Constructing EH Antennas

Materials:

2" PVC sch. 40 Pipe - 2 - 3' Home Depot/Lowes

Aluminum Roof Flashing Home Depot/Lowes

Short 2" PVC Coupling (3) Home Depot/Lowes

Sheet Metal Screws #6 or #8 X 1/2" Home Depot/Lowes

PVC Cap - 2" Home Depot/Lowes

Brass Bolts / Nuts #6 X 3/4" Home Depot/Lowes

Building the Pieces:

Cut two pieces of 2" PVC pipe 10 - 11" long. (7 1/4" + 1 1/2" + 1 1/2" space for couplings)

Cut two pieces of aluminum flashing 8 1/2" x 7 1/4".

Make two cylinders. Wrap a piece of the aluminum flashing around the PVC pipe leaving 1 1/2" at each end for the coupling. Secure the flashing using #6 or #8 sheet metal screws. It helps to have a partner during this part of the assembly. They can hold the flashing around the pipe until you get a couple of screws in to hold the flashing. I drill a 1/8" pilot hole for each screw. On the end of each cylinder drill a hole for the #6 or #8 brass bolt. The hole should be close to the edge of the aluminum flashing. On one cylinder drill a small hole (~ 5/64") next to the bolt, this will be the top of the bottom cylinder. Take a piece of # 14 enamel wire 14 - 16" long and scrape 1/2" fo theenamel off one end. From the inside of the cylinder place the wire through the hole and wrap it around the bolt, and secure it with another nut. This wire should be flush next to the inside of the cylinder.

Completed Cylinder

Take one of the couplings and drill a 5/64" hole in the center of the coupling. Cut a piece of # 14 enamel wire 36" long. Push 16" inside the hole and leave 20" exposed. Now bend the wire as it comes out of the hole and wrp two turns around the coupling. This will be your Phasing Coil. I secure the coil with black tape until it is time to assemble the antenna.

Take a piece of 2" PVC (~ 6") long and drill a 5/64" hole about 2" from one end. Cut a piece of # 14 enamel wire 11' long. Scrape 1/2" enamel off one end. Bend the wire at right angle 1/4" from the end. Place this end in the hole and start winding your coil. Use electricians tape to hole the coil in place after you have ~ 5 turns. Wind 13 - 14 turns on the piece of PVC pipe.

