Revisão de artigos selecionados de Handbooks de décadas passadas sobre choques de RF, compilados por Bob NA4G. Contribuição de José Vicente - PY2AUC (SK) de Campinas - SP, grande experimentador em RF! Texto em Inglês - Vale a pena conferir: ----------
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Whilst twiddlin' the grey matters fer thoughts on homebrewed RF chokes, I decided to go back and review some of my early handbooks and see what was there.

1. From Elmer Bucher's Practical Wireless Telegrahpy (1917):

> ``These coils consist of a few turns of fine wire wound in the form of a spiral, or in a single layer on a porcelain, glass or hard rubber tube. They offer but little impedance to the low frequency current flowing from the secondary winding of the transformer, but they greatly impede the radio-frequency oscillations. Hence the secondary winding is protected from injury."

This relates to transformer driven spark transmitters. But, the concept of a spiral winding is interesting. The chokes keep the spark RF out of the line transformer.

2. From Loomis' Radio Theory and Operating (1925), paragraph no. 335:

> ``The radio frequency choke coils used in tube transmitters have usually an inductance of about 3 millihenries, and are made of one layer of insulated copper wire, No. 28 or 30, wound over an insulating bas about 2 inches in diameter and 7 or 8 inches long."

That is a pretty big choke coil!

3. From 1928 ARRL Handbook, page 80 (relating to a ``simple and inexpensive low-power sending set'':

> ``The radio-frequency choke coil (at left) is wound of about 150 turns of No. 30 D.C.C. magnet wire on the cardboard tube for 1-1/2 inch in diameter and held in place by the connecting bus wiring."

This appears to be a 160 meter transmitter. So, 150 turns on a toilet paper roll form should do the trick. Perhaps a little wax or shellac to seal it up to prevent turns from shifting.

4. From 1928 ARRL Handbook, page 88 (relating to RF Chokes in general):

> ``In a quarter-wave choke the voltage at the end next the transmitter is highest (loop) while at the power supply end the voltage is minimum or zero (node). The size wire used should be slightly larger than necessary to carry the plate current as otherwise the R.F. present may burn the choke up. Building the choke to dissipate the heat generated in the windings is a more difficult problem when the cooke is confined instead of mounted in the open where the heat radiation is good. A quarter wave choke for 40-meter work will be a half-wave choke for 20-meters. This may be checked with a Westinghouse Spark-C or any form of neon-lamp indicator. A screwdriver or other metal object with an insulated handle may be used for making an investigation of conditions. The size of a quarter-wave choke should be varied until there is no spark (or an extremely small one) at the power supply end."

So, the best operation seems to be with a quarter wave choke, just as a quarter wave impedance transformer. But, BE EXTREMELY CAREFUL OR DONT USE the screwdriver method to test for proper choking action. You might get zapped by the High Voltage. The neon-indicator is probably a much safer method. We don't want any boatanchorites or glowbuggites getting zapped to SK status, OK!

5. From 1928 ARRL Handbook, Page 88 (again on RF Chokes in general):

> ``Satisfactory chokes can be wound for a low-power job using No. 30 wire closely wound on a 3-inch form, 250 turns for 150-200 meters, 150 turns for 75-80 meters, 100 turns for 40 meters, or 50 turns for 20 meters. ''

This is for a 3 inch coil. If you reduce the size of the coil form, then more turns are going to be required. How much may require some cut and try or coil inductance calculations. The 3-inch for required many fewer turns than the 1 inch forms I hinted at yesterday.

Continuing on:

> ``Smaller diameter coils are preferable to confine the field to the coil and to reduce the voltage per turn (which causes breakdown when excessive). Of course smaller diameter choke coils must have a correspondingly greater number of turns.''

So, it would appear that a smaller diameter form could be advantageous both in stray RF coupling and in insulation breakdown at higher plate voltages.

Continuing on:

> ``R.F. chokes to go in series with the grid leak should be made to the same specirications as the plate choke for a given set. The choke should always go at the tube-end of the leak or right next the plate if we are referring to a parallel-feed Hartley circuit.''

Grid leaks were often choked to prevent excessive rf coupling feedback. So, the choke goes right next to the tube and should be the same size as the normal plate choke. Also, for parallel-feed circuits, place the choke as close to the tube plate pin as possible. All this is obvious, right?

6. From 1928 ARRL Handbook, page 92 (concerning transmitter adjustment):

> ``Sometimes trouble will be found with the radio-frequency choke coil or coils. When working below 20 meters wavelength*, chokes in series with the filament leads will help to get more antenna output. Often chokes in the 110-volt power supply leads to the station will be helpful in preventing loss of radio-frequency energy. R.F. chokes so used give the high frequency impulses a backstop `on which to get their feet placed.' Chokes in the set should be mounted at right angles to the main coil to avoid harmful coupling effects. There is bound to be some coupling if the coils are near together even if they are located at right angles. A greater distance will aid materially in improving the operation or if this is impossible, the position may be changed until the right point of lowest coupling is found."

So if you are working 20/10/5 meters, you need to use chokes in the filament leads. On lower frequencies this probably would be a pretty good idea also. The part about using 110v line feed RF chokes is a good one, especially if one is building breadboard style sets. Modern all aluminum shielding helps too.

Note that sometimes the placement of the choke is important, and that classical right angling of the chokes and coils helps to prevent stray rf coupling. How many of us follow that technique to the letter?

So, by 1928, homebrew chokes were beginning to favor single-layer

solenoid wound chokes. That is probably a pretty good idea, although in tight construction, room for such large chokes is often not available. Thus modern pie wound chokes would fill the bill there.

7. From Ghirardi's Radio Physics Course (1960 reprint), nothing is mentioned about RF chokes, or their construction, other than a few indications of some many mh required at for such a choking use. Chapter 23 is a good general chapter on coils and their design (pp 586-614).

8. From Duncan and Drew's Radio Telegraphy and Telephony (1931), page 672:

> ``It will be noted that the radio-frequency chokes are not single-layer wound coils, but have a special form of winding. This construction was found necessary in order to prevent trouble due to burned-out chokes. The burning currents were frequencies of some even multiple of the fundamental or operating frequency of the transmitter. Because of the special winding the chokes possess a greater amount of inductance and less distributed capacitance than the ordinary single-layer wound coil. Damage to these special chokes could only be done by frequencies other than those that might possibly be generated in the circuits in which they are contained."

This refers mainly to plate chokes, but it is interesting that by 1931, commercial marine radio transmitters (about which this chapter in the book was written) were using pie-wound chokes rather than single-layer chokes for the above reasons. It is interesting that the burning seems to be due to harmonic or perhaps parasitic oscillations.

Continuing on, relating to grid radio-frequency chokes:

> ``A grid radio-frequency choke prevents losses through the grid circuit of the high frequencies which flow from the grid excitation condenser.

> The largest amount of this energy fed back from the plate circuit is necessary for building up a maximum alternating current voltage on the grids to promote the generation of continuous oscillations. Also, the grid choke coil will suppress ultra high frequency or parasitic oscillations from being generated. The frequency of such oscillations, if allowed to occur, is governed mainly by the grid to plate capacity of the two tubes in series and the inductance of the connecting leads."

So, for better oscillations in the oscillator, use a grid choke. Also, the grid choke can suppress parasitics in amplifiers. Obvious, right? How many of us think to use grid chokes?

9. By the 1936 ARRL Handbook, everyone seemed to be using commercially made RF chokes.

That is all I could lay my hand on, right off, but might serve as starting material for folks trying to build their own homebrew transmitter rf chokes.

73/ZUT DE NA4G/Bob