

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

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COILS AND CASES

INSTALLING SPLICE LOADING COIL CASES— SUBMARINE

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1. GENERAL

1.01 This section covers a method of loading submarine cables using splice loading coil cases rather than by means of a submarine loading coil case.

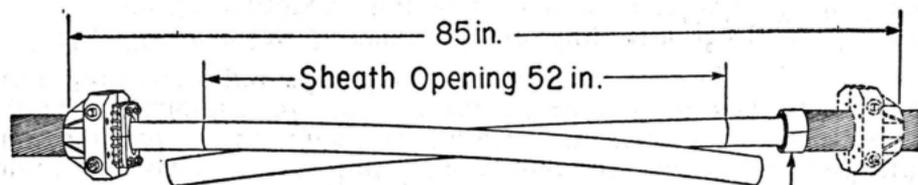
1.02 Generally a larger than normal size lead sleeve is required to house the splice loading coil cases. This necessitates using a modified submarine splice case to cover the splice. The end clamps of a standard splice case can be used to terminate the armor wires but longer than normal galvanized side, bottom and top members of the case and longer tie rods are required to enclose the lead sleeve. Arrangements should be made to obtain these parts locally.

1.03 This section describes the loading of a 458-pair 19-gauge single armored submarine cable in which all the pairs are loaded. The method can be employed to load other sizes of cable. The size of the end clamps to be employed, the length of the splice opening, the type of loading coil case to be used, the dimensions of the tie rods and side members, etc., for a particular installation will, of course, depend on the size of the submarine cable, the number of pairs to be loaded and the type of loading coil cases required. A top plate should be substituted for the skid plate where the case is lowered over the side of the barge. This information is given in the detail plans.

2. PREPARING THE ENDS OF THE CABLE

2.01 The cable ends should be set up for splicing in the manner prescribed for splicing submarine cables using a submarine splice case.

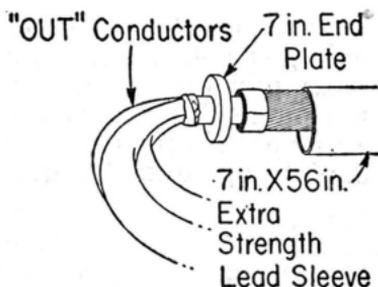
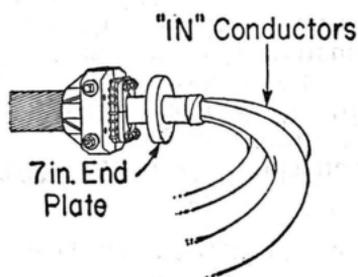
2.02 The armor wires of one end of the cable should be terminated in an end clamp of a No. 4 Submarine Splice Case in the usual manner. The wires of the other end should be prepared as shown in the following sketch. This will avoid the use of a split lead sleeve.



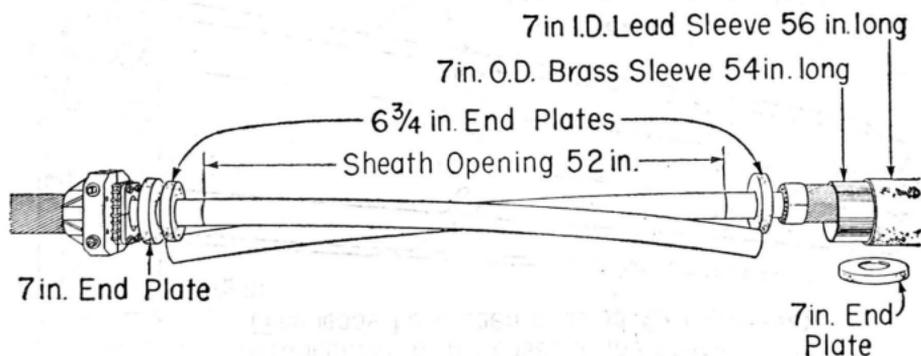
Place 6 turns of
2 in. friction tape
around the cable,
then cut the armor
wires with a hack
saw.

2.03 If the splice case is to be placed in water more than 50 feet deep, and the cable is not to be maintained under pressure, the completed splice (lead sleeve) shall be filled with paraffin heated to 275° F. to reinforce the lead sleeve. If the cable is to be maintained under pressure, the lead sleeve shall be reinforced with a brass sleeve instead of filling with paraffin.

