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LM-30-8-5S-6X400LTL-LED-EW-SM-RD-10KVAPDS in a 45mph Wind Load

Date: Monday, January 25, 2016
Designer: Christopher Thauer
Study name: Wind Load Study
Analysis type: Static

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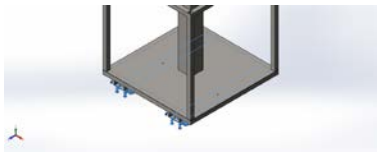
Description

The simulation of the LM-30-8-5S-6X400LTL-LED-EW-SM-RD-10KVAPDS in a 45 mph wind. The simulation was done by first using Solidworks Flow simulation to simulate the wind load and importing the results into a Solidworks static simulation.

Study Properties

Study name	Wind Load Study
Analysis type	Static
Mesh type	Mixed Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	77 Fahrenheit
Include fluid pressure effects from SOLIDWORKS Flow Simulation	On
Solver type	Automatic
Inplane Effect:	Off
Soft Spring:	Off
Inertial Relief:	Off
Incompatible bonding options	Automatic
Large displacement	Off
Compute free body forces	On
Friction	Off
Use Adaptive Method:	Off
Result folder	SOLIDWORKS document

Loads and Fixtures

Fixture name	Fixture Image	Fixture Details
Fixed-1		**Entities:** 2 face(s) **Type:** Fixed Geometry

Resultant Forces

Components	X	Y	Z	Resultant
Reaction force(lbf)	119.196	1.32576	-0.632975	119.205
Reaction Moment(lbf.in)	7.66533	-5.06134	-612.894	612.963

Resultant Forces

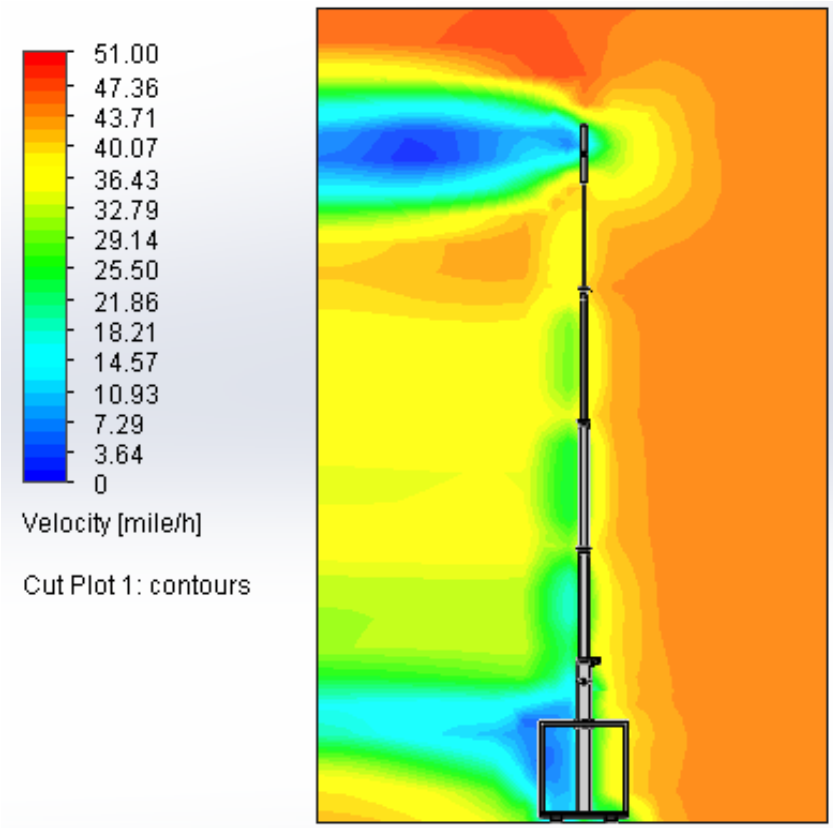
Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	lbf	119.196	1.32576	-0.632975	119.205

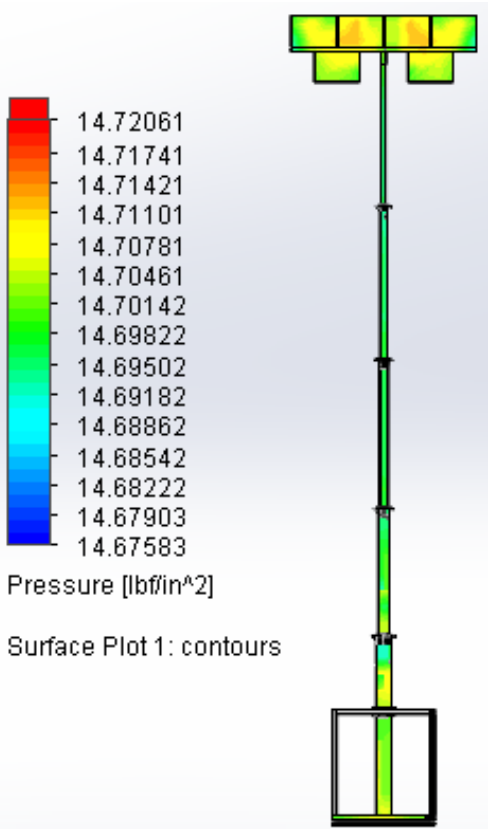
Reaction Moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	lbf.in	7.66533	-5.06134	-612.894	612.963

