A Field Day Wire Antenna Idea for 2 Meters:

Simple and cheap, this is one antenna you have no excuse not to build.

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Its getting awful close to Field Day again, and I waited till almost the last minute to build my antennas for this round. VHF and up is where I have the most fun, so I figured 6 and 2m was where I would spend most of my time, perhaps with some 70cm work thrown in just for kicks. My TS-2000 is an all mode transceiver, so I figured I would run a mix of digital modes (FT-8, FT-4, and MSK144), SSB, and FM on 6m, with SSB and FM on 2m. I have stacked 5/8 wave verticals for 2m FM, but I had to think of something for 2m SSB and all things 6m.

The 2m Hour Glass Antenna

Halos are my go-to SSB antenna, but without stacking them for 2m, you don't really get much gain. As an alternative, I found plans for a 2m hourglass antenna online (http://www.arrl.org/files/file/QST/This%20Month%20in%20QST/December2018/Stanley.pdf) which seemed to fit my requirements for portability, ability to be hung from a tree, and lack of any parts that I didn't have already.

Construction was rather simple. I used pieces of plastic tread-in posts (used for electric fencing) as the horizontal support; the only thing special here was that I used a hoof rasp to notch the post so that it hugged the PVC mast securely. Two holes on either side of the notch allowed me to wrap a zip-tie around the mast to secure the horizontal. I then added two more zip ties crisscrossed around both or added support.

The original plan used insulated wire, and I knew switching to non-insulated would shift the resonate frequency slightly. The following dimensions will land at about 151 MHz. Loop height: 68.9" Loop width: 14.57" Total length of wire: 169.29" (Don't worry, we'll adjust it in a minute.) You can substitute the aluminum wire for copper of any gauge, but I would stick with something 18g or thicker. In this case, you won't need the spade connectors or 4" piece of stranded copper wire since you can solder straight onto the SO-239.

Parts for the 2m Hourglass Antenna

74" (or more) ¾ inch PVC conduit
2 16"-17" pieces of strong plastic or fiberglass (one 48" plastic step-in post should work—cut to length)
169.29" 14g aluminum wire
2" 16g stranded copper wire
1 pair 16g spade connectors (remove skirt/jacket if present)
1 pair 14g spade connectors (also without the insulation)
7 10" zip-ties
1 4" cable tie
1 SO-239 chassis mount connector
4" of plastic tubing to fit over the 14g wire (a ball point pen barrel should work)
About 3' of scrap wire for tuning stubs
Wire cutters
Pliers
Solder and mini torch or soldering gun
Permanent marker
Drill and drill bit (big enough to fit zip-ties through)
SWR meter or VNA for tuning

Figure 1: The author's 2m hourglass antenna

Mechanical Construction

Before attaching the horizontal arms to your mast, be sure and notch out a V in the middle of each support. This will keep them from rotating about their attachment point. Drill a hole on either side of the V so that a zip tie can wrap

around the mast to hold it in place—but don't stick on yet. Drill another hole on both ends of the horizontal 7.28" from the center; this will be where your wire passes through. If using an I-shaped post like I did, drill through what ever part of the I-shape you plan on having towards the inside of the antenna. This keeps the wire from getting bent at an odd angle.

Do the same thing for the second horizontal and secure them on the mast with the holes facing inwards, so that the wire (which will run inside your I-channel) will be 68.9" apart, and mark half-way in between the two horizontals(34.45" from one horizontal). Try and keep both horizontals parallel; tight zip-ties will help hold things in position. You can glue them as well after the tuning and assembly is complete.

Take the 169.29" piece of wire and find the middle. Mark it with a piece of tape or marker, and starting from what will be the top end of the antenna, feed both ends through the holes on either side of the mast. Keep the center of the wire in-line with the center of the mast and then bend the wire sharply at the holes you drilled to keep it from slipping. Slide the tubing or pen barrel over one wire and tape it near the top horizontal so it doesn't get in the way. Cross the wires in the middle of the mast (which you should have marked already), and then feed one wire through each of the holes you drilled on the bottom horizontal. Bend the wire at these holes after you have it somewhat snug—the wire ends should nearly meet if you measured it correctly.

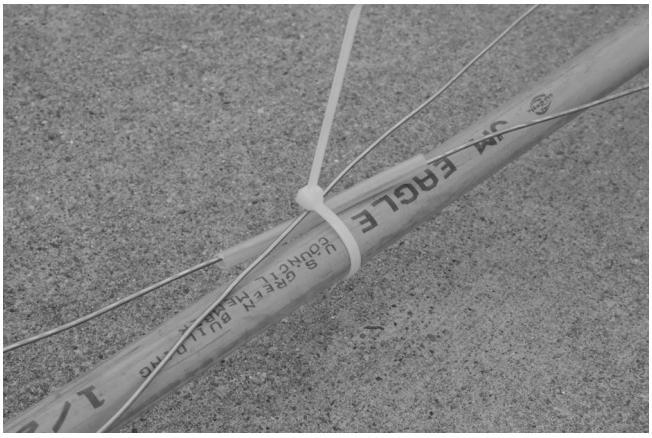

Figure 2: A close up of where the wires cross.

