X6-IN	FB-0.5X6-IN	0.001	1.000	0.001	SHEAR-Z	39	3.000	9.000	0.063	0.250
12	FB-0.375X5-	FB-0.375X5-	0.934	1.000	0.934	LRFD-H1-1B-	48	1.875	3.906	0.022	0.088
13	PIPE	PIPE	0.525	1.000	0.525	LRFD-H1-1B-	45	0.850	0.542	0.542	1.084
14	PIPE	PIPE	0.480	1.000	0.480	LRFD-H1-1B-	45	0.850	0.542	0.542	1.084
15	FB-0.375X5-	FB-0.375X5-	0.043	1.000	0.043	LRFD-H1-1B-	42	1.875	3.906	0.022	0.088
16	PIPE	PIPE	0.072	1.000	0.072	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
17	PIPE	PIPE	0.432	1.000	0.432	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
18	FB-0.375X5-	FB-0.375X5-	0.937	1.000	0.937	LRFD-H1-1B-	42	1.875	3.906	0.022	0.088
19	PIPE	PIPE	0.525	1.000	0.525	LRFD-H1-1B-	42	0.850	0.542	0.542	1.084
20	PIPE	PIPE	0.479	1.000	0.479	LRFD-H1-1B-	45	0.850	0.542	0.542	1.084

Utilization Ratio Cont...

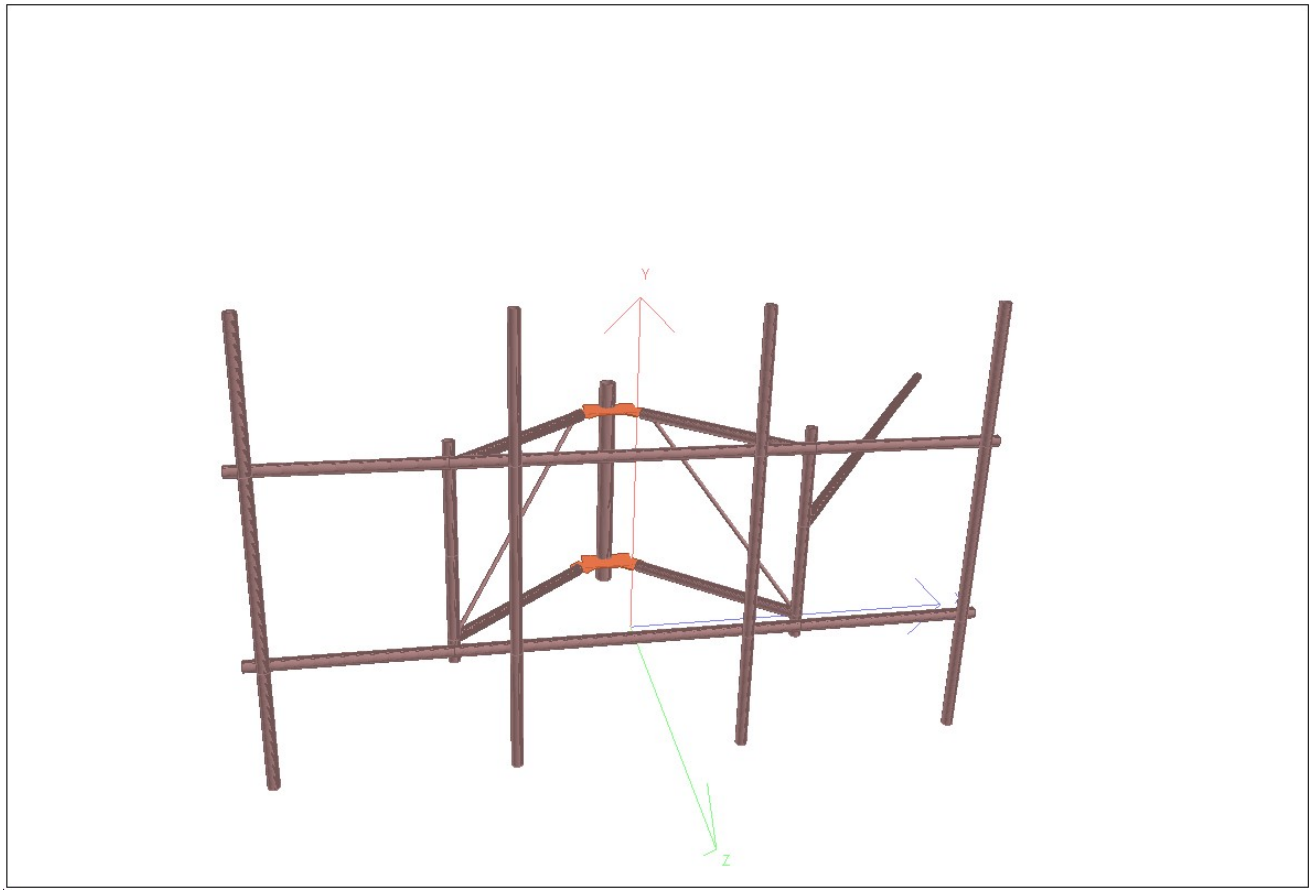
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
21	FB-0.375X5-	FB-0.375X5-	0.047	1.000	0.047	LRFD-H1-1B-	48	1.875	3.906	0.022	0.088
22	PIPE	PIPE	0.071	1.000	0.071	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
23	PIPE	PIPE	0.152	1.000	0.152	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
24	PIPE	PIPE	0.000	1.000	0.000	SHEAR-Z	15	0.850	0.542	0.542	1.084
25	PIPE	PIPE	0.238	1.000	0.238	LRFD-H1-1B-	39	0.850	0.542	0.542	1.084
26	PIPE	PIPE	0.240	1.000	0.240	LRFD-H1-1B-	39	0.850	0.542	0.542	1.084
27	PIPE	PIPE	0.181	1.000	0.181	LRFD-H1-1B-	45	0.850	0.542	0.542	1.084
28	PIPE	PIPE	0.375	1.000	0.375	LRFD-H1-1B-	45	0.850	0.542	0.542	1.084
29	PIPE	PIPE	0.000	1.000	0.000	SHEAR-Z	15	0.850	0.542	0.542	1.084
30	PIPE	PIPE	0.000	1.000	0.000	SHEAR-Z	15	0.850	0.542	0.542	1.084
31	PIPE	PIPE	0.274	1.000	0.274	LRFD-H1-1B-	42	0.850	0.542	0.542	1.084
32	PIPE	PIPE	0.348	1.000	0.348	LRFD-H1-1B-	18	0.850	0.542	0.542	1.084
33	PIPE	PIPE	0.396	1.000	0.396	LRFD-H1-1B-	48	0.850	0.542	0.542	1.084
34	PIPE	PIPE	0.000	1.000	0.000	SHEAR-Z	15	0.850	0.542	0.542	1.084
35	0.75-IN-SR	0.75-IN-SR	0.366	1.000	0.366	LRFD-H1-1A-	39	0.442	0.016	0.016	0.031
36	0.75-IN-SR	0.75-IN-SR	0.360	1.000	0.360	LRFD-H1-1A-	48	0.442	0.016	0.016	0.031
37	PIPE	PIPE	0.055	1.000	0.055	LRFD-H1-1B-	48	0.850	0.542	0.542	1.084
38	PIPE	PIPE	0.077	1.000	0.077	LRFD-H1-1B-	42	0.850	0.542	0.542	1.084
39	PIPS20	PIPS20	0.001	1.000	0.001	SHEAR-Y	39	1.020	0.627	0.627	1.254
40	PIPS20	PIPS20	0.650	1.000	0.650	LRFD-H1-1B-	15	1.020	0.627	0.627	1.254
41	PIPS20	PIPS20	0.260	1.000	0.260	LRFD-H1-1B-	24	1.020	0.627	0.627	1.254
42	PIPS20	PIPS20	0.201	1.000	0.201	LRFD-H1-1B-	18	1.020	0.627	0.627	1.254
43	PIPS20	PIPS20	0.304	1.000	0.304	LRFD-H1-1B-	24	1.020	0.627	0.627	1.254
44	PIPS20	PIPS20	0.648	1.000	0.648	LRFD-H1-1B-	21	1.020	0.627	0.627	1.254
45	PIPS20	PIPS20	0.001	1.000	0.001	SHEAR-Y	39	1.020	0.627	0.627	1.254
46	PIPS20	PIPS20	0.001	1.000	0.001	SHEAR-Y	39	1.020	0.627	0.627	1.254
47	PIPS20	PIPS20	0.735	1.000	0.735	LRFD-H1-1B-	21	1.020	0.627	0.627	1.254
48	PIPS20	PIPS20	0.268	1.000	0.268	LRFD-H1-1B-	21	1.020	0.627	0.627	1.254
49	PIPS20	PIPS20	0.205	1.000	0.205	LRFD-H1-1B-	18	1.020	0.627	0.627	1.254
50	PIPS20	PIPS20	0.320	1.000	0.320	LRFD-H1-1B-	18	1.020	0.627	0.627	1.254
51	PIPS20	PIPS20	0.734	1.000	0.734	LRFD-H1-1B-	15	1.020	0.627	0.627	1.254
52	PIPS20	PIPS20	0.001	1.000	0.001	SHEAR-Y	39	1.020	0.627	0.627	1.254
100	PIPE	PIPE	0.289	1.000	0.289	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
101	PIPE	PIPE	0.404	1.000	0.404	LRFD-H1-1B-	42	0.850	0.542	0.542	1.084
102	PIPE	PIPE	0.427	1.000	0.427	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
200	PIPE	PIPE	0.013	1.000	0.013	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
201	PIPE	PIPE	0.084	1.000	0.084	LRFD-H1-1B-	39	0.850	0.542	0.542	1.084
202	PIPE	PIPE	0.017	1.000	0.017	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
300	PIPE	PIPE	0.013	1.000	0.013	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
301	PIPE	PIPE	0.085	1.000	0.085	LRFD-H1-1B-	39	0.850	0.542	0.542	1.084
302	PIPE	PIPE	0.017	1.000	0.017	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
400	PIPE	PIPE	0.290	1.000	0.290	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
401	PIPE	PIPE	0.417	1.000	0.417	LRFD-H1-1B-	48	0.850	0.542	0.542	1.084
402	PIPE	PIPE	0.428	1.000	0.428	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
403	PIPE	PIPE	0.460	1.000	0.460	LRFD-H1-1B-	21	0.850	0.542	0.542	1.084

