

# Tower Trailer for Field Day

Kerry Veenstra

SLVARC

April 2019

# K6MMM Field Day 2018

K6MMM Field Day 2018  
© SLVARC, John AC6SL 2018-07-20

photo: Gary K6PDL









## SSB Station

Close to first  
raising.

John N5HPB and  
Tom W6TJK, are  
par-boiled.

Photo: Gary  
K6PDL

K6MMM Field Day 2018  
© SLVARC, John AC6SL 2018-07-20



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## SSB Station

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Tom W6TJK, are  
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Photo: Gary  
K6PDL

K6MMM Field Day 2018  
© SLVARC, John AC6SL 2018-07-20





Natalie KO2V and Kerry K3RRY preparing the Falling-Derrick.

Photo: John KJ6WKT

# Digital Station Tower

- Tower: 30' of Rohn 25G tower segments
- Derrick: 20' of Rohn 25G tower segments
- Guy lines, preparation, large crew
- Can this be done more easily?
- How about a tower trailer?

# How Does One Build a Tower Trailer?

1. Get a **tower**
2. Get a **trailer**
3. Bolt 'em together!



# What Could Go Wrong?

1. Get a **tower**
2. Get a **trailer**
3. Bolt 'em together!



"Low-Energy State"

Image: Tim Marek K7XC



Image: Tim Marek K7XC



# What Could Go Wrong?

1. Get a tower
2. Get a trailer
3. Bolt 'em together!

**Needs More Planning**

# A 1200-pound Gorilla

This tower trailer started out as a kit and was towed coast to coast. It's good for DXing, roving and maybe even getting around antenna restrictions...

By Wayne Overbeck, N6NB



Image: N6NB



Image: N4FND







Image: Jim Story



Image: Jim Story





Image: YouTube user Russ A



Image: YouTube user Russ A







Out riggers set up  
ready for the lift

Image: [radiostructures.com](http://radiostructures.com)

Image: [radiostructures.com](http://radiostructures.com)





