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# The Pleasures and Perils of Crankup Towers

## —don't lose your head!

A tower is well known as one of the most beneficial station accessories an amateur may own. Standing as an outdoor monument to our superb world of long-distance communica-

tions and international friendships, the amateur's tower supports that final and most important link in his setup—the antenna. The height of such towers is usually a compromise influ-

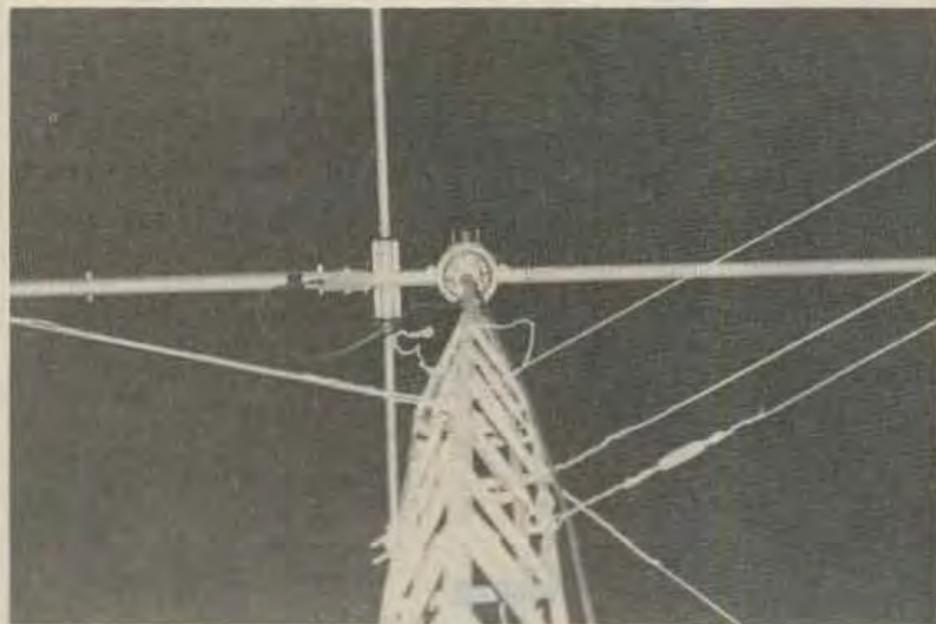
enced by cost, self-serviceability, and neighborhood acceptance.

Recently, the somewhat limited in height but highly versatile crank-up tower has gained renewed interest in amateur circles. This article will present some vital information concerning crank-up towers so that the reader may be made aware of their favorable and unfavorable aspects. In some situations, this information may provide new light for cliff-dwelling amateurs. In other situations, this information may help prevent serious personal injury to unsuspecting owners of crank-up towers. This is not to imply that crank-up towers are excessively dangerous, but rather to remind that there are right and wrong ways for using these antenna supports.

### The Pleasures

Zoning laws and neighborhood restrictions are affecting an increasing number of radio amateurs each day. Unfortunately, it's becoming more and more difficult for amateurs to erect a simple triband beam on a reasonably-sized tower (40 to 50 feet). Quite often, this problem is solved with the aid of a crank-up tower mounted out of view behind a house. The antenna may thus be raised above roof level only during periods of actual on-the-air use. Additionally, if this activity is confined to night hours, darkness can cloak the raised array.

Many amateurs are not able to climb towering heights (no pun intended!) and must forego antenna tuning or repairs until a



*A triband beam on the crank-up tower nestles in its fully-retracted position awaiting the impact of an approaching late-night storm. The photo was taken at midnight with flash and 400 ASA film.*

suitable "antenna party" can be organized. Crank-up towers, however, may be erected initially against the side of one's house, and future changes or repairs may be made by the amateur while sitting or standing on his roof. If the tower is secured to the house, it may be used as a ladder to access the roof. Warning: Never climb a crank-up tower that isn't securely lowered to its resting position. An inside section could slip and break an arm, leg, or foot.

Adequate guying is another sensitive area of tower installations. Many times, upper level guys require more real estate than an amateur can provide. Limiting reasons range from guy wires obtrusively crossing established boundaries to unwarranted TVI complaints from neighbors. Two-section crank-up towers which are raised to full height only during use need to be guyed only at roof level (near the top of the lower section).

The wind-load rating of a lowered crank-up tower is much greater than a comparable full-height tower. Here in Alabama, for example, our crank-up tower and triband beam have "rode through" many extreme storms and tornado side-effects with no damage while smaller towers and antennas have been totally destroyed. (But I'd better not brag!)

Crank-up towers maintain a relatively high resale value; consequently, many amateurs secure these towers to their house and guy them at one level. The bottom section is then placed in one or two feet of dirt. This method permits the tower to change locations with the amateur, rather than being left behind in a massive pillar of concrete.

The mental (and some-

times physical!) security obtained by lowering your towering giant of an antenna to mere roof level as a violent storm approaches is sheer bliss. I speak from experience. Have you ever run out during a hailstorm and started replacing snapping guy wires as a tornado passes within a few miles of your home? Have you ever wrapped the aforementioned guy wires around yourself and held onto a swaying tree only to see your three-element quad become a rotary loop? Yes, crank-up towers are a blessing for the less-than-stout-hearted amateur!

