

ANNEX 4-8

Estimated Local Traffic Matrixes (1994, 1999 and 2004)

(Bogor M.A. - 1994)

TO / FROM	(1) CSA	(2) CWI	(3) BOA	(4) BOB	(5) BOC	(6) BOD	(7) SPL	(8) CAA	TOTAL	TO / FROM
1)CSA	4.30	5.04	14.68	17.62	14.53	0.00	0.00	3.83	60.00	1)CSA
2)CWI	4.58	6.94	19.85	23.81	19.65	0.00	0.00	5.18	80.00	2)CWI
3)BOA	12.50	18.60	63.53	76.23	62.89	0.00	0.00	16.26	250.00	3)BOA
4)BOB	14.99	22.32	76.23	91.48	75.47	0.00	0.00	19.51	300.00	4)BOB
5)BOC	12.37	18.41	62.89	75.47	62.26	0.00	0.00	16.09	247.50	5)BOC
6)BOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6)BOD
7)SPL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7)SPL
8)CAA	3.72	5.54	18.56	22.27	18.38	0.00	0.00	6.53	75.00	8)CAA
TOTAL	52.46	76.84	255.74	306.89	253.18	0.00	0.00	67.39	1,012.50	TOTAL
FROM / TO	(1) CSA	(2) CWI	(3) BOA	(4) BOB	(5) BOC	(6) BOD	(7) SPL	(8) CAA	TOTAL	FROM / TO

(Bogor M.A. - 1999)

TO / FROM	(1) CSA	(2) CWI	(3) BOA	(4) BOB	(5) BOC	(6) BOD	(7) SPL	(8) CAA	TOTAL	TO / FROM
1)CSA	6.48	7.54	14.35	17.22	40.91	0.00	0.00	5.99	92.50	1)CSA
2)CWI	6.85	10.32	19.27	23.12	54.91	0.00	0.00	8.04	122.50	2)CWI
3)BOA	12.21	18.04	40.25	48.30	114.72	0.00	0.00	16.48	250.00	3)BOA
4)BOB	14.65	21.65	48.30	57.96	137.66	0.00	0.00	19.78	300.00	4)BOB
5)BOC	34.79	51.42	114.72	137.66	326.94	0.00	0.00	46.97	712.50	5)BOC
6)BOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6)BOD
7)SPL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7)SPL
8)CAA	5.81	8.60	18.81	22.58	53.62	0.00	0.00	10.59	120.00	8)CAA
TOTAL	80.78	117.58	255.70	306.84	728.75	0.00	0.00	107.84	1,597.50	TOTAL
FROM / TO	(1) CSA	(2) CWI	(3) BOA	(4) BOB	(5) BOC	(6) BOD	(7) SPL	(8) CAA	TOTAL	FROM / TO

(Bogor M.A. - 2004)

TO / FROM	(1) CSA	(2) CWI	(3) BOA	(4) BOB	(5) BOC	(6) BOD	(7) SPL	(8) CAA	TOTAL	TO / FROM
1)CSA	8.82	10.09	0.00	16.37	40.92	41.06	7.05	8.18	132.50	1)CSA
2)CWI	9.16	13.57	0.00	21.58	53.96	54.14	9.30	10.79	172.50	2)CWI
3)BOA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3)BOA
4)BOB	13.89	20.19	0.00	38.37	95.93	96.25	16.55	18.82	300.00	4)BOB
5)BOC	34.72	50.46	0.00	95.93	239.83	240.63	41.37	47.05	750.00	5)BOC
6)BOD	34.84	50.63	0.00	96.25	240.63	241.43	41.51	47.21	752.50	6)BOD
7)SPL	6.35	9.23	0.00	17.57	43.92	44.06	8.87	10.00	140.00	7)SPL
8)CAA	7.87	11.43	0.00	21.33	53.32	53.50	10.67	14.38	172.50	8)CAA
TOTAL	115.66	165.61	0.00	307.40	768.51	771.07	135.32	156.43	2,420.00	TOTAL
FROM / TO	(1) CSA	(2) CWI	(3) BOA	(4) BOB	(5) BOC	(6) BOD	(7) SPL	(8) CAA	TOTAL	FROM / TO

ANNEX 5-1

List of Switches in Jabotabek Area

ANNEX 5-1 List of Switches in Jabotabek Area (May, 1988) (1/4)

Switch Unit	Switching Function	Type of Switch	Type of CPU	Capacity (L.U.)	No. of Sub.	Waiting Lists	Service in	Paket 154K	Paket 170K	Remarks
** Kota Tandem Area **										
KT1A	Local	EMD		10,000	9,994	6,117	1960			
KT1B	Local	EVSD/DE5.2	SSP103	9,844	501		1988			
KT2A	Local	PRX	Multi	9,728	9,451	18,982	1976			
KT2B	Local	PRX	Multi	9,728	9,512		1978			
KT2C	Local	PRX	Multi	12,288	6,801		1981			
KT2D	Local	PRX	Multi	11,520	6,848		1979			
KT2E	Combined L/T	EVSD/DE5.2	SSP103	6,000	4,941		1986		14,000	D. PH-11/Contracted Combined in 1987
KT2F/KT8	Combined L/T	PRX	Multi	3,328	1,216		1980			
KT7A	Local Tandem	PRX	Mono				1978			
PLTA	Local	PRX	Multi	11,520	11,459	14,784	1977		5,000	D. PH-11/Contracted
PLTB	Local	(EVSD/DE5.1)								
CKG	Local	PRX	Multi	7,936	5,605	13,065	1979		2,048	PRX5/Contracted
ANC	Local	PRX	Mono	8,704	6,249	4,061	1977		1,536	PRX5/Contracted/Multi
** Gambir Tandem Area **										
GB1A	Local	EMD		10,000	8,531	12,607	1962			
GB1B	Local	EMD		10,000	9,093		1965			
GB1C	Local	PRX	Multi	8,192	6,944		1977			
GB1D	Local	PRX	Multi	8,192	6,481		1978			
GB1E	Comb. L/T/Sub.	EVSD/DE5.2	SSP103	11,044	9,884		1985			
GBTA	Local Tandem	PRX	Mono							
GBTB	Local Tandem	PRX	Mono							
SUBT	Suburban Tandem	CIT-JANUS								
JKTT	Trunk Tandem	MC-10C	Multi	(8,000#2)			1975			
GB2A	Local	PRX	Multi	8,192	6,849	9,307	1977			
GB2B	Local	PRX	Multi	8,192	7,062		1980			
GB2C	Local	PRX	Multi	7,168	5,065		1982			
Subtotal				171,576	132,496	78,923		0	22,584	