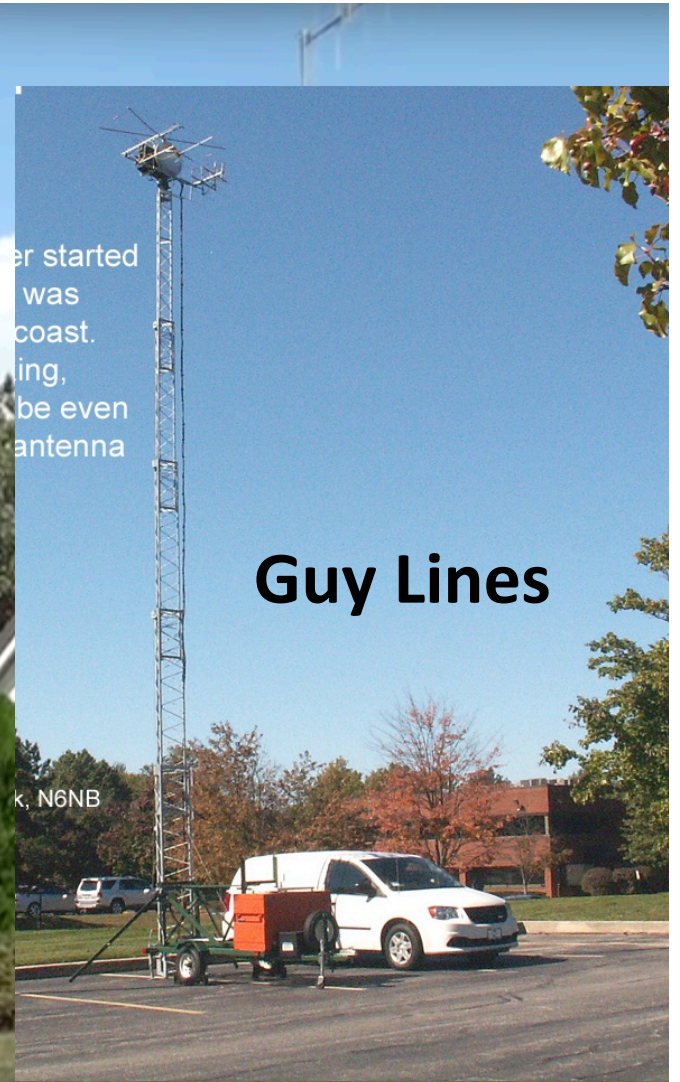


Image: YouTube user Tom Rut





**Self-Supporting**



**Guy Lines**

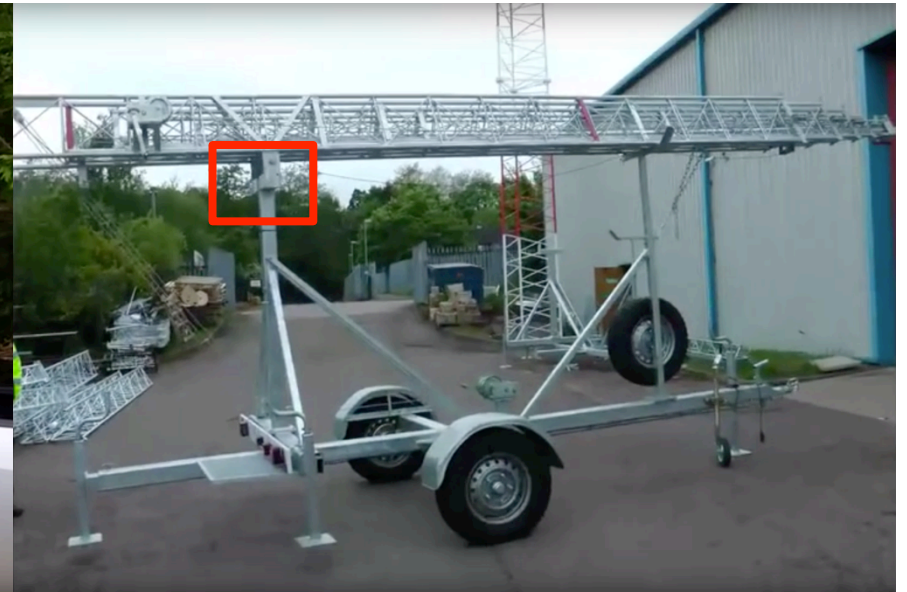


**Leveling Jacks  
not Outriggers**

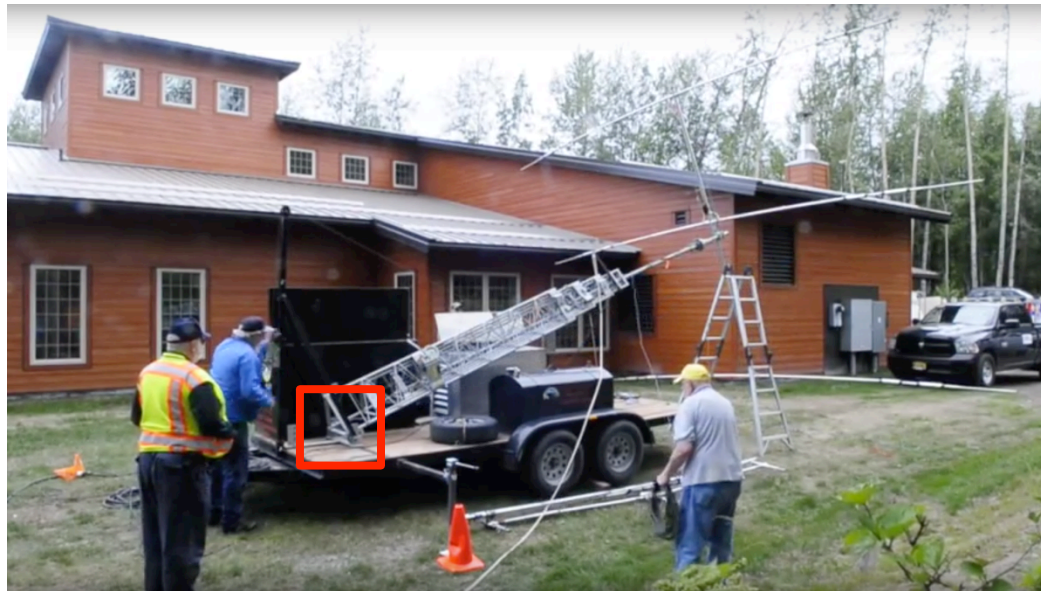
Image: Tim Marek K7XC



# “Bottom” Tower Pivot

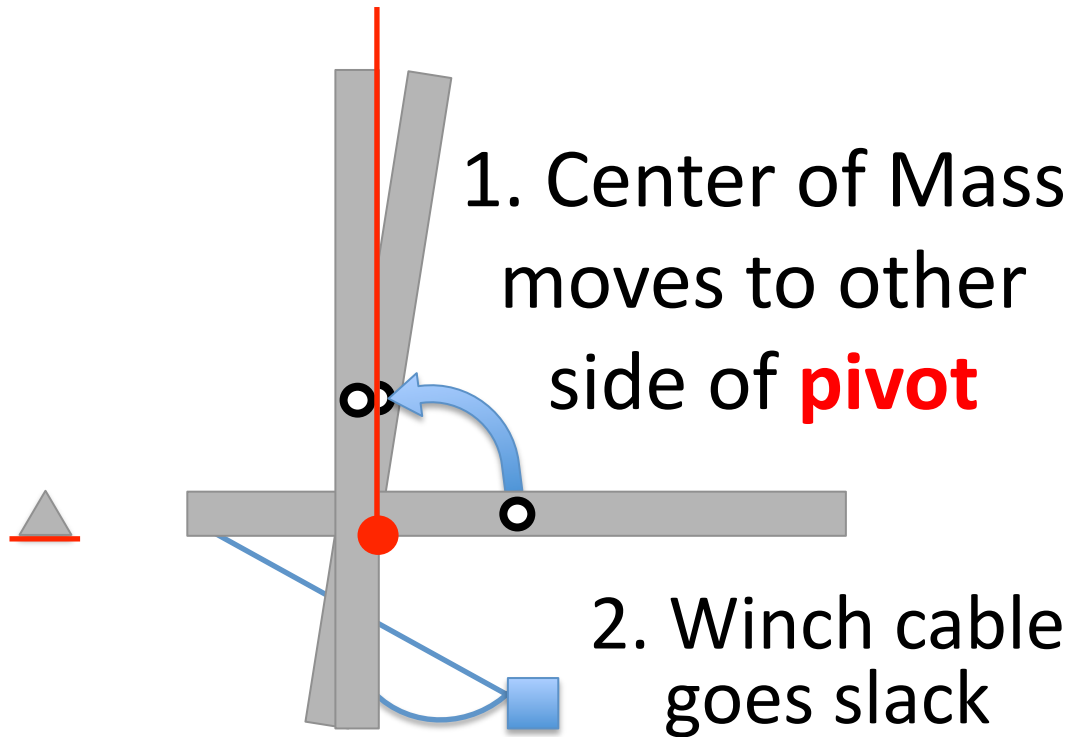


# “Bottom” Tower Pivot





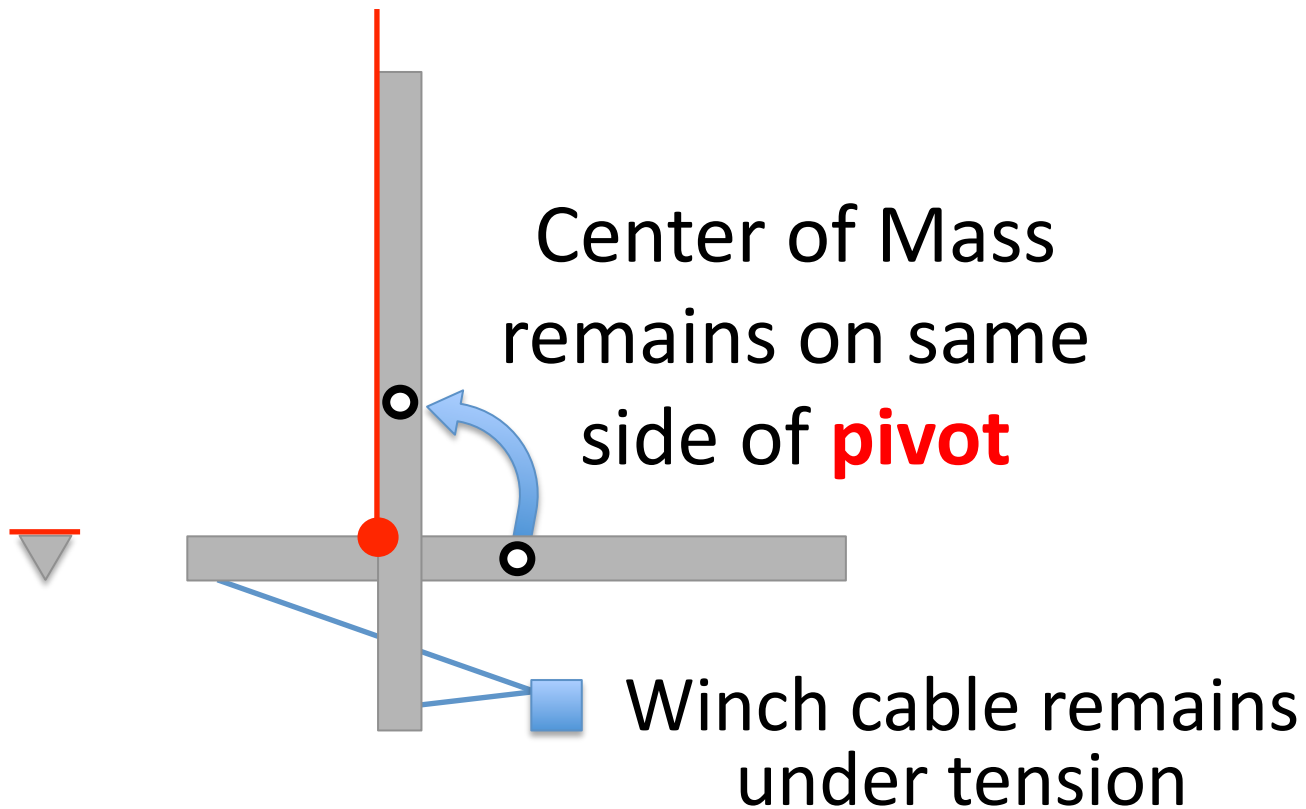
# “Bottom” Tower Pivot



# “Top” Tower Pivot



# “Top” Tower Pivot





## **Self-Supporting Tower with Outriggers**

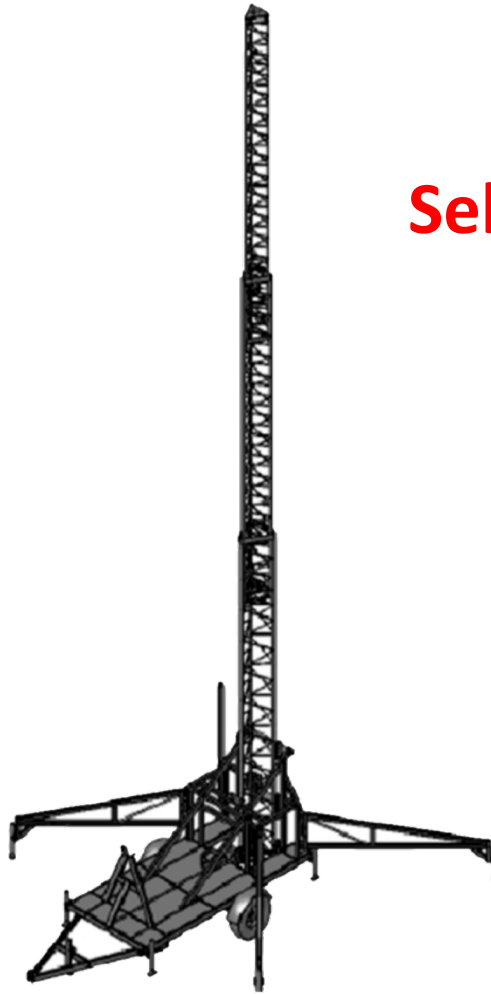


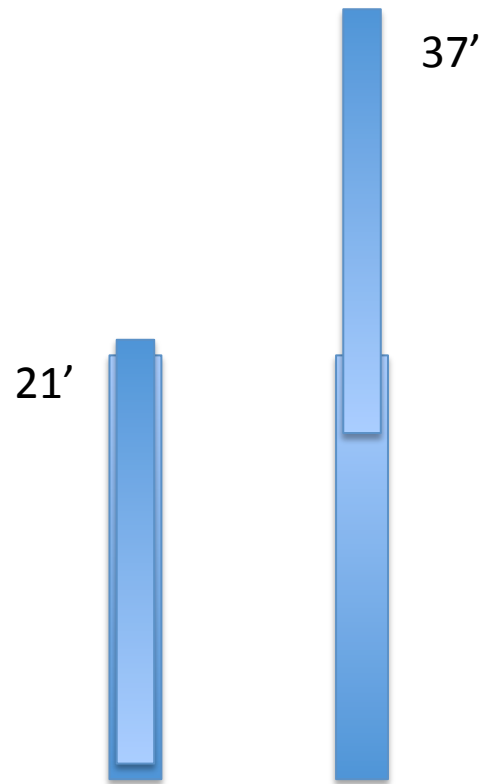
Image: Tashjian Towers

# Building a Tower Trailer

- Project Goals

1. 37-foot Crank-up Tower

# 37-Foot Crank-up Tower



# Building a Tower Trailer

- Project Goals
  1. 37-foot Crank-up Tower
  2. Remain standing in the expected wind



OLD FARMER'S STORE LOGIN



Enter keywords... **GO**

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## WEATHER HISTORY FOR SILVER SPRINGS, NV



SEE HISTORICAL WEATHER DATA FOR A LOCATION AND DATE

Silver Springs, NV

2009 ▾

Nov ▾

20 ▾

**Change**

*Data is available up to March 9, 2019.*

**Previous Day**

**Next Day**

**FOR THE FALLON NAS NV USA WEATHER STATION**

### TEMPERATURE

MINIMUM TEMPERATURE	21.2 °F
MEAN TEMPERATURE	42.6 °F
MAXIMUM TEMPERATURE	66.2 °F

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FOUNDED IN 1792

[GET A COPY!](#)[WEATHER ▾](#)[ASTRONOMY ▾](#)[GARDENING ▾](#)[CALENDAR ▾](#)[FOOD ▾](#)[HOME & HEALTH ▾](#)[STORE ▾](#)**TOTAL PRECIPITATION**

Rain and/or melted snow reported during the day.

0.00 IN

**VISIBILITY****SNOW DEPTH**

Last report for the day if reported more than



WIND

**MEAN WIND SPEED****MAXIMUM SUSTAINED WIND SPEED****MAXIMUM WIND GUST**

57.54 MPH

**57.54 MPH**

Weather data collected from the [National Climatic Data Center Global Surface Summary of Day](#). Information from the NCDC may be incomplete. Not every station reports every day, and some stations never report certain values. To learn more about weather station terminology, please consult the [Weather Observation Station](#) page of the NCDC.

Are you planning a trip or an event such as a wedding? To get a sense of "typical" weather over a range of dates, we also offer an [Enhanced Weather History Search](#) that makes finding out easy. Search by a [Range of Dates](#) or the [Same Dates Over a Range of Years](#)! [Learn More](#).



## Department of Water Resources CALIFORNIA DATA EXCHANGE CENTER

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### → Historical Data Selector

#### HTML Data View

To retrieve historical data for web display \* Hourly Data \* Daily Data \* Monthly Data

1. Please use auto complete form to select Station ID
2. Please select sensor from the drop down list
3. Enter a Start Date or an End Date. Leave Start Date blank for one month back of records. Leave End Date blank to retrieve records up to present.
4. Click the "Get Data" button only once.



Station ID

Sensor

Number:

Start Date

2019-03-09



End Date

2019-03-10



View Data



## Historical Data Selector



### HTML Data View

To retrieve historical data for web display \* Hourly Data \* Daily Data \* Monthly Data

1. Please use auto complete form to select Station ID
2. Please select sensor from the drop down list
3. Enter a Start Date or an End Date. Leave Start Date blank for one month back of records. Leave End Date blank to retrieve records up to present.
4. Click the "Get Data" button only once.

Station ID

BLO

Sensor  
Number:

77-(hourly) - WIND, PEAK GUST



Start Date

2019-01-01



End Date

2019-03-10



View Data

## HOURLY DATA

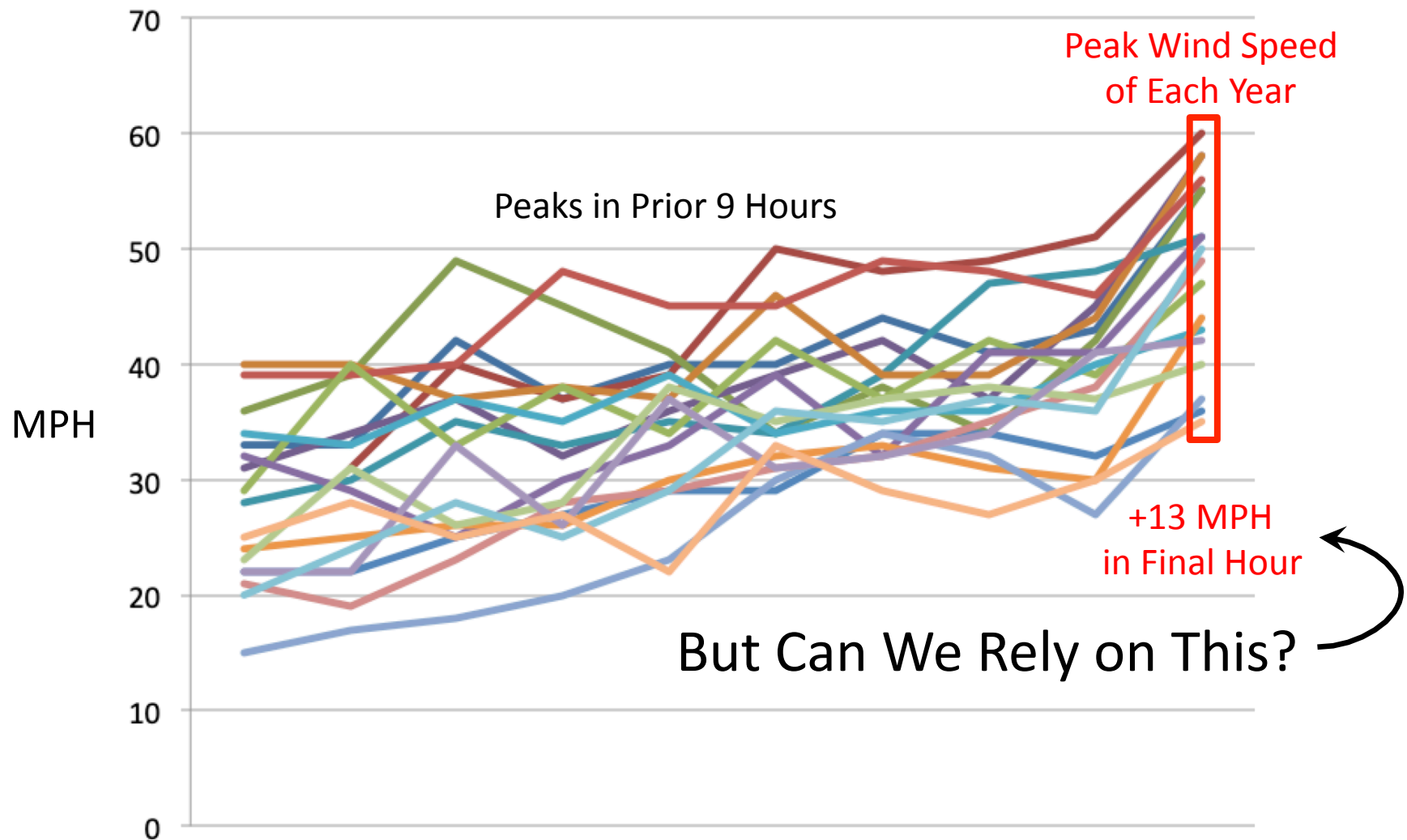
Earlier

DATE / TIME (PST)	<i>PEAK WS</i> MPH
01/01/2019 01:00	16
01/01/2019 02:00	11
01/01/2019 03:00	11
01/01/2019 04:00	11
01/01/2019 05:00	14
01/01/2019 06:00	13
01/01/2019 07:00	12
01/01/2019 08:00	12
01/01/2019 09:00	14
01/01/2019 10:00	12
01/01/2019 11:00	7

# CDEC Historical Weather Data

- Repeat query for each year, 2001–2019
- Peak wind speed 2001–2019
  - 60 MPH (all months)
  - 41 MPH (June/July)





# Fremont Peak



Image:  
[waymarking.com](http://waymarking.com)

