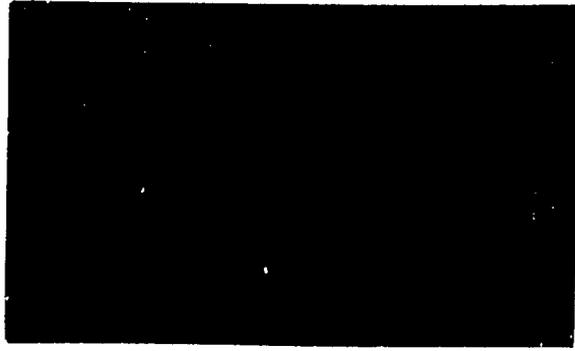


10-10-1933



THE PALEMBANG PORT
AND SHIPPING STUDY
VOLUME VI
SHORT TERM
IMPROVEMENTS

VOLUME VI

Short Term Improvements.

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1.0 INTRODUCTIONS.

The present facilities and performance of the Port of Palembang were reviewed in detail. After studying the economic base of the port and its hinterland a formal regional economic analysis was undertaken which included consideration of the development plans in order to obtain an effective forecast of economic developments and all particular future economic factors affecting potential port traffic.

During the last two years some of the short term expansion programs recommended by NEDECO in 1972 were implemented and the old wooden island piers were replaced by concrete, piled marginal wharves. The large majority of dry and liquid bulk handling is performed by proprietary port installations such as PUSRI (fertilizer) and PERTAMINA (crude petroleum, petroleum products, propylene). These facilities also handle general cargo and heavy lifts (PUSRI) both for their own and other requirements. Practically all exports and a significant proportion of imports are handled in the stream by direct lighter-ship transfer. While this method is preferred by exporters because most exports originate at waterfront locations and are lightered to Palembang and can more readily be cleared by customs on a lighter, some exports and imports are lightered because of the lack of berthing at Boom Baru or the insufficiency of mechanical equipment. There is no unitization practiced at the port and the first 1000 pallets are expected to be introduced early in 1976. Existing Boom Baru facilities and equipment cannot handle bulk cargo in any form and will only be able to perform limited palletization (pier to storage) early in 1976.

Our review of Cargo Handling and Storage Control Operations, as well as Inventory of Port Facilities (Volumes IV and V) provided the inputs into the analysis of present facilities.

and the evaluation of present capacity, productivity and cost. Using the results of the Economic Base Study, Transport System, and Changes in Shipping Patterns (Volumes I, II and III) estimates of near future expected cargo flows and ship traffic based on currently available port facilities and methods as well as known economic development plans were made to determine short term improvement requirements designed to meet near future demand. The effects of facility and port operating method improvements on cargo flow over Boom Baru facilities were next reviewed. This included a study of the effects of improvements in available wharfage, mechanical equipment, operating methods on ship turn around time, physical form of cargoes, port costs, storage and other factors which would influence port users and increase the use of Boom Baru facilities'. Combining the estimates of future demand based on current Boom Baru usage with expected future usage under improved conditions we then obtained an estimate of near term future demand on Boom Baru facilities. As a result two cargo flow and ship traffic estimates were derived. One based on existing practice of usage of Boom Baru and the other of expected usage of Boom Baru under improved facility and operating conditions. This approach permits an effective cost benefit analysis based on an upper and lower bound of facility use. Obviously usage will also be affected by the level of user charges, a problem that is addressed in Volume X, where we present recommended changes in tariff structure which represents user charges based on service costs but which also includes an incentive tariff structure designed to assure most effective utilization of the improved Boom Baru facilities.

This Volume presents a summary of our findings of the sufficiency of the present facilities in meeting projected near term future needs, the short term improvements necessary to fill shortcomings, and the effects of improvements on the projected future demand for port service.

2.0 EXPECTED CARGO AND TRAFFIC FLOW AND ANALYSIS OF PRESENT FACILITY SUFFICIENCY

The cargo flow projections based on our Economic Base Study assume the implementation of a variety of industrial and agricultural development projects. The projections similarly depend on national and provincial economic policy. This is a particularly difficult issue during this time of world wide economic upsets which among other things may force Indonesia to assume a more defensive positions in some of its major commodity exports. For example rubber has been particularly hard hit by price and demand fluctuations in recent months. Such measures applied to major commodities in the trade of Indonesia will effect trade projections and cargo flow. Unfortunately most of these policy issues are not yet resolved at this time and therefore projections had to be used as established on the basis of known economic developments and plans on the federal, provincial and private level. The short term improvements recommended by the consultants include many projects suggested, developed, or planned by PPA. Some of these were modified or changed. Many of the short term improvements are designed to significantly effect not only method and capacity of throughput but also costs of moving cargoes through the Port of Palembang. As such these improvements may result in a feedback effect, which induces an increase in the projected cargo flow, which was developed on the basis of existing costs. On the other hand, the proposed projects require significant capital investment. The resulting need for loan servicing as well as the effects of inflation on other operating costs may result in port cost escalation, forcing changes in port for user services which from a user point of view may balance the cost savings offered to users resulting from reduced turn around time, larger cargo handling rates and other improvements. Therefore, while the improvements are designed to

assure increased capacity, efficiency and productivity in line with projected cargo flow demand, they may not in fact provide immediate reductions in the unit cost of handling cargo through the Port of Palembang. The increased capacity, efficiency and productivity resulting from the recommended short term improvements will though within a year or so introduce significant cost savings and induce larger cargo flows, the use of larger and more efficient vessels, and improved technology. Its a result a feedback effect will be noticeable which will continue to depress unit costs.

We therefore assume the conservative cargo flow demand forecasts presented in Volume I to be valid under the conditions of the proposed short term improvements.

2.1 Forecast of Cargo Flow.

The amount of cargo which will be handled at Boom Baru in the future is dependent on several factors. The three primary factors are; the types and tonnages of commodities handled through the port, the level of service provided at the wharf in contrast for the provided in the stream, and at proprietary facilities and the regulations on cargo handling and pricing established by PPA and customs. The forecasts given in Volume I provide an estimate of the types of commodity and the relative tonnages. However, the other two factors are difficult to predict. Therefore, four projections have been derived concerning the possible tonnage of cargo handled to and from ships berthed at Boom Baru. This includes the tonnages handled both over the wharf and over the side. The first projection A assumes that the same percentages of each commodity are handled as they are at present. These percentages are given in Table V(-2.1-1 and the resulting tonnages are shown in Table VI-2.1-2. The total tonnage handled at Boom Baru is 280,000 tons in 1980 and 347,000 tons in 1985

as compared to 185,000 in 1974. It is rather obvious, that the great improvements in capacity and productivity of Boom Baru resulting from planned use of mechanical handling palletization will induce a rapid change from this traditional pattern.

The second projection B assumes that all cargoes handled in the stream with the exception of exports are handled at the wharf after introduction of the recommended short term improvements. In addition sawn timber and timber products are shipped through Boom Baru as well as an increased percentage of imported and domestic general cargo. The resulting tonnages are given in Table VI-2.1-3. The total tonnage is 877,000 tons in 1980 increasing to 1,380,000 tons in 1985. These figures represent an upper limit of the cargo handled at Boom Baru.

The third projection C is similar to the second except that sawn timber and timber products are assumed to be handled at private facilities. The fourth projection is also similar to the second except that the ratio of general cargo handled at the wharf is kept the same as in 1974. The resulting tonnages for each of the four projections is shown in Table VI-2.1-4. No attempt has been made to allocate the Boom Baru tonnages between that handled across the wharf and that handled overside to lighters.

For the purpose of short term improvements the assumption is made, that the demand on expanded and improved port facilities will at least include all palletizable imports and interinsular or local incoming shipments. With this assumption demand for port facilities will exceed 500,000 tons by 1980.

TABLE VI-2.1-1

DISTRIBUTION OF PRESENT CARGO FLOWS OVER PALEMBANG PORT FACILITIES

<u>Imports</u>	<u>Room Baru</u>	<u>Mid-Stream</u>	<u>Pertamina</u>	<u>Pjsri</u>	<u>P.N. Garam</u>
Rice	70 %	30 %	—	—	—
Sugar	70 %	30 %	—	—	—
Cotton	100 %	—	—	—	—
Flour	—	100 %	—	—	—
Cement	—	100 %	—	—	—
Fertilizer	—	—	—	100 %	—
Oil Products	10 %	—	90 %	—	—
Crude	—	—	100 %	—	—
Other	55 %	—	45 %	5 %	—
<hr/>					
Exports	—	100 %	—	—	—
<hr/>					
<u>Interisland Inward</u>					
Sugar	—	100 %	—	—	—
Rice	—	100 %	—	—	—
Timber	—	—	—	—	—
Salt	50 %	—	—	—	50 %
Cement	100 %	—	—	—	—
Flour	—	100 %	—	—	—
Oil Products	100 %	—	—	—	—
Others	25 %	—	75 %	—	—
<hr/>					
<u>Local Inward</u>					
Coconut Oil	100 %	—	—	—	—
Others	100 %	—	—	—	—
<hr/>					
<u>Interisland Outward</u>					
Fertilizer	—	—	—	100 %	—
Oil Products	—	—	100 %	—	—
Plywood	—	—	—	—	—
Timber	—	—	—	—	—
Other	30 %	30 %	—	40 %	—
<hr/>					
Local Outward	100 %	—	—	—	—
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TABLE VI-2.1-2

CARGO MOVEMENTS USING PRESENT RATES (000's tons)

	Tonnage 1980				1985			
	Boom Baru	Stream	Pusri	Pertamina	Boom Baru	Stream	Pusri	Pertamina
Imports								
Fertilizer	—	—	96	—	—	—	187	—
Rice	80.8	34.7	—	—	67.2	28.8	—	—
Sugar	10.1	4.4	—	—	15.1	6.5	—	—
Wheat & Flour	—	2.0	—	—	—	2.5	—	—
Cotton	5.6	—	—	—	6.9	—	—	—
Cement	—	25.	—	—	—	50.	—	—
Naptha	—	—	—	—	—	—	—	400
Oil Products	13.6	—	—	122.4	19	—	—	171
Other	76.1	—	6.9	55.4	115	—	10.5	83.5
Total	186.2	66.1	102.9	177.8	223.2	87.8	197.5	654.5
Exports								
	—	274.3	311.0	300	—	352.1	7	300
Total	—	274.3	311.0	300	—	352.1	—	300
Interisland & Local Domestic Unloaded								
Rice	—	38.5	—	—	—	32.0	—	—
Wheat & Flour	—	57.9	—	—	—	86.4	—	—
Salt	—	17.5	—	—	—	22.4	—	—
Salt	10.8	—	—	—	12.2	—	—	—
Coconut oil	22.4	—	—	—	28.5	—	—	—
Rubber	3.3	—	—	—	5.3	—	—	—
Coffee	2.2	—	—	—	2.8	—	—	—
Crude	—	—	—	2150	—	—	—	1880
Petrochemicals	—	—	—	—	—	—	—	44
Others	41.2	—	—	124.6	58.6	—	—	191.8
Total	79.9	113.9	—	2274.6	107.4	140.8	—	2115.8
Interisland & Local Domestic Loaded								
Fertilizer	—	—	755	—	—	—	1425.0	—
Petrochemical	—	—	—	—	—	—	—	288.0
Oil Products	—	—	—	4170.0	—	—	—	3750.0
Other	14.4	14.4	14.4	—	16.3	16.3	16.3	—
Total	14.4	14.4	769.4	4170.0	16.3	16.3	1441.3	4038.0
Grand Total	280.5	468.7	1183.3	6922.4	346.9	597.0	1638.9	7108.3
Total all Port Facilities	—	—	—	8854.9	—	—	—	9691.1

TABLE VI-2.1-2 (Continued)

	<u>Tonnage 1980</u>				<u>1985</u>			
	<u>Boom Baru</u>	<u>Stream</u>	<u>Fusri</u>	<u>Pertamina</u>	<u>Boom Baru</u>	<u>Stream</u>	<u>Pusri</u>	<u>Pertamina</u>
Total all port facilities	--	--	--	8854.9	--	--	--	9691.1

Interisland/Local Private Facilities

	<u>P.J.K.A.</u>	<u>Private facilities</u>	<u>P.J.K.A.</u>	<u>Private facilities</u>
Cement	163.9		327.7	
Coal	170.0		750.0	
Salt	10.9		12.2	
Timber products		153.7		245.6
Sawn timber *		118.0		238.0
Total	344.8	153.7	1089.9	245.6
		118.0		238.0*
Grand total all port and private interisland/local	--	--	--	11026.6
			118.0*	238.0*

Exports Private Facilities (Stream)

	<u>Tonnage 1980</u>	<u>Tonnage 1985</u>
Sawn Timber *	55.0	160.0
Logs *	1041.0	1450.0
Total *	1096.0	1610.0
Grand Total		
All cargoes	9353.4	11026.6
Palembang	1214.0*	1848.0*

TABLE VI-2.1-2

MAXIMUM TONNAGES BOOM BARU (PROJECTION B)

	<u>1980</u>	<u>1985</u>
<u>Exports</u>		
Sawn timber *	55 *	160 *
<u>Imports</u>		
Rice	115.5	96.0
Sugar	14.5	21.6
Wheat & Flour	2.0	2.5
Cotton	5.6	6.9
Cement	25.0	50.0
Oil Products (20 %)	27.2	38.0
General Cargo (75 %)	104.0	157.0
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	293.8	372.0
<u>Domestic Unloaded</u>		
Rice	38.5	32.0
Sugar	57.9	86.4
Wheat & Flour	17.5	22.4
Salt (- 10)	11.7	24.4
Coconut oil	22.4	28.5
Coffee	2.2	2.8
General (50%)	83.0	125.0
Rubber	3.3	5.3
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	234.3	326.8
<u>Domestic Loaded</u>		
Sawn timber *	118.0	238.0
Timber products	153.7	245.6
General (50%)	22.0	38.0
	<hr/>	<hr/>
	175.7	283.6
	118.0 *	238.0 *
	<hr/>	<hr/>
TOTAL	703.8	982.4
	183.1 *	498.0 *

Resulting difference with assumption A.

5 % more imports
 200 more domestic unloaded
 260 - 500 000 tons more loaded

* 000's M³

TABLE VI-2.1-4

CARGO MOVEMENTS OVER BOOM BARU USING DIFFERENT ASSUMPTIONS

<u>Assumption</u>	<u>Year</u>	<u>Boom Baru</u>	<u>Stream</u>	<u>Pusri</u>	<u>Pertamina</u>
A - Distribution similar to 1974	1980	280.5	468.7	1183.3	6922.4
	1985	346.9	597.0	1638.8	7108.1
B - Maximum tonnage handled at Boom Baru	1980	876.8			
	1985	1380.4			
C - Maximum tonnage excluding sawn timber and timber products	1980	550.1			
	1985	736.8			
D - Maximum tonnage excluding increased ratio of general cargo	1980	799.5			
	1985	1250.3			

2.2 Organization of Short Term Improvement Projects.

The Short Term Improvement Projects were developed to meet recognized deficiencies in capacity, facilities, equipment, operational methods and administration. The projects are divided into the following categories :

- 1) Projects involving Facility and/or Equipment requisition or construction which are classed as development projects and would be financed by 'Additional Government Funding' or external loans (Figure VI-2.2-1).
- 2) Projects that are essentially operational improvement, which would be financed by internal budgets of BPP. The projects were organized into Floating Equipment, Pilotage and Navigation, Port Operations, and Port Facilities. The separation is obviously not strict as several of the proposed projects fall into more than one category. Similarly some of the development type projects of category 1 were found to require little funding or that the funding should be a BPP budget item.

2.3 Analysis of Short Term Improvement Projects.

After determining a need for an improvement an analysis was performed to quantify the need in terms of both capacity and performance specifications. Next, various alternatives were developed which met these specifications and their capital and operating costs were derived. A number of the most attractive among these alternative solution was then selected because of their low capital and operating cost, ease of operation or simplicity, expandability or superior performance. These were further developed by preparing conceptual designs or layouts for facilities. Various trade-offs were next considered until a satisfactory solution was derived.

An important consideration in the development of these projects was timing. It is necessary to assure provision of sufficient capacity to meet future demand including newly generated future demand resulting from improved productivity or facilities. On the other hand excess capacity is to be avoided, as well as large and sudden spurts of expenditures.

As a result it was attempted to establish a short term development program which provides desirable increases in capacity and performance with a reasonable and well spread capital investment which results in a gradually increasing total cost and a high probability of meeting these development and operating costs from newly generated revenues.

2.4 Financial Requirements.

The capital and operating costs of each project was determined for the year of actual expenditure by applying a 15% annual rate of escalation. Loan repayments and amortization of capital costs of projects in category 1 were extended over the economic life of the assets. Fixed facilities such as wharves and buildings for example were assumed to have an economic life of 25 years, large mechanical and floating equipment 10 years, and small mechanical and floating equipment 5 years. A ten percent interest rate was levied on the outstanding balance. It was furthermore assumed that during the year of actual capital expenditure, one half of the full years interest and capital repayment would become due. Total investment costs of the proposed Capital Short Term Improvement Projects during the 5 years period 1976-1980 is estimated at US\$ 14.43 million (Table VI-2.4-1) rising from \$ 2.1 million in 1976 to \$ 4.57 in 1978.

