

CHAPTER 3 TASK OF THE MAINTENANCE
CENTRE PREPARATORY EXPLANATION

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In order to carry out the maintenance work of nationwide facilities effectively and to sustain their standard of reliability, information about existing facilities and data to be processed must be corrective failure recovery system must be provided and the technical level of staff must be improved. From these points of view, the items necessary for establishing the maintenance system are summarized as follows:

- 1) Preparation of booklet on the outline of facilities
- 2) Establishment of technical maintenance standards to carry out maintenance work of facilities properly
- 3) Determination of communication method and reporting routes
- 4) Establishment of procedures for failure restoration
- 5) Planning and implementation of maintenance schedule
- 6) Grasp of equipment histories and relevant data
- 7) Standardization of format of technical service record and establishment of data processing method by computer
- 8) Centralization and effective operation of material/parts storage and inventory control
- 9) Compiling of technical information and its reporting format
- 10) Establishment of procedures for periodical maintenance
- 11) Training of maintenance staff
- 12) Budgeting and others

Further explanations for the above are given below.

(1) Outline of facilities

A document summarizing the outline of facilities including ratings of equipment, floor layout of buildings, power sources, antennas and other special mentions, which should take a form allowing registration to computers, should be prepared.

(2) Technical standards for facilities and equipment

Technical standards for independent equipment are provided in the form of normal specifications, but the standards for maintenance work should be established separately.

(3) Establishment of communication and reporting routes

To set up the Maintenance Centre, information communication routes and methods must be established. For routine communication, failure notification, restoration support, and requesting of parts supply communication methods and routes must be determined before the introduction of the new organization.

(4) Measures and procedure for failure restoration

A guideline should be established to clarify the responsibility and support system for failure restoration and to carry out aftercare properly. The policy should also be set up at the preparation stage prior to the start of the maintenance centre.

(5) Maintenance Plan

Since the plan is related to a smooth transition from current RRI, TVRI and Film organizations to integrated organization, a temporary plan for transition must be prepared paying careful attention to interface with a future maintenance plan. The plan will have influence over the results of R/TV/Film integration. So nationwide participation of broadcasting engineering departments is essential to discuss and determine the plan.

(6) Grasp of equipment data

At the preparation stage, the data on broadcasting facilities be particularly arranged on the common among between Radio, TV and FILM to shift to a new maintenance system.

(7) Standardization of technical service records

The best way for processing technical data is the use of computer for the work, compiling histories and other data on the equipment. Shifting toward this direction calls for an effort and cooperation of overall technical departments, but essential for integration of the maintenance work.

(8) Centralization of parts control

The quantity of spare parts for Radio, TV and FILM could be greatly reduced by centralizing a whole control system, and purchasing for replenishment can be carried out properly without losses by computer control.

(9) Compiling and offering of technical information

All data on facilities and equipment, after periodical arrangement, are offered and sent to each related section.

Books, magazines and other materials on electronics and broadcasting technologies should be collected and offered for perusal so that broadcasting staff can know the newest trend of major overseas broadcasting organizations and electronics industries.

Lending service and listing of important technical papers will be computerized and contents of important documents are stored as microfilmed. Drawings and specifications are also .

(This should be done at the second stage)

(10) Periodical maintenance procedures

Standard procedures for periodical maintenance should be preliminary established.

(11) Improvement of technical level of maintenance personnel

As already explained, improvement of technical level of maintenance personnel is one of the most important items which saves directly the expenses for equipment operation and increases the efficiency of the job through reduced frequency of failures and improved equality of radiated signal. Especially trouble shooting of television transmitter station needs the assistance of Up-stream stations in opposition to the case of radio where failures are restored by local technicians. The training in MMTC will greatly contribute to the establishment of the same trouble shooting system in local television stations as that for radio.

(12) Budgeting and others

Budgeting is required for maintenance expenses related to R/TV/Film integration, transitional actions (as office moving, for moving personnel, etc.) and operational expenses after shifting including the cost of tower painting and engine repair by contract.

In addition to the above, there are many other questions such as acceptance of equipment, inspection in the factory and installation at site, supervision of construction work, dealing with requirements from local stations, matters on responsibility and other general matters.

The above items except (10) must be completed at the preparation stage of the Maintenance Centre.

The description below is related to the work after the Maintenance Centre start functioning.

3 - 1 Control and Maintenance of Facilities and Equipment

While all broadcasting facilities are operated by broadcasting operation departments, a comprehensive maintenance of the equipment except minor maintenance is put under control of the Maintenance Centre. The scope of work should be decided complying with actual situation. The equipment in studios in particular should be maintained as much as possible by operating departments, while the Maintenance Centre is in charge of such matters as to be entrusted to specialized contractors. The maintenance staff of local station corresponding to this new organization are incorporated into a series of instruction system regarding the maintenance work.

Therefore, local stations are in charge of following jobs, and the rest is left for the Maintenance Centre.

- 1) Management of lists and information on the facilities and equipment within the area in charge.
- 2) Delivery and filing of technical service records.
- 3) Countermeasures necessary for failure restoration of the facilities
- 4) Some minor repair work.

3 - 2 Formulation and Implementation of the Maintenance Plan

The maintenance plan must be prepared in tune with the facilities divisions to make it systematic and efficient, thereby to maintain the facilities at minimum expense and personnel. A data bank which contains the information on the current status of facilities and the requirement from local stations should be prepared and used for the planning and trade-off of them have to be taken into account to make balance among them.

In other words, there must be consistency established among 3M's - (Man, Materials and Money, and 2P's - (Philosophy and Policy) to make matching between information and time lines. Thus, all matters related to following items are managed by the maintenance centre as a major part of its function.

- 1) Formulation and implementation of long and short term maintenance plan.
- 2) Dispatch of specialities for the above.
- 3) Maintenance work by specialists or specialized contractors.

3 - 3 Storage and Control of Material and Parts for Repair

A reasonable parts management is essential for maintenance and replenishment of materials for urgent repair. Existing spare parts should be reviewed from this point and their inventory control is to be computerized. Also, to rationalize the work, a workshop is set up to maintain the equipment, and in the future to carry out repairs of measuring instruments and periodical maintenance of special devices which have been so far entrusted to specialized contractors. This shift will take several years for smooth transition. Therefore, major maintenance works are as follows:

- 1) Storage and control of common parts
- 2) Storage and lending of substitute units
- 3) Maintenance and repairs of equipment requested
- 4) Dealing with requirements from other departments.

Within the category of maintenance and repairs work included painting of steel tower and some minor improvement of building.

3 - 4 Procurement and Control of Repairing Material and Parts

Inventory control of repairing material and parts can be effectively computerized, and thus the ordering system is much simplified. Procedure for delivery of parts requires approval of computer section, data input for the delivery and entry in technical service records. Inventory control can be readily effected by an interactive computer.

3 - 5 Rationalization of Works by the Introduction of the Maintenance Centre

It will be examined what sort of work could be rationalized as the Maintenance Centre starts functioning. The term of rationalization is ambiguous and difficult to define in general. In Indonesia, the maintenance work currently consists of maintenance and repairs independently executed by each station to some extent and serious failures or a large-scale maintenance and modification work are left to specialized contractors. The Maintenance Centre will control comprehensively this work and carry out large-scale repairs to a certain extent. Thus, the maintenance system will gradually be strengthened and increase its capability through specialization of staff, resulting in saving of maintenance cost and reduction of downtime. Table 4-3-1 illustrates average maintenance intervals of major equipment. The items with asterisk (*) should be executed as much as possible by the maintenance centre. The work of failure restoration can also be improved by increasing equipment rate through modernization and standardization of procedures, in addition to communicate with and receive instruction from specialists in the Maintenance Centre. Fig. 4-3-1 outlines the procedure for failure restoration, and underlined jobs are essential for assured works. The repairing work takes roughly the same procedure, and the data obtained from these works can be effectively used for formulation of the maintenance plan.

Meanwhile, the facilities increase in number constantly as broadcasting networks are extended. The volume of maintenance work for these facilities is not clear, but assessed as about 1,500 man-days with respect to the major equipment mentioned on Table 4-3-1 judging from average working days in Japan. The volume of the works is equivalent to the sum of annual labour days of seven persons, and actually this is carried out by the technical staff somewhere in the Central Stations in the course of routine operational work.

The foregoing is concerned with the number of maintenance personnel for studio equipment. Assuming half of them moves to Central Maintenance Centre in Jakarta and establish the maintenance procedures of equipment beside other job, then efficient repairing work could be expected. Table 4-3-2 to 4-3-4 show outlines of the major equipment of TVRI and RRI for reference except power supplies.

Since it is considered that the quantity of these facilities is bound to increase, the maintenance work will become more and more important.

Table 4-3-1

Average Interval of Equipment Maintenance

Equipment	Maintenance interval	Person in charge	Necessary period
2" VTR	Exchange of head assembly with interval of 300 to 600 hours use	Employee	4 days for periodical maintenance
1" VTR	With interval of every 500 hours, <u>1,000</u> , <u>1,500</u> , <u>2,000</u>	Underline indicates maintenance is made by contractor	4 days for underlined *
3/4" VTR	Every 1,500 hours use	Employee,	4 days *
Studio camera	500 to 1,000 hours	Employee	4 days
Handheld camera	Every year	Employee	4 days
Telecine	Every two years	Employee	4 days
Film Developer	Every two years, or every 5,000,000 feet use	Expert or contractor	3 days *
Color monitor	Twice in a year	Employee	3 hours
O-B Van	Every six months	Employee	2 days or more
Sound tape recorder	2,000 to 2,500 hours use	Employee	2 days
Measuring equipment	Every two years	Expert or contractor	2 days *
Lighting equipment	Every six months/ year	Employee	1 day
Transposer	One or two times in a year, depend on output	Employee	4 hours
TV transmitter	Every two weeks	Employee	1 day
MF transmitter	Every two weeks	Employee	1 day
Engine generator	1.5 years	Expert or contractor	4 days
Tower & Building	Several years, depend on environmental condition	Expert or contractor	1 week (painting)

* Jobs with asterics are to be gradually transferred to the task of employee.

Table 4-3-2

Studio Facilities Used in TVRI
(Main Equipment only)

Equipment	Quantities			
	Jakarta	Medan	Ujung Pandang	Total
Studio camera B/W	18/0	3/0	6/0	27/0
Studio camera Color	31/23	3/0	3/6	37/29
Announce camera B/W	3/0	1/0	2/0	6/0
Announce camera color	7/6	1/1	1/5	9/12
Film camera with sound	41/9	5/1	8/9	54/19
Film camera without sound	60/32	7/8	29/17	96/57
Telecine B/W	9/0	3/0	7/0	19/0
Telecine color	11/5	3/0	1/5	15/10
FSS B/w	1/0	1/0	0/0	2/0
FSS color	5/4	1/0	1/3	7/7
VTR 2" color	22/0	2/0	7/0	31/0
VTR 2" B/W	5/0	2/0	3/0	10/0
VTR 1" color	10/8	3/0	0/6	13/14
VTR 1" color portable	16/5	2/2	7/4	25/11
VTR 3/4" color	21/0	----	0/0	21/0
OB Van B/W	3/0	1/0	0/0	4/0
OB Van color	6/4	1/0	1/2	8/6

(As of the end of 1981) (Operating + under installation)
 Numerical expression A/B = $\frac{\text{Operating}}{\text{Under planning}}$

Table 4-3-3

Number of MW and SW Transmitters in Three Territories

Classification	Jakarta	Medan	Ujung Pandang	Total
300---100 kW	10	1	1	12
50--- 20 kW	10	4	3	17
10--- 5 kW	33	10	23	66
3--- 1 kW	35	6	14	55
0.5---0.1 kW	13	3	22	38
Less than 0.1 kW	1	1	2	4

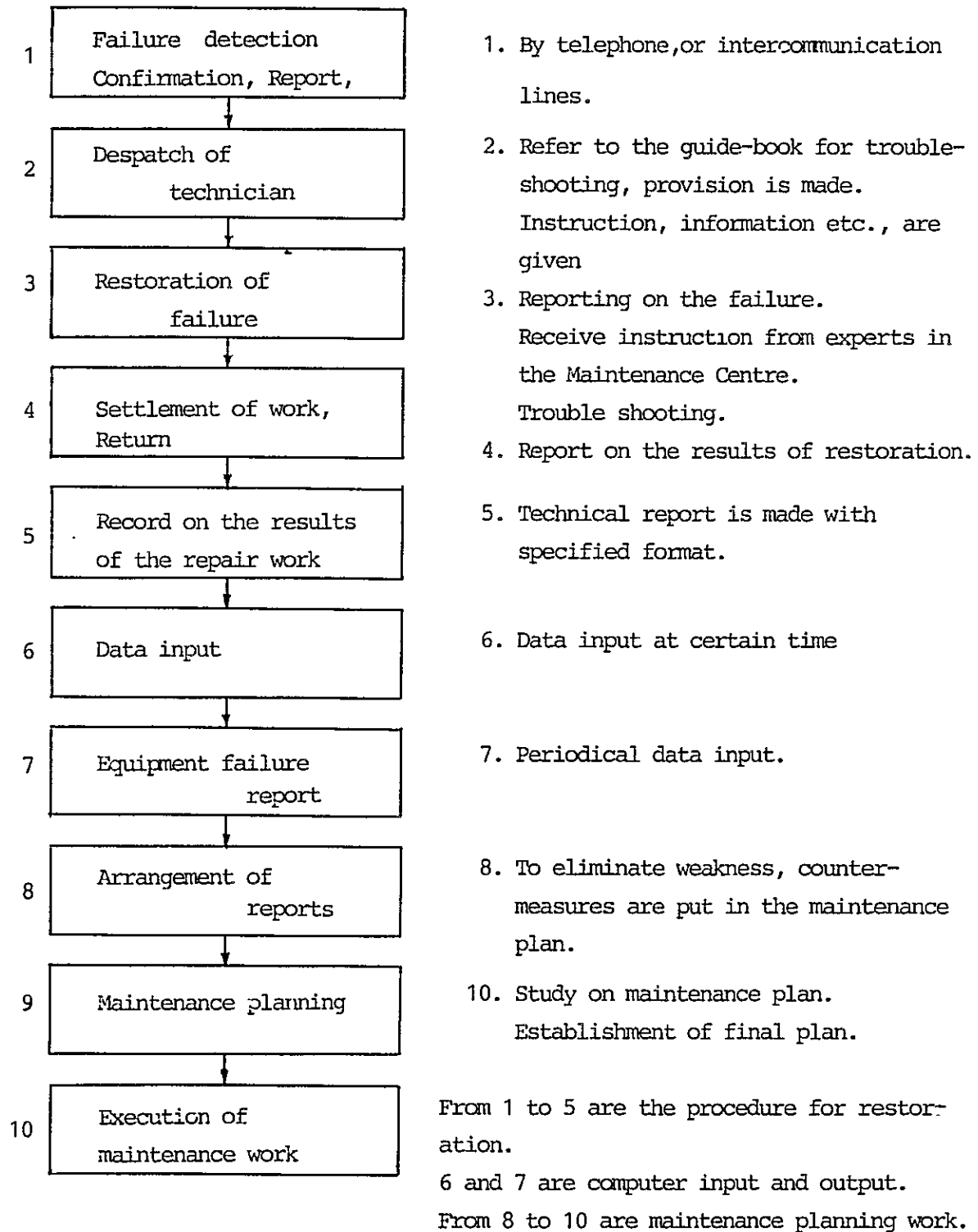
Table 4-3-4

Number of Television Transmitters in Three Territories

Classification	Jakarta	Medan	Ujung Pandang	Total
10 kW	16	14		30
5 kW	18	5	4	27
2--- 1 kW	45	13	16	74
0.6--- 0.3 kW	16	23	21	60
100--- 30 W	67	14	45	126
Less than 30 W	2	2	6	10

Fig. 4-3-1

Failure Restoration Procedure



CHAPTER 4 FACILITY OF THE MAINTENANCE CENTRE

CHAPTER 4 FACILITIES OF THE MAINTENANCE CENTRE

The Central Maintenance Centre in Jakarta will be provided with a series of mechanical and measuring equipment necessary for the maintenance work of all broadcasting facilities. The Centres in Medan and Ujung Pandang projected in the 3rd/4th and 4th/5th years will be equipped in a simplified mode. The facilities roughly consist of;

- (1) Common broadcasting equipment for maintenance purpose
- (2) Machine tools
- (3) Measuring instruments
- (4) Computer and peripherals
- (5) F/C Van
- (6) Information equipment
- (7) Spare parts, warehouse for spare parts, etc.

Details of each item is indicated separately in the following. The Table-4-4-1 and Fig. 4-4-1 show required floor area and layout of building to contain the equipment. Fig. 4-4-2 indicates a diagram of visual equipment for maintenance work. Major components are as follows.

4-1 Common Broadcasting Equipment for Maintenance in Jakarta Maintenance Centre

All equipment for maintenance service are listed in Table 4-4-2.

4-2 Machine Tools

In Table 4-4-3, list of machine tools for the workshop of the Central Maintenance Centre is shown.

4-3 Measuring Instrument

Measuring instrument provided in the Maintenance Centre are also tabulated in Table 4-4-4.

Items 1) & 2) are expected to be installed in each Maintenance Centre and regional central station in future.

4 - 4 Computer System

Computers should be installed in the Maintenance Centres for the real-time processing of a large quantity of data. Since host-computer and its intelligent terminals are installed in Jakarta, data are directly sent to and received from the stations where communication lines are provided among them, however for the station where no communication lines is available data recorded on the standard sheet is mailed to the data processing section in the Maintenance Centre to input.

Therefore, a nationwide real-time data processing system using communication lines should be established as soon as possible in the future.

F/C Van collects data of transposer stations into the diskettes during the patrol maintenance and the data is registered into the disk of host-computer. So the personnel computer loaded in the Van should be of the type directly communicate with host-computer without using interfacial devices and of interactive type for easy of operation. Jakarta and other Maintenance Centres are connected for data transmission with exclusively used telephone lines via PALAPA or SSB short wave links (use of links by time-sharing). The objectives of network are to send the following informations promptly:

- 1) Parts control
- 2) Failure information management
- 3) Failure case management
- 4) Establishment of preventive maintenance schedule
- 5) Management of technical reference material
- 6) Others

Parts control of the above 1) is performed based on such data obtained from computer memory as type, rating, place of storage, quantity and is able to commend supply and transportation from the nearest station in case of failures. A component of which a station has run out of can be replenished from another station, and output lists serve for timely ordering.

2) Failure information management will display the situation of failures in the facilities throughout the country as well as countermeasures taken and its time.

Accommodation of failures of 3) compiles causes of failures by equipment and serve for furnishing measures of restoration.

4) Preventive maintenance could be perfectly executed by statistically processing the data from F/C Van which can only be managed by periodical checking of actual conditions. F/C Vans provided an accurate measures for checking of signal quality and are indispensable for quality evaluation of radiated signal.

5) Management of technical data is concerned with the materials on electronics and broadcasting technology. To assure better utilization, they are tabulated by titles, and indexed. They can be used for maintenance works in various ways such as searching semi-conductor supplies or equipment manufactures.

6) Others include, for example, management of order sheets, lending service of books and preparation of reference material for the maintenance plan, and increase gradually the scope. The host-computer is installed in Jakarta Maintenance Centre and its terminals are provided in the office, information room, workshop, and other sections which require them.

In Medan and Ujung pandang Maintenance Centres, smaller scale computers and their intelligent terminals are installed. The Central Maintenance Centre is connected to Medan and Ujung Pandang Maintenance Centres through telephone lines for data transmission. Printers or facsimile units are also installed as peripherals. Fig. 4-4-2 shows the outline of the system.

4 - 5 Field Checking Vehicles (F/C Vans)

Periodical check have to be continued to reduce failures of equipment and facilities. Information on the operating condition of transmitter stations can be easily collected by receiving and analyzing the signals radiated from them partially related to equipment performances.

For the purpose, Field Checking Vehicles (F/C Vans) have been used in the Department of Information and TVRI. F/C Vans are equipped with various instrument which receive radiated signals, analyze their quality and remotely supervise the operating conditions of broadcasting stations without accessing to each site which usually located at high altitude, and necessary information can be obtained by fixed-point measurement using F/C Vans. Thus, many stations can be patrolled within a short period.

Portable measurement instrument are distributed in such regions where F/C Van can not work effectively due to poor road condition or small island. The instrument are also convenient for emergency use.

4 - 6 Information Equipment

A real-time processing system using computers is required to efficient maintain many facilities distributed throughout the country.

Such real-time processing requires a leased network which connect all sites in the country. At present, it could not be expected to have such an ideal system. However, a network has been gradually expanding by Perumtel, and exclusively used leased lines for the Department of Information will be available in future. From the site where such lines are not laid standardized data sheets should be mailed for data transmission to Jakarta Maintenance Centre or other Maintenance Centre to input them to the computer.

4 - 7 Library Equipment

Equipment for recording of maintenance information, technical books, magazines, and other information materials are prepared.

4 - 8 Warehouse for Spare Parts

Stock of spare parts should be managed with the aid of computer, and large warehouse for spare parts are constructed in Jakarta, Medan and Ujung Pandang Maintenance Centres. Previously supplied spare parts are stored in these warehouse so that requested parts can be delivered to each site at once. Each site has also a small scale spare parts storage in which some articles of consumption are always stored.

