



SECTION REPLACEMENT HIGH PRODUCTION METHOD

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1. GENERAL

1.01 This section gives the outline of a high production method of replacing one or more sections of metal conductor cable where the cable makeup allows the use of Automatic Pair Identification (API) equipment. This method also permits the replacement of cable sections without service interruption and may be used on all types of subscriber loops except

those listed in 1.04.

1.02 When this section is reissued, this paragraph will contain the reasons for reissue.

1.03 Before a section replacement is begun it is necessary to obtain a thorough understanding of the test sets involved.

1.04 Due to the negative effect of bridge taps on circuit quality and stability, this method cannot be used on subscriber loops carrying Data- Phone, DTWX, or any repeaters. If there is any doubt as to whether a particular circuit can be transferred using this method, it is suggested that the local transmission engineer be consulted. All appearances of the above circuits should be carefully identified and transferred using existing local procedures.

1.05 The following high production method discusses the use of the 3M Modular System and the Western Electric 710 modules for wire joining by groups rather than a pair at a time.

2. ADVANTAGES

2.01 One of the major advantages of using this method is that the required amount of slack is minimal, usually between 3 and 5 inches.

2.02 The splicing methods are identical at both ends of the section to be replaced using existing modular techniques.

2.03 A greater amount of slack is not a determining factor in identifying either the cut end or the half-tap end. Placement and ease of use of testing equipment is the primary factor in selecting the cut end.

2.04 All of the half-tap modules are installed at one time so that all groups are easily

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accessible. This requires the least amount of slack and reduces disturbance of the existing cable.

- 2.05 All testing is done in the new cable using new ends.
- 2.06 Splicing is finished with hand tools to allow easiest access to the existing splice.
- 2.07 No more than one group is half tapped at a time, so incorrect groups should never be trimmed out accidentally.
- 2.08 The use of the cut-closed test set virtually eliminates reverse, transpositions and other troubles.

3. APPARATUS

3.01 The following pieces of equipment are required:

- A cut-closed test set (Such as the Throwmaster 106-25)
- A spare pair test set (Such as the Testmaster 108)
- Suitable 100 pair switching device (Such as the Switchmaster 110)
- Four 25 pair access cords (such as the Industrial Technologies Model 307 Section Cut Cord)
- Automatic Pair Identifier - Central Office Unit
- Automatic Pair Identifier - Field Unit
- 2-Bank through 4-Bank Module holding tools for 710 Modules
- 3-Bank Module holding tool or a 4-Head splicing arrangement for 3M Modules

4. SPLICE PREPARATION

4.01 Where not enough slack is available in a manhole where splicing is required, re-racking of the cable in adjacent manholes to allow for the gathering of slack in the splicing manhole should be considered.

4.02 In pressurized cable systems, local methods of buffering should be employed to maintain essentially standard air pressure.

4.03 Open the existing cable to be replaced at both ends in the usual manner. Expose the maximum amount of new wire possible away from the section to be replaced.

4.04 Position the new cable to make splicing to the old cable convenient, preferably above and slightly in back of the existing cable (i.e., away from the worker). Open the cable in the usual manner.

4.05 If slack has been pulled from adjacent manholes, allow an appropriate amount of slack in the new cable to allow the re-racking in the manholes affected.

4.06 By this time a talk circuit must be established by the conventional local means.

4.07 Now, install half-tap (female) modules on the *entire* old cable at both ends, allowing for a future trim-out of the replaced section.

4.08 Clear the new cable ends at the cut end. The cut end splicer determines which group will be spliced first, preferably one of the bottom back groups of the existing cable, and notifies the half-tap end splicer.

4.09 At the half-tap end, install proper bridging modules on the 100 pair group to be spliced and test the new cable for defects with an appropriate test set. Install proper bridging modules on the remaining groups and arrange proper slack to allow an in-line modular splice configuration when completed. At this time no connections between the old and new cables should be made.

4.10 Next, attach the 3-bank modular holder to the 890 splicing set for WECO or 4-splicing head arrangement for 3M.

4.11 Notify the half-tap end splicer to plug in the first group to be cut. Do not plug in other groups at this time.

5. TEST SET CONNECTIONS

- 5.01 At the cut end, position the test sets in a convenient location.
- 5.02 At the cut end, make the test set connections as shown in Fig. 1.
- (a) The Automatic Pair Identifier (API) CO unit connects to the 100 pair access switch.
- (b) From the 100 pair switch a 25 Pair Cord connects to the cut-closed test set, and a set of four 25 pair cords plug into the group to be cut first.
- (c) From the cut-closed test set, a 25 pair cord connects to the modular splicing machine with inhead testing capability.

