base-loaded vertical antenna for 160 meters

No room for a 160-meter beam? Try this vertical antenna which can be easily made from readily available materials

Much has been written and discussed on the best antenna for 160 meters. The most popular solution seems to be to tie the ends of an 80-meter antenna together and feed the system on 160 meters with an antenna matching network. Some Amateurs string up an inverted L antenna. Both work fine for local contacts, but if you really want to work across the country, the vertical antenna is best.

the case for a vertical antenna

Several 160-meter enthusiasts use phased vertical antennas. Their signals are outstanding all year around compared with signals from other antennas. For those who don't have room for a beam, the top-loaded vertical is the next best. The loading coil should be wound with no. 10 AWG (2.6 mm) wire. It requires a long coil and an extended tube for adjustments. I tried such an antenna, but the assembly swayed back and forth like a pendulum, and the nylon guys would not remain tight enough to hold it. After the coil broke off, I experimented with a base-loaded vertical.

base-loaded vertical

I was surprised that my signals seemed to be equally good, but not before some testing of the wire size used on the base coil. My vertical uses a 32-foot (9.8-meter) length of aluminum irrigation tubing, which is 2 inches (50 mm) in diameter. (It cost $20.00.) The tube was set on a beer bottle for an insulator and guyed with nylon rope. This assembly was backed up by burying a 6-foot (1.8-meter) length of 4 × 4 lumber into the ground and using insulators and wood blocks to secure the tube to it (**fig. 1**).

To resonate the tube to 160 meters, a series capacitor and coil were first tried. However, I was told it would be better to just use the coil. First tried was a wire coil, but later a coil made from 3/16-inch (5-mm) diameter copper tubing was substituted, and the signal increased by 1 dB.

coil construction

The inductance was wound with 3/16-inch (5-mm) diameter copper tubing which cost $9.75 for a 50-foot (15.25-meter) coil. I used a 4-inch (102-mm) diameter pipe as a mandrel and wound a coil of forty turns.

Next three pieces of plastic were cut 1 inch (25.4 mm) wide and 1/4 inch (6.5 mm) thick for the length of the coil. Holes were drilled in these strips with a drill just over 3/16 inch (5 mm), so that the copper would slide through it easily. The first hole was 1/4 inch (6.5 mm) from the end.

The holes were cut with a drill sharpened like a sheet metal drill so that it did not shatter as it came through the plastic. A small hole could have been drilled, then a large drill put through half way on each side. That takes patience. Once the pieces are snaked onto the coil and spaced, they are treated with coil dope. The coil was rugged enough to be mounted on insulators and put into a wooden dog house at the base of the antenna.

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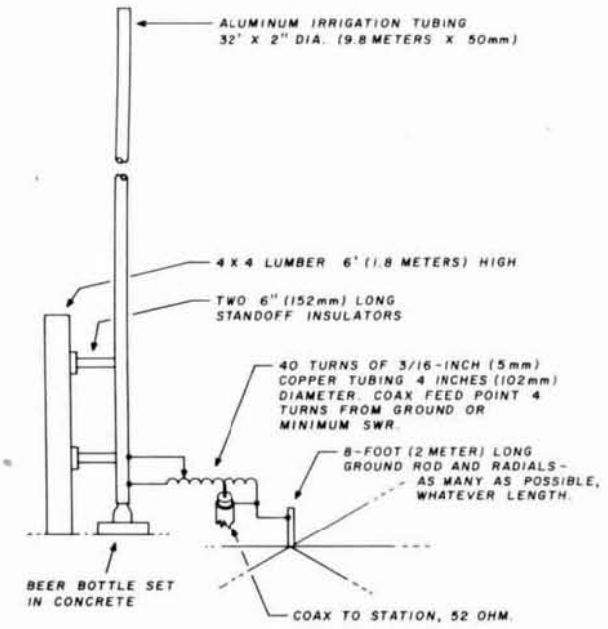

fig. 1. Construction details of a base-loaded vertical antenna for 160 meters. Antenna performs as well as a top-loaded affair and is much more stable and easier to construct. Use as many radials as possible in the ground system.

tune up

Antenna tuning was accomplished by leaving the feeder off and grid dipping the coil with it all in place. The coil was then tapped for resonance at 1820 kHz. Wide copper straps can be formed around the 3/16-inch (5-mm) copper and soldered once the proper place is found. The next step is to vary the tap for the 50-ohm feeder from the bottom of the coil for minimum SWR. Mine came out at the fourth turn up from the bottom. (This will depend on your ground system.) I used an 8-foot (2-meter) rod driven into the ground at the antenna base and four or five radials of various lengths pushed into the grass. None are over 30 feet (9 meters) long, but make them as long as you can and use as many as possible. The more the better on 160 meters.*

performance

We have a daytime 160-meter net here in California, and records are kept of signal strengths up and down the coast. At 11 AM Sunday mornings Santa Barbara checks in with signal reports. I can say this antenna receives and sends equally as well as my old top-loaded affair. I've worked the East Coast with it and am pleased to report that it is more stable and easier to construct. All in all, it seems like the best answer to many 160-meter antenna problems — if you can't have a phased array.

*Or on any frequency. **Editor**.

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More Details? CHECK—OFF Page 94