Telephony 101 – Ringer Properties December 26, 2012

Hello All,

As always, please send any questions about the reading assignment directly to me at oldtimetelephones@goeaston.net. I will bundle questions if necessary, repeat the questions, and give answers in an e-mail to the TCI List Server before moving on to the next reading assignment. This way everyone will benefit from these questions and answers. By sending questions directly to me, we will avoid unnecessary clutter on the List Server. Previous reading assignments, notes, questions, and answers are available in the TCI Library at http://www.telephonecollectors.info/telephony-101/.

Please read the final section on Electrical Properties of Ringers on pages 42 through 44. Also read the section called Adding Voltages on pages 225-226.

First let me emphasize that ringers are going to be permanently connected to the line, so it is important to look at their impedance at the ac frequency of a ring signal (about 20 cycles per second) and at the ac frequency of speech. As you saw in the Appendix section on Sound, excellent telephone voice service is provided by frequencies in the range of 250 to 3,000 cycles per second. In the book we will always use 1,000 cycles per second as a typical voice frequency. So for ringers, we are interested in their properties at 20 cycles per second and at 1,000 cycles per second.

Let me clarify a sentence near the top of p. 43: "Inductive impedances have been given at 20 cycles per second, rather than the related phase angles, because the inductive impedances are used in the following discussion." According to the equation in the footnote, inductive impedance, total impedance, and phase angle are related. Therefore if you know any two of them, you can calculate the third. So I have listed inductive impedance and total impedance (but not phase angle) at 20 cps whereas I have listed total impedance and phase angle (but not inductive impedance) at 1,000 cps. If you want to know the missing value, just use the equation in the footnote – but you won't need those values for discussions in the book.

You will see in later chapters that, on a common-battery line, a telephone will see a dc voltage and current (for the transmitter) in addition to the ac ring signal and voice signal. Therefore, on a common-battery line it is necessary to put a condenser (will not pass dc at all) in series with a ringer to prevent dc current from flowing through the ringer (you want to keep all the dc current for the transmitter).

In the section on adding voltages, at the top of p. 226, it says "... these are exactly the voltages that would be measured with a multimeter." If I were to write this sentence over, I would delete the word "exactly" because I have used the theoretical value of impedance for an ideal condenser (159 ohms in this example) whereas I have set this up as a real example with a real condenser. A real condenser might have a little resistance (maybe even some inductance) and its impedance might not be exactly 159 ohms if you had a really good multimeter. It's a fine point, but the word "exactly" implies complete accuracy. I would consider this to be a mistake and suggest just crossing this word out in your books.

The rest of this reading assignment seems pretty clear in the book, although a little complicated. Just take your time and I think you will understand it.

If there are any questions about the current reading assignment, we will deal with the questions before moving on to the next reading assignment.

Ralph