Table 4-4-1

Floor Area of Maintenance Centre

Room	Function	Jakarta	Medan	Ujung Pandang
Entrance Reception	Lobby Reception	20 m ²	20	20
Workshop	Repair & Adjustment	160	80	80
Machine	Machine work	100	50	50
Measuring Equipment	Adjustment & Repair	50	30	30
Storage	Storage of parts	100	50	50
Library	Library for B.C Engineer	30	20	20
Computer	Data I/O	50	40	40
Office	Office	150	80	80
Meeting	Meeting	50 x 2	50	50
F/C Van	Adjustment of F/C Van	40	20	20
Total		800	440	440

Table 4-4-2

Common Broadcasting Equipment for Maintenance Purpose

Equipment	Quantity
Studio colour canera	2 sets
Portable colour camera	2 sets
1" colour VTR (B & C formats)	2 sets
3/4" U-matic VTR (Three modes)	4 sets
Editor & monitor	2 sets
1/2" cassette VTR for NTSC, PAL (both VHS & Beta)	2 sets
Simplitied switcher for sound and video	2 sets
Sound tape recorder	2 sets
Simplified sound system	2 sets
Receivers (MW, SW, FM, TV)	2 sets each
Small modulator (FM, TV)	2 sets each

Table 4-4-3

List of Typical Machine Tools

Machine tool for metal and wood work	Quantity
Medium size boring machine	2 sets
Small size boring machine	2 sets
Lathe machine	2 sets
Milling machine	2 sets
Plane shving machine	2 sets
Shaping machine	2 setw
Bending machine	2 sets
Cutting machine	2 sets
Polishing machine	2 sets
Grinder	2 sets

Continued

Machine tool	Quantity
Electric welder	2 sets
Sawing machine	2 sets
Coating machine	2 sets
Electric furnace	2 sets
Soldering machine	2 sets
Electro-plating equipment	2 sets
Tools	2 sets
Working table & other necessary shelves, etc.	5 sets each

Measuring Equipment

Table 4-4-4

Equipment	Quantity
TV signal generator	2 sets
Vectorscope	2 sets
Vectorscope waveform monitor	2 sets
TV demodulator	2 sets
Spectrum analyzer	2 sets
Automatic video signal analyzer	2 sets
Waveform monitor for NTSC & PAL	2 sets
Picture monitor	5 sets
FM linear detector	5 sets
Oscilloscope (Class A)	5 sets
Oscilloscope (Class B)	5 sets
Frequency counter	5 sets
FC Van	10 sets
White balance checker	5 sets
Illumination meter	5 sets
Densito-meter	2 sets

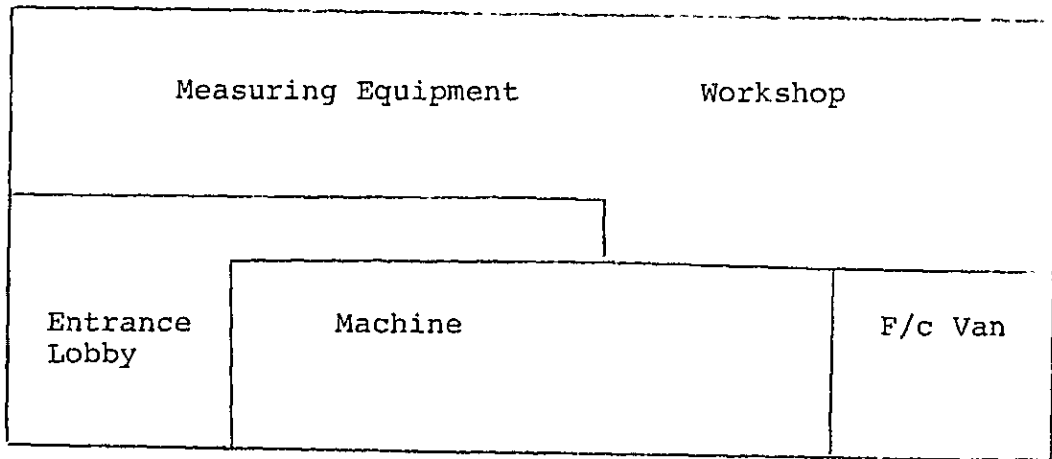
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Equipment	Quantity
Sensito-meter	2 sets
GR admittance bridge	2 sets
VHF sweep generator	2 sets
UHF sweep generator	2 sets
AM sideband analyzer	2 sets
FM sideband analyzer	2 sets
Dimmer checker	2 sets
Audio analyzer	2 sets
Envelope delay measurement equipment	2 sets
Logic analyzer	2 sets
Feild intensity meter	2 sets
Wideband frequency signal generator	2 sets
VHF signal generator	2 sets
UHF signal generator	2 sets
SHF signal generator	2 sets
Sound level meter	2 sets
Megger	2 sets
Standard signal generator	2 sets
Tester (Class 0.5)	20 sets
Portable tester	20 sets
Cart for measuring equipment	10 sets
Power supply (0 -- 48 V, 5 A)	20 sets
Accessory for measuring	2 sets

Fig. 4-4-1

Floor Layout of Jakarta Maintenance Centre

Ground floor



First floor

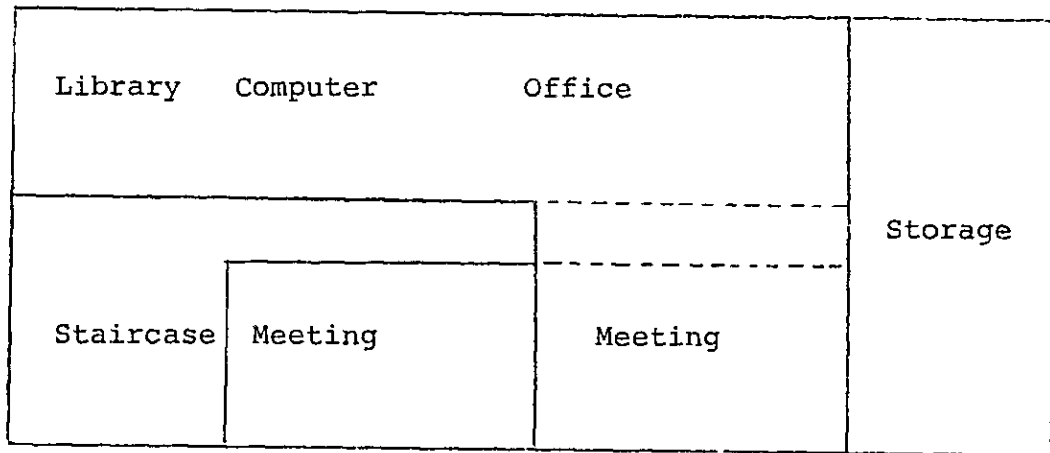


Fig. 4-4-2

Block Diagram of Video System for Maintenance

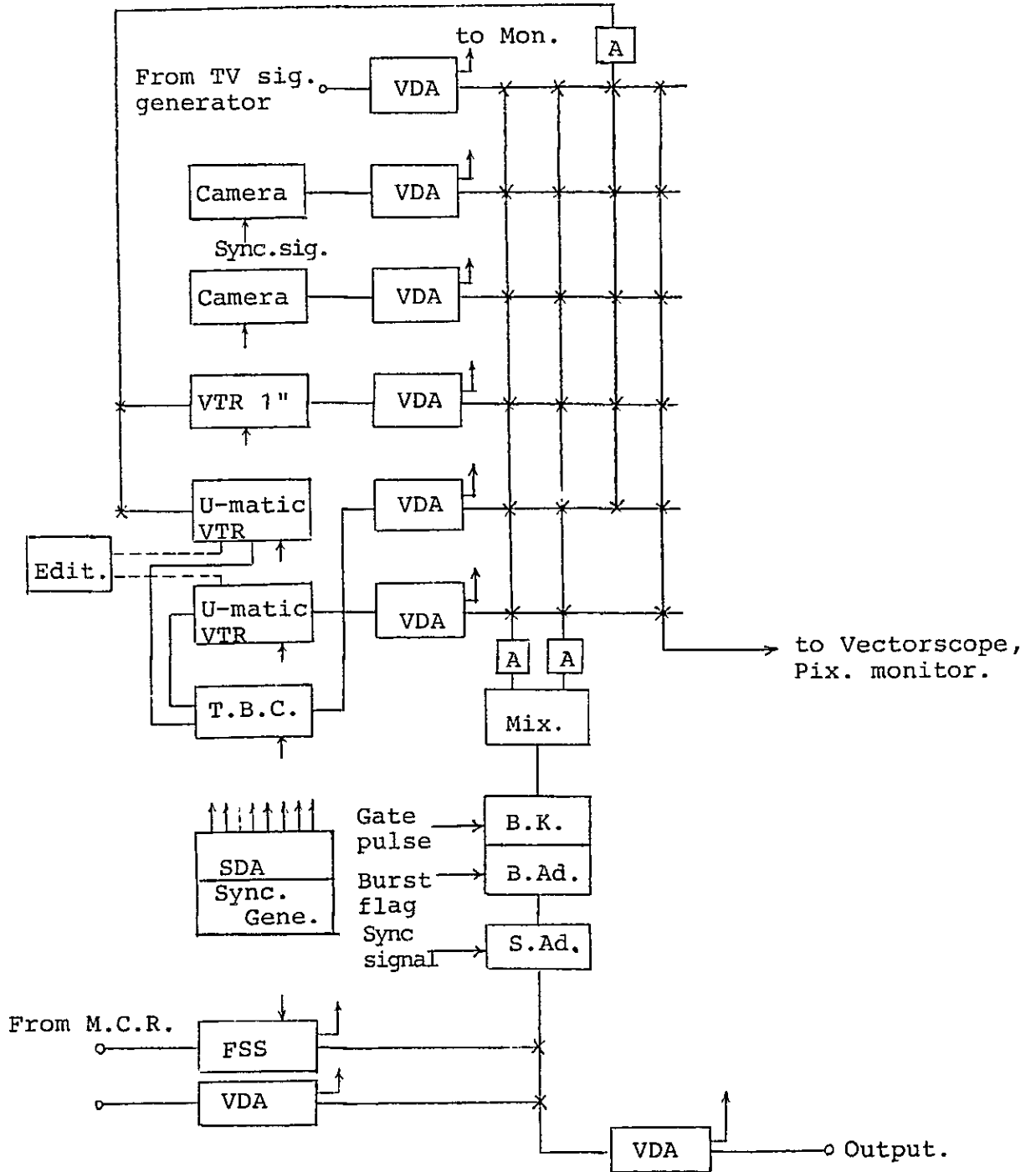
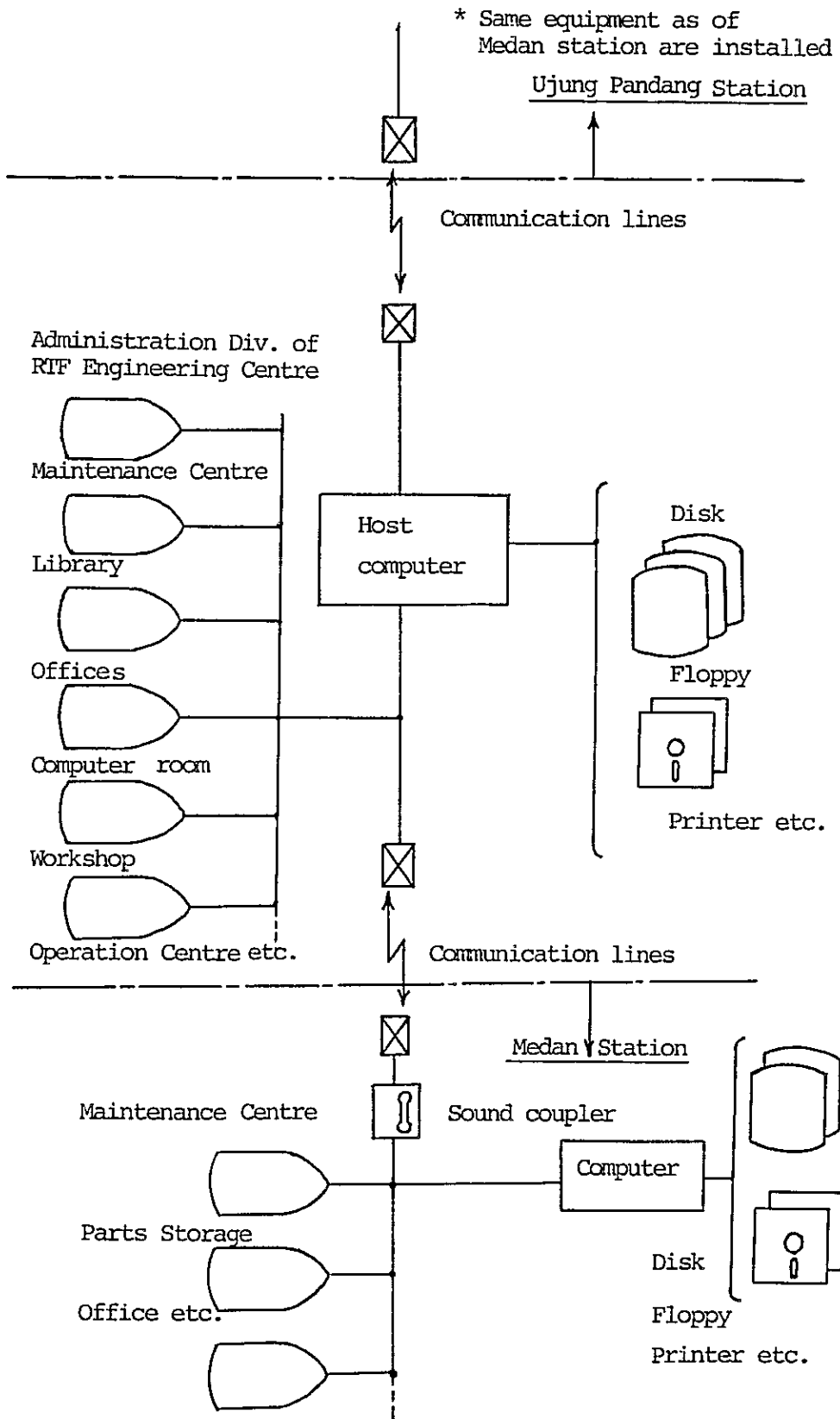


Fig.4-4-3

Machining Equipment



CHAPTER 5 OPERATION OF MAINTENANCE CENTRES

CHAPTER 5 OPERATION OF MAINTENANCE CENTRES

As already explained in each previous chapter, study from various aspects is essential to make the operation of the Maintenance Centre effective. This chapter will again provide a different angle to review its operation.

5 - 1 Communication System among the Maintenance Centres and Each Station

To cope with urgent matters such as failures of facilities, disasters etc., communication system must be previously established, and despatch of staff and transportation of recovery material must be systematically executed. For example, to restore the failures that might be occurred at random in each station in the West Irian area, stationing of competent technician is required by referring the peculiar traffic condition in the area. Transportation of restoring materials is just alike. In case failure happens, it is most important to secure the initial arrangement and exchange of information, because superiority and inferiority of them affect directly on the results of failure restoration. Accordingly, it is undoubtedly most important to secure communication links. Counter measures therefore have been studied as hereunder based on the analysis of current situation.

(1) Consolidation of Communication Links

Currently normal telephone lines are used as communication measures beside leasing each one of telephone lines via satellite and SSB links. Alternative for the future is to increase the number of telephone lines via satellite, while discontinuing the SSB networks.

However, the SSB links should be kept as spare lines so as not to be disturbed by failure of satellite (Parapa). Even if the current SSB links are used as regular communication lines for the present, communication among stations could be made more easier by reallocating their frequencies. Fig. 4-5-1 is a map indicating the links with temporarily given channel number for each frequency as shown here, most of the stations use channel 5, but few stations use channel 7,8 and 9. Due to unavailability of statistics

on current transmission volume and its distribution, no definite conclusions can be given, but it appears that utilization (hours) of transmitter channel 5 is very low in most stations, and that the frequency channel 7,8 and 9 are seldom used (since only a few low-order stations use these bands). On the other hand, following measures will greatly improve the situation, although it might be difficult to allocate the frequencies to the optimum, because actual situation of radio interference to these frequency band, emission and incidence of interference signal, C/N ratio and other data are not necessarily clear.

- 1) There is only 5 kHz difference between the short wave broadcasting frequency of 7,720 kHz, 100kW output and the channel 3 of 7,265kHz resulting in poor reception of the channel 3, and it will not be improved without giving more frequency difference as long as above short wave broadcasting is emitted.
- 2) Reallocation of frequencies to improve the utilization of the above mentioned less-used frequencies.
- 3) Discontinuing one of short wave broadcasting to convert to SSB communication in Jakarta.

Fig. 4-5-1 (2) and Fig. 4-5-2 show the improvement plan of SSB Communication network using the above three measures without drastic change in current frequency utilization. Fig. 4-5-3 suggests an example of a time table for inter-station communication which appropriates one hour used for each division of program production, technical operation and general affairs allowing communication every three hours. In the Figures, asterisks *1 and *2 show the inter-communication with Manado and Somarinda territories. This plan is flexible enough to modify complying with actual situation. With the plan improved service will be secured in all territories, and further improvement is expected through better directivity of antenna system. If channel 10 is not available for Jakarta area, the plan should be modified as indicated by dotted lines with channel 1 appropriated to Jakarta.

In addition, currently used press-to-talk system is not necessarily convenient, and eventually restricts the utilization. Instead, dialing system with a pilot lamp indication should be applied and each set placed in broadcasting, engineering and general affairs departments of centre stations in each territory. Even if number of lines via satellite has a capacity to handle growing communication in future, this plan should be used with some modification to avoid the risk of total dependency on satellite.

(2) Failure Reporting System

An established communication system is essential to finish restoration as fast as possible, and following set-up system is recommended, as mentioned in the latter section.

- 1) Liaison staff for failures and troubles are designated on the routine shift basis, and they hold other night and early morning jobs concurrently. The staff are responsible for giving proper instructions for restoration, and takes restoring measures after consulting with managers in charge and local station staff.
- 2) Managers of local stations expressly obligate the liaison staff of each station the responsibility of early detection and reporting of failures and troubles.
- 3) Communication methods should be preliminarily established, and the equipment necessary for fulfilling the above 2) and 3) should be installed through suitable budgeting.

Failures or troubles incurred and countermeasures taken are reported to up-stream stations and Maintenance Centre. According to the nature and scope of influence of failures/troubles, emergency reporting system should be set up for quick restoration to determine dispatch of personnel and supply of spare parts.

5 - 2 Restoration

Currently there seems to be some difference in attitude between RRI and TVRI regarding restoration under responsibility of local stations. After the Maintenance Centre starts functioning, restoration work is in principle placed under the responsibility of each station, and the Centre undertakes the obligation to assist it when the failure or trouble is serious. Most of studio equipment are scarcely at issue, because they have redundancy and substitute equipment is usually available. However, failure in programme relay links and transmitter facilities give an influence over broad range. They are managed according to the following classification by extent of the influences.

<u>Class of station</u>	<u>Population in area</u>		<u>Duration of failures per year</u>
A	Over	250,000	within 10 min.
B	"	50,000	" 30 min,
C	"	10,000	" 3 hrs.
D	"	3,000	" 24 hrs.
E	under	3,000	2 days

Stations in the distant countryside could be lowered the above standard by actual application.

The above table has been established temporarily as a target taking actual situation in Indonesia into account. In fact, in West Irian area for example, it may take more than two days from the Maintenance Centre to a station in question according to flight schedule. For such cases, it is advisable to station well-experienced and professionally trained technicians at such semi-key position as Jayapara and equip with portable measuring instruments, vehicles and portable transceiver for inter-station communication. The restoration work with constantly communication maintained will save about one day as average compared with the case of dispatching personnel from Jakarta or Ujung Pandang Maintenance Centre. In other words, adequate restoration can be secured by competent transmitter technicians and proper equipment arranged in the key stations of the territories as mentioned in the paragraph 1-2, 1) Territories of Maintenance Centre.

Meanwhile, pertinency of the restoration work is ultimately influenced by the capability of personnel dispatched. This implies the importance of daily education and training. In the event that material transportation is required, the work must be preceded according to the report from a station in question of technicians dispatched. The communication for this purpose use VHF or SW wireless equipment which connects major (parent) broadcasting station and a local transmitter station.

5 - 3 Periodical Maintenance and Improvement of Facilities

Although the necessity of periodical maintenance is widely recognized by most people, it tends to be neglected in reality due to budgetary or other restrictions. While the equipment generally deteriorates in performance as the time elapses, periodical inspection and maintenance extends its life with the performance preserved. Moreover, overall maintenance and improvement of facilities increases the reliability of operation and reduces failures.

Opposed to studio equipment installed in well-protected indoors, transmitters are operated using the air directly introduced from outside as cooling medium, and accordingly subject to various troubles such as dust deposit, decomposition of metallic material, deterioration of rotating machines and segments of contactor, smudge of high voltage insulators surface and transformer oil, and blinding of dust collecting mat. Transmitting tubes are comparatively short in life, and the life of high output semi-conductors is greatly influenced by heat sink treatment and operating conditions. Periodical maintenance is an inevitable work to prevent transmission interruption arising from these causes. Rotating machines, engines in particular, will account for large portion of the total volume of the maintenance work because of a large quantity owned. With respect to buildings and steel towers as well, omission of periodical inspection and painting work will extremely shorten their life. The steel towers particularly need re-painting normally about every seven years, or more frequently in areas subject to salt damage regardless of Table 4-3-1. Most of the maintenance work will be carried out within the organization of broadcasting stations, but such special works as painting, maintenance of engines and replacement of obstruction lamps should be undertaken by external specialized contractors in view of the nature of these works. These expenses should be budgeted by the Maintenance Centre in charge.

Repairs of mechanical parts is undertaken by the Maintenance Centre and arrangement of technical service records and data input to computer also constitutes a major part of the work to be done by the Maintenance Centre. Maintenance of measuring instruments requires a high technology. Although immediate shift of this work to the Maintenance Centre could be burdensome but this should be done as a part of the workshop's job by the time of complete functioning of the Centre.

As for the maintenance of studio equipment, a guide-book of periodical maintenance procedures should be prepared by the Maintenance Centre, and supplied to each site. Using the guide, operators in the operation department obligate to perform such maintenance work. However, such a major maintenance work as overhaul of VTR should be carried out in the Maintenance Centre. It is considered that maintenance of computers should be entrusted to specialized contractors for the present. Such specialized staff as programmers, hardware engineers have to be secured through systematic education and training by the Maintenance Centre themselves in the future.

