CLASSIFYING AND RECORDING TROUBLE DATA

MANUAL TOLL AND TWX OFFICES

1. GENERAL

1.01 This section describes a method of classifying, recording and summarizing troubles found in manual toll switchboard, TWX switchboard, and toll test room equipment. Form E-2848, Manual Toll and TWX Equipment - Reported and Routine Troubles, is provided for recording and summarizing these trouble data. This method is for use in those offices of a size to make it worth while to regularly record trouble data in some detail.

1.02 This section is reissued to cover Form E-2848, which replaces Forms E-1107 and E-1108, to include TWX equipment and to clarify the definitions of "Trouble Reports," "T" and "R" troubles.

2. TROUBLE REPORTS

2.01 A trouble report is any notice, either oral or written, received by a plant employee responsible for the maintenance of the equipment, which indicates a defect in, or the failure to function properly of a circuit or other equipment item.

2.02 Only initial trouble reports should be counted. An initial trouble report is defined as a trouble report received by the plant maintenance forces on any circuit or equipment not involved in a previous report which has not been closed. For example, a trouble report is received which, upon investigation, is "found OK." The report, therefore, is closed and notation to that effect made in the records. Shortly after the closing of the report, another report is received pertaining to what appears to be the same case. As a definite disposition was made of the previous report, the second report is counted as an initial report.

2.03 In case of a trouble on a number of circuits due to a common cause (such as the operation of a fuse supplying current to a number of circuits or a loose connection on a common ground or battery wire) one trouble report should be counted for each circuit reported out of order except as provided in 2.04.

2.04 If two or more circuits or other items of equipment are reported at the same time, one trouble report should be counted for each circuit or equipment item reported, if, upon investigation, the troubles are found to be due to separate defects. If, on the other hand, the troubles experienced on all the circuits or equipment items reported at the same time are found to be due to a common cause, such as a blown fuse, failure of generator or battery supply, or broken battery or generator strap, only one report and one trouble should be counted.

2.05 In clearing troubles on such circuits as intertoll trunks, toll switching trunks, telegraph circuits, etc., it is frequently found that the fault is located in an office other than the one which first received the report. In such cases, the office or area in which no trouble was found should exclude the report from its trouble count. The office or area in which the fault was located should accept the trouble report and count it, the same as if it had first been received by that office.

2.06 When circuits, which are made busy or otherwise indicated to be in trouble, are found and repaired by plant employees before trouble reports are received, trouble reports and troubles should be counted in the same manner as if the item had been reported.

2.07 Reports of faulty conditions or capped cords (not previously reported) found by the traffic force during patrols of the switchboard should be considered as trouble reports.

2.08 When traffic employees are required to test or inspect operators' telephone sets or any other equipment before attempting to use such equipment in establishing connections, all defects found should be considered as reported troubles.

2.09 All central office equipment troubles observed by plant employees while monitoring on telephone or telegraph repeaters and systems or program transmission circuits should be considered as reported troubles.

2.10 When demountable polar relays (such as the 209, 215, 228 and 255 types) used in telegraph repeaters and systems are removed from service because of suspected trouble they should be treated as reported troubles if upon test they fail to meet the "test" requirements.

2.11 All central office equipment troubles found by the Plant or Traffic operating forces in connection with overall service tests, such as "morning tests of toll lines," "circuit lineup tests," "overall circuit

transmission tests," etc., should be considered as reported troubles even though these tests are made on a routine basis.

2.12 As this method provides for all troubles detected in connection with service tests, which are usually made by the Plant operating forces in the larger offices, to be entered in the trouble records as "reported troubles" and since certain types of these troubles are usually cleared by the person making the service test it is important that trouble reports be made on all troubles detected by these forces regardless of whether or not they are referred to the maintenance forces for clearing.

2.13 "Transmission Reports" (Telephone) referred to the Plant Department should be treated as trouble reports only when actual trouble is found, in which case they should be recorded in the same manner as if the troubles had been reported in the usual way.

2.14 Reports or maintenance memoranda on building items, furniture, lighting fixtures, ventilating systems, pencil sharpeners, fans or other office fittings, not classified as central office telephone equipment, should be excluded from the trouble data.

3. REPORTED (T) TROUBLES

3.01 A reported (T) trouble is a faulty condition found on a circuit or item of equipment as a result of an investigation brought about by a trouble report. It may be either a condition which impairs service or merely one of defective physical condition or appearance.

