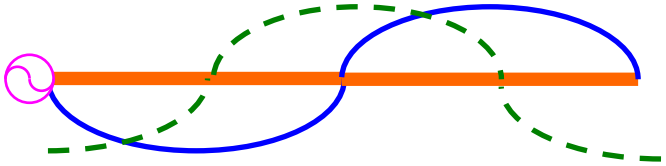
THE DOUBLE ZEPP
by
Aaron VK4VOX

In my earlier article "Zepp Antennas for VHF" (see the link on Face Book for more information **http://www.facebook.com/GoldCoastAmateurRadio?ref=hl**) I explained the Zepp or J-Pole Antenna and how it worked. In this article I want to show you how to double the gain from a single Zepp J-Pole Antenna and get 3 dB gain in an omni-directional pattern. It is so easy and so simple, once you know how that you will be running out to your local aluminium supplier for a length of tube to try your hand.

In my earlier article I showed you the measurements and electrical properties of the Zepp or J-Pole Antenna. I will use that as a starting point for a description of the properties of the "Double Zepp". So let's have a look at how it works.

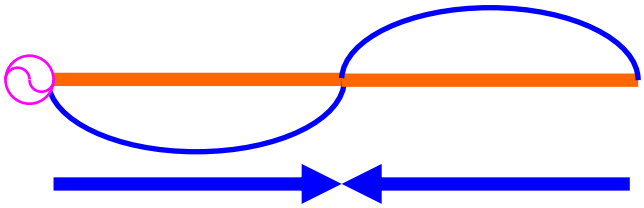
From the ARRL Antenna Handbook we know that the Voltage and Current along a radiator reverse every half wave length. This is shown diagrammatically below.

Voltage and **Current** distribution along a radiator



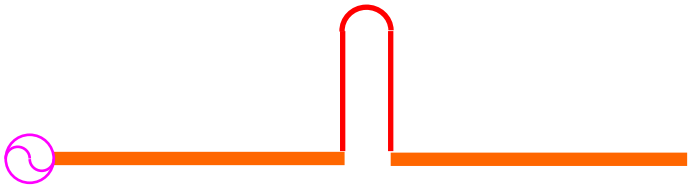
We are particularly interested in the Current distribution shown in **Blue**. If we simplify the schematic below we can see clearly how the Current reverses every half wave. Knowing how the current works is the key to doubling the gain on your Zepp or J-Pole Antenna.

The **Current** reverses every half wave length



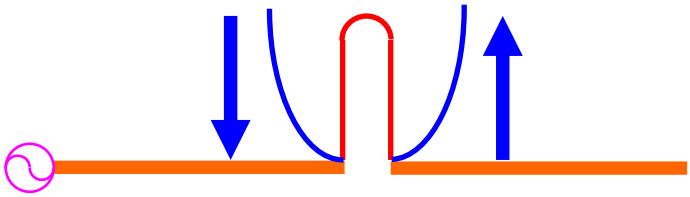
In order to get your antenna to exhibit gain we need to get the Current flowing in one direction. To do this we separate each half wave and insert a half wave length horse-shoe shaped stub at every half wave interval along the radiator.

Insert a half wave length stub folded into a horse shoe shape.



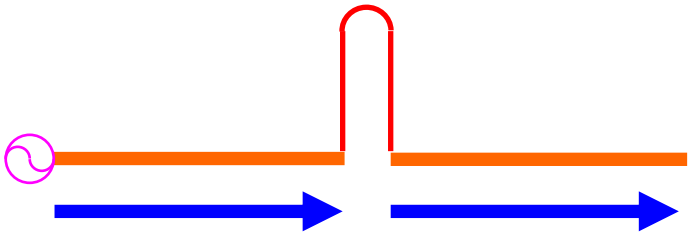
The Current on the stud is equal and opposite and cancel each other out allowing the current on the second half wave radiator to flow in the same direction as the first half wave length radiator. If this isn't immediately obvious don't worry as it took me years to get it.

The **Current** on the stub is equal and opposite and cancel the other out



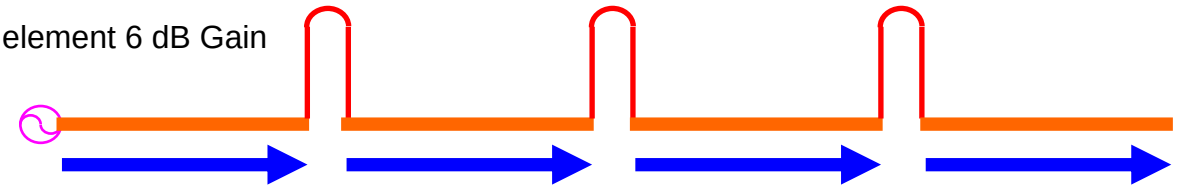
Now we have an antenna with the current flowing in one direction the ARRL Antenna Hand Book informs us we have doubled the gain of the single half wave radiator. It is this easy

The **Current** on both radiators is flowing in the same direction



You can even stack them with four half wave radiators to get 6 dB gain over a single half wave length Zepp J-Pole antenna. Now that's something from an omni antenna.