Classification of periodical maintenance job by equipment should be established according to actual conditions consisting of well diversified items. This classification work should be done along with the progress of programming work for computers.

5 - 4 Accumulation of Information on Facilities and the Others

Information on broadcasting technology is roughly classified into the following two types;

- 1) Facilities information
- 2) Technical information

- 1) The facilities information is excerpted from technical service records consisting of phenomena, failures, countermeasures and errors which are suggestive to other stations. This is compiled periodically or sporadically, and distributed to engineering departments to serve for overall improvement of maintenance work and to use for endorsement of budget acquisition. Accumulation and filing of information would be of massive work during the preparatory stage of Maintenance Centre.

- 2) The technical information collects latest trends in electronics and broadcasting industries as well as other up-dated technological information intending to stimulate and motivate the technical staff by keeping them informed of the newest situation. Specialized personnel should be appointed for editing this information.

In addition, guidebooks introducing outlines of facilities etc., in each station, filed brochures explaining special conditions should also be made for supporting efficient maintenance system.

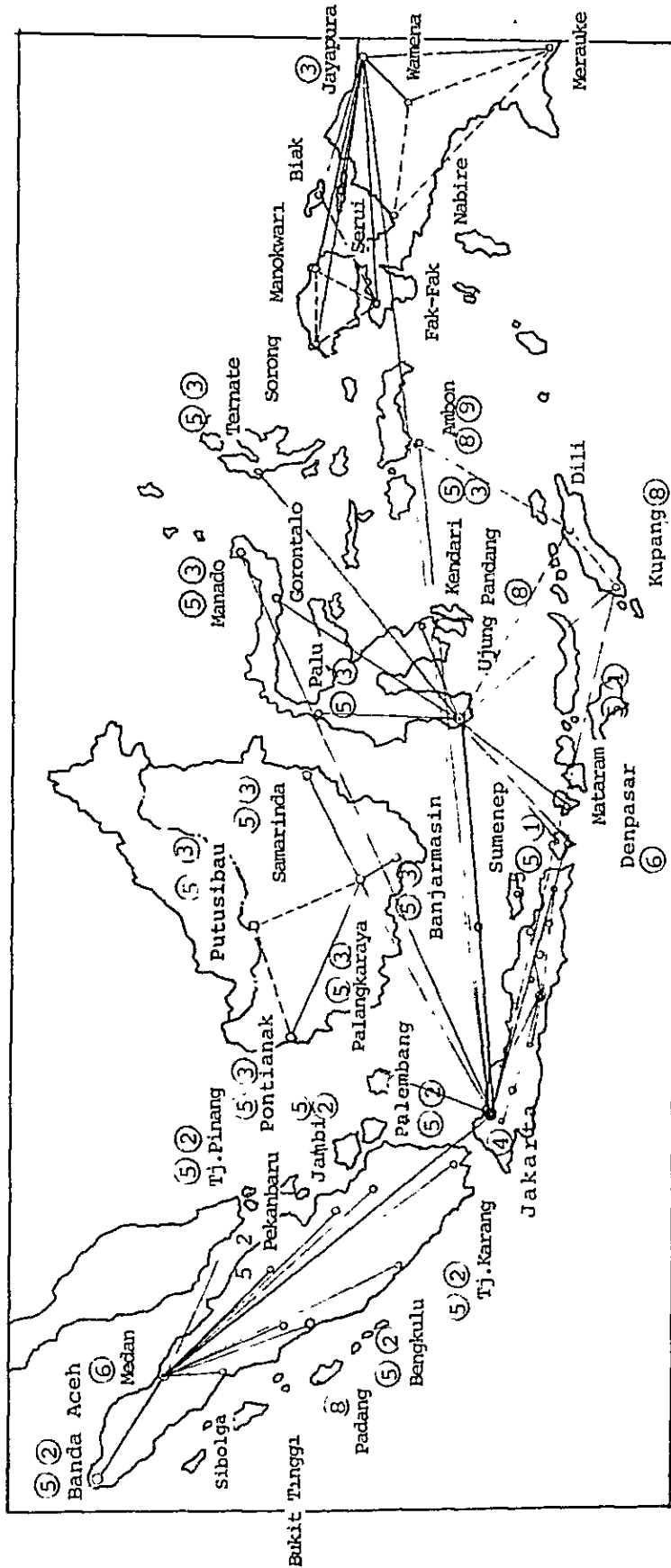
5 - 5 Management of Spare Parts

Spare parts are managed by processing their information with host computer in the Maintenance Centre. Actual spare parts are stored in the warehouse, and their delivery information are registered by warehouse keepers. Delivery information is input to the computer in real-time mode.

As to the spare parts held by local stations, their delivery must be controlled through technical service records. The delivery information must be input to the computer in the Maintenance Centre as soon as possible. In the current stage, this input is inevitably delayed to a certain extent as compared with the actual delivery. Existing spare parts must be examined and registered at the preparatory stage of the Maintenance Centre setting up. The Maintenance Centre checks stock state in all stations, and inputs its information into the computer. Then, a total set of common spare parts should be prepared in the spare parts warehouse in the Jakarta Maintenance Centre as soon as possible.

Fig. 4-5-1-(1)

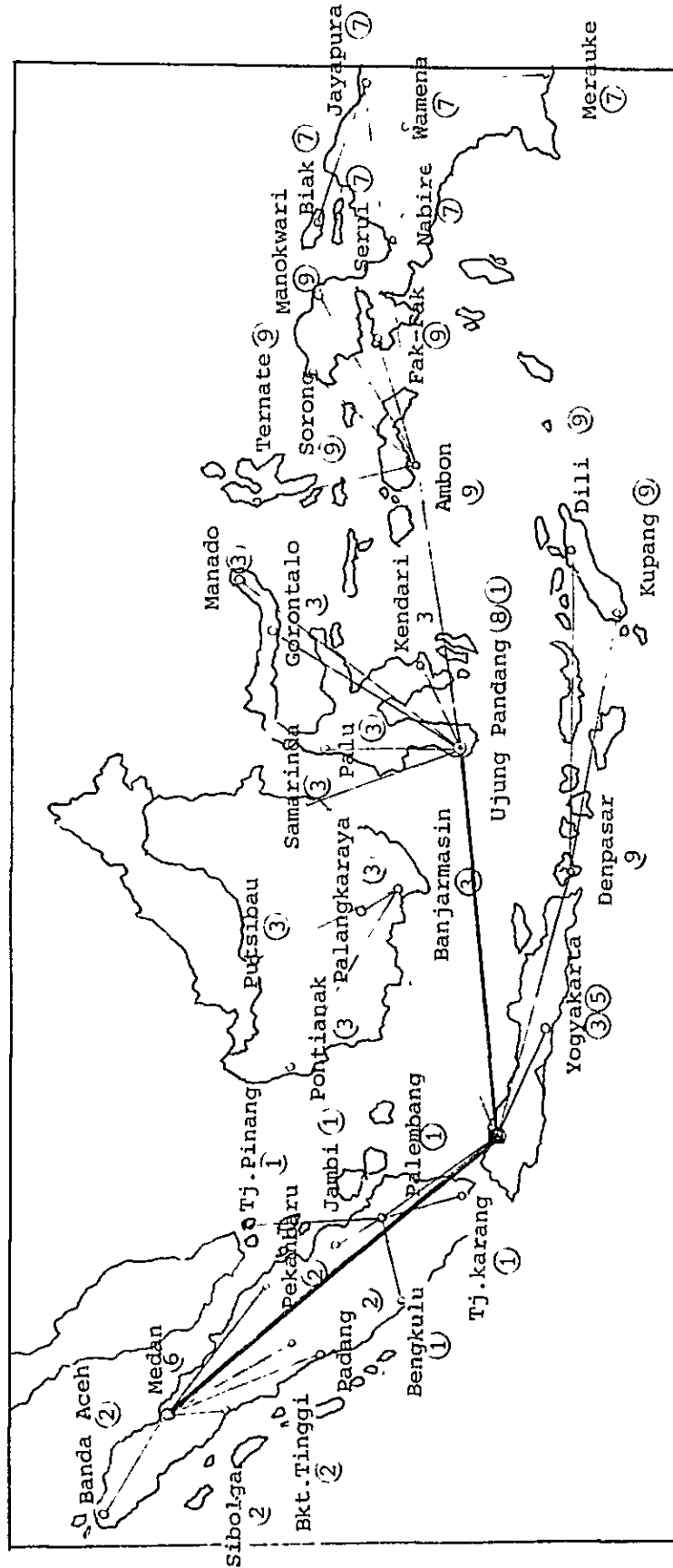
SSB Communication Network



- (5) (1) Cirebon Semarang Surabaya (5) (1)
- (5) (1) Bandung (5) (1) Surakarta (1) Jember
- Bogor (5) (1) Purwokerto Madiun Malang (5) (1)
- (5) (1) Yogyakarta (5) (1)

Fig. 4-5-1-(2)

Improvement Plan for SSB Communication Network



Main stations in Jawa are to use 3 and 5

Frequency Allocation of SSB Communication Network

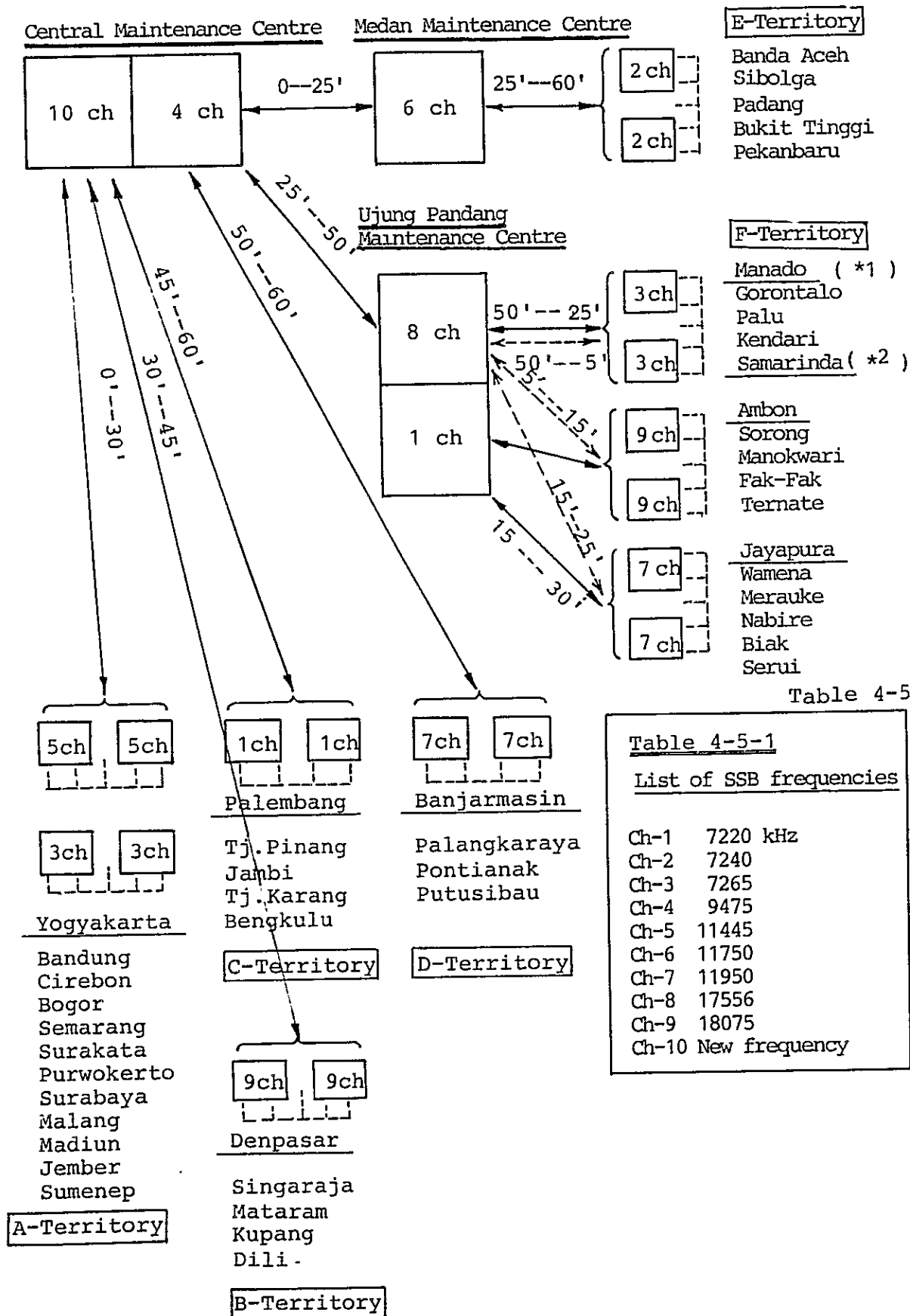


Table 4-5-1

Ch-1	7220 kHz
Ch-2	7240
Ch-3	7265
Ch-4	9475
Ch-5	11445
Ch-6	11750
Ch-7	11950
Ch-8	17556
Ch-9	18075
Ch-10	New frequency

Fig. 4-5-3

Use of SSB Intercommunication by Time

Time Territory	0'	30'	60'	5'
A (5CH)	Communication with Jakarta 10 CH		Presstalk intercom. among 5 CH territory	
	5'	25'	Presstalk intercom. among A (CH 3)	
B (9CH)	Communication with Jakarta 10CH		Com. with Jakarta 10CH	Presstalk among 9CH territory
	Presstalk among 1CH territory		Presstalk among 1CH territory	Com. with Jakarta 10CH 50'
C (1CH)	Communication with Medan 6CH		Presstalk among 7CH territory	Com. with Jakarta 4CH
	Presstalk intercom. among 2CH territory		Presstalk among 2CH territory	Communication with Medan 6CH 50'
D (7CH)	Com. with Ujung Pandang 8 CH *1		Presstalk com. among 3CH territory	Com. with Ujung Pandang 8CH *2
	Com. with Ujung Pandang 1 CH		Intercom among 9CH territory	Communication with Medan 6CH
E (2CH)	Presstalk among 7CH territory		Com. with Ujung Pandang territory	Communication with Medan 6CH
	Com. with Medan 6CH 25'		Com. with Ujung Pandang 8 CH 30'	Com. among 7ch terr.
F (3CH)	Communication with 5CH territory		Com. with 9 CH	Com. with C territory 1 CH
	Com. with Jakarta 4 CH		Com. with E territory 2 CH	
G (9CH)	* Free,		Com. with Jakarta 4 CH	Com. with F territory 3CH
	Com. with G territory 9CH		Com. with H territory 7CH	Communication with Medan 6CH
H (7CH)	Com. with Medan 6CH		Com. with Ujung Pandang 8 CH	Com. among 7ch terr.
	Communication with 5CH territory		Com. with 9 CH	Com. with C territory 1 CH
J A K A R T A	Com. with Medan 6CH		Com. with Ujung Pandang 8 CH 30'	Com. among 7ch terr.
	Communication with 5CH territory		Com. with 9 CH	Com. with C territory 1 CH
MEDAN M (6CH)	* Free,		Com. with Jakarta 4 CH	Com. with F territory 3CH
	Com. with G territory 9CH		Com. with H territory 7CH	Communication with Medan 6CH
P U N D A N G	Com. with Medan 6CH		Com. with Ujung Pandang 8 CH	Com. among 7ch terr.
	Communication with 5CH territory		Com. with 9 CH	Com. with C territory 1 CH
U J U N G	Com. with Medan 6CH		Com. with Ujung Pandang 8 CH	Com. among 7ch terr.
	Communication with 5CH territory		Com. with 9 CH	Com. with C territory 1 CH



CHAPTER 6 CONSTRUCTION AND OPERATION
COSTS OF MAINTENANCE CENTRE

CHAPTER 6 CONSTRUCTION AND OPERATION COST OF MAINTENANCE CENTRE

In Table 4-4-1 and 4-4-2, necessary cost for the installation and operation of three maintenance center are tabulated.

6 - 1 Construction Cost

construction cost shown in Table 4-4-1 as of the 2nd, 4th and 5th year are of the maintenance center in Jakarta, Medan and Ujung Pandang respectively, unless otherwise mentioned.

Improvement of SSB links must be undertaken by Indonesia with cooperation of consultant engineers and the cost are represented in Rps.

Equipment cost are expressed in F.O.B. yen price in Japan, hence it is required to add 5% to indicate in C.I.F. Details of equipment such as measuring equipment, machine tools and other facilities are given in previous section. Caution should be paid in summing up Rupiah portion to add installation and operation cost together with.

6 - 2 Operation Cost

In Table 4-4-2, break down cost of operation by year for the three Maintenance Centre are shown. Travelling cost for failure restoration are to be distributed to all stations concerned as accounted in an attached sheet as reference.

Operation budget are to be shared among three Maintenance Centre of each areas.

In the table only the operation cost for Maintenance Centre are listed except other expenses such as painting of steel tower, purchasing of vacuum tubes, oil, travel expense, etc, that are actually required for the maintenance of broadcast equipment.

This travelling cost is to be distributed to the three Maintenance Centres and the eight central stations explained in previous chapter. The cost in this table represents the operation cost for the Maintenance Centres themselves, but excludes other operation cost such as steel tower painting cost, vacuum tube and spare parts purchasing expenses, station keeping cost etc. It is estimated that the total maintenance expenses for the RRI, TVRI and FILM facilities and all the facilities to be held at the completion of the fourth five-year plan are enormous. To make the function of the Maintenance Centres effective, it is necessary to prepare not only the budget listed in the above tables but also the annual operation cost of all stations in RRI, TVRI and FILM.

Construction Cost of Maintenance Centre

(F.O.B) * 8

1st year (84/85)	2nd year (85/86)	3rd year (86/87)	4th year (87/88)	5th year (88/89)	Remarks
<p>1. Improvement of building (JAKARTA) 880m² 320 M.Rp</p> <p>2. Reallocation of SSB freq.*1 48 M.Rp (JAKARTA territory)</p>	<p>1. Garage Yogyakarta Palembang *2 30 m² x 2 24 M.Rp</p> <p>2. Facilities. 216,600 th.yen</p> <p>3. Measuring equipment. 77,500 th.yen</p> <p>4. Computer 130,000 th.yen</p> <p>5. Machine 65,000 th.yen</p> <p>6. Office equip. 5,000 th.yen</p> <p>7. F/C Van (3 *2 75,000 th.yen</p> <p>8. Transportation * 7 55,000 th.yen</p> <p>9. Installation 50,000 th.yen</p>	<p>1. Improvement of building (MEDAN) 440 m² 185 M.Rp</p> <p>2. Reallocation of SSB freq. *3 24 M.Rp (MEDAN Territory)</p>	<p>1. Improvement of building (UJUNG PANDANG) 440 m² 190 M.Rp</p> <p>2. Facilities 67,300 th.yen</p> <p>3. Measuring equipment 46,000 th.yen</p> <p>4. Computer 50,000 th.yen</p> <p>5. Machine 31,500 th.yen</p> <p>6. Office equip. 3,500 th.yen</p> <p>7. F/c Van 25,000 th.yen</p> <p>8. Transportation 20,000 th.yen</p> <p>9. Installation 33,000 th.yen</p> <p>10. Reallocation of SSB freq. *4 72 M.Rp (UJUNG PANDANG territory)</p>	<p>1. -----</p> <p>2. Facilities 67,300 th.yen</p> <p>3. Measuring *5 equipment 93,000 th.yen</p> <p>4. Computer 50,000 th.yen</p> <p>5. Machine 31,500 th.yen</p> <p>6. Office equip. 3,500 th.yen</p> <p>7. F/C Van 25,000 th.yen</p> <p>8. Transportation 20,000 th.yen</p> <p>9. Installation 33,000 th.yen</p>	<p>*1, *3, *4 items shall be executed by INDONESIA</p> <p>*2 Building of garage at Palembang can be delayed to 4th year by sending F/C Van to Medan.</p> <p>*5 Three sets of portable measuring equipment are included.</p> <p>*6 Other expenses such as operation cost of maintenance fee are to be considered in Rp portion.</p> <p>*7 Transportation fee is calculated by assuming sea-cargo from Japan</p> <p>*8 To convert F.O.B price into C.I.F 5 % of increase in price is required.</p>
368 M.Rp	24 M.Rp 674,100 th.yen	209 M.Rp	262 M.Rp 276,300 th.yen	323,300 th.yen	TOTAL 863 M.Rp 1,273,700 th.yen

Estimation of maintenance cost (for reference only)*

1. Urgent travel for failure restoration		14,000,000 Rp
2. Vacuum tube	for TV	200,000,000
	for radio	260,000,000
3. Image tube		40,000,000
4. Display		20,000,000
5* Tape	for radio	20,000,000
	for TV	28,000,000
6* Film, developing agents	for TV	40,000,000
	for FILM**	
7. VTR maintenance, incl. contract fee		140,000,000
8. Engine maintenance, excl. parts procurement		120,000,000
9* Engine fuel	for radio	880,000,000
	for TV	960,000,000
10. Antenna-mast maintenance ,	radio	30,000,000
	TV	70,000,000
11. Transistor, ICs etc.		40,000,000
12. Special parts		100,000,000
13. Transportation		12,000,000
14. Mail		10,000,000
15. Office expenses, photo etc.		50,000,000
16. Official travel,		64,000,000
17. Special measuring devices, maintenance		10,000,000
18. Building maintenance		720,000,000

Other expenditure, such as salary, electricity, gas, water supply those are included in the routine operation are excluded.

Due to the difficulty in estimating accurate amount of expenditure, only an estimation of maintenance cost are tabulated.

Actual budget shall be determined with due consideration of transition in the three organizations and maintenance centre.

