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SPlicing PROCEDURES FOR DSS-3 CARLE.(U)

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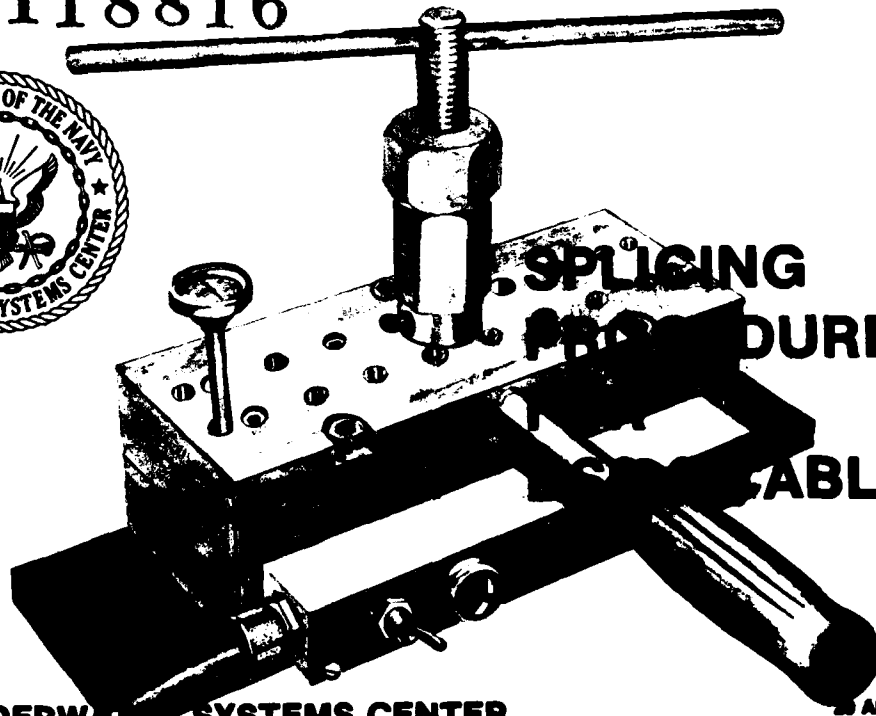
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**CABLE SPlicing PROCEDURES**

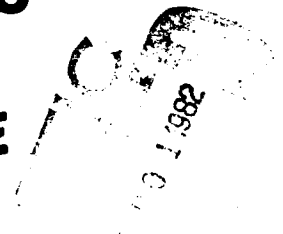
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NAVAL UNDERWATER SYSTEMS CENTER  
New London Laboratory

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PREFACE

This document was prepared under NUSC Project No. A80015, "Shipsystems Maintenance Monitoring and Support (SMMS) Program" (U), Principal Investigator, M. Cloutier (Code 3262); Sponsoring Activity, NAVSEC, Program Manager, CAPT A. Young (Code 6107).

REVIEWED AND APPROVED: 20 April 1977

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### REQUIRED MATERIALS

Silicone Parting Agent	Plywood Board ( $\approx 18 \times 24 \times 3/8$ -in.)
Cyclohexanone Technical Solution	Covered With Heavy Plastic Sheet
Electrical Jacketing Neoprene Tape (0.75 $\times$ 0.030 in.)	Fine-Tooth Hacksaw Blade
Fiberglass Tape	Crimp Pliers
Silicone Rubber Tubing	Needle Nose Pliers
Cable Connector, Crimp Type (#14)	Side Cutter, 6 in. Diagonal
Solder, Multi-Core (1/16-in.)	Crescent Wrench (12 in.)
Carbon Arc Soldering Pliers	Allen Wrench (3/16-in.)
Thermometer (500°F) (2)	Scissors, Manicure (3 in.)
Cable Holding Fixture (To Be Fabricated)	Knife, Exposed Blade
	Ice Pick
	C-Clamp (4-in.) (2)
	Swab Brush

## SPLICING PROCEDURES FOR DSS-3 CABLE

### 1. Introduction

This document describes a "hot splice" method for splicing DSS-3 cable. The advantage of the method is that the neoprene is permanently bonded to the cable jacket.

The molding device illustrated in figure 1 is typical of the equipment used.