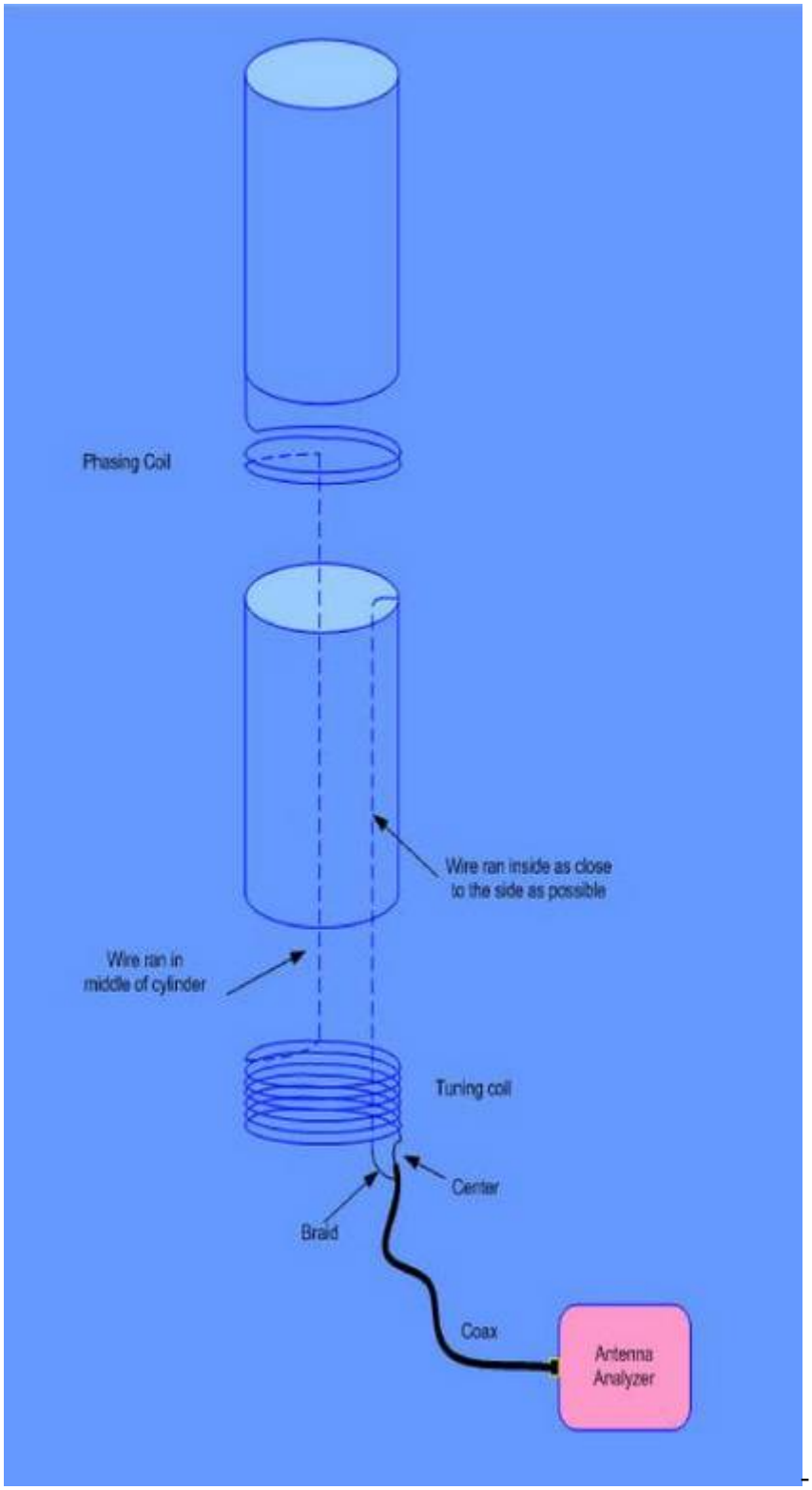
Assembly: Take a coupling that you wound the Phasing Coil on and measure the depth that the pipe will penetrate. Now cut off the bottom of the top cylinder and glue it into the coupling (the outside wire should be closest to the cylinder bolt). Scrape 1/2" of the enamel off the wire and connect it to the bolt of the top cylinder.

Now measure the depth of the coupling (Phasing Coil) and measure the distance that the bottom cylinder will have to be for 1 diameter (2 3/8") spacing. Before gluing route the wire from the phasing coil down the center of the bottom cylinder. The bolts on the cylinder should be on opposite of each other (180 degrees).

Using another coupling measure and cut the bottom of the bottom cylinder and the top of the pipe with the tuning coil to have 1 diameter spacing between the top of the coil and the bottom of the bottom cylinder. Nw glue the coil onto the existing antenna.

Drill a 5/64" hole next to the end of the coil. Route the wire from the phasing coil through this hole. Scrape the enamel off the end and cut leaving ~ 1/4" (this needs to connect with the top end of the coil) bend and solder to the top end of the coil.

Solder a short piece of coax (~ 1 foot) to the coil and the wire from the bottom cylinder. Now we are ready to tune the antenna. The center of the coax will be connected to the bottom of the coil and the shield will be connected to the wire from the bottom cylinder.