Items with asterisks are also included in the routine operation cost for broadcasting and film production. Modification cost of equipment is also excluded, because it must be included in the installation cost.

** A roll of colour film of two hours-use cost about 1,600,000 Rp.

PART V IMPLEMENTATION PLAN



CHAPTER 1 CONSTRUCTION SCHEDULE

PART V IMPLEMENTATION PLAN

CHAPTER 1 CONSTRUCTION SCHEDULE

1 - 1 Various construction works will be realized within the period of this plan: replacement of the existing radio and TV broadcasting facilities, new or additional installation of broadcasting facilities for expanding the broadcasting service, etc. The schedules of all construction works are adjusted so that the relations of the works do not contradict one another, observing the following points.

- (1) Schedule of installation works of programme production and transmitting facilities
- (2) Schedule of extension and reconstruction works of station buildings and installation of their facilities
- (3) Schedule of construction of transmitting facilities, programme transmission links and ST links

Table 5-1-1 is a rough schedule of each project. Details of each project will be adjusted when it is carried into execution.

1 - 2 Establishment of the Construction Headquarters

This plan includes a wide range of construction works such as structures, buildings, programme production facilities, transmitting facilities, communication facilities, computer system, etc., and the work continues for several years. To promote smooth progress of every construction work, the construction headquarters shall be established. The headquarters control the whole construction schedule, adjustment of the schedules of all related projects, organization and administration each project team and management of the accountant's business, personnel management, liaison with the governmental offices, contract making, public relation business, etc. in relation to the construction works.

For the preparation of tender documents required for contract , particularly technical specifications, conduction of technical assessment, inspection of delivered equipment, control of construction schedule, and inspection of completion of work, etc., experienced consultants shall be employed.

Table 5-1-2 shows a typical construction schedule of each project. Each project will be completed in about two years, although the period of each event changes according to the scale and contents of each project.

Table 5-1-1

Construction & Improvement Plan for TV/Radio Facilities

PROJECT	FISCAL YEAR					
	84/85	85/86	86/87	87/88	88/89	
1. Radio Transmitting Facilities						
(1) Installation of Standby MW Tx	5	7	4	5	5	26 Sets
(2) Installation of MW Tx for RN-II Service	2	1	2			5 Stations
(3) Installation of MW TX for Station without MW TX	4	1	2	2	1	10 Stations
(4) Renewal of Aged SW Transmitter	5	5	5	4	4	23 Stations
2. FM Transmitting Facilities						
(1) Construction of FM Transmitting Station	10	6	7	7	9	39 Stations
3. TV Transmitting Facilities						
(1) Construction of New TX Station	10	10	10	10	10	50 Stations
(2) Renewal of Aged TV Tx	2	2	2	2	2	10 Sets
4. Radio Programme Production Facilities						
(1) Remodel of Radio Studio (Monophonic)	24	23	20	17	15	99 Stations
(2) New Installation of Radio Studio (Monophonic)	2	2	2			6 Studios (in Jakarta)
(3) Programme Continuity Room (Jakarta)	3	2	1 *	1	1	8 Rooms * Stereophonic
(4) Programme Transmission System			Switching Board		Automation	Jakarta
(5) News Studio	1	1				2 Jakarta
(6) News Centre			Peripheral Facilities			
(7) Tape Duplication System		1	1*	1	1*	2 Stereophonic 2 Monaural
(8) Continuity Studio (Nusantara Station)	2	4	4			10 Studios
(9) Tape Recorder			46	43	25	114 Sets
(10) Radio OB Van	10	10	10	8	4	42
5. TV Programme Production Facilities in Jakarta						
(1) Programme Production Studio		1	1			2 Studios
(2) Programme Continuity Studio			1	1		2 Studios
(3) News Studio				1	1	2 Studios
(4) News Centre Facilities						
(5) OB Van			1	1	1	3 Vehicles
(6) 1" VTR	2	2	2			6 Sets
(7) Video Tape Duplication System			1		1	2 Sets
6. TV Programme Production Facilities in Regional Station						
(1) Colourization of Existing Studio	2	2	2	1	1	8 Studios
(2) New TV Studio			1	1	1	3 Studios
(3) OB Van			2	1	1	4 Vehicles
(4) MPU		3	3	3		9 Vehicles
(5) ENG System	9	9	6			24 Units
(6) VTR Editor	6	6	4			16 Sets
(7) 1" VTR		4	4	4	2	14 Sets
(8) Colour Film Processor		1	1			2 Units
(9) Telecine Chain		1	1	1		3 Units

Table 5-1-2

Typical Construction Schedule for Each Project

ITEMS	1ST YEAR	2ND YEAR	3RD YEAR	REMARKS
<p>1. PREPARATION</p> <p>(1) SET UP OF CONSTRUCTION TEAM AND ITS HEAD OFFICE</p> <p>(2) CONSULTANT CONTRACT</p> <p>(3) DETAILED SURVEY AND DESIGN</p> <p>(4) PREPARATION OF TENDER DOCUMENT</p> <p>2. TENDER</p> <p>3. TENDER EVALUATION</p> <p>4. CONTRACT WITH SUPPLIERS OR CONTRACTOR</p> <p>5. APPROVAL OF DRAWINGS</p> <p>6. PREPARATION OF BUILDING, ROOM AND SITE</p> <p>7. MANUFACTURING OF EQUIPMENT AND CONSTRUCTION MATERIALS</p> <p>8. TRANSPORTATION</p> <p>9. CONSTRUCTION AND INSTALLATION</p> <p>10. COMPLETION AND START OF OPERATION</p>			<p>*1 Time period of each event will change with project size</p> <p>*2 Some item will be skipped according to the project</p>	

CHAPTER 2 CONSTRUCTION COST

CHAPTER 2 CONSTRUCTION COST

2 - 1 The construction cost for the 4th 5-year plan is estimated in about 214.4 billion Rp including foreign and local currency portion.

The breakdown of the above is shown in Table 5-2-1.

The construction works to be realized in each year and their cost are shown in Table 5-2-2.

2 - 2 The above estimation are based on the following conditions;

- (1) The cost estimation is as of February 1984 and the cost of equipment and materials are calculated as CIF prices at an appropriate port in Indonesia.
- (2) The cost for land, access road, building, structure and inland transportation are all estimated and calculated by local currency.
- (3) Currency exchange rate is set at
1 Japanese Yen = 4 Indonesian Rupiah

Total Cost for Construction

(Unit: mRp)

P R O J E C T S	Foreign Currency (C.I.F.)		L o c a l Currency Million Rp.
	Million Yen	Million Rp.	
1. MW & SW Transmitting Facilities for National Service	3,544.0	(14,176.0)	1,476.0
2. SW Transmitting Facilities for Overseas Service	1,400.0	(5,600.0)	2,340.0
3. FM Transmitting Facilities for National Service	3,806.0	(15,224.0)	366.0
4. TV Transmitting Facilities for National Channel	3,831.0	(15,324.0)	5,000.0
5. Studio Facilities for Radio	13,715.6	(54,862.4)	1,250.0
6. Studio Facilities for Television	6,505.0	(26,020.0)	648.0
7. TV Transmitting Facilities for 2nd-Channel	1,312.0	(5,248.0)	96.0
8. Radio & TV Programme Transmission and Station-to-Station Communication Network	8,000.0	(32,000.0)	
9. Facilities for Maintenance Centre	1,273.7	(5,094.8)	863.0
Sub-Total	43,387.3	(173,549.2)	12,039.0
10. Consultant Fees	2,169.4	(8,677.5)	602.0
(A) Sub-Total	45,556.7	(182,226.7)	12,641.0
(B) Contingency	4,555.7	(18,222.7)	1,264.1
Grand Total(A+B)	50,112.4	(200,449.6)	13,905.1

Note: Cost for Spare Parts is included in each Facilities

Table 5-2-2
Construction Cost (Equipment)

(Unit: mRp)

PROJECT	FISCAL YEAR					TOTAL
	84/85	85/86	86/87	87/88	88/89	
1. MW. SW. TRANSMITTING FACILITIES	3,428.0	3,176.0	3,472.0	2,412.0	1,688.0	14,176.0
2. OVERSEAS SW. SERVICE	—	—	560.0	5,040.0	—	5,600.0
3. FM TRANSMITTING FACILITIES	4,620.0	2,516.0	2,684.0	2,148.0	3,256.0	15,224.0
4. TV TRANSMITTING FACILITIES	3,189.6	3,085.6	3,033.6	3,033.6	2,981.6	15,324.0
5. RADIO STUDIO FACILITIES	7,997.2	8,288.4	15,368.8	13,683.2	9,524.8	54,862.4
6. TV STUDIO FACILITIES	2,328.0	5,584.0	8,536.0	5,376.0	4,196.0	26,020.0
7. SECOND TV TX	—	—	2,288.0	1,516.0	1,444.0	5,248.0
8. PROGRAM TRANSMISSION NETWORK	—	—	16,000.0	8,000.0	8,000.0	32,000.0
9. MAINTENANCE CENTRE	—	2,696.4	—	1,105.2	1,293.2	5,094.8
SUB-TOTAL	21,562.8	25,346.4	51,942.4	42,314.0	32,383.6	173,549.2
CONSULTANT FEE (5%)						8,677.5
(A) SUB-TOTAL						182,226.7
(B) CONTINGENCY (10%)						18,222.7
TOTAL						200,449.6

CHAPTER 3 OPERATION COST

CHAPTER 3 OPERATION COST

3 - 1 Total Operation Cost

The operation costs which increase in proportion to the scale of facilities expanded during the period of this plan are estimated in PART II, III and IV respectively.

The total of those operation costs will be about 16.825 billion Rp.

The breakdown of the above are as follows;

- (1) Operation cost in relation to the Development Plan of Programme Production Facilities and Transmitting Facilities for the Nationwide Radio and TV Programme Service and the Establishment Plan of Radio and TV Programme Transmission Networks.

a. Transmitting operation	2,238.0 mRp
b. Programme production operation	5,300.0 mRp
c. Programme transmission operation	4,500.0 mRp
d. Tape duplication & distribution	1,200.0 mRp
e. Personnel cost	881.8 mRp
Total	14,119.8 mRp

- (2) Operation cost in relation to the Construction Plan of the TVN-II Broadcasting Network

a. Transmitting operation	149.6 mRp
b. Programme production operation	1,644.0 mRp
c. Tape duplication operation	550.0 mRp
d. Personnel cost	267.3 mRp
Total	2,610.9 mRp

- (3) Operation cost in relation to the Establishment plan of the Integrated Maintenance Centre

a. Operation cost for Maintenance Centre	16.5 mRp
b. Cost for emergency despatch	15.2 mRp
c. Personnel cost	62.5 mRp
Total	94.2 mRp

CHAPTER 4 PERSONNEL SUPPLEMENT PLAN

CHAPTER 4 PERSONNEL SUPPLEMENT PLAN

4 - 1 Number of the Present Staff

At the end of 1983, the RRI and TVRI have the following number of staff in each section.

	RRI	TVRI
Programme production	2,286	1,189
Technical staff	1,513	1,893
Administrative staff	1,341	1,204
<hr/>		
Total	5,140	4,286

4 - 2 The Factor of the Increment of the Staff

The staff to be increased when the projects of this 5-year plan is completed are estimated as mentioned in PART II, III and IV, respectively. The total number of personnel to be supplemented are estimated as about 913 persons. The breakdown of the above are as follows;

- (1) For the development plan of programme production facilities and transmitting facilities for the Nationwide radio and TV programme service and establishment plan of radio and TV programme transmission network
663 persons
 - (2) For the construction plan of the TVN-II broadcasting network
200 persons
 - (3) For establishment plan of the integrated maintenance system and the construction of Maintenance Centre
50 persons
- Total 913 persons

CHAPTER 5 THE POINTS OF CONSIDERATION
IN THE EXECUTION OF THE PLANS

CHAPTER 5 THE POINTS OF CONSIDERATION IN THE EXECUTION OF THE PLANS

This five year plan is composed of the various kind of projects concerning the production of radio and TV programmes, programme transmission networks, radio and TV transmitting facilities, frequency allocations, telephone communication networks and so on. Therefore, the following points should be considered when executing these plans.

1. It is recommended that the task force team and its headquarters should be set up in the Directorate of Engineering so as to be able to manage and promote these projects efficiently in consideration of the fact that this plan is to be continued for the consecutive five years period.
2. It is recommended that the experienced consultant shall be appointed to ask useful advises in relation to the design of overall system and facilities, supervision of construction work, tender and its evaluation, adjustment of construction schedule and so on.
3. In the case when domestic equipment are utilized for these projects, construction costs shall be re-estimated by local currency portion and foreign currency portion based on the equipment prices of domestic procured and the percentage ratio of domestic parts or equipment and that of imported.
4. It will be needed that the construction cost shall be checked and made adjustment in consultation with the up-to-date economical variation factors before the start of actual construction work.

PART VI ECONOMIC EVALUATION

INTRODUCTION

PART VI ECONOMIC EVALUATION

Introduction

The 4th 5-year broadcasting plan is represented by the following three basic plans.

1. Development plan of programme production facilities and transmitting facilities for the nationwide radio and TV programme service and the establishment plan of radio and TV programme transmission networks.
2. Construction plan of the second Television broadcasting network.
3. The establishment of an integrated maintenance system and construction plan of Maintenance Centre.

In line with achievement of the above objectives, the necessary investment during the five years is estimated in this chapter. The 5-year financial plan of the Ministry of Information is settled on the basis of this estimation. Furthermore, the social effect of the development of broadcasting system to the nation is evaluated being referred to the role of state for investing in the broadcasting service. The Part VI is divided into two chapters as mentioned below.

Chapter 1 Financial Plan

Chapter 2 Social and economic benefits

Particularly, in the Financial Plan of Chapter 1, the following items are evaluated.

- (1) Draft of investment plan required for the 5-year development plan
- (2) Financial analysis of investment for the system development project
- (3) Furthermore, fund procurement plan for the development project.

It is to be noted that through the two studies that were carried out in 1983, namely 12 days in July, 14 days in October in Indonesia, studies on the plan made by the Ministry of Information and analysis of collected materials were carried out.

The data which were obtained in Indonesia and used for analysis are listed in the following.

- 1) Routine Income of License Fee : TVRI
- 2) Routine Operational Expenditure : TVRI
- 3) Development Budget of TVRI in the past
- 4) Number of TV receiver sets in use from the past to the present : TVRI
- 5) Tariff system of TV License valid as of Mar 1981 : TVRI
- 6) Actual Data of Operating Cost : TVRI
- 7) Annual Budget by location : RRI
- 8) Daftar Kontrak Pemancar : RRI
- 9) Perkiraan APBN : RRI
- 10) Rencana Pelita IV DIRECTORAT RADIO : RRI
- 11) Project Aid Record for the broadcasting sector : RRI & TVRI
- 12) Regulation & Tariff on Commercial Broadcasting of Television of the Republic of Indonesia : TVRI
- 13) Address of State by His Excellency the President of the Republic of Indonesia : DEPPEN
- 14) Rencana Anggaran Rutin Dan Pembarggunaan Direktorat Radio Stasiun Nasional Jakarta Dan Stasiun RRI Daerah Dalam Pelita IV : RRI
- 15) Anggaran APBN Selama PELITA III : RRI
- 16) Radio Republik Indonesia 1976 : RRI
- 17) Radio Televisi Film 1977 : DEPPEN
- 18) Indonesia 1981 an official handbook : DEPPEN
- 19) Organization of the Ministry of Information : DEPPEN
- 20) preliminary feasibility study report 1983 : JICA
- 21) Economic Statistics in Indonesia 1982
- 22) F/S report on VHF/FM Broadcast Coverage Malaysia : JICA

CHAPTER 1 FINANCIAL PLAN

CHAPTER 1 FINANCIAL PLAN

1 - 1 Investment Plan

1-1-1 Base of estimation of investment amount in system construction

The total investment amount in system construction required for the 4th 5-year plan is estimated on the basis of investment estimate for each sector as shown in Table 6-1-1.

Table 6-1-1 (Unit : bRp)

DESCRIPTION	FOREIGN CURRENCY PORTION	LOCAL CURRENCY PORTION	TOTAL PORTION
(1) Basic Facilities			
- Radio Broadcasting Service	99.56	5.99	105.55
- Television Broadcasting Service	73.99	5.99	79.98
Sub-total	173.55	11.98	185.53
(2) Consultancy	8.68	0.54	9.22
(3) Contingency	18.22	1.39	19.61
(4) Grand Total	200.45	13.91	214.36

From Table 5-2-2

Conditions of Estimation are as follows;

- 1) The investment amount in the above items was estimated by using the price at the beginning of 1984.
- 2) The capital expenditure plan in each item, was decided in accordance with project implementation plan assumed for each year.
- 3) The consulting fee was estimated as 5% of the total investment amounts.
- 4) The contingency was estimated as 10% of the total of the above basic facilities and the consultancy.

As indicated in the preceding table, 94% of the total investment is estimated in foreign currency, and the remaining 6% is appropriated from local currency.

1-1-2 Estimation of Investment in System Construction

Annual investment required for implementation of the 4th 5-year development programme is as in the following Table 6-1-2. The investment amounts were expressed by the nominal value actually necessary for each year during the period of the 4th 5-year plan.

Of the basic facilities necessary for system construction, all equipment and facilities were assumed to be procured in foreign currency (indicated in Yen), and the installation cost of equipment, construction cost of building including labour cost etc. which can be prepared locally were assumed to be procured in local currency.

Table 6-1-2

Year	Foreign Currency	Local Currency	Total (Unit: bRp)
84/85	24.9	1.7	26.6
85/86	30.7	2.4	33.1
86/87	66.0	5.5	71.5
87/88	56.7	5.1	61.8
88/89	45.6	4.6	50.2
Grand Total	223.9	19.3	243.2

This table is derived from Table 6-1-1 in consideration of inflation factor of 5 % for Foreign Currency and 15 % for Local Portion.

1 - 2 Financial Analysis

1-2-1 Outline of Analysis

Financial analysis was performed against the investment plan required for the broadcasting system development. The financial charges which will be required for implementation of project and operation of system, such as initial investment portion, supplementary investment portion, system operation expense and incomes, working capital, equipment capital residual value, are estimated to analyse the cost benefit of the project. The start of the project implementation plan is considered to begin from 1984, the year when the 4th 5-year plan will begin, and the system construction is assumed to be completed through five years of the 4th 5-year plan.

The reinvestment plan is indispensable for progressing the system operation smoothly, not only in the 4th 5-year plan period but also in the 5th 5-year plan and after. It is considered that financial needs against reinvestment will be raised for system operation and maintenance after the end of 4th 5-year plan.

In considering the average life of system equipment, system life is assumed to be 15 years until the 6th 5-year plan terminates.

In considering that the year 2000 will be the final year for project evaluation, the financial efficiency of the funds which will be invested in about 15 years is analysed in the following.

For the analysis, the Internal Rate of Return and B/C Ratio method is used. For evaluation of projects including transfer of funds between countries, this method is considered to be appropriate. The details of this method will be explained later in the item "Total Capital Profit Rate Analysis".

It is to be noted that the financial values used for analysis were estimated by local and international market rate as of beginning of 1984.

1-2-2 Investment in System Construction

(1) Initial Investment

The necessary construction fund based on the investment plan as indicated in Table 6-1-1, was appropriated in the initial investment.

As for the construction materials to be used, ones to purvey in foreign currency are appropriated in the foreign currency portion, and what can be procured in local currency are appropriated in the local portion.

(Unit: bRp)	
Foreign currency portion	200.45
Local currency portion	13.91
Total amount	
	214.36

The above are all indicated in Indonesian currency (Rupiah), with the money exchange rate as of the beginning of 1984:

Rp 970/ US \$, ¥ 240/ US\$.

For the capital expenditure plan by year, refer to Table 5-2-1.

(2) Supplementary investment in system construction

By investment of supplementary funds in the 5th and 6th-5-year plans which are required for system maintenance and operation, it would be possible to cope with the increasing demands for keeping smooth and effective broadcasting services year by year.

The capital expenditure plan including supplementary investment in system construction is as follows.

<u>Year</u>		<u>Year</u>	(Unit: bRp)
1	26.5	10	15.2
2	31.4	11	44.0
3	64.2	12	29.7
4	52.2	13	90.3
5	40.1	14	24.3
6	34.0	15	22.7
7	76.1	16	15.2
8	72.9	17	16.2
9	11.3		

Each amount at year 1 to 5 indicates annual investment that is needed during Pelita IV.

Total amount in Table 6-1-2 is distributed to each year according to construction schedule.

Each cost is expressed with prices of 1984 over 17 years.

1-2-3 Working Capital

Working capital will be required for a broadcasting enterprise to carry out the broadcasting service smoothly.

The size of working capital required for system maintenance and operation differs in accordance with the operation efficiency of an enterprise, and also varies with the grade of service to deal with and the scale of the system. The working capital necessary for this system operation was estimated on the basis of the following.

- (1) The working capital is considered to be in proportion to a yearly increment in annual operating cost. This capital account is generated after completion of system construction.
- (2) Annual working capital is not an expense but a capital. Accordingly, the sum of the appropriated value for each year shall be introduced into the profit account at the year when the project terminates.

1-2-4 Operating Cost

The annual operation expense required for operation of a broadcasting service constitutes of the following items.

- a. As regards the programme production, the following items can be considered.
 - o Direct expense for programme production
 - o Expense for conveyance of produced programmes
 - o Expense for film development
 - o Other expenses
- b. The general management and operation expense required for the operation of system is indicated by the following items.
 - o Personnel expenditure for radio and TV stations
 - o Office expenditures
 - o General management expenses for spare parts and operation
 - o Expense for transferring personnel and equipment
 - o Publicity expenses
 - o Other expenses

- c. Equipment and materials directly required for operation of system
- d. Direct and indirect technical expenses required for operation of system
- e. Maintenance expense required for smooth operation of system
- f. In addition, the self-fund investment in the fixed assets necessary for operation of system is to be appropriated timely.

