

Chapter 10

Port Administration and Operation

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

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CHAPTER 10 PORT ADMINISTRATION AND OPERATION

10-1 Administration System of the Port of Balikpapan.

The Port of Balikpapan is a national port, yet, in principle, its operation should be made with the same objectives as the other commercial enterprises. That is, to insure maximum effects of the investment and economical use of the port, improvement and reinforcement of the port administration system and efficiency and promptness in the control of incoming and outgoing vessels are required, while the services which the port administrator offers (such as, quay service, shed and warehouse service, water and electricity service, and land and equipment service etc.) must be effective and economical.

For the administrator of this port, the important sources of revenue may be classified largely into the pilotage, towage, port due, mooring fee and the port facilities due (storage fee, wharfage, direct transport, etc.).

Presently, however, because of the shortage of manpower and insufficiency of required equipment, revenues that are procurable are often missed. In 1985, the foregoing sources of revenue are still the important sources of revenue. It is, therefore, required to complete the organization system and provide the necessary equipment so that said revenues are secured definitely.

In such case, it is also an important task to effectuate and intensify the work of collecting the port fees and charges.

On the other hand, with development and expansion of the hinterland area in East Kalimantan, there will be increasing number of ocean-going vessels and transil cargo laden ships coming in and going out of the port, and it is desirable to provide better services to such vessels.

Therefore, the following will be described the administration system corresponding to the increasing cargo volume of 1985 and the newly installed port facilities from the points of view of increasing the revenue and improving the services.

10-1-1 In general, the port organization is divided into the following three departments:

- (1) Administrative Department – General administrative staff responsible for personnel, finance, purchasing, public relations and law;
- (2) Staff Department – Staff responsible for engineering, maintenance and traffic management; and
- (3) Operating Department – Terminal operation, warehouse operation, land transportation, berthing control, fire and security forces, etc.

On the other hand, the administrative functions particularly required of the administrator of this port in and after 1980 are the following five points:

- (1) Increasing the personnel of the Operating Department with emphasis placed on securing the revenue and improvement and expansion of the services (Increase of mainly the pilot, boat crew and equipment maintenance personnel);
- (2) Introduction and execution of the 24 hours service for the pilotage and relevant services (mainly towage);
- (3) Provision of necessary equipment and increase of the personnel for the foregoing;
- (4) Higher efficiency of Badan Usaha Karya (UKA) cargo handling service to meet the increasing volume of cargos to be handled, and thus establishment of a system and increase of the personnel for direction and supervision of the handling service, and provision of necessary equipment; and
- (5) Increase of the personnel concerned with finance, and classification of the scope of administration (cost administration corresponding to the system of port charges, strengthening of the budgetary control, and intensification of the recovery of fees and charges with increasing port revenue and of the accounting administration with increasing volume of the services.)

The number of personnel of the Port of Balikpapan in 1985 satisfying the foregoing five points is shown in the Table 10-1 of "Personnel Staff in 1985." Details will be stated in the following paragraph.

Table 10-1: Personnel Staff in 1985

(An administrator is not included in this table)

| Present Organization | Present employees (as of Feb. 1979) | Operation items | Number of Personnel in 1985 | Remarks |
|----------------------|-------------------------------------|--------------------------------|-----------------------------|--|
| Secretariat | 13 | Administrative Dept. | 2 | |
| | | • General | 8 | |
| | | • Personnel | 5 | |
| Financial Division | 15 | • Public Relations & Statistic | 2 | |
| | | • Law | 1 | |
| | | • Purchasing | 2 | |
| | | • Finance | 25 | |
| | 19 (tot. 34) | | (tot. 45) | |
| Technical Division | 28 | Staff Dept. | 1 | |
| | | • Chief | 4 | |
| | | • Engineering | 18 | |
| | | • Maintenance | 6 | |
| | 3 (tot. 22) | • Traffic Management | (tot. 29) | |
| Service Division | 27 | Operating Dept. | 3 | III. Class → II. Class @ 1 |
| | | • Chief | 12 | |
| | | • Kampung Baru | 5 | |
| | | • Panajam | | |
| | | • Foreign terminal | 13 | Included Permit & Rental (10) |
| | | • Domestic terminal | 25 | Foldlifts (16) Mobile cranes (4) Others (5) |
| | 8 | • Land transportation | 2 | |
| | | • Foreign warehouse | 3 | |
| | | • Domestic warehouse | 116 | Pilots (32), Tug boats (60), Other boat crews (24) |
| | 47 | • Pilot & Tug | 12 | |
| | | • Communication | 35 | |
| | 4 (tot. 84) | • Fire & Security | (tot. 228) | |
| Pilot Division | 57 | | | |
| Grand Total | 140 | | 302 | |

10-1-2 Administrative Personnel, Main Equipment and Working Hours.

- 1) The personnel staff of 1985 shown in Table 10-1 has the staff for ADPEL BALKPAPAN promoted from Class III to Class II and has also the functions of the Unit Terminal, a separate organization, absorbed in the organization of this Administrator to eliminate wastefulness of the dual administration. On the other hand, both Administrative and Staff Departments are so organized as to enhance efficiency with as small forces as practicable, but the Financial Division has the number of personnel increased to comply with the system stated in the preceding paragraph.

Here, it should be noted that no consideration was made of the system for prevention of the pollution occurring from oil (including provision of skimmer boats and completion of necessary materials and equipment as well as personnel) which would be generated in relation to PERTAMINA (although this should have been included in the scope of administration of the Port Administrator), as it was thought from the viewpoint of the beneficiary benefit that such should be provided by PERTAMINA.

Thus, in Chapter 12 "financial analysis", the revenue of the fee for use of the waters area for the oil jetty owned and managed by PERTAMINA (the Port is not collecting the fee presently) is excluded.

- 2) In 1985, the foreign and domestic trade wharves are clearly distinguished from each other for use. At this point, the general cargos on the public wharf is 611,000 tons or nearly about 5 times the volume in 1978. With use of the foreign trade wharf in and after 1984, the volume of transit cargos will increase, and the cargo flow at the Terminal will become more complex and have the volume increased (with generation of the flow of transit cargos from the domestic trade wharf to the foreign trade wharf and that in a reverse direction). Enhancing the efficiency of cargo handling at the Terminal is particularly required from the point of view of improving the through-put (volume of cargo handled per meter of the wharf).

It is thus required to increase the personnel of the Operating Department, and this increase includes the reinforcement for the Port Administrator to participate positively in improving the cargo handling efficiency by directing and supervising UKA (Badan Usaha Karya). This reinforcement is made particularly of the staff personnel of Traffic Management in Staff Dept., terminal operators and the operators of the Land Transportation. Considering the type of vessels and cargo, the terminal operators are classed in four divisions of Foreign Trade Wharf, Domestic Trade Wharf, Panajam and Kampung Baru. Assignment of the handling equipment operator and maintenance operator to the Land Transportation is intended for higher rate of working of the handling materials and machines and smoother operation of the transportation work in the port area of Balikpapan.

Presently, the warehouse and boat crew are for the greater part consisting of temporary workers. Here, the required workers are summed up for the respective facilities and equipment, and they are estimated as regular operators. Yet, the employment of temporary workers is by no means denied. Rather, it is desirable to employ as many temporary workers as practicable from the social position of the port. But, in the financial analysis in Chapter 12, all personnel are handled as regular employees.

- 3) Pilot and Pilot Boat

As proposed by the Port of Balikpapan, the 24 hours service of pilotage is advantageous in that it insures increasing revenue from pilotage for the offerer of the service and shorter time and safer navigation for the beneficiaries of the service. However, it is one-sided to offer the 24 hours service only for the pilotage. Such service must be offered simultaneously for the other related services or, more particularly, tugboat service.

From the point of view of securing the revenue, execution of the 24 hours services permits reduction of the number of tugboats and that of pilot boats to be maintained and, at the same time, effective use of the materials and equipment required. The merits of decreasing financial burden and maintenance cost due to reduction of the number of boats to be purchased are more than counterbalance the increasing personnel expense and fuel cost.

Further, the 24 hours service is advantageous for the beneficiaries of the services, and it is enabled for the vessels to come in and go out of the port at night (navigation aids included in the investment).

When the 24 hours services are placed in practice, they are of 3 shifts of 8 hours labor. But, here, it is not required to assign the pilots simply in 3 equal divisions. It is well presumed that the vessels coming in and going out during daytime are greater in number than those at night so that the pilots assigned to night duty should be kept at a considerably lower level than

those during the daytime. Accordingly, in the following description, it is assumed that the 24 hours system is applied to the pilotage and tugboat services. The number of pilots and that of pilot boats required in 1985 under the 24 hours system are obtainable by the formula

$$\text{Required number of pilots a year} = \frac{(\text{Number of incoming and outgoing vessels a year}) \times (\text{Hours of pilot service per vessel})}{\text{Actual working hours per pilot per year.}}$$

$$\text{Required number of pilot boats a year} = \frac{(\text{Number of incoming and outgoing vessels a year}) \times (\text{Hours of pilot service per vessel})}{\text{Actual working hours per vessel per year.}}$$

Mean hours of requirement of piloting per vessel (from Annual report)

Hours required at berthing and departing:

Average 2 hours.

Hours required for entry into and exit from Area A:

Average 4 hours.

Hours required for entry into and exit from Area B:

Average 8 hours.

Number of calling vessels with pilotage in 1985:

Foreign trade — 830 vessels.

Domestic trade — 1,910 vessels.

From the foregoing, annual pilotage hours are obtained as

$$[830 \times (2h + 8h)] + [1,910 \times (2h + 4h)] = 19,760 \text{ hours/year.}$$

$$19,760h \div (300 \text{ days} \times 8h \times 0.252^*) = 32$$

(*Working rate per pilot: Estimated from the number of pilots at 15 persons and the number of vessels having the tugboat service in 1977)

Thus, at least 32 pilots are required.

Required number of boats: $19,760h \div (365 \text{ days} \times 24h \times 0.65) = 4$ (As of February 1979, 3 boats maintained).

Required boat crew: $4 \text{ boats} \times 2 \text{ crew} \times 3 \text{ shifts} = 24 \text{ crew.}$

For the foregoing, minimum 2 persons are required for repair and maintenance of the materials and equipment required for the service.

4) Tugboat Service

With a tugboat of 1700HP added in 1977 and that of 850HP in 1978, there are total 3 tugboats, 1700HP, 1500HP and 850HP, engaged in the towing service as of February 1979. In 1977 and 1978, the service was by no means satisfactory, but with assignment of 3 tugboats, the service system was established.

The number of tugboats required in 1985 was calculated as below.

Number of Vessels Requiring Tugboat Service in 1985

| (Kinds of vessel) | (Number of calling vessels) | (Average length of vessel) | Required number of Tugboat specified by Port Tariff |
|-------------------------|-----------------------------|----------------------------|---|
| General for foreign | 410 | 110M | 2 |
| RLS for Singapore route | 90 | 80M | 1 |
| Log for foreign | 250 | 120M | 2 |
| Tanker for foreign | 80 | 210M | 3 |
| Inter-insular RLS | 620 | 65M | 1 |
| Log for domestic | 190 | 95M | 1 |
| Tanker for domestic | 1040 | 115M | 2 |
| General for domestic | 60 | 95M | 1 |

Mean Hours of Towing (per Vessel)

| Incoming | Outgoing | Shift | Total |
|----------|----------|-------|-------|
| 2.0h | 2.0h | 0.02h | 4.02h |

(Data Source: Laporan Tahunan Kegiatan Penundaan in 1978)

With the foregoing as a base, the number of tugboats required in 1985 under the 24 hours service is calculated as below.

4,600 (Required number of tugboats specified in Port Tariff) x 4.02 = 18,492 hours/year.

(220 days (Standard days of operation per tugboat per year) x 24h x 0.68* (Working rate) = 3,590 hours/year.

(* According to Laporan Tahunan Kegiatan Penundaan, monthly mean daily working rate is 76%. But, it was adjusted with the working rate in the night service assumed at a lower rate of 50%.)

$18,492 \div 3,590 = 5$ tugboats (minimum number).

Thus, the number of tugboats to be maintained in 1985 is 5. Then, in consideration of the horsepower values and number of the tugboats currently maintained and the average ship form of the calling vessels, it is required to provide newly at least 2 tugboats of about 500HP. In such case, the boat crew becomes to be 60 persons.

5 Vessels x 4 Persons x 3 Shift = 60.

5) Cargo Handling Equipment

Currently, 5 forklifts and 3 mobile cranes are maintained, but their use is hardly said to be satisfactory. Causes may be sought in the cargo loading rate per vessel of incoming and outgoing ships, absolute volume, package style and types of incoming and outgoing ships (number of hatches, etc.) and further in the relationship between the handling system of UKA and the shipper (or ship agent). However, as a conclusion, it may be said that the cause lies in too small volume of cargo against the dock workers of UKA (Badan Usaha Karya) composed in units and the cargo handling assumed by UKA having a neck in stevedoring. (With respect to the improvement of cargo handling, it is described in 10-2' "Cargo Operation".

Use of Handling Equipment in 1977 (from Annual Report)

| <u>Cargo handling equipment</u> | <u>Mobile crane</u> | <u>Mobile crane in case of 8 hours work</u> | <u>Forklift</u> |
|-------------------------------------|---|---|-----------------|
| In standby (non-active) : | 1 unit | — | 2 units |
| In operation (active) : | 2 units | (per 1 unit) | 3 units |
| Capacity : | 15 Ton | 15 Ton | 2.5 Ton |
| Working hours : | 4,000 h (Including one unit at 1,600 h) | 2,400 h | 7,200 h |
| Actual working hours (used hours) : | 462 h (Including one unit at 181 h) | 281 h | 2,548 h |
| Handling frequency : | 895 times (Including one unit at 181 t.) | 714 times | 14,315 times |
| Processed cargo volume : | 3,125 tons (Including one unit 704 t) | 2,421 tons | 18,660 tons |
| Working rate : | 11% | 11% | 35% |

From the foregoing, the number of forklifts and that of mobile cranes required in 1985 are obtained as below.

