



MOTOROLA

December 4, 2009

Collin County Sheriff Office
Attn: Major Pam Palmisano
4300 Community Ave.
McKinney, Texas

Major Palmisano,

Please find below a brief Statement of Work and pricing information for the remediation of the Wilmeth road tower. This work is required to strengthen and bring the tower to code to allow for the inclusion of any additional antennas systems and dishes as outlined in our meeting of December 3rd.

This Statement of Work is based on the loading and tower configuration from the CFE Tower Analysis dated 11-19-09 Rev 2. This work would be done in conjunction with AeroSolutions who is a recognized leader in the tower remediation field.

Remediation of the tower legs 0' to 150' including:

P.E. sealed optimized engineering design of self support tower upgrade
Preliminary engineering
Furnish materials and install 6000-psi grout in the tower legs from 0' – 150'
Furnish and install 2' STD redundant diagonal steel pipe from 0' – 30'
Furnish and install 1.5" XS redundant diagonal steel pipe from 30' – 90'
Furnish and install new 1.5" SX redundant diagonal steel pipe from 60' – 90'
Furnish and install new 1.5" STD redundant diagonal steel pipe from 90' – 110'
P.E. sealed close-out documentation

Total Remediation Cost \$73,465.00

Should you require additional information or have any questions, please do not hesitate to contact me at 972-977-8022.

Regards,

Becky Smartt
Motorola, Inc.



CFE TELECOM
907 West 5th Street, Suite 250
Austin, Texas 78703
PO Box 1528
Austin, Texas 78767-1528
P: 512.495.9470
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November 19, 2009

Robert Brown
Motorola
1507 LBJ Fwy, Suite 700
Farmers Branch, TX 75234
P: (972) 467-0075

Tower Analysis Summary

Motorola – City of McKinney – Wilmeth SST

Dear Robert Brown:

The following is a high level summary of the previous tower analysis performed on this tower and the current tower analysis findings.

The tower analyses reviewed are as follows:

- 2000 Tower Analysis by Malouf Engineering, Inc prepared for Trott Communications/Collin County
- 2004-5 Tower Analysis by CSI for Prepared for Motorola/Colin County in 2004-5.
- Current Tower Analysis by CFE prepared for Motorola/City of McKinney in 2009.

2000 Tower Analysis

The 2000 tower analysis analyzed existing and proposed loads and recommended that 10 bays of leg members and 2 bays of diagonal members on the tower be remediated. The proposed remediation in three bays located in the 0' to 150' portion of the tower were installed incorrectly. This was confirmed via email by Malouf Engineering.

Additionally, the analysis stated the tower foundation had adequate capacity for the loads at that time. This was based on the assumption that there are (18) #8 vertical bars in the foundation.

2004-5 Tower Analysis

The 2003 tower analysis analyzed existing and proposed loads and recommended that additional bracing be added from 283' to 290'. This analysis assumed that the tower modifications recommended in the 2000 report were installed correctly and adequately remediated the tower legs.

The analysis stated the tower foundation had adequate capacity for the loads at that time based on a comparison to the 2000 Tower Analysis results.

Current Tower Analysis

The current tower analysis dated November 19, 2009, prepared by CFE Telecom, analyzes the existing and proposed loads based on the configuration of the tower as determined after field investigation and review of previous tower analyses. The result of this analysis is that the legs from 0' to 150' do not have the design capacity to support the loads and require remediation. This is largely due to the fact the previous remediation was installed incorrectly and even if it was installed correctly it would cause other diagonal members of the tower to fail and require remediation.



The tower foundation capacity has been analyzed for the current load making reasonable assumptions on the reinforcement steel in the foundation (the original tower foundation design has a hole-punch where the number of vertical reinforcement was listed and the size of the reinforcement is unclear). Our best interpretation is that (18) #6 vertical bars are in the foundation. This analysis indicates the vertical reinforcement in the tower is insufficient to meet the design criteria for moment in the foundation and requires remediation. This reinforcement could be further investigated to determine its exact nature.

Sincerely,

A handwritten signature in black ink, appearing to read 'Dale Shumaker', written over a horizontal line.