# What Would an Engineer Do?





Image:  
Public Domain



Image:  
Public Domain



Wikipedia article: *Engineer*  
Section on *Ethics*



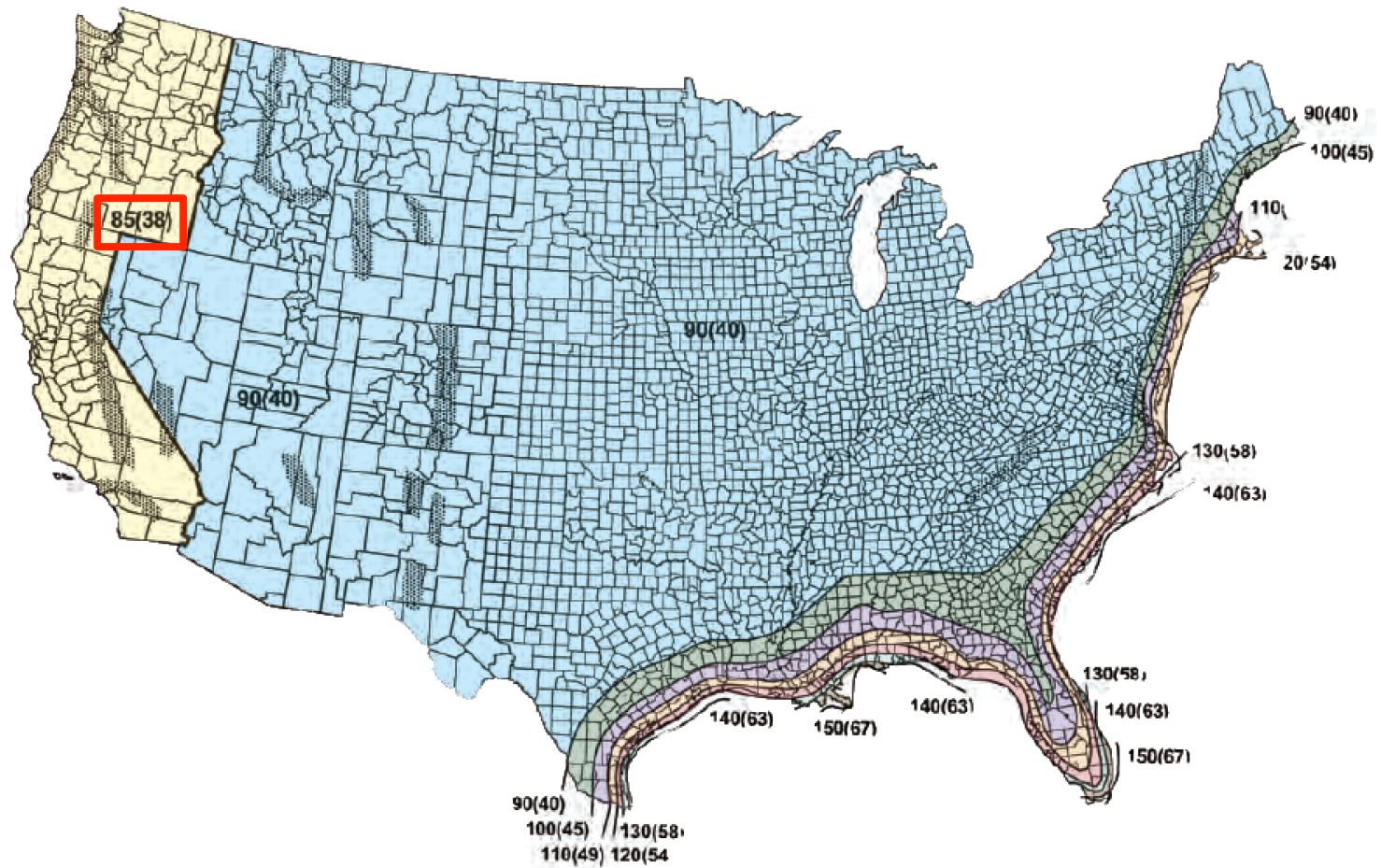
Image:  
Public Domain

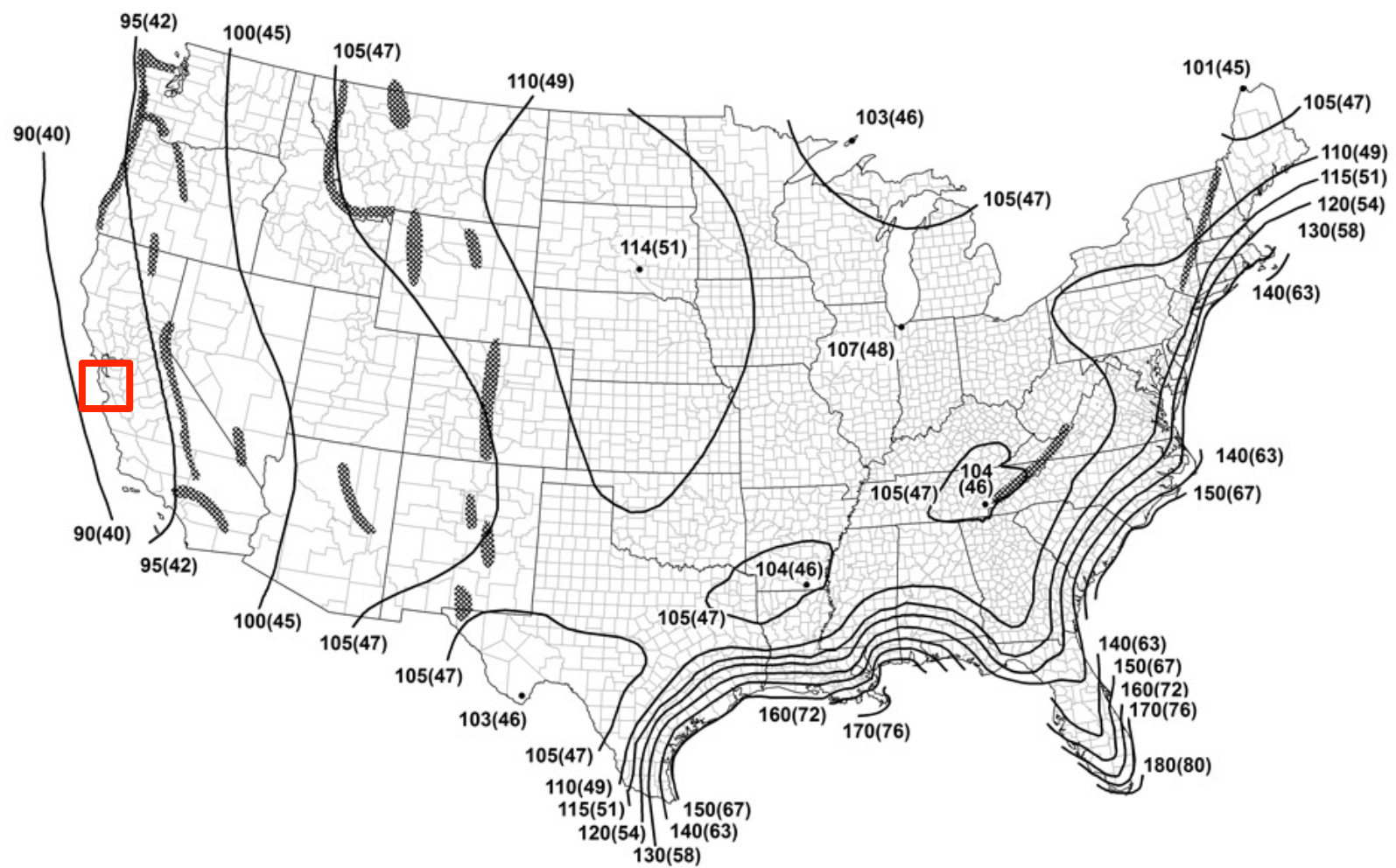


# What Would an Engineer Do?

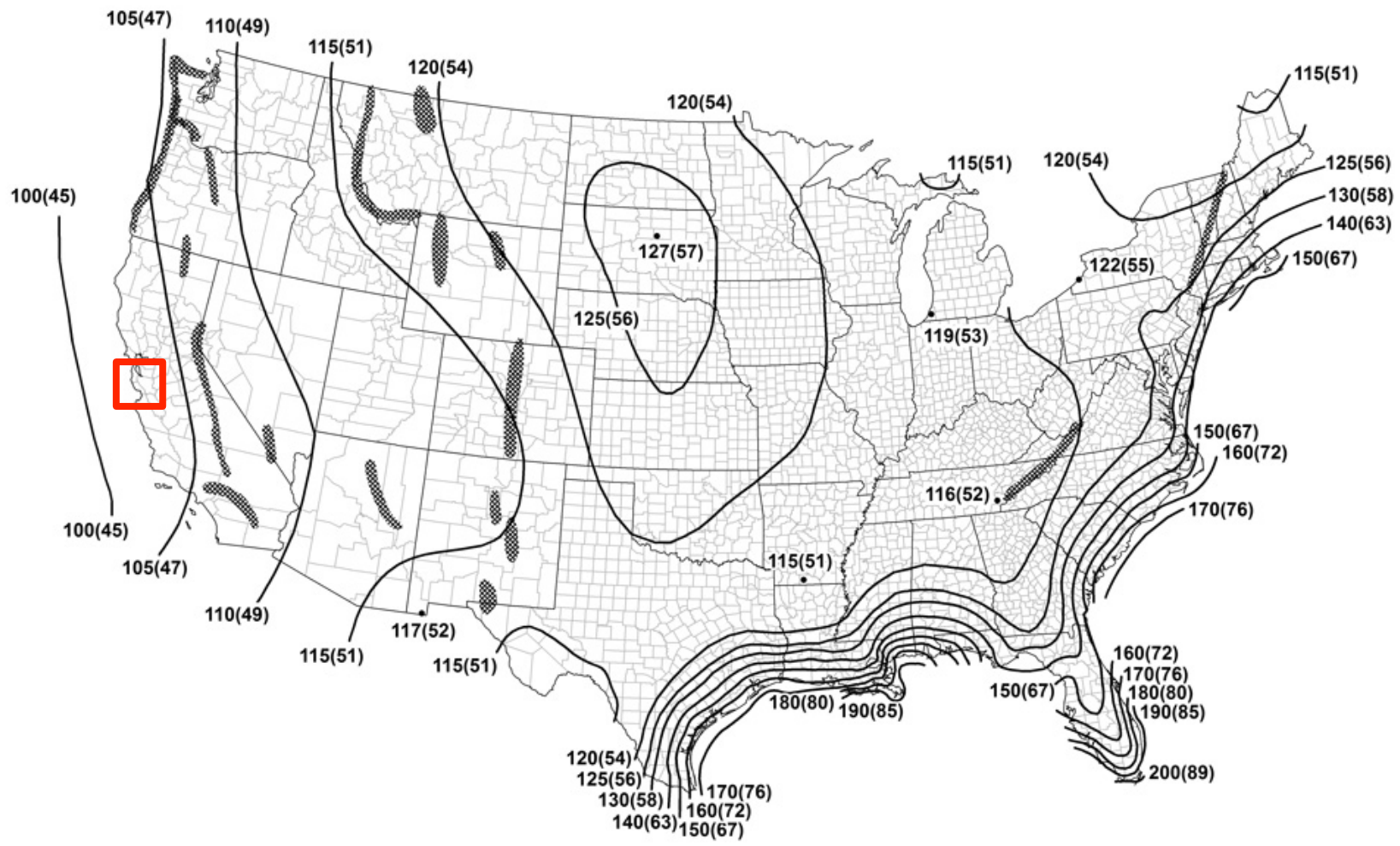
- TIA-222H: “Structural Standards for Antenna Supporting Structures and Antennas”
  - Basic Wind Speed Map

## REV G 3 SECOND BASIC WIND SPEED MAP





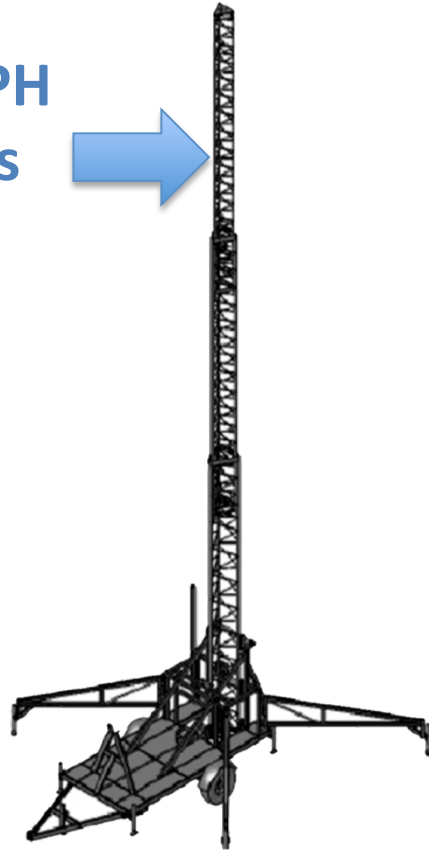




# Basic Wind Speed Map

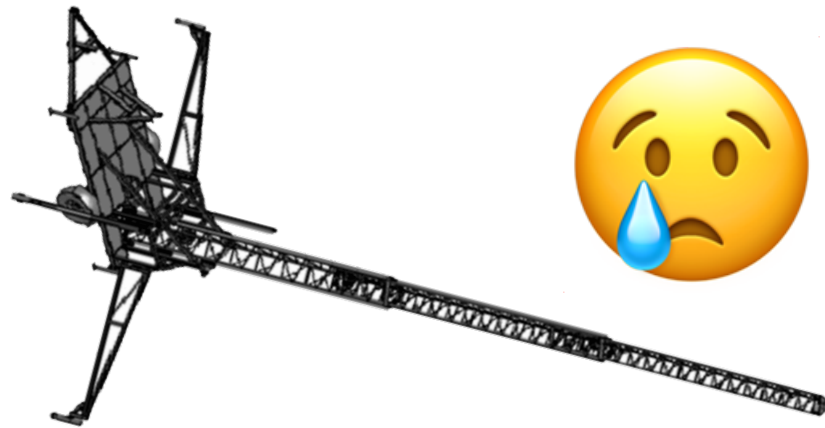
- Applied Technology Council Hazard Map
  - <https://hazards.atcouncil.org/#/wind?lat=37.131896&lng=-122.170466>
- ASCE 7 Hazard Tool
  - <https://asce7hazardtool.online>

