CABLE TROUBLE ANALYSIS PLAN
CABLE TROUBLE TICKET FORM E-5039
CABLE TROUBLE SUMMARY FORM E-3626A

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1. GENERAL

1.01 This is one of a group of Plant Series Bell System Practices on the Cable Trouble Analysis Plan. This section covers the use of the edge sort trouble ticket, Form E-5039 (Fig. 1), the recording of information on cable troubles, the use of the Cable Trouble Summary Form E-3626A (Fig. 2.), the summarizing of information from Cable Trouble Tickets, and the filing of trouble tickets.

1.02 This section is reissued to provide for revisions of Form E-5039 and Form E-3626A, and to make corresponding changes in the instructions for their preparation.

1.03 Information from cable trouble reports is summarized monthly, quarterly, and annually from Cable Trouble Tickets Form E-5039. The monthly summary is entered on Form E-5408, which is described in Section 660-003-013, and on Form E-3626A for each test center and district. The quarterly and annual summaries are entered on Form E-3626A for forwarding in accordance with Section 660-003-010. Section 010-210-001 — Edge Sorted Cards — Method of Coding, Punching, and Sorting — gives a detailed explanation of how to code, punch, and sort edge sort cards. To use these cards effectively, it is imperative that the punching and sorting procedures be fully understood by all employees who use the cards. Although the mechanics of sorting are simple and are easily mastered, there are certain fundamentals which must be learned and practiced before any reasonable degree of efficiency can be obtained.

2. USE OF CABLE TROUBLE TICKET

2.01 The edge sort trouble ticket, properly prepared and filed, is the trouble history. It provides a means of making local analysis as the need is indicated.

2.02 A Cable Trouble Ticket must be prepared for every cable trouble whether handled by a cable repairman, station repairman, splicer, installer, or other craftsman. Trouble tickets are required for Routine troubles as well as Service-Affecting troubles as covered in this Plan.

2.03 All data pertinent to the trouble should be recorded or punched on the ticket as covered in Part 4 — Recording Information on Cable Trouble Ticket. Only a part of this data is required to prepare the Cable Trouble Summary Form E-3626A. Other entries are required when computing the index under the Outside Plant Service Results Plan. The remainder is available for further analysis when required.

2.04 The need for detailed analysis will be indicated by poor trends developing in the E-3626A data. Such trends will be readily seen from the monthly entries on Form E-5408.

3. EDGE SORT CABLE TROUBLE TICKET FORM E-5039

3.01 Form E-5039 is a single copy, corner-cut ticket 7½" by 3¼". Spaces are provided on the edges of the card to check off data needed for summary and analysis. The checked spaces

are then edge punched (notched) for quick analysis by sorting with a sorting needle. The edge markings are the same on both sides of the ticket, and it can be edge punched and sorted from either side. In addition, space is provided on the back of the card to record any other information pertaining to the trouble and its disposition.

3.02 Subgroup and Detail Codes, along with Special Study numbers and X spaces, provide sufficient codes and optional numbers to record all details of the trouble. No specific information is assigned to the Special Study numbers and X spaces on the ticket. These are left available for developing any special information which may be required locally, such as the age of cables in which troubles are occurring.

3.03 A typical example of the information provided by the trouble ticket is as follows: If troubles under General Code 7B, No Sheath Break — Terminating, have materially increased, a more detailed study may be warranted. Subgroup Codes 74 and 75 could then be key-sorted to determine where the majority of Code 7B troubles are occurring. If it is found that most troubles are occurring in ready-access terminations (Subgroup Code 74), a further analysis may be made by key-sorting the Detail Codes 1 through 8 under Subgroup Code 74. This check may indicate that many troubles are resulting from broken conductors (Detail Code 3). Figure 1 shows how a trouble of this type would be punched on the trouble ticket.

3.04 If additional information is required, a special study may be set up. The special study data can then be punched into the Special Study spaces on the card for a predetermined period and then analyzed. The collection of such special study data should not be continued beyond the study period.