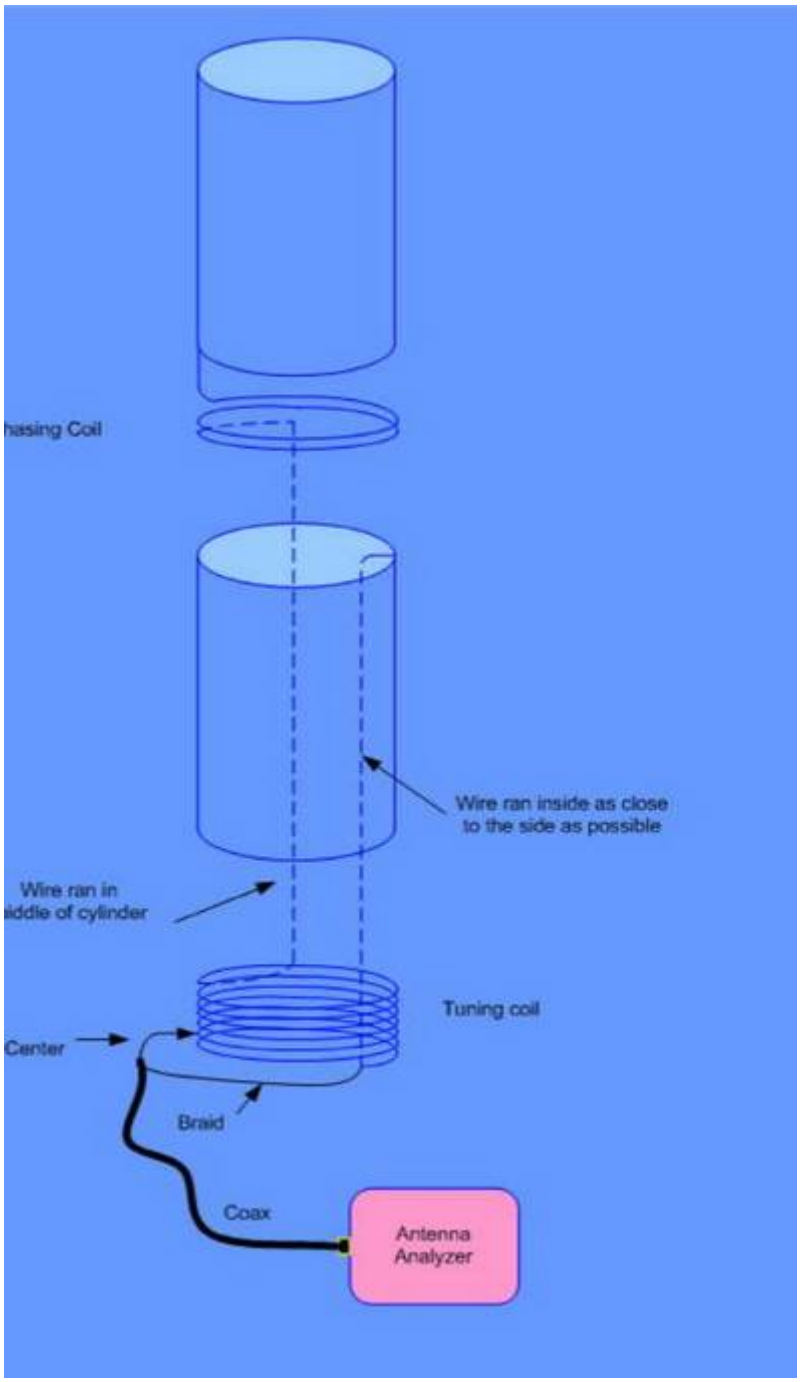


Step 5 - Connect the top of the coil to the top cylinder. Space the wire 1/2" or more away from the lower cylinder to minimize capacity coupling. We prefer to run this wire down the center of the lower cylinder.

Step 6 - Connect a wire to the lower cylinder. This will be "ground" for the antenna.

Step 7 - Connect a short piece of coax to the lower end of the coil and the lower cylinder wire. Measure the resonant frequency and remove turns to get the frequency just below the desired freequency.

(**Note:** The resonant frequency is the lowest impedance shown on the antenna analyzer.)



