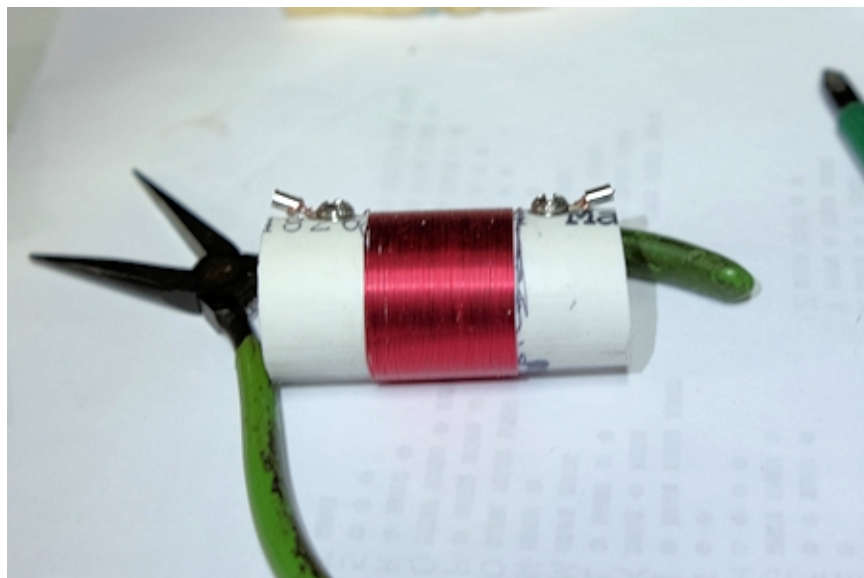


Let's make a loading coil for a 20m/40m short EFHW antenna

by
WI6NG (Tim Scott)



Let's make a loading coil for the 20m/40m short EfHW antenna element.
This Antenna element is about 40 feet in length, length will vary and is dependent on final tuning.
Speaking of tuning you will tune this after you attach the 40m element.
Basic Hand tools are used.

Parts:

- 45 feet 24 to 28 AWG stranded antenna wire (I like #26 AWG)
- 3" section of 1" PVC pipe
- Two (2) crimp lugs
- Two (2) #6-32 stainless steel screws, Two (2) star washers, and Two (2) #6-32 Stainless Steel nuts
- 20 feet # 26 magnet wire
- solder

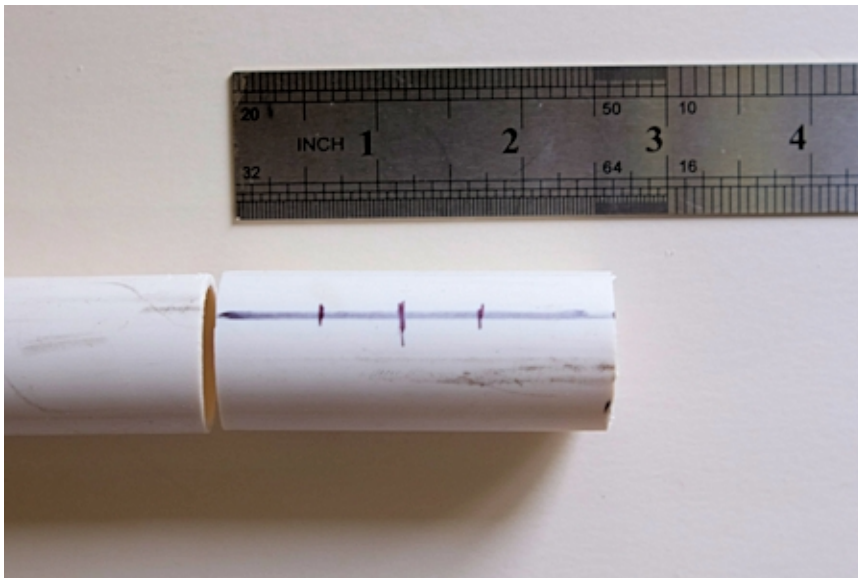
Tools:

- emery cloth or 1000 grit sand paper
- Soldering Iron
- wire cutters
- needle nose pliers or tweezers
- twist drill 1/16th" and a 1/8th"
- hand drill or dremel tool
- screwdriver and wrench for size screws & nuts you choose
- masking/painters tape
- multi-meter to check continuity
- Antenna analyzer to adjust the 40m element

