DEFECTIVE PAIRS
LOCATING AND HANDLING
CABLE SPLICING

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1. GENERAL

1.01 This section describes the method of locating and handling defective pairs when splicing cables. The defective pairs may be due to manufacture or other causes.

1.02 This section is reissued to include:

- A new method for handling spare pairs in splicing exchange cables
- Defective pair treatment in connectorized exchange cable system (CONECS)
- Defective pair treatment in nonscreened 1200 and larger pair size plastic-insulated conductor (PIC) cables, all screened PIC, and pulp-insulated cables
- New defect tags and spare pair records.

Since this reissue is a general revision, arrows normally used to denote significant changes have been omitted.

1.03 This section does not apply to even-count PIC cable in pair sizes 6 through 900 which has every pair guaranteed and has no spare (extra) pairs. Some types of PIC cable (odd count) have spare pairs and can be handled in the same manner as pulp-insulated AD- or CD-type cable.

1.04 Detailed information on defect tags used by factories to record defective pairs in cable reel lengths is given in Section 632-020-105.

1.05 Information on the cable letter code is given in Section 626-020-011.

1.06 Detailed information on spare pair allocations, maximum factory defects, and guaranteed minimum usable spare pairs is given in the 626 Division of the Bell System Practices which covers the respective letter-coded cable.

2. PRECAUTIONS

2.01 When splicing cables with defective pairs, the following admonishments apply.

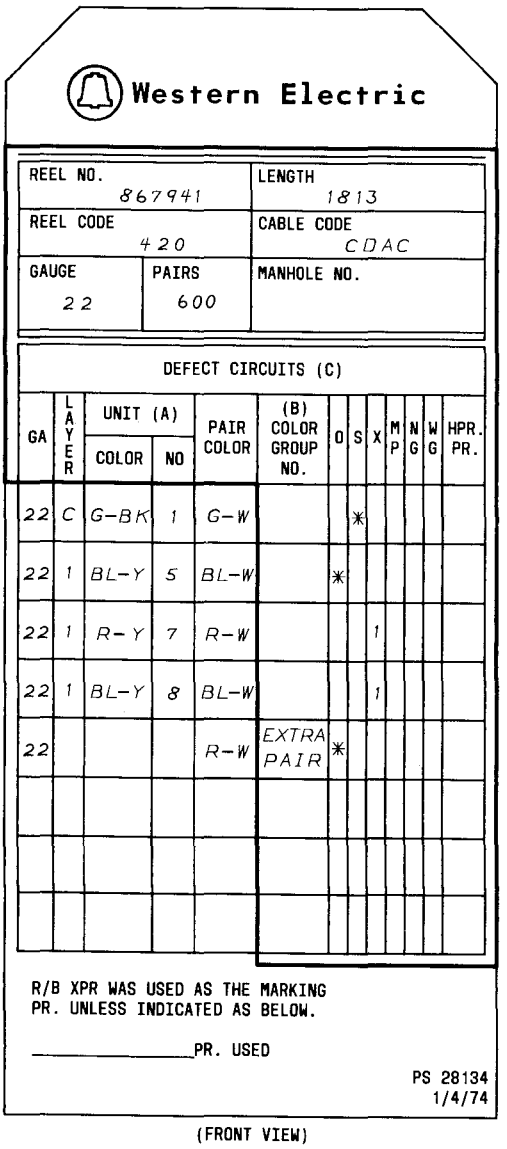
Caution 1: Record defective pairs in both cables when making a splice between a dead cable and a working cable, or between two working cables. Tag or mark any defective pairs found in individual lengths of cable in the splice, and also record any defective pairs for subsequent reference.

Caution 2: Do not splice pairs between groups when disposing of defective pairs, as this may introduce excessive crosstalk when the cable is used for carrier circuits.

3. METHOD FOR LOCATING DEFECTIVE PAIRS MARKED BY THE ELECTRICAL INDICATION METHOD OR SLEEVE MARKERS

NONCONECS CABLES

3.01 ***Pulp-insulated exchange cables*** that are not connectorized at the factory have defective pairs marked by the electrical indication method or by sleeve markers. Sleeve markers are used when a ground bond is ordered for the cable. The cable ends on the reel are sealed in the manner described in Section 632-020-105. The nature and location of the defects will be indicated by ***red*** tags attached at the factory to the outside of both ends of the cable reel length. An example of a factory-marked defect tag for nonconnectorized CD-type cable is shown in Fig. 1.



Western Electric

REEL NO.		LENGTH
867941		1813
REEL CODE		CABLE CODE
420		CDAC
GAUGE	PAIRS	MANHOLE NO.
22	600	

DEFECT CIRCUITS (C)

GA	LAYER	UNIT (A) COLOR	UNIT (A) NO	PAIR COLOR	(B) COLOR GROUP NO.	O	S	X	MP	NG	WG	HPR. PR.
22	C	G-BK	1	G-W			*					
22	1	BL-Y	5	BL-W		*						
22	1	R-Y	7	R-W				1				
22	1	BL-Y	8	BL-W				1				
22				R-W	EXTRA PAIR	*						

R/B XPR WAS USED AS THE MARKING PR. UNLESS INDICATED AS BELOW.

_____PR. USED

PS 28134
1/4/74

(FRONT VIEW)

NOTE A: THE UNITS ARE NUMBERED IN ROTATION STARTING WITH THE GREEN-WHITE UNIT IN EACH LAYER. THE DIRECTION OF ROTATION FOR ALL LAYERS SHALL BE DETERMINED BY THE DIRECTION FORMED IN GOING FROM THE GREEN-WHITE UNIT IN THE OUTER LAYER TOWARD THE RED-BLUE EXTRA PAIR. THE LAYERS SHALL BE NUMBERED STARTING IN THE CENTER OF THE CABLE WITH "C" FOR CENTER, LAYER 1 FOR THE FIRST LAYER AROUND THE CENTER, LAYER 2, ETC. IF REFERENCE TO COLOR AND NUMBER OF UNITS IS OMITTED. CABLE IS LAYER TYPE.

NOTE B: IN LAYER TYPE CABLE, THE COLOR GROUP SHALL BE NUMBERED STARTING IN THE CENTER OF THE CABLE.

NOTE C: THE DEFECTS SHALL BE INDICATED BY AN * EXCEPT CROSSES, WHICH SHALL BE NUMBERED 1 & 1 FOR THE FIRST CROSS, 2 & 2 FOR THE SECOND CROSS, ETC.

(BACK VIEW)

Fig. 1—Defect Tag for Nonconnectorized CD-Type Cable

3.02 ***Nonscreened PIC cables with spare pairs*** are marked by the electrical indication method. Defect tags can be used to identify the defective pair(s). When a ground bond is ordered for this type cable, the electrical indication method is not used. The defective pair information on the defect tag must be used to locate the defective pairs. (For detailed information, see Part 4.)

3.03 ***Screened PIC cables with spare pairs*** are not marked by the electrical indication method. The defective pair(s) can be located by using the factory counting method explained on the back of the screened PIC cable defect tag. (For detailed information, see Part 4.)

3.04 ***Defective Pair Marking Method:*** At the ***trailing end*** (***plastic cap end***) of the reel, all defective pairs are connected together electrically and then connected to a good marking pair, as shown in Fig. 2 and as follows.

- For nonscreened pulp-insulated cable, the No. 1 spare pair (red-blue) is reserved for the marking pair (Table A). The No. 1 spare is always required to be good.
- Screened pulp-insulated cable will have the No. 1 spare pair on the low-count side of the screen shorted to the defective pairs. The highest-numbered spare pair on the high-count side of the screen is shorted to the defective pairs.
- For PIC cable, the white-red spare pair is reserved for the marking pair.

Note: If the sleeve marker method is used to identify defective pairs, the sleeve markers are placed on both cable ends.

Warning: Should any cable reel length containing defective pairs (indicated by the red-painted cable ends) need to be cut, use one of the options listed in the subsequent B or C headings.