Assuming loan financing at 10% and repayment (linear) over the economic life of the asset, total operating, loan repayment and operating costs for these projects during

SHORT TERM IMPROVEMENTS PROJECTS (ADDITIONAL GOVERNMENT FUNDING)

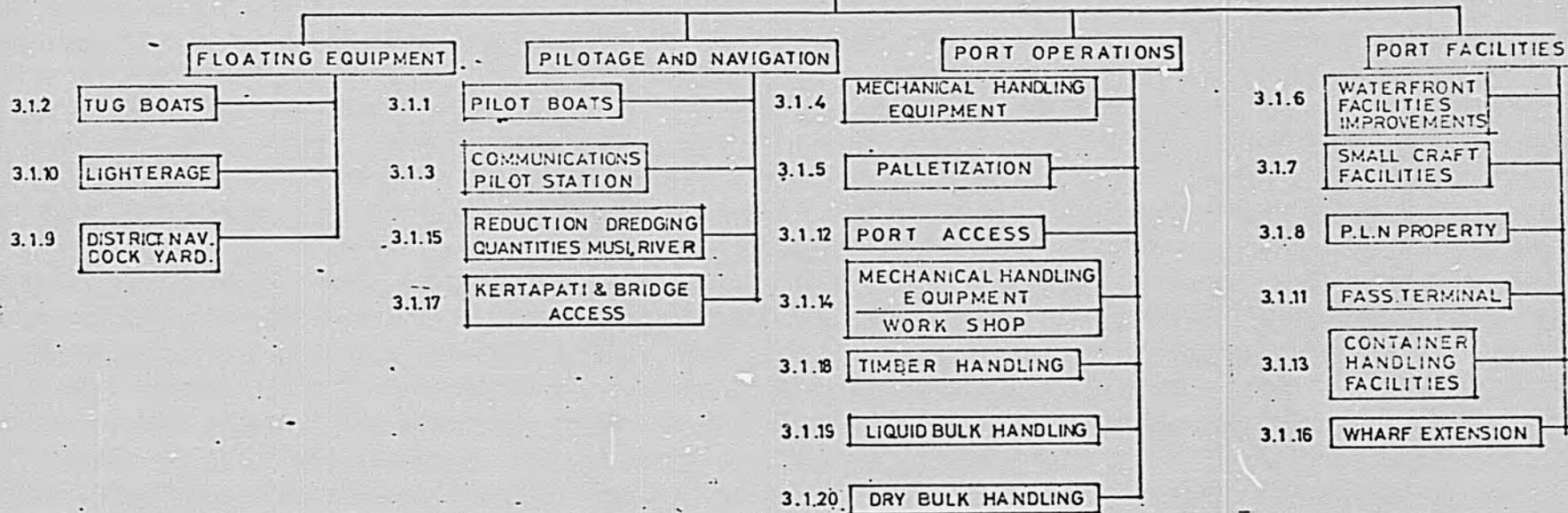


FIGURE VI-2.2-1

TABLE VI-2.4.-1

SHORT TERM IMPROVEMENT PROJECTS
SUMMARY OF PROJECT BUDGET ESTIMATES
 (Additional Government Funds)

(10% Interest on all Loans - Loans Repaid Over Economic Life of Assets)

PROJECT		CAPITAL COST (\$ 000)						TOTAL COST (\$ 000)					
No.	Title	1976	1977	1978	1979	1980	Total	1976	1977	1978	1979	1980	Total 5 yr. cost
3.1.1	Pilot Boats	600	-	-	-	-	600	56	1.78	184	191	202	811
3.1.2	Tug Boats	750	-	750	-	-	1500	75	284	376	495	542	1772
3.1.2a	Mooring Boats	80	80	-	-	-	160	8.0	24.0	30.4	28.6	27.2	118.4
3.1.3	Communications	32	-	-	-	-	32	6.4	12.9	8.6	8.0	7.3	43.2
3.1.4	Mechanical Handling Equipment	178	182	-	-	-	360	35.6	120.6	201.5	210.3	219.1	787.1
3.1.5	Palletization	64.5	51.7	59.5	68.2	78.5	322.4	75.0	63.4	74.0	84.9	98.0	395.3
3.1.6	Waterfront Facility Improvements	40	640	-	-	-	680	3.0	31.0	93.6	90.9	88.2	303.7
3.1.7	Small Craft Facilities	-	68	280	364	-	712	-	5.0	29.3	90.2	103.5	228.0
3.1.8	PLN Property Conversion	-	240	300	-	-	540	-	240	300	-	-	540.0
3.1.9	DN Dockyard Improvements	180	54	-	-	-	234	18.0	87.2	91.9	89.5	87.1	373.7
3.1.10	Lighterage	-	183	-	-	-	183	-	21.3	52.4	49.0	46.6	160.3
3.1.11	Passenger Terminal	90	-	-	-	-	90	6.3	17.9	17.6	17.3	17.0	76.1
3.1.12	Road Access	12	-	-	-	-	12	2.5	2.4	2.2	2.0	1.9	11.0
3.1.13	Container Handling	-	20	650	850	12	1532	-	2.0	67.0	259.0	413.8	801.8
3.1.14	MHE Workshop	35	-	-	-	-	35	3.2	9.5	9.2	8.8	8.4	40.3
3.1.15	Dredging Musi River	-	130	-	-	-	130	-	32.0	61.0	59.0	57.0	209.0
3.1.16	Main Wharf Extension	50	2000	2286	2370	-	6726	5.0	198.6	541.0	868.0	1115.3	2727.9
3.1.17	Kertapati and Bridge Access	1	-	-	-	-	1	-	-	-	-	-	-
3.1.18	Timber Handling	-	-	-	142	-	142	-	-	-	10.1	54.2	64.3
3.1.19	Liquid Bulk Handling	-	-	248	-	-	248	-	-	24.8	53.9	51.4	130.1
3.1.20	Dry Bulk Handling	-	216	-	-	-	216	-	32.4	106.0	102.5	99.0	339.9
T O T A L		2112.5	3664.7	4573.5	3794.2	90.2	14435.1	294.0	1362.2	2270.5	2718.2	3239.0	5933.1

1976-1980 amounts to \$ 9.9 million, with total annual costs rising gradually from \$ 294,000 in 1976 to \$ 3.24 million in 1980. The financial scheduling was designed to permit payments to follow the potential increases in port revenues and therefore permit the port to repay the improvement cost from such new revenues. It should be noted that the improvement projects are designed for a 130% increase in port traffic with a proportional increase in revenues.

3.1.1 Pilot Boats.

1. Project Number - 1:
2. Project Title : Pilot Boats
3. Background

At the present time there are three pilot boats in operation, two at Palembang and one the Musi River Outer Bar pilot station. While one of the pilot boats is quite new, the rest are older boats and all are very slow with speeds ranging from about 6 to 7½ knots.

The AP-032, the newest pilot boat, is a rather heavily built tow boat type of boat, with a Dutch-Indonesian diesel engine of 140 shaft horse power (SHP), built in 1969. The principal characteristics of the boat are as follows :

Length	- 20 meters	- 66 feet
Draft	- 2.5 meters	- 8 feet
Speed	- Nominally 8 knots - Actually about 7.5 knots.	

The maximum current in the Musi River is stated to be about three knots and the distance from the pilot station to where the pilots board inbound ships is about 25 kilometers or 15.6 miles.

Since most ships enter the Musi River at from half to full tide the pilot boats usually have to run against the current at an average speed over the ground of 4.5 to 5.0 knots and the one way trip from the pilot station to the ships standing off the bar takes about three hours.

Again, since most outgoing ships plan their schedules such that they arrive at Payung Island at high water, they usually pass through the Outer Bar three hours after high water and the pilot boats have to run back to the pilot station against the current consuming another three hours.

One of the best criteria for determining the adequacy of the pilot boat service is the opinion of its customers. As a group their consensus is that there are too many delays in arrival of pilots due to mechanical equipment failure, that there are insufficient boats to serve the pilots needs, that the pilot boats are too slow and that if pilots are delayed or it is necessary to send to Palembang for a relief pilot boat the ships awaiting pilots will be delayed until the next high water a period of time a little over 24 hours.

A pilot boat is a means of transporting highly qualified personnel who are in short supply and it should be a reasonably fast and stable boat for embarking and disembarking pilots off the Musi River Outer Bar. Many successful pilot boats operating under conditions similar to those at the Musi River entrance are using fast 18 to 20 knots boats of about 40 to 45 feet length powered with about 400 to 480 SHP.

4. Project.

a) Description.

Procure two pilot boats of about 40 feet in length equipped with about 480 SHP and having a speed of about 18 to 20 knots.

b) Stage of Preparation

While PPA has requested action on the project under consideration no action has been taken to date.

c) Limiting Factors

None

d) Implementation Schedule.

The project should be initiated at an early date by 1976 for delivery in late 1976 or early 1977.

e) Organization and Administration

No change.

5. Cost Estimates - Also see Table VI-3.1.1-1

a) Capital Costs (1976)

\$ 600,000

b) Recurrent Costs

1) Maintenance @ 5% year

\$ 30,000

2) Crew (2 shift basis)

\$

3) Fuel (two boats)

\$ 42,000

6. Manpower Requirements

The present pilot boats have a crew of about 8 men. The proposed pilot boats should have a crew of about 4 men for single crew operation with another 4 men crew for double crew operation. It is envisioned that each pilot boat will have on board only one crew at a time and that the second crew will be quartered at the pilot station. The total number of men would be about the same.

7. Land Problems and Requirements

There are no land problems or requirements.

8. Benefits and Justification.

The acquisition of the new pilot boats will permit the operation of fast pilot boats in lieu of slow boats with a resulting economy of operation and reduction of pilot dead time.

Fast new pilot boats will eliminate the many complaints from the shipowners about the late arrival of pilots due to broken down or very slow pilot boats which frequently result in the loss of a tide by an arriving ship and a consequent delay of about 25 hours (high water to high water).

8. Benefits and Justification (continued)

When the two men pilot boats are on duty it is recommended that the AP-032 be assigned duty as a survey vessel. It has all of the requisites of a satisfactory general service survey vessel, although it could use a little more speed.

A secondary assignment for the AP-032 would be that of a tugboat in the Port of Palembang. It has the necessary hull configuration and if equipped with a reasonable fendering system would make a very satisfactory small to medium size tugboat.

A tertiary assignment for the vessel would be as a reserve Outer Bar pilot boat.

It is assumed that the AP-17 and AP-18 will continue to function as harbor pilot boats where their slow speeds will not be a serious handicap.

The pilot boat situation at the pilot station is often satisfactory when two boats are in operation there. However, when one boat is in operation, it has spent up to 12 hours waiting to collect all pilots before returning to the pilot station. The average waiting time to collect all pilots is about four hours. Because the pilot boat is so slow, it will not return to the pilot station if the next ship is due within three hours. The best answer to this problem is to operate faster pilot boats.

TABLE VI-3.

Department :

Project No. : ...3.1.1.....

Head No. :

Description : PILOT BOATS.....

Item	Year (\$ 000)						Breakdown of Capital Costs (\$ 000)						
	1976	1977	1978	1979	1980	Total 1976-80	Local	Foreign Exchange				Net Increase 1976 - 80	
								Indirect		Direct			
Capital Costs -													
Pre-Investment													
Land													
Construction													
Equipment													
Other	600					600							
Total Capital Costs	600					600							
Operating Expenses -								Breakdown of additional Staff Requirements					
Personal Emoluments							Adm. & Managerial Professional Executive Sub-Professional Clerical Technical Industrial and Manual Group : Skilled Unskilled	1976	1977	1978	1979	1980	
Travel & Transportation of Persons													
Communications													
Utilities (Fuel)		42	48	56	64	210							
Rent or Hire													
Printing Services													
Supplies & Materials													
Maintenance Contractual Services		30	35	40	46	151							
Furniture Equipment & Livestock													
Lands													
Constructions													
Investment & Loans	56	106	101	95	92	450							
Miscellaneous Services													
Total Operating Costs	56	178	184	191	202	811	Total						
Renewal Costs													
GRAND TOTAL	56	178	184	191	202	811							

3.1.2 Tugboats

1. Project Number - 2.
2. Project Title - Tugboats.
3. Background

The liner shipping services are now using ships in the 10,000 to 12,000 and sometimes up to about 20,000 DWT in their Southeast Asia operations and it is in the interest of the Port of Palembang and the development of South Sumatra that these ships be capable of safely operating up the Musi River to the heart of the areas industrial center, Palembang.

The PPA which requires by law that all ships over 60 meters in length must have tug assistance in docking and undocking in Palembang is itself required to furnish the necessary tugboat service to meet the port needs. The port, however does not own a docking tugboat and leases a tugboat to partially compensate for its lack of towing facilities.

In order that the port will be able to handle the maximum size vessels permitted in the port, vessels in the 135 to 185 meter length category, and will be able to service the increasing towing need, the port needs two large tugs which are under the control and administration of the Port Administrator.

The docking pilots report that they dock and undock about 330 ships per month in a slow month, 600 ships in a busy month and about 460 ships in an average month.

About half of the above dockings occur at the Pertamina facilities at Plaju and Sungai Gerong about 10 kilometers below the center of Palembang.

All vessels over 60 meters in length require tow boat assistance in docking and undocking. The average number of

such vessels docking per month at facilities other than Pertamina is about 92 ships per month.

The number of tug assisted ship docking cycles per month exclusive of Pertamina activities is scheduled to increase by about 40 as the result of projected increases at Pusri and Kertapati alone within the next three years.

The average docking cycle time is given in Table VI-3.1.2-1 as 2.62 hours and the tugboat docking workload in 1978 will be about $2.62 \times 132 = 345$ hours per month or 4150 hours per year.

The ship docking workload fluctuates somewhat with the tides with the demand being higher at some stages of the tide than at others.

Due to the total number of operating hours required per year, the unpredictable schedule demands and the usual down time particularly for Indonesian vessels, two tugboats will be required to fulfill the required needs.

The tugs equipped for ship handling, docking and undocking etc, are usually fairly short, very maneuverable and well powered vessels. The minimum size tugs recommended would have a length of 80 to 90 feet and have at least 800 shaft horse power installed.

If the tugs are to be used regularly for docking large tankers at the Pertamina jetty type facilities, a minimum horse power of 1200 would be more appropriate and recommended.

4. Project.

a) Description

It is proposed that PPA acquire two large harbor tugs with the following principle characteristics.

Length - 90 to 100 feet
 Beam - 24 to 27 feet
 Depth - 12 - 15 feet
 Draft - 9 - 12 feet
 Horsepower - 800 to 1000 shp.

b) Stage of Preparation

The state of preparation for PPA to acquire tugboats for its operations is somewhat clouded. Apparently Pertamina is to obtain a 1500 SWP tug for service around its Plaju and Sungai Gerong terminals. However, PPA has previously requested that its floating craft allowance include two docking tugboats.

c) Limiting Factors.

None.

d) Implementation Schedule.

The first tug should be delivered as soon as possible either in late 1976 or early 1977 and the second tug should be scheduled for delivery in 1978.

e) Organization and Administration.

No changes required.

5. Cost Estimate - See Table VI-3.1.2-1

a) <u>Capital Cost 1976</u>	\$ 1,500,000
b) <u>Recurring Costs</u>	
1) Maintenance	\$ 75,000
2) Crew costs - 2 (1 captain, 1 mate, 1 chief engineer, 1 asst. engineer, 4 seamen, 2 greasers and 1 cook)	\$
3) Fuel costs	\$ 100,000

6. Manpower Requirements.

The addition of two large tugs to the floating craft allowance of PPA will require an increase in their personnel allowance as follows

<u>Item No.</u>	<u>Position</u>	<u>Number per tug</u>	<u>Total number required</u>
1	Captain	1	2
2	Mate	1	2
3	Chief engineer	1	2
4	Assistant engineer	1	2
5	Seamen	4	8
6	Greasers	2	4
7	Cook	1	2
8	Total	<u>11</u>	<u>22</u>

The above crew would be required for full time operation. If one shift operation the following crew would be required per tug

1	Captain	1
2	Chief engineer	1
3	Seamen	2
4	Greaser	1
5	Cook	1
6	Total	<u>6</u>

7. Land Problems and Requirements

None

8. Benefits and Justification.

The benefits to be derived from the acquisition of two 800 HP tugs are : the port will be able to advertize the fact that it has two large tugs available which will assist

in attracting traffic to the port. The port presently advertizes that it has a 350 HP tug which is an indication of a limited port facility; the port will be able to handle the maximum sized vessel which may come to its facilities and will be able to accommodate the expected increase in the volume of ship traffic in the port; the anticipated volume of work available for the tugs should make the tugs self-supporting provided reasonable charges for tug services are required; the port will have under its control the necessary equipment to discharge its obligation under the law without having to pay high prices for inadequately powered equipment.

TABLE VI-3.1.2-1

Department :
 Head No. :

Project No. :².....
 Description : PROCURE TWO TUG BOATS

Item	Year (\$ 000)						Breakdown of Capital Costs (\$ 000)							
	1976	1977	1978	1979	1980	Total 1976-80	Local	Foreign Exchange						
								Indirect		Direct				
Capital Costs -														
Pre-Investment														
Land														
Construction	750		750			1500								
Equipment														
Other														
Total Capital Costs	750		750			1500								
Operating Expenses -														
Personal Emoluments														
Travel & Transportation of Persons														
Communications														
Utilities (Fuel)	-	100	173	265	304	842								
Rent or Hire														
Printing Services														
Supplies & Materials														
Maintenance Contractual Services	-	38	64	99	114	315								
Furniture Equipment & Livestock														
Lands														
Constructions														
Investment & Loans	75	146	139	131	124	615								
Miscellaneous Services														
Total Operating Costs	75	284	376	495	542	1772	Total							
Renewal Costs	-	-	-	-	-									
GRAND TOTAL	75	284	376	495	542	1772								

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3.1.2a Mooring Boats or Small Tugs

1. Project Number - 3.1.2 (a)
2. Project Title - Mooring Boats or Small Tugs.
3. Background

The port has a collection of mooring boats two of which are of old wooden construction and are not in condition to be renovated and it has two small new mooring boats. All of the mooring boats are very slow, underpowered and overworked due in large part to the down time of the older vessels.

