BURIED PIC CABLE

PREREHABILITATION TESTING

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1. GENERAL

1.01 This practice defines a systematic field test sequence to determine the need for rehabilitation action on buried PIC cable sections. The tests determine sheath integrity and the presence of water in the cable core.

1.02 Should sheath damage or water in the core be verified in buried ALPETH PIC cable, rehabilitation action should be performed. In the case of multisheath buried PIC cable, rehabilitation action should be considered if sheath damage is verified, and should definitely be performed if water in the core is verified.

1.03 ***Rehabilitation*** of buried PIC cable may be accomplished by one of the following methods:

(1) Locating sheath and conductor faults and repair of each. (See Section 644-104-102.)

(2) Water drying methods. (See Section 644-200-030.)

(3) In-place reclamation with reclamation compound. (See Section 629-295-312.)

(4) Replacement.

Local factors including location, extent of damage, type of service, and percent fill should be considered in the selection of the most economical rehabilitation action.

> ***Caution: Water removal should not be used if sheath damage is known to exist since future entry of water is almost certain.***

1.04 Because of normal manufacture variations in PIC cables and field test measurement inaccuracies, the method described in this section may result in some sections which test good but may in fact have a slight amount of moisture. ***However, the tests are designed never to call a section bad that is in fact good.***

2. REQUIRED TEST EQUIPMENT

2.01 The following test sets (or equivalents) are required:

(1) KS-8455 test set

(2) Dynatel 710A fault locator

(3) Delcon 4910F open fault locator.

2.02 The AT-7851 L1A test set is used to locate sheath damage.

3. PRETEST INSPECTION

3.01 Prior to conducting any tests on the cable section, a visual inspection should be made. If the section has obviously been flooded, and if moisture plugs have not been placed at both ends, REHABILITATE THE SECTION. If plugs are present, or if it is not known whether or not flooding has occurred, proceed with tests.

**Reprinted to comply with modified final judgment.

4. TESTING PROCEDURE

4.01 The section to be tested should ***never exceed one cable section***. Testing must be performed at the nearest access point to the section of cable suspected of containing water.

SHIELD TO GROUND FAULT TEST

4.02 Disconnect the cable shield bond at each end of the section to isolate the shield from ground and from other shields. (See Fig. 1.)

4.03 With the KS-8455 meter, measure the resistance between shield and ground.

> ***Note:*** Refer to Section 106-020-100, KS-8455 Test Set—Description And Use.

If the resistance is less than 500,000 ohms, the sheath is probably damaged. REHABILITATE IF SINGLE SHEATH CABLE. Operate the REVERSE switch on the test set. If the reading in each position is different, this indicates battery on the shield due either to water in the core or sheath damage. REHABILITATE THE SECTION.

PAIR FAULT TEST

4.04 Locate two conductor pairs and cut them clear at each end of the section. (See Fig. 2.) With the KS-8455 meter, measure the resistance between each conductor and cable shield. If any of the four has a resistance less than 2 Megohms, the section probably contains water. REHABILITATE THE SECTION, NO FURTHER TESTING REQUIRED.

CAPACITIVE-RESISTIVE TEST

4.05 Place a strap between tip and ring of one pair, and leave the other pair open. Go to the other end of the section for further testing. (See Fig. 3.)

4.06 Using the Dynatel 710A fault locator, connect the red and white test leads to the strapped pair and read the distance to the strap.

> ***Note:*** Refer to Section 634-305-514, Locating Faults Using the Dynatel 710A Test Set—Description and Use

For purposes of this test, this length will be referred to as the ***resistive length*** of the cable section. Record this length.

