SHAK NOWTZ BY "MAD" FRANK - G3ZMF

SHAK NOWTZ No 8 – Antenna Rigging & Erection

***Editor's Note**: When I worked in the Telecommunications industry, the "Gin Pole" method of raising a mast or tower as described below by Frank, G3ZMF, was known as the "Falling Derrick" method. There is a school of thought that defines a Gin Pole as a vertical or near-vertical pole on top of another structure that is used to raise, for example, an additional tower segment onto the top of an already erected structure. However, in this article, we have used the term "gin pole" as it is in common usage locally although it is, essentially, the falling derrick method. Google returns 8000 radio-related entries when searching for "gin pole" but only 400 when searching for "jin pole". We have therefore used the "gin" spelling throughout.*

Introduction

Happy New Year everyone, hope you had a good one and Santa brought you all the pressies you asked for.

It's time to get that mast in the air … safely …. I have always stood by the principle of 4-way guying. Not only for safety reasons but because it also means you can raise a 20 metre mast with very few people, and even fewer people are required to lower the mast for antenna change or repair although use of a block and tackle may be advisable or even essential.

I have also been researching into knots. You will find some pointers to useful sources of information at the end of this article.

Small Masts

Going up in stages of increasing height, at 15 to 20 feet generally two people can raise a mast safely, one on the base to keep it grounded and the second to "walk up " the mast – but not before you have set out and secured all the guy ropes. (See fig 8.1.a)

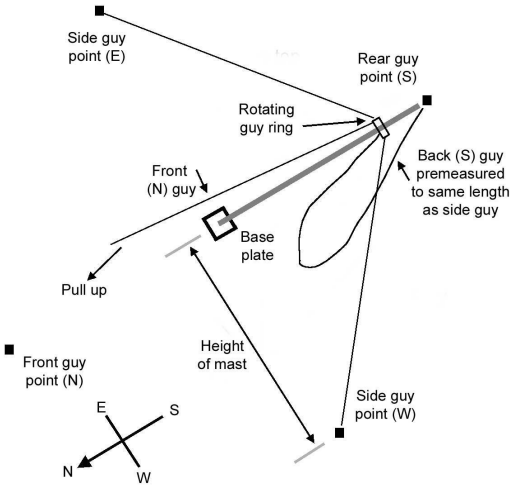

Fig 8.1a - Basic guying arrangement for simple small mast (plan view)

Guying stakes should be, as near as possible, at 90 degrees to each other and equidistant from the base of the mast. The easiest way to achieve this is by using a triangle of rope or string with a loop at each "corner." See fig 8.1 b below:

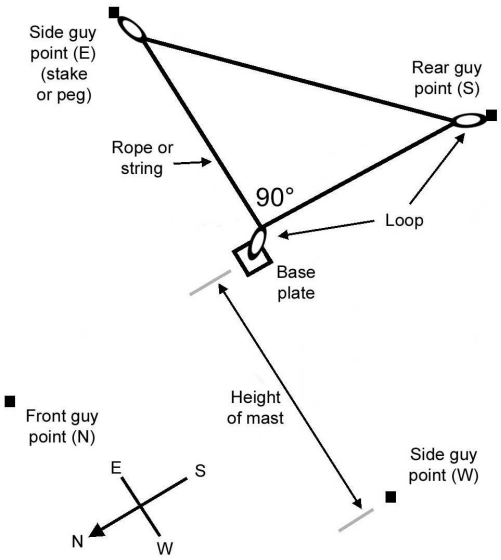

Fig 8.1 c: Arrangement recommended by G3ZMF for accurately setting out guying points

The two "short" legs are from the base point of the mast, to two of the guying points (say South and East.) The long leg forming the triangle goes peg to peg, South peg to East peg. Two pegs in – two to go. Leave the South peg rope where it is and transfer the East peg to the West pegging point and put a peg in. Three down, one to go. Now transfer the South peg to the North pegging point and put your peg in. Now check for alignment by sighting the far peg from where you stand, eg North looking South, and check that the base point is exactly in line. If not, recheck the triangle rope lengths. To get a 90 degree angle, use the same method that the groundsmen use on football pitches. A triangle of 3 ft x 4 ft x 5 ft made of wood (say 1" by 2") - see fig 8.1c below:

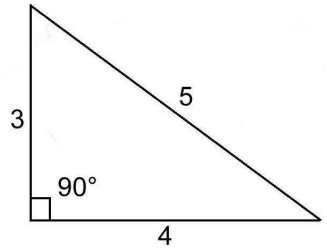

Fig 8.1c: 3, 4, 5 triangle as used for setting out ropes at a right angle (90 degrees)

Before you raise either the gin pole or the mast make sure that the mast base cannot move. Don't forget that there will be very large stresses at this point. Try to use some form of anchored and pivoting connection from the main mast to the base plate. If a rotator is to be fitted at the base, fix it after the mast is up to avoid strain on the rotator. **Slacken guy ropes slightly and lift up bodily 10 to 15 inches and slot the rotator in.**

Now your main mast is in the ground and ready to have its guys attached. Again, for ease of reference, the mast lies to the south of the base point. Tie off the east and west guys firmly. Now take the South guy which will effectively be the back guy to either the East or West guy point and mark, or grip tight, to this distance. Now secure this back guy to the South stake. Yes, it is loose, but when the mast is vertical the back guy will be there (a) to stop the mast going over the top and (b) means that only on the North side will any effort be needed to pull the mast up into place.