Dale Shumaker, PE

Attachments:

2000 Tower Analysis
2004-5 Tower Analysis
Current Tower Analysis



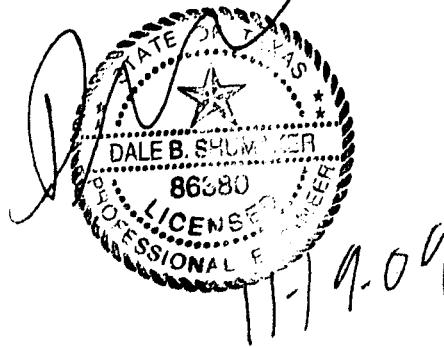
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November 19, 2009

Structural Analysis of an Existing 400-ft Self Support Tower
Motorola - McKinney, TX - Wilmeth Tower - Revision 2 (4165.004-04)
Structural Analysis

Prepared for

Motorola - McKinney, TX



Dale B. Shumaker, P.E.



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November 19, 2009

Structural Analysis of an Existing 400-ft Self Support Tower

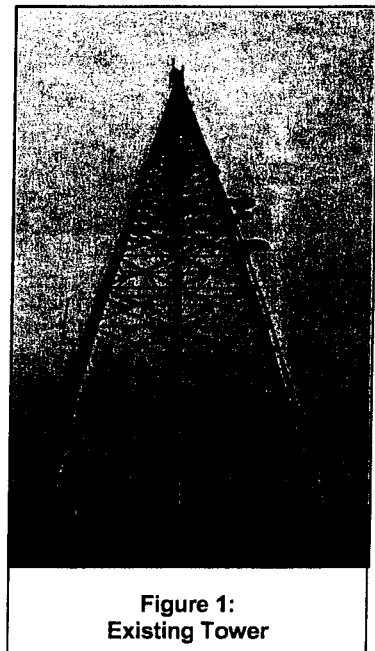
Motorola - McKinney, TX - Wilmeth Tower - Revision 2 (4165.004-04)
Structural Analysis

This letter is to report to you the results of CFE's structural analysis of the existing 400-ft self support tower at the above-referenced site. The analysis considers the existing tower including the proposed Motorola appurtenances. For a summary of the tower structure as modeled and a list of the appurtenances analyzed, refer to the attached elevation drawing.

Information Used by CFE

Tower Elevation Drawing

A tower elevation drawing prepared by Communication Services Inc, CSI Job #DAL04s089, dated June 1, 2004, was used as the main source of information regarding the tower's member sizes, their configuration, and their ASTM steel designations. This report was supplemented by CSI report DAL05s039, dated March 14, 2005 as well as the Structural Analysis Report number 00-273 prepared by Malouf Engineering Intl., Inc, dated April 13, 2000. The supplemental reports were used to confirm the grade of steel used in the tower as well as the design of the different remediations on the tower.



**Figure 1:
Existing Tower**

Tower Mapping Report

A tower mapping report prepared by CFE, dated July 29, 2009, was used as the supplementary source of information regarding the tower modifications, their configuration, and the existing appurtenances and coax layout.

Tower Foundation Information

The original tower foundation report prepared by UNR-ROHN file number 21087AE, dated May 16, 1986, was used as the main source of information regarding the tower's caisson foundation. This was supplemented with the geotechnical report prepared by Southwestern Laboratories, Inc report number 86-339, dated July 23, 1986, was used as the main source of information about the soil conditions.



Appurtenance Information

The appurtenance information received in emails from Bill Burks, dated August 31, 2009 and on October 6, 2009, was used as the main source of information regarding the proposed appurtenances' size, quantity, and location on the tower.