ANNEX 5-1 List of Switches in Jabotabek Area (May, 1988) (2/4)

Switch Unit	Switching Function	Type of Switch	Type of CPU	Capacity (L.U.)	No. of Sub.	Waiting Lists	Service In	Paket 154k	Paket 170k	Remarks	
** Siliipi Tandem Area **											
SLPA	Local	EMD		7,500	7,372	9,836	1972				
SLPB	Combined L/T	EWSD/DE4	SSP103	6,500	5,614		1986				
SLPC	Local	(EWSD/DE5.2)	CP103					10,000		D.PH-IV/Under installation	
SHIA	Local	EMD		7,000	6,740	2,205	1972				
SHIB	Local	EWSD/DE5.1	SSP103	4,743	37		1987			D.PH-IV/Under installation	
SHIC	Local	PRX	Mono	3,072	2,661		1986			Container	
SNZA	Local	PRX	Multi	8,448	7,900	6,830	1978				
SNZB	Local	EWSD/DE5.1	SSP103	9,740	2,038		1987			D.PH-IV/Under installation	
SNT	Trunk Tandem	EWSD/DE5	CP103	(7,000)						D.PH-IV/Under installation	
MTX	Mobile Tel.	AXE		(10,000)							
PLMA	Local	PRX	Mono	7,680	6,644	15,172	1978				
PLMB	Local	PRX	Mono	5,376	2,763		1986				
PLMC	Local	EWSD/DE5.1	SSP103	3,905	0		1987				
KED	Local	(RLC/SLPC)						1,000	1,000	D.PH-IV/Contracted D.PH-III/C/Under negotiation	
MER	Local	(RLC/PLMC)						1,000	1,000	D.PH-IV/Contracted D.PH-III/C/Under negotiation	
TGA	Local	(RLC/JIA)						1,000	1,000	D.PH-IV/Contracted	
JIA	Local	EWSD/DE4		1,780	1,675	0	1984				
** Gempaka Putih Tandem Area **											
CPPA	Local	PRX	Multi	10,240	9,446	5,075	1977				
CPPB	Combined L/T	EWSD/DE5.2	SSP103	12,924	4,409		1986				
CPT	Local Tandem	PRX	Mono								
RNGA	Local	PRX	Multi	12,288	11,173	5,572	1978			D.PH-IV/Under installation/DE5.2	
RNGB	Local	RLC/CPPB		4,000	3,239		1987	4,000			
KGD	Local				0	6,672		3,000		D.PH-IV/Contracted	
KGP	Local	EWSD/DE4	SSP112	2,979	2,277	0	1987			User's credit	
PGG	Local								1,000	D.PH-III/C/Under negotiation	
TPRA	Local	PRX	Multi	9,216	7,857	4,391	1977				
TPRB	Local	(EWSD/DE5.1)							5,000	D.PH-III/P/Under negotiation	
CIL	Local	(RLC/CPPB)							1,000	D.PH-IV/Contracted	
Subtotal									28,000	9,000	
									117,391	81,845	55,753

ANNEX 5-1 List of Switches in Jabotabek Area (May, 1988) (3/4)

Switch Unit	Switching Function	Type of Switch	Type of CPU	Capacity (L.U.)	No. of Sub.	Waiting Lists	Service in	Paket 154k	Paket 170k	Remarks
## Kebayoran Tandem Area ##										
KBIA	Local	EMD		4,000	3,812	8,080	1981			
KBIB	Local	PRX	Multi	8,192	7,830		1977			
KBZA	Local	PRX	Multi	9,216	8,316		1981			
KBZB	Combined L/T	EVSD/DE5.1	SSP103	5,000	3,098		1986	3,000		D.PH-IV/Under installation
KBT	Local Tandem	PRX	Mono				1979			
KBB	Local		(Mono)						5,120	PRX5/Contracted/Container
CPEA	Local	PRX	Mono	8,448	8,398	9,123	1978			
CPEB	Local	EWSD/DE5.1	SSP103	7,300	2,493		1987			
KLI	Local	PRX	Multi	13,824	9,685	4,684	1978			
CPAA	Local	EMD	Mono	2,000	1,960	3,570	1978			
CPAB	Local	PRX	Mono	1,536	885		1986		1,536	PRX5/Contracted/Container
PSMA	Local	EMD	Mono	3,000	2,800	3,384	1978			
PSMB	Local	PRX	Mono	3,840	685		1987		4,352	PRX5/Contracted/Multi
JAG	Local	RLC/K82B		240	107	0	1987			
SER	Local		(Mono)						1,024	PRX5/Contracted/Container
## Jatinegara Tandem Area ##										
JTIA	Local	EMD		2,000	1,890	2,985	1968			
JTIB	Local	RLC/JT2B		2,496	2,160		1987			
JTZA	Local	PRX	Multi	10,240	9,338	4,954	1978			
JT2B	Combined L/T	EWSD/DE5.2	SSP103	8,528	316		1986			
JTT	Local Tandem	PRX	Mono				1977			
CV	Local	PRX	Mono	6,144	4,073	3,589	1978		3,072	PRX5/Contracted/Multi
PSR	Local	EWSD/DE4	SSP112	3,905	1,804	1,340	1986			
KLD	Local	RLC/JT2B		3,260	2,340	9,171	1987	3,000		D.PH-IV/Contracted/DE4
TBA	Local	PRX	Multi	13,056	10,723	4,406	1978			
TBB	Local	(EWSD/DE5.1)							5,000	D.PH-III/Under negotiation
GANA	Local	N230		1,000	952	1,471	1975			
GANB	Local	(EWSD/DE5.1)							2,000	D.PH-III/Under negotiation
Subtotal				117,225	83,665	56,757		6,000	22,104	
Total				406,192	298,006	191,433		34,000	53,688	