3.02 When more than one defect is found during the process of clearing a reported trouble, only one case should be counted and the classification used should be the one representing the most serious impairment to service, or the one most likely to have caused the report.

3.03 In the case of common troubles (such as the operation of a fuse supplying current to a number of circuits or trouble on a common ground or battery wire) one trouble should be counted for each circuit reported out of order regardless of the number of circuits affected except as outlined in 2.04.

4. ROUTINE (R) TROUBLES

4.01 Routine (R) troubles are those which are discovered and cleared as a result of routine tests or inspections initiated or performed by the equipment maintenance forces, and which troubles have not been previously reported or otherwise indicated as being out of order by the Plant or Traffic operating forces.

4.02 Where traffic employees perform certain scheduled routine tests or inspections for the plant maintenance forces at the same frequency that such tests or inspections would be performed if made by the maintenance forces, defects found and reported in the process of such routine tests and inspections should be considered as routine (R) troubles.

4.03 Frayed cords which are detected by regular routine inspections generally are not entered as routine (R) troubles on the forms as they usually serve no useful function in the overall analysis of the amount of trouble experienced.

5. FOUND OK

5.01 A trouble report is said to be "found OK" when, after an investigation of the equipment by a central office repairman, no trouble can be found.

5.02 Where there is some substantial evidence as to the cause of a report, it should not be closed as "found OK" but should be charged to the plant classification in which the fault is indicated. Such cases as are caused by workmen splicing out switchboard multiple cables, blown fuses, etc., can often be allocated to the plant involved with a high degree of accuracy.

5.03 When a trouble report is one which indicates an impairment in the operating condition of the circuit or equipment, it should be classed as "found OK" only when no trouble can be found which affects the operation of the circuit or equipment. For example, if a cord circuit is reported as "noisy" and no trouble of this nature can be found, but a test discloses that the supervisory relay is not operating properly, the report should be closed by classifying as "relay" rather than as "found OK." If, however, only troubles not affecting service such as a frayed cord, broken lamp cap, etc., are found, the report should be closed as "found OK."

5.04 If the report is one of defective appearance or physical condition, it should be classed as "found OK" only when an investigation discloses no trouble of the nature reported as well as no other trouble which would affect service.

6. DESCRIPTION OF FORM E-2848, MANUAL TOLL AND TWX EQUIPMENT - REPORTED AND ROUTINE TROUBLES

6.01 Form E-2848 is an 8-3/8" x 10-7/8" sheet and is made up in pads of 25.

6.02 It is intended for use either as a stroke record form on which the reported and routine trouble can be tabulated by entering a stroke mark opposite the proper trouble classification using one form for a month or as a summary form on which the monthly or

quarterly totals are taken from the stroke sheet and entered in one of the columns under the particular month or quarter.

6.03 This form furnishes a day-by-day cumulative record of the trouble offered by each classification for use of maintenance force in analyzing the performance of the equipment and determining where specific maintenance effort should be applied.

6.04 When a special analyzation of troubles by particular circuit or equipment groups is desirable, a separate form should be used entering the name of the circuit or equipment in the block opposite that designation.

6.05 Samples of Form E-2848 showing its use as (1) a day-by-day cumulative stroke record, (2) a yearly summary, (3) a circuit group analysis sheet, and (4) a summary by quarters are shown on Pages 5, 6, 7 and 8.

7. DESCRIPTION OF ENTRIES - FORM E-2848

General Data

7.01 Company - City - Office - Enter the name of the company, city and office, respectively.

7.02 Period Covered - Enter the period which the particular form covers.

7.03 Equipment or Circuit - Enter the name of the equipment or circuit group which the form is intended to cover. In very large offices it may be found desirable to prepare a summary for (1) the toll switchboard equipment, (2) the TWX switchboard equipment, (3) and the test room equipment. In smaller offices one summary may be satisfactory for the entire office.

7.04 Units in Service - Enter the number of units in service for each circuit group where separate forms are used for special analyzation. For example, the unit for cord circuits should be the number of cord circuits. For summary sheets the number of "Labor Units" or other suitable units may be used.

Column Headings

7.05 Expectancy - This column is provided so that the number of found troubles for each trouble classification which would be normally expected may be entered. These data should be based upon previous trouble performances or trouble objectives. The expectancy may be entered separately for T and R troubles or combined as a total for the two.

