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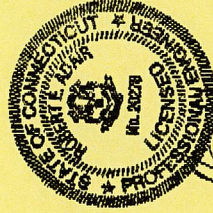
H. E. Bergeron Engineers
• Civil • Structural • Land Surveying

STRUCTURAL ANALYSIS REPORT
of
160' MONOPOLE TOWER
BEACON FALLS, CONNECTICUT

Nextel Site #CT-0058

Prepared for Diversified Technology Consultants, Inc.

August 22, 2000



H. E. Bergeron

Prepared by:

H. E. Bergeron Engineers
P.O. Box 440, 2605 White Mountain Highway
North Conway, New Hampshire 03860
HBB Project No. 2000-148



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160' MONOPOLE TOWER
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Diversified Technology Consultants, Inc.
NexTel Site #CT-0058

EXECUTIVE SUMMARY:

H. E. Bergeron Engineers, P.A. (HEB) performed a structural analysis of this 160-foot Valmont monopole tower located in Beacon Falls, Connecticut. The analysis was performed with the addition of twelve DB844H90 panel antennas mounted on a low-profile platform at 135'.

Our analysis indicates the tower is capable of supporting the proposed antennas.

INTRODUCTION:

A structural analysis of this communications tower was performed by H. E. Bergeron Engineers, P.A. (HEB) for Diversified Technology Consultants, Inc. (DTC). The tower is located in Beacon Falls, Connecticut. HEB did not visit the tower site. The analysis relied on information provided by DTC, which included Valmont Industries, Inc. drawings and antenna inventory.

The structure is a 160-foot, galvanized steel monopole manufactured by Valmont Industries, Inc. The analysis was conducted with the following antenna inventory:

- (12) Allgon 7120.16 panel antennas mounted on a platform at 157'
- (12) DB 844N panel antennas mounted on a platform at 143'
- (12) DB844H90 panel antennas mounted on a low-profile platform at 135' (proposed)

For the purpose of the analysis, all existing waveguide cables were assumed to be 1-5/8" diameter installed on the inside of the pole.



STRUCTURAL ANALYSIS:

Methodology:

The structural analysis was done in accordance with TIA/EIA-222-F (EIA), Structural Standards for Steel Antenna Towers and Antenna Supporting Structures; and the American Institute of Steel Construction (AISC), Manual of Steel Construction, Allowable Stress Design, Ninth Edition.

The analysis was conducted using a wind speed of 85 miles per hour and one-half inch of radial ice over the entire structure and all appurtenances. The TIA/EIA Standard requires a minimum of 85-mph wind load for New Haven County, Connecticut.

Two analytical methods were used to evaluate the structure: a two-dimensional linear computer model developed by HEB, and a P-delta analysis using CSTRAD finite element software distributed by BCOM Associates. The HEB 2-D model was used to generate dead loads of the tower and all of its appurtenances, radial ice loads and the resultant wind loading. The maximum bending moments and axial loads were used to calculate combined axial and bending stresses at intervals on the monopole, which were compared to allowable stresses according to AISC and TIA/EIA.

Loads generated in the 2-D model were input into the CSTRAD program to evaluate secondary bending moments induced during deflection of the structure under load and to independently evaluate stresses. Evaluation of secondary bending moments is required by EIA paragraph 3.1.15. Our analysis indicates that the secondary moments exceed those of the linear analysis, and therefore govern in determining the capacity of the structure.

EIA requires two loading conditions to be evaluated to determine the tower's capacity. The higher stresses resulting from the two cases is used to calculate the tower capacity:

- Case 1 = Wind Load (without ice) + Tower Dead Load (controls)
- Case 2 = 0.75 Wind Load (with ice) + Ice Load + Tower Dead Load

EIA permits a one-third increase in allowable stresses for towers less than 700-foot tall. Allowable stresses of tower members were increased by one-third in computing the load capacity values indicated herein.

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ANALYSIS RESULTS:

Our analysis determined the tower will support the proposed antennae in addition to its current loading. Supporting calculations are provided in Appendix B.

The following table summarizes the capacity of the tower based on combined axial and bending stresses:

Elevation	Capacity
0'-10'	79%
10'-20'	76%
20'-30'	73%
30'-40'	71%
40'-50'	69%
50'-58'	78%
58'-66'	75%
66'-74'	71%
74'-83'	68%
83'-91'	64%
91'-98'	72%
98'-105'	67%
105'-111'	61%
111'-118'	55%
118'-125'	48%
125'-132'	63%
132'-139'	45%
139'-146'	28%
146'-153'	16%
153'-160'	6%

The capability of the existing foundation to support the proposed load was evaluated by comparing design reactions with those imposed by the proposed loading. We calculated the reactions under the proposed loading to be less than design reactions, thus the existing foundation is adequate to support the proposed loads, provided it was designed and constructed to meet original design reactions.

Base reactions imposed with the proposed antennas were calculated to be as follows:

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Compression:	25.2 kips
Shear:	30.9 kips
Overturning Moment:	2503.5 ft-kips

CONCLUSIONS AND SUGGESTIONS:

As detailed above, our analysis indicates that the existing 160' monopole tower is capable of supporting the additional antenna loading proposed by Nextel Communications.

LIMITATIONS:

This report is based on the following:

1. Tower is properly installed and maintained.
2. All members are in new condition.
3. All required members are in place.
4. All bolts are in place and are properly tightened.
5. Tower is in plumb condition.
6. All members are galvanized.
7. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
8. Record drawings accurately reflect tower dimensions and height.

H. E. Bergeron Engineers, P.A. (HEB) is not responsible for any modifications completed prior to or hereafter which HEB is not or was not directly involved. Modifications include but are not limited to:

1. Adding or relocating antennas.
2. Installing antenna mounting gates or side arms.
3. Extending tower.

HEB hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon the information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies,

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NEXTEL

FAX COVER LETTER

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TO:

Christine Lepage

COMPANY:

Connecticut Siting Council

FAX NUMBER:

(860) 827-2950

DATE: Monday, October 02, 2000

Pages including cover sheet: 7

MESSAGE:

Nextel Exempt Modification-Beacon Falls Structural Analysis. Please call if you would like any additional information of have any questions.