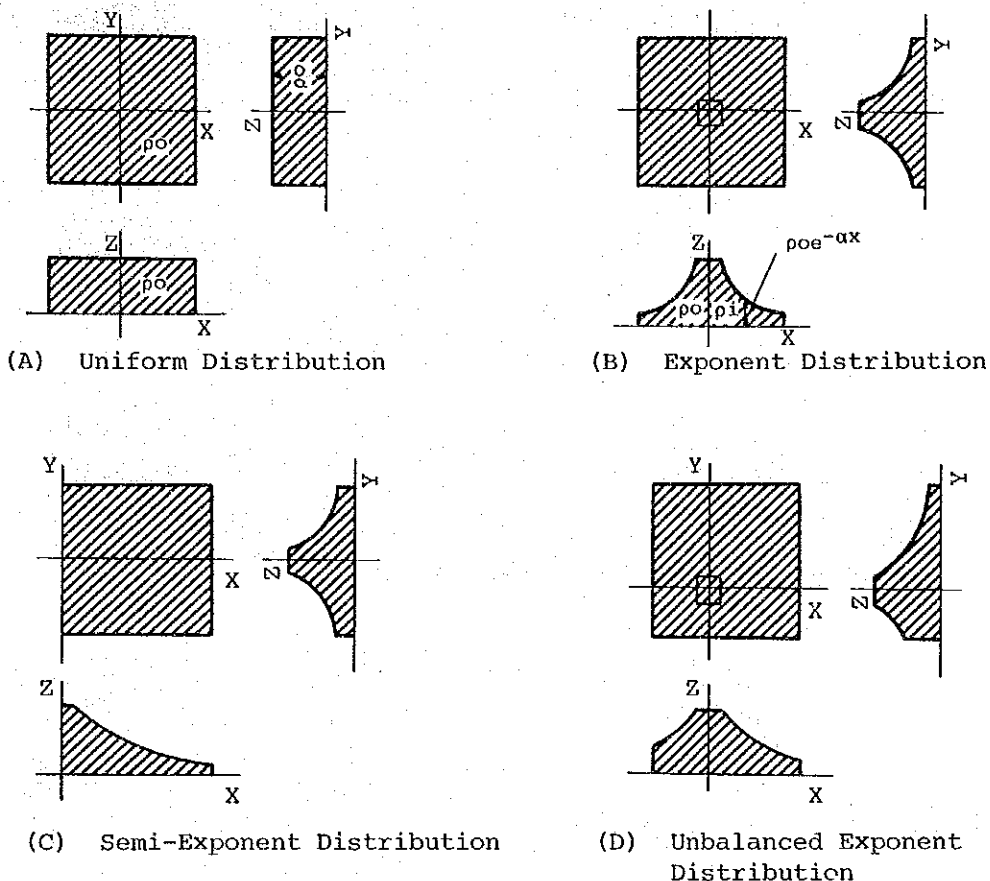
ANNEX 5-1 List of Switches in Jabotabek Area (May, 1986) (4/4)

Switch Unit	Switching Function	Type of Switch	Type of CPU	Capacity (L.U.)	No. of Sub.	Waiting Lists	Service in	Paket 154k	Paket 170k	Remarks
** Jakarta Suburban Area **										
TAN	Local	EMD		4,000	2,927	7,184	1978			REALOKASI(+1000):Completed
BEK	Local	EMD		2,000	1,877	6,379	1978			REALOKASI(+1000):On-going
CIB	Local	PRX	Mono	1,536	1,318	779	1986		1,024	PRX5/Contracted/Container
DEP	Local	EWSD/DEA	SSP112	1,956	1,772	2,451	1986			
Total				9,492	7,894	16,793		0	1,024	
** Bogor Area **										
800A	Local	MC-10C		8,000	7,950	6,407	1978	2,000		MC-10C/Contracted
800B	Local	EWSD/DEA	SSP112	4,000	0		1988			
800T	Trunk Tandem	EWSD/DEA	SSP112	(1,020)						
CSA	Local	N230		1,000	913	506	1980			Manufactured in 1976
CAA	Manual	ABK		70	56	0	1926			
LWL	Manual	ABK		60	45	4	1960			
JSC	Manual	ABK		50	33	0	1938			
Total				13,180	8,997	6,917		2,000	0	

ANNEX 5-2

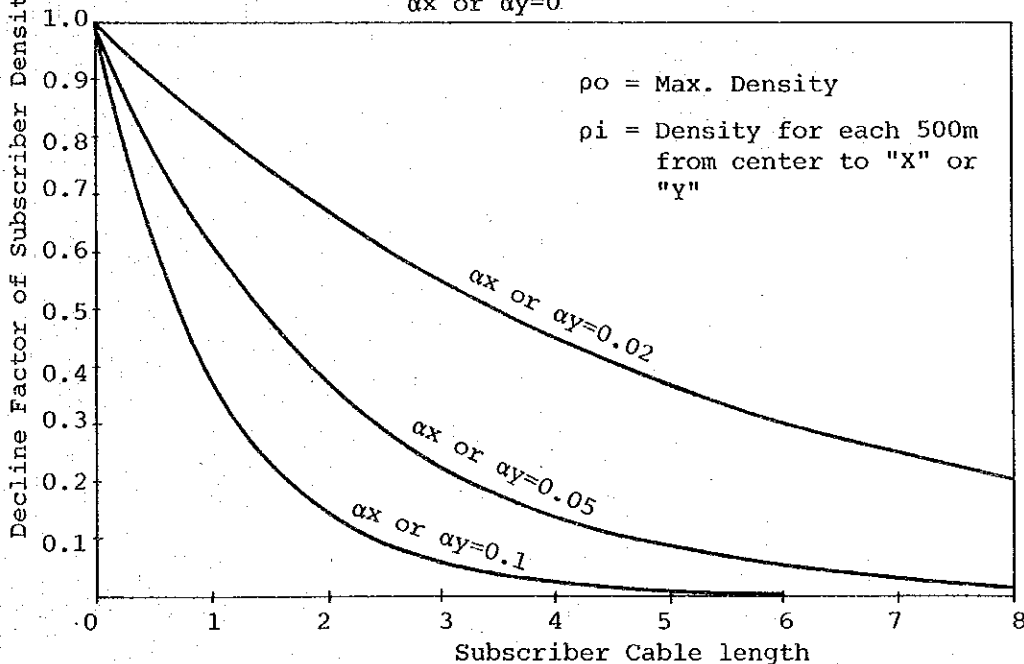
Subscriber Distribution Model and Subscriber Cable Length