By implementation of the 4th 5-year plan, the system under control of the Ministry of Information will be expanded. Furthermore, in accordance with the promotion of regional modernization policy of Indonesia, the broadcasting service will infiltrate more into the nation.

With the expansion of Population Coverage and Area Coverage, the expense required for system operation is considered to increase in relation to the following.

- o Increase of necessary personnel as for the Ministry of Information, and increase in training expense accordingly.
- o Purveyance of equipment and materials
- o Increase of general sundry expenses

The following operation expenses required for radio and TV broadcasting sectors during the implementation of the 4th 5-year plan are estimated.

(1) Radio broadcasting service

The radio broadcasting sector can be classified by the following three management sectors.

- o Radio broadcasting sector in the Ministry of Information
- o Jakarta National Station
- o Each Nusantara station and its subordinate regional I, II stations

The operation expenses including working capital required for operation and maintenance of the radio broadcasting system, with implementation of the 4th 5-year plan is estimated as the following.

(Unit: bRp)

<u>Year</u>		<u>Year</u>	
1	13.8	10	19.3
2	15.0	11	19.3
3	16.2	12	19.3
4	17.4	13	19.3
5	19.3	14	19.3
6	19.3	15	19.3
7	19.3	16	19.3
8	19.3	17	19.3
9	19.3		

(Refer to Table 6-1-13)

(2) TV broadcasting service

The main operating entity of the TV broadcasting sector can be classified by three sectors; management sector of the Ministry of Information, Jakarta Central Station and 8 Regional stations. The operation expenses including working capital required for maintenance and operation of the TV nationwide network service after the end of the 4th 5-year plan period is estimated as follows (Refer to Table 6-1-13)

(Unit: bRp)

<u>Year</u>		<u>Year</u>	
1	58.4	11	66.6
2	60.2	12	66.6
3	62.0	13	66.6
4	63.8	14	66.6
5	66.6	15	66.6
6	66.6	16	66.6
7	66.6	17	66.6
8	66.6		
9	66.6		
10	66.6		

1-2-5 Residual Value

The operation period of the system is regarded as 15 years. The residual value of equipment with 15 years life is estimated at 10% of investment in facility as of the period when the project was established.

At the terminating year of the project life, the book keeping value of investment in fixed asset of the project every year, is appropriated in the profit account. (Refer to Table 6-1-8)

Total residual value is estimated at 155.63 bRp.

1-2-6 Operating Revenue

(1) Demand Forecast of Broadcast Receiver Sets

1) General

In developing countries, diffusion of broadcast receivers into the peoples is generally not easily driven because level of national incomes is very low.

Means of broadcasting can be classified into the following media in order from the lower service cost.

- a. Long wave
- b. Medium wave
- c. Short wave
- d. FM
- e. TV (black and white, and colour)

Among TV receivers, colour receivers are extremely expensive for peoples in developing countries.

In Indonesia, radio broadcasting service was started in 1945 and TV broadcasting service in 1962.

The number of radio receivers in use is said to be really 20 or 30 million sets per the population 156 millions (estimated in 1983). On the other hand, the number of TV receivers in use was estimated to be 5 million sets as of 1983. Policy to abolish non registered possession of receivers was executed in the middle of 1983, so that the registered receivers have increased to 4,960,000 sets as of the end of 1983 at a stretch from 2,000,000 sets.

Recent national economy of Indonesia fell into recession at the real growth rate in the context of the secondary oil crisis. As a result, in prospect of long-term plan of investment, period of reconstruction seems to continue for recent two or three years. Through this process, the national economy will recover activity and the new growth might be realized in 1986 and after. Meanwhile, demand for radio and TV receivers in Indonesia has high GDP elasticity.

The following is to study and analyze the diffusion trend of broadcasting service from the past to the future. In addition, "Present Condition of popularization of receiver" and "Economic Level" necessary for study and analysis are shown in Table 6-1-3.

Table 6-1-3

	1970 to '75 (Period)		1976 to '80 (Period)	
	A(*)	B(**)	A(*)	B(**)
Thailand	3.0	300	2.3	600
Sri Lanka	2.0	200	1.8	260
Singapore	1.9	2,000	1.3	-
Philippine	2.9	300	2.4	650
Malaysia	2.8	700	2.6	1,700
Bangladesh	-		2.3	
Indonesia	2.9	150	1.7	350

by UN publication

(*) A: Real economic growth rate (%)

(**) B: GDP per capita (US\$)

On the other hand, yearly sales of radio and TV receivers are as follows:

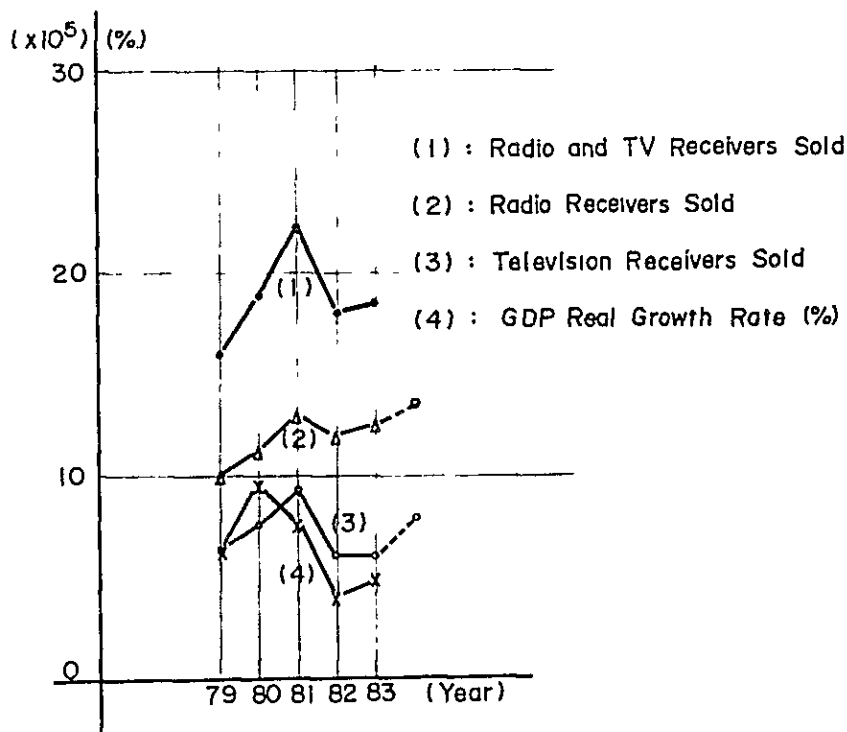
(Unit: thousands of sets)

The number of receivers annual sold Table 6-1-4

Year	Radio receiver including Radio cassette	TV Receiver		
		Black and white	Colour	Total
1979	1,000	550	90	640
1980	1,125	650	110	760
1981	1,300	760	180	940
1982	1,200	430	180	610
1983	1,250	430	180	610

The number of receivers annually sold sharply responds to the real economic growth rate (see Fig. 6-1-1 and 6-1-4).

Comparison of Radio and TV Receivers Sold, with GDP Real Growth Rate Fig. 6-1-1



Any document was not available for justification of the data on sales at the time of preparing this report.

But, generally, the purchasing plan of durable consumer goods is strongly affected by the business trend in the previous year.

Future demand for receivers is forecasted to increase more and more for the reasons of increase in population, rapid development of international information exchange, performance of receiver upgraded on account of technical progress, decrease in real price level and improvement of TV signal quality.

2) Forecast of number of television receivers in use

a. General

In Indonesia, the diffusion rate of television receivers compared with the population is behind that of other countries. Relationship between GDP per capita, registered number of TV receivers and its annual growth rate in Asian countries is given in the following Table 6-1-5.

Table 6-1-5

	Number of TV receivers in use ('000)		Number of receivers in use per thousand persons	Annual growth rate (%)	GDP per capita (US\$)	
	'75	'80			'75	'80
Thailand	738	810	17	2	167	323
Philippine	756	1,000	21	6	170	336
Malaysia	452	1,000	75	17	305	714
Hong Kong	837	1,114	220	6	-	-
Korea	1,860	6,280	164	-	-	-
Indonesia	300	1,405	9	36	70	200
Pakistan	380	800	10	16	163	183
Iran	1,700	2,085	56	4.5	369	1,583
Singapore	372	397	166	1.3	842	2,279
Japan	54,301	62,976	539	3	1,584	3,632
India	455	1,150	2	21	93	139

by UN publication

Under such circumstances, correlation of annual growth rate in the number of TV receivers in use with the present Population Diffusion Rate (*) is given in Fig. 6.1.2.

Although the annual growth rate is very high in countries with diffusion rate of 10 or less, it is extremely low in countries with diffusion rate of 100 or more.

(*): Population Diffusion Rate is defined as the number of receivers in use per thousand persons.

Television Receivers in Use
V.S.
Growth Rate of Television Receivers in Use

Fig. 6-1-2

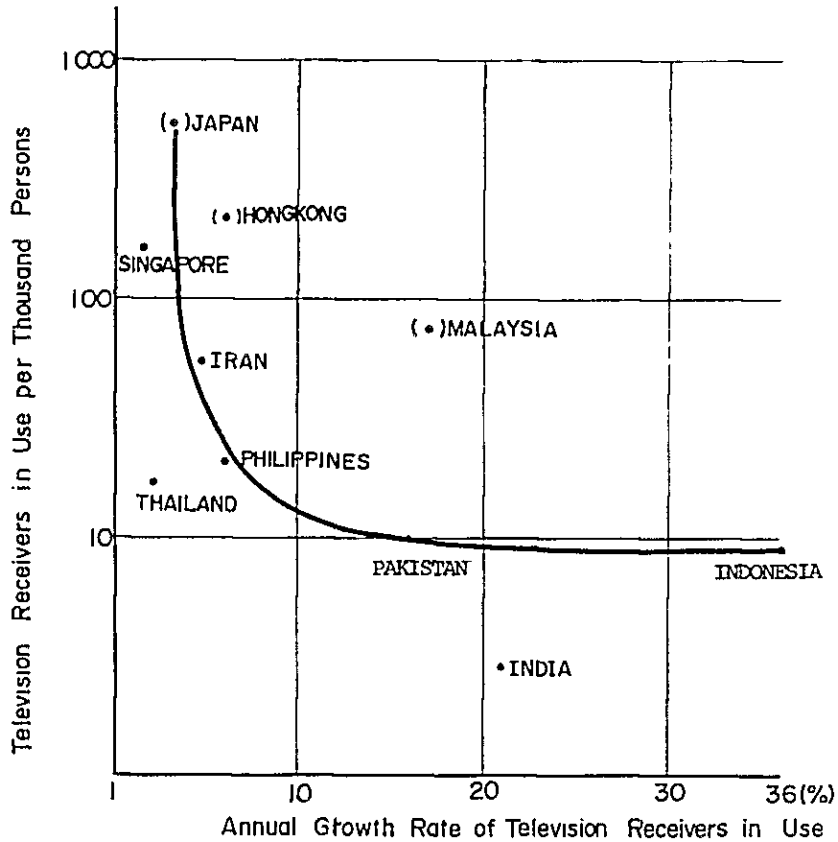


Fig. 6-1-2 is drawn based on Table 6-1-5

b. Forecast of Indonesian economic growth

Real Growth Rate of GDP has changed as shown below.

<u>Real GDP Growth Rate (%)</u>	
by UN Publication	
'79	6.4
'80	9.7
'81	7.7
'82	4.0
'83	5.0

In accordance with latest economic outlook, the real growth rate is forecasted to be 5% annually in 1984 and 1985 as it was in 1983 and to keep 6% after 1986.

Thus, a long term prospect of economic growth in Indonesia is assumed to be as given below.

<u>In Growth Rate (%)</u>	
1984	5.0
1985	5.0
1986 to 2000	6.0

According to the opinion of Research Institute of Asian Economy, the most authorized institute in Japan, 6% of Growth Rate was adopted for 1986 - 2000.

On the other hand, the growth rate of population was at an average 2.3% during the past decade. However, during recent several years, the trend is toward decreasing to less than 2%.

In 1983, the population amounted to 156 million. Several years ago, the national income settled on comparatively stable growth. GDP per capita is estimated to be US\$500 during recent several years.

In consideration of the above conditions, population is assumed to increase at the annual growth rate of 1.7% from the long-term viewpoint.

GDP per capita is estimated to be US\$950 in the year 2000.

c. Television-Receivers-in-Use in the future

Statistical curves in Fig. 6-1-3 illustrate the correlation of population covered by one receiver set with GDP per capita. Almost all statistical data is explained to fall between both curves.

Indonesian GDP per capita is forecasted to change as shown below.

1983 US\$ 500^{*1}
2000 US\$ 950^{*2}

*1 US\$ 500 : GDP/person based on the World Bank Annual Report.

*2 Quoted from the following data.

• 156 million people in Indonesia ; by recent population census published by Statistical Bureau.

1.7% increase/year in population is derived from the data in the past.

• GDP/person in the year 2000 is US\$950.

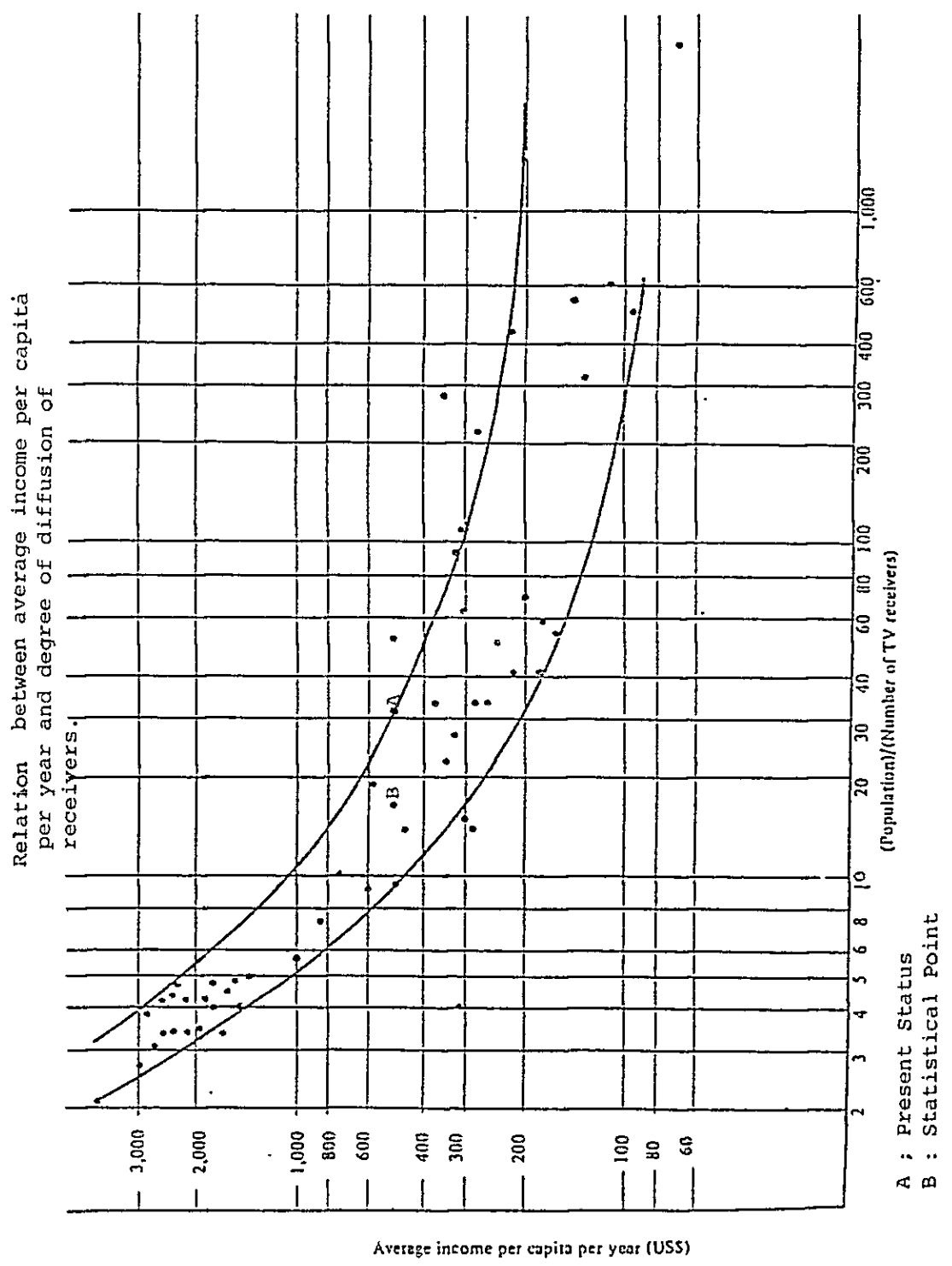
GDP real growth rate is assumed to be 6%/year. Considering population growth rate 2% more or less, 6-2 = 4%

This 4% is nearly equal to the growth rate of GDP per capita.

$$\text{US\$}500 \times (1.04)^{17} = 950$$

Degree of diffusion of the receivers in Indonesian people in 1984 is indicated by the point "A" on the graph. It is understood that Population Diffusion Rate of receivers is considerably behind other countries, in comparison with the "Statistical point B" on the graph.

Fig. 6-1-3



	G D P per capita (US \$)	Population versus Number of receiver sets in use	Million of Population
1983	500	31	156
2000	950	11	208

In 1983

$$\left(\frac{\text{Population}}{\text{No of Receivers in Use}} \right) = 31$$

In 2000

" = 11

Above figures are possible to read out of the statistical data in the graph in Fig. 6-1-3 if GDP per capital is assumed \$950 in 2000.

Under such conditions, number of receiver sets in use in Indonesia is estimated to be;

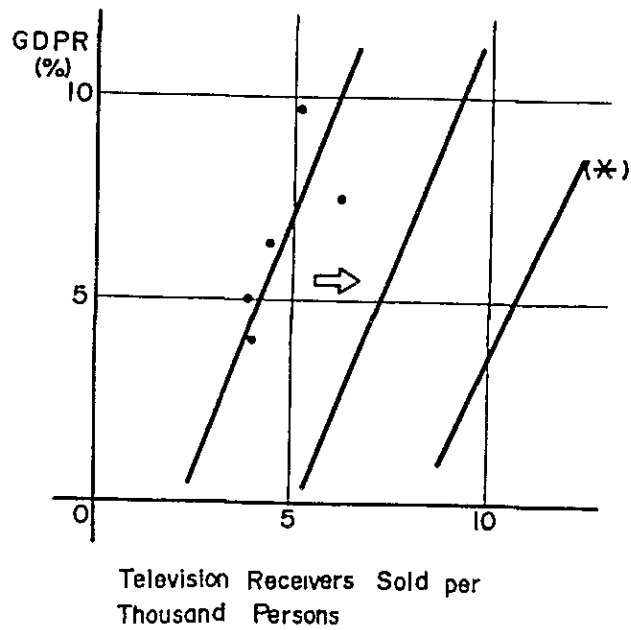
1983	5,000,000 sets
2000	18,900,000 sets

This increase over 15 years explains that the number of receiver sets in use is at the annual growth rate of a little over 8%.

On the other hand, Fig.6-1-4 shows correlation of the number of receiver sets sold annually divided by population with annual real growth rate of GDP in Indonesia. The same correlation in Malaysia is also indicated in the same graph, to be compared with that in Indonesia. Analogy between Indonesia and Malaysia in terms of GDP elasticity can be pointed out. From the long-term viewpoint, the correlation curve is considered to shift toward the right hand in the future.

If, Television receiver sets in use will favourably increase up to the year 2000, Population Diffusion Rate will be 9 sets per hundred person. This estimate means that the growth of diffusion rate will be about 3 times in the year of 2000 compared with 3 sets per hundred person in 1983.

GDP Real Growth Rate
v. s.
Television Receivers Sold
(1978~1982) Fig. 6-1-4



(*) Malaysia in 1978~1982

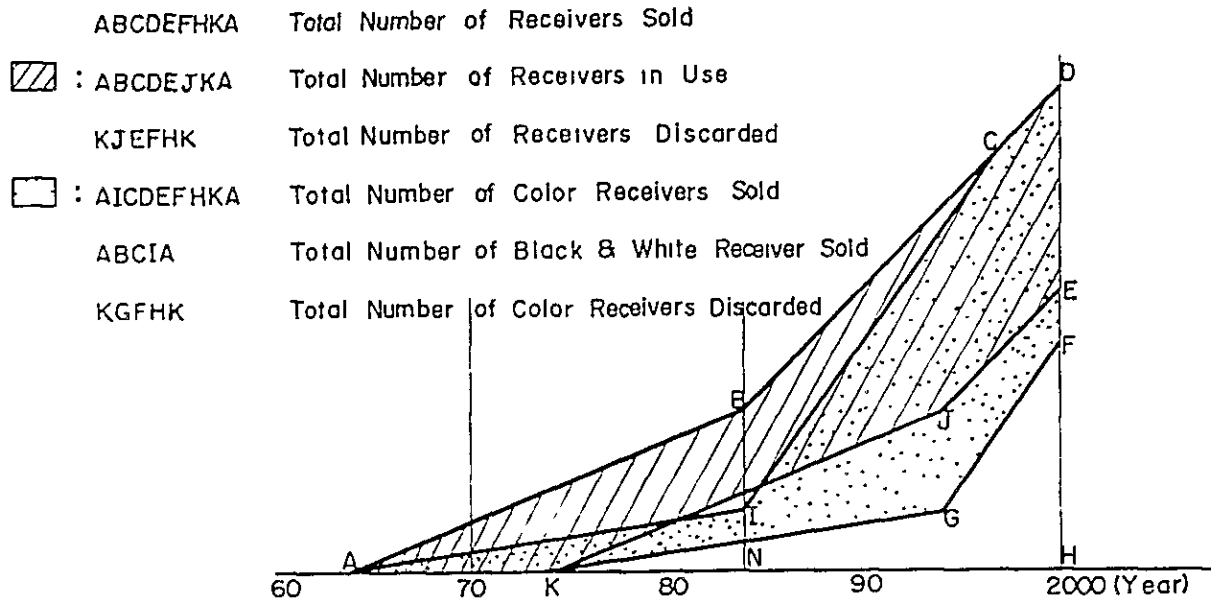
Fig. 6-1-5 shows number of Colour and Black & White receivers sold and discarded over the year 2000.