4. RECORDING INFORMATION ON CABLE TROUBLE TICKET

4.01 The person entering the information on the ticket will make entries or check marks in the appropriate spaces. The checked spaces are edge punched to prepare the trouble tickets for sorting.

Initial Information

4.02 The person receiving the report of trouble shall enter the following information on the trouble ticket:

Write In

(a) Ticket number — associated ticket number (if required locally)

(b) Line number or circuit number

(c) Address of subscriber or location of trouble indication.

(d) Cable identification

(e) Pair or pairs involved

(f) Test results. If wheatstone bridge readings are taken space is provided on the back of the ticket for recording them.

(g) Terminal identification

(h) Binding post — also PIC color code if appropriate.

(i) Changed-to pair identification if service was restored, perhaps by a station repairman, by transferring circuit to a good pair leaving the bad pair in plant for subsequent attention.

(j) First report — date and time first report was received from a customer, or date and time trouble was detected.

Check for Later Punching

(k) Exchange designation by number (hundreds, tens, and units)

(*l*) Cable designation by number (thousands, hundreds, tens, and units), eg. cable number for numbered cables and building number for cables having building number and street name. Where addresses are identical, an additional number may be punched into the card to distinguish one cable from another.

(m) Source of report

(n) Month and quarter

4.03 Referred to field forces — In those cases where cable troubles are referred to a different force group which is responsible for field work (for example, from test center to construction forces) enter date and time trouble is referred.

4.04 Dispatched — date and time cable repairman is given the cable trouble, and repairman's initials or identification number.

Information Entered After the Trouble Is Cleared

4.05 Enter the following when trouble is cleared:

Write In

(a) Service restored — date and time that service is restored and by whom

(b) Permanent repairs — when all work is completed on one visit enter date and time permanent repairs are completed and by whom. In case a second visit is required this section will be filled in then.

(c) Trouble location including cable size and gauge if desired

(d) Trouble cause

(e) Work done

(f) Working pairs affected — include number of lines and stations if desired.

(g) Material required for permanent repairs (see back of ticket) — when second visit is necessary.

Check for Later Punching

(h) Routine or Service-Affecting — In cases where no trouble is found in cable, trouble is dropped, or case is to be excluded from E-3626A for any other reasons, check NTF. However, service restored by transferring a circuit to a good pair is always closed out as either Service-Affecting or Routine even though the trouble has not actually been found.

(i) Aerial, Underground, Buried, or Submarine

(j) PIC or Non-PIC

(k) Pressurized or Non-Pressurized

(*l*) Vented or filled

(m) Exchange, Toll, or Trunk

(n) General Code, Subgroup Code, and Detail Code (See Form E-3628A.)

NOTE: When punching Subgroup Code, it is not necessary to punch the General Code number again. For example, for Subgroup Code "71", punch only "1". The "7" will be identified by the General Code 7A.

(o) Closing time — elapsed time between receipt of first customer report in the Repair Service Bureau and the time all service affected by the trouble is restored, or the trouble is closed out. Also check "Carried Over" if service was restored on the day following first report, or later.

(p) Permanent repairs

(q) Supplemental data block (When applicable)

4.06 Additional information as required locally may be punched into the Special Study numbers and spaces for a predetermined period.

5. FILING CABLE TROUBLE TICKETS

5.01 File Cable Trouble Tickets Form E-5039 so they will be readily available for reference and analysis. Three separate files should be established:

(a) A current file

(b) A completed file

(c) A defective pair file

5.02 Establish a current file of Forms E-5039, consisting of the present month's Cable Trouble Tickets, by central offices and cable numbers. Use Edge Sort Trouble Ticket Separators—Form E-5287 to separate the current file for ease of handling. At the end of each month, these tickets should be summarized on Summary of Trouble Data Form E-5408, as covered in Section 660-003-013, and filed in either the completed or defective pair file.

5.03 Establish a completed Cable Trouble Ticket file to include the previous 12 months' completed Forms E-5039. This file should be subdivided by central offices and cable numbers. If it is desired locally, this file can be further divided by class of plant and/or type of report. Use Edge Sort Trouble Separators — Form E-5287 to separate the file. At the end of each month, the current month's completed tickets should be added to this file and the tickets for the same month in the previous year should be removed.

