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REPORT ON JAKARTA CITY TELEPHONE NETWORK PLANNING

VOLUME IV

March 1976

JAPAN INTERNATIONAL COOPERATION AGENCY

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CHAPTER 8 CONSTRUCTION COST ESTIMATE BY YEAR

8.1 General Description

This chapter presents the construction cost estimate covering the building, switching equipment, cable, civil and telephone installation cost required for completion of local telephone network. (Cost of toll facilities is excluded.)

The construction cost estimate is projected for the undermentioned two plans. The projection is based on PERUMTEL Plan for 1979 and JTP Expansion Plan for 1983, 1988 and 1993 shown in Fig. 8.1.(4). The construction cost is determined by estimating the contract amount agreed upon between PERUMTEL and the Contractor.

Plan 1   (Demand fulfilment rate in 1979:   90%)

Manhole construction and conduit laying before completion of road construction are not desirable. Therefore, in the areas where road construction has not yet been completed, the telephone expansion work will be carried out after completion of road construction. It follows that the telephone demand in such areas will be kept unsatisfied until that time.

Considering the progress of road construction, the areas where road construction has not yet been completed are classified into the following three categories:

a)   Areas where the expansion work is not desirable until 1979

b)   Areas where the expansion work is not desirable until 1983

c)   Areas where the expansion work is not desirable until 1988

Plan 2   (Demand fulfilment rate in 1979:   100%)

The assumption is set to the effect that although manhole construction and conduit laying are difficult considering the progress of road construction, such civil engineering works will be completed by 1979 in all the areas. It follows, therefore, that the telephone demand will be satisfied 100% by that time.

It is also so planned that in the service area where the telephone exchange office has not yet been completed, additional subscriber cables will be laid from the nearby existing exchange office, by considering the D.C. resistance limit value of subscriber lines.

In both Plan 1 and Plan 2 the building and switching equipment expansion plan is of the same scale, so that the construction cost defference between the two plans arises from the outside plan expansion plan including telephone installation (according to the degree of demand to be satisfied).

In this cost estimate projection the unit construction cost as of 1974 remains unchanged until 1993. However, the actual unit cost will change in accordance with the rise of material and work cost. When based on JTP telephone demand forecast, Demand Fulfilment Plan 1 and plan 2 will be as follows:

Table 8.1.(1) Demand Fulfilment Plan Unit in thousands

	1975 ~ 1979	1980 ~ 1983	1984 ~1988	1989 ~ 1993
Plan – No. 1	116	100	188	361
Plan – No. 2	138	85	185	357
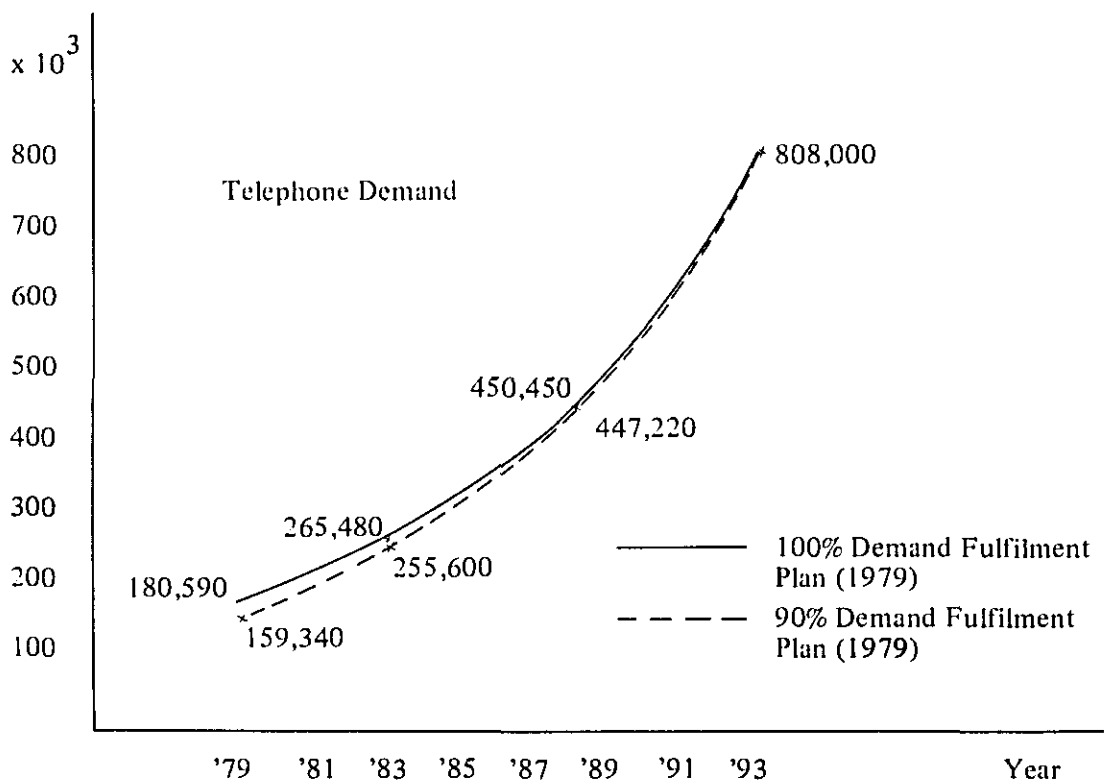
Exchange Office Establishment Plan

As stated in Chapter 5, the number of exchange offices to be established according to JTP exchange office establishment plan is 26 by 1979 and 35 by 1993.

When the work period is relatively long (2-3 years, for instance, for exchange office construction), it must be carefully studied whether to set the time of disbursement at the starting year or at the completion year of the work. In this chapter, however, the construction cost calculation for each base year is carried out on an assumption that the disbursement is to be made in the completion year.

Pluit
(73)

(A)
Kota

(A)
Tg.P

Slipi

(A)

(A)

ayoran
(A)

(A)

Cipete

Gandaria

(Existing)

('75 ~ '79)

('80 ~ '83)

('84 ~ '88)
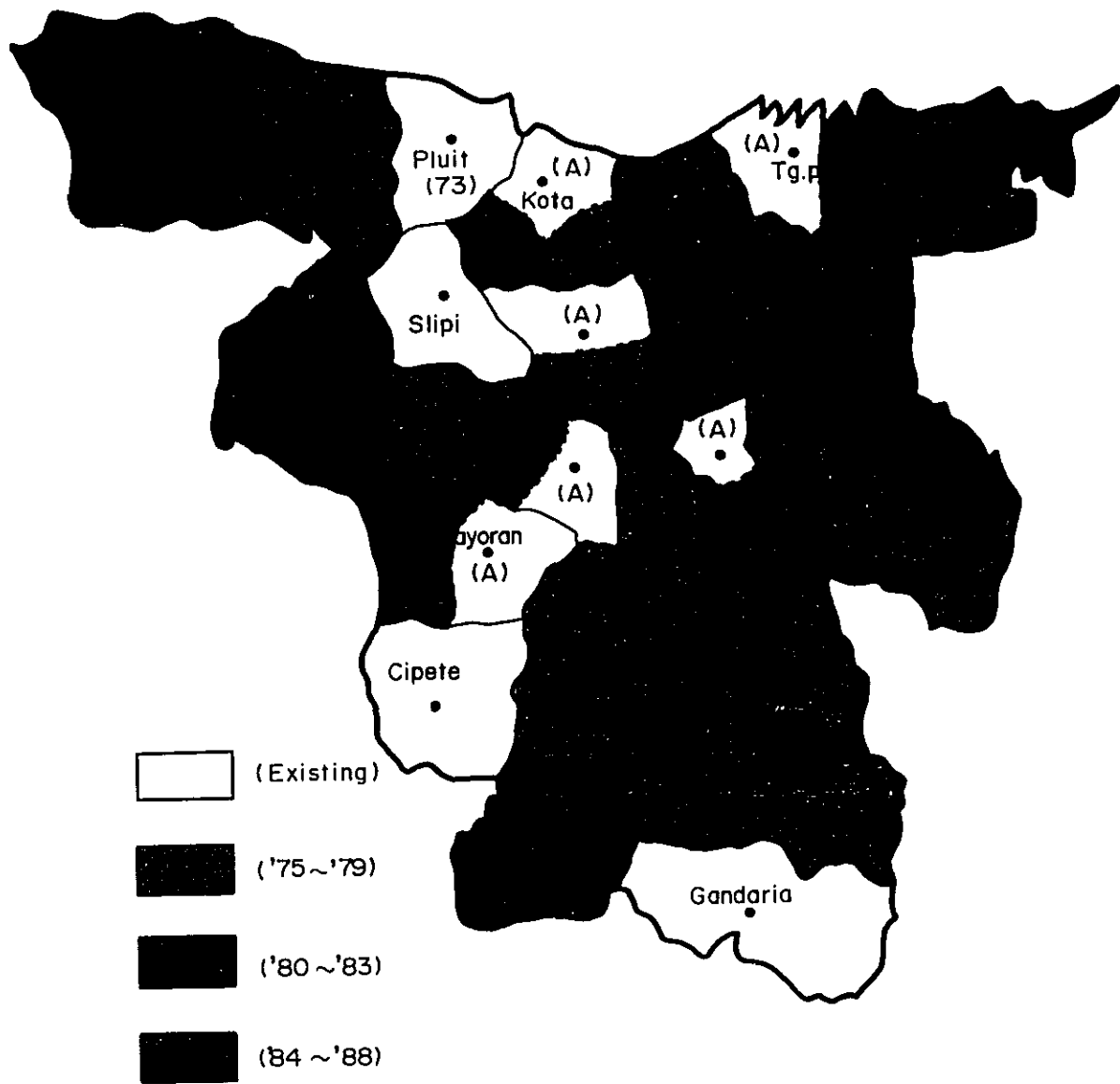
FIG. 8-I-(2)   BUILDING ESTABLISHMENT PLAN

Following is the definition of special terms and marks used in this chapter:

1) Special Terms
   a) Total construction cost = exchange office building cost + switching equipment cost + cable cost + civil cost + telephone installation cost
   b) New subscribers = Number of subscribers newly served during the year concerned
   c) Cable structure = overhead cable, direct buried cable, conduit cable
   d) Area classification = residential area, office building area, commercial area, industrial area, etc.

2) Marks
   a) Telephone demand density per hectare of service area of each exchange office is divided into the following three categories:
      I: Telephone demand density (0 - 15) in 1993
      II: Telephone demand density (16 - 30) in 1993
      III: Telephone demand density (31 or more) in 1993
   b) Telephone demand density per hectare of distribution block area is divided into the following category
      A: Telephone demand densi. '0 - 15) in 1993
      B: Telephone demand density (· 30) in 1993
      C: Telephone demand density (31   nore) in 1993
   c) The following marks are used in the cla. 'ication of outside plant expansion plan in consideration of road construction.
      G1: Distribution block area where the expan 'on work is not desirable until 1988
      G2: Distribution block area where the expansion work is not desirable until 1983
      G3: Distribution block area where the expansion work is not desirable until 1979
      G4: Developing area where the change of development pattern is conspicuous
      G5: Developed area where the development pattern is stabilized

8.2 Exchange Office Building

Exchange office building cost consists of land cost and construction cost. Land cost varies to a great extent, depending upon the location, so that it is extremely difficult to estimate the exchange office land cost. The land cost estimate shown in Table 8.1.(1) has been prepared by comparison with the cost of other land in the similar condition.

The size of land for exchange office is determined by the size of telephone demand in
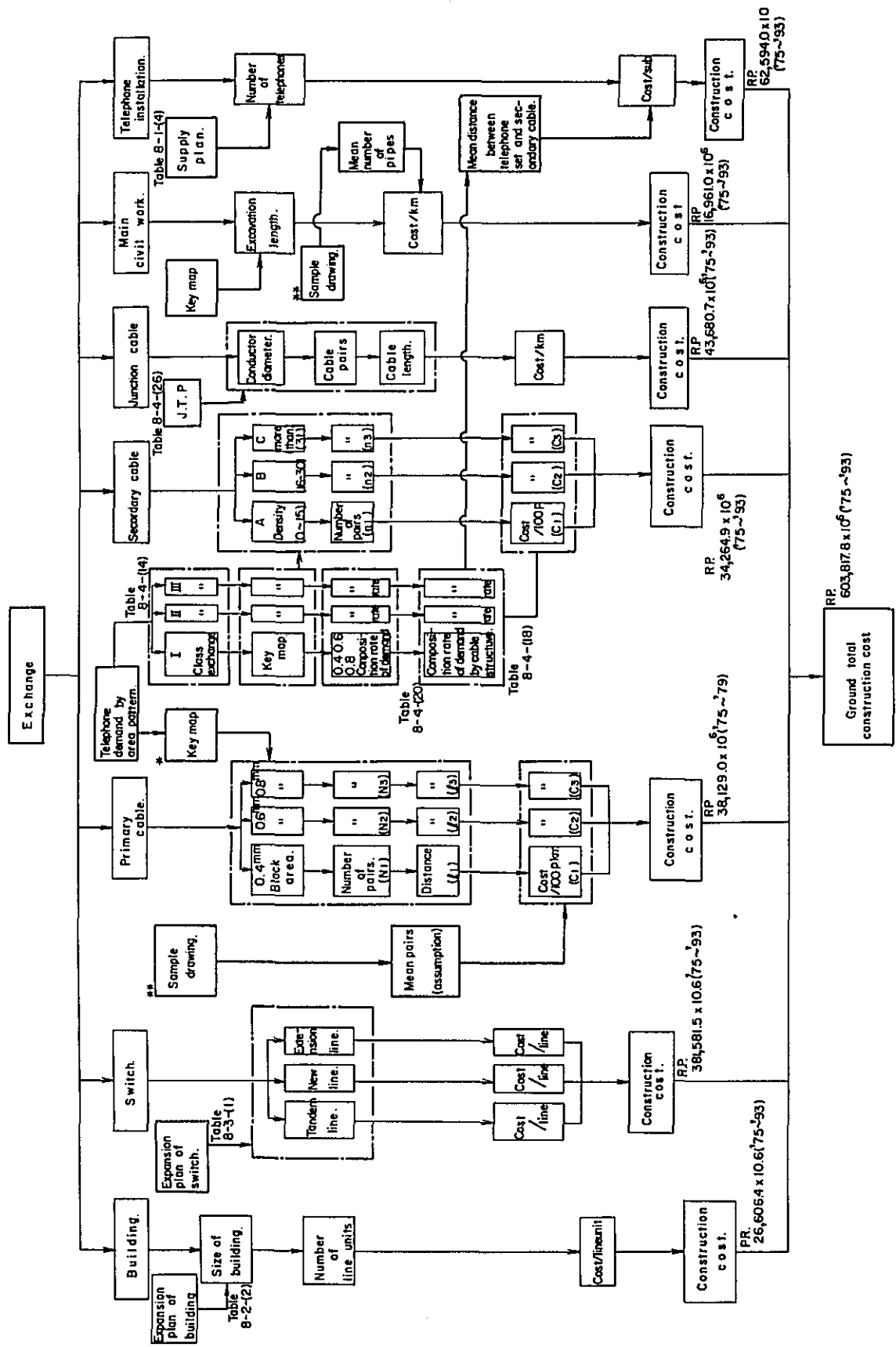
FIG. 8-1-(3)　WORK FLOW OF CONSTRUCTION COST ESTIMATION

TABLE 8-1-(4) TELEPHONE DEMAND FULFILMENT PLAN.

No	Name of Exchange	1979 Demand	1979 Fulfilment	1983 Demand	1983 Fulfilment	1988 Demand	1988 Fulfilment	1993 Demand	1993 Fulfilment	Subscriber (1974)
1	Kota (A)	8500 (25649)	8200 (25119)	11100 (2600)	11100 (2900)	15100 (4000)	15100 (4000)	20900 (5800)	20900 (5800)	
2	" (B)	13100 (6000)	13030 (6070)	19100	19100	33800 (14700)	33800 (14700)	57100 (23300)	37100 (23300)	8951
3	" (C)	13000 (3650)	12840 (2270)	18000 (3100)	18000 (2630)	26400 (7000)	26400 (7250)	39400 (13800)	39400 (15400)	
4	Ancol.	4400 (5081)	3020 (4331)	7500 (2300)	5650 (3050)	14500 (4200)	12900 (4200)	28300 (6600)	28300 (6600)	750
5	Pluit.	5700 (1253)	4950 (843)	8000 (1250)	8000 (1660)	12200 (3450)	12200 (3450)	18800 (8600)	18800 (8600)	619
6	Cengkareng.	1300	890	2550 (770)	2550 (990)	6000 (2300)	6000 (2810)	14600 (5500)	14600 (5500)	47
7	Tegal Alur.	730 (730)	0	1500	990	3800	3800	9300	9300	
8	Gambir (A)	17700 (21288)	16560 (18348)	22500 (4800)	22500 (5940)	31500 (9000)	31500 (9000)	43700 (12200)	43700 (12200)	15612
9	" (B)	19200 (6300)	17400	25500 (6300)	25500 (8100)	36000 (10500)	36000 (10500)	52200 (16200)	52200 (16200)	
10	Semanggi (A)	10400 (13171)	9350 (11731)	14550 (5200)	14550 (5200)	22450 (7900)	22450 (7900)	36100 (13650)	36100 (13650)	1779
11	" (B)	4550 (7578)	4160 (7108)	6300 (4400)	6000 (4830)	9700 (8300)	9700 (8280)	14900 (13800)	14900 (13860)	
12	Slipi.	8600 (8130)	8130	13000 (2350)	12960 (2410)	21300 (6400)	21240 (6600)	35100 (14300)	35100 (14300)	1022
13	Pal Merah.	2950 (2447)	2690 (2187)	5300 (600)	5100 (970)	11700 (2120)	11700 (2230)	26000 (6900)	26000 (6900)	503
14	Kedoya.	480 (480)	0	1080 (600)	970 (970)	3200	3200	10100	10100	
15	Meruya.	720 (708)	60 (48)	1600 (880)	1360 (1300)	4300	3630	11800 (8170)	11800	12
16	Cempaka Putih.	10700 (9369)	8950 (7619)	15200 (4500)	15200 (6250)	23700 (8500)	23700 (8500)	40200 (16500)	40200 (16500)	1331
17	Rawamangun.	4000 (3300)	4000 (3500)	6500 (2500)	6500 (2500)	12000 (5500)	12000 (5500)	21900 (9900)	21900 (9900)	500
18	Pulo Gadung.	470 (459)	280 (269)	1000 (530)	810 (530)	2600 (1600)	2600 (1790)	6900 (4300)	6900 (4300)	11
19	Pengilingan.	480	190	630	920	1950	1950	5200	5200	40
20	Tg. Priok (A)	4600 (3067)	4370 (2837)	7900 (3300)	7900 (3530)	16000 (8000)	16000 (8100)	32500 (16500)	32500 (16500)	1533
21	Tg. Priok (B)	3700 (3625)	2400 (2325)	6500 (2800)	6500 (4100)	13500 (7000)	13500 (7000)	29000 (15500)	29000 (15500)	75
22	Cilincing.	870 (870)	260 (260)	1800 (930)	1240 (980)	4600 (2800)	4370 (3130)	11700 (7100)	11700 (7330)	
23	Kebayoran (A)	12700 (10397)	12700 (7997)	15400 (2700)	15400 (2700)	20200 (4800)	20200 (4800)	26000 (5800)	26000 (6300)	5703
24	" (B)	3400 (3650)	1000	5200 (1800)	5030 (4030)	9300 (4100)	9300 (4270)	15600 (6300)	15600	
25	Cipete.	2400 (2202)	2250 (2052)	4100 (1700)	3970 (1720)	8000 (3900)	8000 (4030)	15700 (7700)	15700 (7700)	198
26	Kalibata.	4550 (3882)	2640 (1972)	7500 (2950)	7500 (4860)	14700 (7200)	14700 (7200)	29200 (14500)	29200 (14500)	668
27	Pasar Minggu	1600 (1381)	920 (701)	2750 (1150)	2610 (1690)	5600 (2850)	5600 (2990)	11400 (5800)	11400 (5800)	219
28	Jogiakarsa.	550 (550)	80 (80)	1050 (500)	610 (530)	2450 (1400)	1780 (1170)	5800 (3350)	5800 (4020)	
29	Jatinegara (A)	3500 (7718)	3500 (7698)	5900 (2400)	5900 (2400)	10100 (4200)	10100 (4200)	17700 (7600)	17700 (7600)	1882
30	" (B)	6100 (2700)	6080 (2720)	8800 (4500)	8800 (4500)	13300 (6700)	13300 (6700)	20000 (6700)	20000	
31	Cawang.	2300 (2195)	2140 (2035)	4200 (1900)	4200 (2060)	10000 (5800)	10000 (5800)	24600 (14600)	24600 (14600)	105
32	Pasar Rebo.	910 (853)	720 (663)	1700 (790)	1590 (870)	4800 (3100)	4800 (3210)	15400 (10600)	15400 (10600)	57
33	Klender.	700 (658)	270 (228)	1800 (1100)	1260 (990)	6000 (4200)	6000 (4740)	20300 (14300)	20300 (14300)	42
34	Tebet.	4950 (3619)	4680 (3349)	7900 (2950)	7900 (3220)	14700 (6800)	14700 (6800)	27700 (13000)	27700 (13000)	1331
35	Gandaria.	740 (681)	590 (531)	1550 (810)	1260 (670)	3850 (2300)	3850 (2590)	9800 (5950)	9800 (5950)	59
	TOTAL	180590 (137541)	159340 (116291)	265480 (84890)	259660 (103320)	450450 (184970)	447220 (187560)	808000 (357550)	808000 (360780)	43049

( ) : Number of subscribers to be fulfilled during objective year.

Demand : Based on 100% demand fulfilment plan.

Fulfilment : Based on 90% demand fulfilment plan.

TABLE 8-1-(5) PRINCIPAL WORK (IN 1993).

No	Name of Exchange Office	Exchange office (L.U)	Switch (L.U)	Primary cable 100-pair length (km)	Subscriber 2ndary (No. of blocks)	Civil work (km)	Telephone installation (no)	Number of Subscriber lines
1	Kota (A)	26	18	323.9	31	8.9	37819	20900
2	" (B)	84	257.5	10906	57	13.8	44070	57100
3	" (C)	58	31	667.2	54	12.2	26560	39400
4	Ancol.	54	28	900.9	57	22.8	27550	28300
5	Pluit.	22	20	3983	33	12.0	18181	18800
6	Cengkareng.	36	15	3532	26	12.9	14553	14600
7	Tegal Alur.	34	12	2609	17	14.3	9300	9300
8	Gambir (A)	47	320	8906	83	18.8	45488	43700
9	" (B)	67	35	9617	87	17.0	34800	52200
10	Semanggi (A)	49	47	958.7	55	19.5	38481	36100
11	" (B)	15	9	315.7	28	11.3	10740	14900
12	Slipi	60	42	8355	70	24.0	34078	35100
13	Pal Merah	34	36	5634	55	20.7	25497	26000
14	Kedoya	28	11	218.1	22	12.3	10100	10100
15	Meruya	33	12	2039	25	10.6	11788	11800
16	Gempaka Putih.	75	235	941.8	71	23.9	38869	40200
17	Rawamangun.	32	19	446.7	48	19.3	21400	21900
18	Pulo Gadung.	10	5	199.0	15	11.7	6889	6900
19	Panggilingan.	21	13	194.4	18	10.8	8260	8300
20	Tg. Priok (A)	43	43	558.7	65	20.6	30967	32500

No	Name of Exchange office	Exchange office	Switch	Primary cable 100-pair length (km)	Subscriber 2ndary (No. of blocks)	Civil work (km)	Telephone installation (no)	Number of Subscriber lines
21	Tg Priok (B)	49	33	477.0	54	15.9	28925	29000
22	Cilincing.	34	14	148.4	25	11.8	11700	11700
23	Kebayoran (A)	20	148	4253	51	18.8	21297	26000
24	" (B)	30	10	1604	24	9.4	14600	15600
25	Cipete.	28	21	430.0	33	15.6	15502	15700
26	Kalibata.	59	29	9992	58	20.1	28532	29200
27	Pasar Minggu	24	10	2288	25	13.5	11181	11400
28	Jagakarsa.	13	6	873	11	6.1	5800	5800
29	Jatinegara (A)	30	20	2484	33	8.0	21898	17700
30	" (B)	40	209	341.0	38	12.9	13920	20000
31	Cawang.	34	27	636.8	29	16.5	24495	24600
32	Pasar Rebo.	34	22	163.1	17	13.4	15343	15400
33	Klender.	34	21	5009	36	17.7	20258	20300
34	Tebet.	28	34	6947	54	19.7	26369	27700
35	Gondaria	27	19	167.5	13	6.7	9741	9800
	T O T A L	1312	1831.5	16992	1418	523.5	764951	808000

the service area, the number of floors and the space required for other facilities than switching equipment. Since the size of land required for exchange office cannot be easily determined, we have had to make the rough determination by the following standard:

a) Land for local exchange office .... 4,000 m^2

b) Land for tandem exchange office .... 6,000 m^2

The building cost is calculated by the following linear equation using the number of subscribers (X) as a function:

$$Y = 65 + 115 \, X$$

where

Y: Building cost (10^8 Rupiahs)

X: Number of subscriber line units (10^4)

As stated in Chapter 6, Section 8, when the annual increase of telephone demand in the service area is less than 2,500 the period of exchange office plan is set at 10 years, whereas when the annual demand increase exceeds 2,500 the period of exchange office plan is set at 8 years. Using these provision periods which conform with the telephone demand estimate of JTP and based on the exchange building construction plan given in Table 8.2.(2) the exchange building construction cost is calculated.

However, for the exchange offices covered by the Construction Plan of PERUMTEL, the initial stage building cost is calculated, based on the PERUMTEL Plan, and when the expansion of these exchange offices becomes necessary in the future, the building cost is calculated, based on the aforementioned provision period (8 years or 10 years) and in consideration of the number of telephones in demand.

Years in which each telephone office will reach its full capacity are forecasted, based on the demand estimate of JTP, as shown in Fig. 8.2.(3). Actually, the exchange office construction must be completed before the demand curve and the exchange office capacity line reach the crossing point.

Therefore, generally speaking, if the installation budget starts from the time in which the construction work begins, exchange office building cost calculation must originate 2-3 years earlier than estimated in this chapter.

8.3 Switching Equipment

Switching equipment cost covers all internal facilities of local telephone exchange office. Switching equipment cost is calculated in two stages, i.e., initial installation and additional installation. Unit cost of switching equipment is calculated by lineal equation using the number of subscribers as a function.

Initial installation investment:

$$Yi = 124.5 + 0.311 \, X \, (10^6 \text{ Rupiahs})$$

TABLE 8-2-(1) EXCHANGE OFFICE BUILDING CONSTRUCTION COST AND LAND COST.

Unit: Rp. in million.

No	Name of Exchange office	1979	1983	1988	1993
1	Kota (A)		(400.0) 170.0		
2	" (B)	787.5			200.0
3	" (C)	(800.0) 410.0			(600.0) 550.0
4	Ancol	(80.0) 180.0		280.0	390.0
5	Pluit	124.4		(117.5) 210.0	370.0
6	Cengkareng	(40.0) 205.4			370.0
7	Tegal Alur		(24.0) 180.0		350.0
8	Gambir (A)		(800.0) 280.0		400.0
9	" (B)	(706.0) 684.1			(494.0) 3700
10	Semanggi (A)	(30.0) 70.0	240.0		370.0
11	" (B)			(120.0) 240.0	
12	Slipi	(120.0) 180.0		260.0	440.0
13	Pal Merah	(100.0) 180.0		340.0	
14	Kadoya		(40.0) 180.0		270.0
15	Meruya		(40.0) 200.0		310.0
16	Cempaka Putih	(300.0) 491.4			470.0
17	Rawamangun	(17.5) 187.0		(22.5) 320.0	
18	Pulo Gadung	(400.0) 180.0			
19	Panggilingan		(40.0) 140.0		250.0
20	Tg. Priok (A)		(155.5) 220.0		400.0

No	Name of Exchange office	1979	1983	1988	1993
21	Tg. Priok (B)		(200.0) 285.0		410.0
22	Cilincing	(20.0) 180.0			330.0
23	Kebayoran (A)	314.7			
24	" (B)		(200.0) 250.0		240.0
25	Cipete	(80.0) 180.0		270.0	
26	Kalibata	(112.5) 202.8		285.0	410.0
27	Pasar Minggu	(51.8) 200.3		230.0	
28	Jagakarsa		(40.0) 140.0		150.0
29	Jatinegara (A)		(75.0) 190.0		290.0
30	" (B)	(377.5) 525.4			
31	Cawang	(39.2) 180.0		(23.3) 330.0	
32	Pasar Rebo	(93.0) 134.9			
33	Klender	(29.2) 180.0			(30.0) 340.0
34	Tebet	(109.5) 180.0		2650	
35	Gandaria	(24.5)	(21.0) 150.0		300.0
	TOTAL	(2 370.7) 5547.9	(2 835.5) 3 035.0	(283.3) 3030.0	(1 124.0) 8380.0

( ): Land cost.
Below : Building cost.

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TABLE 8-2-(2) EXCHANGE OFFICE BUILDING CONSTRUCTION PLAN.

74: Existing

No	Name of Exchange	1979						1983				1988					1993					(Capacity) Provision periods
		'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	
1	Kota (A)	(10)								9										17		(36)/10
2	" (B)		40														52					(92)/8
3	" (C)							30										28				(38)/8
4	Ancol			10									18								26	(54)/8
5	Pluit		10										14									(24)/10
6	Cengkareng			10															26			(36)/10
7	Tegal Alur										9										25	(34)/10
8	Gambir (A)	(20)							18										29			(67)/8
9	" (B)			40													27					(67)/8
10	Samanggi (A)	(6)		9							14								26			(55)/8
11	" (B)											15										(15)/10
12	Slipi	(4)		10								17								33		(64)/8
13	Pal Merah			10											24							(34)/8
14	Kedoya										10										18	(28)/10
15	Meruya										12										21	(33)/10
16	Cempaka Putih			40																35		(75)/8
17	Rawamangun			10											22							(32)/10
18	Pulo Gadung			10																		(10)/10
19	Penggilingan								5										16			(21)/10
20	Tg. Priok (A)	(6)							13								30					(49)/8
21	" (B)							19										30				(49)/8
22	Cilincing						10													24		(34)/10
23	Kabayoran (A)	(10)	20																			(30)/8
24	" (B)									16											14	(30)/10
25	Cipete			10													18					(28)/10
26	Kalibata			10									19								30	(59)/8
27	Pasar Minggu			10															14			(24)/10
28	Jagakarsa										6										7	(13)/10
29	Jatinegara (A)	(4)							11										19			(34)/10
30	" (B)			40																		(40)/8
31	Cawang			10												24						(34)/8
32	Pasar Rebo			10															24			(34)/8
33	Klender			10												24						(34)/8
34	Tebet			10									18									(28)/8
35	Gandaria							7										20				(27)/10
	TOTAL		70	259			10	56	47	9	67	32	69		46	48	127	78	154	109	141	

[ ] : Capacity of building.
Unit : Line unit (x10³)

FIG. 8-2-(3)

Telephone Demand / Telephone Demand — FIG. 8-2-(4)

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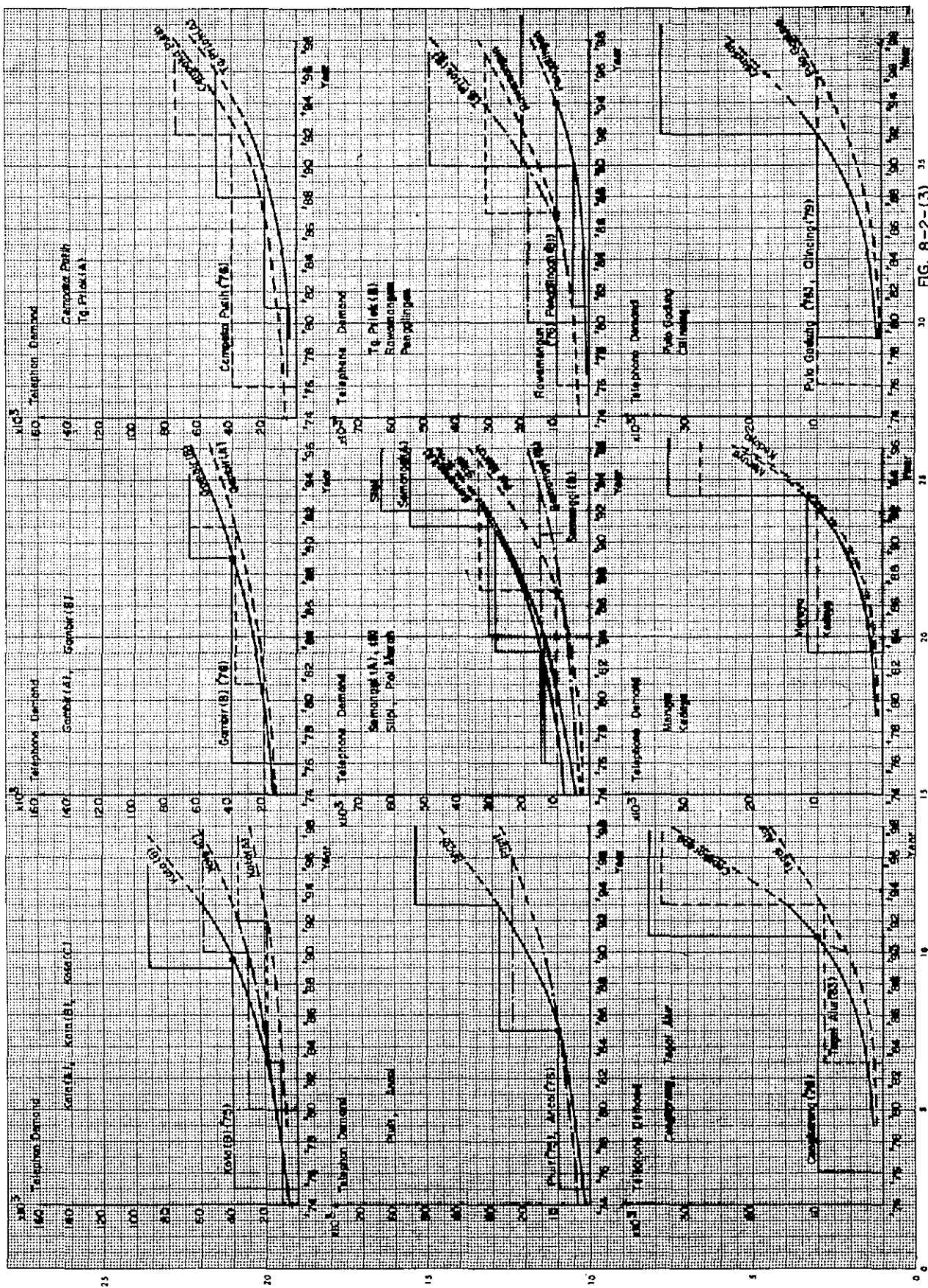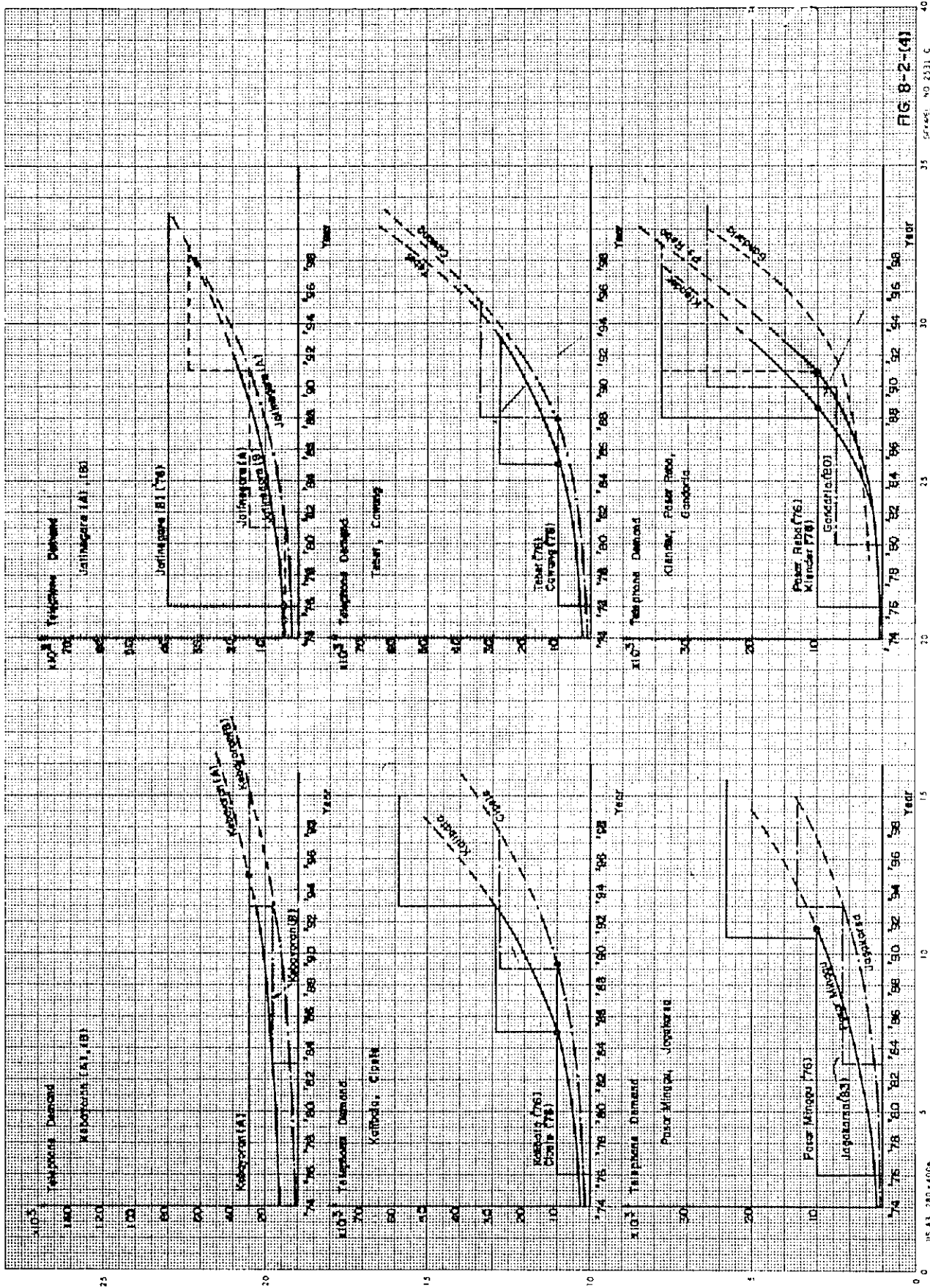
Additional installation investment:

$$Y_a = 90.9 + 0.303 \, X \, (\times 10^6 \text{ Rupiahs})$$

Unit cost of tandem switching equipment is calculated by the formula using the number of subscribers in tandem service area as a function.

$$Y_t = 124.5 + 0.054 \, X \, (\times 10^6 \text{ Rupiahs})$$

The amount of investment in switching equipment in the future is calculated by these unit costs, based on the Switching Equipment Expansion Plan described in Chapter 5. (Refer to Table 8.3.(1))

The switching equipment expansion plan up to 1977 is based on PERUMTEL Plan. The switching equipment expansion plan for and after 1978 is in compliance with JTP demand forecast, using 4 years for each provision period.

As stated previously, the switching equipment unit cost is determined by estimating the contract amount agreed upon between PERUMTEL and the Contractor.

8.4 Cable

Cable cost consists of primary cable cost, secondary cable cost and junction cable cost. Each cable cost is produced by the method described below.

8.4.1 Primary Cable

Primary cable cost does not include civil engineering cost.

In all cases cable cost is calculated on the basis of conduit cable. Based on the Subscriber Cable Basic Plan (Key Map) prepared by JTP, the distance from the exchange office to the feeding point and the conductor pair number allotted to the distribution block area are also calculated. Construction cost by conductor diameters varies according to the cable size as shown in Fig. 8.4.(5) so that it is necessary to produce the mean pair number by conductor diameters. Therefore, using the Subscriber Primary Cable Network Basic Designing Schemes (which covers Gambir, Kebayoran, Jatinegara, Cawang, Pasak Rebo and Gandaria) prepared by JTP, the calculation was made for the mean pair number by conductor diameters. The result of calculation is as follows:

Conductor Diameter	Mean Number of Pairs	Unit Cost per 100 Pairs	Maximum Pair Number
0.4 mm	850	1.7×10^6 Rupiahs	1,200
0.6 mm	800	2.5×10^6 Rupiahs	1,200
0.8 mm	600	3.9×10^6 Rupiahs	800

The number of cable pairs allotted to the distribution block area is calculated, based on the telephone demand estimate for 1993.

TABLE 8-3-(1)   SWITCHING EQUIPMENT CONSTRUCTION COST.

Unit : Rp. in million.

No	Name of Exchange office	1979	1983	1988	1993	No	Name of Exchange office	1979	1983	1988	1993
1	Kota (A)		3 (999.9)	3 (999.9)	12 (3726.9)	21	Tg. Priok (B)		(8) (2612.5)	17 (5241.9)	16 (4938.9)
2	" (B)	(26) +4 (9513.4)	(20) (6364.5)	12 (3726.9)	22 (6756.9)	22	Cilincing	(2) (746.5)	2 (696.9)	4 (1302.9)	8 (2514.9)
3	" (C)			16 (4938.9)	15 (4635.9)	23	Kebayoran (A)	14 (4332.9)			10 (3120.9)
4	Ancol	(3.5) +3 (2212.9)	5 (1605.9)	8 (2514.9)	12 (3726.9)	24	" (B)		(9) (2923.5)	4 (1302.9)	6 (1908.9)
5	Pluit	(3) +5 (2663.4)	4 (1302.9)	4 (1302.9)	7 (2211.9)	25	Cipete	8 (2514.9)		6 (1908.9)	7 (2211.9)
6	Cengkareng	(5) (1679.5)		5 (2605.9)	10 (3120.9)	26	Kalibata	(8) (2612.5)	5 (1605.9)	9 (2817.9)	15 (4635.9)
7	Tegal Alur		(3) (1057.5)	3 (999.9)	9 (2817.9)	27	Pasar Minggu	(5) (1679.5)		4 (1302.9)	6 (1908.9)
8	Gambir (A)	9 (2817.9)	8 (2514.9)	11 (3423.9)	15 (4635.9)	28	Jagakarsa		(2) (746.5)	2 (696.9)	4 (1302.9)
9	" (B)	(20) +5 (7950.4)		15 (4635.9)	15 (4635.9)	29	Jatinegara (A)		3 (999.9)	9 (2817.9)	8 (2514.9)
10	Senanggi (A)	14 (4332.9)	7 (2211.9)	9 (2817.9)	17 (5241.9)	30	" (B)	(12) (3856.5)		5 (1605.9)	7 (2211.9)
11	" (B)			(10) +4 (4537.4)	5 (1605.9)	31	Cawang	(10) (3234.5)		11 (3423.9)	16 (4738.9)
12	Slipi	12 (3726.9)	6 (1908.9)	9 (2817.9)	15 (4635.9)	32	Pasar Rebo	(6) (1990.5)			22 (6756.9)
13	Pal Merah	(5) (1679.5)	3 (999.9)	6 (1908.9)	27 (8271.9)	33	Klender	(4) (1368.5)		6 (1908.9)	15 (4635.9)
14	Kedoya		(3) (1057.5)	4 (1302.9)	7 (2211.9)	34	Tebet	(10) (3234.5)		7 (2211.9)	27 (8271.9)
15	Meruya		(4) (1368.5)	4 (1302.9)	8 (2514.9)	35	Gandaria		1 (393.9)	3 (999.9)	14 (4332.9)
16	Cempaka Putih	(24) (7588.5)		12 (3726.9)	18 (5544.9)		SAB TOTAL	(155.5) +83 (76625.9)	(55) +47 (33400.8)	(10) +239 (78560.1)	436 (135289.5)
17	Rawamangun	(6) (1990.5)	(4) (1302.9)	6 (1908.9)	9 (2817.9)	B	Kota (Tandem)	465 (2635.5)	35 (2014.5)	51 (2878.5)	87 (4822.5)
18	Pulo Gadung	(6) (1990.5)			5 (1605.9)	A	Gambir "	165 (3654.5)	31 (1798.5)	72 (4012.5)	109 (6010.5)
19	Pinggilingan		(2) (746.5)	2 (696.9)	11 (3423.9)		Cemp. Putih "	)46 (2608.5)	16 (988.5)	60 (3364.5)	83 (4606.5)
20	Tg. Priok (A)	8 (2514.9)		19 (5847.9)	16 (4938.9)	A	Kebayoran "	)35 (2014.5)	16 (988.5)	25 (1474.5)	48 (2716.5)
						B	Jatinegara "	)43 (2446.5)	4 (3405)	41 (2338.5)	109 (6010.5)
							SAB TOTAL	(13339.5)	(61305)	(140685)	241 (66.5)
							TOTAL	(89964.4)	(39531.3)	(926288)	(594560)

Initial in investment : 124.5+0.311 X (10⁶ Rp.)

Extension : 90.9+0.303X (")

Tandem : 124.5+0.054X (")

X : Number of line units.

(26)
+4 (9513.4)

— Number of line unit (x10³)(New)
— Switch construction cost.
— Number of line units (x10³)(Extension)
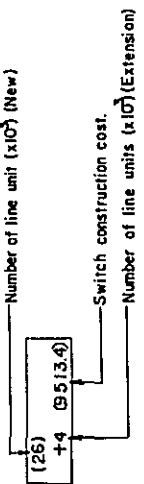
The method of primary cable cost calculation is:

$$Yp = Np \times Li \times Cd$$

where

Yp: Primary cable cost

Np: Cable pair number allotted to distribution block area

Li: Cable length between exchange office and cross connection point

Cd: Unit cost per 100 pairs per Km by conductor diameter

Np and Li are calculated from the Subscriber Cable Basic Plan (Key Map). The investment amount for each Five-Year Plan period is distributed at the following ratio to the total amount calculated based on the demand forecast as of 1993.

Table 8.4.(1)
% Distribution of Investment Amount for Primary Cable

	1979	1983	1988	1993
	%	%	%	%
G – 1	0	0	0	100
G – 2	0	0	50	50
G – 3	0	30	30	40
G – 4	30	20	20	30
G – 5	60	10	10	20

G1 : Distribution block area where the construction work is not desirable until 1988

G2 : Distribution block area where the construction work is not desirable until 1983

G3 : Distribution block area where the construction work is not desirable until 1979

G4 : Developing area where the change of development pattern is conspicuous

G5 : Developed area where the development pattern is stabilized

8.4.2 Secondary Cable

Secondary cable cost includes all installation cost for secondary cable, such as pole, conduit and handhole cost, but does not include telephone installation cost.

TABLE 8-4-(2)

TABLE 8-4-(2) PRIMARY CABLE WORK AND CONSTRUCTION COST.

Based on 90% Demand fulfilment plan. Unit : Rp. in million.

( ): Cabinet (1 Cabinet = 1.2 x 10⁶ Rp.).
Below: Primary cable plant.
Total: 100-pair cable length (km).

No	Name of Exchange	1979 Work	1979 Cost	1983 Work	1983 Cost	1988 Work	1988 Cost	1993 Work	1993 Cost	TOTAL Work	TOTAL Cost
1	Kota (A)	(10) 120.3	(12.0) 228.2	(3) 57.1	(3.6) 121.6	57.1	121.6	89.5	187.4	(13) 323.9	(15.6) 658.8
2	" (B)	(2) 369.3	(2.4) 671.6	(1) 204.1	(1.2) 380.8	204.1	380.8	313.1	582.5	(3) 1090.6	(3.6) 2015.7
3	" (C)	(19) 271.4	(22.8) 462.0	(1) 109.7	(1.2) 182.6	109.7	182.6	176.4	294.9	(20) 667.2	(24) 1122.1
4	Ancol	(29) 188.6	(34.8) 521.6	(6) 134.8	(7.2) 351.2	209.5	588.7	368.0	967.7	(52) 900.9	(62.4) 2429.2
5	Pluit	(17) 82.7	(20.4) 148.4	(11) 91.9	(13.2) 204.3	91.9	204.3	131.8	288.9	(28.0) 398.3	33.6 845.9
6	Cengkareng	(6) 27.8	(7.2) 162.1	(15) 96.7	(18.0) 235.4	96.7	235.4	132.0	320.8	(21) 261.0	(25.2) 953.7
7	Tegal Alur	0	—	(8) 41.0	(9.6) 92.0	103.2	275.8	116.8	306.6	(16) 261.0	(19.2) 674.4
8	Gambir (A)	(44) 236.7	(52.8) 402.7	(6) 188.3	(7.2) 331.1	188.3	331.1	277.3	486.2	(50) 890.6	(60) 1551.1
9	" (B)	(47) 306.0	(56.4) 571.9	(11) 186.5	(13.2) 373.4	186.5	373.4	282.7	561.3	(58) 961.7	(69.6) 1880.0
10	Bemanggri (A)	(16) 232.0	(19.2) 472.8	(12) 210.3	(14.4) 452.8	210.3	452.8	306.4	656.3	(28) 958.7	(33.6) 2034.7
11	" (B)	(9) 98.5	(10.8) 222.7	(5) 43.6	(6.0) 86.0	67.9	127.3	94.7	180.7	(17) 315.7	(20.4) 616.7
12	Slipi	(43) 207.0	(51.6) 421.1	(8) 144.2	(9.6) 305.4	198.0	432.6	286.3	624.2	(60) 835.3	(72) 1783.3
13	Pal Merah	(44) 226.7	(52.8) 473.4	(5) 81.6	(6.0) 174.3	101.4	223.8	153.7	334.5	(51) 563.7	(61.2) 1206.0
14	Kedoya	0.1	—	(15) 56.5	(18.0) 129.8	71.5	163.4	90.3	206.6	(17) 218.3	(20.4) 499.8
15	Menya.			(16) 47.4	(19.2) 96.4	49.0	99.1	107.4	212.9	(22) 203.8	(26.4) 408.4
16	Cempaka Putih	(53) 230.2	(63.6) 499.1	(12) 205.8	(14.4) 448.4	205.8	448.4	300.0	653.3	(65) 941.8	(78) 2049.2
17	Rawamangun	(40) 134.1	(48.0) 282.8	(3) 89.3	(3.6) 188.6	89.3	188.6	134.0	282.9	(40) 446.7	(48) 942.9
18	Pulo Gadung	(7) 38.8	(8.4) 126.3	(3) 35.8	(3.6) 108.0	54.1	153.8	70.3	203.9	(13) 199.0	(15.6) 592.0
19	Penggilingan	(9) 35.5	(10.8) 82.1	(5) 39.4	(6.0) 88.5	51.2	88.5	68.3	127.1	(14) 194.4	(16.8) 386.2
20	Tg. Priok (A)	(43) 133.5	(51.6) 250.7	(8) 123.1	(9.6) 239.9	123.1	239.9	179.0	347.8	(51.0) 558.7	(61.2) 1078.3
21	Tg. Priok (B)	(32) 108.0	(38.4) 205	(11) 107.1	(13.2) 196.2	107.1	196.2	154.8	284.5	(43) 477.0	(51.6) 881.9
22	Cilincing	(6) 14.6	(7.2) 24.6	25.2	46.6	41.8	108.2	66.8	164.0	148.4	(21.6) 343.4
23	Kebayoran (A)	(46) 181.7	(55.2) 330.0	67.0	128.1	67.0	128.1	109.6	207.4	(46) 425.3	(55.2) 793.6
24	" (B)	(5) 4.2	(6.0) 7.1	45.3	77.0	47.7	81.1	63.2	107.5	(24) 160.4	(28.8) 272.7
25	Cipete	(24) 105.7	(28.8) 243.4	(4) 76.8	(4.8) 177.4	105.1	244.7	142.4	330.9	(31) 430.0	(37.2) 996.4
26	Kalibata	(23) 143.3	(27.6) 390.2	(29) 252.0	(34.8) 745.7	252.0	745.7	351.9	1037.6	(52) 999.2	(62.4) 2919.2
27	Pasar Minggu	(8) 19.4	(9.6) 32.9	(13) 49.7	(15.6) 92.9	70.5	174.0	89.2	208.6	(23) 228.8	(27.6) 508.4
28	Jagakarsa	(1) 2.2	(1.2) 4.2	12.5	36.6	16.5	43.3	56.1	184.5	(1) 87.3	(8.4) 268.6
29	Jatinegara (A)	(24) 74.5	(28.8) 142.0	49.7	94.6	49.7	94.6	74.5	142.0	(24) 248.4	(28.8) 473.2
30	" (B)	(34) 98.5	(40.8) 177.0	(1) 69.5	(1.2) 124.5	69.5	124.5	103.5	185.7	(35) 341.0	(42) 611.7
31	Cawang	(20) 166.3	(24.0) 351.7	(4) 133.5	(4.8) 301.7	137.0	307.7	200.0	447.2	(24) 636.8	(28.8) 1408.3
32	Pasar Rebo.	(7) 18.3	(8.4) 34.0	(5) 33.9	(6.0) 98.3	48.8	133.4	62.1	169.9	(15) 163.1	(18) 435.6
33	Klender.	(7) 23.8	(8.4) 40.2	(6) 68.4	(7.2) 155.2	191.6	555.0	217.1	611.2	(31) 500.9	(37.2) 1361.6
34	Tebet.	(39) 234.7	(46.8) 500.4	(6) 130.2	(7.2) 280.9	130.2	280.9	199.6	430.0	(45) 694.7	(54) 1492.2
35	Gandaria.	(7) 34.1	(8.4) 64.9	20.8	39.7	51.0	113.6	61.6	134.0	167.5	352.2
	TOTAL	(721) 4179.5	(865.2) 8547.1	(265) 3328.7	(318.0) 7185.9	(66) 3854.1	(79.2) 8642.9	(16) 5630.0	(19.2) 12471.5	(1068) 16992.0	(1281.6) 36847.4

TABLE 8-4-(3)　　PRIMARY CABLE WORKS CONSTRUCTION COST.

(Based on 100% demand fulfilment plan.)　Cost unit : Rp. in million.

No	Name of Exchange	1979 Work	1979 Cost	1983 Work	1983 Cost	1988 Work	1988 Cost	1993 Work	1993 Cost	TOTAL Work	TOTAL Cost
1	Kota (A)	132.6	258.1	53.0	111.6	53.0	111.6	85.3	177.4	323.9	658.7
2	" (B)	377.4	690.0	201.4	374.7	201.4	374.7	310.4	576.3	1090.6	2015.7
3	" (C)	273.8	670.5	108.9	263.0	108.9	263.0	175.6	425.2	667.2	1621.7
4	Ancol	295.4	835.0	171.5	504.2	171.5	504.2	261.5	765.0	900.9	2608.4
5	Pluit	144.5	296.4	71.3	155.0	71.3	155.0	111.2	239.6	398.3	846.0
6	Cengkareng	106.0	256.0	70.6	170.7	70.6	170.7	106.0	256.1	353.2	853.5
7	Tegal Alur	78.2	304.1	52.2	202.7	52.2	202.7	78.3	304.1	260.9	1013.6
8	Gambir (A)	267.2	465.4	178.1	310.2	178.1	310.2	267.2	465.3	890.6	1551.1
9	" (B)	348.6	666.0	172.3	342.0	172.3	342.0	268.5	530.0	961.0	1880.0
10	Semanggi (A)	305.7	646.7	185.7	394.8	185.7	394.8	281.6	598.3	958.7	2034.6
11	" (B)	113.7	301.5	56.8	144.7	56.8	144.7	88.4	226.5	315.7	817.4
12	Slipi	272.3	571.9	159.9	344.4	159.9	344.4	243.4	522.7	835.5	1783.4
13	Pal Merah	261.4	554.0	81.9	177.0	81.9	177.0	138.2	297.0	563.4	1205.9
14	Kedoya	65.5	255.2	43.6	170.1	43.6	170.1	65.4	255.2	218.1	850.6
15	Meruya	61.1	238.6	40.8	159.0	40.8	159.0	61.2	238.6	203.0	795.2
16	Cempaka Putih	282.5	614.8	188.4	409.8	188.4	409.8	202.5	614.8	941.8	2049.2
17	Rawamangun	134.1	282.8	89.3	188.6	89.3	188.6	134.0	282.9	446.7	942.9
18	Pulo Gadung	59.7	177.6	39.8	118.4	39.8	118.4	59.7	177.6	199.0	592.0
19	Penggilingan	51.2	199.9	34.2	133.2	34.2	133.2	51.2	199.8	170.8	666.1
20	Tg. Priok (A)	167.7	323.4	111.7	215.7	111.7	215.7	167.6	323.5	558.7	1078.3
21	Tg.Priok (B)	143.1	400.3	95.4	266.8	95.4	266.8	143.1	400.3	477.0	1334.2
22	Cilincing	51.6	103.0	34.4	68.7	34.4	68.7	51.6	103.0	172.0	343.4
23	Kebayoran (A)	181.7	330.0	67.0	128.1	67.0	128.1	109.6	207.4	425.3	793.6
24	" (B)	48.1	252.6	32.1	168.4	32.1	168.4	48.1	252.6	160.4	842.0
25	Cipete	129.0	298.9	86.0	199.3	86.0	199.3	129.0	298.9	430.0	996.4
26	Kalibata	299.8	875.8	199.8	583.8	199.8	583.8	299.8	875.7	999.2	2919.1
27	Pasar Minggu	68.6	152.5	45.8	101.7	45.8	101.7	68.6	152.5	228.8	508.4
28	Jagakarsa	26.1	102.1	17.5	68.1	17.5	68.1	26.2	102.2	87.3	340.5
29	Jatinegara (A)	74.5	142.0	49.7	94.6	49.7	94.6	74.5	142.0	248.4	473.2
30	" (B)	102.3	183.6	68.2	122.3	68.2	122.3	102.3	183.5	341.0	611.7
31	Cawang	216.7	476.3	118.8	263.7	118.8	263.7	182.5	404.6	636.8	1408.3
32	Pasar Rebo	49.9	132.4	32.3	86.5	32.3	86.5	48.6	130.1	163.1	435.5
33	Klender	150.2	408.4	100.2	272.3	100.2	272.3	150.3	408.5	500.9	1361.5
34	Tebet	247.2	521.6	126.0	273.8	126.0	273.8	195.5	423.0	694.7	1492.2
35	Gandaria	54.5	113.0	32.1	68.0	32.1	68.0	48.8	103.3	169.5	352.3
	TOTAL	5642.9	13100.8	3216.7	7655.9	3216.7	7655.9	4915.7	11664.0	16992.0	40076.6

Work : Total 100-pair cable length (km).

TABLE 8-4-(4). PRIMARY CABLE PLANT CONSTRUCTION COST.

(Unit. 10^3 Rp./ km.)

Cable		Construction cost. 10^3 RP/ km	Cable material.	Installation.	Principle work.	Other	Construction cost per unit.km. (10^6 Rp/ km)
mm 0.4	Pairs 2,400	38,480	*29,200	1,484	1,383	6,413	1.6
	1,200"	19,338	14,357	770	988	3,223	1.6
	1,000"	16,721	*12,300	699	935	2,787	1.7
	800"	13,810	10,007	627	874	2,302	(1.7)
	600"	10,403	7,383	483	803	1,734	1.7
	400"	7,040	4,790	342	735	1,173	1.8
	300"	5,743	3,823	254	709	957	1.9
mm 0.6	1,200"	30,032	23,043	770	1,214	5,005	2.5
	1,000"	25,093	*19,100	699	1,112	4,182	2.5
	800"	20,018	15,050	627	1,005	3,336	(2.5)
	600"	15,564	11,575	483	912	2,594	2.6
	400"	10,506	*7,600	342	813	1,751	2.6
	300"	8,062	*5,700	254	764	1,344	2.7
mm. 0.8	800"	30,084	23,225	627	1218	5,014	3.9
	600"	23,308	17,865	483	1075	3,885	(3.9)
	400"	16,201	12,231	342	928	2,700	4.0
	300"	12,382	9,214	254	850	2,064	4.1

Mean pairs of cable.   * Assumption.

    0.4^{mm} : 850 pairs.

    0.6^{mm} : 800 "

    0.8^{mm} : 600 "
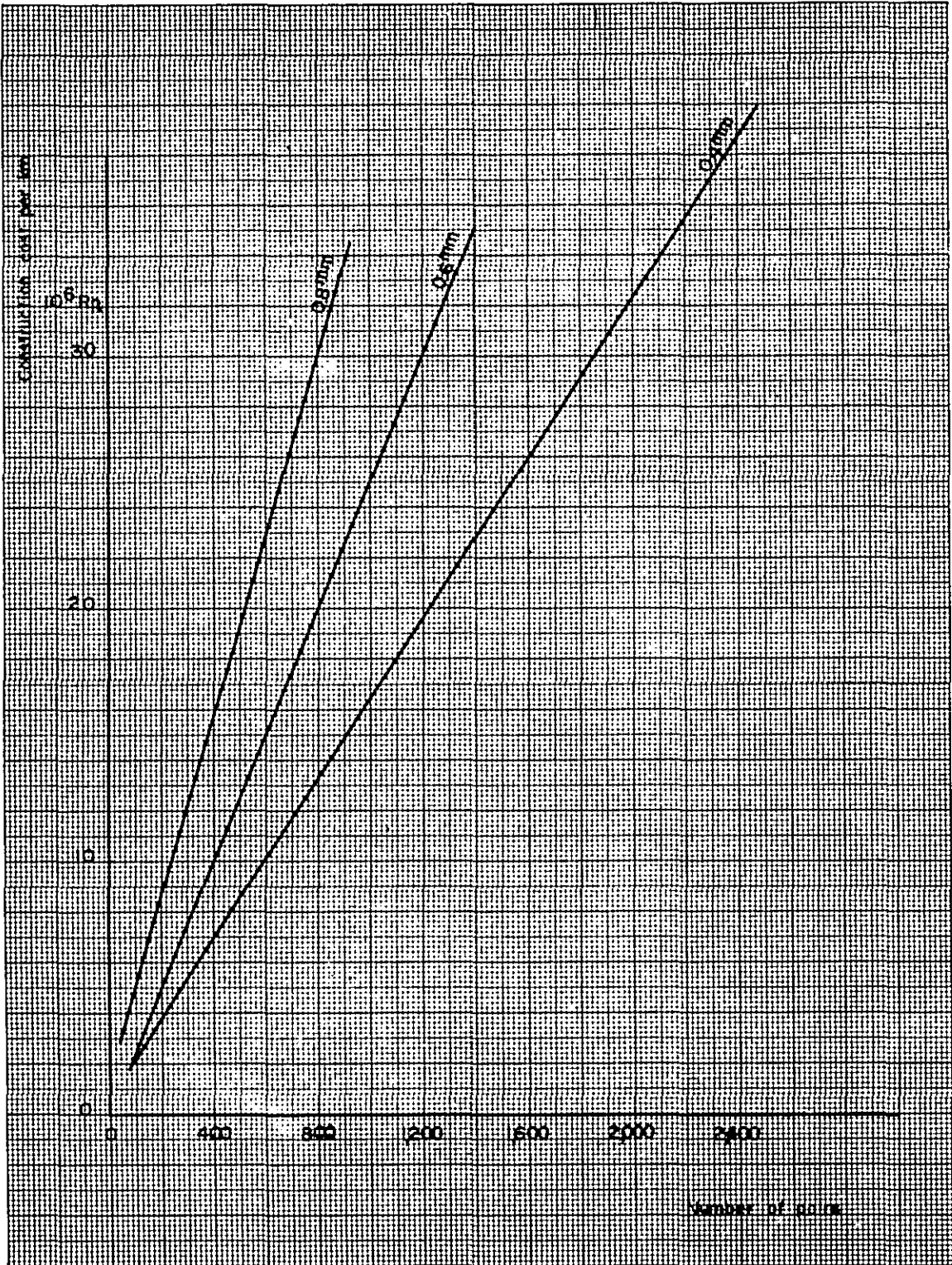
FIG 8-4-(5) CONSTRUCTION COST OF PRIMARY CABLE

Secondary cable cost is calculated, based on the cable pair number to be allotted to the distribution block area and the unit cost per subscriber line. In this case the unit cost varies to a great extent according to the conductor diameter, cable structure and demand density (size of area or cable length) as shown in Fig. 8.4.(24). Therefore, in the actual calculation the following method is used:

First, considering that the conductor diameter and cable structure to be used depend to a great extent upon the distribution block area and the mean demand density in the service area, the 35 telephone exchange offices are classified in three grades (I, II and III) by demand density as shown in Table 8.4.(14) and in each distribution block area also are classified in three grades (A, B and C) by demand density.

Second, the composition ratio of conductor diameter is calculated from the Subscriber Cable Basic Plan (Key Map) and the composition ratio of cable structure is estimated from the development pattern of the area. By this means the unit cost as shown in Table 8.4.(20) to Table 8.4.(22) is obtained.

For instance, in the case of Grade I (demand density: 0 - 15) exchange office shown in Table 8.4.(6):

a) Secondary cable cost by demand density in the distrubution block area

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\ Y$$

b) Composition ratio of demand by conductor diameter

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\ \alpha$$

0.4 mm (conductor diameter) cable $\quad \alpha_{0.4} = 67\%$

0.6 mm (conductor diameter) cable $\quad \alpha_{0.6} = 27\%$

0.8 mm (conductor diameter) cable $\quad \alpha_{0.8} = 6\%$

c) Composition ratio of demand by cable structure

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\ \beta$$

Aerial cable $\qquad\qquad\qquad \beta a = 61\%$

Direct buried cable $\qquad\qquad \beta b = 33\%$

Conduit cable $\qquad\qquad\quad \beta c = 6\%$

As in Table 8.4.(6), when classified by demand density (I, II and III) in service area, the secondary cable cost increases in proportion to demand density. On the other hand, when classified by demand density (A, B and C) in distribution block area, the secondary cable cost decreases as demand density increases. The reason why the 35 exchange offices are classified in three grades is that the cable structure required differs to a great extent according to demand density. For instance, in the service area of Grade III exchange office, conduit cable is more frequently used than in the service area of Grade II or Grade I exchange office.

Table 8.4.(6) Construction Cost

		Aerial Cable	Direct buried Cable	Conduit cable	Remarks
A demand density	0.4 mm	O 0.4	B 0.4	C 0.4	
	0.6 mm	O 0.6	B 0.6	C 0.6	
	0.8 mm	O 0.8	B 0.8	C 0.8	

By reason of convenience of calculation the composition ratio of demand in each distribution block area by cable structure is set at the same level regardless of demand density in the distribution block area. Therefore, secondary cable cost in one distribution bloc area differs greatly from that in another by the size of distribution block area (mean secondary cable length).

Secondary cable installation cost per subscriber line by demand density, conductor diameter and cable structure (YI) is expressed by the following formula:

Table 8.4.(7) Construction Cost of Secondary Cable per Subscriber Line

Class of exchange office by demand density	Class of distribution block area by demand density			Remarks
	A (0 ~ 15)	B (16 ~ 30)	C (more than 31)	
I (0 ~ 15)	57.1	33.6	17.3	
II (16 ~ 30)	70.6	42.9	21.8	
III (more than 31)	108.0	64.1	32.1	

As the result, secondary cable cost per subscriber line in distribution block area becomes approximately 57.1×10^3 Rupiahs in the case of demand density A, approximately 33.6×10^3 Rupiahs in the case of demand density B, and approximately 17.3×10^3 Rupiahs in the case of demand density C.

For secondary cable also the cost estimation is projected, using Plan 1 and Plan 2 , as in the case of primary cable cost (refer to General Description). For the distribution block area where primary cable is not installed it is assumed that the telephone demand will not be fulfilled.

The distribution of investment amount to each Five-Year Plan period is made by the same method as that described in Subsection 8.4.1. As stated in General Description, for the distribution block area where the telephone demand cannot be fulfilled due to the delay of road construction and the difficulty of communication civil engineering, the outside plant work is determined for each base year (1979, 1983 and 1988), based on the field survey, at the time of demand estimation.

According to the field survey, the number of cases of unfulfilled demand is approximately 21,250 in 1979, approximately 5,820 in 1983 and approximately 3,230 in 1988. The investment amount in each Five-Year Plan period is the distribution at the following ratio to the total amount of investment calculated based on the demand estimate as of 1993.

Table 8.4.(8)
% Distribution of Investment Amount for Secondary Cable

	1979	1983	1988	1993
G – 1	0 %	0 %	0 %	100 %
G – 2	0	0	50	50
G – 3	0	30	30	40
G – 4	40	20	20	20
G – 5	70	10	10	10

G1 : Distribution block area where the construction work is not desirable until 1988

G2 : Distribution block area where the construction work is not desirable until 1983

G3 : Distribution block area where the construction work is not desirable until 1979

G4 : Developing area where the change of development pattern is conspicuous

G5 : Developed area where the development pattern is stabilized

8.4.3 Junction Cable

In principle, junction cable cost is calculated, based on JTP junction cable expansion plan described in Chapter 7. In case where part or whole of telephone demand in the area

TABLE 8-4-(9)　　SECONDARY CABLE AND CONSTRUCTION COST.

(Based on 90% demand fulfilment plan.)