The number of receivers sold and discarded were classified into 2 types; Colour and Black & White in Fig. 6-1-5.

Fig. 6-1-5

Comparison of Colour with Black & White Television Receivers sold and discarded until CY 2000

(CY 1965 - 1983; Actual data, CY 1984 - 2000; Estimated Data)



Note: Fig. 6-1-5 is necessary for estimating the ratio of colour TV to total TV sets.

Surface of ABCDEJKA is almost equal to the surface AICDEFHKA

This means that almost all TV sets are changed to colour receiver sets at C point.

From Fig. 6-1-5 ratio of total number of receivers sold and discarded until the year 2000 between Colour and Black & White was analysed. Diffusion ratio between Colour and Black & White at the time of the year 2000 is estimated. Diffusion of colour and black & white television receivers in Japan is shown hereunder.

Year	Ratio of Colour receivers
1965	0%
1973	50%
1980	90%

from NHK Handbook

In Japan, the holding ratio of colour television receivers reached 50% in 7 years and up to 90% after additional 7 years, that is, after 14 years since the service started. In Indonesia, the diffusion ratios between black & white and colour television receivers in the recent years are as follows:

(Unit: %)

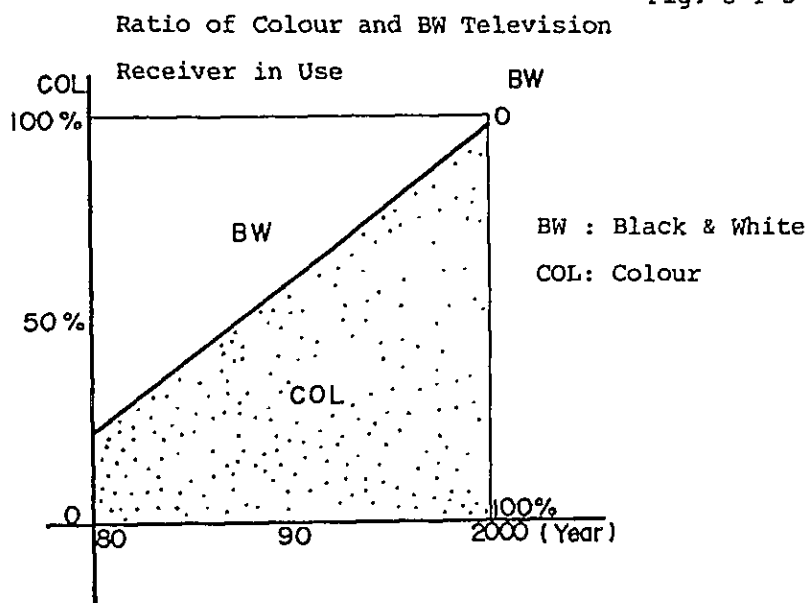
Year	Black & White	Colour	Total
1981	92	8	100
1982	89	11	100

Note: Based on the suggestion of TVRI, number of registered sets were estimated by dividing revenues from B/W and Colour TV set with respective license fee.

On the other hand, the ratio of colour sets sold among the total number of TV receiver sets sold for a year is nearly 30% in 1983.

It is estimated that the share of colour TV receivers will expand increasingly, so that colour TV receivers will hold 100% share in market in the year 2000. Based on the above analysis, the number of colour TV receiver sets in use in the year 2000 is estimated to be 93%. It means that nationwide tendency is toward change to colour receivers hold (see Fig.6-1-6).

Fig. 6-1-6



As a result, number of television-receivers-in-use that was estimated by year was shown in the following table (unit: Millions of sets)

Table 6-1-6

(Unit: millions of sets)

Year	B/W	Colour	Total	Ratio of Colour TV
1. '84	3.3	2.0	5.3	37
2.	3.3	2.4	5.7	42
3.	3.2	3.1	6.3	49
4.	3.3	3.6	6.9	52
5.	3.3	4.3	7.6	57
6.	3.2	5.2	8.4	62
7. '90	3.0	6.3	9.3	68
8.	2.8	7.5	10.3	73
9.	2.7	8.7	11.4	76
10.	2.5	10.2	12.7	80
11.	2.4	11.5	13.9	83
12. '95	2.2	12.9	15.1	85
13.	2.0	14.3	16.3	88
14.	1.9	15.2	17.1	89
15.	1.7	16.2	17.9	91
16.	1.6	16.8	18.4	91
17. 2000	1.4	17.5	18.9	93

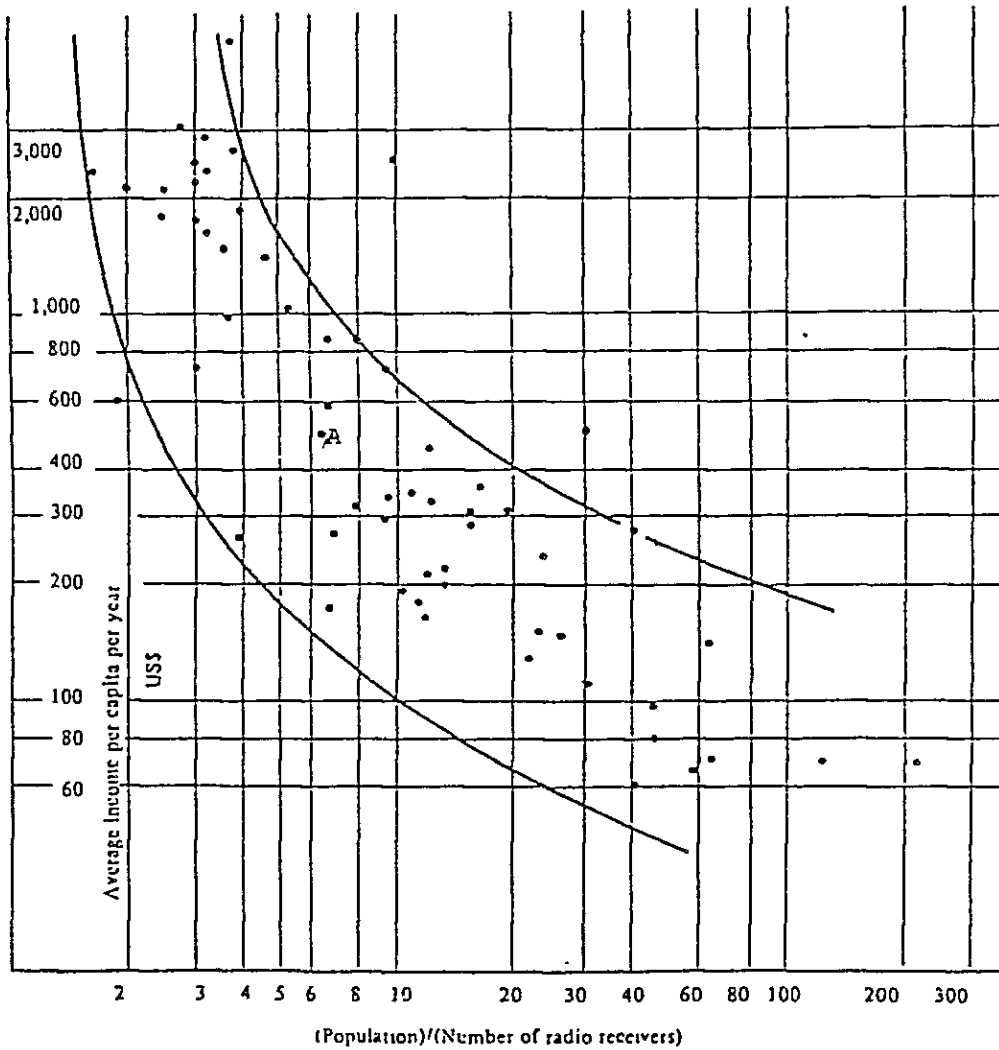
3) Number of Radio Receivers in Use in the future

The diffusion number of radio receiver sets in Indonesia in 1983 is estimated to be about 25,000,000 sets. The worldwide tendency of radio receivers in use is shown in Fig.6.1.7.

Note: Estimation based on the same idea as that of TV.

Fig. 6-1-7

Relation between Average Income perCapita per Year and Degree of Diffusion of Radio Receiver Set



Population/(Number of radio receivers) is 6.0 for Indonesian GDP per capita US\$500 in 1983. This fact shows that the above diffusion ratio to an economic level is a little over the statistical average. If the GDP per capita is assumed to reach US\$950 in 2000, the above figure becomes 4.5 as shown hereunder.

	GDP/capita (US\$)	Population/Number of Diffused radio receiver sets	Population (Million)
1983	500	6.2	156
2000	950	4.5	208

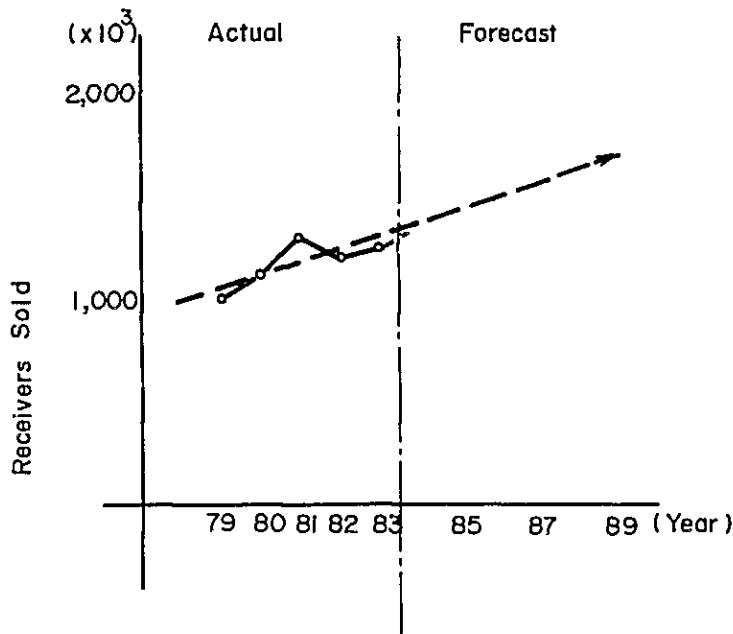
Finally number of radio receiver sets in use in Indonesia will reach finally 46,000,000 sets in the 2000 from 25,000,000 sets in 1983. This means that receivers in use diffuse at an annual growth rate of 3.6%. In other words, radio receivers in use increase at a twice growth rate as large as the estimated population growth rate (1.7%), though demand for radio receivers decreases a little, due to increase of demand for television receivers.

The number of 46,000,000 sets in use for 208 millions of population in the year 2000, means one set per four or five persons. Nationwide provision of 1 or 2 sets per family is considered to be appropriate forecast.

In accordance with the implementation of the 4th-5 year plan, introduction of FM as well as MW and SW for receiving wave is to be promoted.

Therefore, social utility of radio broadcasting service is not only diffusion of education as it is but also on extension of individual hobbies necessary for enjoying living. Requirement for the broadcasting service will be diversified. Demand for FM broadcasting is aroused among high income groups, as trend is toward hearing radio sound with good quality. As a result, demand for portable and car radio receivers, and stereophonic FM receivers is thought to accelerate in the future. As shown in Fig. 6-1-8, recent tendency of sales for television receivers is over 1 million sets.

Time trend of Radio Receivers Sold Fig. 6-1-8



Note: Detailed discussion by regression method was not made.
This curve is drawn by eye-ball-forecast.

In Indonesia, radio broadcasting has a long history (service was started in 1945) but the diffusion of ordinary radio receivers is scarcely related to the economic growth rate. Thus, the diffusion rate of radio receivers is thought to increase at nearly the same rate as population growth rate in the future.

On the other hand, sales of high quality radio receivers with FM function will be affected by annual real economic growth rate for some time after 1984.

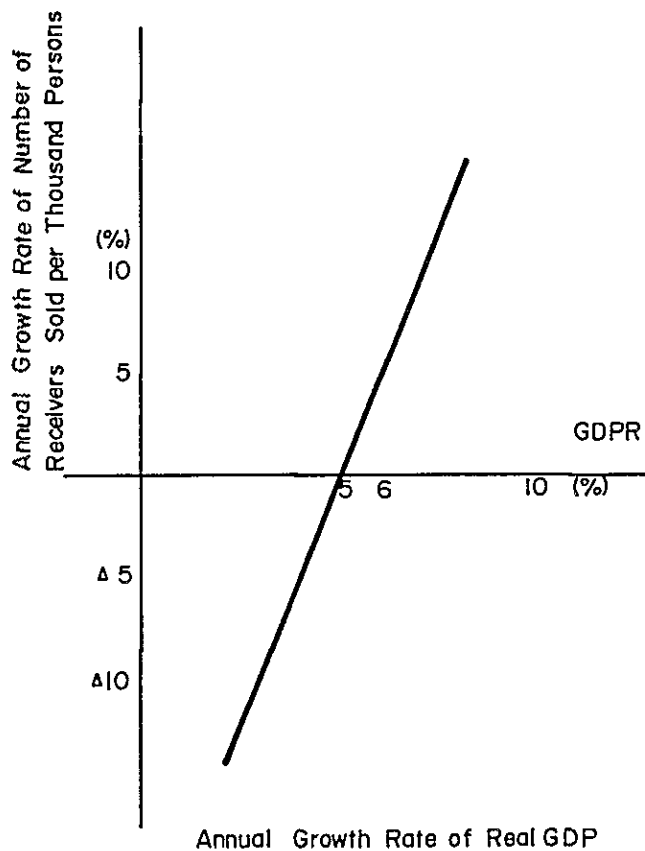
In accordance with Fig.6-1-9, sales total of ordinary and AM plus FM radio receivers, are estimated as follows:

The sales growth rate is Zero when economic growth rate is 5%

The sales growth rate is 5% when economic growth rate is 6%

However, number of ordinary radio receivers sold is to be replaced by television receivers as television receivers increasingly diffuse henceforth . So that the growth rate of number of radio receivers sold is to become dull.

Growth Rate of Receivers Sold Fig. 6-1-9
v.s.
Growth Rate of Real GDP



According to the 4th 5-year national development plan, Indonesian economy would be limited to annual real growth rate of 5% in 1984 to 1985, but in 1986 and after, the growth rate will be around 6% along with the recovery of business situation would be recovered.

Assuming that the economy could be at the growth rate of 6% until the year 2000, annual growth rate of the number of receivers sold versus population is forecasted to be 5%. Therefore, annual growth rate of number of receivers sold only is estimated to be around 7% when discarded receivers are taken into consideration and total number of receiver sets in use may be thought to increase at the annual rate 3 to 4% annually.

Year	Number of receiver set (Million)	Population (Million)	Number of receiver sets/population x 100
1983	25.0	156	16
2000	46.2* ²	208* ¹	22

Note: *1 Population; 156 million of persons $\times (1.017)^{17} = 208$

*2 Number of receivers is population $\times \left(\frac{\text{No of receivers}}{\text{population}} \right)$

That is, $208/4.5 = 46.2$

As a result of the above and analysis, number of receiver sets in use changes as shown in Table 6-1-7.

Estimation of No. of radio receivers in Use

Table 6-1-7

(Unit: Million of Sets)

<u>Year</u>	<u>Number of Receivers in Use</u>
84	26.8
85	28.0
86	29.2
87	30.4
88	31.6
89	32.8
90	34.0
91	35.2
92	36.4
93	37.6
94	38.9
95	40.2
96	41.3
97	42.5
98	43.8
99	45.0
2000	46.2

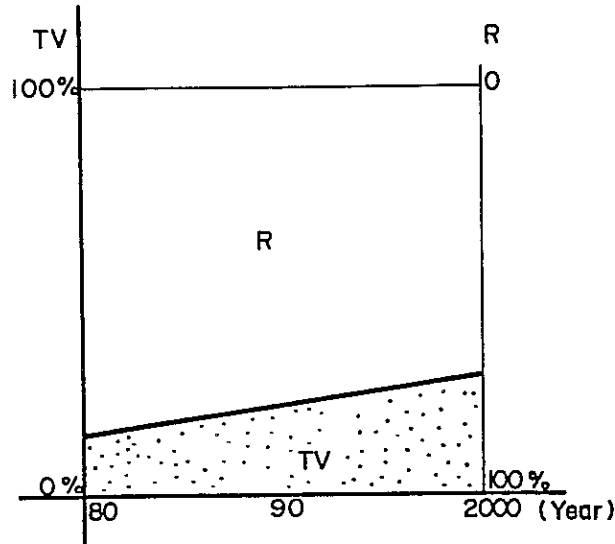
- 4) Estimation of diffusion ratio between radio and television receivers

Number of diffused receiver sets

Year	TV receivers (Millions sets)	Radio receivers (Millions sets)	Total (Millions sets)	Ratio of TV receivers
1983	5.0	25.0	30.0	17%
2000	18.9	46.2	65.1	29%

Time series change is as shown in Fig. 6-1-10

Ratio of Radio and Television Receivers in Use. Fig. 6-1-10



(2) Forecast of Revenues gained from Radio and Television License Fee.

1) Radio Broadcasting Service

Estimation of license fee revenue from the nationwide radio broadcasting system operated by RRI is given hereunder. Revenue is to be dedicated to Indonesian National Treasury.

(Unit: bRp)

<u>Year</u>	<u>Revenue</u>	<u>Year</u>	<u>Revenue</u>	<u>Year</u>	<u>Revenue</u>
1	25.0	7	28.2	13	31.8
2	25.4	8	28.6	14	32.3
3	25.9	9	29.4	15	33.0
4	26.6	10	29.9	16	33.7
5	27.1	11	30.6	17	34.4
6	27.5	12	31.1		

2) Television Broadcasting Service

License fee revenue from television broadcasting service operation estimated during the 4th 5-year plan is given in the following table. (License fee collection rate is assumed to be 80%)

(Unit: bRp)

<u>Year</u>	<u>Revenue</u>	<u>Year</u>	<u>Revenue</u>	<u>Year</u>	<u>Revenue</u>
1	71.0	7	194.4	13	371.7
2	80.1	8	191.9	14	359.5
3	95.2	9	218.3	15	380.6
4	107.4	10	250.8	16	393.5
5	123.2	11	279.5	17	407.8
6	142.8	12	309.7		

3) Total License Fee Revenues from Radio and Television Broadcasting Services

(Unit: bRp)

<u>Year</u>	<u>Revenue</u>	<u>Year</u>	<u>Revenue</u>	<u>Year</u>	<u>Revenue</u>
1	96.0	7	194.4	13	371.7
2	105.5	8	220.5	14	391.8
3	121.1	9	247.7	15	413.6
4	134.0	10	280.7	16	427.2
5	150.3	11	310.1	17	442.2
6	170.3	12	340.8		

(3) Forecast of Other Revenue

1) Radio Broadcasting Service (RRI)

Revenue from advertisement

Assuming that all of 49 stations broadcast spot commercials, the following revenue is expected.

F.Y. 84/85 - 98/99 : bRp 1.74/year

2) Television Broadcasting Service (TVRI)

Commercial broadcasting has been prohibited since 1982. Afterward, there is no sign of resumption.

(4) Broadcast License Fee System

It is assumed that the following license fee system be implemented at the beginning of the 4th 5-year plan.

1) Television Broadcast License Fee (annual) (Unit: RP)

a. Black & White Television receiver

- o Less than 16 inch 6,000
- o 16 inch more 18,000

b. Colour Television receiver

- o Less than 16 inch 24,000
- o 16 to 19 inch 30,000
- o 19 inch or more 36,000

2) Radio Broadcast License Fee (annual) : 1,200

The above license fee system is also implemented by the Ministry of Information at percent. However, increase in license fees is ought to be taken into consideration during the period of the 5-year plan. License fee, the basic fund sources indispensable for business operation of the Ministry of Information, has been obviously positioned. The license fee levying system is given in the following figure.

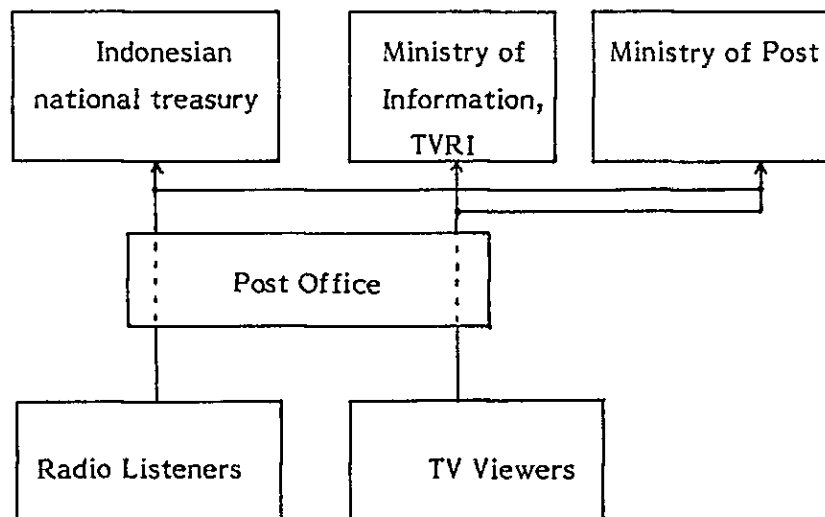


Fig. 6-1-11 Diagram of License Fee Collection Route

1-2-7 Financing of Project

The estimated sum of money assumed to be financed by foreign loan is classified by item. Within this sum of money, foreign currency portions of installation work and the consulting service as well as the expenses of equipment and materials for this project are included.

