REPAIRING BURIED CABLE
PULP AND PAPER INSULATION

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1. GENERAL

1.01 This section covers the methods and procedures to be used in repairing buried cables with pulp or paper insulated conductors.

1.02 This section is reissued to revise procedure for identifying telephone cable.

1.03 Adequate electrical continuity must be maintained across all sheath openings. A temporary bond must be provided until the opening is permanently closed.

1.04 The repair of buried PIC cable is covered in Section 629-295-301.

2. PRECAUTIONS

2.01 Careful consideration must be exercised in all work operations, to ensure that safe conditions exist for employees, for other persons, and for tools and supplies.

2.02 Become familiar with the following sections.

- 081-020-011 Eye Protection
- 620-135-012 Guarding Work Areas
- 629-100-010 Buried Plant Precautions

2.03 Do not open the cable sheath until the cable has definitely been identified as being a telephone cable. ◗Electrically identify the exposed telephone cable with approved test sets. Place a tone at a terminal or central office between one conductor of a pair in one group and a conductor of a pair in a different group. Short these conductors at the distant end, then use an exploring coil to pick out the cable. ***Do not use a ground return.*** (In the case of a dig-up where cables have been cut and can be positively identified by appearance, electrical identification is not required.)◖

3. TYPES OF REPAIR

3.01 Cable repairs are made for several reasons, some of which are listed here:

(a) ***Sheath breaks*** may occur, such as a result of rodents, corrosion, damage by trenchers, back-hoes, hole diggers, hand shovels, or improper handling. The extent of the damage will vary from a very small break in the sheath to a large area that will require replacing a length of cable. Sheath breaks may also involve conductor breaks.

(b) ***Conductor trouble*** may be either physical damage caused by excavating equipment, or moisture entering through the sheath break.

3.02 A careful assessment of the extent of damage must be made to determine whether the damage can be enclosed in available closures, or if a new piece of cable must be spliced in to replace the damaged section of cable.

3.03 The type of splice closure (cast-iron splice case or lead sleeve) required on a buried repair splice must vary according to the type of sheath and the extent of the damage. The closure must be treated for corrosion protection as covered in Section 633-020-205.

4. SHEATH REMOVAL AND REPAIR

4.01 If no conductor damage has occurred and no moisture entered the cable, install a splice case or lead sleeve over the damaged portion of the sheath and treat for corrosion protection. Minor sheath damages on lead sheath cables may be repaired with solder.

4.02 Section 632-319-211 covers the procedures to be followed in removing the various types of outer protection, jute, wire armor, buried tape, etc.

4.03 Section 632-215-200 covers the procedures to be followed to maintain core protection and shield continuity.

4.04 When the sheath must be opened to repair conductors, pressurized cable should be buffered with nitrogen tanks or a portable air dryer to maintain pressure as outlined in Section 637-305-303.

5. CONDUCTOR REPAIR

5.01 Damaged conductor insulation should be repaired with B paper tape. Repair broken conductors with wire joints made by soldering, B wire connectors, or other approved connectors.

5.02 When all conductor damage has been repaired, check with the test center to make certain all trouble has been cleared before closing the opening.

6. DRYING WET CONDUCTORS

Heated-air Method

6.01 The heated-air method of drying wet cable conductors utilizes a prefabricated cable drying hood connected through a blower hose to a ventilator/heater.

6.02 Commerically available drying hoods consist of an approximately 6-feet by 30-inch piece of impregnated nylon equipped with zippers and straps for enclosing the cable. An opening is provided in the center to accept an adapter for the 8-inch blower hose. Holes are provided on the bottom of the hood to permit the free flow of heated air through the hood.

Note: The cable drying hood may be obtained commerically or made locally with a 6-feet square of medium weight canvass fitted with a sleeve in the center for attaching to a blower hose.

6.03 Observe the following precautions when using the heated-air method:

- Observe all precautions relating to the use of ventilator/heaters as covered in the 649 Division.
- Do not use desiccant because of the hazard of flying particles.
- Do not handle wet conductors until the insulation has dried sufficiently.

6.04 To dry conductors with the heated-air method, proceed as follows:

(1) Remove the cable sheath to expose at least 4 inches of dry cable on either side of the moisture (Fig. 1).