(1) Mobile Crane

Handling cargo volume by mobile cranes in 1985:

611,000 tons x 0.025 (Processed cargo volume/1977:

3,125 ÷ Total volume of general cargo/1977: 122,000 tons) = 15,300 tons.

Processing capacity per mobile crane:

2,421 tons/one shift x 2 Shifts = 4,840 tons.

Required number:

15,300 ÷ 4,840 = 3 units.

Operators:

4 Persons (in consideration of the improvement in the working rate per unit and overtime processing).

(2) Forklift

Handling cargo volume by forklift in 1985:

611,000 tons x 0.16 (Processed cargo volume, 1977: 18,660 tons ÷ 122,000 tons) = 98,000.

Processing capacity per unit:

6,220 tons/one shift x 2 Shifts = 12,440 tons.

Required number:

98,000 ÷ 12,440 = 8 units.

Operators:

8 Units x 1 Person x 2 Shifts = 16 Persons.

(3) Two shift system is introduced for the mobile crane and forklift in order to cope with the cargo operation described in the following paragraph.

The two shift system may require an increase of the personnel, but from the aspect of improving the revenue, it is greatly advantageous in that the number of handling machines to be purchased will be decreased, while the working capacity per unit will be increased.

Further, in view of the current low level of equipment rental tariff, it will reduce the financial burden to use as many UKA workers as practicable in the "cargo handling" (carriage of cargos from or to sheds and storages), and "delivery" works and thus process the cargos rather than mere introduction mechanization.

10-1-3 Number of Personnel by Year and Number of Equipment Introduced by Year.

Upon estimation of the number of calling vessels and handling cargo volume in the respective years and in consideration of the capacity of the respective equipment, the time of introducing the machines by year is set as shown below.

Table 10-2: Required Equipment by Year

| Equip. Year | Tug boats | Pilot boats | Forklifts |
|----------------|---|---|--|
| 1983 | 1 vessel introduced (Tot. 4 operating) | — (Tot. 3 operating) | 1 unit introduced (Tot. 6 operating) |
| 1984 | — (Tot. 4 operating) | — (Tot. 3 operating) | — (Tot. 6 operating) |
| 1985 | 1 vessel introduced (Tot. 5 operating) | 1 vessel introduced (Tot. 4 operating) | 2 units introduced (Tot. 8 operating) |

Considering the operating number of main machines by year, the commencement period of the domestic trade wharf now under construction (1980) and the commencement period of new facilities, the number of personnel by year is shown in Table 10-3 "Employees Number by Year."

In this table, the pilotage and tugboat services are assumed to be started from 1981 in consideration

of the estimate of incoming and outgoing vessels. Further, from the handling cargo volume and incoming and outgoing vessels the two shift system for the handling equipment is assumed to be commenced from 1981. The number of personnel of the Operating Department of the Port of Balikpapan is not considered to be sufficient presently. Therefore, it is an urgent requirement to employ a number of personnel in two years of 1980 and 1981.

Table 10-3: Employees Number by Years

| | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|----------------------------------|------------|------------|------------|------------|------------|------------|------------|
| Administrative Department | | | | | | | |
| Chief | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| General | 7 | 7 | 7 | 7 | 7 | 7 | 8 |
| Personnel | 4 | 4 | 4 | 4 | 4 | 4 | 5 |
| Public Relation & Statistic | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Law | 0 | — | — | 1 | 1 | 1 | 1 |
| Purchasing | 0 | — | — | 1 | 1 | 1 | 2 |
| Finance & Accounting | 19 | 20 | 21 | 21 | 21 | 23 | 25 |
| (Tot.) | (22) | (35) | (36) | (38) | (38) | (40) | (45) |
| Staff Department | | | | | | | |
| Chief | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Engineering | 3 | 3 | 3 | 3 | 3 | 3 | 4 |
| Maintenance | 15 | 15 | 15 | 15 | 15 | 18 | 18 |
| Traffic Management | 3 | 3 | 4 | 4 | 4 | 5 | 6 |
| (Tot.) | (22) | (22) | (23) | (23) | (23) | (27) | (29) |
| Operating Department | | | | | | | |
| Chief | 2 | 3 | 3 | 3 | 3 | 3 | 3 |
| Panajam | 4 | 4 | 4 | 4 | 4 | 4 | 5 |
| Kampung Baruh | 10 | 10 | 10 | 10 | 10 | 11 | 12 |
| Fire & Security Forces | 9 | 25 | 25 | 25 | 25 | 30 | 35 |
| Domestic Warehouse | 0 | 2 | 3 | 3 | 3 | 3 | 3 |
| Foreign Warehouse | 0 | — | — | — | 1 | 1 | 2 |
| Land Transportation | 8 | 10 | 18 | 18 | 20 | 20 | 25 |
| Domestic Terminal | 0 | 11 | 12 | 12 | 12 | 13 | 13 |
| Foreign Terminal | 0 | — | — | — | — | 1 | 2 |
| Communication | 7 | 9 | 10 | 10 | 10 | 12 | 12 |
| Pilot & Tug | 41 | 60 | 84 | 84 | 91 | 96 | 116 |
| (Tot.) | (84) | (134) | (169) | (169) | (182) | (194) | (228) |
| Grand Total | 140 | 191 | 228 | 230 | 243 | 261 | 302 |

10-2 Cargo Operation

Following the start of use of the domestic trade concrete wharf in 1980, the foreign trade concrete wharf is placed in use from 1984. In 1985, the volume of handling general cargos at the public wharfs is 611,000 tons, nearly five times that in 1978. Further, with calling of the ocean-going vessels, there will be an increasing volume of transit cargo, and the cargo flow at the terminal will become more complex than it is at present. Then, efficiency of the cargo operation mainly around the foreign trade wharf is the most important task for improvement of the services of the Port.

Introduction of the two shift system for the cargo operation to cope with the increasing cargo volume and the corresponding system on the side of the Port Administrator have been described in "10-1 Administration System." While the cargo operation is carried out by UKA (Badan Usaha Karya) without participation of ADPEL Balikpapan presently, positive guidance and supervision of ADPEL Balikpapan to the UKA cargo operation are intended.

In this paragraph will be described the improvement of efficiency of the cargo operation by improving the cargo handling services by UKA workers rather than introduction of handling machines and how ADPEL Balikpapan should participate in the cargo operation.

10-2-1 The operations at the general cargo wharf may be classified into the following two:

- (1) Movement of cargo to or from vessel or truck; and
- (2) Transit to or from storage at the wharf.

Further, the cargo handling capacity is governed mainly by the following factors:

- (1) Productivity of worker;
- (2) Number of personnel forming gang;
- (3) Efficiency of stevedoring;
- (4) Cargo types - Package style, size, lot weight, etc.;
- (5) Forms of incoming and outgoing ships - Hatch, size, etc.;
- (6) Working space at wharf; and
- (7) Cargo handling equipment.

Among these, the productivity of worker, number of personnel forming the gang and stevedoring efficiency are the factors affecting the cargo handling capacity at the wharf to the highest degree.

10-2-2 As of February 1979, UKA has 912 workers (registered)

They form teams of about 18 units, 1 unit comprising 3 gangs and 1 gang being formed by 15 workers.

Respective teams are assigned to duty, with 1 team organized for an incoming or outgoing vessel. The organization is determined upon anchoring of a vessel, and when another vessel comes in the port simultaneously, the team on duty undertakes the cargo handling of such vessel, and in such case, the team is divided.

Now calculating the cargo handling capacity per gang at the concrete wharf in 1978, it is estimated as follows. Here, it was assumed that one team assumed one vessel and that the stevedoring was made by 1 gang (minimum gang number).

| | Handling Cargo Volume (in 1978) | Number of calling vessels | Mean cargo handling hour per vessel | Number of gangs at stevedoring (minimum) |
|----------------|---------------------------------|---------------------------|-------------------------------------|--|
| Foreign trade | 20,000 tons | 22 vessels | 40 hours | 22 (= 22 x 1 gang) |
| Domestic trade | 68,000 tons | 231 vessels | 22 hours | 231 (= 231 x 1 gang) |

The cargo handling volume per gang per hour at the foreign trade wharf is 23 tons, and that at the domestic trade wharf is 14 tons.

Foreign trade: $[20,000 \div 40h] \div 22 \text{ gangs} = 23 \text{ tons}$.

Domestic trade: $[68,000 \div 22h] \div 231 \text{ gangs} = 14 \text{ tons}$.

It should be noted that the foregoing are the highest values (with the gangs assumed at the minimum number).

Note: 1977 Cargo Handling Capacity - From Annual Report 1977.

General cargo: 10 tons/hour/gang.

Bulk cargo: 15 tons/hour/gang.

Log: 31 tons/hour/gang.

The cargo handling capacity per gang obtained as above is 14-23 tons which is about one-half of the generally said volume at 30-40 tons/hour/gang.

At present, there is a neck in the stevedoring, and an allowance is produced in the carriage incident to "cargo handling" and "delivery." It is, therefore, required to improve the efficiency of stevedoring for the increasing cargo volume hereafter. From the present condition, mal-efficiency in stevedoring is considered to be attributable to the number of workers forming the gang. The gang formation of 15 workers with 1 supervisor is to be changed depending on the kind of cargo. In the Port of Yokohama in Japan, if the wheat, soybean, etc. are packed in bags, the gang for stevedoring in the ship is formed by 20-25 workers.

Further, the team organization should not be determined upon anchoring of a calling vessel. The calling vessels are bound to notify the calling by radio at least 48 hours before calling. Then, it is possible to organize a team before assignment of berthing. Therefor, close contact between ADPEL Balikpapan and UKA or powerful guidance or supervision by ADPEL is necessary. It is also proposed that the stevedoring should be rationalized as stated below so far as practicable.

- (1) Miscellaneous works incident to the transport should be eliminated in order to simplify the transport work.
- (2) The works should be carried out systematically and successively. For such purpose, education and training of supervisors should be executed.
- (3) A horizontal transport system should be taken. (to reject the up-down transport work)
- (4) A linear transport method should be employed. (to keep the straight transport work)
- (5) Relaying transport works should be reduced.
- (6) Transport works should be mechanized (use of stevedore gear, roller conveyer, etc.).

10-2-3 Under the present condition, it is rather difficult to introduce the two shift system for the port cargo handling work. But, here, it is proposed to employ the two shift system in and after 1981. Particularly, reduction of the mooring hours per vessel by acceleration of the ship cargo handling brings about an improvement of the through-put. It also induces acceleration of the "cargo handling" (cargo transport to or from shed or storage) and "delivery" (truck loading from or to shed, storage or vessel). With such acceleration, effective use of cargo handling equipment is required. Then, it is proposed to use pallets along with forklifts.

Chapter 11

Economic Analysis

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CHAPTER 11 ECONOMIC ANALYSIS

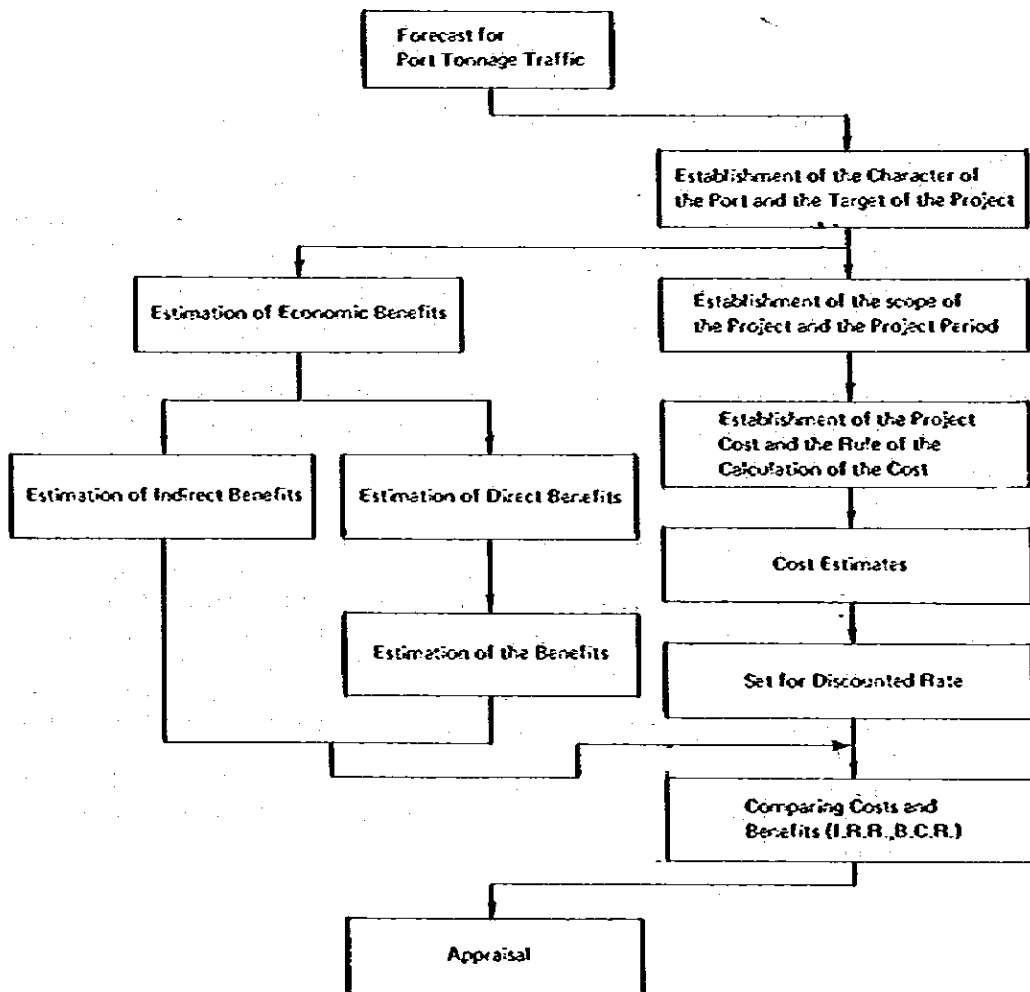
11-1 Premises and procedure for economic analysis.