At the present time PPA does not have in its floating craft a good small tugboat. Since the operations of PPA will expand and will include the use of a few lighters as well as a water barge and other craft, PPA will have a need for small tug towing services. As it is possible to combine the capabilities of a good small tug and a good mooring boat into one vessel it is recommended that the two old and inadequate wooden construction mooring boats be scrapped and replaced by two modern combination small tug and mooring boats.

4. Project.

a) Description

Procure two combination small tug and mooring boats for use by the port for mooring duty and general towing services.

The boats will serve primarily as mooring boats but will be available and handy for general port towing purposes. It is proposed that vessels to be acquired under this project will be about 15 meters in length and about 2.2 meters in depth with about 240 horsepower installed.

b) Stage of Preparation

None.

c) Limiting Factors.

None.

d) Implementation Schedule.

It is recommended that one of the combination mooring and tug boats be acquired in 1977 and the other in 1978.

e) Organization and Administration

No change.

5. Cost Estimates.

a) Capital Costs US\$ 160,000

b) Recurrent Costs.

Since the two boats will be replacing-exchange two existing boats it is assumed that the recurrent costs for maintenance, crew and fuel will be about the same as at present.

6. Manpower Requirements.

NO change.

7. Land Problems and Requirements.

None.

8. Benefits and Justification.

The requirements for mooring boats have been developed as follows.

Table VI-3.1.2-2 is the result of an analysis of the time requirements for a docking and undocking cycle for a mooring boat.

Given the cycle time per mooring boat the number of mooring boats required by the Port of Palembang is computed as follows.

TABLE VI-3.1.2-2

OPERATIONAL DATA - MOORING BOAT

<u>No.</u>	<u>Description of work item</u>	<u>Est.time hours minimum</u>	<u>Est.time hours maximum</u>	<u>Est.time hours average</u>	<u>Recommended time hours standard allowance</u>	<u>Comments</u>
<u>SHIP DOCKING</u>						
1.	Time from base to incoming ship	0.13	0.22	0.17	0.17	
2.	Time standing by or assisting docking ship	0.99	1.06	0.96	0.96	
3.	Time from ship docking back to base	0.13	0.13	0.17	0.17	
4.	Sub-total time docking	1.25	1.50	1.30	1.30	
<u>SHIP UNDOCKING</u>						
5.	Time from base to docked ship	0.13	0.22	0.17	0.17	
6.	Time standing by or assisting undocking ship	0.19	1.06	0.86	0.86	
7.	Time from ship undocking back to base	0.13	0.22	0.17	0.17	
8.	Sub-total undocking	0.75	1.50	1.20	1.20	
9.	Total vessel time docking and undocking	2.00	3.00	2.50	2.50	

a) The number of ships per year requiring docking and undocking	6,580 (1)
Total cycle time for docking and undocking	<u>2.5</u>
Subtotal hours of mooring boat time required per year	16,458

- b) Assuming that one mooring boat can operate a maximum of about 4000 hours per year on multiple shift operation there is a need for four operational mooring boats.

The benefits to be derived consist mainly of the greater efficiency which would be obtained by replacing two old wooden mooring boats which are not worthy of further extensive maintenance and repairs. The new combination mooring and tug boats would be faster more versatile and would replace boats which are considered to be unsuitable for their purpose.

The port would further benefit by having a substantial small tug towing capability in its fleet which will prove to be a necessity with the expanding port activities.

(1) Obtained from Table IV-2.3.2-5 and equals the number of vessels which should take a docking pilot.

Department :

Project No. : 3,1,2,a.....

Head No. :

Description : MOORING BOATS.....

Item	Year (\$ 000)						Breakdown of Capital Costs (\$ 000)							
	1976	1977	1978	1979	1980	Total 1976-80	Local	Foreign Exchange						
								Indirect		Direct				
Capital Costs -														
Pre-Investment														
Land														
Construction														
Equipment	80	80				160								
Other														
Total Capital Costs	80	80				160								
Operating Expenses -														
Personal Emoluments														
Travel & Transportation of Persons														
Communications														
Utilities (Fuel)														
Rent or Hire														
Printing Services														
Supplies & Materials														
Maintenance Contractual Services														
Furniture Equipment & Livestock														
Lands														
Constructions														
Investment & Loans	8.0	24.0	30.4	28.8	27.2	118.4								
Miscellaneous Services														
Total Operating Costs	8.0	24.0	30.4	28.8	27.2	118.4	Total							
Renewal Costs														
GRAND TOTAL	8.0	24.0	30.4	28.8	27.2	118.4								

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Adm. & Managerial
Professional
Executive
Sub-Professional
Clerical
Technical
Industrial and
Manual Group :
 Skilled
 Unskilled

3.1.3 Communications - PPA Fleet.

1. Project Number - 3
2. Project Title - Communications - PPA Fleet and Pilot Station.
3. Background.

The communication network operated by PPA is inadequate for its task. PPA Palembang Radio (PPR) has difficulty reaching the pilot station except under favorable conditions and there are virtually no communications between the pilot station or PPR and any of the floating vessels except by virtue of one walkie talkie radio in use at the pilot station. There have been many adverse comments by industry on the inadequacy of communications from a ship to the pilot station etc.

4. Project.

a) Description

It is proposed that the PPR and the pilot station be equipped with radio equipment of sufficient power such that they can communicate satisfactorily under most atmospheric conditions and that the major PPA fleet units be equipped with radio telephones of about 10 watts power output.

b) State of Preparation

PPA is aware of the communications difficulties and is evaluating its communications system prior to recommending changes.

c) Limiting Factors

The distance between PPR and the pilot station about 54 miles is too great for VHF or UHF frequency use without resorting to expensive high antenna systems and the range of most low powered equipment is limited.

d) Implementation Schedule.

PPR and the pilot station should be equipped with adequate radio gear as soon as possible or about late 1976 or early 1977.

The new tugs and pilot boats should come equipped with satisfactory radio equipment.

The AP-032 whether operated as a pilot boat or survey boat should be radio equipped in 1976 as will the three primary aids to navigation light attendant vessels should be radio equipped in late 1976 or early 1977.

e) Organization and Administration

No change.

5. Cost Estimates.

a) Capital Costs

1) Two 150 watt radio transceiver units one for PPR and the other for the pilot station for 100 mile range @ \$ 6000	\$ 12,000
2) Four 10 watt VHF crystal controlled radio transceivers one each for the AP-032 and three aids to navigation boats @ \$ 5000	\$ 20,000
Total capital cost	US \$ 32,000

b) Recurrent Costs

1) Maintenance 6 units @ \$ 600	\$ 3,600
2) Crew costs - No additional	
3) Fuel costs - negligible	
Total recurrent costs	US \$ 3,600

6. Manpower Requirements

No additional requirements.

7. Land Problems and Requirements

None

8. Benefits and Justification

Providing adequate radio equipment for PPR, pilot station and the major floating units will make it possible for PPR to contact the pilot station on the fleet units any any time for routine operational calls which will substantially improve the service rendered to the maritime public and will eliminate the complaint about inadequate communications on the part of the shipping interests. If PPA is going to require pilotage and docking assistance, PPR should be able to communicate with the fleet doing the work.

In addition if the tugs are fire fighting unit equipped and they should be, they will need radio to be effective fire fighting units. Also in view of the fact that most PPC units are good search and rescue (SAR) vessels they should be radio equipped for SAR purposes if for no other purpose.

TABLE VI-3.1.3-1

Department :

Project No. :³.....

Head No. :

Description :
COMMUNICATIONS - PPA FLEET
(5 Year Economic Life)

I t e m	Year (\$ 000)						Breakdown of Capital Costs (\$ 000)					
	1976	1977	1978	1979	1980	Total 1976-80	Local	Foreign Exchange				
								Indirect		Direct		
Capital Costs -												
Pre-Investment												
Land												
Construction												
Equipment												
Other	32	-	-	-	-	32						
Total Capital Costs	32	-	-	-	-	32						
Operating Expenses -												
Personal Emoluments												
Travel & Transportation of Persons												
Communications												
Utilities (Fuel)												
Rent or Hire												
Printing Services												
Supplies & Materials												
Maintenance Contractual Services		3.6				3.6						
Furniture Equipment & Livestock												
Lands												
Constructions												
Investment & Loans	6.4	9.3	8.6	8.0	7.3	39.6						
Miscellaneous Services	-	-	-	-	-							
Total Operating Costs	6.4	12.9	8.6	8.0	7.3	43.2	Total					
Renewal Costs												
GRAND TOTAL	6.4	12.9	8.6	8.0	7.3	43.2						

3.1.4 Procure Mechanical Handling Equipment (MHE)

1. Project Number - 3.1.4
2. Project Title - Procure Mechanical Handling Equipment.
3. Background

The Port of Palembang is essentially a manual labor cargo handling port although there is some forklift truck (FLT) handling of cargo performed. PPA has about seven FLT in its inventory; of equipment most of which are inoperable. Several of the FLTs will never see service again and should be surveyed and replaced.

If the PPA Boom Baru facilities are to handle the amount of cargo which is being handled per gang hour in other efficient ports (ie 17 to 20 tons of general cargo per hatch gang per hour at Singapore) the facilities will have to be increased and the port will have to palletize all of the cargo which can be effectively palletized. The improvement achieved at Tanjung Priok with an increase of MHE and the adoption of palletization has exceeded the consultants performance estimates and is running at better than 30 percent.

PPA now has four mobile truck type cranes ranging in size from about five to fifteen ton capacity. Unfortunately the cranes are general purpose cranes which are somewhat slow at handling multiple similar lifts of light cargo loads. Two of the cranes have lost their mobility but are still in use being pushed by FLTs from position to position. Their hoisting gear is still operable and they are still preferred to other cranes due to their fast speed of operation.

The port handling of cargo by cranes would be greatly

improved by obtaining several fast operating cargo handling cranes.

A review of Table VI-3.1.4-1 indicates that there has been a tendency to order larger equipment than is required for the port. Oversizing MHE equipment is generally not an economical practice.

There is a requirement for heavy lift equipment in the port which should be handled by PPA. This subject will be presented in Section 3.1.13.

4. Project.

a) Description.

The project is to acquire the number of FLTS and small cranes usually associated with an efficient mechanized and palletized port operation. The number of FLTs and cranes required is contained in Table VI-3.1.4-1.

b) State of Preparation

PPA realizes that Boom Baru needs additional MHE and has submitted requisitions for additional FLTs and cranes. The MHE which has been approved by the Crash Program and the BPP capital budget 1976 are indicated in Table VI - 3.1.4-1 and have been deducted from the recommended list of MHE now needed by PPA. (In the meantime (Dec.26,1975) we are informed that 13 forklifts and 3 mobile cranes have been obtained through an ExIm Bank loan to the Federal Government).

c) Limiting Factors.

None.

d) Implementation Schedule.

The implementation schedule is contained in the cost estimates.

e) Organization and Administration

No changes required.

5. Cost Estimates.

a) Capital Costs

i. Forklift trucks

1976	5	- 5000 lb units @ \$ 13,800	=	US\$ 69,000
1977	5	- 6000 lb units @ \$ 17,250	=	US\$ 86,250
1977	1	-20000 lb unit @ \$ 33,350	=	US\$ 33,350

Subtotal US\$ 188,600

ii. Mobile cranes

1976	2	- 6000 lb units @ 21' R (Pickrover R-5) @ \$54,400	=	US\$ 108,800
1977	1	- 6000 lb unit @ 21' R (Pickrover R-5) @ \$62,500	=	US\$ 62,500

Subtotal US\$ 171,300

Total US\$ 259,900

or say US\$ 260,000

b) Recurrent Costs.

i. Maintenance (5% per year) US\$ 12,000

ii. Crew - one driver per MHE unit

per shift	1977 - 14	US\$ 8,400
	1978 - 28	US\$ 16,800

iii. Fuel

	1977	US\$ 28,000
	1978	US\$ 56,000

6. Manpower Requirements.

The FLT's and the small cranes will require one additional driver per unit per shift.

7. Land Problems and Requirements.

The only land problems associated with this project is that it requires for a new adequately sized, constructed and equipped MHE workshop which is now a project on the BPP capital budget 1976.

8. Benefits and Justification

The cargo handling rate per hatch gang per hour for general cargo in Palembang is about eight to ten tons. This is indicative of an inefficient manual labor type of cargo handling which cannot be continued successfully for very long. In the most efficient ports, those full mechanized and with maximum palletization, the cargo handling rate for general cargo is about 16 to 20 tons per hatch gang per hour. Tanjung Priok has experienced about a 30 percent increase in productivity as a result of the recent introduction of palletization and increased mechanization in cargo handling. The benefits to be derived from an increase in productivity of about 30 percent include the following

Benefits

- a) Reduction ship turn around time about 25 percent
- b) Decrease in pier space requirements three berths will serve where four are now required
- c) Improving the turn around time will attract additional shipping
- d) The time when additional pier facilities will be required will be pushed further into the future and the port will be able to handle significantly more cargo
- e) Increased cargo revenues.

The benefits to the port are primarily the additional revenue derived from ships attracted to the Boom Baru wharves as a result of improved cargo transfer rates and the increase in cargo revenues resulting from the increase in the total amount of cargo handled. These benefits estimated to result in an increase in port revenue of about Rp.200 million per year are obviously not only the result of improved MHE capability, but include the effects of other improvements.

TABLE VI(-3.1.4-1
MECHANICAL HANDLING EQUIPMENT
FORKLIFT TRUCK AND MOBILE CRANE REQUIREMENTS

Item No.	Equipment Assignments	Forklift Truck			Mobile Cranes			Heavylift Cranes
		Capacity in Pounds			Capacity in Pounds			
		5000	10,000	20,000	6000	10,000	20,000	
1.	<u>Ocean Berths</u>				@ 10 M	@ 10 M	@ 10 M	
	1	2	.		1			
	2	2	1		1	1		1 - 30 T
	3	2		1	1		1	
	4	2	1		1			
	Operating spares	2	:		1			
2.	<u>Warehouses</u>							
	A - B	1						
	D - E	2						
	H	1						
	T	2						
	Operating spares	1						
3.	Operational Re- quirements	17	2	1	5	1	1	1
4.	Maintenance and Repair allowance 20 %	4	-	-	1	-	-	-
5.	Total MHE Require- ments	21	2	1	6	1	1	1 - 30 T
6.	MHE on hand or repairable	4	1	-	-	2	2	-
7.	Crash Program Authorizations	-	5	-	-	-	1	1 - 25 T
8.	BPP Capital Budget 1976	3	-	-	-	-	-	-
9.	MHE Requirements New Authoriza- tions	10	(+ 4)	1	3	(+ 1)	(+ 2)	-

COMMENTS ASSOCIATED WITH TABLE VI-3.1.4-1

Mechanical Handling Equipment Requirements Fork Lift

Forklift Trucks

Assumptions

1. That the maximum sustained load assumed for the Boom Baru terminal would be three medium sized ships, 150 to 170 meters in length, discharging two hatches each simulatneously.

Comments Associated with Table VI-3.1.4-1 (Continued)

2. That the cargo is being taken to transit sheds for interim or short term storage.
3. That a reasonably quick turnaround is desired to reduce shipping costs.
4. That the cargo will be palletized.
5. That all of the ports four primary warehouses will be in operation.
6. A larger forklift truck within limits can perform the work of a smaller forklift truck but not vice versa.
7. The smaller forklift trucks are generally cheaper to buy, easier to maintain, faster in operation and generally more useful.
8. The cost differential between 4000 and 5000 pound forklift trucks is so small that 5000 pound forklift trucks are usually recommended.
9. All mechanical equipment should be ordered with a minimum of three years spareparts at a cost of about 15 percent of cost of equipment. A spareparts allowance of 15 % has been included in MHE pricing. ,

TABLE VI-3.1.4

Department :
 Head No. :

Project No. : ...3.1.4.....
 Description : PROCURE MECHANICAL HANDLING EQUIPMENT
 (Economic Life 5 Years)

Item	Year (\$ 000)						Breakdown of Capital Costs (\$ 000)					
	1976	1977	1978	1979	1980	Total 1976-80	Local	Foreign Exchange				
								Indirect		Direct		
Capital Costs -												
Pre-Investment												
Land												
Construction												
Equipment	178	182	-	-	-	360						
Other												
Total Capital Costs	178	182	-	-	-	360						
Operating Expenses -								Breakdown of additional Staff Requirements			Net Increase	
Personal Emoluments		10	22	26	29	87						1976 - 80
Travel & Transportation of Persons												
Communications												
Utilities (Fuel)		28	64	74	85	251						
Rent or Hire												
Printing Services												
Supplies & Materials												
Maintenance Contractual Services		12	14	16	18	60						
Furniture Equipment & Livestock												
Lands												
Constructions												
Investment & Loans	35.6	70.6	101.5	94.3	87.1	389.1						
Miscellaneous Services												
Total Operating Costs	35.6	120.6	201.5	210.3	219.1	787.1	Total					
Renewal Costs												
GRAND TOTAL	35.6	120.6	201.5	210.3	219.1	787.1						

1. Project Number - 3.1.5
2. Project Title - Introduction of Palletization
3. Background

Palletization - Unitization

General cargo handling at Boom Baru needs urgent improvements. Arriving cargo is loaded in the hatches onto nets, loading boards (bak semen) etc. and heavier cargoes such as steel, gas bottles are transferred to the wharf by sling. Once landed on the wharf the cargo is then separated and transferred in small units of 30-100 kgs by handcarts from ship's side to the open or covered storage areas, where the cargo is stacked again on the ground in heights convenient for manual handling. Relatively little use is made of the forklifts (FLT) belonging to the BPP. Two shipping lines own 2 FLTs each and use these at times. Exports are dealt with similarly; and scrap steel for instance is being loaded very inefficiently by slings. Wherever imports or exports are handled by direct delivery, the cargo is unloaded or loaded manually and in small units from or onto the trucks, onto or from nets, loading boards or slings. The concept of palletization of any other form of unitization is practically unknown to exist.

