

Tower Reanalysis Report

Proposal 156273-2-1

August 14, 2017

#KD90 x 912' Tower
Franklin, IL

PiRod Engineering File A-118599

Prepared for
Tower Owner:
WSEC TV
Rich Plotkin
PO Box 6248
Springfield IL 62708

This document does not constitute a construction document. All modifications and/or installations of structural members and/or appurtenances shall be completed under the direction of a person qualified to conduct and/or direct the installation procedures in accordance with state, local and national rules.

156273-2-1 118599

Approved by
Chi S Lee, P.E., S.E.
5801 Lorraine Avenue
Sioux City IA 51106
Telephone: 712-276-2142



TABLE OF CONTENTS

Description	Page No.
1.0 EXECUTIVE SUMMARY	1
2.0 ASSUMPTIONS	1
3.0 TOWER HISTORY	2
4.0 CURRENT WIND LOAD REQUIREMENT	2
5.0 ANTENNA LOADING	3
6.0 RESULTS	4
6.1 Tower Modifications	4
6.2 Foundation Modifications	4
7.0 LIST OF APPENDICES	4
8.0 DISCLAIMER	5



1.0 EXECUTIVE SUMMARY

This reanalysis was performed by PiRod to determine if the structure is capable of accommodating loading that is different than previous design specifications. This engineering report gives details how the loading changes affect the tower, specifies feasible modifications, and proposes modification materials. **PiRod's engineering study concludes that the tower does not comply and cannot be modified to meet the current code.** See section 6.0 for details.

2.0 ASSUMPTIONS

This engineering study is based on the theoretical capacity of the structure. It is not a condition assessment of the tower. This report is being provided by PiRod without the benefit of an inspection by PiRod personnel and is based on information supplied by the customer to PiRod. PiRod has made no independent determination, nor is required to, of the accuracy of the information provided. Therefore, unless specifically informed to the contrary by the customer in writing, PiRod assumes the following:

1. The subsoil characteristics exist as stated on the tower drawing or stated elsewhere in this report;
2. The tower is erected and maintained in accordance with the manufacturer's plans and specifications and is plumb;
3. There is no damage, natural or manmade, to the structure, either gradual or sudden;
4. All connections and guy cables are properly installed;
5. The information concerning the components, existing and proposed, is accurate; and
6. There are no modifications to the tower itself, except as may be disclosed elsewhere in this report.

PiRod recommends that qualified personnel assess the physical condition of the tower, preferably under the direction of a licensed professional engineer. Following is a list of the general areas that PiRod recommends to be inspected.

<u>Tower Structure</u>	<u>Guyed Towers</u>	<u>Foundations</u>	<u>Appurtenances</u>
Tower Sections	Guy Cables	Cracking	Antennas
Bolted Connections	Turnbuckles	Drainage	Mounts
Welded Connections	Preforms	Spalling	Transmission Lines
Plumbness	Guy Lugs	Anchor Bolts	Line Brackets
Corrosion	Thimbles	Settling	Cable Hangers
Linearity	Torque Arms	Grounding	Lighting
Galvanization	Ice Clips	Grout	
Paint	Guy Tensions	Subsoil	
	Anchor Rods	Characteristics	
	Shackles	Erosion	
	Insulators		



3.0 TOWER HISTORY

Date of Origination: 2001
PiRod Model: #KD90 x 912' Tower
Sold to: CONVOCOM

ORIGINAL DESIGN CRITERIA				
Code/Standard	Wind Loading	Radial Ice	Wind Load Reduction Used	Allowable Stress Increase Used
TIA/EIA-222- F	70 mph fastest mile	no	none	yes
TIA/EIA-222-F	70 mph fastest mile	½" solid	25%	yes

For the structural analysis, the tower and foundation are assumed to exist as shown on the enclosed tower drawing, which is PiRod's latest revision.

4.0 CURRENT WIND LOAD REQUIREMENT

We have taken the opportunity to reanalyze this structure using the following wind speed and ice load conditions:

Code/Standard	Wind Loading	Radial Ice	Topography	Structure Class	Exposure
TIA/EIA-222-G	90 mph 3-second gust	NO	1	II	C
	40 mph 3-second gust	1.0"			

Note: Some localities stipulate wind load requirements that are different from that required by the TIA/EIA Standard. Please check with your local building department and verify the required wind load.

5.0 ANTENNA LOADING

The tower analysis uses the following antenna loading, which was provided on 6/25.