The following premises were set for conducting economic analysis.

- (1) The economic analysis is to cover those short-term plan to be completed by 1985 and those thereafter are to be outside the scope of the economic analysis.
- (2) The berth (77.6 m) for domestic trade to be constructed in 1979 is to be regarded as existing facilities and is to be excluded from the economic analysis.
- (3) The reclaimed land to be made behind the above berth of 77.6 m for domestic trade is to be regarded as existing facilities functioning in unity with this berth and are, therefore, not to be covered by the economic analysis.
- (4) The planned extension of jetty in Kampung Baru is to be regarded as one of the projects to be covered by the economic analysis.

The economic analysis of this project is to be based on the above premises and Fig. 11-1 shows the procedure of the analysis.

Fig. 11-1 Procedure of economic analysis



The economic analysis is to cover those short term plan to be completed by 1985. But, the berth (77.6 m) for domestic trade to be constructed in 1979 and the reclaimed land to be made behind this berth are regarded as existing facilities, and are therefore, not to be covered by the economic analysis.

The reasons are as follows.

- (1) Since the budget allocation has already been made for this berth of 77.6 m for domestic trade to be constructed in 1979, it may be concluded that this project has already been found to be feasible.
- (2) It will be necessary to reclaim the area behind the berth, but it will be unnatural to pick only this without berth for this economic analysis, as this reclaimed land can function only with the berth for domestic trade.

Further, since budgeting has not been conducted for the planned extension of the jetty in Kampung Baru, it has been decided to regard it as a future project to be included in this economic analysis.

11-2 Estimate of costs

The costs to be covered by the economic analysis are those of constructing additional public facilities in the Port of Balikpapan to be completed during the four-year period from 1981 to 1984 and the necessary expenses for maintaining and operating these facilities.

As has been described under 9-4, the costs of constructing the additional public facilities amount to US\$20,888,000. (As mentioned under 9-1, this figure does not include customs duties on imported equipment and materials.) For economic analysis, it is necessary to deduct sales tax from this, as it is a mere transfer of money.

Further, the price contingency which takes account of inflation in cost is not normally considered in economic analysis for a feasibility study. Accordingly, after these deductions, the costs of constructing the additional public facilities to be covered by the economic analysis will be US\$17,819,000.

The maintenance and operating costs of the Port of Balikpapan, include the cost of maintenance and operating of wharves, jetties, forklifts, tugboats and pilot boats, the cost of power, water supply and fuel, personnel cost and miscellaneous expenses. Of these, those relating to the additional public facilities are to be covered by this economic analysis, which amount to US\$505,000 as of 1985.

Further, with regard to the shadow prices, they would be applied where 1) there is a shadow rate against the foreign exchange rate and 2) there are laid-off personnel but the wages of laborers are controlled by the minimum wages law. However, neither of the above was found to be operating according to the results of the survey. It was decided, therefore, that the shadow prices would not apply to the cost-benefit analysis.

11-2-1 Construction costs of additional public facilities.

As has been described under 9-4, construction costs of additional public facilities during the 4-year period from 1981 to 1984 amount to US\$20,888,000 at 1979 prices. This figure excludes customs duties on imported equipment and materials but includes sales tax in domestic currency. Since this is a mere transfer of money, it is to be deducted for economic analysis.

Further, this figure contains both physical and price contingencies. Since the price contingency is the contingency which takes account of inflation, normally it is not considered in economic analysis for a feasibility study.

As a result, the construction costs of additional public facilities during the 4-year period from 1981 to 1984 for economic analysis will be US\$17,819,000 and the break-down figures will be as given by Table 11-1.

Table 11-1 Consturction Costs of Additional Public Facilities to be Used in Economic Analysis

(Unit: 1,000 US\$)

| Year | Construction costs of additional public facilities to be used in economic analysis |
|------|--|
| 1981 | 1,313 |
| 1982 | 6,930 |
| 1983 | 4,408 |
| 1984 | 5,168 |

11-2-2 Maintenance and operating costs

The maintenance and operating costs to be covered by the economic analysis are those relating to the additional public facilities, which may be computed on the basis of the system of control and operation as has been described in Chapter 10.

Table 11-2 Maintenance and Operating Costs to be Used in Economic Analysis

(Unit: 1,000 US\$)

| Year | Personnel cost in operational sector | Personnel cost in control sector and miscellaneous expenses | Maintenance cost | | | Power, Water, Fuel | Total |
|------------------|--------------------------------------|---|--------------------------|------------------------------|--------------|--------------------|-------|
| | | | Wharf, Jetty, Road, etc. | Forklift, Tugboat, Pilotboat | Water supply | | |
| 1983 | 32 | 24 | 0 | 67 | 0 | 18 | 141 |
| 1984 | 34 | 48 | 34 | 67 | 11 | 35 | 229 |
| from 1985 onward | 91 | 77 | 116 | 135 | 32 | 54 | 505 |

Note: 1979 prices

11-3 Estimation of benefits

Investments in the Port of Balikpapan are made in order to increase the capacity of port facilities in response to an increase of transport demand with development of regional economy. The transport system is then expected to be improved, resulting in many economic and social benefits such as further development of regional industry, urban development, etc.

This project is expected to bring about the following benefits.

- (1) Saving in freight and handling charges through direct importation and exportation
- (2) Decrease of congestion of the wharf and jetty for domestic trade
- (3) Decrease in damage to port cargo
- (4) Decrease in accidents in the harbor
- (5) Contributions to regional development such as increased agricultural production

Of these benefits, it is difficult to deal with (3)–(5) quantitatively. Accordingly (1) and (2) are to be analyzed quantitatively.

- (1) Saving in freight and handling charges through direct importation and exportation.

Some of the goods shipped to Balikpapan are those which are first imported at Surabaya or other ports, as Balikpapan is not established as a foreign trade port. Unless Balikpapan is established as a foreign trade port, these goods are expected to be imported at Surabaya or other ports before being shipped to Balikpapan.

Accordingly, if Balikpapan is established as a foreign trade port, these goods are expected to be imported directly through Balikpapan.

The same situation seems to exist with shipments to other ports in East Kalimantan and Central Sulawesi or with those from these areas. This may be summarized as follows.

- 1) Imported cargo for Balikpapan.
 - a) The cargo transported by land to the service area of Balikpapan as a domestic trade port and to that of Samarinda.
Unless Balikpapan is established as a foreign trade port, this cargo is first imported at Surabaya or other ports before being shipped to Balikpapan or Samarinda.
 - b) The cargo shipped to the service areas of those ports in East Kalimantan other than Balikpapan and Samarinda.
Unless Balikpapan is established as a foreign trade port, this cargo is first imported at Surabaya or other ports before being shipped to those ports in East Kalimantan other than Balikpapan and Samarinda.
 - c) The cargo shipped to Central Sulawesi.
Unless Balikpapan is established as a foreign trade port, this cargo is first imported at Bitung or Ujung Pandang before being shipped to Donggala in Central Sulawesi.
- 2) Export cargo from Balikpapan
 - a) The cargo transported by land to Balikpapan to be exported.
Unless Balikpapan is established as a foreign trade port, this cargo is first shipped from Balikpapan or Samarinda to Surabaya or other ports to be exported.
 - b) The cargo shipped from Donggala in Central Sulawesi to Balikpapan to be exported.
Unless Balikpapan is established as a foreign trade port, this cargo is first shipped from Donggala to Bitung or Ujung Pandang to be exported.

The freight from the transit port to Balikpapan and the handling charges at the transit port will be saved by direct importation and exportation of the above cargoes through Balikpapan. Table 11-3 shows the amount which may be saved.

Table 11-3 Economy in Freight and Handling Charges through Direct Importation and Exportation

(Unit: 1,000 US\$)

| Kind of Cargo \ Year | 1) - a) | 1) - b) | 1) - c) | 2) - a) | 2) - b) | Total |
|----------------------|---------|---------|---------|---------|---------|-------|
| 1984 | 582 | 65 | 0 | 359 | 0 | 1,006 |
| From 1985 onward | 1,396 | 119 | 28 | 1,316 | 74 | 2,933 |

(2) Decrease of congestion at the wharf and jetty for domestic trade.

Benefits resulting from decreased congestion at the wharf and jetty for domestic trade are to be computed for each of Site 2 and Kampung Baru area.

1) Site 2

Unless the wharf for foreign trade is provided in Site 2 area, exports and imports expected to go through Balikpapan will have to go through Surabaya or other ports with the former used for transit shipment. Consequently, it will increase the congestion at the wharf for domestic trade.

Accordingly, it may be concluded that the congestion at the wharf for domestic trade can be reduced by providing the wharf for foreign trade.

2) Kampung Baru area

Unless the jetty in Kampung Baru area is extended, increasing cargo volume will have to be handled by existing facilities, and congestion will increase.

Accordingly, the congestion may be decreased by extending the jetty in Kampung Baru area. The benefits resulting from decreased congestion, or shorter duration of call may be computed as Table 11-4.

Table 11-4 Benefits Resulting from Decreased Congestion on the Wharf and Jetty for Domestic Trade

(Unit: 1,000 US\$)

| Year | Area | 1) Site 2 area | 2) Kampung Baru area | Total |
|------------------|------|----------------|----------------------|-------|
| | 1984 | | 211 | 0 |
| From 1985 onward | | 278 | 210 | 488 |

11-3-1 Saving in freight and handling charges through direct importation and exportation

Foreign trade cargo through Balikpapan in 1985 may be classified as Table 11-5 according to the place of final demand and the place of first shipment.

Table 11-6 shows the volume of foreign trade cargo in 1985 classified in the same way as Table 11-5, assuming that Balikpapan is not established as a foreign trade port.

The difference between Tables 11-5 and 11-6 is the volume of foreign trade expected to be handled directly at Balikpapan when the improvement has been made, which is shown as Table 11-7. The cargo volume for 1984 given by the table was obtained as with 1985.

Table 11-5 Projection of General Cargo Volume of Foreign Trade Handled by ADPEL in the Port of Balikpapan by Commodity, by Kind of Foreign Trade (1985)

(Unit: 1,000 tons)

| Commodity Group | Foreign Trade | | | | | | | Total |
|------------------------|---------------|-----------|----------|------------|------------|-----------|------------|------------|
| | Discharging | | | | Loading | | | |
| | A | B | C | Total | D | E | Total | |
| Food stuffs | 49 | 14 | — | 63 | — | — | — | 63 |
| Rice | 49 | 14 | — | 63 | — | — | — | 63 |
| Wheat flour | — | — | — | — | — | — | — | — |
| Sugar | — | — | — | — | — | — | — | — |
| Marine products | — | — | — | — | — | — | — | — |
| Miscellaneous | — | — | — | — | — | — | — | — |
| Estate crops | — | — | — | — | 74 | 19 | 93 | 93 |
| Construction materials | 20 | 6 | 1 | 27 | — | — | — | 27 |
| Machinery | 30 | 8 | 2 | 40 | — | — | — | 40 |
| Vehicles | 11 | 3 | 1 | 15 | — | — | — | 15 |
| Fertilizer | — | — | — | — | — | — | — | — |
| Miscellaneous | 57 | 17 | 3 | 77 | 30 | — | 30 | 107 |
| Total | 167 | 48 | 7 | 222 | 104 | 19 | 123 | 345 |

- Notes: A. Cargo imported at Balikpapan to be transported by land to the service areas of Balikpapan and Samarinda.
 B. Cargo imported at Balikpapan to be shipped to Sangkulirang and the group of northern ports.
 C. Cargo imported at Balikpapan to be shipped to Donggala in Central Sulawesi.
 D. Cargo transported by land from the service areas of Balikpapan and Samarinda to Balikpapan to be exported.
 E. Cargo shipped from Donggala in Central Sulawesi to Balikpapan to be exported.

