antenna hinge

A method of mounting your beam more easily with less help

For more than thirty years I have used a method of erecting a beam that enables me to put up the antenna either by myself or with a minimum of assistance. I use a simple hinge that permits a Yagi-type antenna to be changed from a horizontal to a vertical position with the removal of a single bolt (**fig. 1**). The hinge is made of two pieces of channel steel or aluminum, with the latter preferred since it's lighter.

The hinge should be as long as the top of the tower is wide. This ensures that when the antenna is tilted to a vertical position the bottom half of the antenna is parallel to the tower. The top half of the hinge should be at least 4 inches (102 mm) wide when you're using it with an antenna boom 2 inches (51 mm) in diameter; a larger-diameter boom requires a wider hinge. This is necessary so that the U bolts, muffler clamps, or the mounting method recommended by the beam manufacturer will give you enough clearance on the bottom of the top piece for properly tightening the nuts.

typical hinge dimensions

bottom half	inches	(mm)	top half	inches	(mm)
length	14	(356)	length	14	(356)
width	5	(127)	width	4	(102)
height	1-7/8	(48)	height	1-1/2	(38)
thickness	3/8	(10)	thickness	3/16	(4.8)

The bottom half of the hinge is positioned with the flat side down (channel up), and the top half, with the flat side up (channel down), is mated with the bottom half. In-line holes are drilled through both pieces approximately 3/4 inch (19 mm) from the ends. These holes should be slightly oversize to freely accept 1/2-inch bolts 6 inches (152 mm) long. This is all that is required at this time.

hinge-to-mast mounting plate

The plate shown in **fig. 2** is cut from 3/16-inch (4.8-mm) steel that measures 17 × 14 inches (43.2 × 35.6 cm). It is almost necessary to have a machine shop fabricate it. In order to reduce weight, 4 × 12-inch (10.2 × 30.5-cm) triangles are cut from each side prior to making a 90-degree bend that provides a horizontal shelf 5 inches wide × 14 inches long (12.7 × 35.6 cm). This leaves a vertical section 14 inches wide at the top, 6 inches wide at the bottom, and 12 inches high (35.6 × 15.2 × 30.5 cm).

The bottom of the hinge can now be mounted to the 5 × 14-inch shelf using four 5/16-inch × 1-inch bolts. The holes are approximately 1-1/2 inches (3.8 cm) in from each end of the shelf and hinge.

parts assembly

Mount a short section of the boom to the top half of the hinge. Mate the two pieces of the hinge and insert the hinge bolts. Remove one of the bolts and the position of the boom can now be changed from horizontal to vertical. Repeat the procedure by replacing the first and removing the second bolt. While this temporary section of boom is in place, two additional holes are required approximately 3 inches (7.6 cm) from each end of the hinge on both sides of the boom. Holes to accommodate 3/8-inch (9.5-mm) bolts are drilled through both pieces of the hinge and mounting shelf, clearing the boom.

After the antenna installation has been completed, the last thing to do before coming down the tower is to install the above bolts (3/8 × 2-1/2-inch) to join the hinge and mounting plate. Without the bolts, wind vibration could damage the hinge. Mark the hinge, top and bottom, so that the ends can always be correctly mated. If reversed, some of the holes might not be in alignment.

Check the antenna for balance before mounting it on the tower. If you balance it well, little effort will be

By J.R. Yost, N4LI, Route 3, Box 342, Mocksville, North Carolina 27028

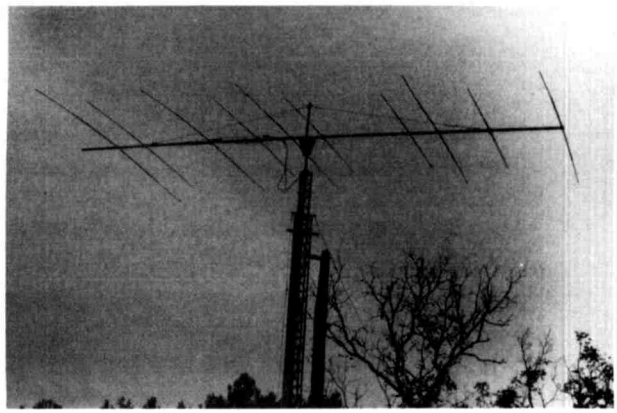

fig. 1. Beam antenna supported by the antenna hinge.

