TELEPHONE TRAFFIC - DIAL CENTRAL OFFICE EQUIPMENT SWITCH QUANTITIES

Purpose: The purpose of this addendum is to describe in detail the calculation of the number of trunks required when an interoffice group is divided into one-way and two-way subgroups as described in Paragraphs 4.2, 4.4, and 4.55. Directional splitting is economical on EAS groups of 11 or more trunks and it often is advantageous on toll connecting groups. The traffic on a toll group between a tributary and its toll center may be unequal in the two directions during some hours because of the effect of time zones and reduced rate periods. Also, when DDD service is provided over a one-way group to the ticketing center, the remaining toll trunks will carry more inward than outward traffic. These factors must be taken into account in any directional division of a toll group in order to avoid an adverse effect on service.

Additions: 4.41 Paragraph 4.4 of this section states that " - - - it will be satisfactory to assume that combination trunk groups are as efficient as a regular graded group." For most REA systems this has been sufficiently accurate. However, there is some loss in efficiency when trunk groups are divided directionally, even where there are some two-way trunks in the group. The load that can be carried on divided groups is shown in attached Table 1.

4.42 The trunk group capacities in Table 1 were derived from the following equation:

$$\text{Capacity total group } (2A + B) = \text{Capacity } (A + B) \ \frac{2A + B}{A + B}$$

Where:

A = number of one-way trunks in each direction (traffic assumed equal in two directions).

B = number of two-way trunks.

For example, with a group of 16 trunks divided into 4 in each direction and 8 in both directions A = 4 B = 8

Capacity of a group of (A + B) or 12 trunks (P = .03) = 230 unit calls (REA TE & CM-510 - Figure 2A)

$$\text{Capacity of } (2A + B) \text{ or } 16 \text{ trunks} = 230 \ \frac{8 + 8}{4 + 8} = 307 \text{ u.c.}$$

A group of 16 two-way trunks with regular grading has a capacity of 318 u.c. at P = .03 grade of service. (Figure 2A). The loss of efficiency, therefore, by splitting the group as indicated is 318-307 = (11 ÷ 318) x 100 or 3.3 percent.

By the use of the above equation, the capacity of a divided trunk group can be calculated for any combination of one-way and two-way trunks.

In practice, it is considered advisable to provide a minimum of 5 two-way trunks for groups of up to 25 trunks to care for normal fluctuations in the flow of traffic in the two directions.

4.43 Attached Table 1 and Figure 1 show the recommended division of trunks and the grading for divided groups of 11 to 25 trunks at both terminals of a trunk group. The grading was developed on the basis of using all 10 terminals of the selector banks. Other combinations, of course, are possible and the capacity of any trunk split can be calculated as described.

4.44 If there is reason to believe that the traffic on a group is not equal in the two directions, a different number of one-way trunks in the two directions may be provided. This will be the case in a toll group handling outward CLR plus inward traffic when a separate group is used for access to DDD. In practice, it is not customary to divide such groups except perhaps for those with 11 or 12 trunks where the last one or two trunks might require an extra shelf in a step-by-step office.

4.45 On any divided group it is suggested that the trunk overflow registrations at the two terminals be compared at regular intervals and, if there is a material difference, adjustments be made in the number of one-way trunks assigned to each office.

TRUNK CAPACITY TABLE FOR DIVIDED GROUPS
TEN-TERMINAL ACCESS

Number of Trunks				Capacity-Unit Calls Grade of Service		
Total	In	Out	Two-Way	P = .01	P = .03	P = .05
11	1	1	9	164	196	215
12	2	2	8	179	214	234
13	3	3	7	194	232	254
14	4	4	6	209	249	273
15	5	5	5	224	267	293
16	4	4	8	259	307	328
17	4	4*	8#	273	323	345
18	5	5	8#	286	338	362
19	6	6	7	313	368	393
20	6	6*	7#	327	384	410
21	7	7	7#	340	399	426
22	8	8	6	366	430	460
23	8	8*	6#	380	446	478
24	9	9	6#	394	462	496
25	10	10	5	420	493	530