7.06 Month or Quarter and Year - Enter the month or quarter in the upper block and the year in the lower block when this form is used for a yearly summary by months or quarters.

7.07 Period Total - Enter the total of the strokes when used as a stroke record form and the total troubles for the year when used as a summary form by months.

Line Headings

7.08 Line 1 - Distributing Frame - Covers troubles on the distributing frame due to faults in terminal strips or to opens, crosses, shorts and grounds in the cross-connection wires.

Includes:

(a) Troubles on working circuits due to errors in cross-connection work, cross-connection omissions or cross-connection reversals, and temporary opens, grounds, shorts, and crosses due to distributing frame activity.

(b) Loose connections between cross-connection wires and terminal strips or protectors, and troubles caused by improperly placed shoes and clips.

Does not include:

(a) Wiring troubles on the cabling side of terminal strips or protectors (see Line 15).

(b) Troubles on protectors and fuses (see Line 16).

7.09 Line 2 - Cord - Covers cord troubles in switchboard positions and miscellaneous desks. Includes troubles in patching, testing and connecting cords of telephone and telegraph testboards, circuit control boards and all miscellaneous cords.

(a) Does not include cords on operator's telephone sets (see Line 12).

7.10 Line 3 - Plug - Covers plug troubles in switchboard positions and miscellaneous desks. Includes troubles in plugs associated with patching, testing and connecting cords of telephone and telegraph testboards, circuit control boards and all miscellaneous plugs used in the test room.

(a) Does not include plugs on operator's telephone sets (see Line 12).

7.11 Line 4 - Jack - Covers all jack troubles in the switchboard and test room equipment.

(a) Includes foreign objects in jacks, such as pencil points, pins, paper, tin foil, broken plugs in jacks, wire clippings, solder splashes, etc.

(b) Does not include loose jack strips (see Line 16).

7.12 Line 5 - Lamps - Covers all troubles on lamps in the switchboard and test room equipment.

7.13 Line 6 - Key - Covers all troubles on keys in the switchboard and test room equipment.

7.14 Line 7 - A-C Relay - Covers all troubles on relays which are operated by alternating current, except demountable polar relays (see Line 9).

7.15 Line 8 - D-C Relay - Covers all troubles on relays which are operated by direct current, except demountable polar relays (see Line 9).

7.16 Line 9 - Demountable Polar Relay - Covers all troubles on demountable polar relays such as 209, 215, 228 and 255 types.

7.17 Line 10 - Busy Signal - Covers troubles on 42 type busy signals.

(a) Does not include troubles on busy lamps (see Line 5).

7.18 Line 11 - Teletypewriter - Covers troubles on teletypewriters.

7.19 Line 12 - Operator's Telephone Set - Covers all troubles on operator's telephone sets, including cord and plug troubles.

7.20 Line 13 - Calculagraph - Covers all troubles on calculagraphs.

7.21 Line 14 - Vacuum Tube - Covers all troubles on vacuum tubes.

7.22 Line 15 - Wiring - Covers all wiring and cabling troubles except cross-connection wires on the distributing frames (see Line 1). Includes all broken, loose, or otherwise defective connections between wiring and terminals of jacks, keys, lamp sockets, relays, etc., unless they are caused by defective or broken lugs, terminals, or binding posts, in which case they should be classified under the apparatus of which these items are a part.

7.23 Line 15 - Miscellaneous - Covers all troubles not coming under the above classifications.

Includes:

(a) Broken or missing lamp caps defective plug seats, loose jack strips, loose designation strips, loose lamp strips, protector, fuse and heat coil troubles, etc.

(b) Troubles due to Plant and Traffic operation.

Does not include:

(c) Troubles due to the normal operation of line circuit fuses, heat coils and protector blocks (see "Toll Circuit Trouble Summary").

7.24 Line 17 - Total - Enter the total of Lines 1 to 16.

7.25 Line 18 - Trouble Reports - Enter the number of initial "trouble reports" received using the blocks either as a stroke record or as a summary showing the total for the month or quarter.

