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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 130 ft Monopole tower to reflect the change in loading by AT&T MOBILITY.

Supporting Documents

Tower:	EI Project #GS52508, dated July 17, 2000 Mapping by ETS Report #162934, dated December 29, 2016
Foundation:	EI Project #7388, dated July 17, 2000
Geotechnical:	CTL Project #00050356, dated June 5, 2000

Analysis

The tower was analyzed using American Tower Corporation’s tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	108 mph (3-second gust)
Basic Wind Speed w/ Ice:	40 mph (3-second gust) w/ 1.00" radial ice concurrent
Code(s):	ANSI/TIA-222-H / 2021 IBC / 2024 Ohio Building Code
Exposure Category:	C
Risk Category:	II
Topographic Factor Procedure:	Method 1
Topographic Category:	1
Spectral Response:	$S_s = 0.12, S_i = 0.06$
Site Class:	D - Stiff Soil - Default

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please reach out to your American Tower contact. If you do not have an American Tower contact and have an Engineering question, please contact Engineering@americantower.com Please include the American Tower asset name, asset number, and engineering number in the subject line for any questions.



09/26/2024

Structure Usages

Structural Component	Usage	Control	Result
Pole Shaft	66.0%	1.2D + 1.0W	Pass
Reinforcement	72.8%	48.95 ft to 76.5 ft	Pass
Upper Termination	40.1%	76.5 ft to 104.41 ft	Pass
Intermediate Connector	26.0%	76.5 ft to 104.41 ft	Pass
Lower Termination	54.8%	48.95 ft to 76.5 ft	Pass
Serviceability Usage	49.0%	1.0D + 1.0W	Pass
Base Plate @ 0.0 ft	58.0%	Rods	Pass
Pier	45.8%	Flexure [Steel]	Pass

Maximum Reactions

Foundation	Moment (k-ft)	Axial (k)	Shear (k)
Monopole Base	1,681.8	30.8	16.9

**Reactions shown reflect the results from the Load Case with maximum Moment*

Structure base reactions were analyzed using available geotechnical and foundation information.



AT&T MOBILITY Final Loading

Elev (ft)	Qty	Equipment	Lines
109.0	1	Platform with Handrails	(2) 0.39" (10mm) Fiber Trunk (4) 0.78" (19.7mm) 8 AWG 6 (1) 0.92" (23.4mm) Cable (6) 1 5/8" Coax (2) 2" conduit (6) 7/8" Coax
	1	Raycap DC6-48-60-18-8C-EV (Enclosure)	
	1	Raycap DC9-48-60-24-8C-EV (Enclosure)	
	3	Ericsson AIR 6472 B77G B77M (77.2lbs)	
	3	Ericsson Radio 4471 B30	
	3	Ericsson Radio 4490HP 44B5 44B12A C (17.5" Height)	
	3	Ericsson Radio 4494 44B14 20B29 M01	
	3	Ericsson Radio 4890HP 48B2/B25 48B66 M01 (68.3lbs)	
	6	Commscope NNH4-65C-R6 (102.1 lbs)	

Install proposed lines inside the pole shaft.

Other Existing/Reserved Loading

Elev (ft)	Qty	Equipment	Lines	Carrier
132.0	1	Commscope RC3DC-3315-PF-48	(2) 1 5/8" Hybriflex (13) 7/8" Coax	VERIZON WIRELESS
	1	Raycap RCMDC-3315-PF-48		
	3	Samsung B2/B66A RRH-BR049		
	3	Samsung B5/B13 RRH-BR04C		
	3	Samsung RT4401-48A		
131.0	1	Unused Reserve (6136.88 sqin)		
130.0	1	Platform with Handrails		
	3	Commscope VVSSP-65S-R1BV2		
	3	Samsung MT6407-77A		
	6	Andrew SBNHH-1D65C		

(If table breaks across pages, please see previous page for data in merged cells)