100 MPH  
??? lbs



# Trailer Overturn

# Trailer Overturn





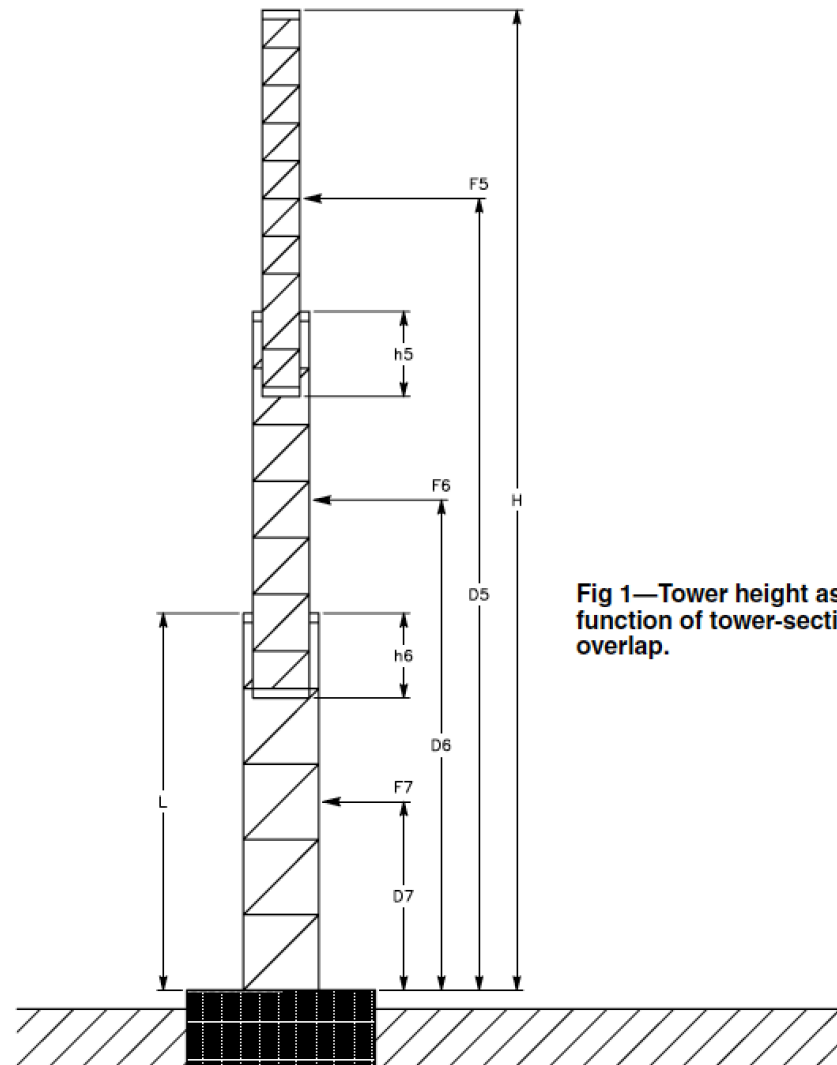
# *Tower and Antenna Wind Loading as a Function of Height*

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*Do you want to determine the maximum safe height of your freestanding tower—for any antenna configuration—as a function of wind velocity? Use this approach to write a simple spreadsheet that will do the calculations in a matter of seconds and check the mast stress at the same time.*

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By Frank Travanty, W9JCC



**Fig 1—Tower height as a function of tower-section overlap.**

<b><i>tnxTower</i></b>  <b><i>Tashjian Towers Corporation</i></b> <i>2765 S Temperance Ave.</i> <i>Fowler, CA</i> <i>Phone: 559-834-4300</i> <i>FAX: 559-834-4377</i>	<b>Job</b>  37' CRANK UP TOWER	<b>Page</b>  1 of 23
	<b>Project</b>  LM-237 (TIA-222-G)	<b>Date</b>  16:44:01 04/20/17
	<b>Client</b>	<b>Designed by</b>  N. Tashjian

## Tower Input Data

The main tower is a 3x free standing tower with an overall height of 37' above the ground line.

The base of the tower is set at an elevation of 0' above the ground line.

The face width of the tower is 1'5/8" at the top and 1'3-1/4" at the base.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- Tower is located in San Bernardino County, California.

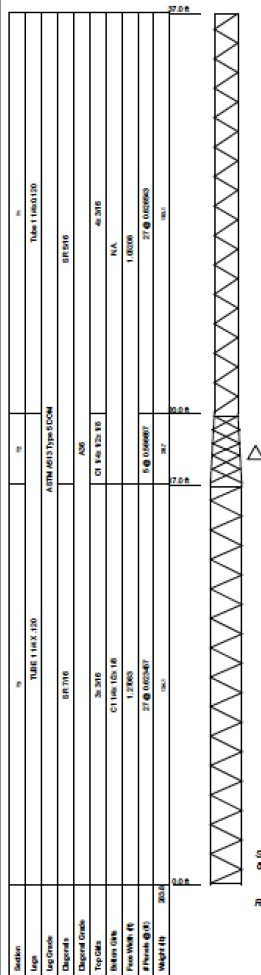
- Basic wind speed of 85 mph.

- Structure Class I.

- Exposure Category C.

- Topographic Category 1.

- Seismicity Category 1.

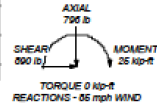


ALL REACTIONS  
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:

DOWN: 22870 lb  
SHEAR: 288 lb

UPLIFT: -22213 lb  
SHEAR: 371 lb



#### DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ANTENNA	37	Wind Assembly	45

#### MATERIAL STRENGTH

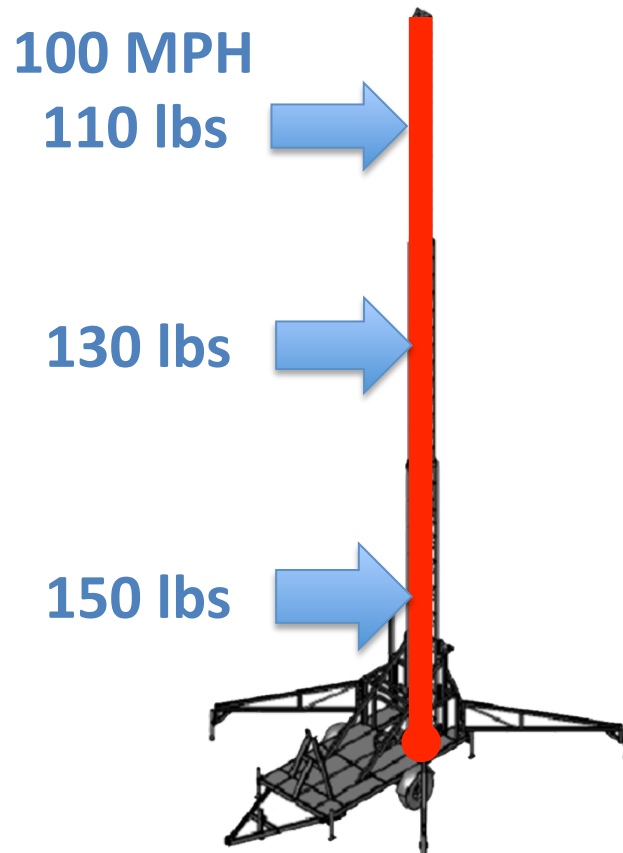
GRADE	Fy	Fu	GRADE	Fy	Fu
ASTM A513 Type E DOM	70 ksi	80 ksi	A36	36 ksi	58 ksi

#### TOWER DESIGN NOTES

1. Tower is located in San Bernardino County, California.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 55 mph basic wind in accordance with the TIA-222-G Standard.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class I.
6. Topographic Category 1 with Crest Height of 0'
7. This analysis is current with the 2015/2016 IBC
8. Though the tower is designed to be operated while fully extended, it can be safely operated while lowered to 35'
9. The base of this tower is adequate per the enclosed foundation analysis. The foundation size being over excavated is acceptable.
10. TOWER RATING: 98.2%

<b>Tashjian Towers Corporation</b>		<b>37' CRANK UP TOWER</b>	
2765 S Temperance Ave. Fowler, CA		Project: <b>LM-237 (TIA-222-G)</b>	App'd:
Phone: 559-834-4300		Client: Mark Gattin	Drawn by: N. Tashjian
FAX: 559-834-4377		Code: TIA-222-G	Date: 04/20/17
		Scale: NTS	Check: E-1





# Overturn Moment

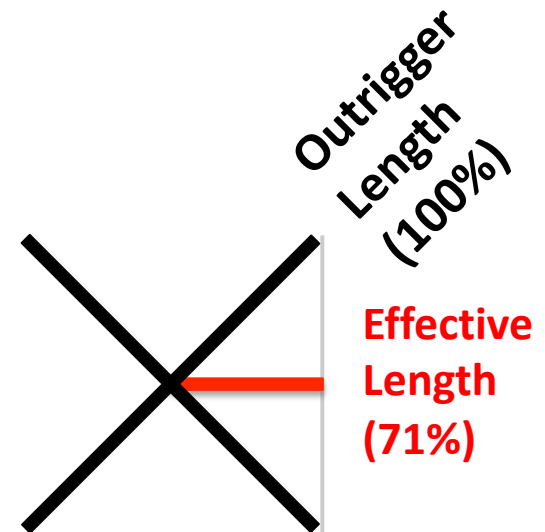
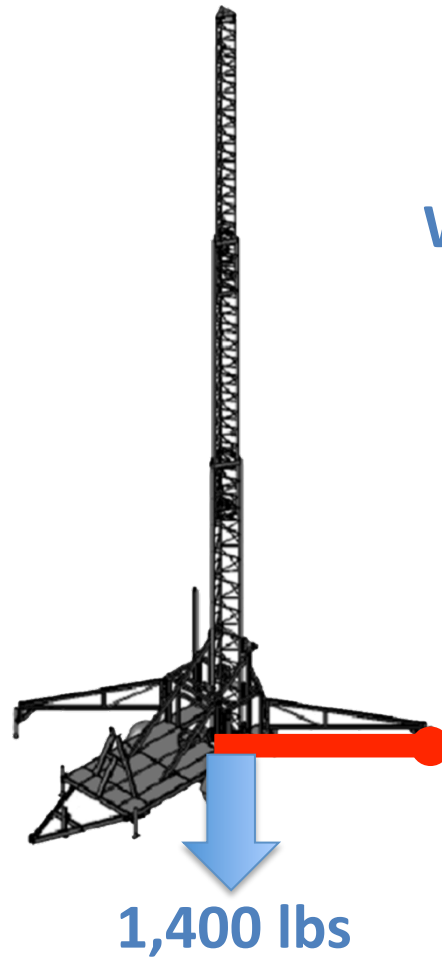
$$110 \text{ lbs} \times 45 \text{ ft} +$$

$$130 \text{ lbs} \times 29 \text{ ft} +$$

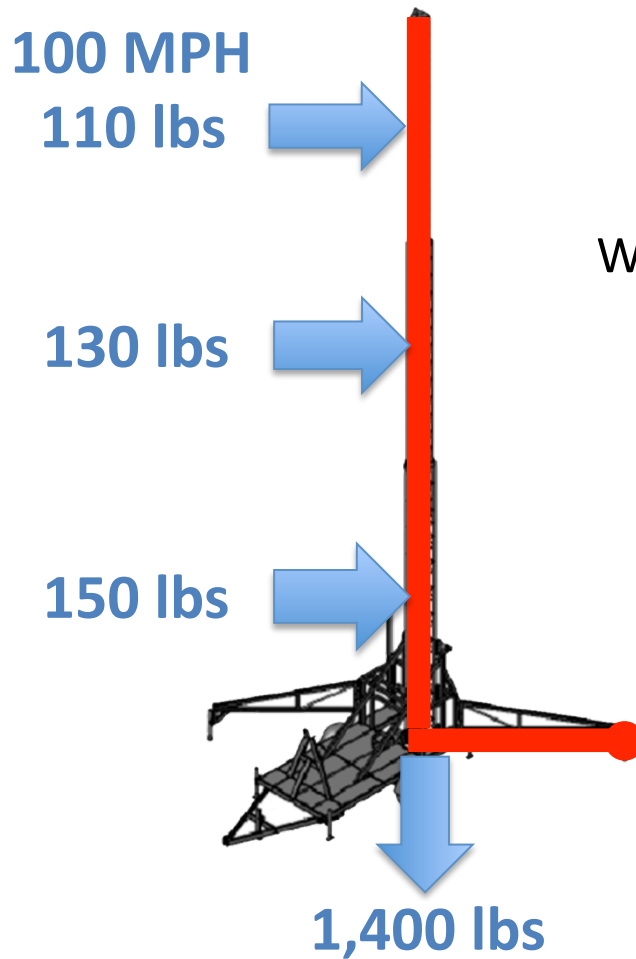
$$150 \text{ lbs} \times 11 \text{ ft} = 10,370 \text{ ft-lbs}$$

# Restoring Moment

Weight × Effective Outrigger Length



Check **Worst-case** Wind Direction



# Trailer Overturn

Want Restoring Moment > Overturn Moment

$$\frac{10,370 \text{ ft-lbs}}{1,400 \text{ lbs}} = \boxed{7.4 \text{ ft}}$$

Effective Length

$$\frac{7.4 \text{ ft} \times \sqrt{2}}{1} = \boxed{10.5 \text{ ft}}$$

Actual Length

**This spreadsheet estimates the base moment of a Tashijan Towers LM-273 telescoping tower using data from a Chino, CA analysis for the same kind of exposure.**

Antenna Weight (lb) =	21							
Antenna Area (ft^2) =	3.35							
Wind Speed (MPH) =	85							
Antenna Above Tower (ft) =	7							
Tower Base Height (ft) =	1							
Trailer/Outrigger Weight (lb) =	1100							
Trailer/Outrigger Equiv. Area (ft^2) =	4							
Trailer/Outrigger Equiv. Height (ft) =	2							

## Force varies with windspeed<sup>2</sup>

Section	Length (ft)	Weight (lb)	w (lb/lf) at 85 MPH	w (lb/lf) at Wind Speed	Sheer (lb) at Wind Speed	z (ft)	Moment (ft-lb)	Elevated Moment (ft-lb)
Antenna	1	21	62	62	62	44	2726	2788
Mast	10	10	0.1	0.1	1	40.5	41	42
-Antenna	1	-300	-444	-444	-444	37	-16424	-16868
Antenna		300						
Top		103.1						
Overlap	—	26.7	—	—	890	—	25000	25890
Bottom		134.1						
Trailer/Outriggers	1	1100	74	74	74	2	148	148
<b>Total</b>		<b>1394.9</b>						<b>11999</b>

