INTERNATIONAL TELECOMMUNICATION UNION

ITU-T R.90

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TELEGRAPH TRANSMISSION

ORGANIZATION FOR LOCATING AND CLEARING FAULTS IN INTERNATIONAL TELEGRAPH SWITCHED NETWORKS

ITU-T Recommendation R.90

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation R.90 was published in Fascicle VII.1 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation R.90

ORGANIZATION FOR LOCATING AND CLEARING FAULTS IN INTERNATIONAL TELEGRAPH SWITCHED NETWORKS

(former CCIT Recommendation B.55, Geneva, 1956; amended at New Delhi, 1960 and Malaga Torremolinos, 1984)

The CCITT,

considering

(a) that it is desirable that faults affecting communication between stations on international switching networks (e.g. telex and gentex service) should be reported and cleared as quickly as possible;

(b) that it is necessary to unify the essential action to be taken and methods to be employed for locating and clearing faults;

(c) that, for this purpose, it is necessary to determine the essential testing equipment that is to be provided at the switching centres responsible for locating and clearing faults,

unanimously declares the view

1 That it is necessary to set up switching and testing centres (STCs), defined as switching centres equipped with measuring equipment for testing telex subscribers' and public station lines and equipment and also telegraph channels.

2 Each telex subscriber and each public station in the general switching service should have access to an STC for the purpose of reporting faults and cooperating in tests.

3 International switching and testing centres (ISTCs) are the STCs that are also international line-head offices.

4 All STCs should be subscribers to the telex network, both for the purpose of receiving fault reports and for communication for maintenance purposes. They should also be provided with a telephone subscriber's line.

5 Each STC should be responsible for coordinating action in locating and clearing faults on all station lines connected to the exchange and on all trunk circuits for which it is nominated as the controlling office. It should also cooperate with other STCs in locating faults on connections established through two or more exchanges.

5.1 It should carry out a preliminary location of faults by finding out whether they affect channels, switching gear or apparatus. The faults are then accurately located by the engineers responsible for each part of the circuit and the STC cooperates with them for this purpose. It may assume the direction of the fault-locating procedure should there be disagreement between these services. Internationally, it is responsible to the STCs of other countries with which it has telex connections.

5.2 The organization of the liaison between the STC and the different technical services is shown in Figure 1/R.90. The STCs must check that the performance given by the equipment involved in the switching service, i.e. VF channels, switching equipment and apparatus, is satisfactory.