Standard Conditions

All engineering services performed by ATC Tower Services LLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts, and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of ATC Tower Services LLC

It is the responsibility of the client to ensure that the information provided to ATC Tower Services LLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates, and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and ATC Tower Services LLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. ATC Tower Services LLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

ANALYSIS PARAMETERS

Design Wind: 108 mph	Ice Wind: 40 mph w/ 1.0" ice	Service Wind: 60 mph
Risk Category: II	Exposure: C	S_w: 0.122 S_i: 0.060
Topo Factor: Method 1	Topo Feature:	Topo Category: 1
Structure Height: 130.0 ft	Base Elevation: 0.00 ft	Structure Type: Taper
Base Diameter: 44.00 in	Base Rotation: 0.00°	Taper: 0.2370 (in/ft)

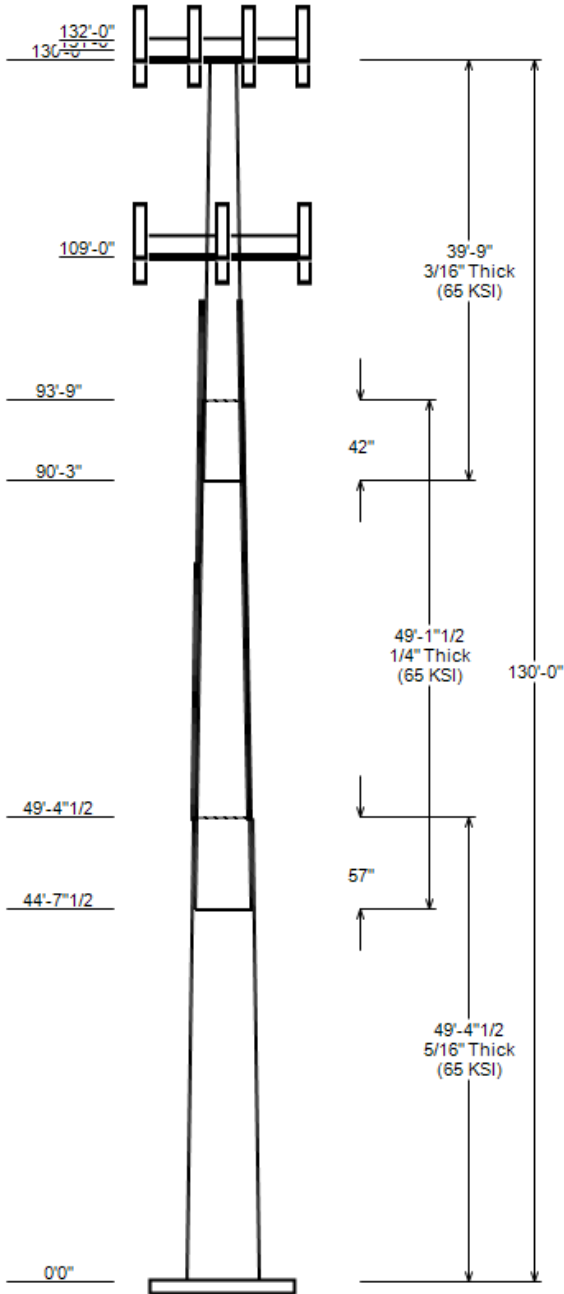
POLE SECTION PROPERTIES

Section	Length (ft)	Flat Diameter (in)		Thick (in)	Joint Type	Joint Length (in)	Pole Shape	Yield Strength (ksi)
		Top	Bottom					
1	49.375	32.27	44.00	0.312		0.00	18 Sides	65
2	49.125	22.23	33.90	0.250	Slip Joint	57.00	18 Sides	65
3	39.750	14.00	23.44	0.188	Slip Joint	42.00	18 Sides	65