ANNEX 5-2 Subscriber Distribution Model and Subscriber Cable Length



Subscriber Distribution Model

αx or $\alpha y = 0$

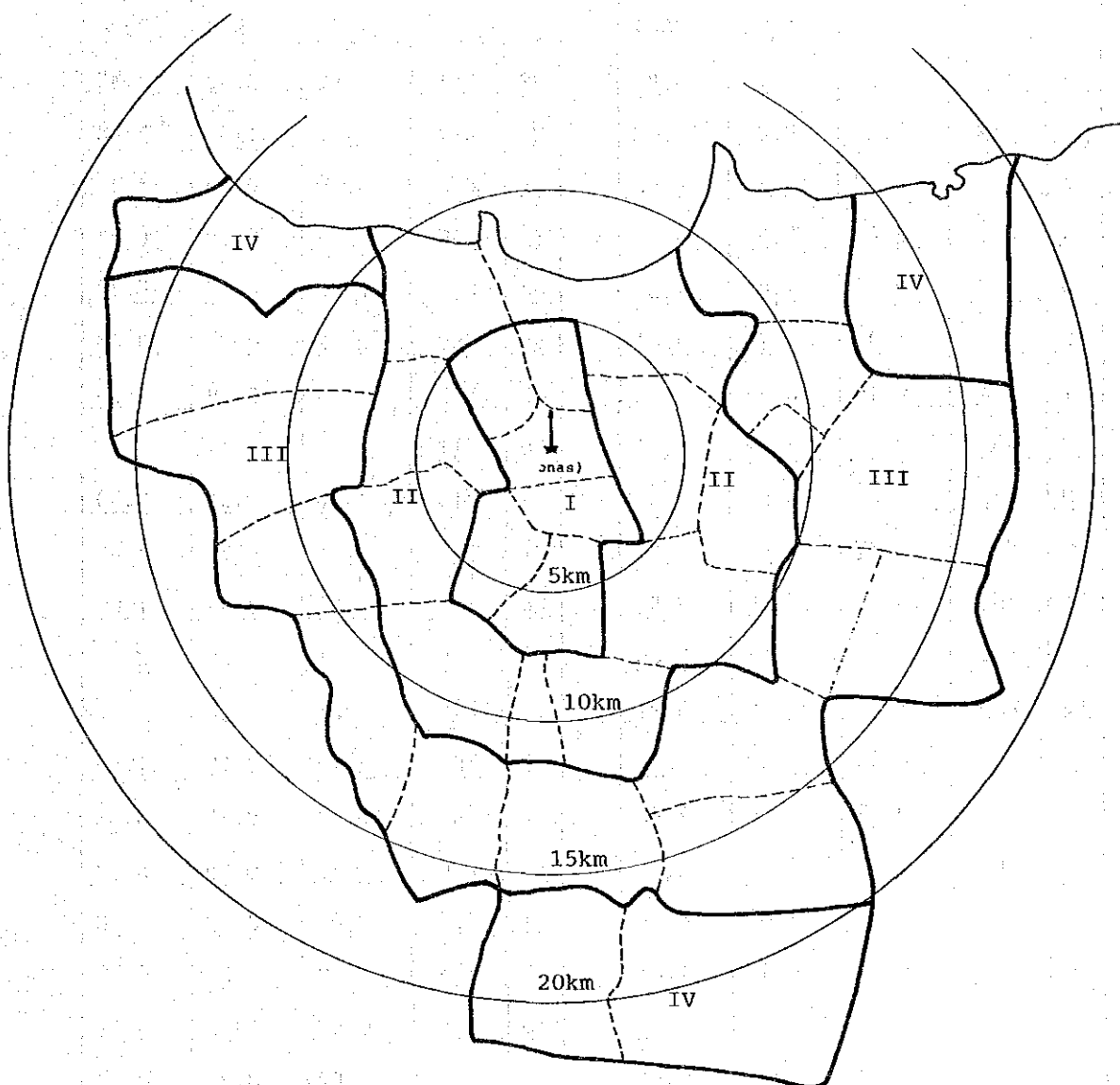


Correlation Between Subscriber Cable Length and Subscriber Density

ANNEX 5-3

Demand Density in Jakarta Multi-Exchange Area

ANNEX 5-3 Demand Density in Jakarta Multi-Exchange Area (1/2)



Area Classification

- | | |
|-------------------------------|--|
| I. High Density Area | 20 k - 25 k Sub/km ²
within around 5 km radius |
| II. Middle Density Area | about 10 k Sub/km ²
within around 10 km radius |
| III. Semi-Middle Density Area | about 5 k Sub/km ²
within around 15 km radius |
| IV. Low Density Area | about 1 k Sub/km ²
within around 20 km radius |

ANNEX 5-3 Demand Density in Jakarta Multi-Exchange Area (2/2)

No.	Ex. Name	Demand Density (1,000/km ²)		
		1994	1999	2004
1	KT1	2.67	3.15	3.63
2	KT2	6.64	8.64	11.07
3	KT3	6.86	7.86	8.98
4	PLT	2.49	3.05	3.47
5	CKG	0.74	1.08	1.53
6	ANC	1.04	1.74	2.61
7	TGA	0.16	0.22	0.30
8	GB1	6.76	7.19	7.50
9	GB2	3.47	4.93	6.68
10	SLP	1.87	2.64	3.61
11	SM1	3.81	5.89	8.00
12	SM2	5.53	8.88	12.00
13	PLM	1.96	2.89	3.97
14	KED	0.55	1.00	1.56
15	MER	0.43	0.90	1.48
16	CPP	2.18	3.18	4.39
17	RMG	2.51	3.60	4.49
18	KGD	0.99	1.45	1.83
19	KGP			
20	PGG	0.20	0.43	0.84
21	TPR	0.90	1.38	1.95
22	CIL	0.18	0.35	0.63
23	KB	1.98	2.48	3.10
24	KBB	1.18	2.17	3.50
25	CDG	0.06	0.12	0.20
26	CPE	1.14	1.61	2.16
27	CNE	1.14	1.70	1.83
28	CPA	0.17	0.31	0.48

No.	Ex. Name	Demand Density (1,000/km ²)		
		1994	1999	2004
29	KL1	1.46	2.32	3.32
30	KL2	1.10	1.69	2.48
31	PSM	0.60	0.92	1.31
32	JAG	0.09	0.19	0.34
33	SER	0.08	0.18	0.32
34	SRU	0.12	0.25	0.43
35	SRB	0.04	0.09	0.15
36	JT1			
	JT2	1.85	2.59	3.50
37	CW	0.45	0.70	1.02
38	PSR	0.31	0.59	1.00
39	KLD	0.81	1.69	2.72
40	PDK	0.51	1.03	1.62
41	TB	2.12	3.15	4.50
42	GAN	0.13	0.23	0.38
43	PDG	0.11	0.20	0.33
44	BEK	0.07	0.12	0.18
45	BKB	0.30	0.51	0.78
46	BGG	0.06	0.11	0.17
47	CL	0.03	0.06	0.10
48	TAN	0.30	0.53	0.81
49	JIA	0.13	0.15	0.18
50	JUG	0.06	0.14	0.24
51	CPD	0.09	0.16	0.25
52	DEP	0.24	0.40	0.60
53	SKJ	0.18	0.31	0.45
54	CIB	0.04	0.06	0.09
55	SWG	0.02	0.04	0.07