Outrigger Radius (ft) = 8.6

Outrigger Length (ft) = 12.2

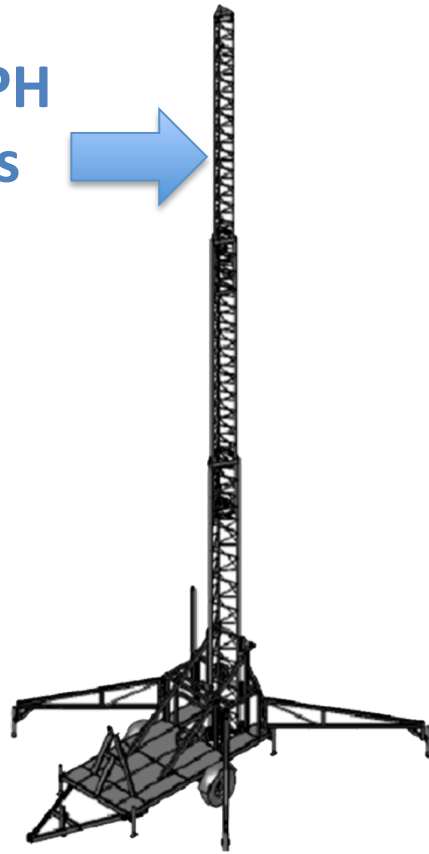
assuming 4 outriggers

<http://www.tashtowers.com/docs/LM237-01.pdf>



# Structural Failure

100 MPH  
??? lbs



# Structural Failure



# What Would an Engineer Do?

- American Society of Civil Engineers
  - Wind Speed
  - TIA-222GH Analysis
- Structural Design – Allowable Stress Design
- Structural Analysis Software

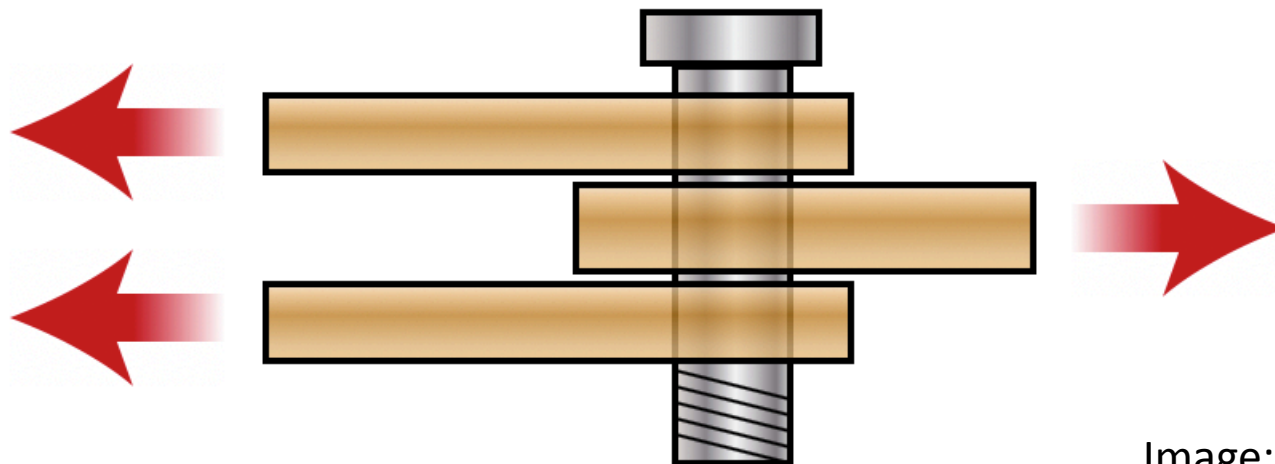
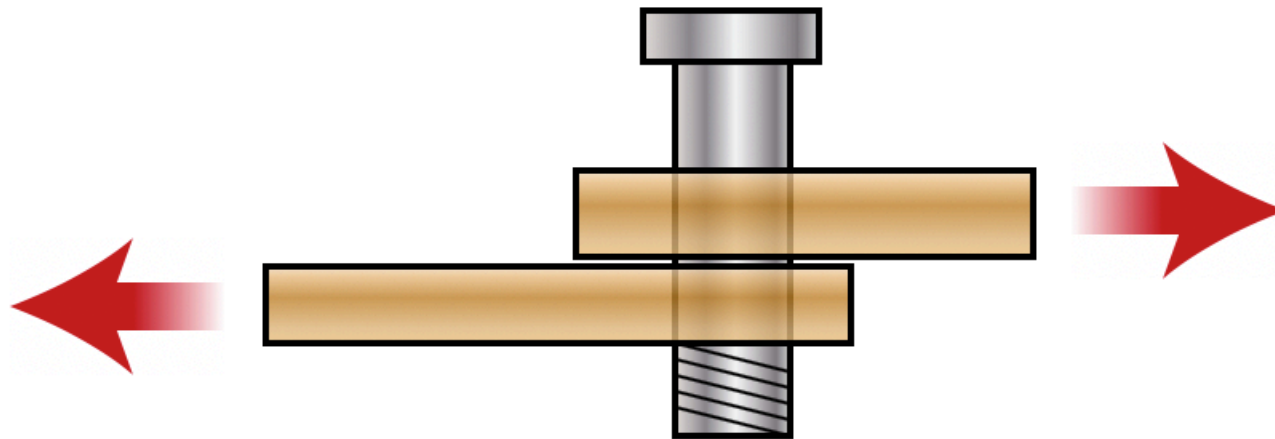


Image: Jon Chui



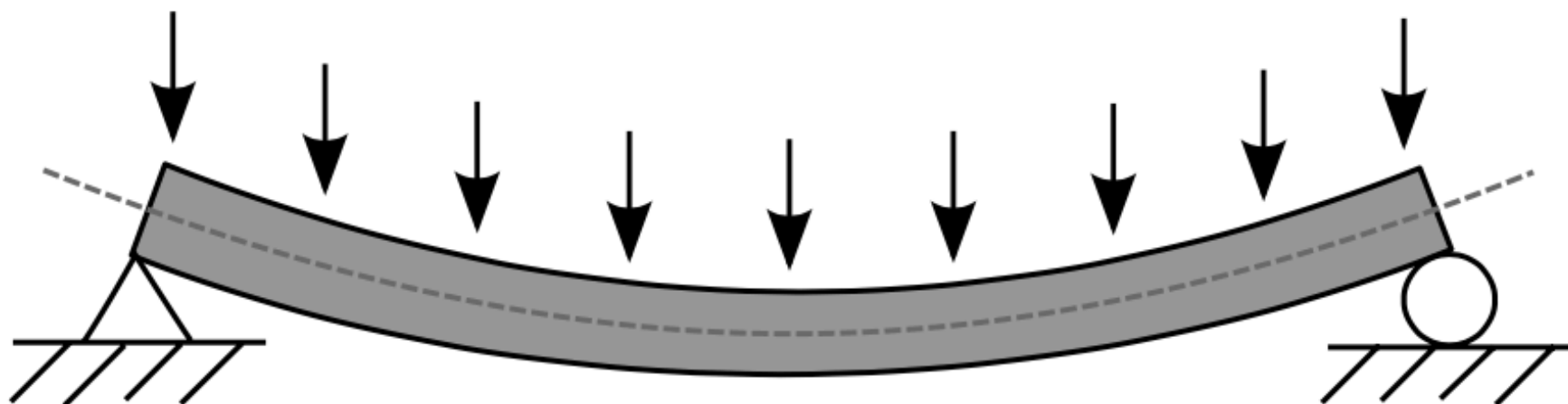
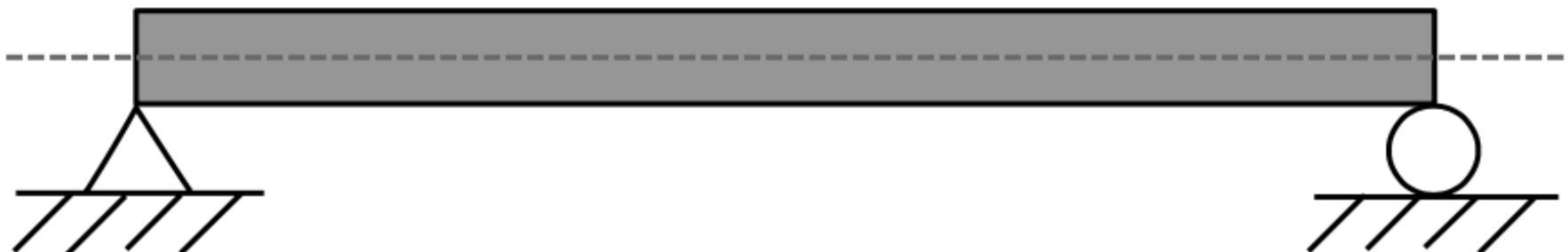


Image: Mircalla22 Wikipedia

# What Would an Engineer Do?

- American Society of Civil Engineers
  - Wind Speed
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# What Would an Engineer Do?

- American Society of Civil Engineers
  - Wind Speed
  - TIA-222GH Analysis
- Structural Design – Allowable Stress Design
- Structural Analysis Software
- Trailer

# Trailer lighting/brakes

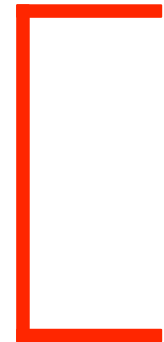
- Trailer sources
  - New or used utility trailer (already has registration)
  - Trailer kit (has certificate of roadworthiness)
  - Custom utility trailer (requires inspection)



# Trailer lighting/brakes

- Trailer sources
  - New or used utility trailer (already has registration)
  - Trailer kit (has certificate of roadworthiness)
  - Custom utility trailer (requires inspection)

# Utility Trailer Kit



**C-channels  
Formed from  
Sheet metal**

# Trailer lighting/brakes

- Trailer sources
  - New or used utility trailer (already has registration)
  - Trailer kit (has certificate of roadworthiness)
  - Custom utility trailer (requires inspection)

# TRAILERS: FEDERAL LIGHTING EQUIPMENT LOCATION REQUIREMENTS

**IMPORTANT NOTE:** Every lamp, reflex reflector, and conspicuity treatment (device) must be permanently attached in the location specified below and must comply with all applicable requirements prescribed for it by FMVSS/CMVSS 108. The face of any device on the front/rear and sides should be, respectively perpendicular and parallel to vehicle centerline, unless it is photometrically certified at installation angle. No part of the vehicle shall prevent any device from meeting its prescribed requirements unless an auxiliary device meeting all prescribed requirements is installed.

**In Canada:** Manufacturers and importers of vehicles must have the proper certification test records demonstrating compliance of lighting components with all prescribed requirements.

## BASIC EQUIPMENT REQUIRED ON ALL TRAILERS

DESCRIPTION				MANDATORY REQUIREMENTS			
Area	Equipment	(SAE Lens Coding)	Functional Purpose	Quantity	Color	Location	Height mm (in.) from the ground
1	Tail Lamps	(T)	Indicate vehicle's presence and width	Minimum 2	Red	On the rear - symmetrical - as far	380-1830 (15-72)

## BASIC EQUIPMENT REQUIRED ON ALL TRAILERS

DESCRIPTION				MANDATORY REQUIREMENTS			
Area	Equipment	(SAE Lens Coding)	Functional Purpose	Quantity	Color	Location	Height mm (in.) from the ground
1	Tail Lamps	(T)	Indicate vehicle's presence and width	Minimum 2	Red	On the rear - symmetrical - as far apart as practicable	380-1830 (15-72)
	Stop Lamps	(S)	Indicate braking	Minimum 2	Red	On the rear - symmetrical - as far apart as practicable	380-1830 (15-72)
	Rear Turn Signal Lamps	(I)	Indicate direction of turn	Minimum 2	Red or Yellow	On the rear - symmetrical - as far apart as practicable	380-2110 (15-83)
	Rear Reflex Reflectors	(A)	Indicate vehicle's presence and width	Minimum 2	Red	On the rear - symmetrical - as far apart as practicable-facing rearward	380-1530 (15-60)
2	License Plate Lamp(s)	(L)	Illuminates license plate	Minimum 1	White	On the rear - above or at the sides of license plate	No requirement
3	Rear Side Marker Lamps	(P2,PC* or P3, PC2*) <i>*photometrically certified at installation angle</i>		Minimum 2	Red	Each side at rear - as far back as practicable	380-1530 (15-60) no max. for veh. under 2.032m(80") wide



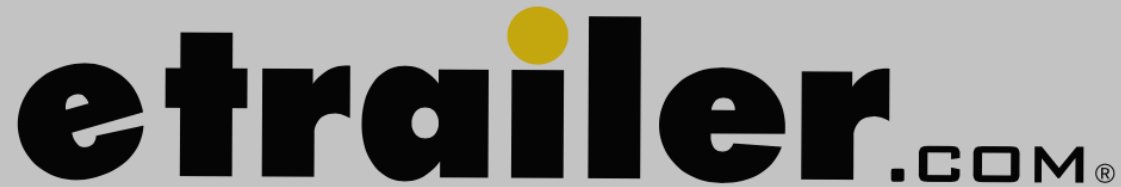
## ADDITIONAL EQUIPMENT FOR TRAILERS EXCEEDING THE FOLLOWING PARAMETERS

### LENGTH 9.1 m (30 ft.) OR LONGER

DESCRIPTION				MANDATORY REQUIREMENTS			
Area	Equipment	(SAE Lens Coding)	Functional Purpose	Quantity	Color	Location	Height mm (in.) from the ground
5a	Intermediate Side Marker Lamps	(P2 or P3)	Indicate presence of a long vehicle	Minimum 2	Yellow	Each side near center - facing sideward	380 (15) minimum
5b	Intermediate Side Reflex Reflectors	(A)	Indicate presence of a long vehicle	Minimum 2	Yellow	Each side near center - facing sideward	380-1530 (15-60)

