

Introduction:

Telecommunications includes electronic radio towers to elevate their antennas. This is because most radio stations in the telecom world use frequency bands that produce "line-of-sight" signals. Therefore, in most cases mounting such antennas a high as practical is best. Normally, the radio station equipment is in a building on the ground floor, which the antennae are up on a metal tower. There is a point of diminishing return between these two areas. The best arraignment is most antennas are from twenty feet to a thousand feet. The latter is normally used for broadcast stations.

Installing the transmission line and antenna can be a difficult and dangerous task at times. The Author is performing on-going research for tools and methods to better address these issues. This unit does that.

Many times antennas are mounted on the side of a radio tower. There are some reasons for this.

- Cost; transmission line, especially the larger type is expensive.
- Safety; Staying lower is less effort against the elements such as wind.
- Lighting; even though lighting is unpredictable it's possible the antenna is less likely to sustain damage from a nearby or direct hit. The antennas on the top of the tower could act like lighting rods and take most of the punishment.
- Strength in with ice and wind loading. A side mount antenna can have a middle and/or top support to help with this loading problem. The top antennas just bend over and sometimes break.

Overview:

As previously mentioned side mounted antennas have advantages. However, this can make installation complicated and dangerous, especially if the antenna is very large and heavy. By including the antenna bracket for one hoist seems like a good idea, simplifying the install. However, the Author discovered this is a bad idea when mounting on the side of the tower with a bracket extension about three feet from the tower leg. Therefore, a Jin pole horizontal extension was designed and built by the Author. This will be shown later in this document.

This unit addresses most if not all issues. The unit comes apart in three sections making hoisting to the mounting location easy. There are some nice anchor points on each piece so carbiners can be clipped on and remove (later) easily.

The unit is assembled near the tower face at the location/ height of the antenna to be mounted. Next, the jin pole (if used) is mounted on this unit. Then, the unit is swung out to line up with the existing tower extension mount. Now, it's a relatively easy task to hoist the antenna (and possible it's brackets) to set it in the side mount area and tighten the bolts there. As an alternative the antenna can be hoisted prior to swinging the unit out. Each install may have different challenges such as other antennas, ice shield and guy wires obstructing the hoist path. There is also a locking pin to prevent the wind from swinging the boom unexpectedly.

Because of the Jin pole in use the pulling side of the rope is pretty much straight down therefore, a loop "bitch" line may not be possible. Therefore, a separate bitch line would be good.

Installations:



As previously mentioned, many antennas are side mounted for several reasons. The one last reason is for directivity for lighter built antennas such as this one. The open loop type is very good electrically however, can be damaged by ice loading. By mounting it close to the tower leg and supporting on the bottom and top improves it survivable greatly. This also provides great "gain" in the cases where a certain area of coverage is needed.

However, for many omni-directional antennas they cannot be mounted that close to the tower legs and must be away from it. The "three-foot" standard optimizes the best radiation pattern. These various type of mounts provide just that. Shown here are some light duty types.





These two examples below are for icing conditions therefore, are built for heavy duty:







Lifting types:

One idea is the "derrick" type of lifting device and was being considered by the Author. However, because of the weight and complexity of such tool it was scrapped in favor of the unit described in this document.

The left image below shows the principle of a conventional jin pole. Each installed section then becomes the anchor point for the next section. The right image shows another example of the jin pole.





Specifics (just a recap):

However, this does not address the issue of having to reach out three feet to install an antenna. The Author designed and built this prototype unit, being an extension for a jin pole. Shown here is the simplified unit showing the three sections (no pun). It's set up as a tube (pipe) in a tube (pipe) for swinging the boom in and out. The bracket sizes can be easily changed for different tower leg sizes. The locking pin prevents the boom from popping up and out or swinging out of control. In the event you need additional strength with the square tubing you can weld some flat on each side of it. The unit is color coded to indicate which way is up; Blue for the sky and white for the snow on the ground. The next page shows the complete unit. The unit is not hot dipped galvanize because it's a "tool" and not a permanent item at the site making hardware easy to find locally. There are "rings" on each piece for an easy anchor point for hoisting them (actually, square rings). The boom section is bolted together. Therefore, the unit can be broken down to a smaller arraignment for packing or shipping.



Any "standard" jin pole can be used. Pulley inside K3-Jin extension NOT to scale Pipe OD same as Rohn 45 leg so any generic jin will fit. enna not to scale Jin pole Pipe in a pipe with locking pin Optional short rope to Flange release the half loop C Half loop for hoisting Brace Large brackets to the Swings tower leg DNR supplied side mount Baltr tarecure tubing Top 10' section Rope direction Carabiner attached for easy release Antenna brackets П Г Tower side mount 1 U-Bolts Perhaps Leg 36" 2 1/2" a bitch line? bolts Pipe Tower SE leg Detail "A" Locking pin Pipe in a pipe Boom Inner pipe Rubbing/bearing point Detail "B" Top view 11/4" ST 11/2" ST x 0.120" x 0.095" 0 0 Bolts/nuts Optional side reinforment

This is the complete unit show attached to a tower leg. There are two sets of leg brackets; one for 4" O.D. and the other for 5" O.D. legs. Future brackets can be fabricated for larger legs.

Shown on the left is a preliminary test of the prototype unit in the shop. Since the effective length of the unit exceeds the normal three-foot standard the jin pole can be position as shown to bring antenna-positioning distance away from the tower leg. The pipe on the far right of the left image is only to simulate a tower leg and it not part of the unit. Painting is not completed at this point.



Below shows the locking pin inserted. The prevents the boom from accidentally popping out or swinging in the wind out of control.



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