BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G56.137.2
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AT&T Co Standard

BURIED CABLE
CABLE WRAPPING

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1. GENERAL

1.01 This issue replaces Issue 1. It covers the materials and methods of applying a protective covering for lead sheath cable in preparation for burial in the ground. It is reissued to cover the use of a new material, B Cable Wrapping, and to change the name of the felt wrapping previously used to C Cable Wrapping.

1.02 The covering consists of an initial coating of Asphalt Cement followed by a B or C Cable Wrapping.

1.03 The B Cable Wrapping is suitable for use except where unusual corrosion conditions are encountered. C Cable Wrapping should continue to be used on all toll and trunk cables and on exchange cables which are buried in localities where the environment is such that the need for maximum protection against corrosion is indicated.

1.04 Where conditions permit, the wrappings are applied to the cable by means of the B Cable Wrapper described in G87.400.1. This method of protection is suitable for use in any situation where application must be made in the field. Although developed primarily as a protection for aerial cables which are to be removed and placed below ground, other uses for the method might include the following:

(a) To permit the use of available lead sheath cables for buried construction when factory protected cable is not on hand.

(b) As a means of protecting underground cables which have suffered corrosion in conduit. The conduit is removed and the cable repaired and wrapped, thereafter being treated as a buried cable.

(c) As protection for splices and cable in manholes where the balance of the cable has protective covering. It can also be applied to small aerial Loading Coil Cases or other apparatus to permit use underground.

2. MATERIALS

2.01 The following materials are required in applying the protective wrapping.

Cement:

AR-7701 Cement

An asphalt roofing cement furnished in 5-gallon cans. Coverage; one gallon per 100 feet of full size cable or 300 feet of 1-inch diameter cable.

B Cable Wrapping:
C Cable Wrapping:

The B Cable Wrapping consists of two layers of Kraft paper bonded together with asphalt adhesive and is supplied in rolls containing a minimum length of 350 feet. The C Cable Wrapping consists of asphalt saturated asbestos felt and is furnished in rolls containing a minimum length of 150 feet. Both Wrappings are provided in 8" diameter rolls having 2" openings at the center. Estimate 1 roll for each 45 feet of cable regardless of cable size plus about 10 per cent excess. Suggested wrapping widths to be used for different cable diameters are as follows:

Cable Diameter Inches	Wrapping Width Inches
1.00 to 1.24	2
1.25 to 1.54	2-3/8
1.55 to 1.90	2-3/4
1.91 to 2.30	3-1/8
2.31 to 2.63	3-1/2
2.63 to 3.125	3-1/2

Gloves:	**Rubberized Fabric Gloves** For use in applying cement.
Tape, **Friction:**	**2-Inch Black Friction Tape** For wrapping at roll ends and at splices.
Muslin, **4-inch:**	**4-inch Rolls of Unbleached Muslin** Used for splice covering—allow 4 rolls per splice to be wrapped.
Muslin:	**Unbleached Muslin Cloths** For use as wiping cloths.
Kerosene:	**Kerosene** For cleaning purposes.

2.02 When work is done in warm seasons, the rolls of B and C Cable Wrappings and drums of cement should be protected against overheating by keeping them out of the sun. In cold weather it may be necessary to heat the cement, using a double boiler method until it attains a workable consistency. Do not heat over a direct flame. It is also desirable to keep wrappings reasonably warm in cold weather to prevent them from becoming stiff.

3. TRENCH WORK

3.01 As far as practicable, trenching should be started somewhat in advance of the actual cable wrapping so that the cable can be lowered directly into the trench after being wrapped. For a few hours immediately following the wrapping the covering is soft and is easily scuffed. Placing it in the trench as soon as practicable after wrapping will lessen the likelihood of damage to the covering. In warm weather, keeping the cable in the shade both after lowering and after wrapping will also promote faster setting of the cement by holding down the temperature of the sheath.

3.02 Ordinarily, wrapped cable should be placed at the depths specified for buried cable, and the trench depth should be governed accordingly. When the lowering is done in conjunction with underground conduit construction, the wrapped cable should be placed alongside the conduit at the bottom of the

trench if possible with suitable mechanical protection being provided where indicated.

3.03 Where accommodation for the cable only is required, the width of the trench should be the minimum it is practical to dig, consistent with other requirements for working on the cable prior to wrapping.