The present method of cargo handling represents substantial losses to the country's economy, the port's finances and increases the cost of consumer goods because of :

- a) longer loading and unloading times for ships in the port, resulting in longer turn around times
- b) damage to import and export cargoes
- c) excess personnel costs
- d) decrease of the cargo handling capacity of the existing facilities.

e) expediting the need for new terminal facilities.

Cargo unitization is an extremely simple concept. The term refers to various methods whereby a number of small units of cargo can be put together and handled as a unit of standard size, with the use of mechanical handling equipment, or whereby large items difficult to handle and to stow can be packed as standard-sized units, capable to be handled by mechanical equipment. The objective in unitizing cargo is to reduce and simplify handling processes by eliminating the handling of small items and thus reduce the overall cost of transport in general and cargo handling in particular. Unitized cargo is mechanically handled thus reducing the amount of labor required, reducing damage to cargo while speeding up the various stages of cargo handling.

Although the use of containers is most commonly known, this is by no means the only method of unitization. The major methods at present in use are :

- a) containerization
- b) use of roll-on/roll-off (Ro-Ro) vessel
- c) use of barge carrying vessels (LASH)
- d) the pre-slinging of cargoes
- e) palletization

While specialized vessels are used for the Ro-Ro, LASH or containerization concept of unitization, pre-slung or pre-palletized cargoes do not require specialized vessels and can be successfully accommodated in break-bulk general cargo vessels.

It is initially proposed to introduce pallets for the port's day to day cargo handling operation but aiming eventually to introduce through palletization (door to door) to the port users and onto an increasing number of RLS vessels. At the same time it is proposed that BPP passes regulation aimed at forcing cement importers to import cement bags pre-palletized or pre-slung.

4. Project.

a) Description

BPP should inaugurate as soon as possible a program aimed at palletizing all cargo handling operations to the maximum extent possible by :

- i) Palletizing its own inter-wharf cargo handling
- ii) Institute a program to through-palletize cargo from and to local customers and manufacturers
- iii) Prepare legislation whereby cement and other long runs of cargoes must arrive to the port in pre-palletized or pre-slung form
- iv) Initiate a through-pallet service from PPA facilities onto a maximum number of vessels calling regularly at Boom Baru

b) Stage of Preparation

While BPP owns no pallets, neither has the required experience nor sufficient mechanical handling equipment to inaugurate palletized cargo handling operations, the fact remains the BPP has the talent to operate the system, pending completion of study of all details of this type of operations - and after having obtained the required mechanical cargo handling equipment.

c) Limiting Factors.

The limiting factors are many folds - and could be complex if not properly handled.

- i) redundancy of labor - one of the main benefits of palletization is the reduction of the size of gangs - mainly on the wharves, in the sheds and open storage areas and those engaged in transporting cargo from ship's side to the godowns and open storage areas.

It is estimated that 30-40% of the labor force would be redundant once the system is fully working. Natural attrition would reduce the labor force by some 5% annually - but if to hasten the process, alternative employment and a retraining program initiated for those no longer needed, if to avoid labor trouble.

- ii) Training Schemes - the introduction of palletization and its successful implementation is depending very much upon the skills of the labor. Whereas we foresee no difficulty that labor will be successfully asked to acquire all knowledge and skills required for palletized cargo handling operations - adequate training schemes must be developed for retraining of port labor. These training schemes should include among others
- a) Forklift truck (FLT) drivers/crane drivers course - covering : principles of the FLT and cranes and their safe operation; driving FLTs and/or cranes , and handling of various types of cargo; stowing and stacking; daily maintenance and checks; technical specifications; work safety, etc.
 - b) Stevedoring course - covering : the use of pallets and slings; safe loading of pallets with various types of cargoes; use of slings and ropes; use of nets; security of wires; handling and stowage of various cargoes in ship's hold; work safety, etc.
 - c) Winchman/Deck Crane Operators/Signalmen Course - covering : types and parts of rigs; types of deck cranes; blocks and tackles; operating winches and signalling; combined use of shore and ships' cranes; security and plumbing; work safety, etc.

iii) Procurement of Mechanical Cargo Handling Equipment.

The procurement of equipment must be coordinated with the progress made in the introduction of palletization so as to utilize the equipment to the best possible extent. The acquisition of the right types of equipment is a precondition and should follow the analysis of types of cargo to be handled at BPP facilities. The establishment of modern equipment maintenance facilities and the setting up of strict maintenance and routine check regulations together with an adequate supply of spare parts will guarantee the availability of the right equipment at all times.

iv) Through-pallet-service.

In many ports one of the main reasons for not providing a through-pallet-service to local customers and manufacturers and/or to vessels is the fear of losing the pallets. However, the recovery of pallets need not present serious problems, since all cargo leaving the port to local customers - with cargo, or empty to manufactureres could be accompanied by a Tally Clerk's debit bill. Similarly the Tally Clerk should charge the vessel with the number of pallets taken aboard and later credit the ship with the pallets returned. Ships and customers would be billed for missing pallets. All BPP pallets should be ready identifiable with burned-in stencil marks.

d) Implementation Schedule

The implementation of the program - taking into consideration all limiting factors - should be started with immediately.

e) Organization and Administrative Arrangements.

- 1) Negotiation should be held between BPP, UKA and the port users on all implications relating the change of operating systems and the reduction of labor force.
- ii) A training section should be set up at BPP, responsible to the Administrator. This section should be responsible with all matters regarding training of port labor, the setting up of a centre, the setting up of syllabus, the hiring of staff and trainers. This training centre could in future handle all matters of BPP's training including that of administrative staff.

5. Cost Estimates.

The cost estimates for the project include (i) the procurement of some 1000-2500 pallets per year over the next 5 years starting with 1000 units/year. (Estimated 20 yearly uses per pallet at 1.5 ton/pallet = $20 \times 1.5 \times 1000 \times 0.8 = 24,000$ tons) (ii) The setting up of a repair workshop for pallets. The costs associated with this project are shown in Table VI-3.1.5-1.

Note : The cost estimates do not include (i) the procurement of mechanical cargo handling equipment (ii) the construction of a maintenance workshops and (iii) the setting up of a training centre - all these are dealt with in other chapters.

6. Manpower Requirements.

The manpower requirements in conjunction with the introduction of palletization are as follows :

TABLE VI-3.1.5-1

COST AT Rp. (000)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Purchase of pallets (number)	1,000	1,500	2,000	2,500	2,500
4' x 4' at 15,000 Rp/unit/ 1976 escalating at 15%/year	15,000	17,250	19,800	22,800	26,200
20% replacement	3,000	3,500	4,000	4,500	5,200
Repair material 5%	750	850	1,000	1,150	1,300
Store 60 M ² at 30,000 Rp/m ²	1,800	-	-	-	-
Storage area 500 M ² with fence at 12,000 Rp/m ²	6,000	-	-	-	-
Staff : Foreman	500	660	760	875	1,000
Assistants	1,050	1,200	1,350	1,550	1,800
Carpenter	500	660	760	875	1,000
2 Assistants	700	800	900	1,050	1,200
Admin. Expenses	100	130	150	180	200
Use of tractor 1000 hrs/a	500	570	660	760	870
Use of 2 trailers 1000 hrs/a	160	190	220	250	290
YEARLY EXPENDITURE	30,060	25,810	29,600	33,990	39,060

Dep ~~code~~ :

Project No. : 3.1.5

Head No. :

Description : Introduction of Palletization

I t e m	Year (\$ 000)						Breakdown of Capital Costs (\$ 000)						
	1976	1977	1978	1979	1980	Total 1976-80	Local	Foreign Exchange				Net Increase 1976 - 80	
								Indirect		Direct			
Capital Costs -													
Pre-Investment	-	-	-	-	-	-							
Land	-	-	-	-	-	-							
Construction	19.5	-	-	-	-	19.5							
Equipment	45.0	51.7	59.5	68.2	78.5	302.9							
Other	-	-	-	-	-	-							
Total Capital Costs	64.5	51.7	59.5	68.2	78.5	322.4							
Operating Expenses -								Breakdown of additional Staff Requirements					
Personal Emoluments	7.0	7.8	9.7	11.0	13.0	48.5	Adm. & Managerial Professional Executive Sub-Professional Clerical Technical Industrial and Manual Group : Skilled Unskilled	1976	1977	1978	1979	1980	
Travel & Transportation of Persons	-	-	-	-	-	-							
Communications													
Utilities (Fuel)													
Rent or Hire													
Printing Services													
Supplies & Materials													
Maintenance Contractual Services													
Furniture Equipment & Livestock													
Lands													
Constructions													
Investment & Loans													
Miscellaneous Services	3.5	3.9	4.8	5.7	6.5	24.4							
Total Operating Costs	10.5	11.7	14.5	16.7	19.5	72.9	Total						
Renewal Costs	-	-	-	-	-	-							
GRAND TOTAL	75.0	63.4	74.0	84.9	98.0	395.3							

3.1.6 Waterfront Facility Improvement

1. Project Number - 3.1.6
2. Project Title - Waterfront Facility Improvements for Maintenance and Repair (M&R) Outfitting Berths, Aids to Navigation (A to N) Operations Wharf and Small Boat

3. Background

The waterfront area from the upriver end of the new wharf construction (Berth No. 3) in front of the Immigration Building passing in front of the Administration Building and extending to Sungai Layang Kidul on the far side of the District Navigation Marine Railways (slipways) is in need of major waterfront facility improvement for the following reasons :

- a) The District Navigation Marine Railway and Repair Facility has no outfitting berths and consequently holds the vessels undergoing repair on the slipway for months at a time. As a result the number of vessels undergoing M&R at the facility per year is about 25 percent of the number of vessels one would normally expect a facility of this size to handle. The further improvement in the District Navigation ship repair facility will be discussed further in Short Term Improvement - 3.1.9
- b) The existing A to N operating jetty is an old part wood and part concrete structure which is inadequate as an A to N facility because of its light structure and inaccessibility to modern mechanical handling equipment such as forklift trucks and small mobile cranes.

- c) The mooring space for the many small vessels at Boom Baru is inadequate for the number of boats involved and should be increased.
- d) There are parts of two old jetties which are beyond further use and they should be removed to make room for the waterfront improvements illustrated in Figure VI-3.1.6-1.
- e) The waterfront area under discussion is now choked with weeds and a number of derelict boats and miscellaneous junk or scrap material. Adjacent to the marine railway on the Sungai Lawang Kidul boundary is a wrecked vessel which should be removed. This area in an eyesore in plain view of the pending new passenger terminal.

The waterfront area in question though of little use now has the potential to solve a number of interrelated waterfront berthing space requirements for PPA.

4. Project.

a) Description

The project consists of the following essential elements combined to improve the waterfront facilities at Boom Baru in way of the custom's facilities, the new passenger terminal, outfitting berths for the shipyard, a modern adequate A to M operations jetty and a small boat basin where the PPA small boats may be moored. Figure VI-3.1.6-1 is a plan showing the proposed facilities.

- i) The waterfront being improved will have to be cleared of debris, derelicts etc. following which a bulkhead will be installed as shown in Figure VI-3.1.6-1 from the ocean wharf (berth No.3) to the marine railway.

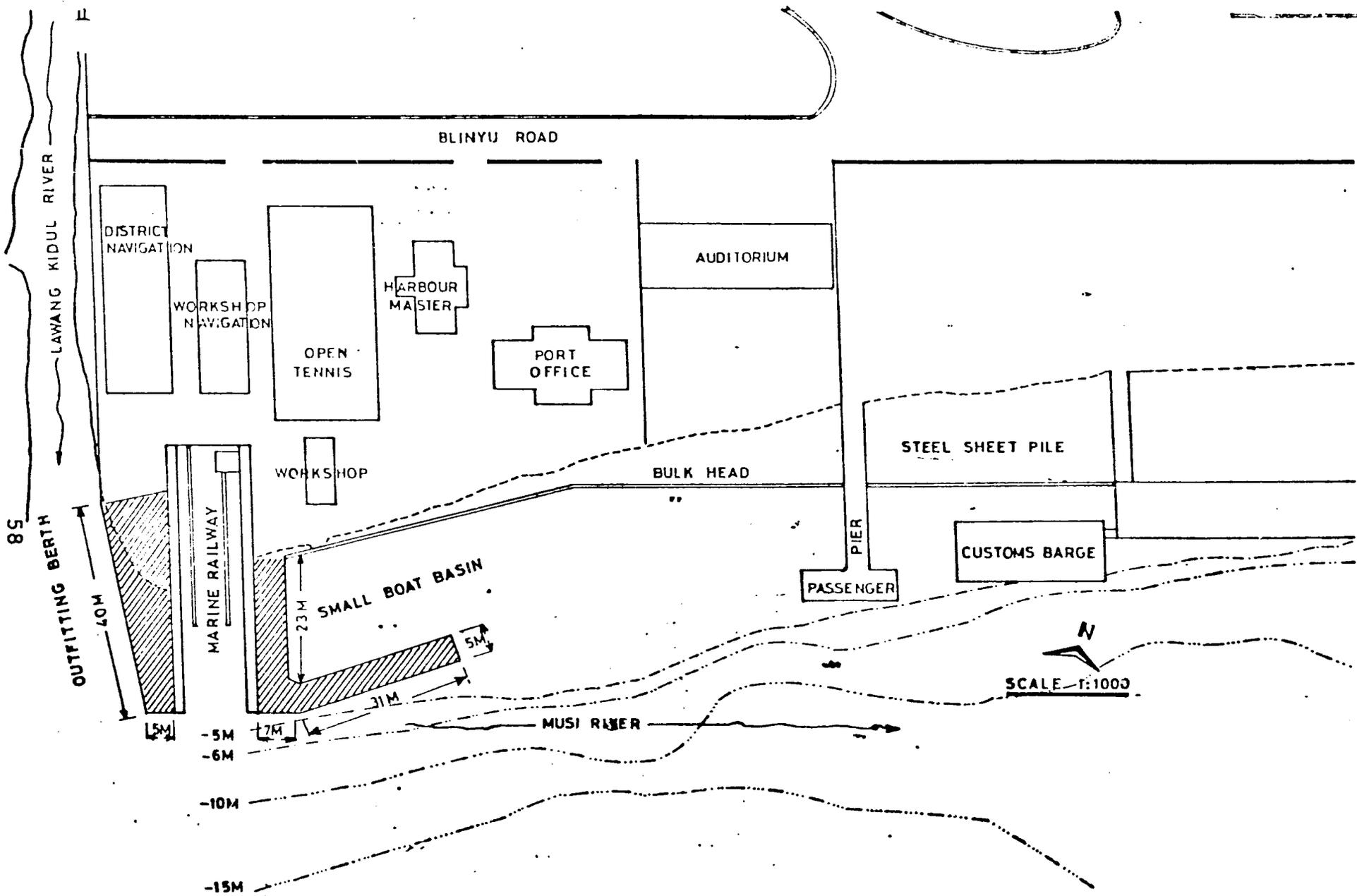


FIGURE VI - 3.1.6 - 1

WATER FRONT FACILITY EXTENSION FOR M AND R OUTFITTING, A TO N, AND SMALL BOAT OPERATIONS

- ii) An A to N pier six meters wide running parallel to the marine railway northeastern sidewall and extending the length of the side wall will connect to a five meter jetty incorporating the concrete portion of the existing A to N jetty. The proposed pier and jetty combination will permit small mobile cranes to service the marine railways and will permit mechanized operations on the A to N jetty for handling propane bottles and other A to N equipment.
- iii) The A to N jetty combined with the aforementioned bulkhead with fenders and mooring attachments will make a sheltered mooring haven for the PPA floating facilities.
- iv) On the Sungai Lawang Kidul opposite the marine slipways will be constructed a bulkhead or wall to provide two outfitting berths for the marine repair facility.
- v) The approaches to the new pier facilities will have to be improved to permit FLT operations thereon.
- vi) The small boat basin will be dredged to about four meters.

b) State of Preparations.

PPA has prepared several sketch plans for the waterfront to be improved in this project but has not officially submitted any plans for construction approval to date.

c) Limiting Factors

None.

d) Implementation Schedule.

The following implementation schedule is not only possible but advantageous because there are two marine construction companies mobilized in the Palembang area

both of which would be interested in additional work about the middle of 1976.