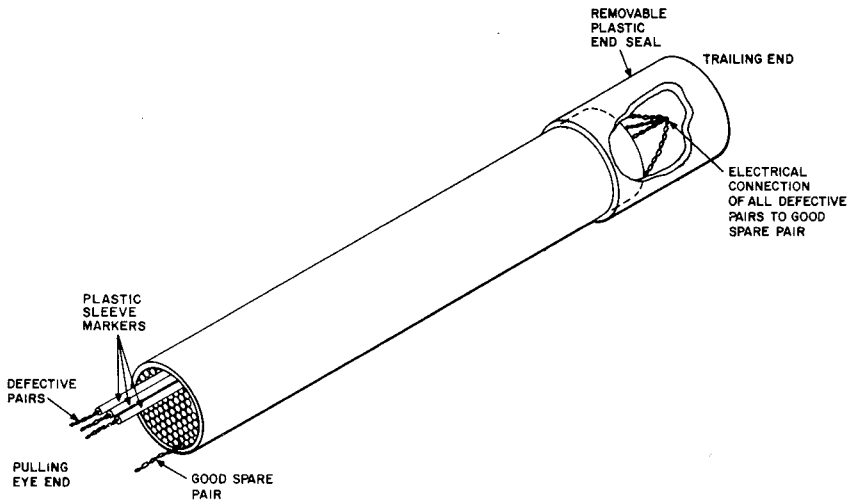


Fig. 2—Electrical Indication Method of Marking Defective Pairs In Exchange Cable and Sleeve-Marker Method for Pulp-Insulated Cable

TABLE A

ORDER OF INTERSTITIAL SPARE PAIR SELECTION FOR PULP-INSULATED CABLE

PAIR NO.	STANDARD CODE (1966 TO DATE)
1	Red-blue *, †
2 or 11	Green-white
3 or 12	Red-white
4 or 13	Blue-white
5 or 14	Green-white/black stain
6 or 15	Red-white/black stain
7 or 16	Blue-white/black stain
8 or 17	Green-white/orange stain
9 or 18	Red-white/orange stain
10 or 19	Blue-white/orange stain

* Red-blue pair is used only once in each cable. First color for all pairs indicates ring conductor.

† The red-blue spare (extra) pair is dedicated to the defective pair identification. Thus, the green-white pair will be substituted for the first defective pair, then red-white, etc.

A. Where Cable Is Not Cut by Placing Forces Prior to Splicing

Electrical Indication Method

3.05 The splicing force should handle the defective pairs as follows.

(1) ***Pulling Eye End:*** Rack the cable in the manhole at the splice location and then cut the cable. The cable ***does not*** have to be cut at the end of the pulling eye. The cable can be opened anywhere, preferably at the splice location. Use the defect tag (red). Place tone or battery on the No. 1 spare pair (Fig. 3) and, by referring to the defect tag, probe into the indicated unit until the defective pair(s) is located. Mark this pair and set it aside for substitution by a good spare pair. (See Part 5.)

(2) ***Trailing End:*** Carefully slit and remove the plastic end cap. All defective pairs are visually found to be connected electrically to the No. 1 spare pair. Retain these connections during sheath opening and during cable splicing. (For information on substituting good spare pairs for defective pairs, see Part 5.)

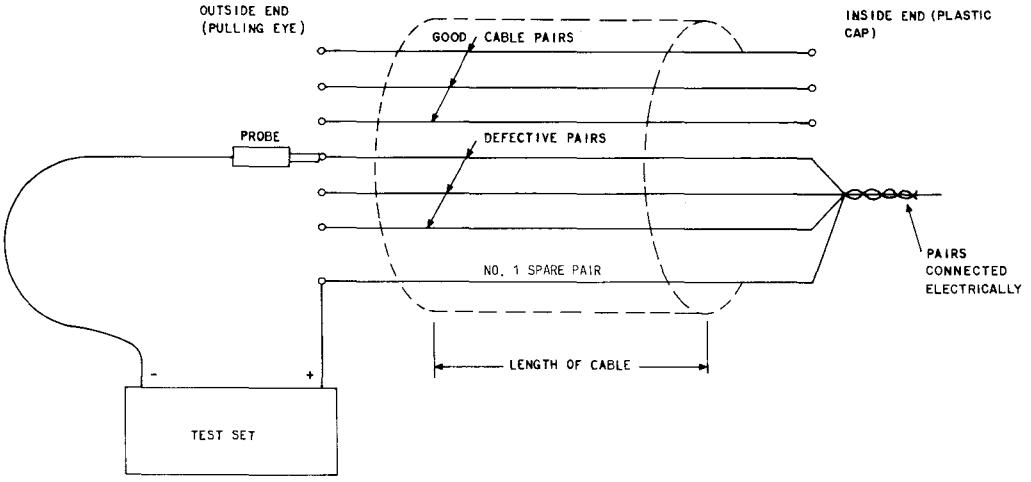


Fig. 3—Locating Defective Pairs In Exchange Cable

Sleeve Marker Method

3.06 When the sleeve marker method is used to identify defective pairs in pulp-insulated cables, proceed as follows.

(1) Carefully remove the metal end seal before clearing the cable end.

(2) Handle the pairs carefully so the sleeve markers are not lost.

(3) Strip the insulation from spare pair No. 1 and the defective pairs. Short these wires together.

(4) At the splice, locate the defective pairs with tone or battery as discussed in paragraph 3.05.

Defect Tag Method

3.07 Use the defect tag information and pair counting sequence for locating defective pairs in PIC cable when the electrical indication method was not used. (See Part 5.)

B. Where Pulp-Insulated Cable Is Cut at Trailing End During Placing Operation

3.08 When the cable must be cut at the trailing end where the defective pairs are electrically marked, there are three methods for identifying the defective pairs.

(a) ***Method No. 1 (Preferred) — Re-mark the Defective Pairs in the Cable in the Pulling Manhole:*** Perform this task as follows.

(1) Go to the pulling manhole and cut the cable as close as possible to the pulling eye.

(2) Remove the sheath for approximately 12 inches.

(3) Clear the pairs at the pulling eye end and place a tone, etc, on the No. 1 spare pair.

(4) Locate the defective pairs, using the defect tag and the amplifier headset.

(5) Set the defective pairs and the No. 1 spare pair aside and cut the remaining pairs at the sheath opening.

Caution: New pulp-insulated cable, identified as TUFPULP* cable, has a latex coating over the copper conductor. Make certain to scrape the conductor to ensure a good contact before twisting the pair(s) together.

(6) Strip the insulation from the defective pairs and the No. 1 spare pair and twist all of the pairs together electrically.

(7) Place several turns of vinyl tape over the exposed conductors.

(8) Place a temporary cap over the cable in the pulling manhole and attach the defect tag along with the following notation:

NOTE TO SPLICER: DUE TO A CUT AT THE TRAILING END DURING PLACEMENT, THE DEFECTIVE PAIRS IN THIS CABLE HAVE BEEN RE-MARKED IN THIS MANHOLE. IDENTIFICATION IN MANHOLE "XYZ" CAN BE ACCOMPLISHED BY THE ELECTRICAL INDICATION METHOD.

Signed Foreman Date

(9) Return to the trailing manhole and cut the cable.

(10) Seal the cable with a temporary cap.

(11) Place the cable in the manhole.

(12) Attach the defect tag to the cable with the following notation:

NOTE TO SPLICER: DUE TO A CUT IN THIS MANHOLE DURING PLACEMENT, THE DEFECTIVE PAIRS HAVE BEEN RE-MARKED IN MANHOLE "ZYZ". THIS CABLE CAN BE CUT AT ANY LOCATION AND DEFECTIVE PAIRS IDENTIFIED BY THE ELECTRICAL INDICATION METHOD.

Signed Foreman Date

(13) Recharge the cable to 9 psi.

* Trademark.

(b) ***Method No. 2—Re-mark the Defective Pairs in the Trailing Manhole:*** Perform this task as follows.

(1) Re-marking of the defective pairs in the trailing manhole is possible only after the cable pairs have been cleared in the pulling manhole. Go to the pulling manhole and cut the cable just beyond the end of the pulling eye.

(2) Remove 12 inches of sheath and cut clear all the pairs.

(3) Return to the trailing manhole and remove the plastic end cap, being careful not to disturb the defective pair connections.

(4) Remove the sheath to the proposed cut location.

(5) Use a tone, battery, or a volt-ohmmeter, etc, and locate the defective pairs at the cut location, referring to the defect tag.

(6) Set the defective pairs aside and cut the remaining pairs.

(7) Strip the insulation from the defective pairs and the No. 1 spare pair.

(8) Twist the ends of the defective pairs and No. 1 spare pair together.

(9) Wrap the bare conductors with vinyl tape.

(10) Place a temporary cap on the cable and attach the defect tag.

(11) Return to the pulling manhole, place a temporary cap on the cable, and attach the defect tag.

(12) Recharge the cable to 9 psi.