3.04 Where the trench bottom is rocky or when the cable is lowered on top of conduit, a sand cushion or fill of selected earth about 2 inches deep should be provided before the cable is lowered into the trench. This is to protect both the wrapping and the cable from damage. ←

3.05 When the underrunning carriage is used, one side of the trench and at least 18 inches of shoulder on the other side of the trench should be kept clear of spoil. This is to permit unobstructed operation of the carriage along the trench.

3.06 In circumstances where uninterrupted machine trenching is practical, the underrunning carriage can be pulled directly by the trenching machine, thereby permitting trenching and wrapping to proceed at the same time. When using this method it is desirable to provide a Cable Sheave supported by a Cable Sheave Shackle suspended from an outrigger on the trencher to guide the cable to the carriage.

4. PREPARATION FOR WRAPPING

4.01 If the cable has been inspected and repaired during the lowering process, as covered in G56.137.1, it may be placed in position for wrapping, generally using one of the methods of support suggested below.

(a) For a short job, say two or three hundred feet, it may be best to support the cable over the trench by placing it on timbers or wooden horses spanning the trench. These should be spaced about 10 feet apart for full size cable. The spacing should be adjusted according to the size of the cable in order that excessive sag between supports will not interfere with the operation of the wrapper.

(b) For longer jobs the use of the underrunning carriage will be found to result in faster operation and less handling of the cable. The carriage should be placed straddling the trench. The cable is then lifted from its position beside the trench to the supporting sheaves of the carriage. Wrapping then proceeds on the section of cable between the sheaves and continues as the carriage is drawn forward, the cable dropping to the trench bed as it is wrapped.

4.02 Variations of the method of handling described in 4.01(b), depending on the method of lowering from the pole line, include feeding the cable to the carriage from the bed of the trench or directly from the pole line. The conditions of the individual job will determine which method is best suited for a particular case.

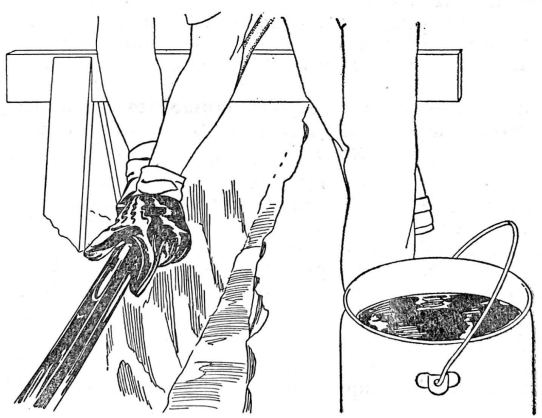
4.03 Where new lead sheath cable is to be wrapped, the reel of cable may be placed on a truck or reel trailer directly ahead of the underrunning carriage on the spoil-free side of the trench or spanning the trench. Feed the cable directly to the front sheave of the carriage or use an outrigger arm with a sheave if it is not practicable to operate the reel carrier close enough to the trench for a direct feed.

4.04 Cable in conduit should be exposed by excavating the conduit and removing the duct material. To get the slack necessary for lifting the cable to a position for wrapping it may be necessary to break out part of the manhole end walls. Support the cable at ground level on timbers spanning the trench and make any repairs necessary before wrapping.

5. APPLYING CEMENT

5.01 Before applying cement make sure that the cable sheath is free of any soap solution or other foreign material and that it is dry. The cement will not adhere uniformly unless the sheath is dry and reasonably clean.

5.02 The cement is of such consistency that it can be applied with a stiff bristle brush, but a more uniform and thorough coverage can be obtained at a faster rate by using



only the hands. One man wearing rubber-coated fabric gloves simply dips a double handful of cement from the can and placing both hands around the cable, applies the cement to the cable with a squeegee action.

5.03 When using the underrunning carriage the can is carried on the carriage and the cement is applied to the cable directly behind the front sheave. When the cable is supported on timbers or horses spanning the trench the cement should be applied only as far as the nearest support. When the wrapping has reached this point the support is moved behind the wrapper and cementing proceeds to the next support.

5.04 As the asphalt cement is the most important part of the cable protection, the coverage should be thorough. The thickness of coating applied should be as heavy as is consistent with the requirements for satisfactory operation of the wrapper. The cement coating should not be so heavy as to squeeze out under the pressure of the rollers. It should, however, not be too light. A light coating, in addition to affording inadequate protection, may not provide the cushion which the wrapping material requires to adjust itself properly to the spiral wrap.

