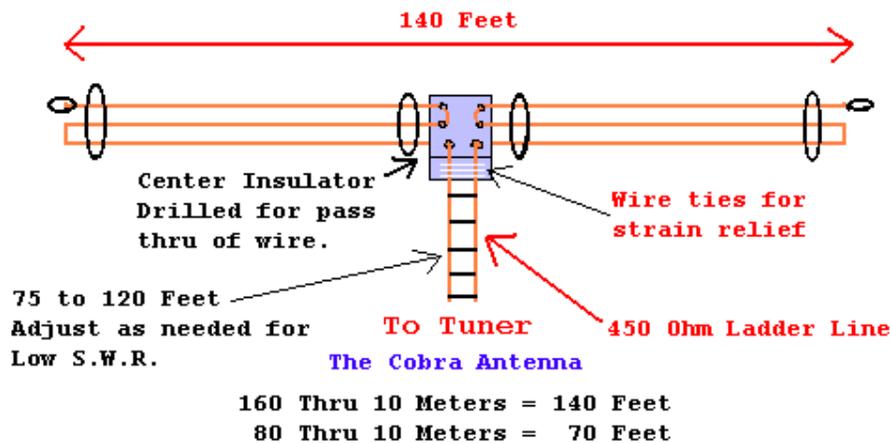


## BUILD THE "COBRA" ANTENNA

By Raymond A. Cook W4JOH

Taken from and re-edited from a project in  
73 Amateur Radio Today  
June, 1997

The original Cobra antenna designed by W4JOH can be built as an all band hf antenna covering either 160 thru 10 meters or 80 thru 10 meters and is built using standard insulated wire of about 14 gauge and fed with 450 ohm ladder line down to the shack into a tuner. It got it's name from the S shaped configuration of it's multi-conductor elements. It performs on it's primary and harmonic operating frequencies as a standard ladder-line fed doublet.



N4UJW

The close spaced wire elements on each leg introduces two added resonant responses BELOW the antenna's fundamental operating frequency.

The 140 foot version (80 meters) in picture also resonates at about 2.8mhz and also on 160 meters. A standard dipole at 1.9mhz is about 246 feet total compared to 140 feet in the Cobra!. This fact alone makes this an ideal antenna for restricted space on the TOP BAND!

The half sized version, 73 foot (40 meter) also covers 60 and 75 meters!

All band operation has been reported in the original article to be excellent! (With a tuner of course).

This antenna design extends the coverage compared to a G5RV both in bands and performance. On its primary and harmonic operating

frequencies, tests show no discernible difference in signal strength between a Cobra and a regular full-sized doublet or dipole. On its sub-bands where the Cobra is physically "short", efficiency is somewhat lower than for a full-sized dipole.

If you do the math, you will see that there is actually about 420 feet total wire across the top of the antenna on the 80 meter version, (210 feet per side), and about half that on the 40 meter version. **The flattop and lead-in length were strictly determined by the physical limitations of the antenna farm and this project is a result of those limitations and the idea of compressing or folding the wire back on itself to fit the antenna farm.** (No formulas were given in the article), but they seem to be this:

$1/2$  of total known length / frequency = multiplier for formula below:

$210 / 3.750$  (band center) = 56 (unknown multiplier)

So  $56 \times 3.750\text{mhz}$  (band center) = 210 feet per side. Which is exactly what he used per side.

**Editor's note: "This formula is mathematically correct in solving for the unknown **assuming** the lowest band center frequency was used, but may not be what was used in the original antenna experimentation if any formulas were used at all! The original author, W4JOH, may have arrived at the lengths strictly by experimentation and found them to work well."....N4UJW**

Keep in mind that there are actually 3 conductors connected in series per side and folded back on each other..... or another way of saying this is that there is one continuous length of 210 feet per side in the 80 meter version connected to one side of the ladder line and the same on the other half. Because the Cobra antenna is a balanced load, it is recommended to install a 4:1 current-style balun at the station end of the feedline (many external tuners provide a built-in balun). Ladder-line feed may have to be trimmed for lowest SWR, but using about a 100 foot length seems to make for easier tuning on all bands.

Extra feedline should be suspended in loose coils and not in a tight roll.

A 4:1 balun possibly could be installed at the antenna, then fed with 50 ohm coax to the radio, BUT, it is not known if this would upset any characteristics of the original design.

Experiment!

Raymond is quoted from the article..... *"Some of our more skeptical, and perhaps knowledgeable, friends have expressed concern about impedance, power rating, wave-cancellation, etc. All that we can offer as an answer is the slogan used for many years by the Packard Motorcar Company.*

*Ask the man who owns one." .....*W4JOH