Newcomers and Elmers Net: (More) Simple Wire Antennas
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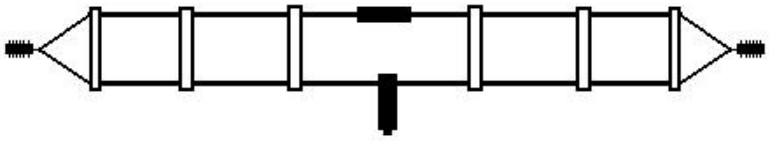
Wire antennas represent one of the greatest values in the radio hobby world. For less than the cost of a good meal out on the town you can buy all of the necessary parts for a really good antenna, and have change left over for a fast-food meal to boot!
-- In addition to being efficient and inexpensive, wire antennas have the added bonus of being fun to build and to experiment with, since mistakes are hardly costly and the materials are easy to work with.

Folded Dipole
When many people think about a wire antenna they think of a single band antenna cut for a specific frequency.
-- They are the most common perhaps, and certainly easy to build. Their main attraction is that they do not require a tuner for good coverage on the desired band.
-- A multi-band antenna almost always requires a tuner to get good coverage of the bands, particularly when covering a wide range of frequencies, such as 10-40 meters or 10-80 meters
-- While a single wire is most common for dipoles, adding another wire or two to a mono-band antenna can widen its bandwidth, and this may be of some use, particularly in the lower frequency bands such as 40 or 80 meters.
-- This "folded dipole" as they are sometimes called works much like a regular dipole, but with higher impedance at the feedpoint, allowing for greater bandwidth.

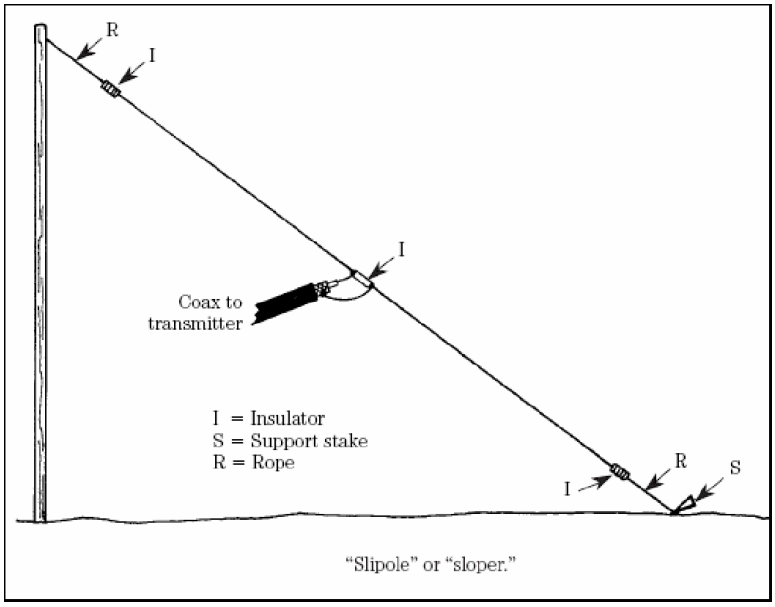


-- Because the impedance falls off more slowly, the bandwidth matching occurs over a greater distance.
-- The design is a bit like a loop antenna, but the distance between the horizontal wires is only 4-6", usually set off with plastic spacers.
-- The length is calculated just like a standard dipole, 468/freq. in MHz, multiplied by 2 or 3 depending on the number of "extra" wires you use.
-- If using only two wires you can easily make the antenna with one continuous wire, just making sure the two ends of the wire connect just like a regular dipole.

-- If using three wires, it is easier just to cut three lengths of wire to the desired band length and tie them together at the ends, cutting the lowest wire at the halfway point for connection to the feedline
-- cut the wires longer than required by your calculations and trim back as necessary.
-- As with a dipole, try to run the feedline at right angles to the transmission line for as long as possible.