Utilization Ratio Cont...

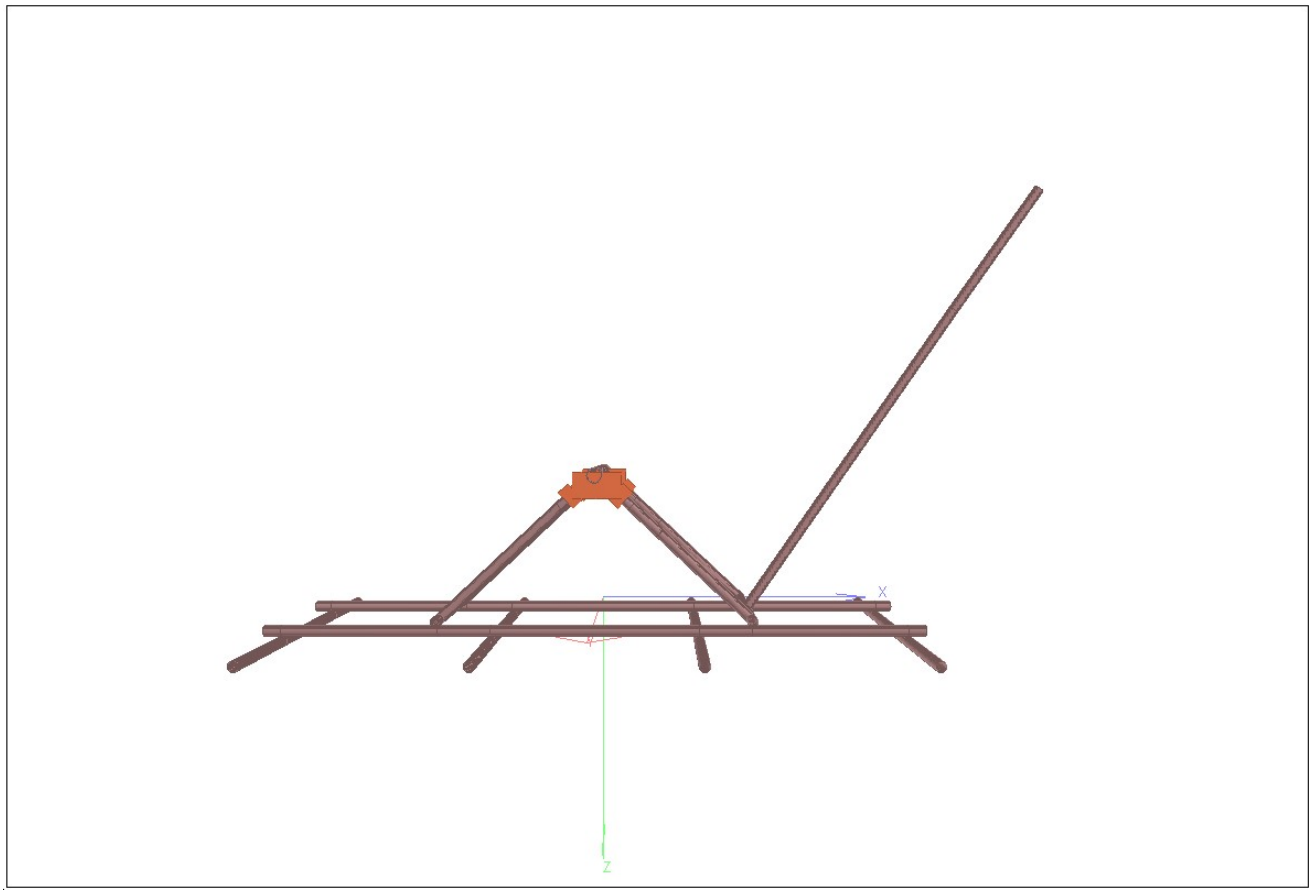
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
404	PIPE	PIPE	0.431	1.000	0.431	LRFD-H1-1B-	15	0.850	0.542	0.542	1.084
503	PIPE	PIPE	0.348	1.000	0.348	LRFD-H1-1B-	18	0.850	0.542	0.542	1.084

