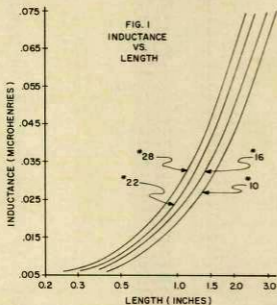


Just a Piece of Wire?

One of the biggest bug-a-boos in the construction of VHF and UHF gear is the interconnection of the individual components which make up the system. The cardinal rule of good construction has always been to keep the leads as short as possible. This is a pretty loose rule and to the newly arrived VHF enthusiast, presents a perplexing problem when he begins to layout his new rig. The following graphs might be valuable in providing an insight into this problem as well as providing valuable design information for the construction of future equipment.



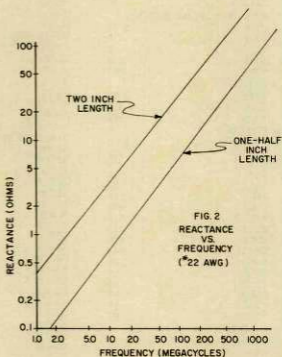
The inductance of a length of wire has been given as¹

$$L = 0.005l \left[2.3 \log_{10} \frac{16l-3d}{4d} \right]$$

where L = Inductance in microhenries
l = Length in inches
d = Diameter in inches

This is shown in Fig. 1 for various wire sizes from #28 AWG to #10 AWG. These sizes were selected as representative of the various sizes used in amateur gear today.

Fig. 2 demonstrates the size of the reactance which can be associated with a short length of wire. This is a graph of the react-



ance versus frequency for a one-half and a two inch length of #22 wire. Notice that at 140 megacycles the reactance is 10 ohms for the one-half inch length. However should the length be increased to two inches as it might be in order to reach from a plate cap of a 2E26 to a tuning capacitor on the front panel, the reactance would increase to 50 ohms. This increase in reactance could conceivably prevent the tank circuit from resonating or from loading properly in the two meter band, causing considerable head scratching on the part of the builder.

It is hoped that the illustration of one of the potential problem areas and a judicious use of the curves will aid in avoiding some of the pitfalls inherent in VHF construction. Always analyze the effect the additional inductance as determined from Fig. 1 would have on the critical path and modify the layout accordingly. And remember: in VHF, all paths are critical.

.. K5BLF

Reference

1. F. Langford-Smith, *Radiotron Designers Handbook*, p. 1287