No	Name of Exchange	1979 Works	1979 Cost	1983 Works	1983 Cost	1988 Works	1988 Cost	1993 Works	1993 Cost	TOTAL Works	TOTAL Cost
1	Kota (A)	16	471.5	5	151.3	5	151.3	5	159.0	31	933.1
2	" (B)	24	890.3	11	382.0	11	382.0	11	390.0	57	2044.3
3	" (C)	24	753.4	10	299.0	10	299.0	10	303.3	54	1654.7
4	Ancol	16	316.7	7	144.4	13	265.9	21	355.7	57	1082.7
5	Pluit	11	301.9	7	176.0	7	176.0	8	210.8	33	864.7
6	Cengkareng.	3	68.1	7	216.5	7	216.5	9	277.3	26	778.4
7	Tegal Alur.	-	-	3	94.6	6	206.0	8	237.5	17	538.1
8	Gambir (A)	31	693.2	17	415.9	17	415.9	18	439.1	83	1964.1
9	" (B)	35	446.8	17	214.2	17	214.2	18	231.3	87	1106.5
10	Semanggi (A)	17	457.5	12	350.9	12	350.9	14	402.9	55	1562.2
11	" (B)	10	337.9	5	147.9	6	196.0	7	212.5	28	894.3
12	Slipi	22	457.8	12	255.3	17	352.6	19	413.8	70	1479.5
13	Pal Merah.	29	665.1	8	195.0	9	220.7	9	237.4	55	1318.2
14	Kedoya	-	-	6	157.8	7	194.9	9	247.5	22	600.2
15	Meruya	-	-	6	165.3	6	176.7	13	368.8	25	710.8
16	Cempaka Putih.	24	468.9	15	327.6	15	327.6	17	358.6	71	1482.7
17	Rawamangun.	18	400.3	10	200.2	10	200.2	10	200.2	48	1000.9
18	Pulo Gadung	3	100.5	3	76.0	4	115.9	5	124.5	15	416.9
19	Penggilingan.	3	109.6	5	128.5	5	128.5	5	153.0	18	519.6
20	Tg.Priok (A)	22	385.4	14	256.6	14	256.6	15	277.9	65	1176.5
21	Tg.Priok (B)	17	296.1	12	273.0	12	273.0	13	314.6	54	1156.7
22	Cilincing	4	76.2	5	107.7	7	187.7	9	239.4	25	611.0
23	Kebayoran (A)	30	551.4	7	144.2	7	144.2	7	144.2	51	984.0
24	" (B)	2	44.8	6	124.3	7	130.9	9	164.8	24	464.8
25	Cipete.	9	263.4	7	169.4	8	217.9	9	230.5	33	881.2
26	Kalibata	11	257.6	15	308.5	15	308.5	17	368.4	58	1243.0
27	Pasar Minggu	3	77.5	6	163.8	7	189.5	9	231.2	25	662.0
28	Jagakarsa.	-	11.4	2	50.3	3	81.7	6	199.3	11	342.7
29	Jatinegara (A)	18	309.7	7	154.8	7	154.8	1	154.8	33	774.1
30	" (B)	14	370.4	8	197.9	8	197.9	8	202.1	38	968.3
31	Cawang.	11	307.6	5	185.3	6	210.8	7	233.0	29	936.7
32	Pasar Rebo.	4	111.9	3	89.6	5	123.9	5	137.0	17	462.4
33	Klender	5	119.2	6	148.9	12	323.1	13	352.8	36	944.0
34	Tebet.	23	452.9	10	221.9	10	221.9	11	240.8	54	1137.5
35	Gondaria.	4	174.1	2	78.8	3	155.9	4	159.3	13	568.1
	TOTAL	463	10749.1	281	6773.4	315	7769.1	359	8973.3	1418.0	34,264.9

Cost : Rp. in million.

Unit : Work – Number of distribution block.

TABLE 8-4-(10) SECONDARY CABLE WORK AND CONSTRUCTION COST.

(Based on 100% demand fulfilment plan.)

No	Name of Exchange	1979 Work	1979 Cost (x10⁶)	1983 Work	1983 Cost (x10⁶)	1988 Work	1988 Cost (x10⁶)	1993 Work	1993 Cost (x10⁶)	TOTAL Work	TOTAL Cost (x10⁶)
1	Kota (A)	16	502.3	5	143.6	5	143.6	5	143.6	31	933.1
2	" (B)	27	922.7	10	373.9	10	373.9	10	373.9	57	2044.4
3	" (C)	24	770.7	10	294.6	10	294.6	10	294.6	54	1654.5
4	Ancol	24	484.4	11	199.4	11	199.4	11	199.4	57	1082.6
5	Pluit.	18	441.1	5	141.2	5	141.2	5	141.2	33	864.7
6	Cengkareng.	11	311.3	5	155.7	5	155.7	5	155.7	26	778.4
7	Tegal Alur.	8	215.2	3	107.6	3	107.6	3	107.6	17	538.0
8	Gambir (A)	35	785.7	16	392.8	16	392.8	16	392.8	83	1964.1
9	" (B)	39	515.0	16	197.1	16	197.1	16	197.1	87	1106.3
10	Semanggi (A)	22	665.3	11	299.0	11	299.0	11	299.0	55	1562.3
11	" (B)	13	442.5	5	150.6	5	150.6	5	150.6	28	894.3
12	Slipi	31	628.0	13	283.8	13	283.8	13	283.8	70	1479.4
13	Pal Merah.	31	752.5	8	188.6	8	188.6	8	188.6	55	1318.3
14	Kedoya.	10	240.0	4	120.0	4	120.0	4	120.0	22	600.0
15	Meruya.	10	284.3	5	142.2	5	142.2	5	142.2	25	710.9
16	Cempaka Putih.	29	393.1	14	296.5	14	296.5	14	296.5	71	1482.6
17	Rawamangun.	18	400.3	10	200.2	10	200.2	10	200.2	48	1000.9
18	Pulo Gadung.	6	166.7	3	83.4	3	83.4	3	83.4	15	416.9
19	Penggilingan.	6	207.9	4	103.3	4	103.3	4	103.3	18	519.6
20	Tg. Priok (A)	26	470.6	13	235.3	13	235.3	13	235.3	65	1176.5
21	Tg. Priok (B)	21	462.7	11	231.4	11	231.4	11	231.4	54	1156.9
22	Cilincing.	10	244.4	5	122.2	5	122.2	5	122.2	25	611.0
23	Kebayoran (A)	30	551.4	7	144.2	7	144.2	7	144.2	51	984.0
24	" (B)	9	185.9	5	93.0	5	93.0	5	93.0	24	464.9
25	Cipete.	12	352.4	7	176.2	7	176.2	7	176.2	33	881.0
26	Kalibata.	22	497.2	12	248.6	12	248.6	12	248.6	58	1243.0
27	Pasar Minggu.	10	264.8	5	132.4	5	132.4	5	132.4	25	662.0
28	Jagakarsa.	5	137.0	2	68.5	2	68.5	2	68.5	11	342.5
29	Jatinegara (A)	12	309.7	7	154.8	7	154.8	7	154.8	33	774.1
30	" (B)	14	387.3	8	193.7	8	193.7	8	193.7	38	968.4
31	Cawang.	14	416.8	5	173.3	5	173.3	5	173.3	29	936.7
32	Pasar Rebo.	8	191.9	3	90.2	3	90.2	3	90.2	17	462.5
33	Klender.	15	377.6	7	188.8	7	188.8	7	188.8	36	944.0
34	Tebet.	24	528.6	10	203.0	10	203.0	10	203.0	54	1137.6
35	Gandaria.	7	249.5	2	106.2	2	106.2	2	106.2	13	568.1
	TOTAL	617	14956.8	267	6435.9	267	6435.9	267	6435.9	1418	34264.5

Cost (x10⁶) : x10⁶ Rp.

Work : Number of distribution block.

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Demand density

I : 0 ~ 15

II : 16 ~ 30

III : more than 31
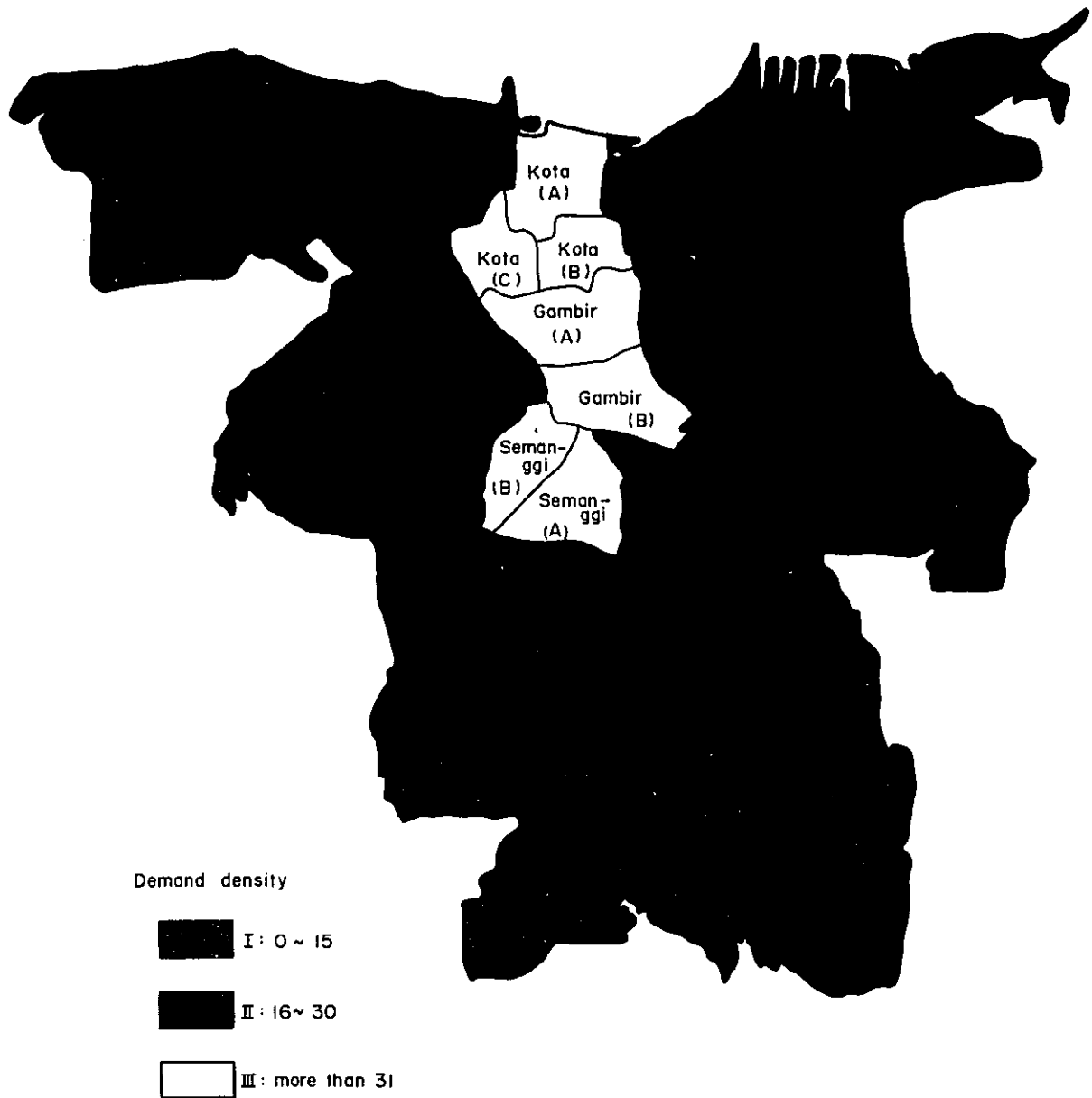
FIG. 8-4-(II)   DEMAND DENSITY EXCHANGE OFFICE

SERVICE AREA IN 1993.
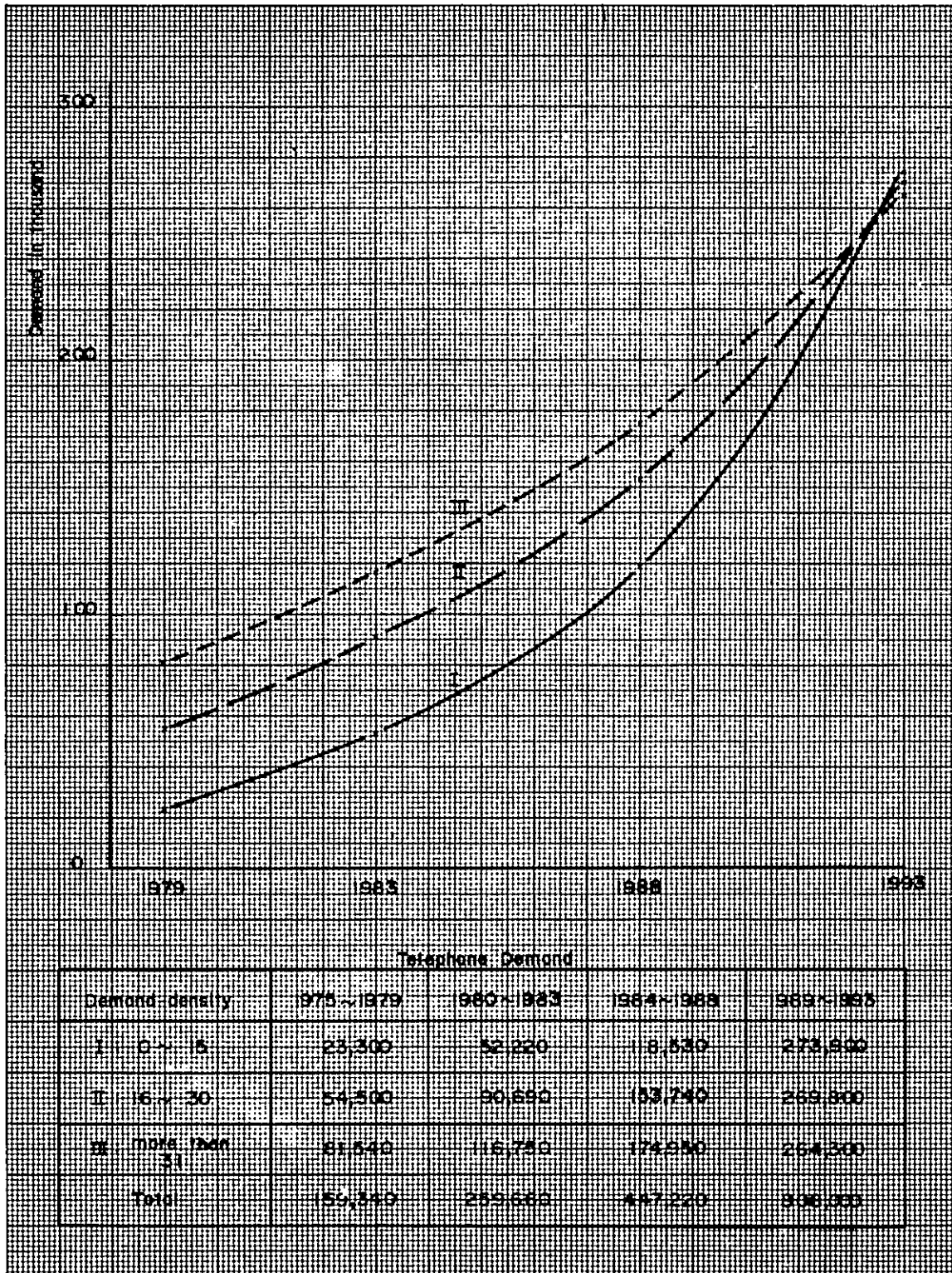
FIG. 8-4-(12) TELEPHON DEMAND BY DEMAND DENSITY

I
DEMAND DENSITY
(0 ~ 15)
3013 unit

G-1
(6.6%) 199

G-5
(9.2%)
277

II
DEMAND DENSITY
(16 ~ 30)
2968 unit

G-1 0.1 % 3
G-2 2.8 % 83

G-5
(17.4%)
516

III
DEMAND DENSITY
(MORE THAN)
31
2907 unit

G-5
(18.6%)
541
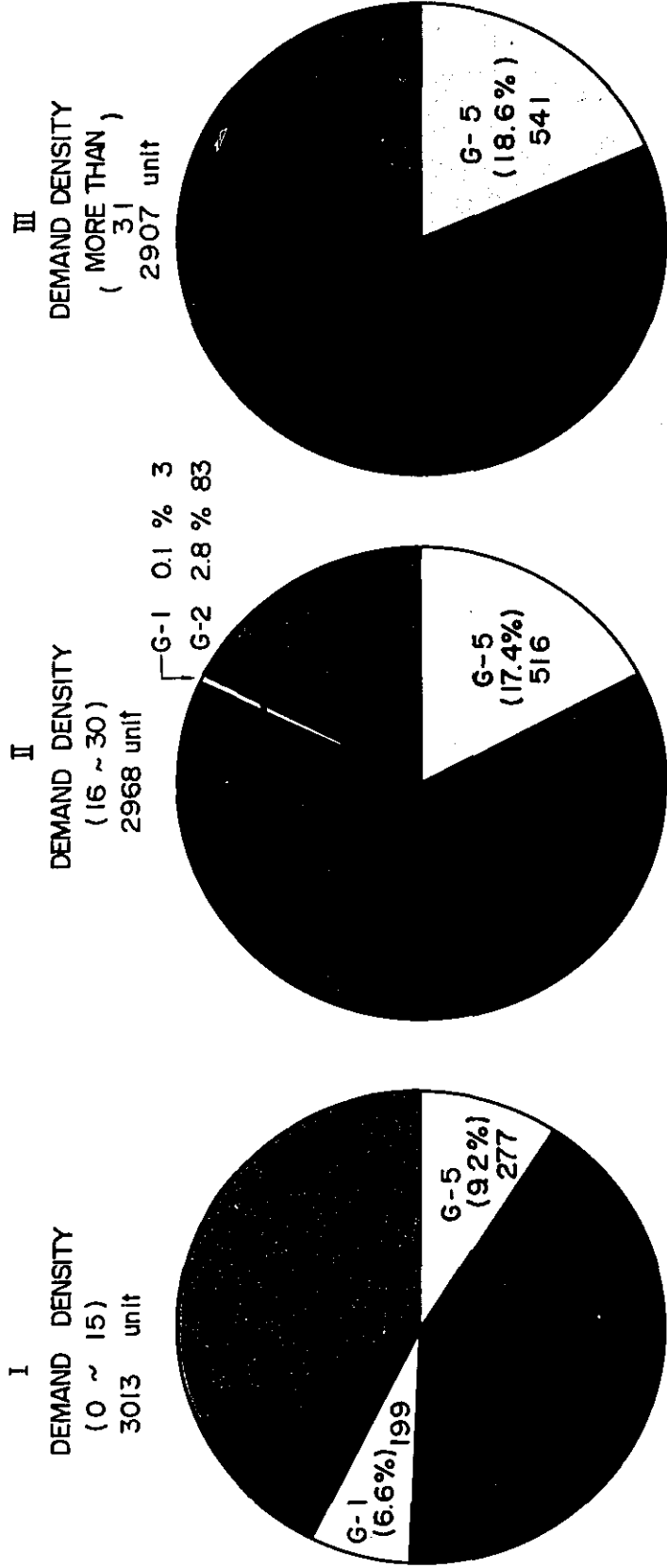
FIG. 8-4-(13)

% DISTRIBUTION OF TELEPHONE DEMAND BY DEMAND DENSITY AND EXPANSION AREA PLAN
(IN 1993)

TABLE 8-4-(14) CLASSIFICATION OF EXCHANGE OFFICE.

Cissification of exchange office.		Name of exchange office.	Area size. (ha)	Demand in 1993	Density per ha.	Name of tandem exchange.	Remarks.
I	Demand density. 0/ha ∫ 15/ha	Ancol.	2,140	28,300	13.2	Kota	
		Pluit.	1,366	18,800	13.8	''	
		Cengkareng.	3,267	14,600	4.5	''	
		Tegal Alur.	3,108	9,300	3.0	''	
		Kedoya.	1,315	10,100	7.7	Gambir	
		Meruya.	1,881	11,800	6.3	''	
		Rawamangun.	1,468	21,900	14.9	Compaka Putih	Total area size.
		Pulo Gadung.	1,692	6,900	4.1	''	39,962 ha.
		Penggilingan.	1,529	8,300	5.4	''	Demand.
		Cilincing.	1,759	11,700	5.7	''	273,900
		Cipete.	2,450	15,700	6.4	Kebayoran.	
		Kalibata.	2,289	29,200	12.8	''	Mean demand density
		Pasar Minggu.	2,144	11,400	5.2	''	6.9/ha.
		Jagakarsa.	2,064	5,800	2.8	''	
		Cawang.	2,660	24,600	9.2	Jatinegara.	
		Pasa Rebo.	3,630	15,400	4.2	''	
		Klender.	1,892	20,300	10.7	''	
		Gandaria.	3,258	9,800	3.0	''	
II	16/ha ∫ 30/ha	Slipi.	1,481	35,100	23.7	Gambir.	
		Pal Merah.	1,505	26,000	17.3	''	
		Cempaka Putih.	1,424	40,200	28.2	Cempaka Putih.	
		Tanjung priok (A)	1,214	32,500	26.8	''	Total area size.
		'' (B)	1,227	29,000	23.6	''	11,890 ha
		Kebayoran (A)	1,107	26,000	23.5	Kebayoran.	Demand
		'' (B)	963	15,600	16.2	''	269,800
		Jatinegara (A)	672	17,700	26.3	Jatinegara.	Mean demand density
		'' (B)	1,130	20,000	17.7	''	22.7/ha
		Tebet.	1,167	27,700	23.7	''	
III	more than 31/ha	Kota (A)	562	20,900	37.2	Kota	
		'' (B)	471	57,100	121.2	''	Total area size.
		'' (C)	543	39,400	72.6	''	5,301 ha
		Gambir (A)	1,139	43,700	38.4	Gambir	Demand.
		'' (B)	998	52,200	52.3	''	264,300
		Semanggi (A)	871	36,100	41.4	''	Mean demand density
		'' (B)	717	14,900	*20.8	''	* 49.9/ha.

I
DEMAND DENSITY
(0 ~ 15)
273,900

I 10.2%
27,900

II
DEMAND DENSITY
(16 ~ 30)
269,800

I 3.0%
8,100

III
DEMAND DENSITY
(MORE THAN,)
31
264,300
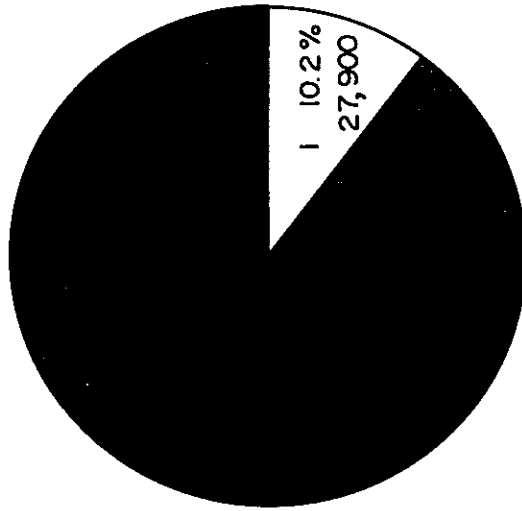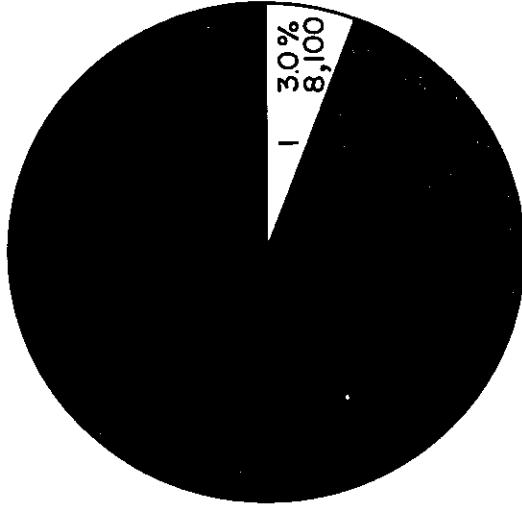
I 0.7%
1,600
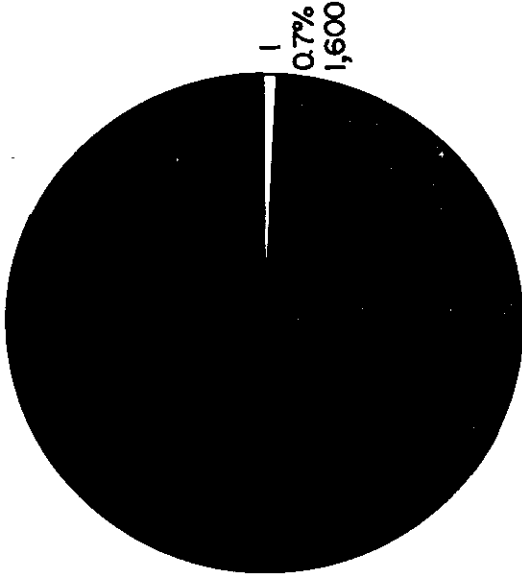
R : RESIDENTIAL TELEPHONE

S : SHOP

O : OFFICE

I : INDUSTRY

F I G. 8 - 4 - (15)

% DISTRIBUTION OF TELEPHONA DEMAND BY DEMAND DENSITY AND DEMAND AREA PATTERN
(IN 1993)

Ⅰ
DEMAND DENSITY
(0 ~ 15)
273,900

Ⅱ
DEMAND DENSITY
(16 ~ 30)
269,800

Ⅲ
DEMAND DENSITY
(MORE THAN)
31
264,300

0.8 mm
16,400
(6%)

0.6mm area
5,300
(2 %)
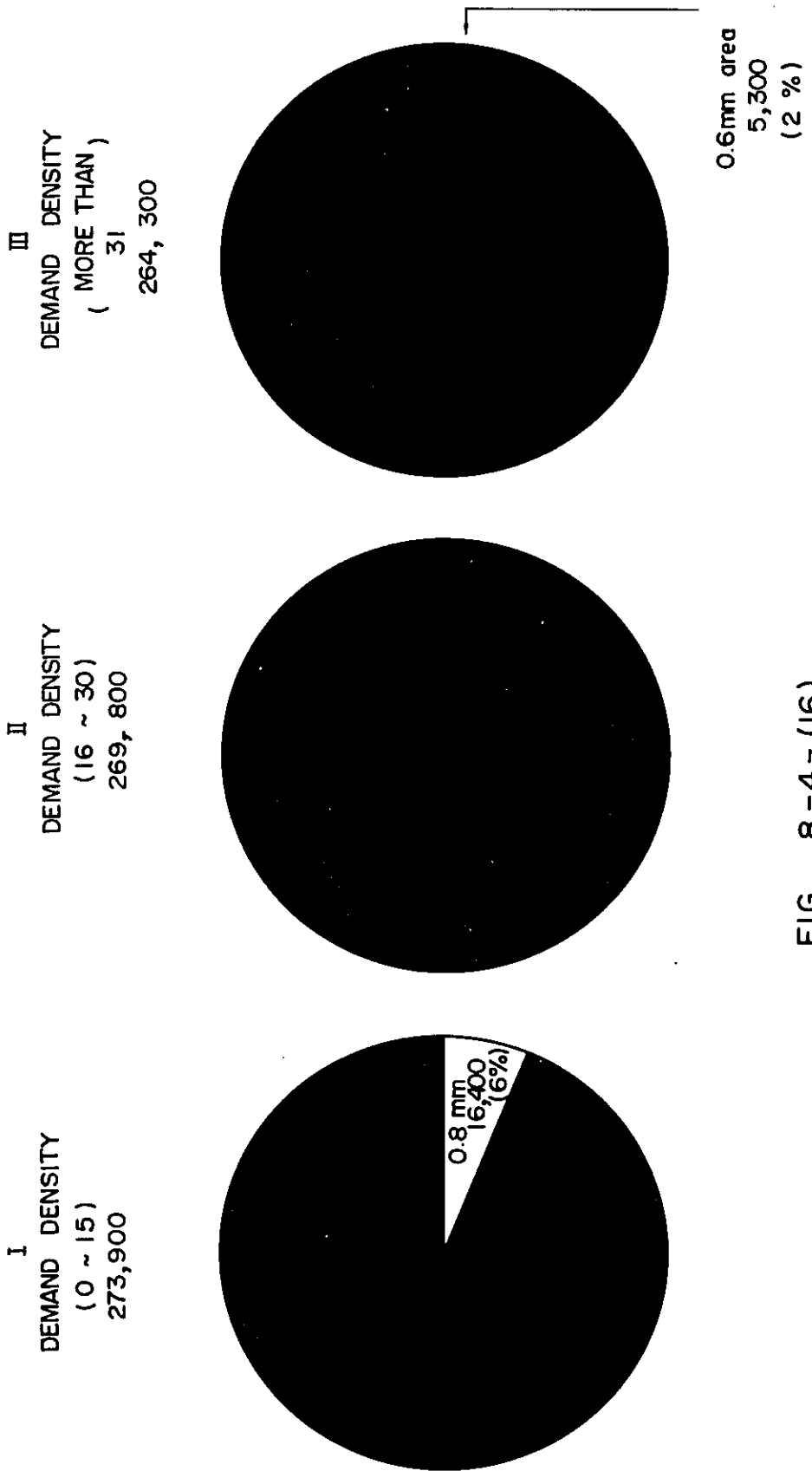
FIG. 8-4-(16)

% DISTRIBUTION OF TELEPHONE DEMAND BY DEMAND DENSITY AND CONDUCTOR DIAMETER
(IN 1993)

I
DEMAND DENSITY
(0 ~ 15)
273,900

CONDIUT
6 %
16,200

II
DEMAND DENSITY
(16 ~ 30)
269,800

CONDIUT
23 %
61,200

III
DEMAND DENSITY
(MORE THAN)
31
264,300

CONDIUT
72 %
191,100
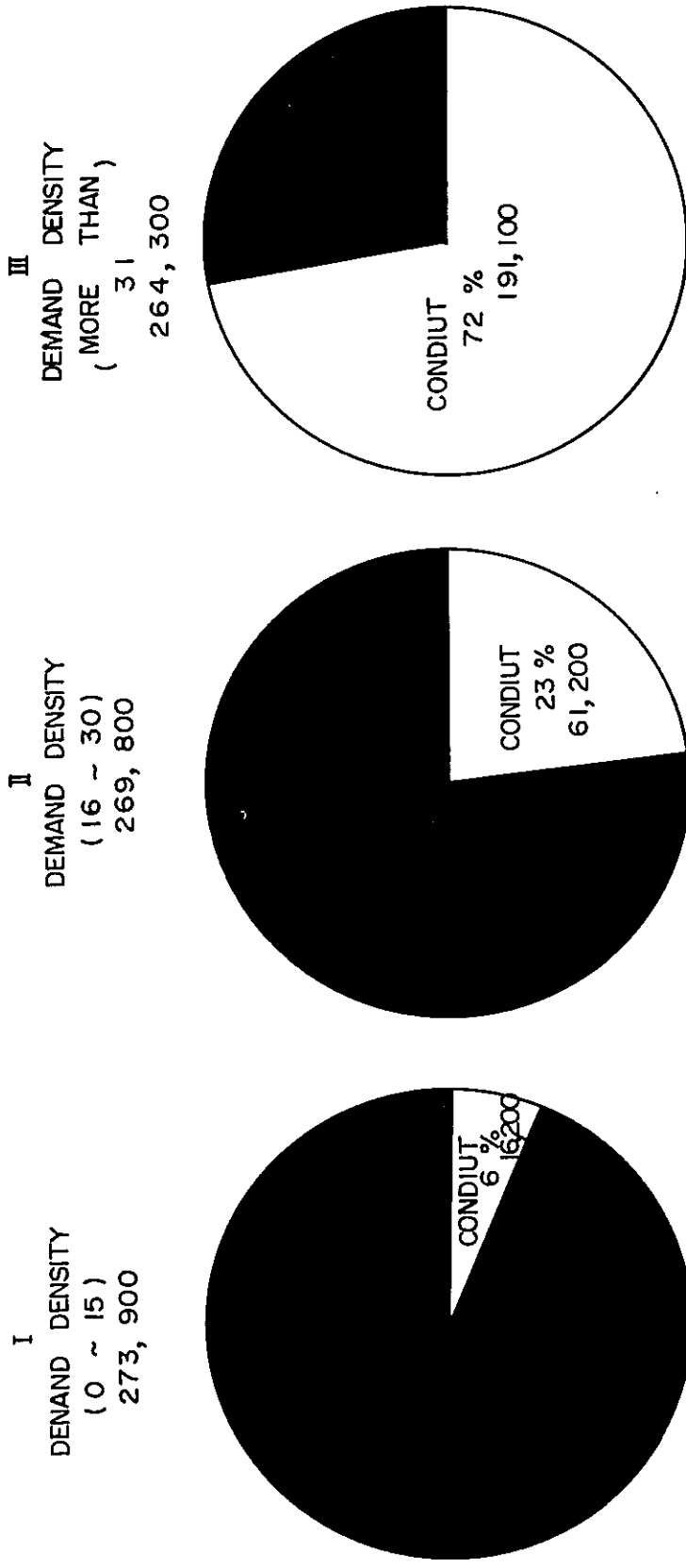
FIG. 8 - 4 - (17)

% DISTRIBUTION OF TELEPHONE DEMAND BY DEMAND DENSITY AND CABIL STRUCTURE
(IN 1993)

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TABLE 8-4-(18) % DISTRIBUTION OF TELEPHONE DEMAND BY DEMAND
DENSITY AND CABLE STRUCTURS (1993).

Area	Pattern	Demand composition (%) in 1993 I (0~15)	II (16~30)	III more than 31	Total x10³	Estimation of cable structure Aerial	Direct buried	Conduit cable	Demand density I (0~15) Aerial	Direct buried cable	Conduit cable	Total x10³	II (16~30) Aerial	Direct buried cable	Conduit cable	Total	III more than (31) Aerial	Direct buried cable	Conduit cable	Total	Remarks
R	R₁	(1.1) 3.0	(6.6) 17.8	(2.4) 6.3	(3.4) 27.1		100%			3.0		3.0		17.8		17.8		6.3		6.3	
	R₂	(36.1) 98.9	(54.3) 146.5	(12.4) 32.8	(34.4) 278.2	50%	50%		49.4	49.5		98.9	73.2	73.3		146.3	16.3	16.4		32.7	
	R₃	(33.7) 92.3	(3.4) 9.2	(3.2) 8.5	(13.6) 110.0	100%			92.3			92.3	9.2			9.2	8.5			8.5	
S	S₁	-	-	(42.9) 113.4	(14.0) 113.4			100%				-						113.4		113.4	
	S₂	(1.5) 4.1	(7.9) 21.3	(2.4) 6.3	(3.9) 31.7		30%	70%		1.2	2.9	4.1		6.4	14.9	21.3		1.9	4.4	6.3	
	S₃	(8.4) 23.0	(2.9) 7.8	(1.4) 3.7	(4.3) 34.5	50%	50%		11.5	11.5		23.0	3.9	3.9		7.8	1.9	1.9		3.8	
O	O₁	(1.9) 5.2	(11.4) 30.8	(20.7) 54.7	(11.2) 90.7			100%			5.2	5.2			30.8	30.8			54.7	54.7	
	O₂	(4.4) 12.1	(10.5) 28.3	(14.0) 37.0	(9.6) 77.4		50%	50%		6.1	6.0	12.1		14.1	14.2	28.3		18.5	18.5	37.0	
I	I₁	(2.6) 7.1	(1.7) 4.6	(0.2) 0.5	(1.5) 12.2	10%	60%	30%	0.7	4.3	2.1	7.1	0.5	2.8	1.3	4.6	0.1	0.3	0.1	0.5	
	I₂	(7.0) 19.2	(1.2) 3.2	(0.4) 1.1	(2.9) 23.5	30%	70%		5.8	13.4		19.2	1.0	2.2		3.2	0.3	0.8		1.1	
	Ag	(2.7) 7.4	-	-	(0.9) 7.4	100%			7.4			7.4				-				-	
	Other	(0.6) 1.6	(0.1) 0.3	(0.2)	(0.2) 1.9	30%	70%		0.5	1.1		1.6	0.1	0.2		0.3					
	TOTAL	(100) 273.9	(100) 269.8	(100) 264.3	(100) 808.0				(61%) 167.6	(33%) 90.1	(6%) 16.2	(100%) 273.9	(32%) 87.9	(45%) 120.7	(23%) 61.2	(100%) 269.8	(10%) 27.1	(18%) 46.1	(72%) 191.1	(100%) 264.3	

TABLE 8-4-(19) SECONDARY CONSTRUCTION COST BY CABLE.

Unit : Rp.

Kind of cable	Duct cable					Direct buried cable					Aerial cable				
	Cable material.	Installation.	Principal work.	Other.	Construction cost per.m.	Cable material.	Installation.	Principal work.	Other	Construction cost per.m.	Cable material.	Installation.	Principal work.	Other.	Construction cost per.m.
Pairs 200	3,250	1,338	2,208	3,359	20,155	3,410	5,238	458	1,821	10,927	2,984	2,416	1,455	1,371	8,226
100"	1,952	"	"	3,100	18,598	2,090	"	"	1,557	9,343	1,556	1,845	"	971	5,827
60"	1,200	"	"	2,949	17,695	1,320	"	"	1,403	8,419	1,015	1,508	"	796	4,774
mm 0.4 40"	835	"	"	2,876	17,257	935	"	"	1,326	7,957	668	1,375	"	700	4,198
30"	677	"	"	2,845	17,068	770	"	"	1,293	7,759	550	1,309	"	663	3,977
20"	554	"	"	2,820	16,920	638	"	"	1,267	7,601	382	1,142	"	596	3,575
10"	370	"	2,205	2,783	16,696	440	"	455	1,227	7,360	262	608	1,367	447	2,684
200"	4,760	"	2,208	3,661	21,967	4,950	"	458	2,129	12,775	4,700	2,416	1,455	1,714	10,285
100"	2,560	"	"	3,221	19,327	2,750	"	"	1,689	10,135	2,450	1,845	"	1,150	6,900
60"	1,590	"	"	3,027	18,163	1,760	"	"	1,491	8,947	1,599	1,508	"	912	5,474
mm 0.6 40"	1,315	"	"	2,972	17,833	1,485	"	"	1,436	8,617	1,052	1,375	"	776	4,658
30"	983	"	"	2,906	17,435	1,045	"	"	1,348	8,089	867	1,309	"	726	4,357
20"	770	"	"	2,863	17,179	825	"	"	1,304	7,825	602	1,142	"	640	3,839
10"	504	"	2,205	2,809	16,856	550	"	455	1,249	7,492	413	608	1,367	478	2,866
200"	6,850	"	2,208	4,074	24,475	7,120	"	458	2,563	15,379	5,849	2,416	1,455	1,944	11,664
100"	3,410	"	"	3,391	20,347	3,670	"	"	1,373	11,239	3,049	1,845	"	1,270	7,619
60"	2,130	"	"	3,135	18,811	2,370	"	"	1,613	9,679	1,990	1,508	"	991	5,944
mm 0.8 40"	1,970	"	"	3,103	18,619	2,270	"	"	1,593	9,559	1,309	1,375	"	828	4,967
30"	1,410	"	"	2,991	17,947	1,430	"	"	1,425	8,551	1,079	1,309	"	769	4,612
20"	1,070	"	"	2,923	17,539	1,090	"	"	1,357	8,143	749	1,142	"	669	4,015
10"	690	"	2,205	2,847	17,080	760	"	455	1,279	7,672	514	608	1,367	498	2,987

Other: (Cable material + installation cost + principal work) x 20%.

TABLE 8-4-(20) SECONDARY CABLE CONSTRUCTION COST.
(FOR I CLASS EXCHANGE OFFICE)

Demand density	Conductor diameter (mm)	Demand composition rate. Demand in1993	Ratio ①	Over head. Construction cost per sub. ② 10³RP.	① x ②	Direct buried. Construction cost per sub. ③	① x ③	Conduit Construction cost per sub. ④	cable ① x ④	Total construction cost per sub. (10³RP)	Remarks.
A 0~15 /ha	0.4	183,500	67	41	27.5	65	43.6	128	85.8		Cable structure composition rate. Aerial 61% Direct buried. 33% Conduit cable. 6%
	0.6	74,000	27	49	13.2	72	19.4	136	36.7		
	0.8	16,400	6	54	3.2	81	4.9	146	8.8		
	TOTAL	273,900	100		439 x 61% 26.8		67.9x33% 22.4		131.3 x 6% 7.9	57.1	
B 16~30 /ha	0.4	183,500	67	24	16.1	38	25.5	76	50.9		
	0.6	74,000	27	29	7.8	43	11.6	80	21.6		
	0.8	16,400	6	32	1.9	49	2.9	86	5.2		
	TOTAL	273,900	100		25.8 x 61% 15.7		40.0 x 33% 13.2		77.7x6% 4.7	33.6	
C more than 31 /ha	0.4	183,500	67	13	8.7	19	12.7	38	25.5		
	0.6	74,000	27	15	4.0	22	5.9	40	10.8		
	0.8	16,400	6	17	1.0	25	1.5	43	2.6		
	TOTAL	273,900	100		13.7 x 61% 8.4		20.1 x 33% 6.6		38.9x 6% 2.3	17.3	

TABLE 8-4-(21)   SECONDARY CABLE CONSTRUCTION COST.

(FOR II CLASS EXCHANGE OFFICE)

Demand density of distribution block area	Conductor diameter	Demand composition rate		Overhead.		Direct buried.		Conduit cable.		Total construction cost per subs. (10³Rp.)	Remarks
		Demand in 1993	Ratio ①	Construction cost per sub ② 10³ Rp	① x ②	Construction cost per sub ③ 10³Rp.	① x ③	Construction cost per sub ④ 10³Rp.	① x ④		Cable structure composition rate. Aerial 32% Direct buried. 45% Conduit cable. 23%
A 0~15/ha	0.4	232,000	86	41	35.3	65	55.9	128	110.1		
	0.6	37,800	14	49	9.7	72	10.1	136	19.0		
	0.8										
	TOTAL	269,800	100	45.0 x 32%	11.2	66.0 x 45%	29.7	129.1 x 23%	29.7	70.6	
B 16~30/ha	0.4	232,000	86	24	20.6	38	32.7	76	65.4		
	0.6	37,800	14	29	4.1	43	6.0	80	11.2		
	0.8										
	TOTAL	269,800	100	24.7 x 32%	7.9	38.7 x 45%	17.4	76.6 x 23%	17.6	42.9	
C more than 31/ha	0.4	232,000	86	13	11.2	19	16.3	38	32.7		
	0.6	37,800	14	15	2.1	22	3.1	40	5.6		
	0.8										
	TOTAL	269,800	100	13.3 x 32%	4.3	19.4 x 45%	8.7	38.3 x 23%	8.8	21.8	

TABLE 8-4 -(22) SECONDARY CABLE CONSTRUCTION COST.

(FOR Ⅲ CLASS EXCHANGE OFFICE)

Demand density of distri- bution block area	Con- ductor dia- meter.	Demand composition rate. Demand in 1993	Ratio ①	Overhead. Construction cost per sub. ② (10³ Rp)	① x ②	Direct buried. Construction cost per sub. ③ (10³ Rp)	① x ③	Conduit Construction cost per sub. ④ (10³ Rp)	cable. ① x ④	Total construction cost per sub. (10³ Rp)	Remarks.
A 0~15 /ha	0.4	259,000	98	41	40.2	65	63.7	128	125.4		Cable structure compo- sition rate. Aerial 10% Direct buried. 18% Conduit cable. 72%
	0.6	5,300	2	49	1.0	72	1.4	136	2.7		
	0.8										
	TOTAL	264,300	100		41.2 x 10% 4.1		65.1 x 18% 11.7		128.1 x 72% 92.2	108.0	
B 16~30 /ha	0.4	259,000	98	24	23.5	38	37.2	76	74.5		
	0.6	5,300	2	29	0.6	43	0.9	80	1.6		
	0.8										
	TOTAL	264,300	100		24.1 x 10% 2.4		38.1 x 18% 6.9		76.1 x 72% 54.8	64.1	
C more than 31 /ha	0.4	259,000	98	13	12.7	19	18.6	38	37.2		
	0.6	5,300	2	15	0.3	22	0.4	40	0.8		
	0.8										
	TOTAL	264,300	100		13.0 x 10% 1.3		19.0 x 18% 3.4		38.0 x 72% 27.4	32.1	

TABLE 8-4-(23)   CONSTRUCTION COST PER SUBSCRIBER LINE.

10^3Rp.

	Cable structure.		A 0 ~ 15 / ha	B 16 ~ 30 / ha	C more than 31 / ha
Secondary cable.	Aearial cable.	0.4 mm	41.0	24.0	13.0
		0.6 mm	49.0	29.0	15.0
		0.8 mm	54.0	32.0	17.0
	Buried cable.	0.4 mm	65.0	38.0	19.0
		0.6 mm	72.0	43.0	22.0
		0.8 mm	81.0	49.0	25.0
	Condiut cable.	0.4 mm	128.0	76.0	38.0
		0.6 mm	136.0	80.0	40.0
		0.8 mm	146.0	86.0	43.0
Subscriber installation.	Aeriala cable.		98.8	65.2	51.6
	Buried cable.		125.0	95.6	74.9
	Condiut cable.		57.9	57.9	57.9
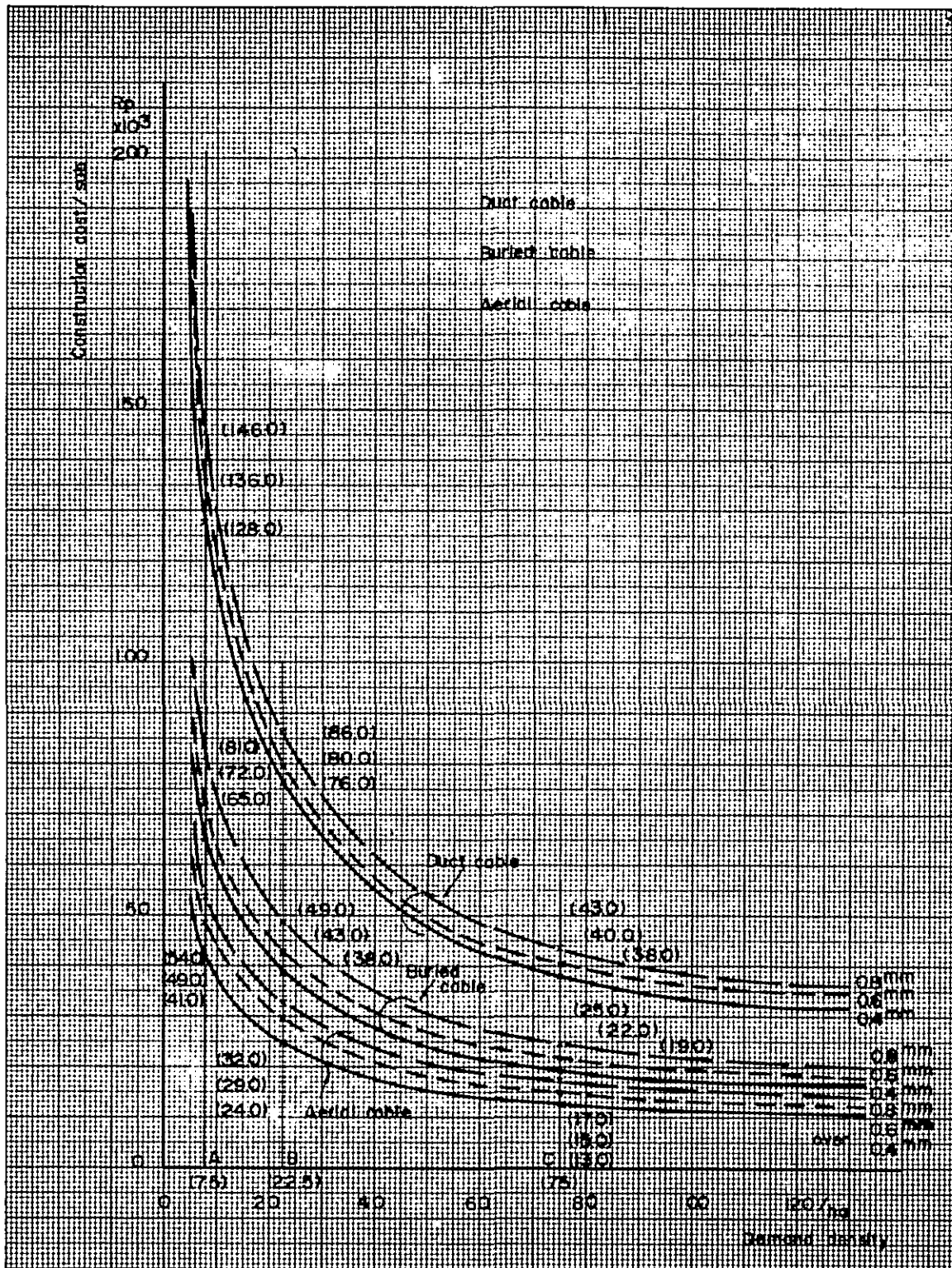
FIG. 8-4-(24) SECONDARY CABLE CONSTRUCTION COST
PER SUBSCRIBER LINE

in which the exchange office is not yet established can be fulfilled from the adjacent existing office, additional junction cables will be installed, considering the D.C. resistance limit. Additional junction cables in Plan 1 and Plan 2 are as follows:

Table 8.4.(25) Additional Junction Cable Works   Unit: km

Kind of cable	1979		1983	
	Plan — No. 1	Plan — No. 2	Plan — No. 1	Plan — No. 2
mm pairs 0.6 — 1200	47.5	63.9	—	4.0
0.6 — 600	—	5.8	2.0	2.0
0.6 — 400	5.8	—		
0.8 — 800	17.8	94.8		
0.8 — 600	—	12.5		
0.8 — 400	5.5	33.5		
0.9 — 400	9.0	14.5		
0.9 — 300	—	5.5		
0.9 — 200	—	7.0		
1.0 — 200	14.5	24.5		

Civil engineering work for junction cable laying is calculated from the Subscriber Cable Basic Plan (Key Map) and the Junction Cable Route Map prepared by JTP. Civil engineering cost is not included in the junction cable cost. All junction cables are calculated as conduit cables and loading coil cost is included in the junction cable cost.

8.5 Civil Engineering

Civil engineering cost consists of that for primary cable and junction cable laying. Civil engineering cost for secondary cable laying is excluded. Conduit length is calculated, based on the Subscriber Cable Basic Plan (Key Map) and the Junction Cable Route Map of JTP. The mean number of conduits is nine. This number derives from the study of the Subscriber. Primary Cable Network Basic Designing Schemes for Gambir, Kebayoran, Jatinegara, Cawang, Pasar Rebo and Gaudaria exchanges.

In the case of cable laying in conduit the cost of restoring pavement after excavation occupies a large part of total civil engineering cost. In the cost estimation the rate of road re-pavement cost is set at 70% and the depth of excavation from ground surface to the bottom of conduit is set at 1.2 m.

Based on the fundamental concept of Plan 1 and Plan 2, civil engineering is to proceed in accordance with the primary cable expansion plan. In this case the volume of civil engineering is calculated, based on telephone demand as of 1993. It is so designed

TABLE 8-4-(26) JUNCTION CABLE CONSTRUCTION COST.

Cable size		Unit cost	Junction										Plan 1. 90% Demand fulfilment plan.									Plan 2. 100% Demand fulfilment plan.									Remarks.
			1974		1983		1988		1993			1974		1983		1988		1993			1979		1983		1988		1993		
			Cable length	Cost	Cable length	Cost	Cable length	Cost	Cable length	Cost		Cable length	Cost	Cable length	Cost	Cable length	Cost	Cable length	Cost		Cable length	Cost	Cable length	Cost	Cable length	Cost	Cable length	Cost	
0.4	2400	38.5	12.4	477.4	12.8	492.8	18.1	696.9	11.0	423.5																			
	1200	19.3					12.4	239.3	6.1	117.7																			
	SAB TOTAL		12.4	477.4	12.8	492.8	30.5	936.2	17.1	541.2																			
0.6	1200	30.0	203.4	6102.0	21.6	648.0	46.9	1470.0	146.8	4404.0		47.5	1425.0	(3.4)(1020)		(7.0)(210.0)		(1.7)(51.0)			63.9	1917.0	(3.4)(1020) 4.0 120.0		(7.0)(210.0)		(1.7)(51.0)		
	800	20.0							4.0	80.0																			
	600	15.6			11.7	182.5								2.0	31.2						5.8	90.5	2.0	31.2					
	400	10.5	8.0	84.0	6.0	63.0	14.5	152.3	5.0	52.5		5.8	60.9																
	SAB TOTAL		211.4	6186.0	39.3	893.5	61.4	1559.3	155.8	4536.5		53.3	1485.9	(3.4)(1020) 2.0 31.2		(7.0)(210.0)		(1.7)(51.0)			69.7	2007.5	(3.4)(1020) 6.0 151.2		(7.0)(210.0)		(1.7)(51.0)		
0.8	800	30.1	138.9	4180.9	29.4	884.9	28.0	842.8	68.3	2055.8		17.8	535.8	(11.8)(355.2)				(6.0)(180.6)			94.8	2853.5	(11.8)(355.2)				(6.0)(180.6)		
	600	23.3	56.2	1309.5	21.2	494.0	8.6	200.4	11.0	256.3				(7.0)(163.1)							12.5	293.1	(7.0)(163.1)				(5.5) 128.2		
	400	16.2	21.9	354.8	18.5	299.7			7.0	113.4		5.5	89.1	(5.5)(89.1)							33.5	542.7	(10.5)(170.1)						
	300	12.4			7.5	93.0																							
	200	9.1	6.0	54.6																									
	SAB TOTAL		223.0	5899.8	76.6	1771.6	36.6	1043.2	86.3	2425.5		23.3	624.9	(17.3)(444.3)				(6.0)(180.6)			140.8	3687.5	(293)(688.4)				(11.5)(308.8)		
0.9	400	19.2	80.0	1536.0	59.4	1140.5	53.4	1025.3	105.4	2023.7		9.0	172.8	(3.0)(57.6)		(3.0) 57.6		(3.0)(57.6)			14.5	278.4	(3.0)(57.6)		(3.0)(57.6)		(8.5)(163.2)		
	300	14.7	24.1	354.3	10.5	154.4	32.3	400.5	83.2	103.7											5.5	80.9	(5.5)(80.9)						
	200	10.6	47.6	504.6	14.0	148.4	32.3	400.5	83.2	103.7											7.0	74.2	(7.0)(74.2)						
	SAB TOTAL		151.7	2394.9	83.9	1443.3	53.4	1025.3	105.4	2023.7		9.0	172.8	(3.0)(57.6)		(3.0) 57.6		(3.0)(57.6)			27.0	433.5	(15.5)(212.7)		(3.0)(57.6)		(8.5)(163.2)		
1.0	200	12.4	57.0	706.8	34.7	430.3	32.3	400.5	83.2	103.7		(5.5)(68.2) 14.5 179.8		(6.0)(74.4)		(3.0)(37.2)		(3.0)(37.2)			(10.5)(130.2) 24.5 303.8		(6.0)(74.4)			(3.0)(37.2)			
	SAB TOTAL		57.0	706.8	34.7	430.3	32.3	400.5	83.2	103.7		(5.5)(68.2) 14.5 179.8		(6.0)(74.4)		3.0 37.2					(10.5)(130.2) 24.5 303.8		(6.0)(74.4)			(3.0)(37.2)			
TOTAL			555.5	15664.9	247.3	5031.5	214.2	4964.5	447.8	10558.6		(5.5)(68.2) 100.1 2463.4		(2.0)(31.2) 29.7 678.3		(0.0)(267.6)		(13.7)(326.4)			(10.5)(130.2) 262.0 6432.3		(5.42)(077.5) 6.0 151.2		(10.0) 267.6		(24.7) 560.2		
GRAND TOTAL			7501	18060.1								7750	5678.6			2042 4696.9		4341 02322			9070 219670 99.1		4105.2		2040 4696.9		4231 99984		

Civil and MH. (Civil 39.5km x 24.6 x 10^6 Rp/km= 97.1 x 10^6 Rp.   Cable length : km.

(MH 264 x 822.5 x 10^3 Rp/each = 217.1 x 10^6 Rp.

T O T A L =1,188.8 x 10^6 Rp.

TABLE 8-4-(27)   JUNCTION CONSTRUCTION COST

Kind of cable		Construction cost. 10³Rp/km. ① ②+③+④+⑤	Cable material 10³Rp/km ②	Installation cost. (Laying+jointing) 10³Rp/km ③	Principal work. (lead sleve + desiccant) ④ 10³ Rp/km	Other. ⑤ (②x③x④)x 20%
0.4 mm	2400"	38480	* 29200	1484	1383	6413
	1200"	19338	14357	770	988	3223
0.6 mm	1200"	30032	23043	770	1214	5005
	800'	20018	15050	627	1005	3336
	600"	15564	11575	483	912	2594
	400"	10500	* 7600	342	808	1750
0.8 mm	800"	30084	23225	627	1218	5014
	600"	23308	17865	483	1075	3885
	400"	16201	12231	342	928	2700
	300"	12382	9214	254	850	2064
	200'	9097	* 6600	199	782	1516
0.9 mm	400"	19241	* 14700	342	992	3207
	300"	14652	11058	254	898	2442
	200"	10574	* 7800	199	813	1762
1.0 mm	300"	19309	14841	254	996	3218
	200"	12421	* 9300	199	852	2070

(* Assumption)

TABLE 8-4-(28) COIL COST

Capacity of coil.	Unit cost. (10^6Rp.)	~1979		~1983		~1988		~1993		Remarks.
		Works.	Cost (10^6Rp.)	Works	Cost (10^6Rp.)	Works	Cost (10^6 Rp.)	Works	Cost (10^6Rp.)	
100 Pairs	1.8	—	—	5	9.0	—	—	—	—	
200 "	2.3	70	161.0	98	225.4	95	218.5	89	204.7	
300 "	2.8	17	47.6	7	19.6	—	—	—	—	
400 "	3.3	105	346.7	77	254.1	47	155.1	137	452.1	
600 "	4.4	206	906.4	34	149.6	109	479.6	135	594.0	
800 "	5.3	75	397.5	7	37.1	22	116.6	45	238.5	
TOTAL		473	1,859.0	228	694.0	273	969.8	406	1,489.3	

that civil engineering in the case of Plan 2 (demand fulfilment rate: 100%) will be completed in 1979 (in which the demand is to be satisfied 100%).

8.6 Telephone Installation

Telephone installation cost consists of leading-in cable or drop wire cost, internal wire cost, leading-in duct cost, handhole cost and telephone set cost, i.e., the cost of telephone facilities on the way from distribution point to telephone set.

Telephone installation cost varies according to the leading-in cable or drop wire length, cable structure and number of cable pairs. Following is an estimate of these factors.

8.6.1 Cable Length

Leading-in cable or drop wire length required depends upon telephone demand density. When demand density is high the leading-in cable can be short and when demand density is low a long leading-in cable is required. (In the latter case it must be noted that the size of distribution block area where demand density is low is larger than that of high demand density area.)

Based on the classification of demand density (A, B and C) in each distribution block area, leading-in cable length required is estimated as follows:

Demand density A	(0 - 15) area	74 m
Demand density B	(16 - 30) area	49 m
Demand density C	(31 or more) area	33 m

8.6.2 Cable Structure

Telephone demand composition ratio by cable structure is calculated in consideration of the cable structure application plan according to local development pattern (R, S, O, I) as shown in Table 8.4.(18).

Table 8.6.(1)   Demand Composition Rate by Cable Structure

	Overhead cable	Direct buried cable	Conduit cable	Remarks
I	61 %	33 %	6 %	
II	32 %	45 %	23 %	
III	10 %	18 %	72 %	

TABLE 8-5-(1) CIVIL ENGINEERING AND CONSTRUCTION COST. (PIPE).

No	Name of Exchange	1979 Length	1979 Cost (10^6 Rp.)	1983 Length	1983 Cost (10^6 Rp.)	1988 Length	1988 Cost (10^6 Rp.)	1993 Length	1993 Cost (10^6 Rp.)	Total Length	Total Cost (10^6 Rp.)
1	Kuta (A)	8.2	201.7	0.7	17.2					8.9	218.9
2	" (B)	13.4	3296	0.4	9.8					13.8	3394
3	" (C)	12.2	3001							12.2	3001
4	Ancol.	19.5	4797	1.6	394	1.7	41.8	0		22.8	5609
5	Pluit.	7.1	174.7	4.9	120.5					12.0	2952
6	Cangkareng.	2.0	492	10.9	268.1					12.9	317.3
7	Tegal Alur.			7.1	174.7	7.2	177.1			14.3	351.8
8	Gambir (A)	17.4	4280	1.4	344					18.8	4624
9	" (B)	15.8	3887	1.2	29.5					17.0	4182
10	Semanggi (A)	15.3	3764	4.2	1033					19.5	4797
11	" (B)	9.2	2263	1.5	369	0.6	14.8			11.3	2780
12	Slipi.	20.9	514.1	2.7	664			0.4	9.8	24.0	590.3
13	Pal Merah	16.9	415.7	3.5	86.1	0.3	7.4			20.7	509.2
14	Kedoya.	12.3	3026							12.3	3026
15	Meruya.	0		7.2	177.1			3.4	83.6	10.6	260.7
16	Cempaka Putih.	21.2	521.5	2.7	66.4					23.9	587.9
17	Rawamangun.	19.3	474.9							19.3	474.9
18	Pulo Gadung	7.7	189.4	3.3	81.2	0.7	17.2			11.7	287.8
19	Penggilingan.	1.9	467	8.9	218.9					10.8	265.6
20	Tg. Priok (A)	17.0	418.2	3.6	88.6					20.6	5068
21	Tg. Priok (B)	11.4	280.4	4.5	110.7					15.9	391.1
22	Cilincing.	3.4	85.6	4.6	113.2	2.3	56.6	1.5	36.9	11.8	290.3
23	Kebayoran (A)	18.8	464.9	0						18.8	464.9
24	" (B)	0.5	12.3	8.8	216.5	0.1	2.5			9.4	231.3
25	Cipete	13.6	334.6	1.8	44.3	0.2	4.9			15.6	383.8
26	Kalibata.	13.1	322.3	7.0	172.2					20.1	494.5
27	Pasar Minggu.	4.7	115.6	6.8	167.3	2.0	49.2			13.5	332.1
28	Jagakarsa.	1.6	39.3	3.9	95.9			0.6	14.8	6.1	150.0
29	Jatinegara (A)	8.0	196.8							8.0	196.8
30	" (B)	12.5	307.5	0.4	9.8					12.9	317.3
31	Cawang.	16.5	405.9							16.5	405.9
32	Pasar Rebo.	7.3	179.6	4.0	98.4	2.1	51.7			13.4	329.7
33	Klendaz	3.3	81.2	5.2	127.9	9.2	226.2			17.7	4353
34	Tebet.	19.5	479.7	0.2	4.9					19.7	484.6
35	Gandaria.	6.7	164.8							6.7	164.8
	TOTAL	378.2	9,3060	113	2,7796	26.4	649.4	5.9	145.1	523.5	12,8801

Unit length: (km)

Cost: Rp. in million.

Unit cost / length: Rp. 24.6 x 10^6.

TABLE 8-5-(2)　MANHOLE WORK AND CONSTRUCTION COST.

No	Name of Exchange	1979 No.of Mh	1979 Cost	1983 No.of Mh	1983 Cost	1988 No.of Mh	1988 Cost	1993 No.of Mh	1993 Cost	No.of Mh	Cost
1	Kota (A)	55	45.2	5	4.1					60	49.3
2	" (B)	90	74.0	3	2.5					93	76.5
3	" (C)	82	67.5							82	67.5
4	Ancol	130	106.9	11	9.1	12	9.9			153	125.9
5	Pluit	48	39.5	33	27.1					81	66.6
6	Cangkareng	14	11.5	73	60.0					87	71.5
7	Tegal Alur	-		48	39.5	48	39.5			96	79.0
8	Gambir (A)	116	95.4	10	8.2					126	103.6
9	" (B)	106	87.2	8	6.6					114	93.8
10	Semanggi(A)	102	83.9	28	23.0					130	106.9
11	" (B)	62	51.0	10	8.2	4	3.3			76	62.5
12	Slipi	140	115.2	18	14.8	-		3	2.5	161	132.5
13	Pal Merah	113	92.5	24	19.7	2	1.7			139	114.3
14	Kedoya	82	67.5							82	67.5
15	Meruya	-		48	39.5	-		23	18.9	71	58.4
16	Cempaka Putih	142	116.8	18	14.8					160	131.6
17	Rawamangun	129	106.1							129	106.1
18	Pulo Gadung	52	42.8	22	18.1	5	4.1			79	65.0
19	Panggilingan	13	10.7	60	49.4					73	60.1
20	Tg. Priok(A)	114	93.8	24	19.7					138	113.5
21	Tg. Priok (B)	76	62.5	30	24.7					106	87.2
22	Cilincing.	23	18.9	31	25.5	16	13.2	10	8.2	80	65.8
23	Kebayoran(A)	126	103.6							126	103.6
24	" (B)	4	3.3	59	48.5	1	0.8			64	52.6
25	Cipete.	91	74.9	12	9.9	2	1.7			105	86.5
26	Kalibata.	88	72.4	47	38.7					135	111.1
27	Pasar Minggu.	32	26.3	46	37.8	14	11.5			92	75.6
28	Jagakarsa.	11	9.1	26	21.4	-		4	3.3	41	33.8
29	Jatinegara(A)	54	44.4							54	44.4
30	" (B)	84	69.1	3	2.5					87	71.6
31	Cawang.	110	90.5							110	90.5
32	Pasar Rebo.	49	40.3	27	22.2	14	11.5			90	74.0
33	Klender.	22	18.1	35	28.8	62	51.0			119	97.9
34	Tebet.	130	106.9	2	1.7					132	108.6
35	Gandaria.	45	37.0							45	37.0
	T O T A L	2535	2085.2	761	626.0	180	148.2	40	32.9	3516	2892.3

MH : 822.5 x 10³ Rp./MH.

Cost unit : Rp. in million.

TABLE 8-5-(3) PIPE CONSTRUCTION COST.

Number of pipe.	Excavation area. ①	Excavation cost (500/m³) ②=①x1000x500	Back filling with sand. (3,000/m³) ③=①x1000x3000	Transportation of earth. (850/m³) ④=①x1000x850	Pavement asfalt. (2800/m) ⑤=(α+0.4+0.4)x1000x70%x2800	Pipe laying and jointing of pipe (100/m) ⑥=pipe x 100x1000	Material cost of pipe (1750/m) ⑦=pipe x 1,750x1000	Total cost. ⑧=②+③+④ +⑤+⑥+⑦ 10³ Rp.	Cost/Pipe 10³ Rp.
2	(1.10 / 0.55) 0.66 mm²	330	1,980	561	2,842	200	3,500	9,413	4,707
4	(1.25 / 0.55) 0.78 mm²	390	2,340	663	2,940	400	7,000	13,733	3,433
6	(1.25 / 0.70) 0.97 mm²	485	2,910	825	3,234	600	10,500	18,554	3,092
⑨	(1.40 / 0.70) 0.85 / 1.09 mm²	545	3,270	927	3,234	900	15,750	24,626	2,736
12	(1.40 / 0.85) 1.00 / 1.30 mm²	650	3,900	1,105	3,528	1,200	21,000	31,383	2,615
16	(1.55 / 0.85) 1.00 / 1.43 mm²	715	4,290	1,216	3,528	1,600	28,000	39,349	2,459
20	(1.55 / 1.00) 1.15 / 1.67 mm²	835	5,010	1,420	3,822	2,000	35,000	48,087	2,404
25	(1.70 / 1.00) 1.15 / 1.83 mm²	915	5,490	1,556	3,822	2,500	43,750	58,033	2,321
30	(1.70 / 1.15) 1.30 / 2.08 mm²	1,040	6,240	1,768	4,116	3,000	52,500	68,664	2,289
36	(1.85 / 1.15) 1.35 / 2.31 mm²	1,155	6,930	1,964	4,214	3,600	63,000	80,863	2,246
42	(1.85 / 1.30) 1.50 / 2.59 mm²	1,295	7,770	2,202	4,508	4,200	73,500	93,475	2,226

NOTE: (D / W ℓ)
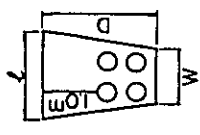
8.6.3 Number of Leading-in Cable Pairs

The number of lead-in cable pairs by cable structure is estimated as follows:

Overhead cable	1 pair
Direct buried cable	2 pairs
Conduit cable	60 pairs

The number of subscriber lines per pole according to telephone demand density of each exchange office is as follows:

Exchange office classification	I	II	III
Number of subscriber lines per pole	0.8	1.4	2.5

By these preconditions the unit cost per subscriber line according to demand density of each exchange office can be calculated as follows:

Exchange office classification	I	II	III
Unit cost per subscriber line	105.1	77.2	60.4

Telephone Installation Work unit cost at high demand density is lower than that at low demand density. Major reason is that the Class III conduit cable composition ratio is high and the number of leading-in cable pairs is relatively large. On the other hand, at Class I exchange office with low demand density, in whose service area the overhead cable ratio is extremely high and the long leading-in cable is used, that is, the number of subscriber lines per pole is smaller than that in the case of high demand density exchange office, the telephone installation work cost per subscriber is high.

8.7 Total Construction Cost

8.7.1 Construction Cost Composition Ratio

As shown in Table 8.7.(1) the total construction cost for the 1975-79 period amounts to approximately 159 billion Rupiahs. This figure is calculated on the assumption that the existing outside plants, i.e., subscriber cables, junction cables, primary cables and civil engineering works, will be improved on a full scale. For exchange office buildings, switching equipment and subscriber premise facilities, only the additional installations from 1975 are considered.

In the cost breakdown by work categories, switching equipment cost occupies an extremely high ratio, accounting for approximately 60% of the total cost.

Outside plant construction cost is based on the estimated telephone demand in 1993. Actually, however, for the exchange office service area where the outside plant construction

TABLE 8-6-(2) TELEPHONE INSTALLATION COST.

Demand : 100% Demand Fulfilment plan.
Fulfilment : 90% Demand Fulfilment plan.

No	Name of Exchange	1979 Demand	1979 Fulfilment	1983 Demand	1983 Fulfilment	1988 Demand	1988 Fulfilment	1993 Demand	1993 Fulfilment	TOTAL Demand	TOTAL Fulfilment
1	Kota (A)	1549.2	1517.2	157.0	175.2	241.6	241.6	350.3	350.3	2298.1	
2	" (B)			362.4	366.6	887.9	887.9	1407.3	1407.3	2657.6	
3	" (C)			302.0	311.7	507.4	507.4	785.2	785.2	1594.6	
4	Ancol.	386.6	238.6	325.8	276.4	735.7	762.0	1450.4	1618.5	2895.5	
5	Pluit.	534.0	455.2	241.7	320.6	441.4	441.4	693.7	693.7	1910.8	
6	Cengkareng.	131.7	88.5	131.4	174.5	362.6	362.6	903.9	903.9	1529.6	
7	Tegal Alur.	767		809	104.0	241.7	295.3	578.1	578.1	977.4	
8	Gambir (A)	2858.1	1108.2	2899	358.8	543.6	543.6	736.9	736.9	2856.2	
9	" (B)			3805	4892	634.2	634.2	978.5	978.5	1993.2	
10	Senanggi (A)	7955	708.6	2507	314.1	477.2	477.2	824.5	824.5	2347.9	
11	" (B)			1057	111.1	2054	2054	314.1	314.1	6252	
12	Slipi.	5850	548.7	3397	3729	640.8	639.2	1065.4	1070.0	2630.9	
13	Pal Merah.	1889	168.8	181.4	1861	494.1	5095	1104.0	1104.0	1968.4	
14	Kedoya.	504	283	63.1	101.9	222.8	2344	725.2	7252	1061.5	
15	Meruya.	74.4	200	925	1366	2838	2386	788.3	858.7	1239.0	
16	Cempaka Putih.	723.3	588.2	347.4	482.5	6562	656.2	1273.8	1273.8	3000.7	
17	Rawamangun.	367.9	367.9	262.8	262.8	578.1	578.1	1040.5	1040.5	2249.3	
18	Pulo Gadung.	482	283	557	557	168.2	188.1	451.9	451.9	7240	
19	Penggilingan.	504	200	662	967	204.9	2049	5465	5465	868.0	
20	Tg. Priok (A)	2368	219.0	2548	272.5	6253	625.3	1273.8	1273.8	2390.7	
21	Tg. Priok (B)	279.9	179.5	216.2	316.5	5404	5404	1196.6	1196.6	2233.1	
22	Cilincing.	91.4	27.3	97.7	1030	294.3	3290	746.2	7704	1229.6	
23	Kebayoran (A)	802.6	617.4	2084	2034	370.6	3706	447.8	447.8	1829.4	
24	" (B)			139.0	311.1	316.5	3296	486.4	486.4	941.9	
25	Cipete.	231.3	215.7	178.7	180.8	423.6	4236	809.3	809.3	1629.2	
26	Kalibata.	408.0	207.3	310.0	510.8	7567	7567	1524.0	1524.0	2998.7	
27	Pasar Minggu.	145.1	73.7	120.9	177.6	2995	314.2	6096	6096	1175.1	
28	Jagakarsa.	57.8	84	52.6	55.7	147.1	1230	352.1	422.5	6622	
29	Jatinegara (A)	595.8	5943	1853	185.3	324.2	3242	586.7	586.7	1692.0	
30	" (B)			2084	210.0	5474	3474	517.2	517.2	10730	
31	Cawang.	230.7	213.9	199.7	216.5	6096	6096	1534.5	1534.5	2574.5	
32	Pasar Rebo.	897	697	830	914	325.8	3374	1114.1	1114.1	1623.1	
33	Klender.	692	240	115.6	1040	441.4	4982	1502.9	1502.9	2129.1	
34	Tebet.	279.4	258.5	227.7	2486	5250	5250	1003.6	1003.6	20357	
35	Gandaria.	71.6	55.8	851	704	241.7	2722	6253	6253	1023.7	
	TOTAL	10434.3	8607.8	6719.9	7960.0	15103	15334	30348.6	30663	626680	

Cost unit: Rp. in million.

