88mH Coils, Explained!

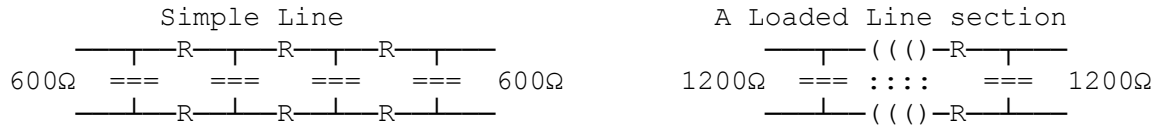
By G8MNY (Update Dec 07)

(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

After seeing several buls on 88mH coils, I thought I would explain what they were used for by the millions in the UK telecomms industry.

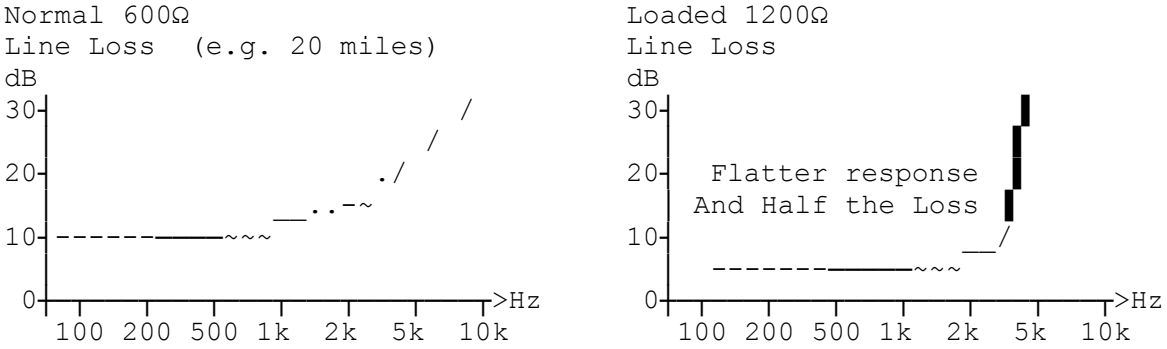
LINE THEORY

The basic 600Ω 2 wire telephone line system is quite lossy. This is due to too high a capacity between the wires & the copper resistance, this causes high loss & also higher loss at higher frequency than ideal.

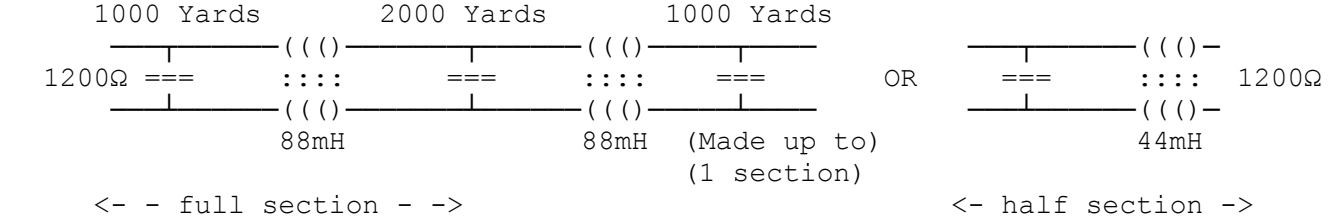


The capacitance & resistance value of the wires can't be changed. Reducing the load Z flattens the frequency response, but increases the loss (a useful trick for short music circuits!). But adding series inductance spaced evenly along the line to make the line look like a cut off filter has several effects...

1/ increases the line impedance (matching transformers need for 600Ω!)
2/ substantially reduces the line loss below the cut off frequency
3/ & flattens the comms band frequency response.



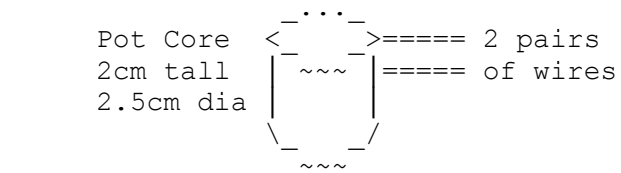
The standard for cables between telephone exchanges (office) was to use a loaded cable with an 88mH balanced coil every 2000 yards, starting 1000 yards from the exchange & completing the last 1000 yard pi section with a capacitor or a 44mH terminated inductor half section.