<u>Event</u>	<u>Schedule</u>
Complete surveys	August 1976
Complete decisions	October 1976
Issue tenders	November 1976
Award contract	January 1977
Start work	March 1977
Complete work	December 1977

e) Organization and Administration

The marine railway and its machinery workshop along with the A to N jetty are under the jurisdiction of the District Navigation officer, while some of the boats are under the jurisdiction of the harbor master and some come under the PPA directly. The multiple management procedure has not been very productive in maintenance and repair results and it is recommended that the marine repair facility and the M&R responsibilities for the entire PPA floating equipment be placed in the hands of a PPA marine engineering officer (MEO). The MEO would prepare vessel work lists which would be approved by the vessel's operating department heads and the work performed by the repair facility would be signed off by the respective operating department heads.

5. Cost Estimates

Waterfront Facility Improvements

Cost Summary (1975)

Bulkhead area	Rp.	107,015,000
Approach jetty 30 x 6	"	20,176,000
Alongside jetty 16 x 5	"	13,869,000
Outfitting berth	"	36,881,000
		<hr/>
	Rp.	177,941,000
Unforeseen 15%	"	26,691,000
		<hr/>
	Rp.	204,632,000
Engineering and administration 10%	"	20,463,000
		<hr/>
	Rp.	225,095,000
Escalation 15% of cost 1976	"	30,695,000
		<hr/>
	Rp.	255,790,000
Dredging	"	10,000,000
Removal of building	"	6,000,000
		<hr/>
Total	Rp.	271,790,000
	US\$	680,000
		=====

6. Manpower Requirements.

There will be some manpower changes recommended in connection with the modernization and increased capacity of the marine repair facility. However, they will be included in STI-3.1.9, and there are no manpower changes indicated for this project.

7. Land Problems.

It may be necessary to obtain a permit to install an outfitting wharf on the bank of the Sungai Lawang Kidul. However, this should pose no real problem.

8. Benefits and Justification.

The benefits to be derived from this project are many. The capacity of the present District Navigation shipyard will be increased about 300 percent and the facility will be able to handle all of the ship repair requirements of the PPA. These benefits are more fully discussed in STI-3.1.9.

The Republic of Indonesia has a very considerable investment in the shipyard and the slipways and workshops are in good condition. It would be a shame to waste the investment in these facilities, when with a small investment in outfitting berths, the A to N pier which will provide a platform for crane operations over the slipways and the addition of a minimal amount of equipment, the facilities productivity can be increased so markedly. This is especially important since the R.I. is generally in need of ship repair facilities.

PPA is greatly in need of adequate berthing space at which to moor its floating craft. This project will provide about 50 meters of outfitting berth space adjacent to the slipways and 150 meters of four meter small boat mooring facilities along the perimeter of the small boat basin.

The project will refurbish an existing jetty in way of the old PJKA (railway) property and make it safe and suitable for the handling of passengers in way of the new proposed passenger terminal.

The project will clean up an existing unsightly waterfront in way of the pending passenger facilities.

1. Project Number - 3.1.7
2. Project Title - Small Craft Facilities.
3. Background

The rate of handling general cargo along side the wharves of Boom Baru is on average 6-9 tons per hatch gang per hour though equal to the output at Penang, this is low if compared to the rates for handling similar cargo in Bangkok which reaches 10-12 tons. The rate at Singapore for handling the same cargoes with similar fixed facilities and operating conditions is 17-19 tons per hatch gang per hour.

The basic differences between the cargo handling operation at Boom Baru and those at Bangkok are

- a) Almost all cargo in Bangkok is palletized
- b) The port of Bangkok operates with much more mechanized equipment than has been in use in Boom Baru.

The basic differences between the cargo handling operations at Boom Baru and those at Singapore are in addition to the above :

- a) All labor whether shore workers and stevedores are in the pay of the Port and all - as integrated gangs - ship-shore-shed - are working on an incentive pay basis.
- b) Small craft are not permitted to work alongside the wharf facilities; but must use specialized facilities.

While the principal factors affecting the capacity of a break-bulk cargo port are :

- a) Number of berths
- b) The berth occupancy

- c) The tonnage of cargo handled per ship
- d) The availability of sufficient and adequate transit storage and long storage areas
- e) The average length of stay in port of unloaded cargo (imports) and the achievable rates of bringing in cargo to be loaded (exports) involving in turn the utilization of open storage and godowns accommodation.
- f) The ratio of direct to indirect deliveries - both for loading and unloading
- g) The productivity while vessels are at berth which involves in turn : actual number of hours worked; the number of hooks (hatches) worked; the proportion of effective working time; and the cargo handling output per hatch gang hour.

While the various factors will be discussed in other chapters of this report we would like to outline here some of the advantages of increasing the rate of general cargo handling outputs per hatch gang hour :

- a) The overall efficiency of the port would be greatly increased
- b) The overall cargo handling capacity (throughput) of the port would be greatly increased
- c) The time at which additional berth facilities would be required could be actually delayed thus permitting proper planning and design.
- d) The turn around time for ships would be substantially reduced thus benefitting the national economy
- e) Any "fast port" - i.e. with high cargo handling outputs will attract more shipping than a "slow port"

The overall improvement of actual general cargo handling rates basically involves ;

- a) trained labor
- b) incentives for all labor involved in the handling of cargo
- c) palletization and other forms of unitization of cargo
- d) increased mechanization
- e) adequate and well organized storage facilities both open and covered

Small craft interinsular traffic constitutes significant amount of trade for the Port of Palembang. Because of lack of specialized facilities at Boom Baru to handle these small craft these are obliged to work alongside the deep water wharves. This operation is inefficient from both the port's and the small craft operators' point of view. The port provides, inefficiently used, deep water facilities while the small craft cannot achieve reasonable good services, which are usually given on a priority basis to the larger vessels. Furthermore, small crafts are often damaged when they are caught at low-water under the front beam of the wharf. Interinsular traffic has a high potential for growth, as it provides the important link via Palembang to the overseas market. With the growth of this traffic, an increase of small craft traffic is unavoidable, but these should not use BPP scarce deep water facilities - but have their own.

The proposed development is designed to provide the port with such specialized facilities.

4. Project.

a) Description.

The construction of a 40 x 10 M finger pier, at the eastern end of the proposed 180 M wharf extension and in a straight continuous line, see attached drawing Figure VI-3.1.7-1.

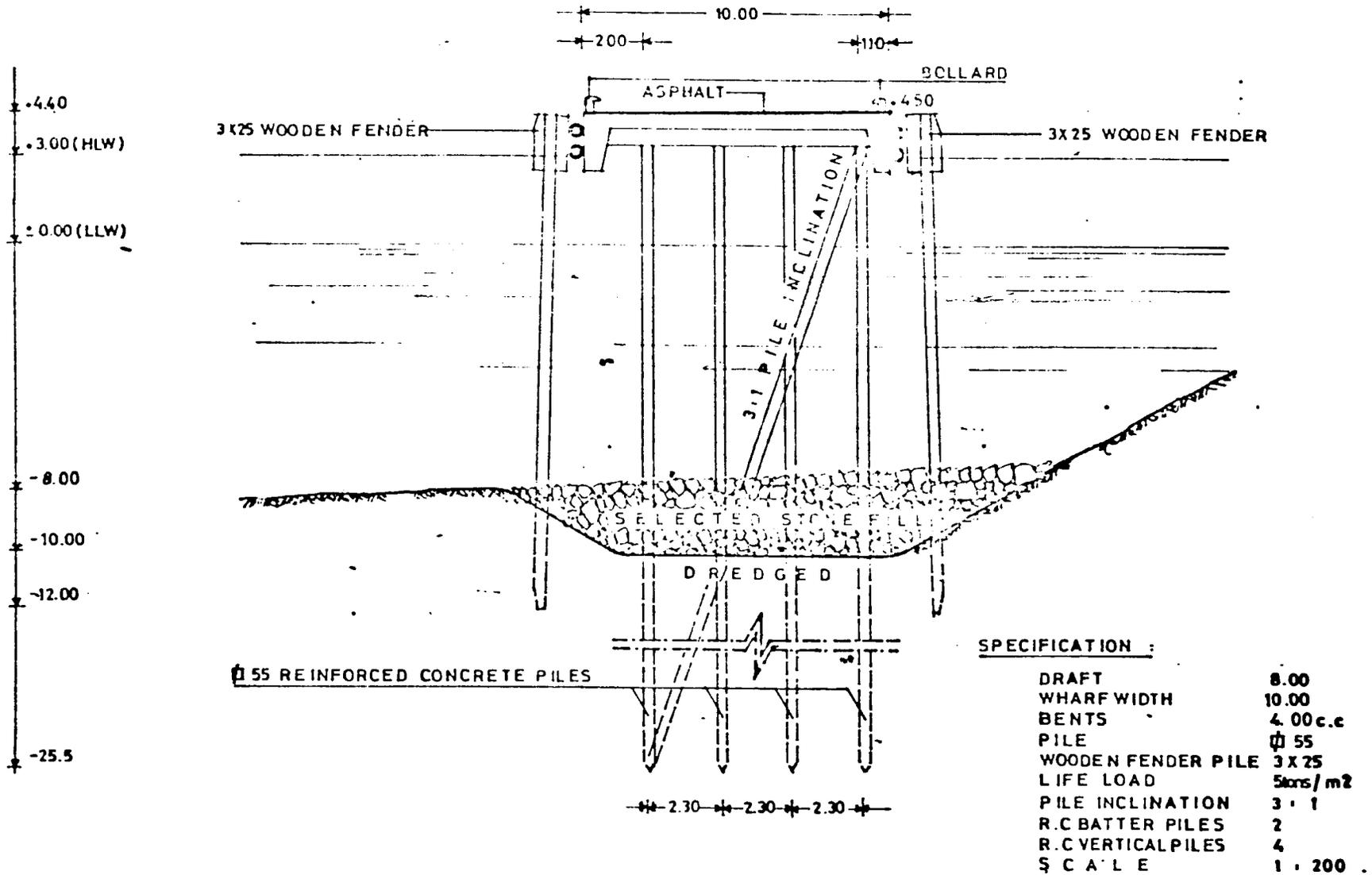


FIGURE VI-3.1.7-1
BOOMBARU FINGER PIER FOR SMALL CRAFT

Small craft will be able to work simultaneously from both sides of the finger pier. The structure will be wide enough to enable the working of trucks and mobile cranes. It is proposed that the design of the finger pier be in practice same as the main wharf - but with only a 10 M wide deck as against the main wharf's 20 M wide deck. The structural details will be such that the finger pier can be widened at a later stage to 20 M to form part of the following wharf expansion - thus widening can be executed without major reconstruction work. The inshore side of the finger pier will be dredged as part of the dredging required for the construction of the main wharf. This will enable the pier to accommodate craft with a 2-3 meter draft at LLW from the inshore side. Some annual maintenance dredging may be required - but as this area is close to the main and largely self-scouring deep channel, we believe that the dredged cut will be self maintaining.

b) Stage of Preparation

Only the basic concept of requirements of such a small craft wharf has been developed.

c) Limiting Factors and Special Problems.

- i) Sediment flows, current measurement and soundings have still to be undertaken in order to establish the dredging quantities as well as the annual maintenance dredging to be expected.
- ii) Borings and soil analysis have still to be undertaken to finalize the piling and decking support system.

d) Implementation Schedule (Similar to the 180 meter main wharf extension)

Survey	December	1976
Design and preparation of tender documents	June	1977
Issuing of tender	November	1977
Award of tender	February	1978
Commence project	April	1978
Complete project	September	1979

e) Organization and Administrative Arrangements.

None

5. Cost Estimates

a) <u>Capital costs</u>	<u>Rp.</u>
1) Hydrographic survey (share cost of main wharf)	410,000
2) Soil investigations --"	820,000
3) Dredging --"	3,200,000
4) Construction cost	129,640,000
5) Flood lighting & navigation aids (share cost of main wharf)	1,230,000
6) Mechanical cargo handling equipment	
Two 5000 lbs FLT + one 10 ton mobile crane	24,600,000
Sub-total	159,900,000
Engineering + administration 10%	15,990,000
Contingency 10%	15,990,000
Sub-total	191,880,000
Cost escalation 15% 1976	28,782,000
Cost escalation 15% 1977 x 0.6	33,099,000
Cost escalation 15% 1978	38,064,000
Total	291,825,000
	US\$ 712,000

<u>6. Recurrent Cost (annual)</u>	<u>Rp.</u>
1) Maintenance dredging (20% of capital dredging)	640,000
2) Pier maintenance (2% annually)	2,590,000
3) Equipment maintenance 15% annually	3,690,000
4) Security (4 men) 1 x 350,000 + 3 x 300,000	1,250,000
5) Equipment operators	2,000,000
Sub-total	10,170,000
Administration 10%	1,020,000
Total	11,190,000

All items are shared with the main 180 meter wharf.

7. Manpower Requirements.

a) Security	4 men
b) Equipment operators	6 men
c) General administration	1 man
Total	11 men

8. Land Problems and Requirements.

None, finger pier is part of main wharf.

9. Benefits and Justification

By removing the small crafts from the deep water facilities of Ecom Baru, and creating separate facilities for them - the port will no doubt increase its overall efficiency. Larger ships will berth alongside the deep water facilities - while the small craft will have their special requirements attended to at their own facilities. The overall throughput of the port will no doubt increase. The small craft facility will stimulate additional insular traffic since more boats which in the past could not receive proper service at Ecom Baru will be able to receive this service now. Furthermore small trailer feeder ships will be able to berth on the inshore side,

TABLE VI-7...

Department :

Project No. :

Head No. :

Description :

Item	Year (\$ 000)						Breakdown of Capital Costs (\$ 000)							
	1976	1977	1978	1979	1980	Total 1976-80	Local	Foreign Exchange				Net Increase 1976 - 80		
								Indirect		Direct				
Capital Costs -														
Pre-Investment			-	-	-	33								
Land			-	-	-	-								
Construction		27	210	270	-	570								
Equipment		-	-	-	-	34								
Other		-	-	-	-	-								
Total Capital Costs		27	210	270	-	712								
Operating Expenses -														
Personal Emoluments														
Travel & Transportation of Persons														
Communications														
Utilities (Fuel)														
Rent or Hire														
Printing Services														
Supplies & Materials														
Maintenance Contractual Services				15.0	15.0	30.0								
Furniture Equipment & Livestock														
Lands														
Constructions				1.9	1.9	3.8								
Investment & Loans		5.0	29.3	73.3	86.6	194.2								
Miscellaneous Services		-	-	-	-	-								
Total Operating Costs		5.0	29.3	90.2	103.5	228.0	Total							
Renewal Costs														
GRAND TOTAL		5.0	29.3	90.2	103.5	228.0								

3.1.8 Acquire PLN Property for Wharf Space.

1. Project Number - 8
2. Project Title - Acquire PLN Property for Wharf Space
3. Background

The South Sumatra power company (PLN) operates a fuel barge oil terminal on 30 meters of prime waterfront property between PPA's berths No.1 and No.4 see Figure VI - 3.1.8-1. There are generally two small oil barges at this terminal most of the time which are in service as floating oil storage facilities.

The use of this property by PLN greatly reduces the efficiency of PPA operations at both berths No.1 and No.4 due to the fact that mooring lines cannot be led across the fuel oil barge terminal, about 15 to 20 meters on the ends of berths No.1 and No.4 adjacent to the oil terminal are not really effective as wharf space. Cargo movements from berth No.1 to No.4 or vice versa must go in and around the PLN facility.