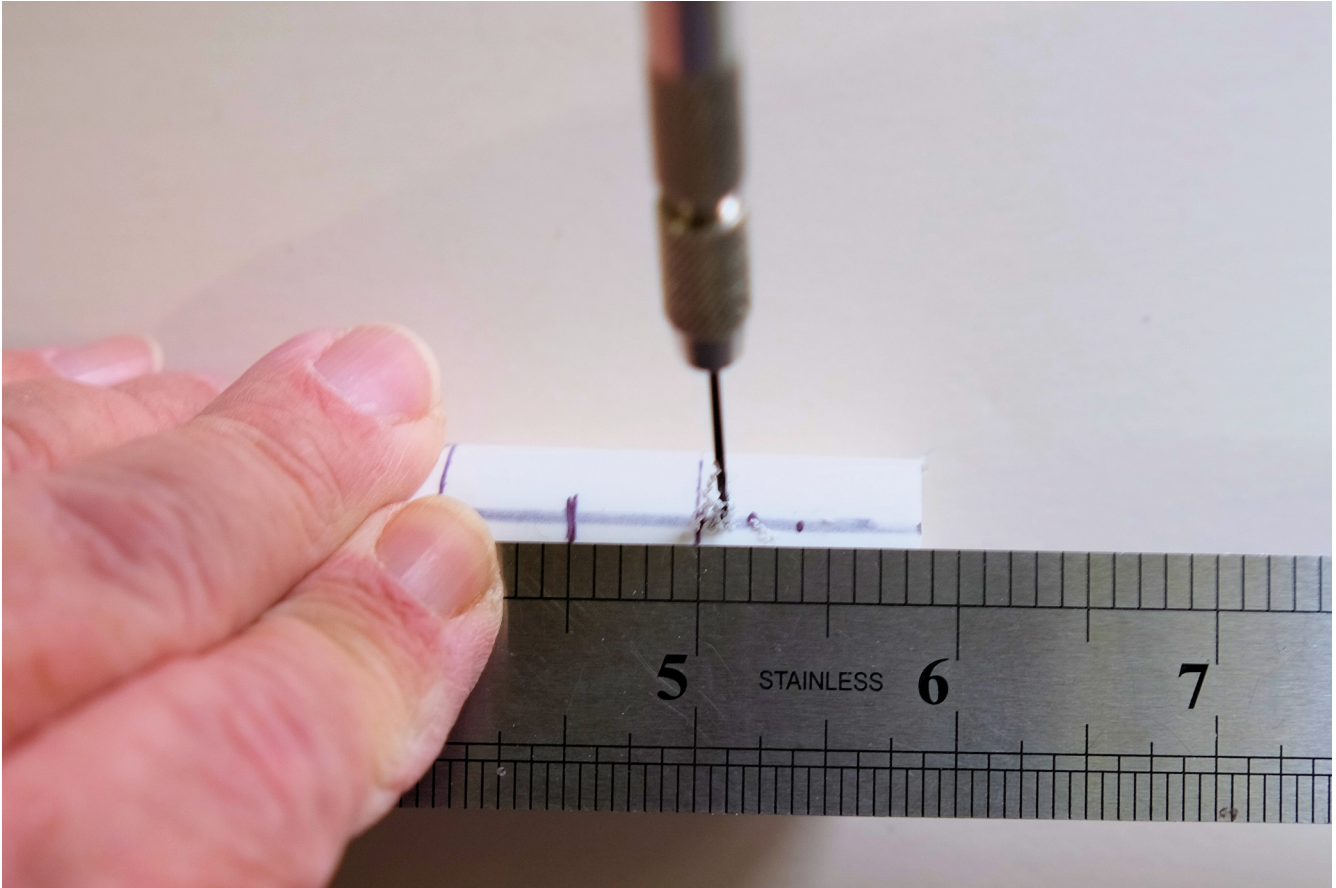
Let's start

Step 1 Prep the Core -

- Cut a 2 3/4" to 3" length of PVC Pipe. (we'll refer to this as the **core** for the remainder of this article)
- draw a line down the length of the PVC pipe you just cut
 - put a mark at the center of line and another mark either side 1/2" from center



- now drill two (1/16th" drill bit) holes about 1/8" apart & away from the outer mark on one side (wait until coil is wrapped before drill the second set of holes), these two little holes act as a lock for the coil wire. Draw about a 2" length of the wire between the sandpaper to remove the coating so it can be soldered.



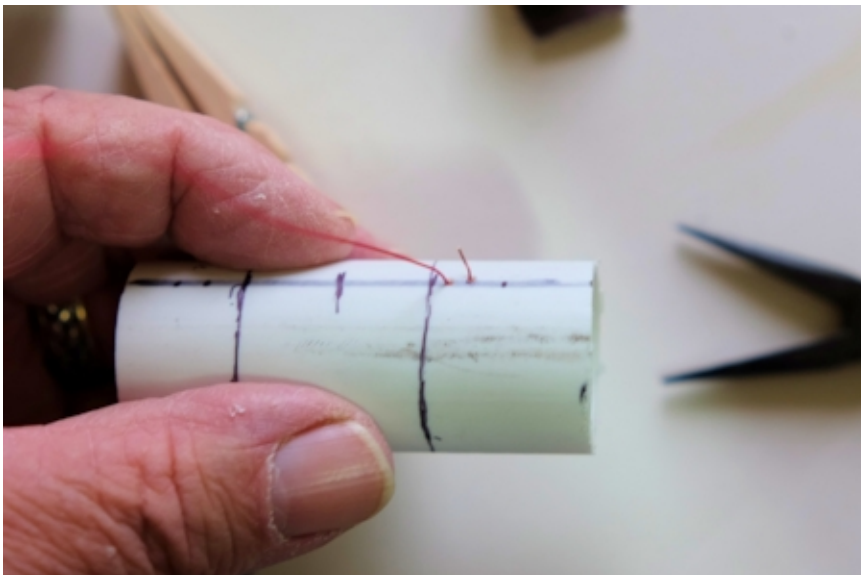
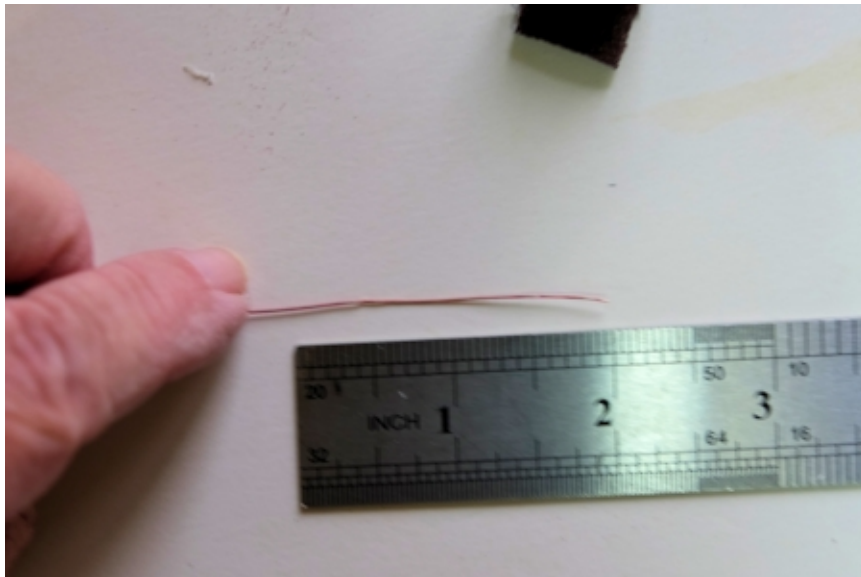
Step 2, Are we ready to wind our coil?

