MY END FED HERZ 1/2 WAVE ANTENNA (EFHWA)

- de IW2MXE DIEGO

Physic Principle

An End Fed Half Wave Length Antenna is a variation of the much more common half wave length dipole antenna. When an antenna that is one half wave length long has RF energy applied to it at its resonant frequency a standing wave develops on it. This standing wave consists of both current and voltage that are 90 degrees out of phase. The end result is a distribution of current that is at a maximum at the center and a distribution of voltage that is at a maximum at the ends (fig.1).

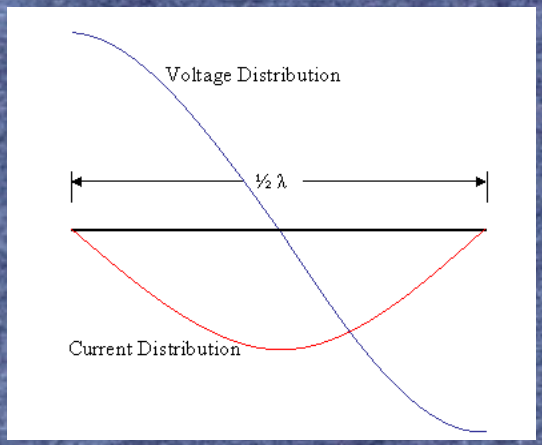
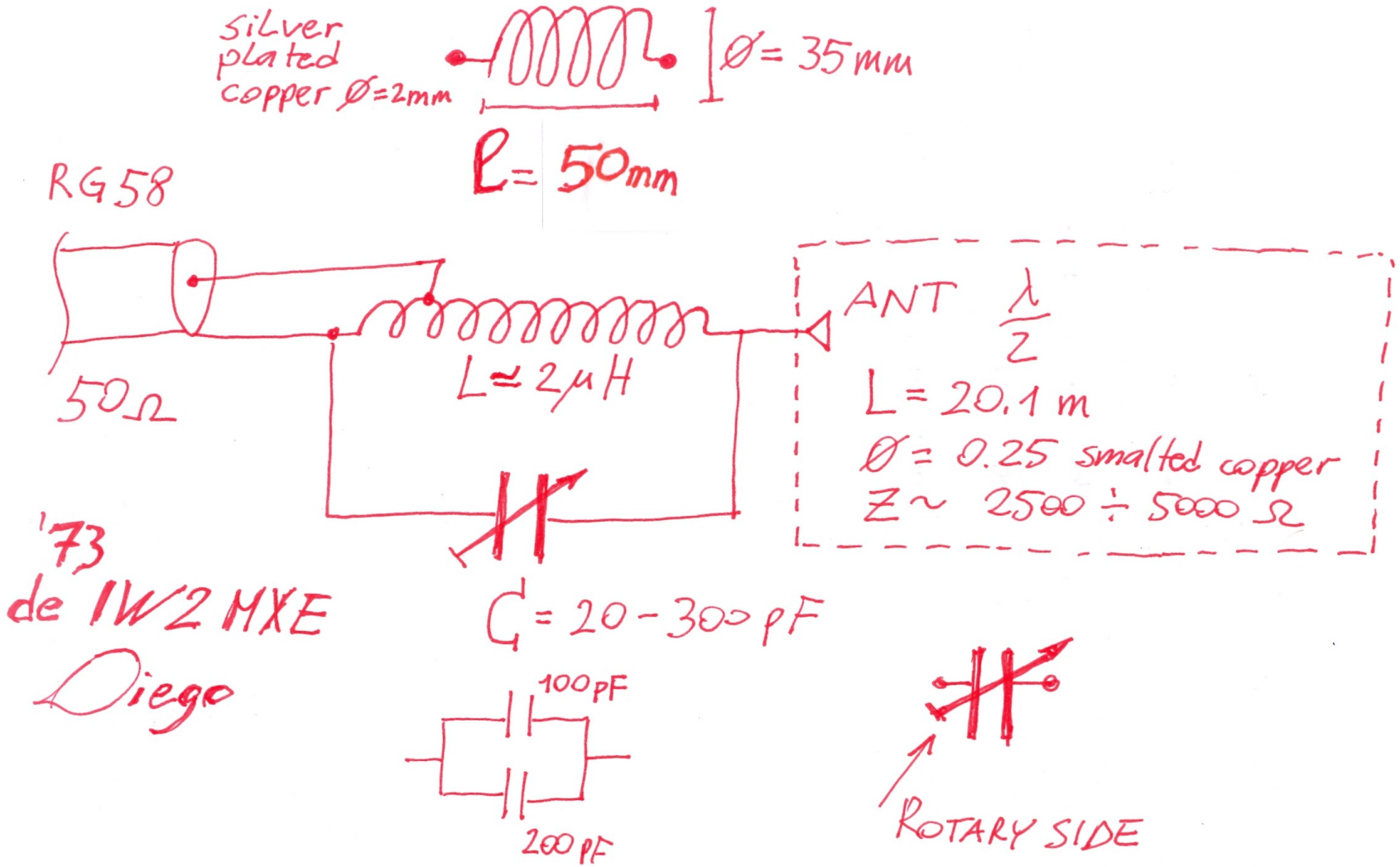