5.04 Establish a file of defective pair Cable Trouble Tickets which should be subdivided by central offices, cable numbers, and cable complements. A Form E-5039 for each defective pair, showing all historical information, ie, all testing information, resistance measurements, etc., should be maintained in this file. As addi-

tional information is obtained about defective pairs, it should be posted on the appropriate Cable Trouble Ticket in this file. Tickets must remain in the file indefinitely until the defect is corrected. The file should be purged and updated after each of the following work operations:

(a) A case of cable trouble has been completed.

(b) A cable trouble identified from LIT has been cleared.

(c) A spare pair frame check has been completed.

(d) A verification of defective pairs has been performed by test center, central office or construction splicing forces.

(e) A report on defective pairs has been received from any force.

5.05 When defective pairs are cleared by locating and repairing defects in cable as the result of a work order, the defective pair tickets should be completed and closed out as Routine cable trouble tickets and placed in the current file. If more than one pair is recovered at a single location only one of the corresponding defective pair tickets should be completed and placed in the current file. The remainder should be destroyed.

5.06 When defective pairs are tested O.K., or are found to have come clear upon verification, but no known physical repairs have been made, remove the corresponding defective pair tickets from the defective pair file and destroy.

6. DESCRIPTION OF CABLE TROUBLE SUMMARY FORM E-3626A

6.01 Form E-3626A (Fig. 2) is a translucent form 8⅜" by 10⅞". It provides spaces for reporting the number of troubles experienced during the report period in aerial, underground, buried and submarine cables. Trouble rates per 100 sheath miles are also reported. In addition, information on taped openings and pair troubles not cleared is also recorded.

7. PREPARATION OF CABLE TROUBLE SUMMARY FORM E-3626A

7.01 A separate form is completed for:

(a) Pressurized cable

(b) Nonpressurized cable

(c) Combined (a) and (b)

Pressurized cable is defined as follows:

Aerial Cable — All cable having a pressure equal to or exceeding locally defined minimum levels and which is monitored by contactors and/or transducers.

Underground Cable — All cable having a pressure equal to or exceeding locally defined minimum levels and which is monitored by air rate indicators, gas meters, and/or pipe flow alarms.

Buried Cable and Submarine Cable — All cable having a pressure equal to or exceeding locally defined minimum levels and which is monitored by contactors and/or transducers.

Forms may also be prepared for specialized categories of cable as determined locally such as toll, trunk, PIC, vented, etc.

7.02 ***Column A — Description of Code:*** In this column are shown the general trouble code descriptions.

7.03 ***Column B — Code Number:*** In this column are listed the general code numbers applying to the various troubles, and their totals.

7.04 ***Columns C through H:*** Enter in these columns, under Trouble Data, the total troubles for each code for the period covered by class of plant, eg, Aerial, Underground, Buried and Submarine, as appropriate. The troubles should be further classified as Service-Affecting or Routine for the period covered by the summary. Then summarize as indicated on lines 1T, 2T, and 3T. Under Trouble Data per 100 Sheath Miles, enter the trouble rate. The trouble rate is developed by dividing the number of troubles under Trouble Data by the applicable number of sheath miles and multiplying by 100.

7.05 ***Columns I and J:*** Enter in these columns, under Trouble Data, the sum of the Service-Affecting and Routine troubles, as appropri-

ate, for each code for Aerial, Underground, Buried and Submarine cables combined. Then summarize as indicated on lines 1T, 2T, and 3T. Under Trouble Data per 100 Sheath Miles enter the trouble rate. The trouble rate is developed by dividing the number of troubles under Trouble Data by the total number of cable sheath miles maintained and multiplying by 100.

The Grand Total under Trouble Data is the sum of all troubles, Service-Affecting and Routine, as shown on line 3T. Grand Total under Trouble Data per 100 Sheath Miles is calculated by dividing Grand Total under Trouble Data by the total number of cable sheath miles maintained and multiplying by 100.

7.06 Cable Trouble Analysis Form E-5408, described in Section 660-003-013, provides a monthly summary of troubles by General Codes which will be helpful in completing columns C through J on Form E-3626A.