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MANUAL TOLL AND TWX EQUIPMENT REPORTED AND ROUTINE TROUBLES

COMPANY	ALPHA
CITY	ANY
OFFICE	TOLL
PERIOD COVERED	NOVEMBER-1939

EQUIPMENT OR CIRCUIT	SWITCHBOARD AND TEST ROOM	UNITS IN SERVICE

	TROUBLE CLASSIFICATION		EXPECTANCY	MONTH OR QUARTER AND YEAR	PERIOD TOTAL
1	DIST. FRAME	T		//	2
		R			0
2	CORD	T		////	5
		R		//// ///	8
3	PLUG	T		///	3
		R		////	5
4	JACK	T		//	2
		R		/	1
5	LAMP	T		//// /	6
		R		/	1
6	KEY	T		//	2
		R		/	1
7	RELAY A.C.	T		//	2
		R		//// ////	10
8	RELAY D.C.	T		/	1
		R		////	4
9	RELAY DEMOUNTABLE POLAR	T		//// /	6
		R		//// //// /	11
10	BUSY SIGNAL	T		/	1
		R			0
11	TELETYPEWRITER	T		//	2
		R		//// /	6
12	OPERATOR'S TEL. SET	T		///	3
		R		//// //// //// ///	18
13	CALCULAGRAPH	T		/	1
		R		//// //// //	12
14	VACUUM TUBE	T			0
		R		//// ///	9
15	WIRING	T		////	4
		R		//	2
16	MISCELLANEOUS	T		///	3
		R		//// //	7
17	TOTAL FOUND TROUBLES	T			43
		R			95
18	TOTAL TROUBLE REPORTS			//// //// //// //// //// //// //// //// //// //// //// //// //// ///	68

SAMPLE #1 DAILY STROKE RECORD

T - REPORTED TROUBLES

R - ROUTINE TROUBLES

MANUAL TOLL AND TWX EQUIPMENT REPORTED AND ROUTINE TROUBLES

COMPANY	ALPHA
CITY	ANY
OFFICE	TOLL
PERIOD COVERED	YEAR - 1939

EQUIPMENT OR CIRCUIT	SWITCHBOARD AND TEST ROOM	UNITS IN SERVICE

SAMPLE #2 YEARLY SUMMARY BY MONTHS

	TROUBLE CLASSIFICATION		EXPECTANCY	JAN. 39	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP	OCT.	NOV.		PERIOD TOTAL
1	DIST. FRAME	T	2	4	2	5	3	2	1	4	6	3	4	2		
		R		0	1	0	0	1	0	0	0	1	0	0		
2	CORD	T	4	3	4	2	7	2	5	4	2	5	6	5		
		R		6	4	5	7	6	9	8	10	7	12	8		
3	PLUG	T	5	7	6	2	5	3	4	7	2	8	6	3		
		R		8	6	9	5	10	6	12	8	3	7	5		
4	JACK	T	3	2	4	1	5	3	2	1	1	5	1	2		
		R		0	0	0	2	0	3	0	0	0	1	1		
5	LAMP	T	3	10	6	8	9	4	7	9	15	11	4	6		
		R		0	1	0	3	0	0		0	0	1	1		
6	KEY	T	5	1	4	3	2	4			6	1	2	2		
		R		3	2	2	4	1				5	2	1		
7	RELAY A.C.	T	4	1	6	3	2					2	5	2		
		R		5	7	6	3					6	8	10		
8	RELAY D.C.	T	5	5	5	4					7	4	3	1		
		R		2	5	1	4				2	3	2	4		
9	RELAY DEMOUNTABLE POLAR	T	5	2	6	4	5				7	4	2	5	6	
		R		3	7	4	10	9			7	12	8	10	11	
10	BUSY SIGNAL	T	4	2	6	1	4	5	3	2	5	7	3	1		
		R		5	1	3	6	4	2	7	4	2	1	0		
11	TELETYPEWRITER	T	2	1	0	2	1	3	0	5	3	4	1	2		
		R		2	4	1	5	3	2	5	4	3	2	6		
12	OPERATOR'S TEL. SET	T	5	6	3	4	5	7	3	2	1	4	5	3		
		R		8	10	15	12	9	14	12	8	6	15	18		
13	CALCULAGRAPH	T	3	2	4	3	4	5	1	4	2	3	4	1		
		R		8	6	5	4	5	8	6	4	10	7	12		
14	VACUUM TUBE	T	1	1	0	0	0	2	0	1	3	0	1	2		
		R		2	4	1	5	3	7	6	2	5	3	9		
15	WIRING	T	6	5	3	8	4	2	5	7	4	8	6	4		
		R		1	0	0	1	0	2	0	0	0	1	2		
16	MISCELLANEOUS	T	5	6	4	5	3	7	4	2	6	1	4	3		
		R		2	2	3	4	1	2	4	3	5	4	7		
17	TOTAL FOUND TROUBLES	T	65	58	63	55	61	63	50	65	72	68	60	45		
		R		56	60	56	75	62	75	84	67	64	76	95		
18	TOTAL TROUBLE REPORTS			72	86	70	89	95	81	102	91	105	79	68		

