

# The Radio Hotel – 468

by Rick Hiller – W5RH

What is the most important number in the Amateur Radio hobby? 73, 88, 331, 340, 468 or 1005 ? Well, depending on what area of the hobby you hover, you will think differently than your fellow hams. 73 is universally known as the QSO ending salutation, as is 88, if you are talking to ‘good lookin’ at the other end. 331 and 340 have to do with DXCC and Honor Roll. But at the top of the list for all hams is the number 468. Of course, if you are into full wave loops then 1005 is paramount.

468 is the number, when divided by F ( the desired design frequency in MHz), that gives you the length, in feet, of a half wavelength antenna. Note that this is not an exact calculation, as our antennas exist in an environment of atmosphere and mankind. But where does 468 come from and when did it appear in Ham Radio lore? My collection of ARRL Antenna handbooks goes back to Issue #1 1939 and 468 appears in that version. So I went back to earlier versions of the Radio Amateur’s Handbook (now known as the ARRL Handbook, as of 1996) and QST. If you are an ARRL member you can search QST back to the first issue. Which I did, but trying to find a search key word within the nomenclature for antenna design that doesn’t appear in every bloody antenna article since the beginning of ham-time is difficult. Long story short, I found a reference to the same research at the eham.net web site. \* Ward Silver, N0AX, a former keynote speaker at the Greater Houston Ham Fest, described, in an eHam article, his hunt for the 468 treasure throughout the ARRL Headquarter’s library archives. He found the first 468 reference in the 1929 Radio Amateur Handbook, but going back even further he found references to experimental discovery articles in QST in 1925 and 1926. In the end, Ward discovered that it was thru empirical measurement that the formula:  $L = 468/F$  was found..

The equation, however, only gets us to a starting point. If you have ever designed and erected an HF dipole, most times you end up “tuning” it for best SWR. Why isn’t it exact? Because there are two main factors that affect the resonant length. 1) the “K factor” – wire length to wire diameter ratio; and 2) “end effect” – additional loading due to the wire end insulators causing a small, additional capacitance. Ward suggests, in the end, that you use  $490/F$  to get a length that gives you a little more “schnully”, (an Amish, Pennsylvania Dutch term for extra length). This way you won’t cut your wire too short and have to add on, plus you’ll have plenty to wrap around your end insulators.

If you wish to dig into antenna design lore a bit more, have a read of one of the various antenna handbooks about antenna “end effect”, the ‘K’ factor, height above ground versus feed Z and other characteristics of antenna design and deployment issues. This excursion into the physical heart of the matter will provide you with a sense of understanding. Will it improve your DXCC count? Probably not, but you can sleep more soundly at night knowing that you know the why’s and how’s of basic antenna design. I will admit here that this is only the top of the tip of the iceberg of antenna understanding, but it is a start to a journey. A journey that, along the way and in the end, is quite satisfying. And, a path thru the hobby that will certainly add to your enjoyment of Amateur Radio.

- See: <https://www.eham.net/article/23802> “Where Does 486 Come From” – Ward Silver, N0AX

Enjoy your hobby....73, Rick, W5RH

*The purpose of **The Radio Hotel** is to give you a practical kick start into exploring the workings of antenna systems Google the buzz words and find out what they mean. Read up on antenna system theory to see how it all works together. You will be glad you did.*