(c) ***Method No. 3—Re-marking Defective Pairs at the Trailing End Where Sleeve Markers Are Used:*** Proceed as follows.

Warning: Carefully remove the pulling eye to avoid losing some of the sleeve markers.

(1) Cut the cable at the cut location in the trailing manhole and place a temporary cap.

(2) Attach the defect tag to the cable with the following notation:

NOTE TO SPLICER: DUE TO A CUT AT THE TRAILING END DURING PLACEMENT, IDENTIFICATION OF DEFECTIVE PAIRS IS NOT POSSIBLE. DEFECTIVE PAIRS MUST BE LOCATED, USING THE SLEEVE MARKERS BEYOND THE PULLING EYE LOCATED IN MANHOLE "XYZ."

Signed Foreman Date

Note: A method similar to Method No. 2 may be used. Proceed as follows.

(1) Remove the metal end cap at the trailing cable end.

(2) Short the sleeve marked defective pairs to the No. 1 spare pair.

C. Where Pulp-Insulated Cable Is Cut at a Pull-Through (Intermediate) Manhole for Any Reason

3.09 Frequently cable is engineered to be pulled through an intermediate manhole to eliminate a splice. When the pull-through is not feasible and the cable must be cut at the trailing manhole, identify the defective pairs as follows.

(1) ***Intermediate Manhole "B":*** Handle the defective pairs as indicated in paragraph 3.08 (ie, Method No. 1). Leave one red defect tag attached to the cable in the intermediate manhole "B", and prepare a note to the splicers to be left in the pulling manhole "A" as indicated in Fig. 4.

(2) ***Trailing Manhole "C":*** Move the cable reel to manhole "C"and pull in the remaining section to intermediate manhole "B". Attach one of the red defect tags to the cable in manhole "B", and leave a note for the splicer in manhole "C" as follows.

NOTE TO SPLICER: ALTHOUGH THIS CABLE WAS CUT DURING PLACEMENT, THE ELECTRICAL INDICATION METHOD OF LOCATING DEFECTIVE PAIRS HAS NOT BEEN DISTURBED UNDER THIS CAP. PRIOR TO REMOVING THE CONNECTIONS UNDER THIS CAP, LOCATE THE DEFECTIVE PAIRS IN MANHOLE "B", USING THE ELECTRICAL INDICATION METHOD.

Signed Foreman Date

The methods described for pulp-insulated cables can be used to identify PIC defective pairs. Also, the PIC defect tag information is sufficient to locate defective pairs without spending the effort to cut and clear cable ends as described in paragraphs 3.08 and 3.09.

3.10 The method for handling spare pairs at field splices is given in Part 5.

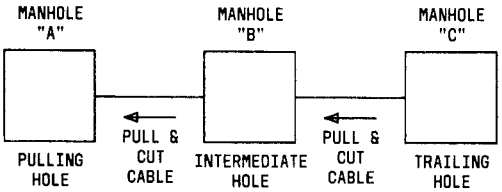


Fig. 4—Cable Cut at Intermediate Manhole

D. Cuts in Buried Plant (PIC and Pulp-Insulated Cable)

3.11 As with underground cable, it is recommended that buried PIC or pulp-insulated cable be ordered with specific cutting lengths where no cut in the field is necessary. However, should a cut be required, the defective pairs can be identified by the method described for cutting at pull-through manholes for pulp-insulated cable and by the defect tag method for PIC cable as described in Part 4.

CONECS CABLES

3.12 The ***connectorized ends*** of CONECS cables and stubs are prepared by Western Electric. The defective pairs are handled as follows.

- ***Defective pulp-insulated pairs*** found defective during manufacture or during testing are shorted to the ***red-blue*** interstitial pair and coiled back. The appropriate interstitial spare pair is substituted for the defective pair in the sequence shown in Table A. Defect tags are furnished with each reel, which locate and identify the nature of the defects. Cable ends which are connectorized have a tag inside and outside of the end seal. Cable ends which are not connectorized have a tag taped faced down on the cable sheath, within 6 inches of the end. Even when there are no faults in the cable, a no-fault defect tag will indicate that there are no defects. There will be no "beads" indicating defective pair on the pulling eye end. However, the eye will be painted red.

- ***Defective PIC pairs*** found at the factory are shorted to the ***red-white*** spare pair. The appropriate interstitial pair is substituted for the defective pair in the sequence shown in Table B. Defect tags are similarly furnished with each PIC reel and screened PIC reel as with the pulp-insulated cables.

▶TABLE B◀

ORDER OF SPARE PAIR SELECTION FOR PIC CABLES WITH SPARE PAIRS

PAIR NO. (NOTES 1 AND 2)	COLOR CODE	
	TIP	RING
1	White	Red
2	White	Black
3	White	Yellow
4	White	Violet
5	Red	Black
6	Red	Yellow
7	Red	Violet
8	Black	Yellow
9	Black	Violet
10	Yellow	Violet
11	Blue	Orange
12	Blue	Green
13	Blue	Brown
14	Blue	Slate
15	Orange	Green
16	Orange	Brown
17	Orange	Slate
18	Green	Brown
19	Green	Slate
20	Brown	Slate

Note 1: For MAT® screen cables, extra pair No. 1 is always on the low-pair count side of the screen and more spare (extra) pairs added in the sequence No. 2, 3, 4, and 5. On the high-pair count side of the screen, the order is No. 10, 9, 8, 7, and 6.

Note 2: Defective pairs in non-screened PIC cables are shorted to the No. 1 spare pair. This spare pair is not used to clear a defective pair during splicing.

3.13 In any CONECS estimate, some cable splices must be made in the field. In underground plant, at least every other splice is not connectorized at the factory and will be a field splice. For these field splices, the craft person will use tools and splicing methods which are standards in their operating company.

The procedures for defective pair treatment are the same for CONECS PIC and pulp-insulated cables with the few exceptions that are noted.

3.14 Before starting a CONECS splicing job which has cables with spare pairs, ***it is necessary to collect all the defect tags from the outside of the pulling end of the cable.*** The defect tag is located at each reel end of every CONECS cable as well as a tag inside the CONECS end seal. Even on reels which have no factory-found defects, there is a defect tag with the words "no defects" written on it. This Western Electric supplied information is most important because it tells the craft person where the defective pairs are and what was done about substitution. At the factory, each connectorized module was tested and, when defects were found, they were corrected so the pairs in the modules are good (except for defects caused by the placing operation).

3.15 The defect tag indicates the following.

(a) The defective pair multiunit and primary unit are identified. In ***pulp-insulated cable,*** this is accomplished with the use of two numbers. The first number designates the multiunit (which is 50 or 100 pair) and the second, the primary unit (which is 25 pair); eg, the number 7-1 is cable pair count 601 through 625; the number 12-3 is 1151 through 1175, etc, for 100-pair multiunit cables. With ***PIC cable,*** a combination of one number and one letter set is used to give the same information; eg, count 601 through 625 is designated 7-BL, and 1151 through 1175 is 12-G.

(b) The defective pair color is identified.

(c) The type of pair defect is indicated.

(d) The color of the spare pair which was used in the factory to substitute for the defective pair is indicated. The sequence of substitution is the standard spare pair sequence, except starting with pair No. 2. This is applicable to both PIC and pulp-insulated cables with one exception. Screened PIC and MAT trunk cable substitution starts with pair No. 1 on one side of the screen and pair No. 10 on the other side.

All defective pairs are shorted to the No. 1 spare pair for nonscreened pulp-insulated and PIC cables. The defective pair can be located by testing, using the No. 1 spare pair connected to the tone set, and searching the designated unit with the remaining test lead.

3.16 The method for substituting CONECS spare pairs for defective pairs is given in Part 5.

4. METHODS FOR LOCATING DEFECTIVE PAIRS IN NONCONECS PIC, SCREENED PIC, AND SCREENED PULP-INSULATED CABLES USING THE DEFECT TAG

4.01 Before starting to splice a nonconnectorized PIC, screened PIC, or screened pulp-insulated cables, collect all the defect tags. A defect tag will be located at each reel end of the cable. The defect tag will indicate the location of the defective pairs.

4.02 ***Defect Tag for PIC Cable:*** The PIC cable defect tag (Fig. 5) under the DEFECTIVE PAIR heading indicates the following.

