

The Radio Hotel – Ground – Friend or Foe ?

by Rick – W5RH

Earth is where you find it,
Ground is where you make it,
Neutral sometimes isn't,
Sometimes they are all the same.

Ground. In electrical terms it is defined as (and I plagerize) “the reference point in an electrical circuit from which voltages are measured, a common return path for electric current, or a direct physical connection to the earth”. But then that definition needs to be further defined depending on the frequency of the electrical signal: DC, AC, Low Band RF, MW RF HF RF and upwards of VHF, UHF, SHF, etc. Ground, and the act or practice of “Grounding”, is almost a separate field of endeavor within the realm of Amateur Radio. Hams must contend with ground in all phases of the hobby. Grounding our equipment and station. Grounding antennas for static discharge and lightning. Providing ground reference for our vertical antennas. All of which are implemented differently.

I am going to off load the AC and DC station and equipment grounding subject to someone else. There are plenty of references out there as to what to do and how to do it. One excellent reference is H. Ward Silver, N0AX, Grounding and Bonding for the Radio Amateur ARRL Press. It is a \$9.99 Kindle book too. My thrust, if I can have a thrust within this short Beacon column is RF grounding: the good, the bad and the ugly.

Let's start with the bad and the ugly. Most of us have experienced “getting bit” by a hot mic or distorted audio in our ears caused by RF getting back into the xmit chain. RF grounding is a slippery fish at times if you are fighting that ghost. Common solutions to equipment focused grounding are choked cables, bypass capacitors, properly terminated cables, etc. which all tend to diminish the problem and hopefully eliminate it, if enough solutions are placed in the proper locations. (Reference N0AX's book above . Also <http://www.audiosystemsgroup.com/RFI-Ham.pdf>)

The good. Ground is most times our friend when it comes to antennas. Take a dipole for instance. There is a definite benefit of using a horizontal polarized antenna versus a vertically polarized antenna. The benefit? Ground gain. Just by using a horizontal antenna we can get a gain in signal strength of about 6 dB. The caveat being – gain at the expense of not having an omni-directional radiation pattern and other factors that come into consideration between a vertical and horizontal skyhook – like angle of the main radiation lobe.

On a deployed vertical antenna, ground has a massive influence on the strength and efficiency of the antennas radiating performance. Many articles and chapters of books have been written about ground radial systems (the other half of a ¼ wavelength vertical antenna system. Best practice says, “the more wire on the ground the better”. Proper deployment of proper length wires in a 360 degree radial fashion makes things as good as it gets. The foe side of ground in a vertical system is that in some vertical deployments the earth ground portion can be a sink for the precious current that we use to radiate our signal, by the earth itself absorbing the current and causing losses within the system.

So, what can you take from this crew cut reference to RF ground? One thing is that it is definitely a portion of our technological hobby to which we should pay attention. Probably the most targeted information source that I have found concerning antennas was **Rudy Severns, N6LF, Design of Radial Ground Systems** (with associated comments and articles) https://www.antennasbyn6lf.com/design_of_radial_ground_systems/ Check it out.

Ground and the practice of grounding should be your friend and in most instances can provide enhanced station performance. Have a look at the discussion concerning lightning on the BVARC List serve Archives July 6th – “N5XZ Lightning Strike – Seeking Guidance”. The List Serve Archives can be found by clicking on:

<https://www.mail-archive.com/bvarc@bvarc.org/>

As part of your overall Ham Radio station building, pay attention to your friend “ground”, no matter the frequency or purpose. You'll be glad you did. Enjoy your hobby – Rick – W5RH