Figure 1 - Dipole Voltage and Current Distribution

The most common method of feeding energy to this type of antenna is at the center where the current is maximum and the voltage is minimum. Consequently, the impedance at this point is low and on the order of 72 ohms. This makes it convenient to feed the antenna directly with low impedance 50 ohm coax cable. To minimize the chance of common mode currents on the coax that can cause the coax to become part of the antenna a balun is sometimes used. Feeding the antenna at the center is by no means a requirement however. Energy can be fed anywhere along its length and the impedance will increase as the feed point moves away from the center (more voltage, less current). Taking this to the extreme is to feed the half wavelength antenna at its end. At first thought this would seem to be impossible yet many people have done it very successfully. In practice the impedance at the end of an end fed half wavelength antenna is on the order of 1800 to 5000 ohms.

It is often commented that the End Fed Half Wavelength Antenna needs no "counterpoise" or radials to work. In practice this is often how the antenna is used in the field. In reality something is always being used as a "counterpoise" even though it may not be evident at first glance.

Project Data 40m



Adjusting the capacitor we can use this antenna in 2nd harmonic on 20m band

Formula

$$\text{Length Antenna [m]} = \frac{142}{f\,[\text{MHz}]}$$

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$$X_L = 2\pi f \cdot L$$

$$X_C = \frac{1}{2\pi f \cdot C}$$

$$f_0 = \frac{1}{2 \cdot \pi \sqrt{L \cdot C}}$$

$X_L = X_C \rightsquigarrow f_0$ @ resonance

BOBINA IN ARIA

$$N = \frac{\sqrt{25.4\,(4.5\,d + 10\,l) \cdot L}}{0.5\,d}$$

Lung. [mm]