Failed Members

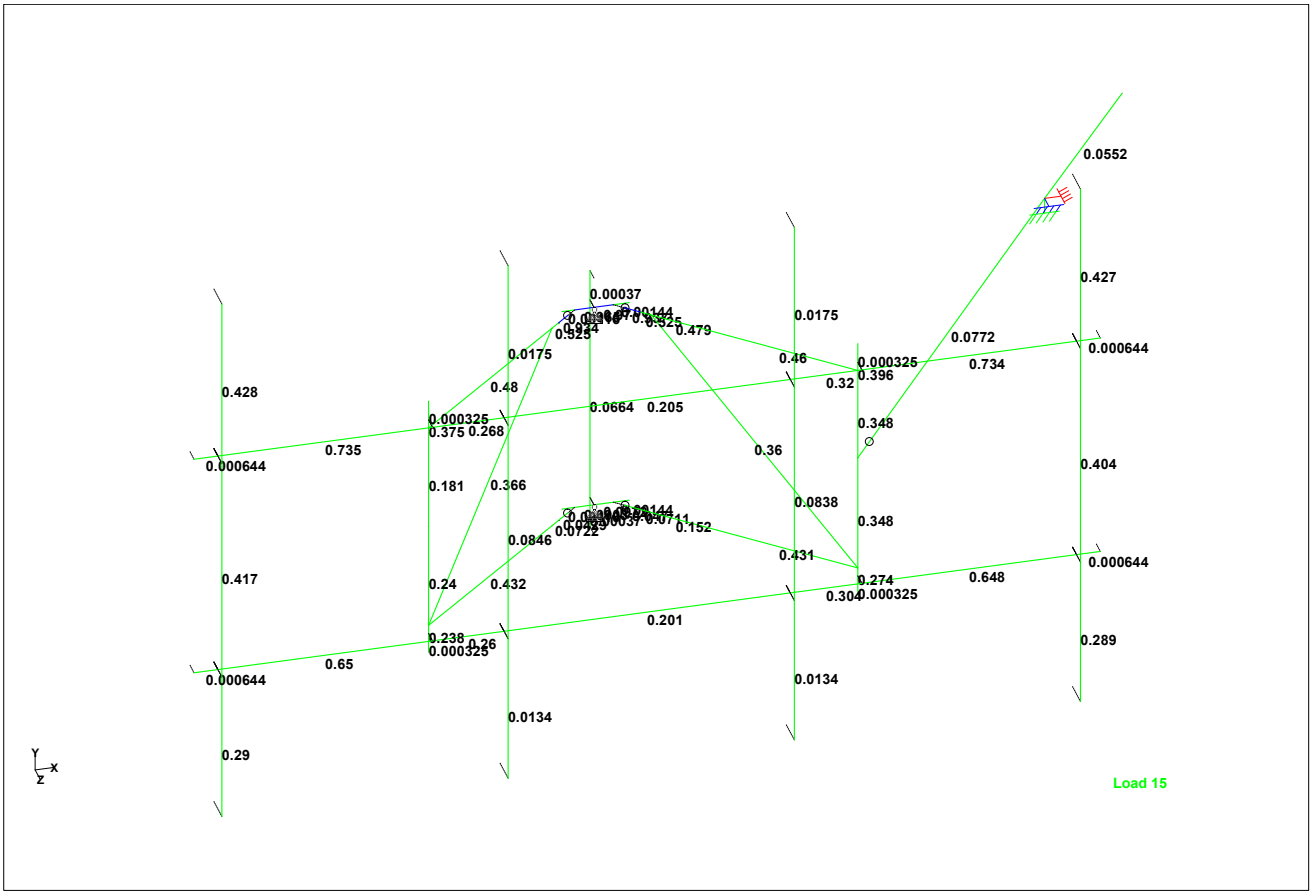
There is no data of this type.