(unit: millions of Yen)

Broadcasting system equipment (installed)	43,387
Consultancy	2,169
Other expenses	4,556
Total	50,112

The loan requested shall be paid in the period of the construction works in accordance with the construction implementation plan. With regard to the imported equipment and the consultant service shall be paid in foreign currency. The expenses required are expressed in local currency as follows.

year	(unit : bRp)		
1984/85	24.90	1987/88	48.87
1985/86	29.28	1988/89	37.40
1986/87	60.00		
		Total	200.45

The currency for payment shall be settled with the currency of the financing country. The conditions of payment can be decided between the parties concerned on the condition of approval of the financing country.

The charge for procured materials in principle, is to be paid by piece-work and shall be settled normally at the time of shipment. Payment related to labour service shall be planned on the basis of piece-work payment including advance payment at a reasonable rate.

It is to be noted that the contingency for construction works included in the above amount of payment can be appropriated in the project cost for purchasing additional materials similar to those procured under loan, upon consultation with the financing agency when the construction works are carried on.

1-2-8 Estimation of Profit Ratio of Total Liabilities and Net Worth

The financial internal rate of return of this investment can be estimated by the following method of analysis for the profit ratio of total liabilities and net worth:

$$I = \sum_v \frac{C_v}{(1+i)^v} - (\text{salvage value})$$

$$D = \sum_v \frac{d_v}{(1+i)^v}$$

$$R = \sum_v \frac{r_v}{(1+i)^v}$$

$$I + D = R$$

where:

- I : Present worth of initial construction cost and necessary working capital
- D : Present worth of annual operating expense required for system management
- R : Present worth of revenue obtainable from system operation
- i : Discount rate
- v : System year concerned
- C_v : Annual capital expense including working capital
- d_v : Annual operating expense required for system management
- r_v : Annual revenue from system operation

1-2-9 Result of Financial Analysis

- (1) Financial Internal Rate of Return (IRR) : 32.6%
- Financial Net Present Value (NPV) : bRp 250.5
- Financial Discount Rate : 15%

- The following assumptions were made for above estimates:
Almost all equipment and materials be imported from foreign countries for the system construction.
- License Fee Collection Rate for TV Broadcasting be 80%

It is expected that execution of the project be accompanied with the equity position enough to compensate the initial investment during 4th 5-year. This can be said to be in optimistic prospect in consideration that FIRR is estimated at 32.6 %, NPV of bRp 250.5 is produced.

In addition, B/C ratio is 1.34.

It is expected that all investment amount in system construction for the 4th 5-year plan be recovered by the period of project termination.

Accordingly, it can be said safely that fund procurement necessary for the reinvestment to maintain the service level as it is, is made from the government equity borne by the project execution.

- (2) On assumption that a half of total investment planned is procured by locally produced goods in Indonesia ; financial indices are estimated as follows:

Financial Internal Rate of Return	: 23.4 %
Financial Net Present Value	: bRp 150.0
B/C ratio	: 1.18
Financial Discount Rate	: 15 %

In consideration that local production process of the equipment is more complicated in Indonesia, increase in production cost is to be inevitable. Nevertheless, total investment amount during the 4th 5-year plan is fully covered by earning power of the project.

- (3) Under the condition described in (2) above, even if License Fee Collection Rate of Return is around 17%, so that return on investment is concluded to be sufficient as the feasibility of the project.

1 - 3 Fund Procurement Plan

1-3-1 Government Development Budget Allocated to the Broadcasting Sector in the Past

(1) General

The total sum of development budget required for reinvestment in the existing systems and development investment in new system expansion has been appropriated by the government's development budget so far. A guideline for the proper investment size given by the 4th 5-year investment programme will be described below, through analysis and evaluation of annual development budget of Government including project aid.

(2) Trend of development budget for radio and TV broadcasting systems.

Budget for investment in equipment and facilities allocated to RRI and TVRI is as follows:

1) Budget for TVRI

The development budget appropriated to TVRI is shown in the following table.

(Year)	(Unit: bRp)
The 1st 5-year plan	
Sub-Total	1.3
The 2nd 5-year plan	
Government Budget	15.4
Borrowing (Loan and Credit)	<u>30.5</u>
Sub-Total	45.9
The 3rd 5-year Plan	
1 '79/'80	1.9
2 '80/'81	10.0
3 '81/'82	42.7
4 '82/'83	19.3
5 '83/'84	<u>22.1</u>
Sub-Total	96.0

The above Sub-Total consists of bRp 26.1 from Government budget and bRp 69.9 from Loan and Credit.

2) Budget for RRI

The development budget for RRI showed the following result during the 1st through 3rd 5-year plans.

(Year)	(Unit: bRp)
The 1st 5-year plan	2.3
The 2nd 5-year plan	29.7
Government Budget	11.0
Borrowing	<u>18.7</u>
Sub-total	32.0

Borrowings equivalent to bRp 18.7 are detailed hereunder.

(Loan and Credit)

YEN	3,700,000,000
US\$	22,000,000
FF	37,000,000
£	1,000,000

The 3rd 5-year plan	(Unit: bRp)
1 '79/'80	2.6
2 '80/'81	3.3
3 '81/'82	8.0
4 '82/'83	9.4
5 '83/'84	<u>5.8</u>
Total	29.1

In addition to these past budgetary position, FF 20,000,000 as Foreign Aid is included. This is equivalent to about bRp 2.3 at the prices in those days. Thus the total investment in the 3rd 5-year plan period is equivalent to 31.4 bRp.

3) The total development budget for both RRI and TVRI is derived from the budgetary position shown in 1) and 2).

The 2nd 5-year plan	(Unit: bRp)
RRI : bRp	29.7
TVRI : bRp	45.9
Total : bRp	75.6

The 3rd 5-year plan	(Unit: bRp)
RRI : bRp	31.4
TVRI : bRp	96.0
Total : bRp	127.4

(3) Trend of Economic Indices of Indonesia in 1975-83

1) Trend of GDP(*) in Indonesia

(Unit: bRp)

<u>Year</u>	<u>G D P</u>
'75	12,600
'76	15,500
'77	19,000
'78	22,500
'79	31,000
'80	43,800
'81	53,600
'82	64,320(**)
'83	83,616(**)

(*) : GDP is defined as Gross Domestic Product

(**) : Estimates

- 2) Trend of Government Development Budget in the past
Keeping pace with the economic growth, the size of total Development Budget of Government has been expanded year by year. The trend is given in the following Table.

(Year)	(Unit: bRp)
The 2nd 5-year Plan	
1 '74/'75	962
2 '75/'76	1,398
3 '76/'77	2,054
4 '77/'78	2,157
5 '78/'79	2,555
The 3rd 5-year Plan	
1 '79/'80	4,014
2 '80/'81	5,027
3 '81/'82	6,399
4 '82/'83	8,606
5 '83/'84	9,290

(4) Correlation of investment in radio and TV broadcasting system development with Indonesian macroscopic economic index.

1) Correlation with GDP

(A): Result of RRI and TVRI Development Budget

(Sum of Investments in System Developments made by RRI and TVRI)

(B): GDP

(C): $((A)/(B)) \times 100$

Ratio of Sum of Investment made by RRI and TVRI to GDP was calculated as shown in the following Table.

The 2nd 5-year Plan	(A)	(B)	(C)
	(Unit: bRp)		(%)
1 '74/'75		-	
2 '75/'76		12,600	
3 '76/'77		15,500	
4 '77/'78		19,900	
5 '78/'79		22,500	
Yearly average	15.1	17,400	0.087

The 3rd 5-year plan	(A)	(B)	(C)
	(Unit: bRp)		(%)
1 '79/'80	10.5	31,000	
2 '80/'81	19.3	43,800	
3 '81/'82	50.7	53,600	
4 '82/'83	28.7	64,320	
5 '83/'84	15.9	83,616	
Yearly average	25.0	55,267	0.045

2) Ratio of Budget for RRI and TVRI to Government Development Budget

(A): Sum of RRI and TVRI Development Investment

(B): Total Government Development Budget

(C): $((A)/(B)) \times 100$

The 2nd 5-year plan		(A)	(B)	(C)
			(Unit: bRp)	(%)
1	'74/'75		962	
2	'75/'76		1,398	
3	'76/'77		2,054	
4	'77/'78		2,157	
5	'78/'79		2,555	
	Yearly average	15.1	1,825	0.83

The 3rd 5-year Plan		(A)	(B)	(C)
1	'79/'80	10.5	4,014	
2	'80/'81	19.3	5,027	
3	'81/'82	50.7	6,399	
4	'82/'83	28.7	8,606	
5	'83/'84	15.9	9,290	
	Yearly average	25.0	6,667	0.37

(5) Trend of Operating Fixed Assets Administered by RRI and TVRI in the Ministry of Information.

Annual Operating Fixed Assets over the past 5 years were assessed and annual assessments were shown hereunder.

'79/'80	62.3 bRp
'80/'81	70.3
'81/'82	117.0
'82/'83	125.9
'83/'84	142.9

1-3-2 Budgeting Policy Necessary for Broadcasting System Development in the 4th 5-Year Plan

(1) Analysis based on the past budgetary position for RRI and TVRI.

In accordance with the analysis in Paragraph 1-3-1, (3), 1) and 2), annual Development Budget assigned to Broadcasting System Development in the past is considered to have been in the range of 0.04 to 0.08% of GDP or 0.4 to 0.8% of State Budget.

Above description is considered to be basic data indispensable for evaluating total Government Development Budget that can be assigned to RRI and TVRI in the 4th 5-year plan.

First of all, forecasts of future GDP and State Budget for Development are made, so that investment amount allowable for public Broadcasting Service Sector is estimated.

It is assumed that devaluation of Indonesian Rupiah was just enforced in March, 1983 but will not be implemented any more during the 4th 5-year programme execution ('84/'85 to '88/'89). The investment amount to Public Broadcasting Service Sector was estimated based on forecast values of GDP and State Budget for Development.

1) GDP Forecast

Indonesian GDP Forecast over a long-term period was made.

The forecast values in the period of the 4th 5-year plan are as follows:

(Year)	(Unit: bRp)
'84	100,339
'85	120,407
'86	144,488
'87	173,386
'88	208,063

If State Budget for development expected for Public Broadcasting Service Sector is evaluated to be equivalent to 0.04 to 0.08% of GDP, the amount of bRp 300 to 600 will be invested for the coming five years. This is equivalent to about bRp 75 to 110 in Japanese Yen.

2) Forecast of Total State Budget for Development

A forecast of total development budget of Indonesian government was made over 5 years in the future. The forecast values of the 4th 5-year plan are as follows:

(Year)	(Unit: bRp)
'84/'85	10,684
'85/'86	12,286
'86/'87	14,129
'87/'88	16,248
'88/'89	18,686

Total amount of budgets assigned to the development of broadcasting service in the period of the 4th 5-year plan is estimated to be in the range of bRp 200 and 430. The amount was evaluated in reference to the past budgetary records, 0.4 to 0.8% of the total State budget. This is equivalent to 7.0 to 14 billion in Japanese Yen.

(2) Expectable development investment size

As described above, from the viewpoint of Indonesian economic strength and fiscal policy to date, the size of development budget to be established in the 4th 5-year plan is expected to be in the range of bRp 300 to 450 judging from the ratio to GDP and in the range of bRp 220 to 430 judging from the government budgetary records.

In consideration of the above analytical results the investment amount which can be expected satisfactorily for the 4th 5-year plan is estimated to be bRp 300 to 500 at the nominal value.

Main sources of funds are expected to be:

- o Government development budget and Annual Budget
- o Foreign Loan
- o Project Aid

However, the remaining projects to be implemented in the 3rd 5-year plan are assumed to be separated from this plan and to be completed within a few years using the funds prescribed in the 3rd 5-year plan.

1-3-3 Fund Procurement Plan

The facility investment and operating fund which the Ministry of Information requires through 1984/85 - 1988/89 is summarized as follows.

The detail are given in Table 6-1-11, 6-1-12 and 6-1-13.

Programming of the Government development budget allocated to projects in the past is not the same manner every year depending on the objective of development and size of budget. For the procurement of fund required for system development which was formulated in this five-year plan, loan from foreign countries was assumed, in addition to the Government development funds.

Of the total funds required, it is assumed that 85% be appropriated on loan (foreign currency) and 15% be allocated from State development fund. On the whole, the necessary fund is considered to be appropriated from foreign loan, internal fund and Government fund as shown in Table 6-1-10.

(1) Foreign loan equivalent to bRp 224 will be procured and allocated for purchase of imported equipment and materials.

(2) The Ministry of Information itself has no accumulation of equity. However, with regards to the operation of fund allocated to the operating entity, the Ministry of Information, the reinvestment portion to be required for system maintenance and programme aid are appropriated here in the budget as internal fund .The total for the 4th 5-year plan will be bRp 264.00. (Refer to Table 6-1-13.)

Table 6-1-10 says that the development fund from Government treasury which is regarded to be required for this plan amounts to bRp 40.00.

The equipment, materials and labour service for the development plan which can be procured by local currency are in principle, to be appropriated from the Government development funds.

(3) In case where a part of goods and materials assumed to be imported by the foreign loan is covered by locally produced goods, necessary development fund from National Treasury increase further more than bRp 40.00.

1-3-4 Financial Impact

Outline of the fund procurement plan described in item 1-3-3, was concluded on the basis of distribution of budget in the past of the Indonesian Government which was analysed in item 1-3-1, and the results of financial analysis of investment in Section 1-1-2, and furthermore on the analysis of financial tables projected.

The results in relation to procurement of fund and application of fund for the 4th-5-year plan are as follows.

	'84/'85	'85/'86	'86/'87	'87/'88	'88/'89
Net operating revenue	-6.1	6.4	8.7	1.7	-17.8
Operating ratio	1.07	1.06	0.94	0.99	1.10
Rate of Return ROI(%)	-1.9	-6.5	1.9	-1.1	-10.3
Debt/Equity Ratio	91/9	88/12	86/14	84/16	79/21
Debt service coverage with Government Budget	-2.1	1.6	1.7	1.7	1.7

Table 6-1-8

Calculation of Net Operating Revenue

(Unit BRP)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total	
<u>Revenue</u>	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	29.58
Operating Revenues	66.00	80.09	95.19	107.35	123.18	142.82	166.21	190.38	219.80	253.76	289.92	326.07	363.72	387.83	405.97	417.31	428.65	4065.24	
Salvage Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104.60	104.60
Revenue Total	67.74	81.83	96.93	109.15	124.93	144.56	167.95	192.12	221.54	255.50	291.66	327.81	365.46	389.57	407.71	419.05	430.39	4093.9	
<u>Expenditure</u>																			
Construction Cost	26.60	33.10	71.50	61.8	50.30	-	34.00	76.00	89.00	15.00	14.00	30.00	24.00	71.00	24.00	23.00	14.00	657.30	
Operating Expenses & Working Capital	72.20	75.20	78.20	81.20	85.90	85.90	85.90	85.90	85.90	85.90	85.90	85.90	85.90	85.90	85.90	85.90	85.90	1423.50	
Total Expenditure	98.80	108.3	149.70	143.00	136.60	85.90	119.90	161.90	174.90	100.90	99.90	115.90	109.90	156.90	109.90	104.90	99.90	2080.80	
Net Revenue	-31.10	-26.50	-52.80	-33.90	-11.30	58.70	48.10	30.20	46.60	154.60	191.80	211.90	255.60	232.70	297.80	310.20	340.50	2013.1	

B/C RATIO 1.34

Fig. 6-1-12

Financial Plan for REPELITA IV
1984 ~ 1988

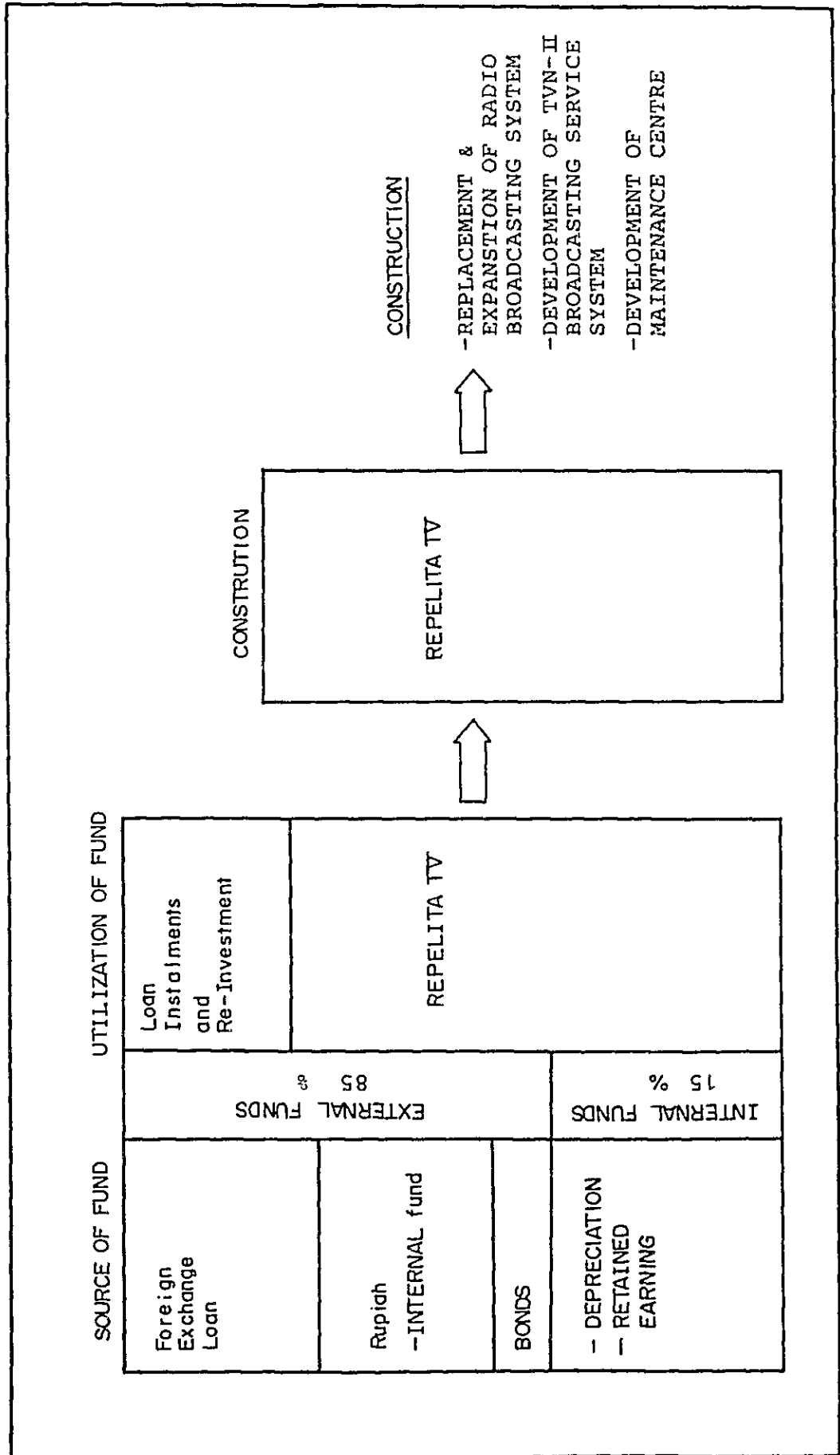


Table 6-1-9

Broadcasting Sector Investment in DEPPEN

PERITA I - IV

(Unit : bRp)

Description	L.C.	F.C.	Total
PELITA I			
1. Television Broadcasting			2.3
2. Radio Broadcasting			1.3
PELITA I Total			3.6
PELITA II			
1. Television Broadcasting			
Government Budget	15.4	-	15.4
Foreign Loan	-	30.5	30.5
SubTotal	15.4	30.5	45.9
2. Radio Broadcasting			
Government Budget	11.0	-	11.0
Foreign Loan	-	18.7	18.7
SubTotal	11.0	18.7	29.7
PELITA II Total	26.4	49.2	75.6
PELITA III			
1. Television Broadcasting			
Government Budget	26.1	-	26.1
Foreign Loan	-	69.9	69.9
SubTotal	26.1	69.9	96.0
2. Radio Broadcasting			
Government Budget	29.1	-	29.1
Freign Loan	-	2.3	2.3
SubTotal	29.1	2.3	31.4
PELITA III Total	55.2	72.2	127.4
PELITA IV			
1. Television Broadcasting			
Government Budget	9.6	-	9.6
Foreign Loan	-	97.5	97.5
SubTotal	9.6	97.5	107.1
2. Radio Broadcasting			
Government Budget	9.6	-	9.6
Foreign Loan	-	126.5	126.5
SubTotal	9.6	126.5	136.1
PELITA IV Total	19.2	224.0	243.2

Table 6-1-10

The 4th 5-year Financial Plan

DEBT/EQUITY: 85 / 15

(84/85 - 88/89) .