TABLE 8-6-(3) TELEPHONE INSTALLATION COST

Exchange Class.	Aerial cable			Buried cable			Conduit cable			Total	Remarks
	Construction cost per sub. (10³Rp/sub) ①	Structure rate. (%) ②	Cost x rate. (10³Rp/sub) ③ = ①x②	Construction cost per sub. (10³Rp/sub) ④	Structure rate. (%) ⑤	Cost x rate. (10³Rp/sub) ⑥ = ④x⑤	Construction cost per sub. (10³Rp/sub) ⑦	Structure rate. (%) ⑧	Cost x rate. (10³Rp/sub) ⑨ = ⑦x⑧	construction cost per sub. (10³Rp/sub) ③+⑥+⑨	
I	98.8	61%	60.3	125.0	33%	41.3	57.9	6%	3.5	105.1	
II	65.2	32%	20.9	95.6	45%	43.0	57.9	23%	13.3	77.2	
III	51.6	10%	5.2	74.9	18%	13.5	57.9	72%	41.7	60.4	

work is to begin in or after 1979, the target design year will be set after 1993, judging from the provision period length. Assume, for instance, that the secondary cable work begins in 1983 under a 15-year plan. Then the target design year is 1998. When the primary cable work is to be carried out in 1990 the target design year is 1995. Therefore, the subscriber cable work cost presented here is lower than the actual work cost. Furthermore, since the telephone demand forecast in each distribution block area is difficult, surplus installation becomes necessary so that the utilization efficiency of cable is lower than that of switching equipment.

Although civil engineering work during the 4th and 5th Five-Year plans tends to decrease the civil engineering cost will have to be somewhat larger than actually required, considering the progress of road construction and the possible change of exchange office locations. Such extra civil engineering work should be carried out before the proper budget is formulated based on the telephone demand management and the revised city planning of the Municipal Authority. At least several percent of fixed assets will have to be set aside as contingency.

For the reason mentioned above the outside plant cost is estimated at a smaller amount than actually required. This, however, does not pose any serious problem in the assessment of general tendency.

As seen in Fig. 8.7.(2) the civil engineering cost ratio to the total construction cost during the period from 1975 to 1993 is approximately 3%. It is important to note that this civil engineering work does not include secondary cable laying and leading-in cable work for telephone installation purpose.

8.7.2 Construction Cost per Exchange Office

Total construction cost per exchange office during the period from 1975 to 1993 is as follows:

(Refer to Fig. 8.7.(3).)

1975 - 1979	6.12 billion Rupiahs
1975 - 1983	6.96 billion Rupiahs
1975 - 1988	10.6 billion Rupiahs
1975 - 1993	17.25 billion Rupiahs

8.7.3 Construction Cost by Tandem Office Area

Total construction cost by tandem exchange office service area during the period from 1975 to 1993 is as follows:

(Refer to Fig. 8.7.(5).)

Kota tandem area	123.3 billion Rupiahs
Gambir tandem area	148.7 billion Rupiahs
Cempaka Putih tandem area	110.0 billion Rupiahs
Kebayoran tandem area	72.3 billion Rupiahs
Jatinegara tandem area	104.6 billion Rupiahs

Each figure quoted above does not include junction cable cost.

8.7.4 Construction Cost per New Subscriber Line

Total construction cost per new subscriber line during each Five-Year plan period is as follows:

(Refer to Fig. 8.7.(4).)

1975 - 1979	1,368,600 Rupiahs
1980 - 1983	771,700 Rupiahs
1984 - 1988	715,700 Rupiahs
1989 - 1993	645,900 Rupiahs

By far the largest figure recorded for the 2nd Five-Year plan period is attributable to a huge amount of investment planned up to 1979 and the lowering of utilization rate toward additionally installed switching equipment.

8.7.5 Outside Plant Construction Cost per New Subscriber

Outside plant construction cost per new subscriber according to telephone demand density classification (0-15/hectare, 16-30/hectare, 31 or more/hectare) during the period from 1975 to 1993 is as follows:

(Refer to Fig. 8.7.(12).)

Class I (0 - 15)	243,000 Rupiahs (589,500 Rupiahs)
Class II (16 - 30)	183,900 Rupiahs (365,700 Rupiahs)
Class III (31 or more)	158,400 Rupiahs (241,800 Rupiahs)

(Note: Parenthesized is the figure for 1975-1979.)

A remarkably large figure is noticed for construction cost per new subscriber for the 1975-1979 period. Construction cost at low demand density class exchange office (Class I) is approximately 2.4 times the cost at high demand density class (Class III) exchange office.

8.7.6 Outside Plant Cost per New Subscriber by Tandem Office Area

Outside plant construction cost per new subscriber in each tandem exchange office

area in the period from 1975 to 1993 is as follows:

(Refer to Fig. 8.7.(6).)

Kota tandem area	188,500 Rupiahs
Gambir tandem area	183,600 Rupiahs
Cempaka Putih tandem area	197,700 Rupiahs
Kebayoran tandem area	229,700 Rupiahs
Jatinegara tandem area	205,600 Rupiahs

Each figure quoted above does not include junction cable cost.

Outside plant cost per new subscriber in the 100% demand fulfilment plan is higher than that in the 90% demand fulfilment plan. However, total construction cost per new subscriber in the 100% demand fulfilment plan is nearly equal to that in the 90% demand fulfilment plan. The reasons are as follows:

a) Switching equipment cost ratio to total construction cost is considerably higher than that of outside plant cost . Furthermore, additional switching equipment installation is of the same rate in both 90% and 100% demand fulfilment plans.

b) The number of new subscribers in the 90% demand fulfilment plan is smaller than that in the 100% demand fulfilment plan.

Considering switching equipment capacity and high switching equipment cost, if the accommodation rate of switching equipment is to be improved, it must be so arranged that the largest possible number of subscriber lines be installed in the switching equipment. Actually, it is impractical to construct permanent facilities, such as manholes and conduits for cable laying, in the developing area. In such cases it is advisable to apply the 90% demand fulfilment plan.

Construction cost per subscriber in the 1975-1979 period is extremely high though it gradually decreases in the succeeding period. This high cost, much higher than the similar cost in the developed countries, is due to high switching equipment cost plus a large amount of investment necessitated in the initial stage because of the absence of existing facilities which can be utilized.

In order to reduce the switching equipment cost the domestic production of switching equipment must be promoted. Switching equipment installation work also should not be assigned to local contractors alone but will have to be carried out by PERUMTEL itself though such can be realized only gradually. Moreover, by means of positive demand adjustment and facilities management the utilization efficiency of facilities must be improved.

Thus is the developing areas where accurate telephone demand forecast is extremely difficult the demand trend must be carefully observed so as to avoid excessive investment.

TABLE 8-7-(1) TOTAL CONSTRUCTION COST.

Item	(Plan-No.1) Based on 90% Demand fulfilment plan					(Plan-No.2) Based on 100% Demand fulfilment plan				
	1979	1983	1988	1993	TOTAL	1979	1983	1988	1993	TOTAL
Exchange building.	(5.0) 7918.6	(7.6) 5870.5	(2.5) 3313.3	(4.1) 9504.0	(4.4) 26606.4	(4.4) 7918.6	(8.3) 5870.5	(2.5) 3313.3	(4.1) 9504.0	(4.4) 26606.4
Switch.	(56.5) 89965.4	(51.1) 39531.3	(69.0) 92628.8	(68.4) 159456.0	(63.2) 381581.5	(50.4) 89965.4	(55.7) 39531.3	(70.8) 92628.8	(69.7) 159456.0	(62.6) 381581.5
Cable Primary.	(5.9) 9412.3	(9.7) 7503.9	(6.5) 8722.1	(5.4) 12490.7	(6.3) 38129.0	(8.1) 14382.4	(10.8) 7655.9	(5.9) 7655.9	(5.1) 11664.0	(6.8) 41358.2
Cable Secondary.	(6.8) 10749.1	(8.7) 6773.4	(5.8) 7769.1	(3.8) 8973.3	(5.7) 34264.9	(8.4) 14956.8	(9.1) 6435.9	(4.9) 6435.9	(2.8) 6435.9	(5.6) 34264.5
Cable Junction	(12.5) 19919.1	(8.2) 6373.4	(4.2) 5666.7	(5.0) 11721.5	(7.2) 43680.7	(13.4) 23826.0	(6.7) 4800.0	(4.3) 5666.7	(5.0) 11487.7	(7.5) 45780.4
Civil work cost of main cable route.	(7.9) 12580.0	(4.4) 3405.6	(0.6) 797.6	(0.1) 178.0	(2.8) 16961.2	(9.5) 16961.2	—	—	—	(2.8) 16961.2
Telephone installation.	(5.4) 8613.8	(10.3) 7960.0	(11.4) 15334.0	(13.2) 30686.3	(10.4) 62594.1	(5.8) 10434.3	(9.4) 6719.9	(11.6) 15103.0	(13.3) 30348.6	(10.3) 62605.8
A. Total ×10^6	(100) 159 1583	(100) 77418.1	(100) 134231.6	(100) 233009.8	(100) 603817.8	(100) 178444.7	(100) 71013.5	(100) 130803.6	(100) 228896.2	(100) 609158.0
B. New subscriber.	116291	100320	187560	360750	764951	137541	84890	184970	357550	764951
Cost per new C. subscriber. A/B ×10^6	1.37	0.77	0.72	0.65	0.79	1.30	0.84	0.71	0.64	0.80

( ) : %

(BASED ON 90 % DEMAND FULFILMENT PLAN)
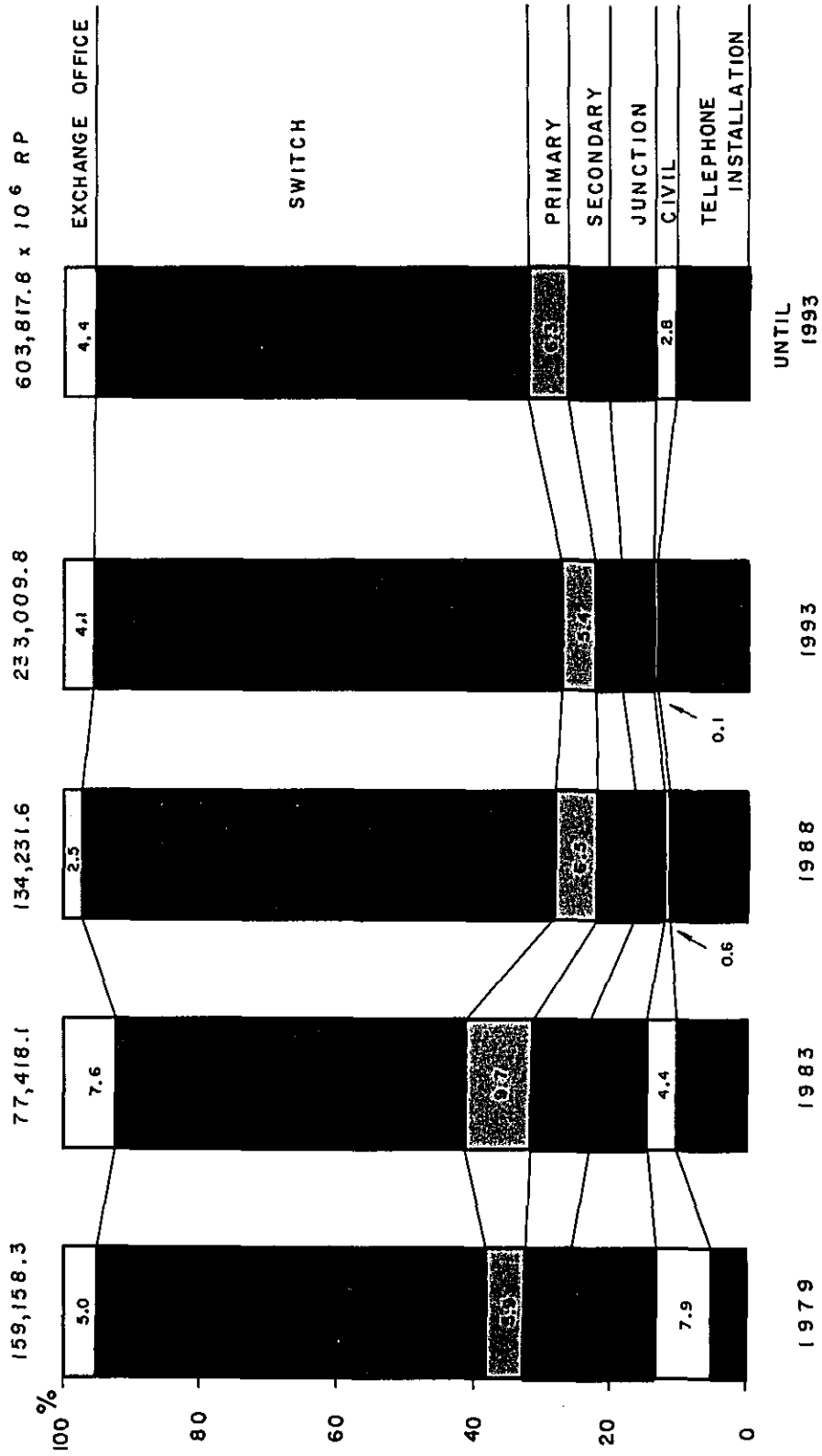
FIG. 8 - 7 - (2)

COMPOSITION RATE OF CONSTRUCTION COST BY KIND OF WORK

FIG. 8 - 7 - (3)   TOTAL CONSTRUCTION COST PER EXCHANGE OFFICE
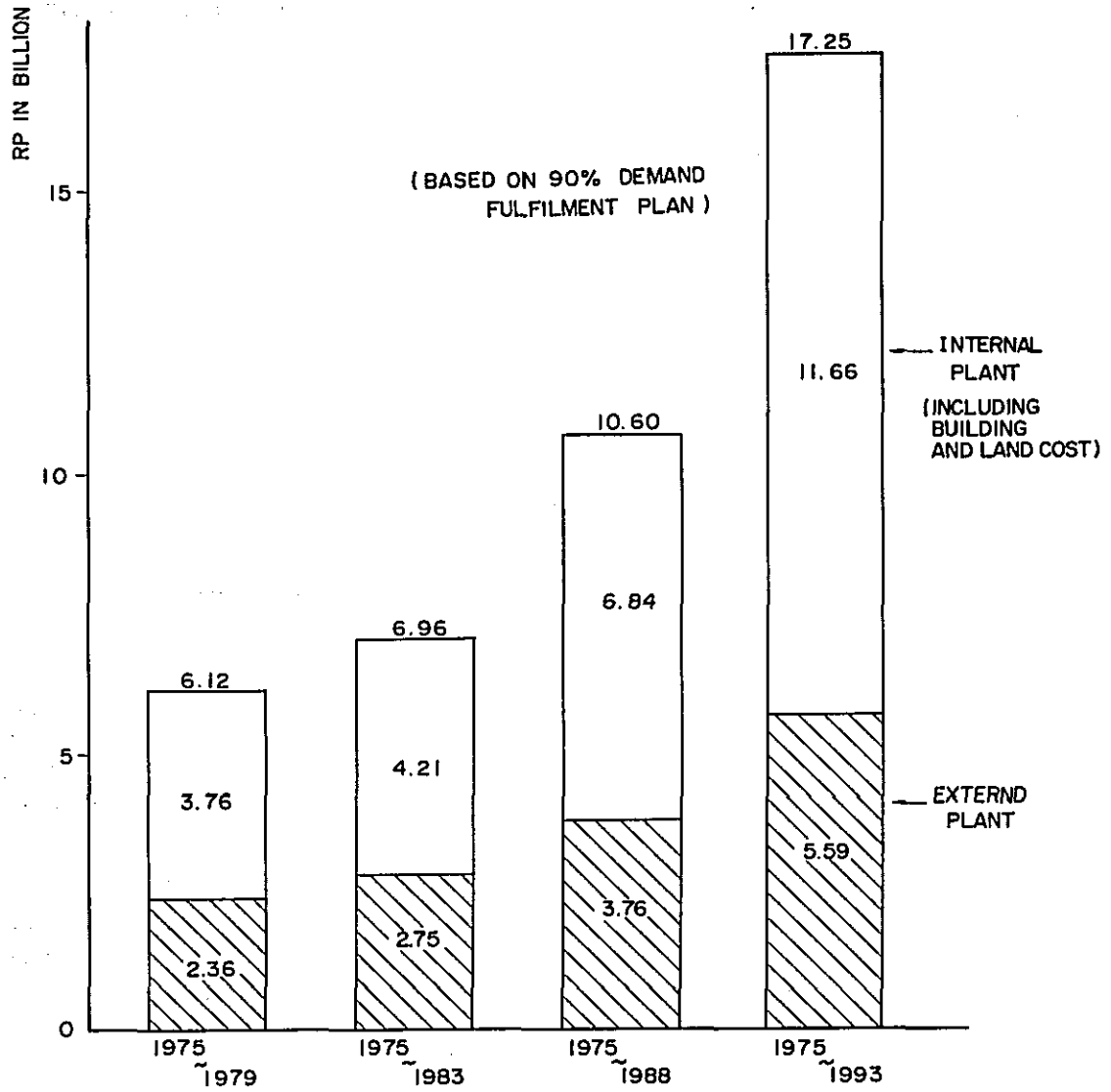
	1975 ~ 1979	1975 ~ 1983	1975 ~ 1988	1975 ~ 1993
CONSTRUCTION COST (X10^{6}RP)	(100) 159,158.3	(148.6) 236,576.4	(233.0) 370,808.0	(379.4) 603,817.8
NEW SUBSCRIBER	(100) 116,291	(186.3) 216,611	(347.6) 404,171	(657.8) 764,951
NUMBER OF EXCHANGE OFFICE	26	34	35	35
CONSTRUCTION COST PER EXCHANGE (X10^{6})	(100) 6,121.5	(113.7) 6,958.1	(173.1) 10,594.5	(281.8) 17,251.9
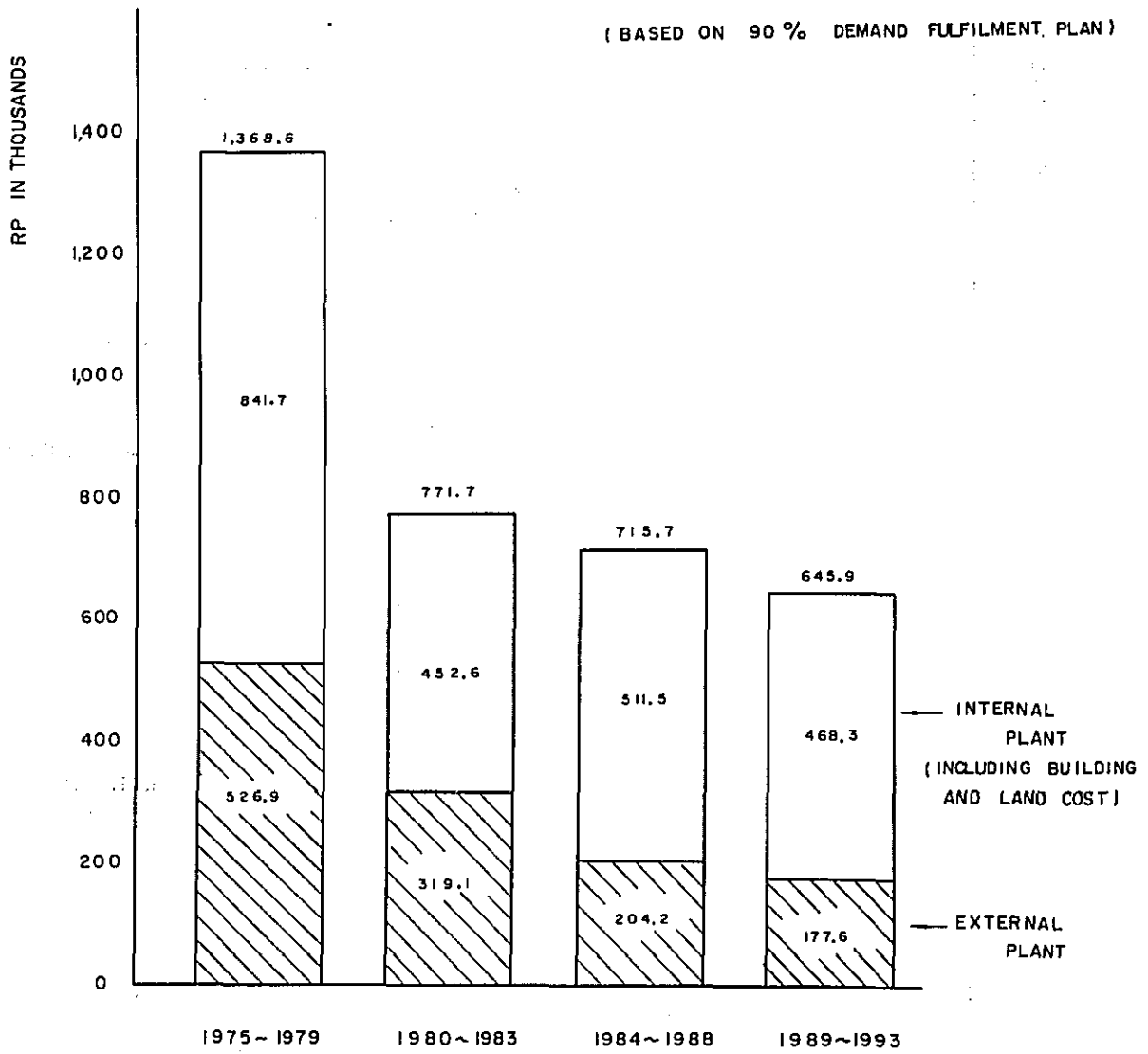
FIG. 8 - 7 - (4)

TOTAL CONSTRUCTION COST PER NEW
SUBSCRIBER LINES
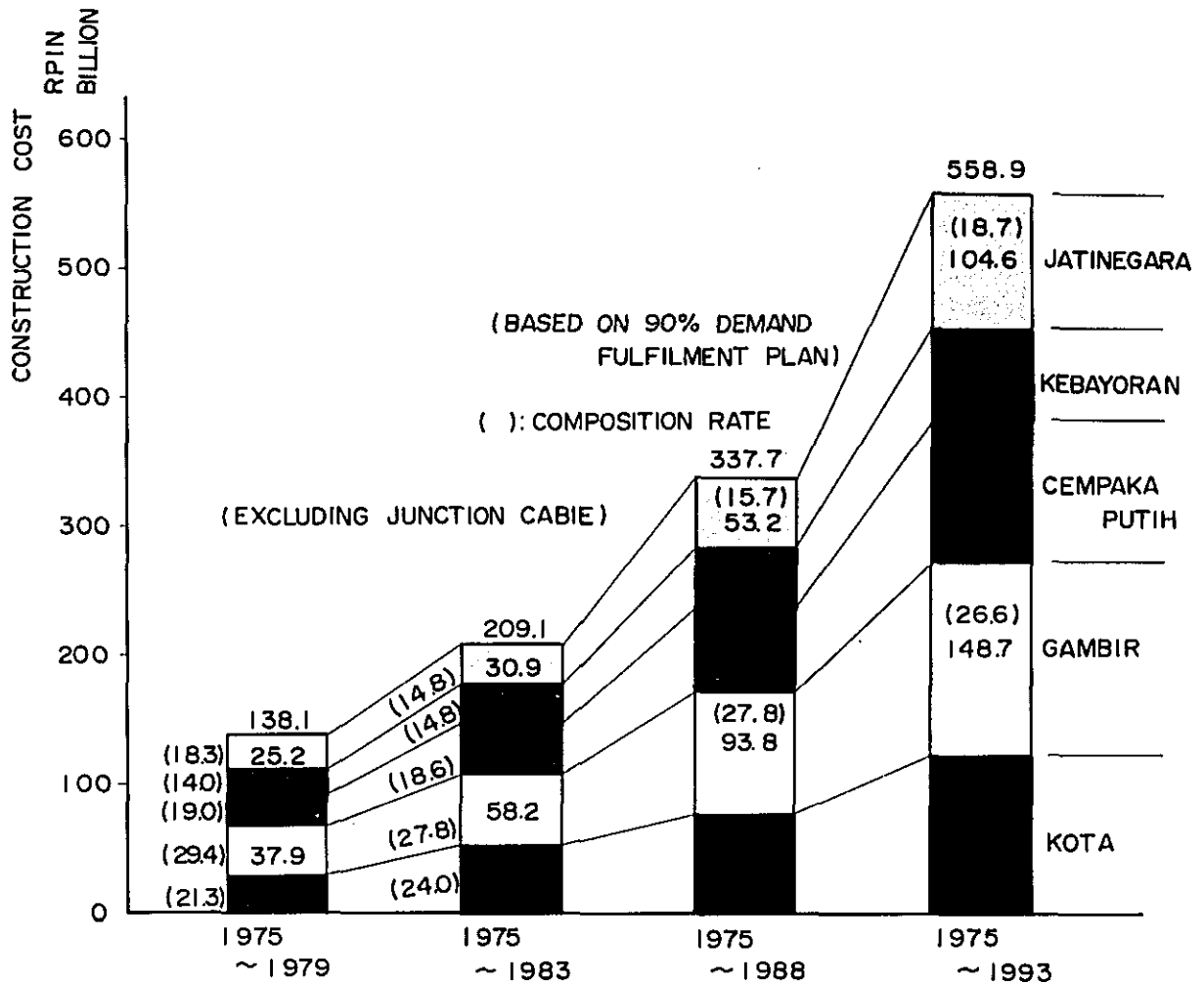
DEMAND AND SIZE OF AREA

TANDEN EXCHANGE NAME	AREA SIZE (ha)	NUMBER OF EXCHANGE	1975 ~1979	1975 ~1983	1975 ~1988	1975 ~1993
KOTA	(20.1) 11,457	7	(25.9) 46,730	(25.5) 67,750	(24.8) 111,800	(23.3) 188,400
GAMBIR	(17.3) 9,907	8	(35.8) 64,600	(33.8) 89,830	(31.1) 140,150	(28.5) 229,900
CEMPAKAPUTIH	(18.0) 10,313	7	(13.8) 24,860	(15.1) 40,050	(16.8) 75,500	(18.6) 150,500
KEBAYORAN	(19.4) 11,067	6	(13.9) 25,200	(13.6) 36,000	(13.4) 60,250	(12.8) 103,700
JATINEGARA	(25.2) 14,409	7	(10.6) 19,200	(12.0) 31,850	(13.9) 62,750	(16.8) 135,500
TOTAL	(100) 57,153	35	(100) 180,590	(100) 265,480	(100) 450,450	(100) 808,000

( ) CONSTRUCTION COST

FIG. 8-7-(5)
TOTAL CONSTRUCTION COST BY TANDEM
EXCHANGE SERVICE AREA
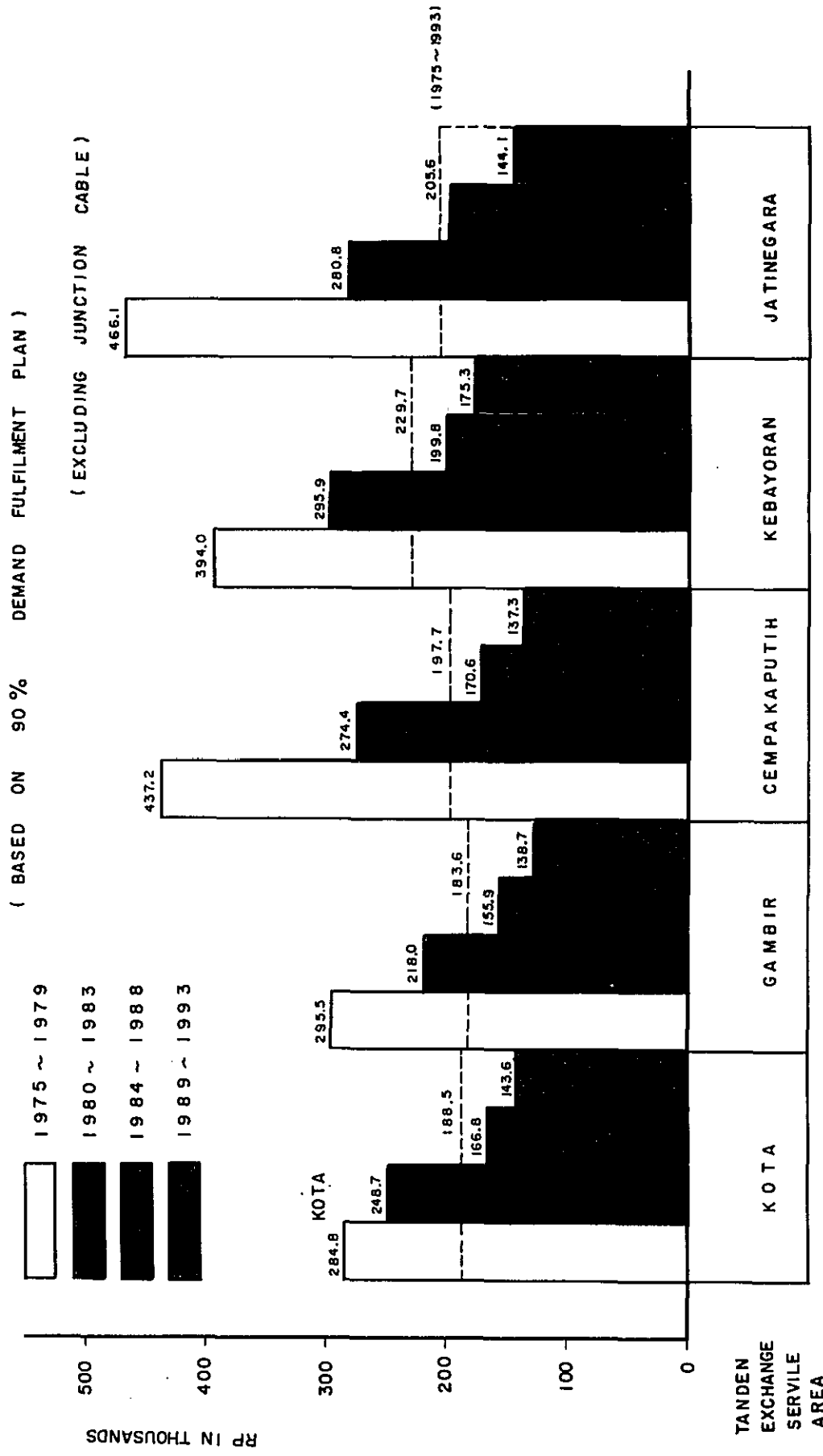
FIG. 8-7-(6)

OUTSIDE PLANT CONSTRUCTION COST PER NEW SUBSCRIBER LINE
BY TANDEM EXCHANGE SERVICE AERIA

TABLE 8-7-(7)   CONSTRUCTION COST BY TANDEM EXCHANGE SERVICE AREA.

(Based on 90% Demand Fulfilment Plan.)

No	Item	Kota					Gambir					Cempaka Putih				
		1979	1983	1988	1993	TOTAL	1979	1983	1988	1993	Total	1979	1983	1988	1993	TOTAL
1	Exchange Building	$\times10^6$ 1417.3	1924.0	607.5	28900	68988	2070.1	1780.0	960.0	2654.0	7464.1	1415.9	1040.5	342.5	1860.0	4658.9
2	Switch.	$\times10^6$ 18704.7	33325.2	18967.8	31819.8	82817.5	24142.1	11860.1	26760.2	39764.7	102527.1	17439.4	63473	220899	30391.8	762684
3	Sub. total ①+②	$\times10^6$ 20122.0	15309.2	19575.3	34709.8	89716.3	26212.2	13640.1	27720.2	42418.7	109991.2	188553	7387.8	224324	322518	809273
4	Cable. Primary.	$\times10^6$ 2093.5	1621.9	2010.8	29572	88834	28082	20428	22227	32699	103436	1698.6	13702	1433.2	2064.7	65667
	Secondary.	$\times10^6$ 2801.9	1463.8	1696.7	1933.6	7896.0	30583	19023	2121.9	25533	96358	1837.0	13696	14895	16682	63643
5	Civil work of main cable route.	$\times10^6$ 1879.6	772.0	2683	—	2909.9	3244.9	653.7	27.2	114.8	40406	2466.3	831.2	91.1	45.1	34337
6	Telephone installation.	$\times10^6$ 22996	1729.0	34982	6337.0	38663.8	25393	20707	35002	6611.9	14722.1	1430.2	15897	3122.0	6553.5	126954
7	Sub total ④+⑤+⑥	$\times10^6$ 9274.6	5586.7	7474.0	122278	33553.1	116507	6669.5	78720	25499.9	38742.1	7432.1	5160.7	6135.8	10331.5	290601
8	Total cost. ③+⑦	$\times10^6$ 29396.6	208953	270493	459376	1232694	378620	208093	355922	549689	1487333	262874	12548.5	28568.5	242583.3	1099874
9	Number of exchange office.	5	7	7	7	7	5	7	8	8	8	5	7	7	7	7
10	New subscriber.	(103671) 32563	22460	44810	78200	(103671) 178033	(18928) 39422	30590	50480	90480	(18928) 210972	(3490) 17000	18810	35970	75230	(3490) 147010
11	Total cost per exchange. ⑧/⑨	$\times10^6$ 5879.3	29851	38642	6562.5	176099	75726	2901.4	4449.0	6871.1	18591.7	5257.5	1792.6	4081.2	6083.3	15712.5
12	Total cost per new sub ⑧/⑩	$\times10^3$ 9028	930.4	6036	587.4	692.5	960.5	663.9	705.1	607.5	705.0	1546.3	667.1	794.2	566.0	748.2
13	Outside plant cost per exchange ⑦/⑨	$\times10^6$ 1854.9	798.1	1067.7	1604.0	4793.3	2330.1	952.8	984.0	1568.7	4842.8	1486.4	7372	876.5	1475.9	4151.4
14	Outside plant cost per new sub. ⑦/⑩	$\times10^3$ 284.8	248.7	166.8	143.6	188.5	295.5	218.0	155.9	138.7	183.6	437.2	274.4	170.6	137.3	197.7

Excluding junction cable and civil,   ( ) : Existing subscriber.

TABLE 8-7-(8) CONSTRUCTION COST BY TANDEM EXCHANGE SERVICE AREA

(Based on 90% Demand Fulfilment Plan.)

No	Item	Kebayoran. 1979	1983	1988	1993	TOTAL	Jatinegara. 1979	1983	1988	1993	TOTAL
1	Exchange Building	x10⁶ 1142.1	630.0	785.0	800.0	3357.1	1873.2	436.0	618.3	1300.0	4227.5
2	Switch.	x10⁶ 13154.3	6264.4	9504.0	17805.9	46728.6	16524.9	1734.3	153069	396738	732399
3	SUB TOTAL ①+②	x10⁶ 14296.4	6894.4	10289.0	18605.9	50085.7	18398.1	21703	159252	409738	774674
4	Cable Primary.	x10⁶ 1136.2	1338.1	1425.3	2078.9	5978.5	1475.8	11309	16301	2120	63568
4	Cable Secondary.	x10⁶ 1206.1	960.5	1072.7	1338.4	4577.7	1845.8	10772	13883	14798	5791.1
5	Civil work of main cable route.	x10⁶ 1578.6	852.5	70.6	18.1	2519.8	2221.8	2962	3404	-	28584
6	Telephone installation.	x10⁶ 1122.5	1444.4	2317.7	4299.6	9184.2	1216.2	11262	2914.0	68843	121407
7	SUB TOTAL ④+⑤+⑥	x10⁶ 5043.4	4595.5	4886.3	7735.0	22260.2	67596	36305	62728	10484.1	271147.0
8	Total cost ③+⑦	x10⁶ 19339.8	11489.9	15175.3	26340.9	72345.9	251577	58008	82198.0	51457.9	1046144
9	Number of exchange office.	4	6	6	6	6	7	7	7	7	7
10	New subscriber.	(6788) 12802	15530	24460	44120	(6788) 96912	(3476) 14504	12930	31840	72750	(3476) 132024
11	Total cost per exchange ⑧/⑨	x10⁶ 4835.0	1915.0	25292	43902	120577	35940	8287	3171.1	7351.1	149449
12	Total cost per new sub ⑧/⑩	x10³ 1510.7	739.9	6204	597.0	7465	1734.5	4486	697.2	707.3	7924
13	Outside plant cost per exchange ⑦/⑨	x10⁶ 1260.9	765.9	814.4	12892	37100	9657	5186	896.1	14977	3878.1
14	Outside plant cost per new sub ⑦/⑩	x10³ 394.0	295.9	199.8	175.3	2297	466.1	2808	197.0	144.1	2056

Excluding junction cable and its civil.

( ):Existing subscriber.

TABLE 8-7-(9)   CONSTRUCTION COST BY TANDEM EXCHANGE SERVICE AREA

(Based on 100% Demand Fulfilment Plan)

No	Item	Kota					Gambir.					Cempaka Putih				
		1979	1983	1988	1993	TOTAL	1979	1983	1988	1993	TOTAL	1979	1983	1988	1993	TOTAL
1	Exchange Building	×10⁶ 1417.3	1984.0	6075	2890.0	6898.8	2070.1	1780.0	9600	2654.0	7464.1	1415.9	1040.5	342.5	1860.0	4658.9
2	Switch.	×10⁶ 18704.7	13325.2	18967.8	31819.8	82817.5	24142.1	11860.1	26760.2	39764.7	102527.1	17439.4	6347.3	22089.9	30391.8	76268.4
3	SUB TOTAL ①+②	×10⁶ 20122.0	15309.2	25042.8	34709.8	89716.3	26212.2	13640.1	27720.2	42418.7	109991.2	18855.3	7387.8	22432.4	32251.8	80927.3
4	Cable. Primary.	×10⁶ 3493.7	1781.9	1781.9	2743.7	9801.2	4063.3	2042.2	2042.2	3134.1	11281.8	2394.6	1401.2	1401.2	2101.9	7298.9
	Secondary.	×10⁶ 3647.7	1416.0	1416.0	1416.0	7895.7	4313.3	1774.1	1774.1	1774.1	9635.6	2545.7	1272.9	1272.9	1272.9	6364.4
5	Civil work of main cable route.	×10⁶ 2919.9	–	–	–	2919.9	4040.6	–	–	–	4040.6	3433.7	–	–	–	3433.7
6	Telephone installation.	×10⁶ 2675.2	1601.2	3418.3	6168.9	13863.6	2980.0	1703.5	3501.9	6536.9	14722.3	1797.9	1300.8	3067.4	6529.3	12695.4
7	Sub total ④+⑤+⑥	×10⁶ 12736.5	4799.1	6616.2	10328.6	34480.4	15397.2	5519.8	7318.2	11445.1	39680.3	10171.9	3974.9	5741.5	9904.1	29792.4
8	Total cost ③+⑦	×10⁶ 32858.5	20108.3	26191.5	45038.4	124196.7	41609.4	19159.9	35038.4	53863.8	149671.5	29027.2	11362.7	28173.9	42155.9	110719.7
9	Number of exchange office.	5	7	7	7	7	5	7	8	8	8	5	7	7	7	7
10	New subscriber.	(10367) 36363	21020	44050	76600	(103671) 178033	(18928) 45672	25230	50320	89750	(18928) 210972	(34490) 21370	15190	35450	75000	(34490) 147010
11	Total cost per exchange ⑧/⑨	×10⁶ 6517.7	2872.6	3741.6	6434.1	177424	8321.9	2737.1	4379.8	6733.0	187089	5805.4	1623.2	4024.8	6022.3	15817.1
12	Total cost per new sub. ⑧/⑩	×10³ 903.6	9566	5946	5880	697.6	911.0	7594	6963	6002	709.4	1358.3	748.0	794.8	562.1	753.1
13	Outside plant cost per exchange ⑦/⑨	×10⁶ 2547.3	6856	9452	1475.5	4925.8	3079.4	7885	9148	1430.6	4960.0	2034.9	567.8	8202	1414.9	4256.1
14	Outside plant cost per new sub. ⑦/⑩	×10³ 350.3	228.3	150.2	134.8	193.7	337.1	218.8	145.4	127.5	188.1	476.0	261.7	162.0	132.1	202.7

Excluding junction cable and its civil.

( ):Existing subscriber.

TABLE 8-7-(10)   CONSTRUCTION COST BY TANDEM EXCHANGE SERVICE AREA

(Based on 100% Demand Fulfilment Plan)

No	Item		Kebayoran					Jatinegara				
			1979	1983	1988	1993	TOTAL	1979	1983	1988	1993	TOTAL
1	Exchange Building	x10⁶	1142.0	630.0	785.0	800.0	3357.1	1873.2	436.0	618.3	1300.0	4227.5
2	Switch.	x10⁶	13154.3	6264.4	9504.0	17805.9	46728.6	16524.9	1734.3	15306.9	39673.8	73239.9
3	SUB TOTAL ①+②	x10⁶	14296.4	6894.4	10289.0	18605.9	50085.7	18398.1	2170.3	15925.2	40973.8	77467.4
4	Cable Primary	x10⁶	2231.5	1249.4	1249.4	1889.3	6619.6	2199.3	1181.2	1181.2	1795.0	6356.7
	Cable Secondary	x10⁶	1988.7	862.9	862.9	862.9	4577.4	2461.4	1110.0	1110.0	1110.0	5791.4
5	Civil work of main cable route.	x10⁶	2519.8	‑	‑	‑	2519.8	2858.4	‑	‑	‑	2858.4
6	Telephone installation.	x10⁶	1644.8	1009.6	2300.3	4229.2	9183.9	1336.4	1104.8	2815.1	6884.3	12140.6
7	Sub total ④+⑤+⑥	x10⁶	8384.8	3121.9	4412.6	6981.4	22900.7	8855.5	3396.0	5106.3	9789.3	27147.1
8	Total cost ③+⑦	x10⁶	22681.2	10016.3	14701.6	25587.3	72986.4	27253.6	5566.3	21031.5	50763.1	104614.5
9	Number of exchange office.		4	6	6	6	6	7	7	7	7	7
10	New subscriber.		(67888) 18412	10800	24250	43450	(6788) 96912	(3476) 15724	12650	30900	72750	(3476) 132024
11	Total cost per exchange ⑧/⑨	x10⁶	5670.3	1669.4	2450.3	4264.6	12164.4	3893.4	795.2	3004.5	7251.9	14944.9
12	Total cost per new sub. ⑧/⑩	x10³	1231.9	927.4	606.3	588.9	753.1	1733.2	440.0	680.6	697.8	792.4
13	Outside plant cost per exchange ⑦/⑨	x10⁶	2096.2	520.3	735.4	1163.6	3816.8	1265.1	485.1	729.5	1398.5	3878.2
14	Outside plant cost per new sub.⑦/⑩	x10³	455.4	289.1	182.0	160.7	236.3	563.2	268.5	165.3	134.6	205.6

Excluding junction cable and its civil.

( ):Existing subscriber.
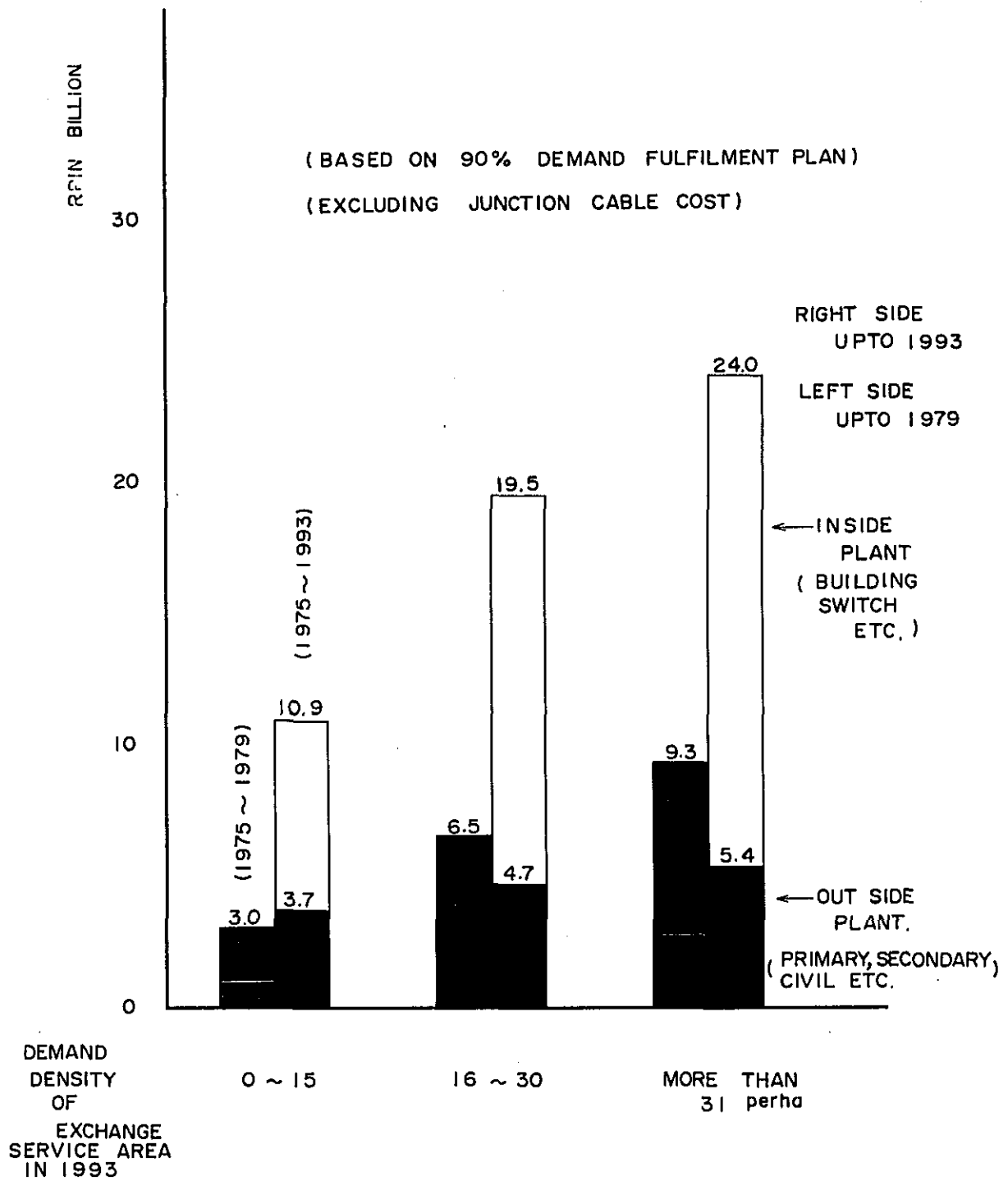
FIG. 8 - 7 - (II)

TOTAL CONSTRUCTION COST PER EXCHANGE OFFICE
BY DEMAND DENSITY

IN THOUSANDS

(BASED ON 90 % DEMAND FULFILMENT PLAN)

	1975~1979
	1980~1983
	1984~1988
	1989~1993

(EXCLUDING JUNCTION CABLE)

589.5 394.3 243.0 236.8 174.1

365.7 218.1 183.9 149.5 127.5

241.8 180.3 158.4 129.1 117.3

(1975 ~ 1993)

600 500 400 300 200 100 0

DEMAND DENSITY
OF
EXCHANGE
SERVICE AREA
IN 1993

0 ~ 15   16 ~ 30   MORE THAN
                              31 PER HA

FIG. 8-7-(12)

OUTSIDE PLANT CONSTRUCTION COST PER NEW SUBSCRIBER
BY TELEPHON DEMAND DENSITY

TABLE 8-7-(13) CONSTRUCTION COST BY DEMAND DENSITY.

(Based on 90% Demand Fulfilment Plan.)

No	Item	I Density (0~15)					II Density (16~30)					III Density (more than 31)				
		1979	1983	1988	1993	TOTAL	1979	1983	1988	1993	TOTAL	1979	1983	1988	1993	TOTAL
1	Exchange Building ($\times 10^6$)	2762.5	1195.0	2405.0	3820.0	10182.5	2878.5	1575.5	548.3	2250.0	7252.3	2277.6	3100.0	360.0	3434.0	9171.6
2	Switch ($\times 10^6$)	25077.6 (26933.7)	11884.9 (9444.7)	25997.4	37691.2 (46359)	120651.1 (11029.5)	34003.2 (27482.1)	11762.2	34665.9 (6692.5)	56692.5 (486090)	140175 (11747.8)	30884.0 (245946)	15884.2 (12071.2)	31971.8 (25060.8)	42072.3 (31239.3)	208129 (1929859)
3	SUB TOTAL ①+② ($\times 10^6$)	27840.1	13079.9	28402.4	61511.2	130833.6	36881.7 (29812.2)	13337.7 (11020.2)	35207.9 (28030.4)	59842.5 (486090)	147369.8 (11747.8)	33162.2 (768722)	18984.2 (15171.2)	32331.8 (254408)	45506.3 (34673.3)	129484.5 (102157.5)
4	Cable. Primary. ($\times 10^6$)	2762.6	3376.7	44856	62233	168482	3441.4	2152.1	22633	3318.1	11174.9	3208.3	1975.1	1973.2	2949.3	10105.9
	Secondary. ($\times 10^6$)	26960	2661.6	34796	43262	131634	4002.5	2150.6	22802	25090	10942.3	4050.6	1961.2	2009.3	2138.1	10159.2
5	Civil work of main cable route. ($\times 10^6$)	4216.6	2326.1	767.1	165.7	7475.5	44196	795.8	12.4	12.3	5240.1	2755.0	283.7	18.1	—	30568
6	Telephone installation. ($\times 10^6$)	2099.4	3039.4	6969.3	16329.6	28437.7	3174.4	2793.9	4867.4	8959.9	19795.6	3334.0	2126.7	3515.4	5396.8	14372.9
7	Sub total ④+⑤+⑥ ($\times 10^6$)	11774.6	11403.8	15701.6	27044.8	65924.8	5037.9	7892.4	9423.3	14799.3	47152.9	13347.9	6346.7	7516.0	10484.2	37694.8
8	Total cost ③+⑦ ($\times 10^6$)	39614.7	24483.7	44104.0	88556.0	196758.4	41919.6 (44850.1)	21230.1 (18912.6)	44632 (374537)	76741.8 (634083)	194522.7 (1646247)	46510.1 (329568)	25330.9 (45157.5)	39847.8 (398523)	55990.5	167679.3
9	Number of exchange office	13	18	18	18	18	8	10	10	10	10	5	6	7	7	7
10	New subscriber.	19973	28920	66310	155370	270573	41120	36190	63050	116060	256420	55198	35210	58200	89350	237958
11	Total cost per exchange ⑧/⑨ ($\times 10^6$)	3047.3	13602	2450.2	4819.8	1093.0	6490.0 (56063)	2123.0 (1891.3)	4463.1 (37454)	7674.2 (63408)	19452.3 (646625)	9302.0 (80440)	4221.8 (3586.3)	3692.5 (4708.1)	7998.6 (6451.1)	239542 (19978.9)
12	Total cost per new sub. ⑧/⑩ ($\times 10^3$)	1983.4	846.6	665.1	570.0	727.2	1262.6 (1090.7)	586.6 (522.6)	707.9 (594.0)	661.2 (546.3)	758.6 (642.0)	842.6 (728.7)	719.4 (611.1)	684.7 (5663)	626.2 (505.4)	704.7 (587.7)
13	Outside plant cost per exchange ⑦/⑨ ($\times 10^6$)	905.7	633.5	872.3	1502.5	3662.5	1879.7	789.2	942.3	1479.9	4715.3	2669.6	1057.8	1073.7	1497.7	5385.0
14	Outside plant cost per new sub ⑦/⑩ ($\times 10^3$)	389.5	394.3	236.8	174.1	243.6	365.7	218.1	149.5	127.5	183.9	241.8	180.3	129.1	117.3	158.4

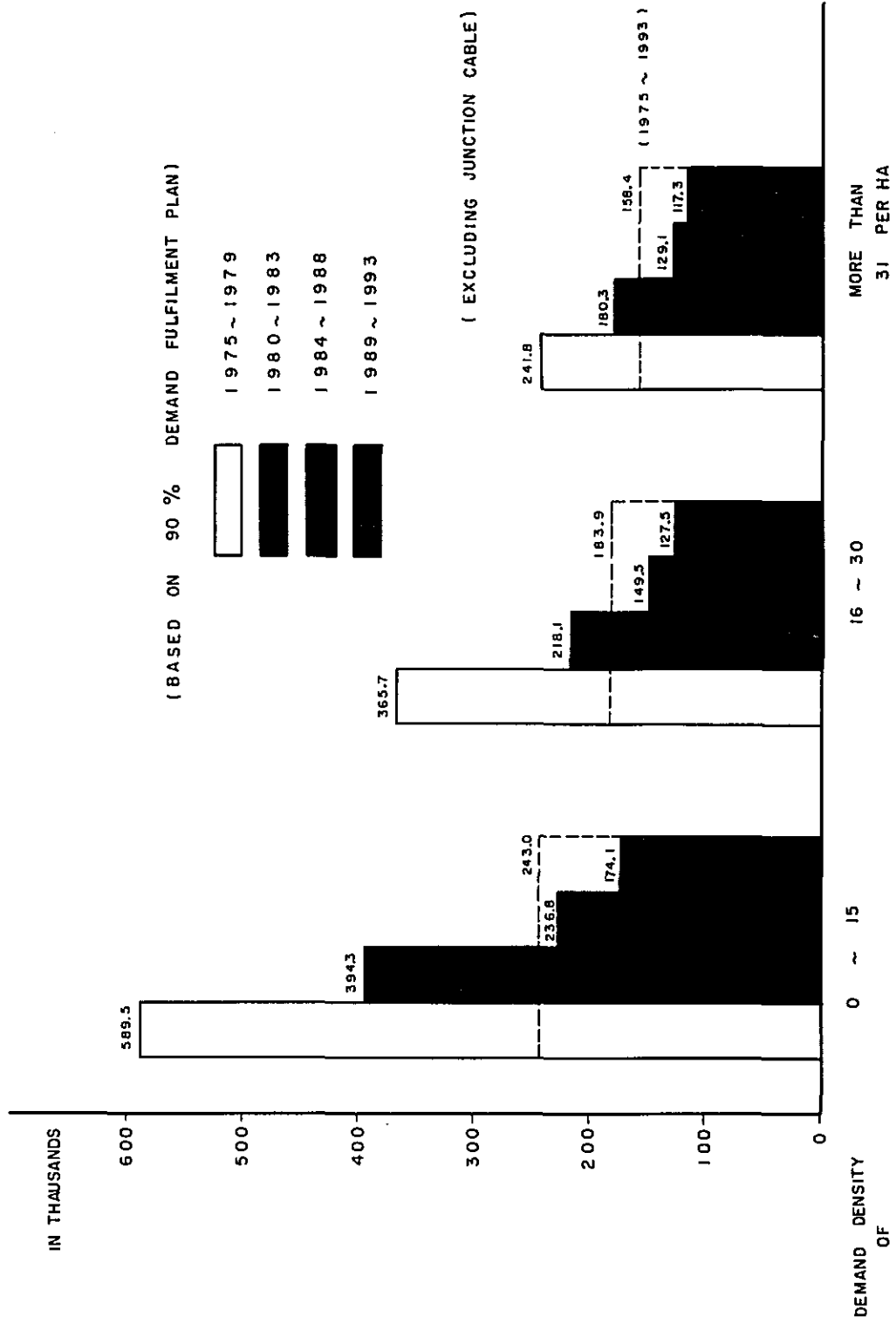Excluding junction cable and its civil.

( ) : Existing subscriber.

TABLE 8-7-(14)   CONSTRUCTION COST BY DEMAND DENSITY.

(Based on 100% Demand Fulfilment Plan.)

No	Item	I Density (0~15)					II Density (16~30)					III Density (more than 31)				
		1979	1983	1988	1993	TOTAL	1979	1983	1988	1993	TOTAL	1979	1983	1988	1993	TOTAL
1	Exchange Building ($\times10^6$)	2762.5	1195.0	2405.0	3820.0	10182.5	2878.5	1575.5	548.3	2250.0	7252.3	2277.6	3100.0	360.0	3434.0	9171.6
2	Switch. ($\times10^6$)	25077.6 (26933.7)	11884.9 (9444.7)	25997.4 (27482.1)	57691.2 (24594.6)	120651.1 (102195)	34003.2 (29812.3)	41762.2 (11020.2)	34659.6 (28030.4)	59692.5 (48609.0)	140117.5 (117471.8)	30884.6 (26872.2)	158842 (15171.2)	319718 (25440.8)	42072.3 (34573.3)	120812.9 (102157.5)
3	SUB TOTAL ①+② ($\times10^6$)	27840.1	13079.9	28402.4	61511.2	130833	36881.7	33337.7	35207.9	61942.5	147369.8	33162.2	18984.2	32331.8	45506.3	129984.5
4	Cable. Primary. ($\times10^6$)	6030.0	3514.0	3514.0	5297.7	18355.7	4427.4	2200.9	2200.9	3367.3	12196.5	3925.0	1941.0	1941.0	2999.0	10806.0
	Cable. Secondary. ($\times10^6$)	5482.8	2560.0	2560.0	2560.0	13162.8	4869.8	2024.3	2024.3	2024.3	10942.7	4604.2	1851.6	1851.6	1851.6	10159.0
5	Civil work of main cable route.	7475.5	—	—	—	7475.5	5240.1	—	—	—	5240.1	3056.8	—	—	—	30568
6	Telephone installation. ($\times10^6$)	3112.1	2563.4	6765.2	5996.5	28437.2	3691.7	2308.3	4840.5	8955.3	19795.8	3630.5	1848.2	3497.3	5396.8	14372.8
7	Sub total ④+⑤+⑥ ($\times10^6$)	22206.1	8842.4	12979.2	23884.2	67911.9	18703.2	7164.0	9089.0	14346.9	49303.1	5725.7	7640.8	7409.9	11341.4	42117.8
8	Total cost ③+⑦ ($\times10^6$)	49940.5 (48154.4)	21717.3 (18184.2)	41241.6 (37119.4)	85365.4	198264.8	55110.7	19871.2	44273.6	76289.4	195544.9	48378.7 (42597.9)	24625.0 (22812.0)	39621.7 (32850.7)	55753.7 (46014.7)	168379.1 (144275.3)
9	Number of exchange office.	13	18	18	18	18	8	10	10	10	10	5	6	7	7	7
10	New subscriber.	29613	24390	64370	152200	270573	47820	29900	62700	116000	256420	60108	30600	57900	89350	237958
11	Total cost per exchange ⑧/⑨ ($\times10^6$)	3841.6	12065	2291.2	4742.5	11014.7	6888.8 (6064.4)	1987.1 (1818.4)	4427.4 (3711.9)	7628.9 (6295.6)	19554.5 (16677.5)	9675.7 (8519.6)	4104.2 (3802.0)	5660.2 (4693.0)	7964.8 (6573.5)	24054.2 (20610.8)
12	Total cost per new sub. ⑧/⑩ ($\times10^3$)	1686.4	890.4	640.7	560.9	732.8	1152.5 (1014.5)	664.6 (608.2)	706.1 (592.0)	657.7 (542.7)	762.6 (650.4)	721.7 (708.7)	804.7 (745.5)	684.3 (567.4)	624.0 (515.0)	707.6 (606.3)
13	Outside plant cost per exchange ⑦/⑨ ($\times10^6$)	1708.2	324.6	721.1	1326.9	3772.9	2337.9	716.4	908.9	1434.7	4930.3	3145.1	1273.5	1058.6	1620.2	6016.8
14	Outside plant cost per new sub ⑦/⑩ ($\times10^3$)	749.9	362.5	201.6	156.9	251.0	391.1	239.6	145.0	123.7	192.3	261.6	249.7	128.0	126.9	177.0

Excluding junction cable and its civil.

( ): Existing subscriber.

TABLE 8-7-(15)   CONSTRUCTION COST OF OUTSIDE PLANT.

Item	Contents			Cost		
Junction cable.	0.4^{mm}	2400^{Pairs}		38.5×10^6 Rp./km.		
		1200"		19.3 "		
	0.6^{mm}	1200"		30.0 "		
		800"		20.0 "		
		600"		15.6 "		
		400"		10.5 "		
	0.8^{mm}	800"		30.1 "		
		600"		23.3 "		
		400"		16.2 "		
		300"		12.4 "		
		200"		9.1 "		
	0.9^{mm}	400"		19.2 "		
		300"		14.7 "		
		200"		10.6 "		
	1.0^{mm}	300"		19.3 "		
		200"		12.4 "		
Coil.	Capacity of coil	100"		1.8×10^6 Rp./km.		
	"	200"		2.3 "		
	"	300"		2.8 "		
	"	400"		3.3 "		
	"	600"		4.4 "		
	"	800"		5.3 "		
Primary cable.	Conductor diameter.	0.4^{mm}		1.7×10^6/100 peils.km		
	"	0.6^{mm}		2.5 "		
	"	0.8^{mm}		3.9 "		
Secondary cable.	Class of exchange office.I (0~15)			(A) 57.1	(B) 33.6	(C) 17.3 $\times 10^3$ Rp/sub.
	"	II (16~30)		(A) 70.6	(B) 42.9	(C) 21.8 "
	"	III (more than 31)		(A) 108.0	(B) 64.1	(C) 32.1 "
Telephone installation.	Class of exchange office.I(0~15)			105.1×10^3 Rp./ Sub.		
	"	II (16~30)		77.2 "		
	"	III (more than 31)		60.4 "		
Civil construction.	Mean number of Pipe : 9			24.6×10^6 Rp/km		
Manhole construction.	Mean span : 150ᵐ·			822.5×10^3 RP.		
Cabinet.	Each.			1.2×10^6 RP.		

(A) Demand density of block area   0 ~ 15 / ha.

(B)   "   16 ~ 30/ ha

(C)   "   more than 31/ ha.

T. ALUR

No Demand Area

CKR

PLUIT

KOTA (A)

KOTA (B)

KOTA (C)

T.PRIOK (A)

PRIOK (B)

CLC

ANCOL

No Demand Area

P. GADUNG

SLIPI

KDY

GBR (A)

C.PUTIH

RW. MANGUN

PGL

MRY

PMERAH

GBR (B)

JTN (A)

SMG (B)

SMG (A)

TBT

TN (B)

KLD

KBY (B)

KBY (A)

KLBT

C W

CPT

TAMINGGUL
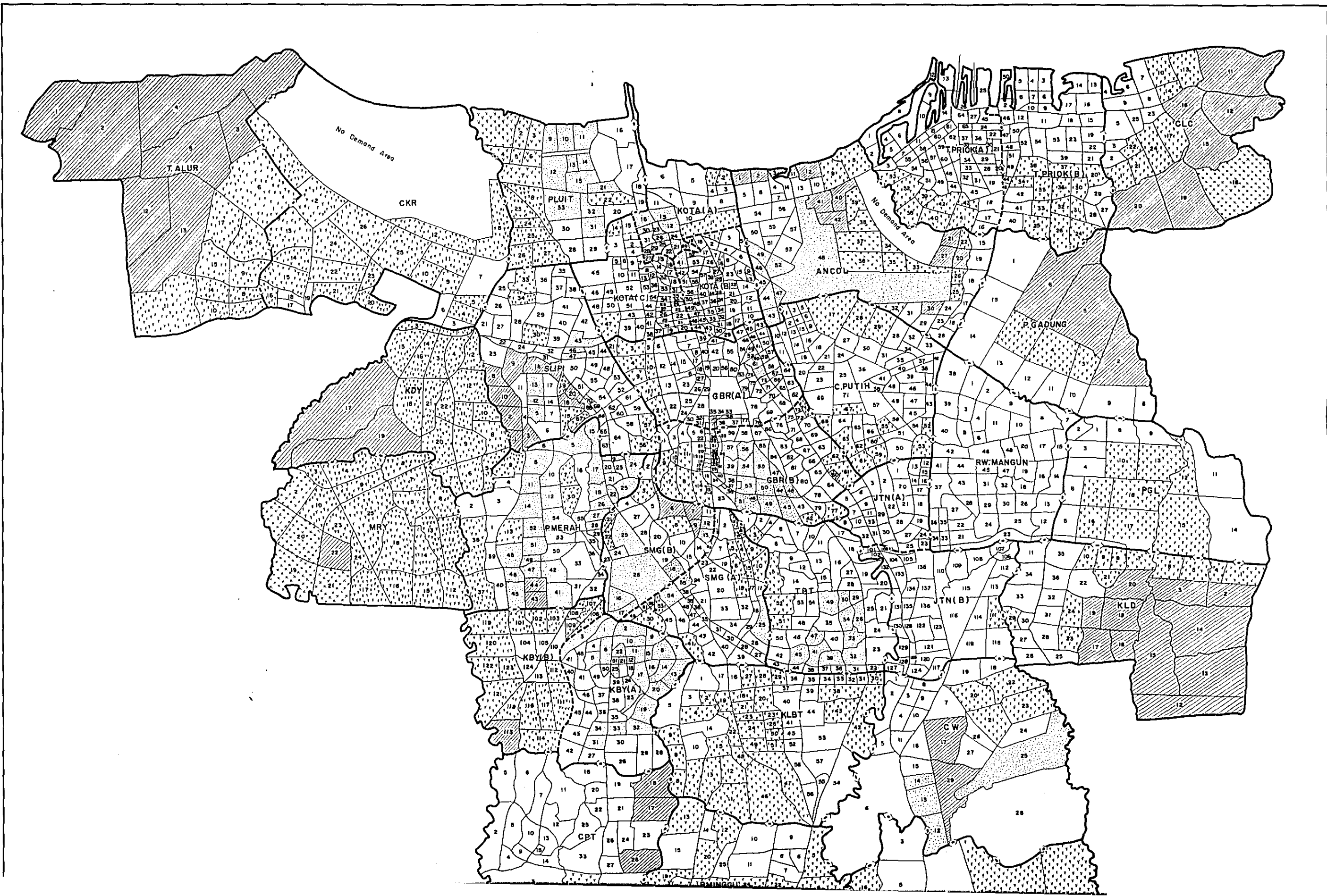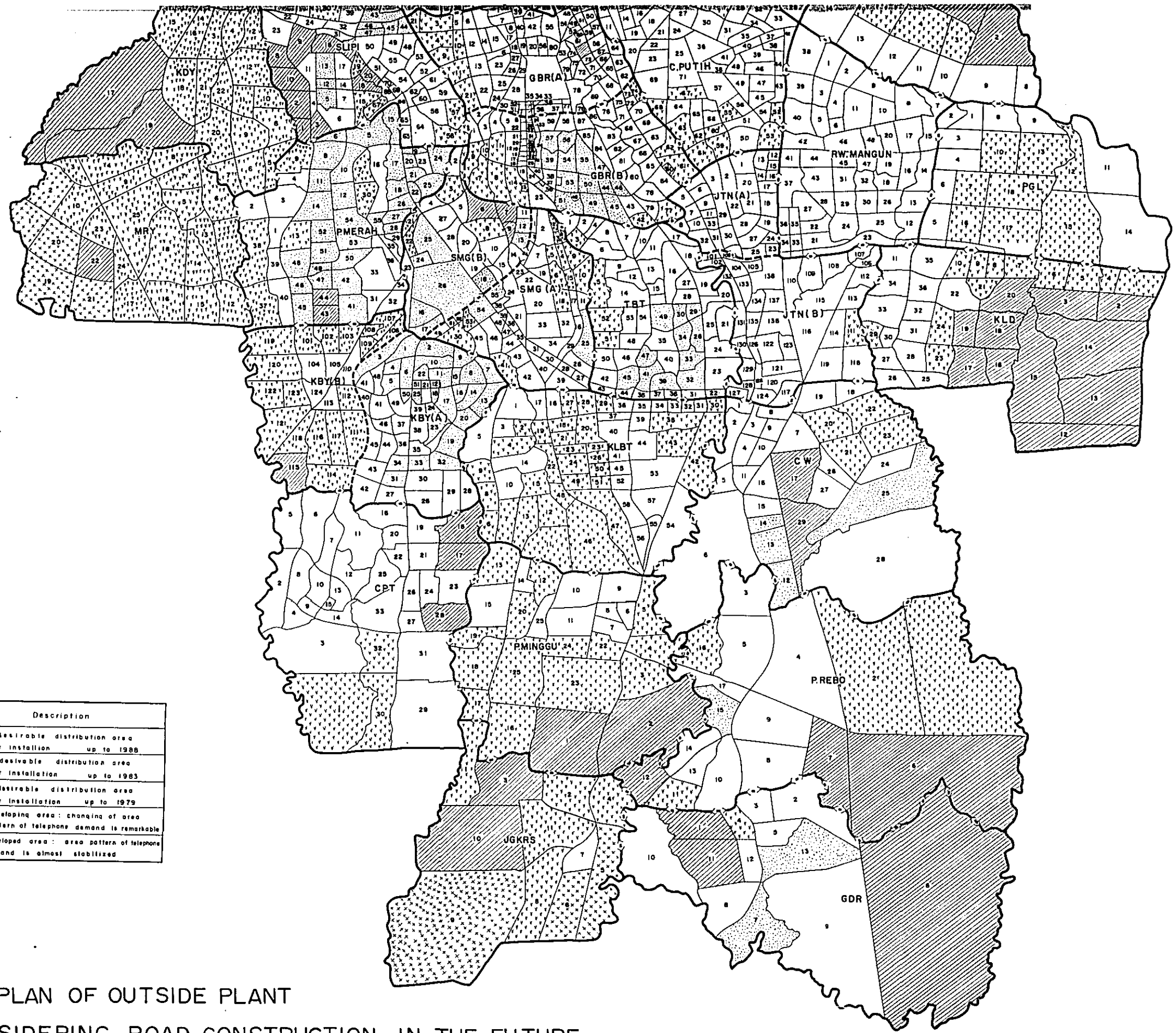
Class	Year				Description
	'79	'83	'88	'93	
	0 %	0 %	0 %	100 %	Undesirable distribution area for installion up to 1988
	0 %	0 %	50 %	50 %	Undesirable distribution area for installation up to 1983
	0 %	30 %	30 %	40 %	Undesirable distribution area for installation up to 1979
	30 %	20 %	20 %	30 %	Developing area : changing of area pattern of telephone demand is remarkable
	60 %	10 %	10 %	20 %	Developed area : area pattern of telephone demand is almost stabilized

EXPANSION   PLAN OF OUTSIDE PLANT

CONSIDERING ROAD CONSTRUCTION IN THE FUTURE

FIG. 8-7-(16)

CHAPTER 9

REVENUE AND EXPENDITURE

CHAPTER 9 REVENUE AND EXPENDITURE

9.1 Status Quo of Revenue and Expenditure in Jakarta

As seen in Fig. 9.1.(1) the international and SLDD service revenue ratios to total revenue as of the end of 1974 are approximately 28.5% and 38.0%, respectively. The telephone service revenue has been constantly increasing since 1969 and, with the increase of SLDD call traffic, this trend is expected to continue for some time to come.