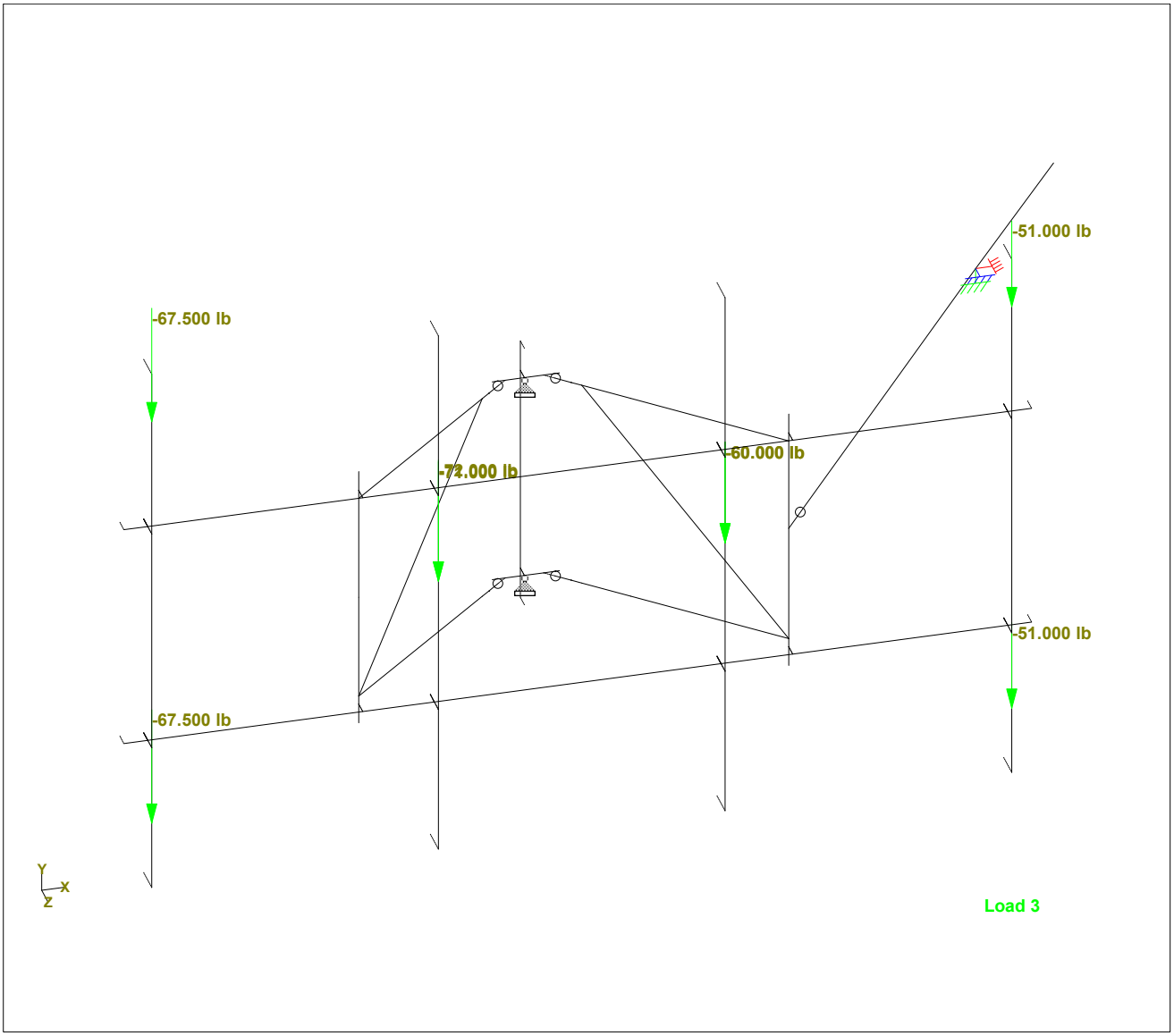
3D Rendered View



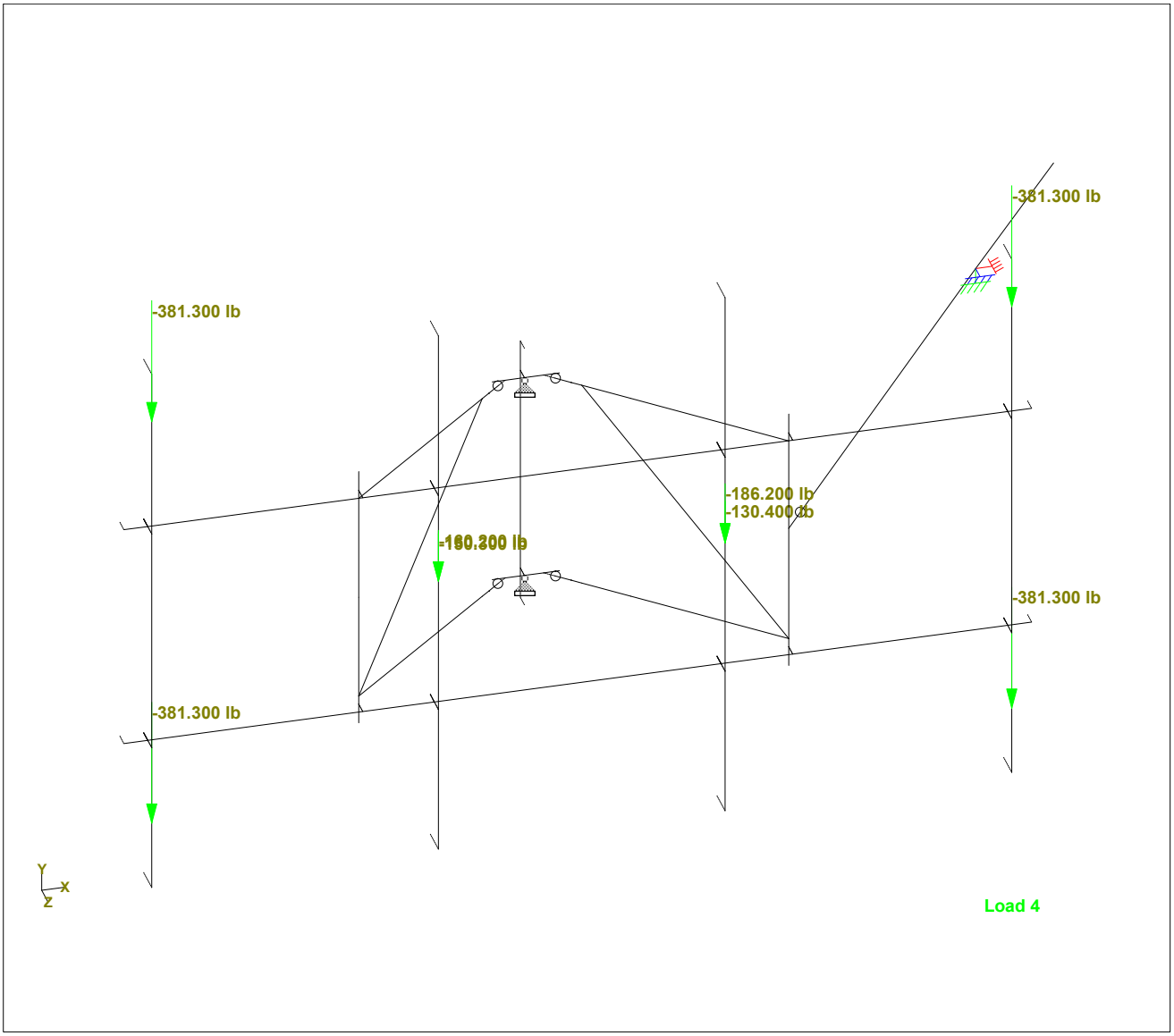
3D Rendered Plan View



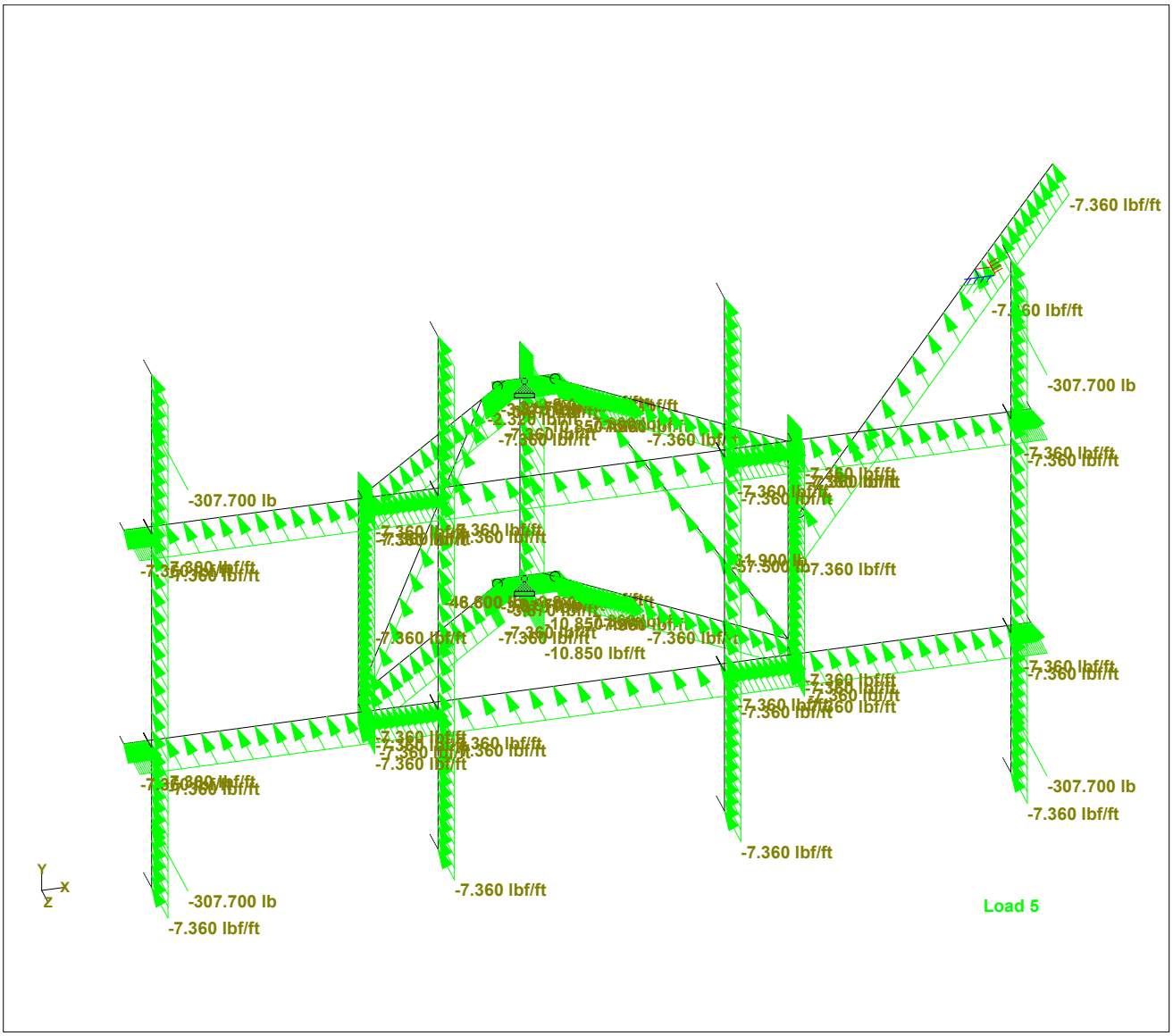
Combined Stress Ratios (Unity Check < 1.05 OK!)



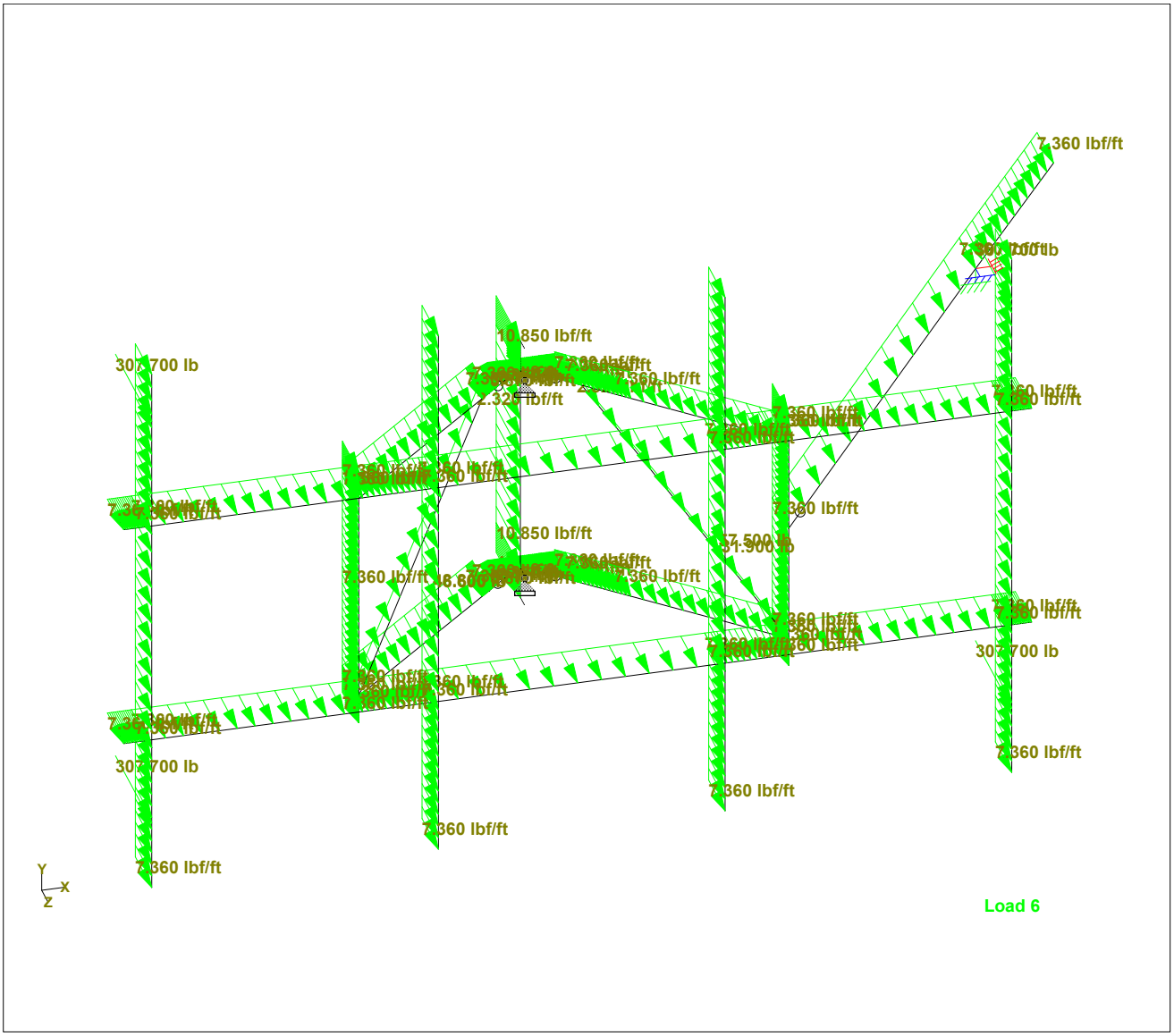
Whole Structure Loads 38.1437lb:1ft 3 ANTENNA DEAD LOADS