### How Crank-Up Towers Work

A crank-up tower consists of one or more concentric sections which move vertically on track guides within lower sections. An aircraft-type flexible cable is affixed to the smaller inside section's bottom rung, passed through a pulley near the top of the larger outside section, and fed down the tower's outer side to a winch mounted a few feet above the outside section's bottom end. As the pulley cable is reeled onto the winch, the tower's inside section is raised up toward the outer section's top-mounted pulley. A safety latch, or ratchet, is included near the outer section's top to prevent accidental down-plummeting should the operator let go of the winch crank. The latch is secured with a spring, and a control line extends downward so that it can be operated from the cranking position.

### The Perils

An improperly operated or unmaintained crank-up tower may, in some respects, resemble a modern guillotine. If a small, inside tower section which is weighted at its top with a triband beam uncontrollably falls straight down, it



A safety-latch system used with many crank-up towers is shown here. A spring, fastened to the top rung of the lower (outside) tower section (see tie-wire projecting out to the right), extends down to and holds firm the "C" latch, here engaged with the third rung down of the outer section. The latch can be disengaged by the safety line, here extending downward from the latch, and when the inner section is cranked up about two inches, it then can be lowered past the outer rungs. Should the operator let go of crank and safety line, the spring will slam the safety latch back in position to engage the next rung down.

easily can sever a hand, arm, or foot which might be in its path of travel. Never rely solely on safety latches or catches for protection, and never allow any part of your body to get into a raised tower without fool-proof safety backups such as concrete chocks between sections.

Assume, for example, a wasp surprise-attacks you as you're cranking a tower. If you inadvertently let go of the winch, it may rapidly unwind and crack your wrist or rib in a split-second's time. If this same tower isn't perfectly plumb,

rungs on the inner section can jump the safety latches and the guillotine effect is created. Assuming you manage to get clear of the plummeting tower, the sudden stop at the bottom (fully retracted position) can snap beam elements or boom supports.

These perils can be reduced to a minimum by periodically ensuring that all safety latches operate properly, that their springs maintain ample latching pressure, and that additional fall-limiting chocks on raised crank-up towers are used. Ratchet teeth on the



Another view of the safety-latch system. The "C" latch is held in the rung by the spring. The safety line can be seen extending down from the latch.



This is the working position of the crank-up tower. Note the use of the solid chock across the rungs, preventing the inner section from descending further. Visualize this chock being replaced with a hand or arm and a cable breaking. Obviously, safety should be a priority consideration for crank-up tower owners.

cranking winch should also be maintained in sharp, toothy condition to prevent winch-handle cartwheeling. Inspect all latches and springs periodically to ensure that rust and/or corrosion isn't hampering their operation.

As an additional safety measure, an amateur might place a concrete or steel chock above the "working position" (winch location) to prevent personal injury should a cable snap during cranking. Also, an auto's front wheel spring can be placed inside the larger tower section at ground level to cushion any accidental inside section drops.

Occasionally, an amateur may raise his crank-up tower slightly higher than suggested by the manufacturer. If the tower is leaning 3 or 5 degrees from perfect plumb, the upper section can tilt and become stuck at this height. Hmmm—a cocked guillotine!

First, never raise an un-plumb crank-up tower to a point where over one-third of the moving section is above its larger lower section. If, however, such misfortune does occur, the amateur must cautiously free the off-center stuck

section. Double-chock the tower's upper and lower sections to limit the freed section from falling more than a couple of inches. Then, assuming the tower is resting against the house roof or side, climb atop the house (via a ladder, not via the tower!) and gently straighten up and reinsert the upper section while an assistant keeps pressure on the winch and controls the safety-latch line. This is not a difficult maneuver; it merely requires caution. I've done this single-handed by keeping pressure on the winch while pushing the moving section back straight and then slowly unwinding the cable (and lowering the upper section). I wouldn't care to try this daredevil stunt very often, however.

It's possible that an unexpected killer storm can arise during that once-a-year occasion when an amateur forgets to lower his crank-up tower. Sorry 'bout that (maybe my next article will describe tower straightening techniques). Plan ahead. Either install permanent guys and chocks, seldom lowering your tower, or make tower-lowering part of your amateur activities. A properly maintained

tower can be raised or lowered within 2 or 3 minutes, and it's great exercise!

Some of the smaller crank-up towers do not have room inside their top sections for mounting large rotors. Consequently, the rotor must be mounted above the top section. Wind force in this case will be directed against the rotor rather than the tower, since a thrust-bearing arrangement cannot be utilized. Assuming a relatively large rotor and reasonably-sized beam are used, few problems need be expected, particularly if the tower is retracted to minimum height during periods of non-use. In other words, pick your antenna and rotor size according to your use and future plans—and don't overrate their capabilities. A 40-dollar rotor mounted atop a tower can't handle a full-size 20-meter beam!

#### Crank-Up Tower Maintenance

Crank-up towers, like any mechanical devices, require occasional maintenance for reliable and long-term operation. Basically, this maintenance consists

of oiling tower sections at points of friction, oiling the pulley(s), cable, and winch bearings, plus oiling the safety clamp(s) and tightening springs as necessary. Regular 20- or 30-weight auto oil is perfect for this application. A few drops placed at the top of each section's corners will slowly run down the section's length and spread into its runners. This procedure may also be applied to the pulley cable. Finally, guy wires can be rechecked and their turnbuckles adjusted as necessary to maintain exact plumb.

#### Conclusion

Assuming that safety and maintenance rules are diligently respected, the crank-up tower should prove a cherished accessory for any amateur. Limited height, two-section crank-ups are extremely useful for antenna experimenters or amateurs faced with structure limitations. The beauty of variable-height, accessible support is hard to beat, but don't overlook safety precautions. Antenna accidents are the leading cause of injuries to today's radio amateurs. ■