MORRISON HERSHFIELD

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STRUCTURAL ANALYSIS REPORT

Site ID: BIR-H0 / Homewood, AL

100 ft PiRod Self-Supporting Tower

MHC Project 7023003: BS0-034

Presented to:

Mr. Jonathon Lindsey
Cingular
100 Concourse Park Way
Birmingham, AL
35244

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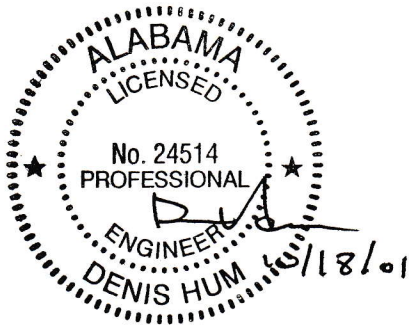

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Revision	Date (M/D/Y)	Engr	Review	Comments
BS0-034	10/18/01	DNA	ARu	Reinforcement Design.

1. Executive Summary

Morrison Hershfield, as requested by Mr. Jonathon Lindsey of Cingular has designed the remedial work required to bring the 100 ft PiRod self-supporting tower described in this report into compliance with the applicable codes. This report includes, but is not limited to, details of the tower, assumptions used in this investigation, structural loading used, stress results, conclusions and recommendations.

Reinforcing design and subsequent structural analysis was done in accordance with the requirements of TIA/EIA-222-F *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures* using using the Jefferson county minimum wind speed of 70 mph with ½" radial ice and for the specified loading. Analysis of the reinforced configuration demonstrates the compliance of the structure.

We have also analyzed the tower foundation based on the assumptions in Section 3 of this report and found it to be adequate to support the loads without additional reinforcing.

2. Tower Information

Tower Details

Site Name	**BIR-H0 Homewood**
Location	2727 19th Place, Homewood, AL / Jefferson County (Lat 33-28-54.93, Long 86-47-16.92)
Tower Description	100 ft Face width at base = 4.0 ft.
Original Fabricator / Date of Installation	PiRod /1967
Original Design Loading	EIA-RS-222-C, 70 psf.
Current Standard and Loading	TIA/EIA-222-F, 70 mph wind speed and ½" ice.
Tower History	Original tower height is 260 ft and face width at base = 7.5 ft.

Material Grade Information

Legs	Solid rounds. 50 ksi yield strength.
Diagonals	Solid rounds. 36 ksi yield strength.
Horizontals	Solid rounds. 36 ksi yield strength.
Member Connections	Diagonal members are welded; legs are bolted.
Anchor Bolts	ASTM A36 ksi (assumed).

Sources of Information for Tower

- Tower drawings by Pi-Rod, Drawing No. SRHS-70-260, dated February 13, 1967, provided by Cingular.
- Antennas and coax based on survey of existing conditions, collocation application sheet, provided by Cingular.
- Foundation drawings by Pi-Rod, Drawing No. SRHS-70-260, dated February 13, 1967, provided by Cingular. Geotechnical Report was not provided, however allowable soil bearing pressure was taken from the foundation drawings by Pi-Rod.

3. Assumptions and Particular Considerations

All results and conclusions derived from this analysis report are as accurate as the information provided to Morrison Hershfield. An independent verification of the information supplied to us has not been made. It is assumed that the tower and foundation have been properly constructed as per the original design drawings and specifications. It is also assumed that the structure has been properly maintained, is in good condition and is capable of carrying the full design loading. Any subsequent modifications to the original tower, where applicable and based on data supplied to Morrison Hershfield, are also assumed to have been properly installed as per design and capable of carrying their full design load. Exceptions to the foregoing are stated explicitly in this report.

The following special assumptions were made in this analysis:

- The coax lines for the antennas at 100 ft are to be equally distributed on the three tower faces.
- The dimensions of the square mat foundation are 10 ft in length and 4.5 ft in depth.

4. Scope of Analysis

Unless noted otherwise, this report is limited to a structural analysis of the tower based on established engineering principles for both structural behavior and member capacities. The analysis is performed using Morrison Hershfield's proprietary software for analysis of self-supporting towers. The software comprises pre- and post processing programs in conjunction with a main processing program, which together implement code provisions based on TIA/EIA and AISC requirements.

The analysis program uses a finite element representation of the self-supporting tower. The three-dimensional model consists of truss elements in a large displacement

formulation. The ensuing non-linear equilibrium equations are solved in an iterative fashion yielding internal tower member forces, incorporating P-delta effects and including the effects of antenna and appurtenance loadings.

5. Antenna Loading Investigated

The following loading was considered for the structural analysis:

Antenna Loads

Elev(ft)	Antenna Description	Carrier	Location	TX-Lines [Face]
	EXISTING			
100.0	(3) DB 855DDH90E-SX panels	0°, 120°, 240°	Cingular	(3) LDF5 [1] (3) LDF5 [2] (3) LDF5 [3]
100.0	(3) Bracket mounts			
91.0	(1) Yagi		Unknown	(1) 1/2" [1]
90.0	(1) 4 ft Dish		Unknown	(1) 1/2" [1]

Notes: Any discrepancies in loading from this listing should be brought to Morrison Hershfield's attention; results of this analysis cannot be used if the loading is different.

6. Analysis Results Summary

Summary results of our structural analysis of the reinforced self-supporting tower are presented below. A listing of the full computer analysis is provided in Appendix A to this report. The results show that when modified in accordance with the drawings in Appendix C, the tower **will be in conformance** with the requirements of the standards given in Section 1 of this report, for a fastest mile wind speed of 70 mph with ½" radial ice and for the specified loading.

Original foundation design loads were not available to MH. We have analyzed mat foundation of the tower based on assumptions in Section 3. This analysis shows that the foundation **is capable** of supporting reactions due to existing loads. It is noted that the foundation is almost at capacity in terms of soil bearing pressure and, therefore, the assumptions with regard to antennas, mounts and line locations given in Sections 3 and 5 of this report are critical.

Maximum Tower Response

Tower Member	Results
Legs	SRmax= 0.80 (20 ft - 22 ft) -> Compr.
Diagonals	SRmax= 0.72 (90 ft - 92 ft) -> Compr.
Horizontals	SRmax= 0.94 (60 ft - 62 ft) -> Compr.

SR= Stress ratio, should be less than 1.00.

Foundation Loads Comparison

Load	Original Design	Current Analysis	Ratio to Original
Compression (kip)	N/A	62.1	--
Uplift (kip)	N/A	56.7	--
Shear (kip)	N/A	2.3	--

N/A – Data not available.

7. Conclusions

Our analysis of the reinforced tower demonstrates that when modified as recommended the existing antennas installations will be fully compliant to the requirements of the codes listed in the previous sections of this report.

We trust that this report is satisfactory. If you have any questions, please feel free to contact our office.