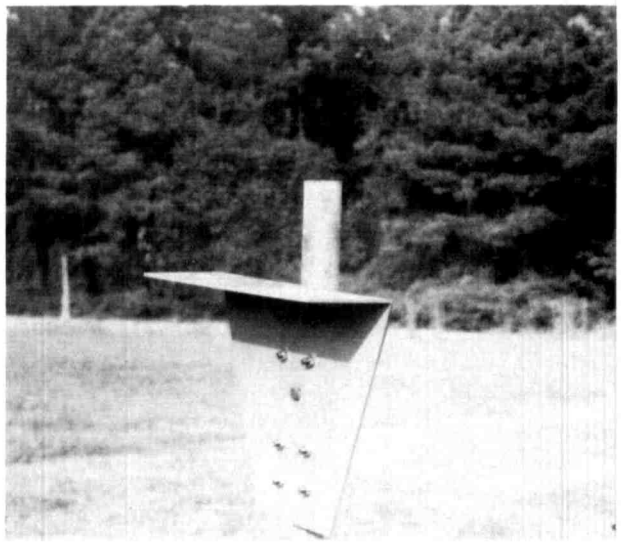

fig. 2. The hinge/mast mounting plate.

needed to change the antenna from a horizontal position to a vertical one.

mounting the antenna

If the antenna weighs more than 50 pounds a gin pole is recommended. The antenna with all elements in place is positioned on the ground at the base of the tower with the boom at a right angle to the tower. The rope from the gin pole is tied to the boom near the end nearest to the tower. By pulling the rope you can stand the antenna on end and lean it against the tower. The rope tied to the boom can now be repositioned to a point 1 or 2 feet above the hinge. A helper on the ground can pull the antenna up the tower, assisted by one man near the top of the tower. The antenna is kept in a vertical position right up to the point where the bottom end of the hinge attached to the boom is at a right angle to the horizontal half of the hinge attached to the mast (**fig. 3**). At this point the holes in the two pieces of the hinge should be

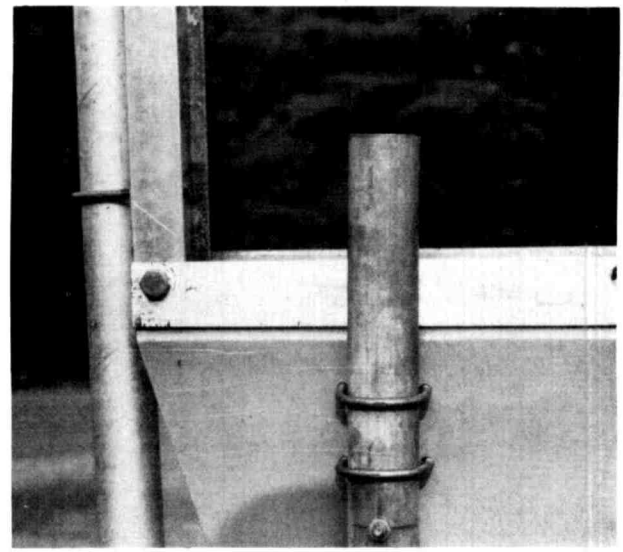

fig. 3. The hinge attached to the mast during erection of the antenna.

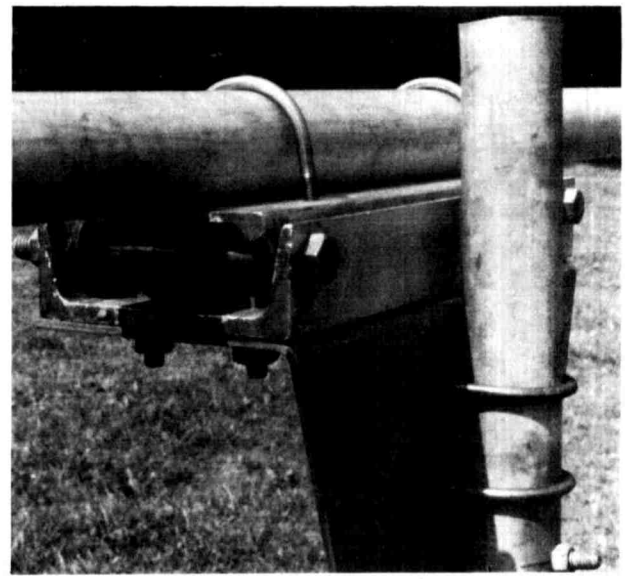

fig. 4. Bolts in place secure the hinge.

aligned and a hinge bolt inserted. With this bolt in place the antenna is secured to the antenna mast (**fig. 4**).

final note

Carefully plan your antenna installation. Write up each step to be taken including the tools needed. Always use a safety belt when working on the tower. Make sure there is no way for the antenna to get near a power line. And always have someone standing by, clear of the tower and the antenna, in case of an emergency.

ham radio