ANNEX 5-4

General Circuit Dimensioning Method

ANNEX 5-4 General Circuit Dimensioning Method

(1) Circuit Dimensioning (Two Choices)

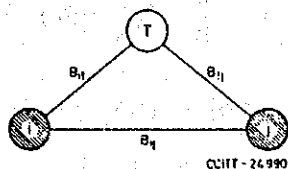


FIGURE C-1 (VI)

Requisite data:

- A_{ij} : is the offered traffic from exchange i to exchange j
- B_{ij}, B_{it}, B_{tj} : are the incremental costs for junctions between exchanges (i, j) and exchanges and transit stage (t)
- E_{ij} : is the grade of service on the transit routes

Calculation steps	Formulae
1) Cost ratios	$\epsilon_{ij} = \frac{B_{ij}}{B_{it} + B_{tj}}$
2) Number of high-usage junctions n_{ij} for all routes i-j between exchanges	$A_{ij} \cdot [E(n_{ij}, A_{ij}) - E(n_{ij}+1, A_{ij})]$ $= \epsilon_{ij} \cdot [1 - 0.3(1 - \epsilon_{ij}^2)]$
3) Mean value P_{ij} and variance V_{ij} of traffic rejected from each high-usage routes	$P_{ij} = A_{ij} \cdot E(n_{ij}, A_{ij})$ $V_{ij} = P_{ij} \cdot [1 - P_{ij} + \frac{A_{ij}}{n_{ij}+1+P_{ij}-A_{ij}}]$

- 4) Mean value M and variance V of traffic offered to the transit route
- $$M_{it} = \sum_j P_{ij}, \quad V_{it} = \sum_j V_{ij}$$
- $$M_{tj} = \sum_i P_{ij}, \quad V_{tj} = \sum_i V_{ij}$$

- 5) Equivalent traffic A^* and equivalent number of junctions n^* (index omitted) on the transit routes
- $$A^* = V + 3 \frac{V}{M} \cdot \left(\frac{V}{M} - 1 \right)$$
- $$n^* = \frac{A^*}{q} - M - 1$$

where

$$q = 1 - \frac{1}{M + \frac{V}{M}}$$

- 6) Number of transit circuits m (index omitted)
- $$A^* \cdot E(n^* + m, A^*) = E_{ij} \cdot M$$

(2) Circuit Dimensioning for Tandem Routes (Three Choices)

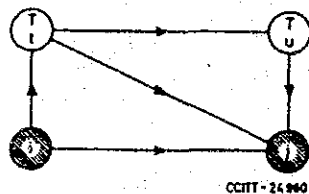


FIGURE 9-6 (VI)
Traffic flows in a network with three choices for routing

- i is the sending exchange in area t ;
- j is the receiving exchange in transit area u ;
- $i-j$ is the first choice;
- $i-t-j$ is the second choice;
- $i-t-u-j$ is the third choice;
- P_{ij} is the traffic rejected (overflow traffic) from the high-usage route ij ;
- P_{tj} is the traffic rejected (overflow traffic) from the high-usage route tj ;

traffic on the route it : $A_{it} = \sum_j P_{ij}$

i.e. the sum of the rejected traffic from i to all other exchanges;

$$\text{traffic on the route } tj: A_{tj} = \sum_{j \in u} P_{tj}$$

i.e. the sum of the rejected traffic from all exchanges belonging to transit area t to exchange j in transit area u ;

$$\text{traffic on the route } tu: A_{tu} = \sum_{j \in u} P_{tj}$$

i.e. the sum of the rejected traffic from all routes between the transit stage t and all exchanges in transit area u ;

$$\text{traffic on the route } uj: A_{uj} = \sum_{i \in u} P_{tj} + \sum_{T \neq u} P_{tj}$$

i.e. the sum of the rejected traffic from all exchanges in transit area u to exchange j in the same area plus the rejected traffic from other transit stages than u to the same exchange j .

The traffic rejected from a high-usage route with n circuits is represented by the shaded areas above the line $n-n$. Obviously, traffic of this kind assembled on a transit route is not of the same type as the traffic offered to a high-usage route and cannot be described only by its mean value. Also the variances of the traffic have to be taken into account.

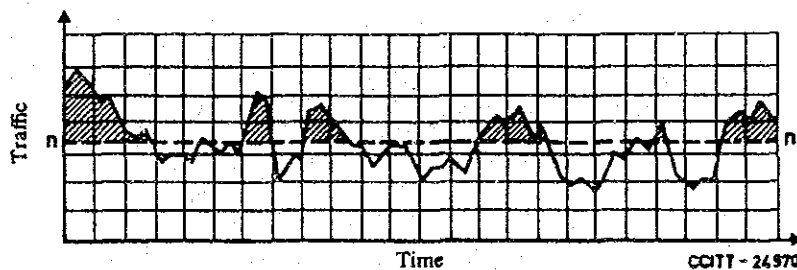


FIGURE 9-7 (VI)
Character of the traffic rejected from a high-usage route

Character of the Traffic Rejected from a High-usage Route

A method for the determination of the number of circuits on high usage and transit routes based on Wilkinson's equivalent random theory. This method is conveniently used in order to determine the structure of the network and the number of high-usage circuits. However, full availability being assumed corrections of the number of transit circuits may be necessary depending on the particular details of the system employed.

ANNEX 5-5

**Integration of Analog and
Digital Trunk Exchanges in Jabotabek Area**

ANNEX 5-5 Integration of Analog and Digital Trunk Exchanges in Jabotabek Area

(1) Network Digitalization Scenario

SLDD network digitalization in Jabotabek area will be achieved through the following transition periods aiming at full-digitalization of the network:

	<u>Trunk Junction</u>	<u>Trunk Switch</u>	<u>Local Junction</u>	<u>Remarks</u>
Period 0:	Analog	Analog	Coexist.	Present Condition
Period 1:	Coexist.	Coexist.	Coexist.	JA-B00 (M/W) & SM2
Period 2:	Coexist.	Coexist.	Coexist.	End of Rep. V/VI
Period 3:	Digital	Digital	Digital	End of Rep. VII

Attachment-1 shows the overall scenario of network digitalization in Jabotabek area.

(2) Routing Principles under Coexistence of Analog/Digital Trunk Switches

Attachment-2 presents the routing principles in case where analog and digital trunk switches coexist in a multi-exchange area. The principles quoted here are in line with FTP '85/POSTEL though the junction routes via local transit exchange are omitted for brevity.