Table 11-6 Projection of General Cargo Volume of Foreign Trade Handled by ADPEL in the Port of Balikpapan by Commodity, by Kind of Foreign Trade (In the Case of No Expansion in 1985)

Unit: 1,000 tons

| Commodity Group | Foreign Trade | | | | | | | Total |
|------------------------|---------------|-----------|----------|-----------|-----------|----------|-----------|-----------|
| | Discharging | | | | Loading | | | |
| | A | B | C | Total | D | E | Total | |
| Food stuffs | 14 | — | — | 14 | — | — | — | 14 |
| Rice | 14 | — | — | 14 | — | — | — | 14 |
| Wheat flour | — | — | — | — | — | — | — | — |
| Sugar | — | — | — | — | — | — | — | — |
| Marine products | — | — | — | — | — | — | — | — |
| Miscellaneous | — | — | — | — | — | — | — | — |
| Estate crops | — | — | — | — | — | — | — | — |
| Construction materials | 11 | 3 | — | 14 | — | — | — | 14 |
| Machinery | 22 | 7 | — | 29 | — | — | — | 29 |
| Vehicles | 10 | 3 | — | 13 | — | — | — | 13 |
| Fertilizer | — | — | — | — | — | — | — | — |
| Miscellaneous | 6 | 2 | — | 8 | 15 | — | 15 | 23 |
| Total | 63 | 15 | — | 78 | 15 | — | 15 | 93 |

- Notes: A. Cargo imported at Balikpapan to be transported by land to the service areas of Balikpapan and Samarinda.
 B. Cargo imported at Balikpapan to be shipped to Sangkulirang and the group of northern ports.
 C. Cargo imported at Balikpapan to be shipped to Donggala in Central Sulawesi.
 D. Cargo transported by land from the service areas of Balikpapan and Samarinda to Balikpapan to be exported.
 E. Cargo shipped from Donggala in Central Sulawesi to Balikpapan to be exported.

Table 11-7 Volume of Foreign Trade Cargo Expected to be Handled Directly with the Improvement of the Port of Balikpapan.

Unit: 1,000 tons

| Commodity | 1984 | | | | | | 1985 | | | | | |
|------------------------|-----------|-----------|---|-----------|---|-----------|------------|-----------|----------|-----------|-----------|------------|
| | A | B | C | D | E | Total | A | B | C | D | E | Total |
| Rice | 13 | 8 | | | | 21 | 35 | 14 | | | | 49 |
| Estate crops | | | | 17 | | 17 | | | | 74 | 19 | 93 |
| Construction materials | 4 | 2 | | | | 6 | 9 | 3 | 1 | | | 13 |
| Machinery | 3 | 1 | | | | 4 | 8 | 1 | 2 | | | 11 |
| Vehicles | | | | | | | 1 | | 1 | | | 2 |
| Miscellaneous | 23 | 7 | | 7 | | 37 | 51 | 15 | 3 | 15 | | 84 |
| Total | 43 | 18 | | 24 | | 85 | 104 | 33 | 7 | 89 | 19 | 252 |

- Notes: A. Cargo imported at Balikpapan to be transported by land to the service areas of Balikpapan and Samarinda.
 B. Cargo imported at Balikpapan to be shipped to Sangkulirang and the group of northern ports.
 C. Cargo imported at Balikpapan to be shipped to Donggala in Central Sulawesi.
 D. Cargo transported by land from the service areas of Balikpapan and Samarinda to Balikpapan to be exported.
 E. Cargo shipped from Donggala in Central Sulawesi to Balikpapan to be exported.

Those expenses which can be saved through direct importation and exportation of these cargos may be obtained as follows.

- (1) Cargo imported at Balikpapan to be transported by land to the service areas of Balikpapan and Samarinda.

Unless Balikpapan is established as a foreign trade port, the cargo will be shipped to Balikpapan through Surabaya. Thus,

$$B = Vx[F+(Cx2)]$$

where, B: Benefits

V: Volume of cargo

F: Freight from Surabaya to Balikpapan

C: Total of cargo handling charge and terminal freightage at Surabaya

- (2) Cargo imported at Balikpapan to be shipped to Sangkulirang and the group of northern ports. Unless Balikpapan is established as a foreign trade port, the cargo will be shipped to Sangkulirang and the group of northern ports through Surabaya. Thus,

$$B = Vx\Delta F$$

where, B: Benefits

V: Volume of cargo

ΔF : (Average freight from Surabaya to Sangkulirang, Tg. Redeb, Tarakan and Nunukan) – (Average freight from Balikpapan to Sangkulirang, Tg. Redeb, Tarakan and Nunukan)

- (3) Cargo imported at Balikpapan to be shipped to Donggala in Central Sulawesi. Unless Balikpapan is established as a foreign trade port, the cargo will be shipped to Donggala through Bitung or Ujung Pandang. Thus,

$$B = Vx\Delta F$$

where, B: Benefits

V: Volume of cargo

ΔF : (Average freight from Donggala to Bitung and Ujung Pandang) – (Average freight from Donggala to Balikpapan)

- (4) Cargo transported by land from the service areas of Balikpapan and Samarinda to Balikpapan to be exported.

Unless Balikpapan is established as a foreign trade port, the cargo will be shipped through Balikpapan to Surabaya to be exported. Thus,

$$B = Vx[F+(Cx2)]$$

where, B: Benefits

V: Volume of cargo

F: Freight from Surabaya to Balikpapan

C: Total of cargo handling charge and terminal freightage at Surabaya

- (5) Cargo shipped from Donggala in Central Sulawesi to Balikpapan to be exported. Unless Balikpapan is established as a foreign trade port, the cargo will be shipped from Donggala to Bitung or Ujung Pandang to be exported. Thus,

$$B = Vx\Delta F$$

where, B: Benefits

V: Volume of cargo

ΔF : (Average freight from Donggala to Bitung and Ujung Pandang) – (Average freight from Donggala to Balikpapan)

The total amount which may be saved in freight, and cargo handling charge, terminal freightage at Surabaya in unit cost may be as shown by Tables 11-8 and 11-9.

Table 11-8 Saving on Freight in Unit Cost

(Unit: US\$/t)

| Commodity | Freight from Surabaya to Balikpapan | (Average freight from Surabaya to Sangkulirang Tg. Redeb, Tarakan and Nunukan) – (Average freight from Balikpapan to Sangkulirang, Tg. Redeb, Tarakan and Nunukan) | (Average freight from Donggala to Bitung and Ujung Pandang) – (Freight from Donggala to Balikpapan) |
|------------------------|-------------------------------------|--|---|
| Rice | 6.94 | 2.60 | 2.22 |
| Estate crops | 12.15 | 4.55 | 3.89 |
| Construction materials | 8.68 | 3.25 | 2.78 |
| Machinery | 13.88 | 5.20 | 4.44 |
| Vehicles | 13.88 | 5.20 | 4.44 |
| Miscellaneous | 12.15 | 4.55 | 3.89 |

Table 11-9 Total Saving in Cargo Handling Charge and Terminal Freight at the Port of Surabaya in Unit Cost

Unit: US\$/t

| Commodity | Total of cargo handling charge and terminal freightage at the Port of Surabaya in unit cost |
|------------------------|---|
| Rice | 1.13 |
| Estate crops | 1.20 |
| Construction materials | 1.01 |
| Machinery | 1.64 |
| Vehicles | 4.82 |
| Miscellaneous | 1.93 |

By putting the data of Tables 11-7, 8 and 9 in the formulae given above, those expenses saved or benefits through direct importation and exportation at Balikpapan are obtained. This is shown as Table 11-10.

Table 11-10 Expenses Saved through Direct Importation and Exportation at the Port of Balikpapan

Unit: 1,000 US\$

| Commodity | 1984 | | | | | 1985 | | | | |
|------------------------|-------|----|---|-----|---|-------|-----|----|-------|----|
| | A | B | C | D | E | A | B | C | D | E |
| Rice | 120 | 21 | 0 | 0 | 0 | 322 | 36 | 0 | 0 | 0 |
| Estate crops | 0 | 0 | 0 | 247 | 0 | 0 | 0 | 0 | 1,076 | 74 |
| Construction materials | 43 | 7 | 0 | 0 | 0 | 97 | 10 | 3 | 0 | 0 |
| Machinery | 51 | 5 | 0 | 0 | 0 | 137 | 5 | 9 | 0 | 0 |
| Vehicles | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 4 | 0 | 0 |
| Miscellaneous | 368 | 32 | 0 | 112 | 0 | 816 | 68 | 12 | 240 | 0 |
| Total | 582 | 65 | 0 | 359 | 0 | 1,396 | 119 | 28 | 1,316 | 74 |
| | 1,006 | | | | | 2,933 | | | | |

- Notes:
- A. Cargo imported at Balikpapan to be transported by land to service areas of Balikpapan and Samarinda.
 - B. Cargo imported at Balikpapan to be shipped to Sangkulirang and the group of northern ports.
 - C. Cargo imported at Balikpapan to be shipped to Donggala in Central Sulawesi.
 - D. Cargo transported by land from service areas of Balikpapan and Samarinda to Balikpapan to be exported.
 - E. Cargo shipped from Donggala in Central Sulawesi to Balikpapan to be exported.

11-3-2 Decreasing of congestion at the wharf and jetty for domestic trade.

(1) Decreasing of congestion in Site 2 area

With the improvement of the wharf for foreign trade, the volume of domestic cargo in 1985 is expected to be 266,000 tons as shown by Tables 6-37 and 6-42 in chapter 6. However, without the improvement to the foreign trade area, the volume of domestic cargo is expected to be 287,000 tons in 1985 as shown by Table 11-11.

Table 11-11 Projection of General Cargo Volume Handled by ADPEL in the Port of Balikpapan, by Commodity (In the Case of No Expansion in 1985)

Unit: 1,000 tons

| Commodity Group | Foreign Trade | | | Domestic Trade | | | Total | | |
|------------------------|---------------|-----------|-----------|----------------|-----------|------------|---------------|-----------|------------|
| | Dis-charg-ing | Load-ing | Total | Dis-charg-ing | Load-ing | Total | Dis-charg-ing | Load-ing | Total |
| Food stuffs | 14 | — | 14 | 26 | 24 | 50 | 40 | 24 | 64 |
| Rice | 14 | — | 14 | 11 | — | 11 | 25 | — | 25 |
| Wheat flour | — | — | — | 6 | — | 6 | 6 | — | 6 |
| Sugar | — | — | — | 8 | — | 8 | 8 | — | 8 |
| Marine products | — | — | — | — | 24 | 24 | — | 24 | 24 |
| Miscellaneous | — | — | — | 1 | — | 1 | 1 | — | 1 |
| Estate crops | — | — | — | — | 36 | 36 | — | 36 | 36 |
| Construction materials | 14 | — | 14 | 24 | 3 | 27 | 38 | 3 | 41 |
| Machinery | 29 | — | 29 | 16 | 7 | 23 | 45 | 7 | 52 |
| Vehicles | 13 | — | 13 | 3 | 3 | 6 | 16 | 3 | 19 |
| Fertilizer | — | — | — | 13 | — | 13 | 13 | — | 13 |
| Miscellaneous | 8 | 15 | 23 | 130 | 2 | 132 | 138 | 17 | 155 |
| Total | 78 | 15 | 93 | 212 | 75 | 287 | 290 | 90 | 380 |

Accordingly, without the wharf for foreign trade, domestic cargo will increase by $287-266=21,000$ tons. This increased volume of cargo is expected to be transported by Interinsular to be handled by the wharf for domestic trade in Site 2 area.

Meanwhile, the volume of cargo loaded and unloaded per vessel of Interinsular in 1985 is expected to be 300 t/vessel as shown by Table 6-48 in Chapter 6. Accordingly, without the provision of the wharf for foreign trade, the number of calls by Interinsular vessels will increase by $21,000 \div 300 = 70$ vessels in a year.

Based on this, the average duration of call including waiting hours of Interinsular vessels at the domestic wharf of Site 2 may be obtained by using the queuing theory for each case of with and without the foreign trade wharf as Table 11-12.

Table 11-12 Average Duration of Call at Domestic Wharf of Site 2

| Item | Year | | 1985 | | |
|--|------|------|------|---------|------|
| | Case | 1984 | with | without | |
| (1) Cargo Volume (1,000 t) | | 158 | 177 | 186 | 207 |
| (2) Number of Arrival Vessels | | 527 | 590 | 620 | 690 |
| (3) = (2)/365 Number of arrivals per day | | 1.44 | 1.62 | 1.70 | 1.89 |
| (4) Reciprocal of average berthing days ¹⁾ | | 0.41 | 0.41 | 0.41 | 0.41 |
| (5) Number of berths ²⁾ | | 5 | 5 | 5 | 5 |
| (6) = (3)/[(4) X (5)] Utilization rate | | 0.70 | 0.79 | 0.83 | 0.92 |
| (7) Average duration of call including waiting hours (day) | | 2.92 | 3.46 | 3.53 | 4.13 |

- Note: 1. Average berthing days of 2.46 days is obtained from the average mooring hours of 59 hours for interinsular in 1978.
 2. The total length of the domestic trade wharf of Site 2 is 271.6m including the length to be constructed in 1979, or approximately 5 berths on the assumption that the average size of interinsular vessels is 6000WT.

From Table 11-12 the reduction in the number of waiting days in a year at the domestic trade wharf of Site 2 with the provision of the foreign trade wharf may be obtained as follows.

1984: $3.46 \times 590 - 2.92 \times 527 = 503$ days

1985: $4.13 \times 690 - 3.53 \times 620 = 661$ days

If the demurrage per day is US\$420, the benefits may be shown as follows.

1984: $420 \times 503 = 211,260$ US\$

1985: $420 \times 690 = 277,620$ US\$

- (2) Decreasing of congestion in Kampung Baru area.

Unless the jetty in Kampung Baru area is extended by 50 m, the effective length of the jetty will be reduced, and congestion will increase.

Average duration of call of local vessels and sailing vessels including waiting hours may be obtained as shown by Table 11-13 based on the queuing theory for each case of with and without the jetty extension in Kampung Baru. (The 50 m-extension of Kampung Baru will be in service from 1985.)