6. METHOD FOR CABLES WITH SLACK (Fig. 1)

- 6.01 Install proper bridging modules in the splice heads or holders and arrange the required slack to allow for an in-line, modular splice configuration when done.
- 6.02 Select a half-tapped group in the new cable.
- 6.03 Using the API field unit, identify individual pairs and place one by one in the male modules. Continue until all pairs in the group have been tested and placed in a module.
- 6.04 Use the cut-closed test set and the 100 pair switch to verify all pairs in the group have been placed in modules correctly and then install the caps.
- 6.05 Tag the newly tested modules appropriately (1,2,3,4). Tag the existing group the same (1,2,3,4) and remove the API cords.
- 6.06 Plug the new group to the old group and, trim out the old section being replaced.
- 6.07 Notify the half-tap splicer to trim out the spliced group and to plug in the next group to be spliced.

- 6.08 Continue in the same manner one group at a time until the entire cable has been cut over.

7. METHOD FOR CABLES WITH NO SLACK (Fig. 2)

- 7.01 Select the first group to be section cut.
- 7.02 Half-tap the first group with Pic-A-Bonds or equivalent type connectors.
- 7.03 At the cut end, install female modules on the "new" cable group, arranging slack for an in-line - no slack configuration when complete.
- 7.04 Connect the test sets as follows:
- A. API CO unit connects to a 100 pair switch.
- B. From the 100 pair switch, the cord connects to the cut-closed test set. The second set of cords plug into the new cable that female modules were installed on.
- C. From the cut-closed test set a 25 pair cord connects to splicing set.

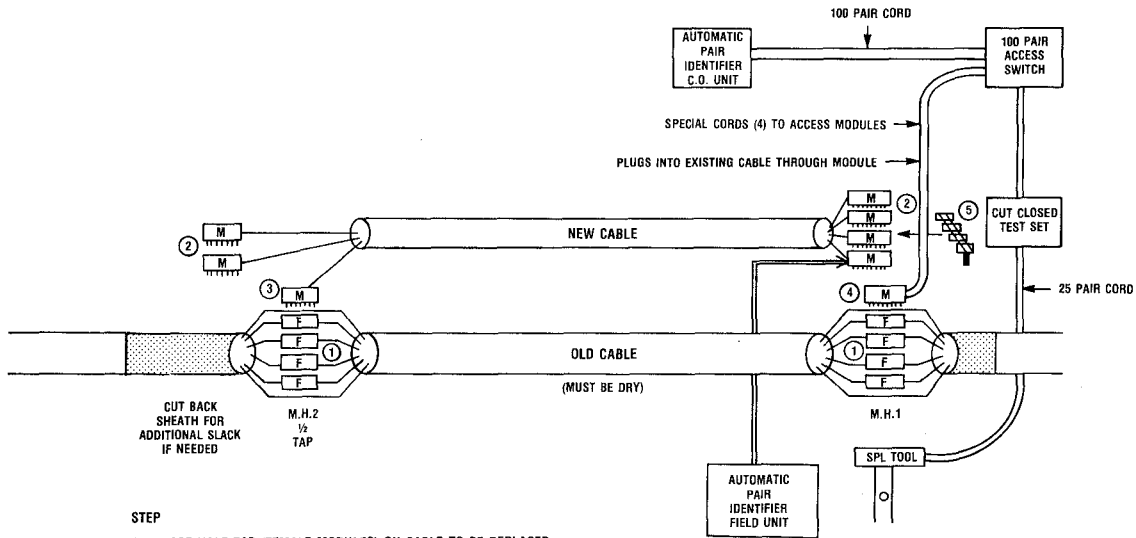
7.05 PROCEDURE:

- (1) Using the API Field Unit, identify a pair in the old cable.
- (2) Connect the cut-closed test set to identified pair using the single pair cord.
- (3) Select the correct pair number on the 100 pair switch and verify the half-tap with the cut-closed test set.
- (4) Use the bridge switch to "bridge" the old pair to the new pair through the 100 pair switch.
- (5) Cut the old pair - install the pair in the module and terminate with single pair insertion tool.
- (6) Disconnect the cut-closed test set.
- (7) Continue until all pairs within that group have been identified.

- (8) Notify the splicer at the half-tap end to trim out spliced group.
- (9) Continue in the same manner, one group at a time until the entire cable is cut over.