Download Demonstration #4:

Demo #4 Download

Step 8 - Connect the lower cylinder wire (ground) to the bottom of the coil. Connect a short piece of coax to the "ground" of the antenna (you just created" and to a tap on the coil 2 turns above the bottom.

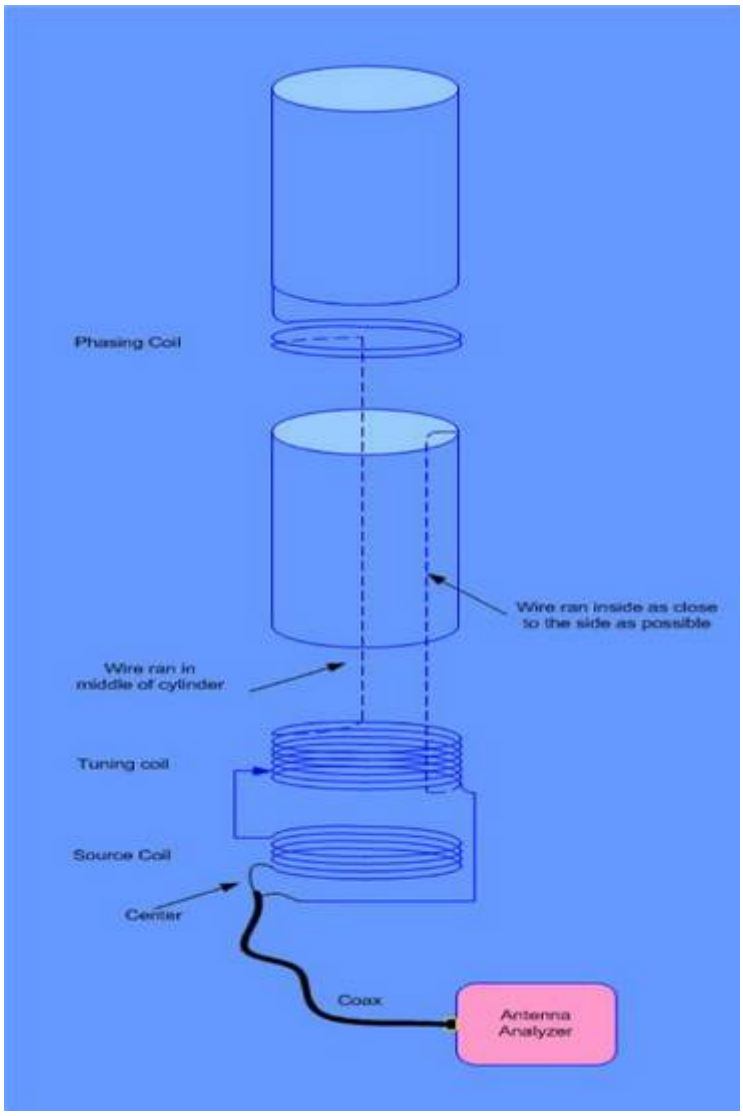
Step 9 - Measure the value of X when R = 50 ohms (you may need to move the tap to get 50 ohms). Calculate the value of a coil with that reactance and install it in series with the center lead of the coax. Alternately, experimentally determine the value of inductance that allow minimum VSWR to occur at the same frequency as maximumum radiation.

Go to the Coil Calculator and it will calculate the number of turns required for the Source Coil.