These principles given in Attachment-2 are applicable to the network development during Periods 1 and 2. In this case the link connecting both analog and digital trunk switches is to carry the transit and/or overflow traffic.

For outgoing traffic: transit traffic only

For incoming traffic: both transit and overflow traffic

(3) Current Environment

a) Junction Network Arrangement in Jakarta Multi-Exchange Area

Even though the digital trunk switch at SM2 is not put into service, the junction circuits among all digital local exchanges (existing/planned) and SM2 are to be provided even for SLDD traffic under OECF JKT PCM Phase 1/2 Projects. However, the inter-link between GB1 and SM2 was not taken into account since it was beyond the scope of work of the said Projects.

On the other hand, the existing analog local exchanges are connected to GB1 trunk switch via analog transmission media, i.e., metallic pair cables to carry SLDD traffic.

Consequently the existing digital local exchanges are to be connected for the time being to GB1 analog trunk switch until service-in of SM2 digital trunk switch.

b) Call Handling Capacity of MC-10C/GB1

As for the call handling capacity the following are found.

- Traffic handled : 2,350 Erlang (actual load)
- BHCA capacity : 150,000 BHCA (multi-processor)
- Trunk terminal capacity: 8,000 x 2 ccts. (approx.)

The trunk terminals above of about 16,000 are allocated to various types of interface equipment.

c) SLDD Traffic/Calls

The following are observed according to the collected data as to SLDD traffic/calls:

Successful Call Ratio: around 20%

A large number of lost calls are mainly due to:

- subscribers' partial dialling;
- ringing but no answer;
- called party/destination exchange busy.

Average Holding Time

- for successful SLDD calls: 118 - 163 seconds
- for SLDD call attempts : 32 - 89 (Ave.: 44 seconds)

Destination-Based Distribution of SLDD Traffic

The following are the present percent distribution of outgoing SLDD traffic from GB1 trunk switch by destination:

- To Sumatera : 22%
- To Jawa : 69%
- (for Bogor) (5%)
- To Kalimantan : 4%
- To Sulawesi : 5%
- To Maluku/Irian Jaya: negligible

Noteworthy here is that the figures above might include the transit SLDD traffic originated from the areas other than Jakarta multi-exchange area.

d) Supplementary Information

International Switching Function

International calls from/to Indonesia are switched in Jakarta (MC-10C/GB1) and Medan at this moment. However, the international switching function of MC-10C as well as the related manual switchboards are scheduled to be transferred to a newly installed international digital switch in new PT. INDOSAT Building by the end of this year (1989). Even in this case, the existing analog switch

MC-10C is still expected to function as a gateway to INTS (international switching center) at national level.

(4) Practical Network Development

Attachment-3 demonstrates SLDD network development in Jakarta multi-exchange area to follow the routing principles set forth in FTP '85.

During Period 1 of Attachment-3, the digital trunk switches in Bandung and Surabaya are likely to remain connected with MC-10C/GB1 via existing analog backbone transmission system.

During Periods 1 and 2, the junction circuits will be arranged so as to make an effective use of already-provided-circuits under other projects as many as possible. (Refer to the physical image in Attachment-3.)

(5) Foreseeable Constraints

Even if SLDD network is developed in accordance with the scenario presented in Attachment-1 and Attachment-3, some constraints against the network development are foreseeable.

The existing MC-10C/GB1 is not likely to have a sufficient call handling capacity in terms of BHCA to cater for the trunk network expansion.

The following table gives the calculated BHCAs assuming different average holding times for SLDD calls to include incoming and transit calls from the areas other than Jakarta area based on the actual load condition:

<u>Average Holding Time</u>	<u>BHCA^{1/}</u>	<u>Remarks</u>
50 sec.	169,200	similar to the current situation; handling capacity of MC-10C=150,000 BHCA.
60 sec.	141,000	
70 sec.	120,900	
90 sec.	94,000	

1/ BHCA = 2,350 (Erlang) x 3,600 (sec.)/(Average Holding Time)

In a word, the handling capacity of MC-10C is exceeded as long as the average holding time remains same (currently 44 sec.).

The existing MC-10C will be obliged to handle the traffic of 3,750 Erlang by the end of Repelita V if the network development scenario given here is followed and based on the following assumptions:

Estimated SLDD traffic from/to Jakarta:	3,800 x 2 (Erlang)
Local switch digitalization in Jakarta:	72%
Trunk junction digitalization	: 60%
Overflow traffic between GB1 and SM2	: 10%
Network expansion scale	: 1,400 k l.u.

It could be said that MC-10C/GB1 will be overloaded by the end of Repelita V if the plan of 1,400 k l.u. expansion is realized and unless the average holding time of SLDD calls including ineffective ones is raised up to 90 sec. in any way by improving successful call ratio:

$$3,750 \text{ (Erlang)} \times 3,600 \text{ (sec.)} / 90 \leq 150,000$$

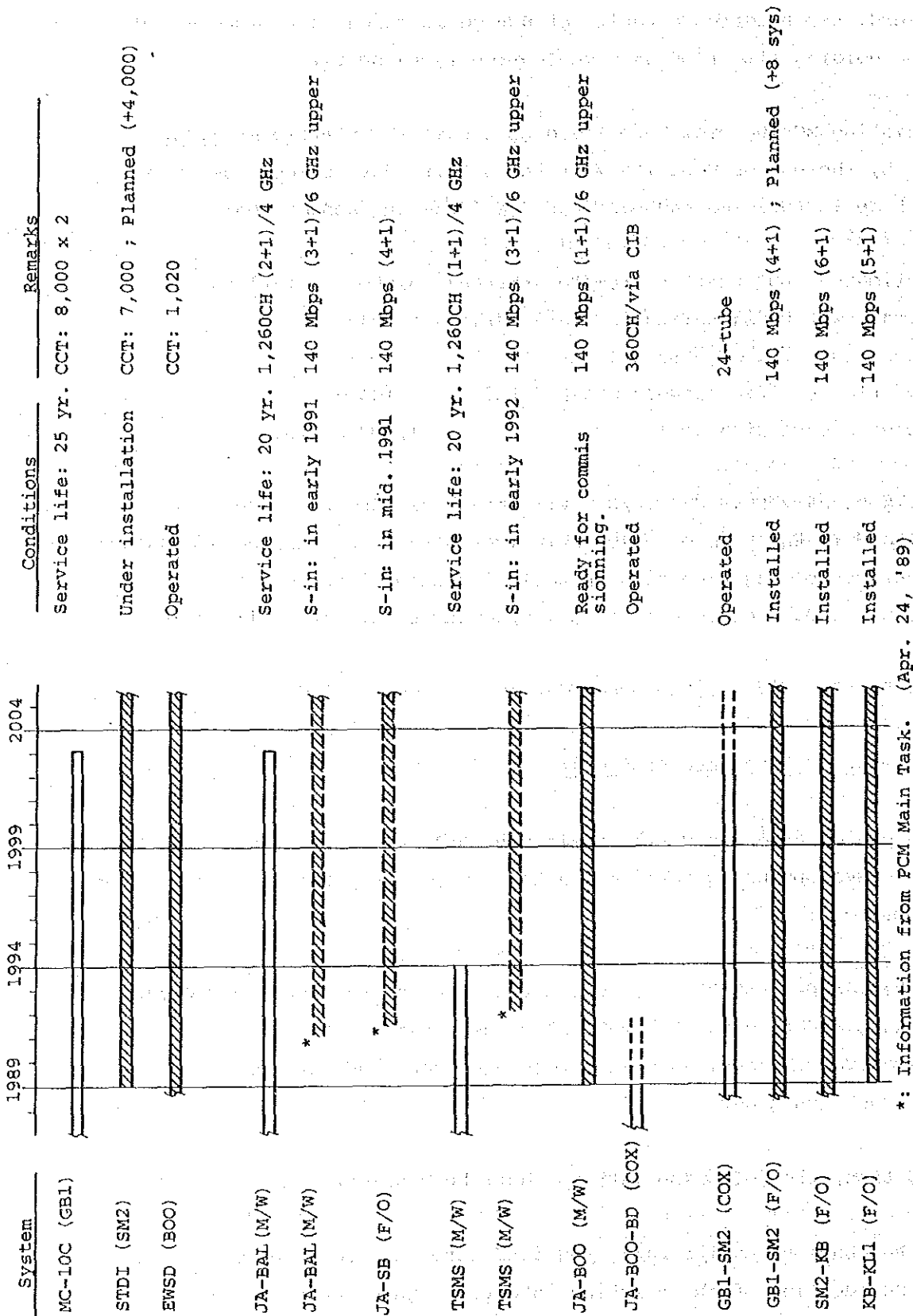
Arrangement of Interface Equipment

By the end of Repelita V, the following measures shall be taken if the network development scenario given here is pursued (Refer to Attachment-4):

- Replacement of No. 5 type interface equipment with E&M/MFC type;
- Removal of local EMD/N230 interface equipment;
- Removal of local EWSD interface equipment and part of analog trunk junctions.

In addition, the following matters shall be considered:

- Purchase of additionally required interface equipment;
- Remodelling of the existing interface equipment to be fit for different types of signalling.



*: Information from PCM Main Task. (Apr. 24, '89)

Conditions
 Service life: 25 yr. CCT: 8,000 x 2
 Under installation CCT: 7,000 ; Planned (+4,000)
 Operated CCT: 1,020

Remarks
 Service life: 20 yr. 1,260CH (2+1)/4 GHz
 S-in: in early 1991 140 Mbps (3+1)/6 GHz upper
 S-in: in mid. 1991 140 Mbps (4+1)

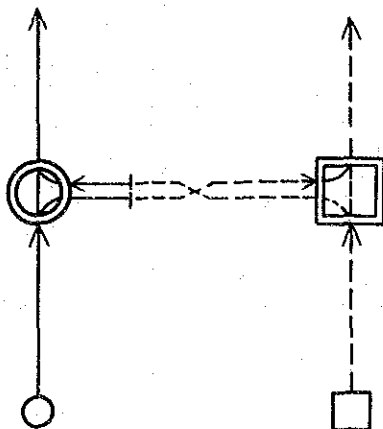
Service life: 20 yr. 1,260CH (1+1)/4 GHz
 S-in: in early 1992 140 Mbps (3+1)/6 GHz upper
 Ready for commis sioning. 140 Mbps (1+1)/6 GHz upper
 Operated 360CH/via CIB

Operated 24-tube
 Installed 140 Mbps (4+1) ; Planned (+8 sys)
 Installed 140 Mbps (6+1)
 Installed 140 Mbps (5+1)

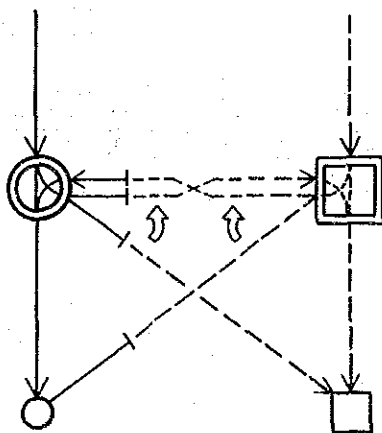
Attachment-1 Overall Scenario of Network Digitalization

Attachment-2 Routing Principles for SLDD Traffic (FTP '85)



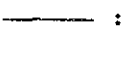


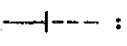
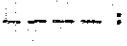
a) Outgoing Traffic from Jakarta