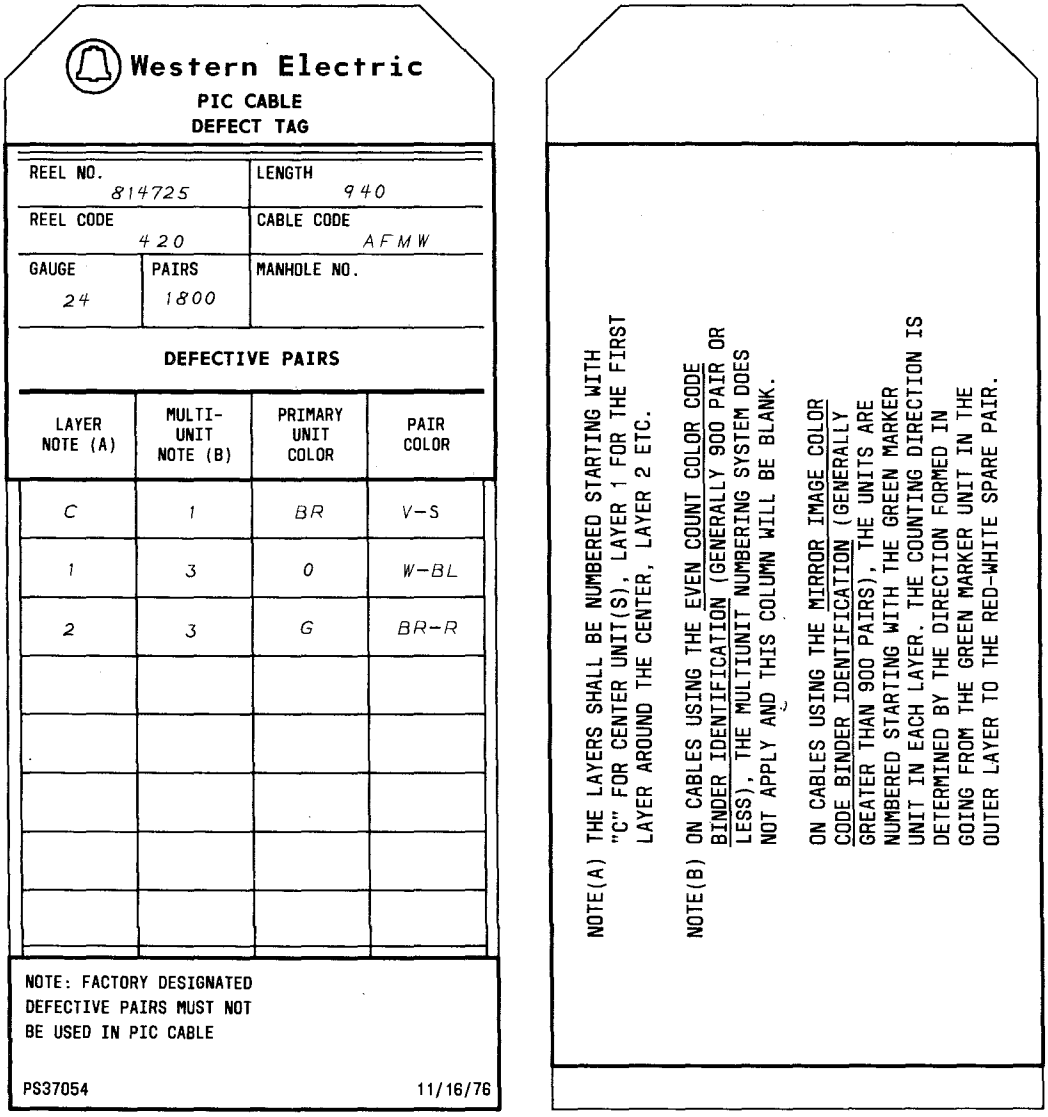
(a) The first column locates the layer in which the defective pair is located; ie, center or layer 1, 2, etc.

(b) The second column locates the defective pair multiunit by position within the layer. Multiunit numbers start with the green marker unit as No. 1 in each layer. (Note that No. 3 multiunit appears in layer No. 1 and layer No. 2.)

(c) The third column indicates the primary unit color within the multiunit.

(d) The last column indicates the defective pair color.

Note: The method for substituting spare pairs for defective pairs is given in Part 5.



Western Electric

PIC CABLE
DEFECT TAG

REEL NO.		LENGTH
814725		940
REEL CODE		CABLE CODE
420		AFMW
GAUGE	PAIRS	MANHOLE NO.
24	1800	

DEFECTIVE PAIRS

LAYER NOTE (A)	MULTI-UNIT NOTE (B)	PRIMARY UNIT COLOR	PAIR COLOR
C	1	BR	V-S
1	3	O	W-BL
2	3	G	BR-R

NOTE: FACTORY DESIGNATED DEFECTIVE PAIRS MUST NOT BE USED IN PIC CABLE

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(FRONT VIEW)

NOTE(A) THE LAYERS SHALL BE NUMBERED STARTING WITH "C" FOR CENTER UNIT(S), LAYER 1 FOR THE FIRST LAYER AROUND THE CENTER, LAYER 2 ETC.

NOTE(B) ON CABLES USING THE EVEN COUNT COLOR CODE BINDER IDENTIFICATION (GENERALLY 900 PAIR OR LESS), THE MULTIUNIT NUMBERING SYSTEM DOES NOT APPLY AND THIS COLUMN WILL BE BLANK.

ON CABLES USING THE MIRROR IMAGE COLOR CODE BINDER IDENTIFICATION (GENERALLY GREATER THAN 900 PAIRS), THE UNITS ARE NUMBERED STARTING WITH THE GREEN MARKER UNIT IN EACH LAYER. THE COUNTING DIRECTION IS DETERMINED BY THE DIRECTION FORMED IN GOING FROM THE GREEN MARKER UNIT IN THE OUTER LAYER TO THE RED-WHITE SPARE PAIR.

(BACK VIEW)

Fig. 5—Defect Tag for Nonconnectorized PIC Exchange Cable

4.03 ***Defect Tag for Screened PIC Cable:*** The screened PIC cable defect tag (Fig. 6) indicates the defective pair and indicates the substituted spare pair as follows.

(a) The first column indicates the defective pair position by multiunit number as counted by the factory.

(b) The second column indicates the defective pair multiunit binders colors.

(c) The third column indicates the unit color within the multiunit.

(d) The fourth column indicates the defective pair color.

(e) The fifth and sixth columns indicate which No. spare pair, by color, is reserved to substitute for the defective pair.

Western Electric

SCREENED PIC CABLE DEFECT TAG

REEL NO.		LENGTH
182791		960
REEL CODE		CABLE CODE
420		MCRC
GAUGE	PAIRS	MANHOLE NO.
25	1024	

DEFECTIVE PAIR				SUBSTITUTE SPARE PAIR	
MULTIUNIT		UNIT COLOR	PAIR COLOR	NO.	COLOR (TIP. RING)
NUMBER (See Back)	BINDING COLOR				
2	G-Y	BL	W-O	1	W-R
4	R-Y	O	V-G	2	W-BK
				3	W-Y
				4	W-V
				5	R-BK
				6	R-Y
				7	R-V
				8	BK-Y
				9	BK-V
8	R-Y	G	W-BL	10	Y-V

NOTE: FACTORY DESIGNATED DEFECTIVE PAIRS MUST NOT BE USED IN PIC CABLE.

(FRONT VIEW)

MULTIUNIT SEQUENCE

1. CABLES CONTAINING 1000 PAIRS OR MORE:
   - THE COUNTING DIRECTION FOR IDENTIFYING DEFECTIVE PAIRS, IS THAT FORMED IN GOING FROM THE GREEN BOUND (MARKER) MULTIUNIT IN THE OUTER LAYER TO THE WHITE-RED EXTRA PAIR.
   - ~~THE LAYERS ARE IDENTIFIED AS "C" FOR THE CENTER, "1" FOR THE FIRST LAYER OUTSIDE THE CENTER, "2" FOR THE NEXT OUTSIDE LAYER, ETC.~~
   - THE MULTIUNIT SEQUENCE STARTS WITH THE CENTERMOST GREEN BOUND (MARKER) MULTIUNIT AND CONTINUES, IN THE COUNTING DIRECTION, TO ANY OTHER MULTIUNITS IN THE SAME LAYER AND ON THE SAME SIDE OF THE SCREEN. THE SEQUENCE CONTINUES SIMILARLY WITH SUCCEEDING OUTERMOST LAYERS TO COMPLETE THE LOW HALF OF THE COUNT. THE HIGH HALF OF THE COUNT IS GENERATED ON THE OTHER SIDE OF THE SCREEN, WHERE THERE ARE NO MARKER MULTIUNITS, BY LAYER, STARTING WITH THE INNERMOST LAYER, AND IN THE COUNTING DIRECTION WITHIN EACH LAYER.
   - WHEN THERE ARE TWO MARKER MULTIUNITS IN A LAYER, START WITH THE MULTIUNIT WHICH WILL CAUSE BOTH MARKER MULTIUNITS TO BE INCLUDED AT THE START OF EACH COUNT.
2. CABLES WITH LESS THAN 1000 PAIRS:
   FOLLOW THE STANDARD PIC COLOR CODE FOR UNIT AND MULTIUNIT BINDER COLORS.