The impedance is usually about 300 Ohms, and can be fed directly to ladder line, or a 4:1 Balun can be used for coax matching.

Half-Wave Sloper
Slopers (also known as *half-wave slopers*) are a variation of the dipole antenna, and they have both horizontal and vertical polarization characteristics.
-- While a 45° angle is common, they can be anything between 0 and 90 degrees. When they are straight up and down (90°) they are sometimes referred to as a *Halfwave Vertical Dipole* (HVD).



"Slipole" or "sloper."

-- This configuration can be very useful when you have less than the ideal amount of horizontal space for a flat-top antenna, or when you wish to use a single support, such as a tree or mast, for the antenna. -- (If the antenna is going to be used where people are likely to be, make sure the lowest end of the antenna is high enough off the ground to avoid physical contact with the radiator.)
-- Assuming you are feeding the sloper in the center, you will want to make sure the feedline does not become part of the radiating element of the antenna since it is near the ground.

-- Two things can help with this: first, make sure you have the feedline at a perpendicular angle to the radiating elements, at least 30-40° or more; second, add a common mode choke at the feedpoint with either ferrite beads or a coaxial loop.
-- Like any antenna the half-wave sloper is a compromise antenna, with its vertical characteristics adding to the noise you are likely to hear. However, its savings in size, use of one tall support, and ease of construction may outweigh its disadvantages, especially in the lower bands.
-- Slopers show a bit of directionality in the direction of the slope, with slight front-to-back signal ratios, and they offer decent low take-off angles for DX work.
-- Even if you already have another antenna you may want to try a sloper just for the experience. A friend of mine has a 160 meter sloper coming off his tower running back into the woods and he uses it both for 160 work and for medium wave broadcast listening. It's a great antenna for AM listening!

Half-Sloper
A popular variation of this antenna is the half-sloper, or ¼ wave sloper.
-- The main advantage of the half-sloper is the reduced height required for the antenna.
-- a standard 160-meter antenna requires quite a bit of height, as does 80 meters. A half-sloper will reduce that amount considerably, but with some reduction in performance.
-- While you always want to put up the best antenna possible, sometimes real-world considerations, such as your neighbor's property line, can get in the way!
-- A half-sloper may be just the ticket to get you on the air on the bands you want even if the noise level is a bit higher than you might like.

If you can, try to angle the antenna as close to 45° as possible if you are using a tower or other metal support to avoid interference.
-- The half-sloper is usually connected to a metal support, and this metal support becomes the 2nd half of the antenna.
-- The metal support must be grounded, or else you must ground the outer braid of the coax at the base of the support for it to act as a conductor.

For a half-sloper use the formula: length (L) = 260 / Frequency (MHz), and trim the wire as needed for a good VSWR match.

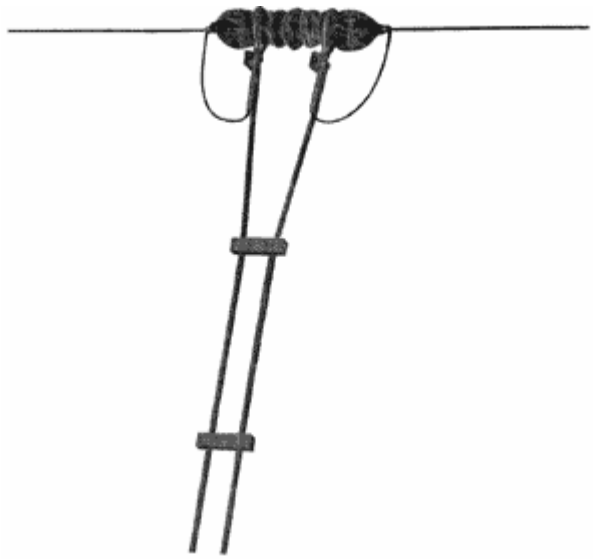
-- You may have to adjust the feedline attachment point to vary the VSWR if you can't get it to 2:1 or below by adjusting the angle of the antenna/feedline. Also a tuner may be used at the radio to adjust the impedance if the VSWR is not too high.

