“EZ-Up” Antennas

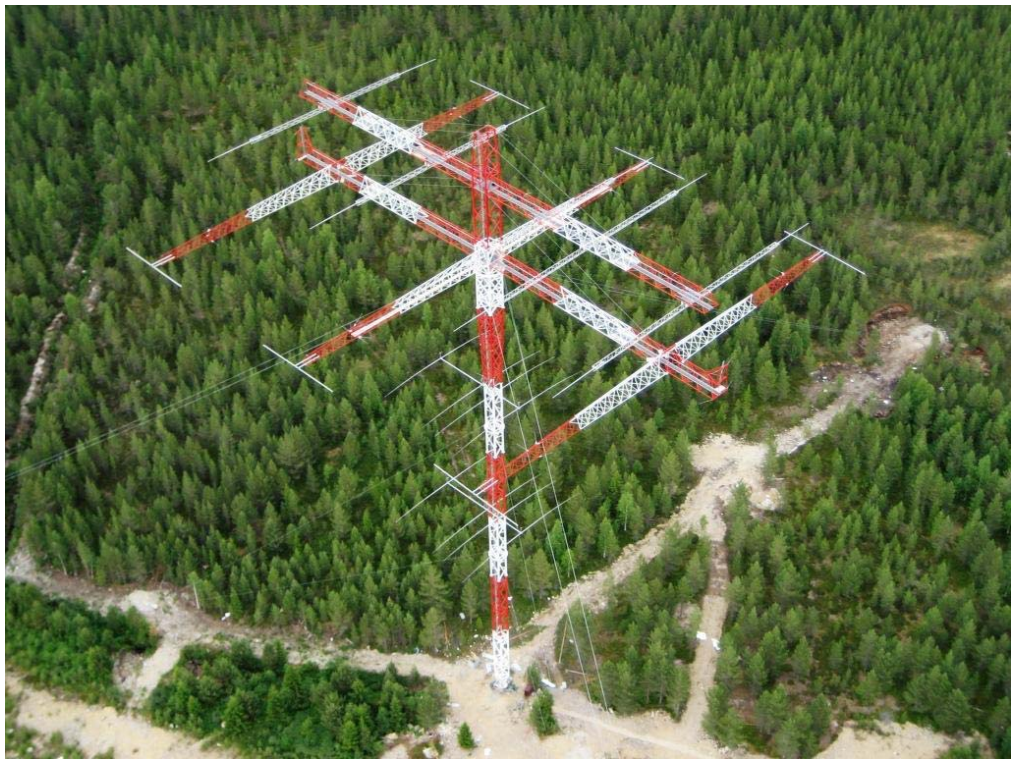
Doug Dowds W6HB

Nick Katnich N6EFI

(charts by Don Putnick NA6Z)

This is NOT an “EZ-Up” Antenna

The OH8X 160m yagi is a 3-element monster with 12.9 dBi gain that stands over 100m high and weighs a staggering 40 tons. It occupies a site of around 29,000 square meters and was built from 450 meters of tower sections, which needed 600 liters of paint! The entire tower can be rotated on a 11kW motorized bearing, alone weighing in at two tons. Yet, this is an amateur radio antenna.



So what are “EZ-Up” Antennas?

- Half-wave dipole
- Half-wave vertical dipole
- Folded dipole
- Quarter-wave vertical

Basic Antenna Construction

- Use #12 AWG wire if the antenna supports its own weight plus feed line
  - Otherwise use #14 AWG
- Copper-clad steel is the strongest
  - Solid copper wire is second choice, easier to work with, but more expensive
- Bare and insulated wire have same losses
  - Insulated wire will end up 3-5% shorter after tuning

The Three Basic Formulas

- Quarter wave (in feet) = 234 / frequency (in megaherz)
- Half wave (in feet) = 468 / frequency (in megaherz)
- Full wave horizontal loop = 1005 / frequency (in megaherz)