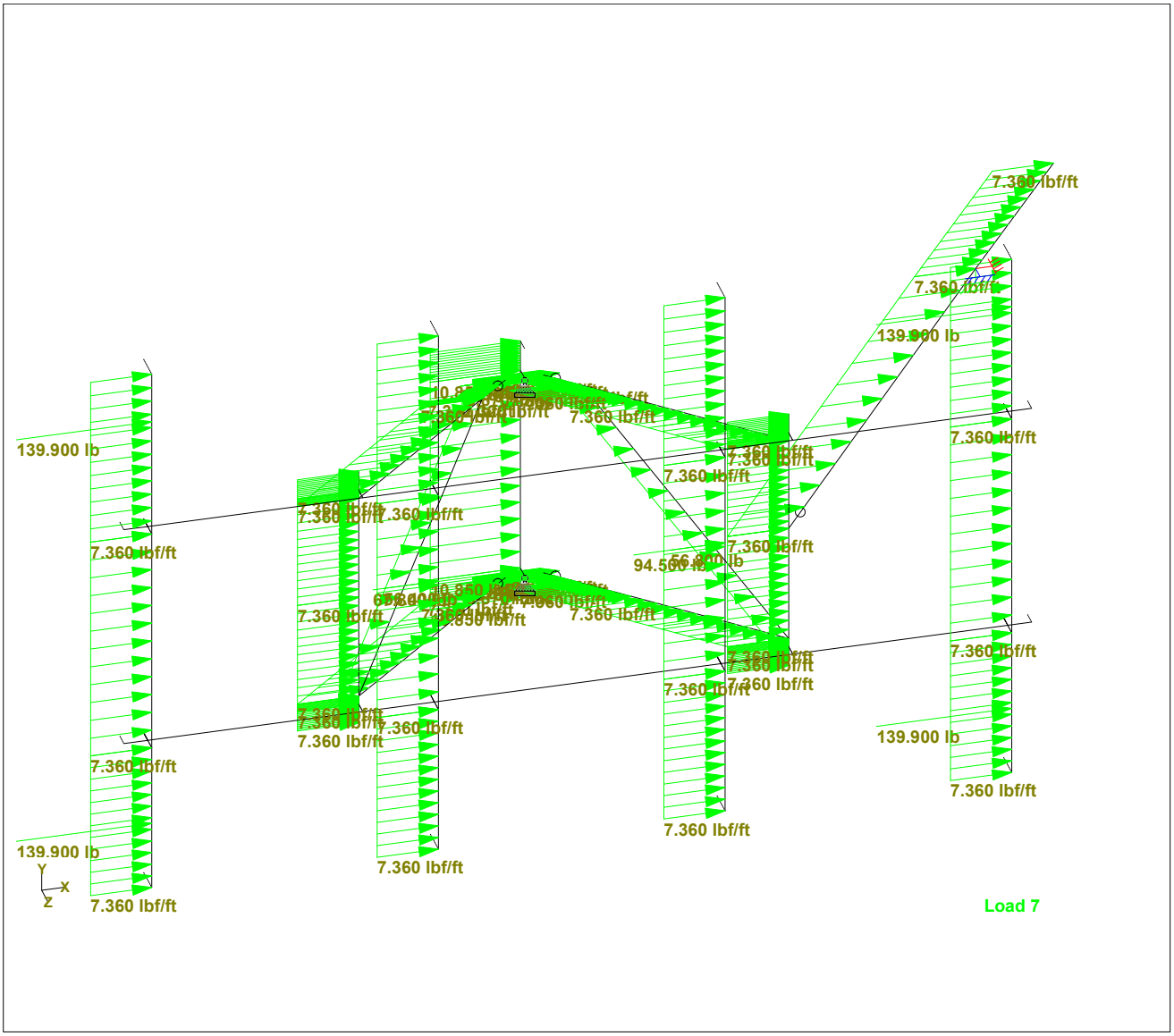
Whole Structure Loads 202.003lb:1ft 4 ANTENNA ICE WEIGHT LOADS



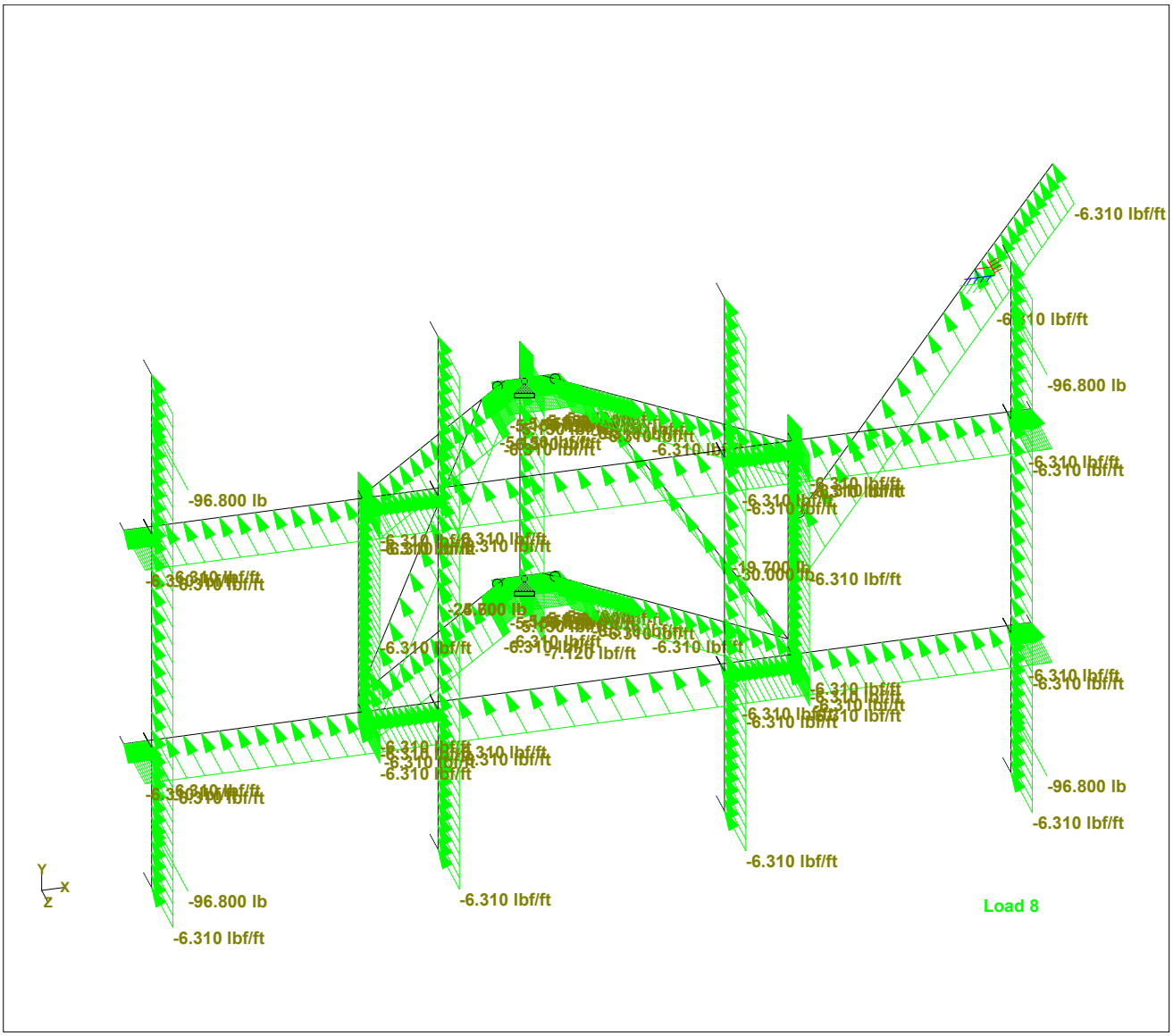
Whole Structure Loads 163.011lb:1ft 5 FRONT WIND LOADS