Table 11-13 Average Duration of Call at Kampung Baru

| Item | Year | | 1985 | |
|--|------|-------|---------|--|
| | Case | with | without | |
| (1) Cargo Volume (1,000 t) | | 80 | 80 | |
| (2) Number of Arrival Vessels | | 2,210 | 2,210 | |
| (3) = (2)/365 Number of arrivals per day | | 6.05 | 6.05 | |
| (4) Reciprocal of average berthing days ¹⁾ | | 0.47 | 0.47 | |
| (5) Number of berth ²⁾ | | 16 | 14 | |
| (6) = (3)/[(4) X (5)] Utilization rate | | 0.80 | 0.92 | |
| (7) Average duration of call including waiting hours (day) | | 2.81 | 3.31 | |

- Notes: 1. Average berthing days of 2.13 days is obtained from the average mooring hours of 51 hours of local vessels in 1978.
 2. Effective length of the jetty is 550m with the extension and 530m without. The number of berths was computed from the effective length of the jetty, average cargo volume loaded and unloaded per vessel and handling volume per unit length.

The reduction in the number of waiting days of vessels in a year with the extension of the jetty in Kampung Baru by 50 m may be obtained from Table 11-13.

1985: $3.31 \times 2,210 - 2.81 \times 2,210 = 1,105$ days

If the demurrage per day is US\$190, the benefits may be computed as follows.

1985: $190 \times 1,105 = 209,950$ US\$

- 11-3-3 Reduced damage to port cargo.**
With the provision of cargo handling and storage facilities such as transit sheds and open storage yards, damage to cargo may be reduced.
- 11-3-4 Reduced accidents in the harbor**
At present, part of general cargo is handled at the berth of PERTAMINA at Balikpapan. Unless the public berth at Balikpapan is improved, general vessels and those tankers going to PERTAMINA may cross each other's path, resulting in an accident. With the improvement of the public berth, it will be possible to use each berth exclusively, and the possibility of accident will reduce.
- 11-3-5 Contributions to regional development such as increased agricultural production**
As the Government of East Kalimantan is planning agricultural development and road construction, with the development of the Port of Balikpapan, they will facilitate further development of East Kalimantan.

11-4 Evaluation

Cost-benefit analysis based on the costs obtained under 11-2 and the benefits under 11-3 with the project life of 25 years from 1981 to 2005 gives the internal rate of return (IRR) of 13.4%. Further, with the discount rate of 12.0%, the benefit-cost ratio will be 1.1.

There are various arguments regarding the minimum IRR which seems feasible. As for the methods, there are two methods: 1) the method adopted by the Asia Development Bank; and 2) the method of ascertainment by taking account of past projects in Indonesia. With regard to the latter, however, the difficulty is that the criterion of judgement changes according to investment opportunities in Indonesia. Evaluation of this figure, therefore, is only relative and extremely difficult. If we adopt the approach taken by the Asia Development Bank that it is feasible at over 12 % when investment opportunities are many and over 8 % when there are not many investment opportunities, this project may be regarded as feasible.

Table 11-14 is a table of cost benefit to obtain IRR Table 11-15 is a table of cost-benefit at the discount rate of 12.0%.

Table 11-14 Cost Benefit Table (I.R.R. = 13.4%)

Unit: 1,000 US\$

| Year | Cost | | | | Benefit | | | Discounted Value (IRR = 13.4%) | | |
|---------|--------------------|---|---|--------|------------------|--|-----------|-----------------------------------|--------|---------|
| | Port Investment | Maintenance & Operating for New Facilities | | Total | Direct Import | Ship Congestion | | Total | Cost | Benefit |
| | | Mainte nance Cost | Personal & General Ad- ministration Cost | | | Water Supply, Electric Power & Fuel Cost | at Site 2 | | | |
| 1 1981 | 1,213 | | | 1,313 | 1,006 | | | 1,217 | 1,313 | 835 |
| 2 1982 | 6,930 | | | 6,930 | 2,933 | | | 3,421 | 6,111 | 2,069 |
| 3 1983 | 4,408 | 67 | 18 | 4,549 | 2,933 | | | 3,421 | 3,537 | 1,824 |
| 4 1984 | 5,168 | 112 | 35 | 5,397 | 2,933 | 211 | | 3,421 | 3,701 | 1,609 |
| 5 1985 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 305 | 2,069 |
| 6 1986 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 269 | 1,824 |
| 7 1987 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 237 | 1,609 |
| 8 1988 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 209 | 1,419 |
| 9 1989 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 185 | 1,251 |
| 10 1990 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 163 | 1,103 |
| 11 1991 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 144 | 973 |
| 12 1992 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 127 | 858 |
| 13 1993 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 112 | 756 |
| 14 1994 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 98 | 667 |
| 15 1995 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 87 | 588 |
| 16 1996 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 77 | 519 |
| 17 1997 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 68 | 457 |
| 18 1998 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 60 | 403 |
| 19 1999 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 53 | 356 |
| 20 2000 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 46 | 314 |
| 21 2001 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 41 | 277 |
| 22 2002 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 36 | 244 |
| 23 2003 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 32 | 215 |
| 24 2004 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 28 | 190 |
| 25 2005 | | 283 | 54 | 505 | 2,933 | 278 | 210 | 3,421 | 25 | 167 |
| Total | 17,819 | 6,122 | 1,187 | 28,794 | 62,599 | 6,049 | 4,410 | 73,058 | 17,064 | 17,094 |

Table 11-15 Cost Benefit Table (Discount Ratio = 12.0%)

Unit: 1,000 US\$

| Year | | Discounted Value (Discount Ratio = 12.0%) | |
|--|------|--|---------|
| | | Cost | Benefit |
| 1 | 1981 | 1,313 | |
| 2 | 1982 | 6,188 | |
| 3 | 1983 | 3,626 | |
| 4 | 1984 | 3,841 | 866 |
| 5 | 1985 | 321 | 2,174 |
| 6 | 1986 | 287 | 1,941 |
| 7 | 1987 | 256 | 1,733 |
| 8 | 1988 | 228 | 1,547 |
| 9 | 1989 | 204 | 1,382 |
| 10 | 1990 | 182 | 1,234 |
| 11 | 1991 | 163 | 1,101 |
| 12 | 1992 | 145 | 983 |
| 13 | 1993 | 130 | 878 |
| 14 | 1994 | 116 | 784 |
| 15 | 1995 | 103 | 700 |
| 16 | 1996 | 92 | 625 |
| 17 | 1997 | 82 | 558 |
| 18 | 1998 | 74 | 498 |
| 19 | 1999 | 66 | 445 |
| 20 | 2000 | 59 | 397 |
| 21 | 2001 | 52 | 355 |
| 22 | 2002 | 47 | 317 |
| 23 | 2003 | 42 | 283 |
| 24 | 2004 | 37 | 252 |
| 25 | 2005 | 33 | 225 |
| Total | | 17,687 | 19,278 |
| Benefit Cost Ratio = 19,278/17,687 = 1.1 | | | |

Chapter 12

Financial Analysis

11-11-11
11-11-11

11

CHAPTER 12

FINANCIAL ANALYSIS

12-1 Purpose of financial analysis

The purpose of financial analysis is to ascertain the impact of investments under the present project on the condition of financial control of port operating bodies or to analyse as to whether financial healthiness may be ensured.

In other words, based on the premise that the financial control is carried by business accounting under the self-supporting accounting system, it is to analyse the effect of investments under the project, i.e., payability situation, ascertain financing situation and present problems and measures to be taken.

12-1-1 general

In conducting the analysis, Financial Statements (Income Statement, Balance Sheet, etc.) will be prepared to ascertain the soundness of financial affairs.

Accordingly, financial analysis of the Port of Balikpapan will be based on the following premises:

- (1) The self-supporting accounting system based on the cost method is to be adopted;
- (2) Investment funds for development are to be met by borrowed capital from abroad with the conditions of loan as given below.

| | |
|---------------------------------|---------------|
| Rate of interest | 3% per annum. |
| Term of deferment for principle | 10 years. |
| Term of repayment of principle | 30 years. |
| Term of loan | 40 years. |

Note: However, in the case of the sensitivity test, described under 12-4-2, 40% of the total investments is to be met by National Development Fund without interest. The reason for setting the figure at 40% is that the domestic currency accounts for 40% of construction costs under the project.

- (3) Depreciation is to be based on the straight line method and life cycle based on the standard set by the Indonesian Government.

Table 12-1 Depreciation rate and life cycle by facilities

| Items | Depreciation Rate | Life Cycle (years) |
|--------------------------|-------------------|--------------------|
| Quay | 0.02 | 50 |
| Open Storage | 0.02 | 50 |
| Warehouse | 0.03 | 33 |
| Road | 0.01 | 100 |
| Office Building | 0.03 | 33 |
| Water Supply | 0.04 | 25 |
| Power Supply | 0.03 | 33 |
| Navigation Aids | 0.04 | 25 |
| Cargo Handling Equipment | 0.05 | 20 |
| Vessel | 0.05 | 20 |

Source: Directorate General of Sea Communications.

(4) Surplus funds

After depreciation and payment of interest, 45% of Net Profit will be deducted for tax and 30.3% for payment to the National Development Fund – (Net profit 100% – Tax 45%) x 55 %. The surplus is to be retained as internal reserve.

12-2 Revenue

In estimating the revenue of the Port of Balikpapan, computation was made in two categories: total revenues of the Port of Balikpapan (ADPEL) and those from new investments only.

Table 12-2 shows the total revenues including those from both existing facilities and new facilities.

Table 12-3 gives only the revenues from new investments.

Table 12-3 does not include "port due" levied on logs and PERTAMINA tankers.

Table 12-2 Total Revenue of the Port of Balikpapan
(for Existing and New Investment Facilities)

(Million R.P.)

| Revenue Item | Unit Charge | 1977 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|--------------------------|---|------|-------|-------|-------|-------|-------|-------|
| Port due | Log 11.1 RP/gross ton Tanker 4.4 " " Others 8.3 " " | 101 | 141 | 147 | 156 | 164 | 179 | 206 |
| Mooring fee | Log 12 RP/cargo ton Others 330 RP/cargo ton | 65 | 82 | 92 | 103 | 117 | 161 | 257 |
| Pilotage | Calculated in accordance with Tariff | 243 | 269 | 284 | 302 | 318 | 349 | 407 |
| Towage | Calculated in accordance with Tariff | 113 | 625 | 706 | 706 | 747 | 814 | 890 |
| Port Facility due | 587 RP/cargo ton | 92 | 92 | 105 | 124 | 145 | 212 | 357 |
| Equipment Rental | 400 RP/cargo ton | 9 | 12 | 13 | 16 | 18 | 27 | 45 |
| Water Supply | 1000 RP/m ³ | 2 | 14 | 28 | 29 | 29 | 52 | 62 |
| Miscellaneous Revenue | | 35 | 35 | 35 | 35 | 35 | 35 | 68 |
| Total | | 660 | 1,270 | 1,410 | 1,471 | 1,573 | 1,829 | 2,292 |

Table 12-3 The Revenue from New Investment Facilities

(Million RP)

| Revenue Item | Unit Charge | New Facilities | 1983 | 1984 | 1985 |
|-------------------|-------------------------|-------------------------|----------------------------------|---|---|
| Port due | 8.3 RP/Gross Ton | Concrete Wharf | 0 | 11 (955x10 ³ G. tons) | 34 (3,015x10 ³ G. tons) |
| Mooring fee | 330 RP/Cargo Ton | Concrete Wharf | 0 | 53 (136x10 ³ C. tons) | 133 (345x10 ³ C. tons) |
| | | Concrete Jetty | 0 | 0 | 10 (27x10 ³ C. tons) |
| Port Facility due | 587 RP/Cargo Ton | Concrete Wharf | 0 | 80 (136x10 ³ C. tons) | 203 (345x10 ³ C. tons) |
| | | Concrete Jetty | 0 | 0 | 16 (27x10 ³ C. tons) |
| Equipment Rental | 400 RP/Cargo Ton | Forklifts | 3 (7x10 ³ C. tons) | 4 (10x10 ³ C. tons) | 15 (37x10 ³ C. tons) |
| Towage | | Tugboats & Pilotboat | 187 (247 x $\frac{1}{4}$) | 204 (814 x $\frac{1}{4}$) | 356 (890 x $\frac{2}{5}$) |
| Pilotage | | | 80 (318 x $\frac{187}{747}$) | 87 (349 x $\frac{204}{814}$) | 163 (407 x $\frac{356}{890}$) |
| Water Supply | 1,000 RP/m ³ | Water Supply Facility | 0 | 23 (2,200 x 10 ³ m ³) | 39 (3,736 x 10 ³ m ³) |
| Land Rental | Estimated | New Land areas | 0 | 0 | 35 |
| | Total | | 270 | 462 | 1,004 |

12-2-1 Method of estimate

On the basis of actual business results contained in 1977 Balikpapan Port Financial Report (in Annual Report 1977), computation was made as below based on the current tariff standards.