- Or, use the next chart

Wire Length

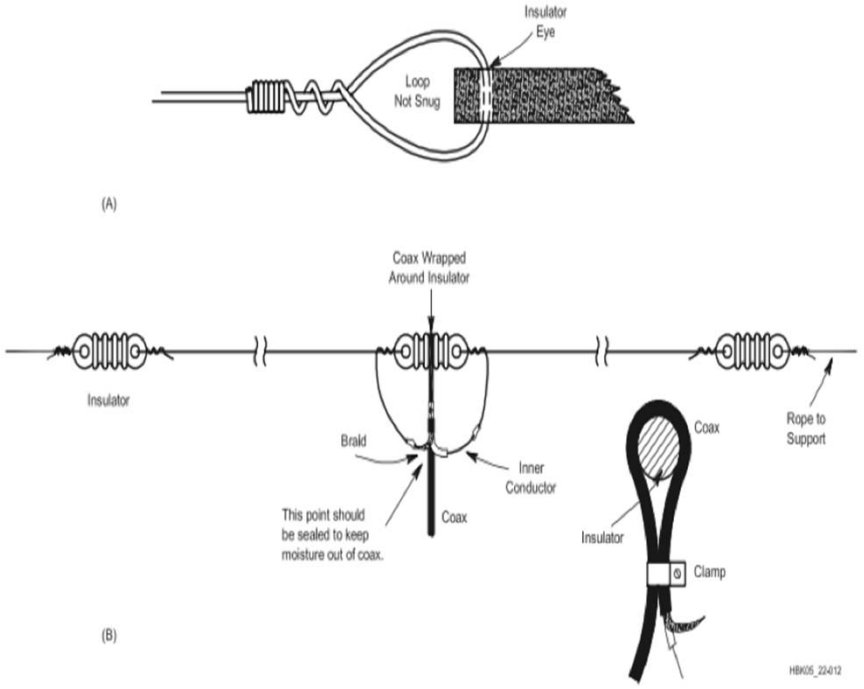
- Lengths at right are for low end of band
- Add 1 foot on each leg for attaching to insulators

	1/2 wave	1/4 wave
10M	16.71 ft	8.355 ft
15M	22.29	11.145
20M	33.43	16.715
40M	66.86	33.43
80M	133.71	66.855

More Construction Techniques

- End Insulators
  - Buy them – ceramic, glass, plastic
  - Make them – PVC tubing, wood, plastic
  - Ceramic or glass most likely will outlast the wire
- Center Insulator/Feedline Connector
  - Buy them – will usually have a SO-239 connector
  - Make them – Plexiglas plate (with or without SO-239 connector)
  - Use an end connector
- See next chart for how to attach wire to insulators

Attaching Wire to Insulators



Even More Construction Techniques

- Attach end insulators to trees or poles using UV-proof Dacron rope
- The higher the better
- STAY AWAY FROM POWER LINES!

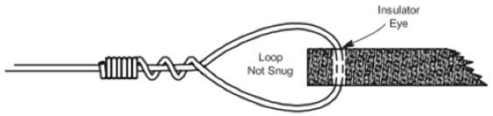
Group Participation

- We will have a group discussion of will each antenna work for the plot plan and what DX will it cover.

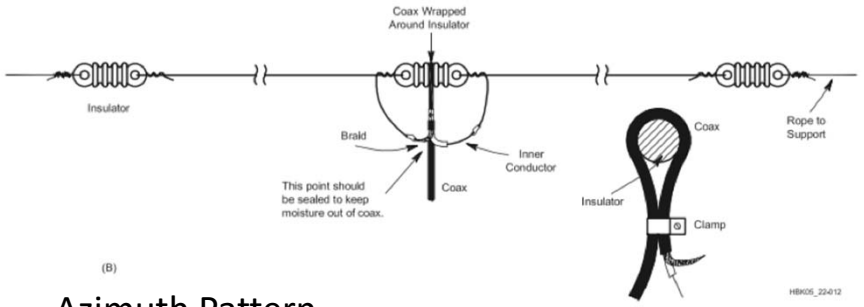
- Need to consider antenna length, orientation, and SAFETY.