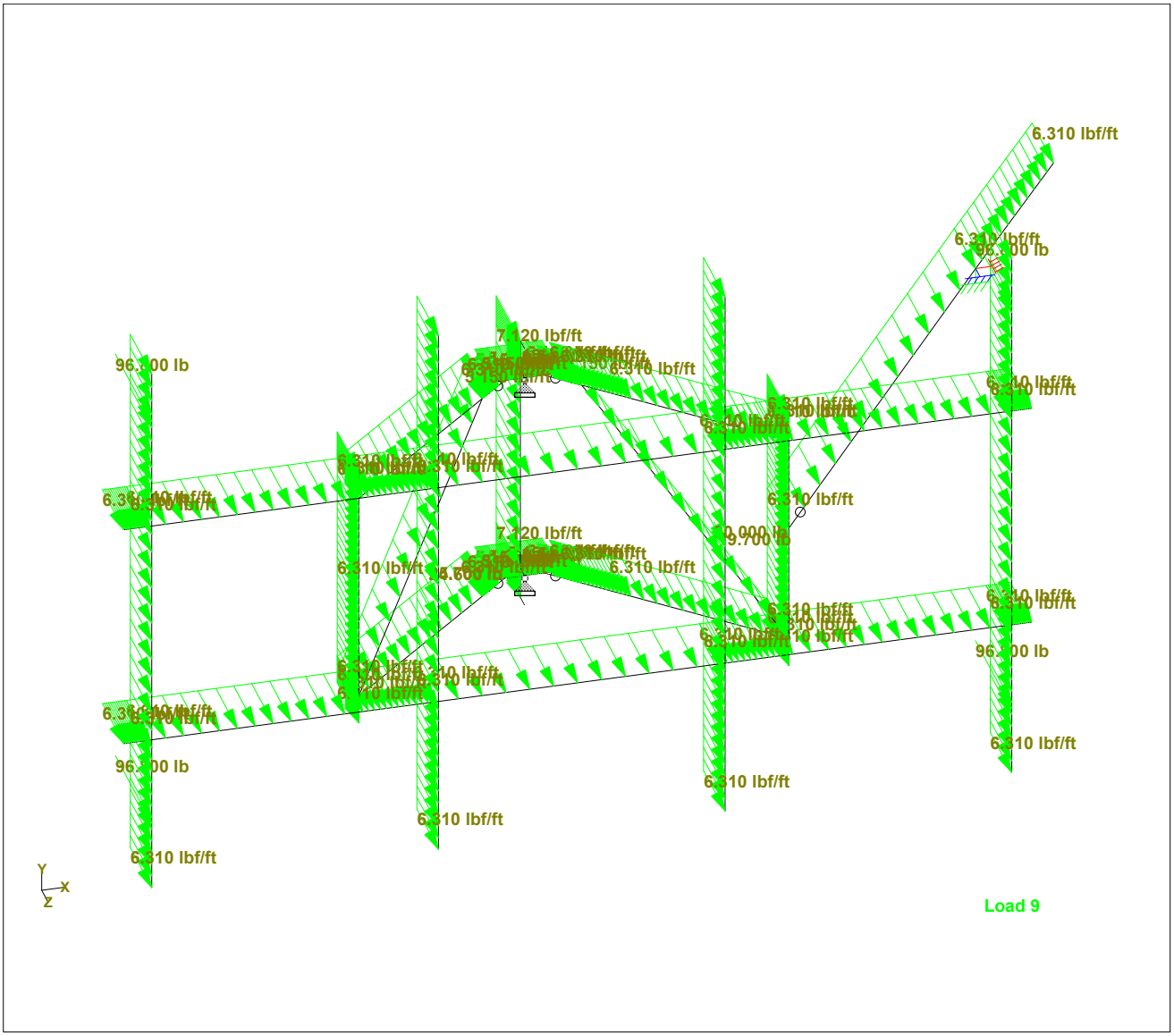
Whole Structure Loads 163.011lb:1ft 6 BACK WIND LOADS



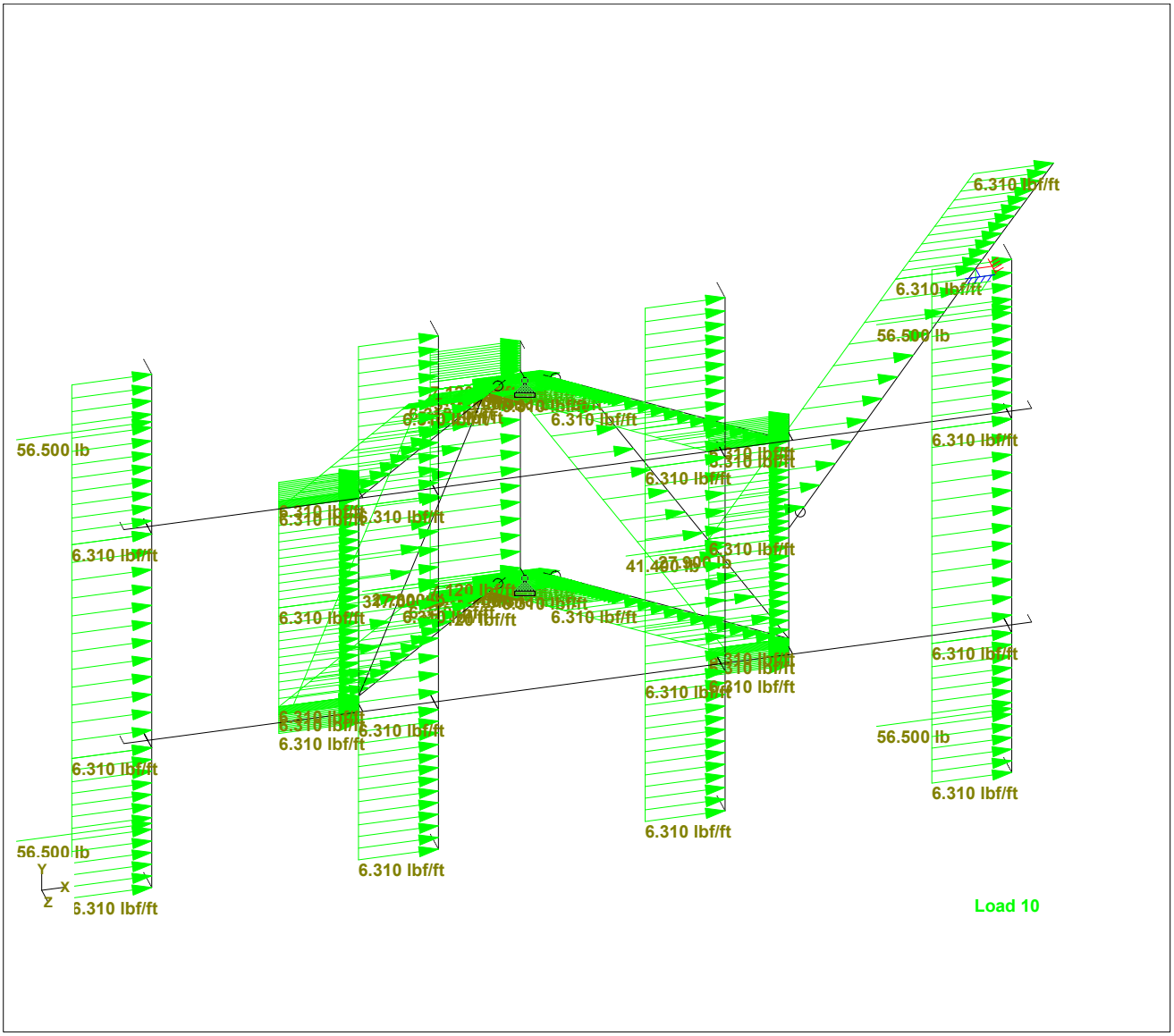
Whole Structure Loads 74.1154lb:1ft 7 SIDE WIND LOADS