- (1) Port due: Based on the business results of 1977, the unit charge per gross ton was established to be multiplied by the gross tonnage of entering vessels classified by type for each fiscal year.
- (2) Mooring fee: The unit charge per cargo ton was established as above to be multiplied by the weight of the cargo, estimating berthing vessels classified by type for each fiscal year.
- (3) Pilotage: Cumulative computation was made on the basis of the tariff, estimating the number of vessels classified by type and size for each fiscal year.
- (4) Towage: Cumulative computation was made on the basis of the tariff, estimating the number of vessels classified by type and size, taking account of the number of tugboats and their horsepower for each fiscal year.
- (5) Facilities charge: Based on the business results of 1977, the unit charge per cargo ton was established to be multiplied by the volume of cargo using the facilities for each fiscal year. This unit charge includes Storage fee, Direct Transport fee and Berthing fee.
- (6) Water supply: The necessary amount of supply was estimated from the number of vessels classified by type and size for each year and computation was made by taking account of the operating capacity of new facilities and the supply capacity of tank lorries at present.
- (7) Equipment rental: Based on the business results of 1977, the unit charge per cargo ton handled was established to be multiplied by the total volume of cargo to be handled for each fiscal year by taking account of the number of operating forklifts and mobile cranes.
- (8) Others: Total revenues were estimated from the past business results.
- (9) Rate of increase in dollar-denominated revenues due to the devaluation of the Rupiah: The current port tariff are on two currency bases: Rupiah and U.S. dollar. The U.S. dollar

basis applies to those vessels under foreign flags. As a result of the devaluation of the Rupiah at the end of 1978, the exchange rate of 625 Rp. to the dollar was instituted by the Port of Balikpapan (compared with the previous 415 Rp. to the dollar) applicable to foreign flag vessels.

Accordingly, it is necessary to consider the increase in Rupiah revenue due to the devaluation (exchange margin from dollar revenues from foreign flag vessels). Thus, on the basis of the ratio of dollar revenues in 1977, the rate of increase in the relevant tariff was computed.

Rate of increase (against the unit charge based on 1\$ = 414 Rp.)

| | |
|--------------|--|
| Port due | : 1.3656 [RP. 100,694 ÷ 137,510 (=28,461 + \$174,478 x 625 RP)] |
| Mooring fee | : 1.1740 [RP. 65,399 ÷ 76,779 (=43,069 + \$185,241 x 625 RP)] |
| Pilotage | : 1.1213 [RP. 243,128 ÷ 272,630 (=185,241 + \$139,823 x 625 RP)] |
| Towage | : 1.1692 [RP. 113,322 ÷ 132,498 (=75,696 + \$90,882 x 625 RP)] |
| Water Supply | : 1.0439 [RP. 2,417 ÷ 2,523 (=2,210 + \$500 x 625 RP)] |

The relevant unit charges were multiplied by the rate of increase to compute the increase in revenues due to the devaluation. The exchange margin in this case is 236 million Rp. as of 1985.

12-3 Expenditure

Computation was made for each of the two categories: existing facilities and new investments on the basis of the system of port control and management described in Chapter 10. In this case, the operation cost of new investments look account of the operation cost for the entire port control (personnel cost of Administrative Department, Personnel Department, etc.).

Tabl 12-4 Total Operating Expenditure
(for Existing and New Investment Facilities)

(Million RP.)

| Item | Year | 1977 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986~ 1990 |
|--|------|------------|------------|------------|------------|------------|------------|------------|---------------|
| Personnel & General Administrative Cost | | 150 | 247 | 295 | 298 | 315 | 338 | 302 | 1,510 |
| Maintenance Cost | | | 367 | 370 | 370 | 412 | 440 | 547 | 2,735 |
| Existing Facilities | } | 274 | (367) | (370) | (370) | (370) | (370) | (370) | (1,850) |
| New Facilities | | | | | | (42) | (70) | (177) | (885) |
| Fuel Cost | | | 17 | 54 | 54 | 59 | 59 | 67 | 336 |
| Tug Boats | | | (14) | (41.1) | (41.1) | (46.1) | (46.1) | (51) | (255) |
| Other boats | | | (3) | (12) | (12) | (12) | (12) | (15) | (75) |
| Forklifts | | | (0.3) | (1.0) | (1.0) | (1.0) | (1.0) | (1.0) | (5) |
| Mobile cranes | | | (0.1) | (0.1) | (0.1) | (0.1) | (0.1) | (0.1) | (0.5) |
| Water Cost | | | 3 | 6 | 6 | 6 | 11 | 14 | 70 |
| Electricity | | | 6 | 6 | 6 | 6 | 11 | 19 | 95 |
| Existing Facilities | } | | (6) | (6) | (6) | (6) | (6) | (6) | (30) |
| New Facilities | | | | | | | (5) | (13) | (65) |
| Total | | 424 | 640 | 731 | 734 | 798 | 859 | 949 | 4,746 |

Table 12-5 Operating Expenditure for New Investment Facilities

| Item | (Million RP.) | | | | |
|---|---------------|----------------|----------------|-----------------|---------------|
| | Year | 1983 | 1984 | 1985 | 1986~ 1990 |
| Personnel & General Administrative Cost (1.295 mill. RP. per person) | | 53 (41 men) | 78 (60 men) | 127 (98 men) | 635 |
| Maintenance Cost | | 54 | 79 | 178 | 890 |
| Concrete Wharf | | | (22) | (22) | |
| Concrete Jetty | | | | (1) | |
| Service Vessel Wharf | | | (1) | (2) | |
| Warehouse | | | | (19.5) | |
| Open Storage | | | | (0.3) | |
| Road | | | | (6) | |
| Water Supply Facility | | | (2) | (9) | |
| Electric Power Supply | | | | (13) | |
| Forklifts | | (1) | (1) | (3) | |
| Tug & Pilot Boats | | (53) | (53) | (102) | |
| Fuel, Electricity & Water | | 15 | 21 | 44 | 220 |
| Forklifts | | (0.2) | (0.2) | (0.3) | |
| Tug boats | | (11.6) | (11.5) | (20.4) | |
| Other boats | | (3.0) | (3.0) | (6.0) | |
| Water | | | (1.0) | (4.0) | |
| Electricity | | | (5.0) | (13.0) | |
| Total | | 122 | 178 | 349 | 1,745 |

12-3-1 Computation method

Items of expenditure were divided into Personnel cost, General administrative cost, Maintenance cost, Fuel, water and power cost, Interest payable and Depreciation and the computation was made as follows.

- (1) Personnel cost: Personnel cost per head was computed on the basis of the business results in 1977 to be multiplied by the number of personnel for each fiscal year.

Personnel cost per head: 1,169 million RP.

$(1,169 \times 10^3 \text{ RP.} = 135,698,000 \text{ RP.} \div 116 \text{ men})$

Table 12-6 Total personnel of Balikpapan: 1977-85

| | 1977 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|----------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Administrative Dept. | -- | 34 | 35 | 36 | 38 | 38 | 40 | 45 |
| Staff Dept. | -- | 22 | 22 | 23 | 23 | 23 | 27 | 29 |
| Operation Dept. | -- | 84 | 134 | 169 | 169 | 182 | 194 | 228 |
| Total | 116 | 140 | 191 | 228 | 230 | 243 | 261 | 302 |

Table 12-7 Personnel required by new investments and those for the general sector

| | | 1983 | 1984 | 1985 |
|---|--|-----------|-----------|-----------|
| General sector personnel covered by New Investments' sector | Administrative & Staff Dept. | 14 | 28 | 54 |
| | Communication Fire & Security, Others | | | |
| Foreign Warehouse | | 1 | 1 | 2 |
| Foreign Terminal | | 0 | 1 | 2 |
| Kampung Baruh | | 3 | 4 | 4 |
| Land Transportation | | 2 | 2 | 7 |
| Pilot & Tug | | 21 | 24 | 29 |
| Total | | 41 | 60 | 98 |

- (2) **General administrative cost:** General administrative cost per head was computed on the basis of the business results in 1977 to be multiplied by the number of personnel required for each fiscal year.

General administrative cost per head: 0.126 Million RP.

$(126 \times 10^3 \text{ RP.} = 14,624 \times 10^3 \text{ RP.} \div 116 \text{ men})$

- (3) **Maintenance cost:** Cumulative computation was made for each facilities and material, classified into new investments and existing facilities. The category of existing facilities includes the concrete wharf for domestic trade under construction and also the maintenance cost of the concrete jetty under construction in Kampung Baru. Of the existing facilities, the maintenance cost except for tugboats, speed boats, pilot boats, forklifts, and mobile cranes was computed on the basis of the business results in 1977.
- (4) **Fuel, water and power cost:** Pilotage and towing are to be 24-hour operation; forklifts and mobile cranes are to be 16-hour operation. Annual consumption of each equipment and material was estimated for cumulative computation.

Table 12-8 Maintenance Cost for New Facilities

| (Million RP/year) | | | | | |
|-----------------------|------------------|-------------------|-------------------------------|-------------------------------------|------------------------------|
| Facilities | Maintenance Cost | Construction Cost | Percentage of Const. Cost (%) | Content of Maintenance | Commencement of Use |
| Foreign Trade Pier | 21.5 | 4,301 | 0.5 | Fender, Curbstone | 1984 |
| Service Vessel Wharf | 3.6 | 724 | 0.5 | " | 1983 |
| Concrete Jetty | 1 | 264 | 0.5 | " | 1985 |
| Transit Shed | 19.5 | 1,949 | 1.0 | Repairing of painting, roofing etc. | 1985 (1 unit) |
| Open Storage | 0.3 | 32 | 1.0 | Asphalt Pavement & Marking | 1985 |
| Building | 0.1 | 9 | 1.2 | Repairing | 1985 |
| Road | 13.4 | 1,343 | 1.0 | Asphalt Pavement & Marking | 1985 |
| Water Supply | 20.2 | 403 | 5.0 | Repairing & Spair Parts | 1984, Sep. |
| Electric Power Supply | 13.1 | 261 | 5.0 | " | 1985 |
| Navigation Aids | 0.2 | 31 | 0.5 | Replacement of Battery | 1984 |
| Green Park | 0.1 | 13 | 0.5 | Gardening | 1985 |
| Sub total | (93) | (8,330) | | | |
| Tug boats (2 units) | 74 | 734 | 10.0 | Repairing & Spare Parts | 1983 (1 unit) 1985 (1 unit) |
| Pilot boat (1 unit) | 7 | 66 | 10.0 | " | 1985 |
| Forklifts (3 units) | 3 | 37 | 8.0 | " | 1983 (1 unit) 1985 (2 units) |
| Sub total | (84) | (837) | | | |
| Grand Total | 177 | 10,167 | | | |

(1,723: Land for Warehouse and others 1.165: Land for rental x 0.03)

Table 12-9 Annual Maintenance Cost for New Facilities

(Million RP)

| Cost | Year | 1983 | 1984 | 1985 |
|------------------|------|------|------|------|
| Maintenance Cost | | 42 | 70 | 177 |

Maintenance Cost for Existing Facilities

| (Facilities) | (Calculation Procedure) | (Million RP./year) (Maintenance Cost) |
|--|--|--|
| (1) Tugboat 1700 pII " 1500 pII " 850 pII | $477 \times 0.1 = 47.7$ $382 \times 0.1 = 38.2$ $245 \times 0.1 = 24.5$ | $111.0 \times \frac{625}{415} \approx 167$ 167 |
| (2) Speed Boat | $10 \times 0.1 = 1$ | |
| (3) Pilot Boat 180 pII } " 190 pII } " 180 pII } | $40 \times 0.1 = 4$ $66 \times 0.1 = 6.6$ | $10.6 \times \frac{625}{415} \approx 16$ 16 |
| (4) Folklift 2.5 Ton (active 3 units) (non-active 2 ") | $40 \times 0.08 \times \frac{625}{415} \approx 5$ | |
| (5) Mobile Crane 15 Ton (active 2 units) (non-active 1 unit) | $135 \times 0.08 \times \frac{625}{415} \approx 16$ | 16 |
| (6) Others | 242 (Results in 1977) - 108 = 134 108 = Tug boat 1700 pII (71) + Pilot Boat (6) + Mobile crane, 2 units (6) + Folklifts, 3 units (2) + Above fuel cost (12) + Power & water cost (11) $134 \times 1.20 \approx 160$ | 160 |
| (7) Concrete Wharf under construction (from 1980) | $449 \times 0.005 \approx 3$ | 3 |
| (8) Concrete Jetty under construction at Kampung Baruh | $203 \times 0.01 \approx 2$ | 2 |
| Total | | 370 |

Fuel, Power and Water Cost

(Million RP.)
(Cost as of 1985)

| | | |
|--|---|-----|
| (1) Tugboat 500 p/h x 2 | } 2,559 kℓ x 20 RP./ℓ = 51.2 | 51 |
| • 850 p/h x 1 | | |
| • 1500 p/h x 1 | | |
| • 1700 p/h x 1 | | |
| (2) Pilot & Speed Boats (5 vessels) | 743 Kℓ x 20 RP./ℓ = 14.9 | 15 |
| (3) Forklifts (8 units) | 5 Kℓ x 20 RP./ℓ x 8 units = 1.0 | 1 |
| (4) Mobile cranes (3 units) | 2 Kℓ x 20 RP./ℓ x 3 units = 0.1 | 0.1 |
| (5) Water for vessels | 59 x 10 ³ x 225 RP./ton = 13.3 | 13 |
| (6) Water for offices | 6 ton/head x 302 x 225 RP./ton = 0.4 | 0.4 |
| (7) Power Cost | | 19 |
| (Existing facilities | 171,000 KWH x 34 RP./KW = 6 |) |
| (New facilities | 372,000 KWH x 34 RP./KW = 13 | |
| | Total | 100 |

- (5) Interest payable: Computation was made on the assumption that the Investment Funds was to be met by borrowed funds from abroad.