### WIDTH 2.032 m (80 in.) OR WIDER

DESCRIPTION				MANDATORY REQUIREMENTS			
Area	Equipment	(SAE Lens Coding)	Functional Purpose	Quantity	Color	Location	Height
6	Rear Clearance Lamps	(P2, PC* or P3, PC2*) <i>* photometrically certified at installation angle</i>	Show vehicle's width - MAY NOT be combined with tail lamps	Minimum 2	Red	At widest point - symmetrical - on the rear or near the rear - facing rearward	As high as practicable - may be lower only if ID lamps are at the top
7	Rear Identification	(P2 or P3)	Indicate presence of a	Exactly 3	Red	On the rear - center, facing rearward - horizontally spaced	<u><i>in Canada</i></u> : at the top - maybe lower if door

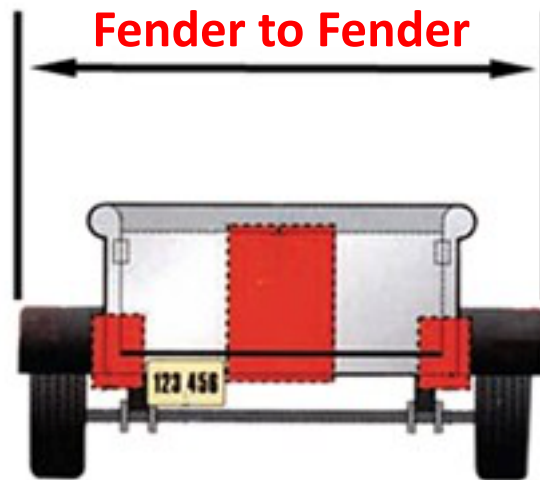


PRODUCT EXPERTS AVAILABLE NOW! CALL 800-298-8924

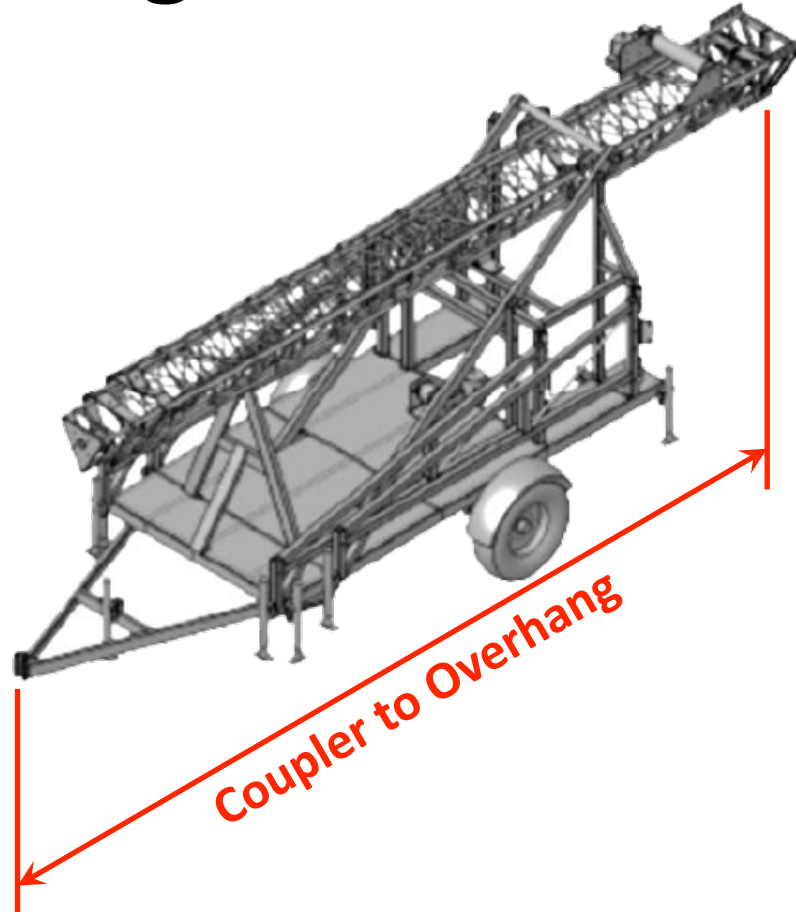
TOWING SPORTS & REC TRAILER VEHICLE RV & CAMPER

- Article “Trailer Lighting Requirements”
  - Explains CFR Title 49, Part 571, Section 108

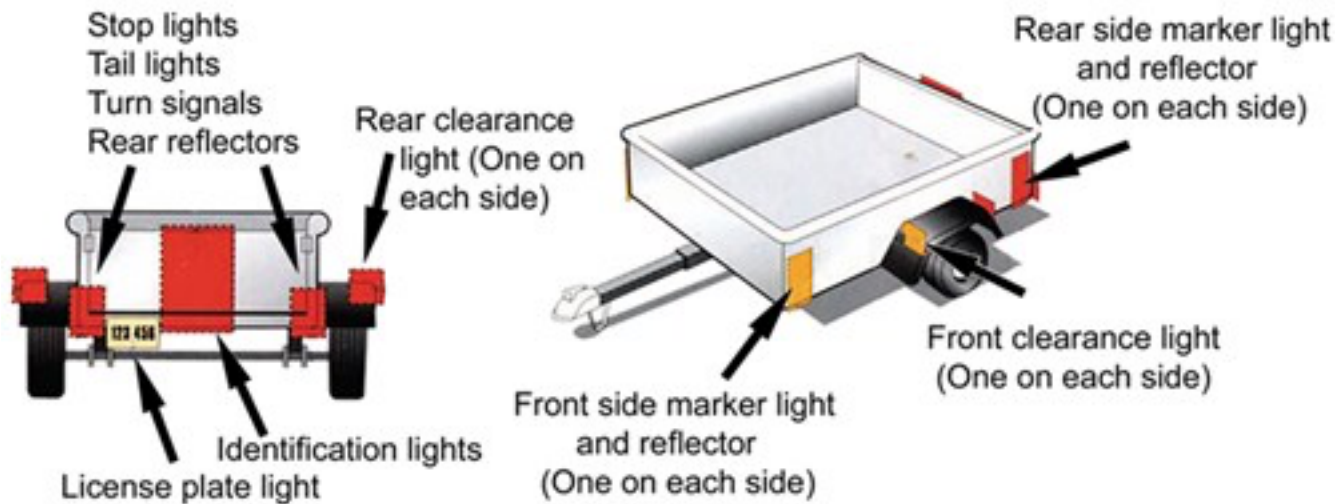
# Measuring the Trailer's Width



# Measuring the Trailer's Length



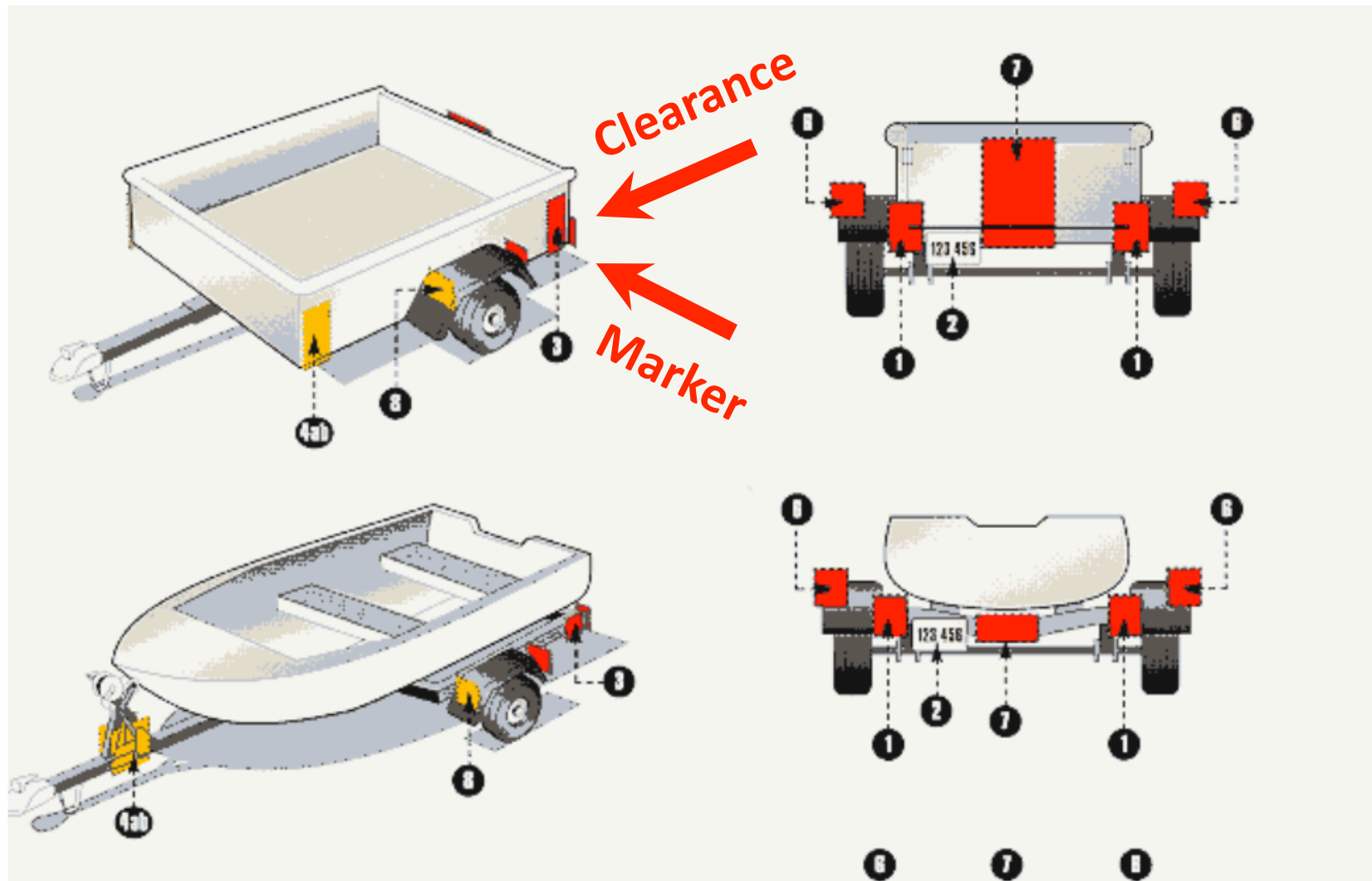
# Required Lights if $\geq 80''$ wide, $< 30'$ long





Required Lights	
2 Stop/brake lights	These functions are frequently found together in combination tail lights.
2 Tail lights	
2 Turn signals	
2 Rear reflectors	
1 License plate light	
2 Rear side marker lights	
2 Rear side reflectors	These functions are frequently combined into a single side marker light.
2 Front side marker lights	
2 Front side marker reflectors	Front and rear clearance lights can be combined on boat trailers.
2 Rear clearance lights	
2 Front clearance lights	ID lights are often grouped into a single light bar.
Rear identification lights	

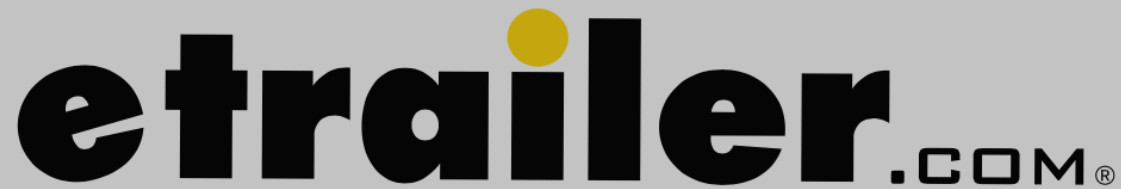
Required Lights  
if  $\geq 80''$  wide,  
 $\leq 10,000$  lbs



# “Identification” Lights



Vehicle  $\geq 80$ " Wide



PRODUCT EXPERTS AVAILABLE NOW! CALL 800-298-8924

TOWING SPORTS & REC TRAILER VEHICLE RV & CAMPER

- Article “Trailer Lighting Requirements”
  - Explains CFR Title 49, Part 571, Section 108

<https://www.etrailer.com/faq-trailer-lighting-info-and-regulations.aspx>

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Per California Vehicle Code (CVC), loads extending to the front and rear of a vehicle, trailer or semitrailer have maximum limits. The CVC Length Section is [35400](#). Following is a selective paraphrase of the CVC. It is not guaranteed and may be subject to change.

### REAR LOADS

#### TO THE REAR:

Per CVC [Section 35410](#), the load upon a vehicle, trailer or semitrailer shall not extend to the rear beyond the last point of support for a greater distance than that equal to **two-thirds of the length of the wheelbase**. The wheelbase of a semitrailer shall be considered as the distance between the rearmost axle of the towing vehicle and the rearmost axle of the semitrailer.

