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[HD RECEPTION]

Antenna Grounding

Do I need to ground my outdoor antenna?

Tip by Don Landis: Offering advice to NOT ground outside antennas is irresponsible, contrary to all known laws of physics on the subject, and civil laws and codes pertaining to static charge buildup, and, down right criminal!

There are three types of grounds. In order of difficulty to achieve, they are from most to least: static; RF; and electrical. The methods and practices used to achieve each of these is different. Static grounding is the most difficult to do with guaranteed results, while electrical grounding is easy and can be considered to work perfectly in most cases. RF and electrical grounding is not important nor considered in this discussion for static discharge (lightning) safety.

The general rule on outside antennas is that they need to be grounded. There is no known government agency that recommends antennas not be grounded for safety. Indeed, the opposite is what is recommended and in most cases required by local codes. And, if you don't do this and don't care, maybe knowing that violation of these codes may be grounds for rendering your home owners insurance null and void in case of a fire caused by lightning strike.

Direct and secondary static electricity (lightning) strike has strike probability increased by a buildup of static charge at points of conductivity such as a metal mast or pole of an outdoor antenna. Static electricity is built up during a thunderstorm with wind blowing over the metal structures. This static charge builds and becomes an attractor to the opposite charge of static build up in the storm clouds. By draining off the static charge continuously, you reduce the probability of strike because the potential difference is reduced. It was shown in the studies conducted on the Empire State building that probability of a strike was a direct relation between the quantity of static buildup on conductive structures. Conductive structures with no ground path were at the highest risk while structures that were intensely grounded over several contact points were the least risk. This is because it is actually rather difficult to completely eliminate all corona point (sharp pointed shaped geometry in the metal structure) static charge buildup even with "good" grounding on multiple contacts of the metal structure.

In an antenna you can ground the mast, the boom, the dish, the director and reflectors of the antenna by contact metal bonding to a ground wire run directly into the earth via a deep ground rod, but you cannot directly ground the driven element or active element of the antenna. All you can do is make a reasonable attempt at grounding it via a special coax grounding block to reduce static charge buildup and reduce probability of a hit. In a Log Periodic yagi most of the elements are driven so that most of the antenna structure can not be grounded directly. In this case it is wise to use a coax grounding block. This block is a device designed to bleed off high voltage spikes that reach dangerous levels that would damage your receiving equipment. They don't directly short out the center conductor to the ground because this would kill the signal but rather allow a small gap that will on a continuous basis bleed off the building static charge before it reaches dangerous damaging levels to your equipment. Using one of these grounding blocks located just before the coax feed wire enters your building is what is recommended to effectively reduce the probability of small static electricity damage to your receiver. It will NOT protect against a direct lightning hit. Both the grounding block on the coax and a direct ground wire to the mast of the antenna should be used.

What are the damage risks? In a simple static charge buildup the minor hits you will get will be silent killers. These tiny hits will be damaging to your receivers RF front end. It will most likely

short out sensitive IC's and diodes in the receivers rendering them useless. In the next worse case you take a secondary hit where the direct hit struck a tree or utility pole near by. Now you may see some signs of obvious visible damage such as the house wiring in your house catching on fire or your TV set getting fried right before your eyes. This happens far less than the hidden damage hit. Finally we have the rarest type of hit which is a primary direct lightning bolt strike to your antenna and or house. In this case your antenna and house was struck with the main bolt. Usually this will cause major fire damage to your dwelling and contents. Fortunately these hits are rare except in places like the open farm lands where the house structure is the only corona point sticking up out of the flat ground for miles around and it looks like a big static attractor to the thunder cloud. In areas where you are surrounded by trees and other structures your odds of a direct hit are much reduced but you are still at risk for the secondary hit and the silent static killer.

One very important thing to know about grounding. Having it present will NOT protect you if you take a direct or even a secondary hit. What it does, is reduce the probability of getting hit in the first place and it provides much better protection against the damaged caused by the silent hits which is the most common of all static electricity damage. Many misunderstand this important point and I cannot repeat this point too often: The grounding also helps eliminate the small silent killer hits. But if you have conditions that are very severe and your grounding is less than ideal (most systems are) then when you take that direct hit, having the antenna grounded or not won't matter much at all. That little 12 Ga. copper or aluminum ground wire to your 10 ft. ground rod won't drain a 50 billion volt lightning bolt where the spark diameter may be as big as a foot across with multiple branches that encage your whole house for 2-3 seconds. Again, the idea of the grounding is to reduce the probability of getting hit in the first place and to continuously bleed off small static charges to prevent the silent killer to your equipment.

This is a good timely discussion as many of us are returning to outdoor VHF and UHF antennas this year to receive the local HDTV terrestrial broadcasts and we are beginning the Thunderstorm season throughout the country. It is important to understand the hazards of outside antenna structures, especially during a thunderstorm..

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