Slide the tubing or pen barrel so that its center is over the center of the mast, place the non-insulated wire over this point, and wrap a zip tie around the whole thing to secure it.

Figure 3: A detail of the feed point.

Feed Point Construction

After ensuring it is taught, trim the aluminum wire so that there is a 1.5" gap right over the mast. Roughen up both wires slightly and crimp spade connectors onto both. Solder if possible. The solder probably won't stick to the aluminum, but it it will keep a tighter connection than without. Copper wire would be much more secure, but I didn't want to use it on this antenna because I didn't have any. Take the SO-239 and solder one spade connector (of the opposite gender of one wire) onto the flange of the connector. Either or both may need roughened up slightly to make the solder stick. Take about 1.5" of stranded copper wire, install another spade connector, and solder the wire into the center pin of the SO-239. Solder the spade connector on if you like. Connect this assembly onto the antenna wires and use the cable tie to secure the connector to the mast.

Testing and Adjustment

I used a NanoVNA for my test, but any antenna analyzer or SWR meter will work. Either hang the antenna from a rope or place it on a mast to get it several feet from near by objects—especially metal ones. Chances are good that the antenna will resonate at close to 151-152 MHz. Take the

scrap wire and cut it into 8” pieces. Wrap it several times around the center of each diagonal leg (see picture), leaving about 6” on each “flag.” Trim each of these evenly until the antenna resonates where you like. If using copper wire, solder them in place. Any other wire that may not support soldering can be crimped or clamped into place with a split-bolt. I got mine to 1.2:1 or less over 144.20 MHz, which is where I plan on doing most of my operating. Once I get it into its final position on Field Day, I’ll adjust it slightly so that I can move up the band without any trouble. Nevertheless, the proof is in the pudding! We shall see how it performs under pressure—and 100 watts of RF….

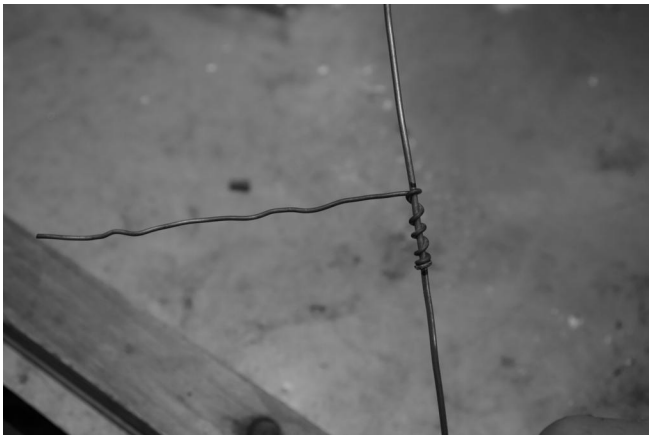

Figure 4: Perhaps it isn't the most secure method of tuning, but it works

But Wait, Where’s the Balun?

That’s a good question. For those of you who are following my “Basic Antennas” series (or at least the start of it as of the time this article was written) you are likely wondering, “Won’t my coax radiate?” Actually, according to the original designer, this antenna doesn’t mind having the coax directly attached to the feed point without a balun. Adding one wouldn’t hurt, but it doesn’t seem to be a necessity.

Now What?

“How do I mount this,” you might wonder. Simple. Tie a rope to the top horizontal and pull it into a tree. Fit pieces of conduit onto the end of the mast to lengthen it as you pull it higher—you don’t need to glue anything as you probably will never get it apart anyway. The PVC hanging off of the bottom can be rested over top of a tent peg or set inside of a larger pipe buried part of the way into the ground to keep the bottom of the antenna from flopping in the wind. This will allow you to rotate the antenna any way you need. (The PVC isn’t there to support the weight of the antenna, its only there for turning it.) As a directional aid, make another horizontal brace like you did for the antenna and mount it a few feet from the base. Make sure it is parallel to the antenna’s horizontals, and you have a simple way to see which way things are pointing without getting a sore neck. Another idea would be to mount the pipe on top of a plywood sheet with a large nail or bolt in the center as a pivot. Then, print a large great circle map (like you can make here: https://ns6t.net/azimuth/azimuth.html) and center it over the bolt. Install a pointer onto the pipe and orient the map to give a very eye catching Field Day presentation!

73 and have fun,

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