4. Project.

a) Description

Acquire the PLN property in the middle of PPA's Boom Baru wharfs, remove the present small PLN buildings and construct a ten meter wide wharf with a sheet pile bulkhead spanning the approximate 30 meters of waterfront between berth No.1 and No.4.

b) State of Preparation

PPA has intended for some time that the PLN properties should be acquired by PPA to improve the Boom Baru wharf

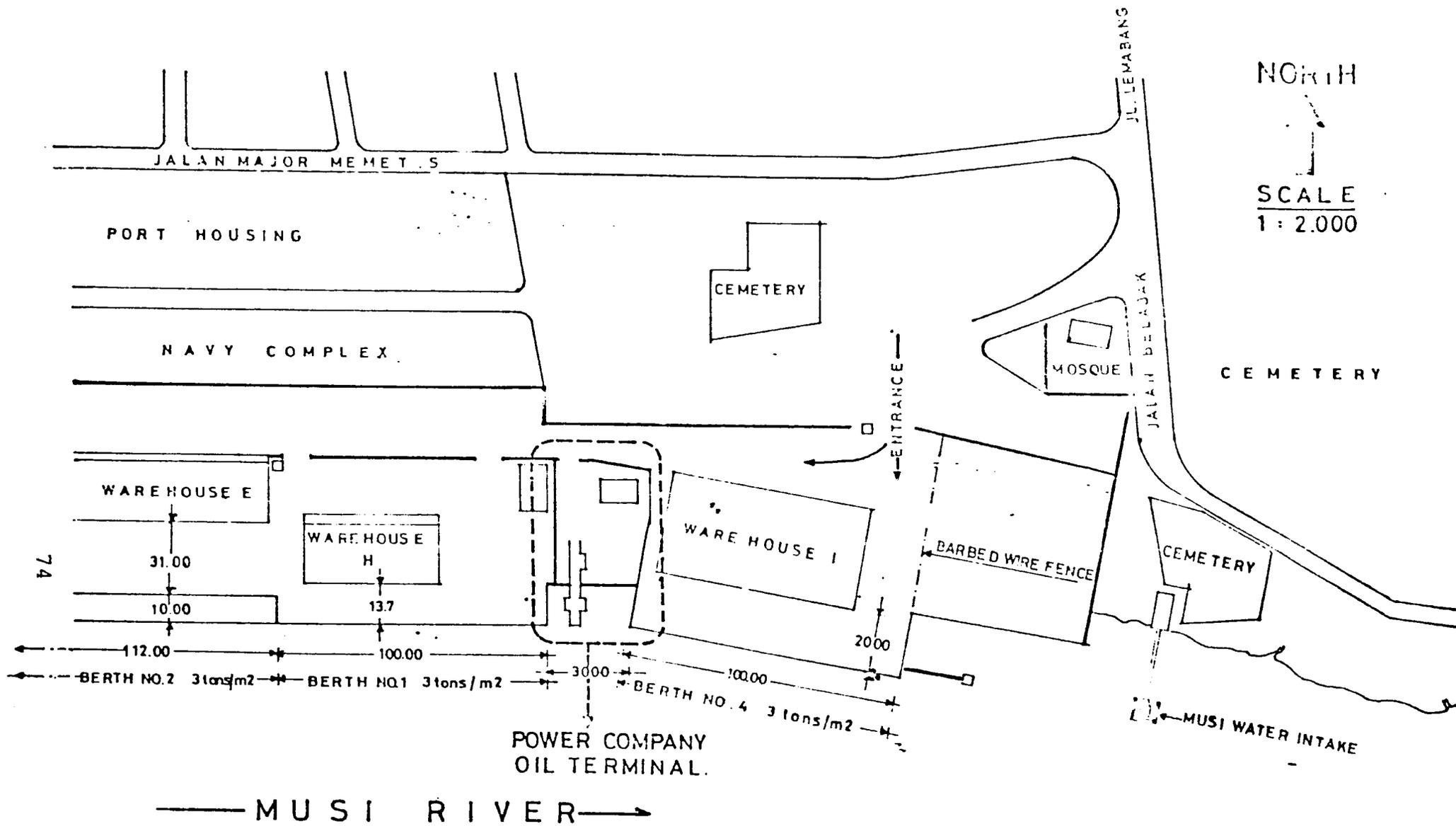


FIGURE: VI-3.1.8-1
 P.L.N BARGE FUEL OIL TERMINAL

facilities. Apparently PLN is agreeable provided PPA compensated PLN for the property and the moving costs. PPA has initiated action seeking to obtain the property.

c) Limiting Factors.

The property cannot be given up by PLN until an alternate suitable fueling facility or arrangement can be completed.

d) Implementation Schedule.

The implementation schedule should be about as follows

- 1) 1976 conclude agreement with PLN
- 2) 1977 PLN establish alternative fueling facility
- 3) 1978 PPA constructs the 30 meters of wharf and land fill operation
- 4) 1979 pier addition ready for use

e) Organization and Administration

No change required.

5. Cost Estimates

a) Capital Costs

US\$ x 1000

1) Acquisition of land and/or transfer of PLN facilities	240
2) Construct 30 meters of pier facility @ \$7500 US per meter of length	225
	<hr/>
Total capital cost	465

b) Recurrent Costs

- 1) Maintenance - No significant increase
- 2) Crew - No increase
- 3) Fuel - No increase

Total recurrent costs - No significant increase.

6. Mannpower Requirements.

No apparent increase.

7. Land Problems.

The land problems have apparently been resolved since PLN is willing to release the necessary property provided it is adequately compensated.

8. Benefits and Jurisdictions.

Obtaining the PLN land in question and constructing thereon a 30 meter length of wharf will effectively increase the usable wharf length at Boom Baru by about 60 to 70 meters. Filling in the wharf gap between berths No.1 and No.4 will permit much more efficient cargo handling operations and wharf access in way of the adjacent berths.

3.1.9 District Navigation Dockyard - Improvements.

1. Project Number - 3.1.9
2. Project Title - District Navigation Dockyard - Improvement
3. Background.

District Navigation Dockyard (DND) is a drydocking, repair and overhaul facility engaged primarily in the maintenance and repair of District Navigation and other PPA floating equipment. It consists of two small slipways and a dockyard workshop.

The productivity of the DND is very low due to several factors which are as follows

- a) The DND has no outfitting berths. As a consequence vessels in a maintenance and repair (M & R) status are held on the marine railways throughout their M&R availability which limits the number of vessels receiving annual M&R at the DND to three or four vessels per slipway. The usual number of vessels handled at a commercial slipway, while varying somewhat from year to year depending upon the type of repairs performed would average somewhere between a low of 25 (one every two weeks) and a high in excess of 50 (about one every week).
- b) The workshop facilities are insufficient to support a very high shipyard productivity standard. The workshop building is adequate but it lacks sufficient equipment and personnel to sustain a high rate of productivity.
- c) The management and engineering talent available in the DND are not sufficient to perform the necessary planning and engineering required to facilitate the rapid overhaul of vessels at the dockyard.

- d) The dockyard is performing major rebuildings of vessels which are more suitable for scrapping than retention in service. This ties up the facilities of the dockyard on unproductive and very questionable work and prevents the dockyard from providing routine M&R to the number of vessels which could and should be handled by the facility. There is no reason why the DND cannot service all of the floating craft associated with the PFA activities and a few other Government vessels as well.

- e) The dockyard does not have any crane or lift capability over its slipways which severely handicaps the facility in making engine or other lifts. The Republic of Indonesia has a substantial investment in the DND, an investment which is useless except for a marine repair facility. Since it is feasible to make the DND pay its way if it receives the correct improvements, the dockyard should be provided with the required physical plant modifications required, the necessary additional equipment and a revised modus operandi.

4. Project.

a) Description

The project consists of providing the following facilities, equipment, personnel and operational guidance such that the DND will be capable of servicing all of the PFA floating craft on a continuing basis.

- i. Provide the DND with sufficient outfitting berth space. In order to determine the amount of outfitting space required to accommodate the needs of DND, if it provides M&R for the PFA fleet, Tables VI-3.19-(a) and (b) were developed. These tables were developed using very conservative drydocking and maintenance schedules based on known ship repair

practices in other countries. A review of the two tables indicate that the larger slipway would be occupied about 33 weeks or 64 percent of the time and that the smaller slipway would be occupied about 27 weeks per year or 52 percent of the time. While the slipway capacity has a surplus averaging about 42 percent of the time. The tables also indicate that there is an unfulfilled requirement for 42 weeks of large vessel outfit berthing and 36 weeks of small vessel outfit berthing. The 50 meters of outfit berthing which is specified as a waterfront facility improvement in STI- 3.16 will provide the necessary outfit berthing and will provide a berthing surplus of about 25 percent to go with the slipway surplus of 42 percent which could be used to service other Government agency vessels if desired.

- ii. The slipways are in need of crane coverage of a reasonable capacity such that engines and other vessel components may be removed to the shops for repairs etc. This ability is furnished in this project by a six meter access wharf running adjacent to the northeast wall of the larger slipway from the shoreline to the new A to N operations wharf. This access will accommodate forklift trucks and small to medium sized mobile cranes. See Figure VI-3.1.6-1 for additional information.
- iii. Table VI-3.1.9-3 is a listing of the equipment considered necessary to make the DND a reasonably equipped dockyard for the efficient performance of the M&R work for the PPA fleet.
- iv. A new set of operational priorities and M&R standards will be required which will preclude the repair of vessels which should be surveyed and scrapped.

The following procedure is suggested to insure that obviously poor risk vessels are not given extensive repairs which unduly tie up the DND facilities and prevent the more desirable repairs to other more suitable and better conditioned vessels.

- a) PPA should adopt a system of periodically surveying each of their vessels. The survey should be conducted every four years of a vessels life. During the first three or four surveys the survey team will primarily concentrate on the suitability of the type of vessel for retention in service etc. After the second or third surveys the survey team should concentrate on the physical condition of the vessel and the amount of work and cost involved to repair the vessel such that it will last for another four years. If the cost to repair the vessel appears to be exorbitant when compared with the replacement cost of the vessel, either by new or used vessels, the survey board should recommend that the vessel be not repaired but scrapped.

The survey board should have as members three of the ports rather senior and more experienced officers. A representative board would include such members as the district navigation officer or the harbor master, the dredging officer of the technical officer and one of the senior pilots. The board should meet once a month to review vessels due for survey and to estimate or review repair estimates for the vessels undergoing survey and to make recommendations as to :

- (a) whether the vessel should or should not be repaired
- (b) whether or not the vessel requires replacement and what type of vessel should be obtained as a replacement.

The above described survey system will take the decision on repair out of anyone individuals hands and is perhaps the best system to insure that vessels in junk condition are not required as sometimes happens when the dockyard superintendent makes the decision on what vessels and what repairs are to be made. Too often the dockyard superintendent will undertake unprofitable work just to keep his men busy, when with adequate planning other work would be available.

- v. In order to have an effective ship repair facility it is necessary to establish a suitable and efficient spare parts system to avoid undue delay in maintaining and repairing PBA vessels.

b) State of Preparation

There are no known preparation which have been made on this subject.

c) Limiting Factors.

None.

d) Implementation Schedule.

The implementation schedule should be approximately as follows

- | | | |
|--|----------|------|
| i. - clearing outfitting berth wharf site
of existing wreck | July | 1976 |
| ii. - commence contract outfit berth | August | 1976 |
| iii. - order equipment on priority list | June | 1976 |
| iv. - adopt revised survey and MaR
procedures | June | 1976 |
| v. - complete waterfront improvements | February | 1977 |

e) Organization and Administration

The organization should be centralized under the command of the Port Administrator. The facilities should be available to all boats operating at Loch Ness including all boats, pilot boats, mooring boats, water barge, tugs and other miscellaneous craft. The management of the yard should be strengthened.

5. Cost Estimates

a) Capital Costs.

i. Fixed facilities - the fixed facilities for providing the mooring, berthing and the other services for port pleasure for slipway craft are estimated to be in SLE - 3.1.5

ii. Equipment costs - the equipment required and the estimated costs as given in table 11-3.1.1-6 are about SLE 234,000.

b) Recurrent Costs.

i. Maintenance costs of equipment	100,000
ii. Crew 15 skilled and 3 unskilled plus benefits	100,000
iii. Fuel and power	100,000
Total recurrent costs	300,000

6. Manpower Requirements.

There are a number of problems associated with a small shipyard such as the DND among them are the following:

- a. The pay and working conditions at the DND are not good young men are generally not attracted to this type of work.

- b) There is a shortage of motor mechanics for diesel engine overhauls, machinists for lathe work, welders and electricians.
- c) DND has insufficient mechanics to set up training courses of their own.
- d) DND has programs for the training of for the workshop trades but does not have the necessary funding to carry out its training program.
- e) There are training programs available in Palembang. They are run by German expatriates and offer training courses for engine mechanics, electricians, electronic technicians, carpenters etc. A full length course requires three years at Rp 300,000 per month per person. This amounts to about US\$ 9,000 per year or US\$ 27,000 per student per 3 year course.

In order to attract and hold qualified workers it will probably be necessary first to institute a substantial training program to entice the workers to work for DND and secondly to install an incentive pay system in to retain the employees when trained.

The complement of the District Navigation drydock is given in the following table along with the suggested manning for the increased productivity facility. The latter manning scale is not based upon a full study of the dockyard manning requirement which is beyond the scope of the Palembang Port Study but is based upon a generalized comparison between the manning and productivity of other small similar shipyards which this firm has analyzed in the past.

Manning Schedule.

<u>Task No.</u>	<u>Personnel assignments</u>	<u>Present Manning Navigation Background</u>	<u>Proposed PIR deck crew</u>
1.	Mainline railway	6 / 3	15 / 3
2.	Tortoise	4 / 2	10 / 2
3.	Boats	10 / 3	15 / 3
4.	Stores		15 / 3

Notes on Manning:

Most Russian vessels like many of those in other Commonwealth Asia countries are rather heavily manned in the style of the old steamboats. This was a necessity and the requirement for engineering personnel on a small vessel usually stem from the old days when the crew had to take care of the boiler and engine.

Some of these boats are operating with a crew of 15 men. This is not necessary for the safety or the operating efficiency of the boat. It will, however, be necessary with the engineer as well as the electrician could be more gainfully employed if they were engaged in the dockyard performing the work of the type of boat since very few if any repairs are carried out in close proximity to the port facilities.

It is suggested that a least 50 percent of the crew complement required to man the vessels be maintained by reducing the engineering complement on PIR vessels including the boats, the fishing boats etc.

7. Land Problems and Recommendations.

None except as stated in SWI-3.1.3. There is one family living on the District Navigation dockyard property which will have to be moved elsewhere.

8. Benefits and Justification

As pointed out before, the Government has a substantial investment in this grossly underutilized facility. The renewal cost of the marine railways and supporting facilities are about \$600,000 today. The amount of Government owned floating equipment is growing rapidly and the condition of existing floating equipment is bad because of inadequate maintenance in the past. The availability and effectiveness of floating equipment could be increased appreciably through more effective maintenance and the real cost of maintenance be reduced by about \$100,000/year by full effective use of the improved facility. This would provide a benefit cost ratio of about 1.1 for the first 3 years but increase appreciably thereafter. The most important effect though would be the vast improvement in vessel condition and availability.

An additional item for justification of the dockyard is the fact that slipway space is in short supply in Palembang and many boats are required to wait for periods well in excess of one month to obtain slipway time for necessary repairs including emergency repairs.

Item No.	General Description	Quantity	Unit Price	Total	Material	Manpower	Material	Manpower	Total	Unit Price	Total
1	HD 13-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7	
2	HD 13-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7	
3	HD 13-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7	
4	HD 13-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7	
5	HD 13-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7	
6	HD 13-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7	
7	HD 13-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7	
8	HD 13-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7	
9	HD 13-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7	
10	Subtotal					27	36				

All other items in schedule

3.1.10 Lighterage

1. Project Number - 3.1.10
2. Project Title - Lighterage
3. Background

All lighterage in use at Palembang is private proprietary. The Port Administration does not own or operate lighters. Nearly all exports and 15-25% of imports are handled by lighter in addition to 30-40% of all interinsular/local incoming and 15% of all interinsular/local outgoing cargo. In recent years 1970-1974 cargo lightered has grown from about 200,000 to 400,000 tons per year and is usually about twice the total amount of cargo handled over Boom Baru wharves. The reasons for this massive amount of lighterage vary :

- a) Export cargo is lightered because of ease of clearance and because most exports are shipped to Palembang by lighter independent on how they are to be loaded onto the ships.
- b) Some imports and interinsular/local incoming cargo are offloaded by lighter under special customs exemption because of the relative efficiency and lower total cost of lighterage compared to Boom Baru operations.

In general it has been found, that lighterage is used because it is cheaper, provided a better interface with feeder barging and does not affect ship turn around time. Its major factor is obviously the past insufficiency of the Boom Baru wharves and the inadequate charges raised against in-stream operations.

4. Project.

a) Description

There appears to be no justification for the port to acquire lighterage for in-stream offloading. There is a more than adequate inventory of private and proprietary lighters available, at reasonable cost.

The only justification is for the acquisition of special purpose liquid and dry bulk lighters to be used in conjunction with improvements in liquid and dry bulk handling at Boom Baru wharf.

There may also be a case for a large flattop barge with mooring and large anchoring devices to be used for the transport of heavy cargo and containers as well as to serve as a standby floating berth for small craft equipped with their own lifting gear.

As a result, it is proposed for the BPP to acquire one combined flattop/tank barge of about 30 x 9 x 3 Meters with a loaded draft of 2 meters and a capacity of about 400 tons. The barge is to have no internal piping nor installed pumps but designed to use self-propelled portable submergence pumps instead.

The barge should be divided into 8 tanks each with its own vents and pump pipe-flange. The flat deck will have complete tie down fittings and oversize mooring gear, including tie downs for mobile crane mounting on the barge. The barge will be of use for heavy loads, as a temporary floating pier for small craft, as temporary storage and as a transfer platform for bulk liquids such as palm oil, molasses etc.

b) State of Preparation.

No design has been considered by standard designs (and barges) for such a barge are readily available.

c) Limiting Factors.

None - except possible objection by private owners.

d) Implementation Schedule.

This barge should be acquired in 1977.

e) Organization and Administration.

No change.

5. Cost Estimates.

a) Capital Costs.

1) 30 x 9 x 3 m barge with 8 internal tanks, center line bulkhead, tank vents, pump flanges, and all deckfittings. Tanks to be epoxy coated	\$ 130,000
2) 3 portable self-propelled submergence pumps with standpipes delivery manifolds, starters etc. 30 tons/hr capacity at 8 Kg/cm ² rail pressure	\$ 30,000
3) Pipe reels, hoses, connectors etc. 3 x 60 mtrs.	\$ 9,000
Total	US\$ 169,000

b) Recurrent Costs.

1) Maintenance	\$ 10,000
2) Crew costs	\$ 6,400
3) Fuel costs (negligible)	--
	US\$ 16,400

6. Manpower Requirements.

2 Barge supervisors
4 Bargemen
2 Pumpmen/mooring men
<hr/>
.8 Total

7. Land Problems and Requirements.

None.

8. Benefits and Justification.

The availability of the flattop/tank barge will permit heavy and outsize cargo to be handled over Boom Bara and transferred to other locations. It will serve as a floating extension wharf for small craft and it provides a transfer and storage capability for liquid bulk loading or discharge.

