THE G5RV

an all-purpose antenna

BY JIM GRAY, W2EUQ

No antenna is really all-purpose or all-band, but this one comes close

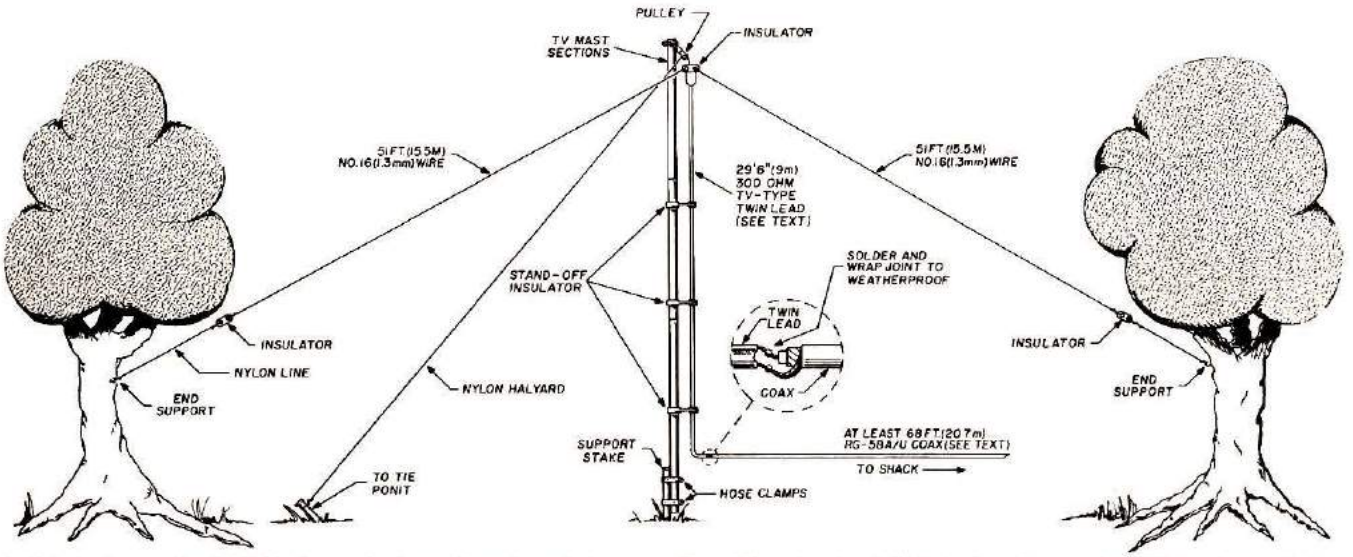
G5RV is the Amateur Radio callsign of R. L. Varney, of Sussex, England. He is credited with having developed and used the antenna that bears his call, although an earlier antenna shown in Collins Radio manuals of the 1930s appears at least similar. It is probably true that the specific antenna known as the G5RV did, however, originate with Mr. Varney — to the delight of Amateur Radio operators everywhere.

The G5RV antenna looks very much like a center-fed Zepp antenna with a flat-top portion and an open-wire feeder portion connected at the center of the flat top. The G5RV, however, lends itself nicely to installation in the popular inverted-vee configuration or, if you have the necessary supports, in the standard dipole or doublet configuration. In any case, the antenna is very simple and unobtrusive — as antennas go.

Dimensions

The flat top can be made from copper antenna wire of no. 14 (1.6 mm) or larger size. The overall length is 102 feet (31.1m) with each leg being half of that. At the center of the flat top, place an insulator or center connector that isolates the two legs of the antenna from each other. Connect an open-wire feedline 35 feet (10.7m) in length at that point, with one wire attached to one leg of the antenna, and the other wire attached to the other leg. If you do not happen to have an open-wire feedline, although it is easy enough to make, just use a length of TV-type, solid dielectric, 300-ohm "twin lead." If you choose the twin lead, use a length of 29.5 feet (9m), a difference in length that takes into consideration the difference between the velocity of propagation of a radio signal along a two-wire "open" line spaced with air dielectric or along a two-wire line spaced with plastic dielectric material.

At the transmitter end of the two-wire feeder, attach a length of 50-ohm coaxial cable, such as RG-58A/U, for example. The center conductor connects to one wire and the shield to the other. If you plan to use a transmitter output power in excess of about two hundred watts, then use the heavier RG-8/U cable. The length of the cable should be at least



In this instance, the G5RV antenna is shown in an inverted vee configuration. A nylon halyard raises the center of the antenna to the top of a mast made from TV mast sections. Stand-off insulators keep the feedline from flapping in the wind. The antenna "legs" serve as guy wires, while the halyard acts as additional support.

68 feet (20.7m), but may be longer if necessary. Attach a PL-259 coaxial connector at the transmitter end of the coax. Solder all connections carefully and weatherproof them by wrapping them with vinyl tape and coating the wrapped portion with silicone caulking material.

Installation

In my own installation, I used several joined sections of TV-type mast tubing as a single support, and hoisted the center of the antenna to the top of the mast with a nylon halyard led through a pulley placed at the top of the mast. I supported the ends of the antenna at a much lower height by tying the end insulators to short lengths of small-diameter nylon line which were attached to the trunks of nearby trees. If I had been blessed with two tall supports, suitably far apart, then the antenna would have been put up as a flat top instead of an inverted vee. In your case, choose the one that is most convenient, or the one you like best. If the inverted-vee configuration is used, the antenna itself acts as two of the guy wires for supporting the mast.

You will find, as I did, that it is desirable to keep the feedline at least several inches (≈10 cm) away from a metal mast or pole. TV-type standoff insulators are good for this. On the other hand, in a flat-top configuration, there is usually no center support, so you don't have to worry; just let the feedline fall vertically away from the antenna at a right angle. As with any antenna, the feedline is preferably led away from the antenna at 90°, and should not lie underneath either of the antenna's legs.

Operation

The first band I tried was 80 meters, and results were fully as good as with my standard 80-meter inverted vee. In fact, I couldn't tell any difference when I switched back and forth. On 40 meters, results were somewhat better than with the trap vertical I had been using, even at long distances, probably due to the lack of a really good ground plane for the vertical. In any case I was pleased. The G5RV really performed well on the 10- 15- and 20-meter bands, and was markedly superior to the vertical at medium distances, although noticeably directional. The apparent pattern at these higher frequencies is a large X whose "legs" form an angle with the wire.

In no instance did I use a tuner or any other matching device until, one day, I became curious about vswr. I put my swr bridge in the line and was horrified to find the vswr over 3:1 on certain frequencies. Up until then the transmitter — and even the stations I worked — didn't seem to know or care what the swr was. Thereafter, I used my line matcher to make the transmitter "see" the magic, non-reactive 50-ohm termination, but you know what? The matcher didn't make a bit of difference! As long as the transmitter tunes and loads to its rated plate current without difficulty, then it is happy. With the G5RV antenna, your transmitter will tune and load well, even if you don't use a tuner or matcher.

Comments

No antenna is supposed to do everything well, and this one is no exception. It does, however, represent a nice compromise between cost, space, and performance as attested to by numerous stations around the world who say: *ANT HR OM G5RV*. The real advantage of this simple, low-cost antenna lies in the fact that you can use it on all bands, CW and phone, from 3.5 MHz to 29.7 MHz, without a tuner! **HRH**