BACK TO THE COILS

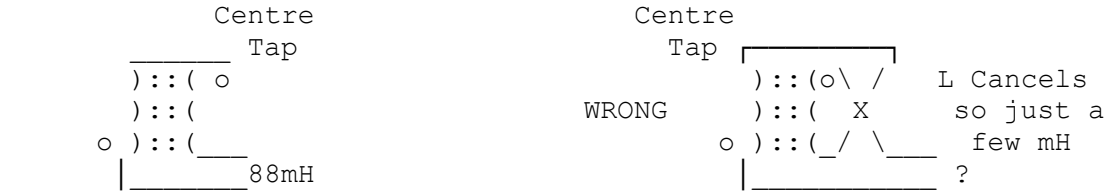
The coils consist of 2 identical bifilar wound windings on a common ferrite core, they are quite high Q, & capable of keeping their inductance with up to 50mA of DC current flowing (which is a lot for a pot core!) which is why they are quite large for the max of 10mW of AF signals on telecomms lines.

Wire colours are normally Black & White Red/Black & Red/White, & it should be quite easy to identify the 2 line pairs.

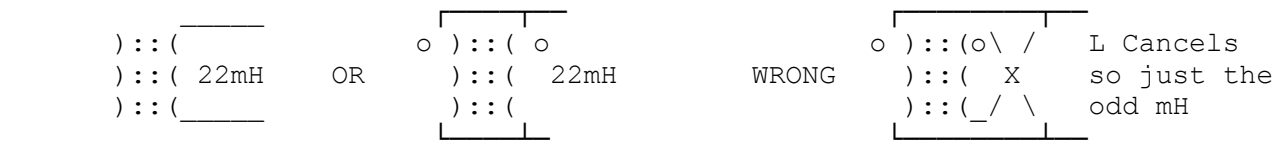


Some coils are ally can encapsulated, others plastic & some not at all.

INDUCTANCE VALUE
Watch out for the 44mH ones, as they look much the same other than labelling & have half the 88mH test inductance values below.



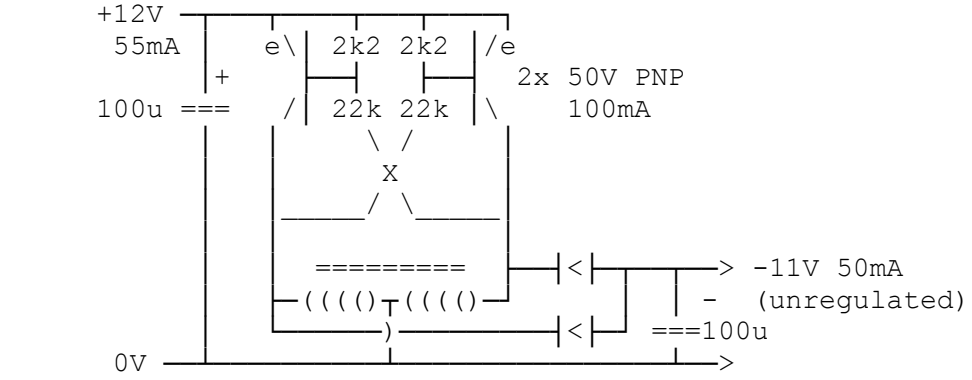
If just 1 winding is used then you have 22mH. By paralleling the 2nd coil you get half the DC resistance, but the phase must be right!



USES
So with suitable capacitors they make useful AF filters etc.

They can be used as isolation transformers, not too well isolated, & no good for LF response with low L value.

One can also be used as an efficient voltage step up or a -rail inverter with just 2 transistors in flip flop. Note the push pull gives nearly 100% output all the time so smoothing is not needed in some applications!



See my buls on "Passive CW Headphone Filter", "AF 2 Tone Test Osc Design" & also "DC Power Conversions".

Why Don't U send an interesting bul?
73 De John, G8MNY @ GB7CIP