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(BACK VIEW)

Fig. 6—Defect Tag for Nonconnectorized Screened PIC Cables

4.04 ***Defect Tag for Screened Pulp-Insulated Cable:*** The defect tag used for these screened pulp-insulated cables is similar to that used for nonconnectorized pulp-insulated cables (Fig. 1).

5. METHODS FOR HANDLING SPARE PAIRS IN SPLICING STANDARD EXCHANGE CABLE

5.01 The following methods are intended to eliminate the necessity of reentering completed splices in new estimates where defective pairs occur during the closing of the completed splice. Estimates with cables containing spare pairs should be completed with nearly 100 percent good pairs available.

A special pocket-size pad of triplicate Spare Pair (X pair) Record is recommended (Fig. 7). One copy of the Spare Pair Record is placed in the splice for information during reentry except if the splice is encapsulated. A copy is kept by the foreman to correct the construction records, and a copy is retained by the splicer for working the adjacent splices.

SPARE PAIR RECORD

SPLICE DATE_____

SPLICER_____

ESTIMATE NO._____

SPLICE NO._____

SECTION NO._____ TO SECTION NO._____

SPARE COLORS	SPARE TO CO	TROUBLE MODULE/PR	TROUBLE MODULE/PR	SPARE TO/FIELD	SPARE COLORS
	X 1			X 1	
	X 2			X 2	
	X 3			X 3	
	X 4			X 4	
	X 5			X 5	
	X 6			X 6	
	X 7			X 7	
	X 8			X 8	
	X 9			X 9	
	X 10			X 10	
	X 11			X 11	
	X 12			X 12	
	X 13			X 13	
	X 14			X 14	
	X 15			X 15	
	X 16			X 16	
	X 17			X 17	
	X 18			X 18	
	X 19			X 19	
	X 20			X 20	

NOTE: ALL DEFECTIVE PAIRS ARE SPLICED TO THE RED-BLUE SPARE PAIR

-KEY-

BK = BLACK
BL = BLUE
G = GREEN
O = ORANGE
W = WHITE
R = RED

– – – – – = SPLICE THROUGH
C = TIP - RING SHORTED

Fig. 7—Spare Pair Record

5.02 The following cable types have spare pairs to substitute for defects:

(a) Pulp

(b) Waterproof PIC, 1200 pairs and larger

(c) Air core PIC, 1200 pairs and larger

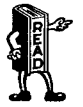
(d) MAT trunk cable.

5.03 Preferably, the entire estimate should be spliced sequentially from the central office or one end. For work-load or service reasons, the estimate may be sectionalized. However, each section should be spliced sequentially from one end. The 152A test set (Section 632-205-220) should be used with the 710 connector at all splices. The CO or first end of a section and the field end of the field cable must be cleared before splicing. It is very important to keep the cable ends clear in the CO or starting splice location.

NONCONECS CABLES—FIELD CABLE SPLICING

5.04 Rules for performing field splicing tasks are as follows.

(1) Splice sections sequentially in one direction.



Do not skip around because this makes record keeping and accurate use of the spare pairs more difficult.

(2) Handle the defective pairs as follows.

(a) In nonscreened PIC and pulp-insulated cables, the defective pairs are shorted to the No. 1 spare pair.

(b) In screened pulp-insulated cables, the defective pairs on the low-count side of the screen are shorted to the No. 1 spare pair. On the high-count side of the screen, the defective pairs are shorted to the highest-numbered spare pair. Do not carry the defective pairs across the screen.

Warning: Do not short the defective pairs in MAT trunk cable to the spare pairs. Cut the defective pair off near the sheath.

(3) Splice through all spare pairs color to color and record these spare pairs on the Spare Pair Record. Splice through the No. 1 spare pairs in PIC and pulp-insulated cable (No. 1 and the highest-numbered spare pair in screened pulp-insulated cable).

(4) Keep good records. (See sample Spare Pair Record, Fig. 8.) Be certain to:

- Record all spare pairs used and where they are used.
- When a spare pair is used, add notes indicating the unit where the defective pair is located and the color of the defective pair (Fig. 8). The unit identification is the field cable count not the factory count.
- Short tip to ring of each unused mate that does not have a matching spare pair in the other cable.
- Splice through color to color all other matching unused spare pairs. If spare pairs are loaded at a load coil splice, indicate the load on the Spare Pair Record.
- Use the 152A test set to identify defective pairs in a splice section if the No. 1 spare pair is connected to the ground terminal of the test set.

Note: Any pairs grounded in closing a previous splice will also be identified in this group.

- Mark each module with group and subgroup numbers; eg, with CD-type cable: 4-2 = 4th group (301-400) - 2nd binder, orange (326-350); or, eg, 6-3 = 6th group (501-600) - 3rd binder, green (551-575).

Note: At AD-type cable splices, mark the modules of the unit and subunit (25 pair) numbers; however, the subunit has no definite count (ie, 1-25, 26-50, etc) as it does in CD-type cable splices.

SPARE PAIR RECORD

SPLICE DATE MAY 6, 1981

SPLICER JONES

ESTIMATE NO. 1234

SPLICE NO. 2

SECTION NO. 2 TO SECTION NO. 3

SPARE COLORS	SPARE TO CO	TROUBLE MODULE/PR		TROUBLE MODULE/PR	SPARE TO/FIELD	SPARE COLORS
R-BL	X 1	SHORT TO DEFECTIVE PAIRS			X 1	
G-W	X 2	4-2 W-BL	C		X 2	
R-W	X 3	5-3 W/O-G	C		X 3	
BL-W	X 4				X 4	
G-W/BK	X 5				X 5	
BL-W/BK	X 6				X 6	
	X 7				X 7	
	X 8				X 8	
	X 9				X 9	
	X 10				X 10	
	X 11				X 11	
	X 12				X 12	
	X 13				X 13	
	X 14				X 14	
	X 15				X 15	
	X 16				X 16	
	X 17				X 17	
	X 18				X 18	
	X 19				X 19	
	X 20				X 20	

NOTE: ALL DEFECTIVE PAIRS ARE SPLICED TO THE RED-BLUE SPARE PAIR

-KEY-

BK = BLACK
BL = BLUE
G = GREEN
O = ORANGE
W = WHITE
R = RED

\- - - - - - = SPLICE THROUGH
C = TIP - RING SHORTED

Fig. 8—Example of Completed Spare Pair Record

(5) Leave one copy of the Spare Pair Record in the splice (unless encapsulated) for information during reentry. Another copy should be retained by the foreman to correct the records. Keep a third copy to make the required spare-pair substitutions at the next splice.

(6) If a defective pair is found in the direction of the CO (or toward the start of the section) at the second and succeeding splices, the trouble probably occurred when the last splice was wrapped, since this splice was tested prior to wrapping. Replace the defective pair with the first remaining spare good pair that goes back to the CO (or toward the start of the section).

Example: At splice No. 2 (Fig. 8), two defective pairs are located in section No. 2 in the CO side of the splice (groups 4-2 and 5-3). At splice No. 3, a defective pair is located in group 12-1 toward the CO (Fig. 9). This is probably a wrap-down fault in splice No. 2. Spare pairs 2 and 3 were used at splice No. 2, so spare pair No. 4 is the next good spare pair in sequence going back to the CO or to the start of the section. Spare pair No. 4 should be used to correct the wrap-down defective pair in module 12-1. If additional defective pairs are found in the sections toward the CO (or at the start of the section), the defective pairs should be replaced sequentially with the spare pairs going back to the splice starting point.

Note: Use the mates of the spare pairs that do not continue all the way back to the start of the section to replace defective pairs in the field cables.

