

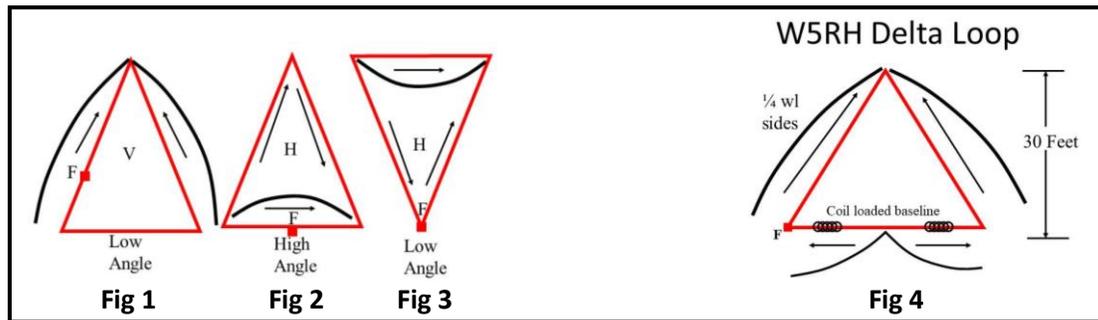
The Radio Hotel - The Saga of the Full Wave Loops

Part 3 – Triangular Loops – The Delta Loop

My favorite antenna of all times is the Delta Loop. Definition -- A 1 wavelength, triangular shaped loop, hung in a vertical orientation and fed in the appropriate location. I have worked all over the world with my customized Delta Loop antenna from my small Sharpstown lot (Of course, the solar cycle was in pretty good shape back then).

So what is so great about Deltas? They are ground independent, can be deployed with the baseline close to the ground, has a low, vertically polarized main lobe launch angle, a single hanging point (in the apex up configuration), easy feed point logistics and efficient shortening tactics. Sound good? Let's have a look.

Shaping the Loop. Look at the flexibility of a single delta loop shape. [Ref: figures 1, 2, 3 below] -- Feed $\frac{1}{4}$ wl down the side for low angle take off.....feed in the middle of the bottom for NVIS work. Flipped over and fed at the bottom, the launch angle is dependent on the height above ground, but the horizontally polarized ground gain is attractive.



More flexibility comes in the form of the shape of the triangle – using maximum vertical space or minimal. Remember your geometry? Triangles: Isosceles or Right Angle. Iso triangle is a 60 degree angle at each corner (max vertical height with 2 equal length sides) and the Right Angle is a 90 degree angle at the apex, 45's at each baseline corner. The top loop angle can be increased only to 120 degrees, but then you start to lose gain.

Loading. The delta can be loaded (shortened) to be physically smaller, but still maintain the low angle of radiation. Even the feed point becomes easier to implement being at the bottom corner. See figure 4 – the W5RH 40 Meter DX Delta. Some, like K1YZW, (see 1998 QST Hints and Kinks) loaded the top and moved the max current point up the side creating a smaller loop with a bit more gain. This method has recently been used again in the winner of the ARRL HF antenna contest (See March 2018 QST).

The benefits and flexibility above only happen when the loop is vertically oriented, perpendicular to the earth. Place it in a horizontal position and you get the same results as a square horizontal loop....typically NVIS. (More on horizontal loops next time).

Feeding the Delta loops. Most loops whether square or triangle, horizontally polarized or vertically polarized have a resonant feed Z of about 100 ohms. The easiest method to feed them is with a Series Section Transformer (SST) – $\frac{1}{4}$ wl section of 75 ohm coax. $\frac{1}{4}$ wl SST's give a Z transformation -- 100 ohms transforms to 50 ohms. The bandwidth of the transform is quite wide, according to my experience. I also take the 75 ohm coax and wind it into a 8 inch diameter coil at the feedpoint, to help with attenuating antenna currents on the coax shield.

Loop Series Bibliography. Eddie, NU5K, has placed a bibliography list on the BVARC Tech Articles web site at www.bvarc.org/tech "Full Wave Loop Antenna Series Bibliography": lots to research and reading to get you fully knowledgeable on Full Wave Loops. Enjoy your hobby. 73...Rick – W5RH

Next time.... Full Wave Loops -- Part 4 – Horizontal loops and Arrays

*The purpose of **The Radio Hotel** is to give you a practical kickstart into exploring the workings of antenna systems. Google the buzz words and find out what they mean. Read up on antenna system theory to see how it all works together. You will be glad you did.*