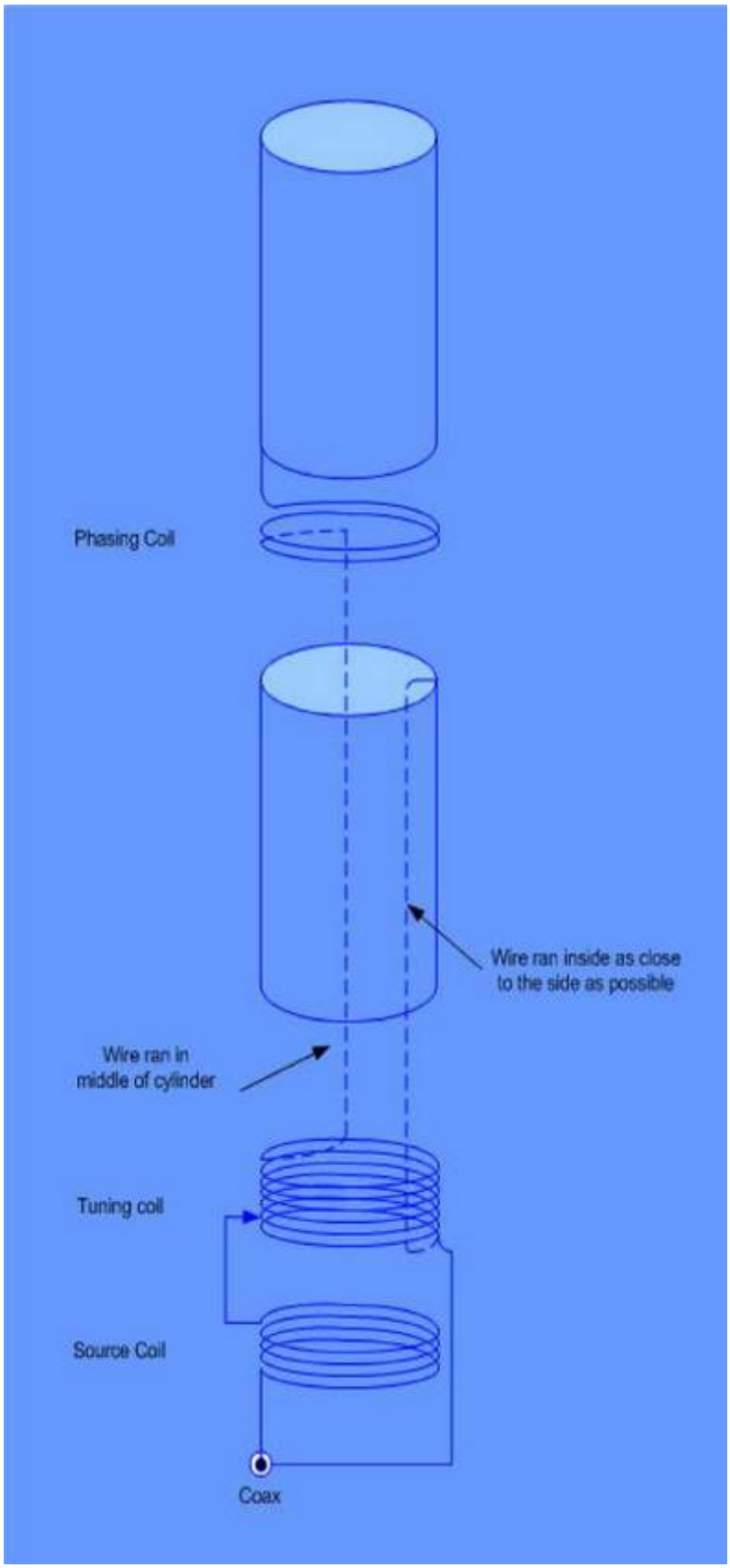
Step 10 - Adjust the tap on the coil to get perfect VSWR, then again adjust the top turns on the coil to place the antenna resonant frequenc wher desired. The impedance of the antenna can be adjusted by spreading turns on the lower end of the coil. The operating frequency can be adjustedby spreading turns on the top of the coil. Be aware that changing the tap will also change the frequenncy, so start low with too many turns, correct the VSWR, then set it on frequency. Hot glue will keep it from moving and changing frequency.

You will have to experiment around with spreading and compressing the coils to have minimum VSWR and resonance at the same frequency. This will take a little time, but in the end it will pay off.

Now put the coax connector on your antenna and connect to your rig - ***TRY IT OUT!!!!***



Finished Antenna Configuration


Phasing Coil
Wire ran inside as close to the side as possible
Wire ran in middle of cylinder
Tuning coil
Source Coil
Coax