8. SUPPLEMENTAL DATA

8.01 Blank spaces are provided under Supplemental Data for summarizing information regarding particular items of cable maintenance as specified locally. These might include Subcode or Detail Code studies, results of a defective pair recovery program, LIT activity, air pressure monitoring, buried cable locating, terminal repairs, number of sheath openings initially closed in a temporary manner, other special studies, etc.

8.02 In addition spaces are provided for reporting the following items:

(a) ***Cable Sheath Miles:*** Enter on this line the number of sheath miles of cable maintained. This figure should be obtained from the General Plant Cost Results Summary, E-5300, for use with the ***Combined*** Summary, E-3626A. Apportionment of this mileage for use with ***Pressurized*** Summary and ***Non-Pressurized*** Summary should be made locally based on the definitions in paragraph 7.01. Miles of vented cable which are included in aerial cable mileage is to be determined locally and reported in the space provided.

(b) ***Trouble Openings Temporarily Taped:*** Enter the number of trouble openings temporarily closed by taping or wrapping which exist in plant at the end of the period covered by the summary.

(c) ***Pair Troubles Not Cleared — Service-Affecting:*** Enter the number of cases during the report period in which a Service-Affecting trouble was cleared by transferring the circuit to a good pair leaving the bad pair in plant for subsequent attention.

(d) ***Pair Troubles Not Cleared — Routine:*** Enter the number of cases during the report period in which a Routine trouble was cleared by transferring the circuit to a good pair leaving the bad pair in plant for subsequent attention.