2.04 **Lead Sleeve Not Reinforced with Brass Sleeve:** The following sketch illustrates a 458-pair cable with the ends prepared and the cable conductors ready for splicing to the leads of the loading coils. If the splice is to be filled with paraffin, core pins should be placed in the ends of the cable and constrictions placed in the sheath to limit the flow of paraffin. A 7-inch end plate should be placed over the end of each cable before removing the sheath.

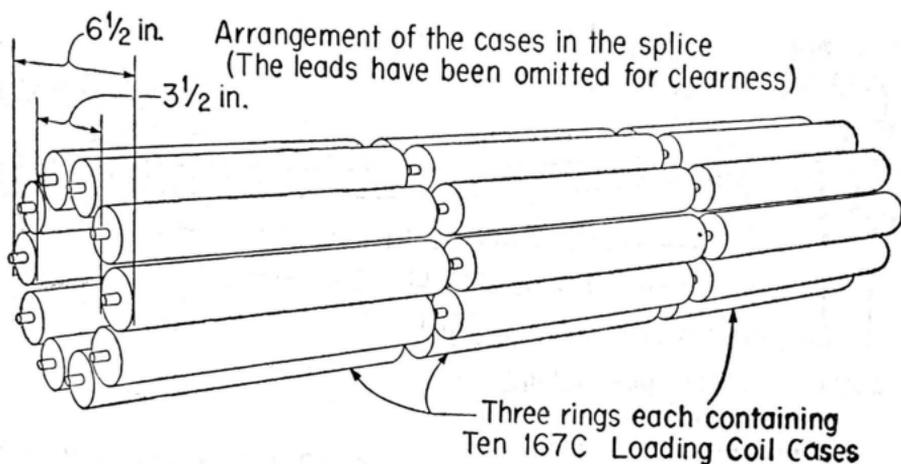


2.05 **Lead Sleeve Reinforced with Brass Sleeve:** The dimensions of the brass sleeve will, of course, depend on the size of the splice. For a 458-pair cable, a brass sleeve 1/8 inch thick, 7 inches outside diameter and 54 inches long is required. The lead sleeve should be drifted and placed over the brass sleeve before the two sleeves are placed on the cable. Two additional end plates 6-3/4 inches in diameter are also required. One of these end plates should be placed over the left-hand end of the cable after the 7-inch end plate has been placed. The other 6-3/4-inch end plate should be placed over the right-hand side of the splice. The other 7-inch plate will be installed at the right-hand end of the cable after the brass sleeve has been placed over the splice. The following illustration shows the ends of the cable prepared for splicing and the lead and brass sleeves slid over the right-hand end of the cable.

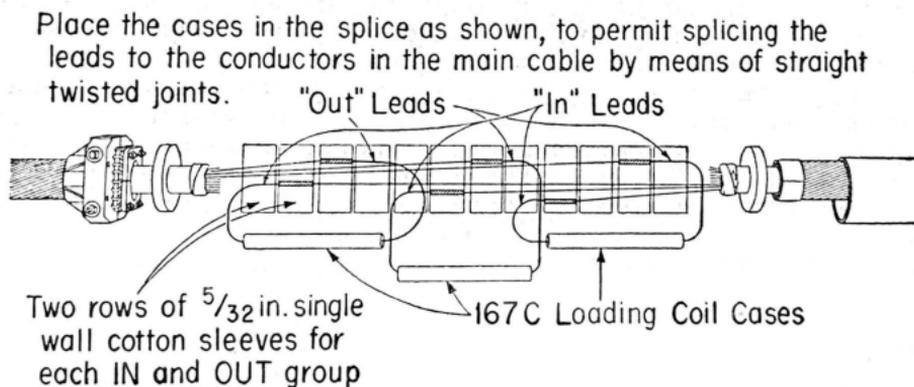


3. SPLICING LOADING COILS

3.01 The position that the loading coil cases will take in the completed splice is shown in the following sketch. The cable conductors and coil leads have been omitted for clearness.



3.02 The method of splicing the leads of the coils to the cable conductors using two rows of splices for each ring of cases and straight twisted joints is shown in the sketch below.