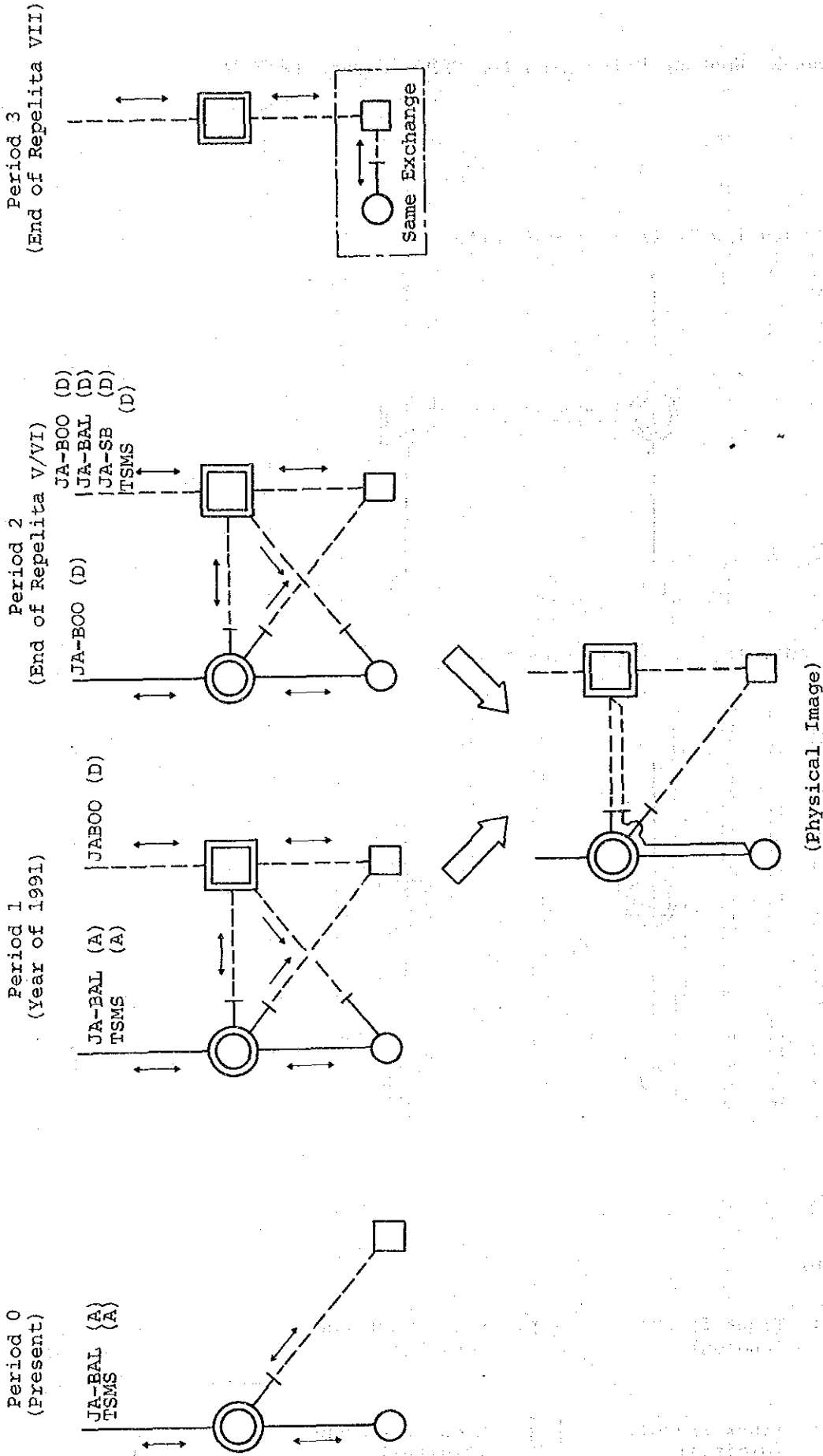


b) Incoming Traffic to Jakarta



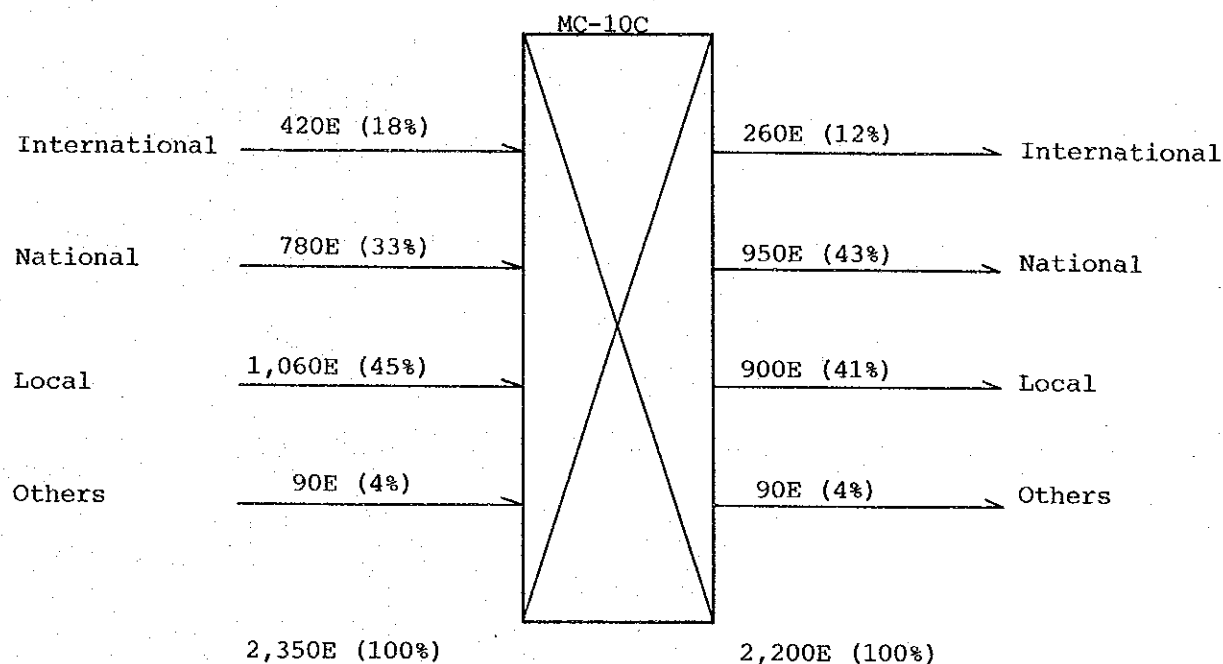
(LEGEND)

- | | | | | | |
|---|---------------------------|---|----------------------------|---|----------------------|
|  | : Trunk Transit (Analog) |  | : Local Exchange (Analog) |  | : Junction (Analog) |
|  | : Trunk Transit (Digital) |  | : Local Exchange (Digital) |  | : CODEC (A/D) |
| | | | |  | : Junction (Digital) |



Attachment-3 Guideline for SLDD Network Integration

Attachment-4 Current Traffic Flow of MC-10C in GB1



Interface Equipment Installed/Planned/Equipped

Signalling Type	Incoming			Outgoing			Remarks
	Inst.	Pland.	Eqpd.	Inst.	Pland.	Eqpd.	
LP/MFC	1958	1689	1594	2065	1513	1487	for PRX and EWSD
3W/MFW	480	480	477	-	-	-	for EMD via Super 10
E&M/DP	237	196	180	572	555	519	for EMD/N230
E&M/MFC	2616	2570	2150	2708	2655	2069	for SLDD and EWSD
E&M/DP	83	68	59	147	69	57	for SLDD and Suburban
E&M/No.5	1145	1137	1049	1145	1137	1048	for ISD (both-way operation)
No.6	296	-	-	296	-	-	
Others	1193	1161	986	1112	1078	826	for Operator, echo sup. etc.
Total	8008	7301	6495	8045	7007	6006	

