160-meter shortened vertical antenna

When you're using a grounded, center-loaded vertical antenna and no guy wires are desired, the feed system shown in **fig. 8** solves the problem of feeding power to the antenna. The feeder may be inside or outside the lower mast section, but should be kept close to the foot of the mast so its potential is close to ground at that point. The coupling to the center loading coil is made at the mast end or "cold"end of the loading coil. I use three turns of coaxial cable with the center conductor returning to the outer braid at the bottom of the three-turn link.

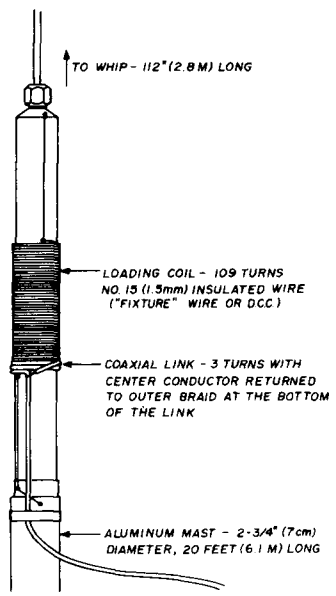

fig. 8. Center loading coil and link coupling used with the shortened vertical antenna for 160 meters. Total antenna height is about 30 feet (9.1m).

My vertical is tuned to 1800 kHz in the 160-meter band and the coil measures approximately 270 μH. This requires a total whip length above the coil of 112 inches (2.84m). The loading coil consists of 109 turns of no.15 (1.5mm) insulated wire, weather proofed with several coats of clear *Krylon* spray. The coil ia 2-3/4 inches (7cm) in diameter and 7-5/8 inches (19.4cm) long. The bottom of the coil is spaced away from the lower mast by about 5 inches (13cm). The lower section of the vertical is made of 2-3/4 inch (7cm) diameter thin-walled aluminum pipe, 20 feet (6.1m) long. This gives a total vertical height of approximately 30 feet (9.1m).

The feed resistance of my vertical, as measured with an Omega noise bridge, is close to 55 ohms. My ground system consists of ground rods and water system as well as a quarter-wavelength of no. 12 (2mm) copper wire just under the surface of the ground.

The bandwidth of the shortened vertical antenna is very narrow so I added the simple capacitive loading system shown in **fig. 9.** This consists of two 12-inch (30.5cm) lengths of no. 10 (2.6mm) copperweld wire which are attached to a swivel joint. By adjusting the angle of these rods to the mast with halyards (remotely with a selsyn, if desired), it's possible to operate over a 30 kHz bandwidth with a 1:1 vswr.

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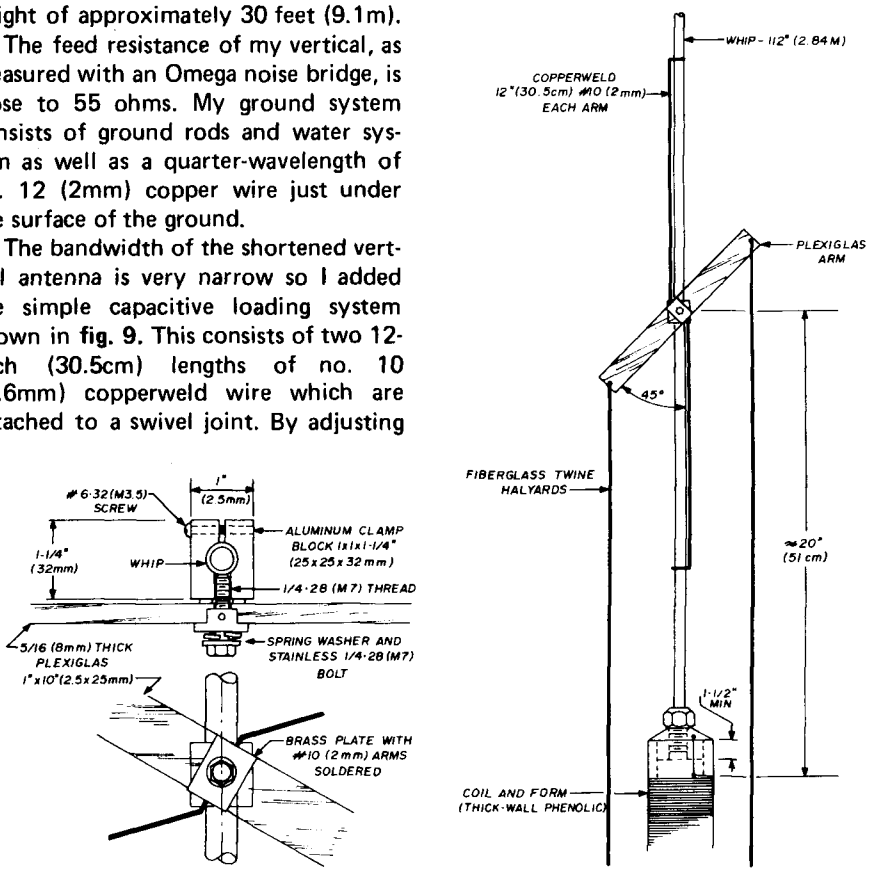

fig. 9. Movable 12" (30.5mm) lengths of no.10 (2mm) copperweld add sufficient capacitive loading that the shortened 160 vertical can be used over a 30 kHz bandwidth with a 1:1 vswr.

Ham-M modification

The accuracy of the metering circuit in the Ham-M rotator is poor, at best, under conditions of varying line voltage. With a line voltage change from 105 to 125 volts, the full-scale reading in my unit varied from 325° to 365°.

While there are, undoubtedly, many modifications to this circuit that would eliminate this problem, cost and parts availability were a factor. The result, a simple voltage regulator, is shown in the schematic diagram of **fig. 10.** New parts are given in the parts list. I used two zeners in series, lacking a single one that would render proper performance. With the value shown for R1, the total zener voltage should be somewhere between 17 and 20 volts. The exact value is not critical so long as the voltage across C1 is under the control of the zener when the line voltage drops to 105 V. C1 can be of any value from 500-μF up, depending upon available parts. R2 was added to compensate for the lower voltage across the rotor pot. With the circuit constants shown, there is less than 1° of change from 105 to 125 V input after a 10-minute warm-up.

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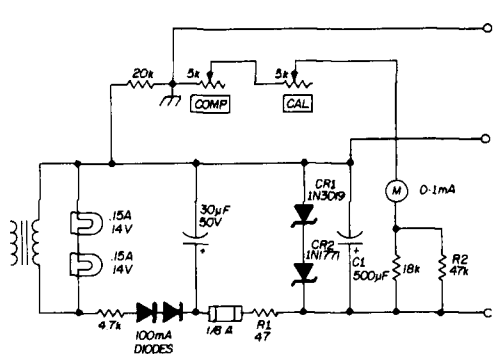

fig. 10. Ham-M meter circuit modification.