A PLAIN MAN'S GUIDE TO MASTS & TOWERS

Part 2

Selecting the correct feeder for the job. A look at rotators.

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In last month's issue we said that the length of coaxial cable needed was an important factor to be considered when deciding on the most practical height for the aerial.

Like any electrical conductor, the amount of current flowing through a coaxial cable can be effected by the length of the cable. That is to say, not all the current entering at one end of the cable finally reaches the other end. Some of the current is lost or attenuated along the way, the amount of the attenuation depending upon the length of the cable and the frequency of the current passing through it.

The loss or attenuation that occurs in coaxial feeders .is not directly proportional to the length of the feeder but varies as a logarithmic proportion that is usually expressed as a value of dB (decibels) loss per 100 foot length of cable. Depending on the frequency of the current passing, the amount of attenuation varies so that at high frequencies such as VHF or UHF the losses can be quite high.

The values given in **Table 1** are approximate and based on straight lengths of cable that are operated under perfect conditions. When planning your aerial layout, it should be remembered that the routing of the cable and number joints can also impair system performance and increase losses.

At the lower end of the HF frequency range, the losses in coaxial feeder can be tolerated and to some extent made up by an increase in transmitter power up to the legal limit. As the frequency gets higher toward UHF, the losses in the coaxial cable can be high enough to cause difficulties. Losses to the transmitted signal can be made up by increasing the transmitter power but incoming or received signals are equally attenuated and cannot be so easily made up, so that performance is seriously impaired.

Before finally deciding on the best practical height for an aerial it is well worth taking into account the losses that can occur in the coax feeder and balance these against the gain in aerial performance that results from the height of the aerial. As long as the gain from the extra increase in aerial height is much more than the losses of signal or power in the coaxial cable needed to feed it, then increases in height are worthwhile.

Although there are a number of different types of aerial feeder which can be used coaxial cable is probably the most popular. Generally, coaxial cable is easier to instal, is more tolerant of other cables or metallic objects in close proximity and its characteristics remain fairly constant. **Fig 1** shows some typical feeders. The first two consist of twin stranded wire conductors encased in a polythene insulation. These are generally of flat or oval form in construction, with the conductors running parallel to one another.

Coaxial cable, where the conductors are placed one inside the other is generally manufac… sizes from about 3/16" diameter up to 1" in diameter in two principal impedences, 72 Ohms and 50 Ohms (there are some small variations). Although there are no real differences in effectiveness of one cable over another, the most commonly used is of 50 Ohm impedence. This is because most test and transmiting equipment is designed to work into a 50 Ohm load. To identify the two impedences, 72 Ohm cables are generally coloured brown and 50 Ohm black.

Referring to Fig. 1, the construction of coaxial cable shows the inner conductor 1, polythene insulation 2, braided (WOVEN) outer conductor 3 and the final

TABLE ONE

	Nominal Impedence	Attenuation in dB/100 ft frequency MHz						
RF58/A SOLID	53	3.5	7	14	21	28	144	420
UR47	53	0.68	1.00	1.50	1.90	2.20	5.70	10.4
RG58/FOAMED	50	0.52	0.80	1.10	1.40	1.70	4.10	7.1
RG59/SOLID	73	0.64	0.90	1.30	1.60	1.80	4.20	7.2
RG59/FOAMED	75	0.48	0.70	1.00	1.20	1.40	3.40	6.1
RG8/A UR67 SOLID	52	0.30	0.45	0.66	0.83	0.98	2.50	4.8
NEW RG213 RG8 FOAMED	50	0.27	0.44	0.62	0.76	0.90	2.20	3.9

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