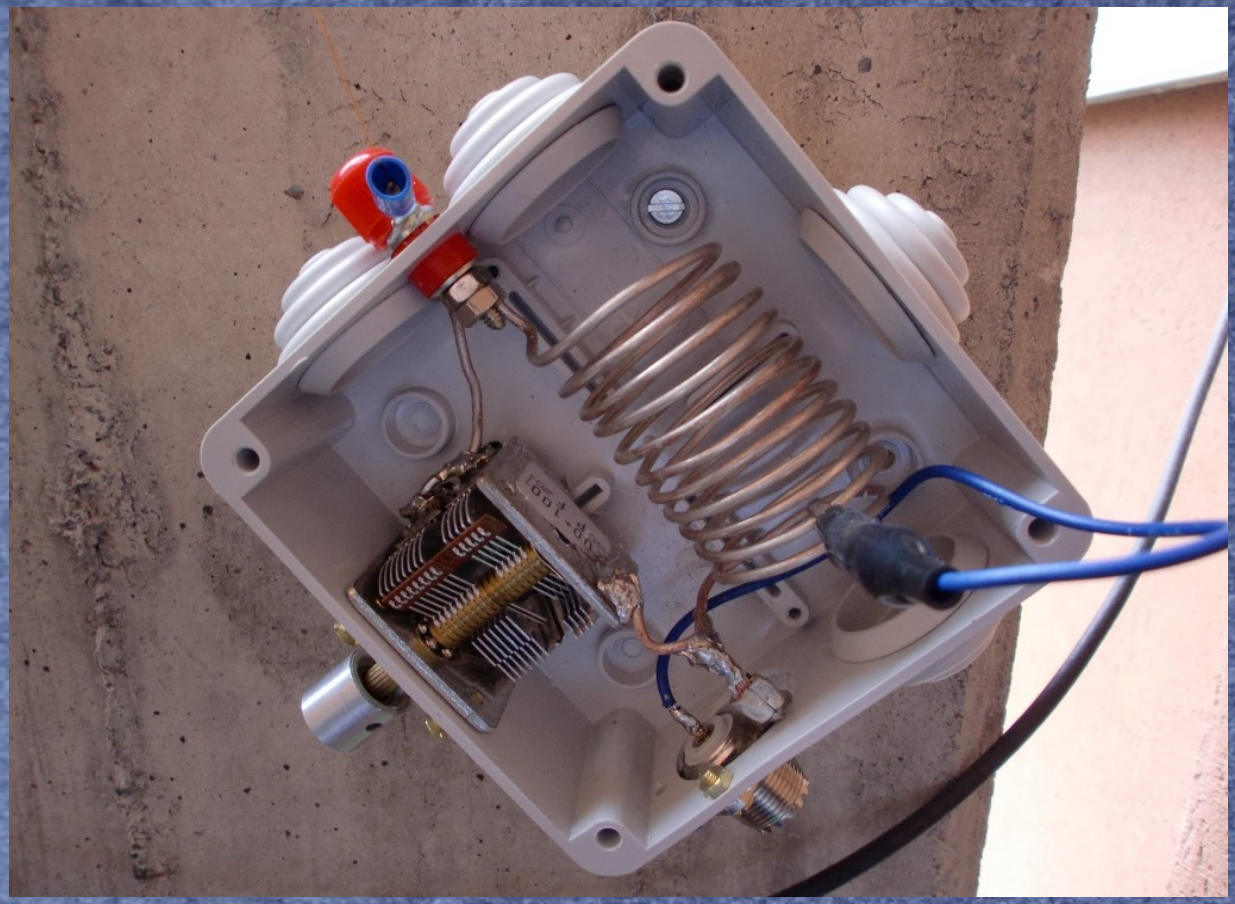
μH

N° spire

Ø supporto [mm]

N = Number of coils
d = Diameter of Inductance
L = value of inductor
l = Length of inductance