- Handouts:
  - Plot Plan
  - Azimuthal Map

Half-Wave Dipole

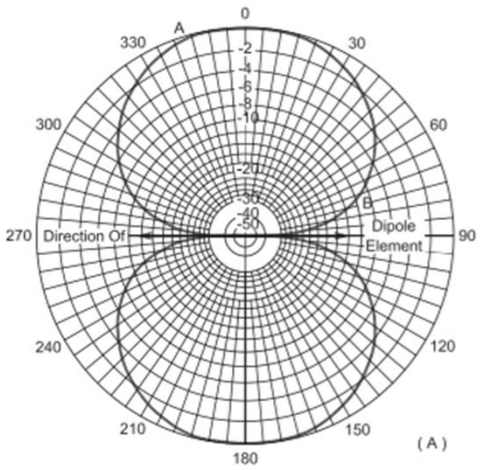


(A)

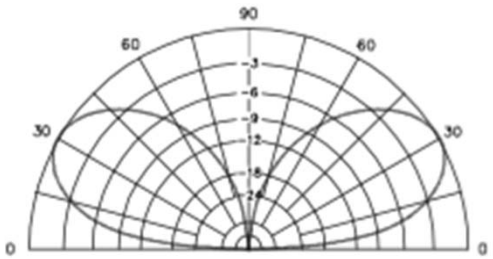


(B)

Azimuth Pattern

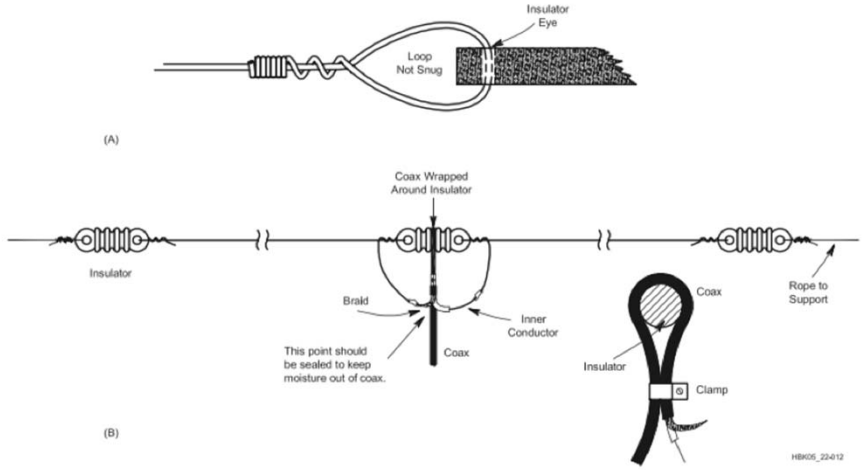


Elevation Pattern

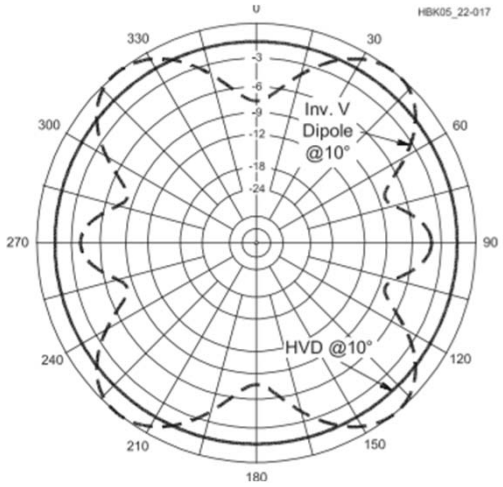


Half-Wave Dipole

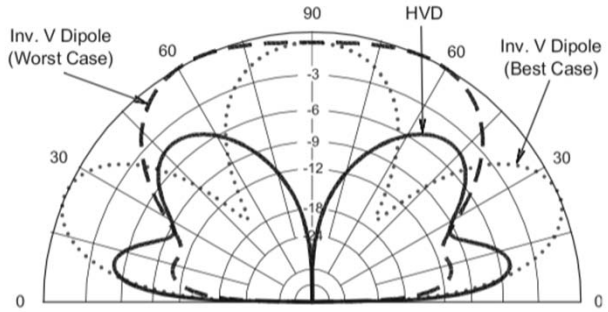
- Use two ¼-wave lengths of wire
  - Don’t forget the extra 1 foot each
- Support the dipole at both ends with dacron rope tied to poles or trees
- A variation is to support the dipole in the middle – known as the “Inverted V”



