Revisiting the Resonant Feed-line Dipole
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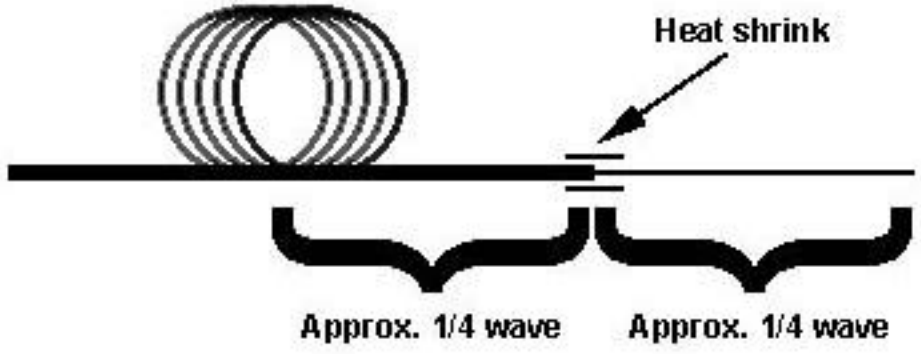
For someone who's helping to build the Internet, I somehow find myself spending a lot of time on the road. When not traveling, I also enjoy portable, lightweight operations—probably in the hope that one day I'll find more time to backpack and camp in the wilderness. In any case, I'm fascinated by the challenge of getting the most signal out in the smallest, lightest weight package—so much so that the monthly Spartan Sprint and the annual Flight of the Bumblebees contests, both sponsored by the Adventure Radio Society (http://www.natworld.com/ars), are two of my favorites.

When I'm on the road, I usually don't have a lot of time for operating ("hey, he's from out of town doesn't have a life—he can stay late and finish the report!"), or more often than not, I'm too tired to operate (travel takes more out of me these days than it did in my youth). But it's fun when I make the attempt. I once worked the Spartan Sprint from a third floor hotel room at Fisherman's Wharf in San Francisco, using my DSW-20 (at one Watt) and a dipole, half of which was hanging strait down from the window and the other half tossed into a tree with a bar of soap as a weight on the end, about 10 feet from the electric trolley line. QRN (or is trolley bus static QRM?) aside, I managed to work the states of Washington, Alaska, and Hawaii. Now that was fun!

For the past couple of years, I've been carrying around a dipole, made from orange #26 wire (easily found when setting up and taking down in the woods), a two-terminal connector block, some RG-174 coax and a BNC connector. I've used it in various configurations, including dipole, inverted-V, vertical, and the occasional sling-it-out-the-window-with-a-bar-of-soap-attached configuration. It has served me well, but it a bit bulky to pack (albeit the most compact antenna I had found to date).

Enter the Resonant Feed-line Dipole. At the NOGA QRP Club (http://www.qsl.net/nogaqrp) meeting in August, Jim Worthington, AD4J, talked about his recent trip to London, and how he used his "toilet paper" antenna from his hotel room. I was fascinated! This was just the antenna I had been looking for! Basically, it is a quarter wave of wire connected to the center conductor of a piece of RG-174 coax ¾ of a wavelength or so long. At ¼ wavelength back from where the wire connects to the coax, a "choke balun" or RF choke is formed by making a loop of 8 to 10 turns of the coax around a roll of toilet paper. (Alright! Knock it off with the TP jokes!)

Several of us got to talking after the meeting. Doesn't an end-fed half-wave antenna have very high impedance at the feed-point? Yes, but while this antenna looks to be end-fed, it's not really! It turns out that because of the "skin effect," the RF current flows on the *inside* of the coax shield to the point where the shield stops, and then it turns around and flows down the *outside* of the coax shield until it reaches the RF choke formed by the coil of wire. This choke has sufficient impedance to effectively terminate the end. The net result is that the antenna acts just like a ***center-fed dipole***!



The idea behind the Resonant Feedline Dipole (or RSD) is not a new one. According to the *ARRL Handbook* (1996 edition, p. 20.17), it was first described by James Taylor, W2OZH, in the August 1991 *QST*. Dave Ingram, K4TWJ, talks about it in his book *How to Get Started in QRP* (pp. 94-96).

The exact location of the choke varies slightly, but should be located at approximately ¼ wave from where the single wire connects to the center conductor. On my RSD, I trimmed off about ¾inch of the shield, and then stripped ¼ of insulation off the center conductor. I soldered a ¼ wave (at 20 meters, about 16 feet 7 inches) piece of #26 black wire (black is stealthier) to the center conductor, and tied a small loop at the other end (of the black wire). I connected a couple of small fishing weights to a piece of twine to aid in hanging the antenna out the window.

The NOGA meeting was very timely for me, as I was traveling to Germany the next week. When he travels, Jim just carries the entire antenna in a big loop in his suitcase. He pulls it out, gets the roll of toilet paper (I've been in very few hotel rooms that don't have a bar of soap, but even fewer that don't have a roll of toilet paper!), and adjusts for resonance. On my trip, I didn't want to have to take extra time for adjusting it, so I made my choke by wrapping several turns in a small loop and attaching them to the side of a three inch wire spool with cable ties.

A resonant dipole, in free space, exhibits low impedance at the feed-point (approximately 50 Ohms) that matches well to coax. However, depending on the configuration, there maybe significant SWR if care isn't taken. For example, at the hotel where I was staying in Germany, the windows had heavy metal frames that seriously affected the antenna. I carried my ZM2 tuner along with me, however, and it tuned up quite nicely.

The neat thing about this antenna is that it gives you a lot of flexibility in how you configure it for operations. This makes it an incredibly versatile antenna! It seems to perform fairly well, as I got a 559 from Moscow to Guetersloh, Germany, on one Watt, with the antenna hanging out a window facing west, during a solar coronal mass discharge!