The easiest way is to wind the wire off the spool and onto the **core**, remember that line we drew down the length of the core? It will help us keep track of the number of turns, each time we complete a rotation the line will be on top. I suggest you sit or stand with the core & spool in front of you. This is a good time to tear a couple of pieces of tape to help if your fingers get tired or you reach the end of the wind and you can use the tape to hold the wrapped wire so it does not unwind while you finish the second set of locking holes (1/16th" drill bit). Before you pull the wire through the locking hole, cut it leaving about 3".

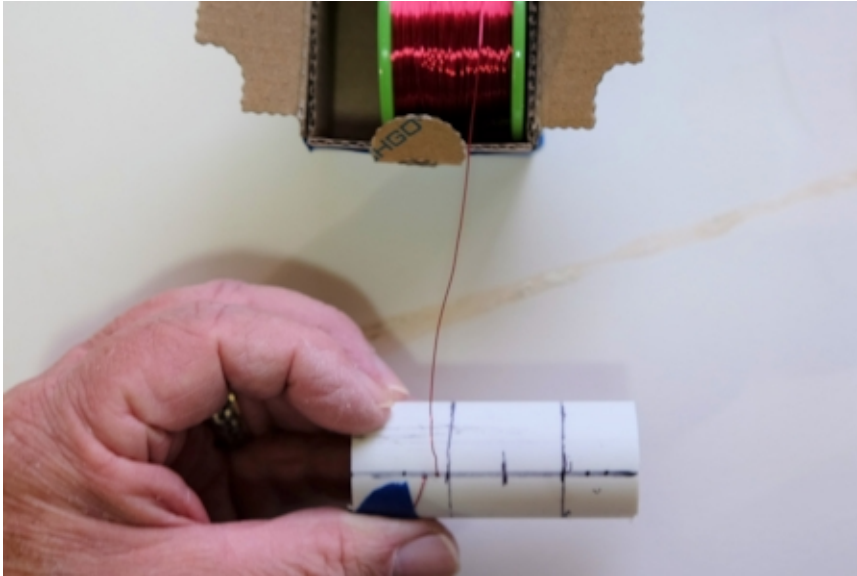
Look at the next several images as a guide.



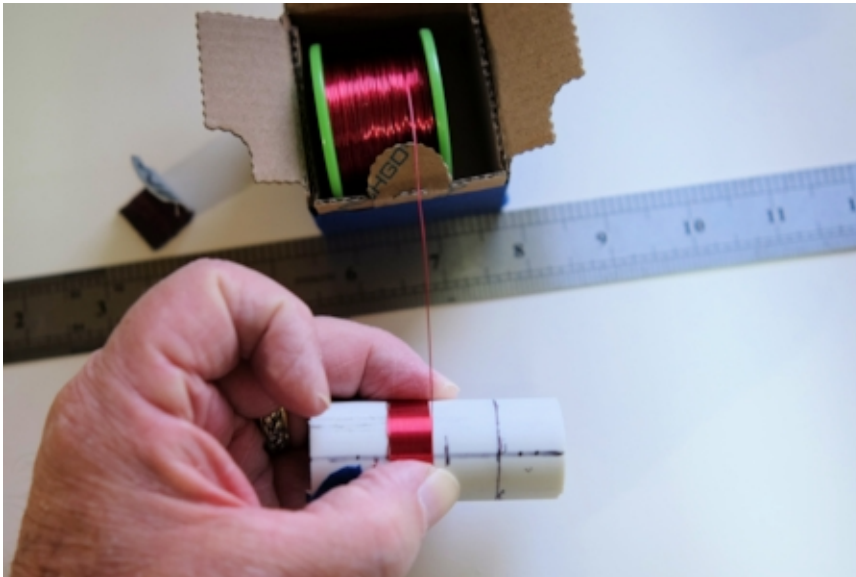
Now use the sand paper and draw the wire between the sand paper to remove the coating so it can be soldered.