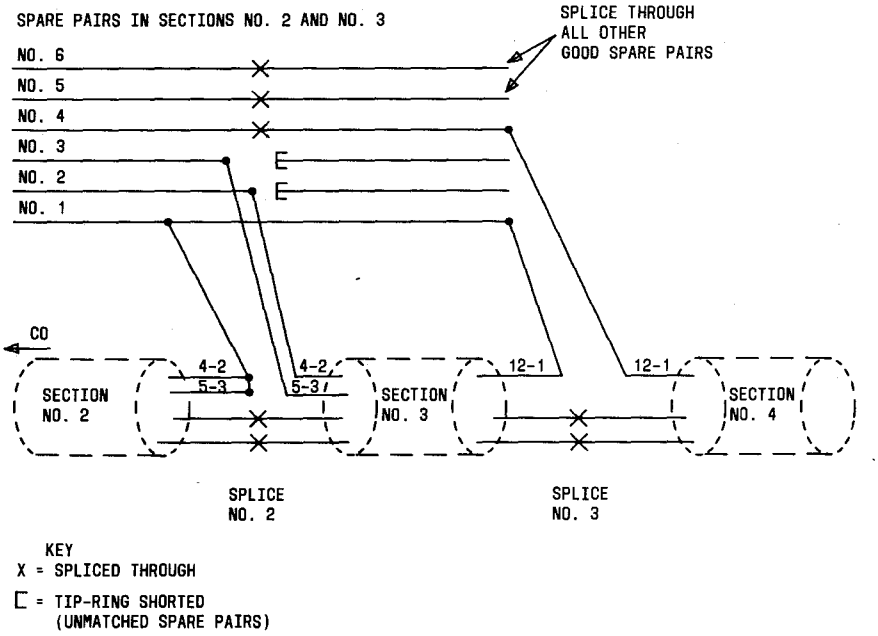


Fig. 9—Example of Handling Defective Pairs

(7) Test through only ***one load coil with the 152A test set***

(8) Follow rules (1) through (7) at each splice until approximately 80 percent of the spare pairs are no longer continuous back to the CO or to the start of the section. At this point, ***skip a splice*** and ***start a new section.*** This restores the full complement of the spare pairs. Continue splicing ***sequentially,*** following rules (1) through (7), until approximately 80 percent of the spare pairs are used. If necessary, skip another splice using rules (1) through (7) until the estimate is completely spliced.

(9) Join the trouble-free sections together, using the spare pairs reserved in each section to correct any trouble pairs created in these splices. If there are not enough spare pairs in the pulp-insulated cable, match trouble pair to trouble pair within the primary units to minimize the number of defective pairs remaining in the cable.

CONECS CABLES—SPLICING

5.05 Basic rules for splicing CONECS cables are as follows.

(1) Field splices on either side of a CONECS splice have the ends cleared by having the wires in CONECS modules.

(2) Follow the methods in paragraph 5.04 for the field splices of CONECS cables.

(3) Defect tags are attached to CONECS cables. The tags are placed in the CONECS end bundle as well as outside the bundle. The tags show the defective pair identity and spare pairs used by the factory. The defective pairs are shorted to the No. 1 spare pair (red-blue for pulp-insulated cable, red-white for PIC cable).

(4) For each cable a defect tag (that was attached to the outside of the cables) should be in hand before starting to splice an estimate.

(5) Do all splices in a section in sequential order.

(6) All spare pairs not used in a splice are spliced through color to color. If any spare pairs are loaded at a load coil splice, indicate the load on the Spare Pair Record.

(7) Short the tip to ring of any spare pair that cannot be joined to a matching spare pair.

(8) Short any defective pairs at the field splice to the No. 1 spare pair. (See paragraph 5.04.)

(9) Test all field splices (including spare pairs) with the 152A test set.

(10) Reuse spare pairs, ahead of the splice being worked where possible. After 80 percent of the good spare pairs back to the start of a section are used, skip a splice and start a new section of the job.

(11) Splice through the No. 1 spare pairs.

5.06 Figure 10 shows a typical underground CONECS estimate. The procedure discussed in the subsequent paragraphs are equally applicable to aerial and buried plant where field splices are mixed with CONECS splices.

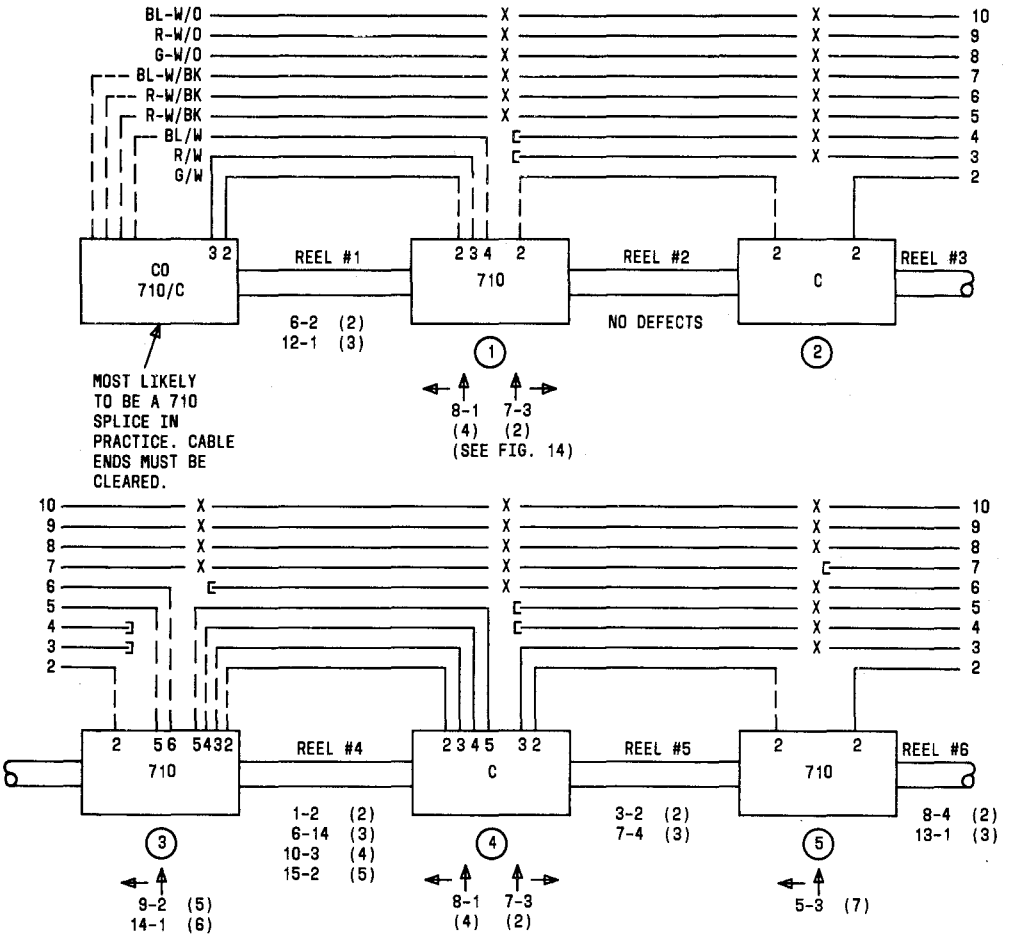


Fig. 10—Typical Underground CONECS Estimate

5.07 The estimate contains six reels of cable and five splices. Defective pair information for each reel is shown on each defect tag in Fig. 11 through 13. This information (Fig. 10) is also shown on the estimate between manholes. The CO could be either the cable entrance facility (vault) or the CO manhole. There are ten spare pairs in each reel of cable. Spare pair No. 1 has been omitted for clarity and is used to short all defective pairs. Factory swapping operations are indicated by a solid line and field operations by a dotted line. The Xs represent a spare spliced through while a small bracket represents a tip-to-ring short.

Western Electric
CONECS
PULP CABLE
DEFECT TAG PG__OF__

CABLE CODE	CUSTOMER ORDER NO.
CDMC-1800	12-3456
WECO NO 123456-1	# OF SPARES 10
SEQUENCE NO. 1	**MANHOLE NO.**

DEFECTIVE CIRCUITS

MODULE IDENT SEE NOTE	DEF PR COLOR	TYPE DEFECT S	O	X	MP	WG	REPLACEMENT SPARE COLOR/NO
6-2	R-W	/					W-G
12-1	G-W		/				W-R
							W-BL
							W/BK-G
							W/BK-R
							W/BK-BL
							W/O-G
							W/O-R
							W/O-BL

THE FACTORY METHOD FOR IDENTIFYING DEFECTIVE CIRCUITS IN PULP CABLE IS TO USE THE MULTIUNIT NO. & PRIMARY UNIT NO.