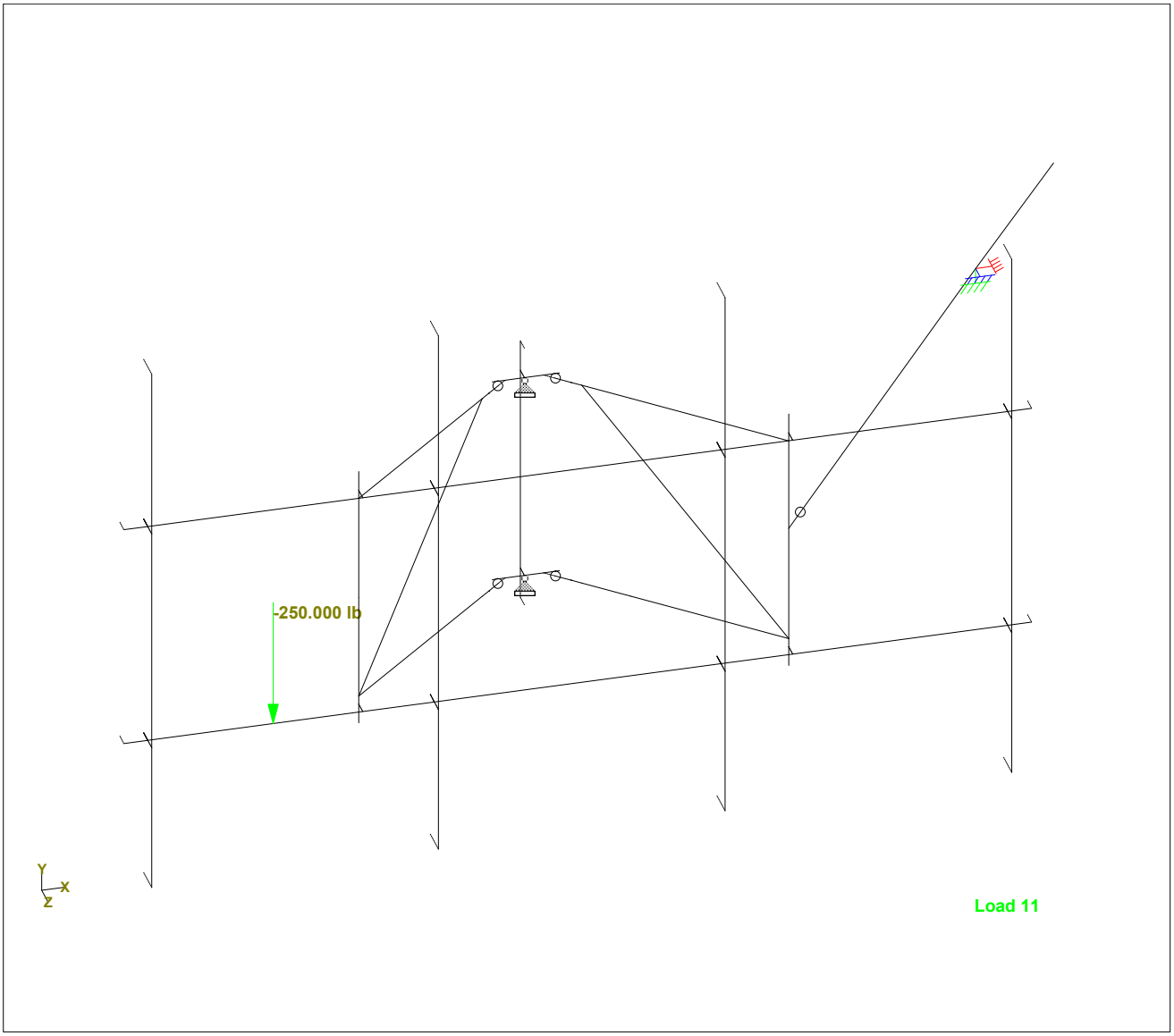
Whole Structure Loads 51.2821lb:1ft 8 FRONT ICED WIND LOADS



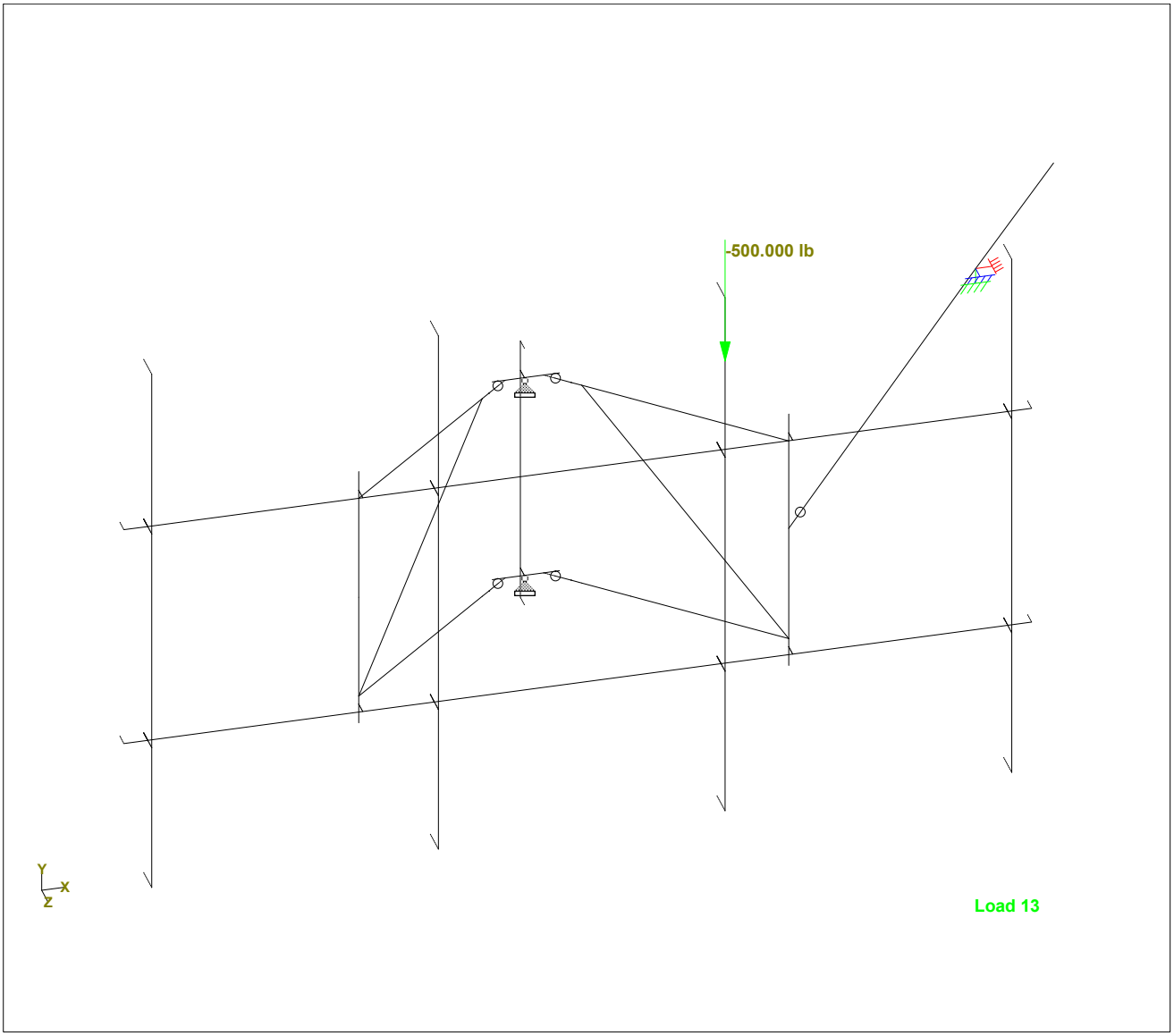
Whole Structure Loads 51.2821lb:1ft 9 BACK ICED WIND LOADS