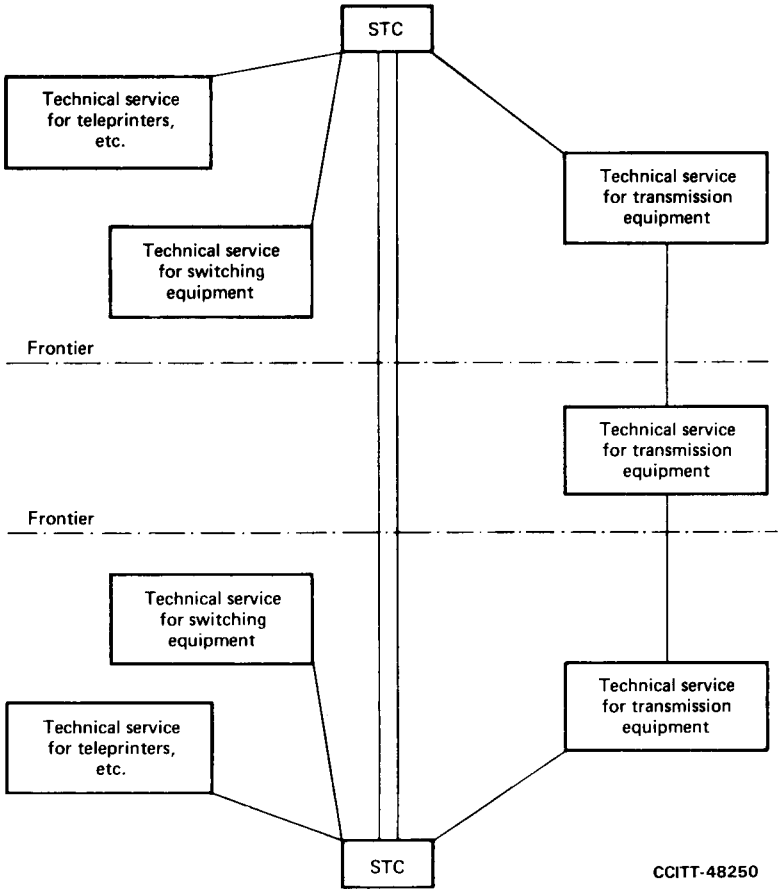

FIGURE 1/R.90

Maintenance organization

6 The staff employed at STCs should be selected with a view to avoiding language difficulties and should be conversant with all types of telegraph equipment used in the switching network, i.e. automatic or manual switching equipment, VFT equipment, telegraph machines and regenerative repeaters. The staff need not necessarily be fully competent to maintain all these items of equipment, but should have sufficient knowledge of them to be able to form an appreciation of the effect that faults on any of them may have on a switched connection. In addition, the staff of ISTCs should have some general knowledge of the types of equipment used in the countries to which they are connected, particularly of the signalling conditions that will be encountered.

7 Each STC should be provided with the following measuring equipment:

a) 50-baud start-stop distortion meter;

b) test transmitter for generating undistorted 50-baud start-stop signals;

c) apparatus to measure the modulation rate of teleprinters at a distance;

d) apparatus for measuring the speed and pulse ratio of dials, where appropriate;

e) apparatus for measurement of the condition of direct current lines; for example, continuity, resistance, insulation.

7.1 The arrangements for access to established connections for making test measurements should be such as not to cause interruptions or reduce the quality of transmission.

7.2 Considering that some Administrations have found it desirable to have available at the STC other items of apparatus to expedite the clearing of faults, all Administrations are invited to consider the utility of these devices, namely:

a) apparatus for measuring teleprinter margin;

b) recording distortion meters for testing established connections;

c) apparatus for measuring continuously, periodically and automatically, the distortion on subscribers' lines and apparatus.

8 The following procedure for reporting, locating and clearing faults should be adopted.

8.1 Faults should be reported to the STC concerned by the subscribers or operators who have experienced difficulty in operation. In the same way, it would be useful, in order to give the STCs a full picture of the situation, that the maintenance engineers should inform them of faults noted during the periodic maintenance operations. Faults should preferably be signalled by teleprinter, if their nature does not preclude this procedure.

8.2 A reference number should be given by the STC to the subscriber or service notifying the fault. This number can then be quoted in any subsequent inquiries as to the progress of fault clearance.

8.3 On account of the difficulties that may arise in the detection of faults on the international section of a communication (due to lack of knowledge of languages, etc.), care should be taken in each country to see that the national sections of the communication, including subscribers' lines and apparatus, are not involved before approaching the STC of the corresponding country.

8.4 Complete holding of a connection that is reported to be faulty should be avoided.

8.5 The STC notified of a fault should therefore begin by ascertaining that it is not located in the national section of the communication and for this purpose should, if necessary, approach the other STCs of its country concerned in the circuit. The STC of the distant country is then advised and, in turn, checks the national section routed over its network. The international section of the communication is not checked until the terminal national sections of telegraph circuits have been definitely exonerated. The STCs in different countries will communicate with one another, either directly or via their ISTCs, as determined by the Administrations concerned.

8.6 If the tests of the two local ends fail to reveal any fault conditions, the STC should report the fault to its ISTC, which will decide what further action, if any, is necessary. As a rule, isolated fault reports would not justify a test of all trunk circuits on a route, and it would be assumed that the condition giving rise to the fault would be cleared on the next routine adjustment. If however, several fault reports were received, some of which might have been due to a faulty circuit on a particular route, then a special routine test of all the circuits on the route might be justified.

8.7 In general, it is considered that the procedure will be broadly the same for manual, semi-automatic and automatic systems.

9 The abbreviations annexed below should be used in calls exchanged between services responsible for the maintenance of telegraph equipment.

ANNEX A

(to Recommendation R.90)