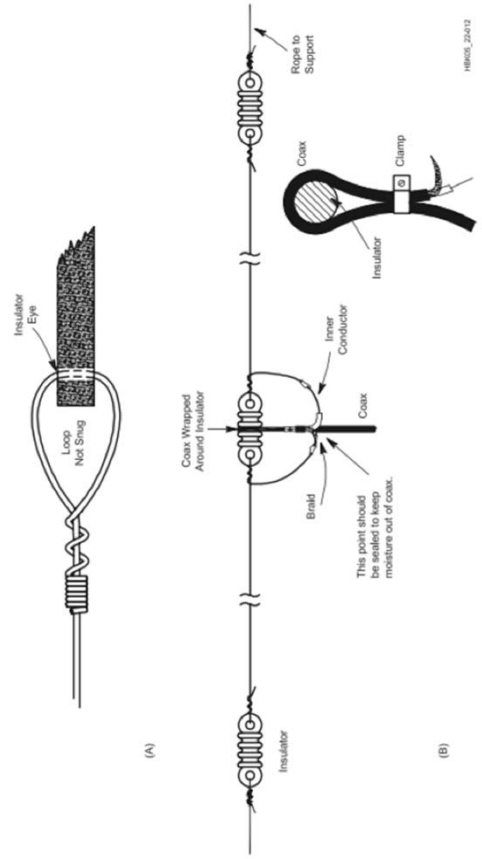
Half-Wave Vertical Dipole



Azimuth Pattern

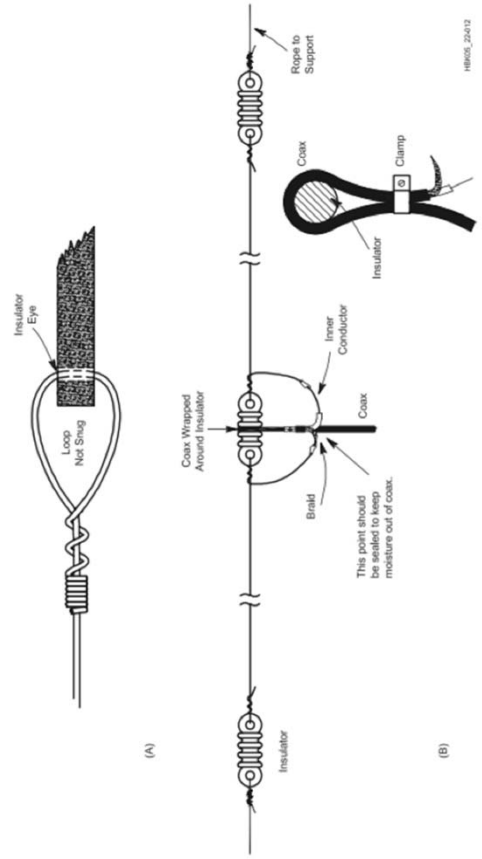


Elevation Pattern

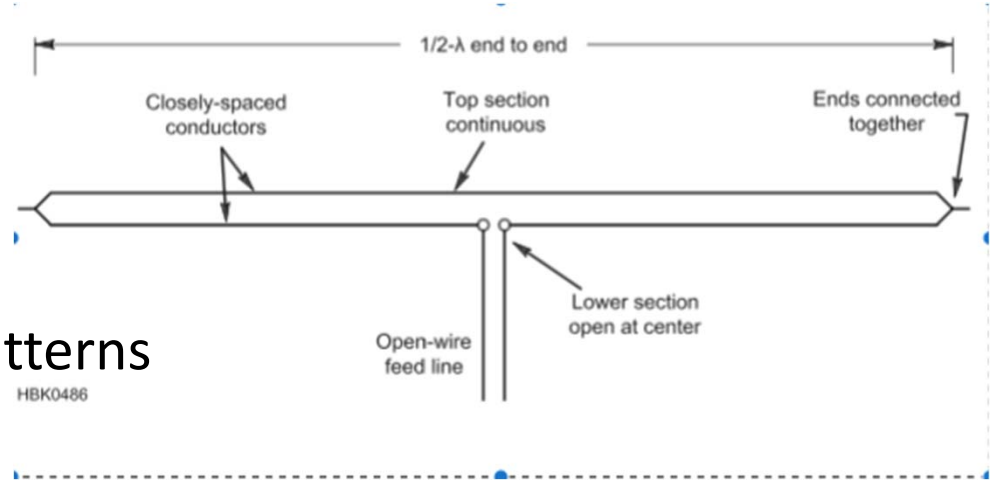


Half-Wave Vertical Dipole

- Use two ¼-wave lengths of wire
  - Don’t forget the extra 1 foot each
- Coax needs to be horizontal at feedpoint
- More susceptible to noise than horizontal antennas