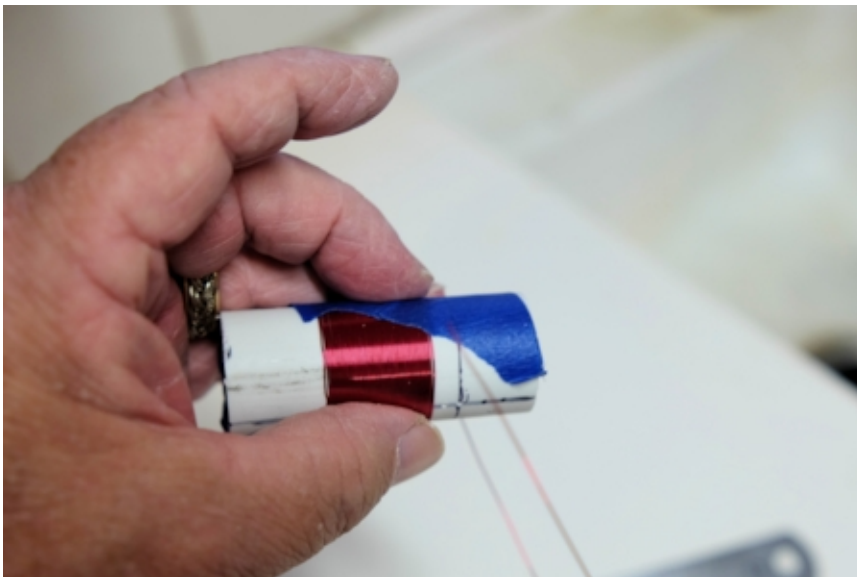
Pull wire through locking holes



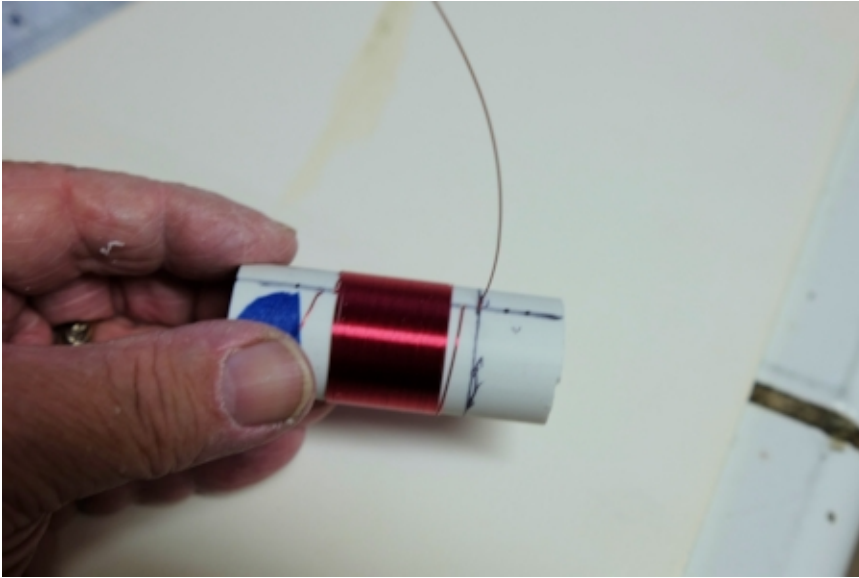
begin the wrap, notice under my thumb, I have used a piece of tape to keep the end of the wire from interfering with winding. The grip you see is used over the wire to keep tension and to keep the wire from unwinding, I rotate the core with my right hand. That line running from one end to the other is to keep track of the count.



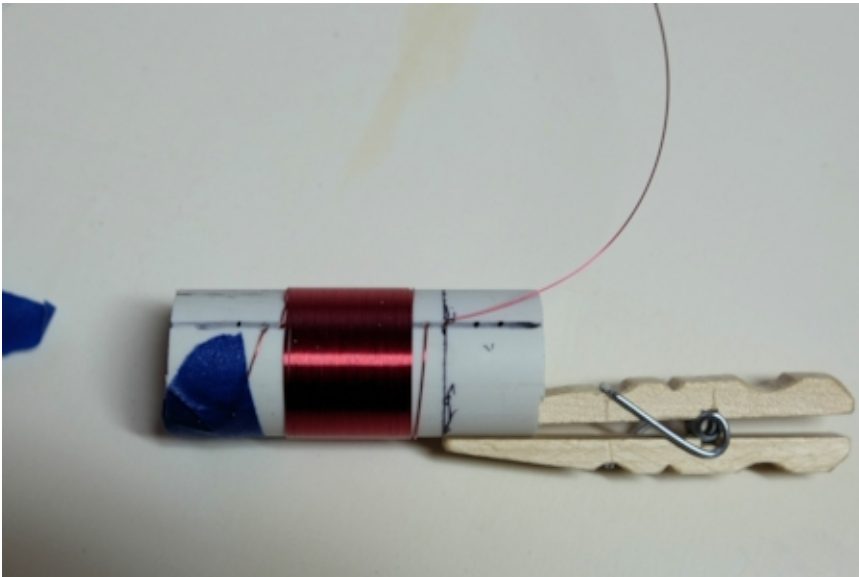
Again I use my left hand to grip and keep the wire tight on the core



I have put tape on to hold the wire tension while I drill the two locking holes for this side of the core. We'll then tread the wire through the holes. Now is a good time to cut the end down to about 3" and sand the varnish coating off before threading it through the locking holes.



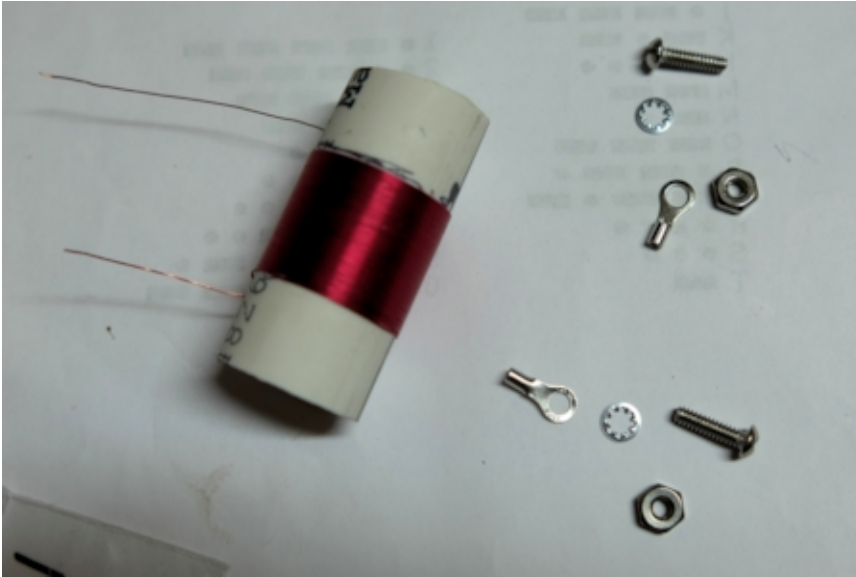
Here you see the wire threaded, I have kept tension on the wrapped wire while pulling it tight. Do this gently so you don't break it, else you'll be wrapping it again.