T - REPORTED TROUBLES R - ROUTINE TROUBLES

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MANUAL TOLL AND TWX EQUIPMENT REPORTED AND ROUTINE TROUBLES

COMPANY	ALPHA
CITY	ANY
OFFICE	TOLL
PERIOD COVERED	NOVEMBER - 1939

EQUIPMENT OR CIRCUIT	TOLL CORD CIRCUITS	UNITS IN SERVICE

	TROUBLE CLASSIFICATION		EXPECTANCY	MONTH OR QUARTER AND YEAR	PERIOD TOTAL
1	DIST. FRAME	T			
		R			
2	CORD	T	4	𝍸	5
		R		𝍸 III	8
3	PLUG	T	5	III	3
		R		𝍸	5
4	JACK	T			
		R			
5	LAMP	T	8	𝍸 I	6
		R		I	1
6	KEY	T	3	I	1
		R		𝍸 III	8
7	RELAY A.C.	T	2	I	1
		R		III	3
8	RELAY D.C.	T	2		
		R			
9	RELAY DEMOUNTABLE POLAR	T			
		R			
10	BUSY SIGNAL	T			
		R			
11	TELETYPEWRITER	T			
		R			
12	OPERATOR'S TEL. SET	T			
		R			
13	CALCULAGRAPH	T			
		R			
14	VACUUM TUBE	T			
		R			
15	WIRING	T			
		R			
16	MISCELLANEOUS	T	1	I	1
		R		II	2
17	TOTAL FOUND TROUBLES	T	25		17
		R			27
18	TOTAL TROUBLE REPORTS			𝍸 𝍸 𝍸 𝍸 𝍸	25

SAMPLE #3
CIRCUIT GROUP ANALYSIS

T - REPORTED TROUBLES

R - ROUTINE TROUBLES

MANUAL TOLL AND TWX EQUIPMENT REPORTED AND ROUTINE TROUBLES

COMPANY ALPHA
CITY ANY
OFFICE TOLL
PERIOD COVERED YEARS - 1939 - 1941

EQUIPMENT OR CIRCUIT: SWITCHBOARD AND TEST ROOM

UNITS IN SERVICE:

SAMPLE #4 QUARTERLY SUMMARY

	TROUBLE CLASSIFICATION		EXPECTANCY	MONTH OR QUARTER AND YEAR 1 1939	2	3	4	1 1940	2	3	4	1 1941	2	3	4	PERIOD TOTAL
1	DIST. FRAME	T	6	11	6	13										
		R		1	1	1										
2	CORD	T	12	9	14	12										
		R		15	22	17										
3	PLUG	T	15	15	12	17										
		R		23	21	23										
4	JACK	T	9	7	10	7										
		R		0	5	0										
5	LAMP	T	24	24	20	35										
		R		1	3	2										
6	KEY	T	9	8	7	10										
		R		7	8	11										
7	RELAY A.C.	T	12	10	11	9										
		R		18	15	20										
8	RELAY D.C.	T	15	14	12	15										
		R		8	14	10										
9	RELAY DEMOUNTABLE POLAR	T	15	12	14	17										
		R		14	24	27										
10	BUSY SIGNAL	T	12	9	12	14										
		R		9	12	13										
11	TELETYPEWRITER	T	6	3	4	12										
		R		7	10	12										
12	OPERATOR'S TEL. SET	T	15	13	15	7										
		R		33	35	26										
13	CALCULAGRAPH	T	9	9	10	9										
		R		19	17	20										
14	VACUUM TUBE	T	3	1	2	4										
		R		7	15	13										
15	WIRING	T	18	16	11	19										
		R		1	3	0										
16	MISCELLANEOUS	T	15	15	14	9										
		R		7	7	12										
17	TOTAL FOUND TROUBLES ①	T	195	176	174	209										
		R		170	212	207										
18	TOTAL TROUBLE REPORTS			228	265	298										

T - REPORTED TROUBLES

R - ROUTINE TROUBLES