Medium Masts

By the time you are thinking about higher masts, you should also be thinking about a gin pole, shorter than the main mast, but effectively pulling up the mast from 10 feet or more above ground. (See fig 8.2.) The purpose of the shorter gin pole is to apply a lifting force from a high vantage point, so reducing the overall pull required, plus avoiding the dreaded banana mast system. (Seen it, done it, had to straighten the poles!)

In the same way as guying the main mast, the gin pole must have its side (East + West) guys secured. As in the back guy of the main mast, the front (North) guy is pre-measured and securely tied to the top of the gin pole. Then, either a gin rope or a block and tackle is fitted from the top of the gin pole to the front (North) guying stake.

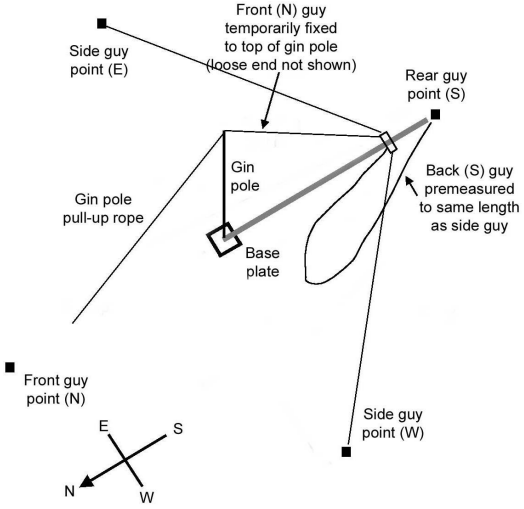

Fig 8.2 a: Using a gin pole (falling derrick) to raise a large mast. Note that for simplicity only one set of guys is shown here: in practice two sets would be advisable, one set attached to the top of the mast arrangement and the other around halfway up. Also, for simplicity, additional gin guying is not shown but may be needed for a large installation.

Pull/ push up the gin pole to the vertical and fix the mast's North guy to the top of the gin pole. Then secure the gin pole's side guys (east plus west) if used. Heave away on the gin pole and pull up the main mast – but do not disconnect

the gin from the mast guys yet! Check that the mast is vertical with respect to the two side guys (East + West) plus the back guy (South).

Adjust all guys to get it right.

Now carefully lower the main mast, preferably onto some form of support below where the lower antenna or rotator will be, so that the mast can be rigged. Test those aerials at ground level if you can. Then up we go, carefully not forgetting to secure the coax antenna feeders and rotator cable to one of the main mast side guys for support. You don't want a cable breakage due to wind etc once the contest starts and the "rigging crew" have gone down to the pub or chip shop!

Carefully transfer the front (north) guy from the gin mast to the north ground stake, stand back and admire your efforts!

The gin pole can now be removed until it is needed another time.

Large Masts:

Now we move onto "monster" or "heavy head load" masts. In this situation for say a 66 ft (20 m) mast, the 10 to 15 foot gin pole cannot provide a good lift while minimising bending stresses. So we use the gin-gin system – basically a 12 to 15ft (3-5 metre) gin is used to pull up a 33 to 39 ft (11 to 13 metre) gin, which is then used to erect the main structure.

The procedure for mast and main gin is the same as for a single gin, but now the primary gin must be side-guyed with one side guy to the North stake and the other to the South stake. Check and recheck that your guys will not cross or tangle. Once the main gin is in place, the smaller gin pole can be put away until it's time to de-rig the system. (See fig 8.3.)

The advantage of not fitting the antennas before the mast has been test-erected is that the larger gin pole will be clamped to the main mast and butted up as close as possible to the main ginning point. Otherwise, follow through the safety rigging system as before.

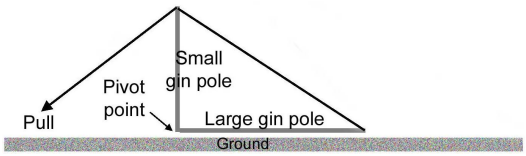

Fig 8.3a: Using a small gin pole to raise a larger one

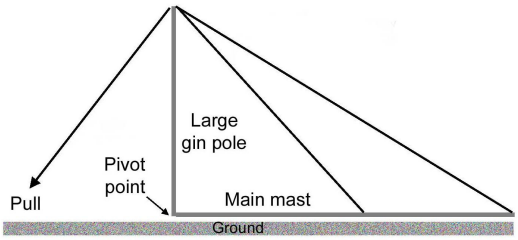

Fig 8.3b: Subsequently using the larger gin pole to raise the main mast

Knots:

There are many on-line sources of information about knots and how to tie them. I recommend the following site, because it illustrates 18 knots from bowlines to sheepshanks, from anchor hitches to sheet bends, and if you click any of the 18 images you will see a short animation of how to tie that particular knot:

www.tollesburysc.co.uk/Knots/Knots_gallery.htm

Future issues of Shak Nowtz will cover "Slim Jim" antennas and "Homebrew Test Kit & Things". I also plan to write one that will be a collection of handy circuits. However, if there's anything else that you would like to see covered in a future issue of "Shak Nowtz", please let me know and I'll see what I can do. Have fun!

73 de Mad Frank G3ZMF

[1] Knots and Splices by Colin Jarman, published by Adlard Coles Nautical, ISBN 0-7136-7748-1