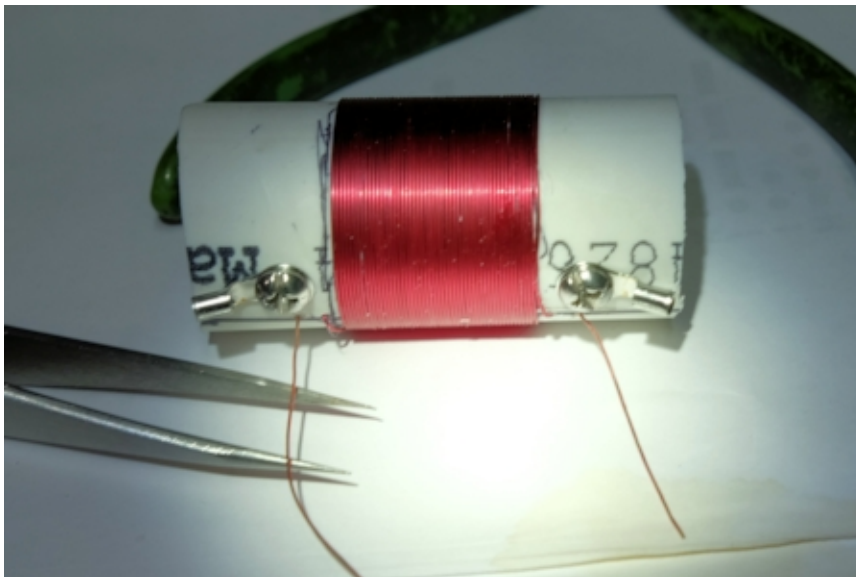
Once pulled taught the wire is locked in place and we can add other components to the complete the Loading Coil

Step 3: Drill holes for attaching screws and solder lugs.

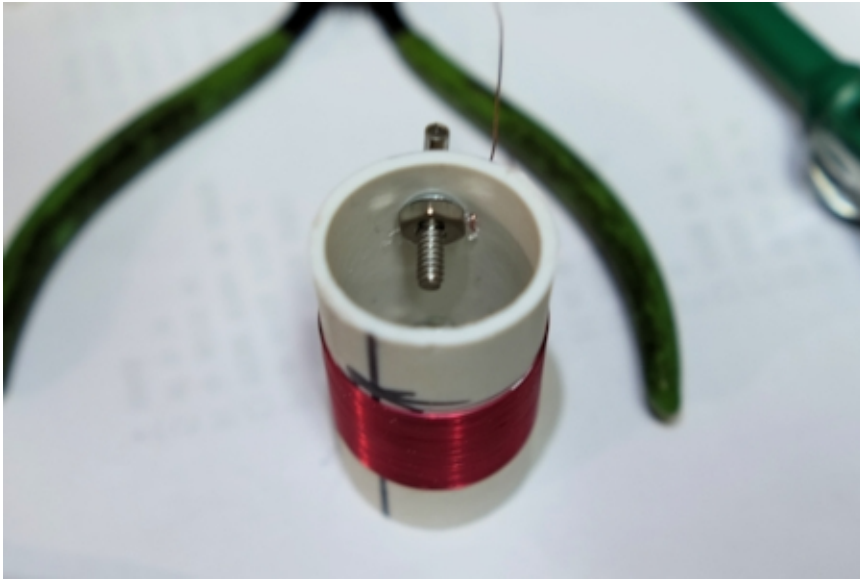
- Using the 1/8" drill bit make a hole about 1/8" away from the last wire locking hole (closer to the end of the **core**).
- put screw, wire lug on top, place star washer and nut on bottom and tighten.
- wrap the coil wire through the wire Lug



If you've used the suggested parts, than drill out hole using the 1/8" drill bit, remove plastic collar from wire lug and install all items as shown in following photos.

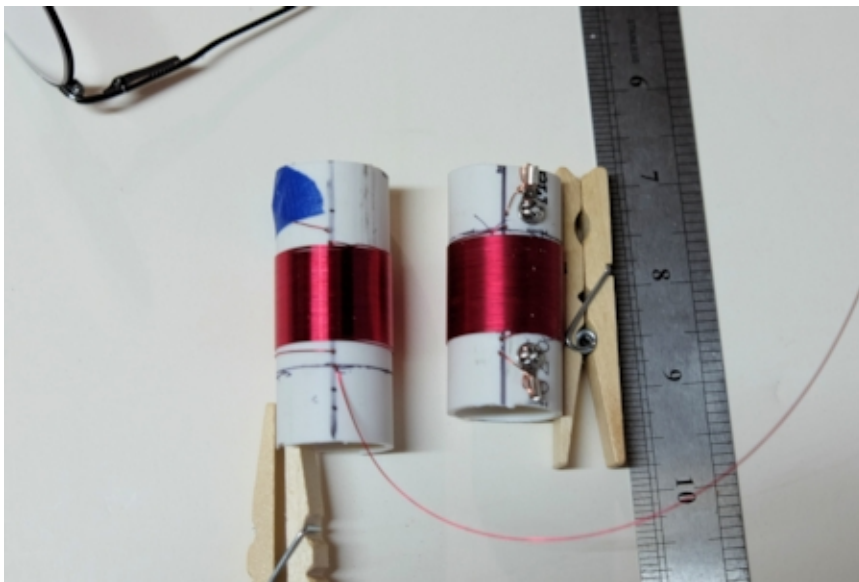


We'll wrap the bare magnet wire over the lugs but not solder just yet.



