The Radio Hotel Building a Coil-Loaded (short) Dipole

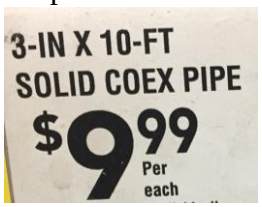
by Rick Hiller W5RH

This is part 2 of a 2 part "cook book" article on designing and building shortened, coil-loaded dipole antenna. I trust you understand the design method outlined in part 1.

Note: find a detailed explanation of the antenna on the BVARC web site Tech Pages – "Building a Coil-Loaded Dipole"

Measuring and cutting the antenna wire and fastening to the insulators and the center balun/coaxial connection is straight forward and typical of what you have done in the past to build a dipole. So, I will not discuss that here. But, I will talk about the loading coils that add a bit of project complexity by 1) figuring the dimensions of the coil to get the required, approximately L – 38 uH; and 2) winding the coils and making the coil mechanically stress worthy, so it stays in the air. This part 2 will concentrate on the coil(s).

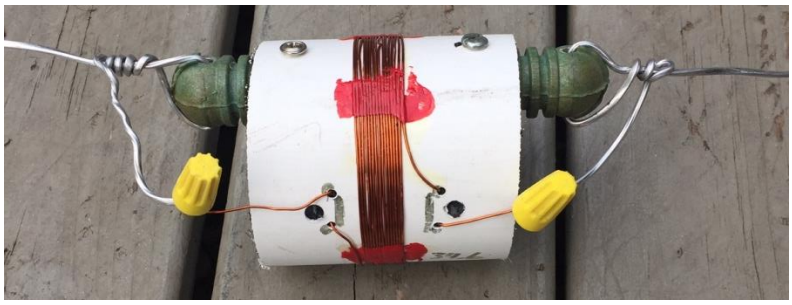
The coil target value is 38uH. A nominal value, so +/– 10% is OK and the difference that causes in the resonant frequency can be easily adjusted by varying the wire lengths when building/tuning the final product. The formula for inductors includes factors for wire size, turns per inch, length of coil and coil diameter. On-line coil inductance calculators make calculations easy (Google them). For this project I chose a 3.3" diameter core, thin wall, coated, pvc drain pipe that works well and does not influence the electrical characteristic of the coils. Nice thing about the 3.3" diameter pvc is that one coil turn is about 1 foot of wire.



As you can see in the pictures, I built 2 coil prototypes. One, large, with #10 insulated – coil was 26 turns at 8 inches long. And, one, small, with 16 turns of #20 magnet wire that was 3 inches long. Each was about 35 to 38 uH, but the #20 coil was smaller and lighter. I was using wire stock that I had in my junque box, so the applicable pickens were slim. The weight of the #10 coil was prohibitive without special, mid-wire, hanging considerations. The #20 coil, being small and light weight, was better but is limited to about 300 watts. (New #14 enameled wire coils will be built for the KW version)

Coil Parts: PVC -- Loews -- 10 foot of PVC drain pipe ($10) -- share the extra.
Wire – Loews or Home Depot or enameled wire from Amazon. 72 feet depending.

I did measure the coil uH values with my AADE L/C meter and the result correlated very well with the calculator's results, so winding a coil based on your calculator's input values (diameter, wire size, length, turns, etc.) will get you in the required uH ball park.



In using the #20 coil, I mounted the pvc coil stock on a long dog bone insulator and configured it as in the picture with temporary wire-nut connections. The antenna can then be put together using the wire lengths in part 1, ensuring good mechanical and electrical connections. I am not a fan of supporting a dipole only at the ends, as the center feed coax weighs heavy on the whole dipole structure. I like to support the center, as you would an Inverted V, even if the ends are not sloped toward the ground.

Visit the BVARC Tech Pages for the complete build plus K5LJ and K5LKJ articles. 73…Rick W5RH