Both the ½ and ¼ wavelength sloper can work quite well on the "top" band (160), particularly because of the low take-off angles of the antenna design.
-- As mentioned previously, noise can be a problem, but much of that is determined by your noise surroundings.

Multi-band Wire Antennas
-- multi-band antennas can be a great compromise antenna for almost any situation.
-- One of the first things you will have to decide is just how much room you have for an antenna, taking into account things like natural and man-made obstacles, sources of interference, height limitations, and feedline considerations.
-- Just by way of a quick recap, ladder line gives the lowest loss of any feedline, and therefore is a great option, especially for long runs (100' or more). The downside is ladder line cannot be bent around corners or come into contact with metal objects, nor should it be allowed to touch the ground.
-- Coax can be lossy, so care must be taken to get the right grade of coax for your needs, and it is of course quite a bit more expensive than ladder line.
-- On the up side, it can be run along the ground, come in contact with metal, and basically (within reason) be woven around objects as needed without causing a termination point.
-- A combination of ladder line and coax may be used for a feedline depending on the antenna and your specific needs.

Most multi-band antennas are devised around a ½ wavelength model, however as the length increases and space decreases, ¼ wavelength antennas become more common.
-- This is why you must first decide on the physical limitations of your space before deciding what type of antenna to build.
-- By far the most common HF multi-band antennas are the 40-10 meter and 80-10 meter antennas. The wider the range of your multi-band antenna the more compromise there will be, but also the more possibilities.

Center-Fed Multi-band Antennas
Like a center-fed mono-band dipole antenna, a multi-band antenna of similar design is one of the simplest antennas to build, and one of the least expensive.
-- The symmetry between the two radiating sections allows for a balanced current, and when using an open-wire feedline losses are minimized.
-- Assuming a flat-top design and a feedline running away at a right angle to the antenna for at least a quarter wavelength, the feedline current should remain balanced.



The antenna length can be anywhere from ¼ wavelength to ½ wavelength and operate successfully, but shoot for ½ wavelength if possible for best results.

Because the antenna is designed to work with multiple bands you will want to use a tuner. Some tuners accept open-wire directly, while others will require a balun to transform it to a coaxial line input.

-- As long as the feedline is kept away from the ground or other conducting materials, its length can be pretty much whatever you need.
-- A common size multi-band antenna is the 135’ 80-10 meter dipole antenna. This antenna can be hung completely flat (horizontal), or as an inverted “V” configuration. While the feed point height is not absolutely critical, 50’ is considered good for this antenna if possible, although almost anything over 32’ will work well.
-- Use whatever is convenient for the supports, whether trees, masts, or buildings. Just make sure to keep the feedline clear of metal and/or bends on the way to the transmitter.

G5RV
The venerable G5RV is a very popular form of multi-band antenna, available commercially or easily made at home with designs being plentiful on the Internet.

-- The main draw of this antenna is its ability to be used with an antenna tuner on 80 thru 10 meters, including some band harmonics with a wide-range tuner.
-- The antenna is usually 102’ in width, with about a 32’ ladder line feedline which can then be converted to coax as needed to connect to the transmitter.
-- Some folks use a balun to make the conversion to coax, but the antenna will work well hardwired to the coax as long as you add a common-mode choke near the coax junction to prevent RF traveling down the coax into the shack.
-- While some folks complain that the antenna is not resonant on any band, I like the antenna for its versatility.
-- It was my first HF antenna, and I still use it on a secondary rig with great results. The antenna is best on 20 meters, but with a tuner it will give very good results on 40 meters and decent coverage on 80 (with some bandwidth limitations).
-- There is also available a “super” or “double” G5RV which will add some coverage on 160, and will increase bandwidth on 80 meters. This antenna is 204’ long, with a 64’ feedline section which must be fully extended. This means the antenna height must be above this distance, usually around 70’ or above.