Here you see the Nut and Star washer installed, hold with small wrench or pliers and tighten screw

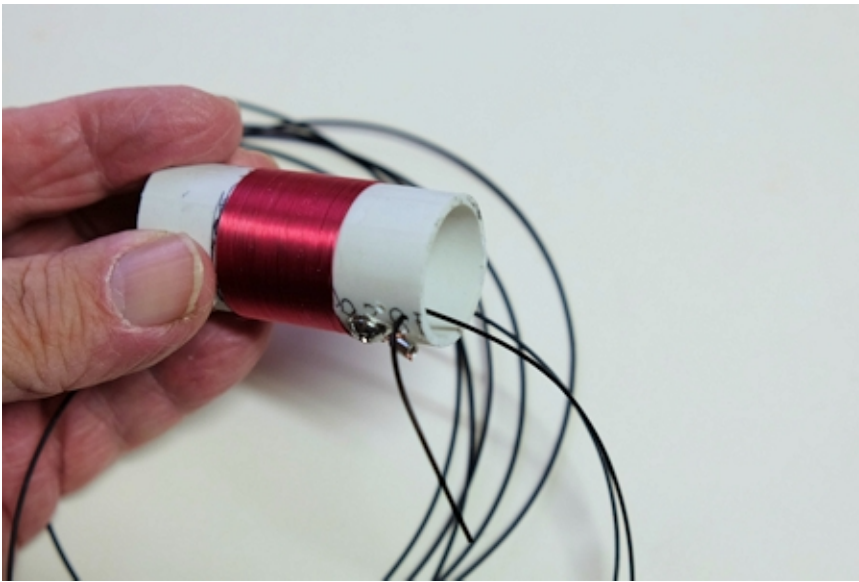
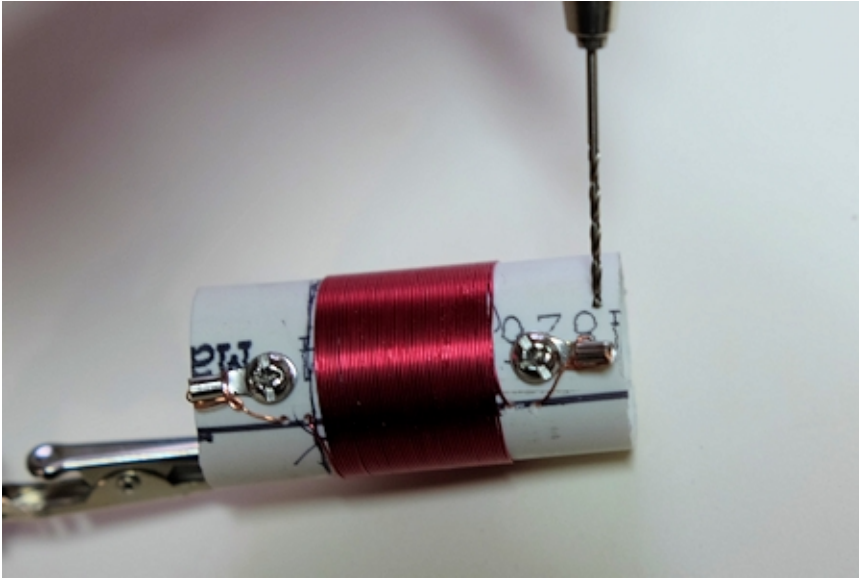
You are almost done with the Coil. Yours should look similar to this if done right.



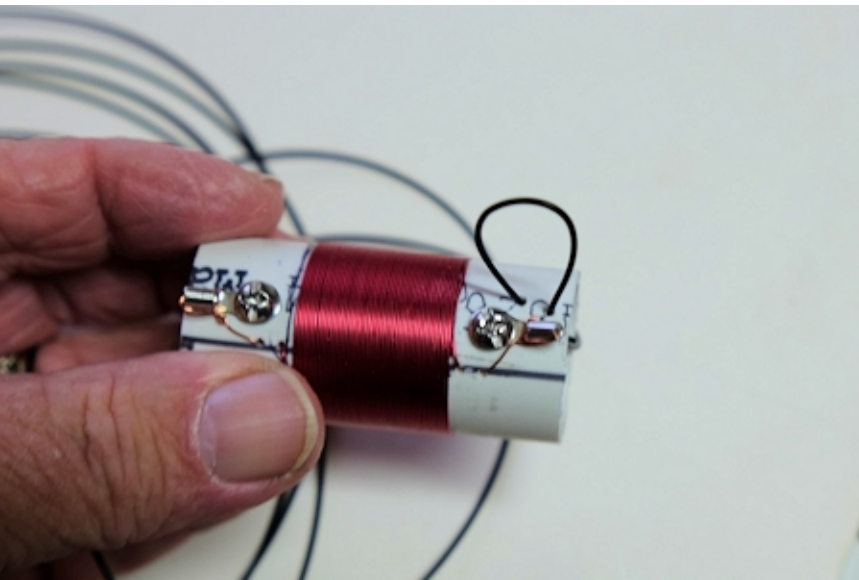
The finished Coil on right with just a few steps left.

To finish off the coil we need a way to provide some strain relief so we do not break the antenna elements off the lugs. We will be drilling two more holes on each end of the coil to the left of the Lug we installed using the 1/16" drill bit. These will be for threading the Antenna wire through before soldering to the lug.