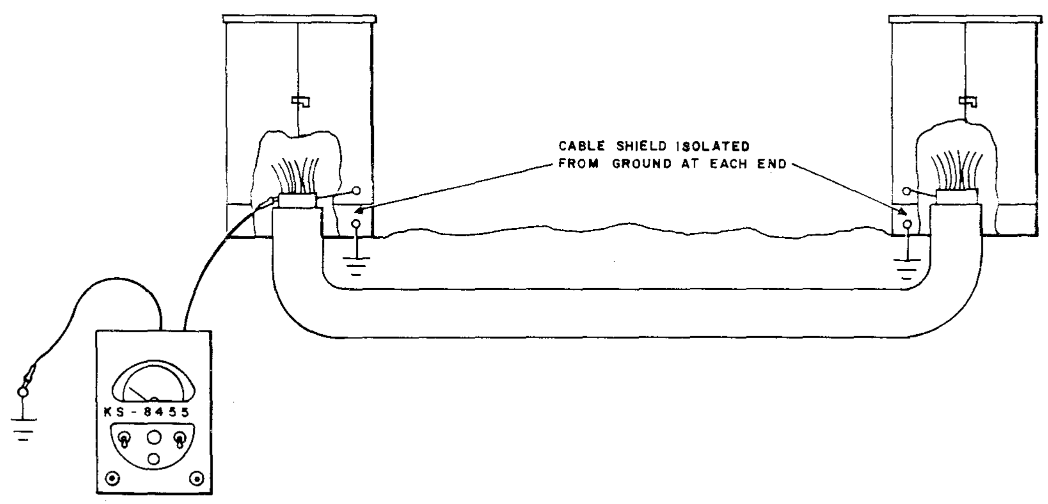

Fig. 1—Shield-to-Ground Fault Test

4.07 Using the Delcon 4910F open fault locator, ***calibrate the D-factor scale to 0.9.***

Note: Setting the D-factor scale to 0.9, for this special test, allows for 10 percent cable manufacture tolerance and test allowance on the capacitance being measured. For cable other than standard 0.083 microfarad per mile exchange cable, set the D-factor 10 percent lower than normally used. Refer to Section 634-305-510, Locating Open Faults Using Delcon 4910-Type Open Fault Locator.

Measure the distance to the far end open, and record this length. For purposes of this test, this length will be referred to as the ***capacitive length*** of the cable section.

4.08 Compare the ***capacitive*** and ***resistive*** lengths; if the capacitive length is greater than the resistive length, the section contains water. REHABILITATE THE SECTION.

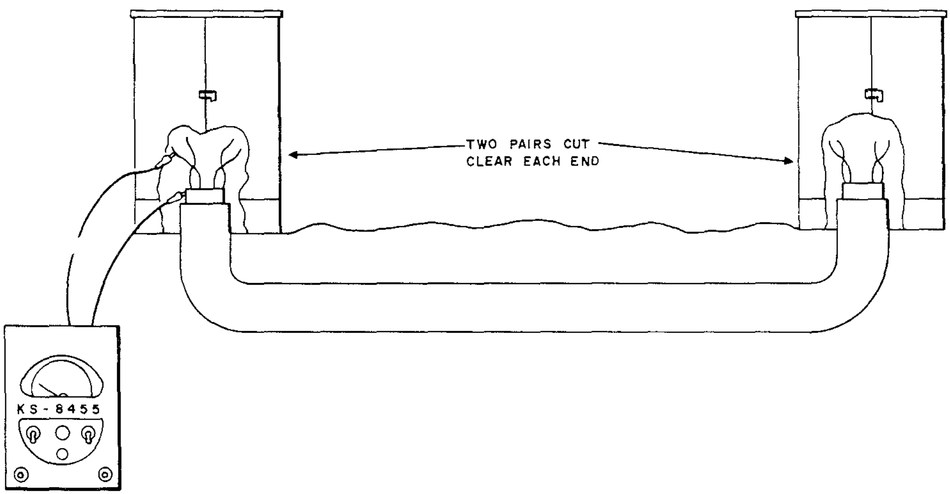

Fig. 2—Pair Fault Test

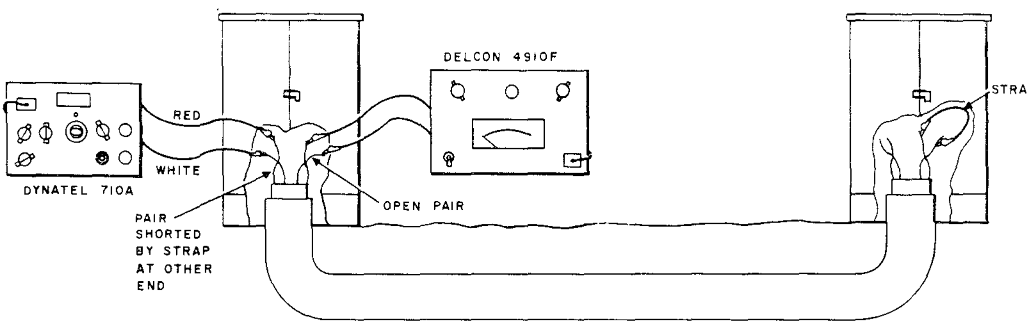

Fig. 3—Test for Water by Capacitive-Resistive Length Comparison

4.09 An estimate of the amount of water in the section can be obtained by taking the ratio of

$$\frac{\text{capacitive length}}{\text{resistive length}}$$

The chart in Fig. 4 shows the approximate percentage of cable core air space which is filled with water.

4.10 When it has been established that the cable contains water, the sheath damage should be located and repaired.

4.11 If it is desired that the exact location of the sheath damage be located, this may be done very accurately (to within a few inches) by means of the AT-7851 L1A test set. See Fig. 5.