843473778 ISSUE 1 6/16/80

Western Electric
CONECS
PULP CABLE
DEFECT TAG PG__OF__

CABLE CODE	CUSTOMER ORDER NO.
CDMC-1800	12-3456
WECO NO 123456-2	# OF SPARES 10
SEQUENCE NO. 2	**MANHOLE NO.**

DEFECTIVE CIRCUITS

MODULE IDENT SEE NOTE	DEF PR COLOR	TYPE DEFECT S	O	X	MP	WG	REPLACEMENT SPARE COLOR/NO
							W-G
							W-R
							W-BL
	NO DEFECTS						W/BK-G
							W/BK-R
							W/BK-BL
							W/O-G
							W/O-R
							W/O-BL

THE FACTORY METHOD FOR IDENTIFYING DEFECTIVE CIRCUITS IN PULP CABLE IS TO USE THE MULTIUNIT NO. & PRIMARY UNIT NO.

843473778 ISSUE 1 6/16/80

Fig. 11—Reels No. 1 and No. 2—Defect Tags

Western Electric
CONECS
PULP CABLE
DEFECT TAG PG___OF___

CABLE CODE	CUSTOMER ORDER NO.
CDMC-1800	12-3456
WECO NO	# OF SPARES
123456-3	10
SEQUENCE NO.	MANHOLE NO.
3	

DEFECTIVE CIRCUITS

MODULE IDENT SEE NOTE	DEF PR COLOR	TYPE DEFECT S	0	X	MP	WG	REPLACEMENT SPARE COLOR/NO
8-3	G-W	✓					W-G
							W-R
							W-BL
							W/BK-G
							W/BK-R
							W/BK-BL
							W/O-G
							W/O-R
							W/O-BL

THE FACTORY METHOD FOR IDENTIFYING DEFECTIVE CIRCUITS IN PULP CABLE IS TO USE THE MULTIUNIT NO. & PRIMARY UNIT NO.

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Western Electric
CONECS
PULP CABLE
DEFECT TAG PG___OF___

CABLE CODE	CUSTOMER ORDER NO.
CDMC-1800	12-3456
WECO NO	# OF SPARES
123456-4	10
SEQUENCE NO.	MANHOLE NO.
4	

DEFECTIVE CIRCUITS

MODULE IDENT SEE NOTE	DEF PR COLOR	TYPE DEFECT S	0	X	MP	WG	REPLACEMENT SPARE COLOR/NO
1-2	R-W			✓			W-G
6-4	R-W			✓			W-R
10-3	G-W	✓					W-BL
15-2	R-W	✓					W/BK-G
							W/BK-R
							W/BK-BL
							W/O-G
							W/O-R
							W/O-BL

THE FACTORY METHOD FOR IDENTIFYING DEFECTIVE CIRCUITS IN PULP CABLE IS TO USE THE MULTIUNIT NO. & PRIMARY UNIT NO.

843473778 ISSUE 1 6/16/80

Fig. 12—Reels No. 3 and No. 4—Defect Tags

Western Electric
CONECS
PULP CABLE
DEFECT TAG PG__OF__

CABLE CODE	CUSTOMER ORDER NO.
CDMC-1800	12-3456
WECO NO	# OF SPARES
123456-5	10
SEQUENCE NO. 5	MANHOLE NO.

DEFECTIVE CIRCUITS

MODULE IDENT SEE NOTE	DEF PR COLOR	TYPE DEFECT S	0	X	MP	WG	REPLACEMENT SPARE COLOR/NO
3-2	R-W	/					W-G
7-4	G-W	/					W-R
							W-BL
							W/BK-G
							W/BK-R
							W/BK-BL
							W/O-G
							W/O-R
							W/O-BL

THE FACTORY METHOD FOR IDENTIFYING DEFECTIVE CIRCUITS IN PULP CABLE IS TO USE THE MULTIUNIT NO. & PRIMARY UNIT NO.

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Western Electric
CONECS
PULP CABLE
DEFECT TAG PG__OF__

CABLE CODE	CUSTOMER ORDER NO.
CDMC-1800	12-3456
WECO NO	# OF SPARES
123456-6	10
SEQUENCE NO. 6	MANHOLE NO.

DEFECTIVE CIRCUITS

MODULE IDENT SEE NOTE	DEF PR COLOR	TYPE DEFECT S	0	X	MP	WG	REPLACEMENT SPARE COLOR/NO
8-4	G-W	/					W-G
13-1	G-W	/					W-R
							W-BL
							W/BK-G
							W/BK-R
							W/BK-BL
							W/O-G
							W/O-R
							W/O-BL

THE FACTORY METHOD FOR IDENTIFYING DEFECTIVE CIRCUITS IN PULP CABLE IS TO USE THE MULTIUNIT NO. & PRIMARY UNIT NO.

843473778 ISSUE 1 6/16/80

Fig. 13—Reel No. 5 and No. 6—Defect Tags

5.08 ***Splice No. 1:*** The splicing (Fig. 10) starts at manhole No. 1 with the unconnectorized ends of reels No. 1 and No. 2. This is the first splice since both of the other ends are inherently cleared because they are connectorized. Reel No. 1 has two defective pairs as shown on the defect tag in Fig. 11. The first is in module 6-2 which has a cable count of 526-550 and the second is in module 12-1, which has the count of 1101-1125. Reel No. 2 has no factory defects (Fig. 11). Proceed as follows.

(1) Locate group count 526-550. (This is more easily done after the cable units have been identified and tagged.)

(2) Connect one lead of the tone test set (or any other equipment which indicates continuity) to the No. 1 spare pair (red-blue in the example.)

(3) Probe with the other lead until the factory short is located.

(4) Check the defective pair color with that indicated on the defect tag. (In the example, this is the red-white pair.)

(5) Remove the defective cable pairs from their unit and substitute the defective pairs with the same spare pairs that the factory used. The tag shows the green-white spare pair in group 6-2 and red-white spare pair in group 12-1.

(6) Short the defective pairs to the red-blue spare pair.

Caution: When more than ten spare pairs are in pulp-insulated cable, the spare pair colors repeat. Make certain to select the correct number spare pairs.

(7) Neatly dress the green-white spare pair into the 6-2 group.

(8) Repeat this method for all factory identified defective pairs for reel No. 1. (This example has no defective pairs for reel No. 2.)

(9) Begin splicing, using the applicable 710 tools and 152A test set. As splicing progresses, an additional defective pair was indicated in the 8-1 count (701-725) of reel No. 1. For this defective pair, substitute the No. 4, blue-white spare pair, the next available good spare in sequence, back to the starting point.

Note: Spare pair No. 1 is not available because it has all defects shorted to it, and spare pairs No. 2 and 3 were used in the factory for other defects. The ***next*** available good spare pair to the CO is spare pair No. 4.

(10) A defective pair, red-white, was also found in group 7-3 (651-675) in the field cable (reel No. 2). Because there had been no defects identified at the factory, spare pair No. 2 was available and was used. These two additional defects (probably caused during placing) are shorted to the No. 1 spare pair, red-blue.

(11) Complete the splice (except for spare pairs).

(12) Remaining spare pairs require attention:

- Spare pairs No. 3 and No. 4 of reel No. 2 cannot be spliced through to the CO because these spare pairs were used in reel No. 1. Each spare pair will have the tip shorted to the ring.
- Spare pairs No. 5 through 10 are spliced color to color.
- Spare pair No. 1, having all shorted defects, is spliced through.

(13) Fill out the Spare Pair Record for splice No. 1 (Fig. 14).

(14) Wrap and close the splice.