In 1974, personnel expense occupied nearly 26.0% of total expenditure. It requires attention that personnel expense will continue to increase annually in the future. Monthly expenditure per subscriber line in 1974 amounted to approximately 10,500 Rupiahs as shown in Fig. 9.2.2(13). Because of the increase of SLDD calls, etc., the revenue-expenditure balance remains in surplus for the time being.

In the future, however, due to the increase of residence telephones the revenue per subscriber line may likely decrease. On the other hand, a conspicuous increase of expenditure is expected because of the ever-growing personnel expense. Thus, to improve the revenue-expenditure balance in the future, many remedial plans must be considered.

(PROFIT AND LOSS ACCOUNT)

1974

1993

OTHER REVENUE 0.2 %

LOCAL REVENUE 24.7 %

REVENUE 148,954 x 10⁶RP (100%)

SLDD REVENUE 53.1 %

INTERLOCAL REVENUE

LOCAL REVENUE 20.3 %

REVENUE 9,725 x 10⁶RP (100%)

SLDD REVENUE 38.2 %

0.9%

OTHER REVENUE
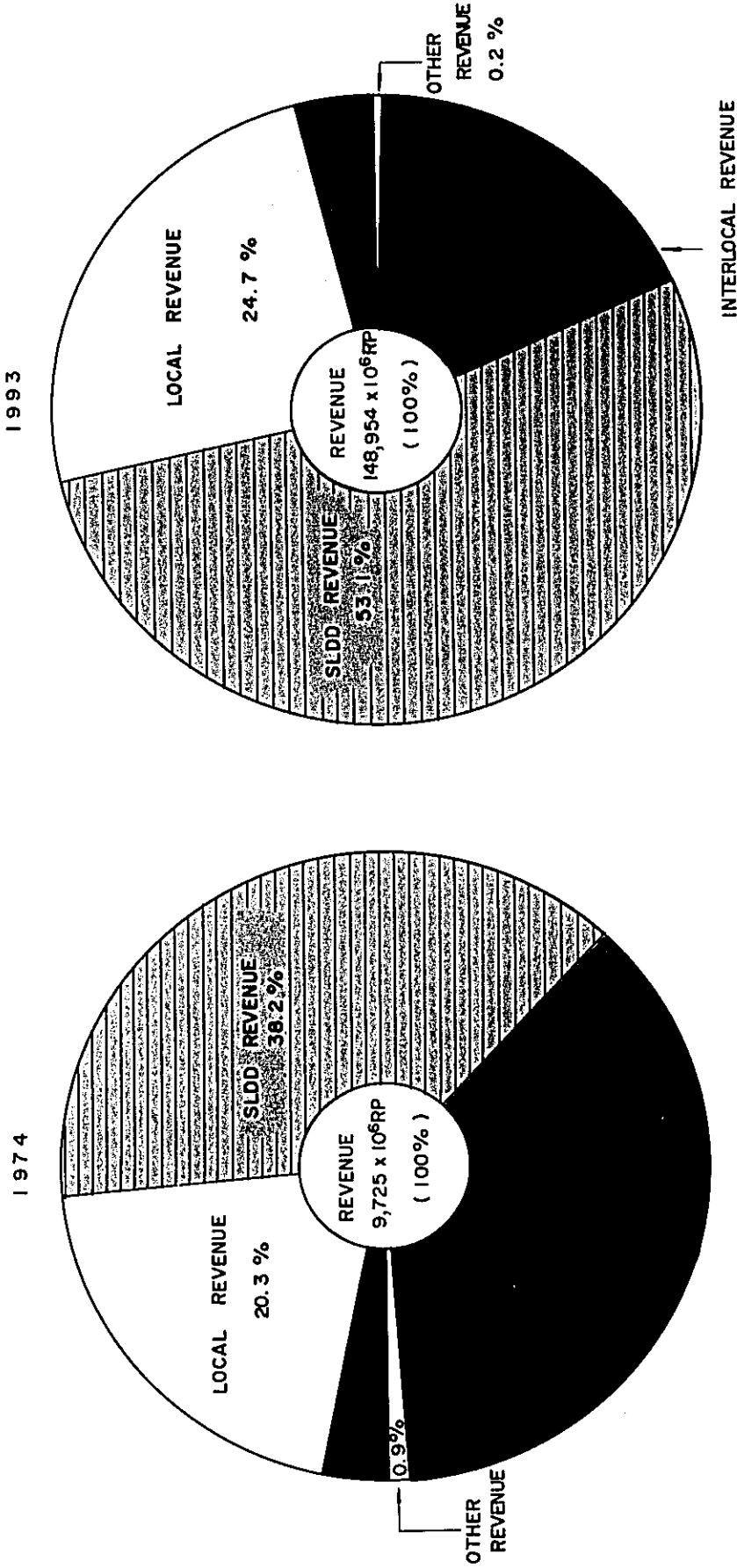
FIG. 9 - I - (I)

COMPARISON OF COMPOSITION RATE OF REVENUE IN 1974 AND 1993

1993

OFFICE
EXPENSE (2.0%)

PERSONNEL EXPENSE
(35.9%)

EXPENSE
202,304 x 10⁶RP
(100%)

MAINTENANCE
EXPENSE
(13.7%)

1974

OFFICE EXPENSE
(2.3%)

MAINTENAN-
CE EXPEN-
SE (6.4%)

PERSONNEL EXPENSE
(25.7%)

EXPENSE
5,4924 x 10⁶ RP
(100%)
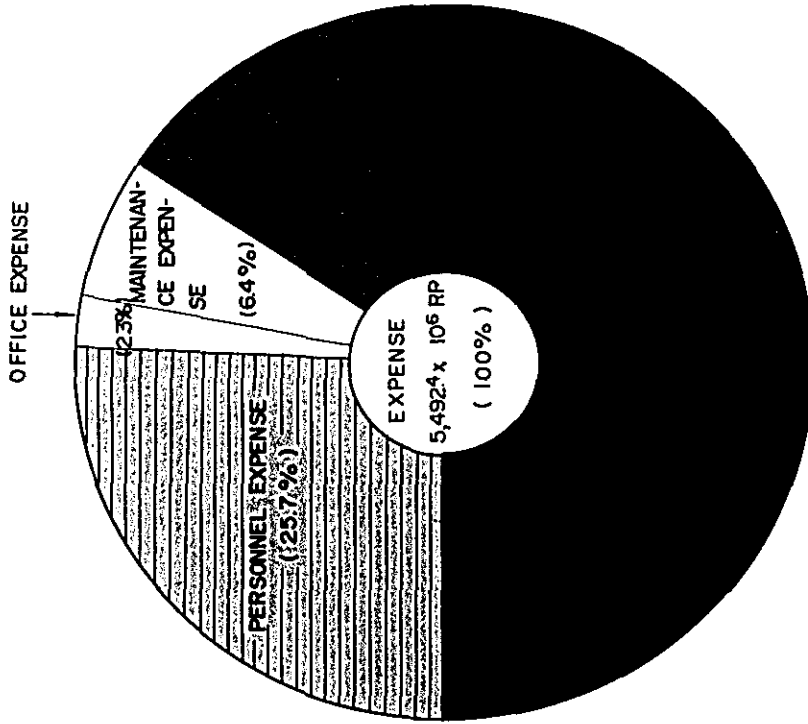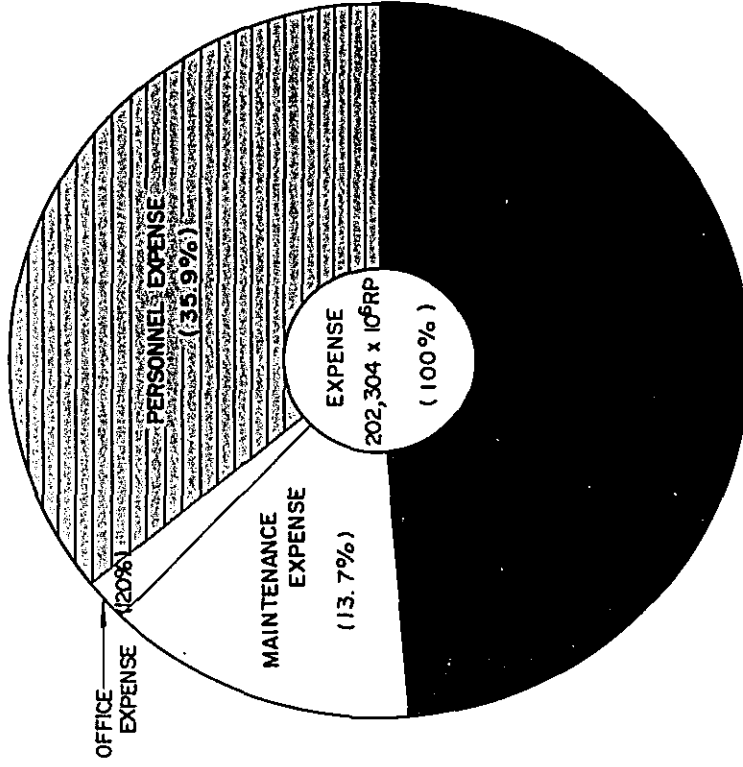
BASED ON "PLAN-C"

FIG. 9-1-(2)

COMPARISON OF COMPOSITION RATE OF EXPENDITURE IN 1974 AND 1993

9.2 Revenue and Expenditure Forecast

9.2.1 Revenue

Telecommunication service revenue consists of revenue from telephone, telegraph, telex services, etc. Here the study is made on telephone service revenue only. Telephone service revenue comprises basic charge, local charge, SLDD charge, inter local charge, international charge and others. Revenue forecast for each of these service items is based on the following conditions:

(1) Annual basic charge per subscriber line is set at 7,243 Rupiahs, using the mean value during 1969 through 1973. It is assumed that this value will remain unchanged in the future.

(2) For local, SLDD and inter local traffics, the values forecasted by JTP, as pei Chapters 3 and 4, are used.

(3) Based on the originating traffic forecast per subscriber line, telephone revenue is calculated by the following formula:

Telephone revenue/year = (Telephone demand) x (Originating traffic per subscriber) x (1/Busy hour traffic concentration rate) x (3,600 sec./holding time) x (Effective originating traffic rate) x (Mean charge per call) x (Effective revenue rate) x (Effective day/year)

1) Telephone Demand

Telephone demand, i.e., the number of telephone sets and the number of subscribers lines, based on JTP's demand forecast is as given in Table 9.2.1.(1).

Table 9.2.1.(1)   Telephone Demand
in thousands

Item	1979	1983	1988	1993
Telephone demand	181	265	450	808
Telephone set	281	445	747	1309
Subscriber line	165	265	450	808

It is so arranged that the number of new subscriber lines in each year will not exceed the number of new subscriber lines in the succeeding year. In and after 1983 the telephone demand is identical with the number of subscribers lines. Meanwhile, the number of subscriber lines in 1979 is 165,000 as seen in Fig. 9.2.1.(7).

2) Busy Hour Originating Traffic per Subscriber Line

Busy hour originating traffic per subscriber line in local, SLDD and inter local services based on traffic forecast by JTP is as shown in Table 9.2.1.(2).

Table 9.2.1.(2) Calling Rate

unit: erl.

Kind of call	1979	1983	1988	1993
Local	0.0593	0.0529	0.0451	0.0383
SLDD	0.00375	0.00538	0.00617	0.00629
Interlocal	0.00066	0.00066	0.00054	0.00036

3) Busy Hour Traffic Concentration Rate by Type of Call

As seen in Chapter 3, Section 3.1, the busy hour traffic concentration rate, 11%, is obtained from the exchange office power consumption and the inter local acceptance distribution by time (Table 9.4.(1)).

4) Holding Time

Holding time is set as follows on the assumption that the 1974 value will remain unchanged:

Local holding time   130 sec.

SLDD holding time   215 sec.

(conversation time: 205 sec.)

5) Effective Traffic Rate

Effective traffic rate is 97%, judging from the result of traffic performance test in Fig. 9.4.(8).

6) Charge per Call

a)   Local Call

Charge per call is 20 Rupiahs. This rate remains unchanged through 1993.

b)   SLDD Call and Inter Local Call

Charge per SLDD call is not constant because the traffic distribution by toll charge zone is presumed to vary from year to year as shown in Fig. 9.4.(3) ~ 9.4.(6). SLDD and inter local charges per call by year are given in Table 9.2.1.(3).

SLDD and inter-local traffic distribution by charge zone in 1993 is forecasted by the following method:

Table 9.2.1.(3) Telephone Charge per Call

unit: Rp

Kind of call \ Year	1974	1979	1983	1988	1993
SLDD	1191	881	734	545	368
Interlocal	1098	1145	938	672	398

To calculate toll traffic distribution by charge zone in the remote future, based on the gravity model. $(Po \times Pi/\gamma i^2)$

Where

Po :   Population of Jakarta

Pi :   Population in charge zone

γi :   Average distance from Jakarta to charge zone

Toll traffic distributions in 1979, 1983 and 1988 are calculated by connecting linearly the present toll traffic distribution and the corresponding 1933 value obtained by the gravity model on the section paper where the vertical and horizontal axes are arranged by uniform scale. Meanwhile, the traffic distribution by distance in 1993 calculated by the gravity model is nearly equal to the actual value in Japan. (Refer to Fig. 9.4.(7).)

Inter local call charge by toll charge zone is calculated from the mean holding time, assuming that the traffic distribution by charge zone in 1993 is the same as that of SLDD calls and that the conversation time presents the almost exponential distribution. (Refer to Table 9.4.(6).)

In projecting the toll charge zone, it is assumed that the composite rates of ordinary calls and urgent calls will be the same in the future as at present at 24% and 76%, respectively.

c)   Effective Revenue Rate

The effective revenue rate is calculated from the relationship between the service revenue based on traffic and the actual service revenue.

Effective revenue rates of local, SLDD and inter local services are as follows:

Local   75%

SLDD   88%

Inter local   81%

d)   Effective Days in One Year

Effective days in one year are calculated to be 325 days from the inter-local call distribution by days of the week. (Refer to Chapter 3, Section 3.1.)

e)   International service charge is calculated by the correlation model of the number of subscriber lines and the external trade volume as

shown below.

$$Y = -1855.2 + 18.42X1 + 37.5X2$$

where

Y : International service charge

X1: Number of subscriber lines

X2: Total external trade volume

Other revenue per subscriber line is fixed at the value as of 1974.

Basic charge revenue and miscellaneous revenue are calculated by the time series extrapolation method, based on the foregoing pre-conditions. Local, SLDD and inter local service revenue is based on the JTP traffic forecast. International service revenue is, as previously stated, based on the number of subscriber lines versus external trade volume correlation model.

The telephone service revenue and the telephone service revenue per subscriber line by year resulting from the above consideration are shown in Table 9.2.1.(4) and Table 9.2.1.(5).

Table 9.2.1.(4)   Telephone Revenue

Unit Rp in millions

Item	Year			
	1979	1983	1988	1993
Basic charge	(2.5) 1,195	(2.4) 1,919	(2.9) 3,259	(3.9) 5,852
Local revenue	(24.1) 11,649	(20.8) 16,695	(21.4) 24,165	(24.7) 36,845
SLDD revenue	(47.6) 23,001	(55.0) 44,176	(56.4) 63,855	(53.1) 79,022
Interlocal revenue	(9.7) 4,436	(7.3) 5,837	(5.1) 5,804	(2.8) 4,114
International revenue	(16.5) 7,972	(14.4) 11,549	(14.1) 15,932	(15.3) 22,826
Other revenue	(0.1) 60	(0.1) 97	(0.1) 165	(0.2) 295
TOTAL	(100%) 48,313	(100%) 80,273	(100%) 113,180	(100%) 148,954

( ) composition rate %

Table 9.2.1.(5)   Yearly Telephone Revenue per Susbscriber

	Year			
	1979	1983	1988	1993
Number of subscribers	165,000	265,000	450,000	808,000
Annual revenue/subscriber (unit Rp in thousands)	292.8	302.9	251.5	184.3
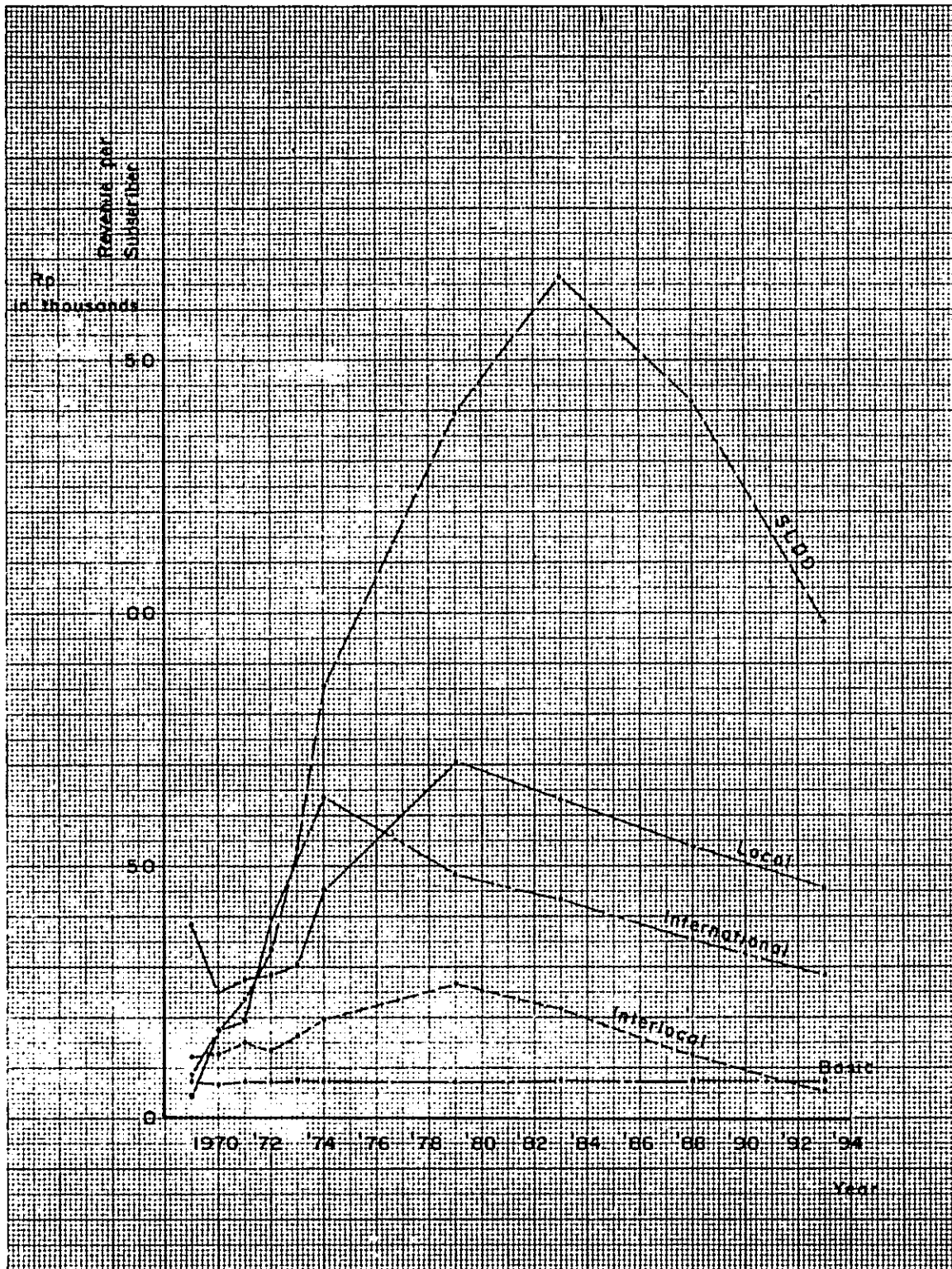
FIG. 9-2-1-(6) DISTRIBUTION OF
REVENUE PER SUBSCRIBER
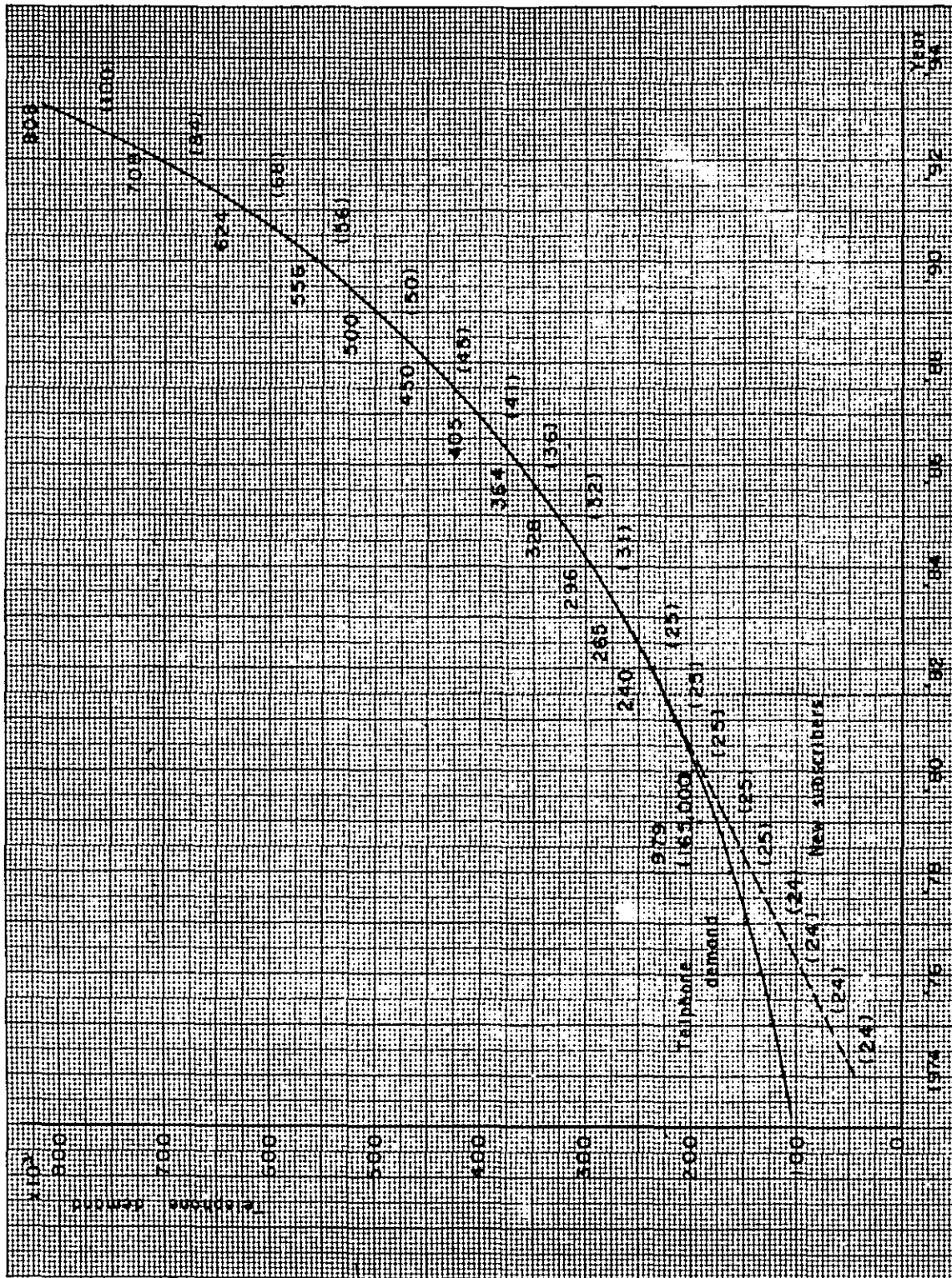
FIG. 9-2-1-(7) NEW SUBSCRIBERS
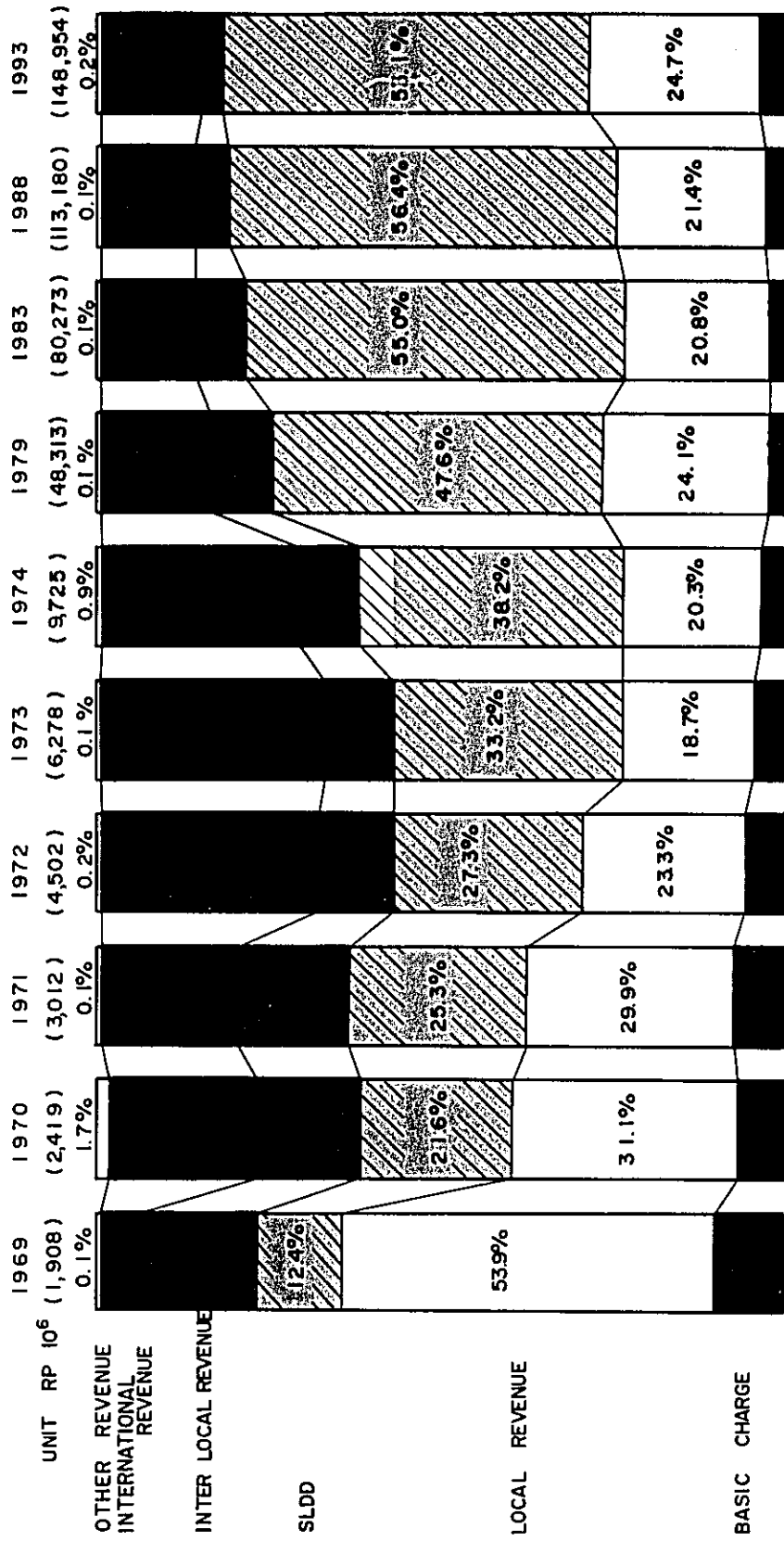
FIG. 9-2-1-(8)

COMPOSITION RATE OF REVENUE

TABLE 9-2-1-(9) TELEPHONE REVENUE

( ) : %

No	Item	Unit	Past Date						Estimation				Remarks
			1969	1970	1971	1972	1973	1974	1979	1983	1988	1993	
1	Basic charge	Rp 10⁶	(10.1) 193	(8.7) 211	(7.9) 239	(5.9) 264	(4.7) 292	(3.3) 323	(2.5) 1,195	(2.4) 1,919	(2.9) 3,259	(3.9) 5,852	
2	Local revenue	"	(53.9) 1,028	(31.1) 752	(29.9) 902	(23.3) 1,049	(18.7) 1,176	(20.3) 1,969	(24.1) 11,649	(20.8) 16,695	(21.4) 24,165	(24.7) 36,845	
3	SLDD revenue	"	(12.4) 237	(21.6) 523	(25.3) 761	(27.3) 1,231	(33.2) 2,084	(38.2) 3,718	(47.6) 23,001	(55.0) 44,176	(56.4) 63,855	(53.1) 79,022	
4	Interlocal rev.	"	(16.9) 322	(15.4) 373	(16.3) 490	(11.1) 501	(10.2) 643	(8.8) 854	(9.7) 4,436	(7.3) 5,837	(5.1) 5,804	(2.8) 4,114	
5	International rev.	"	(6.6) 127	(21.5) 520	(20.5) 618	(32.2) 1,448	(33.1) 2,077	(28.5) 2,770	(16.5) 7,972	(14.4) 11,549	(14.1) 15,932	(15.3) 22,826	
6	Other revenue	"	(0.1) 1	(1.7) 40	(0.1) 2	(0.2) 9	(0.1) 6	(0.9) 91	(0.1) 60	(0.1) 97	(0.1) 165	(0.2) 295	
7	Total	"	(100%) 1,908	(100%) 2,419	(100%) 3,012	(100%) 4,502	(100%) 6,278	(100%) 9,725	(100%) 48,313	(100%) 80,273	(100%) 113,180	(100%) 148,954	
8	Number of subscribers	10³	26.6	30.1	32.6	36.8	39.1	43.6	25 / 165	25 / 265	45 / 450	100 / 808	
9	Revenue/subscriber (one year)	Rp 10³	71.7	80.8	92.4	122.3	160.6	223.1	292.8	302.9	251.5	184.3	
10	Revenue/subscriber (one month)	Rp 10³	6.0	6.7	7.7	10.2	13.4	18.6	24.4	25.2	21.0	15.4	
11	Installation premium	Rp 10⁶	63	565	443	479	464	460	13,340	13,340	24,012	53,360	

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TABLE 9-2-1-(10)　LOCAL TELEPHONE REVENUE

No	Item	Unit	Year				Remarks
			1979	1983	1988	1993	
①	Telephone demand	x10³	(165) 181	265	450	808	( ): Number of subscriber lines since 1983, Subscriber=Telephone demand
②	Local calling rate in busy hour	erl	0.0593	0.0529	0.0451	0.0383	(see: 3→4)
③	1/concentrative rate		9.09	9.09	9.09	9.09	Concentrative rate = 0.11 in busy hour (see: 9-4-(1))
④	Effective traffic rate to all day traffic		0.97	0.97	0.97	0.97	(see: 9-4-(8))
⑤	3600/Holding time		27.69	27.69	27.69	27.69	Conversation time = 130 sec. = Holding time (see:3-1-5-(4))
⑥	Effective call (②x③x④x⑤)		14.48	12.92	11.01	9.35	
⑦	Telephone charge per call	Rp	20	20	20	20	
⑧	Effective revenue rate		0.75	0.75	0.75	0.75	(see: 9-4-(9))
⑨	Revenue per subscriber (⑥x⑦x⑧x 325)	Rp x10³	70.6	63.0	53.7	45.6	
⑩	Revenue ①x⑨	Rp x10⁶	(11,649) 12,779	16,695	24,165	36,845	

TABLE 9-2-1-(11) SLDD TELEPHONE REVENUE

No	Item	Unit	Year 1979	Year 1983	Year 1988	Year 1993	Remarks
①	Telephone demand	$\times 10^3$	(165) 181	265	450	808	( ): Number of subscriber lines since 1983, Subscriber=Telephone demand
②	SLDD calling rate in busy hour	erl	0.00375	0.00538	0.00617	0.00629	(see: 3-4)
③	1/Concentrative rate		9.09	9.09	9.09	9.09	Concentrative rate = 0.11 in busy hour (see: 9-4-(1))
④	Effective traffic rate To all day traffic		0.97	0.97	0.97	0.97	(see: 9-4-(8))
⑤	3600/Holding time		16.74	16.74	16.74	16.74	Conversation time = 215 sec. =Holding time
⑥	Effective call (②x③x④x⑤)		0.5535	0.7941	0.9107	0.9284	
⑦	Telephone charge per call	Rp	880.6	733.8	544.8	368.2	(see: Fig 9-4-(3)-(6))
⑧	Effective revenue rate		0.88	0.88	0.88	0.88	(see: Table 9-4-(9))
⑨	Revenue per subscriber (⑥x⑦x⑧x325)	Rp $\times 10^3$	139.4	166.7	141.9	97.8	
⑩	Revenue (①x⑨)	Rp $\times 10^6$	(23,001) 25,231	44,176	63,855	79,022	( ): estimated based on number of subscriber lines

TABLE 9-2-1-(12) INTERLOCAL TELEPHONE REVENUE

No	Item	Unit	Year 1979	1983	1988	1993	Remarks
(1)	Telephone demand	$\times 10^3$	(165) 181	265	450	808	( ): Number of subscriber lines since 1983, Subscriber = Telephone demand
(2)	Interlocal calling rate in busy hour	erl	0.00066	0.00066	0.00054	0.00036	(see: 3-4)
(3)	1/Concentrative rate		9.09	9.09	9.09	9.09	Concentrative rate: 0.11
(4)	Effective traffic rate To all day traffic		0.97	0.97	0.97	0.97	(see: Fig 9-4-(8))
(5)	3600/Holding time		15.32	15.32	15.32	15.32	(see: Table 9-4-(10)) Conversation time: 205 sec. Holding time 205+30=235
(6)	Effective call (2)x(3)x(4)x(5)		0.0892	0.0892	0.0729	0.0486	
(7)	Telephone charge per call	Rp	1,144.9	938.1	672.1	397.9	(see: Table 9-4-(3)-(6))
(8)	Effective revenue rate		0.81	0.81	0.81	0.81	(see: Table 9-4-(9))
(9)	Revenue per subscriber (6)x(7)x(8)x325)	Rp	26,884	22,028	12,898	5,091	
(10)	Revenue (1)x(9)	Rp $\times 10^6$	(4,436) 4,866	5,837	5,804	4,114	( ): estimated based on number of subscriber lines

TABLE 9-2-1-(13) INTERNATIONAL TELEPHONE REVENUE

No	Item	Unit	Past data					Forecast				Remarks
			1969	1970	1971	1972	1973	1979	1983	1988	1993	
1	International cost (Y)	Rp x10^6	1269	520.1	617.9	1,448.2	2077.5	7,451 7,769	11,397	17,535	27,097	$Y=-12373.7+19.85X_1+101.04X_2$
2	Number of (X$_1$) Subscriber lines	x10^3	26.6	30.1	32.6	36.8	39.1	165 181	265	450	808	see: telephone demand forecast
3	Number of foreigner (X$_2$)	"	118.4	120.5	124.2	129.1	135.1	163.8	183.2	207.6	231.9	$X_2=a+bt$ $=115.05+487t$ $t=1.\ 1970$
4	International cost (Y)	Rp x10^6	126.9	520.1	617.4	1,448.2	2077.5	*7,972 8,275	11,549	15,932	22,826	$Y=-1855.2+18.42X_1+37.5X_2$
5	Number of Subscriber lines (X$_1$)	x10^3	26.6	30.1	32.6	36.8	39.1	*165 181	265	450	808	
6	Export and Import amount (X$_2$)	ton x10^6	38.6	47.8	54.0	67.2	86.0	181	227	252	261	$X_2=\dfrac{264.8}{1+13.05e^{-0.26t}}$ $t=0.\ 1966$

* Number of subscriber lines

after 1983. Number of subscriber linen = Telephone demand

9.2.2 Expenditure

Telecommunication service expenditure consists of personnel expense, office expense, maintenance expense, depreciation expense, interest payment for international traffic, and so forth. Here the expenditure is calculated for the following four plans (Plan A, Plan B, Plan C and Plan D):

Plan A : Productivity per employee (number of telephone sets/number of employees) in Jakarta is calculated, based on data of the advanced countreis. The amount of investment per new subscriber line remains unchanged through 1993.

Plan B : Productivity per employee in Jakarta is to increase by 7% per year in accordance with the increase of personnel expense. The amount of investment per new subscriber line remains the same through 1993 as in Plan A.

Plan C : Productivity per employee in Jakarta is calculated, based on data of the advanced countries. The amount of investment by year is based on JTP demand forecast as stated in Chapter 8.

Plan D : Productivity per employee in Jakarta is to increase by 7% per year as in Plan B. The amount of investment by year is based on JTP demand forecast as stated in Chapter 8. Investment by year described in Chapter 8 is summarized in Table 9.2.2.(1).

Table 9.2.2.(1) Yearly Investment Amount (RP in million)

No.	Item	(I) 1975 – 1979	(II) 1980 – 1983	(III) 1984 – 1988	(IV) 1989 – 1993
1	Local	159,158	77,418	134,232	233,010
2	Toll	47,747	23,225	40,270	69,903
3	Total	206,905	100,643	174,502	302,913
4	Yearly investment	41,381	25,161	34,900	60,583

4 : 3 / 5 (I, III, IV)
4 : 3 / 4 (II)
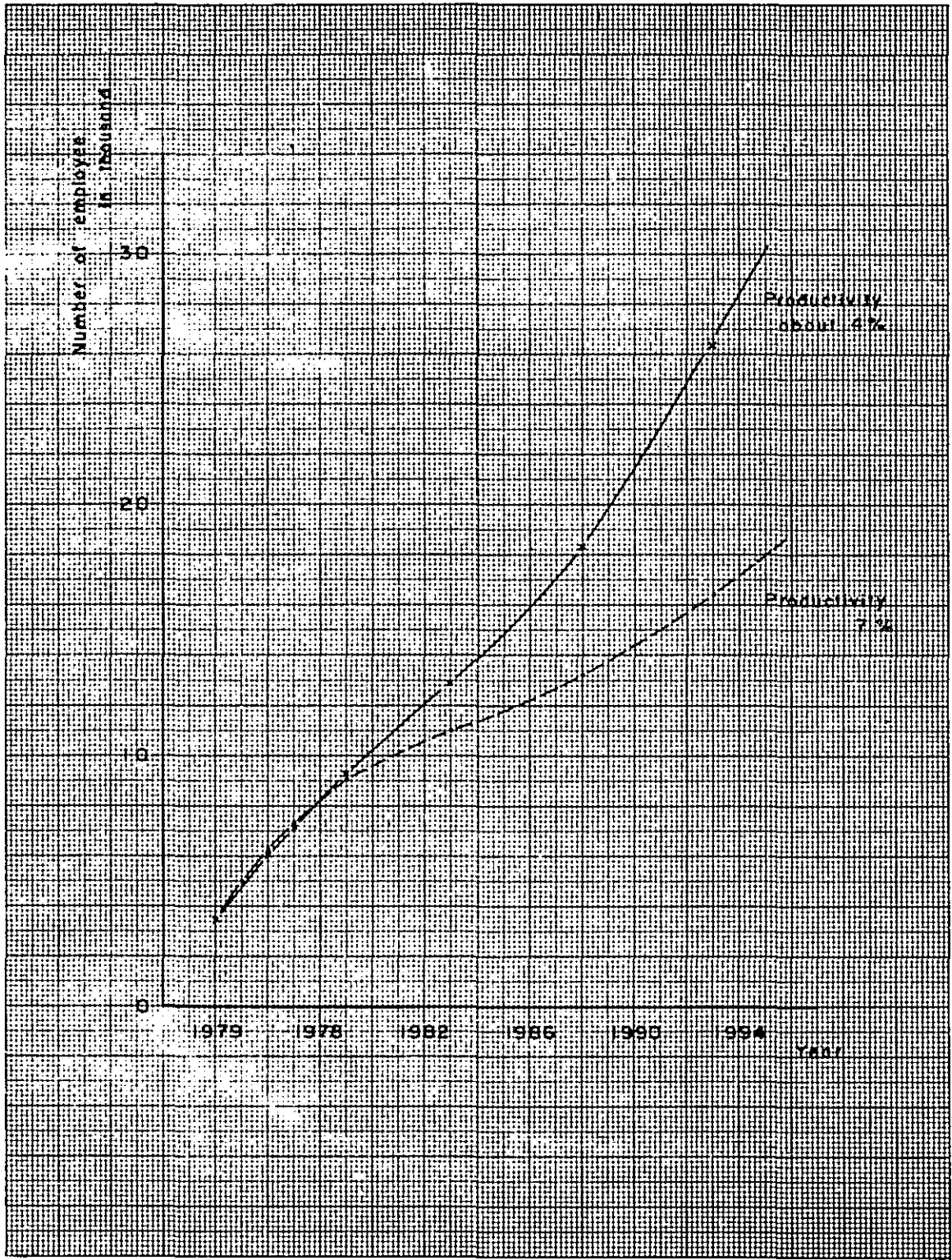
FIG. 9-2-2-(3)   NUMBER OF EMPLOYEES
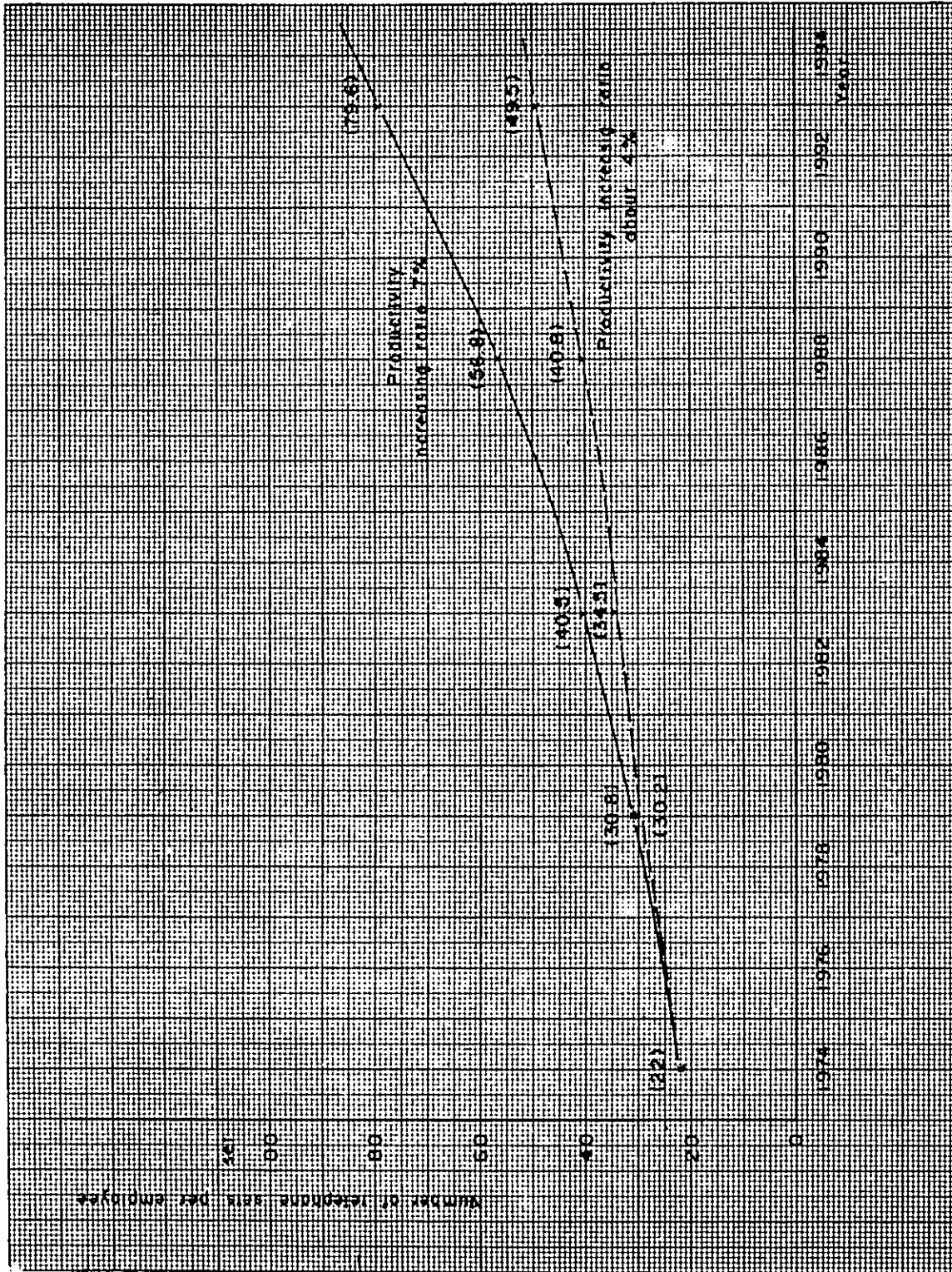
FIG. 9-2-2-(4) PRODUCTIVITY PER EMPLOYEE

9.2.2.1 Personnel Expense

Personnel expense consists of salary, medical care expense, pension, official travelling expense, education expense, accommodation expense, death allowance, advance payment for personnel expense, etc.

The personnel expense ratio to total expenditure is extremely high so that the performance of personnel expense requires greater attention than that of any other expense. When estimating personnel expense the number of employees must first be estimated. In the estimation of personnel expense the following methodology is used:

Plan P-1 : The number of employees in Jakarta in the future is calculated from the relationship between the productivity of employees based on all available data of advanced countries and the rate of telephone diffusion (Fig. 9.4.(14)). Personnel expense per employee is to increase at the rate of 7% per year.

Plan P-2 : The productivity per employee in Jakarta in the future is to be improved by 7% per year. The personnel expense per employee is also to increase by 7% per year.

As seen in Fig. 9.4.(14) the productivity per PERUMTEL employee in Plan P-1 is approximately 22 telephones. In 1993 this productivity is presumed to be improved to approximately 50 telephones.

Generally, as the telephone demand density increases the maintenance efficiency also improves. Sometime in the future when the rate of telephone diffusion in the developing countries reaches the same level as the present or past rate of telephone diffusion in the developed countries as the result of the improvement of maintenance system and telephone

facilities, the productivity is expected to improve remarkably. Therefore, the productivity per employee, i.e., 37 telephones in charge, calculated from Fig. 9.4.(14) may be considered to represent the lower limit.

In Plan P-2 the expected rise of income level of the PERUMTEL employees in accordance with the national economic progress of Indonesia is taken into account. The productivity improvement is designed to keep pace with the increase of income. In the event of a 7% per year improvement of productivity the number of telephones in charge per employee in 1993 will be approximately 80. According to Table 9.2.2.(2) the productivity in terms of the number of telephones in charge per employee in 1971 in the developed countries stands at 104 in Japan, 129 in the U.S., 69 in the U.K., 88 in West Germany and 87 in France.

It is really possible to improve the productivity per employee in Indonesia to 80 telephones by means of introduction of new technology, computerization of business, qualitative improvement of labor by training, amelioration of business management system, and so forth. Therefore, it is desirable to select the 80 telephones per employee as the desired productivity value.

Table 9.2.2.(2)   Productivity Telephone Set per Employee

Country \ Year	1965	1966	1967	1968	1969	1970	1971	1972
Japan	54	60	67	74	82	92	104	117
U.S.A.	124	123	128	130	126	125	129	135
England	51	52	55	57	61	63	69	—
West Germany	62	66	69	74	80	85	88	—
France	59	62	66	69	77	83	87	93

9.2.2.2 Office Expense

Office expense consists of such expense components as stationery, printing matter, electricity, gas, water service, TV, radio, newspapers, transportation, books, magazines, survey and research, etc. Office expense in the future is calculated on the assumption that the office expense per employee in 1974 would have been unchanged compared with the preceding year barring a 10% increase due to the inflation. Office expense is calculated for the previsouly mentioned Plan P-1 where the number of employees is based on the correlation between the rate of telephone diffusion and the productivity per employee and

for Plan P-2 where the productivity improvement rate is set at 7% per year. The result of calculation for both plans appears in Table 9.2.2.(5). Figures in this table do not include a 10% increase due to the inflation.

Table 9.2.2.(5)   Office Expense
(Unit in thousands)

		1974	1979	1983	1988	1993
Number of employees	Plan P-1	3.5	9.3	12.9	18.3	26.4
	Plan P-2	3.5	9.1	11.0	13.2	16.4
Office expense per employee		36.2	36.2	36.2	36.2	36.2
Office expense	Plan P-1	127,500	336,660	466,980	662,460	955,680
	Plan P-2	127,500	329,420	398,200	477,840	593,680

(excluding 10% inflation)

9.2.2.3 Maintenance Expense

Maintenance expense consists of such expense components as subscriber telephones, telephones, telephone facilities, electricity, local telephone network, exchange office buildings, access roads to PERUMTEL houses and facilities, and vehicles. Future maintenance expense is calculated on the assumption that the number of subscriber lines and the maintenance expense per subscriber line in 1974 would have been unchanged compared with the preceding year barring a 10% increase due to the inflation. Figures in Table 9.2.2.(6) do not include a 10% increase due to the inflation.

Table 9.2.2.(6)   Maintenance Expense
(Unit in thousands)

	1974	1979	1983	1988	1993
Number of subscriber	43.6	165	265	450	808
Maintenance expense per subscriber	8.0	8.0	8.0	8.0	8.0
Maintenance expense	349,800	1,320,000	2,120,000	3,600,000	6,464,000

(excluding 10% inflation)

9.2.2.4 Other Expenses

Major items of other expenses are security expense and Directorate General of Tele-communication expense. Future other expenses are calculated on the assumption that other expenses per subscriber line in 1974 would have been unchanged compared with the preceding year barring a 10% increase due to the inflation. Figures in Table 9.2.2.(7) do not include a 10% increase due to the inflation.

Table 9.2.2.(7) Other Expense (Unit in thousands)

	1974	1979	1983	1988	1993
Number of subscribers	43.6	165	265	450	808
Other expense per subscriber	4.77	4.77	4.77	4.77	4.77
Other expense	208,100	787,050	1,264,000	2,146,500	3,830,000

(excluding 10% inflation)

9.2.2.5 Depreciation Expense

Depreciation expense for the year concerned is calculated at 7.5% to the net fixed assets. Total net fixed assets in Jakarta as of the end of 1973 amounted to 7,930 million Rupiahs.

Plan D-1: The amount of investment per subscriber remains fixed at 750,000 Rupiahs through 1993.

Plan D-2: The amount of investment by year is based on the total construction cost calculated in Chapter 8. Figures are given in Table 9.2.2.(8).

Table 9.2.2.(8) Yearly Investment Amount

Rp in millions

	1975~1979	1980~1983	1984~1988	1989~1993
Yearly investment amount	41,381	25,161	34,900	60,583

In Plan D-1 it is presumed that the future construction investment per subscriber line can remain at the existing level as the result of the improvement of existing telephone facilities and the introduction of new technology.

In Plan D-2 the construction cost per subscriber line is extremely large because the communication facilities to cover even the future demand are to be constructed by concentrated investment during a short period unitl 1979. In other words, the long-term construction work, such as road and exchange office construction, is carried out while the existing facilities are extremely limited in capacity. However, the investment decreases gradually with the amount of investment per subscriber line in 1993 being about half the similar amount in 1979.

9.2.2.6 Interest on Borrowing

The amount of net fixed assets minus the telephone installation charges collected from general subscribers is the amount of net fixed assets by borrowing, and this borrowing is subject to interest of 15%. (The telephone installation charges which general subscribers pay to PERUMTEL for having their telephones installed have nothing to do with interest.)

Interest on borrowing by Plan D-1 and Plan D-2 is shown below.

Plan D-1:

    Amount of fixed assets by borrowing = (Net fixed assets) x 0.3

    Plan D-1 is shown in Table 9.2.2.(9).

Table 9.2.2.(9)   Borrowed Money (Plan D-1)

Rp in millions

Year Plan D-1	1979	1983	1988	1993
(1) Net fixed assets	85,732	129,740	209,170	379,254
(2) Accumulated total of installation charge	60,012	90,818	146,419	265,478
Borrowed money (1) − (2)	25,720	38,922	62,751	113,776

Plan D-2

    Investment by year based on the construction cost calculated by JTP as per Chapter 8 is as follows:

        1975 - 1979: $41,381 \times 10^6$ Rupiahs
        1980 - 1983: $25,161 \times 10^6$ Rupiahs
        1984 - 1988: $34,900 \times 10^6$ Rupiahs
        1989 - 1993: $60,583 \times 10^6$ Rupiahs

    Net fixed assets by borrowing is calculated by the method as shown in Table 9.4.(18), (19).

The breakdown of borrowing by base year appears in Table 9.2.2.(10).

Table 9.2.2.(10) Borrowed Money (Plan D-2)

Rp in millions

Year Plan D-2	1979	1983	1988	1993
(1) Net fixed asset	185,617	225,767	303,101	466,016
(2) Accumulated total of installa- tion charge	60,937	92,264	148,790	269,808
Borrowed money (1) − (2)	124,680	133,503	154,311	196,208

9.2.2.7 Inflation

A 10% inflationary increase is considered in each of personnel expense, office expense, maintenance expense and miscellaneous expense.

9.2.2.8 Telephone Expense Rate

Personnel expense, office expense, maintenance expense and miscellaneous expense include not only telephone expense but telegraph and telex expenses also. Therefore, the telephone expense is set at 70% of total expense, based on the employee rate, etc.

9.2.3 Result

The calculation of revenue and expenditure in Jakarta by the foregoing preconditions results in a deficit balance by 1993 as seen in Table 9.2.3.(1).

In Plan D-2 it appears that until 1983 the SLDD traffic continues to increase and the revenue per subscriber line increases annually to record a remarkable surplus balance. Nevertheless, the actual surplus balance is not as large as expected, being relatively limited. The reason is that while the existing facilities are small in capacity a large scale investment is made to complete new facilities which can even cover the future demand on a long range basis. However, in the 3rd five-year plan the revenue and expenditure balance is somewhat improved, and this is attributable to the following two factors:

o   Telephone service revenue per subscriber line continues to increase until 1983.

o   Facilities completed by investment up to 1979 can fill the major part of demand until 1983 so that any sizable facilities expansion is not necessary to install new subscriber telephones.

In 1993 the telephone service revenue per subscriber line decreases drastically and the revenue and expenditure balance is in the deficit as shown in Fig. 9.2.3.(2).

TABLE 9-2-2-(II) EXPENDITURE

(Rp in million)

Plan	Item	Plan P-1					Plan P-2				
		1979	1983	1988	1993	Remarks	1979	1983	1988	1993	Remaks
Plan D-1	Personnel expense	7,910	15,315	32,999	72,663		7,740	13,059	23,802	45,139	
	Office expense	380	771	1,763	4,093		371	658	1,271	2,543	
	Maintenance expense	1,490	3,506	9,576	27,714		1,490	3,506	9,576	27,714	
	Other expense	889	2,096	5,702	16,516	Plan-A	889	2,096	5,702	16,516	Plan-B
	Depreciation (7.5%)	5,431	8,999	14,223	24,669		5,431	8,999	14,223	24,669	
	Interest (15%)	3.858	5,838	9,413	17,066		3,858	5,838	9,413	17,066	
	Payment for International traffic	6,839	9,620	13,271	19,014		6,893	9,620	13,271	19,014	
	Total	26,851	46,145	86,947	181,735		26,672	43,776	77,258	152,661	
Plan D-2	Personnel expense	7,910	15,315	32,999	72,663		7,740	13,059	23,802	45,139	
	Office expense	380	771	1,763	4,093		371	658	1,271	2,543	
	Maintenance expense	1,490	3,506	9,576	27,714		1,490	3,506	9,576	27,714	
	Other expense	889	2,096	5,702	16,516	Plan-C	889	2,096	5,702	16,516	Plan-D
	Depreciation (7.5%)	11,695	16,265	21,746	32,873		11,695	16,265	21,746	32,873	
	Interest (15%)	18,702	20,025	23,147	29,431		18,702	20,025	23,147	29,431	
	Payment for International traffic	6,893	9,620	13,271	19,014		6,893	9,620	13,271	19,014	
	Total	47,959	67,598	108,204	202,304		47,780	65,229	98,515	173,230	
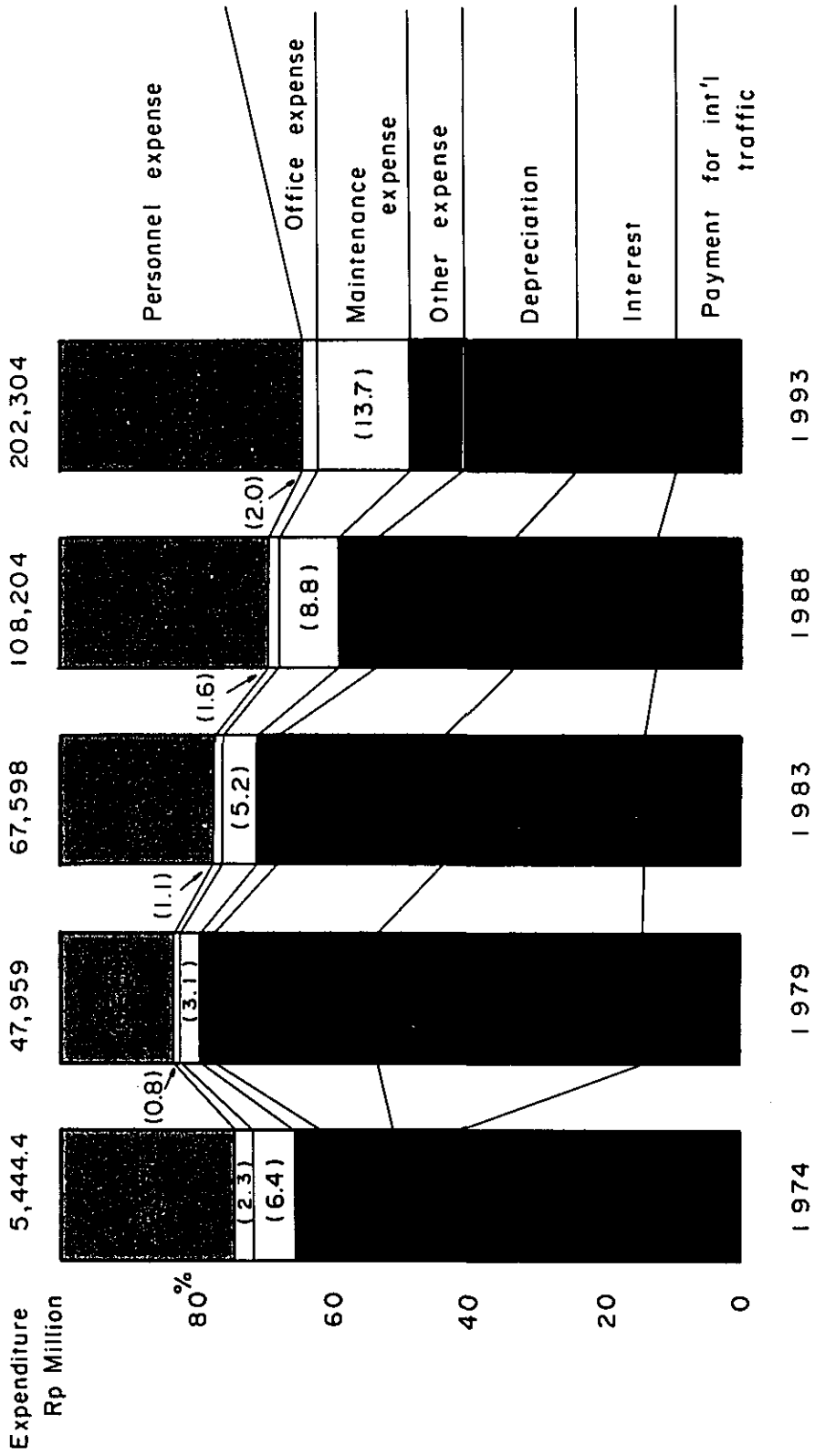
FIG.9-2-2-(12) COMPOSITION RATE OF EXPENDITURE (PLAN-C)

TABLE 9-2-2-(13) EXPENDITURE

( ) : %

No.	Item	Past Date				Estimation				Remarks
		1971	1972	1973	1974	1979	1983	1988	1993	
1	Personnel expense	713.2	889.6	1,323.3	(25.7) 1,413	(16.5) 7,910	(22.7) 15,315	(30.5) 32,999	(35.9) 72,663	Rp in million
2	Office	141.9	95.8	135.0	(2.3) 127.5	(0.8) 380	(1.1) 771	(1.6) 1,763	(2.0) 4,093	"
3	Maintenance	179.4	207.1	268.6	(6.4) 349.8	(3.1) 1,490	(5.2) 3,506	(8.8) 9,576	(13.7) 27,714	"
4	Others	10.7	56.6	148.8	(3.8) 208.1	(1.9) 889	(3.1) 2,096	(5.3) 5,702	(8.2) 16,516	"
5	Depreciation (7.5%)				(10.8) 595	(24.4) 11,695	(24.1) 16,265	(20.1) 21,746	(16.3) 32,873	(see: Table9-4-(19))
6	Interest (15%)				(9.0) 492	(39.0) 18,702	(29.6) 20,025	(21.4) 23,147	(14.5) 29,431	(see: Table9-4-(19))
7	Payment to oversea for int'l traffic				(42.0) 2,307	(14.4) 6,893	(14.2) 9,620	(12.3) 13,271	(9.4) 19,014	"
8	Total	1,045.2	1,249.1	1,875.7	(100.0) 5,492.4	(100.0) 47,959	(100.0) 67,598	(100.0) 108,204	(100.0) 202,304	"
9	Number of subscribers	32.6	36.9	39.1	43.6	165.0	265.0	450.0	808.0	unit: thousand
10	Expense/subscriber	32.1	33.9	48.0	126.0	290.7	255.1	240.5	250.4	Rp in thousand
11	Monthly expense/subscriber	2,675	2,825	4,000	10.5	24.2	21.3	20.0	20.9	"

(Plan - C)

TABLE 9-2-2-(14) EXPENDITURE

(PERSONNEL, OFFICE, MANITENANCE AND OTHERS)

No	Item	Unit	1974	1979	1983	1988	1993	Remarks
①	Jakarta telephone demand	10^3	43.6	165 / 181	265	450	808	
②	Telephone set (①x α)	"	76.0	α=1.70 / 281	α=1.68 / 445	α=1.66 / 747	α=1.62 / 1,309	1974 Main 43,000 PBX 28,000 Branch 5,000 (see:Fig. 9-4-(15))
③	Jakarta Population	"	5,000	7,155	8,600	10,700	13,850	
④	Diffusion rate (②/③x100)	%	1.52	3.93 / 4.30	5.17	6.98	9.45	
⑤	Productivity Per employee	set	22	(30.8) / 30.2	(40.5) / 34.5	(56.8) / 40.8	(79.6) / 49.5	( )Productivity =7% (see: Fig.9-4-(14))
⑥	Number of employees ②/⑤	10^3	3.5	(9.1) / 9.3	(11.0) / 12.9	(13.2) / 18.3	(16.4) / 26.4	1974 employees =3,520
⑦	Personnel expense Per employee (inflation 10%)	Rp 10^3	403.7	650	953	1,534	2,471	
⑧	Personnel expense (based up 7%)	%	403.7	565	743	1,042	1,461	
⑨	(⑦+⑧)		807.4	1,215	1,696	2,576	3,932	
⑩	Personnel expense (⑥x⑨x0.7)	Rp 10^6	1,420	(7,740) / 7,910	(13,059) / 15,315	(23,802) / 32,999	(45,139) / 72,663	Telephone expense rate 0.7
⑪	Office expense per employee	Rp 10^3	36.2	58.3	85.4	137.6	221.5	Inflation :10%
⑫	Office expense (⑥x⑪x0.7)	Rp 10^6	127.5	(371) / 380	(658) / 771	(1,271) / 1,763	(2,543) / 4,093	Telephone expense rate 0.7
⑬	Maintenance expense per subs.	Rp 10^3	8.0	12.9	18.9	30.4	49.0	Inflation 10%
⑭	Maintenance (①x⑬x0.7)	Rp 10^6	349.8	1,490	3,506	9,576	27,714	Telephone expense rate 0.7
⑮	Other expense per subscriber	Rp 10^3	4.77	7.7	11.3	18.1	29.2	Inflation 10%
⑯	Other expense (①x⑮x0.7)	Rp 10^6	208.1	889	2,096	5,702	16,516	Telephone expense rate 0.7

(Left side groupings: Personnel (Plan P-2) — rows ⑦–⑩; Office — rows ⑪–⑫; Maintenance — rows ⑬–⑭; Other — rows ⑮–⑯)

Table 9.2.3.(1) Revenue and Expenditure

(Unit: Rp in million)

		Productivity/employee increasing rate (about 4%/year) Plan - P-1				Productivity/employee increasing rate (about 7%/year) Plan - P-2			
		1979	1983	1988	1993	1979	1983	1988	1993
Investment amount per-new subscriber Plan - D-1	Revenue (1)	48,313	80,273	113,180	148,954	48,313	80,273	113,180	148,954
	Expenditure (2)	26,851	46,145	86,947	181,735	26,672	43,776	77,258	152,661
	Balance (1)-(2)	21,462	34,128	26,233	*32,781	21,641	36,497	35,922	*3,707
Yearly investment amount (paragraph 8) Plan - D-2	Revenue (3)	48,313	80,273	113,180	148,954	48,313	80,273	113,180	148,954
	Expenditure (4)	47,959	67,598	108,204	202,304	47,780	65,229	98,515	173,230
	Balance (3)-(4)	354	12,675	4,976	*53,350	533	15,044	14,665	*24,276

* loss

Therefore, it is extremely important to improve the existing facilities utilization efficiency and the productivity per employee.

Generally, although the telephone traffic is adversely influenced to some extent by the tariff raise, it nevertheless is possible to improve the revenue and expenditure balance by means of the tariff raise to a certain level.

As seen in Table 9.2.1.(9) the SLDD service revenue ratio to the total telephone service revenue excluding the installation charges occupies 53%. It remains a fact that the increase of telephone service revenue in the immediate future owes a great deal to the increase of SLDD service. However, this SLDD service revenue, when compared with that of the developed countries, is extremely large. At the same time, the installation charges are also very high. Thus it is recommended that the tariff raise elsewhere than the basic charge be avoided as far as possible. Generally, the telephone service revenue and expenditure balance is in the surplus in big cities and this surplus remedies the deficit balance in local cities. Therefore, if the revenue and expenditure balance in big cities turns out a deficit, the implication is serious.

PERUMTEL should try all possible means, especially the introduction of new technology, so as to improve the productivity per employee and not to increase the investment per subscriber line.

9.3 Study for Revenue-Expenditure Balance Improvement

9.3.1 Employee

9.3.1.1 Productivity

In this report the productivity per employee in 1974 is set at approximately 22 telephones. When the productivity per employee complying with the rise of income level is presumed to be approximately 80 telephones, the number of employees in 1993 will be nearly 16,000. As stated previsouly it will be possible to improve the productivity per employee to 7% per year by means of introduction of technology of higher level and better maintenance system. However, even though the productivity per employee could have been improved to 7% per year, the revenue and expenditure balance in 1979 will record only a slight surplus and the balance in 1993 will be in the deficit. In and after 1993 the ratio of demand for residential telephones to the total telephone demand will become greater and greater, making it impossible to expect the increase of telephone service revenue, so that the deficit revenue-expenditure balance will only grow further.

9.3.1.2 Training

When the correlation model between the telephone diffusion rate and the productivity per employee is formulated, based on the data in the developed countries, and the number of employees required in Jakarta is forecasted from such correlation model, the present 3,500 employees will have to be increased to 27,000 in 1993. In this case the productivity per employee will increase to 50 telephones from the present 22.

When the productivity per employee is to be imporoved to a level where it complies with a 7% per year income increase, the number of employees totaling 16,000 in 1993 will be sufficient. It has been assumed that when the telephone diffusion rate in Jakarta becomes equal to the past or the present rate of the developed countries, the more advanced technologies than those which were or are available in the developed countries will be introduced. To improve the productivity the introduction of new technology is not the sole requirement, and the organized training program for all employees including the newly employed becomes indispensable. And such training has to be carried out effectively not only at the training center but on the job also.