5.05 While applying the cement to cables under gas pressure be on the lookout for gas leaks. Due to its heavy consistency, the cement can be of assistance in the detection of leaks through the formation of a bubble as it is applied over a leak.

6. WRAPPING CABLE

6.01 In preparation for placing the B Cable Wrapper on the cable, first check to see that the position of the rollers has been adjusted for the size of cable to be wrapped. Four of the six rollers must be retracted in order to fit the machine over the cable. These are the ones adjacent to the openings in the two circular end plates. Turn down the wing nuts on the yoke shafts of these four rollers until the springs are completely compressed.

6.02 Place the wrapper on the cable and turn off the wing nuts on the roller yokes until they are free and all the spring pressure is applied to the rollers.

6.03 Draw out of the wrapping guide enough material to take two or three turns around the cable. The wrapper is operated by rotating it in a clockwise direction as observed from the forward end. The workman doing the wrapping should station himself on the side which permits rotation of the wrapper by pulling the spokes toward himself and downward. In

starting, the wrapping should be wrapped around the cable by hand in a direction corresponding to the manner in which it will be applied by the wrapper. Successive turns of material should overlap by 5/8 inch to 1 inch. Rotate the wrapper slowly until it has advanced to the point where the forward rollers bear on the first hand-applied wraps. The pressure of the rollers will prevent slippage of the starting end from that point on.

6.04 Rotate the wrapper a few turns and observe the lay of the wrapping on the cable. If the wrapping is not being applied smoothly or tears easily it may be due to one of the following causes:

(a) **Excessive wrinkling or failure to obtain an overlap** in order of 5/8 inch to 1 inch may be caused by too little tension or an excess of cement. If the cement oozes out at the overlap, this is probably the trouble. If reducing the amount of cement being applied does not correct the trouble, increase the wrapping tension slightly.

(b) **Frequent tearing of the wrapping** may be the result of excessive tension. If this occurs decrease the tension slightly. Excessive tension may also be the result of obstructed passage of the wrapping through the guide. Examine the guide and remove any particles of material that may have accumulated. In rotating the wrapper make sure there is no tendency to force the wrapper out of alignment with the cable. Any motion of the wrapper which impedes its uniform forward progress along the cable may result in excessive overlap and consequent tearing.

6.05 As the wrapping proceeds, watch for the appearance of excess cement oozing out between turns. In addition to affecting the lay of the wrapping cement appearing on the surface will act as a lubricant and may retard the normal forward movement of the wrapper. It will also foul the rollers and make necessary their frequent cleaning.

6.06 Examine the cable as it is lowered into the trench and repair any breaks in the wrapping by covering with two or three wraps of 2-inch friction tape.

6.07 As the end of a roll of material is reached, continue to rotate the machine until the end passes through the guide. Hold this end against the cable and rotate the machine backward for about 3 revolutions. Place a new roll of wrapping on the spindle. Start the new roll by lapping it over the completed work in the manner described in 6.03.

6.08 Where the wrapping is being done on cable supported on timbers and more than one cable is being worked on,

the completed cables should be protected in a way to prevent damage to the covering.

6.09 When restricted working space prohibits the use of the machine, some hand wrapping of the cable will be necessary. Because of the difficulty of handling the full roll of material, it is advisable to prepare small rolls about 3 or 4 inches in diameter for use in this work.

7. PROTECTION OF SPLICES

7.01 Splices should be coated with cement and then hand wrapped with B or C Cable Wrapping of the width being used on the job. This should be followed by a second coat of cement and a half lapped layer of 4-inch muslin. Finish the covering with a half lapped layer of 2-inch friction tape.

7.02 If desired, the splice can be protected with Pitch Tape as outlined in G56.610.1.

8. BACKFILLING

8.01 Backfilling should follow as promptly as practicable after completion of wrapping to avoid exposing the cable to possible damage. Plank top protection should be considered for wrapped cables located where they may be subject to damage by foreign workmen.

8.02 In backfilling over a wrapped cable, care should be exercised to avoid throwing into the trench rocks or frozen spoil which might damage the covering or cable. If large stones are present in the excavated material a source of backfill material suitable for placing immediately over the cable should be located. After covering the cable to a depth of 6 inches with this material the remainder of the trench can be backfilled with the excavation spoil. Requirements for tamping will be dependent on the location of the work. In road shoulders or other traveled locations the backfill should be tamped in 6-inch layers.