#### MAXIMUM LENGTH FOR VEHICLE AND LOAD:

Per CVC [Section 35411](#), the load upon any combination of vehicles shall not exceed **75 feet** measured

[California Governor](#)[Gavin Newsom](#)[Visit Governor's Website](#)[Caltrans Director](#)[Laurie Berman](#)[Caltrans](#)[Division Chief](#)[Jasvinderj](#)[Bhullar](#)[Traffic Operations](#)[Legal Truck Access Link](#)[Legal Truck Access HOMEPAGE](#) | [Other](#)[45' Buses & Motorhomes](#)



### LAMP OR FLAG ON PROJECTIONS:

Per CVC [Section 24604](#), whenever the load upon any vehicle extends, or whenever any integral part of any vehicle projects, to the rear **four feet** or more beyond the rear of the vehicle, as measured from the taillamps, there shall be displayed at the extreme end of the load or projecting part of the vehicle:

- a single solid **red or fluorescent orange flag or cloth** not less than **18 inches square** if the projecting load is **two feet** wide or less. **Two warning flags or cloths** are required if the projecting load is **wider** than two feet. Flags or cloths shall be located to indicate maximum width of loads that extend beyond the **sides or rear** of the vehicle.
- **during darkness**, in addition to the required taillamp, **two red lights** with a bulb rated not in excess of six candlepower plainly visible from a distance of at least 500 feet to the sides and rear.

Status

**But . . .**

There ~~was~~ <sup>4</sup> a Surprise <sup>s</sup> . . .  
           <sup>were</sup> ^

There were 4 Surprises . . .

**1**



# There were 4 Surprises . . .

- My financial advisor is concerned with liability
  - Surprise #1
    - “If you build the trailer, then you’re liable.”

2

# There were 4 Surprises . . .

- My financial advisor is concerned with liability

- Surprise #1

- “If you build the trailer, then you’re liable.”

- Surprise #2

- “If you bought this trailer, would it make you happy?”

3

# There were 4 Surprises . . .

- My financial advisor is concerned with liability
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“If you build the trailer, then you’re liable.”
  - Surprise #2

“If you bought this trailer, would it make you happy?”
  - Surprise #3

“I think you can buy this trailer.”

**TOWER TYPE:** Self-supporting, extendable, manual crank-up tower.

**SPECIFICATIONS:**

**TOWER HEIGHT:** Extended 33 feet. Retracted 13 feet.

**TOWER SUPPORT:** Self-supporting, with guys for pointing accuracy.

**LOADING:** Engineering analysis indicates the tower will support a square foot of platform area at winds of 85 MPH 3-second gust wind per ANSI/TIA EIA 22 Rev G.

**DEAD LOAD:** The maximum dead load is 3000 lbs.

**SECTIONS:** The tower is made from 4 1/2 foot welded sections, #6, #7 and #8.

**DESCRIPTION:**

The tower is complete with gearbox, drum and hoisting cables, and is designed to extend the tower telescopic sections uniformly.

The tower has pulley frames on two faces. The lifting cable is 1/4 x 7 x 19 aircraft cable.

Because of high strength tubing and the bracing of solid rod, this design is considered to be the strongest engineering configuration for towers, yet saves weight, resists torsion load and reduces wind resistance, allowing more useful load to be installed on the tower.

**TRAILER TYPE:** Single axle equipped with a system of stabilizing and leveling.

**SPECIFICATIONS:**

**TRAILER SIZE:** 7'-5" wide x 17'-7" long

**TRAILER CAPACITY:** 6000 lbs

**GROSS VEHICLE WEIGHT:** 3500 lbs with Tower

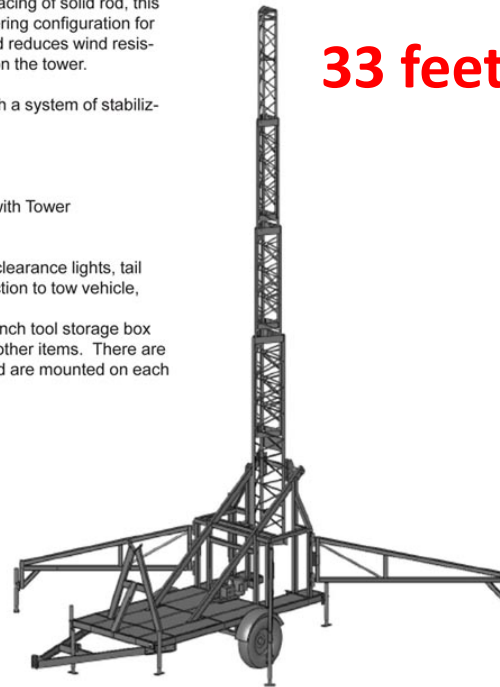
**DESCRIPTION:**

The single axle trailer has electric brakes, clearance lights, tail lights, turn signals, brake lights, a tow pin connection to tow vehicle, adjustable lunette eye attachment ring.

The trailer is equipped with a 18 x 18 x 30 inch tool storage box for the storage of pins, tools, ratchet straps, and other items. There are 4 guy cable reels, which store the guy cables and are mounted on each of the 4 outriggers.

33 < 37

33 feet





**TOWER TYPE:** Self-supporting, extendable, manual crank-up tower.

**SPECIFICATIONS:**

**TOWER HEIGHT:** Extended 55 feet. Retracted 21 feet.

**TOWER SUPPORT:** Self-supporting, with guys for pointing accuracy.

**WIND LOADING:** Engineering analysis indicates the tower will support 20 sq ft of projected area at winds of 85

MPH 3 second gust wind per ANSI/TIA EIA RS 222 Rev G.

**DEAD LOAD:** The maximum dead load is 300 lbs.

**SECTIONS:** The tower is made from 3 each 20 foot welded sections #6, #7 and #8.

**DESCRIPTION:**

Tower is complete with 40:1 gearbox, drum and hoisting cables, and an upright tilt winch.

The tower is designed to extend the tower telescopic sections uniformly.

The tower has pulley frames on two faces. The lifting cable is 1/4 x 7 x 19 aircraft cable.

Because of high strength tubing and the bracing of solid rod, this design is considered to be the strongest engineering configuration for towers, yet saves weight, resists torsion load and reduces wind resistance, allowing more useful load to be installed on the tower.

**TRAILER TYPE:** Single axle equipped with a system of stabilizing and leveling.

**SPECIFICATIONS:**

**TRAILER SIZE:** 7'-5" wide x 17'-7" long

**TRAILER CAPACITY:** 6,000lbs

**GROSS VEHICLE WEIGHT:** 3,000 lbs with Tower

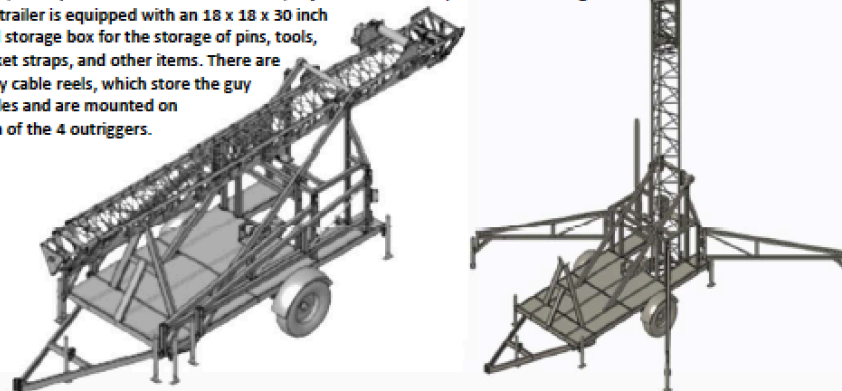
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51 feet



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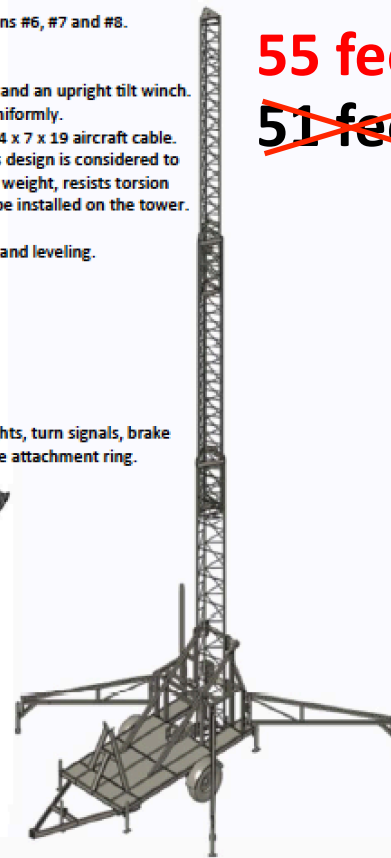
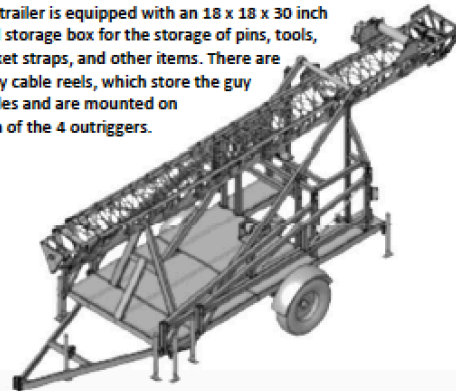
**TRAILER CAPACITY:** 6,000lbs