CFE's Structural Analysis

Approach

1. The analysis of the tower is intended to assess its adequacy to support the existing and proposed appurtenance loading per TIA/EIA-222-F requirements. The tower was analyzed using the finite element computer program "TOWER." The program, by Power Line System Inc., is widely regarded for its accuracy. A secondary analysis was run on the tower using the finite element computer program "RISA Tower." A nonlinear analysis was used to account for the second order geometric effects due to the displacements. The results of the analysis by RISA Tower are attached to this report.
2. For the analysis in PLS TOWER, nine load cases have been considered. Load cases 1A, 1B, and 1C consider an operational scenario with a basic wind speed of 50 mph. Load cases 2A, 2B, and 2C correspond to a scenario with a basic wind speed of 70 mph. Load cases 3A, 3B, and 3C consider a scenario which includes 1/2-inch of radial ice and a 60.6 mph wind.
3. Each load case has been performed applying the wind in three different directions with respect to the tower, i.e. perpendicular to a face (A), perpendicular to an apex (B), and parallel to the same face (C).
4. For the analysis in RISA Tower, three wind scenarios have been considered. Scenario one considers an operational scenario with a basic wind speed of 50 mph. Scenario two corresponds to a basic wind speed of 70 mph. Scenario three includes 1/2-inch of radial ice and a 60.6-mph wind.
5. These three wind speed scenarios are then combined with wind directions of 0, 45, 90, 135, 180, 225, 270, and 315 degrees to create 24 load cases. The final three load cases have no wind but include the dead load only, the dead and ice load, and the temperature effects.
6. The dead load and effective wind area were increased to account for redundant members not modeled in the structural analysis in both RISA Tower and PLS TOWER.

Assumptions

1. All tower steel legs, horizontals, and diagonals meet ASTM A572 grade 50 or A36 standards. Refer to the elevation drawing for more information.
2. All bolts meet ASTM A325 standards. Refer to the elevation drawing for more information.
3. All members and components are in good condition, properly assembled, and free of defects that would affect their capacities.
4. Any bolted or welded connection is adequate to develop the full capacity of the members joined and can transfer all the loads analyzed herein.
5. All bolted connections are adequately tightened.
6. All antenna mounts and other supporting mechanisms are capable of supporting the loads applied to them.



7. The tower base foundations are adequate to support the loads applied to them.
8. All coaxial cables are properly secured and supported along the face of the tower. Refer to the elevation drawing for information on coaxial cable location.

Findings and Conclusions

The results of the structural analysis in both TOWER by PLS as well as RISA Tower resulted in similar results in the structural performance of the tower, therefore the results of the RISA Tower analysis are presented.

The results of the structural analysis of the existing tower indicate that the maximum stressed tower member is at 205% of its design capacity. Therefore, **the existing tower does NOT have the design capacity to support the existing and proposed loading** per the minimum requirements of TIA/EIA-222-F, for load cases applicable in Collin County, Texas.

The tower has overstressed leg members at 3 bay locations (30'-60', 90'-110', and 130'-150') and redundant horizontal and diagonal members between 0' and 110'.

The foundation reactions from CFE's structural analysis were found to be greater than those from the original design. Based on the geotechnical and foundation information provided, CFE performed an analysis on the existing foundation system to verify its capacity.

The design capacity of the tower base was found to be less than the reactions from CFE's structural analysis. Therefore, **the foundation system does not have the design capacity to support the existing and proposed loading** per the minimum requirements of TIA/EIA-222-F. This finding is valid based on the assumptions previously listed.

Limitations

This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower nor its foundation. If there are any modifications made to the appurtenance loading provided by the client, CFE should be notified immediately.

All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard of care of our profession. No other warranty or guarantee, expressed or implied, is offered.

If you have any questions or if you need additional information, please do not hesitate to contact us.

Attachments *E-1 : Elevation*
 E-7 : Feedline Plan
 E-7.1 : Feedline Distribution Chart
 E-8 : Stress Distribution Chart