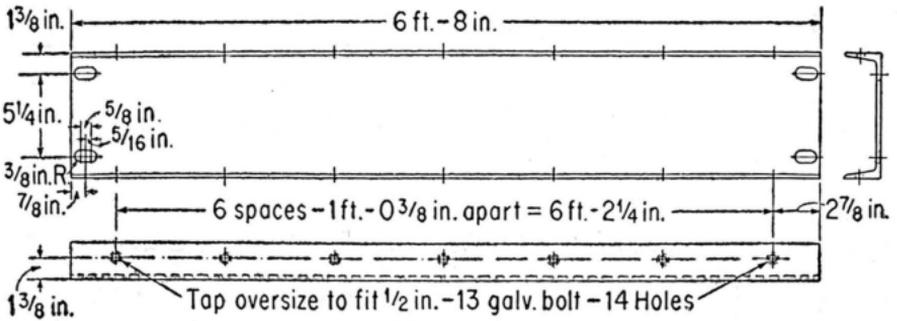
3.03 After the coils have been connected, group the loading coil cases around the spliced conductors into three rings, as shown in Paragraph 3.01, using 1-inch cotton tape to hold the cases in position. Then wrap the splice with muslin and treat with desiccant in the usual manner, unless the splice is to be filled with paraffin. Such a splice should be boiled with paraffin heated to 275° F.

3.04 **Lead Sleeve Not Reinforced with Brass Sleeve:** Center the end plates over the splice with the distance between the inner surfaces of the end plates one inch less than the length of the lead sleeve. Solder the plates to the cable sheath inside the splice at several points. Then center the lead sleeve over the splice and wipe the joints in the usual manner. If the splice is to be placed in water more than 50 feet deep and the cable is not to be maintained under pressure, fill the lead sleeve with paraffin heated to 275° F. to reinforce the lead sleeve. Allow the paraffin to solidify and fill the void with more paraffin before sealing the filling hole.

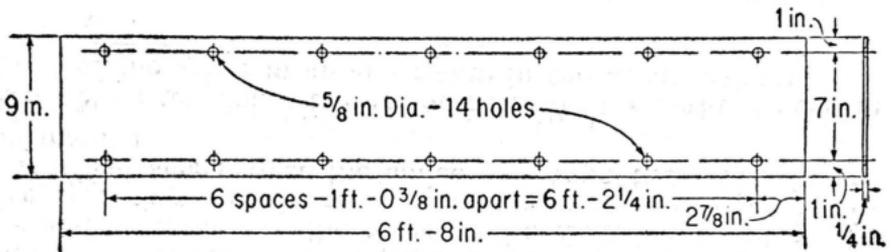
3.05 **Lead Sleeve Reinforced with Brass Sleeve:** Center the inner end plates over the splice with the distance between the inner surfaces of the plates one inch less than the length of the brass sleeve. The plates should be soldered to the sheath at several points. Place the brass sleeve over the splice with the sleeve resting one-half inch on each plate. Place the left-hand outer end plate against the inner end plate and solder at several points to hold the plates together. Split a 7-inch end plate and place it over the cable at the right-hand end of the splice, soldering it to the inner end plate at several points. Center the lead sleeve over the splice and wipe the joints in the usual manner.

3.06 Next terminate the armor wires on the right-hand side of the splice in an end clamp in the usual manner.

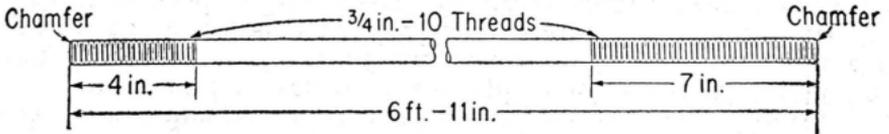
3.07 The dimensions of the tie rods, side, bottom and top members of the case are shown in the following drawing. The skid plate (Details 4, 5 and 6) should be replaced by Detail 2 if the case is to be lowered over the side of the barge.



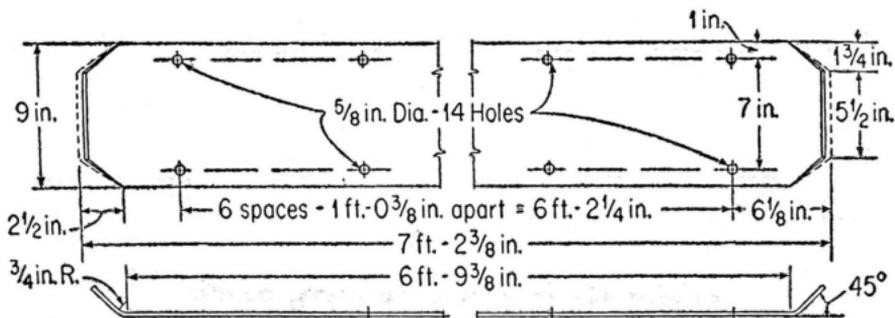
DETAIL 1
8 in. x 13.75 lb. Structural Steel Channel
2 Required