In Jakarta it is usual that a large quantity of telecommunication facilities is introduced in a short period so that it is necessary to familiarize the employees with advanced technical
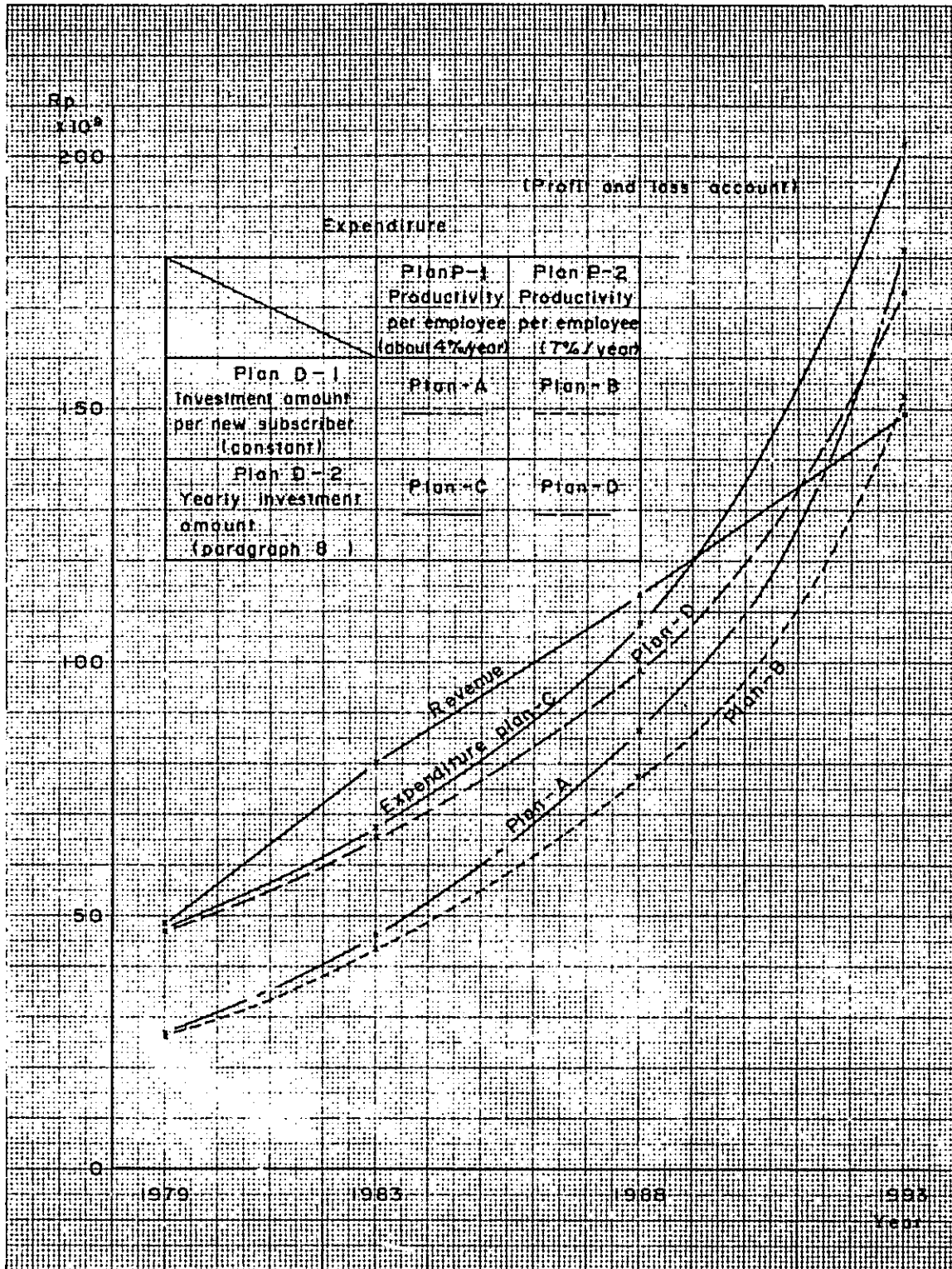
FIG. 9-2-3-(2) REVENUE AND EXPENDITURE

UNIT : 10^6 RP

YEAR   1979   1983   1988   1993

PROFIT AND LOSS ACCOUNT   48,313   80,273   113,180   202,304

1979

REVENUE   EXPENDITURE

BASIC COST

LOCAL 11,649

SLDD 23,00(I)

PERSONNEL 7,910

OFFICE 380
MAINTE-NANCE
OTHER 889

INTERLOCAL
PAYMENT FOR INTL TRAFFIC
OTHER
BALANCE 354

OTHER   6.0

1983

REVENUE   EXPENDITURE

BASIC COST

LOCAL 16,695

SLDD 44,176

PERSONNEL 15,315

3,506

BALANCE 12,675

OFFICE
MAINTENANCE
OTHER EXPENSE

PAYMENT FOR INTL TRAFFIC
INTERLOCAL

OTHER   97

1988

REVENUE   EXPENDITURE

BASIC COST

LOCAL 24,165

SLDD 63,855

PERSONNEL 32,999

MAINTENANCE 9,576

OFFICE 771

4,976

OFFICE 1,763
OTHER
INTER LOCAL 4,114
OTHER 295
PAYMENT FOR INTL TRAFFIC
BALANCE

165

1993

REVENUE   EXPENDITURE

LOCAL 36,845

SLDD 79,022

PERSONNEL 72,663

MAINTENANCE 27,714

OFFICE 4,093

BALANCE 53,350

PAYMENT FOR INTL TRAFFIC

EXPENDITURE : BASED ON PLAN - C

FIG. 9-2-3-(4)

COMPARISON BETWEEN REVENUE AND EXPENDITURE

TABLE 9-2-3-(4) REVENUE AND EXPENDITURE

(Unit: Rp in million)

	No	Item	1979	1983	1988	1993	Remarks
Revenue	①	Basic charge	1,195	1,919	3,259	5,852	
	②	Local call	11,649	16,695	24,165	36,845	
	③	SLDD call	23,001	44,176	63,855	79,022	
	④	Interlocal call	4,436	5,837	5,804	4,114	
	⑤	International call	7,972	11,549	15,932	22,826	
	⑥	Others	60	97	165	295	
	⑦	Total	48,313	80,273	113,180	148,954	
	⑧						
Expenditure	⑨	Personnel expense	(7,740) 7,910	(13,059) 15,315	(23,802) 32,999	(45,139) 72,663	
	⑩	Office expense	(371) 380	(658) 771	(1,271) 1,763	(2,543) 4,093	
	⑪	Maintenance	(1,490) 1,490	(3,506) 3,506	(9,576) 9,576	(27,714) 27,714	
	⑫	Others	(889) 889	(2,096) 2,096	(5,702) 5,702	(16,516) 16,516	
	⑬	Depreciation (7.5%)	(5,431) 11,695	(8,999) 16,265	(14,223) 21,746	(24,669) 32,873	
	⑭	Interest (15%)	(3,858) 18,702	(5,838) 20,025	(9,413) 23,147	(17,066) 29,431	
	⑮	Payment for Int'l traffic	(6,893) 6,893	(9,620) 9,620	(13,271) 13,271	(19,014) 19,014	(⑤ x 0.98) x 0.85
	⑯	Total	(26,672) 47,959	(43,776) 67,598	(77,258) 108,204	(152,661) 202,304	
	⑰	Balance ⑦-⑯	(21,641) 354	(36,497) 12,675	(35,922) 4,976	*(13,707) *53,350	*Loss
	⑱						
	⑲	Installation premium	(13,340)	(13,340)	(24,012)	(53,360)	
	⑳	Net fixed asset	(85,732) 185,617	(129,740) 225,767	(209,176) 303,101	(379,254) 466,016	

Expenditure ( ) : based on plan-B

Down side : based on plan-C

knowledge during a short period. Hence it is important to employ people who have received higher education than at present. No less important is to establish the management system for data collection and analysis, as well as general business execution, not to mention technical affairs.

9.3.2 Proposal on Telephone Tariff

When the existing telephone tariff system continues without modification it is anticipated that the service revenue and expenditure balance with turn into deficit around 1990 as seen in Fig. 9.2.3.(2). It is important to study carefully which part of the tariff system has to be modified before the deficit balance appears in the revenue and expenditure performance.

In comparison with the telephone tariff systems in the developed countries the following can be pointed out as requiring modification in the telephone tariff system in Jakarta.

(1) Basic Charge

Considering that the residential telephones will occupy the major part of telephone demand in the future, the originating traffic per subscriber will decrease. For, even the subscribers who utilize their telephones on very few occasions only keep the telephones installed as the status symbol. Even for the subscribers who seldom utilize their telephones the premise facilities including telephone sets having little to do with traffic, as well as subscriber lines and the related civil engineering facilities, have to be provided, and they hold a large weight in the construction cost. For this reason it is desirable to consider the basic charge raise in the future.

(2) Local Charge

As seen in Table 9.2.1.(9) the ratio of local traffic to the total traffic is high. In 1993 it occupies 80%. On the other hand, the local service revenue accounts for not more than 25% of the total telephone service revenue. Investment per subscriber line for the local telephone network is larger than that for the toll network. Considering the high construction cost of exchange offices to handle a great volume of traffic and the inclusion of data communication, in which case the holding time is extremely long, in the telephone network in the future, it is necessary to introduce for local calls time charging system based on the conversation time.

(3) Toll Charge

As seen in Fig. 9.4.(17) the long distance toll charge is extremely high compared with that in the developed countries. More and more multichannel toll circuits will be adopted in the future and this fact, together with the effective utilization of the toll transmission route, may lead to the lowering of toll charges. Therefore, it is not desirable to raise toll charges above the existing level.

(4) Other

At present it is so regulated that, in case the distance from the exchange office to the subscriber applicant exceeds a certain limit, the additional installation charge is imposed in accordance with the excess distance. It is worth studying to impose additional installation charge in the areas where the telephone demand density is low also.

9.3.3 Installation Planning

In the installation planning to improve producitivity of telecommunication facilities the following points must be taken into account:

(1) Coordination between office facilities and outside plant.

(2) Coordination between outside plant and urban development program.

(3) Prevention of delay of construction work.

(4) Selection of priority order for telephone installation.

(5) Practicing of construction work from the viewpoint of system building.

(6) Improvement of existing facilities.

(7) Introduction of new technology complying with social environmental requirement.

9.3.4 Introduction of New Service to Promote Telephone Utilization

9.3.4.1 General Description

At present the time announcement service is practiced in Jakarta. This service is very extensively utilized as shown in Table 9.3.4.(1). For improving the telephone service revenue-expenditure balance in the future it is important to arouse new traffic by introducing information service, such as time announcement service, which does not require sizable investment. In the developed countries the following information services besides the time announcement service are already introduced:

(1) Weather forecast.

(2) "Alarm clock" service.

(3) Stock market quotation service.

(4) Social event announcement service.

(5) News service.

(6) "Calculation by Telephone" service (by use of computer).

(7) Train seat reservation service (ditto).

Furthermore, the improvement of call completion rate contributes positively to the increase of telephone service revenue.

For instance:

(1) Remedies for incomplete dialing and changed number subscriber

1) To introduce push-button telephones with abbreviate dialing function.

2) To introduce automatic directory service equipment.

(2) Remedy for busy subscriber

To introduce service to announce terminating call on busy line.

(3) Remedy for unanswered terminating call

To introduce message service or automatic answering telephone service.

To improve the call completion rate it is necessary to introduce new technology described in Chapter 12, Section 2, not to speak of additional telephone installation for subscribers who use their telephones very frequently.

Table 9.3.4.(1) Time Service

(September, 1974)

No.	Item	Unit	Time service	Local	Remarks
1	Monthly revenue	Rp $\times 10^3$	3,470	164,123	Sub. 43,600
2	Revenue per subscriber	Rp	79.6	3,764	
3	Weekly call per subscriber	No	2	94	

9.3.4.2 Promotion of Public Telephone Utilization

As stated in Chapter 10 the public telephone revenue per telephone set is larger than the subscriber telephone revenue per subscriber line. Public telephones thus play an extremely important part as a means of increasing telephone service revenue. However, according to our investigation, part of public telephones are not completely used or only slightly used. To cope with this situation the following measures are required:

(1) To make thorough maintenance of public telephones.

(2) To establish a system for full study concerning the public telephone locations and the number of public telephones to install.

(3) To consider the re-location of existing public telephones not used as frequently as desired to the places where they will raise greater revenue.

(4) To plan the introduction of toll public telephones which will contribute greatly to the service revenue increase.

(5) To select public telephone locations where around-the-clock service is possible.

(6) To use intelligible marks for public telephone locations.

(7) To plan the establishment of automatic money exchangers at a place where relatively many public telephones are installed.

9.3.5 Organization

Improvement of productivity of employees, which is indispensable for improving the service revenue-expenditure balance in the future, is influenced to a great extent by the organization. Therefore, the organizaton must be such as will enable individual employees to use their capabilities to the best advantage.

If the organization is not suitable for the execution of work the enterprise productivity cannot be improved even though the individual employees are capable. For, the enterprise is composed of such organization that ensures close mutual relationship of works of individual employees and thus realizes the smooth flow of works.

According to our forecast the telephone service in Jakarta will require approximately 4,000 employees by 1979 as stated previously. In order that the facilities being rapidly expanded can be effectively managed by those employees it is essential that the Communication Bureau in Jakarta be furnished with planning, design, execution and maintenance divisions. Needless to say, a full study must be made with regard to the scope of work to be carried out by each division so as to ensure the smooth inter-divisional flow of works.

9.3.6 Comparison with Other Countries

(1) Investment Amount per Telephone Set (Refer to Table 9.3.6.(2).)

The investment amount per telephone set is larger than that in the developed countries. The reason is that almost all materials must be imported. Therefore, the domestic production of those materials must be promoted. Furthermore, not only by the introduction of new technology and the carrying out of optimum design and maintenance but also by the positive execution of demand management and traffic management the circuit utilization efficiency must be improved. Especially important is to carry out the demand management so that the rate of traffic increase will not exceed the similar rate in the developed countries.

(2) Telecommunication Investment to Revenue (Refer to Table 9.3.6.(3).)

Telecommunication investment amount to revenue is relatively small up to 1983. This is attributable to the fact that the service revenue per telephone set in Jakarta is at a high level.

(3) Telecommunication Revenue per Capita (Refer to Table 9.3.6.(4).)

Because of the low rate of telephone propagation in Jakarta telecommunication revenue per capita is extremely limited even if the service revenue per subscriber line is at a very high level.

(4) Telephone Revenue per Employee (Refer to Table 9.3.6.(5).)

The telephone service revenue per employee in Jakarta in 1979 stands at almost the same level as that in the U.K. at present. However, compared with the corresponding values in other developed countries, the value in Jakarta is at a much lower level. The reason is that the productivity per employee in Jakarta in 1979 (in Plan B: 30.2 telephones; in Plan C: 30.8 telephones) is by far lower than that in the developed countries.

(5) Telephone Revenue per Telephone Set (Refer to Table 9.3.6.(6).)

The telephone service revenue per telephone set maintains a very high level up to 1983, compared with that in the developed countries. However, in and after 1983 a sharp decrease is recorded.

(6) Telephone Revenue per Net Fixed Asset (Refer to Table 9.3.6.(7).)

The telephone service revenue per net fixed asset in Plan B maintains a relatively higher level than in the developed countries. The reason is the exceedingly high level of telephone service revenue per subscriber line. On the other hand, in Plan C the telephone service revenue per net fixed asset proves to be very small in 1979. This is due to a long-term, large-scale facilities establishment having been carried out by 1979.

(7) Expenditure per Employee (Refer to Table 9.3.6.(8).)

The telephone service expenditure per employee is extremely small, compared with that in the developed countries. It is conceivable, however, that in the future the telephone service expenditure per employee will increase in accordance with the growth of personnel expence.

(8) Expenditure per Telephone Set (Refer to Table 9.3.6.(9).)

In Plan C the expenditure per telephone set is very large. The reason is that, as previously pointed out, a long-term investment in telecommunication facilities is carried out to the extent of fully covering the future demand also, while the capacity of existing facilities remains limited, resulting in the very low facilities utilization efficiency. Another reason in the still low level of productivity per employee.

(9) Personnel Expense per Employee (Refer to Table 9.3.6.(10).)

Personnel expense per employee is increased in proportion to the real growth rate of the economy. A further 10% is used in consideration of the inflation. Nevertheless the personnel expense in Indonesia is at a low level. To improve the pay level of employees in the future the productivity of employees must first be increased to a level in the developed countries.

(10) % Structure Rate of Personnel Expense (Refer to Table 9.3.6.(11).)

In Plan B the % structure rate of personnel expense is nearly equal to that in the developed countries. However, in Plan C, the rate in 1979 is extremely low. This is due to the huge facilities investment up to 1979 plus the fact that personnel expence is estimated from the number of telephones put into service.

(11) % Distribution of Accumulated Depreciation to Fixed Assets

(Refer to Table 9.3.6.(12).)

Almost the same.

(12) Net Fixed Assets per Employee (Refer to Table 9.3.6.(13).)

In Plan C, net Fixed assets per employee are at a relatively high level. No great change is seen in the future also. The reason is that the employees and facilities increase at almost the same rate.

9.4 Appendix

TABLE 9-3-6-(1)

No	Item	Year 1979	1983	1988	1993	Remarks
①	Population 10³	7,155	8,600	10,700	13,850	
②	Number of employees "	(9.1) 9.3	(11.0) 12.9	(13.2) 18.3'	(16.4) 26.4	
③	Telephone set "	281	445	747	1,309	
④	New Telephone set "	42.5	42.0	74.7	162.0	
⑤	Investment amount Rp10⁶	(18,750) 21,225	(18,750) 23,205	(33,750) 46,224	(75,000) 112,620	
⑥	Total revenue "	48,313	80,273	113,180	148,954	
⑦	Total expenditure "	26,672 47,959	43,776 67,598	77,258 108,204	152,661 202,304	Include Depreciation Interest
⑧	Personnel expense "	7,740 7,910	13,059 15,315	23,802 32,999	45,139 72,663	Inflation 10% Salary increasing rate 7%
⑨	Depreciation "	5,431 11,695	8,999 16,265	14,223 21,746	24,669 32,873	
⑩	Net fixed asset	(85,732) 185,617	(129,740) 225,767	(209,170) 303,101	(379,254) 466,016	Plan D-1 Plan D-2
1	Investment amount per new telephone set	(441) 499	(446) 553	(452) 619	(463) 695	⑤/④
2	Telecommunication Investment to revenue	(38.8) 43.9	(23.4) 28.9	(25.3) 34.7	(50.4) 75.6	⑤/⑥x100
3	Growth of telecommunication revenue per capita	6.8	9.3	10.6	10.8	⑥/①
4	Total revenue per employee	(5,309) 5,195	(7,298) 6,223	(8,574) 6,185	(9,083) 5,642	⑥/②
5	Growth of telephone revenue per telephone set	171.9	180.4	151.5	113.8	⑥/③
6	Telephone revenue per net fixed asset	(0.56) 0.26	(0.62) 0.36	(0.54) 0.37	(0.39) 0.32	⑥/⑩
7	Expenditure per employee	(2,931) 5,157	(3,980) 5,240	(5,853) 5,913	(9,309) 7,663	⑦/②
8	Expenditur pere telephone set	(94.9) 170.7	(98.4) 151.9	(103.4) 144.9	(116.6) 154.6	⑦/③
9	Personnel expense per employee	(851) 851	(1,187) 1,187	(1,803) 1,803	(2,752) 2,752	⑧/②
10	%structure of personnel expense to total expenditure	(29.0) 16.5	(29.8) 22.7	(30.8) 30.5	(29.6) 35.9	⑧/⑦x100
11	%Distribution of depreciation to fixed asset	(19.1) 16.5	(28.3) 30.1	(34.6) 39.1	(35.5) 41.8	⑨/⑩+⑨x100
12	Net fixed assed per employee	(9,421) 19,959	(11,795) 17,501	(15,846) 16,563	(23,125) 17,652	⑩/②
13	Accumulate Depreciation	(20,288.2) 36,558.2	(51,280.2) 97,052.2	(110,600.2) 194,218.2	(209,016.2) 334,218.2	

x 10³ Rp
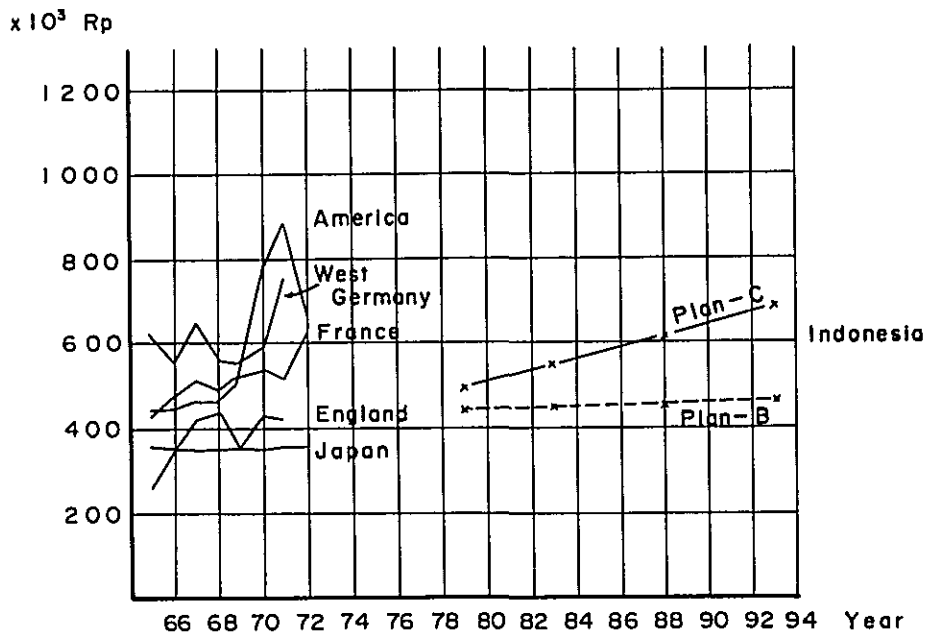
TABLE 9-3-6-(2)   INVESTMENT AMOUNT

PER NEW TELEPHONE SET ( ): Plan-C
down side: Plan-B

Unit. Thousand Rp

Country	Year													
	'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)											(441)	(446)	(452)	(463)
											499	553	619	695
Japan	365	357	345	357	350	345	365	348						
America	426	432	465	465	509	770	896	689						
England	267	352	416	436	353	421	409	–						
West Germany	615	558	640	552	531	595	740	–						
France	420	457	504	493	512	535	509	619						

(%)

Chart axis values (%): 80, 70, 60, 50, 40, 30, 20, 10

Labels: Japan, England, West Germany, France, America, Indonesia, Plan-C, Plan-B

X-axis (Year): 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 Year
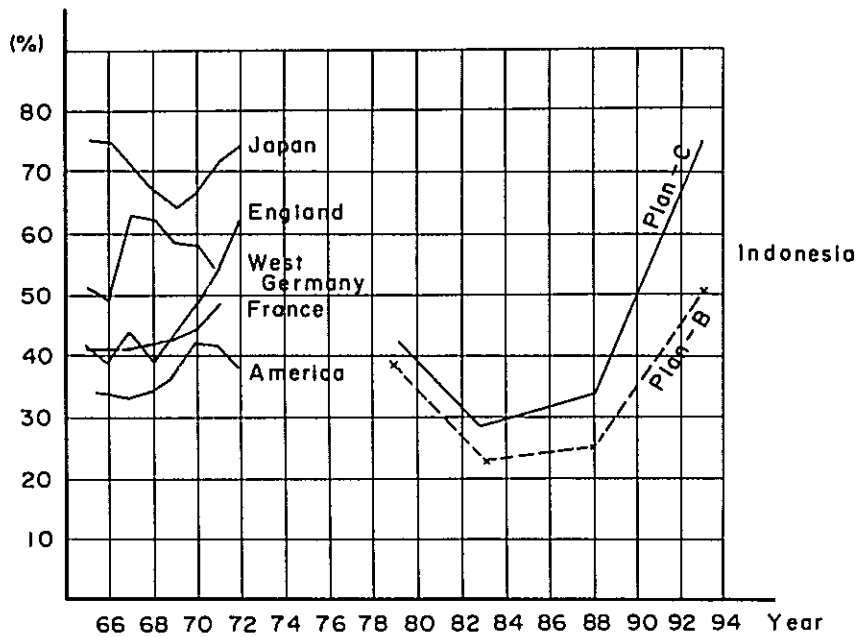
TABLE 9-3-6-(3) TELECOMMUNICATION INVESTMENT TO REVENUE

( ): Plan-C
down side: Plan-B

Country	Unit	Year													
		'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)	%											(38.8) 43.9	(23.4) 28.9	(25.3) 34.7	(50.4) 75.6
Japan	"	73.6	73.2	71.2	69.1	64.2	66.3	72.8	74.6						
America	"	35.4	34.5	33.1	33.6	36.5	42.2	41.0	39.7						
England	"	50.0	54.9	63.7	63.4	58.4	57.1	55.9	61.8						
West Germany	"	41.2	38.7	44.1	39.8	43.9	49.8	55.1							
France	"	40.5	41.1	40.5	41.3	43.5	42.0	43.4	49.2						

x10³Rp

60

50

40

America
West
Germany

30

Japan

20

England

France   Plan-B = Plan-C   Indonesia

10

66 68 70 72 74 76 78 80 82 84 86 88 90 92 94   Year
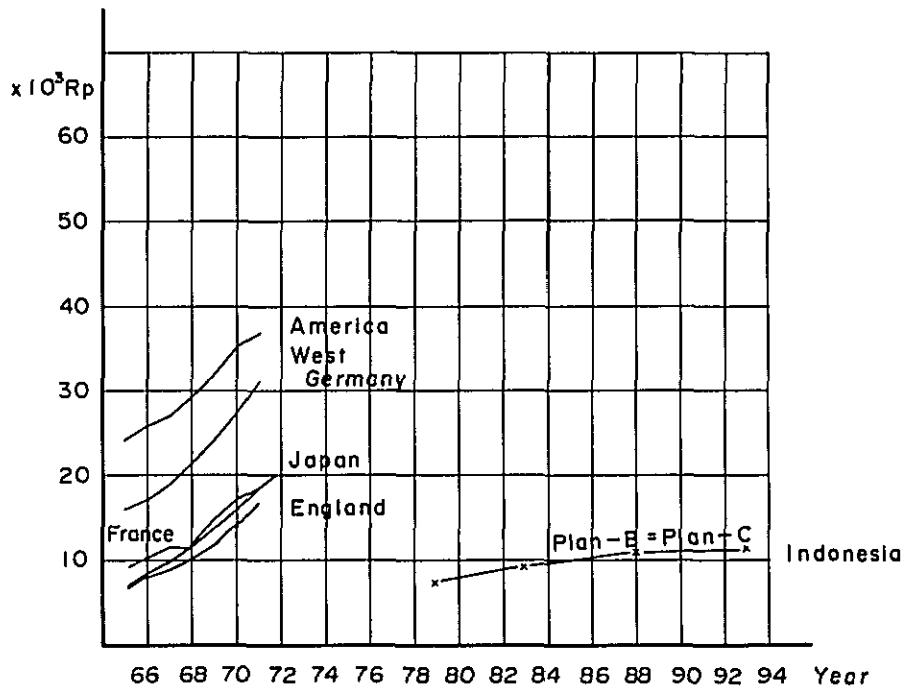
TABLE 9-3-6-(4)   GROWTH OF TELE-
COMMUNICATION REVENUE PER CAPITA

Country	Unit	Year													
		'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)	Rp											6.8	9.3	10.6	10.8
Japan	Rp	7	9	10	12	14	16	18	20						
America	,,	24	26	27	29	32	35	37							
England	,,	7	8	9	10	12	14	16							
West Germany	,,	16	18	19	21	24	27	31							
France	,,	9	10	11	12	14	17	18							

Rp : thousand

x 10³ Rp

14000
12000
10000
8000
6000
4000
2000

West Germany
America
France
Japan
England

Plan—B — Indonesia

Plan—C — Indonesia

66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 Year
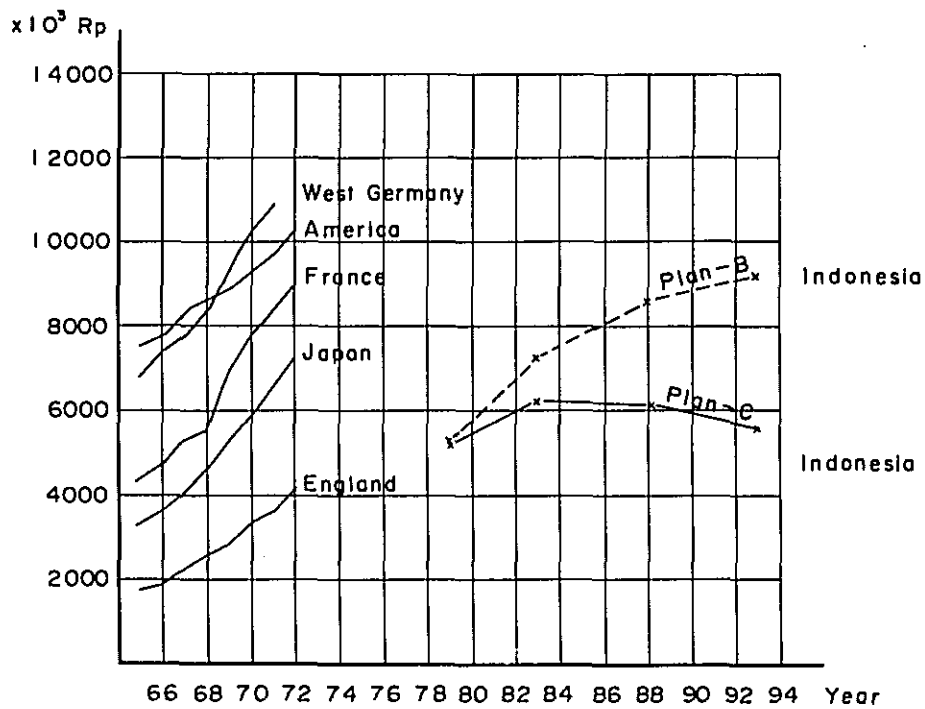
TABLE 9-3-6-(5)

TELEPHONE REVENUE PER EMPLOYEE

( ): Plan—C
down side: Plan—B

Country	Unit	Year													
		'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)												(5,309)	(7,298)	(8,574)	(9,083)
												5,195	6,223	6,185	5,642
Japan	Rp	3,084	3,524	4,005	4,476	5,157	5,810	6,426	7,272						
America	"	7,250	7,159	8,246	8,637	8,861	9,125	9,877	11,190						
England	"	1,859	1,968	2,131	2,443	2,773	3,242	3,669	4,052						
West Germany	"	6,600	7,287	7,720	8,517	9,333	10,158	10,934							
France	"	4,149	4,623	5,205	5,526	6,837	7,938	8,224	9,003						

x 10³ PR
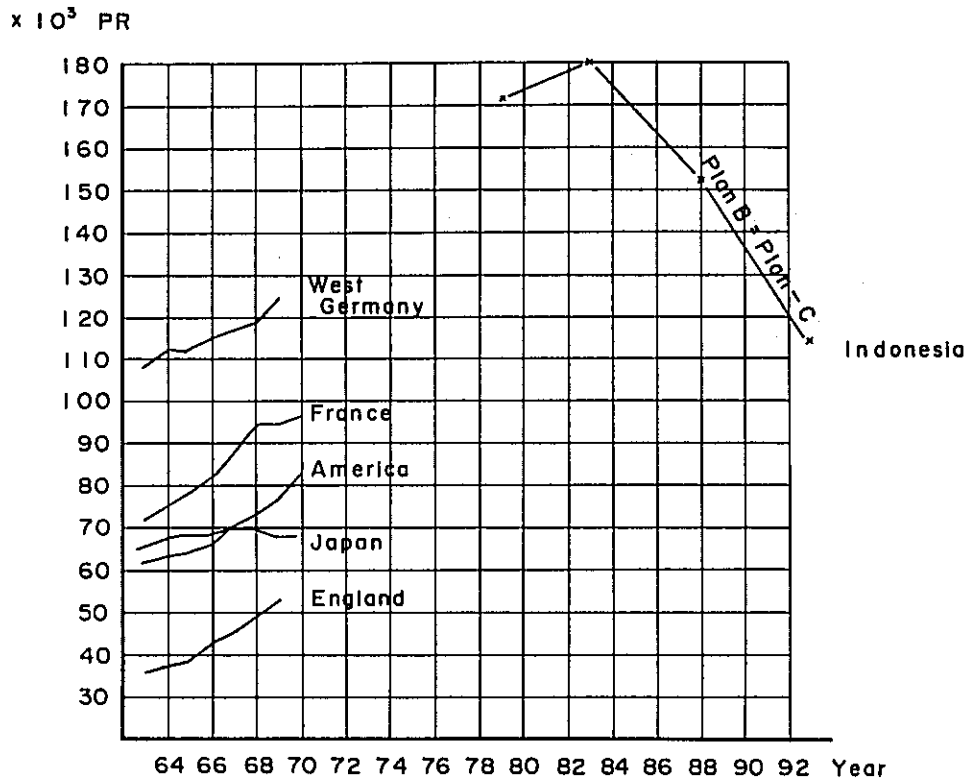
TABLE 9-3-6-(6)

TELEPHONE REVENUE PER TELEPHONE SET

Country	Unit	Year										'79	'83	'88	'93
		'65	'66	'67	'68	'69	'70	'71	'72	'73	'74				
Indonesia (Jakarta)	Rp x10³											172	180	152	114
Japan	Rp x10³	65	67	68	68	70	70	69	69						
America	"	61	63	64	67	70	73	77	83						
England	"	37	38	39	43	46	50	53							
West Germany	"	107	111	111	115	117	119	124							
France	"	70	74	79	80	89	96	95	97						

Rate

(1.1)

0.6
(1.0)

0.5
(0.9)   France
          West
          Germany
0.4   America
(0.8)
          Japan
          England
0.3
(0.7)

Indonesia

Scale : ( ).

Plan-B

Plan-C

Indonesia

0.2
(0.6)

Indonesia

0.1
(0.3)

66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 Year
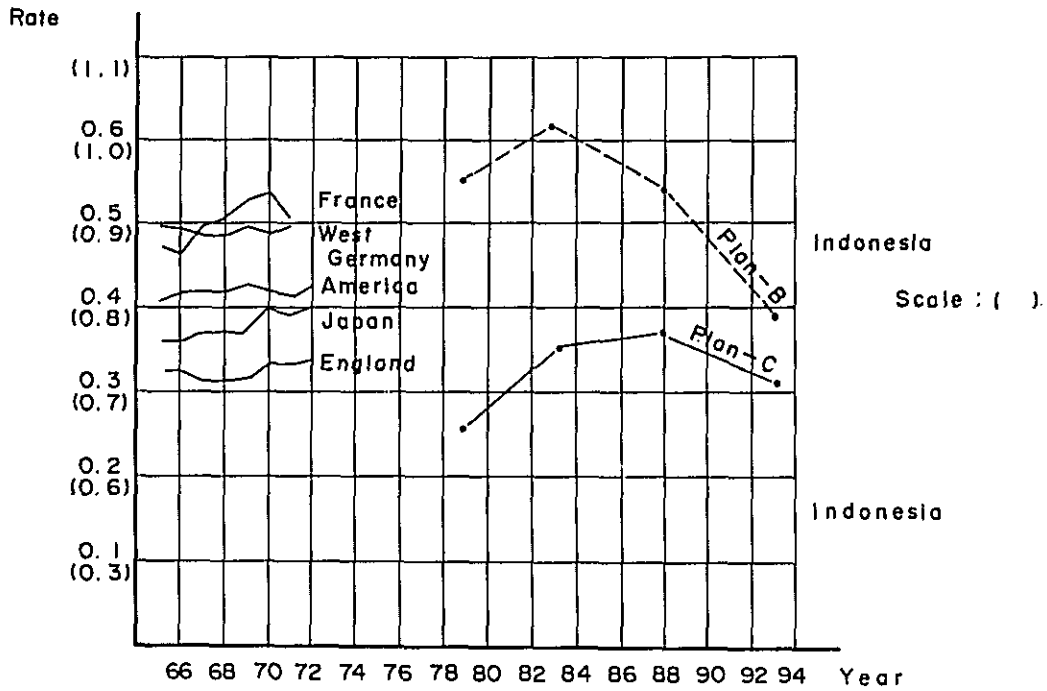
TABLE 9-3-6-(7)   TELEPHONE

REVENUE PER NET FIXED ASSET

( ) : Plan -C
down side: Plan - B

Country	Unit	Year													
		'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)	rate											(0.56)	(0.62)	(0.54)	(0.39)
												0.26	0.36	0.37	0.38
Japan	"	0.36	0.36	0.37	0.37	0.39	0.40	0.39	0.40						
America	"	0.41	0.42	0.42	0.42	0.43	0.42	0.41	0.42						
England	"	0.33	0.32	0.31	0.31	0.31	0.32	0.32	0.32						
West	"	0.56	0.50	0.49	0.49	0.50	0.49	0.48							
France	"	0.48	0.47	0.50	0.50	0.52	0.53	0.50							

Turnover rate
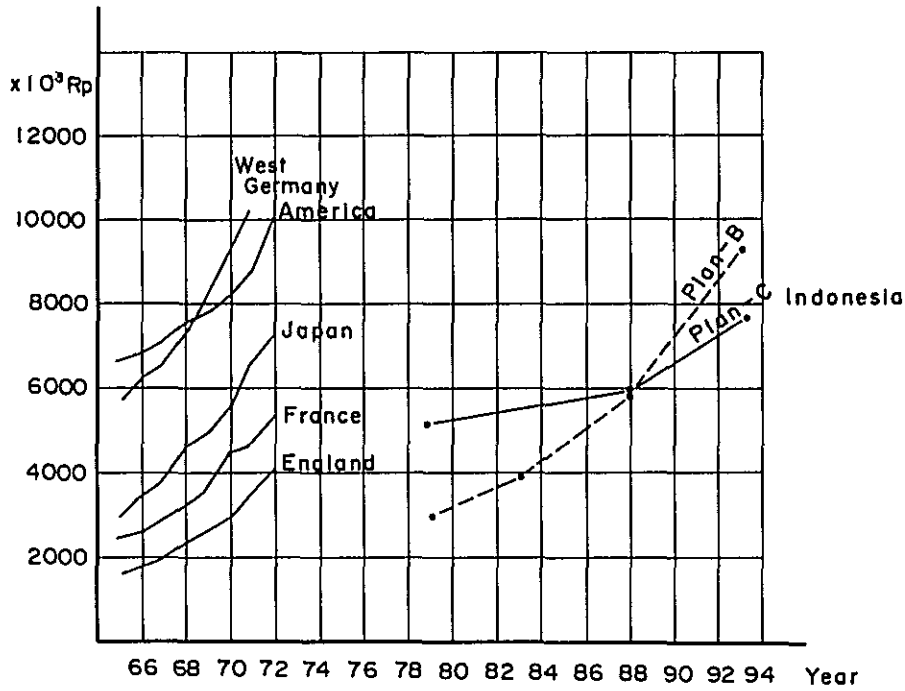
TABLE 9-3-6-(8)

EXPENDITURE PER EMPLOYEE

( ) : Plan-C
down side : Plan-B

Country	Unit	Year													
		'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)	Rp x10³											(2931) 5,157	(3980) 5240	(5853) 5913	(9309) 7,663
Japan	Rp x10³	2,835	3,363	3,861	4,439	4,995	5,679	6,417	7,179						
America	''	6,440	6,636	7,082	7,536	7,807	8,146	8,146	10,065						
England	''	1,687	1,800	1,976	2,228	2,514	2,850	3,429	4,093						
West Germany	''	5,587	6,067	6,490	7,407	8,259	9,168	10,747							
France	''	2,406	2,616	2,845	3,125	3,689	4,476	4,660	5,284						
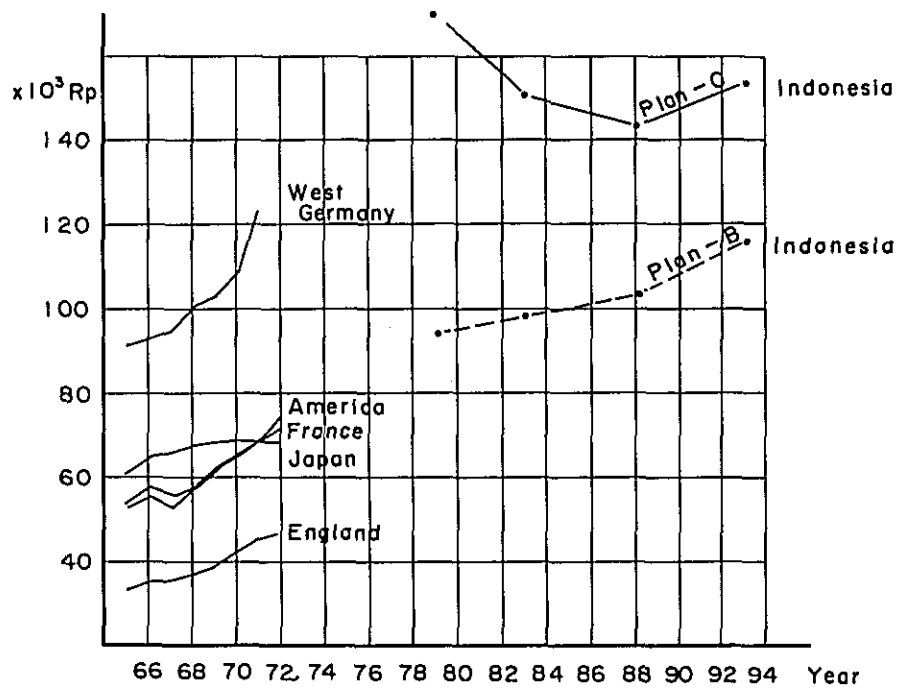
TABLE 9-3-6-(9)

EXPENDITURE PER TELEPHONE SET

( ) : Plan - C
down side : Plan - B

Country	Unit	Year													
		'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)	Rp x10³											(94.9)	(98.4)	(103.4)	(116.6)
												170.7	151.9	144.9	154.6
Japan	Rp x10³	60	64	65	67	68	69	69	68						
America	"	52	59	56	58	62	65	69	74						
England	"	33	35	36	39	41	45	48							
West Germany	"	91	92	94	100	104	108	123							
France	"	52	57	56	58	61	68	69	73						

x10³ Rp

America

West Germany

France

Japan

England

Plan B Plan C Indonesia

5000
4000
3000
2000
1000

66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 Year
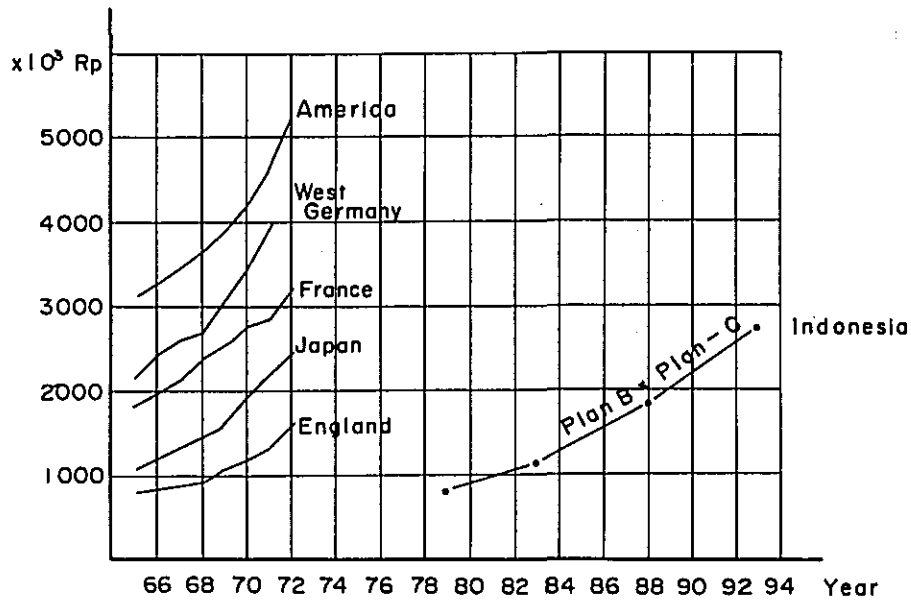
TABLE 9-3-6-(10)

PERSONNEL EXPENSE PER EMPLOYEE

Country	Unit	Year												
		'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)	Rp x10³											851	1,187	1,803	2,752
Japan	Rp x10³	1,098	1,202	1,334	1,475	1,688	1,985	2,274	2,582						
America	"	3,155	3,231	3,424	3,583	3,808	4,138	4,602	5,313						
England	"	809	848	909	985	1,055	1,124	1,341	1,561						
West Germany	"	2,250	2,400	2,534	2,641	3,092	3,473	3,937							
France	"	1,870	1,972	2,088	2,335	2,508	2,793	2,854	3,207						

(%)

70
60
50
40
30
20
10
0

66 68 70 72 74 76 78 80 82 84 86 88 90 92   Year

France
America
England
West Germany
Japan
Plan-B
Plan-C
Indonesia
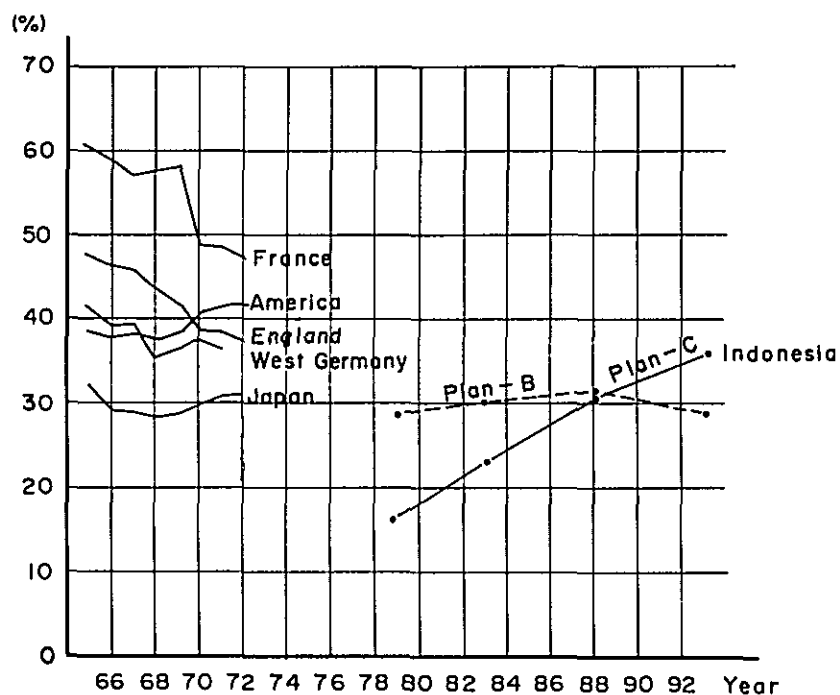
TABLE 9-3-6-(11)   % STRUCTURE OF

PERSONNEL EXPENSE TO TOTAL EXPENDITURE

( ) : Plan -C
down side : Plan - B

Country	Year													
	'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)											(29.0)	(29.8)	(30.8)	(29.6)
											16.5	22.7	30.5	35.9
Japan	33.2	30.8	29.7	28.5	29.1	30.0	30.4	30.4						
America	39.0	38.8	38.7	37.5	38.7	40.5	41.2	41.8						
England	48.2	47.1	46.0	44.2	42.0	39.4	39.1	38.1						
West Germany	40.3	39.6	39.0	35.6	37.4	37.9	36.5							
France	61.0	59.2	57.6	58.7	53.4	49.5	48.1	47.3						

- 1288 -

%

50

40   France
      Japan

30

      England
20   America   Indnesia

10

0
    66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 Year
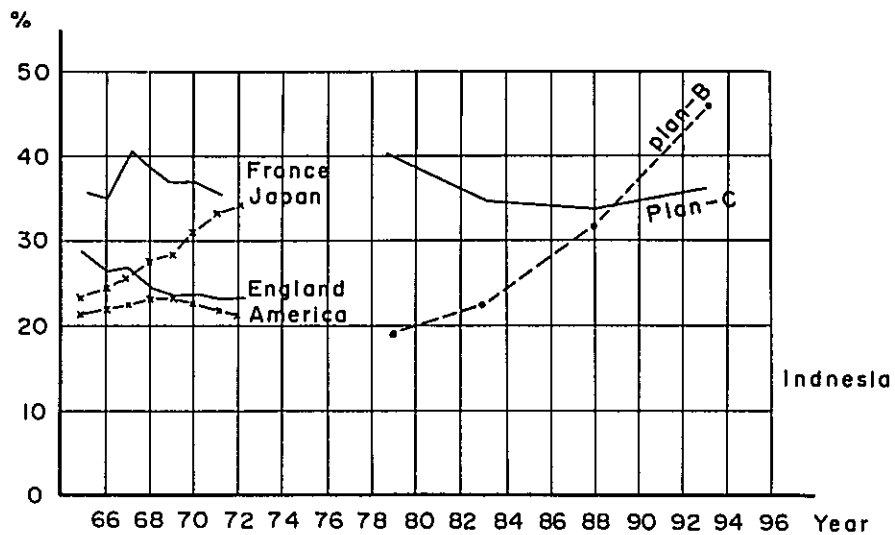
TABLE 9-3-6-(12)   %DISTRIBUTION OF ACCUMULATED

DEPRECIATION TO FIXED ASSETS

Country	Unit	Year													
		'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)	%											(19.1) 16.5	(28.3) 30.1	(34.6) 39.1	(35.5) 41.8
Japan	"	23.4	24.5	25.9	27.9	28.8	31.8	33.0	33.8						
America	"	21.4	21.7	22.1	22.7	22.8	22.4	22.1	21.6						
England	"	29.0	27.5	26.4	24.9	23.8	23.8	23.3	22.9						
West Germany	"														
France	"	36.4	35.4	40.1	39.4	37.9	37.4	36.6							

( )：Plan－C

down side：Plan－B

Million Rp

30

25

20

15

10

5

America

West Germany

Japan
France

England

Plan-B

Plan-C

Indonesia

66 68 70 72 74 76 78 80 82 84 86 88 90 92 94   Year
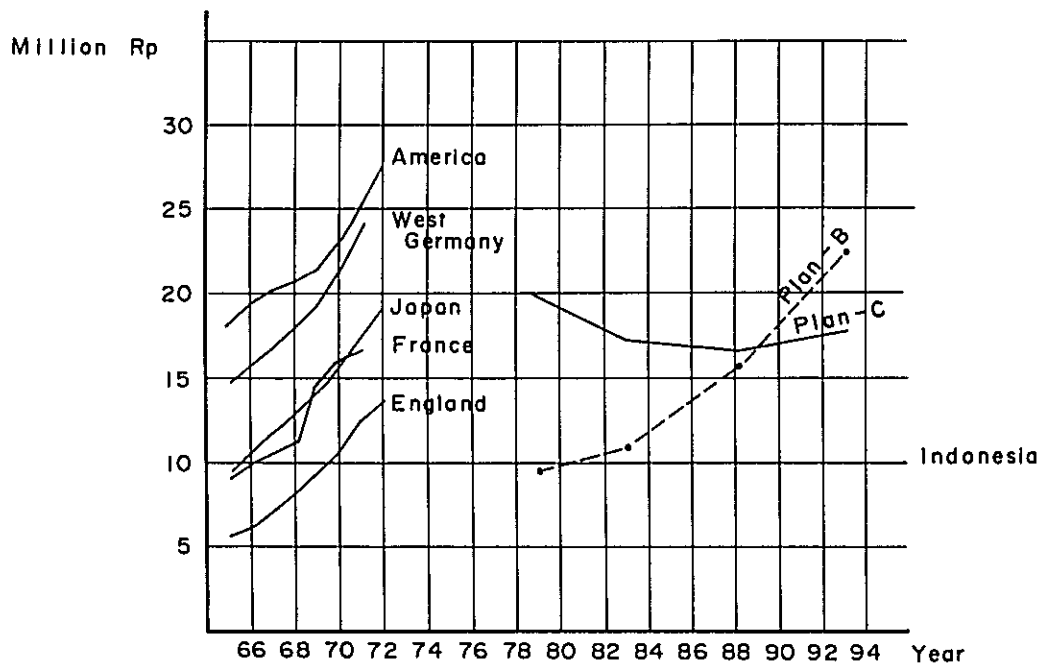
TABLE 9-3-6-(13)   NET FIXED ASSETS PER EMPLOYEE

unit : Million   Rp

Country	Year													
	'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'79	'83	'88	'93
Indonesia (Jakarta)											9.4	11.8	15.8	23.1
											20.0	17.5	16.6	17.7
Japan	9.3	10.4	11.6	12.8	13.9	15.5	17.5	19.9						
America	18.9	19.2	20.5	21.3	21.5	22.9	25.3	28.1						
England	6.0	6.6	7.4	8.3	9.6	10.7	12.3	13.7						
West Germany	14.0	15.4	16.7	18.2	19.8	22.1	24.6							
France	9.3	10.4	10.5	11.8	14.1	16.0	17.6							

( ) : Plan - C

down side: Plan - B

TABLE 9-4-(1) DISTRIBUTION OF INTERLOCAL ORIGINATING CALL FROM JAKARTA BY TIME

(25/3 ～ 31/3 '74)

Time / day	Total	0~4	4~5	5~6	6~7	7~8	8~9	9~10	10~11	11~12	12~13	13~14	14~15	15~16	16~17	17~18	18~19	19~20	20~21	21~22	22~23	23~24	Concentrative rate	Composition rate
Monday	505 / 1805 / (2310)	8 / 3 / (11)	10 / 3 / (13)	22 / 15 / (37)	11 / 23 / (34)	36 / 120 / (156)	34 / 177 / (211)	37 / 204 / (241)	39 / 202 / (241)	27 / 159 / (186)	18 / 141 / (159)	16 / 121 / (137)	18 / 118 / (136)	28 / 73 / (101)	25 / 69 / (94)	32 / 74 / (106)	31 / 62 / (93)	53 / 90 / (143)	27 / 54 / (81)	14 / 41 / (55)	14 / 34 / (48)	5 / 22 / (27)	0.104	22% / 78 / (100)
Tuesday	576 / 1848 / (2424)*	10 / 8 / (18)	22 / 14 / (36)	11 / 10 / (21)	38 / 40 / (78)	48 / 131 / (179)	21 / 234 / (255)*	27 / 180 / (207)	26 / 180 / (206)	36 / 124 / (160)	22 / 139 / (161)	29 / 117 / (146)	33 / 104 / (137)	37 / 93 / (130)	20 / 90 / (110)	32 / 71 / (103)	20 / 77 / (97)	44 / 107 / (151)	26 / 75 / (101)	37 / 25 / (62)	24 / 16 / (40)	13 / 13 / (26)	0.105	24%* / 76 / (100)
Wednesday	578 / 1714 / (2292)	20 / 4 / (24)	6 / 5 / (11)	28 / 32 / (60)	19 / 56 / (75)	22 / 137 / (159)	30 / 229 / (259)	45 / 201 / (246)	44 / 161 / (205)	22 / 135 / (157)	27 / 107 / (134)	30 / 49 / (79)	23 / 85 / (108)	17 / 83 / (100)	33 / 67 / (100)	24 / 67 / (91)	33 / 71 / (104)	61 / 79 / (140)	45 / 52 / (97)	25 / 47 / (72)	11 / 32 / (43)	13 / 15 / (28)	0.113	25% / 75 / (100)
Thursday	612 / 1763 / (2375)	1 / 1 / (2)	16 / 4 / (20)	40 / 26 / (66)	30 / 51 / (81)	23 / 142 / (165)	43 / 237 / (280)	76 / 213 / (289)	26 / 158 / (184)	22 / 136 / (158)	37 / 85 / (122)	34 / 102 / (136)	37 / 85 / (122)	22 / 89 / (111)	25 / 76 / (101)	26 / 62 / (88)	23 / 86 / (109)	39 / 85 / (124)	40 / 40 / (82)	30 / 41 / (71)	18 / 25 / (43)	4 / 17 / (21)	0.122	26% / 74 / (100)
Friday	483 / 1617 / (2102)	22 / 19 / (41)	5 / 1 / (6)	36 / 19 / (55)	25 / 40 / (65)	29 / 124 / (153)	31 / 261 / (292)	28 / 193 / (221)	19 / 166 / (185)	26 / 111 / (137)	29 / 78 / (107)	31 / 97 / (128)	20 / 75 / (95)	20 / 64 / (84)	24 / 64 / (88)	25 / 55 / (80)	25 / 64 / (89)	36 / 54 / (90)	25 / 59 / (84)	17 / 33 / (50)	7 / 24 / (31)	5 / 16 / (21)	0.139	23% / 77 / (100)
Saturday	514 / 1396 / (1910)	11 / 14 / (25)	14 / 2 / (16)	30 / 16 / (46)	27 / 36 / (63)	37 / 110 / (147)	31 / 251 / (282)*	29 / 206 / (235)	33 / 131 / (164)	21 / 82 / (103)	33 / 81 / (114)	29 / 76 / (105)	25 / 64 / (89)	19 / 48 / (67)	28 / 54 / (82)	20 / 48 / (68)	24 / 37 / (61)	31 / 6 / (37)	28 / 49 / (77)	14 / 30 / (44)	25 / 47 / (72)	5 / 8 / (13)	0.148	27% / 73%* / (100)
Sunday	399 / 676 / (1075)	6 / 2 / (8)	5 / 3 / (8)	19 / 3 / (22)	32 / 32 / (64)	20 / 47 / (67)	32 / 58 / (90)	29 / 64 / (93)	26 / 44 / (70)	19 / 30 / (49)	17 / 48 / (65)	15 / 23 / (38)	10 / 21 / (31)	17 / 20 / (37)	10 / 22 / (32)	19 / 44 / (63)	28 / 46 / (74)	35 / 63 / (98)	24 / 54 / (78)	12 / 30 / (42)	20 / 11 / (31)	4 / 11 / (15)	0.087	37% / 63 / (100)
Total	3669 / 10819 / (14488)	78 / 51 / (129)	78 / 32 / (110)	186 / 121 / (307)	182 / 278 / (460)	215 / 811 / (1026)	222 / 1447 / (1669)	271 / 1261 / (1532)	213 / 1042 / (1255)	173 / 777 / (950)	183 / 679 / (862)	184 / 585 / (769)	166 / 552 / (718)	160 / 470 / (630)	165 / 442 / (607)	178 / 421 / (599)	184 / 443 / (627)	299 / 484 / (783)	215 / 385 / (600)	149 / 247 / (396)	119 / 189 / (308)	49 / 102 / (151)	0.115	25% / 75 / (100)
Concentrative rate	1.000	0.009	0.008	0.021	0.032	0.071	0.115	0.106	0.087	0.066	0.059	0.053	0.050	0.043	0.042	0.041	0.044	0.054	0.041	0.027	0.021	0.010		

213 ----Ordinary
1042 ----Urgent
(1255)----Total

Source: Interlocal office

* busy hour or busy day of traffic

— 1291 —
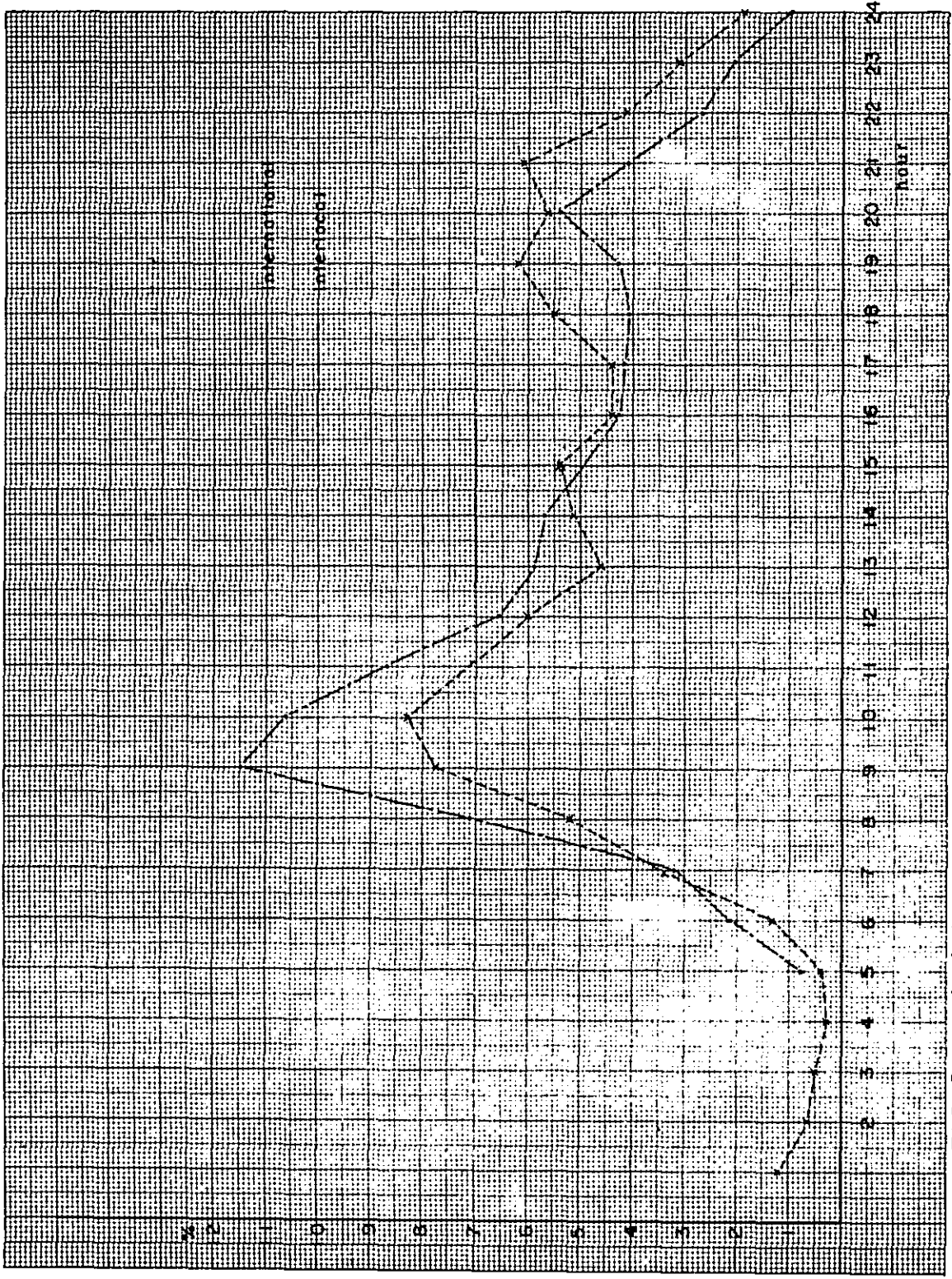
FIG. 9 - 4 - (2) % DISTRIBUTION OF WEEK DAY CALL BY TIME

TABLE 9-4-(3) SLDD CONVERSATION TIME

( ) : Conversation time

Item	Destination		1	2	3	4	5	6	7	8	9	10	Total	Remarks
						Number of investigation times in 1973								
①	Bandung	Number of pulse	(32,499) 10,833	(31,896) 10,632	(30,318) 10,106	(33,660) 11,220	(32,334) 10,778	(33,900) 11,300	(36,159) 12,053	(33,264) 11,088	(37,041) 12,347	(31,272) 10,424	(332,343) 110,781	1 pulse = 3 sec.
②	Cirebon		(4,773) 1,591	(4,656) 1,552	(4,482) 1,494	(4,851) 1,617	(4,914) 1,638	(5,127) 1,709	(5,541) 1,847	(5,418) 1,806	(5,554) 1,853	(4,806) 1,602	(50,127) 16,709	3 sec.
③	Semarang		(14,684) 7,342	(14,588) 7,294	(14,612) 7,306	(15,910) 7,955	(16,198) 8,099	(14,862) 7,431	(16,488) 8,244	(16,044) 8,022	(16,542) 8,271	(14,754) 7,377	(154,682) 77,341	2 sec.
④	Dempasar		(2,870) 1,435	(2,864) 1,432	(2,600) 1,300	(3,064) 1,532	(2,902) 1,451	(2,774) 1,387	(3,242) 1,621	(3,062) 1,531	(3,010) 1,505	(2,664) 1,332	(29,052) 14,526	2 sec. (566,204) 219,357
⑤	Bandung	Number of calls	159	151	163	165	233	194	169	156	165	152	1,707	
⑥	Cirebon		22	21	21	20	22	23	24	24	23	22	222	
⑦	Semarang		61	58	58	41	62	61	67	63	56	58	585	
⑧	Dempasar		10	8	8	10	11	10	15	12	11	10	105	Total 2,619
⑨	Bandung	Conversation time per call	sec. 204.4	211.2	186.0	204.0	138.8	174.7	214.0	213.2	224.5	205.7	194.7	sec. 202
⑩	Cirebon		sec. 217.0	221.7	213.4	242.6	223.4	222.9	230.9	225.8	241.7	218.5	225.8	conversation time
⑪	Semarang		sec. 240.7	251.5	251.9	388.0	261.3	243.6	246.1	254.7	295.4	254.4	264.4	
⑫	Dempasar		sec. 287.0	358.0	325.0	306.4	263.8	277.4	216.1	255.2	273.6	266.4	276.7	

FIG. 9-4-(4) TRAFFIC DISTRIBUTION
FOR TARIFF ZONE

TABLE 9-4-(5) % DISTRIBUTION OF TELEPHONE TRAFFIC TO EACH TARIFF ZONE AND TELEPHONE CHARGE PER CALL

	Zone	Number of call each month 1974,1975 (x10³)							Total call	Mean call	Composition rate	X_i	Year $X_i \times (\alpha_i)$				Remarks
		7	8	9	10	11	12	1					1979	1983	1988	1993	
S.L.D.D	O										(0)	89	(0.16) 14.2	(0.29) 25.8	(0.46) 40.9	(0.62) 55.2	( ):Composition rate $=\alpha_i$
	I										(0)	717	(0.06) 43.0	(0.12) 86.0	(0.18) 129.1	(0.24) 172.1	Conversation time:215 sec (215/6)x20 Rp=717 Rp
	II	193	180	188	174	162	182	167	1246	178	(0.72)	860	(0.56) 481.6	(0.42) 361.2	(0.20) 223.6	(0.10) 86.0	(215/5)x20= 860
	III										(0)	1,075	(0.002) 2.2	(0.004) 4.3	(0.006) 6.5	(0.009) 9.7	(215/4)x20=1075
	IV	67	63	56	58	48	52	52	396	57	(0.23)	1,433	(0.18) 257.9	(0.14) 200.6	(0.08) 114.6	(0.03) 43.0	(215/3)x20=1433
	V	15	12	11	10	10	11	12	81	12	(0.05)	2,150	(0.038) 81.7	(0.026) 55.9	(0.014) 30.1	(0.001) 2.2	(215/2)x20=2,150
	Total	275	255	255	242	220	245	231	1723	247	(1.00)		(1.00) 880.6	(1.00) 733.8	(1.00) 544.8	(1.00) 368.2	
Interlocal	O	1.2	1.3	1.4	1.1	1.1	1.1	0.6	7.8	1.13	(0.02)	89	(0.18) 16.0	(0.30) 26.7	(0.46) 40.9	(0.62) 55.2	Conversation time:205 sec Xi see Table 9-4-(6)
	I	8.2	8.5	8.6	10.3	7.9	8.2	7.4	59.1	8.44	(0.16)	785	(0.18) 141.3	(0.20) 157.0	(0.21) 164.9	(0.24) 88.4	
	II	6.9	8.6	10.5	6.9	7.9	8.6	7.7	57.1	8.16	(0.16)	942	(0.14) 131.9	(0.13) 122.5	(0.12) 113.0	(0.10) 94.2	
	III	1.9	2.1	2.2	2.0	2.2	2.2	2.1	14.7	2.10	(0.04)	1,178	(0.04) 47.1	(0.03) 35.3	(0.02) 23.6	(0.009) 10.6	
	IV	23.0	22.9	27.0	21.7	23.6	24.2	22.9	165.3	23.61	(0.46)	1,570	(0.35) 549.5	(0.26) 408.2	(0.15) 235.5	(0.03) 47.1	
	V	8.5	8.4	9.3	7.5	8.5	8.8	7.0	58.0	8.29	(0.16)	2,355	(0.11) 259.1	(0.08) 188.4	(0.04) 94.2	(0.001) 2.4	
	Total	49.7	51.8	59.0	59.5	51.2	53.1	47.7	362.05	51.71	(1.00)		(1.00) 1,144.9	(1.00) 938.1	(1.00) 672.1	(1.00) 397.9	

% distribution of call to conversation time

3min.

$N = e^{-\frac{t}{h}}$

h : Conversation time

h = 205 sec.