Table 12-10 Long-term Loan Schedule
(Case of entire investment funds raised from abroad)

(Million RP.)

| Year | Investment Long-term Loan | Loan Repayment Amount | Loan Balance at End | Interest on Loan |
|-----------|---------------------------------|-----------------------------|---------------------------|---------------------|
| 1981 | 961 | | 961 | 29 |
| 1982 | 5,078 | | 6,039 | 181 |
| 1983 | 3,228 | | 9,267 | 278 |
| 1984 | 3,788 | | 13,055 | 392 |
| 1985 | | | 13,055 | 392 |
| 1986-1990 | | | 13,055 | 1,960 |
| 1991-1995 | | 2,175 | 10,880 | 1,763 |
| 1996-2000 | | 2,175 | 8,705 | 1,435 |
| 2001-2005 | | 2,175 | 6,530 | 1,110 |

Table 12-11 Long-term Loan Schedule
(Case of 60% foreign loan and 40% National Development Fund)

(Million RP.)

| Year | Investment | | | Loan Repayment Amount | Loan Balance at End | Interest on Loan |
|-----------|---------------------------|----------------|-------|-----------------------|---------------------|------------------|
| | National Development Fund | Long-term Loan | Total | | | |
| 1981 | 384 | 577 | 961 | | 577 | 17 |
| 1982 | 2,031 | 3,047 | 5,078 | | 3,624 | 109 |
| 1983 | 1,291 | 1,937 | 3,228 | | 5,561 | 167 |
| 1984 | 1,515 | 2,273 | 3,788 | | 7,834 | 235 |
| 1985 | | | | | 7,834 | 235 |
| 1986-1990 | | | | | 7,834 | 1,175 |
| 1991-1995 | | | | 1,305 | 6,529 | 1,058 |
| 1996-2000 | | | | 1,305 | 5,224 | 862 |
| 2001-2005 | | | | 1,305 | 3,919 | 666 |

(6) Depreciation: The amount of depreciation was computed cumulatively based on the depreciation rate and life cycle (Table 12-1).

With regard to the fixed assets of existing facilities, actual investments after 1976 were cumulatively computed for each facilities based on the figures of the table of fixed assets as of the end of 1975 prepared by the Port of Banjarmasin. This computation includes the concrete wharf and the concrete jetty under construction.

Table 12-12 Total Fixed Asset Schedule
(for Existing and New Investment Facilities)

(Million RP.)

| Year | Addition Fixed Assets to be depreciated | Addition Land | Net Fixed Assets to be depreciated at End | De-preciation | Net Fixed Assets at End | Fixed Assets at End |
|-----------|---|---------------|---|---------------|-------------------------|---------------------|
| 1975 | | | (478) | | (568) | (758) |
| 1976 | 463 | | 1,031 | 34 | 997 | 1,221 |
| 1977 | 636 | | 1,633 | 61 | 1,572 | 1,857 |
| 1978 | 339 | | 1,911 | 73 | 1,838 | 2,196 |
| 1979 | 520 | | 2,358 | 97 | 2,261 | 2,716 |
| 1980 | 210 | | 2,471 | 102 | 2,369 | 2,926 |
| 1981 | 457 | 386 | 2,826 | 111 | 3,101 | 3,769 |
| 1982 | | | 2,715 | 111 | 2,990 | 3,769 |
| 1983 | 1,103 | | 3,707 | 145 | 3,948 | 4,872 |
| 1984 | 4,433 | | 7,995 | 236 | 8,145 | 9,305 |
| 1985 | 4,618 | 2,901 | 12,377 | 356 | 15,308 | 16,824 |
| 1986-1990 | | | 12,021 | 1,780 | 13,528 | 16,824 |
| 1991-1995 | | | 10,241 | 1,780 | 11,748 | 16,824 |
| 1996-2000 | | | 8,461 | 1,780 | 9,968 | 16,824 |
| 2001-2005 | | | 6,681 | 1,780 | 8,188 | 16,824 |

Table 12-13 Fixed Asset Schedule
(for New Investment Facilities only)

(Million RP.)

| Year | Addition Fixed Assets to be depreciated | Addition Land | Net Fixed Assets to be depreciated at End | De-preciation | Net Fixed Assets at End | Fixed Assets at End |
|-----------|---|---------------|---|---------------|-------------------------|---------------------|
| 1983 | 1,103 | | 1,103 | 33 | 1,070 | 1,103 |
| 1984 | 4,433 | | 5,503 | 125 | 5,378 | 5,536 |
| 1985 | 4,618 | 2,901 | 9,996 | 246 | 12,651 | 13,055 |
| 1986-1990 | | | 9,750 | 1,230 | 11,421 | 13,055 |
| 1991-1995 | | | 8,520 | 1,230 | 10,191 | 13,055 |
| 1996-2000 | | | 7,290 | 1,230 | 8,961 | 13,055 |
| 2001-2005 | | | 6,060 | 1,230 | 7,731 | 13,055 |

12-4 Payability situation and Earning position

Table 12-14 Total Statement of Revenue and Expenditure
(for Existing and New Investment Facilities)

(Million RP.)

| | 1977 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986~1990 | 1991~1995 | 1996~2000 | 2001~2005 |
|-----------------------------------|------|-------|-------|-------|-------|-------|-------|-----------|-----------|-----------|-----------|
| Operating Revenue | 660 | 1,270 | 1,410 | 1,471 | 1,573 | 1,829 | 2,292 | 11,460 | 11,460 | 11,460 | 11,460 |
| Operating Expenditure | 424 | 640 | 731 | 734 | 798 | 859 | 949 | 4,746 | 4,746 | 4,746 | 4,746 |
| Operating Profit | 236 | 630 | 679 | 737 | 775 | 970 | 1,343 | 6,714 | 6,714 | 6,714 | 6,714 |
| Depreciation | 61 | 102 | 111 | 111 | 145 | 236 | 356 | 1,780 | 1,780 | 1,780 | 1,780 |
| Interest on Loan | | | 29 | 181 | 278 | 392 | 392 | 1,960 | 1,763 | 1,435 | 1,110 |
| Gross Profit | 175 | 528 | 539 | 445 | 352 | 342 | 595 | 2,974 | 3,171 | 3,499 | 3,824 |
| Tax | 79 | 238 | 243 | 200 | 158 | 154 | 268 | 1,338 | 1,427 | 1,575 | 1,721 |
| National Development Fund Reserve | 53 | 160 | 163 | 135 | 107 | 104 | 180 | 901 | 961 | 1,060 | 1,159 |
| Net Profit | 43 | 130 | 133 | 110 | 87 | 84 | 147 | 735 | 783 | 864 | 941 |
| Accumulated Net Profit from 1980 | | 130 | 263 | 373 | 460 | 544 | 691 | 1,426 | 2,209 | 3,073 | 4,017 |
| Loan Repayment | | | | | | | | - | 2,175 | 2,175 | 2,175 |

Table 12-15 Statement of Revenue and Expenditure of New Investment Facilities

(Million RP.)

| | 1983 | 1984 | 1985 | 1986~ 1990 | 1991~ 1995 | 1996~ 2000 | 2001~ 2005 |
|--------------------------------------|-------|-------|-------|---------------|---------------|---------------|---------------|
| Operating Revenue | 270 | 462 | 1,004 | 5,020 | 5,020 | 5,020 | 5,020 |
| Operating Expenditure | 122 | 178 | 349 | 1,745 | 1,745 | 1,745 | 1,745 |
| Operating Profit | 148 | 284 | 655 | 3,275 | 3,275 | 3,275 | 3,275 |
| Depreciation | 33 | 125 | 246 | 1,230 | 1,230 | 1,230 | 1,230 |
| Interest on Loan | 278 | 392 | 392 | 1,960 | 1,763 | 1,435 | 1,110 |
| Gross Profit | ▲ 163 | ▲ 233 | 17 | 85 | 282 | 610 | 935 |
| Tax | | | 8 | 38 | 127 | 275 | 421 |
| National Development Fund Reserve | | | 5 | 26 | 85 | 185 | 283 |
| Net Profit | ▲ 163 | ▲ 233 | 4 | 21 | 70 | 150 | 231 |
| Accumulated Net Profit | ▲ 373 | ▲ 606 | ▲ 602 | ▲ 581 | ▲ 511 | ▲ 361 | ▲ 130 |
| Loan Repayment | | | | — | 2,175 | 2,175 | 2,175 |

12-4-1 Statement of Revenue and Expenditure

Table 12-14 shows the revenue and expenditure of the Port of Balikpapan as a whole and Table 12-15 the revenue and expenditure in respect of new investment facilities only.

The payability situation and earning position shown by Table 12-14 are extremely favorable to the extent that a relatively large amount could be set aside each year for internal reserve. The reasons for producing such surplus after offsetting the deficit due to new investments shown by Table 12-15 are as shown below.

- (1) In expanding the existing facilities, large investments in fundamental port facilities requiring the construction of breakwaters and channels are not necessary with the result that the burden of depreciation is small.
- (2) No maintenance work such as dredging of channels requires a large amount of expenses.
- (3) Logs and PERTAMINA tankers provide a large and stable source of earnings. However, the future task shall be required for ADPEL to provide a system to effectively secure the source of earnings within the control and management of the Port.
- (4) Large exchange margin due to dollar earnings from logs and PERTAMINA tankers mainly.

As Table 12-15 shows, the earning position of new investments is not favorable, breaking even as late as 1985. This is due to the amount of depreciation corresponding to the new investments and the large burden of interest payable. At the same time, it is due to the fact that port dues on logs and tankers which provide an important source of profit for existing facilities cannot be utilized as a source of profit for new investments.

12-4-2 Sensitivity test for new investments

Financial Rate of Return on the investment were computed by the following cases and the results are as follows;

| | (F.R.R.) |
|----------|----------|
| Case I | : 10% |
| Case II | : 26% |
| Case III | : 9% |

Note

- Case I: Assumed that 40% of the investment is covered by National Development Fund, the calculation of F.R.R. is limited the income from the New Investment Facilities.
- Case II: Assumed that 40% of the investment is covered by National Development Fund, the calculation is made by the whole income of the Port of Balikpapan including the Existing and the New Investment Facilities.
- Case III: Assumed that the total investment is loaned by abroad, the calculation of F.R.R. is made by the whole income of the Port of Balikpapan including the Existing and New Investment Facilities.

If 40% of the funds necessary for development is met by National Development Fund in order to ensure that new investments pay, the income statement may be prepared as the table below. As the burden of interest payable decreases, it becomes a good profitability.

| | 1981~1985 | 1986~1990 | 1991~1995 | 1996~2000 | 2001~2005 |
|------------------|-----------|-----------|-----------|-----------|-----------|
| Revenue | 1,736 | 5,020 | 5,020 | 5,020 | 5,020 |
| Expenditure | 649 | 1,745 | 1,745 | 1,745 | 1,745 |
| Operating Profit | 1,087 | 3,275 | 3,275 | 3,275 | 3,275 |
| Depreciation | 404 | 1,230 | 1,230 | 1,230 | 1,230 |
| Interest on Loan | 763 | 1,175 | 1,058 | 862 | 666 |
| Profit | ▲ 80 | 870 | 987 | 1,183 | 1,379 |

The Financial Rate of Return in this case is 10%; it seems that the investment return rate is a reasonable figure from the viewpoint of investment in infrastructure.

In order to ensure that new investments pay, the port tariff may be raised. However, the new investments cover those which are to be used with existing facilities: service vessel wharf, concrete jetty, road, water supply, green park, office building, tugboat, pilot boat, forklift, created land by reclamation.

On the other hand, the total earnings and expenditure including new investments show a favorable paying situation ensuring relatively adequate internal reserve funds. The internal earning rate in this case is 9%.

Accordingly, instead of raising port tariff for new investments, it is more appropriate from the financial point of view to let National Development Fund cover 40% of the funds necessary for development. In considering social benefits of infrastructure investments, it is worthy of note that the total earning position, shown by Table 12-14, not only offsets the deficit due to the new investments but also presents a favorable payability situation not requiring higher port tariff.

**Table 12-16 Discounted Financial Rate of Return
(Calculation Sheet: Case I)**

(Million RP.)

| Year | | Project Cost | Net Revenue | FRR = 10% | |
|--------------|------|--------------|---------------|--------------|--------------|
| | | | | Project Cost | Net Revenue |
| 1 | 1981 | 384 | | 349 | |
| 2 | 1982 | 2,031 | | 1,678 | |
| 3 | 1983 | 1,291 | 148 | 970 | 111 |
| 4 | 1984 | 1,515 | 284 | 1,035 | 194 |
| 5 | 1985 | | 655 | | 407 |
| 6 | 1986 | | 655 | | |
| 7 | 1987 | | | | |
| 8 | 1988 | | | | |
| 9 | 1989 | | | | |
| 10 | 1990 | | | | |
| 11 | 1991 | | | | |
| 12 | 1992 | | | | |
| 13 | 1993 | | | | |
| 14 | 1994 | | | | |
| 15 | 1995 | | | | |
| 16 | 1996 | | | | 3,463 |
| 17 | 1997 | | | | |
| 18 | 1998 | | | | |
| 19 | 1999 | | | | |
| 21 | 2001 | | | | |
| 22 | 2002 | | | | |
| 23 | 2003 | | | | |
| 24 | 2004 | | | | |
| 25 | 2005 | | 655 | | |
| Total | | 5,221 | 14,187 | 4,032 | 4,175 |

(Net Revenue = Operating Profit)

**Table 12-17 Discounted Financial Rate of Return
(Calculation Sheet: Case II)**

(Million RP.)