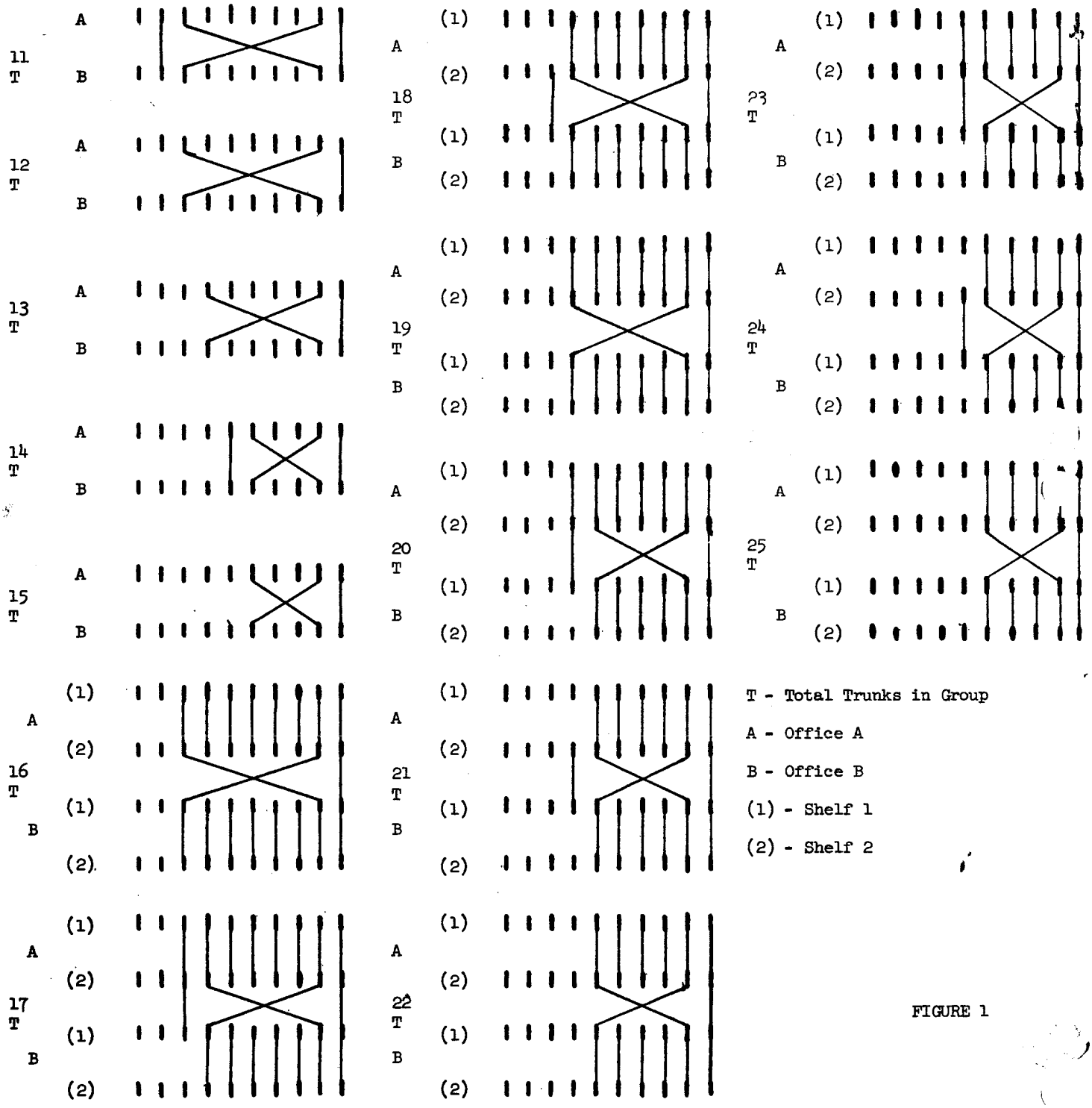
* One more in one direction. See Figure 1

\# One not terminated on one shelf. See Figure 1

TABLE 1

GRADED MULTIPLE ARRANGEMENTS

TRUNK GROUPS DIVIDED DIRECTIONALLY



T - Total Trunks in Group

A - Office A

B - Office B

(1) - Shelf 1

(2) - Shelf 2

FIGURE 1