(42%)
(31%)
(23%)
(17%)
(13%)(10%)(7%)(3%)(4%)
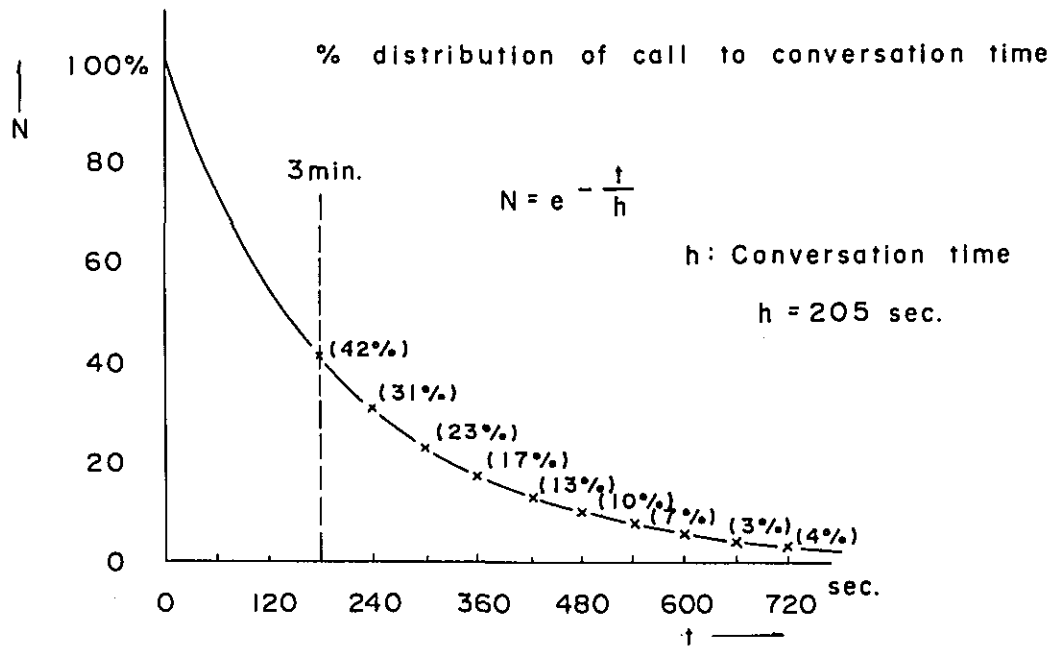
TABLE 9-4-(6)　INTERLOCAL TELEPHONE CHARGE PER CALL EACH TARIFF　ZONE

Zone	Tariff		0:24% U:76% Tariff/min.	Composition rate							Charge (Rp)
	O	U		0~3min 58%	4 11%	5 8%	6 6%	7 4%	8 3%	10 10%	
O (0~50K)	–	–	20	(60 Rp) 34.8	(80) 8.8	(100) 8	(120) 7.2	(140) 5.6	(160) 4.8	(200) 20	89.2
I (51~100)	100 Rp	200 Rp	176	(528 Rp) 306.2	(704) 77.4	(880) 70.4	(1,056) 63.4	(1,232) 49.3	(1,408) 42.2	(1,760) 176	784.9
II 101~200	120	240	211.2	(633.6 Rp) 367.5	(844.8) 92.9	(1,056) 84.5	(1,267.2) 76.0	(1,478.4) 59.1	(1,689.6) 50.7	(2,112) 211.2	941.9
III 201~300	150	300	264	(792 Rp) 459.4	(1,056) 116.2	(1,320) 105.6	(1,584) 95.0	(1,848) 73.9	(2,112) 63.4	(2,640) 264.0	1,177.5
IV 301~1000	200	400	352	(1,056 Rp) 612.5	(1,408) 154.9	(1,760) 140.8	(2,112) 126.7	(2,464) 98.6	(2,816) 84.5	(3,520) 352	1,570
V (more than 1001)	300	600	528	(1,584 Rp) 918.7	(2,112) 232.3	(2,640) 211.2	(3,168) 190.1	(3,696) 147.8	(4,224) 126.7	(5,280) 528	2,354.8

O : ordinary　　　( ) charge

U : urgent
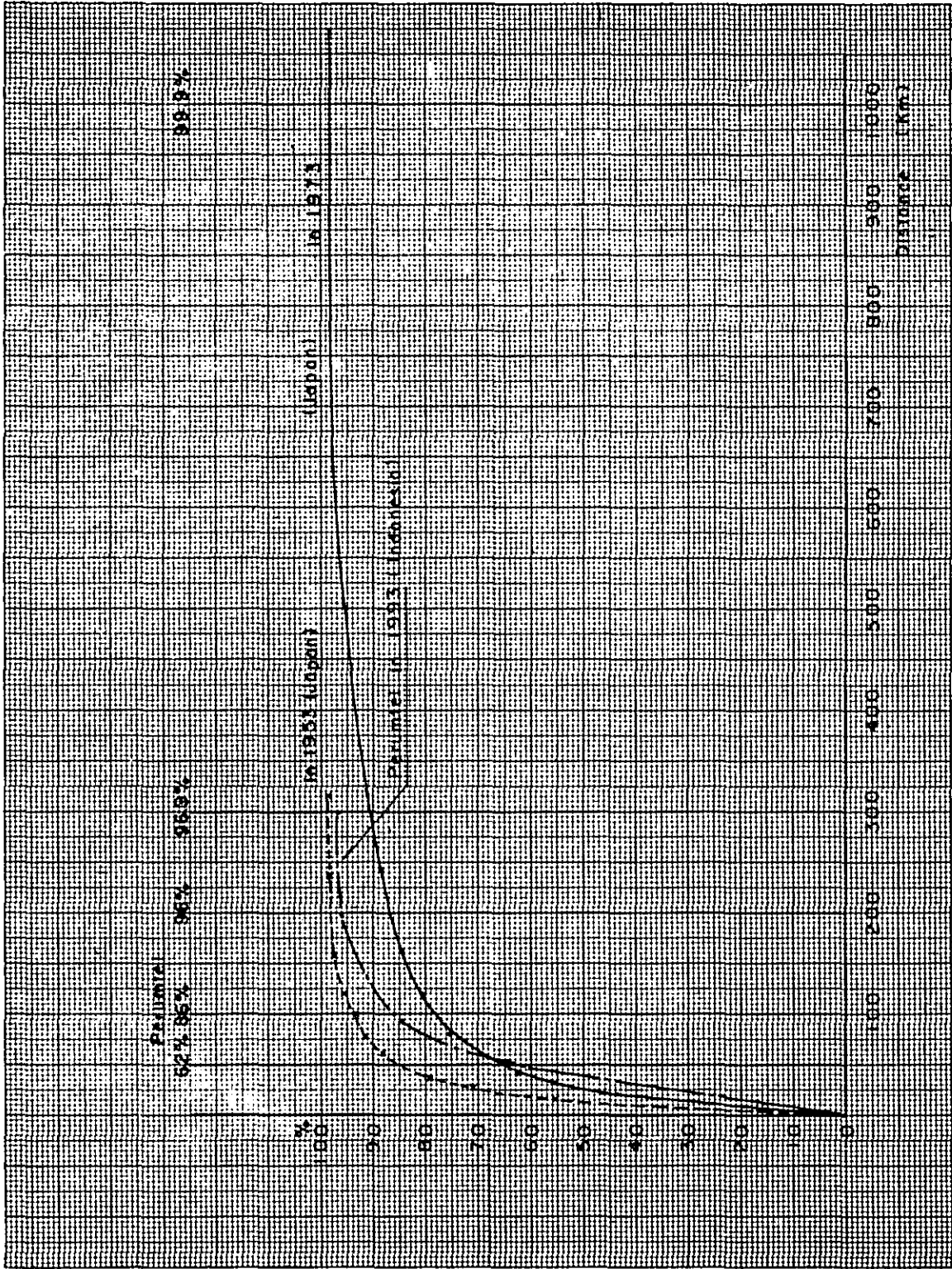
FIG. 9-4-(7) % DISTRIBUTION OF CALL BY DISTANCE

Traffic

C₁ A C₂

Busy hour

Time
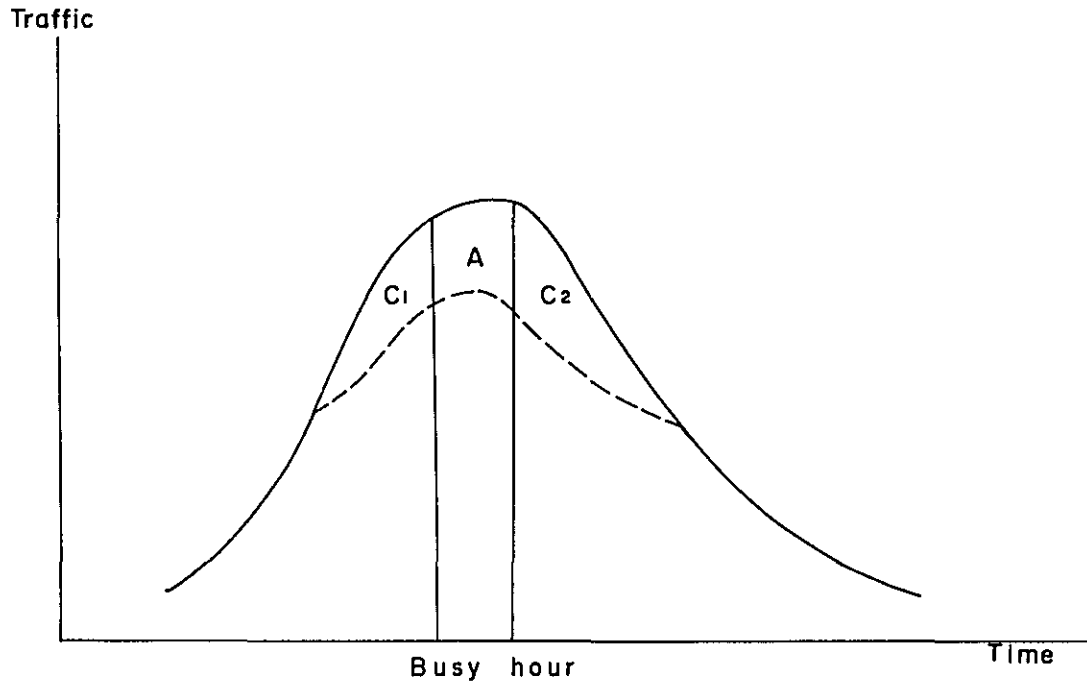
FIG 9-4-(8) EFFECTIVE TRAFFIC TO ALL DAY TRAFFIC

Item	
All day traffic	T
Uneffective traffic in busy hour	A
Effective traffic in busy hour	B
Uneffective traffic	C_1, C_2
Uneffective traffic rate (according to the JTP Survey) $\left(\dfrac{A}{A+B}\right)$	0.183
Concentration ratio of uneffective traffic in busy hour to uneffective traffic in all day $\left(\dfrac{A}{A+C_1+C_2}\right)$	0.6
Effective traffic rate to all day traffic $\left(1-\dfrac{A+C_1+C_2}{T}\right)$	0.97

(※ Concentration ratio : 0.11)

TABLE 9-4-(9) EFFECTIVE REVENUE RATE

(in 1973)

No	Item	Unit	Local	SLDD	Inter-local	Inter national
①	Telephone revenue	Rp x10⁶	1,176	2,084	643	2,077
②	Effective working subscriber in 1973	x10³	37.9	37.9	37.9	37.9
③	Calling rate	erl	0.0522	0.00156	0.0004	0.000299
④	$\frac{1}{\text{Concentrative rate}}$ (11%)		9.09	9.09	9.09	9.09
⑤	Effective traffic rate to all day		0.97	0.97	0.97	0.97
⑥	$\frac{3600}{\text{Holding time}}$		27.69	17.82	18.75	7.14
⑦	Effective call (③x④x⑤x⑥)		12.74	0.245	0.066	0.014
⑧	Telephone charge per call	Rp	10	784	974	9336
⑨	One year total revenue (②x⑦x⑧ x 325)	Rp x10⁶	1,569	2,366	792	2,185
⑩	Revenue rate (①/⑨)	%	75	88	81	95
	Conversation time	sec.	130	202	162	474
	Holding time	"	— 130	— 202	(30) 192	(30) 504

TABLE 9-4-(10) CONVERSATION TIME PER CALL AND SLDD PULSE

No.	Item	Unit	1969	1970	1971	1972	1973	1974	Remarks
①	Manual Conversation time	minute x10³	1,208	1,356	1,772	1,826	1,781	2,660	
②	Number of calls	x10³	369	420	497	522	660	778	
③	Conversation time per call (①/②)	Sec.	196	194	214	210	162	205	
④	International Conversation	minute x10³	180	957	1,100	1,235	1,757	1,996	
⑤	Number of call	x10³	42.3	127.0	170.2	185.8	222.5	276.3	
⑥	Conversation time per call (④/⑤)	Sec	255	452	388	399	474	433	
⑦	SLDD number of calls	x10³	754	880	1,095	1,598	2,660	3,122	
⑧	Number of pulses	"	23,651	52,300	76,061	123,125	208,392	*11,190 260,852	* Conversation time
⑨	Conversation time per call	Sec					**202	215	** See: Table 9-4-(3)
⑩	Local pulse	x10³	162,781	75,238	90,154	104,870	117,625	137,819	

TABLE 9-4-(11) TELEPHONE CHARGE PER CALL

No	Item	Unit	Year 1969	1970	1971	1972	1973	1974	Remarks
①	Interlocal Revenue	$\times 10^3$	322,320	373,176	490,125	500,659	643,258	854,034	
②	Number of calls	$\times 10^3$	369	420	497	522	660	778	Effective call + Cancelation call with charge
③	Charge per call (①/②)	Rp	873	888	986	959	974	1,098	
④	International Revenue	$\times 10^3$	126,926	520,170	617,903	1,448,205	2,077,467	2,770,025	
⑤	Number of calls	$\times 10^3$	42.3	127.0	170.2	185.8	222.5	276.3	
⑥	Charge per call (④/⑤)	Rp	3,000	4,096	3,630	7,794	9,336	10,025	
⑦									
⑧	SLDD Revenue	$\times 10^3$	236,512	522,999	760,606	1,231,254	2,083,925	3,717,541	
⑨	Number of calls	$\times 10^3$	754	880	1,095	1,598	2,660	3,122	
⑩	Charge per call (⑧/⑨)	Rp	314	594	694	770	784	1,191	
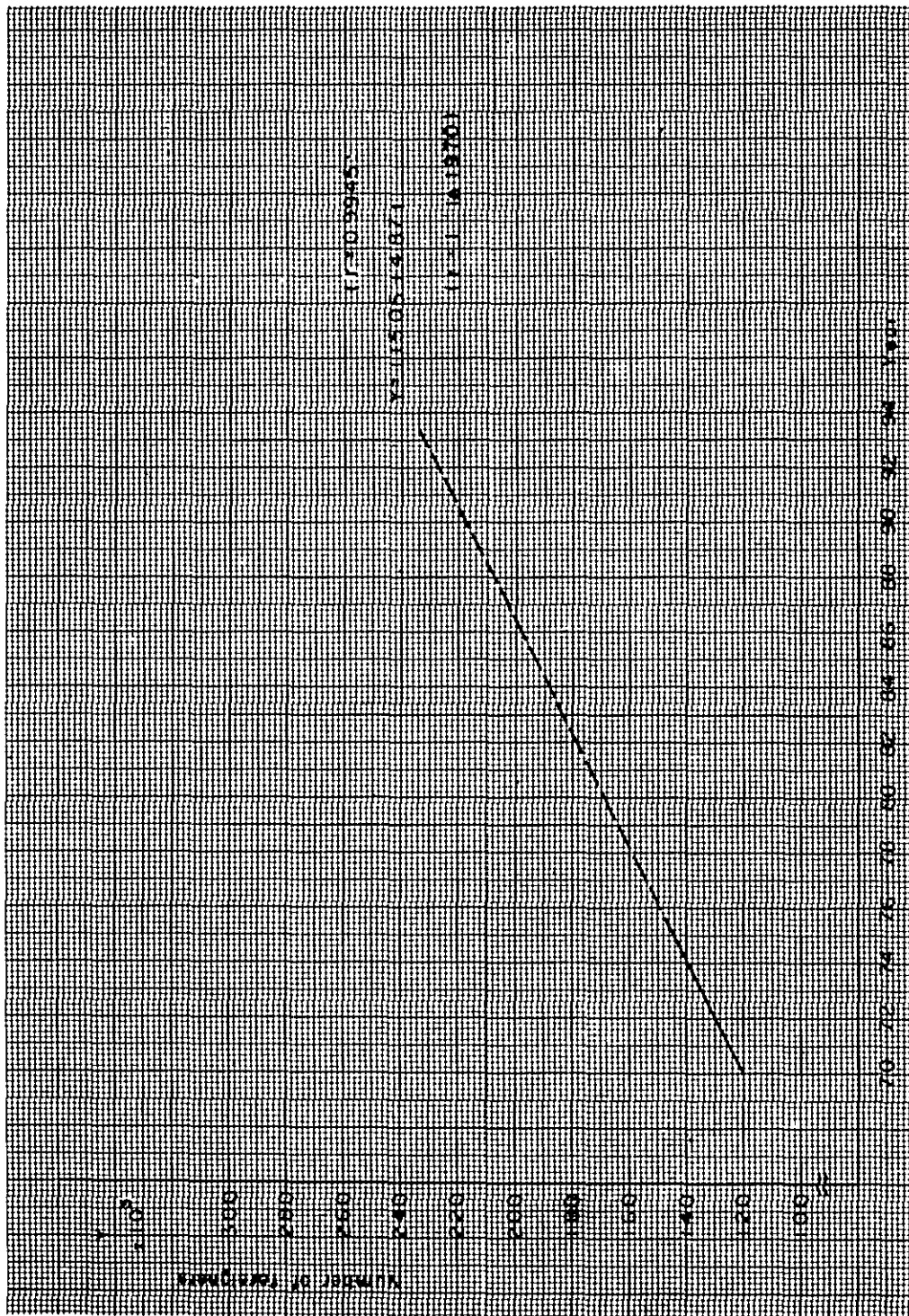
FIG. 9 - 4 - (12) NUMBER OF FOREIGNERS
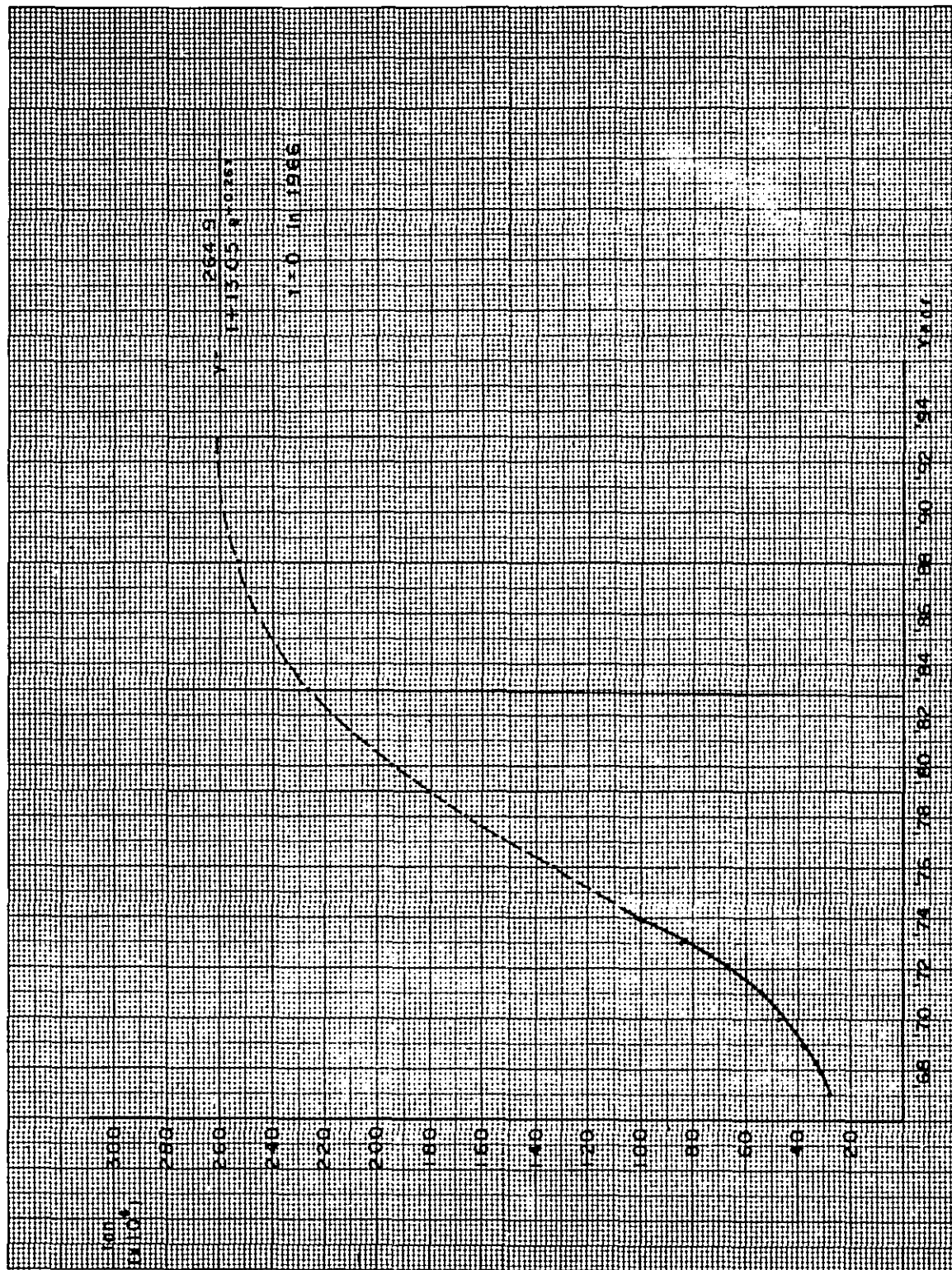
FIG. 9−4−(13) IMPORT AND EXPORT AMOUNT
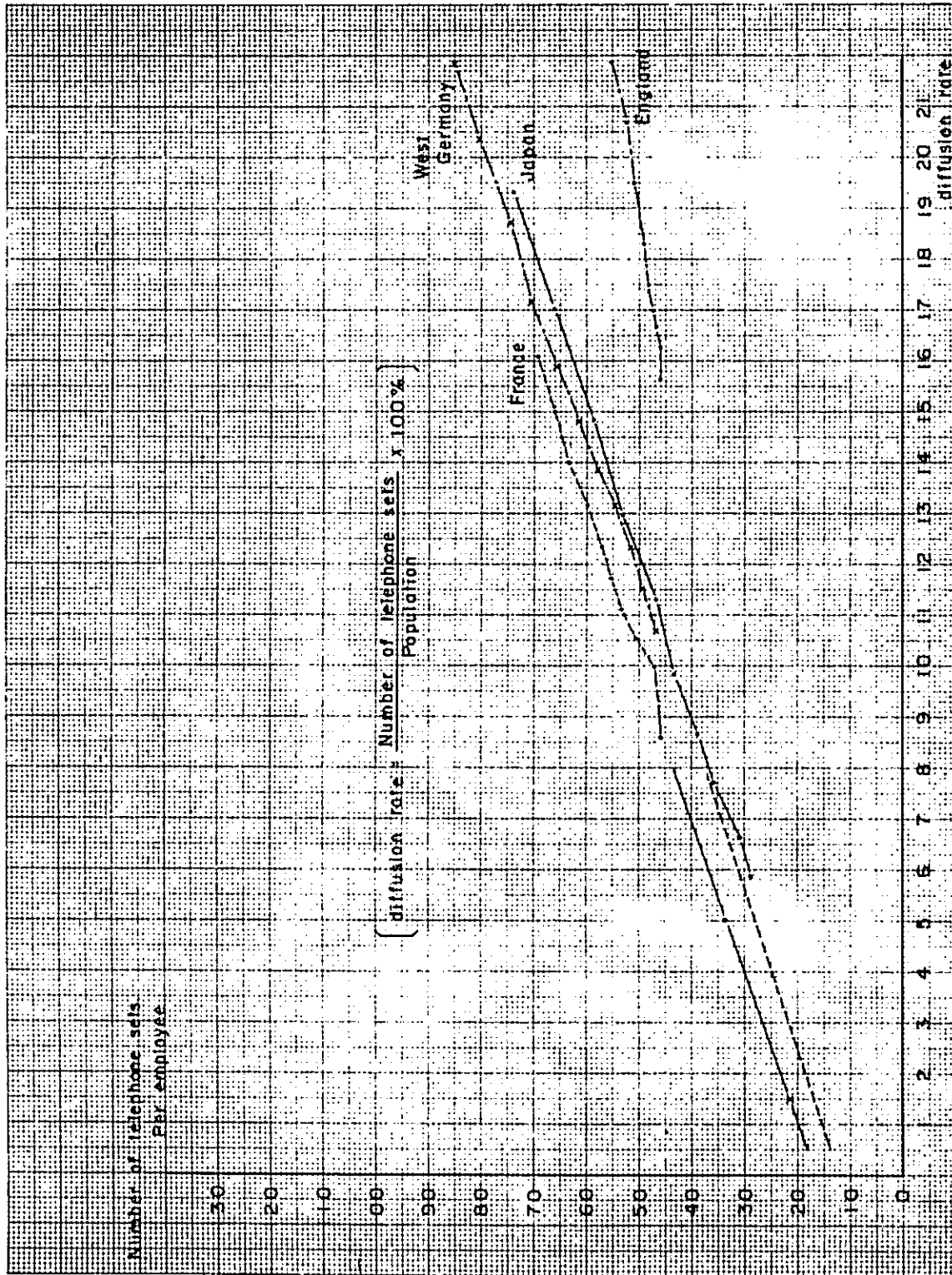
FIG. 9-4-(14) CORRELATION BETWEEN NUMBER OF TELEPHONE
SETS PER EMPLOYEE AND DIFFUSION RATE
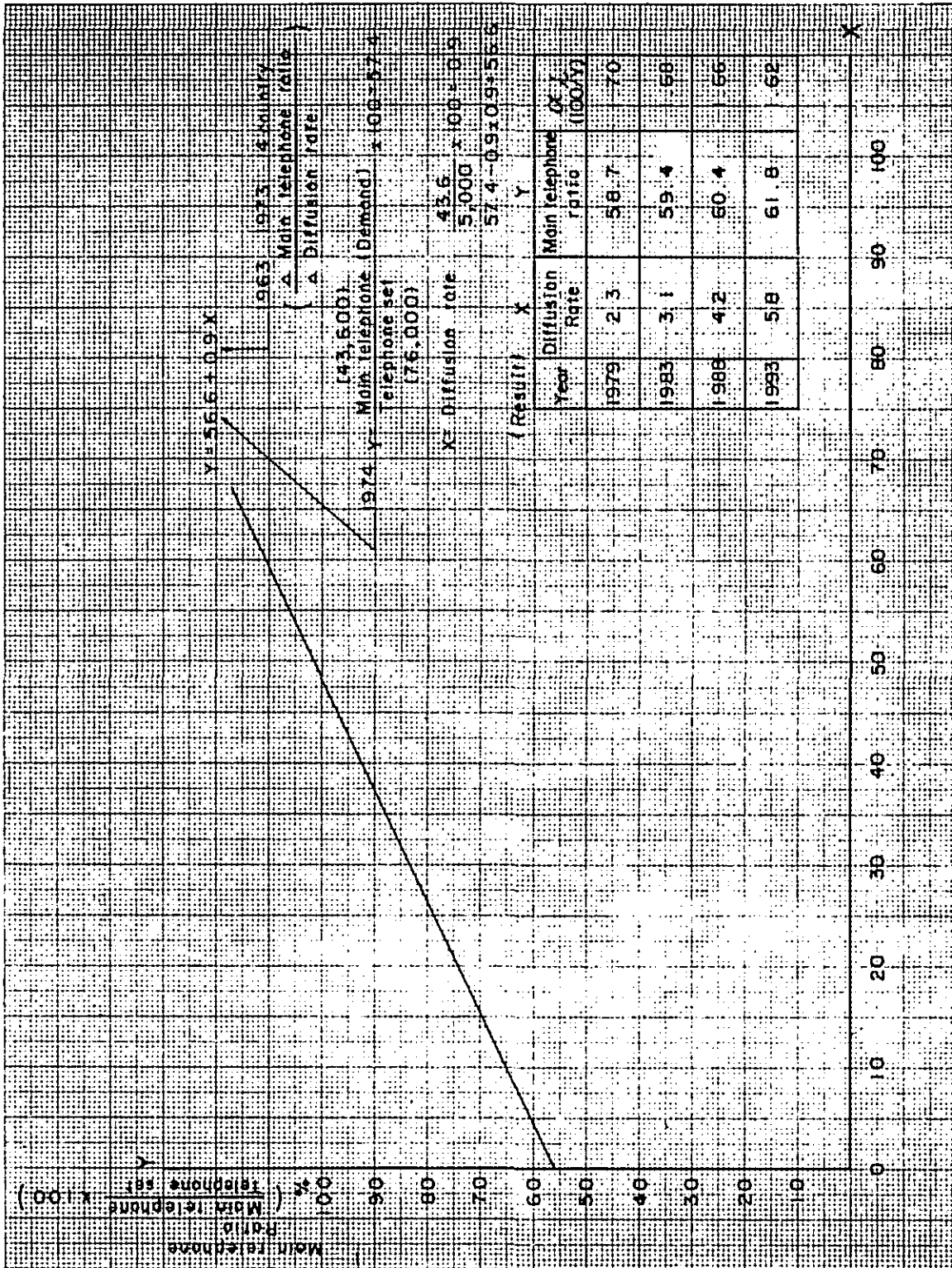
FIG. 9-4-(15) CORRELATION BETWEEN DIFFUSION
RATE AND MAIN TELEPHONE RATIO
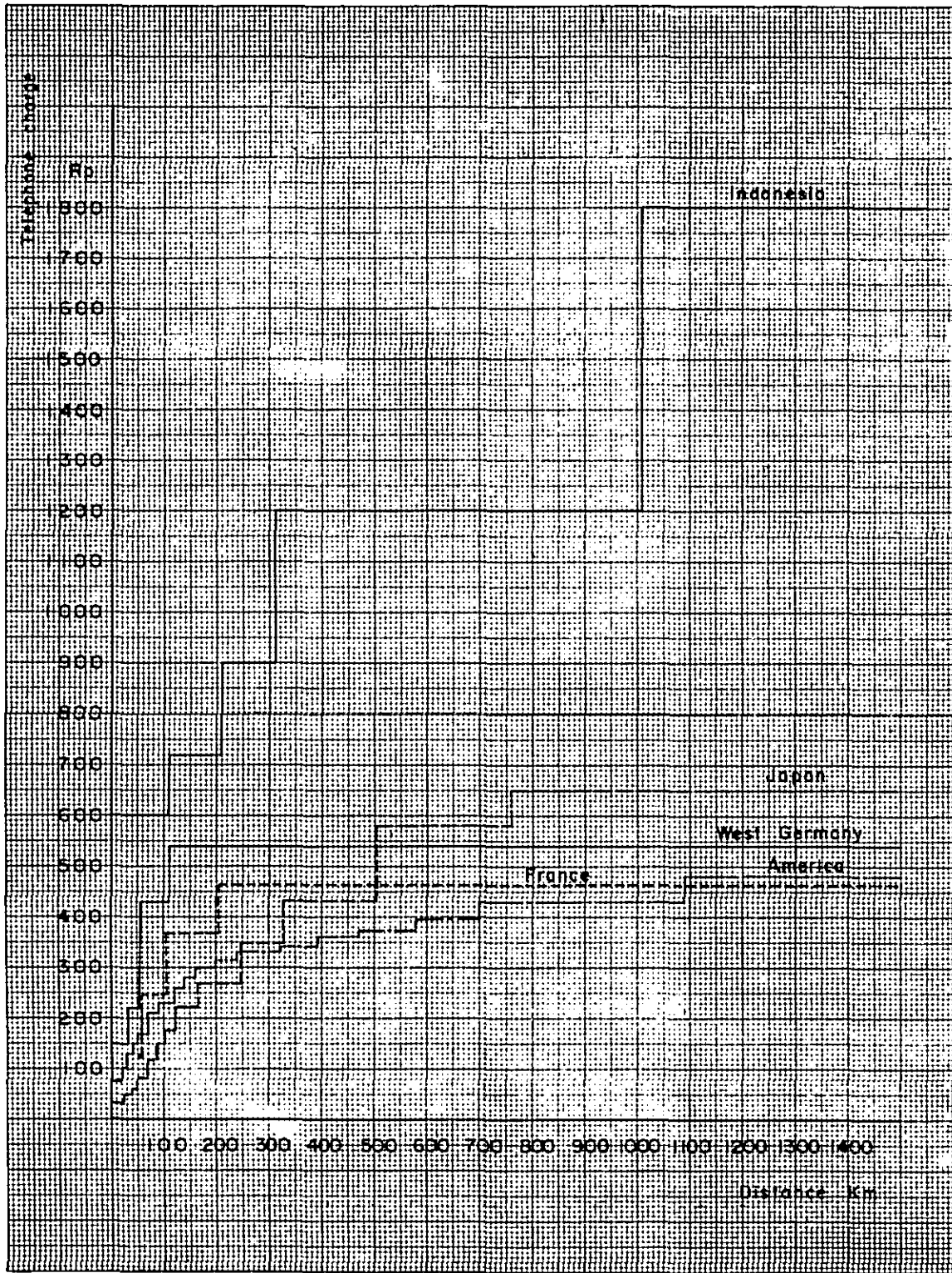
FIG. 9-4-(16) TELEPHONE CHARGE BY
DISTANCE IN 3 MINUTE CONVERSATION

TABLE 9-4-(17) DEPRECIATION (PLAN -D-I)

Year	Total Demand ①	New Subscribers ②	Net fixed assets at the beginning of ③ the Year	Net fixed assets Deprecation (7.5%) ④=③x7.5%	Net fixed assets ⑤=③-④	Investment ⑥	Net fixed assets ⑦=⑤+⑥	Remarks
	x10³	x10³	x10⁶	x10⁶	x10⁶	x10⁶	x10⁶	
'74	113	5	7,930	595	7,335	3,750	11,085	
'75	123	24	11,085	831	10,254	18,000	28,254	
'76	135	24	28,254	2,119	26,135	18,000	44,135	
'77	149	24	44,135	3,310	40,825	18,000	58,825	
'78	164	24	58,825	4,412	54,413	18,000	72,413	Interest
'79	181	25	72,413	5,431	66,982	18,750	85,732	85,732 x0.3x0.15 =3,858
'80	199	25	85,732	6,430	79,302	18,750	98,052	
'81	218	25	98,052	7,354	90,698	18,750	109,448	
'82	240	25	109,448	8,209	101,239	18,750	119,989	
'83	265	25	119,989	8,999	110,990	18,750	129,740	129,740 x0.3x0.15 =5,838
'84	296	31	129,740	9,731	120,009	23,250	143,259	
'85	328	32	143,259	10,744	132,515	24,000	156,515	
'86	364	36	156,515	11,739	144,776	27,000	171,776	
'87	405	41	171,776	12,883	158,893	30,750	189,643	
'88	450	45	189,643	14,223	175,420	33,750	209,170	209,170 x0.3x0.15 =9,413
'89	500	50	209,170	15,688	193,482	37,500	230,982	
'95	556	56	230,982	17,324	213,658	42,000	255,658	
'91	624	68	255,658	19,174	236,484	51,000	287,484	
'92	708	84	287,484	21,561	265,923	63,000	328,923	
'93	808	100	328,923	24,669	304,254	75,000	379,254	379,254 x0.3x0.15 =17,066

TABLE 9-4-(18) DEPRECIATION (PLAN D-2)

Year	Net fixed assets			Investment ④	at the end of the year ⑤=③+④	Installation premium ⑥	Borrowed ⑦=⑥-⑤	Remarks
	at the beginning of the Year ①	Deprecation (7.5%) ②=①x7.5%	Net ③=①-②					
'74	x10⁶ 7,930	x10⁶ 595	x10⁶ 7,335	x10⁶ 3,750	x10⁶ 11,085	x10⁶ 7,803	x10⁶ 3,282	3,282 x 0.15=492
'75	11,085	831	10,254	41,381	51,635	20,024	31,611	
'76	51,635	3,873	47,762	41,381	89,143	31,328	57,815	
'77	89,143	6,686	82,457	41,381	123,838	41,784	82,054	
'78	123,838	9,288	114,550	41,381	155,931	51,456	104,475	
'79	155,931	11,695	144,236	41,381	185,617	60,937	124,680	124680 x 0.15 =18,702
'80	185,617	13,921	171,696	25,161	196,857	69,707	127,150	
'81	196,857	14,764	182,093	25,161	207,254	77,819	129,435	
'82	207,254	15,544	191,710	25,161	216,871	85,323	131,548	
'83	216,871	16,265	200,606	25,161	225,767	92,264	133,503	133,503 x0.15 =20,025
'84	225,767	16,933	208,834	34,900	243,734	101,886	141,848	
'85	243,734	18,280	225,454	34,900	260,354	111,320	149,034	
'86	260,354	19,527	240,827	34,900	275,727	122,181	153,546	
'87	275,727	20,680	255,047	34,900	289,947	134,895	155,052	
'88	289,947	21,746	268,201	34,900	303,101	148,790	154,311	154,311 x 0.15 =23,147
'89	303,101	22,733	280,368	60,583	340,951	164,311	176,640	
'90	340,951	25,571	315,380	60,583	375,963	181,870	194,093	
'91	375,963	28,197	347,766	60,583	408,349	204,515	203,834	
'92	408,349	30,626	377,723	60,583	438,306	233,998	204,308	
'93	438,306	32,873	405,433	60,583	466,016	269,808	196,208	196,208 x0.15 =29,431

TABLE 9-4-(19) INSTALLATION PRENIUM (DEPRECIATION)

Year	Total Demand ①	New Subscribers ②	Net fixed assets at the beginning of ③ the Year	Deprecation (7.5%) ④=③×7.5%	Net ⑤=③-④	Investment amount ⑥	at the end of the year	Remarks
'73	3.9						$\times 10^6$ 9,930	Perumtel Data
'74	$\times 3$ 113	$\times 10^3$ 5	$\times 10^6$ 5,551	$\times 10^6$ 416	$\times 10^6$ 5,135	$\times 10^6$ 2,668	7,803	
'75	123	24	7,803	585	7,218	12,806	20,024	
'76	135	24	20,024	1,502	18,522	12,806	31,328	
'77	149	24	31,328	2,350	28,978	12,806	41,784	
'78	164	24	41,784	3,134	38,650	12,806	51,465	
'79	181	25	51,456	3,859	47,597	13,340	60,937	
'80	199	25	60,937	4,570	56,367	13,340	69,707	
'81	218	25	69,707	5,228	64,479	13,340	77,819	
'82	240	25	77,819	5,836	71,983	13,340	85,323	
'83	265	25	85,323	6,399	78,924	13,340	92,264	
'84	296	31	92,264	6,920	85,344	16,542	101,886	
'85	328	32	101,886	7,641	94,245	17,075	111,320	
'86	364	36	111,320	8,349	102,971	19,210	122,181	
'87	405	41	122,181	9,164	113,017	21,878	134,895	
'88	450	45	134,895	10,117	124,778	24,012	148,790	
'89	500	50	148,790	11,159	137,631	26,680	164,311	
'90	556	56	164,311	12,323	151,988	29,882	181,870	
'91	624	68	181,870	13,640	168,230	36,285	204,515	
'92	708	84	204,515	15,339	189,176	44,822	233,998	
'93	808	100	233,998	17,550	216,448	53,360	269,808	

CHAPTER 10

PUBLIC TELEPHONE

CHAPTER 10

PUBLIC RELATIONS

CHAPTER 10 PUBLIC TELEPHONE

10.1 Existing Public Telephones in Jakarta

10.1.1 Number of Public Telephones and Rate of Diffusion

According to PERUMTEL data the number of public telephones in Jakarta as of 1974 was 198. The rate of diffusion per 1,000 inhabitants was 0.04. Both these figures are much smaller than the corresponding figures in the advanced countries as seen in Table 10.1(2).

As shown in Fig. 10.1.(1), approximately 50% of the existing public telephones are located in the Gambir Exchange service area. In other words, the major part of the existing public telephones are concentrated in the central part of Jakarta. This fact shows that the inhabitants in the peripheral districts of Jakarta can hardly enjoy the benefit of public telephones.

The public telephone expansion plan must be considered and determined not merely from the commercial viewpoint, i.e., to increase the service revenue, but also from the viewpoint of public interests also.

Therefore, it is necessary to install public telephones in the service area of each exchange office to start service during the Second Five-Year Plan. If possible, it must be so arranged that at least one public telephone will be installed in each kelurahan.

10.1.2 Distribution of Public Telephones by Installation Sites and Service Revenue

As is found in Fig. 10.1.(6) the largest number of public telephones are installed at hotels, business offices, supermarkets, recreation centers, airport and theaters follow in the order mentioned.

In terms of average revenue per public telephone the bus terminals lead the list with 44,100 Rupiahs. The second largest revenue earner is supermarkets (42,500 Rupiahs); the third, railway stations (42,000 Rupiahs); the fourth, hospitals (38,900 Rupiahs); the fifth, department stores (34,500 Rupiahs); and the sixth, airport (25,300 Rupiahs). (Refer to Table 10.1.(8).)

Places where the public telephone revenue amounts to more than 3,000 coins are supermarkets (number of public telephones installed: 5), bus terminals (3), hospitals (2) and business office (1).

In January 1975 the largest public telephone revenue earning (100,450 Rupiahs) was recorded at bus terminals located in the service area of Gambir Exchange. In this case, when calculated, by the conditions of

      (a) Holding time: 130 seconds/call

      (b) Number of calls: 4,000/month

the time length for which the public telephones are engaged is approximately 5 hours per day. More precisely,

TEGAL ALUR

CENGKARENG

PLUIT

PRIOK
(B)

CILINCING

KEDOYA

PULO
GADUNG

MERUYA

PAL
MERAH

TEBET

PENGGILIN-
GAN

KLENDER

(B)

KALIBATA

PASAR REBO

JAGAKARSA

GANDARIA

Number of existing
Public telephones

1 ~ 5

6 ~ 10

11 ~ 15

35 ~ 40

71 ~ 75

(   ):Number of public telephones
in total
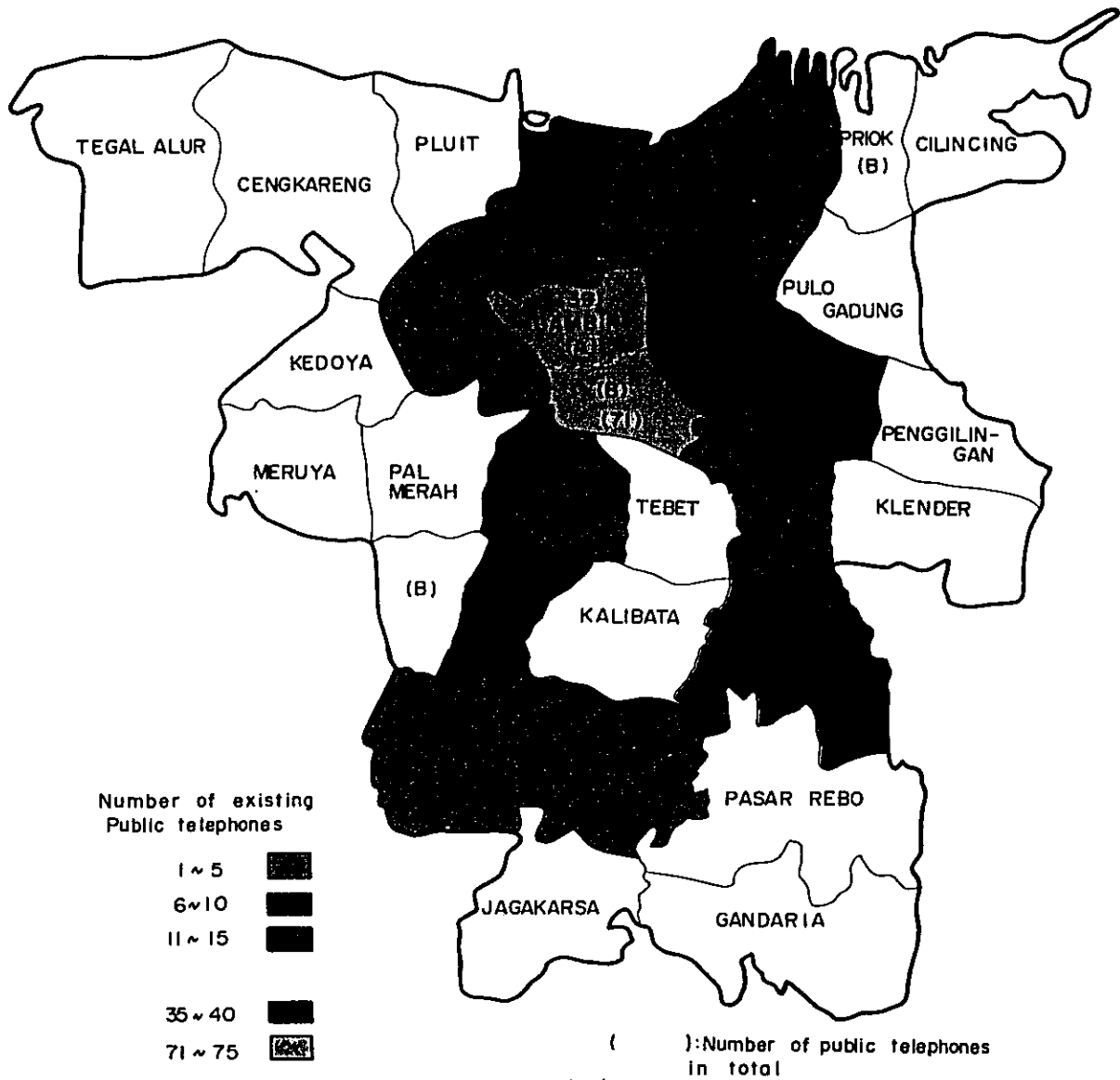
FIG. 10 - 1 - (1)

DISTRIBUTION OF NUMBER OF EXISTING PUBLIC TELEPHONES

TABLE IO-I-(2)

DIFFUSION RATE OF PUBLIC TELEPHONES PER 1,000 INHABITANTS
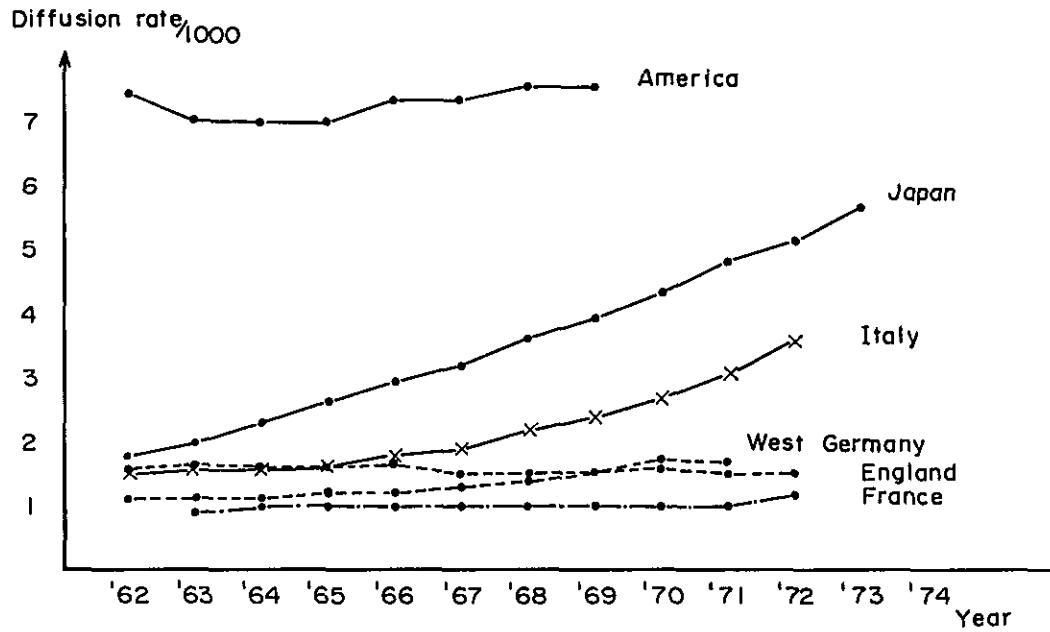
Country	Unit	Number of Public Telephones and Diffusion Rate												
		'62	'63	'64	'65	'66	'67	'68	'69	'70	'71	'72	'73	'74
Japan	(1/1000) x10³	(1.8) 168	(2.0) 195	(2.3) 224	(2.6) 254	(2.9) 287	(3.2) 327	(3.6) 364	(3.9) 404	(4.3) 450	(4.8) 508	(5.1) 548	(5.5) 596	
America	(1/1000) x10³	(7.4) 1279	(7.0) 1311	(7.0) 1342	(7.0) 1370	(7.3) 1432	(7.3) 1455	(7.5) 1499	(7.5) 1514					
France	(1/1000) x10³	—	(0.9) 45	(1.0) 46	(1.0) 47	(1.0) 48	(1.0) 48	(1.0) 49	(1.0) 50	(1.0) 51	(1.0) 53	(1.1) 55		
England	(1/1000) x10³	(1.6) 75	(1.6) 75	(1.6) 75	(1.6) 75	(1.6) 75	(1.5) 75	(1.5) 75	(1.5) 75	(1.6) 76	(1.5) 76	(1.5) 76		
West Germany	(1/1000) x10³	(1.1) 59	(1.1) 61	(1.1) 62	(1.2) 65	(1.2) 69	(1.3) 73	(1.4) 79	(1.5) 86	(1.7) 94	(1.7) 104	—		
Italy	(1/1000) x10³	(1.5) 74	(1.6) 80	(1.6) 84	(1.7) 88	(1.8) 93	(1.9) 102	(2.2) 114	(2.4) 129	(2.7) 146	(3.1) 167	(3.6) 197		
Indonesia (Jakarta)	(1/1000) x 1									24	24	24	185	(0.04) 198

TABLE IO-I-(3)

NUMBER OF PUBLIC TELEHONS PER IOO SUBSCRIBER   LINES

Number of public telehones
per IOO Subscriber lines
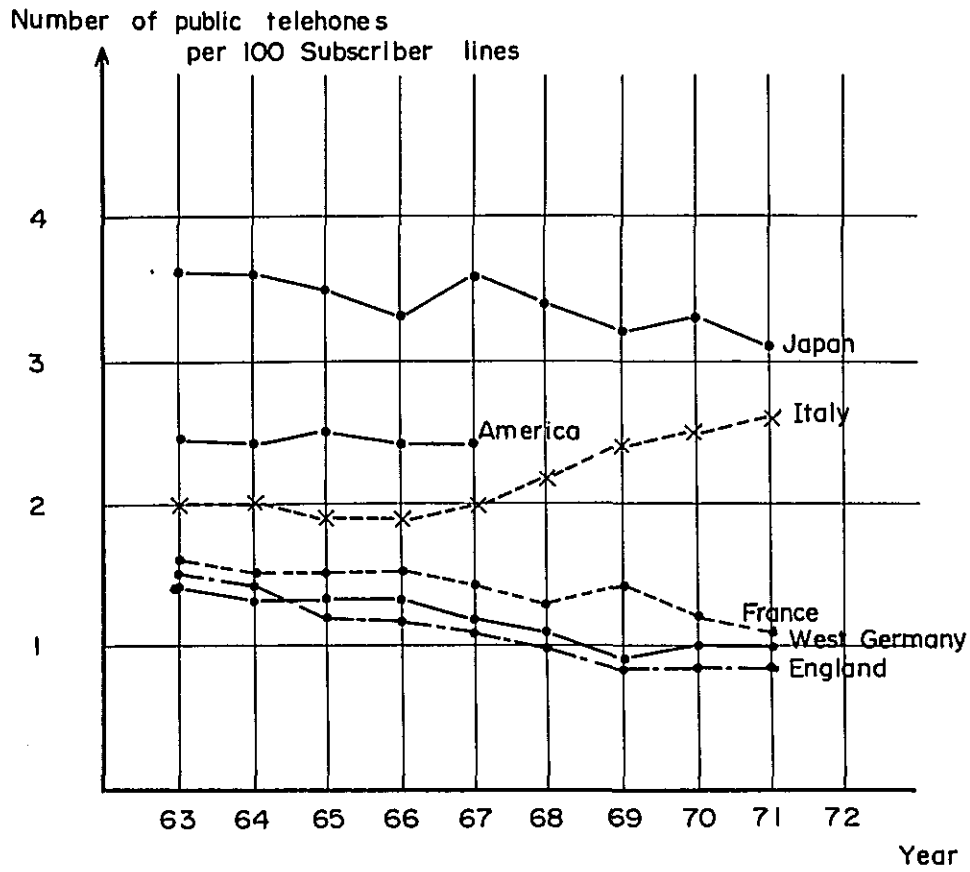
Country	63	64	65	66	67	68	69	70	71	72	
Japan	3.6	3.6	3.5	3.3	3.6	3.4	3.2	3.3	3.1		
America	2.4	2.4	2.5	2.4	2.4						
France	1.6	1.5	1.5	1.5	1.4	1.3	1.4	1.2	1.1		
England	1.5	1.4	1.2	1.2	1.1	1.0	0.9	0.9	0.9		
West Germany	1.4	1.3	1.3	1.3	1.2	1.1	0.9	1.0	1.0		
Italy	2.0	2.0	1.9	1.9	2.0	2.2	2.4	2.5	2.8		

TABLE 10-1-(4)

DIFFUSION RATE PER 1,000 INHABITANTS
AND PER 100 SABSCRIBER LINES
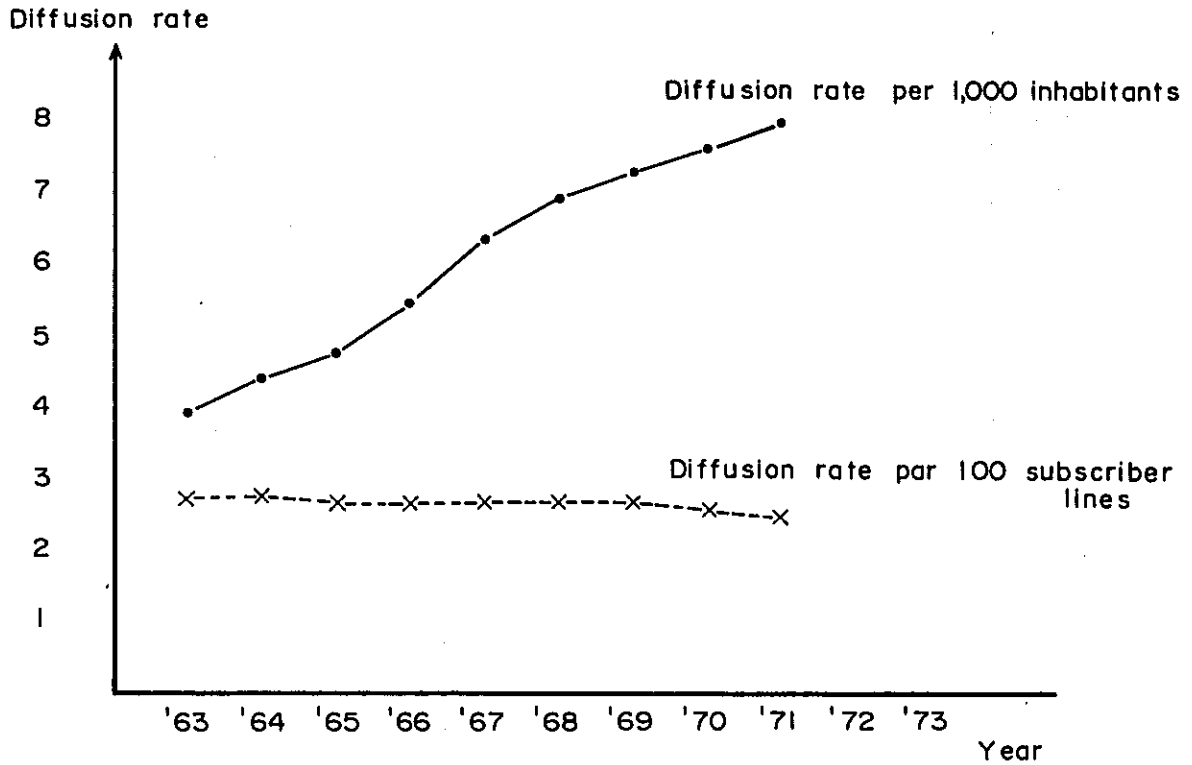
Tokyo	Year											
Metropolitan	'62	'63	'64	'65	'66	'67	'68	'69	'70	'71	'72	'73
1 Subscriber line (x10³)	1,024	1,174	1,382	1,593	1,801	1,998	2,228	2,414	2,620	2,799		
2 Public telehone (x10³)		32.1	37.5	42.2	47.1	53.9	58.8	62.1	64.7	68.0	70.1	72.1
3 Diffusion rate per 100 Subscriber lines		2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.5	2.4		
4 Diffusion rate per 1,000 inhabitants		3.8	4.3	4.7	5.4	6.3	6.8	7.2	7.5	7.9		

TABLE 10 - 1 - (5)

PUBLIC TELEPHONE REVENUE (EXCLNDING DKI. RP. 15)
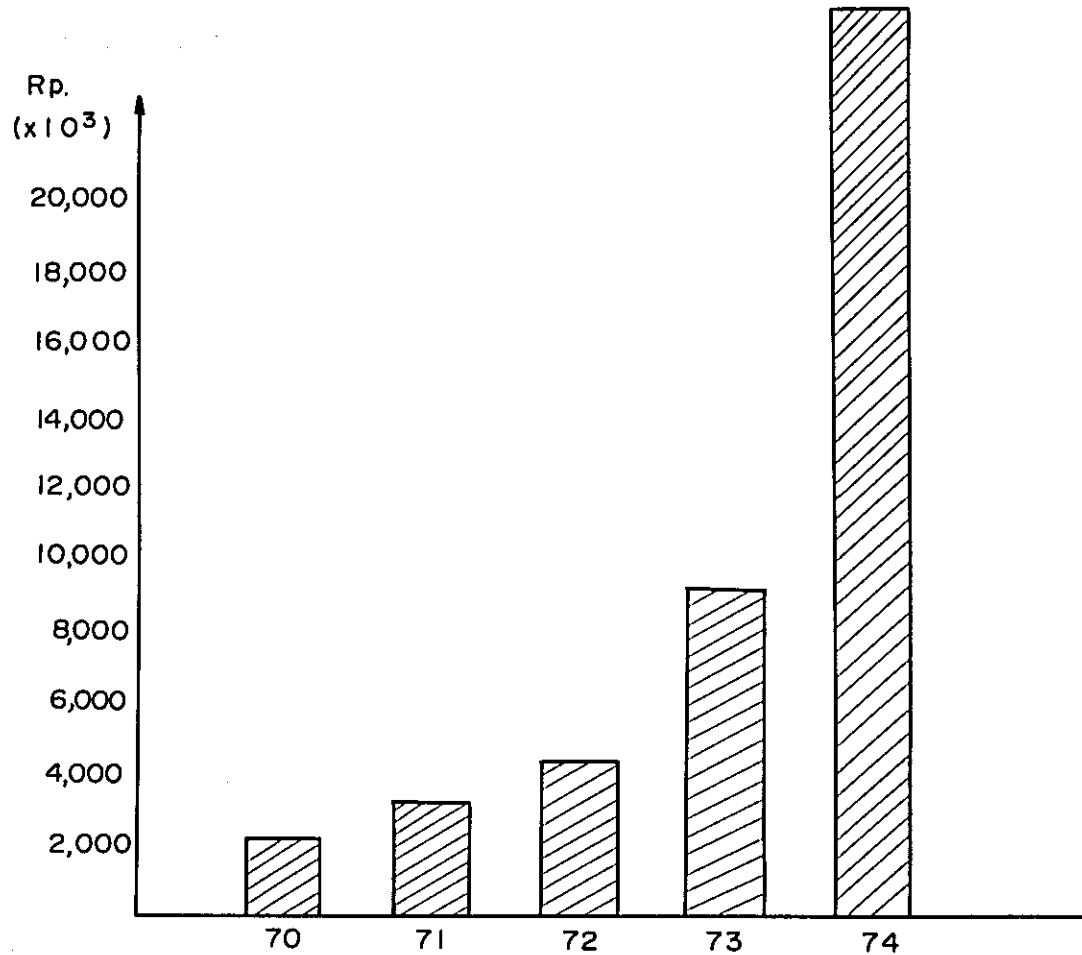
Rp. (x10³)

Rp. (x10³)

Name of Exchange	1970	1971	1972	1973	1974
Gambir / slipi	(24) 2,087	(24) 3,185	(24) 4,259	(119) 6,170	(126) 14,843
Kota / Tg. Priok	—	—	—	(17) 1,635	(21) 2,952
Jatinegara	—	—	—	(28) 373	(28) 5,344
Kebayoran	—	—	—	(11) 614	(12) 1,629
Semanggi	—	—	—	(10) 383	(11) 650
Total (x10³)	(24) 2,087	(24) 3,185	(24) 4,259	(185) 9,175	(198) 25,418

( ):Number of public telephones

$$(400 \times 30 \times \frac{130}{3,600} = 4.8 \text{ hours/day})$$

From this fact it can be presumed that many people are being forced to wait for their turns to use public telephones. Therefore, we recommend that PERUMTEL would install additional public telephones at such places where the number of calls (or coins) is expected to be more than 3,000.

10.1.3 Comparison between Revenue (Number of Coins) and Number of Meter Pulses

As shown in Table 10.1.(8) and Table 10.1.(9) the number of coins and the number of meter pulses per public telephone during January 1975 are approximately 894 and 1,390, respectively. The balance between them is approximately 496 and this balance is equivalent to 12,400 Rupiahs. When seen for all public telephones the balance between the number of coins and the number of meter pulses in one month is 98,201 equivalent to 2.5 million Rupiahs in tariffs.

This revenue balance is attributable to:

(a) Illegitimate toll dialing;

(b) Use of substitute metal for coin;

(c) More or less difference between the time of charge collection and the time of final pulse recorded;

(d) Others.

In order to reduce the discrepancy between the number of coins and the number of meter pulses we recommend that PERUMTEL would take the following actions:

(a) To establish public telephone switch groups.

(b) To carry out traffic observation.

(c) To reduce traffic load of line finder.

(d) In case of heavy traffic, to connect public telephone circuit directly to first selector without the intermediation of line finder.

(e) To introduce public telephone with lock type coin box.

(f) To introduce toll public telephone.

Besides the items mentioned above it is also desirable to introduce the consignment system (see note below). As seen in Fig. 10.1.(7) the university is the location of public telephone showing the biggest difference between the number of meter pulses and the number of coins. The bus terminal, airport, theater and railway station follow in the order mentioned.

The most important thing is to analyze work management as a whole without being limited to the aforementioned items (a) through (f) and take necessary action to reduce the

Number of public telephones (Jan. 1975)

Department store
Police
Bank
Railway station
University
Bussiness office
Hospital
Bus terminal
Theatre
Recreation centre
Airport
Supermarket
Government office
Hotel

50   40   30   20   10
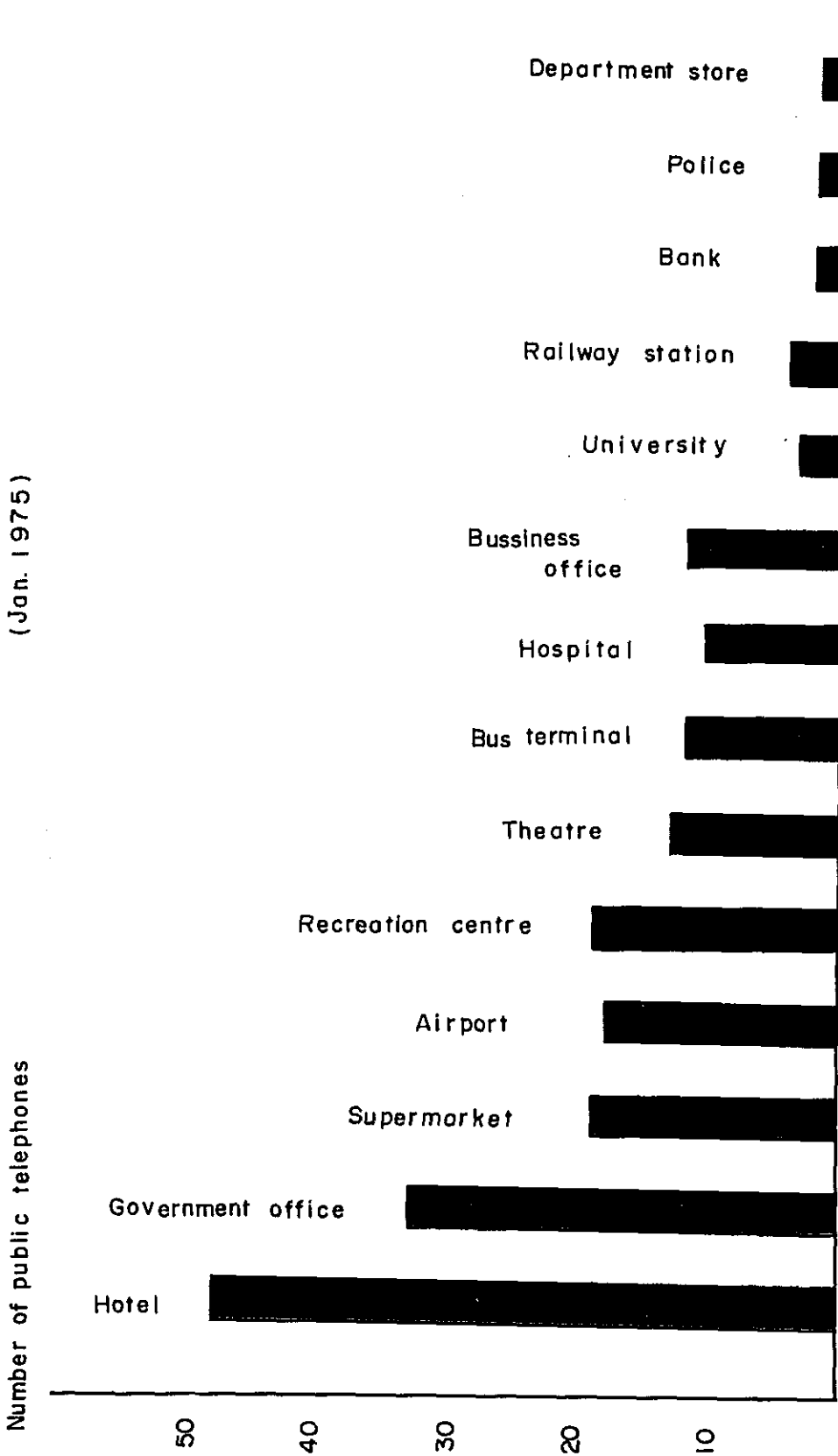
FIG. IO-I-(6)
NUMBER OF PUBLIC TELEPHONES

gap between the number of coins and the number of meter pulses as soon as possible.

Note: Consignment System

a)   PERUMTEL should pay consignment fee to the shop owner for service and space which he provides for public telephone.

b)   PERUMTEL can claim payment according to the number of meter pulses indicated by the call meter.

c)   The consignee can freely take out money from public telephone.

10.1.4 Non-dialing

The number of non-dialing (unused) public telephones in one month is 36. The ratio to the total number of public telephones is approximately 18% as shown in Table 10.1.(8).

When the non-dialing public telephones are classified by locations those at hotels number 12. This number represents nearly 33% of all non-dialing public telephones in Jakarta.

As is evident in the foregoing statement the number of public telephones in Jakarta is extremely small, compared with the number in major cities of other countries. It is very important to maintain those public telephones in good operating condition in order that they can be effectively utilized by the general public.

The average public telephone revenue per telephone per month amounts to 27,000 Rupiahs. If all public telephones are kept in good operating condition a revenue increase by approximately 1 million Rupiahs per month will accrue to PERUMTEL.

The conceivable reasons for non-dialing are as follows:

(a)   Trouble with public telephone

(b)   Trouble with public telephone line

(c)   No use of public telephone

(d)   Others

We recommend that PERUMTEL would carry out pertinent public telephone maintenance by means of revenue or meter pulse management and at the same time consider the change of public telephone locations.

10.2 Findings by Enquete

10.1.1 Public Telephone Locations Desired by General Public besides Existing Locations
(Refer to Fig. 10.2.(1))

Public telephones are most frequently used at bus terminals as seen in Table 10.1.(8). This fact is proven by PERUMTEL's coin revenue statistics also. However, when installing public telephones, PERUMTEL should not consider the economic aspect only but should take the public service aspect also into consideration.

NUMBER OF PULSES. NUMBER OF COINS / MONTH   (JUNUARY 1975)

( ) : %
NUMBER OF COINS

4000

3000

2000

1000

0

HOTEL
762
66%

GOVERNMENT OFFICE
1116
74%

SUPER MARKET
2245
76%

AIR PORT
1739
56%

RECREATION CENTRE
477
71%

THEATRE
1478
59%

BUS STATION
3500
50%

HOSPITAL
2359
66%

COMMERCIAL BUILDING
917
67%

UNIVERSITY
655
20%

RAILWAY STATION
2760
61%

BANK
615
62%

POLICE
828
77%

DEPERTMENT STORE
1837
75%

TOTAL
1380
49%

FIG. 10 - 1 - (7)

BALANCE BETWEEN NUMBER OF PULSES AND
NUMBER OF COINS PER PUBLIC TELEPHONE

.

