CABLE TESTING—GENERAL
LOCATING FAULTS IN
NONLOADED CABLES
BY THE EXPLORING COIL METHOD

1. GENERAL

1.01 This section provides information on the location of grounds, shorts, and crosses in nonloaded paper and polyethylene insulated cables by the exploring coil method. This method generally cannot be employed to locate faults in cables having steel tapes or wire armor protection because of the shielding effect of these materials. Although the steel in stalpeth cable has some shielding effect, faults in such cables can generally be located by this method.

1.02 This section is reissued to update text and illustrations.

1.03 The tracing current should be obtained from a 76 or KS-14103-type test set. The locating should be done with a 101B or 105D Test Set in conjunction with a 147-type amplifier. Use only the high dielectric strength test sets (exploring coils).

> ***Note:*** ◗When locating faults with the KS-14103 L6 Test Set in areas where additional filtering is required to separate the ***Tone*** signal of the L8 Control Unit from strong power frequency harmonics, an F-59133 cord should be connected between the ***REC*** jack of one 147B Amplifier and the ***INPUT*** jack of a second 147B Amplifier.◖

1.04 When running down high resistance faults, the tone may not disappear entirely after the fault is passed. This is due to the "carryover effect" of the capacitance of the wires beyond the fault. The intensity of the tone usually decreases when the location of the fault is passed, but in some cases the decrease may be so slight that a positive location can not be made.

1.05 When difficulty is experienced in determining the location of the fault because of inability to distinguish a decrease in tone volume, it is advisable to connect the tracing current at one side of the fault and then on the other, checking one test against the other.

1.06 When an exploring coil is moved along a cable some variation in tone intensity will be noted before the fault is reached. As the volume of tone is sensitive to the distance between the faulty wires and the exploring coil, some difference in volume will be noted unless the coil is rotated around the cable to follow the lay of the wires inside the sheath. This, of course, can not be done in aerial cable because of the strand. Where the conductors in trouble go from an outer layer to an inner or from an inner to an outer layer at a splice, a change in tone intensity will be noted. This change, however, is generally not as great as at the fault.

1.07 The 76-type set provides an automatic means for turning off the tone if the fault becomes clear while it is being run down. This is done by a direct current relay circuit which is superimposed on the alternating current tone circuit. If the fault disappears or if the resistance rises much above 2000 ohms, the relay releases and turns off the tone, which gives the tester an indication that something has occurred to the fault. This feature is helpful when working on long cables where the disappearance of the fault would result in tracing the tone beyond the fault, possibly to the end of the cable. The automatic feature can be operated by connecting the crossed or short-circuited conductors or the faulty conductor and ground in the case of a grounded wire to the binding posts marked ***HIGH*** and ***GND*** and setting the keys at ***SND*** and ***REL.***

1.08 At the first test point in the vicinity of the fault the gain of the amplifier should be adjusted so that the tone is not too loud but still definitely audible. This should be done while

holding the exploring coil on the sheath where maximum intensity is heard. If the gain is set too high it may be difficult to determine a change in tone intensity as the coil is passed over the fault.

2. LOCATING A GROUND

2.01 The tracing current should be connected between the grounded wire and the sheath and the coil held on the cable as shown in Fig. 1.

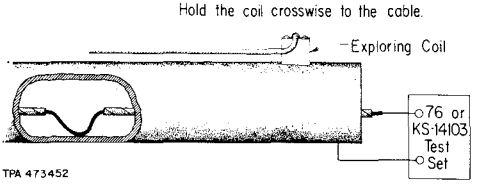

Fig. 1—Method of Locating a Ground

2.02 Listen at convenient locations along the cable for tone. At the fault, tone will be heard on the side of the fault toward the source of tone and no tone, or reduced tone, will be heard on the side away from the tone source.

3. LOCATING A SHORT CIRCUIT OR CROSS

3.01 To locate a short circuit or cross, connect the tracing current to the wires and hold the coil on the cable (Fig. 2). Proceed as covered in 2.02.

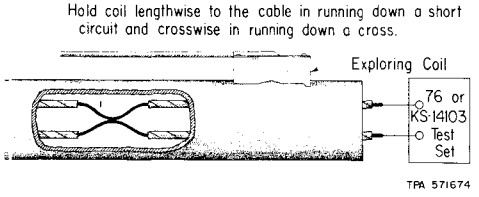

Fig. 2—Method of Locating a Short Circuit or Cross

4. LOCATING POINT OF LOW INSULATION

4.01 Low insulation due to the entrance of moisture into the cable may be located either as a ground or as a cross. Follow the instructions given in 2.01 in locating the fault as a ground. To locate the fault as a cross, select a number of pairs having the lowest insulation resistance, divide them into two groups and connect the groups to the tracing current, as shown in Fig. 3. Proceed as covered in 2.02.

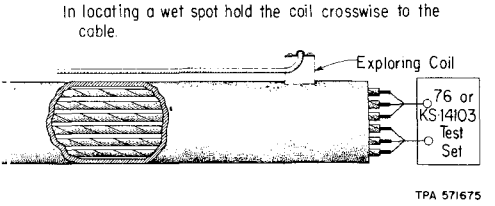

Fig. 3—Method of Locating Point of Low Insulation

5. LOCATING POINT OF SPLIT IN A PAIR

5.01 The tracing current should be connected to one of the pairs and all four wires strapped together at the far end (Fig. 4). The exploring coil should be moved along the cable from the tone. From the tone to the split a weak tone will be heard and from the split to the point where the wires are strapped together a stronger tone will be heard.

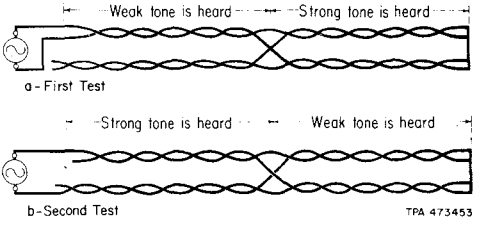

Fig. 4—Connections for Locating Point of Split

5.02 A second test of the location should be made with the connections shown in Fig. 4. Move the coil along the cable from the tone. From the tone to the split a strong tone will be heard and from the split to the point where the conductors are strapped together a weaker tone will be heard.

5.03 It is impracticable to locate split pair in quadded cables by the exploring coil method.