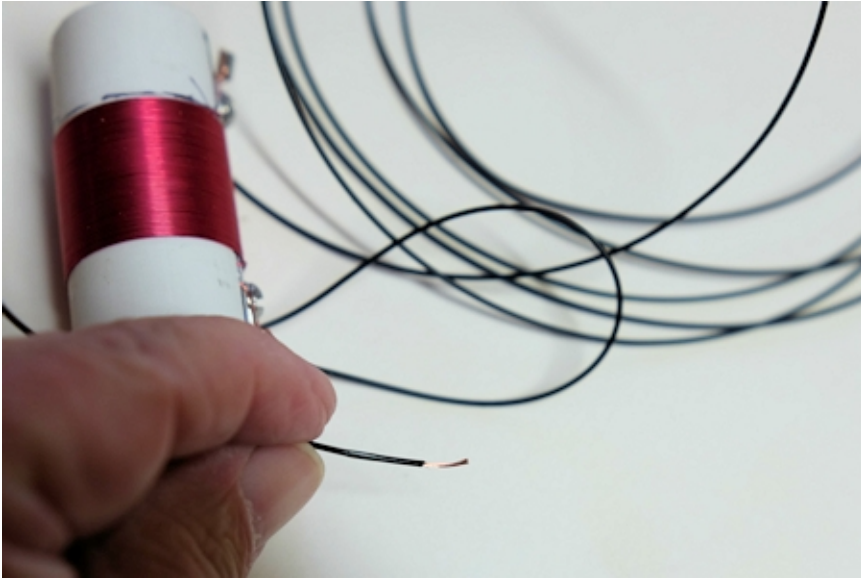
Attaching the 40m wire stub to coil



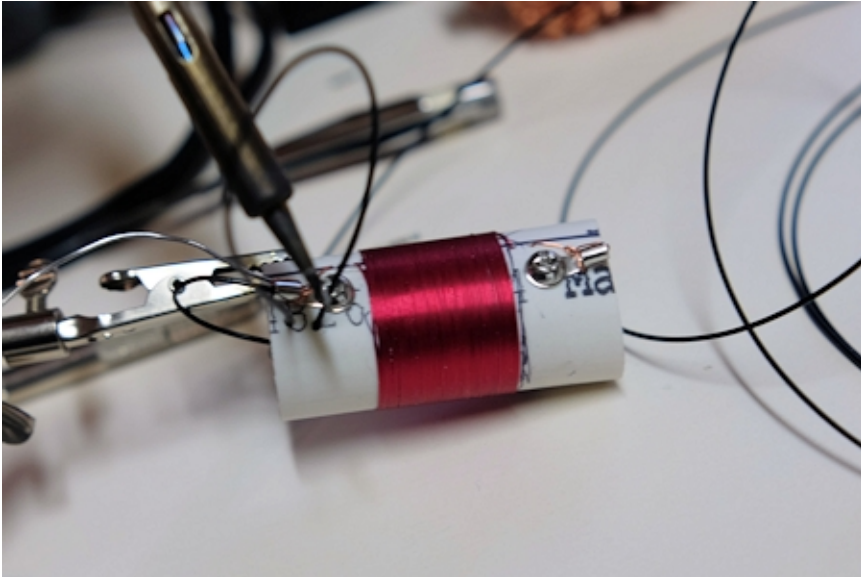
Loop through 1st hole.



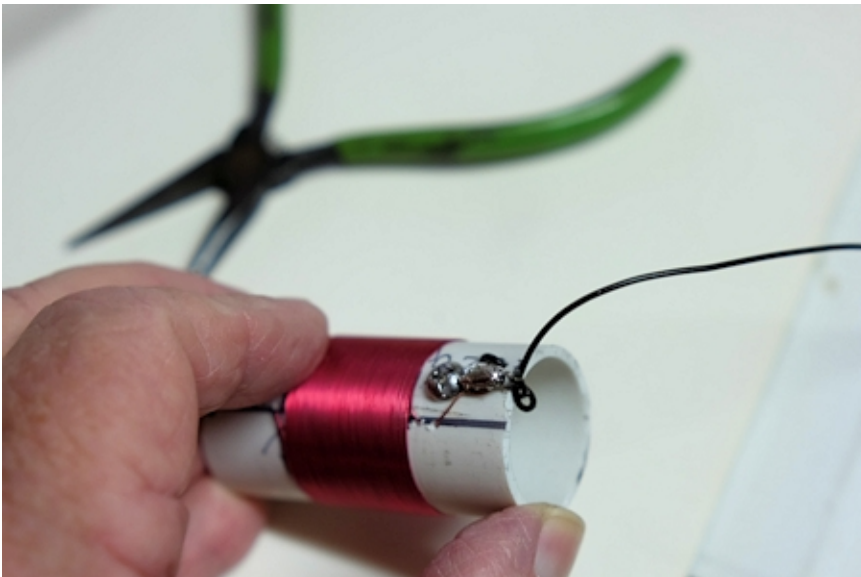
Loop through second hole.



Remove ¼" of jacket to bare the wire, tin push into lug.



Now solder both antenna wire and coil wire to lug.



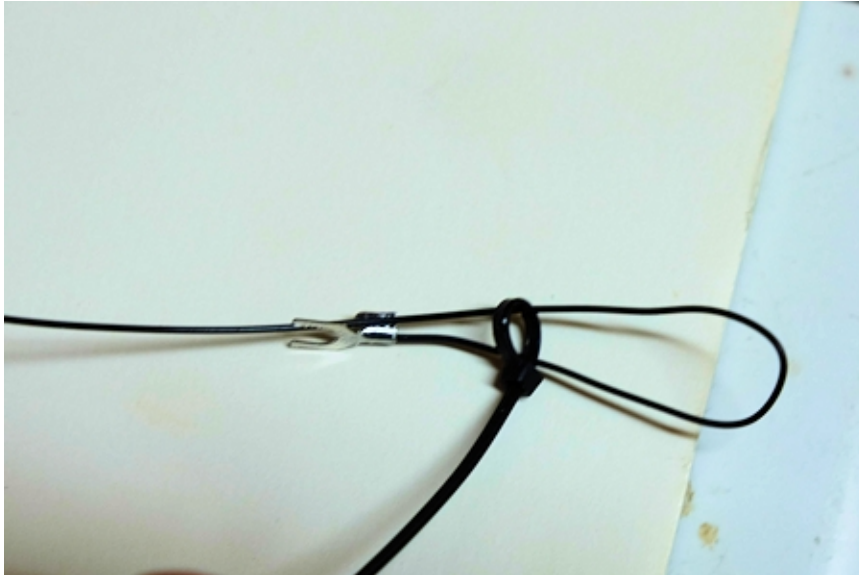
Now pull wire snug.

Repeat the procedure as seen in the above photos for attaching the 20m section as well.

- Procedure to Measure & Cut the 20m antenna section.