TABLE 10-1-(8)

% DISTRIBUTION OF PUBLIC TELEPHONE CHARGE BY LOCATION

(Date : Jan. 1975)

Classification of charge / Location of public telephone	0	1~100	101~300	301~500	501~1000	1,001~1,500	1,501~2,000	2,001~2,500	2,501~3,000	3,001~4,000	Total (A)	Number of P.T. (B)	(A)/(B)
Hotel	12	2	7	6	12	6	3	—	—	—	(13.5%) 23,977	(24) 48	500
Government office	4	—	9	1	8	4	6	—	1	—	(15.3) 27,145	(17) 33	823
Supermarket	2	1	1	—	3	3	1	1	2	5	(18.2) 32,293	(10) 19	1,700
Airport	5	—	1	1	2	6	—	—	3	—	(10.3) 18,192	(9) 18	1,011
Recreation centre	4	1	7	2	3	2	—	—	—	—	(3.6) 6,395	(10) 19	337
Theatre	—	—	3	—	7	1	1	1	—	—	(6.5) 11,421	(7) 13	879
Bus terminal	2	—	—	1	1	2	1	2	—	3	(12.0) 21,162	(6) 12	1,764
Hospital	2	—	—	—	2	2	2	1	—	2	(9.7) 17,112	(5) 11	1,556
Bussiness office	4	1	2	1	1	1	1	—	—	1	(4.2) 7,360	(6) 12	613
University	1	1	—	1	—	—	—	—	—	—	(0.2) 393	(1) 3	131
Railway station	—	—	—	—	—	2	1	1	—	—	(3.8) 6,749	(2) 4	1,687
Bank	—	—	—	1	—	—	—	—	—	—	(0.4) 763	(1) 2	382
Police	—	—	—	—	2	—	—	—	—	—	(0.7) 1,269	(1) 2	635
Department store	—	—	—	—	—	1	1	—	—	—	(1.6) 2,760	(1) 2	1,380
Total (revenue of P.T)	0	(1) 241	(3) 5,640	(3) 5,970	(17) 30,499	(21) 37,456	(17) 29,439	(7) 12,649	(9) 16,729	(22) 38,368	(100) 176,991	(100) 198	894
Total (number of P.T)	(18%) 36	(3) 6	(15) 30	(8) 15	(21) 41	(15) 30	(9) 17	(3) 6	(3) 6	(6) 11	(100%) 198		

Charge : number of coins (R.P. 25)

P. T : Public Telephone

TABLE 10-1-(9)

% DISTRIBUTION OF PUBLIC TELEPHONE PULSES BY LOCATION

(Jan. 1975)

Location of Public telephone \ Classification of Pulses	0	1~100	101~300	301~500	501~1,000	1001~1500	1,501~2000	2001~2500	2501~3000	3001~4000	Total (A)	Number of P.T (B)	(A)/(B)
Hotel	12		2	9	10	12	3				(13.3) 36,576	(24) 48	762
Government office	4	2	7	1	3	9	6	1			(13.4) 36,820	(17) 33	1,116
Supermarket	2	1		1	2	3	2	5	3		(15.5) 42,622	(10) 19	2,243
Airport	5			1	1	3	2	5	1		(11.9) 32,381	(9) 18	1,799
Recreation cantre	4	1	5	2	4	3					(3.3) 9,057	(10) 19	477
Theatre	—		3		1	6	2		1		(6.9) 19,220	(7) 13	1,478
Bus terminal	2					2	1	3	1	3	(15.3) 41,998	(6) 12	3,500
Hospital	3					3	3	1		2	(9.4) 25,951	(5) 11	2,359
Bussiness office	4			4	1	1	1			1	(4.0) 11,005	(6) 12	917
University	1				1	1					(0.7) 1,965	(1) 3	655
Railway station					1	2			1		(4.0) 11,038	(2) 4	2,760
Bank					1	1					(0.5) 1,229	(1) 2	615
Police					2						(0.6) 1,656	(1) 2	828
Department store						1	1				(1.3) 3,674	(1) 2	1,837
Total (revenue of P.T)	0	(0.2) 424	(1.6) 4,359	(2.9) 8,033	(0.8) 2,161	(25.6) 70,810	(21.8) 59,965	(21.1) 58,010	(11.5) 35,53	(14.5) 39,899	(100) 275,192		
Total (number of P.T)	(18%) 36	(2) 4	(9) 17	(10) 19	(13) 26	(23) 45	(12) 23	(7) 15	(3) 7	(3) 6		(100) 198	1,390

Name of location		Number of public telephones (scale: 2, 4, 6, 8, 10)
Hotel	Ambassador	
	Borobudur	
	Menteng	
	Kartika Plaza	
	President	
	Indonesia	
	Asoka	
	Paripurna	
	Sabang	
Office	D. K. I	
	Gambir Exchange	
	Tg. Priok Exchange	
	Kota Exchange	
Supermarket	Blok M	
	Harco Pasar Baru	
	Senen Project	
	Cikini	
	Gloria	
	P.D. Pasar Pagi	
Airport	Kemayoran	
	Halim Perdana Kusumah	
Recreation or Park	Ancol	
	Taman Ria Monas	
	Jakarta Fair	
	Bowling Kartika Plaza	
Bus Terminal	Banteng	
	Blok M Kebayoran	
Building	Museum	
	Wisma Nusantara	
	P.T. Gunung Agung	
	Glodok	
Depart. Store	Sarinah	
Other	Only one public telephone installed at the same place	

FIG. 10 - 1 - (10)
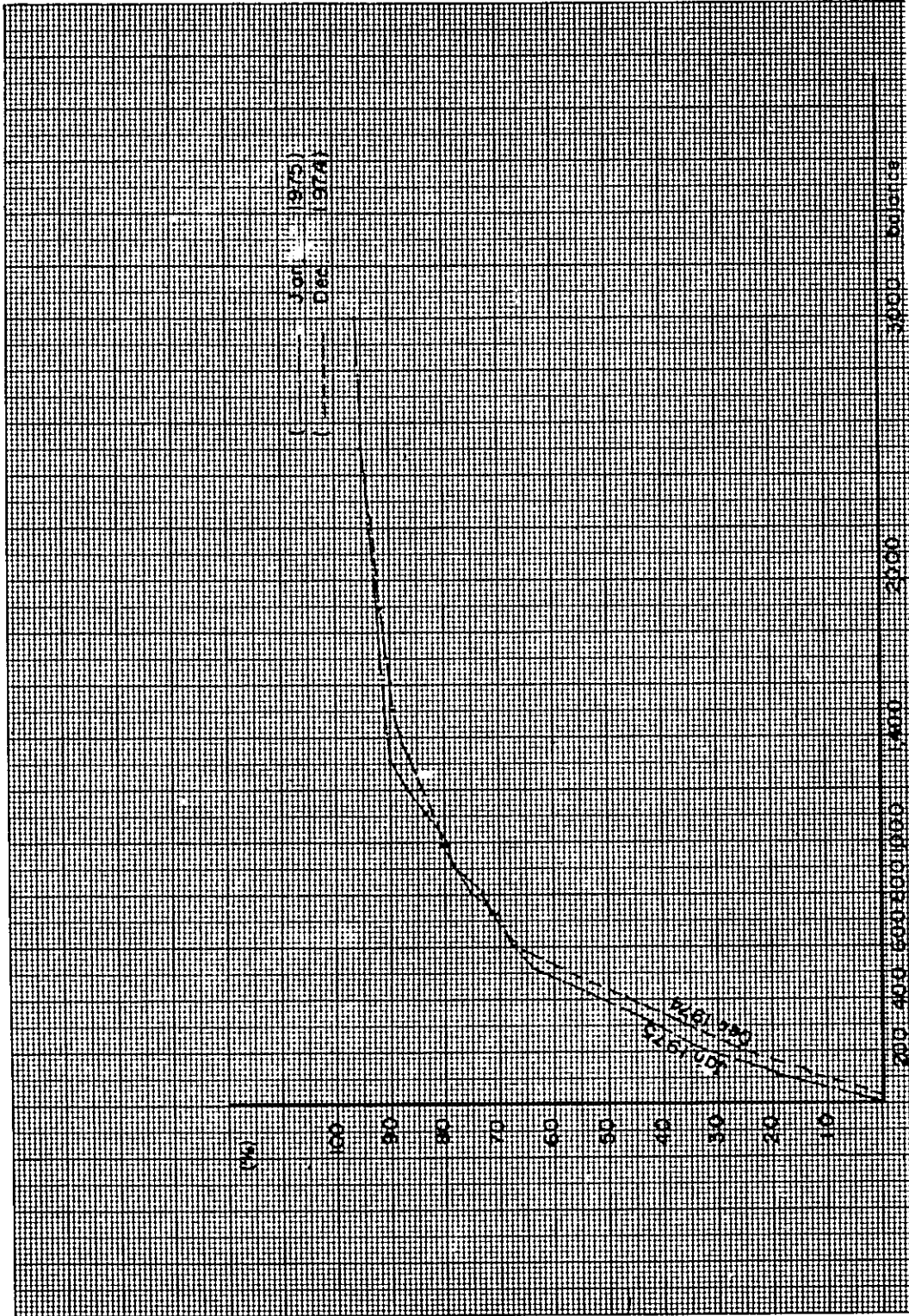
FIG. IO-I-(II)

% DISTRIBUTION OF BALANCE BETWEEN NUMBER OF PULSES AND COINS
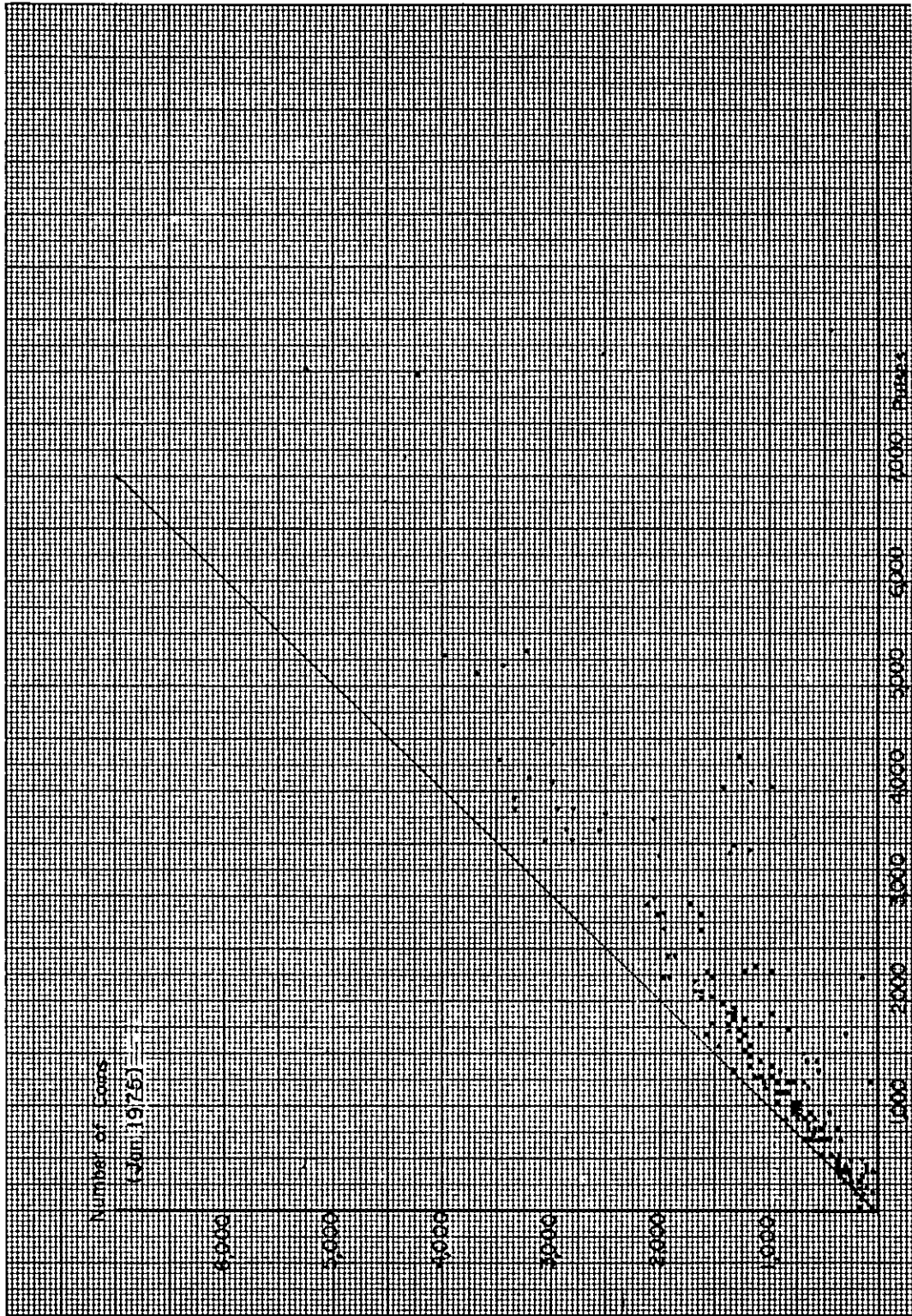
FIG. 10 - 1 - (12)

CORRELATION BETWEEN NUMBER OF PULSES AND COINS

The enquete shows that the existing public telephones are concentrated in the central part of Jakarta and many poeple living away from the city center desire to have public telephones installed in kelurahan offices at least.

There are 220 kelurahans in Jakarta. It is important that public telephones be diffused in low telephone density areas in the future.

Main roads take second place in the order of precedence for public telephone installation. However, we do not recommend unattended roadside public telephones for fear that the coins may be stolen as seen in the answer to Question No. 22.

We recommend the introduction of consignment public telephone system in Indonesia in the belief that this system is useful for the improvement of public telephone management including the prevention of improper dialing and for the carrying out of counterplan against malfunction of call meters.

10.2.2 Complaints about Public Telephone
(Refer to Fig. 10.2.(2))

The top complaint is about the fewness of public telephones. This is evident in the answer to Question No. 26. The rate of diffusion standing at approximately 0.04 per 1,000 inhabitants is extremely low, compared with the similar rates in advanced countries (5.5 in Japan, 1.7 in West Germany, 1.5 in Britain and 1.1 in France).

The second complaint is about the very frequent troubles with public telephones. If a large number of public telephones are installed in Jakarta, troubles with a limited number of them do not pose a serious problem. Because of the low rate of diffusion it is important to maintain the existing few public telephones in good operating condition.

The third complaint is about the indistinctness of public telephone signboard which makes the public telephone location hard to identify. Because of their small number, public telephones are all the more difficult to find. There is need for the distinct, large-sized public telephone signboard.

The fourth complaint is about the unavailability of toll dialing to outside Jakarta by public telephone. People at the airport and railway stations are for the most part the people who have arrived from or are departing to other places, and the demand for toll calls among those people is generally large.

We recommend that PERUMTEL would introduce toll public telephones at the earliest possible opportunity.

10.2.3 General Public Proposal Concerning Conversation Time Limit
(Refer to Fig. 10.2.(5))

Since this is still the initial period of public telephone service and the diffusion rate is extremely low, the monopoly of public telephones by conversationists for a long time is not

NO	Location	10	20	30	40	50	60	70	80	90	100	110	120	
1	Kelurahan													124
2	Main Road											(114)		
3	Major Intersection							(69)						
4	R W							(66)						
5	Market					(45)								
6	School			(32)										
7	Bus Stop			(29)										
8	R T		(25)											
9	Housing Complex		(25)											
10	Hansip Post		(21)											
11	Plice Post		(19)											
12	Office		(19)											
13	Taxi Bemo station		(18)											
14	Gasoline station		(16)											
15	Remote Area	(15)												
16	Worship place	(15)												
17	Harbour	(13)												
18	City Border	(12)												
19	Sport Centre	(12)												
20	Hospital	(11)												
21	Post Office	(9)												
22	Recreation Centre	(8)												
23	Density Area	(7)												
24	Bus Terminal	(6)												
25	Swimming pool	(5)												
26	Pedistrian Bridge	(5)												
27	Crowded spot	(5)												
28	Traffickly dangerous spot	(5)												
29	Drugstore	(5)												
30	Zoo	(4)												
31	Park	(4)												
32	Every 1 km	(4)												
33	Kecamatan	(3)												

FIG. 10-2-(1)

PABLIC TELEPHONE LOCATIONS DESIRED BY GENERAL
PUBLIC BESIDES EXISTING LOCATIONS

Expensive
3
(0.4)

% distribution of respondent
for complaint

No connection
all day
34
(4.6)

Noisy
surro-
unding
42
(5.7)

( ) : %

741
(100)

No answer
17
(2.3)

Number of
public telephones
is small
229
(30.9)

other 36
(4.9)

No directory
26
(3.5)

% distribution of respondent
for complaint by sex

□ Male

■ Female

%
40

30

20

10

8.6% Using method
8.6%
8.4% Toll call
11.7%
5.9% Noise, Cross talk
6.8%
4.0% Noisy surrounding
8.6%
0.2% Expensive
0.7%
5.7% No connection all day
2.6%
12.6% Damaged
11.7%
34.5% Number of public telephones is small
24.4%
10.1% Location unknown
12.8%
3.0% No diretory
4.5%
5.5 % Other
3.8%
1.5% No answer
3.8%

FIG. 10 − 2 − (2)

COMPLAINTS OF GENERAL PUBLIC ABOUT PUBLIC TELEPHONE

desirable. Also, since the local call tariff rate is fixed regardless of conversation time, the public telephone revenue increase cannot be expected if long conversations are frequent.

Public telephone service must be planned on both commercial and public service bases. Therefore, we carried out the opinion poll with respect to the conversation time limit.

The answer to Question No. 24 admitting the necessity of imposing the time limit on conversations by public telephones so as to prevent long conversations occupies 83.5%. Almost all respondents, regardles of sex and whether they are telephone owners or not, propose the conversation time limit. Nearly 70% of the respondents propose a 3-minute time limit.

According to PERUMTEL statistics the average local conversation time is 150 seconds so that the 3-minute time limit is considered desirable.

10.2.4 Proposal for Toll Public Telephone System

As previously stated the existing public telephones in Jakarta cannot be used for toll calls to outside Jakarta. However, with the development of transportation facilities the economic activity sphere of Jakarta has expanded and many people are visiting Jakarta easily from outside the city. In other words, the economic activity sphere of Jakarta is now bigger than the local telephone service area. This fact indicates that the people feel great necessity of toll public telephone service to outside Jakarta.

The answer to Question No. 15 shows that approximately 50% of the respondents "always," "often" or "somethimes" desire toll calls from public telephones. The rate of similar desire among telephone owners is higher than that among non-owners. Especially noteworthy is the fact that 10% of "always" and "often" category respondents strongly desire toll calls from public telephones.

Since a large number of travellers gather at the airport, railway stations and hotels it will be necessary for PERUMTEL to try to realize the toll public telephone system as soon as possible, responding to the desire among those people.

The fact that the revenue from toll public telephone service is much larger than the revenue from local public telephone service deserves to be noticed. Thus the introduction of toll public telephone service brings great benefits to both the general public and PERUMTEL.

10.2.5 Public Opinion Concerning Public Telephone Tariff

(Refer to Fig. 10.2.(10))

Approximately 91% of the respondents to Question No. 19 are of the opinion that the public telephone charge of 25 Rupiahs is not high. Although the public opinion concerning the public telephone charge depends upon the incomes of individuals, it remains a fact that the public telephone charge of 25 Rupiahs is accepted as being not too high even by the relatively low income earners such as students and non-telephone owners. This fact signifies

SENSE OF COMMON
BELONGING

25% DISCOUNT
FOR REQUIAR
USERS

INCREASE OF PUBLIC TELEPHONE

242

(39.7%)

610

(100%)

(0.2%)

4 (0.7%)

6 (1.0%)

9 (1.5%)

11 (1.8%)

13 (2.1%)

22 HOUR USAGE

TELEPHONE DIRECTORY NEEDED

MAINTAIN THE LOWEST POSSIDLE CHARGE

COIN- CHARGER NEEDED

NOISE - PROOF BOOTH

CAMPAIGN TO POPULARIZE
PUBLIC TELEPHONE
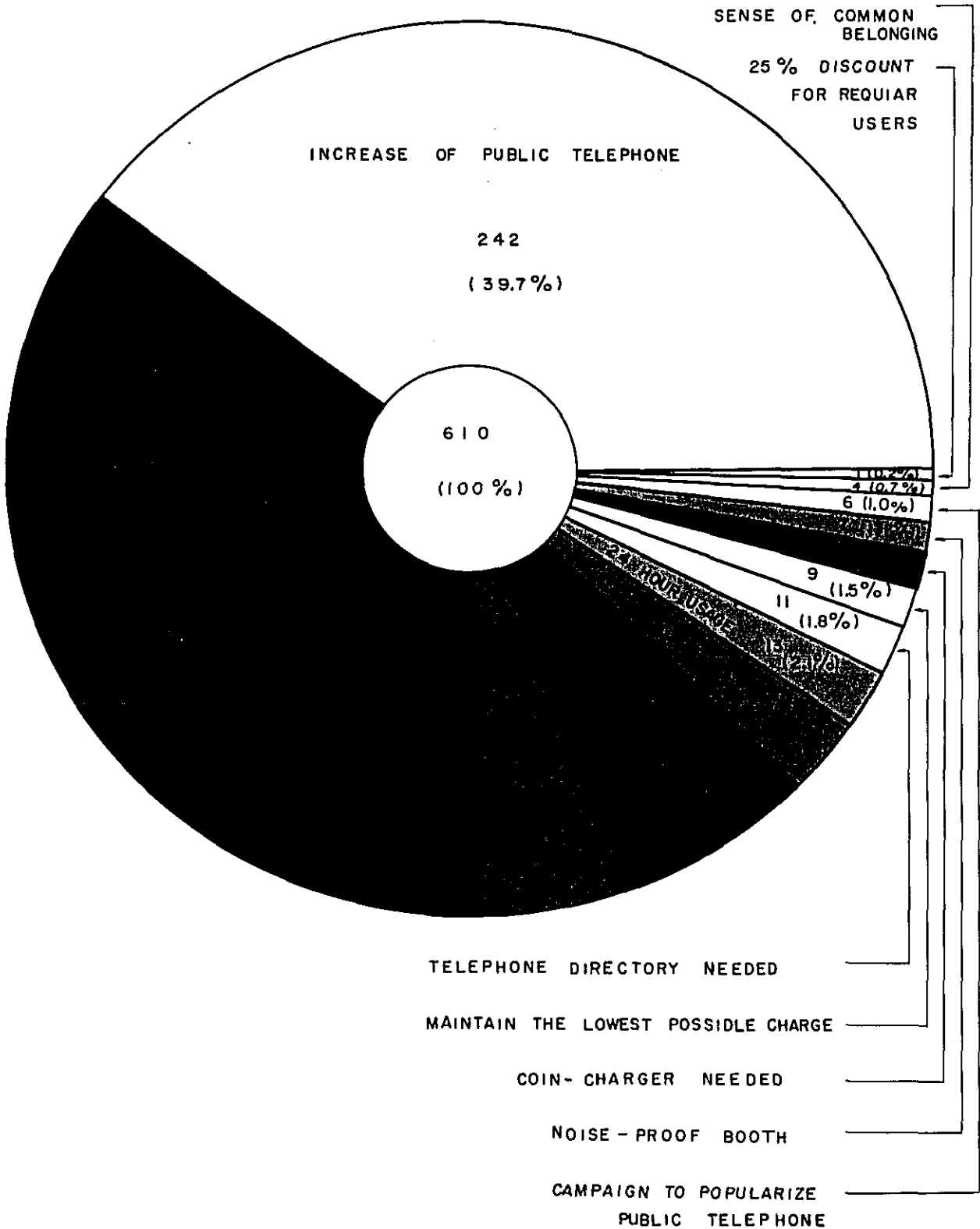
FIG. 10 - 2 - (3)

PUBLIC OPINION AND SUGGESTION
ABOUT PUDLIC TELEPHONE
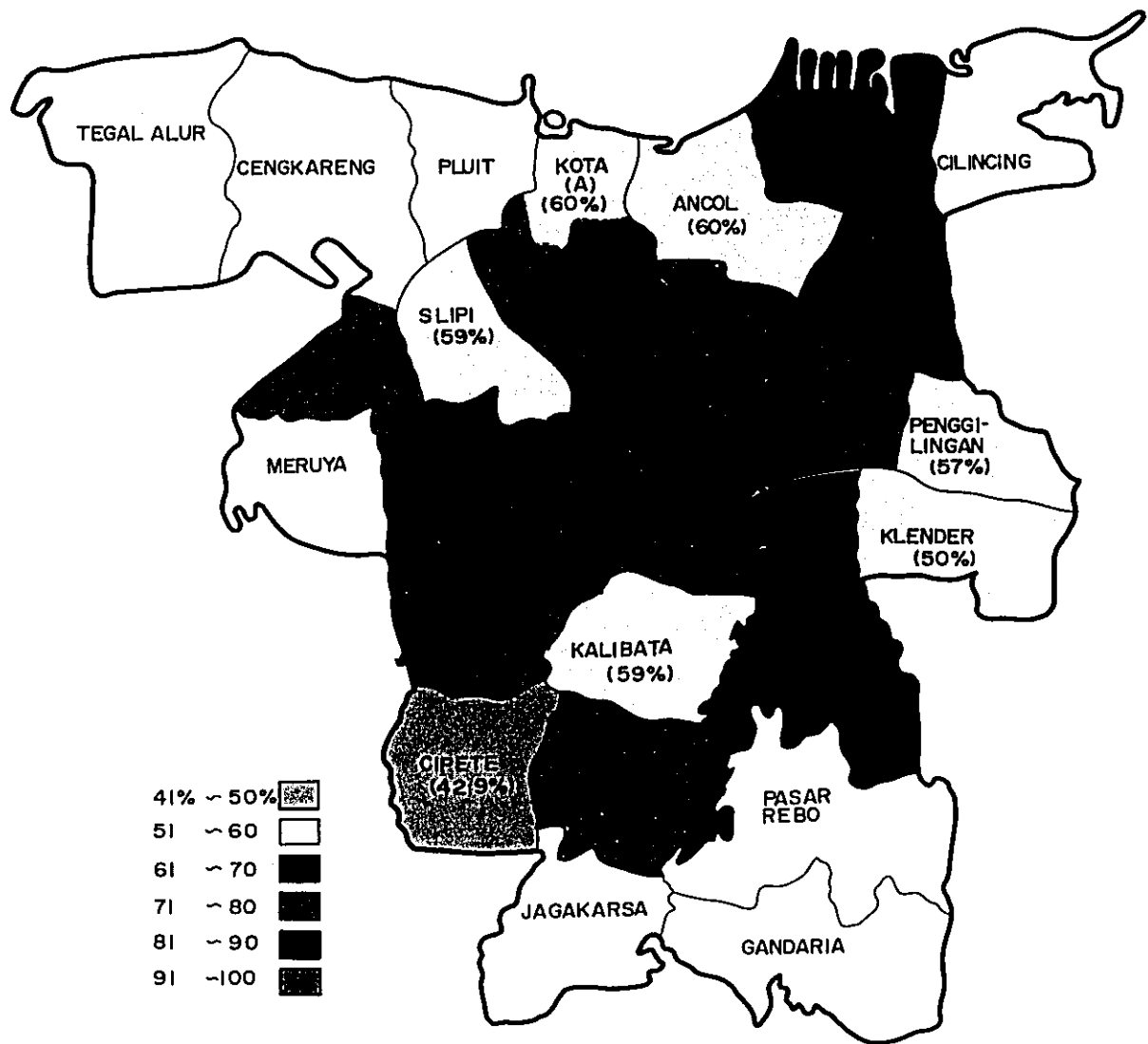
FIG. 10 - 2 - (4)

% DISTRIBUTION OF RESPONDENTS WHO ARE URGENTLY REQUESTING PUBLIC TELEPONE TO BE INSTALLED NEAR RESIDENCE

% Distribution of Respondents on Conversation Time Limit

No answer
8
(1. 1 %)

74.1
(100%)

% Distribution of Respondents on Conversation Time Limit by Sex

Male   Female

No answer   No answer
4   4
(0.2%)   (1.5 %)

475
(100%)

266
(100%)
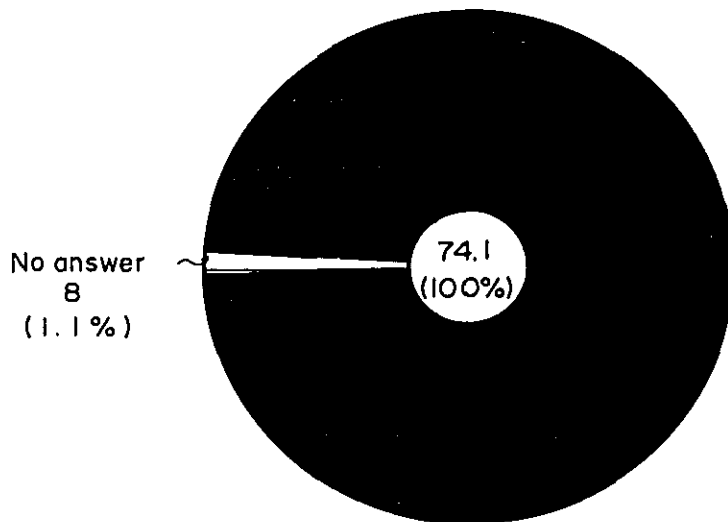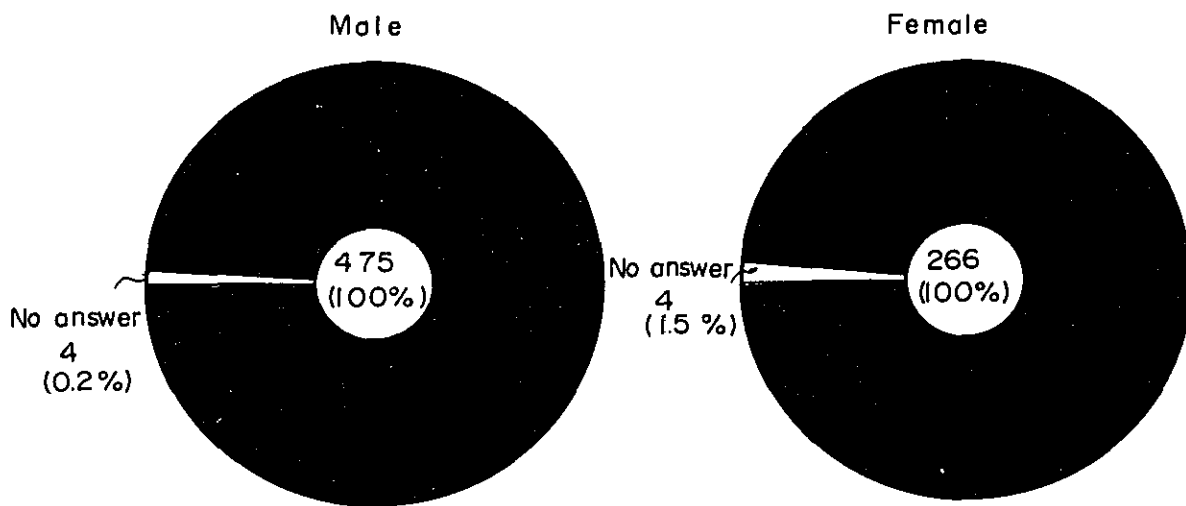
FIG. 10 - 2 -(5)

PROPOSED OF GENERAL PUBLIC FOR CONVERSATION TIME LIMIT

Owner

Non -Owner

147
(100%)

594
(100%)

No answer
8
(1.3%)

" 0 "

" 1 ~ 2" (Call)

316
(100%)

195
(100%)

No answer
1
(0.3%)

No answer
1
(0.5%)

"3 ~ 4 "

" More than 5 "

101
(100%)

129
(100%)

No answer
3
(2.9%)

No answer
3
(2.3%)
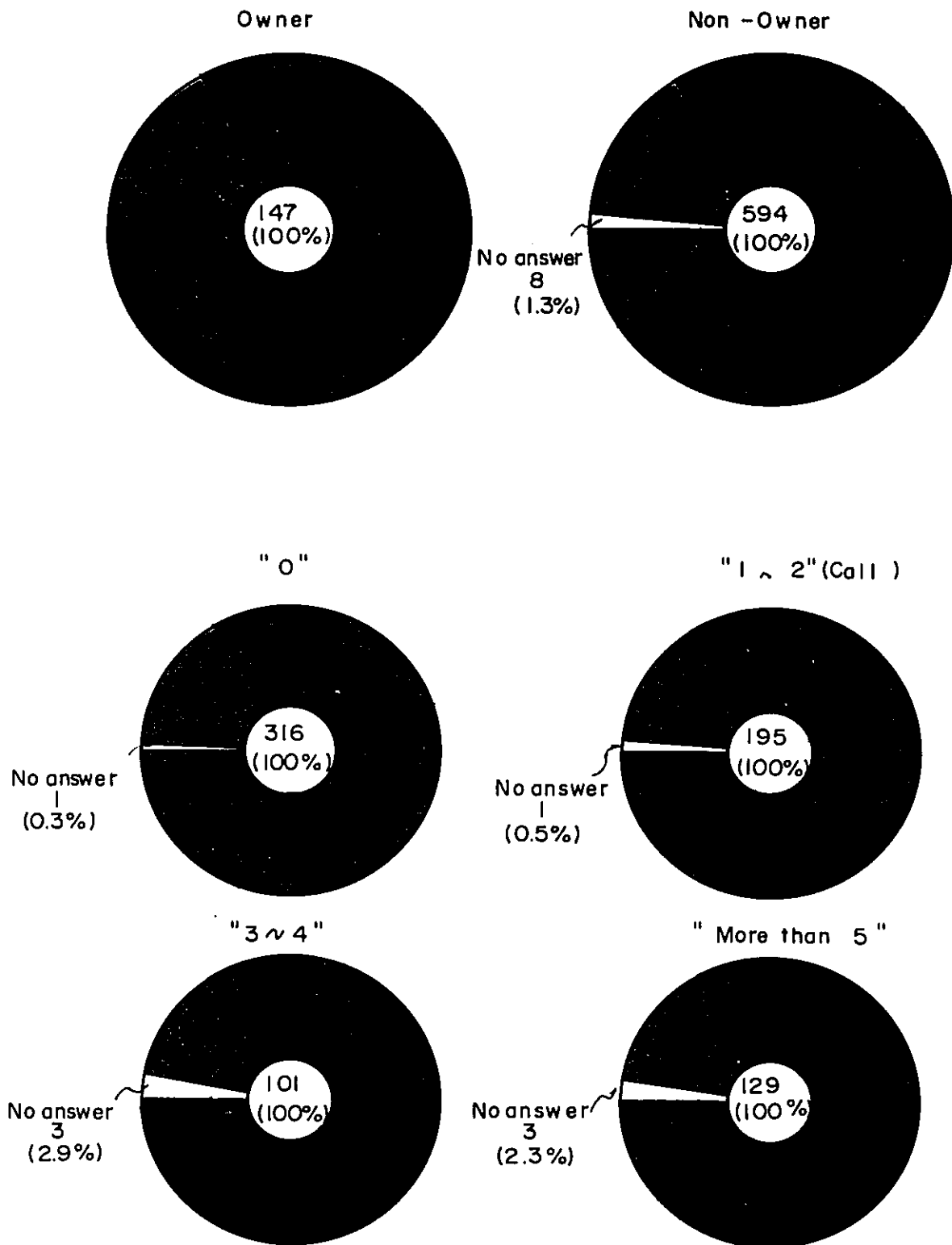
FIG. 10 - 2-(6)

% DISTRIBUTION OF RESPONDENTS ON TIME LIMIT
BY TELEPONE OWNERSHIP AND FREQUENCY OF CALLS
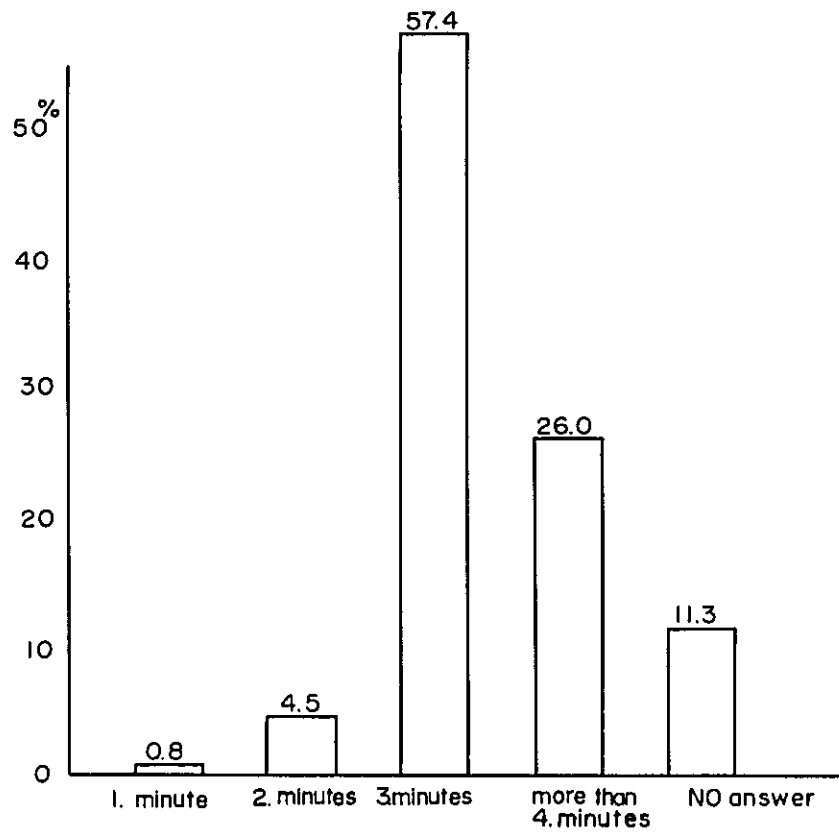
% DISTRIBUTION OF RESPONDENTS ON CONVERSATION TIME LIMIT
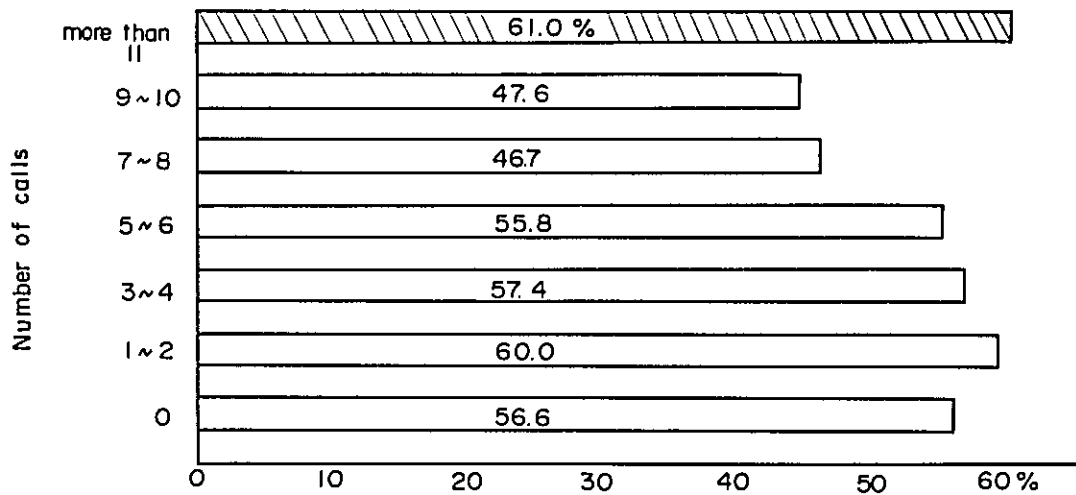
% DISTRIBUTION OF RESPONDENTS OF 3 MINUTE CONVERSATION

FIG. 10-2-(7)
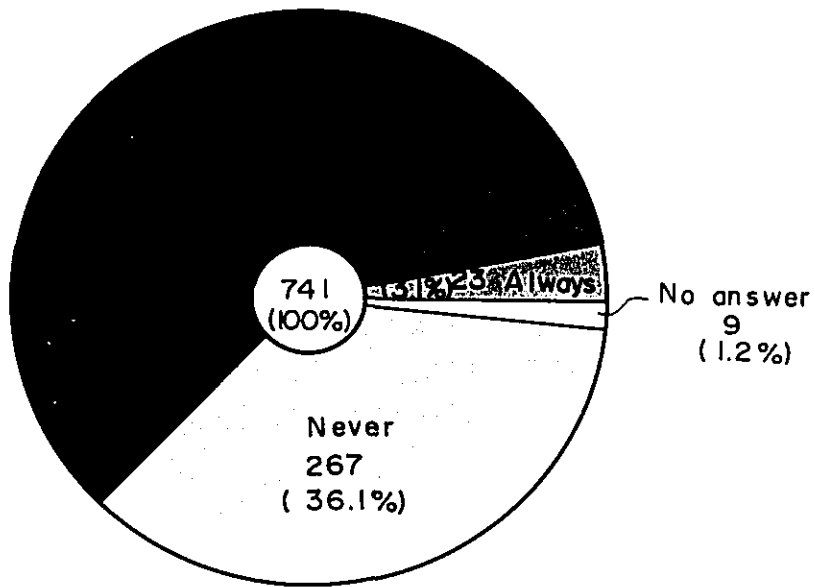
741
(100%)

~31%23Always

No answer
9
(1.2%)

Never
267
(36.1%)

% DISTRIBUTION OF RESPONDENTS FOR NECESSITY
OF TOLL PUBLIC TELEPHONE SYSTEM.

Male

Female

475
(100%)

Always
15
(3.2%)

Never
169
(35.6%)

No answer
5
(1.1%)

266
(100%)

Always
8
(3.0%)
No answer
4
(1.5%)

Never
98
(36.8%)
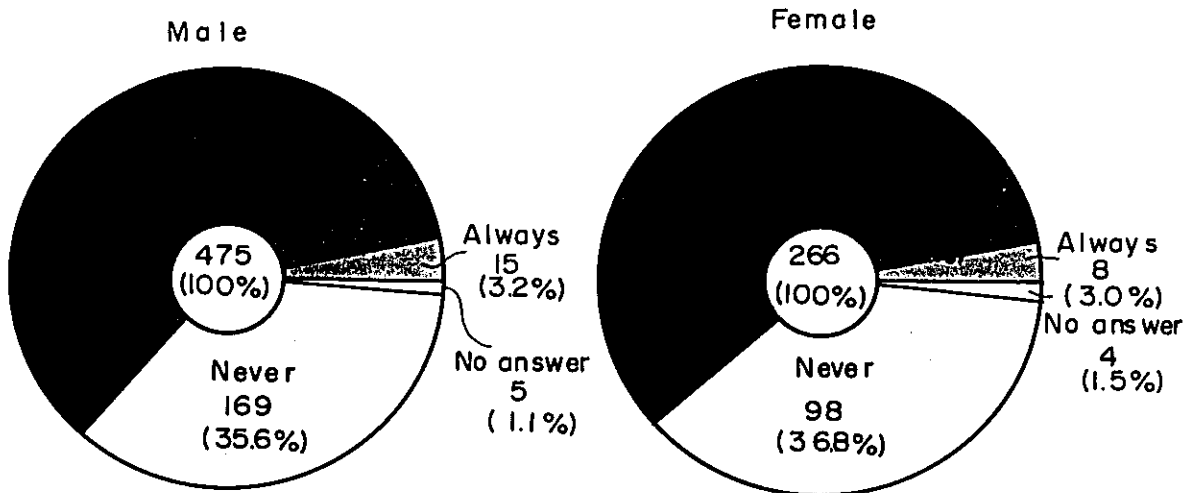
% DISTRIBUTION OF RESPONDENTS FOR NECESSITY
OF TOLL PUBLIC TELEPHONE SYSTEM BY SEX

FIG. 10-2-(8)

PROPOSAL FOR TOLL PUBLIC TELEPHONE SYSTEM
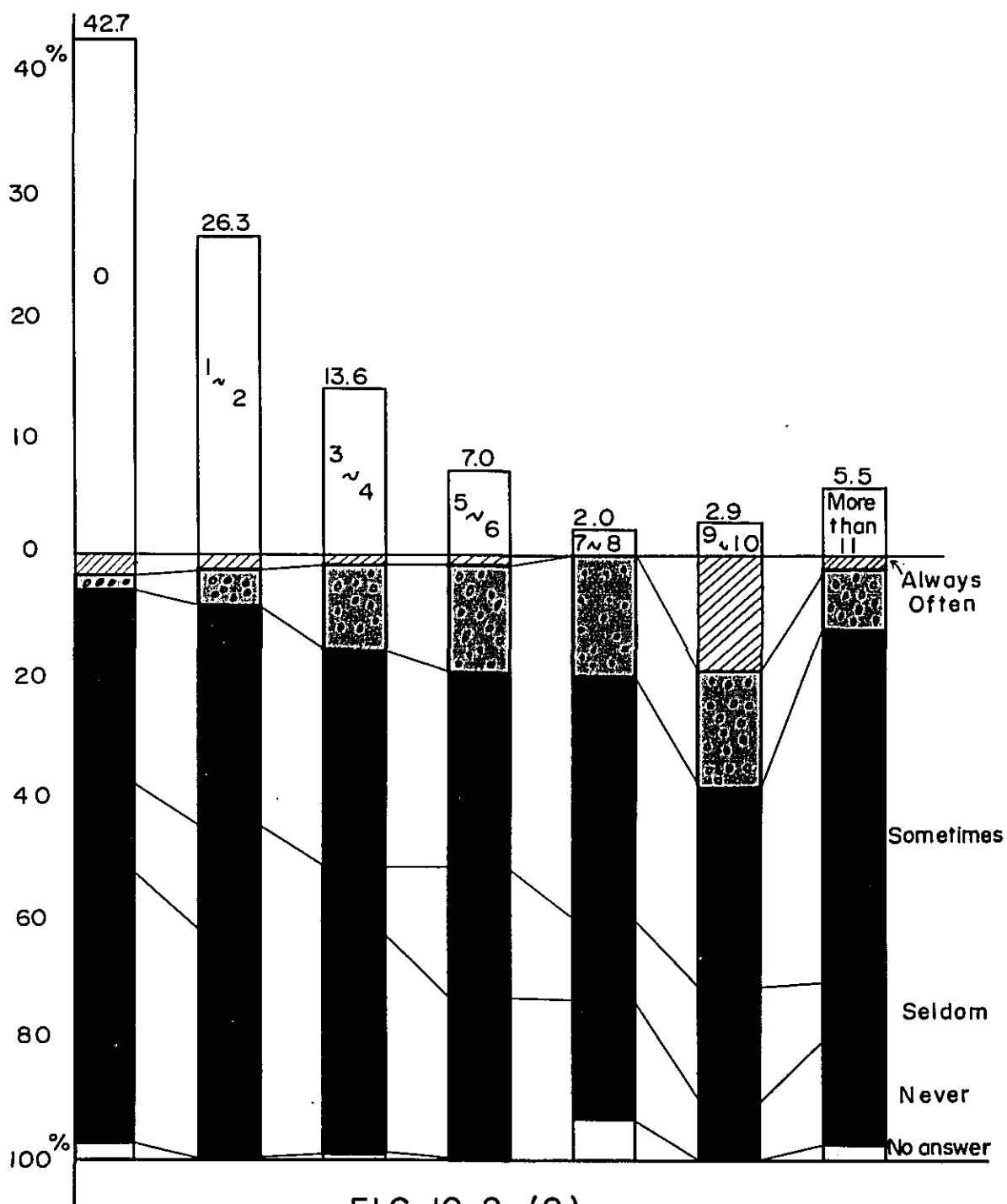
FIG. 10-2-(9)

%DISTRIBUTION OF RESPONDENTS FOR NECESSITY OF TOLL
PUBLIC TELEPHONE SYSTEM BY FREQUENCY OF CALLS

that the telephone is a speedy and convenient means of information transmission.

Many respondents who consider that the public telephone tariff is not high point out that it compares favorably with parking fee, transportation fare and telegraph charge.

10.3 Recommendations

10.3.1 Basic Concept of Public Telephone Expansion Plan

As already pointed out the public telephone expansion plan must be formulated fron the viewpoints of public service and commercial service.

a) From the viewpoint of public service the following items must be considered fc public telephones:

        a-1) Service to remote areas

        a-2) 24 hours/day service

        a-3) Ease of use (at all times and in all places)

        a-4) Introduction of public telephones for physically handicapped person

        a-5) Standardization of public telephone locations

        a-6) Availability of telephone directory

        a-7) Cashless public telephone service

        a-8) Free service for emergency calls

        a-9) Others

Items a-5) and a-6) are closely related to the public telephone revenue increase.

From public telephones installed in the peripheral districts of Jakarta as much revenue as from public telephones installed in the central part of Jakarta cannot be expected. However, in those peripheral districts the diffusion rate of subscriber telephones is extremely low. The shortage of telephones plus incomplete transportation facilities are causing the inhabitants to experience great inconvenience in information transmission which is indispensable for the improvement of the standard of living.

Emergency business or sudden illness does not necessarily take place during daytime. In order to cope with such urgent demand, the public telephone service on around-the-clock basis is necessary.

The primary step to realize 24 hours/day public telephone service is to install public telephones in such shops as gasoline stations which are open all hours, and this is relatively easy. However, the number of gasoline stations is rather limited. Therefore, to extend public telephone installation to the areas where it is desired, the introduction of booth type public telephones will become necessary.

The introduction of booth type public telephones is a relatively expensive project. Means to protect coins from being stolen must be devised; telephone booths must be procured; power source and lands must be secured. Thus, to accomplish the objective, more convenient facilities than those existing will have to be developed.

Not expensive   Expensive

| 91.5% (678) | 8.5% (63) | (100%) 741 |
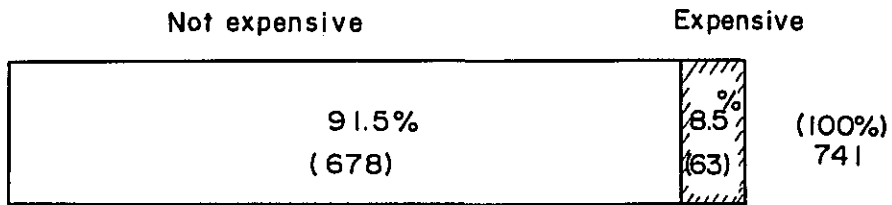
% DISTRIBUTION OF RESPONDENTS ON PUBLIC
TELEPHONE CHARGE BY ECONOMIC ACTIVITY

1.6%
Hospital
13 (1.8%)

20.1%   Residence interview
               176 (23.8%)

8.4%   Shop interview
        64 (8.6%)   ☐ Not expensive

3.4%   Student
       28 (3.8%)   ▨ Expensive

11.7%   Repair shop
        94 (12.7%)

9.0%   Bank
       73 (9.9 %)

21.6%   Trading company
               169 (22.8 %)

15.7 %   Office
         124 (16.7%)

O   10   20   30   40   50 %

FIG. IO-2-(IO)
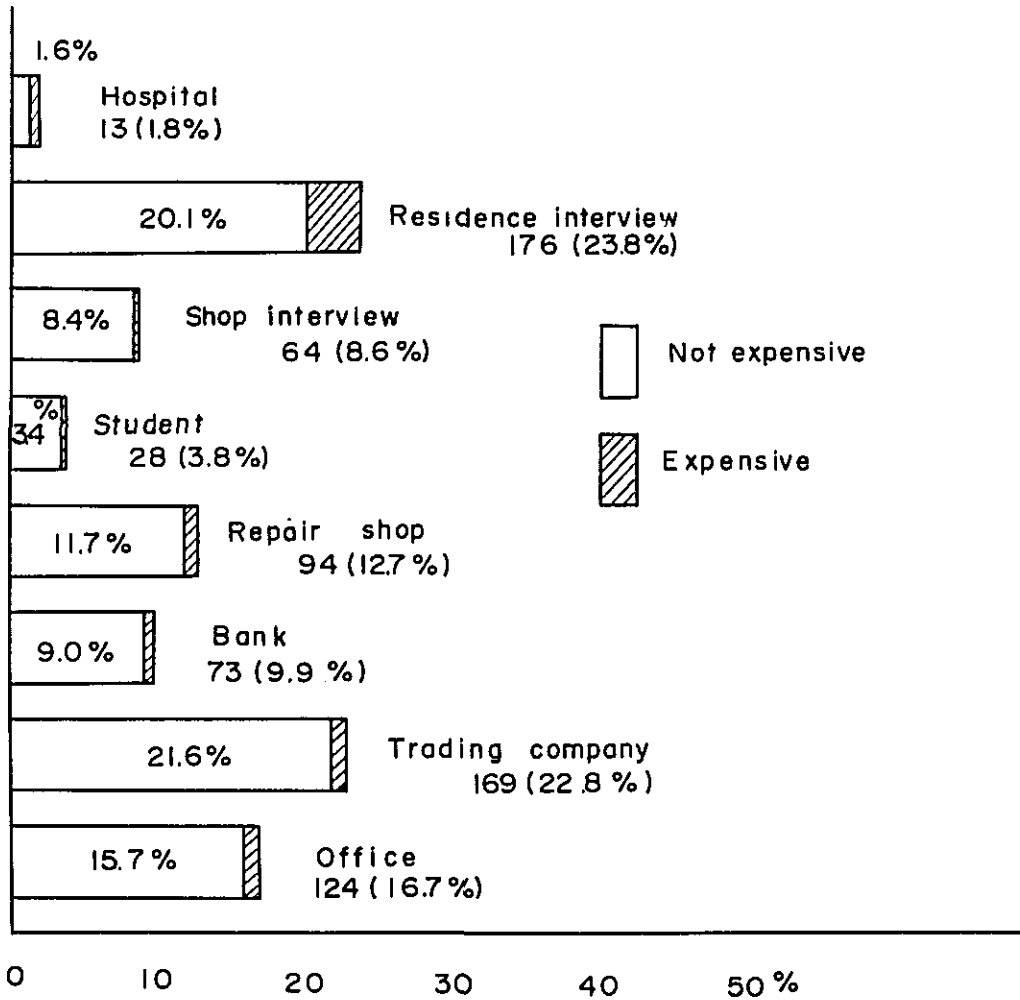
PUBLIC OPINION ABOUT PUBLIC TELEPHONE CHARGE
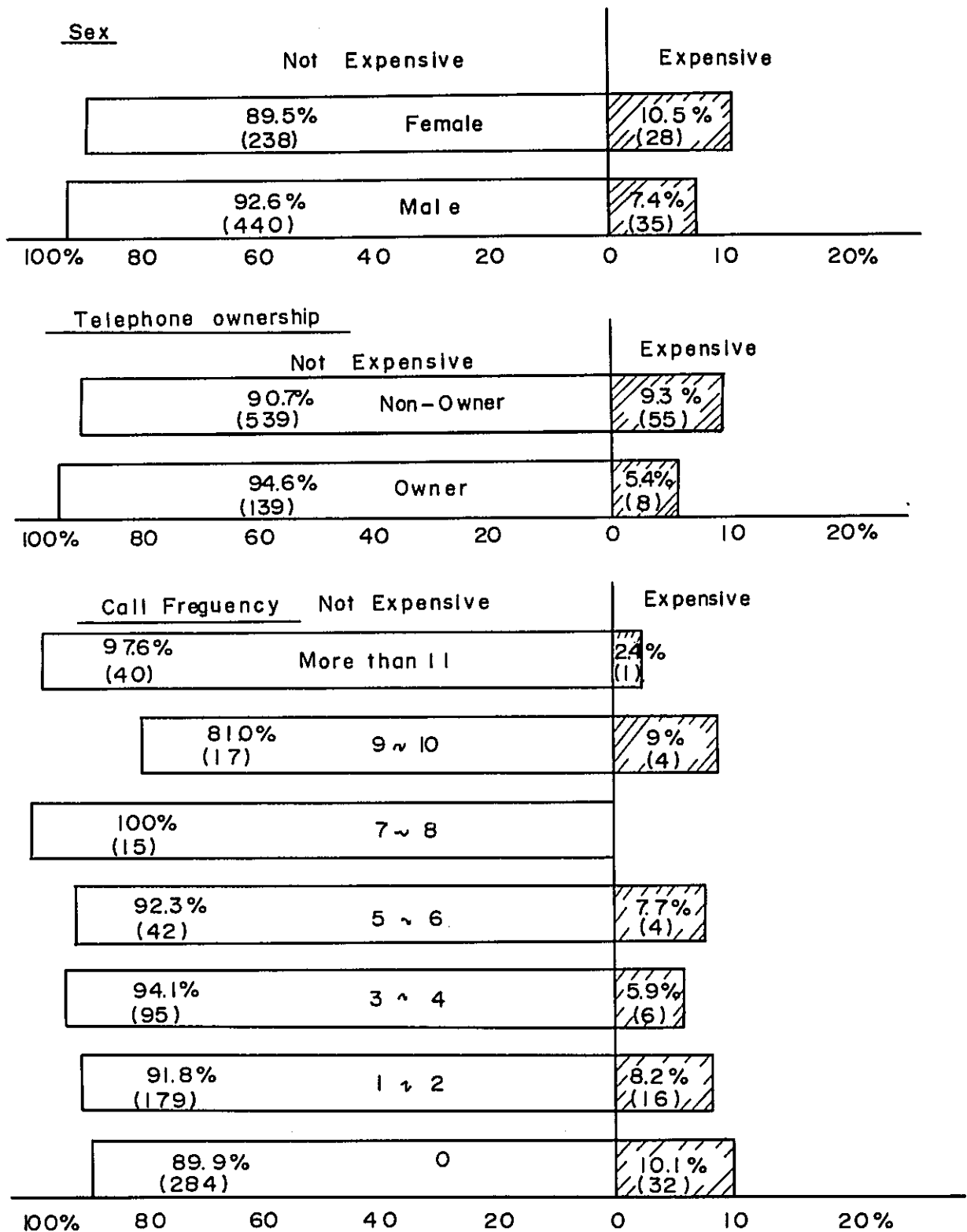
FIG. 10-2-(11)

% DISTRIBUTION OF RESPONDENTS ON PUBLIC TELEPHONE CHARGE
BY SEX, TELEPHONE OWNEYSHIP AND CALL FREGUENCY

Expensive

9
(14.3%)
No answer

63
(100%)

Higher than electricity
and water subscriber
charge

Not expensive

Lower than
parking fee
201
(29.7%)

678
(100%)

Lower than television set
subscription fee
and no-answer
10
(1.5%)
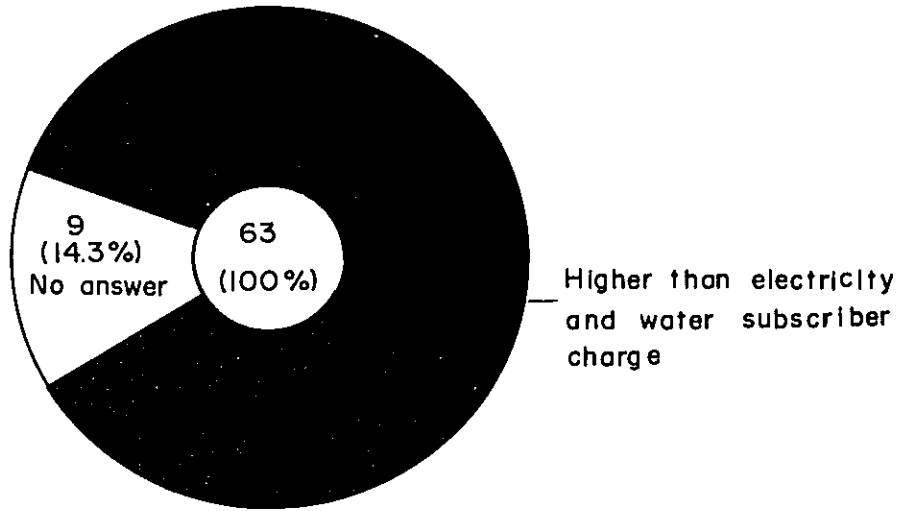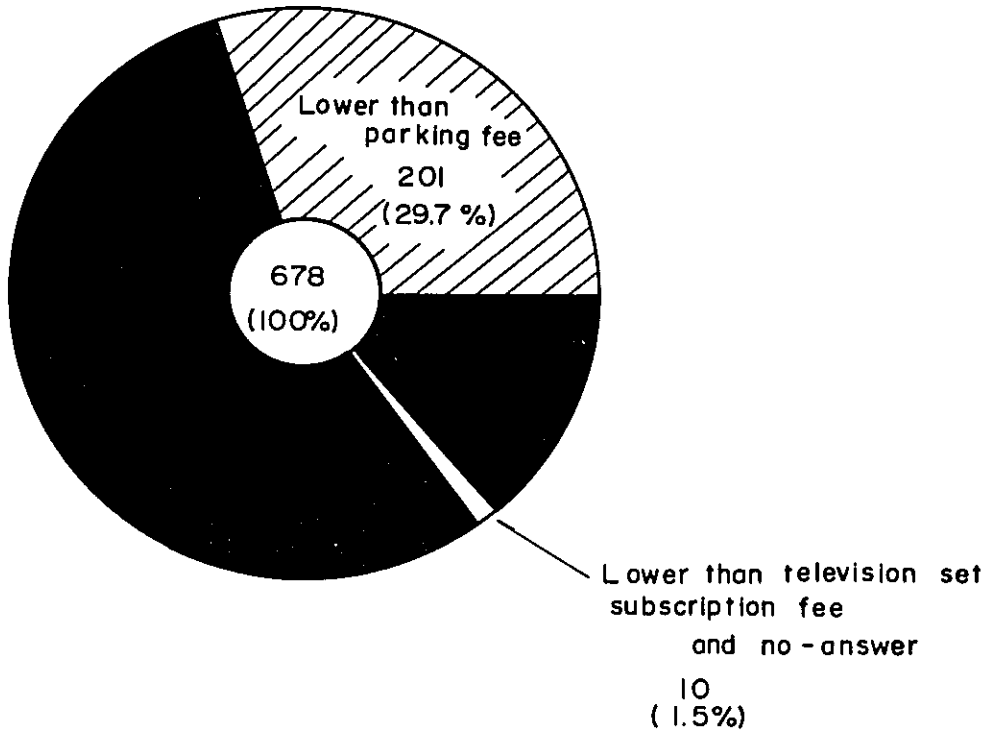
FIG. 10-2-(12)

% DISTRIBUTION OF "EXPENSIVE" AND "NOT EXPENSIVE"
RESPONDENTS BY REASON

b)   From the viewpoint of commercial service the following items must be considered:

b-1)   Selection of public telephone locations where a large service revenue can be expected.

b-2)   Selection of public telephone locations where installation and maintenance cost can be moderate.

b-3)   Change of public telephone locations based on the service revenue investigation.

b-4)   Practicing of conversation time limit and/or time charging system.

b-5)   Introduction of toll calls from public telephones.

b-6)   *Improvement of existing public telephones. (lock type coin box)*

b-7)   Optimum investment based on relationship between the number of public telephones and service revenue.

At present the public telephone expansion is being formulated by Jakarta Municipal Authority (D.K.I.). Considering that public telephones provide a strategic means for service revenue increase we believe that it is essential to proceed ahead with the public telephone expansion plan (including new technology), based on investigation and analysis of maintenance and revenue aspects, as well as the users' complaints, besides the telephone network expansion program itself. Without these considerations an ideal public telephone plan cannot be realized effectively. The vital influence of the public telephone plan on the telephone service revenue increase cannot be overemphasized.

When the telephone network cost and the public telephone set cost are compared, the former is undoubtedly much larger than the latter. Therefore, the distribution of public telephone service revenue between D.K.I. and PERUMTEL cannot necessarily be considered to be fair.

At any rate, PERUMTEL must exert its utmost efforts to increase the public telephone service revenue through the cooperation of the technical division and the management division.

Our conclusion is that as far as the installation of public telephones themselves is concerned, whichever party, D.K.I. or PERUMTEL, can carry it out; however, in preparing the public telephone expansion plan, the capacities of inside and outside plants should be taken into account. From this point of view and in consideration of the vital influence on the telephone service revenue increase mentioned previsouly, it is recommended that the public telephone expantion plan be implemented by PERUMTEL.

10.3.2   Installation of Public Telephone in Kelurahan Office

As mentioned before, the existing public telephones are concentrated in the central part of Jakarta but in the peripheral districts of Jakarta public telephones are scarcely avail-

able. If we, based on the findings in the enquete, plan installing public telephones in 220 kelurahans which spread in the extensive Jakarta region, such will bring a great benefit to the inhabitants in outlying districts.

Since many people visit kelurahan offices for registration, etc. and will use telephones a lot of times, the revenue accruing from public telephones installed in kelurahan offices will never be small.

To be regretted, however, is that the business hours of kelurahan offices are from 8:00 to 13:00 so that in other time zone than this the public telephones installed in kelurahan offices are not available to the public. Therefore, it is desirable to so arrange that the consignment public telephones would be available at shops which are open until late at night also.

10.3.3 Good Maintenance and Change of Location

Field survey has disclosed that 18% of public telephones in Jakarta remain out of use for 2-3 months. On the other hand, the general public entertains a strong complaint over the fewness of public telephones available in Jakarta. For the purpose of complete availability of a small number of public telephones PERUMTEL must hasten the repair of public telephones in trouble.

Good maintenance of public telephones not only reduces complaints from the inconvenienced general public but leads to the increased service revenue also. The importance of maintenance is evident when the public telephone revenue is compared with the general subscriber telephone charges. The former (27,000 Rupiahs) by far exceeds the latter (18,000 Rupiahs).

In case many public telephones are installed at the same place or adjacent places without raising as much revenue as expected, part of such public telephones should be relocated to more suitable places.

10.3.4 Introduction of Toll Public Telephone

Approximately 50% of all respondents feel inconvenienced by the unavailability of public telephone connections to outside Jakarta. As seen in the answer to Question No. 26 the complaint over the inability of toll calls ranks fourth among all complaints.

Introduction of toll public telephones in Jakarta brings great benefit not only to the users but to PERUMTEL also. In Japan the revenue from toll public telephone service (equivalent to 235,000 Repiahs/month per telephone set) is nearly 40 times the revenue from local public telephone service (equivalent to 5,900 Rupiahs/month per telephone set).

Needless to say, for introducing toll public telephones, new equipments, such as pulse senders and new public telephone sets, are required. However, since such additional equipment cost is not so much, the toll public telephone service will prove to be a profitable

undertaking. The airport and railway stations are among the optimum locations of toll public telephones. By means of public telephone revenue management, PERUMTEL must exert efforts to find appropriate places for toll public telephones in addition to the airport and railway stations.

Practicing of conversation time limit will have to be considered before introducing time charging system to local networks.

Furthermore, we recommend that PERUMTEL would initiate the consignment public telephone system. For, if the consignment public telephone system is realized, the connections to other towns via manual switchboard operator become possible even before the introduction of toll public telephones. In this case the public telephone consignee can be informed of toll charge by the exchange office after the completion of conversation.

10.3.5 Others

In addition to the foregoing we recommend that PERUMTEL would consider installing public telephones temporarily at the places of social gatherings for the period such gatherings are in session. Since a large number of people visit those social events, there will naturally be no small demand for calls by public telephones. Such temporarily installed public telephones can be moved to other places where greater service revenue can be expected, when the social events are over. This kind of action to increase telephone service revenue must be taken by all means.

It is also necessary to maintain the optimum inventory of public telephones by consulting the social gathering schedules and past statistical data.

10.3.6 Public Telephone Expansion Plan

It is extremely difficult to determine the optimum number of public telephones. For, this number depends to a great extent upon the administrative policy of the country concerned.

We believe that the installation of public telephones must be planned, based on the following points, in careful consideration of both the public service aspect and the commercial service aspect:

a) To improve the public telephone diffusion rate.

b) To extend service benefit to the peripheral districts.

c) To introduce the consignment public telephone system.

d) To introduce the toll public telephone system.

e) To introduce the conversation time limit and/or time charging system.

f) To introduce the booth type public telephones.

g) Others

It is desirable that the public telephone diffusion rate per 1,000 inhabitants in Jakarta
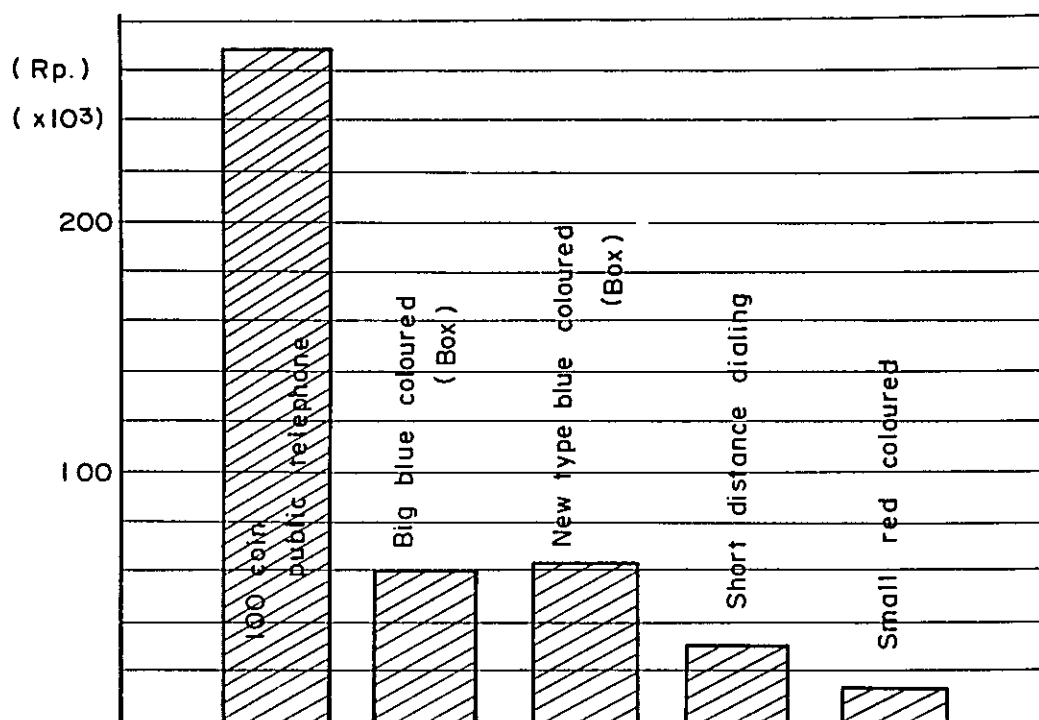
Kind of public telephone (Japan)			Charge (x10³)	Remarks
100 coin public telephone			Rp. 235	414
Box type	Big blue coloured public telephone		29.5	10,675
	New type blue coloured public telephone		31.2	
Consignment public telephone	10 coin public telephone		15.0	60,999
	Small red coloured public telephone		5.9	
Average			15.7	72,088

FIG. 10-3-(1)

MONTHLY REVENUE / PUBLIC TELEPHONE

be improved to 1.0 by 1993, based on the diffusion rates in the advanced countries given in Table 10.1.(2) and Table 10.1.(3).

If, based on the diffusion rates in the advanced countries referred to above, the diffusion rate of 1.0 per 1,000 inhabitants and the similar diffusion rate per 100 subscriber lines can be realized, the number of public telephones in Jakarta will be approximately 10,000 units by 1993 as shown in Table 10.3.(2). Furthermore, during the period of the Second Five-Year Plan, a minimum of 10 or more public telephones should be installed in each kelurahan by means of introduction of the consignment public telephone system, etc.

Toll public telephones and conversation time limit must be introduced as early as possible before introducing time charging system to local network in consideration of the progress of the new switching system expansion plan.

As regards the unattended booth type public telephones on main roads or other public places, it is desirable to install them for the time being in front of or in the neighborhood of police stations, etc., so as to prevent the loss of coins by stealing. The number of such public telephones installed in more appropriate places can be increased gradually as the standard of living among the general public improves.

10.4 Appendix

(1) Object of Questionnaire Survey

The main objective of this questionnaire is to identify the complaints which the general public entertain with regard to the public telephone service and evaluate their recognition of necessity of the service, and to make the best use of the findings in formulating the long-term public telephone expansion plan.

(2) Survey Period

March 11, 1975 to March 31, 1975 (21 days)

(3) Survey Team

The Jakarta City Telephone Network Planning Team (JTP)

(4) Survey Methods

Restante survey and personal interview survey were carried out. Interviews were made with Indonesians only.

(a) Restante Survey

The respondents (company employees) were briefed about how to fill the questionnaire. 2-3 days later the filled-in sheets were collected.

(b) Personal Interview Survey

Interviews were made by household visits. Questions and answers were exchanged directly with interviewees.

