INTERNATIONAL TELECOMMUNICATION UNION

ITU-T E.510

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

TELEPHONE NETWORK AND ISDN

QUALITY OF SERVICE, NETWORK MANAGEMENT AND TRAFFIC ENGINEERING

DETERMINATION OF THE NUMBER OF CIRCUITS IN MANUAL OPERATION

ITU-T Recommendation E.510

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation E.510 was published in Fascicle II.3 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 E.510[1)]

DETERMINATION OF THE NUMBER OF CIRCUITS IN MANUAL OPERATION

1 The quality of an international manual demand service should be defined as the percentage of call requests which, during the average busy hour (as defined later under § 3) cannot be satisfied immediately because no circuit is free in the relation considered.

By *call requests satisfied immediately* are meant those for which the call is established by the same operator who received the call, and within a period of two minutes from receipt of that call, whether the operator (when she does not immediately find a free circuit) continues observation of the group of circuits, or whether she makes several attempts in the course of this period.

Ultimately, it will be desirable to evolve a corresponding definition based on the *average speed* of establishing calls in the busy hour, i.e. the average time which elapses between the moment when the operator has completed the recording of the call request and the moment when the called subscriber is on the line, or the caller receives the advice *subscriber engaged*, *no reply*, etc. But for the moment, in the absence of information about the operating time in the European international service, such a definition cannot be established.

2 The number of circuits it is necessary to allocate to an international relation, in order to obtain a given grade of service, should be determined as a function of the *total holding time* of the group in the busy hour.

The total holding time is the product of the number of calls in the busy hour and a factor which is the sum of the average call duration and the average operating time.

These durations will be obtained by means of a large number of observations made during the busy hours, by agreement between the Administrations concerned. If necessary, the particulars entered on the tickets could also serve to determine the average duration of the calls.

The average call duration will be obtained by dividing the total number of minutes of conversation recorded by the recorded number of effective calls.

The average operating time will be obtained by dividing the total number of minutes given to operating (including ineffective calls) by the number of effective calls recorded.

3 The number of calls in the busy hour will be determined from the average of returns taken during the busy hours on a certain number of busy days in the year.

Exceptionally busy days, such as those which occur around certain holidays, etc., will be eliminated from these returns. The Administrations concerned should plan, whenever possible, to put additional circuits into service for these days.

In principle, these returns will be taken during the working days of two consecutive weeks, or during ten consecutive working days. If the monthly traffic curve shows only small variations, they will be repeated twice a year only. They will be taken three or four times a year or more if there are material seasonal variations, so that the average established is in accordance with all the characteristic periods of traffic flow.

4 The total occupied time thus determined should be increased by a certain amount determined by agreement between the Administrations concerned according to the statistics of traffic growth during earlier years, to take account of the probable growth in traffic and the fact that putting new circuits into service takes place some time after they are first found to be necessary.

5 The total holding time of the circuits thus obtained, in conjunction with a suitable table (see Table 1/E.510), will enable the required number of circuits to be ascertained.

---

1) This Recommendation dates from the XIIIth Plenary Assembly of the CCIF (London, 1946) and has not been fundamentally revised since. It was studied under Question 13/II in the Study Period 1968-1972 and was found to be still valid.

6 In the international manual telephone service, the following Tables A and B should be used as a basis of minimum allocation:

Table A corresponds to about 30% of calls failing at the first attempt because of all circuits being engaged and to about 20% of the calls being deferred.

Table B, corresponding to about 7% of calls deferred, will be used whenever possible.

These tables do not take account of the fact that the possibility of using secondary routes permits, particularly for small groups, an increase in the permissible occupation time.

TABLE 1/E.510

Capacity of circuit groups
(See Supplement No. 2 - Fascicle II.3 of the Blue Book)

Number of circuits	Table A		Table B	
	Percentage of circuit usage	Minutes of circuit usage possible in the busy hour	Percentage of circuit usage	Minutes of circuit usage possible in the busy hour
1	65.0	39	–	–
2	76.7	92	46.6	56
3	83.3	150	56.7	102
4	86.7	208	63.3	152
5	88.6	266	68.3	205
6	90.0	324	72.0	259
7	91.0	382	74.5	313
8	91.7	440	76.5	367
9	92.2	498	78.0	421
10	92.6	556	79.2	475
11	93.0	614	80.1	529
12	93.4	672	81.0	583
13	93.6	730	81.7	637
14	93.9	788	82.3	691
15	94.1	846	82.8	745
16	94.2	904	83.2	799
17	94.3	962	83.6	853
18	94.4	1020	83.9	907
19	94.5	1078	84.2	961
20	94.6	1136	84.6	1015

Note – Tables A and B can be extended for groups comprising more than 20 circuits by using the values given for 20 circuits.