Project No. : 3.1.20
 Description : 170-1174
 (10 Year Amortization)

Category	Year (in \$ 000)					Total 1976	Breakdown of Capital Costs (\$ 000)					Net Increase 1976 - 80
	1976	1977	1978	1979	1980		Year	Staff Requirement				
Capital Costs - Provision of Land Construction Equipment Office		1.05	-	-	-	1.05						
Total Capital Costs		1.05	-	-	-	1.05						
Operating Expenses -								Breakdown of additional Staff Requirement				
Personal Expenditure Travel & Transportation of Persons Communications Utilities (Fuel) Rent or Hire Printing Services Stationery & Supplies Maintenance Contract & Services Furniture, Equipment & Fixtures Light Concessions Insurance & Taxes Depreciation & Sinking Fund	3.0	6.4	6.4	6.4	22.2		1976	1977	1978	1979	1980	
			10.0	10.0	10.0	30.0						
	11.3	16.0	16.6	16.6	49.9							
Total Operating Costs	14.3	22.4	26.6	26.6	89.9							

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3.1.11 Passenger Terminal

1. Project Title - 3.1.11

2. Project Title - Passenger Terminal

3. Introduction

Passenger facilities at Palembang consist only of a concrete pier with a minimum of shelter. Passenger traffic is increasing rapidly with the local ferry doubling its service frequency and several international services contemplated. As a result BPP is contemplating the construction of a passenger terminal which will provide for passenger waiting rooms, check rooms, toilets, customs, immigration, travel offices and other facilities.

4. Object

4.1 Introduction

The proposed passenger terminal is a two story structure with an enclosed lower level and a covered but open upper level. Each level has a floor area of 357 m². The building is adjacent and connected with the "Saluh" restaurant which is designed to provide food and drink services to passengers. It also includes a tourist gift shop. The building's roof is connected to that of the "Saluh" restaurant and a connecting front veranda and a joint main access staircase is provided. The main access passage between the two buildings to the passenger pier is covered. Access to the pier is either directly through this passage, via the main terminal waiting room or through the cleared waiting room. Toilet and other facilities are available in both the general and cleared waiting room. The layout is arranged so that there is either direct passage through immigration to the cleared waiting room for departing passengers or via immigration to customs to the general waiting room for arriving passengers.

b. Limiting Factors

None

c. State of Preparation

Concept and architectural drawings complete. Land acquired and cleared of previous buildings.

d. Implementation Schedule

To be constructed in 1976.

5. Cost Estimates

a. Capital Costs

Preliminary Building Cost Estimates	\$	80,000
Outfit, Decoration, etc.	\$	10,000
		<hr/>
	US	\$ 90,000

b. Recurrent Costs

Staff	\$	2,500
Maintenance	\$	3,000
		<hr/>
TOTAL	US	\$ 5,500

6. Personnel Requirements

(EFP Personnel Only)

1 Terminal Manager	\$	1,000
3 Attendants	\$	1,500
		<hr/>
	US	\$ 2,500

7. Land Requirements

On EFP acquired property.

11. Benefits and Justification

There are no quantifiable benefits except the potential for increased use of BIP facilities for passenger handling. It is proposed to levy a passenger handling charge, similar to that paid at all passenger aircraft slip terminals. The level of the charge is yet to be determined but the terminal investment is expected to be paid off in about 4 years.

Department :

Project No. : ...3.1.11.....

Head No. :

Description : PASSENGER TERMINAL.....

Item	Year (\$ 000)						Breakdown of Capital Costs (\$ 000)							
	1976	1977	1978	1979	1980	Total 1976-80	Local	Foreign Exchange						
								Indirect			Direct			
Capital Costs -														
Pre-Investment														
Land														
Construction	90					90								
Equipment														
Other														
Total Capital Costs	90	-	-	-	-	90								
Operating Expenses -														
Personal Emoluments	1.0	2.5	2.5	2.5	2.5	11.0	Adm. & Managerial Professional Executive Sub-Professional Clerical Technical Industrial and Manual Group : Skilled Unskilled	Breakdown of additional Staff Requirements					Net Increase 1976 - 80	
Travel & Transportation of Persons								1976	1977	1978	1979	1980		
Communications														
Utilities (Fuel)														
Rent or Hire														
Printing Services														
Supplies & Materials														
Maintenance Contractual Services	-	3.0	3.0	3.0	3.0	12.0								
Furniture Equipment & Livestock														
Leads														
Constructions														
Investment & Loans	5.3	12.4	12.1	11.8	11.5	53.1								
Miscellaneous Services														
Total Operating Costs	6.3	17.9	17.6	17.3	17.0	76.1	Total							
Renewal Costs														
GRAND TOTAL	6.3	17.9	17.6	17.3	17.0	76.1								

3.1.12 Improvement of Access to Port.

1. Project Number - 3.1.12
2. Project Title - Improvement of Access to Port.
3. Background.

Both international and interisland cargo is unloaded at the wharves of Boom Baru. The offloading is into barges, directly onto trucks or into the gudangs. Cargo on the trucks and from the gudangs mostly go directly to various locations within Palembang. Generally these locations are :

- i) Retail market at Pasar 16.
- ii) Various locations on Sudirman Street.
- iii) Importers gudangs
- iv) Rice marketing stores
- v) Special equipment to Pusri, Taba etc.

The recorded number of trucks leaving the Boom Baru terminal since 1970 are :

<u>Year</u>	<u>Number of trucks</u>	<u>Average per day</u>
1970	37,555	125
1971	34,325	111
1972	32,976	110
1973	29,274	98
1974	31,296	104

Counts in September 1975 revealed similar averages. On average 30-50 trucks are waiting at times to load at Gudang No.1. While the parking area behind the gudang is ample, the gate there cannot accommodate but one truck at the time.

Trucks enter the port near the intersection of Mayor Memet Sastrawirya Street and Lematang Street. The traffic

path is one way past Gudang 1 and the other gudangs, and trucks leave the port through the wide double gates to the south onto Boom Baru Street. Presently there are no traffic operational difficulties in the port area, as volumes of traffic are reasonably low and the amount of roads are high.

Boom Baru and Mayor Memet Sastrawirya are city streets which presently cut port owned property into two. When plans are made to utilize the far side of the port's property as port operational area, consideration should be given to construction of a new street on the perimeter of the port property. This street may be designed in conjunction with the plan to relieve the badly congested streets leading to Pasar 16.

With the planned expansion east of the "100 meter wharf" the gate behind gudang 1 should be widened in order to enable traffic especially trailers with container to leave through the same gate and not be forced to transverse the entire port.

4. Project.

a) Description.

Widen the port entrance gate behind gudang 1 to accommodate two trucks simultaneously. The guard room should be left in its present position, so that traffic can flow from both sides of the guard room.

b) Stage of Preparation.

None.

c) Limiting Factors.

None

d) Implementation Schedule.

The widened gate should be available with the completion.

of the planned expansion of 80 meters east of the "100 m wharf". The time required :

Design and preparation of tender documents	1 month
Tendering and award of contract	1 month
Construction	1 month

e) Organizational and Administration Arrangements.

None.

5. Cost Estimates.

a) Capital Costs.

i) Building of second entrance gate behind gudang 1, including gate and paving	LS	Rp.	4,000,000
ii) Engineering including supervision	"		300,000
		Rp.	4,300,000
Subtotal		"	450,000
Unforeseen 10%		"	250,000
Administration			
		Rp.	5,000,000
Subtotal		"	250,000*
Escalation 15% 1976 x 0.3			
		Rp.	5,250,000
Total		US\$	12,800

b) Recurrent Costs.

None

6. Manpower Requirements.

Administration during construction	1 man
------------------------------------	-------

7. Land Problems/Requirements.

None.

8. Benefits and Justification.

A second entrance gate will permit traffic flow in both directions. This will relieve the port area from congestion. Trailers carrying containers or heavy loads landed at the deep water section of the port will not have to transverse the port area when leaving the port. This will increase the overall efficiency of port operations.

Departure :

Project No. :

Road No. :

Description :

Item	Year (\$ 000)						Breakdown of Capital Costs (\$ 000)					
	1976	1977	1978	1979	1980	Total 1976-80	Local	Foreign Exchange			Not Increase 1976 -- 80	
								Indirect	Direct			
Capital Costs -												
Pre-Investment												
Land												
Construction	12.0					12.0						
Equipment												
Other												
Total Capital Costs	12.0					12.0						
Operating Expenses -								Breakdown of additional Staff Requirements				
Personal Emoluments								1976	1977	1978	1979	1980
Travel & Transportation of Persons												
Communications												
Utilities (Fuel)												
Rent or Hire												
Printing Services												
Supplies & Materials												
Maintenance Contractual Services												
Furniture Equipment & Livestock												
Lands												
Constructions												
Investment & Loans	2.5	2.4	2.2	2.0	1.9	11.0						
Miscellaneous Services	-	-	-	-	-	-						
Total Operating Costs	2.5	2.4	2.2	2.0	1.9	11.0	Total					
Renewal Costs												
GRAND TOTAL	2.5	2.4	2.2	2.0	1.9	11.0						

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3.1.13 Container and Trailer Handling Facilities

1. Project Number - 3.1.13
2. Project Title - Container Handling Facilities
3. Back/ground

The Port of Palembang uses essentially no unitization at this time. Limited use of pallets is projected for early 1976. The increased use of containers and trailers in South East Asia in both long and short distance international trade will influence the future role of Palembang. A large number of liner operators serving this region have converted a significant proportion of their liner tonnage to container handling and major elements of the Indonesian national liner fleet are now being so converted. Much of the cargo transhipped through ports, such as Singapore is containerized there because of the increasing availability of container services at these ports. As a result, we must address the question of the extend and timing of the introduction of limited container handling capability at Palembang.

Selfsustaining containerships are on their way out of service and with the exception of a few crans equipped feeder container vessels no new containerships with deckmounted gantries are being built.

There are deviations from that practice in the form of LASH type barge carriers which are equipped with container gantries and some converted or non-converted general cargo ships used for container deck-loading, which use their existing deck gear for container handling.

Although Palembang handles a comparatively small amount of general cargo which would be a prime candidate for containerization, there are significant amounts of containerizable exports and imports such as rubber, timber products, coffee, and others. As a result there is a considerable incentive for the introduction of limited container service into Palembang. It is obvious that Palembang cannot expect to have containerized cargo loaded by selfsufficient containerships for very long for the average age

of ships with deckmounted containers is 17 years. Nor can it be assumed that containers will all be handled as deckcargo on general cargo ships equipped with heavy lift gear. If Palembang is to attract containerized cargo some limited port capability for container transfer between ship and shore must be provided, in addition a minimum of container transfer and stacking equipment would be needed.

Another area of potential importance to the port is transfer of trailers. Trailerships are increasing their applications in South East Asia and are now serving a number of short regional routes. It is highly likely that trailer shipping will be introduced into local, interinsular and short distance foreign service within a few years. While there are few incentives for road feeders in South Sumatra because of road conditions and the regional origin/destination locations, there are major advantages in many of the counterpart trading areas both domestic and foreign.

As a result we expect increasing pressure for the introduction of a limited trailer handling facility in the Port of Palembang.

The amount of projected flow of containerizable cargo is listed in Table A-3.1.13-1. Assuming that essentially only containerizable export and import cargo and only a very small fraction of interisland cargo will go by container and that the percentage of containerized cargo in the various categories of containerizable cargoes will be very small in 1975 and rise gradually in 1980 and reach a near plateau by 1990, we obtain a potential flow of containerized cargo of 81,700 tons in 1980 and 197,800 tons in 1985 or the equivalent of 8,700 TEU's in 1980 and 19,780 TEU's in 1985. Longer range projections indicate that container traffic may reach 30,000 TEU's by 1990 and 55,000 TEU's by the year 2000.

Should a deep water port at Banyuasin be developed and connected by road to Palembang as a long term project, then additional incentives for the use of containers and/or trailers will be provided because of the elimination of transfer from ship to truck or vice versa.

It is noted, that we assumed that of all the containerizable export and import cargo only 16.1% could be containerized by 1980, 38.3% by 1985

TABLE VI-3.1.1²-1

PROJECTIONS OF CONTAINERIZABLE AND CONTAINERIZED CARGO FLOWS

(000's tons)

	1980		1985	
	<u>% of total</u>	<u>Tons</u>	<u>% of total</u>	<u>Tons</u>
<u>Imports</u>				
General cargo	20	15.2	40	46.0
Oil Products	25	3.4	40	7.6
Cotton	25	1.4	40	3.5
Total	41.5	20.0	40.0	57.1
<u>Exports</u>				
Coffee	15	7.5	40	23.1
Rubber	25	31.3	40	111.5
Timber Products	20	15.3	20	49.0
Total	44.0	53.6	38.2	183.6
<u>Interisland, Local and Domestic Unloaded</u>				
General Cargo	20.0	8.1	25.0	14.2
<u>Interisland, Local and Domestic Loaded</u>				
General Cargo	—	—	—	—
<u>GRAND TOTAL</u>	16.1	81.7	38.5	297.0

and 50% by 1990. On the other hand, we expect that a reasonable proportion of containerizable exports presently handled exclusively by lighterage will use containers and trailers because of economic and operational advantages. It should be noted, that some Malaysia rubber exports (bales) are now handled in containers, while a significant proportion of South and Central America coffee exports are now containerized. Such a move would be particularly attractive because of the gross imbalance in export-import general cargo movements which would be prime condition for containerization. There is therefore a vast supply of empty export container space which could be economically used to transport commodities such as coffee and rubber.

As a result, though it is obvious, that the Port of Palembang cannot justify a special container terminal for at least 10 years, the potential for demand of handling up to 6,000 TEU's per year by 1980, requires the development of a limited container and trailer handling capability. The proposed program consists of an initial phase to be implemented with the next 5 years and second phase during the period 1982-85 and a reevaluation of container handling facility requirement in 1980.

4. Project

a. Description

The new 180 m long pier extension (Section 3.1.23) will be designed for a 5 ton/m² load capacity, a 20 m wide piled deck and a 50-60 m wide storage area. The deck will be recessed for the later mounting of crane and gantry, rails if desired.

A mobile truck or crawler crane with a boom length of about 120 ft. a lifting capacity of 35 tons at an outreach of 35 ft., and a lifting capacity of 100 tons at minimum crane radius (about 26 ft.) is to be procured for delivery by the end of 1978. This crane when supplied will normally work containers and other heavy lifts over the new wharf, but will also be available to assist construction of new wharves. For container handling to and from storage or transfer onto chassis or trailers,

one large sideloader of 30 ton capacity should be procured early in 1979. This sideloader will primarily work in the back storage area. The sideloader is designed to also serve storage and transfer of timber.

In 1980 a simple 10 ft. span 22 ft. hookheight travellift with a capacity of 20 tons should be procured to serve both timber and container transfer and storage.

In addition it is recommended to purchase 4 trailers (2 x 20' and 2 x 40') of 15 and 30 ton capacity respectively as well as 1 tractor with a 5000 lbs. pull. These trailers will be used for interport transfer of heavy cargoes and containers.

A container storage area of 20 m x 100 m (2000 m²) for single height storage of 12 containers (144 double stacking) should be provided by 1978 and expanded to 4000 m² by 1980.

No container stuffing/unstuffing facility is required before 1982. Existing port transit sheds suffice to fill the limited freight station demand until 1982. 18 of the container storage positions should be equipped with power supply for refrigerated, ventilated or freezer containers.

To permit more effective circulation, access and regress from the new wharf it is recommended, to provide a new access road provided by an extension of Jalan Lemabang. Future trailership traffic will be accommodated at the extension of wharf not with the ramp landing on the cut between the main wharf and the small ship, fingerpier.

b. State of Preparation

There exist no present plan for container handling at Paluchang.

c. Limiting Factors and Special Problems

The long lead time required by heavy equipment manufacturers as well as shipping companies makes an early decision important. Shipping companies should be given 2-3 years notice of the future availability of container feeder port facilities.

d. Implementation Schedule

Phase I

1. Obtain firm quotes for mobile crane and sideloader
(including quotes for preowned) Oct. 1976
2. Review Tenders Dec. 1976
3. Place orders for mobile crane and sideloader
and announce establishment of feeder container
port of Palembang Feb. 1977
4. Design and layout of container storage area Dec. 1977
5. Issue tenders for storage area March 1978
6. Contract for storage area June 1978
7. Call for tenders for travellift, 4 trailers
and tractor June 1978
8. Review tenders Aug. 1978
9. Place orders for travellift, 4 trailers,
tractor Oct. 1978
10. Delivery of mobile crane and sideloader
completion of storage area June 1979
11. Delivery of travellift, 4 trailers and
tractor Oct. 1980
12. Perform study of future (1985 plus) container
terminal requirements with or without deep
water international port development Dec. 1980
13. Expand storage area Dec. 1980

Phase II

Implement recommendations of study of future
container terminal requirements.