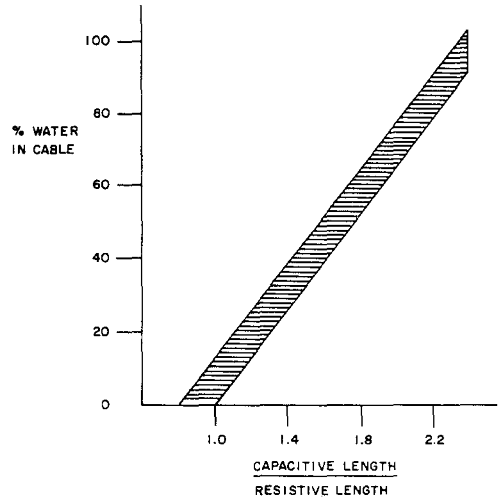

Fig. 4—Percent of Cable Air Space Filled With Water

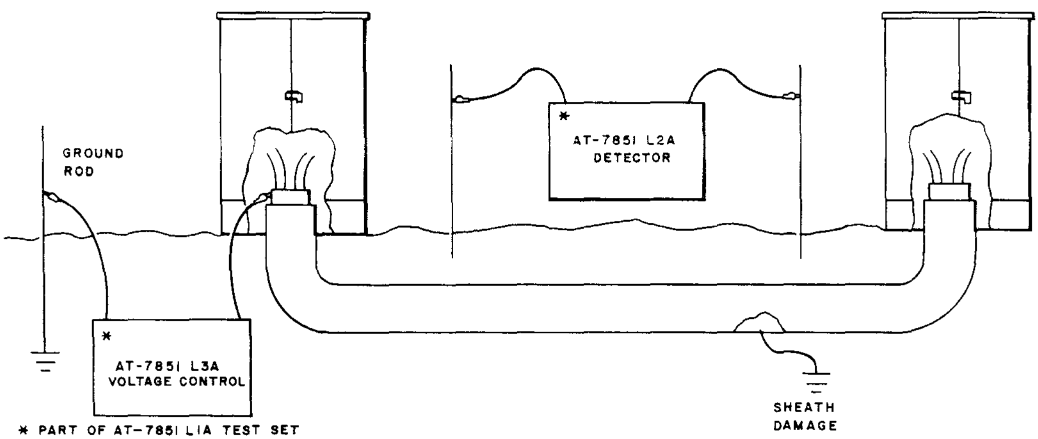

Fig. 5—Shield-to-Ground

Note: Refer to Section 634-315-500, Cable Testing—General Locating Sheath Openings in Buried PIC Cables and Section 644-104-102, Buried PIC Cable Fault Locating.

The voltage control (transmitter portion) of this test set is connected at one end of the cable section shield, and the sheath damage is located by means of the portable detector (receiver) and test probes.

5. SUMMARY

5.01 The testing procedure described above may be summarized by referring to the flowchart in Fig. 6.

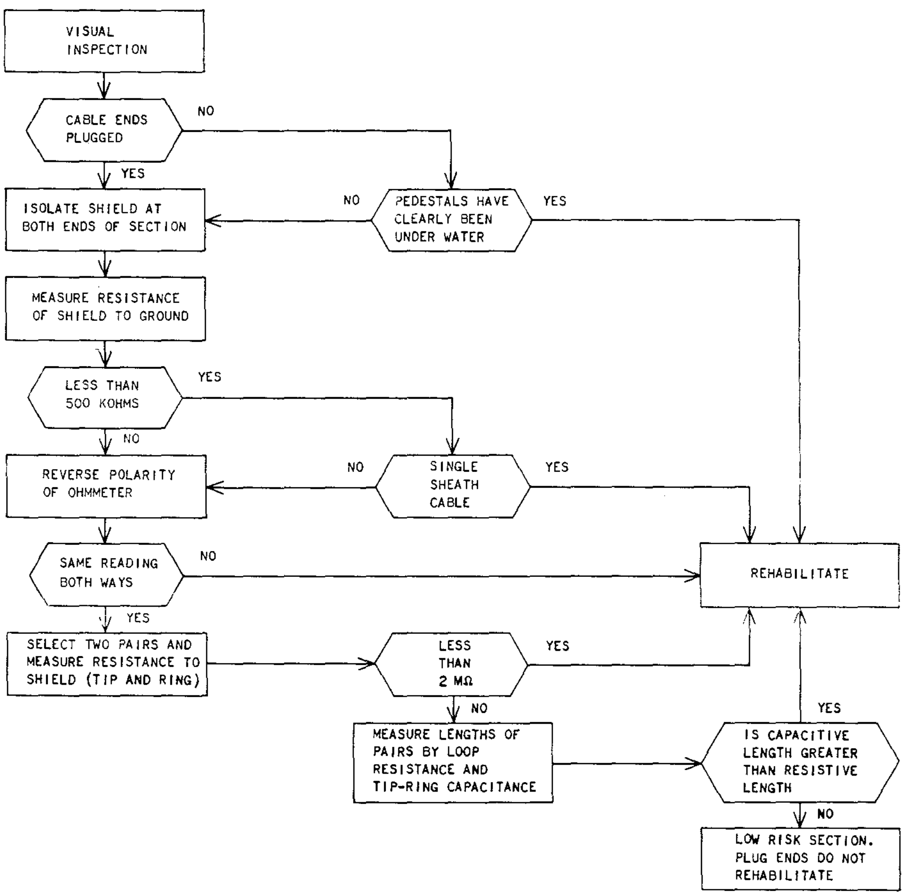

Fig. 6—Summarized Testing Procedure