Guying a Portable Vertical Fiberglass Antenna Mast

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When I was a newly minted General, watching me trying to erect my 32' MFJ fiberglass push-up pole and guyed it all by myself must have been worthy of a lawn chair and some popcorn. Trying to figure out how long the guy ropes needed to be, where to stake them into the ground, AND do it by myself was quite comical to watch!

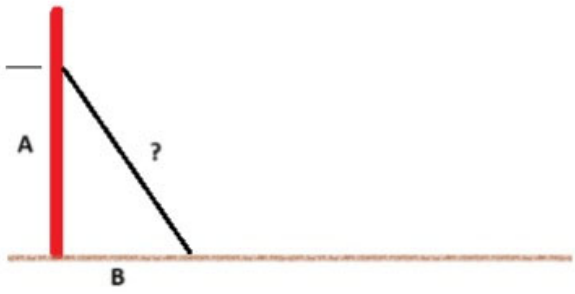
If you've had this problem, here is your solution. It only requires a little math, but don't worry, it's math that even I can figure out with the help of a calculator.

For this example, we will assume you need 3 guy ropes. You will need to know two measurements before we start: 1] how high up the mast the guy ropes will attach *(A in the drawing below)*, and 2] how far out from the bottom of the mast base the guy ropes will be staked into the ground *(B in the drawing below)*. The distance from the base of the mast to the stake should be about 80% of the height where the guy will be attached to the mast (B/A=%, or 16/20- 0.80).

A = Guy rope point on mast above the ground

B = Distance from mast base where the guy will be staked into the ground

? = How long the guy rope needs to be



We will use these known measurements:
A = 20 feet
B = 16 feet
? = How long the rope needs to be

Multiply A by itself: A x A = X (so 20 X 20 = 400)
X = 400

Multiply B by itself: B x B = Y (so 16 x 16 = 256)
Y = 256

Add X and Y together: 400 + 256 = 656

To find ?, figure the square root of 656. On your calculator, enter 656, then hit the √ button.
√ 256 = 25.615 feet

So your guy ropes need to be just over 25-1/2 feet long.

Once you know how long each of the guy ropes needs to be, we can start laying everything out on the ground. Start by fully extending the mast on the ground. Now would be the time to attach the antenna too.

Using a piece rope or paracord, tie a figure eight on a bight in the rope's end (or just tie the rope around the mast). This will be our measuring rope. Stretch the measuring rope out 90° from the base of the mast. Take one of the guy ropes that is already attached to the mast *(in this example, it's attached 20' up from the bottom)* and attach a ground stake. Pull it out until the stake and the measuring rope meet. Mark this spot on the measuring rope by pinching it with your fingers.

Keeping the measuring rope tight, walk it back toward the mast until you are at roughly a 120° angle to the end of the mast. Poke the stake in the ground at the point where you are pinching the rope. Repeat for the other side.

At this point you will have the third guy rope attached with a stake ready to go into the ground. Start walking the mast upright until the two staked guy ropes are tight. Then take ahold of the third rope, and keeping tension on it so the mast doesn't fall backwards, walk it out until it's tight, and stake it in the ground. To lower the mast, just repeat these steps in reverse order.

Red = Mast
Black = Guy ropes
Green = Measuring rope

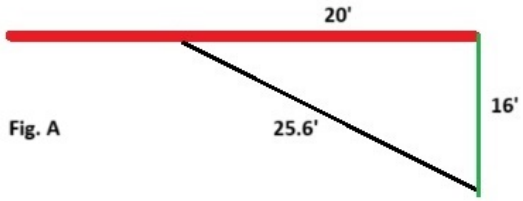


Fig. A

- Pull one end of a guy rope out to be in the position it would in if it were staked in the ground.

- Pull measuring rope out at a 90° angle to the mast and measure to where the stake will be in the ground.

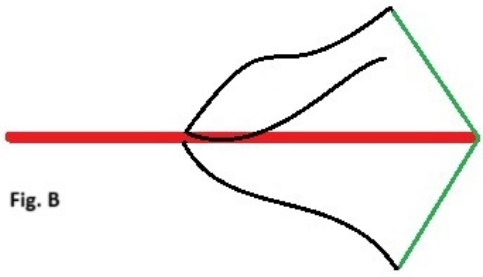


Fig. B

-Walk the measuring rope and the stake back to an angle of 120° from the mast.

- Insert stake there.

- Repeat for the other side.

- Walk the mast upright until pulled tight against the two guys, then pull the third guy tight and stake.