HEIGHT (FT)	ANTENNAS		ASSUMED CaAC (SQ.FT.)	MOUNTS		LINES		
	#	MODEL		#	MODEL	#	SIZE	BRACKET
SCENARIO #1 Existing Loading								
912	1	Dielectric TFU-24GTH/VP-R-04			Top mounted	1	4- 1/16” Rigid	
866	1	Dielectric DL-12		1	Leg mounted	1	3” Rigid	
360	1	PAR8-65-PXA 287.6°		1	Dish mount	1	EW63	
310	1	PAR6-64-PXA 287.6°		1	Dish mount	1	EW63	
262	1	PAR8-65-PXA 72.1°		1	Dish mount	1	EW63	
250	2	Hyperlink HG5158-19DP-090 90°, 270°			Leg mounted	2	CAT5	
212	1	PAR6-64-PXA 72.1°		1	Dish mount	1	EW63	
79	1	Ice shield						
75	1	Scala 687-493			Leg mounted	1	RG211	
SCENARIO #2 – REMOVE LOADING AT 912’								

These antennas, mounts, and lines represent our understanding of the antenna loading required. Please contact us if any discrepancies are evident. If different antennas, mounts, or lines are installed on this structure, this analysis is invalid. If the lines are mounted on PiRod Double-T, Extended Double-T or Expandable Double-T, they are assumed to be mounted inside the tower and the transmission lines are mounted in a back to back configuration. If any of these brackets cannot be placed inside concerning physical fit, alternatively they can be installed outside the tower, but all the brackets need to be swung back as close as possible to one of the tower faces, to minimize the torque.

* An asterisk indicates that we were not provided with a value for the effective projected area (C_{AAC}), and that the area has been assumed based on any information that was made available. The actual effective projected area for each antenna must be confirmed to be equal to the assumed area listed above. If it is determined that the area is different than that stated for any of the above items, this analysis is invalid.

6.0 RESULTS

With the antennas listed in section 5.0, the following modifications are required for the tower to comply with the indicated code and TIA/EIA Standard listed in section 4.0.

6.1 Tower Results – FAIL

SCENARIO #1- FAIL

Due to the high amount of overstress and the limitations in our analysis software, the program failed to converge on a solution. Therefore, the specific amount of overstress is unknown. The tower cannot be modified to meet current code.

SCENARIO #2- FAIL

(REMOVE LOADING AT 912')

The tower does not comply and cannot be modified to meet the current code.

- Resulting tower capacity 167.8%

6.2 Foundation Results – UNKNOWN

NOTE: Due to the lack of reactions from the tower analysis, the foundation was not analyzed.

The foundation analysis is based on the soil report by Hannibal Testing Laboratories Inc, dated 6/18/2001, file #01-828-F.

7.0 LIST OF APPENDICES

Tower Elevation Drawing



8.0 DISCLAIMER

1. The information and conclusions contained in this Report were determined by the application of the then current "state of the art" engineering and analysis procedures and formulae, and Valmont Structures⁽¹⁾ assumes no obligation to revise any of the information or conclusions contained in this Report in the event such engineering and analysis procedures and formulae are hereafter modified or revised.
2. In no event shall Valmont Structures be liable for any incidental, consequential, indirect, special or punitive damages (including without limitation lost profits) arising out of any claim associated with the use of this report (whether for breach of contract, tort, negligence or other form of action), irrespective of whether Valmont Structures has been advised of the possibility of any such loss or damage. In no event shall Valmont Structures' total, cumulative liability to the customer exceed the amount paid by customer for the preparation of this report.
3. Valmont Structures shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than Valmont Structures personnel, including but not limited to, any services rendered 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 for the quality of work performed by them.
4. Valmont Structures makes no warranties, expressed or implied, in connection with this Report as to any other matter whatsoever, and in particular, any and all warranties of merchantability or fitness for a particular purpose are hereby expressly disclaimed. Valmont Structures further expressly disclaims any liability arising from material, fabrication, and erection deficiencies. This Report is being provided by Valmont Structures without the benefit of an inspection by Valmont Structures personnel and is based solely on information supplied by the Customer to Valmont Structures. Valmont Structures has made no independent determination, nor is it required to do so, of the accuracy of the information provided by Customer. Therefore, unless specifically informed to the contrary by the Customer in writing, the following assumptions apply to the Report:
 - A. The subsoil characteristics exist as stated on the tower drawing or stated elsewhere in this report;
 - B. The tower is erected and maintained in accordance with the manufacturer's plans and specifications and is plumb;
 - C. There is no damage, natural or manmade, to the structure, either gradual or sudden;
 - D. All connections are properly installed;
 - E. The information concerning the components, existing and proposed, is accurate; and
 - F. There are no modifications to the tower itself, except as may be disclosed elsewhere in this report. Examples include but are not limited to replacement or strengthening of bracing members, reinforcing vertical members in any manner, adding additional bracing, or extending tower.
6. All representations and recommendations and conclusions are based upon the information contained and set forth herein. If Customer is aware of any information which is contrary to that which is contained herein, or if Customer is aware of any defects arising from the original design, material, fabrication, and erection deficiencies Customer must disregard this Report and immediately contact Valmont Structures.

⁽¹⁾ Valmont Structures is the Structures Division of Valmont Industries, Inc., and performs engineering services under the engineering corporation name PiRod, Inc.