The Radio Hotel – The EFHW-Things to Consider

(*Beacon abridged version)

by Rick Hiller – W5RH

The EFHW or End Fed Half Wave antenna has been a very popular skyhook for the past few years. Reasons being that it provides a close to 50 ohm match on multiple HF Ham bands and it is easy to build and deploy. Most of the information on the web, etc. focuses on the construction and resultant SWR curves. I have seen little as far as how best to deploy the half wavelength wire. Deployment layout is questionable due to the fact that at the lowest fundamental frequency it is half wave length. Equivalent to a dipole in size and radiation pattern, but as you go up in frequency it turns into a multiple wavelength wire. ½ wl on 80 is 1 wl on 40, 2 wl on 20 and 4 wl on 10 meters.

Things to consider. How best should you deploy this wire to be advantageous radiation angle and pattern wise on multiple bands? My hypothesis is that it will be good on some bands, but not so good on others. If your goal is to make and deploy a multi-band antenna just to get on the air with little regard for the pattern produced then stop reading, put one up best you can and go make some contacts. But if you would like to achieve the best patterns, gain and lowest angles of radiation etc. please read on and let's see what we can find out.

The radiation patterns of antennas are heavily influenced by the surrounding environment. Height above ground affects both feed impedance and pattern. High voltage, end feeding gives a bit of a variance on feed impedance and the wide band 1:49 ratio transformer provides a reasonable primary impedance to match closely to 50 ohm feed line. If not close to 50 ohms, the internal ATU in your rig can usually handle the differential.

Physical deployment can be done as a sloping, tilted wire, an inverted V, a vertical (with the right tree height) and an inverted L. The issue is that, for example, the 80 meter version is 135 feet long and when fed on 40 meters it is two ½ wl's long. This can best be configured as an inverted L with ½ wl vertical and the other half horizontal. This gives a much more beneficial pattern than just a low to the ground dipole. Take this varying deployment scheme and apply it to the higher bands too. Maybe even folding in between ½ wl sections into drop down stub like sections, so that the other sections are in phase and create a gain issue. Remember that, as with all antennas, the EFHW is a compromise – not particularly efficient at either short or long ranges. But they will produce contacts, as any wire antenna of similar length and height will.

To counterpoise or not to counterpoise. There are quite a few convincing and persuasive arguments on-line concerning counterpoise use. Have a read of a few. Seems to me though, if you have the feed point right at your operating picnic table that you would at least use a ground rod and short wire. Otherwise the coax shield of a long feed line can (and will) be used as the counterpoise. A separate ¼ wl wire at the lowest frequency just might suffice also. Google www.aa5tb.com/efha.html or have a listen to Dave Casler's popular #494 video to see if that helps. *(Note: I'm not sure it does)*

One last point -- using EZNEC modeling analysis – if you use an 80 meter fundamental EFHW (135 feet long) you will get resonant points at 80, 40, 30, 20, 17,15,12 and 10. However, if you are using a 40 meter (65 feet long) fundamental length EFHW, you will only get nice resonant points at 40, 20, 15 and 10. ***See the full unabridged article with graphics and pictures at www.bvarc.org/tech-pages**

Enjoy your hobby and be curious……73…Rick W5RH