LC tank match Data

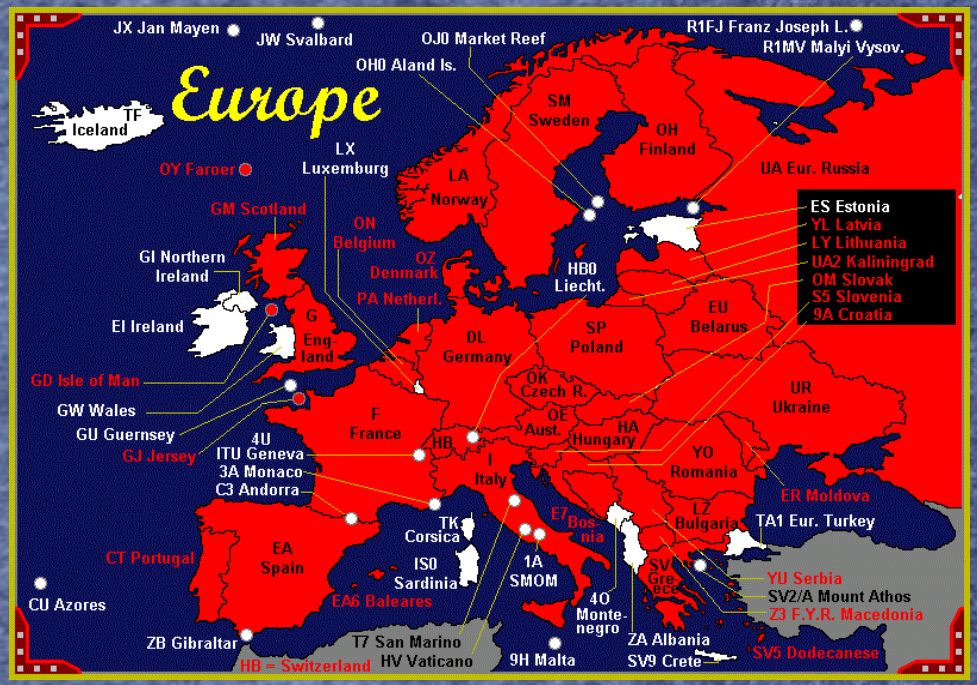


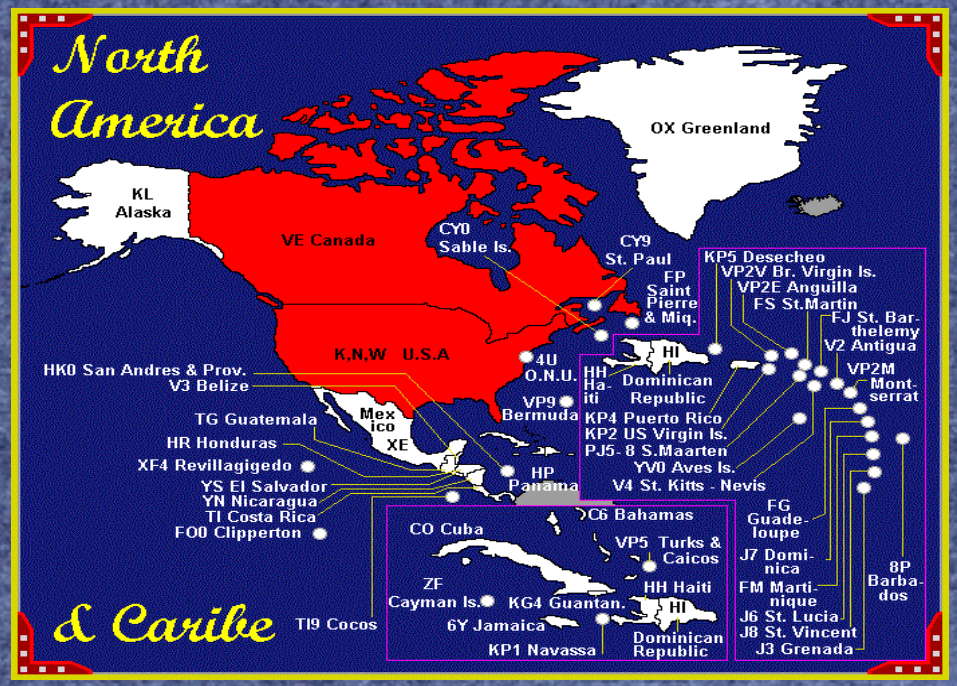
- INDUCTANCE on air is made with silver plated copper wire Ø=2mm 10 turns on Ø=35mm Length=50mm so the value maybe 2µH
- CAPACITOR 2 bank of 100+200 pF I have link it in parallel so I can use 300 pF as Max Cap.
- The link to ground is made with crocodile plug so I'm able to tap in the correct position on the coils. When you find the correct position you can finally sold it)

Tuning

- Move the Capacitor to half value
- Find the minimun ROS moving 10mm the crocodile tap on the second coils
- Fix the position of the link
- Fine Adjust the ROS moving the condenser with rig in trasmission (low power 5W)

Conclusion





My antenna works very well. With only 10W in my FT-857 I've done a lot of QSO in Europe and in the rest of the word. (red colour is my present country worked)

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Ciao . . HPE CU IN CW