BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G50.640.1
Issue 1, May, 1948
AT&T Co Standard

CABLE SPLICING—GENERAL
SPLICING DEFECTIVE CONDUCTORS

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1. GENERAL

1.01 This section outlines certain general rules that should be followed in splicing defective conductors. It also gives a detailed procedure for handling defective pairs in multiple unit cables, which will be found helpful in splicing cables having a comparatively large number of defects. For splicing cables having few defects the procedures can be modified to fit the individual job.

1.02 The procedure for splicing defective conductors outlined below, has three objectives:

(a) To have the smallest number of defective conductors in the cable after it is spliced.

(b) Avoid the necessity of opening cable ends to identify pairs to which defective conductors are being connected.

(c) Reduce the number of defective conductors in any one color group of the completed cable by using the tracer pairs and the known defects to best advantage.

2. RULES

2.01 Cable ends that are painted or tagged to indicate the presence of defective conductors should be opened carefully to prevent tearing the tags from the defective conductors.

2.02 If both ends of a section of cable have been opened, it is advisable to test the tagged conductors and verify the defects. If a reel length containing defective conductors

has been cut, the defective pairs should be identified at the cut ends. The identifying should be done at the time the splices are made.

2.03 If there are pairs tagged MP (misplaced) or (NG) (missing at end), it may be advisable to count the pairs in the color groups or units because the actual number of pairs appearing at the end may be in excess of the normal number, and it may be necessary to leave the NG pair dead in the splice.

2.04 Defective conductors should not be spliced to working conductors. In making a splice between a dead cable and a working cable, or between two working cables, it is advisable to record the known defective pairs in both cables. Any defective pairs found in individual lengths of cable should be tagged in the splice as they are found and recorded for subsequent reference.

2.05 Defective pairs on one side of a splice should be connected wherever possible to defective pairs on the opposite side in the same color group or unit. When defective pairs in two or more lengths of cable are connected together, they are known as universal bad pairs. If possible, keep one conductor of a universal bad pair continuous throughout the cable to facilitate subsequent identification. If necessary, bad pairs may be spliced through reversed, but they should not be split.

Layer Type Cable with Paired Conductors

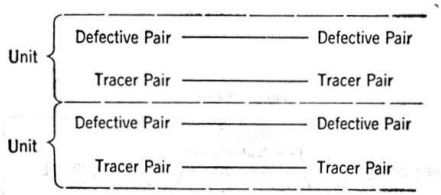
2.06 If the defective pairs on opposite sides of a splice in layer type cable are not in corresponding color groups, it may be advisable to transpose some of them in order to reduce the total number of defective pairs. This will also necessitate transposing certain good pairs from their color groups, and these pairs should be restored to their original groups at the nearest convenient splice. This will require identification of the transposed pairs at certain splices. When transposing pairs in large cables it is advisable to arrange the transpositions so that no pair will be shifted more than two or three color groups from its original group.

2.07 If there are more defective pairs on one side of a splice than on the other side, splice the unmatched defective pairs through on tracer pairs as far as possible to permit ready identification at the adjacent splice.

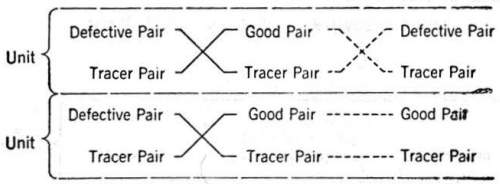
Multiple Unit Type Cable with Paired Conductors

2.08 Since there is generally one tracer pair in each unit of multiple unit cable, the defective pairs can conveniently be disposed of in accordance with the following rules:

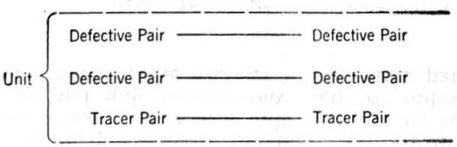
(a) If there is a defective pair on one side of the splice and a defective pair in the corresponding unit on the opposite side, splice them together as indicated in the following:



(b) If there is a defective pair on one side but no defective pair in the corresponding unit on the opposite side, splice the defective pair to the tracer pair, as indicated below.