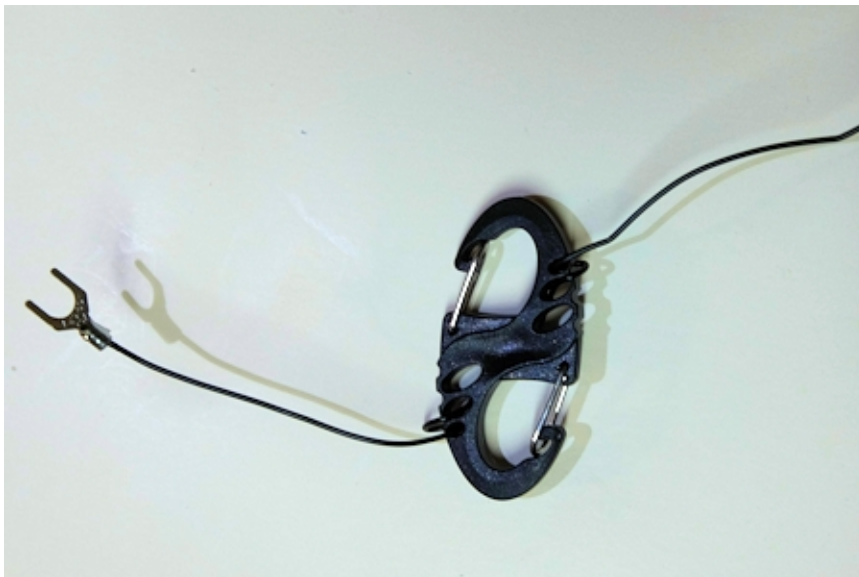
- after attaching the 20m section to the Loading Coil carefully measure 32' 9" (put a piece of tape to mark it) (**Do Not Cut YET**).

Method One: Form a loop around a pencil and use a zip-tie to secure the loop , you will be leaving a short amount to go to the Ant. Connector of the 49:1 transformer.

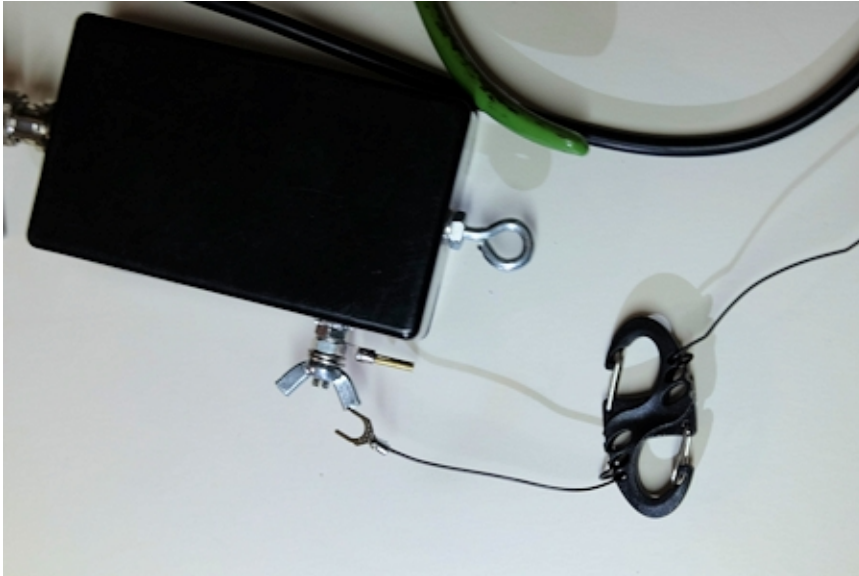


There are many ways to provide strain relief, This is the simple quick and dirty way. You may use whatever method suits you at this point on.

Method Two: my preferred method



I use a **Carabiner** clip, get these on Amazon. Once you have the wire threaded (the 32'9" end at the start of the Carabiner) the rest is strain relief about an extra 2" that goes to the Antenna connection on the 49:1 transformer. See next photo.



Clip Carabiner to eye bolt, and wire lug to antenna connection



all connected and ready to finish it up.

Step 4a: Antenna elements

- cut the first antenna element 32' 9", add 6" for attaching to 49:1 and Loading Coil strip the wire end and crimp on a wire lug (I use an open lug), I also solder mine.

Method One: Now, fold back about 2" and make a small loop, use a small zip tie to lock the wire loop.

Alternate Method: I put this over one side of the plastic **Carabiner clip** so I can attach to the 49:1 transformer. From the center of the loop measure out to the 32' 11" and cut it. Thread the wire through the two locking holes and now re-measure to the 32'9" mark. You'll use the remaining pigtail to go to the wire lug after you strip off the insulation.

You can now solder this connection.

Step 4b: 40m pigtail

- cut Second element 8' long. Like the example above we are going to attach the 8' section to the opposite side of the coil. We will use the antenna analyzer to fine tune the length (somewhere around 6') to bring the antenna into tune at the portion of the band we want, I'd suggest 7.175Mhz and if you need to touch it up then use the radios onboard tuner or an external tuner.

Remember when Tuning an antenna that you can fold the wire back upon itself to shorten it without cutting it. (I leave about 6" folded back for later adjustments if required)

My DIY 49:1 transformer



I used some bell wire to make this one, it shows some slight heating of the wire that is wound around the core, (I stress tested the unit) it will handle 100w, I only run 80w when out activating a park, just habit, but will on occasion run 95w.

From this, I attach a 6' rg8x jumper – a 1:1 current balun – then another 18' or 25' hank of rg8x to the back of the atu or radio. Everything works great.

So attach this to your 49:1 and play away . . . I usually run it up a 33' push-up pole, I do have to wrap it around it a bit but it performs admirably . . . 73 de WI6NG

Hope you have fun building the Antenna, and perhaps you'll wind your own 49:1 as well.

POTA ON