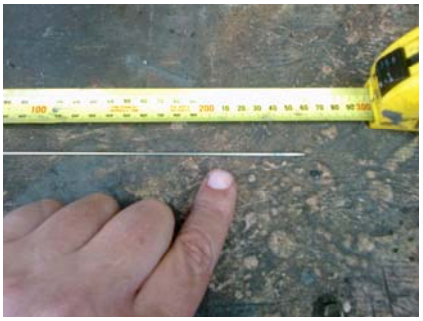
4 element 6 dB Gain



Knowing how it works in theory and getting it to function in real life can sometimes be a struggle so I am including a few tips below on how I fabricate and assemble a Double Zepp J-Pole antenna.

Let's start with the stub.

I visit my local welding supplier and purchase a single 2.4 mm diameter 316 grade stainless steel welding rod for $2. If you tell your local supplier you are a radio hobbyist and that you are building an experimental antenna it can provide a good topic for developing an on-going relationship. Welding suppliers are a great source of parts and it is all about networking and making the right contacts so use your best diplomacy and make a new friend. Who knows they may already be a Radio Ham or know someone who is and give you special treatment.



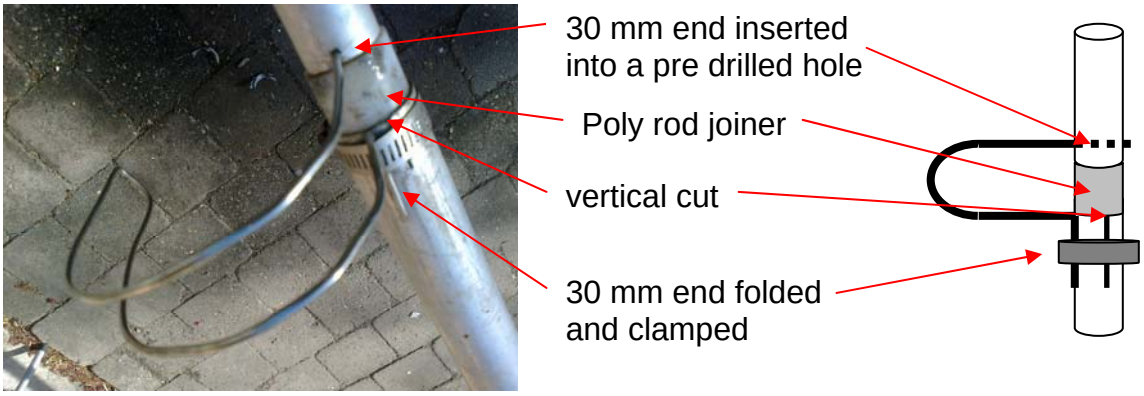
Left – 2.4 mm stainless steel welding rod

Right – the rod measured and cut to length with the mid-point marked in black for bending

The above image of a 2.4 mm 316 grade stainless steel welding rod I purchased for the job at hand with the mid-point marked with a felt tipped pen and bent in the middle point around a piece of pipe as seen in the image above.

As detailed in the article of “Zepp Antennas for VHF” I mentioned earlier I measure a half wave in accord with the dimensions (1951.3 ÷ 2 = 975.65 mm plus an extra 60 mm) plus a bit extra so I can connect it to both half wave lengths as seen below.

Below is an image of the mounting detail. I use a suitable sized piece of super high density polyethylene rod from a plastic supplier ($5) to join both tube sections as it is highly resilient to all weather conditions - the one in the image has lasted more then 20 years. Note that I place a vertical cut in the lower tube and bend and clamp the 2.4 mm rod whereas the upper tube and poly is drilled and the rod inserted. I use a stainless steel hose clamp to lock it in place. Finally I prefer that the little birds don't sit on my antenna so I bend an equal curve in the stub. This curve makes NO difference to the performance. The end result is an exact half wave (welding rod) folded in two joining both radiators. One end folded and clamped the other inserted in a pre drilled hole locking the top tube in place. I had a friend in a bloke shed turn the poly on a lathe to take a smaller diameter top tube to lessen the wind resistance - but it is not critical as the design is very robust.



Now that's all there is to it - you have added another half wave radiator to your single Zepp and in so doing have doubled the gain. All that is left is to stick it on a suitable sky hook and your on the air. Below are my VHF and UHF versions that have been in operations for over 20 years. If you want a truly bullet proof antenna then this may just what you need.

Next time I will show you how to build a channel dominating Super Double Zepp with 7 dB gain from a two element three-quarter wave radiators.

Until then 7-3 from Aaron VK4VOX.