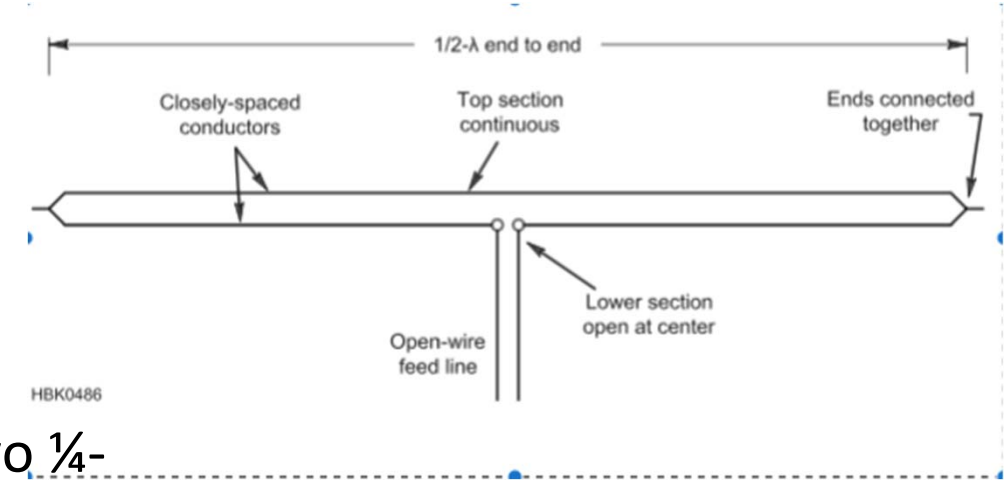


Folded Dipole



- Same azimuth and elevation patterns as single wire dipole
- Raises the feed point impedance of the antenna to present a better impedance match to high impedance feed line

Folded Dipole

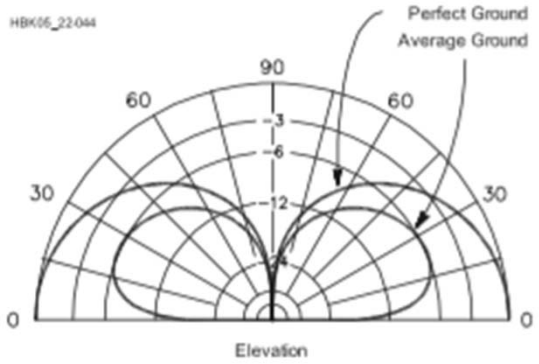


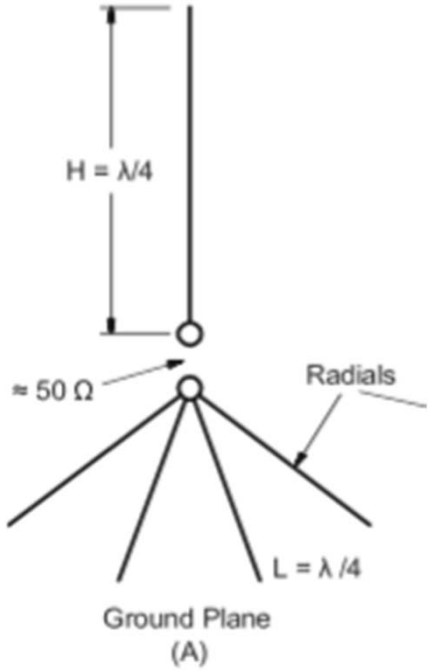
- Use one ½-wave length and two ¼-wave lengths of wire
  - Don’t forget the extra 1 foot each
- Use high impedance feed line (like ladder line)

Quarter-Wave Vertical

Azimuth pattern is omni-directional

Elevation pattern is lower than dipole –
good for DX





Quarter-Wave Vertical

- Use one ¼-wave length of wire
  - Don’t forget the extra 1 foot each
- If antenna is elevated, use four ¼-wave radials
- If antenna is ground-based, use LOTS of radials
  - Number and length of radials is under constant debate
- More susceptible to noise than horizontal antennas