Whole Structure Loads 29.9322lb:1ft 10 SIDE ICED WIND LOADS



Whole Structure Loads 132.443lb:1ft 11 MAN LV LOAD 1



Whole Structure Loads 264.887lb:1ft 13 MAN LM LOAD 1

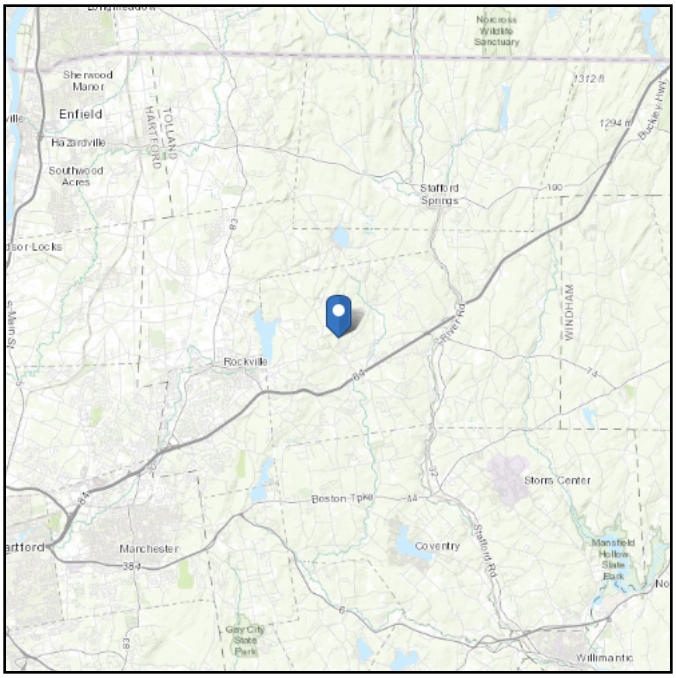
APPENDIX 2 – SOURCE / REFERENCE DOCUMENTS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: III
Soil Class: D - Stiff Soil

Elevation: 959.15 ft (NAVD 88)
Latitude: 41.883092
Longitude: -72.375699



Wind

Results:

Wind Speed:	134 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	101 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1B and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Fri Jul 17 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

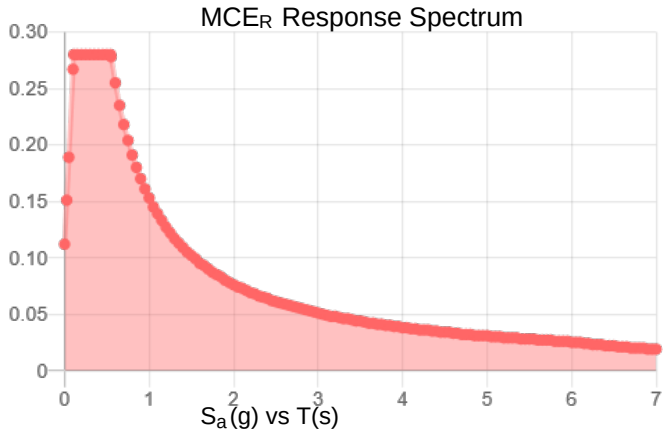
Seismic

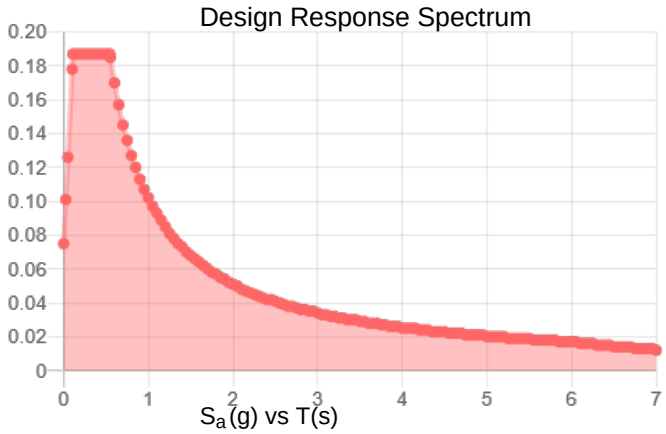
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.175	S_{DS} :	0.187
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.087
S_{MS} :	0.28	PGA_M :	0.139
S_{M1} :	0.153	F_{PGA} :	1.6
		I_e :	1.25

Seismic Design Category B





Data Accessed: Fri Jul 17 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Fri Jul 17 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

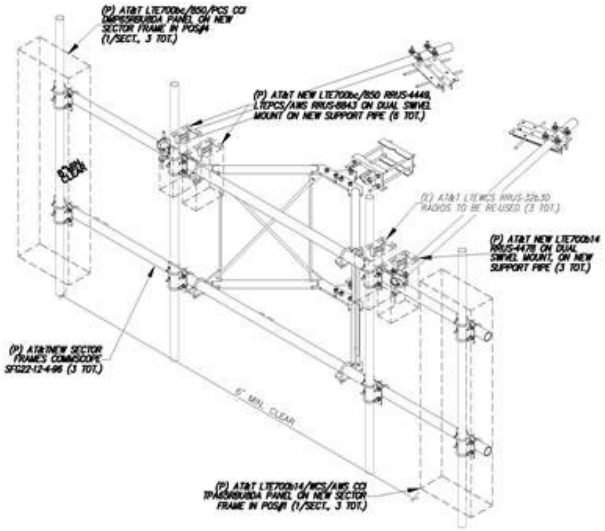
Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

From: Vertical Resources Group <mnobre@verticalresourcesgrp.com>
Sent: Thursday, October 15, 2020 10:00 AM
To: Mark Malouf
Subject: Request AT&T site CT5331 Tolland CT NEW sector frame Analysis
Attachments: CT5331_2021-LTE-Next-Carrier_LTE_SP656B_2051A0VDNK_10071279_25953_03-09-....pdf; COMMSCOPE SFG22HDX ss sector frame.pdf; VRG-MEI PO#14-147 dated 10-15-2020.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Mark, looks like Empire/AT&T will want a mount analysis on the NEW replacement mount Commscope SFG22-12-4-96.
Ive attached the only specs I have on the said frame.

Final/Proposed Loading:
Elev 170' (3) CCI TPA65RBU8D (LTE700b14/WCS/AWS position #1 NEW)
Elev 170' (3) CCI DMP65RBU8DA (LTE700bc/850/PCS position #4 NEW)
Elev 170' (3) Ericsson RRUS-4478b14 mounted on dual swivel mount on backside of pipe mount position #2
Elev 170' (3) Ericsson RRUS-32b30 mounted on dual swivel mount on backside of pipe mount position #2
Elev 170' (3) Ericsson RRUS-4449b5b12 mounted on dual swivel mount on backside of pipe mount position #3
Elev 170' (3) Ericsson RRUS-8843b2b66 mounted on dual swivel mount on backside of pipe mount position #3
Elev 170' (2) DC6-48-60-18-8F (1) DC6-48-60-17-8CEV mounted to tower leg



Miguel Nobre
Vertical Resources Group
23 MidState Dr., #210S
Auburn, MA 01501
P: 508-981-9590
F: 508-519-8939