DISCRETE APPURTENANCE

LINEAR APPURTENANCE

Elev (ft)	Description	Elev To (ft)	Description
132.0	(3) Samsung RT4401-48A	132.0	(2) 1 5/8" Hybriflex
132.0	(3) Samsung B5/B13 RRH-BR04C	130.0	(13) 7/8" Coax
132.0	(1) Raycap RCMDC-3315-PF-48	109.0	(1) 0.92" (23.4mm) Cable
132.0	(3) Samsung B2/B66A RRH-BR049	109.0	(6) 7/8" Coax
132.0	(1) Commscope RC3DC-3315-PF-48	109.0	(2) 0.39" (10mm) Fiber Trunk
131.0	(1) Unused Reserve (6136.88 sqin)	109.0	(4) 0.78" (19.7mm) 8 AWG 6
130.0	(6) Andrew SBNHH-1D65C	109.0	(6) 1 5/8" Coax
130.0	(3) Commscope VVSSP-65S-R1BV2	109.0	(2) 2" conduit
130.0	(3) Samsung MT6407-77A	106.5	(1) Plate Reinforcement
130.0	(1) Generic Flat Platform with Handrails	106.5	(1) Plate Reinforcement
109.0	(3) Ericsson Radio 4890HP 48B2/B25 48	106.5	(1) Plate Reinforcement
109.0	(6) Commscope NNH4-65C-R6 (102.1 lb		
109.0	(3) Ericsson Radio 4490HP 44B5 44B12		
109.0	(1) Generic Flat Platform with Handrails		
109.0	(3) Ericsson AIR 6472 B77G B77M (77.2		
109.0	(1) Raycap DC9-48-60-24-8C-EV (Encl		
109.0	(3) Ericsson Radio 4471 B30		
109.0	(3) Ericsson Radio 4494 44B14 20B29 M		
109.0	(1) Raycap DC6-48-60-18-8C-EV (Encl		



GLOBAL BASE REACTIONS

Load Case	Moment (kip-ft)	Axial (kip)	Shear (kip)
1.2D + 1.0W	1681.78	30.78	16.86
0.9D + 1.0W	1656.16	23.08	16.84
1.2D + 1.0Di + 1.0Wi	343.24	41.38	3.51
1.2D + 1.0Ev + 1.0Eh	86.90	30.51	0.77
0.9D - 1.0Ev + 1.0Eh	85.40	21.75	0.77
1.0D + 1.0W	460.22	25.68	4.65

ANALYSIS PARAMETERS

Location:	Franklin County,OH	Height:	130 ft
Type and Shape:	Taper, 18 Sides	Base Diameter:	44.00 in
Manufacturer:	EEL	Top Diameter:	14.00 in
K_d (non-service):	0.95	Taper:	0.2370 in/ft
K_e:	0.97	Rotation:	0.000°

ICE & WIND PARAMETERS

Risk Category:	II	Design Wind Speed:	108 mph
Exposure Category:	C	Design Wind Speed w/ Ice:	40 mph
Topo Factor Procedure:	Method 1	Design Ice Thickness:	1.00 in
Topographic Category:	1	Service Wind Speed:	60 mph
Crest Height:	0 ft	HMSL:	929.00 ft

SEISMIC PARAMETERS

Analysis Method:	Equivalent Lateral Force Method		
Site Class:	D - Stiff Soil	Period Based on Rayleigh Method (sec):	2.50
T_L (sec):	12	P:	1
S_{ds}:	0.130	S_{d1}:	0.096
S_s:	0.122	S₁:	0.060
F_a:	1.600	F_v:	2.400
		C_s:	0.030
		C_s Max:	0.030
		C_s Min:	0.030

LOAD CASES

1.2D + 1.0W	108 mph Wind with No Ice
0.9D + 1.0W	108 mph Wind with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	40 mph Wind with 1" Radial Ice
1.2D + 1.0Ev + 1.0Eh	Seismic
0.9D - 1.0Ev + 1.0Eh	Seismic (Reduced DL)
1.0D + 1.0W	60 mph Wind with No Ice