SPARE PAIR RECORD

SPLICE DATE 1/6/82

SPLICER J. SMITH

ESTIMATE NO. 12345

SPLICE NO. 1

SECTION NO. 2 TO SECTION NO. 3

SPARE COLORS	SPARE TO CO	TROUBLE MODULE/PR	TROUBLE MODULE/PR	SPARE TO/FIELD	SPARE COLORS
R-BL	X 1	SHORT TO DEFECTIVE PAIRS		X 1	R-BL
G-W	X 2	6-2 R-W	7-3 R-W	X 2	G-W
R-W	X 3	12-1 G-W		X 3	R-W
BL-W	X 4	8-1 G-W/O		X 4	BL-W
G-W/BK	X 5			X 5	G-W/BK
R-W/BK	X 6			X 6	R-W/BK
BL-W/BK	X 7			X 7	BL-W/BK
G-W/O	X 8			X 8	G-W/O
R-W/O	X 9			X 9	R-W/O
BL-W/O	X 10			X 10	BL-W/O
	X 11			X 11	
	X 12			X 12	
	X 13			X 13	
	X 14			X 14	
	X 15			X 15	
	X 16			X 16	
	X 17			X 17	
	X 18			X 18	
	X 19			X 19	
	X 20			X 20	

NOTE: ALL DEFECTIVE PAIRS ARE SPLICED TO THE RED-BLUE SPARE PAIR

-KEY-

BK = BLACK
BL = BLUE
G = GREEN
O = ORANGE
W = WHITE
R = RED

– – – – – = SPLICE THROUGH
⊏ = TIP - RING SHORTED

Fig. 14—Spare Pair Record—Splice No. 1

5.09 ***Splice No. 2:*** Splice sequentially. Normally the CONECS splice is plugged together and all spare pairs are spliced through or shorted tip to ring if there is no matching spare pair. However, since a defect was found in reel No. 2 while at splice No. 1, additional work is required. In splice No. 1, the red-white pair, found defective in cable count 651-675 (group 7-3), was shorted to the red-blue spare pair. Handle the defective pair as follows.

(1) Test to locate the defective pair in the 7-3 module.

Note: When the defective pair is located, the same spare pair used in splice No. 1 (ie, spare pair No. 2 which is green-white) must also be used here.

(2) Cut the defective pair several inches behind the 7-3 module.

(3) Splice the No. 2 spare pair tip to tip and ring to ring.

(4) Short the defective pair to the red-blue spare pair.

(5) Splice through the red-blue spare pair and spare pairs No. 3 through 10. Test all spare pairs before splicing through.

(6) Short defective spares to the red-blue spare pair. (The No. 2 spare pair in reel No. 3 was used at the factory. (See defect tag in Fig. 12.)

(7) Fill out a Spare Pair Record for splice No. 2.

5.10 ***Splice No. 3:*** The same methods used in splice No. 1 also apply. Proceed as follows.

(1) Identify the factory-found defect in the 8-3 module in reel No. 3 and the four defects in reel No. 4.

(2) Substitute the same spare pairs the factory used for the defects. Refer to the defect tags in Fig. 12 and the activity at splice No. 3 shown in Fig. 10.

Note: While splicing, two additional defects were found in reel No. 3, one in the 9-2 group (826-850) and one in the 14-1 group (1301-1325). The defective pairs were then shorted to the red-blue spare pair. The defect in the 9-2 group was replaced with spare pair No. 5, and No. 6 was used for the 14-1 group defect. Spare pairs No. 3 and 4 could not be used because they were not continuous to the CO. This is shown in Fig. 9 in splice No. 1 (starting point) where the tip and ring were shorted. Because of this short condition, it is easy to test and determine that they are not good to the CO. No additional defects were found in reel No. 4.

(3) Finish splicing through the spare pairs (No. 1 and 7 through 10) or short the tip and ring (spare pairs No. 3 and 4 of reel No. 3 and spare pair No. 6 of reel No. 4). Test all spare pairs before splicing through.

(4) Short the defective pair to the red-blue spare pair.

(5) Fill out a Spare Pair Record for splice No. 3.

5.11 ***Splice No.4:*** This CONECS splice is simply plugged together. Since ***no*** additional defects were found in reel No. 4, it is not necessary to make substitutions as was required in splice No. 2. Spare pairs No. 1 and 6 through 10 are spliced through (test them first where possible), or these spare pairs may have their tip and ring shorted as was the case for spare pairs No. 4 and 5. Spare pair No. 6 will show a short at splice No. 3.

Note: Fill out a Spare Pair Record for splice No. 4.

5.12 ***Splice No. 5:*** Use the defect tags for reels No. 5 and 6 to substitute the spare pairs for defective pairs in the units as indicated. One additional defect was found in the 5-3 group (451-475) of reel No. 5. Find the next available good spare pair, back to the splice starting point (this pair will not be shorted). Use spare pair No. 7. The splice was completed by filling out the Spare Pair Record and splicing through the matching spare pairs and shorting the tip and ring of spare pairs that do not have a match (Fig. 10).

(a) Only three spare pairs remain good to the CO. When 80 percent of the spare pairs are used, the ***rule*** is to skip a splice and start over. In the example (Fig. 10), this would occur after spare pair No. 8 was used.

(b) From this example (Fig. 10), it can be seen that splices behind the splicer (toward the CO) should not have to be reentered. Further, by shorting and splicing through, the splicer can al-

ways locate a spare pair good to the CO because it will not have a short between tip and ring. An exception to a possible reentry is where a load splice is located between the splice and the CO and none of the cable spare pairs have been loaded via spare pair load coils. At such a location, the good spare pair need only go to the load splice where it must be put back in the count (in the appropriate module) and thus pass through the load coil.

5.13 When the section splices are completed, use the Spare Pair Records to complete the substitutions at the CO or starting splice (Fig. 10).

6. SUBSTITUTING SPARE PAIRS FOR DEFECTIVE PAIRS IN NONSTANDARD/LIMITED AVAILABILITY (NS/LA) AND SUPERSEDED CABLES

MULTIPLE UNIT CABLES

6.01 For multiple unit cables, the rules for substituting the spare pairs for defective pairs are as follows.

(a) Pulp-insulated multiple unit cables (AD type) are made up of 25-, 50-, or 100-pair units with the spare pairs placed in the space between units immediately under the core wrapper.

(b) Units having factory defects are made good by substituting, ***in the section involved,*** one or more of the spare pairs in numerical order according to the color code sequence listed in Table A and shown in Fig. 15.

(c) The Spare Pair Record and the defective pair treatment given in Part 5 should be used.

(d) Older superseded multiple unit cables contain a tracer pair within each unit.

(e) Units having a factory defect are made good by substituting the tracer pair for the defective pair in the section involved as shown in Fig. 16.

(f) Clear and sleeve defective pairs at each end of the section involved. Mark the nature of the defect on a tag affixed to the defective pair.

(g) When wandering pairs are encountered in a trunk cable that is likely to become a carrier cable, they should be eliminated.

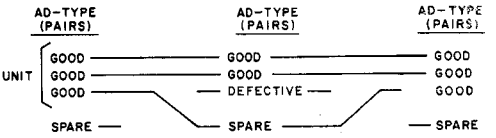

Fig. 15—Substituting a Good Spare Pair in a Single Section of AD-Type Cable

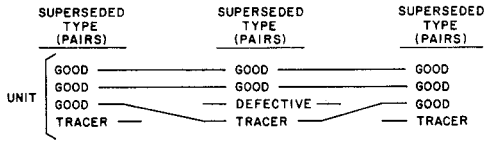

Fig. 16—Substituting a Good Tracer (or Spare) Pair in a Single Section of Superseded Cable

SPLICING CABLE WITH SPARE PAIRS TO CABLE WITH TRACER PAIRS

6.02 The sequence of splicing sections together is not important to the handling of defective pairs except that when a splice is started, craft personnel should know what tracer pairs and spare pairs have been spliced to good pairs in adjacent splices. This will permit retransposing of pairs within the units as shown in Fig. 17.

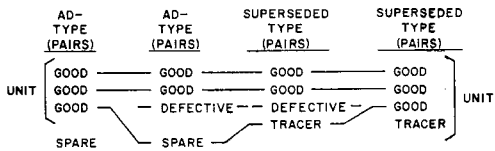

Fig. 17—Substituting a Good Spare and Tracer Pairs in a Single Section of AD-Type and Superseded-Type Cable

6.03 In splicing AD-type cables to superseded types, either as extensions or as section replacements, it is rather obvious that all services must be removed from spare pairs. If this has not been accomplished, it will be necessary to contact the engineer of outside plant so he may arrange for conversion to even counts and reissue the work prints. When the revised prints have been received, it is then possible to renumber the main frame to reflect this change and to accumulate defective pairs on the spare pairs. Transposition of defective pairs to spare pairs can be accomplished on the main frame at the CO location.

6.04 The tracer pairs are the spare pairs and, if terminated, appear on the main frame as X1, X2, etc. Under the even-count plan, any defective pairs are made spare pairs, and good sections of the tracer pairs are used to make numbered pairs good.