

The TinyTenna

A portable 20-meter dipole that measures only 2.5"L x 1.75"D when stored

By Rob L. Dey, KA2BEO 7/4/2010



After building the 20-meter band version of the MFJ Cub (MFJ-9320K) QRP transceiver, I decided to build a small portable antenna as a companion to the rig. A solar-charged Lithium-Ion battery pack with a USB port powers my new 2-watt radio through a 5Vdc-to-12Vdc boost converter. The new rig also contains an internal Embedded Research TICK-2B keyer, SWL Freq-Mite counter (with CW annunciator), and 32-ohm speaker. I decided that a continuously-loaded horizontal dipole would be the best antenna choice for the portable Amateur Radio station. This linear approach combines the advantages of low-noise reception and the simple ungrounded installation of a balanced design over a vertical antenna, while the shorter overall length can potentially perform similar to a full-size dipole.

Materials

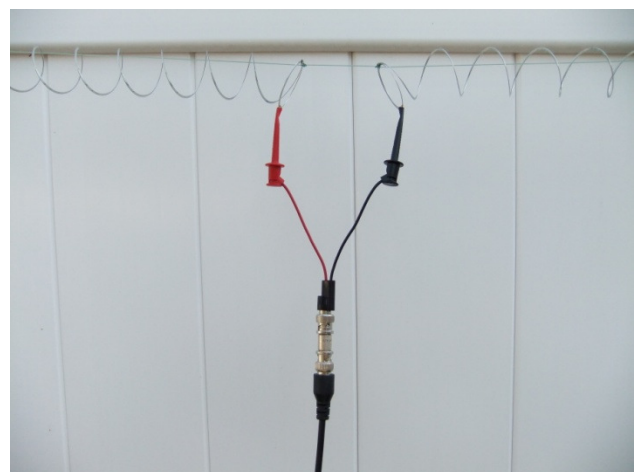
In order to keep the antenna weight light and the storage space small, only a few simple and commonly available parts were used to construct the dipole, as listed below.

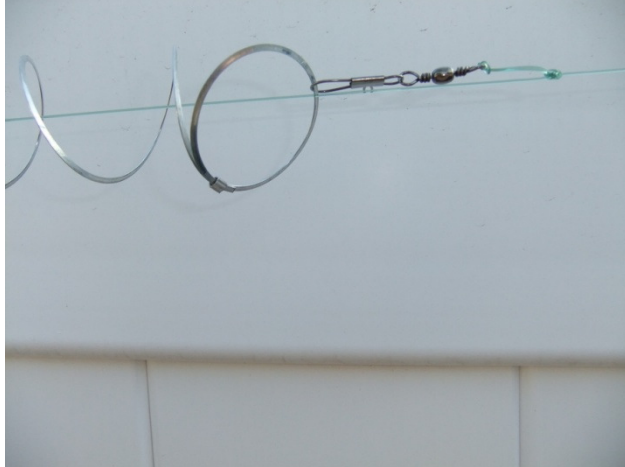
Qty	Description	Manufacturer #	Price (USD)
2	Slinky Jr. (toy) 1.25"L x 1.6"D compressed	Poof-Slinky #126	\$1.59 each
4	#5 snap swivel (fishing tackle)	Mustad #BLBW15	\$2.79/12
27'	60 lb test monofilament line (fishing tackle)	Berkley Trilene Big Game #BGQS60C-22	\$7.99/705'
1	Lure storage tube (fishing tackle) cut to 2.75"L x 2"D	Niagara/Caplug #226 (or C&H #TAP-3)	\$4.69/18" (or \$5.49/16")
1	BNC/Mini-hook test lead 5.5"L	Pomona #3788 or #3789 (shown)	\$10.59 each

Using all new materials, the total cost is less than \$30 (USD). By visiting a nearby toy store and the local bait shop, you should be able to obtain all of the required components to build your own antenna. If you do not already have the supplies handy, some of the materials must be purchased in bulk. For example, the quarter-pound spool of monofilament fishing line can provide enough material to assemble 26 of these antennas! The test lead assembly provides a convenient means to connect the antenna and radio. You can order one online from Mouser.com or Digikey.com, or simply use an alligator clip cable assembly.

Construction

Building the antenna is a simple task. Find the approximate center, by folding the line in half, and tie a double overhand (square) knot on one end of the Slinky Jr. coil. At 2-inches away, tie the second coil onto the line. Snake each line end into each coil. At





about 9' 2" away from the knot, the other end of each coil should be secured. Tie a dropper loop slightly beyond that point, so that the snap of the snap-swivel will sit at the 9' 2" point.

Using a clinch knot, tie a snap-swivel onto the remaining line ends to help secure the entire antenna between two supports that are from 19' to 26' apart. The two coils with a 2" center gap between them should extend to about 18' 6" overall, when the antenna is completed and installed. This length is almost half the size of a typical half-wave wire dipole for the 20-meter band.

Operation

The VSWR was measured on the prototype to be only 1.1:1 at 14.1MHz. This reflected reading was even better than I expected, with the dipole mounted only six feet above the ground. The next step is to see what distant stations that I can work with this setup, while operating CW, and running just two watts.

Storage

I created a portable enclosure for storing the antenna, by cutting a 2.75"L piece of clear plastic tubing from the 18"L storage tube, and by reusing the plastic end caps. The completed storage case measures less than 3"L x 2"D.



The end result is that this portable dipole expands to 18.5'L from its collapsed state of only 2.5"L, and works just great for the travelling Ham.

This antenna should be perfect for QRP operating on 20m CW from a hotel room!

RLD