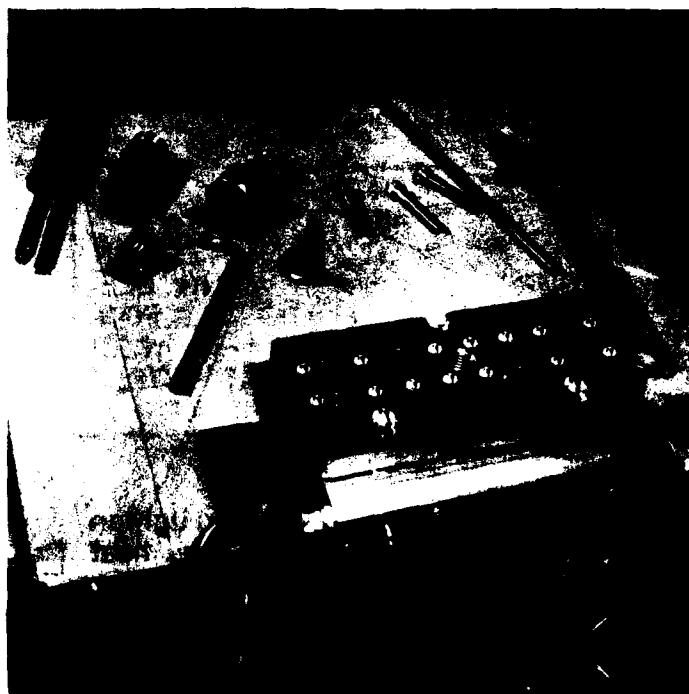


Fig. 1

## 2. Mold Preparation

- a. Spray a light coating of silicone on the parting surfaces of the mold.

### NOTE

THE MOLD ILLUSTRATED IN FIGURE 1 HAS A HEATING ELEMENT ONLY IN THE BOTTOM PORTION. THEREFORE, IT IS NECESSARY TO ENSURE THAT PROPER HEAT TRANSFER OCCURS.

- b. Close the mold, turn it on, and tighten all hex screws to facilitate heat transfer. Insert thermometers in the holes provided in the top and bottom portions; the temperature throughout must be between 150° and 170°F before beginning the molding process.

## 3. Neoprene Tape Preparation

- a. Cut five strips of electrical jacketing neoprene tape, approximately 2 ft long, and lay them on the plastic covered plywood board.
- b. Wash one side of the tape using cyclohexanone technical solution with swab brush as shown in figure 2.

### WARNING

CYCLOHEXANONE TECHNICAL SOLUTION IS EXTREMELY TOXIC. ENSURE PROPER VENTILATION. AVOID SKIN CONTACT.

- c. Allow the first side to dry completely, turn the strips over, and coat them with cyclohexanone technical solution.



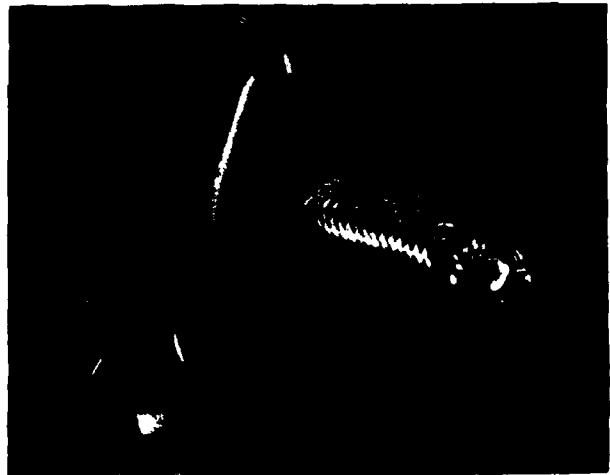
**Fig. 2**

- d. When the strips are completely dry, cut them in half for easy handling when wrapping the splice.

#### **4. Cable Preparation**

- a. Cut 2-1/4 in. of the outer jacket back from the end of the cable.

- b. Place the cable in the cable holding fixture (as shown in figure 3), clean the shield using fine emery cloth, and apply solder to that portion of the shield around the inner jacket that is 1/4-in. (maximum) from the outer jacket.



**Fig. 3**

**NOTE**

THE CABLE HOLDING FIXTURE IS EASILY FABRICATED AND GREATLY FACILITATES THE CABLE SPLICING PROCEDURE. IT CAN BE USED IN A BENCH VISE OR CLAMPED TO BEAMS IN TIGHT SPACES.

**CAUTION**

CUT THE INNER JACKET WITH EXTREME CARE. IF THE JACKETS OF THE WHITE AND BLACK CONDUCTORS ARE NICKED DURING THIS PROCESS, A SHORT CIRCUIT COULD RESULT.

- c. Using the ice pick, separate the shield strand by strand up to the solder line (see figure 4). Cut away approximately one-third of the strands using the manicure scissors.
- d. Twist the stranded shield to form a solid conductor approximately 1-3/4 in. long.
- e. Using the knife, cut 1-3/4 in. of the inner jacket from the end of the cable. The remaining 1/4-in. will protect the individual conductors from the shield.



Fig. 4



Fig. 5

- f. Reposition the cable in the holding fixture as shown in figure 5 and coat approximately 6 in. of the outer jacket with cyclohexanone technical solution. Allow the area to dry and carefully scrape it with the fine-tooth hacksaw blade to remove the wax-like coating.

**CAUTION**

**AVOID NICKING THE OUTER JACKET.**

- g. Repeat the above procedure for the other cable.