| Year | | Project Cost | Net Revenue | FRR = 26% | |
|--------------|------|--------------|---------------|--------------|--------------|
| | | | | Project Cost | Net Revenue |
| 1 | 1981 | 384 | | 305 | |
| 2 | 1982 | 2,031 | | 1,279 | |
| 3 | 1983 | 1,291 | 775 | 645 | 387 |
| 4 | 1984 | 1,515 | 970 | 601 | 385 |
| 5 | 1985 | | 1,343 | | 423 |
| 6 | 1986 | | 1,343 | | |
| 7 | 1987 | | | | |
| 8 | 1988 | | | | |
| 9 | 1989 | | | | |
| 10 | 1990 | | | | |
| 11 | 1991 | | | | |
| 12 | 1992 | | | | |
| 13 | 1993 | | | | |
| 14 | 1994 | | | | |
| 15 | 1995 | | | | |
| 16 | 1996 | | | | 1,610 |
| 17 | 1997 | | | | |
| 18 | 1998 | | | | |
| 19 | 1999 | | | | |
| 20 | 2000 | | | | |
| 21 | 2001 | | | | |
| 22 | 2002 | | | | |
| 23 | 2003 | | | | |
| 24 | 2004 | | | | |
| 25 | 2005 | | 1,343 | | |
| Total | | 5,221 | 29,948 | 2,830 | 2,805 |

(Net Revenue = Operating Profit)

Table 12-18 Discounted Financial Rate of Return
(Calculation Sheet: Case III)

(Million RP.)

| Year | | Project Cost | Net Revenue | FRR = 9% | |
|-------|------|--------------|-------------|--------------|-------------|
| | | | | Project Cost | Net Revenue |
| 1 | 1981 | 961 | | 882 | |
| 2 | 1982 | 5,078 | | 4,274 | |
| 3 | 1983 | 3,228 | 775 | 2,493 | 598 |
| 4 | 1984 | 3,788 | 970 | 2,683 | 687 |
| 5 | 1985 | | 1,343 | | 873 |
| 6 | 1986 | | 1,343 | | |
| 7 | 1987 | | | | |
| 8 | 1988 | | | | |
| 9 | 1989 | | | | |
| 10 | 1990 | | | | |
| 11 | 1991 | | | | |
| 12 | 1992 | | | | |
| 13 | 1993 | | | | |
| 14 | 1994 | | | | |
| 15 | 1995 | | | | |
| 16 | 1996 | | | | 7,968 |
| 17 | 1997 | | | | |
| 18 | 1998 | | | | |
| 19 | 1999 | | | | |
| 20 | 2000 | | | | |
| 21 | 2001 | | | | |
| 22 | 2002 | | | | |
| 23 | 2003 | | | | |
| 24 | 2004 | | | | |
| 25 | 2005 | | 1,343 | | |
| Total | | 13,055 | 29,948 | 10,332 | 10,126 |

(Net Revenue = Operating Profit)

12-5 Financial evaluation

Fixed assets ratio analysis is to be made as to the soundness of financial affairs of ADPEL using figures from the three financial statements (Table 12-14, 12-20 and 12-21). In this case, the financial statements cover the entire management of ADPEL Balikpapan including the new investments and the source of funds for development is to be sought entirely in loans from abroad. As for the period to be analyzed, since management is expected to be stabilized during the period from 1991 to 1995, annual average figures for that period are to be used. Needless to say, the ascertainment of financial healthiness is possible only when the management ascertains the entire financial affairs, and then they are to form the object of analysis.

12-5-1 Financial Ratio used for analysis

The following five financial ratios are to be used for analysis.

$$(1) \text{ Working Ratio} = \frac{(A) - \text{Depreciation Cost}}{(B)}$$

(Note: To ascertain the income position)

$$(2) \text{ Operating Ratio} = \frac{(A)}{(B)}$$

(Note: To ascertain the income position)

$$(3) \text{ Return on Net Fixed Assets} = \frac{(C)}{(D)}$$

(Note: To ascertain the earning capacity)

$$(4) \text{ Interest Earned Ratio (Time Interest covered)} = \frac{(C)}{(E)}$$

(Note: To ascertain the interest payment capacity)

$$(5) \text{ Debt Service Coverage (Time Debt Service Covered)} = \frac{(C) + \text{Depreciation Cost}}{(E)} \text{ or} \\ = \frac{(C - \text{Tax}) + \text{Depreciation Cost}}{(F)}$$

(Note: To ascertain repayment capacity of borrowings)

Remarks (items of denominator and numerator)

- (A) Total Operating Expenses
= Total costs – Non-operating expenses – Extraordinary expenses
- (B) Total Operating Revenues
= Total revenues – Non-operating revenues – Extraordinary revenues
- (C) Net Operating Income
= Operating revenues – Operating expenses
- (D) Balance of Fixed Assets
= or Fixed Assets excluded Accumulated Depreciation
- (E) Interest on Long-term Loans or Interest Payable
- (F) Debt Service or Principal and Interest of Borrowings

12-5-2 Evaluation of financial ratios

Financial ratios, average figures taken from Financial Statements (Table 2-14, 12-20 and 12-21), are listed below.

Table 12-19 Financial Ratios (%)

| Financial Ratios | 1985 | 1991~1995 |
|--------------------------------|------|-----------|
| (1) Working Ratio | 41 | 41 |
| (2) Operating Ratio | 57 | 57 |
| (3) Return on Net Fixed Assets | 6 | 8 |
| (4) Interest Earned Ratio | 252 | 280 |
| (5) Debt Service Coverage | 343 | 171 |

- (1) **Working Ratio**
The working ratio is of very good value upon comparison with the port operating bodies in European and American countries (including Australia) performing business accounting.
- (2) **Operating Ratio**
This is also an extraordinary favorable value like the working ratio. Both being of such good value is accountable mainly by the large revenue from the log and PERTAMINA tankers and absence of an enormous amount of maintenance cost for, for example, dredging.
- (3) **Return on Net Fixed Assets**
Very good when compared with the ports in European and American countries. Notwithstanding the net fixed assets by the new investment occupying an overwhelming proportion, it is noteworthy that the earning capacity taken as a whole is as high as this.
- (4) **Interest Earned Ratio**
Such a good ratio over the ports in European and American countries is a matter of course as the loan of a low interest rate from overseas is preconditioned.
However, when the other ports in the developing countries are taken, such high value of this ratio without raising the port tariff and in the absence of subsidy from the central government shows a high capacity of this port for bearing the interests.
- (5) **Debt Service Coverage**
For repayment of the loan, there is no problem involved as shown by this value.
Said large source of revenue is probably one of the principal reasons.
- (6) **Conclusion**
As shown by the foregoing fixed ratios and presumed from the three financial statements (Tables 12-14, 12-20 and 12-21), there is no problem in the payability and fund raising. That is, with the new investment executed, the financial healthiness of the port is secured with ease, with financial viability observed fully.

Table 12-20 Statement of Changes in Financial Position

(Million RP.)

| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986~ 1990 | 1991~ 1995 | 1996~ 2000 | 2001~ 2005 |
|--|------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|
| Source of Funds (A) | | | | | | | | | | |
| Net Profit | 130 | 133 | 110 | 87 | 84 | 147 | 735 | 783 | 864 | 944 |
| Depreciation | 102 | 111 | 111 | 145 | 236 | 356 | 1,780 | 1,780 | 1,780 | 1,780 |
| Incurrence of Long-term Loans | | 961 | 5,078 | 3,228 | 3,788 | | | | | |
| Total | 232 | 1,205 | 5,299 | 3,460 | 4,108 | 503 | 2,515 | 2,563 | 2,644 | 2,724 |
| Application of Funds (B) | | | | | | | | | | |
| Cost of Fixed Assets Addition | - | 961 | 5,078 | 3,228 | 3,788 | | | | | |
| Repayment of Long-term Loans | | | | | | | | 2,175 | 2,175 | 2,175 |
| Total | | 961 | 5,078 | 3,228 | 3,788 | | | 2,175 | 2,175 | 2,175 |
| Decrease/Increase Net Current Assets (C) (C = A - B) | 232 | 244 | 221 | 232 | 320 | 503 | 2,515 | 388 | 469 | 549 |
| Net Current Assets at Beginning (D) | 509 | 741 | 985 | 1,206 | 1,438 | 1,758 | 2,261 | 4,776 | 5,164 | 5,633 |
| Net Current Assets at End (C + D) | 741 | 985 | 1,206 | 1,438 | 1,758 | 2,261 | 4,776 | 5,164 | 5,633 | 6,182 |

Table 12-21 Balance Sheet

(Million RP.)

| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986~ 1990 | 1991~ 1995 | 1996~ 2000 | 2001~ 2005 |
|--------------------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Assets | | | | | | | | | | |
| Fixed Assets (Land) | 2,926 | 3,769 | 3,769 | 4,872 | 9,305 | 16,824 | 16,824 | 16,824 | 16,824 | 16,824 |
| Net Current Assets | 741 | 985 | 1,206 | 1,438 | 1,758 | 2,261 | 4,776 | 5,164 | 5,633 | 6,182 |
| Construction in Progress | | 961 | 6,039 | 8,164 | 7,519 | | | | | |
| Total | 3,667 | 5,715 | 11,014 | 14,474 | 18,582 | 19,085 | 21,600 | 21,988 | 22,457 | 23,006 |
| Liabilities | | | | | | | | | | |
| Long-term Loans | | 961 | 6,039 | 9,267 | 13,055 | 13,055 | 13,055 | 10,880 | 8,705 | 6,530 |
| Capital | 2,980 | 3,823 | 3,823 | 3,823 | 3,823 | 3,823 | 3,823 | 3,823 | 3,823 | 3,823 |
| Reserve & Provision | 130 | 263 | 373 | 460 | 544 | 691 | 1,426 | 2,209 | 3,073 | 4,017 |
| Accumulated Depreciation | 557 | 668 | 779 | 924 | 1,160 | 1,516 | 3,296 | 5,076 | 6,856 | 8,636 |
| Total | 3,667 | 5,715 | 11,014 | 14,474 | 18,582 | 19,085 | 21,600 | 21,988 | 22,457 | 23,006 |

Chapter 13

Environment Assessment

11/11/11

CHAPTER 13 ENVIRONMENT ASSESSMENT

In general, it is unavoidable for betterment of the environment for human activities to more or less reconstruct the nature. In order not to relate the alteration of nature to its destruction, the actual conditions of environment as well as their function and interaction of each element must be fully understood before development activities are undertaken.

At present considering the development of the Port of Balikpapan, it will promote regional development and industrial development and bring about a great benefit to the regional economy but sometimes it may cause pollution by the intensified use of ports and increased industry activities.

However, as the environmental force (environmental capacity or recovering capability) of Balikpapan bay and its hinterland seems to be far greater than the scale of the development of the Port of Balikpapan, environmental problem will not become big in future as it is not today.

13-1 Atmospheric Pollution

Causes for atmospheric pollution are sulfurous acid gas discharged from various industrial activities, exhaust from vehicles and other human wastes. Among them, the greatest is industrial activities.

Speaking of pollution causes at the areas in the Port of Balikpapan at present, there might be only possible pollutant caused by waste gas from PERTAMINA's refinery plant. When coastal type industries are going to be developed at the Port of Balikpapan in future, Site 4 Tg. Makasar and Site 5 Penajam are recommended as industrial sites. However, both of these sites are far from the city and will not become a source of pollution directly affecting the living of citizens.

At the present moment, timber related industries and coal related chemical industries are expected to be implemented. With regard to timber related industries, lumber manufacture will not cause any problem but plywood and pulp industries are liable to emit bad odor, smoke and gas of unpleasant smell and the chip industry is liable to generate bad smelling gas and inflammable methane gas from the chip storage. And the coal chemical industry as well as the petroleum industry emitted much of sulfurous acid gas. If the abovementioned industrial activities fully provide environmental measure, there is little possibility of causing pollution but both the public and industries must cooperate in establishing effective countermeasures for pollution.

Atmospheric pollution is somewhat scattered by wind, washed by rain and reduced by other climatic conditions. At the Port of Balikpapan, wind blows from east from December to May, spreading pollutant from land to sea and it blows from south from June to November, affecting the city to some extent but with accelerated spreading due to strong wind. Precipitation is roughly same throughout the year at 200 – 300 mm and helps clean the atmosphere.

13-2 Water Pollution

Causes for water pollution are waste water from city sewers and ditches, floating dirt, waste water and waste liquor from industrial development, cargo spills, sewage and waste oil from vessels into the sea, dirt and wastes around the wharf, etc.

They include such substance which floats on the surface of the sea for a long time or dissolves in the sea water and rapidly settles at the bottom of the sea.

Pollutants are transported on the current and flow of rivers and spread by wave, wind and current. At the prospective sites for expansion of the Port of Balikpapan, Site 2 and Site 4, as there are a difference of tide more than 2 m and strong current flowing from top to bottom, they are expected to greatly purify the water in the area. Site 3 is located toward the deep end of the bay and as the bottom is considered to be composed of sediments, water quality control must be carefully undertaken.

In order to clearly establish the exchange of sea water, various data and analyses are generally

required.

The difference of the tide at the Port of Balikpapan is considerably large, max. 2.83 m, high rate of exchange of the seawater in the harbour is expected due to the tide and the seawater in the harbour is pushed toward the Makasar Straits. Accordingly, the possibility of accumulating pollution at the port is expected to be reduced greatly, unless there is heavy pollution in the bay. However, such ordinary measures will also be necessary as prohibition of throwing trash, waste water and waste oil in the port area and from vessels.

13-3 Oil Pollution

The causes of oil pollution at the Port of Balikpapan are mainly oil pollutant from calling vessels and PERTAMINA.

In response to the increase of calling vessels, the enough measures and control is necessary for prohibition of waste oil from vessels. At the same time, such necessary measures and control are applied to tankers at oil jetties in order to prohibit and withdraw de-ballast water, waste oil and bilge from tankers. Oil fence facilities and skimmer boats is necessary to secure for protection of oil flowing spread at the waters area entrusted with PERTAMINA.