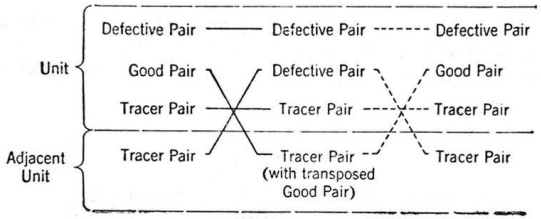
(c) If there are two defective pairs in a unit on one side and two defective pairs in the corresponding unit on the opposite side, splice them together, as indicated below.



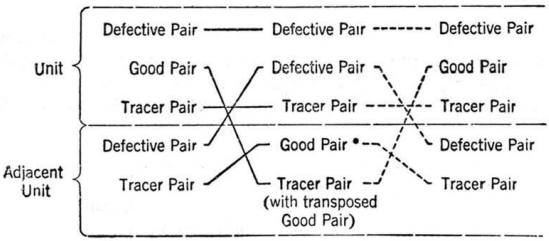
(d) If there are two defective pairs in a unit on one side but only one defective pair in the corresponding unit on the opposite side, splice one set of defective pairs together and splice the remaining defective pair to a tracer in an

adjacent unit, or to an unmatched defective pair in an adjacent unit. This will necessitate transposing a good pair to a tracer in an adjacent unit and retransposing it to its original unit at the next splice, as indicated in the following. This can be done without testing because the transposed good pair is spliced to a definite tracer that can be identified from the position of the unit. A defective pair that has been transposed from a unit need not be retransposed to its original unit unless convenient or unless it would otherwise increase the number of defective pairs.

USING TRACER PAIR IN ADJACENT UNIT

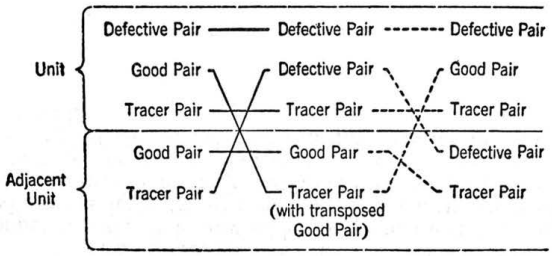


USING DEFECTIVE PAIR IN ADJACENT UNIT



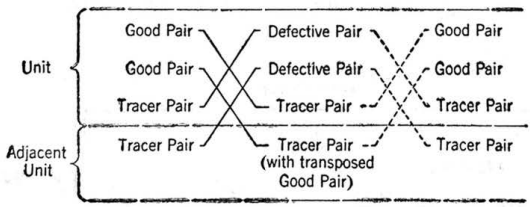
•Any good pair

USING TRACER PAIR IN ADJACENT UNIT AT ONE SPLICE AND DEFECTIVE PAIR IN ADJACENT UNIT AT NEXT SPLICE

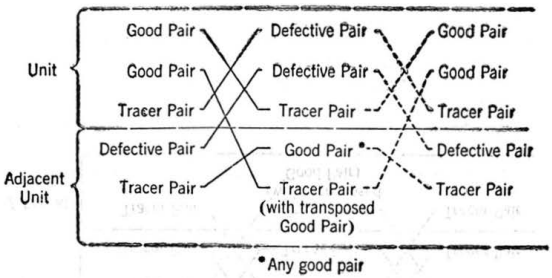


(e) If there are two defective pairs in a unit on one side but no defective pairs in the corresponding unit on the opposite side, splice one defective pair to the tracer in the unit and splice the remaining defective pair to a tracer in an adjacent unit or to an unmatched defective pair in an adjacent unit. This will necessitate transposing a good pair to a tracer in an adjacent unit and retransposing it to its original unit at the next splice as indicated in the following. This can be done without testing because the transposed good pair is spliced to a definite tracer that can be identified from the position of the unit.