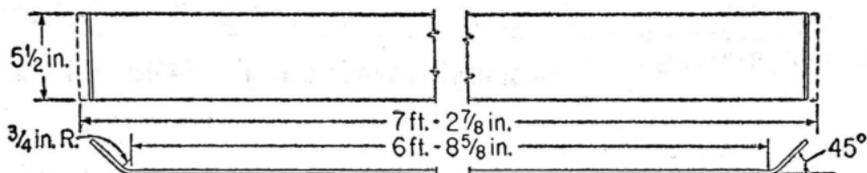
DETAIL 2
Structural Mild Steel - 1 Required



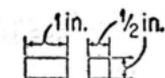
DETAIL 3
Mild Steel - 4 Required
Provide four galvanized Hex. Nuts for each bolt



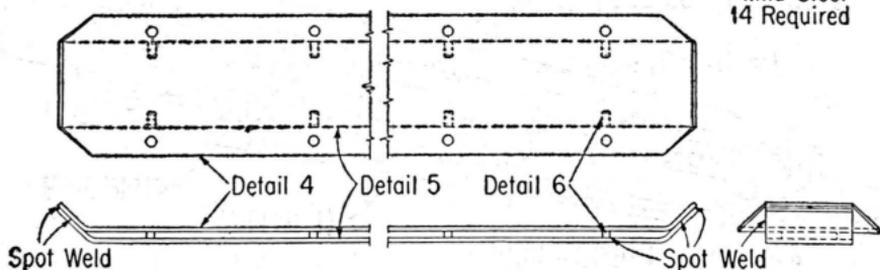
DETAIL 4
Structural Mild Steel - 1 Required



DETAIL 5
Structural Mild Steel - 1 Required

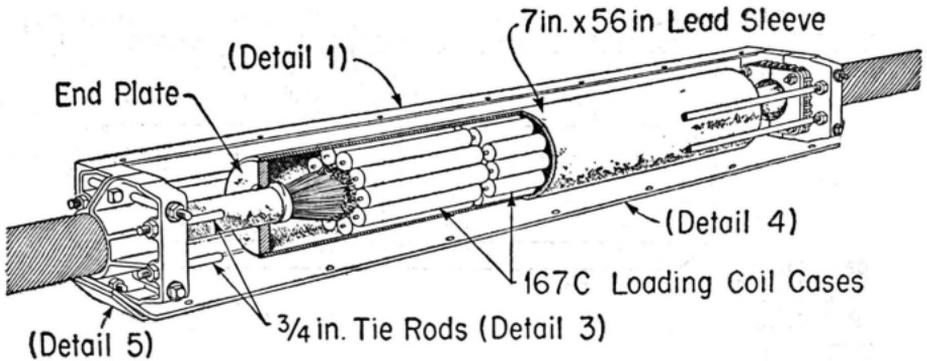


DETAIL 6
Mild Steel
14 Required



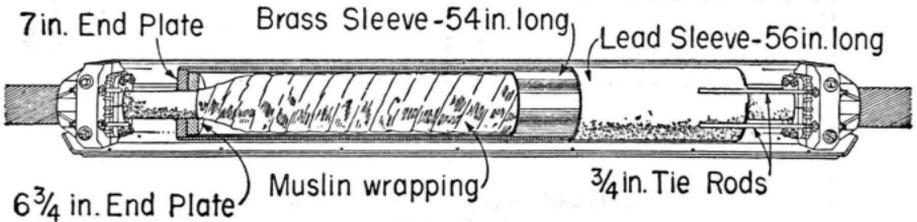
Assembly of Details 4, 5, and 6

- 3.08 Place the tie rods and bolt the side and bottom members to the end clamps.
- 3.09 Fill the case with Terminal Compound heated to a temperature not in excess of 275° F. However, where this operation will cause undue delay in placing the cable, just pour sufficient hot compound over the splice to thoroughly coat the lead surfaces. Bolt the top plate in place. Completed splices with and without reinforcing brass sleeve are shown below.



Note:- Wrapping of muslin in splice omitted for clearness.

Splice without Brass Sleeve



Splice Reinforced with Brass Sleeve