List of service abbreviations for maintenance of telegraph circuits

No.	*Abbreviation*	*Meaning*
30 *bis*	**BL**	Holding
30	**BL . . . SVP**	Please hold . . .
2	**BR TR . . .**	Bad transmission on . . .
39 *bis*	**CCT . . . IN**	I have restored circuit No. . . .
39	**CCT . . . IN SVP**	Please restore circuit No. . . .
38 *bis*	**CCT . . . OUT**	I have taken circuit No. . . . out of service
38	**CCT . . . OUT SVP**	Please take circuit No. . . . out of service
43	**CRD . . .**	The connection is released after selection on circuit No. . . .
37 *bis*	**CSR**	I am receiving your calling signal
8	**DER CCT**	Circuit faulty
51	**DER REG**	Register does not operate
52	**DER TAPE**	Your perforated tape is faulty
33	**DER VF . . .**	Fault on voice-frequency system . . .
7	**DERA**	Machine faulty
9	**DERPS**	Position equipment faulty
10	**DERR**	Fault now cleared
64	**DEVD**	Deviation of distributor speed at your end
23	**DEVS . . .**	Speed deviation is . . . %
16	**. . . DIS . . .**	The distortion on is . . . %
62	**DS . . .**	Distribution switched over to . . .
25	**EDIS . . .**	The transmitter distortion is . . . %
1	**ICI . . .**	Here is . . .
53 *bis*	**LOOP . . .**	I have looped circuit . . .
53	**LOOP . . . SVP**	Please loop circuit . . .
24	**MAR . . .**	The margin is . . . %
18	**MEET . . .**	Meet me on circuit No. . . .
50	**N IND**	I am not receiving your answer-back code
40	**N PER A**	I am not receiving your permanent start polarity signal
41	**N PER Z**	I am not receiving your permanent stop polarity signal
66	**NARQ . . .**	Multiplex . . . unprotected; please re-establish automatic request for repetition (ARQ)
31 *bis*	**NBL . . .**	Clearing
31	**NBL . . . SVP**	Please clear . . .
27	**NCFM . . .**	No call-confirmation signal on . . .
26	**NCS . . .**	No call-connected signal from . . .

11	**NDER**	No fault found
42	**NPS**	I am not receiving your proceed-to-select signal
28	**OCC OCC. . .**	Permanent busy signal from . . .
65	**OPH . . .**	Out of phase on system . . .
46	**PER A . . .**	Permanent start polarity on . . .
48	**PER A . . . SVP**	Please send permanent start polarity on . . .
47	**PER Z . . .**	Permanent stop polarity on . . .
49	**PER Z . . . SVP**	Please send permanent stop polarity on . . .
29	**PERC . . .**	Permanent call on . . .
63	**PH . . .**	Please phase system . . .
34 *bis*	**Q DIS A**	Is there bias distortion (prolonged start polarity) on the received signals?
35 *bis*	**Q DIS Z**	Is there bias distortion (prolonged stop polarity) on the received signals?
13	**QDIS . . .**	Please measure distortion on . . . and report result
37	**QRCS**	Are you receiving my calling signal?
3	**QREF**	Please give reference number
4	**QRES**	Please report result
15	**RAP . . . MNS**	I shall recall you in . . . minutes
14	**RAP . . . MNS SVP**	Please call me in . . . minutes
5	**REF . . .**	Reference number is . . .
6	**RES . . .**	Here is result of test on . . .
55	**RFC . . .**	I am receiving errors in 5-unit code. Please check channel No. . . .
70	**RMUT . . .**	I am receiving garbled signals on multiplex channel . . . please check your 7-unit code
54	**RQFS . . .**	Your repetition cycle transmission contains 7-unit code faults. Please check channel No. . . .
59	**RS . . .**	Reception switched over to . . .
44	**SIG 1/1 SVP**	Please send 1:1 signals
45	**SIG 2/2 SVP**	Please send 2:2 signals
61	**SS . . .**	Storage switched over to . . .
12	**TESTD . . . SVP**	Please send test message with . . . % distortion on . . .
67	**TRAS . . .**	Please send alpha signal on multiplex channel . . .
68	**TRBS . . .**	Please send beta signal on multiplex channel . . .
60	**TRS . . .**	Transmission switched over to . . .
21	**VERED**	Please check the transmitter distortion
22	**VERM**	Please check the margin
20	**VERS**	Please check the speed
19	**VERX . . .**	Please check subscriber No. . . .
34	**ZKWA . . .**	The received signals have . . . % bias (start polarity prolonged)
35	**ZKWZ . . .**	The received signals have . . . % bias (stop polarity prolonged)
32	**ZOK**	I am receiving correctly
17	**ZSU**	Your signals are unreadable
71	**ZYA**	Cease traffic on all channels; send **As** on A channel for line-up

69	**ZYC**	Your transmitter is sending permanent ARQ
56	**ZYK . . .**	Your keying on channel . . . is affected; please check
57	**ZYM**	Change from single printer to multiplex
36	**ZYN**	Reduce the bias
58	**ZYP**	Change from multiplex to single printer