TABLE 10-3-(2)

PUBLIC TELEPHONE EXPANSION PlAN
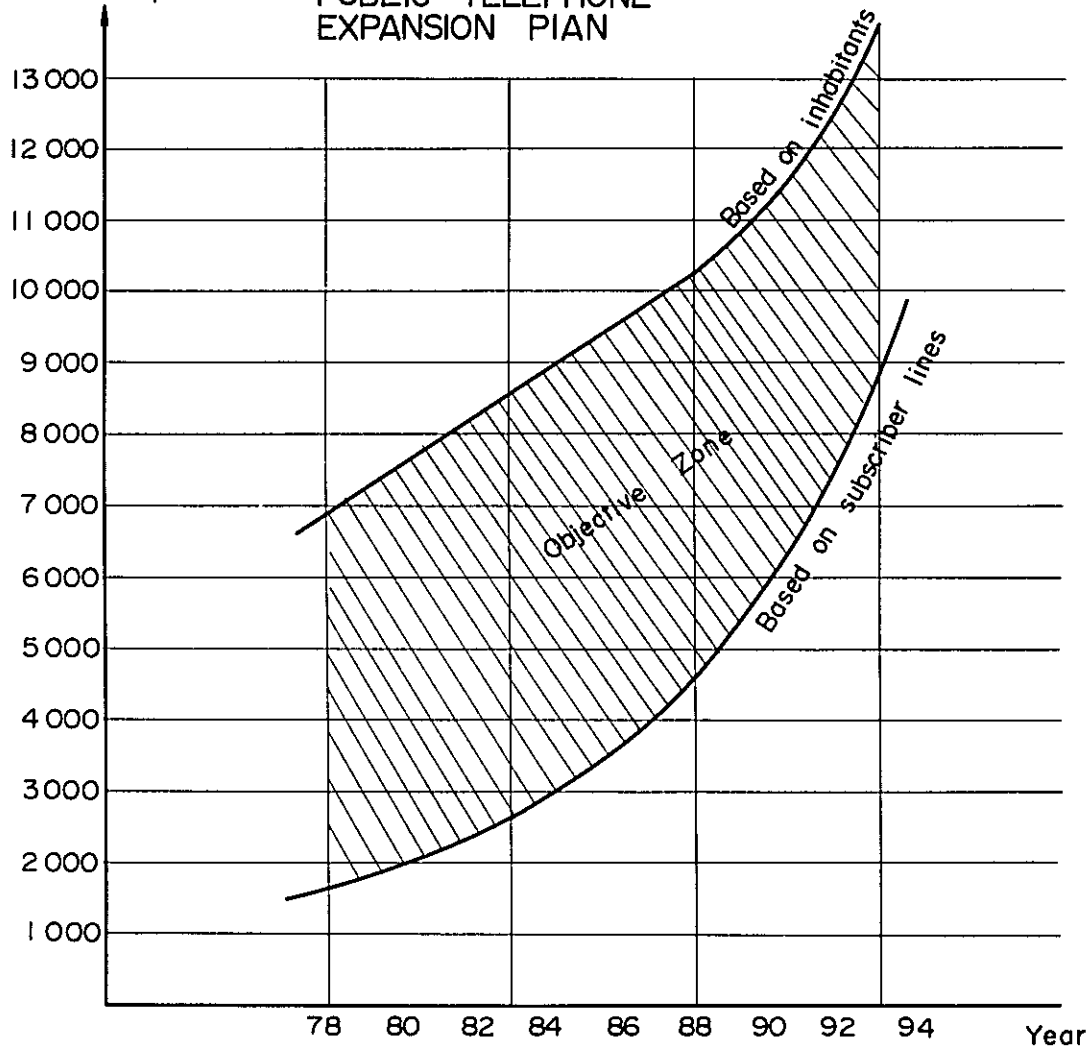
Item	1978	1979	1983	1988	1993	Remarks
① Inhabitant	6,850,000		8,650,000	10,700,000	13,850,000	
② Subscriber line	163,850	180,590	265,480	450,450	808,000	
③① x $1/1000$	6,850		8,650	10,700	13,850	
④② x $1/100$	1,640		2,650	4,500	8,080	

③ Estimated based on inhabitants

④ Estimated based on subscriber lines

TABLE 10-4-(1)   NUMBER OF DISTRIBUTED AND COLLECTED QUESTIONNAIRES

NO	Name of Company	Delive -ry	Collec- tion	NO	Name of Company	Delive -ry	Collec- tion
1	Astra Toyota	20	12	21	Bank Bumi Daya	50	35
2	Kurama Yuda	30	23	22	Wisma Nusantara	20	18
3	Indokaya	30	23	23	Indonesia hot	20	18
4	Mitsubishi corporation	20	15	24	Jakarta transport	20	11
5	Tomen	20	20	25	P.T. Ratax	20	8
6	Tokyo marine	20	18	26	Turi	20	5
7	Pacific Consultant	5	4	27	Sumisho	20	17
8	Obayashi	20	18	28	Taisho Marine	20	20
9	Sarinah	40	33	29	P.T. Asuransi India	50	43
10	Tokyo Bank	20	20	30	Students	40	28
11	C. Itoh	20	13	31	Pelita air sevice	20	13
12	Indonasia Hospital	20	13	32			
13	Chase Manhattan	20	18	33			
14	Government office	20	8	34			
15	Intalan	20	13	35			
16	Kwarta Daya	20	16		Sub total		501
17	Udatimex	20	11		Interview (Residence)		176
18	UNDP	20	17		" (Shop)		64
19	Intalan Iapco oil	20	11		Sub total		240
20	Statistic Bureau	20	12		Total	1000	741

Number of questionnaire sheets distributed : 1000 sheets
Number of questionnaire sheets collected : 741 sheets
Collection rate : 74.1 %

QUESTIONNAIRE

This questionnaire on the utility of public telephones in Jakarta is conducted at the request of the Government of Indonesia. We ask you to answer the following questions correctly. Answers produced in this questionnaire will not be used for other purpose than to develop statistical data.

Thank you for your cooperation.

Respondent's occupation : _____

Age : _____

Home address : _____

Kelurahan : _____

Sex : _____

Surveyer's name : _____

Date of survey : _____

o Encircle the item number you have chosen as your answer.

o In case your answer is "others", state your opinion in the provided column.

1. Do you know that Perusahaan Umum Telekomunikasi (PERUMTEL) has provided the public telephone for use by people in Jakarta?

Answer : (1.1) Yes   (1.2) No

2. How many family members do you have (including yourself)?

Answer : _____ persons

3. How many members of your family (including you) are working and/or studying?

Answer : _____ persons

4. Is there a telephone in your family member's office and/or school?

Answer : (4.1) Yes   (4.2) No

5. Have you ever used a public telephone in Jakarta before?

Answer : (5.1) Yes   (5.2) No

6. Did you use a public telephone in Jakarta during the past one month?

Answer : (6.1) Yes   (6.2) No

7. How many times did you use a public telephone in Jakarta during the past one month?

Answer : (7.1) 0   (7.2) 1 - 2

               (7.3) 3 - 4   (7.4) 5 - 6

               (7.5) 7 - 8   (7.6) 9 - 10

               (7.7) More than 11 times

8. Where did you use a public telephone in Jakarta during the past one month? Please mark all places where you did.

Answer : (8.1) Hotel   (8.2) Bus terminal

(8.3) Theatre   (8.4) Railway station

(8.5) Hospital   (8.6) Bank

(8.7) Supermarket   (8.8) Police station

(8.9) Airport   (8.10) Recreation centre

(8.11) Drugstore   (8.12) University

(8.13) Business building   (8.14) Shopping centre

(8.15) Others

9. Where did you call by using a public telephone in Jakarta during the past one month? Please mark the places concerned.

Answer : (9.1) My home   (9.2) Friend's home

(9.3) Hotel   (9.4) Shopping centre

(9.5) Theatre   (9.6) Hospital

(9.7) Police station   (9.8) Supermarket

(9.9) Airport   (9.10) My office

(9.11) Recreation centre   (9.12) University

(9.13) Bank   (9.14) Drugstore

(9.15) Others

10. For what purpose did you use a public telephone mostly in Jakarta during the past one month? Choose one answer only.

Answer : (10.1) Private   (10.2) Business

(10.3) Others

11. Do you have a telephone in your home?

Answer : (11.1) Yes   (11.2) No

12. Have you ever had any trouble in communication due to the fewness of telephones in Jakarta?

Answer : (12.1) Always   (12.2) Often

(12.3) Sometimes   (12.4) Seldom

(12.5) Never

13. Do you want a public telephone to be installed near your house?

Answer : (13.1) Urgent   (13.2) Not so urgent

(13.3) No

14. For what purpose do you want a public telephone to be installed near your house? Choose one answer mostly concerned with you.

Answer : For conveying information to :

(14.1)	My friend	(14.2)	My office
(14.3)	Hotel	(14.4)	Shopping centre
(14.5)	Hospital	(14.6)	Police station
(14.7)	Supermarket	(14.8)	Airport
(14.9)	Other offices	(14.10)	Recreation centre
(14.11)	University	(14.12)	Bank
(14.13)	Drugstore	(14.14)	Railway station
(14.15)	Others		

15. Present public telephone in Jakarta cannot be connected to outside of Jakarta. Have you ever had a wish to call to outside Jakarta?

Answer : (15.1) Always   (15.2) Often

(15.3) Sometimes   (15.4) Seldom

(15.5) Never

16. In case a public telephone was unavailable because it was damaged, or located far away, or due to any other reasons, what means did you mostly use to convey information to someone else?

Answer : (16.1) To borrow neighbor's/other person's telephone.

(16.2) To utilize a rental telephone.

(16.3) To ask another person to convey the information.

(16.4) To use telegram.

(16.5) To give up information sending.

(16.6) Others.

17. Do you know the locations of public telephones in Jakarta?

Answer : (17.1) Know well   (17.2) Know a little

(17.3) No

18. Do you think that the signboard indicating the location of public telephone is easy to identify?

        Answer :   (18.1)   Yes   (18.2)   No

19. Present public telephone charge is Rp.25,-. Do you think that this charge is expensive?

        Answer :   (19.1)   Yes   (19.2)   No

20. Why do you think that this charge is expensive?

    (This question is only for the persons whose answer to Question 19 is "Yes".)

        Answer :   Choose one answer only.

                (20.1)   Higher than subscriber-telephone charge

                (20.2)   Higher than electricity and water subscriber charge

                (20.3)   Others

21. Why do you think that this charge is not expensive?

    (This question is only for the persons whose answer to Question 19 is "No".)

        Answer :   Choose one answer only.

                (21.1)   Lower than parking fee

                (21.2)   Same as public transport fare

                (21.3)   Lower than telegram charge

                (21.4)   Lower than Television subscriber fee

                (21.5)   Others

22. Do you think it is safe enough to put a public telephone outdoors without any attendant?

        Answer :   (22.1)   Yes   (22.2)   No

23. Existing public telephones are placed on locations mentioned below.

                (23.1)   Hotel   (23.2)   Bus terminal

                (23.3)   Shopping centre   (23.4)   Theatre

                (23.5)   Supermarket   (23.6)   Police station

                (23.7)   Hospital   (23.8)   Airport

                (23.9)   Business building   (23.10) Recreation centre

                (23.11) University   (23.12) Bank

                (23.13) Railway station   (23.14) Drugstore

    Where else do you want a public telephone to be placed other than those existing locations? Mention two additional locations.

24. Is it necessary to set a time limit in using a public telephone in order to avoid long telephone conversation?

        Answer   :   (25.1)   Yes   (25.2)   No

25. How long should such time limit be according to your opinion?

        Answer   :   (26.1)   1 minute   (26.2)   2 minutes

                          (26.3)   3 minutes   (26.4)   More than 4 minutes

26. Do you have any complaint about the public telephone in Jakarta?

        Answer   :   Choose one answer only.

                        (27.1)   Difficulty in using it

                        (27.2)   Cannot be connected to outside Jakarta

                        (27.3)   Noise and cross talks in telephone set

                        (27.4)   Noisy surroundings

                        (27.5)   Expensive

                        (27.6)   No connection all day long

                        (27.7)   Damaged

                        (27.8)   Number of public telephones is very small.

                        (27.9)   Difficulty in looking for location of public telephone

                        (27.10)   No telephone directory

                        (27.11)   Others

27. Would you please tell us your opinion, as well as suggestions, about public telephone service in Jakarta?

        Answer   :

THANK YOU FOR YOUR COOPERATION.

Distribution
I ~ 10	
II ~ 20	
21 ~ 30	
31 ~ 40	
41 ~ 50	
51 ~ 70	
91 ~ 100	
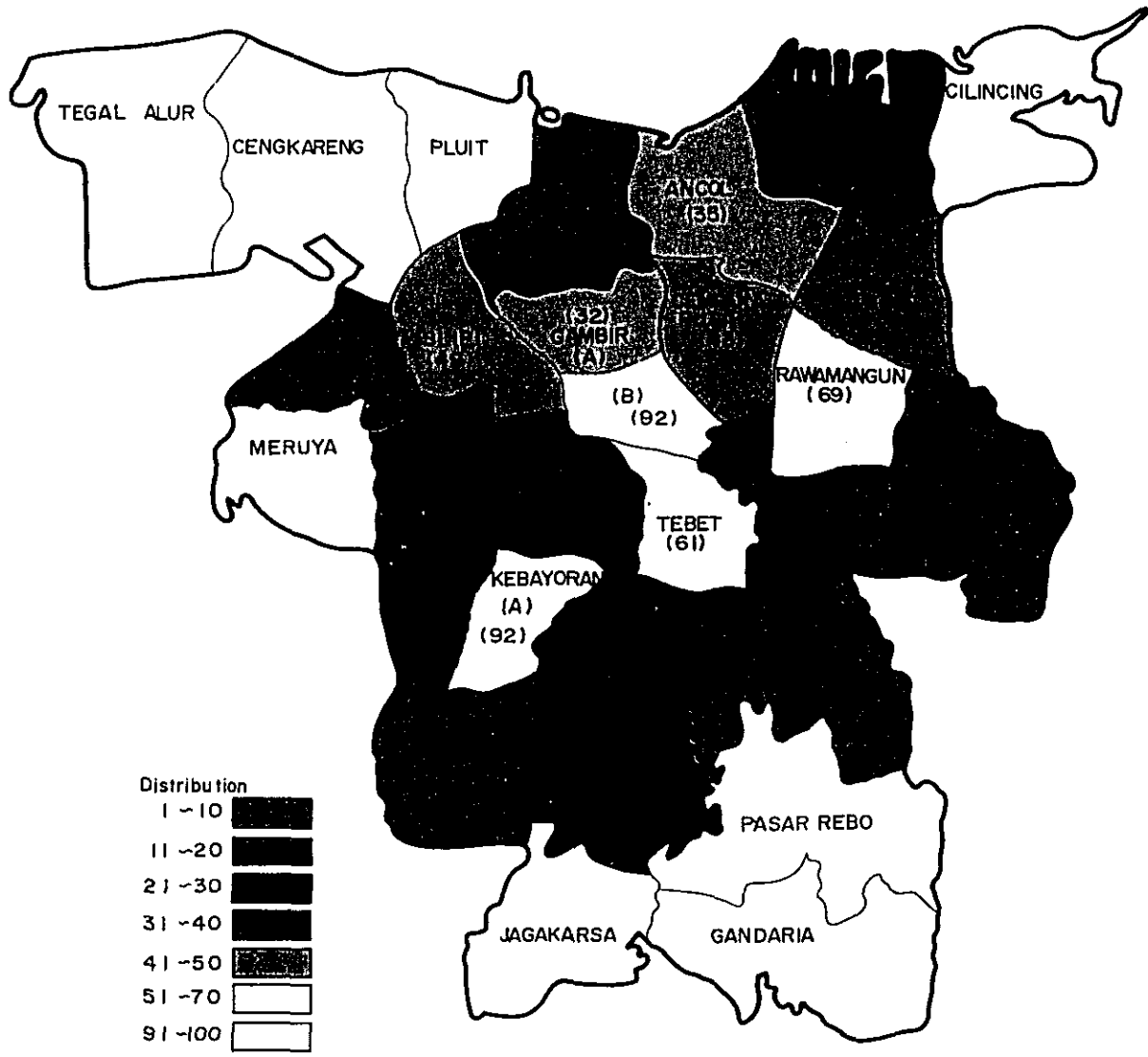
FIG. 10-4-(2)   DISTRIBUTION OF RESPONDENT OF QUESTIONNAIRE

TABLE IO-4-(3)

Q. No.	Items	Table No.
1.	Knowledge about the provision of the public telephone	IO - 4 -(8)
2.	Number of Working and/or studying family members	" (9)~(12)
3.	Working family members	" (13)~(16)
4.	Telephone in family members' office and/or school	" (17)~(20)
5.	Previous experience in using a public telephone	" (21)~(24)
6.	Usage of a public telephone the month before	" (25)~(28)
7.	Frequeney of using a public telephones the month before	" (29)~(31)
8.	Places of public telephones used ·	" (32)~(34)
9.	Destination of call	" (35)~(36)
IO.	Purpose of call	" (37)~(40)
11.	Ownership of private telephone	" (41)~(43)
12.	Trouble due to lack of a public telephone	" (44)~(47)
13.	Necessity of a public telephone near one's house	" (48)~(51)
14.	Reason of a public telephone to be near one's house	" (52)~(54)
15.	Frequency of toll call need	" (55)~(57)
16.	Other means to convey information	" (58)~(60)
17.	Knowledge about the location of public telephones	" (61)~(64)
18.	Opinion about signboard	" (65)~(68)
19.	Opinion about present charge	" (69)~(72)
20.	Reason for expensive	" (73)~(76)
21.	Reason for not expensiye	" (77)~(79)
22.	Safety of an unguarded public telephone	" (80)~(83)
23.	Other proposed places of public telephones	—
24.	Necessity of conversation time limit	" (84)~(87)
25.	Length of time limit	" (88)~(91)
26.	Conplaint	" (92)~(94)
27.	Opinion & Suggestion	—
	*******	

TABLE IO-4-(4)

I) NUMBER OF COLLECTED SHEETS BY ECONOMIC ACTIVITIES

Economic activities	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residen-ce interview	Hospital	Total
Number of sheets	124	169	73	94	28	64	176	13	741

TABLE IO-4-(5)

2) CLASSIFICATION BY AGE AND ECONOMIC ACTIVITIES

Economic activities / Age	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residen-ce interview	Hospital	Total
Less than 20	2	8	1	5	0	7	3	0	26
21 ~ 25	33	55	8	22	2	23	31	4	178
26 ~ 30	36	48	19	37	7	15	34	2	198
31 ~ 35	21	26	16	17	7	5	26	4	122
36 ~ 45	23	25	23	12	8	7	51	2	151
46 ~ 55	9	7	5	0	3	7	27	1	59
more than 56	0	0	1	1	1	0	4	0	7
Total	124	169	73	94	28	64	176	13	741

TABLE IO-4-(6)

3) CLASSIFICATION BY SEX AND ECONOMIC ACTIVITIES

Economic activities / Sex	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residen-ce interview	Hospital	Total
Male	93	113	45	60	25	25	106	8	475
Female	31	56	28	34	3	39	70	5	266
Total	124	169	73	94	28	64	176	13	741

TABLE IO-4-(7)

4) CLASSIFICATION BY SEX AND AGE

Age / Sex	less than 20	21~25	26~30	31~35	36~45	46~55	more than 56	Total
Male	9	91	123	97	109	39	7	475
Female	17	87	75	25	42	20	0	266
Total	26	178	198	122	151	59	7	741

TABLE IO-4-(8)

Q.I   DO YOU KNOW THAT PEURSAHAN UMUM TELEKOMUNIKASI (PERUMTEL) HAS PROVIDED THE PUBLIC TELEPHONE FOR USE BY PEOPLE IN JAKARTA ?

Economic activities / Answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Yes	119	167	73	93	27	64	140	12	694
No	5	2	0	I	I	0	0	I	46
Total	124	169	73	94	28	64	176	13	741

TEBLE 10-4-(9)

Q2. HOW MANY FAMILY MEMBERS DO YOU HAVE (INCLUDING YOURSELF) ?

I) CLASSIFICATION BY ECONOMIC ACTIVITIES

Number of family / Economic activities	1	2	3	4	5	6	7	8	9	more than 10	Total
Office	9	13	18	26	13	16	5	5	5	14	124
Trading company	8	12	19	22	26	21	11	22	4	24	169
Bank	2	3	8	15	8	11	7	10	7	2	73
Repair shop	5	9	14	10	15	7	10	8	8	8	94
Studnt	3	2	1	1	4	4	3	3	6	1	28
Shop interview	1	3	4	11	12	9	4	7	5	8	64
Residence interview	15	21	30	29	25	25	11	8	6	6	176
Hospital	1	1	2	3	1	0	3	2	0	0	13
Total	44	64	96	117	104	93	54	65	41	63	741

TABLE 10-4-(10)

2) CLASSIFICATION BY SEX

Number of family / Sex	1	2	3	4	5	6	7	8	9	more than 10	Total
Male	34	36	66	75	68	64	34	40	23	35	475
Female	10	28	30	42	36	29	20	25	18	28	266
Total	44	64	96	117	104	93	54	65	41	63	741

TABLE IO-4-(II)

3) CLASSIFICATION BY OWNERSHIP OF TELEPHONE

Telephone set \ Number of family	1	2	3	4	5	6	7	8	9	more than 10	Total
Owner	9	18	7	15	22	28	9	16	5	18	147
Non-owner	35	46	89	102	82	65	45	49	36	45	594
Total	44	64	96	117	104	93	54	65	41	63	741

TABLE IO-4-(I2)

4) CLASSIFICATION BY NUMBER OF CALLS

Number of calls \ Number of family	1	2	3	4	5	6	7	8	9	more than 10	Total
0	13	31	38	56	47	45	18	29	17	22	316
1 ~ 2	17	18	25	36	24	23	10	11	11	20	195
3 ~ 4	4	6	17	7	17	14	8	10	8	10	101
5 ~ 6	3	3	3	8	8	4	7	6	3	7	52
7 ~ 8	1	1	4	1	0	3	3	2	0	0	15
9 ~ 10	1	1	2	1	3	2	5	2	1	3	21
more than 11	5	4	7	8	5	2	3	5	1	1	41
Total	44	64	96	117	104	93	54	65	41	63	741

TABLE 10-4- (13)

Q.3 HOW MANY MEMBERS OF YOUR FAMILY (INCLUDING YOU) ARE WORKING AND/OR STUDYING ?

1) CLASSIFICATION BY ECONOMIC ACTIVITIES

Economic activities \ Number of persons	1	2	3	4	5	6	7	8	9	more than 10	No answer	Total
Office	28	23	15	5	8	7	2	1	5	1	29	124
Trading company	27	38	18	18	9	15	9	3	3	1	28	169
Bank	18	18	7	9	4	3	0	2	1	0	11	73
Repair shop	17	20	10	9	4	3	4	2	2	0	23	94
Student	4	2	6	3	3	0	1	4	0	0	5	28
Shop interview	17	14	9	6	5	4	0	3	1	1	4	64
Residence interview	43	35	16	8	5	6	3	1	0	0	59	176
Hospital	3	0	3	1	0	3	1	0	0	0	2	13
Total	157	150	84	59	38	41	20	16	12	3	161	741

TABLE 10-4-(14)

2) CLASSIFICATION BY SEX

Sex \ Number of persons	1	2	3	4	5	6	7	8	9	more than 10	No answer	Total
Male	103	105	55	33	16	25	11	9	5	1	112	475
Female	54	45	29	26	22	16	9	7	7	2	49	266
Total	157	150	84	59	38	41	20	16	12	3	161	741

TABLE IO-4-(I5)

3) CLASSIFICATION BY OWNERSHIP OF TELEPHONE

Number of persons / Telephone set	1	2	3	4	5	6	7	8	9	more than 10	No answer	Total
Owner	34	29	16	20	10	5	4	3	4	0	22	147
Mon-owner	123	121	68	39	28	36	16	13	8	3	139	594
Total	157	150	84	59	38	41	20	16	12	3	161	741

TABLE IO-4-(I6)

4) CLASSIFICATION BY NUMBER OF CALLS

Number of persons / Number of call	1	2	3	4	5	6	7	8	9	more than 10	No answer	Total
0	71	72	31	20	17	22	8	6	3	1	65	316
1~2	49	31	25	14	9	9	5	5	3	1	44	195
3~4	20	19	11	12	6	5	2	0	3	1	22	101
5~6	3	18	6	4	1	1	1	4	3	0	11	52
7~8	3	3	1	0	0	1	2	0	0	0	5	15
9~10	2	1	7	5	3	2	1	0	0	0	0	21
more than 11	9	6	3	4	2	1	1	1	0	0	14	41
Total	157	150	84	59	38	41	20	16	12	3	161	741

TABLE IO-4-(I7)

Q.4   IS THERE A TELEPHONE IN YOUR FAMILY MEMBER'S OFFICE AND/OR SCHOOL ?

I) ECONOMIC ACTIVITIES

Economic activities / Answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Yes	101	141	61	73	21	49	76	12	534
No	22	24	12	21	7	15	100	1	202
No. answer	1	4	0	0	0	0	0	0	5
Total	124	169	73	94	28	64	176	13	741

TABLE IO-4-(I8)

2) SEX AND ECONOMIC ACTIVITIES

Economic activities / Sex / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Female
Yes	76	25	91	50	35	26	43	30	19	2	14	35	59	17	7	5	344	190
No	16	6	21	3	10	2	17	4	5	1	11	4	47	53	1	0	129	73
No answer	1	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	2	3
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	475	266

(M : Male   F : Femele)

TABLE IO-4-(I9)

3) ECONOMIC ACTIVITIES AND TELEPHONE

Economic activities / Tel.Ser / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	Owner	Non-ower
Yes	18	83	26	115	10	51	14	59	1	20	20	29	17	59	3	9	109	425
No	8	14	4	20	2	10	2	19	2	5	7	8	12	88	0	1	37	165
No answer	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	1	4
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	147	594

(O : Owner   N : Non - owner)

TABLE 10-4-(20)

4) NUMBER OF CALLS

Number of calls / Answer	O	1~2	3~4	5~6	7~8	9~10	more than 11	Total
Yes	209	145	80	39	10	18	33	534
No	106	50	20	13	4	3	6	202
No answer	1	O	1	O	1	O	2	5
Total	316	195	101	52	15	21	41	741

TABLE IO-4-(2I)

Q.5 HAVE YOU EVER USED A PUBLIC TELEPHONE IN JAKARTA BEFORE ?

I) ECONOMIC ACTIVITIES

Answer \ Economic activities	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Yes	105	139	57	80	22	57	114	11	(78.9) 585
No	19	30	16	14	6	7	62	2	(21.1) 156
Total	124	169	73	94	28	64	176	13	(100) 741

TABLE IO-4-(22)

2) SEX AND ECONOMIC ACTIVITIES

Answer \ Economic activities / Sex	Office M	Office F	Trading company M	Trading company F	Bank M	Bank F	Repair shop M	Repair shop F	Student M	Student F	Shop interview M	Shop interview F	Residence interview M	Residence interview F	Hospital M	Hospital F	Total Male	Total Female
Yes	79	26	96	43	36	21	51	29	19	3	22	35	84	30	6	5	(82.7) 393	(72.2) 192
No	14	5	17	13	9	7	9	5	6	0	3	4	22	40	2	0	(17.3) 82	(27.3) 74
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	(100) 475	(100) 268

(M : Male   F : Female)

TABLE IO-4-(23)

3) ECONOMIC ACTIVITIES AND TELEPHONE

Answer \ Economic activities / Tel.	Office O	Office N	Trading company O	Trading company N	Bank O	Bank N	Repair shop O	Repair shop N	Student O	Student N	Shop interview O	Shop interview N	Residence interview O	Residence interview N	Hospital O	Hospital N	Total Owner	Total Non-owner
Yes	20	85	24	115	10	47	15	65	3	19	23	34	25	89	3	8	(83.7) 123	(77.8) 462
No	6	13	7	23	2	14	1	13	0	6	4	3	4	58	0	2	(16.3) 24	(22.2) 132
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	(100) 147	(100) 594

(O : Owner   N : Non-owner)

TABLE 10-4-(24)　4) NUMBER OF CALLS

Number of calls / Answer	0	1 ~ 2	3 ~ 4	5 ~ 6	7 ~ 8	9 ~ 10	More than 11	Total
Yes	181	183	99	47	14	21	40	585
No	135	12	2	5	1	0	1	156
Total	316	195	101	52	15	21	41	741

TABLE IO-4-(25)
Q.6 DID YOU USE A PUBLIC TELEHONE IN JAKARTA DURING THE PAST ONE MONTH ?

I) ECONOMIC ACTIVITIES

Economic activities / Answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Yes	67	97	29	62	15	40	95	7	412
No	57	72	44	32	13	24	81	6	329
Total	124	169	73	94	28	64	176	13	741

TABLE IO-4-(26) . 2) ECONOMIC ACTIVITIES AND SEX

Economic activities / Sex / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Famale
Yes	57	10	66	31	15	14	41	21	13	2	17	23	74	21	4	3	287	125
No	36	21	47	25	30	14	19	13	12	1	8	16	32	49	4	2	188	141
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	475	266

(M:Male F : Female)

TABLE IO-4-(27) 3) ECONOMIC ACTIVITIES AND TELEPHONE

Economic activities / Tel. / Answer	Office		Trading Company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	Owner	Non-owner
Yes	12	55	17	80	6	23	11	51	2	13	15	25	22	73	0	7	85	327
No	14	43	14	58	6	38	5	27	1	12	12	12	7	74	3	3	62	267
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	147	594

(O:Owner   N: Non-owner)

TABLE IO-4-(28)   4) NUMBER OF CALLS

Number of calls / Answer	O	1~2	3~4	5~6	7~8	9~10	More than 11	Total
Yes	14	183	98	48	15	20	34	412
No	302	12	3	4	0	1	7	329
Total	316	195	101	52	15	21	41	741

TABLE 10 – 4 – (29)

Q.7 HOW MANY TIMES DID YOU USE A PUBLIC TELEPHONE IN JAKARTA DURING THE PAST ONE MONTH ?

1) ECONOMIC ACTIVITIES

Number of calls / Economic activities	0	1～2	3～4	5～6	7～8	9～10	more than 11	Total
Office	56	27	22	6	5	1	7	124
Trading company	63	51	26	13	3	3	10	169
Bank	42	16	8	5	0	0	2	73
Repair shop	36	21	15	7	1	1	13	94
Student	9	8	3	3	0	2	3	28
Shop interview	24	20	10	5	2	3	0	64
Residence interview	80	46	17	12	4	11	6	176
Hospital	6	6	0	1	0	0	0	13
Total	316	195	101	52	15	21	41	741

TABLE 10-4-(30)   2) ECONOMIC ACTIVITIES AND SEX

Number of calls / Economic activities / Sex	0	1~2	3~4	5~6	7~8	9~10	More than 11	Total
Office	Male	37	20	20	4	5	1	6	93
Office	Female	19	7	2	2	0	0	1	31.
Trading company	Male	39	32	19	10	2	3	8	113
Trading company	Female	24	19	7	3	1	0	2	56
Bank	Male	28	10	4	2	0	0	1	45
Bank	Female	14	6	4	3	0	0	1	28
Repair shop	Male	22	13	12	2	1	0	10	60
Repair shop	Female	14	8	3	5	0	1	3	34
Student	Male	8	7	2	3	0	2	3	25
Student	Female	1	1	1	0	0	0	0	3
Shop interview	Male	8	10	3	3	1	0	0	25
Shop interview	Female	16	10	7	2	1	3	0	39
Residence interview	Male	32	37	11	8	4	8	6	106
Residence interview	Female	48	9	6	4	0	3	0	70
Hospital	Male	4	4	0	0	0	0	0	8
Hospital	Female	2	2	0	1	0	0	1	5
Total	Male	(37.5) 178	(28.0) 133	(14.9) 71	(6.7) 32	(2.7) 13	(2.9) 14	(7.2) 34	(100) 475
Total	Female	(51.5) 138	(23.3) 62	(11.3) 30	(7.5) 20	(0.8) 2	(2.6) 7	(3.0) 7	(100) 266

TABLE 10-4-(31)   3) TELEPHONE

Number of calls / Telehone	0	1~2	3~4	5~6	7~8	9~10	More than 11	Total
Owner	59	30	26	15	3	7	7	147
Non—owner	257	165	75	37	12	14	34	594
Total	316	195	101	52	15	21	41	741

TABLE 10-4-(32)

Q.8 WHERE DID YOU USE A PUBLIC TELEPHONE IN JAKARTA DURING THE PAST ONE MONTH ?
PLEASE MARK ALL PLACES WHERE YOU DID.

1) CLASSIFICATION BY ECONOMIC ACTIVITIES.

Location / Economic activities	Hotel	Bus terminal	Theatre	Railway station	Hospital	Bank	Super-market	Police station	Airport	Recreation center	Drug store	University	Business building	Shopping centre	Others	Total
Office	22	26	10	8	7	5	14	3	10	7	5	1	21	8	0	147
Trading company	31	35	13	12	28	12	19	5	25	21	9	4	22	28	4	268
Bank	5	10	3	0	6	3	5	0	3	0	4	0	1	13	1	54
Repair shop	13	18	3	11	21	7	7	3	13	8	6	0	15	14	3	142
Student	2	3	0	3	6	2	1	2	1	2	0	1	8	4	0	35
Shope interview	5	16	3	4	1	2	14	2	4	2	0	2	12	7	3	77
Residence interview	13	40	5	9	13	10	9	10	2	5	11	3	21	12	1	164
Hospital	1	1	1	0	3	0	0	0	0	0	0	0	0	2	1	9
Total	92	149	38	47	85	41	69	25	58	45	35	11	100	88	13	896

TABLE 10-4-(33)

2) ECONOMIC ACTIVITIES AND SEX

Economic activities	Sex	Hotel	Bus terminal	Theatre	Railway station	Hospital	Bank	Super market	Police station	Airport	Recreation center	Drugstore	University	Business building	Shopping center	Others	Total
Office	M	16	21	8	5	6	3	11	2	9	5	5	0	17	7	0	115
Office	F	6	5	2	3	1	2	3	1	1	2	0	1	4	1	0	32
Trading company	M	26	24	10	10	16	10	12	4	18	15	8	4	18	17	4	196
Trading company	F	5	11	3	2	12	2	7	1	7	6	1	0	4	11	0	72
Bank	M	4	7	2	0	5	1	2	0	2	0	1	0	0	7	0	31
Bank	F	1	3	1	0	1	2	3	0	1	0	3	0	1	6	1	23
Repair shop	M	8	17	3	9	15	6	3	3	10	6	2	0	7	10	3	102
Repair shop	F	5	1	0	2	6	1	4	0	3	2	4	0	8	4	0	40
Student	M	2	3	0	2	4	2	1	2	1	2	0	1	7	4	0	31
Student	F	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	4
Shope interview	M	3	8	2	3	0	2	3	1	2	1	0	1	5	3	0	34
Shope interview	F	2	8	1	1	1	0	11	1	2	1	0	1	7	4	3	43
Residence interview	M	9	32	2	8	11	8	6	6	2	4	9	2	17	9	1	126
Residence interview	F	4	8	3	1	2	2	3	4	0	1	2	1	4	3	0	38
Hospital	M	0	0	0	0	3	0	0	0	0	0	0	0	0	1	1	5
Hospital	F	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	4
Total	M	68	112	27	37	60	32	38	18	44	33	25	8	71	58	9	640
Total	F	24	37	11	10	25	9	31	7	14	12	10	3	29	30	4	256

(M: Male   F: Female)

TABLE 10-4-(34)

3) TELEPHONE AND NUMBER OF CALLS

Item		Hotel	Bus terminal	Theatre	Railway station	Hospital	Bank	Super-market	Police station	Airport	Recreation center	Drugstore	University	Business building	Shopping center	Others	Total
Telephone	Owner	19	35	11	14	10	11	25	6	18	16	8	4	19	20	3	219
	Non-owner	73	114	27	33	75	30	44	19	40	29	27	7	81	68	10	677
Number of calls	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1~2	26	70	15	18	31	6	20	7	13	15	10	2	36	30	7	306
	3~4	24	35	8	12	22	4	24	3	20	6	10	5	16	26	1	216
	5~6	10	16	6	5	13	7	8	5	8	13	7	1	17	15	2	133
	7~8	6	5	2	2	0	2	3	2	5	2	3	0	5	5	0	42
	9~10	9	8	2	2	5	9	7	4	1	1	1	2	9	3	1	64
	more than 11	17	15	5	8	14	13	7	4	11	8	4	1	17	9	2	135
Total		92	149	38	47	85	41	69	25	58	45	35	11	100	88	13	896

TABLE 10-4-(35)

Q9 WHERE DID YOU CALL BY USING A PUBLIC TELEPHONE IN JAKARTA DURING THE PAST ONE MONTH ? PLEASE MARK THE PLACES CONCERNED.

1) CLASSIFICATION BY ECONOMIC ACTIVITIES AND SEX

Economic activities	My home M	F	Friend's home M	F	Hotel M	F	Shopping centre M	F	Theatre M	F	Hospital M	F	Police station M	F	Super-market M	F	Airport M	F	My office M	F	Recreation centre M	F	University M	F	Bank M	F	Drug-store M	F	Others M	F	Total M	F
Office	5	2	22	8	12	1	-	-	1	2	4	1	3	1	36	4	1	1	7	3	1	1	3	1	8	2	2	1	6	2	109	26
Trading company	10	10	39	19	13	4	6	1	9	2	10	3	7	1	41	16	4	4	11	5	10	1	4	1	14	2	4	3	9	1	191	73
Bank	4	2	9	6	1	-	-	-	1	-	4	1	-	-	5	5	1	-	3	1	1	2	1	-	1	1	1	-	4	2	30	21
Repair shop	12	1	19	7	6	-	2	-	2	1	11	3	2	-	23	12	2	-	4	3	4	2	5	1	5	3	5	3	7	1	109	37
Station	-	-	5	-	2	-	2	-	1	-	2	-	-	-	13	2	2	-	2	-	-	-	-	-	2	-	-	-	3	-	35	2
Shop interview	7	6	6	14	1	2	3	3	-	-	-	-	-	1	4	6	5	7	-	2	-	-	-	-	3	4	-	-	2	7	32	56
Residence interview	13	4	41	15	2	-	5	1	1	1	9	2	1	3	19	3	7	1	4	1	2	2	2	-	7	2	-	-	4	1	118	36
Hospital	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	-	4	3
Total	52	25	142	71	36	8	18	5	12	9	41	11	13	6	141	49	20	13	32	13	18	7	14	3	39	14	13	6	37	14	628	254

Row totals (M+F): Office 135, Trading company 264, Bank 51, Repair shop 146, Station 37, Shop interview 88, Residence interview 154, Hospital 7, Total 882.

Column totals (M+F): My home 77, Friend's home 213, Hotel 44, Shopping centre 23, Theatre 21, Hospital 52, Police station 19, Super-market 190, Airport 33, My office 45, Recreation centre 25, University 17, Bank 53, Drug-store 19, Others 51.

(M : Male   F : Female)

TABLE 10 - 4 - (36)

2) NUMBER OF CALLS

Number of calls / Location	0	1~2	3~4	5~6	7~8	9~10	more than 11	Total
My home	—	27	23	13	2	6	6	77
Friend's home	—	86	48	32	10	13	24	213
Hotel	—	5	9	5	3	5	17	44
Shopping centre	—	3	3	4	2	5	6	23
Theatre	—	2	6	4	0	3	6	21
Hospital	—	17	13	7	2	3	10	52
Police station	—	2	3	3	2	2	7	19
Supermarket	—	76	55	23	5	9	22	190
Airport	—	9	2	7	1	6	8	33
My office	—	12	12	5	3	2	11	45
Recreation centre	—	7	6	5	1	1	5	25
University	—	4	5	1	1	1	5	17
Bank	—	8	10	11	4	7	13	53
Drugstore	—	6	7	0	1	1	4	19
Others	—	18	12	5	2	4	10	5
Total	—	282	214	125	39	68	154	882

TABLE 10-4-(37)

Q.10 FOR WHAT PURPOSE DID YOU USE A PUBLIC TELEPHONE MOSTLY IN JAKARTA DURING THE PAST ONE MONTH ? CHOOSE ONE ANSWER ONLY.

1) ECONOMIC ACTIVITIES

Economic activities / Pupose	Office	Trading company	Bank	Repair shop	Student	Shope interview	Residence interview	Hospital	Total
Private	31	63	22	37	4	34	65	5	(61.4) 261
Business	34	40	6	20	12	4	18	2	(32.0) 136
Others	11	4	1	1	3	4	4	0	(6.6) 28
Total	76	107	'29	58	19	42	87	7	(100) 425

TABLE 10-4-(38)

2) ECONOMIC ACTIVITIES AND SEX

Economic activities Sex / Purpose	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Female
Private	21	10	43	20	12	10	26	11	4	0	14	20	49	16	3	2	(58.9) 172	(66.9) 89
Business	32	2	29	11	4	2	12	8	10	2	2	2	14	4	1	1	(35.6) 104	(24.1) 32
Others	3	8	3	1	1	0	0	1	3	0	2	2	4	0	0	0	(5.5) 16	(9.0) 12
Total	56	20	75	32	17	12	38	20	17	2	18	24	67	20	4	3	(100) 292	(100) 133

(M: Male. F : Female)

TABLE IO-4-(39)

3) ECONOMIC ACTIVITIES AND TELEPHONE

Purpose \ Economic activities / Tel. sex	Office O	Office N	Trading company O	Trading company N	Bank O	Bank N	Repair shop O	Repair shop N	Student O	Student N	Shop interview O	Shop interview N	Residence interview O	Residence interview N	Hospital O	Hospital N	Total Owner	Total Non-owner
Private	8	23	13	50	3	19	6	31	1	3	22	12	19	46	0	5	72	189
Business	3	31	4	36	2	4	1	19	0	12	3	1	1	17	0	2	14	122
Others	1	10	0	4	1	0	0	1	1	2	2	2	1	3	0	0	6	22
Total	12	64	17	90	6	23	7	51	2	17	27	15	21	66	0	7	92	333

(O: Owner   N: Non-owner)

TABLE IO-4-(40)

4) NUMBER AT CALLS

Pupose \ Number at calls	0	1~2	3~4	5~6	7~8	9~10	more than 11	Total
Private	-	130	59	30	9	11	22	261
Business	-	57	34	18	4	8	15	136
Others	-	8	8	4	2	2	4	28
Total	-	195	101	52	15	21	41	425

TABLE 10-4-(41)

Q.11 DO YOU HAVE A TELEPHONE IN YOUR HOME ?

1) ECONOMIC ACTIVITIES

Economic activities / Answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Yes	26	31	12	16	3	27	29	3	147
No	98	138	61	78	25	37	147	10	594
Total	124	169	73	94	28	64	176	13	(100) 741

TABLE 10-4-(42)
2) SEX AND ECONOMIC ACTIVITIES

Economic activities / Sex / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Female
Yes	18	8	15	16	8	4	8	8	3	0	11	16	22	7	2	1	87	60
No	75	23	98	40	37	24	52	26	22	3	14	23	84	63	6	4	388	206
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	(100) 475	(100) 266

(M : Male   F : Female)

TABLE 10-4-(43)
3) NUMBER OF COLLS

Number of calls / Answer	0	1~2	3~4	5~6	7~8	9~10	more than 11	Total
Yes	58	29	25	14	2	8	11	147
No	258	166	76	38	13	13	30	594
Total	316	195	101	52	15	21	41	741

TABLE 10-4 -(44)

Q.12 HAVE YOU EVER HAD ANY TROUBLE IN COMMUNICATION DUE TO THE FEWNESS OF TELEPHONS IN JAKARTA ?

1) ECONOMIC ACTIVITIES

Trouble \ Economic activities	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Always	20	29	11	11	2	3	17	1	94
Often	32	66	14	41	9	12	56	6	236
Sometimes	50	54	37	35	13	38	62	4	293
Seldom	3	7	1	3	2	3	17	0	36
Never	19	13	7	4	2	8	23	2	78
No answer	0	0	3	0	0	0	1	0	4
Total	124	169	73	94	28	64	176	13	741

TABLE 10- 4 -(45)

2) ECONOMIC ACTIVITIES AND SEX

Trouble \ Economic activities \ Sex	Office M	Office F	Trading company M	Trading company F	Bank M	Bank F	Repair shop M	Repair shop F	Student M	Student F	Shop interview M	Shop interview F	Residence interview M	Residence interview F	Hospital M	Hospital F	Total Male	Total Female
Always	13	7	21	8	7	4	8	3	2	0	2	1	13	4	1	0	(14.1) 67	(10.2) 27
Often	25	7	45	21	9	5	28	13	9	0	5	7	35	21	4	2	(33.7) 160	(28.6) 76
Sometimes	36	14	34	20	23	14	19	16	11	2	15	23	49	13	2	2	(39.8) 189	(39.1) 104
Seldom	3	0	4	3	0	1	2	1	1	1	0	3	2	15	0	0	(2.5) 12	(9.0) 24
Never	16	3	9	4	5	2	3	1	2	0	3	5	6	17	1	1	(9.5) 45	(12.4) 33
No answer	0	0	0	0	1	2	0	0	0	0	0	0	1	0	0	0	(0.4) 2	(0.8) 2
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	(100) 475	(100) 266

TABLE 10-4-(46)

3) ECONOMIC ACTIVITIES AND TELEPHONE

Economic activities / Tel. Set Trouble	Office O	Office N	Trading company O	Trading company N	Bank O	Bank N	Repair shop O	Repair shop N	Student O	Student N	Shop interview O	Shop interview N	Residence interview O	Residence interview N	Hospital O	Hospital N	Total Owner	Total Non-owner
Always	3	17	0	29	2	9	2	9	1	1	2	1	4	13	1	0	15	79
Often	4	28	14	52	1	13	4	37	1	8	5	7	11	45	0	6	40	196
Sometimes	9	41	10	44	6	31	9	26	1	12	18	20	10	52	2	2	65	228
Seldom	2	1	1	6	0	1	0	3	0	2	0	3	1	16	0	0	4	32
Never	8	11	6	7	3	4	1	3	0	2	2	6	3	20	0	2	23	55
No answer	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	4
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	147	594

(O : Owner   N : Non-owner)

TABLE 10-4-(47)

4) NUMBER OF CALLS

Number of calls / Trouble	0	1~2	3~4	5~6	7~8	9~10	more than 11	Total
Always	41	22	11	9	1	4	6	94
Often	67	60	47	27	9	8	18	236
Sometimes	137	84	35	13	4	9	11	293
Seldom	11	21	2	1	0	0	1	36
Never	58	8	6	1	1	0	4	78
No answer	2	0	0	1	0	0	1	4
Total	316	195	101	52	15	21	41	741

TABLE 10- 4-(48)

Q13 DO YOU WANT A PUBLIC TELEPHONE TO BE INSTALLED NEAR YOUR HOUSE ?

1) ECONOMIC ACTIVITIES

Economic activitie / Answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Urgent	84	127	51	69	21	48	139	9	548
Not so urgent	24	31	18	18	3	13	34	3	144
No	16	10	3	6	4	3	3	1	46
No answer	0	1	1	1	0	0	0	0	3
Total	124	169	73	94	28	64	176	13	741

TABLE 10- 4 - (49)

2) ECONOMIC ACTIVITIES AND SEX

Economic activities / Answer	Sex	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Urgent	M	62	86	34	42	18	18	90	6	(74.9) 356
	F	22	41	17	27	3	30	49	3	(72.2) 192
Not so urgent	M	19	19	7	12	3	6	14	1	(17.1) 81
	F	5	12	11	6	0	7	20	2	(23.7) 68
No	M	12	8	3	6	4	1	2	1	(7.8) 37
	F	4	2	0	0	0	2	1	0	(3.4) 9
No answer	M	0	0	1	0	0	0	0	0	(0.2) 1
	F	0	1	0	1	0	0	0	0	(0.8) 2
Total	M	93	113	45	60	25	25	106	8	(100) 475
	F	31	56	28	34	3	39	70	5	(100) 266

(M : Male F : Female)

TABLE 10- 4 -(50)

3) ECONOMIC ACTIVITIES AND TELEPHONE

Economic activities / Tel sex / Answer		Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Urgent	O	6	14	6	7	3	21	16	1	74
	N	78	113	45	62	18	27	123	8	474
Not so urgent	O	10	12	5	6	0	5	13	2	53
	N	14	19	13	12	3	8	21	1	91
No	O	10	5	1	2	0	1	0	0	19
	N	6	5	2	4	4	2	3	1	27
No answer	O	0	0	0	1	0	0	0	0	1
	N	0	1	1	0	0	0	0	0	2
Total	O	26	31	12	16	3	27	29	3	147
	N	98	138	61	78	25	37	147	10	594

(O : Owner   N : Non-owner)

TABLE 10- 4 -(51)

4) NUMBER AT CALLS

Number of calls / Answer	0	1~2	3~4	5~6	7~8	9~10	more than 11	Total
Urgent	216	159	78	32	12	19	32	548
Not so urgent	72	26	20	17	2	2	5	144
No	26	10	3	3	0	0	4	46
No answer	2	0	0	0	1	0	0	3
Total	316	195	101	52	15	21	41	741

TABLE IO-4-(52)

Q.I4 FOR WHAT PURPOSE DO YOU WANT A PUBLIC TELEPHONE
TO BE INSTALLED NEAR YOUR HOUSE ?
CHOOSE ONE ANSWER MOSTLY CONCERNED WITH YOU.

I) ECONOMIC ACTIVITIES

Economic activites / Purpose	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
My friend	11	17	5	11	7	5	47	3	106
My office	44	66	22	25	7	11	24	3	202
Hotel	3	2	0	1	0	0	0	0	6
Shopping centre	1	1	0	0	0	3	4	0	9
Hospital	13	21	8	20	6	3	23	4	98
Police station	6	5	4	1	1	6	9	0	32
Super-market	0	0	0	0	0	1	1	0	2
Airport	3	1	0	0	0	0	1	0	5
Other offices	4	11	3	6	1	3	3	0	31
Recreation centre	3	3	0	0	0	1	1	0	8
University	1	0	1	0	0	0	6	0	8
Bank	0	1	2	0	0	0	1	0	4
Drugstore	0	0	0	1	0	0	0	0	1
Railway station	0	3	0	1	0	0	1	0	5
Others	8	24	11	7	3	23	32	0	108
No answer	27	14	17	21	3	8	23	3	116
Total	124	169	73	94	28	64	176	13	741

TABLE IO - 4 -(53)

2) SEX AND TELEPHONE

Purpose	Sex		Telephone		Total
	Male	Female	Owner	Non-Owner	
My friend	72	32	I7	89	I06
My office	I40	62	26	I76	202
Hotel	6	O	2	4	6
Shopping centre	8	I	4	5	9
Hospital	57	4I	I5	83	98
Police station	I8	I4	7	25	32
Supermarket	I	I	I	I	2
Airport	3	2	I	4	5
Other offices	23	8	8	23	3I
Recreation centre	7	I	6	2	8
University	7	I	I	7	8
Bank	2	2	I	3	4
Drugstore	I	O	O	I	I
Railway station	3	2	I	4	5
Others	59	49	23	85	I08
No answer	68	50	34	82	II6
Total	475	266	I47	594	74I

TABLE 10-4-(54) 3) NUMBER OF CALLS

Number of calls / Purpose	0	1~2	3~4	5~6	7~8	9~10	More than 11	Total
My friend	39	32	16	5	5	5	4	106
My office	72	72	28	8	4	5	13	202
Hotel	3	1	2	0	0	0	0	6
Shopping centere	5	3	0	0	0	1	0	9
Hospital	50	18	15	9	2	1	3	98
Police station	14	7	5	2	1	3	0	32
Super market	1	1	0	0	0	0	0	2
Airport	2	3	0	0	0	0	0	5
Other office	12	8	5	0	0	0	6	31
Recreation centre	4	3	0	1	0	0	0	8
University	4	1	2	1	0	0	0	8
Bank	2	0	1	0	0	0	1	4
Drugstore	1	0	0	0	0	0	0	1
Railway station	2	1	1	0	0	0	1	5
Others	53	27	12	8	3	1	4	108
No answer	52	18	14	18	0	5	9	116
Total	316	195	101	52	15	21	41	741

TABLE 10-4-(55)

Q.15 PRESENT PUBLIC TELEPHONE IN JAKARTA CANNOT BE CONNECTED TO OUTSIDE OF JAKARTA. HAVE YOU EVER HAD A WISH TO CALL TO OUTSIDE JAKARTA ?

1) ECONOMIC ACTIVITIES

Economic activities / Toll call	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Always	1	2	2	2	3	4	8	1	23
Often	5	15	6	6	1	5	16	0	54
Sometimes	32	55	26	51	9	31	52	5	261
Seldom	15	28	8	16	2	6	47	5	127
Never	70	66	29	17	12	18	53	2	267
No answer	1	3	2	2	1	0	0	0	9
Total	124	169	73	94	28	64	176	13	741

TABLE 10-4-(56)

2) SEX AND TELEPHONE

Toll call	Sex		Telephone		Total
	Male	Female	Owner	Non-Owner	
Always	15	8	4	19	23
Often	38	16	24	30	54
Sometimes	173	88	50	211	261
Seldom	75	52	22	105	127
Never	169	98	43	224	267
No answer	5	4	4	5	9
Total	475	266	147	594	741

TABLE 10-4-(57)

3) NUMBER OF CALLS

Number of calls / Toll call	0	1~2	3~4	5~6	7~8	9~10	more than 11	Total
Always	10	5	2	1	0	4	1	23
Often	9	11	14	9	3	4	4	54
Sometimes	99	71	36	17	6	8	24	261
Seldom	62	34	11	11	2	3	4	127
Never	130	74	37	14	3	2	7	267
No answer	6	0	1	0	1	0	1	9
Total	316	195	101	52	15	21	41	741

TABLE I O – 4 – (58)

Q.I6 IN CASE A PUBLIC TELEPHONE WAS UNAVAILABLE BECAUSE IT WAS DAMAGED, OR LOCATED FOR AWAY, OR DUE TO ANY OTHER REASONS, WHAT MEANS DID YOU MOSTLY USE TO CONVEY INFORMATION TO SOMEONE ELSE ?

I) ECONOMIC ACTIVITIES

Economic activities / Means	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Borrowing	53	72	34	35	9	46	69	4	322
Rental	33	54	22	37	12	13	38	3	212
Convey the information	19	17	11	10	6	3	44	3	113
Telegram	10	12	0	8	1	1	8	1	41
Give up	2	4	0	0	0	0	12	0	18
Others	6	8	4	3	0	1	4	2	28
No answer	1	2	2	1	0	0	1	0	7
Total	124	169	73	94	28	64	176	13	741

TABLE I O – 4 – (59)

2) SEX AND TELEPHONE

Means	Sex		Telephone		Total
	Male	Female	Owner	Non – Owner	
Borrowing	216	106	(44.9) 66	(43.1) 256	(43.5) 322
Rental	139	73	(29.9) 44	(28.3) 168	(28.6) 212
Convey the information	64	49	(5.4) 8	(17.7) 105	(15.2) 113
Telegram	27	14	(7.5) 11	(5.1) 30	(5.5) 41
Give up	6	12	(2.0) 3	(2.5) 15	(2.4) 18
Others	19	9	(8.2) 12	(2.7) 16	(3.8) 28
No answer	4	3	(2.0) 3	(0.7) 4	(0.9) 7
Total	475	266	(100) 147	594	741

TABLE 10-4-(60)

3) NUMBER OF CALLS

Number of calls \ Means	0	1 ~ 2	3 ~ 4	5 ~ 6	7 ~ 8	9 ~ 10	more than 11	Total
Borrowing	129	103	40	18	4	11	17	322
Rental	71	58	37	20	6	6	14	212
Convey the information	64	19	16	5	4	1	4	113
Telegram	17	8	6	6	0	3	1	41
Give up	15	2	0	1	0	0	0	18
Others	18	4	2	0	0	0	4	28
No answer	2	1	0	2	1	0	1	7
Total	316	195	101	52	15	21	41	741

TABLE IO-4-(61)

Q.17 DO YOU KNOW THE LOCATIONS OF PUBLIC TELEPHONE IN JAKARTA ?

1) ECONOMIC ACTIVITIES

Economic activities / Answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Know well	62	85	17	24	8	37	67	4	304
Know a little	56	80	49	64	16	26	84	8	383
No	6	4	7	6	4	1	25	1	54
Total	124	169	73	94	28	64	176	13	741

TABLE IO-4-(62)

2) SEX

Economic activities / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Female
Know well	45	17	56	29	10	7	17	7	8	0	13	24	45	22	3	1	197	107
Know a little	43	13	56	24	31	18	38	26	13	3	11	15	56	28	4	4	252	131
No	5	1	1	3	4	3	5	1	4	0	1	0	5	20	1	0	26	28
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	475	266

(M: Male   F: Female)

TABLE IO-4-(63)

3) TELEPHONE

Economic activities / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	Owner	Non-owner
Know well	17	45	15	70	2	15	5	19	1	7	20	17	14	53	0	4	74	230
Know a little	8	48	15	65	9	40	11	53	2	14	7	19	14	70	3	5	69	314
No	1	5	1	3	1	6	0	6	0	4	0	1	1	24	0	1	4	50
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	147	594

(O: Owner   N: Non-owner)

TABLE 10-4-(64)

4) NUMBER OF CALLS

Number of calls / Answer	0	1~2	3~4	5~6	7~8	9~10	More than 11	Total
Know well	107	81	52	22	6	17	19	304
Know a little	164	111	46	20	9	4	20	383
No	45	3	3	1	0	0	2	54
Total	316	195	101	52	15	21	41	741

TABLE 10 - 4 - (65)

Q.18 DO YOU THINK THAT THE SIGNBOARD INDICATING THE LOCATION OF PUBLIC TELEPHONE IS EASY TO IDENTIFY ?

1) ECONOMIC ACTIVITIES

Economic activities \ Answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Yes	70	90	36	45	17	35	52	7	352
No	34	77	35	49	11	29	122	6	383
No answer	0	2	2	0	0	0	2	0	6
Total	124	169	73	94	28	64	176	13	741

TABLE 10- 4 -(66)

2) ECONOMIC ACTIVITES AND SEX

Economic activities \ Sex \ Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Female
Yes	49	21	58	32	21	15	28	17	15	2	8	27	43	9	4	3	226	126
No	44	10	54	23	24	11	32	17	10	1	17	12	63	59	4	2	248	135
No answer	0	0	1	1	0	2	0	0	0	0	0	0	0	2	0	0	1	5
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	475	266

(M : Male   F : Female)

TABLE 10- 4- (67)

3) ECONOMIC ACTIVITIES AND TELEPHONE

Economic activities \ Tel set \ Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	Owner	Non-owner
Yes	15	55	15	75	4	32	7	38	2	15	14	21	6	46	1	6	64	288
No	11	43	15	62	7	28	9	40	1	10	13	16	23	99	2	4	81	302
No answer	0	0	1	1	1	1	0	0	0	0	0	0	0	2	0	0	2	4
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	147	594

(O : Owner   N : Non-owner)

TABLE 10-4-(68)   4) NUMBER OF CALLS

Number of calls / Answer	0	1 ~ 2	3 ~ 4	5 ~ 6	7 ~ 8	9 ~ 10	More than 11	Total
Yes	140	104	46	22	7	10	23	352
No	173	91	55	29	7	11	17	383
No answer	3	0	0	1	1	0	1	6
Total	316	195	101	32	15	21	41	741

TABLE 10-4-(69)

Q.19 PRESENT PUBLIC TELEPHONE CHARGE IS RP. 25.
DO YOU THINK THAT THIS CHARGE IS EXPENSIVE ?

1) ECONOMIC ACTIVITIES

Economic activities / Answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Yes	8	9	6	7	3	2	27	1	63
No	116	160	67	87	25	62	149	12	678
Total	124	169	73	94	28	64	176	13	741

TABLE 10-4-(70) 2) ECONOMIC ACTIVITIES AND SEX

Economic activities / Sex / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Female
Yes	6	2	6	3	2	4	3	4	2	1	0	2	15	12	1	0	35	28
No	87	29	107	53	43	24	57	30	23	2	25	37	91	58	7	5	440	238
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	475	266

(M:Male   F:Female)

TABLE 10-4-(71) 3) ECONOMIC ACTIVITIES AND TELEPHONE

Economic activities / Tel.set / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	Owner	Non-owner
Yes	2	6	2	7	0	6	2	5	0	3	1	1	1	26	0	1	8	55
No	24	92	29	131	12	55	14	73	3	22	26	36	28	121	3	9	139	539
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	147	594

(O:owner   N:Non-owner)

TABLE 10-4-(72)   4). NUMBER OF CALLS

Number of calls / Answer	O	1~2	3~4	5~6	7~8	9~10	More than 11	Total
Yes	32	16	6	4	0	4	1	63
N	284	179	95	48	15	17	40	678
Total	316	195	101	52	15	21	41	741

TABLE 10-4-(73)

Q.20 WHY DO YOU THINK THAT THIS CHARGE IS EXPENSIVE ? (THIS QUESTION IS ONLY FOR THE PERONS WHOSE ANSWER TO QUESTION 19 IS "YES")

1) ECONOMIC ACTIVITIES

Reason \ Economic activities	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Higher than subscriber tel.	4	8	3	3	1	1	8	0	28
Electvicity and water	0	0	2	1	0	0	2	0	5
Others	2	1	1	1	0	1	14	1	21
No answer	2	0	0	2	2	0	3	0	9
Total	8	9	6	7	3	2	27	1	63

TABLE 10-4-(74)   2) SEX

Sex \ Reason	Higher than sub-scriber-telephone charge	Higher than elect-ricity and water subscriber charge	Others	No answer	Total
Male	14	3	12	6	35
Female	14	2	9	3	28
Total	28	5	21	9	63

TABLE 10-4-(75)   3) TELEPHONE

Telephone set \ Reason	Higher than sub-scriber-telephone charge	Higher than elect-ricity and water subscriber charge	Others	No answer	Total
Owner	5	0	1	2	8
Non-owner	23	5	20	7	55
Total	28	5	21	9	63

TABLE 10-4-(76)

4) NUMBER OF CALLS

Number of calls / Reason	0	1~2	3~4	5~6	7~8	9~10	more than 11	Total
Highor than sub-scriber telep-hone charge	13	8	2	2	0	1	2	28
Electricity & water	2	2	1	0	0	0	0	5
Others	16	3	0	1	0	0	1	21
No answer	5	2	0	1	1	0	0	9
Total	36	15	3	4	1	1	3	63

TABLE 10-4-(77)

Q.21 WHY DO YOU THINK THAT THIS CHARGE IS NOT EXPENSIVE ?
(THIS QUESTION IS ONLY FOR THE PERSONS WHOSE ANSWER TO QUESTION 19 IS "NO".)

1) ECONOMIC ACTIVITIES

Economic activities / Reason	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Lower than parking fee	31	46	8	21	8	23	58	6	201
Public transport fare	47	60	20	23	10	28	64	5	257
Telegram charge	15	24	14	20	1	4	15	0	93
Televison fee	0	2	0	2	2	0	2	0	8
Others	23	28	25	20	4	6	10	1	117
No answer	0	0	0	1	0	1	0	0	2
Total	116	160	67	87	25	62	149	12	678

TABLE 10-4-(78)   2) SEX AND TELEPHONE

Reason	Sex		Telephone set		Total
	Male	Female	Owner	Non -owner	
Lower than Parklg fee	140	61	53	148	201
Public tranport fee	159	98	39	218	257
Telegram charge	52	41	18	75	93
Television fee	4	4	2	6	8
Others	84	33	27	90	117
No answer	1	1	0	2	2
Total	440	238	139	539	678

TABLE 10-4-(79)

3) NUMBER OF CALLS

Number of calls / Reason	0	1~2	3~4	5~6	7~8	9~10	more than 11	Total
Lower than parking fee	76	62	21	14	7	9	12	201
Public transport fee	111	71	42	16	5	3	9	257
Telegram charge	38	18	17	7	1	6	6	93
Televison fee	4	0	2	0	0	0	2	8
Others	49	29	16	11	1	2	9	117
No answer	2	0	0	0	0	0	0	2
Total	280	180	98	48	14	20	38	678

TABLE 10 - 4-(80)

Q.22 DO YOU THINK IT IS SAFE ENOUGH TO PUT A PUBLIC TELEPHONE OUTDOORS WITHOUT ANY ATTENDANT ?

1) ECONOMIC ACTIVITIES

Economic activities / answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Yes	23	50	12	39	1	28	51	2	206
No	100	118	61	54	27	36	124	11	531
No answer	1	1	0	1	0	0	1	0	4
Total	124	169	73	94	28	64	176	13	741

TABLE 10- 4 -(81)

2) ECONOMIC ACTIVITIES AND SEX.

Economic activities / Sex / answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Female
Yes	16	7	27	23	4	8	28	11	1	0	12	16	31	20	1	1	120	86
No	77	23	85	33	41	20	31	23	24	3	13	23	74	50	7	4	352	179
No answer	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	3	1
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	475	266

(M : Male   F : Female)

TABLE 10 - 4 - (82)

3) ECONOMIC ACTIVITIES AND TELEPHONE

Economic activities / Tel. Set / answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	Owner	Non-owner
Yes	7	16	12	38	2	10	5	34	1	0	15	13	7	44	1	1	50	156
No	19	81	19	99	10	51	11	43	2	25	12	24	22	102	2	9	97	434
No answer	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	4
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	147	594

(O : Owner   N : Non-owner)

TABLE 10-4-(83)   4) NUMBER OF CALLS

Number of calls / Answer	0	1 ~ 2	3 ~ 4	5 ~ 6	7 ~ 8	9 ~ 10	More than 11	Total
Yes	75	58	30	15	2	6	20	206
No	238	137	71	37	12	15	21	531
No answer	3	0	0	0	1	0	0	4
Total	316	195	101	52	15	21	41	741

TABLE 10-4-(84)

Q.24 IS IT NECESSARY TO SET A TIME LIMIT IN USING A PUBLIC TELEPHONE IN ORDER TO AVOID LONG TELEPHONE CONVERSATION ?

1) ECONOMIC ACTIVITIES

Economic activities / Answer	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Yes	87	143	59	80	28	57	154	11	619
No	36	25	12	14	0	7	18	2	114
No answer	1	1	2	0	0	0	4	0	8
Total	124	169	73	94	28	64	176	13	741

TABLE 10-4-(85) 2) ECONOMIC ACTIVITIES AND SEX

Economic activities / Sex / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Female
Yes	65	22	92	51	36	23	51	29	25	3	20	37	90	64	7	4	386	233
No	27	9	21	4	9	13	9	5	0	0	5	2	13	5	1	1	85	29
No answer	1	0	0	1	0	2	0	0	0	0	0	0	3	1	0	0	4	4
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	475	266

(M: Male F: Female)

TABLE 10-4-(86) 3) ECONOMIC ACTIVITIES AND TELEPHONE

Economic activities / Tel. set / Answer	Office		Trading company		Bank		Repair shop		Student		Shop interview		Residence interview		Hospital		Total	
	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	Owner	Non-owner
Yes	15	72	26	117	10	49	15	65	3	25	24	33	26	128	3	8	122	497
No	11	25	5	20	2	10	1	13	0	0	3	4	3	15	0	2	25	89
No answer	0	1	0	1	0	2	0	0	0	0	0	0	0	4	0	0	0	8
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	147	594

(O: Owner N: Non-owner)

TABLE 10-4-(87) 4) NUMBER OF CALLS

Number of calls / Answer	0	1~2	3~4	5~6	7~8	9~10	More than 11	Total
Yes	263	164	85	45	8	19	35	619
No	52	30	13	6	6	2	5	114
NO answer	1	1	3	1	1	0	1	8
Total	316	195	101	52	15	21	41	741

TABLE 10-4-(88) Q. 25 HOW LONG SHOULD SUCH TIME LIMIT BE ACCORING TO YOUR OPINION ? 1)ECONOMIC ACTIVITIES

Time limit \ Economic activities	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
1 minute	0	2	2	0	0	2	0	0	6
2 minutes	6	3	2	2	2	0	18	0	33
3 "	56	97	42	54	19	44	104	9	425
more than 4 minutes	31	48	18	25	7	13	47	4	193
No answer	31	19	9	13	0	5	7	0	84
Total	124	169	73	94	28	64	176	13	741

TABLE 10-4-(89) 2) ECONOMIC ACTIVITIES AND SEX

Time limit	Office M	Office F	Trading company M	Trading company F	Bank M	Bank F	Repair shop M	Repair shop F	Student M	Student F	Shop interview M	Shop interview F	Residence interview M	Residence interview F	Hospital M	Hospital F	Total Male	Total Female
1 minute	0	0	2	0	1	1	0	0	0	0	2	0	0	0	0	0	5	1
2 minutes	5	1	2	1	2	0	2	0	2	0	0	0	3	15	0	0	16	17
3 "	42	14	63	34	25	17	34	20	17	2	18	26	68	36	5	4	272	153
more than 4 minutes	21	10	29	19	11	7	16	9	6	1	3	10	30	17	3	1	119	74
No answer	25	6	17	2	6	3	8	5	0	0	2	8	5	2	0	0	63	21
Total	93	31	113	56	45	28	60	34	25	3	25	39	106	70	8	5	475	266

(M : Male   F : Female)

TABLE 10-4-(90) 3) ECONOMIC ACTIVITIES AND TELEPHONE

Time limit	Office O	Office N	Trading Company O	Trading Company N	Bank O	Bank N	Repair Shop O	Repair Shop N	Student O	Student N	Shop interview O	Shop interview N	Residence interview O	Residence interview N	Hospital O	Hospital N	Total Owner	Total Non-owner
1 minute	0	0	1	1	0	2	0	0	0	0	1	1	0	0	0	0	(1.4) 2	(0.7) 4
2 minutes	0	6	0	3	0	2	0	2	0	2	0	0	2	16	0	0	(1.4) 2	(5.2) 31
3 "	11	45	17	80	7	35	12	42	2	17	18	26	17	87	2	7	(58.5) 86	(57.1) 339
more than 4 minutes	6	25	10	38	4	14	3	22	1	6	6	7	10	37	1	3	(27.9) 41	(25.6) 152
No answer	9	22	3	16	1	8	1	12	0	0	2	3	0	7	0	0	(10.9) 16	(11.4) 68
Total	26	98	31	138	12	61	16	78	3	25	27	37	29	147	3	10	(100) 147	(100) 394

(O : Owner   N : Non-Owner)

TABLE IO-4-(91) 4) NUMBER OF CALLS

Number of calls / Time limit	0	1~2	3~4	5~6	7~8	9~10	More than 11	Total
1 minute	2	3	0	0	0	0	1	6
2 minutus	24	3	2	1	0	2	1	33
3 "	179	117	58	29	7	10	25	425
more than 4 minutes	72	51	29	17	4	9	11	193
No answer	39	21	12	5	4	0	3	84
Total	316	195	101	52	15	21	41	741

TABLE 10-4-(92) Q. 26 DO YOU HAVE ANY COMPAINT ABOUT THE PUBLIC TELEPHONE IN JAKARTA? (CHOOSE ONE ANSWER ONLY) 1) ECONOMIC ACTIVITIES

Economic activities / Complaint	Office	Trading company	Bank	Repair shop	Student	Shop interview	Residence interview	Hospital	Total
Using method	8	17	3	7	2	3	21	3	64
Toll call	11	10	1	6	3	7	33	0	71
Noise Cross talk	6	12	6	9	1	5	7	0	46
Noisy surroundings	3	10	4	7	3	7	7	1	42
Expensive	1	0	0	0	0	0	2	0	3
No connection all day	8	10	1	4	2	2	7	0	34
Damaged	24	20	11	16	1	7	12	0	91
Number of public telephones is small	33	58	27	26	8	21	54	2	229
Location unknown	7	19	7	10	2	7	27	3	82
No directory	5	9	1	2	0	4	2	3	26
Others	14	4	6	5	5	1	1	0	36
No answer	4	0	6	2	1	0	3	1	17
Total	124	169	73	94	28	64	176	13	741

TABLE 10-4-(93) 2) SEX AND TELEPHONE

Complaint	Sex		Telephone		Total
	Male	Female	Owner	Non-owner	
Using method	41	23	(8.6) 13	51	64
Toll call	40	31	(8.6) 13	58	71
Noise Cross talk	28	18	(5.3) 8	38	46
Noisy surroundings	19	23	(6.0) 9	33	42
Expensive	1	2	0	3	3
No connection all day	27	7	(6.6) 10	24	34
Damaged	60	31	26	65	91
Number of public telephones is small	164	65	41	188	229
Location unknown	48	34	12	70	82
No directory	14	12	6	20	26
Others	26	10	8	28	36
No answer	7	10	1	16	17
Total	475	266	147	594	741

TABLE 10-4-(94) 3) NUMBER OF CALLS

Number of calls / Complaint	0	1~2	3~4	5~6	7~8	9~10	More than 11	Total
Using method	34	16	7	4	0	2	1	64
Toll call	31	17	9	5	2	3	4	71
Noise Cross talk	15	13	10	2	1	3	2	46
Noisy surreundings	18	11	6	2	1	2	2	42
Expensive	2	0	1	0	0	0	0	3
No connection all day	11	7	7	3	1	2	3	34
Damaged	37	23	15	6	4	1	5	91
Number of public telehones is small	83	76	30	21	4	3	12	229
Location unknown	44	16	9	4	0	3	6	82
No directory	10	7	3	2	2	1	1	26
Others	20	8	4	0	0	1	3	36
No answer	11	1	0	3	0	0	2	17
Total	316	195	101	52	15	21	41	741