(Unit : bRp)

REPELITA IV	Foreign Currency	Local Currency	Total
Source of Fund	224.00	40.00	264.00
<u>Debt</u>			
1. Foreign Loan			
Construction	197.90	-	197.90
Reinvestment	26.10	-	26.10
Debt Sub-Total	224.00	-	224.00
<u>Equity</u>			
1. Internal Fund	-	6.22	6.22
2. Development Fund	-	33.78	33.78
Equity Sub-Total	-	40.00	40.00

Investment Plan

(Unit : bRp)

Description	84/85		85/86		86/87		87/88		88/89		Total	
	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign
Radio Broadcasting Facilities	-	-	-	-	-	-	-	-	-	-	-	-
MH & SH Transmitting Facilities	-	3.43	-	3.33	-	4.44	-	8.64	-	2.06	-	21.90
FM Transmitting Facilities-	-	4.62	-	2.64	-	2.95	-	2.49	-	3.97	-	16.68
Programme Production Facilities	-	8.00	-	8.70	-	21.31	-	18.19	-	14.06	-	70.26
Maintenance Facilities	-	-	-	0.94	-	-	-	0.43	-	0.53	-	1.90
Civil Work	0.72	-	1.03	-	2.37	-	2.18	-	1.99	-	8.3	-
Consultancy	0.03	0.80	0.05	0.78	0.11	1.43	0.10	1.49	0.09	1.03	0.38	5.54
Contingency	0.08	1.13	0.12	1.40	0.28	3.00	0.25	2.58	0.23	2.08	0.97	10.18
Sub Total	0.84	17.98	1.20	17.80	2.75	33.13	2.54	33.82	2.31	23.73	9.64	126.6
Television Broadcasting Facilities	-	-	-	-	-	-	-	-	-	-	-	-
Transmitting Facilities	-	3.19	-	3.24	-	5.85	-	5.28	-	5.40	-	22.96
Programme Production Facilities	-	2.33	-	5.86	-	22.59	-	13.20	-	12.44	-	56.42
Maintenance Facilities	-	-	-	1.89	-	-	-	0.85	-	1.05	-	3.79
Civil Work	0.72	-	1.03	-	2.37	-	2.18	-	1.99	-	8.30	-
Consultancy	0.03	0.28	0.05	0.55	0.11	1.42	0.10	0.97	0.09	0.94	0.37	4.16
Contingency	0.08	1.13	0.12	1.40	0.27	3.00	0.25	2.58	0.23	2.08	0.96	10.18
Sub Total	0.83	6.92	1.20	12.94	2.75	32.87	2.54	22.87	2.31	21.91	9.63	97.51
Grand Total	1.67	24.90	2.40	30.74	5.50	66.00	5.07	56.69	4.62	45.64	19.26	224.01
Annual Total Investment by Rupiahcurrency	26.57		33.14		71.50		61.76		50.26		243.27	

Table 6-1-12

Operating Revenues

(Unit : bRp)

Description	84/85	85/86	86/87	87/88	88/89	Total
Television Broadcasting Sector B & W	25.7	25.7	30.0	30.9	30.9	30.9
Colour	40.3	54.4	84.4	98.0	117.0	117.0
Total	66.0	80.1	114.4	128.9	147.9	147.9
Other Revenue	-	-	-	-	-	-
Total Revenue	66.0	80.1	114.4	128.9	147.9	147.9
Radio Broadcasting Sector						
License Fee Revenue	25.04	25.40	30.24	31.05	31.65	31.65
Commercial Broadcasting Revenue	1.74	2.02	2.31	2.60	2.89	2.89
Other Revenue	-	-	-	-	-	-
Total Revenue	26.78	27.42	32.55	33.65	34.54	34.54
Radio/Television Grand Total	92.78	107.52	146.95	162.55	182.44	692.24

Table 6-1-13

Operating Expenses

(Unit : bRp)

	84/85	85/86	86/87	87/88	88/89	Total
Radio Broadcasting Sector						
Personnel Expenses	6.49	8.25	10.40	13.00	16.80	54.93
Material Expenses	5.50	6.99	8.81	11.02	14.24	46.57
Maintenance Expenses	1.97	2.51	3.16	3.96	5.11	16.72
Travell Expenses	0.14	0.18	0.23	0.28	0.37	1.19
Sub-Total	14.10	17.93	22.60	28.26	36.52	119.41
Television Broadcasting Sector						
Broadcasting Expenses	20.89	24.16	28.43	33.52	41.42	148.43
General Administrative Expenses	17.91	20.71	24.37	28.73	35.50	127.22
Material Expenses	4.78	5.52	6.50	7.66	9.46	33.92
Technical Expenses	11.94	13.81	16.25	19.16	23.67	84.82
Maintenance Expenses	2.99	3.45	4.06	4.79	5.92	21.21
Additional Investment	1.19	1.38	1.62	1.92	2.37	8.48
Sub-Total	59.70	69.03	81.23	95.78	118.34	424.08
Grand Total	73.80	86.96	103.83	124.04	154.86	543.49

Table 6-1-14

Income Loss Statement

Description	(Unit : bRp)				
	84/85	85/86	86/87	87/88	88/89
<u>Operating Revenues</u>					
License Fee Revenue	25.04	25.40	30.24	31.24	31.05
Radio Television	71.05	80.10	114.40	128.90	147.90
Other Revenue (Commercial Radio)	1.74	2.02	2.31	2.60	2.89
Total Operating Revenues	97.83	107.52	146.95	162.55	182.44
<u>Operating Expenses</u>					
Operating & Administrative Expenses	14.10	17.93	22.60	28.26	36.52
Radio Television	59.70	69.03	81.23	95.78	118.34
Total	73.80	86.96	103.83	124.04	154.86
Depreciation	0	1.58	4.14	8.36	13.75
Other Expenses	25.04	25.40	30.24	31.05	31.65
Total Operating Expenses	98.84	113.94	138.21	160.90	200.26
<u>Financial Expenses</u>					
Interest Payment	1.88	4.04	8.68	12.27	14.70
Handling Charges and Others	0.12	0.15	0.33	0.28	0.23
Total Financial Expenses	2.00	4.19	9.01	12.55	14.93
Total Expenses	100.84	118.13	147.22	173.45	215.19
Retained Earnings	-3.01	-10.61	-0.27	-10.90	032.75

Table 6-1-15

Funds Source Application

(Unit BRP)

Description	84/85	85/86	86/87	87/88	88/89
<u>Internal Funds</u>					
Net Surplus	-3.01	-10.61	-0.27	-10.90	-32.75
Depreciation	-	1.58	4.14	8.36	13.75
Other Fund (Annual Budget)	3.77	10.99	3.42	9.11	27.70
Total Internal Funds	0.76	1.96	7.29	6.57	8.70
<u>Utilization of Funds</u>					
Repayment	-	1.25	2.79	6.09	8.93
Reinvestment	6.32	5.96	5.92	4.58	3.32
Total Repayment & Reinvestment	6.32	7.21	8.71	10.67	12.25
Remaining Fund for Construction	-5.56	05.25	-1.42	-4.10	-3.55
Construction	20.25	27.18	65.58	57.18	46.94
Necessary Fund for Construction	25.81	32.43	67.00	61.28	50.49
<u>Funds assumed to be acquired</u>					
Foreign Loan	24.90	30.74	66.00	56.69	45.64
Government Development Fund	1.67	3.40	6.50	10.00	12.21
Other Fund	-	-	-	-	-
Total Funds Assumed to be acquired	26.57	34.14	72.50	66.69	57.85
Excess (Shortage) of Fund	0.76	1.71	5.50	5.41	7.36
Initial Balance	0.76	0.76	2.47	7.97	13.38
End Balance	0.76	2.47	7.97	13.38	20.74

Table 6-1-16

Estimation of Operating Assets (Unit : bRp)

<u>Accounting Item</u>	83/84	84/85	85/86	86/87	87/88	88/89
<u>Assets</u>						
<u>Fixed Assets</u>						
Gross Plant	137.1	121.4	106.9	92.6	78.4	64.5
Existing Construction	-	16.6	42.6	91.3	139.6	172.4
Depreciation	14.6	15.7	16.1	18.4	20.0	27.8
Net Fixed Assets in Operation	122.5	122.3	133.4	165.5	198.0	209.1
Work in Progress	8.4	6.5	8.0	17.1	14.7	11.9
Other Assets	6.1	6.1	6.7	8.3	9.9	10.4
Total Fixed Assets	137.0	134.9	148.1	190.9	222.6	231.4
<u>Current Assets</u>						
Account Receivable	5.5	5.4	5.9	7.6	8.9	9.3
Others	21.9	21.6	23.7	30.6	35.6	37.0
Total Current Assets	27.4	27.0	29.6	38.2	44.5	46.3
Total Assets	164.4	161.9	177.7	229.1	267.1	277.7

SUMMARY AND RECOMMENDATION

CHAPTER 2 SOCIAL AND ECONOMIC BENEFIT

CHAPTER 2 SOCIAL AND ECONOMIC BENEFIT IN INDONESIA

2 - 1 Social Impact

In general, social benefit which the peoples in the developing countries enjoy by utilizing broadcasting service is ought to be much greater than the size of construction cost for broadcasting system development.

In Indonesia, the broadcasting service is effective for consolidation of islands' will and unity.

In Indonesia, the broadcasting service is especially effective for promoting national unity. Therefore, utilization of Radio and Television broadcasting service to be popularized all over the country has more important role than in any other Asian countries.

In spite of its importance, however, the scale of investment oriented to broadcasting system development has not been growing well, as the past budgetary records indicate.

If the importance of Public Broadcasting Service Sector is much more recognized from the long-term viewpoint of Indonesian socio-economic development, the development budget allocated to the investment for broadcasting system development is to be expected to increase in the 4th 5-year plan.

2 - 2 Economic Analysis

Contribution of the broadcasting service to the economic growth in Indonesia was discussed from the viewpoint of economic cost benefit analysis of the project.

2-2-1 Economic Benefit

(1) General

Economic benefit is produced by utilization of the broadcasting system partially replaced and newly expanded by the project implementation. The economic benefit of the project is defined as direct or indirect contribution of system operation service to stimulation of the investment activity in the country.

Following 3 kinds of economic impacts are considered as economic benefits.

- 1) Consumer surplus based on the willingness to pay for the broadcasting receiver sets.
- 2) Economic effect exerted to the viewers to which programme broadcasting service is distributed.
- 3) User's surplus based on the willingness to pay for the broadcast programmes sponsored by users.

These benefits were analysed quantitatively with the following process.

(2) Measurement of Consumer surplus

Consumer surplus based on the willingness to pay for Colour TV receiver sets, for example is estimated as follows.

Shadow area surrounded between straight line to show a receiver's market price level and a demand curve for the receiver set, is shown in the figure.

Surface of the shadow area is equivalent to the consumer surplus for colour TV receiver sets. Consumer surplus for each kind of a broadcast receiver set was estimated and shown in the Fig. 6-2-1.

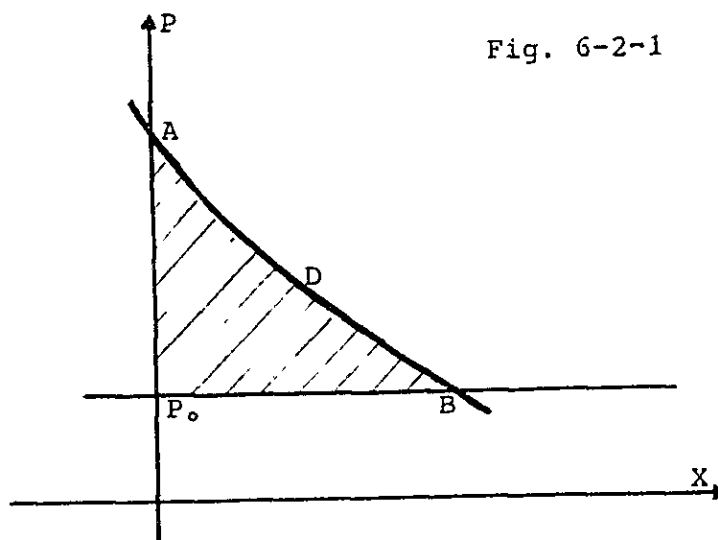


Fig. 6-2-1

Classification of broadcasting receiver sets	Consumer surplus per receiver set (Unit : Rp)
1. Colour TV receiver	250,000
2. Black & White receiver	123,000
3. Radio receiver	9,900
4. Radio cassette	33,000

(3) Forecast of broadcast receiver sets sold

1) TV receiver sets sold

(Unit : '000)

<u>Period</u>	<u>B&W</u>	<u>Colour</u>	<u>Total</u>
1	350	230	580
2	333	280	613
3	317	340	657
4	302	420	722
5	288	510	798
6	274	630	904
7	261	760	1,021
8	249	920	1.169
9	237	1,240	1,477
10	226	1,480	1,706
11	200	1,698	1,898
12	180	1,820	2,000
13	140	1,930	2,070
14	100	2,000	2,100
15	50	2,080	2,130
16	0	2,150	2,150
17	0	2,200	2,200

2) Radio receiver sets sold

(Unit : '000)

<u>Period</u>	<u>Radio</u>	<u>Radio Cassette</u>	<u>Total</u>
1	1,200	630	1,830
2	1,250	660	1,910
3	1,310	690	2,000
4	1,380	720	2,100
5	1,450	780	2,230
6	1,520	830	2,350
7	1,600	890	2,490
8	1,680	970	2,650
9	1,760	1,050	2,810
10	1,850	1,150	3,000
11	1,940	1,250	3,190
12	2,040	1,350	3,390
13	2,140	1,450	3,590
14	2,240	1,550	3,790
15	2,360	1,650	4,010
16	2,470	1,740	4,210
17	2,600	1,830	4,430

Annual consumer surplus is equivalent to consumer surplus per set multiplied by number of annual receiver sets sold.

Refer to Table 6-2-1.

(4) Economic effect derived from programme broadcasting infiltrated into the whole country.

Economic effect on the programme broadcast is estimated based on the willingness to pay for broadcast programmes to be sponsored.

1) Necessary charge to be paid by the programme sponsors for programme supplies to the viewers.

In case of Radio broadcast Average Rp 100 / second

In case of TV broadcast Average kRp 14.55 / second

2) Programme sponsor surplus produced by sponsoring the broadcast programmes is introduced into economic benefits.

From 1) and 2), willingness to pay for the programmes sponsored is estimated.

It can be said that the willingness to pay total, mentioned over (2) to (4), is equivalent to the economic worthiness which is generated by programme broadcasting service.

These quantitative benefits should be duly multiplied by SCF (Standard Conversion Factor) to be reevaluated at the border price basis.

2-2-2 Economic Cost

Financial costs necessary for the project are System construction cost, System operation cost and so on. All of them are converted to economic costs by use of shadow prices from the view of contribution to the national investment activities or from the view of correction of income disparity.

Following shows each shadow conversion factor and its value estimated.

1) Standard Conversion Factor (SCF)	: 0.98
2) Shadow Wage Rate (SWR)	: 0.30
3) Consumption Conversion Factor	: 0.95
4) Average Propensity to Consume (APC)	: 0.90
5) Investment Conversion Factor (ICF)	: 0.90

Financial costs, such as construction and operation costs are converted to economic costs by being multiplied by shadow prices.

Economic costs converted are considered to be substantial economic cost burdening the national economic growth.

(Refer to Table 6-2-1)

2-2-3 Review of Economic Analysis

Review of Economic feasibility is introduced as follows in terms of Economic Cost Benefit Estimates given in Table 6-2-1.

1) Present Value of Net Economic Benefit	: bRp 2,873
2) Economic Benefit Cost Ratio	: 5.0
(Social Accounting Discount Rate	: 15%)

Economic B/C Ratio (5.0) is expected to be 4 times as much as financial ratio (1.34).

Requirement of the national peoples for the broadcasting development is much enhanced today.

This was analysed in terms of estimation of consumer and user surplus based on the willingness to pay for the system utilization. Thus, economic effect given to the industrial society and to the consumers by the development of broadcasting was estimated to be high in the analytical aspect.

Today, contribution of the broadcasting to the national development in Indonesia as the quasi-industrialized country is highly related to promotion of not only social instruction for the national peoples but also the economic activities.

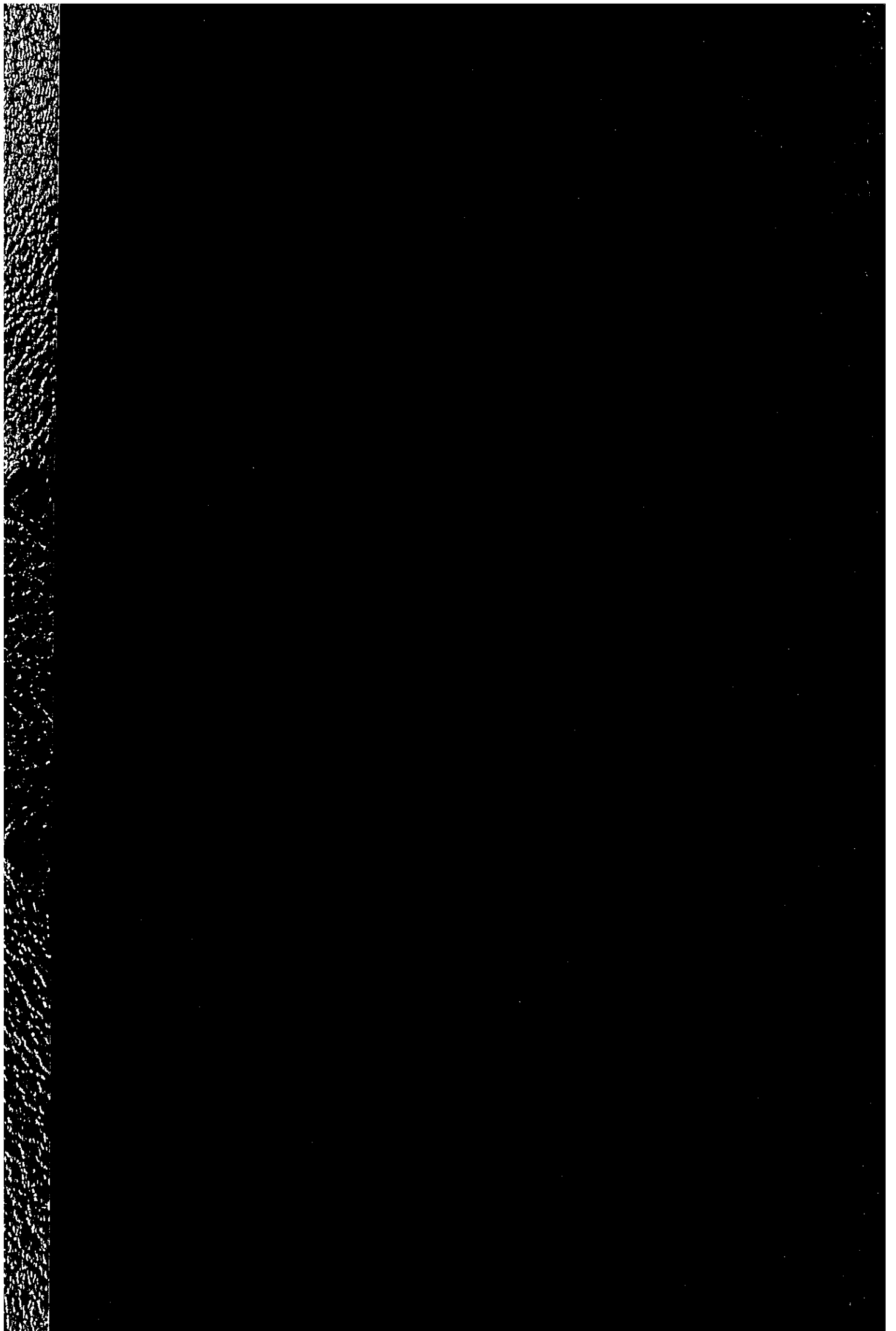
Table 6-2-1

Economic Cost Benefit

(Unit : bRp)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total	
(1) Consumer Surplus for Broadcast Receiver Set																			
- TV Receiver Set	98.6	108.0	121.5	139.3	159.6	187.4	217.7	255.4	332.4	389.8	440.1	467.6	489.7	502.1	515.7	526.8	539.0	5491.5	
- Radio Receiver Set	32.0	33.5	35.1	36.8	39.2	41.6	44.3	47.6	51.1	55.2	59.3	63.5	67.6	71.9	76.3	80.3	84.4	919.7	
Total	130.6	142.3	156.6	176.0	198.8	228.9	262.0	303.0	383.5	445.0	499.4	531.1	557.3	574.0	592.0	607.1	623.4	6411	
(2) Sponsor Surplus for Program Broadcasting																			
- TV Broadcast Program	80.1	90.2	100.2	110.2	120.1	120.1	120.1	120.1	120.1	120.1	120.1	120.1	120.1	120.1	120.1	120.1	120.1	1042	
- Radio Broadcast Program	1.3	1.4	1.4	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	26.4	
Total	81.3	91.6	101.5	111.6	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	1068	
(3) User's Surplus for Broadcasting System - (1) + (2)	211.9	233.6	258.1	287.6	320.5	350.6	383.7	424.7	505.2	566.7	621.1	652.8	679.0	695.7	713.7	728.8	745.1	8379	
(4) Economic Effect for Broadcast Program Distribution - TV	160.1	180.2	200.2	220.2	240.2	240.2	240.2	240.2	240.2	240.2	240.2	240.2	240.2	240.2	240.2	240.2	240.2	1883	
- Radio	2.5	2.6	2.7	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	40.7	
(5) Total Benefit - (3)+(4)	314.6	416.7	461.1	510.8	563.8	593.9	626.9	668.0	748.4	810	864.4	896.0	922.3	938.9	957	972	988.1	12112	
(6) System Construction Cost	26.3	31.1	63.7	51.7	39.8	31.7	25.5	22.1	11.2	15.1	41.6	29.5	89.6	24.1	22.5	15.1	16.1	661	
(7) System Operation Cost with Working Capital	68.7	71.5	74.2	77.0	81.5	81.5	81.5	81.5	81.5	81.5	81.5	81.5	81.5	81.5	81.5	81.5	81.5	1350	
(8) Total Economic Cost	95.0	102.6	137.9	128.7	121.3	115.2	107.0	103.8	92.7	96.6	125.1	111.0	171.1	105.6	104.0	96.6	97.6	2011	
(9) Net Benefit	279.6	314.1	323.2	382.1	442.5	478.7	469.9	514.2	655.7	713.4	739.3	785.0	751.2	833.3	853.0	875.4	890.7	10101	

B/C RATIO 5.0



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