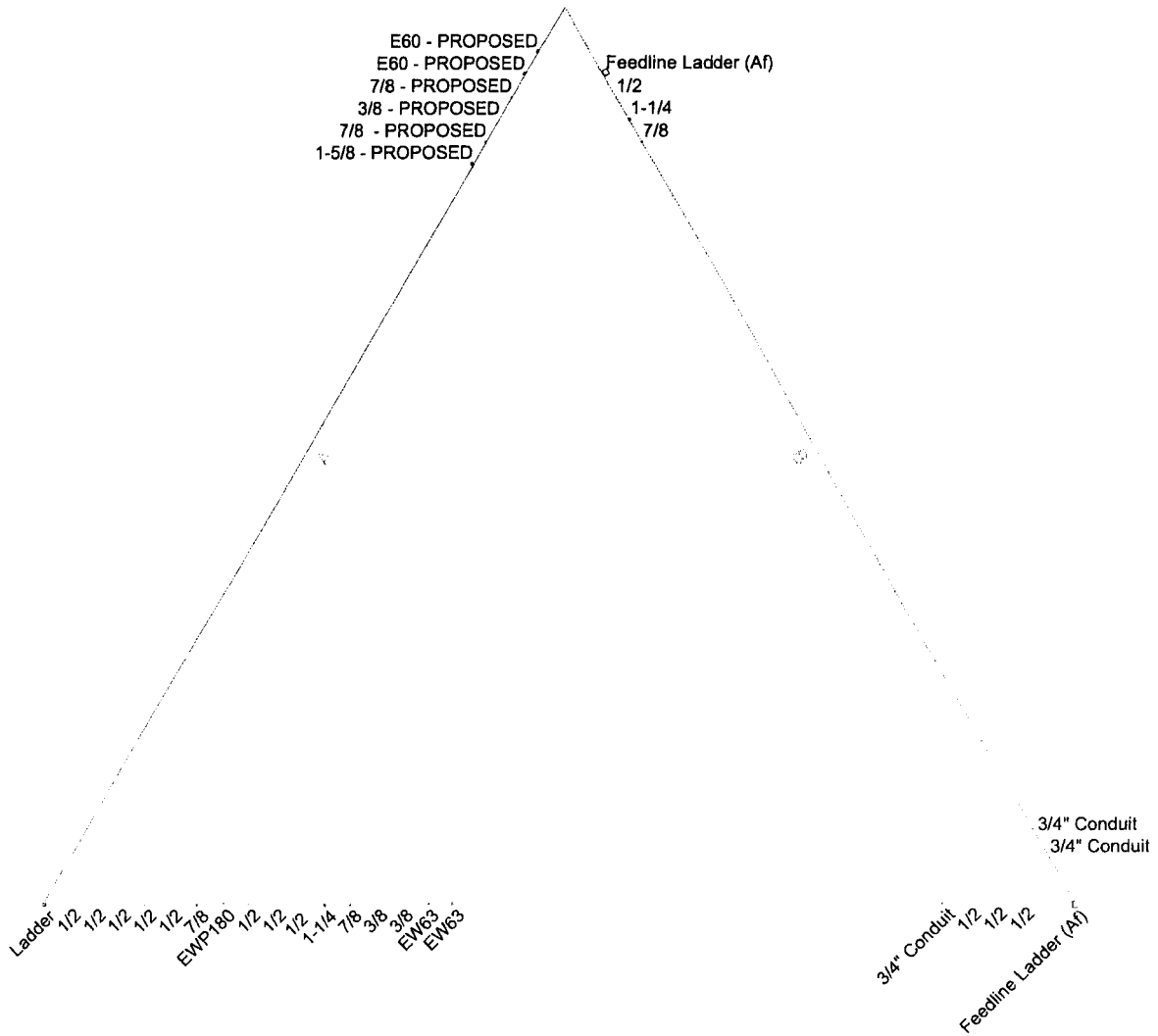
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290.0 ft
283.3 ft
270.0 ft
250.0 ft
230.0 ft
210.0 ft
190.0 ft
170.0 ft
150.0 ft
30.0 ft
10.0 ft
90.0 ft
50.0 ft
30.0 ft
0.0 ft



 CFE TBPE #7726	CFE Telecom 907 West 5th Street, Suite 250 Austin, TX 78703 Phone: (512) 495-9470 FAX: (512) 495-9473		Job Wilmeth Tower Project McKinney, TX Client Motorola Drawn by mwilson App'd Code TIA/EIA-222-F Date 11/19/09 Scale NT Path _____ Dwg No. E		

Feedline Plan

Round _____ Flat _____ App In Face _____ App Out Face _____



 TBPE #7728	CFE Telecom 907 West 5th Street, Suite 250 Austin, TX 78703 Phone: (512) 495-9470 FAX: (512) 495-9473		Job Wilmeth Tower	
	Project McKinney, TX		Drawn by mwilson	
	Client Motorola		Date 11/19/09	
	Code TIA/EIA-222-F		Scale NT	
	Path		Dwg No E	

0' - 402'