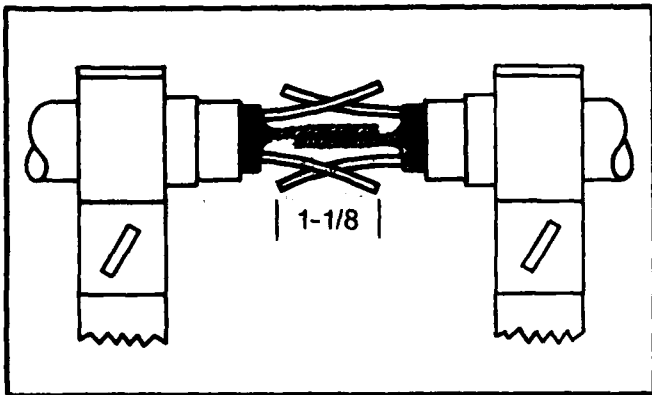


Fig. 6

### 5. Splicing Procedure

- a. Set the cables to be spliced in the cable holding fixture. Align them so they overlap by 1-1/8 in. (see figure 6).

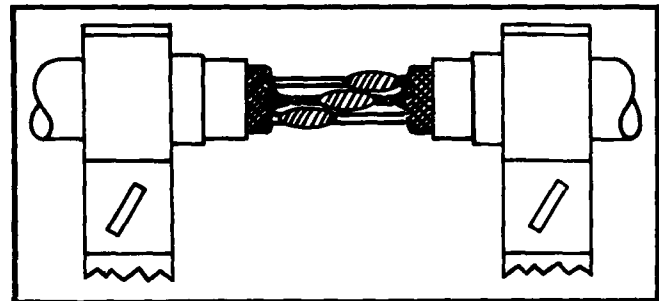


Fig. 7

### NOTE

WHEN THE SPLICING PROCEDURE IS COMPLETED THE INDIVIDUAL CONDUCTORS SHOULD BE STAGGERED AND ALL OF THE SAME LENGTH (TO ENSURE THAT THE TENSION ON EACH WILL BE THE SAME), AS SHOWN IN FIGURE 7.

- b. Cut the white conductor of the cable

on the left to within 1/2-in. of the inner jacket. Using the knife, lightly cut around the white jacket 1/4-in. from the end. Remove the white jacket and crimp a cable connector onto the exposed conductor.

c. Using the knife, lightly cut around the white jacket of the conductor on the right 1/4-in. from the end. Place a 3/4-in. piece of silicon tubing over this conductor. Crimp the white conductors together. Solder the connection, slide the silicon tubing over the soldered joint, and wrap it tightly with fiberglass tape (see figure 8).

d. Repeat steps b and c in reverse for the black conductors; i.e., cut the black conductor of the cable on the right to within 1/2-in. of the inner jacket, and so on.

e. When the black and white conductors of the two cables are individually

wrapped, wrap them together.

f. Cut 3/4-in. from the shield conductor on the left. Slide a 3/4-in. piece of silicone tubing onto each shield conductor, crimp the conductors together, and solder the connection. Wrap the shield conductors with fiberglass tape and then wrap them together with the white and black conductors (see figure 9).



Fig. 8



Fig. 9



Fig. 10

**CAUTION**

**BE SURE THE OUTSIDE DIMENSION OF THE WRAPPED CONDUCTORS IS LESS THAN THAT OF THE CABLE.**

**6. Molding Procedure**

- a. Wrap the spliced cables tightly in neoprene tape until they fit the form of the mold as shown in figure 10.
- b. Place the splice into the mold and



Fig. 11

bolt the halves together (at this point, the temperature should be 300°F).

- c. Cut the remaining pieces of neoprene tape into lengths approximately 3 in. long and roll them into slugs about 5/16-in. in diameter.
- d. Remove the injection hole bolt from the center of the mold.
- e. Screw the injection tube into the top of the mold and fill the tube with the neoprene slugs as shown in figure 11.

f. Slowly turn the injection screw into the injection tube to force the neoprene slugs into the molding chamber (see figure 12).

g. When the mold is completely filled, fluid neoprene will seep out of the two bleeder holes at the top as shown in figure 13. When this happens, immediately replace the injection tube

with the injection hole bolt so that the tube may be cleaned.

**CAUTION**

**USE NEEDLE NOSE PLIERS TO REMOVE THE NEOPRENE FROM THE INJECTION TUBE BEFORE IT HARDENS.**



Fig. 12



Fig. 13



Fig. 14

h. Allow the splice to cure at 300°F for 30 min to 1 hr.

i. After curing, unplug the mold. When the temperature reaches 150° to 175°F, remove the cable and trim the excess neoprene (see figure 14) so that the splice looks as it does in figure 15.

j. Gently bend and twist the cable in the area of the splice to ensure that the neoprene is securely bonded to the jacket.

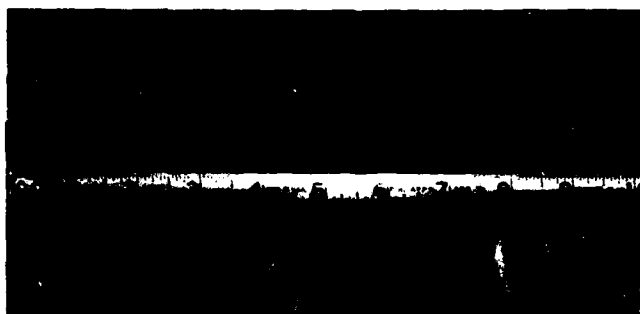


Fig. 15

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