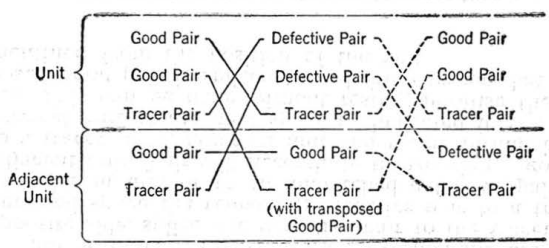
USING TRACER PAIR IN ADJACENT UNIT



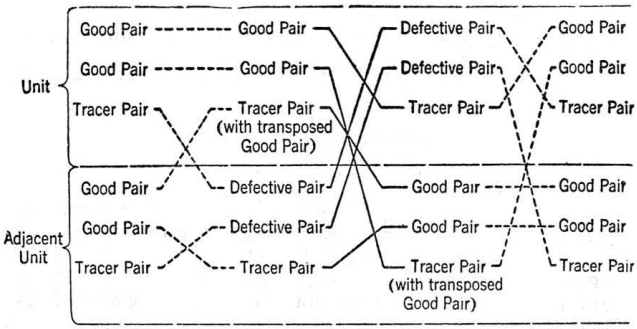
USING DEFECTIVE PAIR IN ADJACENT UNIT



USING TRACER PAIR IN ADJACENT UNIT AT ONE SPLICE AND DEFECTIVE PAIR IN ADJACENT UNIT AT NEXT SPLICE



(f) If there are two defective pairs in a unit on one side and two defective pairs in an adjacent unit on the opposite side, it is advisable to splice them together. This will necessitate transposing a good pair in each direction to a tracer in an adjacent unit and retransposing at the adjacent splices, as indicated below. Testing will not be required if the identity of the units containing the tracers is noted.



2.09 So far as the splicing of defective pairs is concerned, the sequence in which the splices are made is not important. However, it is necessary when a splice is started that the splicer be informed as to what tracers have been spliced to defective pairs and what tracers have transposed good pairs from adjacent splices. The transposed good pairs should be restored to their correct units. It is desirable, but not essential, to restore the transposed defective pairs to their correct units.

2.10 In splicing paired cables it is generally advisable to make a defective pair test (battery and receiver or tone comparison method) after a number of cable lengths have been spliced together. This test will reveal the manufacturing defects plus any defects that may have been caused in the placing and splicing operations. In multiple unit cable, if the rules given in Paragraph 2.08 have been followed, the manufacturing defects should be either on tagged pairs or tracer pairs.

Quadded Conductor Cable

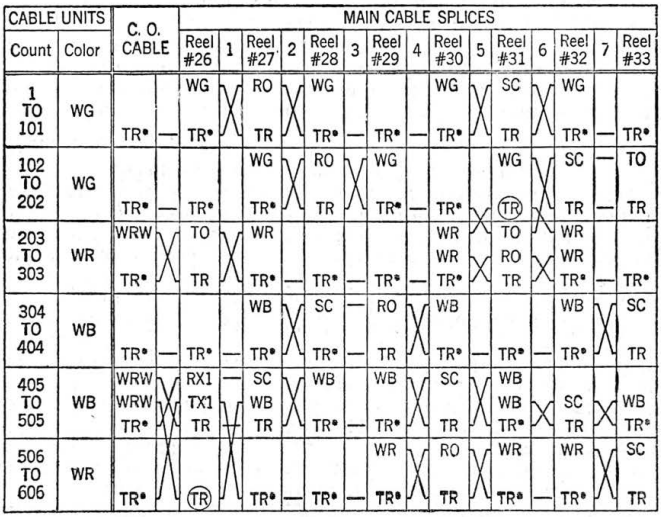
2.11 All 19 and heavier gauge quadded conductors are guaranteed to be good in newly manufactured cables. The following rules apply mainly to defects that develop during or after installation:

(a) A 19-gauge quad may be substituted for a defective 16-gauge quad in an underground section. The 19-gauge quad should preferably be in the 2-wire group of quads.

(b) A pair from a 16-gauge quad may be substituted for a defective 16-gauge program transmission pair. If there are no 16-gauge quads in the cable a pair from a 19-gauge quad in the 2-wire group may be substituted for the defective 16-gauge program pair, but there should not be more than 750 feet of substituted 19-gauge in a voice repeater section.

3. DEFECTIVE CONDUCTOR DIAGRAM

3.01 In cables of large pair size or long length it may be desirable to prepare a diagram showing the splicing of the defective pairs, tracer pairs and the transposed good pairs. A typical example of part of such a diagram for a 606-pair 24-gauge multiple unit cable is given in the following illustration.



Code

SC	Short circuit	WG	White Green
TO	Tip open	WR	White Red
RO	Ring open	WB	White Blue
X	Crossed conductors	WRW	White Red-White textile insulation.
TR	Tracer pair	•	Tracer pair spliced to defective pair.
		○	Good pair transposed out of normal unit on tracer.

Sequence of Splicing

1 and 4
2 and 5
3 and 6
CO and 7

4. DEFECTIVE PAIRS IN BRANCH CABLE

4.01 Whenever practicable, defective pairs in branch cable shall be spliced to defective pairs in the main cable.