Round

Flat

App in Face

App Out Face

Truss Leg



TBPE #7728

FAX: (512) 495-9473

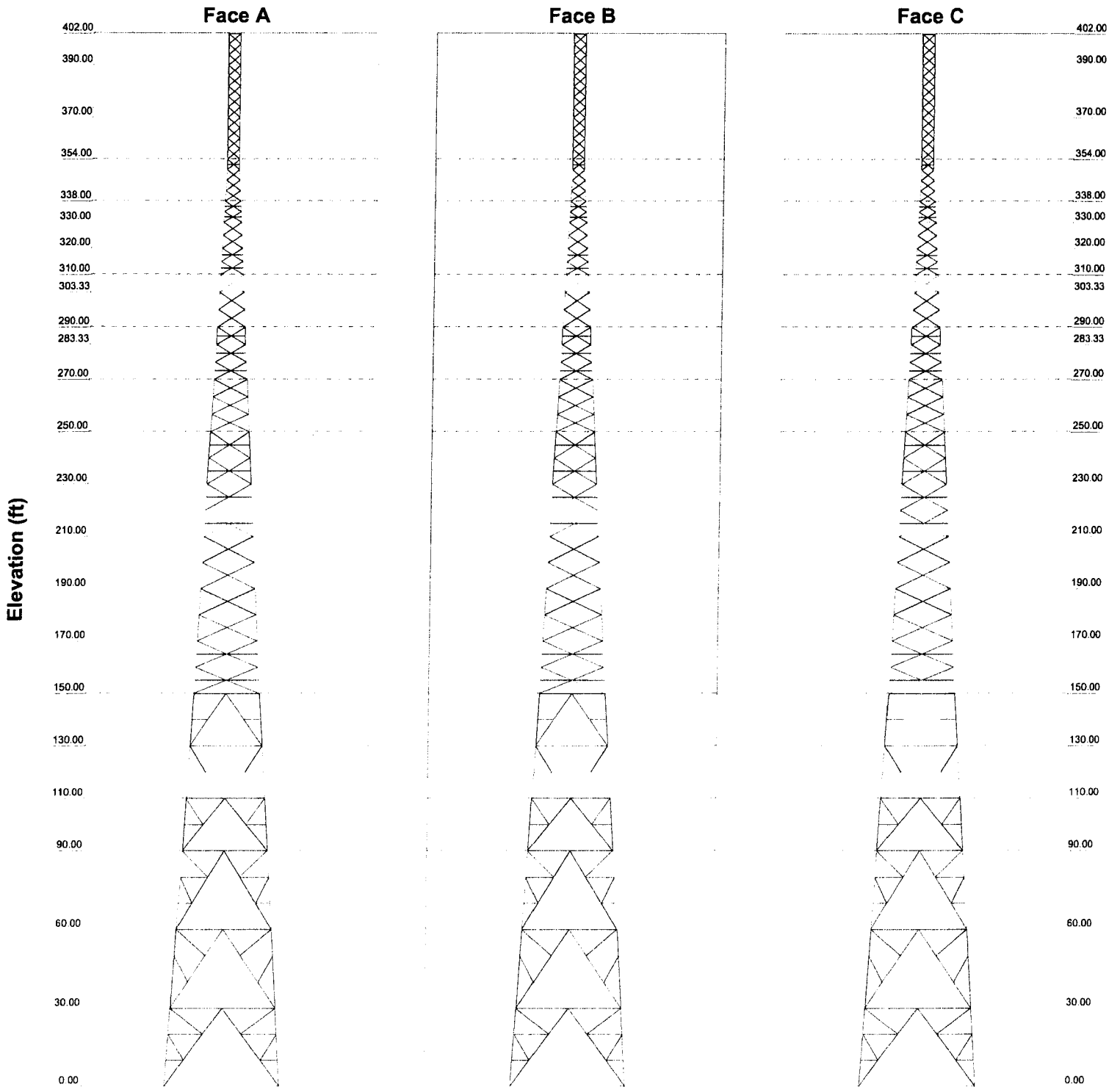
Path:

Dwg No E-7

Stress Distribution Chart

0' - 402'

■ > 100% ■ 90%-100% ■ 75%-90% ■ 50%-75% ■ < 50% Overstress



TBPE #7728

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Job **Wilmeth Tower**

Project **McKinney, TX**

Client **Motorola**

Code **TIA/EIA-222-F**

Path

Drawn by **mwilson**

Date **11/19/09**

App'd

Scale **NT**

Dwg No **E-**