8. SPECIAL CIRCUITS

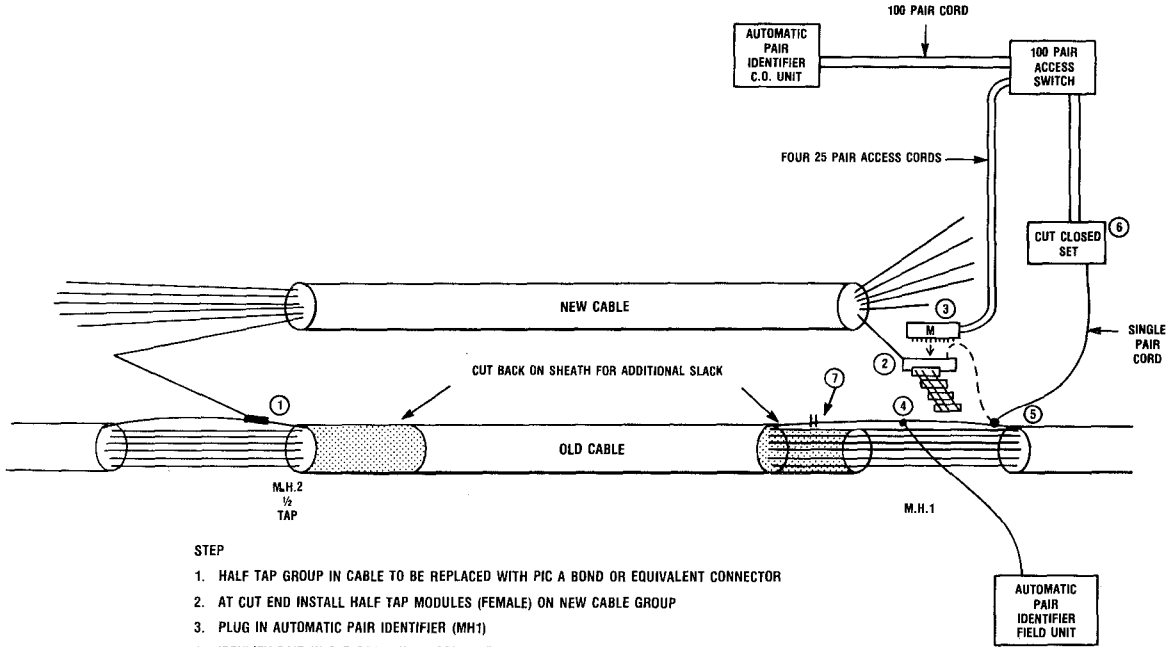
8.01 When four wire or other special circuits are encountered while testing, the cut-closed set can be used together with the 100 pair access switch to identify the proper pairs. This virtually eliminates the possibility of transpositions.



STEP

1. PLACE HALF TAP (FEMALE MODULES) ON CABLE TO BE REPLACED. WHEN POSSIBLE, PLACE MODULES ON ENTIRE CABLE
2. PLACE BRIDGING MODULES ON ENDS OF NEW CABLE AT 1/2 TAP SPLICE
3. PLUG IN 1st 100 PAIR AT 1/2 TAP (M.H.2)
4. PLUG IN AUTOMATIC PAIR IDENTIFIER (M.H.1)
5. IDENTIFY PAIRS IN NEW CABLE AND PLACE IN MODULE IN NUMERICAL SEQUENCE IN FOUR TIER TAGGING MODULE HOLDER OR FOUR HEAD SPLICING ARRANGEMENT
6. WHEN ALL PAIRS ARE IDENTIFIED, REMOVE AUTO PAIR IDENTIFIER AND PLUG IN 100 PAIR GROUP, TRIM OUT OLD CABLE WITH 840-A TOOL

Figure 1. Splicing and Test Set Configuration for Cable With Slack



STEP

1. HALF TAP GROUP IN CABLE TO BE REPLACED WITH PIC A BOND OR EQUIVALENT CONNECTOR
2. AT CUT END INSTALL HALF TAP MODULES (FEMALE) ON NEW CABLE GROUP
3. PLUG IN AUTOMATIC PAIR IDENTIFIER (MH1)
4. IDENTIFY PAIR IN OLD CABLE WITH API FIELD UNIT
5. SELECT CORRECT PAIR NUMBER ON THE 100 PAIR SWITCH AND VERIFY THE HALF TAP WITH THE CUT-CLOSED TEST SET
6. USE BRIDGE SWITCH TO BRIDGE OLD PAIR TO 100 PAIR SWITCH
7. CUT OLD PAIR, INSTALL IN MODULE & TERMINATE WITH SINGLE PAIR INSERTION TOOL

Figure 2. Splicing and Test Configuration for Cable Without Slack