8.03 In the lower right is space to show Company — Area, Division — District, City or Test Center, and Period covered.

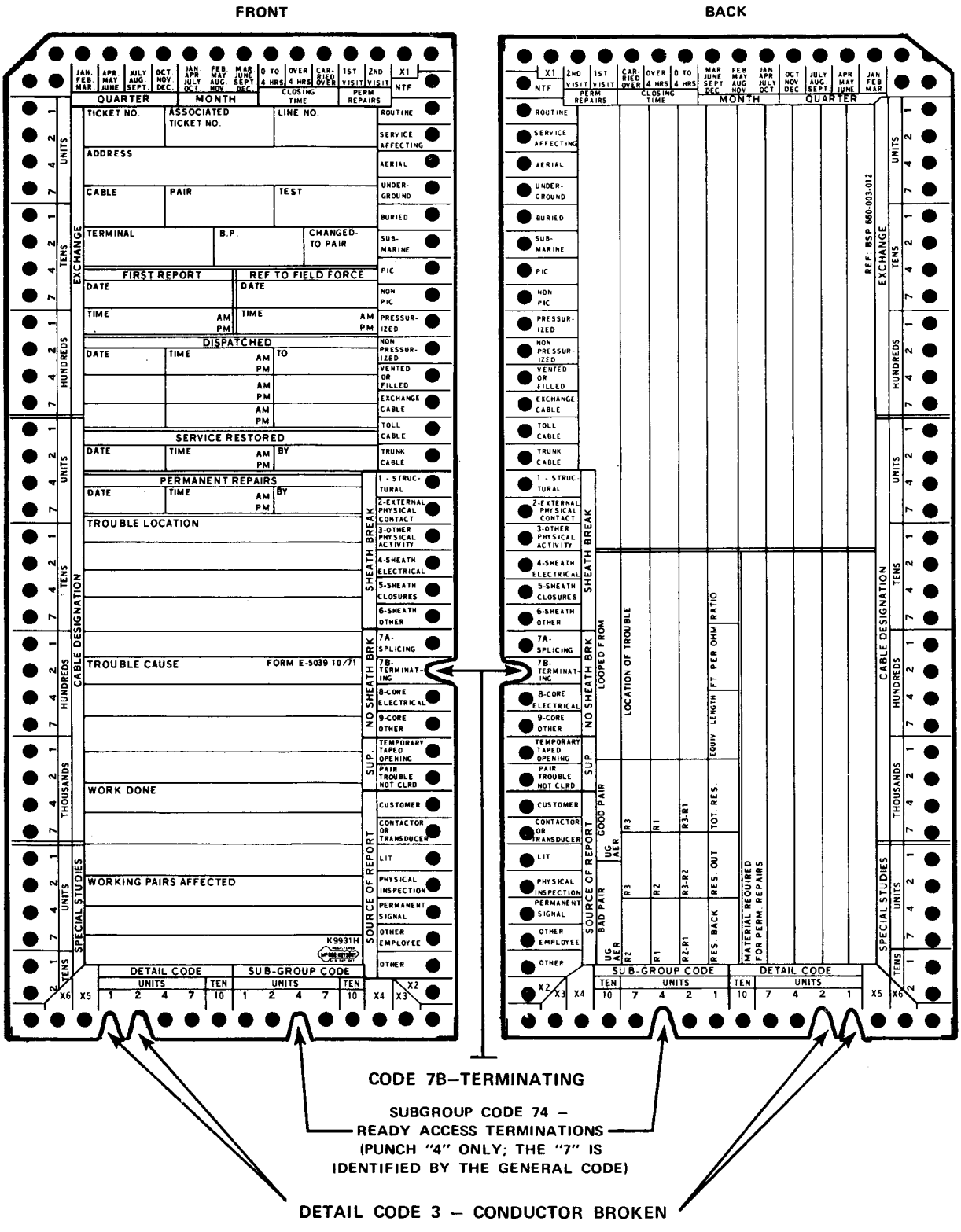

FIG. 1 – FORM E–5039 – CABLE TROUBLE TICKET

FORM E-3626A
(1-72)

CABLE TROUBLE SUMMARY

PRESSURIZED ☐
NON-PRESSURIZED ☐
COMBINED ☐

TROUBLE DATA

REFERENCE: 660-003-012

	DESCRIPTION OF CODE (A)	CODE NO. (B)	AERIAL		UNDERGROUND		BURIED AND SUBMARINE		TOTAL	
			SERVICE-AFFECT (C)	ROUT. (D)	SERVICE-AFFECT (E)	ROUT. (F)	SERVICE-AFFECT (G)	ROUT. (H)	SERVICE-AFFECT (I)	ROUT. (J)
SHEATH BREAK	STRUCTURAL	1								
	EXT. PHYSICAL CONTACT	2								
	OTHER PHYSICAL ACTIVITY	3								
	SHEATH-ELECTRICAL	4								
	SHEATH-CLOSURES	5								
	SHEATH-OTHER	6								
	TOTAL SHEATH BREAKS	1T								
NO SH. BREAK	SPLICING	7A								
	TERMINATING	7B								
	CORE ELECTRICAL	8								
	CORE-OTHER	9								
	TOTAL NO SHEATH BREAK	2T								
TOTAL ALL TYPES (1T + 2T)		3T								
								GRAND TOTAL		

TROUBLE DATA PER 100 SHEATH MILES

SHEATH BREAK	STRUCTURAL	1								
	EXT. PHYSICAL CONTACT	2								
	OTHER PHYSICAL ACTIVITY	3								
	SHEATH ELECTRICAL	4								
	SHEATH-CLOSURES	5								
	SHEATH-OTHER	6								
	TOTAL SHEATH BREAKS	1T								
NO SH. BREAK	SPLICING	7A								
	TERMINATING	7B								
	CORE-ELECTRICAL	8								
	CORE-OTHER	9								
	TOTAL NO SHEATH BREAK	2T								
TOTAL ALL TYPES (1T + 2T)		3T								
								GRAND TOTAL		

SUPPLEMENTAL DATA

CABLE SHEATH MILES	*			*

TROUBLE OPENINGS TEMPORARILY TAPED	
PAIR TRBLS. NOT CLRD.-SERVICE AFFECTING	
PAIR TRBLS. NOT CLRD.-ROUTINE	
* INCLUDES _____ MILES OF VENTED CABLE	

COMPANY - AREA
DIVISION - DISTRICT
CITY OR TEST CENTER
PERIOD COVERED

Fig. 2 – Form E-3626A — Cable Trouble Summary