Wind Speed Plot

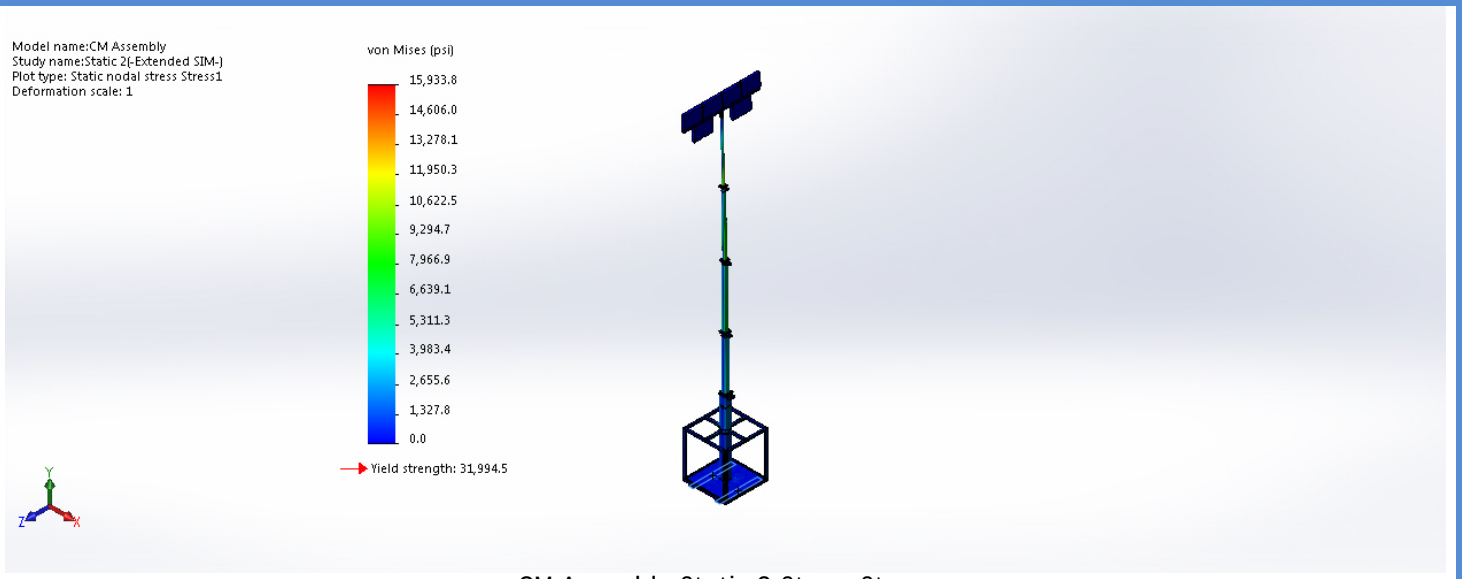


Wind Pressure Plot



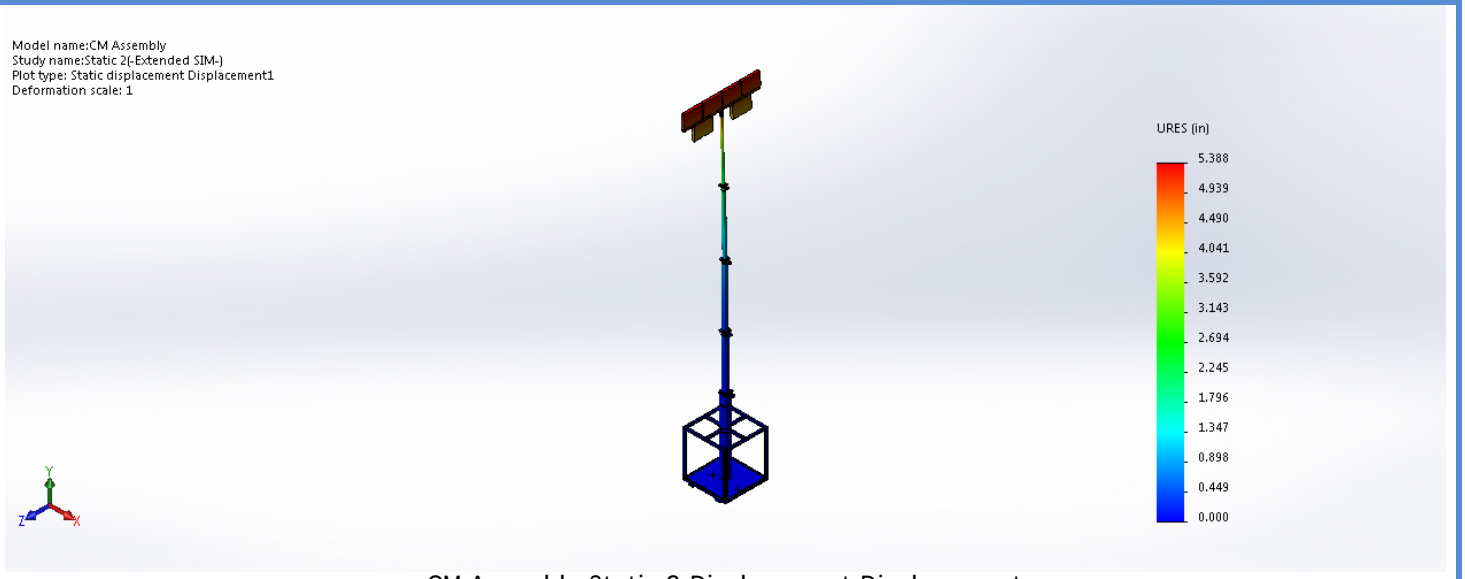
Study Results

Name	Type	Min	Max
Stress	VON: von Mises Stress	0 psi Node: 70	15933.8 psi Node: 73058



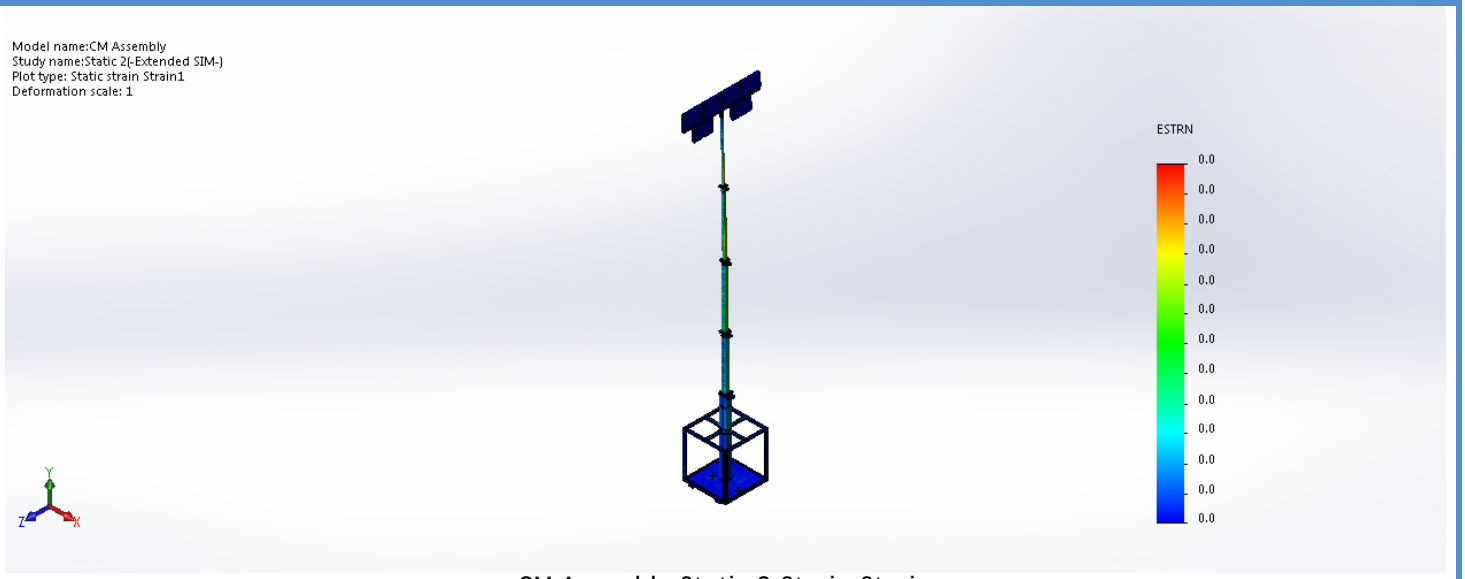
CM Assembly-Static 2-Stress-Stress

Name	Type	Min	Max
Displacement	URES: Resultant Displacement	0 in Node: 5	5.38819 in Node: 79398



CM Assembly-Static 2-Displacement-Displacement

Name	Type	Min	Max
Strain	ESTRN: Equivalent Strain	0 Element: 156	0.000324907 Element: 30544



CM Assembly-Static 2-Strain-Strain

Conclusion

After running Solidworks Flow Simulation and importing the results into a static simulation, it is shown that the LM-30-8-5S-6X400LTL-LED-EW-SM-RD-10KVAPDS can be deployed fully extended in a maximum wind speed of 45mph. The maximum displacement of the light mast is 5.38" and the maximum stress is 15,944 psi. The yield strength of steel is 31,994psi giving a factor of safety of 2.0.