

Conducted this month by John Stevens, K5JS

Portable Moxon Antenna for 6 Meters

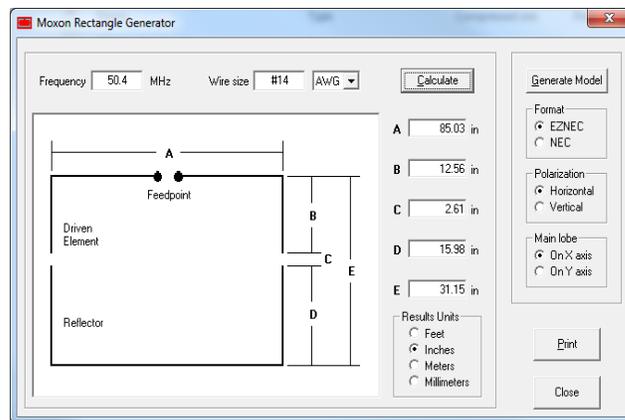
This project came about because all my real antennas are in storage in Arizona and 6 meters had some good openings this year with no way to take advantage of them. This antenna was brought to an Arizona ScQRPions campout near Flagstaff a few years ago and appeared to be a quick and easy antenna to build. The Moxon antenna offers good performance for its compact size. Two elements will get you a bit of gain and F/B ratio from an antenna only 7' wide for 6M. Software is available to give you the dimensions for your Moxon. See the references at the end.

This is a "stressed" antenna as the spreaders are bent to hold them in place on the central support made from PVC pipe or small piece of wood. Pictures will be worth many words during construction of this antenna. This is by no means the only way to build this antenna as you will see in the Moxon antenna reference at the end and even during this paper.

Materials are available from many local sources. 48" X 3/8" fiberglass driveway marker rods turn out to be near perfect for spreaders to support the wire elements. You'll need 4. 1/2" PEX tubing couplers are used to hold the wires on the ends of the spreaders. You'll need 4. Use a 1/8" bit to drill a single hole through one end of each coupler. The couplers fit the ends of the rods exactly.

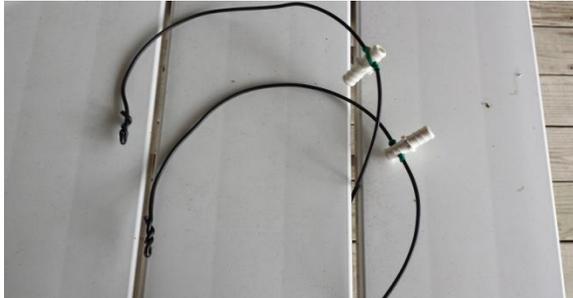


The panel below shows the dimensions for a 6M Moxon using #14 wire. You can export the EZNEC description of the antenna for use with your antenna modeling software. What! No modeling software? Use the free versions of EZNEC or MMANA-GAL to import this file and see the theoretical gain and pattern.

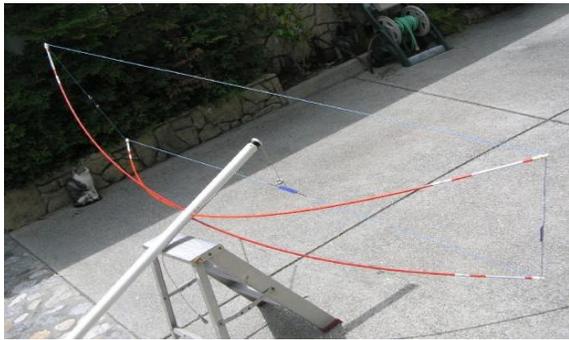


Construct the two elements from continuous pieces of wire using the dimensions above. The driven element is 110.65" and the reflector is 116.99". Reduce these measurements by about 5% for insulated wire. You should add 3" to each of these measurements so you can fold back 1 1/2" on each end to go through your element end spacers. Measure these fairly close. The ends are folded toward one another and the spacing of the ends (C) is very important. Thread two end caps on each wire element. Move the end caps to the approximate B+ 1 1/2" measurement from each end of the driven element and secure in place with a twist tie. Do the same to the reflector except use the D+1 1/2" measurement. These caps may move when you stress the elements. Mine did. This may be preventable if you pull the wire up from the inside of the end cap, put a twist in it and pull it back down. Imagination

is your friend here. You can Use a bulkhead female F connector for the center of the driven element if you would like to use lower loss RG-6 coax. Radio Shack still has them. If you can find one. Really.