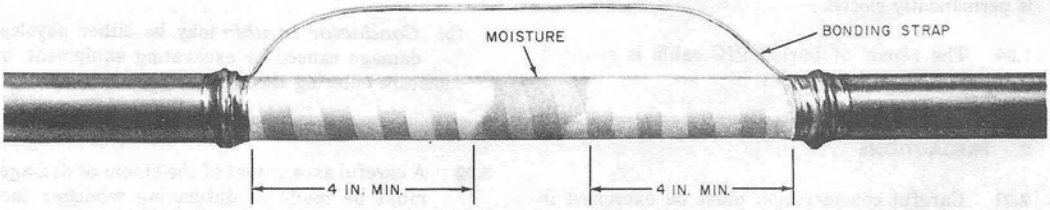

Fig. 1—Cable Sheath Removed

(2) Remove the paper core wrap and the outside binders if this can be done without damaging the wet insulation (Fig. 2). If insulation is too wet, place the cable drying hood over the cable and operate the blower at least 10 minutes before removing the outside binders.

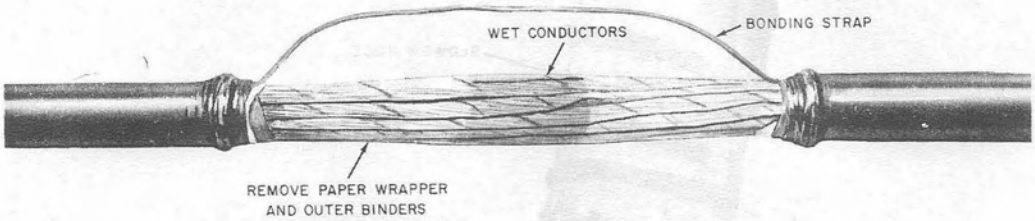

Fig. 2—Paper Wrapper Removed

(3) Place the cable drying hood over the cable, centering the opening over the wet conductors.

(4) Secure the ends of the hood to the cable with the straps provided, or in the case of locally made hoods, rubber bandage may be used.

(5) Close the zipper opening and connect the blower hose to the hood using the blower hose adapter (Fig. 3).

(6) Operate the ventilator/heater at maximum heat and air volume.

(7) Drying progress can be checked through the zipper opening.

(8) Remove the inner binders as soon as conditions permit.

(9) After all binders are removed, place spacers (no sharp edges) between the units.

(10) When the insulation has completely dried and the trouble cleared place fresh desiccant among the conductors in accordance with Section 632-050-205.

(11) Wrap the opening in accordance with Section 632-490-200 and close with a cast-iron splice case or lead sleeve. Treat the closure for corrosion protection.

Desiccant Method

6.05 Remove enough sheath to expose all the core affected by moisture (approximately 4 inches on either side of the wet area). Place a loose muslin envelope around the exposed conductors, and secure the ends of the envelope to the cable sheath with the opening of the envelope at the top of the cable opening as shown in Fig. 4.

6.06 Pour desiccant into the envelope, covering as many conductors as practical and allowing the desiccant to sift through to the conductors underneath (Fig. 5).

6.07 Continue drying the conductors with desiccant until inspection reveals that the insulation on the conductors is sufficiently dry so as to permit handling without causing damage. Desiccant can be picked up from the bottom of the envelope and poured over the conductors.

6.08 Remove the spent desiccant from the envelope and continue drying the conductors using fresh desiccant.

6.09 After the splice has dried sufficiently to permit work on the conductors, remove the muslin envelope and gently shake the splice to remove desiccant. Repair conductors having badly charred or broken insulation.