**GROSS VEHICLE WEIGHT:** 3,000 lbs with Tower

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55 feet  
~~51 feet~~

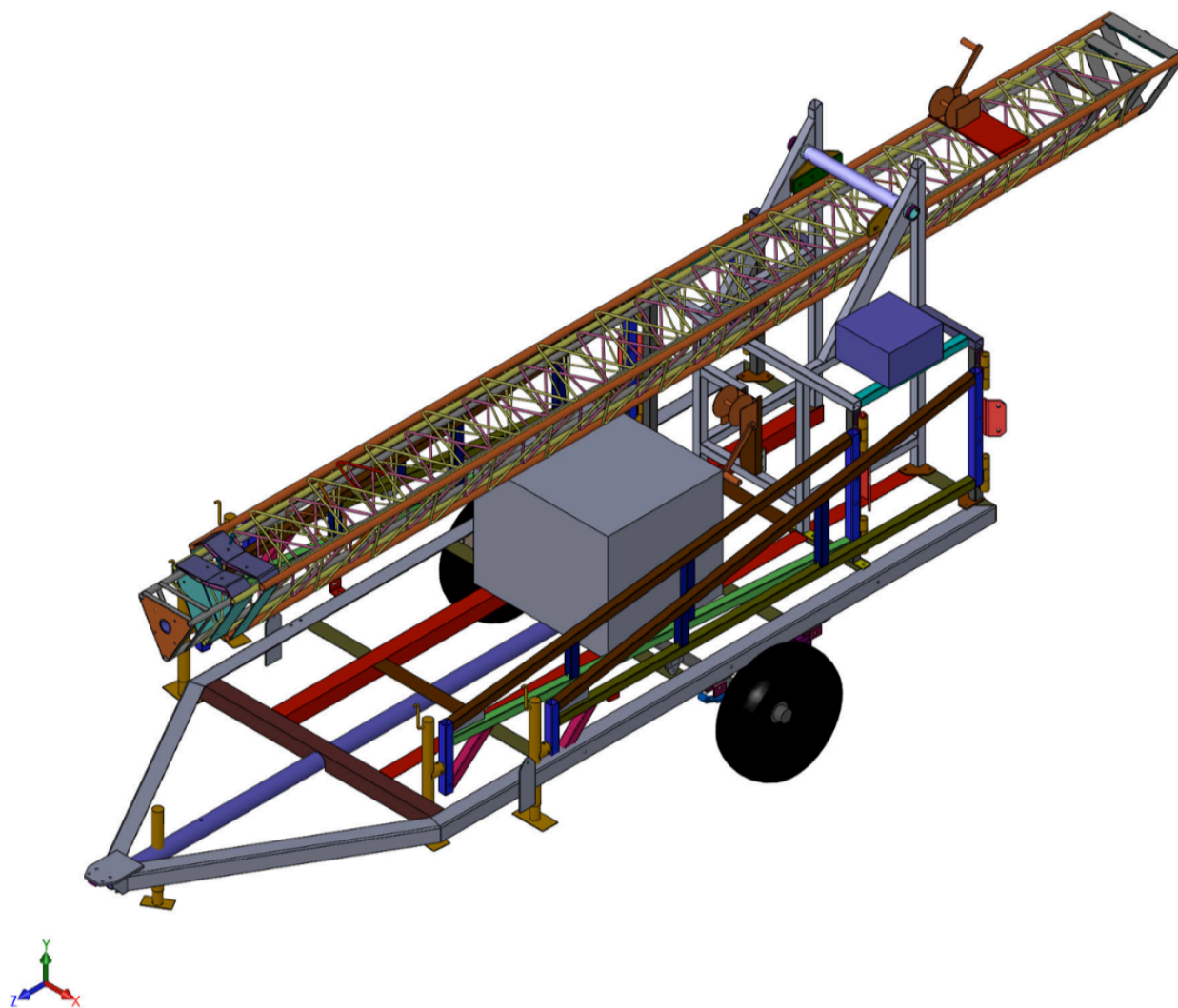
**4**

# There were 4 Surprises . . .

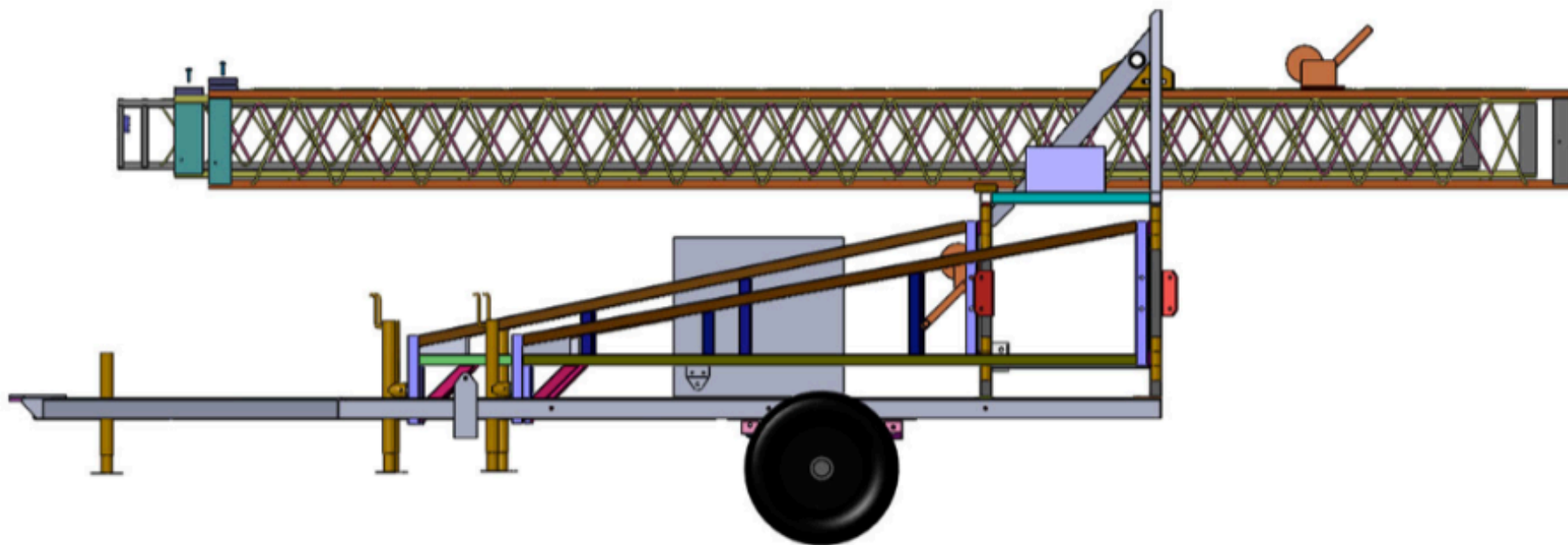
- My financial advisor is concerned with liability
  - Surprise #1  
“If you build the trailer, then you’re liable.”
  - Surprise #2  
“If you bought this trailer, would it make you happy?”
  - Surprise #3  
“I think you can buy this trailer.”
  - Surprise #4  
UCSC may get a tower trailer

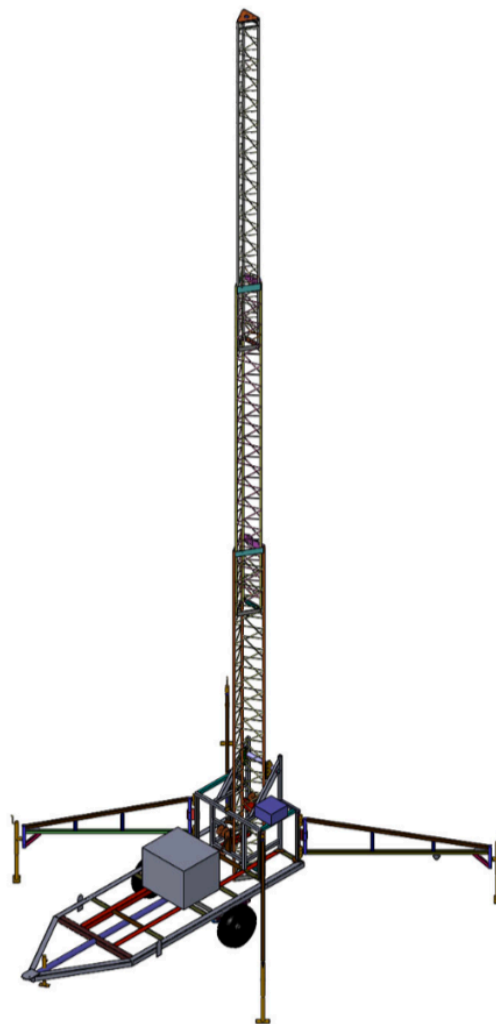
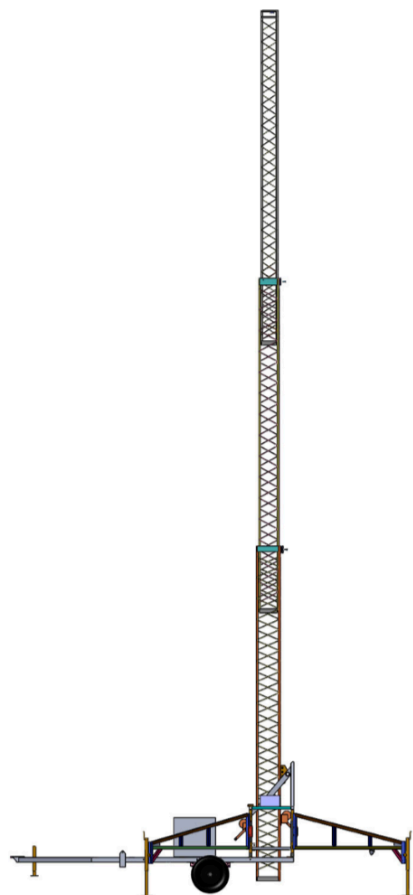
# Status

- Mid March: accepted quote
- April: prepared parking on my property
- Mid May: day trip to Fowler for pick-up









# Customization

- PVC pipe for antenna storage
  - 8" Sch 40 (8" ID)

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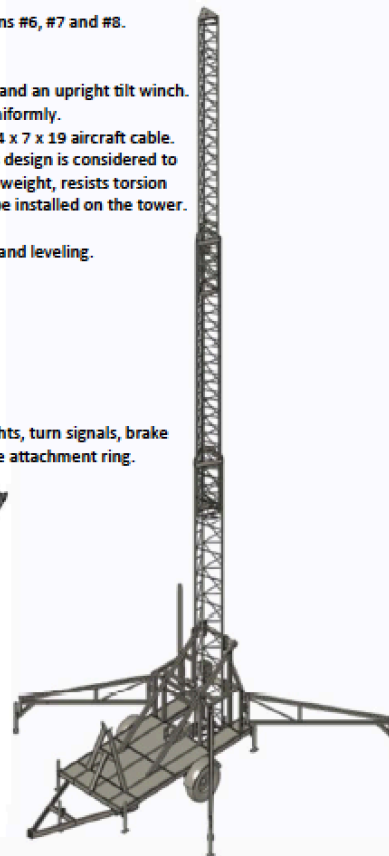
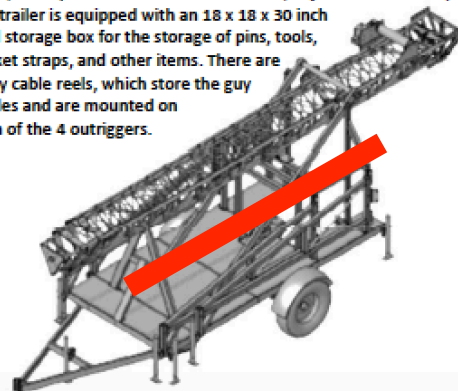
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# Customization

- PVC pipe for antenna storage
  - 8" Sch 40 (8" ID)
- Winch adapter for right-angle drill (*maybe*)







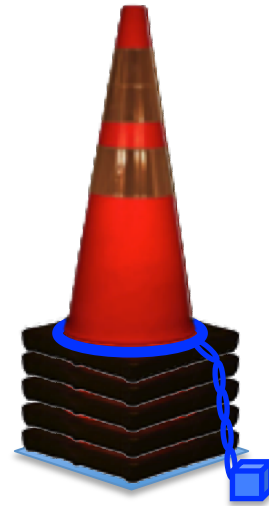
# Customization

- PVC pipe for antenna storage
  - 8" Sch 40 (8" ID)
- Winch adapter for right-angle drill
- Traffic-cone Storage

# Traffic Cone Storage



# Traffic Cone Storage



# Customization

- PVC pipe for antenna storage
  - 8" Sch 40 (8" ID)
- Winch adapter for right-angle drill
- Traffic-cone Storage
- Winch-locking brackets (to reduce liability)

# Customization

- PVC pipe for antenna storage
  - 8" Sch 40 (8" ID)
- Winch adapter for right-angle drill
- Traffic-cone Storage
- Winch-locking brackets (to reduce liability)
- Signs ([mysafetysign.com](http://mysafetysign.com))



**DANGER**



**Do Not  
Climb  
Tower**

SmartSign.com • 800-952-1457 • S-8191



YouTube

tower climbing



## World's Tallest TV Tower Climb without Safety Equipment (475m)

Urban Endeavors • 1.5M views • 3 years ago

Do not mess around on these towers! There are dangers you can't see like radiation and electrocution. After 3 months of steady ...



## climbing highest tower in the world BY WATCH MORE

Watch More • 5.5M views • 2 years ago

PLZ SUBSCRIBE FOR MORE VIDEO -climbing highest tower in the world – views by WATCH MORE  
MUSICE BY- High [NCS ...



## CLIMBING THE SIDEMEN TOWER (ARRESTED)

Night Scape ✓ 4.9M views • 2 years ago

So this week i decided to keep my promise and climb the Sidemen tower! (goon tower). It was sketchy af but still a crazy ...



## climbing antenna spire ends horribly...

ILLSIGHT ✓ 2.1M views • 1 year ago

Thanks for watching this video! In this video, me and DyingLlama made it to the top of a building that I've always wanted to climb.







**! DANGER**



**DO NOT CLIMB  
TOWER WILL  
COLLAPSE**

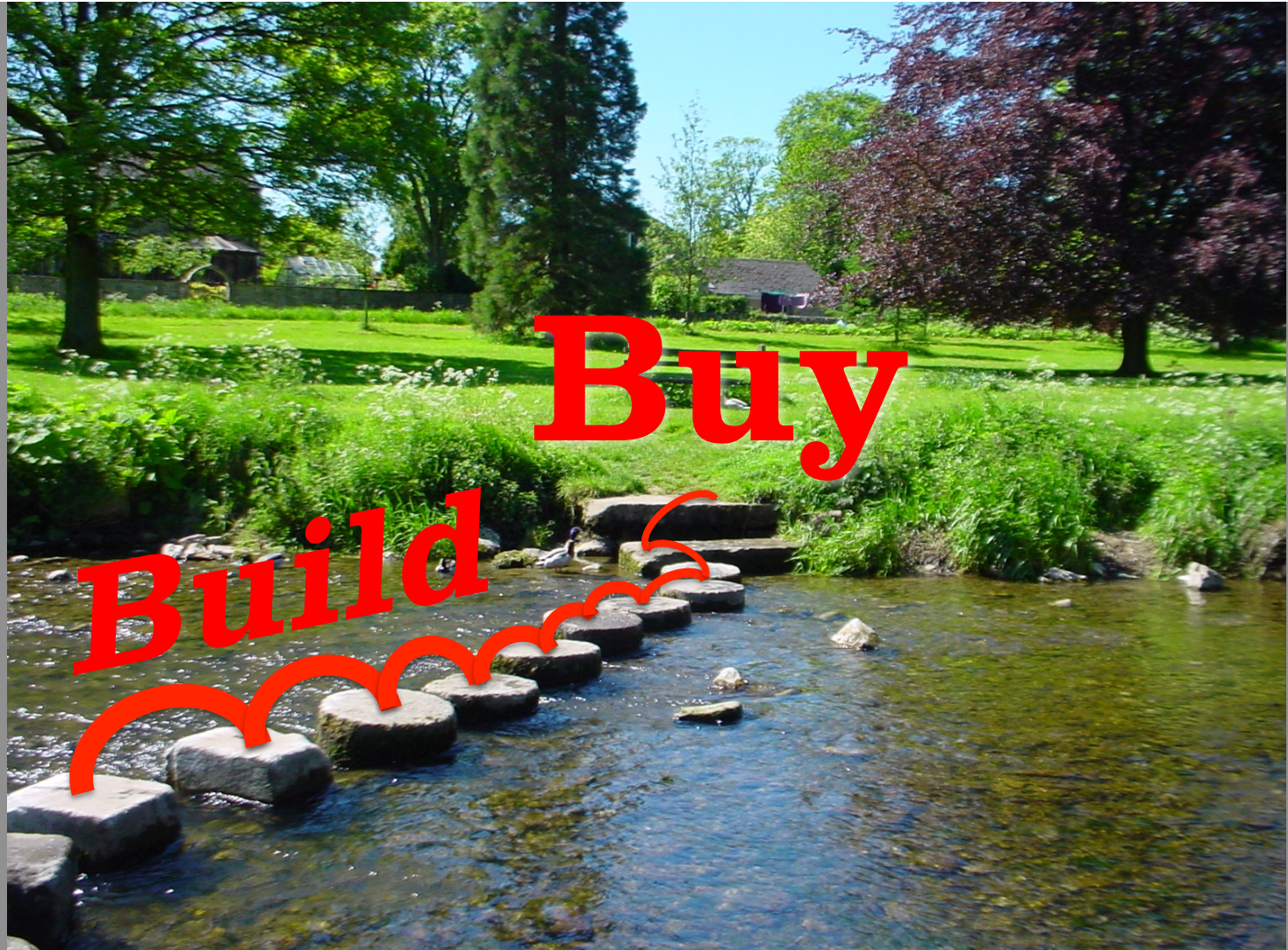
# Tower Trailer for Field Day

Kerry Veenstra

SLVARC

April 2019





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**SPECIFICATIONS:**

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55 feet