We are now ready to prepare the center support for the antenna.



The angle between the spreaders is about 40 degrees to obtain the 31.11" element spacing (E). This is a simple problem and the math is done for you in the spreadsheet if you decide to use a different diameter PVC pipe.



Ignore the top two holes (senior builder error). The lateral spacing of the holes changes with the diameter of the PVC pipe you choose as the

center support. This is 3/4" PVC. The lateral spacing is not overly critical as you can make adjustments at the ends of the spreaders to compensate for small angular drilling errors at the center. The two vertical pencil lines marking the center lines are about 1/2" apart for 3/4" diameter PVC. Note the two holes that accommodate the 3/8" rod and the two smaller holes below. The two smaller holes should be slightly less than 1/4" inch in diameter since one end of the rod is pointed. This will keep the rod from sliding through the wall of the PVC pipe and lock it into place. A drill press should be used to drill 4 - 1/4" small holes as pilot holes or you can make a template to mark front and back holes. Remember to space the holes 3/8" vertically so there will be room inside to accommodate the 4 stacked 3/8" rods. The drill press or template will insure everything lines up on the reverse side of the pipe. The top two holes should be enlarged to 3/8" on the front side of the pipe and the bottom two holes on the back should be enlarged to 3/8".

Leave about 16" of PVC pipe above the spreader mounting holes to support the feedline from the driven element and another foot or so below so you can connect to your supporting mast. You should also add a choke to the feedline. A few turns of coax, a bead choke, or a few turns of wire on a toroid will work.

The diagonal distance across the antenna is 90 1/2". You can use a string of this length with a small hook on each end to stress the spreader rods upward to the approximate correct size. Insert the two rods that form one diagonal and connect the diagonal string to the ends. Do this with both diagonals to make it a little easier to mount the elements the first time.

If you prefer, you can use an alternate method of mounting the spreaders as shown in the following picture.



This is a bottom view. This mount is made from an 8" length of 1" X 4" plank. Two screw eyes per spreader will be used to secure them to the mount. The screw eyes are slightly smaller than the diameter of the rod. The screw eye at the pointed end of each spreader is unmodified. The screw eye farther up the spreader is opened just enough to allow the pointed end of the spreader to pass through the eye into the end screw eye. Be sure to allow enough room in the center of the plank to drill a hole large enough to accommodate your center PVC support pipe.

Mark the center point of the plank and draw a straight line the length of the board through the center. Use a protractor to draw two diagonal lines with a 40 degree central angle about the center line. These are the lines upon which the screw eyes and spreaders will be installed. Stress the spreaders as described earlier.

Everything including the builder should be well and properly stressed by this time. You'll understand when you start bending the rods unless you have four hands. Break now for a stiff drink. Once the spreaders are stressed, slip the end caps of one element over the ends of the two spreaders for that element. Do the same for the other element.

Make two small spacers of some sort with a hole in each end that are spaced 2.6". You can also use two zip ties in a loop of this length as the spacers. Connect the ends of each element to your spacers. Adjust the ends of the spreaders and wire elements to the dimensions shown in the diagram in the dimensions panel.

Remember that the end spacing of the Moxon elements is very important and will affect the performance of the antenna.



Disconnect the diagonal strings when you're done if you haven't already thrown them as far as you can. The antenna can now be assembled or disassembled very quickly since there are no bolts or screws holding it together. There is also no need to remove the PEX end caps from the wire elements at this point. Pop the end caps off the spreaders and pieces will begin to fall on the ground. Gather up the pieces, stuff them in a bag, and you're portable.

Connect up the feedline and choke, mount it on your mast, hose up the radio, and wait for the fun of a hot 6 meter opening. And wait. And wait. And wait... It IS the Magic Band when it happens!

References:

<<http://www.moxonantennaproject.com/construction.htm>>

Design Software:

<<http://www.moxonantennaproject.com/design.htm>>

Spreadsheet: <[http://www.azscqrptions.org/6M Moxon Dimensions.xls](http://www.azscqrptions.org/6M%20Moxon%20Dimensions.xls)>

Credits:

Thanks to Cam Hartford N6GA, former CQ Magazine QRP editor and Dick Palmer WB6JDH for the pictures of their implementations of this antenna.