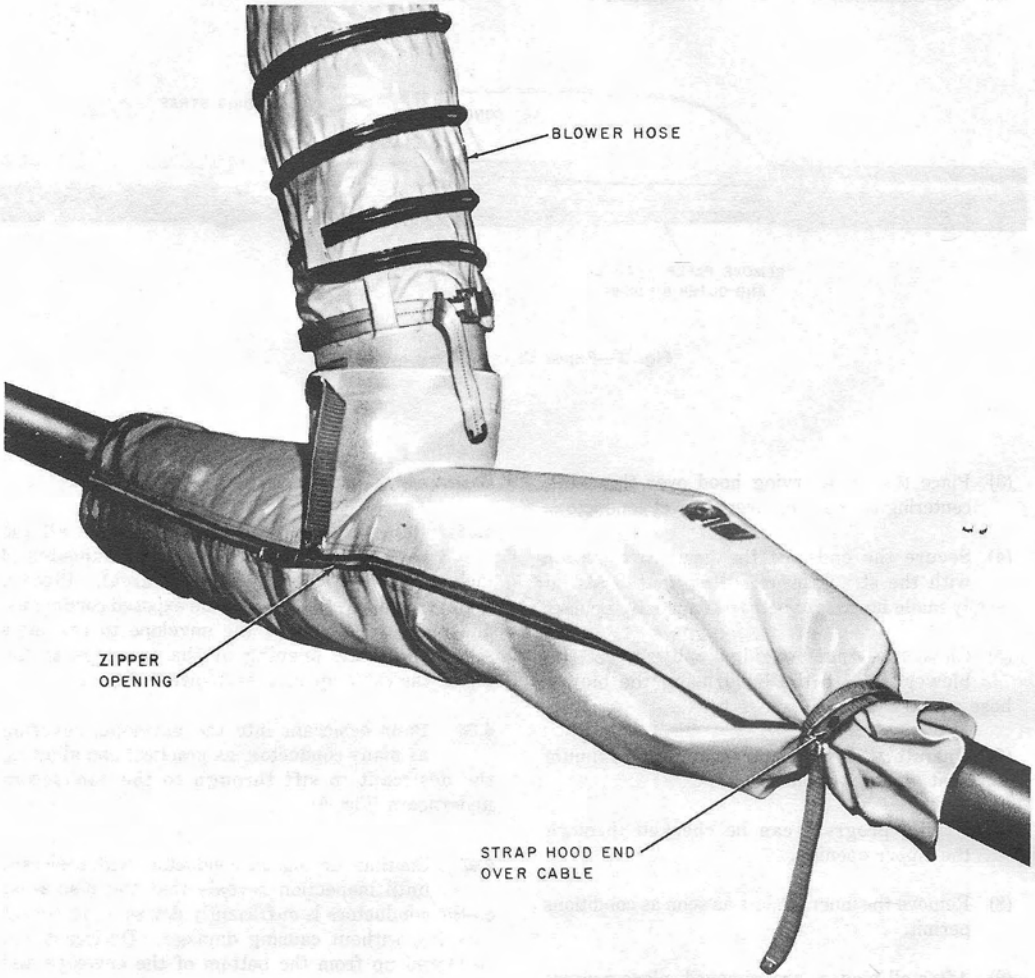

Fig. 3—Cable Drying Hood in Place

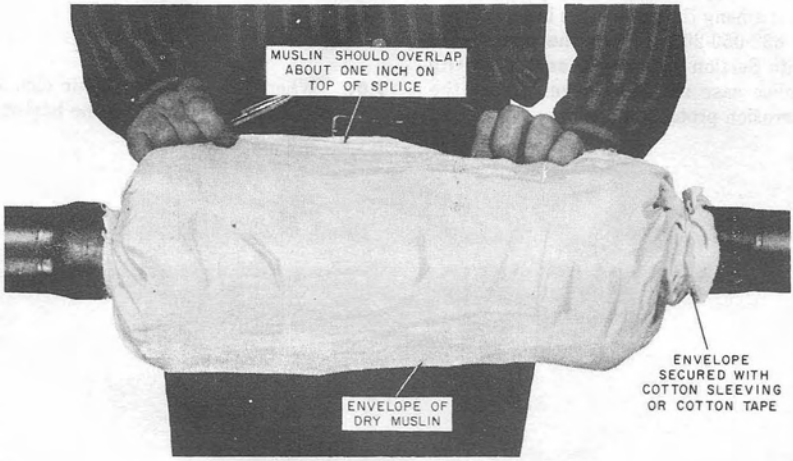

Fig. 4—Muslin Envelope Placed

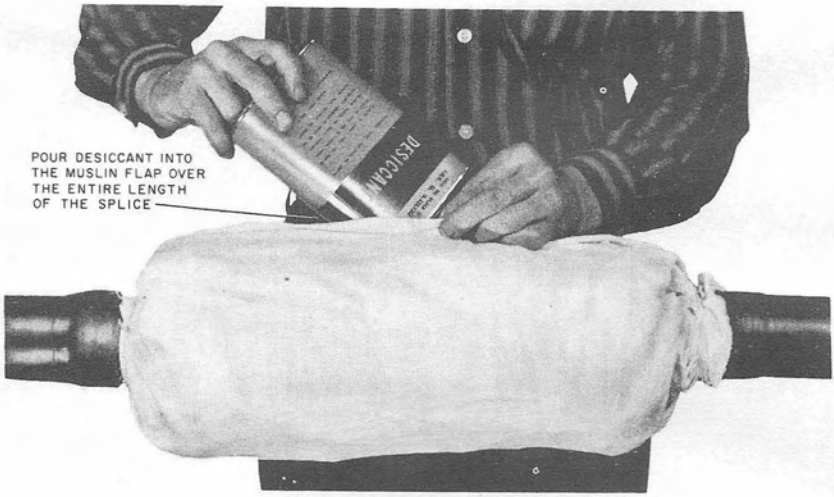

Fig. 5—Applying Desiccant to Wet Conductors

6.10 After the trouble is cleared place fresh desiccant among the conductors in accordance with Section 632-050-205. Wrap the opening in accordance with Section 632-490-200 and close with a cast-iron splice case or lead sleeve. Treat the closure for corrosion protection.

7. RECORDING REPAIR LOCATIONS

7.01 Whenever possible, repair closure locations should be recorded on the buried cable plats.