5. Cost Estimates

a. Capital Costs (1975)

Phase I

1. Mobile crane 100 ton max.	\$ 500,000
2. Sideloader 30 ton	\$ 180,000
3. 4 trailers (2 x 15 - 2 x 30)	\$ 42,000
4. 1 tractor 5000 lbs.	\$ 50,000
5. 1 travellift 20 tons (10' x 24)	\$ 380,000
	<hr/>
Total equipment costs	\$ 1,452,000
6. Container storage area	\$ 100,000
	<hr/>
Total cost	\$ 1,552,000

Phase II

To be determined.

b. Operating Costs

	<u>Manpower Requirements</u>		<u>Annual Costs (Drs.) (000)</u>	
	<u>1979</u>	<u>1980</u>	<u>1979</u>	<u>1980</u>
Administrative	1	2	600	1,200
Clerical	1	2	450	900
Technical	-	1	-	300
Industrial skilled	4	6	1,560	2,040
Industrial unskilled	3	12	2,400	3,600
	<hr/>	<hr/>	<hr/>	<hr/>
Total Emp.	14	23	4,810	8,340
	<hr/>	<hr/>	<hr/>	<hr/>
\$			12,000	21,000
	<hr/>	<hr/>	<hr/>	<hr/>

6. Manpower Requirements

	(\$ 000)	
	1979	1980
1. Wages and Salaries	4	7
2. Cargo handling labor	8	24
3. Supplies	15	25
4. Repair and Maintenance	-	60
5. Fuel	20	80
<hr/>		
Total	47	182
<hr/>		

7. Land Requirements

Within Port boundary

8. Benefits and Justifications

The benefits and justifications for the feeder container port facility can be listed as follows.

- a. Provision of limited container handling capability will improve port services, and attract more shipping to the port and particularly to Boom Baru wharf.
- b. The greatly increased handling rate of containerized cargo over the new wharf should increase its capacity appreciably and thereby extend the time before another new wharf is needed by 1-2 years.
- c. The operating cost of handling containerized cargo is only about 30% that of handling breakbulk (palletized) cargo. As user costs chargeable are usually twice those charged for an equal tonnage of breakbulk cargo capital investments can be amortized over a 3-5 year periods. This provide significant potentials for future surpluses.

Project No. :
 Description :

Project No. : 2.1.12
 Description : **COOLERS AND TRAILER HANDLING FACILITIES**
 (10 Year Depreciation)

Item	Value (\$ 000)						Breakdown of Capital Costs (\$ 000)						
							Total	Foreign Exchange				Net Increase 1976 - 80	
	1976	1977	1978	1979	1980	1976-80		Indirect		Direct			
Capital Costs -													
Investment		20	-	-	12	32							
Land		-	-	-	-	-							
Construction		-	50	50	-	100							
Furniture		-	600	600	-	1200							
Other		-	-	-	-	-							
Total Capital Costs		20	650	850	12	1532							
Operating Expenses -													
Personnel Expenses				12.0	21.0	33.0							
Travel & Transportation of Persons													
Commodities													
Utilities (Fuel)				20.0	80.0	100.0							
Rent or Hire													
Printing Services													
Supplies & Materials													
Maintenance Contracted Services				-	60.0	60.0							
Furniture Equipment & Livestock													
Land													
Construction													
Investment & Loans		2.0	67.0	112.0	287.0	568.0							
Miscellaneous				15.0	25.0	40.0							
Total Operating Costs		2.0	67.0	127.0	313.0	683.0							
Total Costs													
Operating Costs													

Breakdown of additional Staff Requirements

	1976	1977	1978	1979	1980
Adm. & Managerial					
Professional					
Executive					
Sub-Professional					
Clerical					
Technical					
Industrial and Manual Group :					
Skilled					
Unskilled					
Total					

3.1.14 Provide Mechanical Handling Equipment Workshop.

1. Project Number - 3.1.14

2. Project Title - Provide an adequate mechanical handling equipment maintenance shop with the necessary repair equipment and a sound maintenance program.

3. Background.

One of the greatest problems facing the Port of Palembang in particular and the Republic of Indonesia as a whole is the apparent little regard held for adequate maintenance programs due almost any and all equipment by what seems to be a substantial number of employees. This lack of appreciation of good maintenance programs is quite common in many if not most Asian and Eastern European countries. Unfortunately inadequate maintenance results in short equipment life, high repair costs and generally unsatisfactory service of the equipment.

The consensus of the PHS Team strongly supports the recent statement by an Indonesian Government official on the need for operational and maintenance knowledge in order to obtain satisfactory service from most equipment. See Figure VI-3.1.14-1.

It is important that the port have an adequate mechanical handling equipment workshop and a good equipment maintenance program.

4. Project.

a) Description

The project consists essentially of providing a building for the workshop, equipping the building and establishing

MECHANICAL HANDLING EQUIPMENT WORKSHOP

REQUIRED EQUIPMENT LIST

<u>Item No.</u>	<u>Item description</u>	<u>No. required</u>	<u>Unit price</u>	<u>Total cost. US</u>
1.	Parts cleaning tank	1	1,000	1,000
2.	Racks to stow parts	1 set	3,000	3,000
3.	Facilities to stow tools	1 set	500	500
4.	Arbor press	1	500	500
5.	3 T - Chain falls	4	250	1,000
6.	Install pit to work under forklift truck	1	2,000	2,000
7.	Special tools for fork-lift truck repairs	1 set	3,000	3,000
8.	Mechanic tools	2 sets	1,000	2,000
9.	Battery charger heavy duty	1	2,000	2,000
10.	Bucket pump (grease)	1	500	500
11.	Tire changer	1	500	500
12.	Air compressor	1	2,000	2,000
13.	Bench Gridner	1	500	500
14.	Electrical test kit	1	3,000	3,000
15.	Total Equipment			21,500
16.	Contingencies 20 %			4,500
17.	Initial equipment Spare parts allowance to be designated later			9,000
18.	GRAND TOTAL			35,000

an adequate maintenance program.

The BPP capital budget for 1976 provides for the construction of the mobile handling equipment workshop on a selected site within the port area.

This project is designed to furnish the requisite equipment for the facility and the recommended equipment is given in Table VI-3.1.14-1. An adequate progressive maintenance and repair program will also be required in order to derive maximum performance with minimum down time on the equipment.

b) State of Preparation

PPA has decided to establish the MHE workshop and the building of the shop is authorized in BPP capital budget 1976.

c) Limiting Factors.

None.

d) Implementation schedule.

The MHE workshop should be completed and equipped as soon as possible as the present facilities for maintaining equipment are very inadequate.

e) Organization and Administration

The organization and management of maintenance at the port should be revised and the responsibility for the accomplishment of adequate maintenance should rest with a maintenance engineer. The organization and administration of the MHE maintenance shop will be further discussed in a later chapter dealing with management studies.

5. Cost Estimates

a) Capital Costs

US \$

Equipment costs see Table VI-3.1.14-1 35,000

b) Recurrent costs

i. maintenance	1,500
ii. crew (no change)	-
iii. fuel and power	1,200

6. Manpower Requirements

There is no apparent need at this time for an increase in the number of maintenance personnel.

7. Land Problems and Requirements.

None

8. Benefits and Justification

Good maintenance programs wherever installed have always paid dividends in greater availability of equipment, greater reliability of equipment, longer useful life of equipment and fewer repair bills on the equipment.

Actually the port cannot afford to be without a good equipment maintenance program and a well equipped M&R workshop is an essential part of any good maintenance program.

Page No. :

Head No. :

Item	Year (in '000)						Breakdown of Capital Costs (in '000)				
	1976	1977	1978	1979	1980	Total 1976-80	Level	Foreign Exchange		Net Increase 1976-80	
								Indonesian	Foreign		
Capital Costs --											
Pre-Investment											
Land											
Construction											
Equipment	35					35					
Other											
Total Capital Costs	35	-	-	-	-	35					
Operating Expenses --								Breakdown of additional Staff Requirements			
Personal Expenditure											
Travel & Transportation of Persons											
Communications											
Utilities (Fuel)	1.0	1.2	1.2	1.2	1.2	7.0	Adm. & Managerial				
Rent or Hire							Professional				
Printing Services							Executive				
Supplies & Materials							Sub-Professional				
Maintenance Contractual Services	0.5	1.3	1.3	1.3	1.3	5.7	Clerical				
Furniture Equipment & Livestock							Technical				
Lands							Industrial and Manual Group :				
Constructions							Skilled				
Investment & Loans	7.7	7.0	6.7	6.3	5.9	27.6	Unskilled				
Miscellaneous Services	-	-	-	-	-	-					
Total Operating Costs	3.2	9.5	9.2	8.8	8.4	40.3	Total :				
Renewal Costs											
GRAND TOTAL	3.2	9.5	9.2	8.8	8.4	40.3					

3.1.15 Reduction in Dredging Quantities - Musi River

1. Project Number - 3.1.15
2. Project Title - Reduction in Dredging Quantities Musi River - Outer Bar to Palembang

3. Background

Palembang as a river port is becoming more and more dependent upon dredging to maintain the depth of the Musi such that the Port can be economically viable for use by the ships of Indonesia's Trading Partners.

River dredging is performed to provide a channel for the navigation of ships and the least dredging for which any given channel dimension can be maintained, the lower the charges against the port for maintenance will be and the more advantageous the position of the port. The ability to provide any given channel with a minimum of dredging is also important when channel depth increases are under consideration and increases in the depth of the Musi River have recently been made and further increases are under consideration. The retention of the Musi River at a depth of six meters will undoubtedly depend upon the maintenance dredging experience in the river for the next several years.

Since the future of the Port of Palembang will require at least a minimum depth of 6 in the river, the life of the port is at stake in the amount of dredging which must be performed to maintain that depth. Thus it can be seen that reducing the amount of non essential, unnecessary or non productive dredging in the river is essential to the survival of Palembang as a modern Port.

Analysis of Dredged Volumes

Analysis of the quantities dredged from the Musi River in the last few years indicate that in the Payung Island area the total amount of dredging performed was approximately 360 percent of the volume of the authorized 100 meter dredged channel when dredged to the controlling depth of the time of dredging - See Table VII-3.1.2-9 Computations - Maintenance Dredging Estimate of Payung Island which is attached to this STI Project.

6
COMPARISON OF 1975 AND 1974
PERFORMANCE RATIOS

1	2	3	4	5	6	7	8
Year	Depth of Perforation 1000 ft ²	Depth of Perforation ft.	Depth of Perforation 1000 ft ²	Depth of Perforation (2)-(4) = (5) 1000 ft ²	Total Perforation Depth - ft. 1000 ft ²	Perforation Depth - ft. (5)+(6) = 7 Ratio	Depth of Perforation ft. - ft. 1975 1974
1966	79	4.3/4.2	20	59	20	2.05	0.3
1967	236	4.2/4.3	20	216	40	5.40	1.1
1968	475	4.3/4.4	20	455	60	7.58	1.3
1969	301	4.3/4.4	---	301	60	5.01	1.3
1970	385	4.4/4.5	20	365	100	3.65	1.4
1971	375	4.5/4.7	40	335	140	2.39	1.3
1972	471	4.7/5.0	60	411	200	2.06	1.6
1973	469	5.0/5.1	20	449	200	2.00	1.2
1974	169	5.1/5.1	---	169	200	0.73	1.0
1975	2500	4.5/6.0	250	2250	550	4.00	2.0
Totals 10 years	5442	---	450	4992	1630	35.86	---
Average Per Year	544	---	45	500	163	7.50	1.21

Maintenance Dredging Problems

Since it is obviously not possible to dredge 359 percent in maintenance dredging on a once a year dredging basis, there must be something wrong with either the statistics or in their application to the problem of determining the percentage of maintenance dredging actually performed.

Speaking of the dredging statistics other Study Teams have had difficulty in reconciling the figures and one suggested as a possible solution that the dredged volume figures be discounted by 50 percent. The reason for suggesting the discount was the possibility of dredges having reported dredged tank volumes in lieu of in situ spoils dredged. However, if a 50 percent reduction was accepted it would reduce the volume of maintenance dredging to 180 percent per year but would double the cost of the dredging performed. Discounting the dredged volume statistics, does not appear to be an acceptable answer because it will badly unbalance the price structure of dredging.

There are several other possible answers to the maintenance dredging and its apparently high dredging percentages among which are the following.

1. The dredging may be deeper than the reported depth of the channel by a substantial margin. Since adequate pre-dredging and post-dredging surveys have not been the general practice, although the dredging division of PPA is gearing toward accomplishing the necessary surveys in the near future, the fact remains that dredging deeper by a meter or more could account for a substantial reduction in the dredging percentage.
2. Another very good possibility is that the maintenance dredging is not confined to the limits of the channel as originally specified but is in fact performing both capital and maintenance dredging on a much wider channel. This possibility is supported by several factors.
 - a. Except in way of the Outer Bar, which incidently has a fairly reasonable percentage of maintenance dredging the dredged channels are not well defined by navigational aids and the channels may be substantially wider than designed.
 - b. Ships navigating the channels do not seem to be constrained to as tight quarters as a fairly narrow channel would normally dictate.

- c. A review of the survey charts particularly for the Pajung Island channels do not reveal clearly defined channels but indicate rather broad irregular channels and there is a good possibility that substantial dredging may have been performed outside of the described channels.
- d. The positioning equipment in use on the state dredges may not be accurate enough to permit a dredge to maintain her position within the desired channel width.
3. The dredged channel may have been unofficially widened by yearly dredging to be more easily navigated by the pilots.

Dredging Lualaba River - Conclusions

- a. That the primary cause for excessive percentages of maintenance dredging in the Lualaba River particularly in way of Pajung Island is that a much wider channel is being dredged than specified or approved for dredging.
- b. In the way of Pajung Island, the following information applies to the East and West channels.

<u>Channel</u>	<u>Dredging Volume-6 M x 100 M channel in 1000 M³</u>	<u>Dredging Volume-6 M x 150 M channel in 1000 M³</u>	<u>Dredging Volume-6 M x 200 M channel in 1000 M³</u>
East	359	496	656
West	257	355	471
<hr/>			
Both channels	616	851	1127
<hr/>			

- i. Cost of one West 150 M channel Vs East & West 100 M channels = $355/616$ or 0.58 which represents a potential saving of 47 percent in both capital and maintenance dredging costs.
- ii. Cost of one West 200 M channel Vs East & West 100 M channels = $471/616 = 0.76$ which represents a savings of 30 percent in both capital and maintenance dredging costs.

iii. Note: About the same ratios of dredging volumes hold for a dredging depth of eight meters for the East and West channels as exhibited above for six meter channels.

- c. That the water flow rate, through one channel in lieu of two channels off Payung Island, would be improved and consequently should reduce the sediment deposit in the navigable channel.
- d. A review of the Dredging Volumes - Talways off Payung Island reveals that the volumes for a six meter channel appear to be quite reasonable at about 400,000 M³ whereas the dredging volume for an eight meter channel represents dredging about 3,400,000 M³ at a cost 8.5 times that of the six meter channel.
- e. Again an inspection of the statistical data reveals that while there appears to be sufficient dumping ground for spoils dredged in the river to a depth of six meters throughout the length of the river and for eight meter spoils upriver of Payung Island, the eight meter spoils in way of Payung Island could not be dumped in the river but would have to be carried to sea or otherwise disposed of to inland reclamation projects.
- f. That it is difficult if not impossible to determine the precise amounts of maintenance dredging involved in the Musi River system and that the maintenance dredging estimates obtained for the river are reasonable estimates and are satisfactory for preliminary planning and cost estimating purposes.

Dredging Recommendations - Musi River

1. That complete pre-dredging and post-dredging surveys be conducted for all dredging projects so that the Dredging Division at EPA and at the Harbors and Dredging Division of the Directorate of Sea Communications will know what dredging has been accomplished and will be in a better position to determine what the maintenance dredging requirements actually are.

2. The one and only dredged channel in way of Payung Island should be the west channel and it should be made wide enough to satisfy the requirements for the navigation of the required number of ships in both directions to and from Palembang. The east channel should be allowed to seek its normal level unless it is required for other purposes. In its natural state it apparently will handle ships with a draft of 4.2 meters at LWS.
3. Since the dredging data available is not of sufficient detail or completeness to warrant a firm recommendation that additional navigational aids should be installed in the navigable channels of the river to permit ships to navigate within the boundaries of the approved channels in order that excessive dredging may be reduced, the necessary detailed dredging data to make such a determination should be developed in the near future.
4. The dredging scheduled for the Indragiri River should be performed by dredges which have accurate positioning devices installed aboard such that the dredge master will know with precision where he is dredging. Estimates indicate that with accurate positioning of dredging, the amount of dredging required could be reduced by more than 50 percent.

4. Project

- a. Introduction - The project consists of several elements which are as follows.

1. There is a need for survey boats in order that pre and post dredging and quarterly surveys of the Indragiri River areas regarding dredging may be carried out by the P.M. Dredging Division. There is a need for two survey boats, one for general use either in or out of the river and the second boat should be a small survey boat. The boats should have the following general characteristics.

Survey Boat Characteristics

<u>Item number</u>	<u>Characteristics</u>	<u>Small survey boat river use</u>	<u>Large survey boat Bangka Strait and river use</u>
1	Length	8 M	15 M
2	Width	2.4 M	4 M
3	Draft	1 M	1.5 M
4	Speed	12 Kt	12 Kt
5	Deck area	Substantial working area for survey purposes	Substantial deck area for survey purposes.
6	Accommodations	Crew plus four surveyors for daily operations and occasional overnight duty	Crew plus four surveyors for five day survey trips
7	Equipment requirements normal equipment plus		
	a) echo depth finder	Yes	Yes
	b) Electronic position finder	Yes	Yes

ii. Equip the dredge to be stationed in Palembang and operating in the Musi River with an electronic position device such that the dredge will accurately know its position and will be able to confine its dredge activities to the geographical limits of the channel specified for dredging.

iii. Given the results of the surveys now being conducted on behalf of Nedeco and a complete set of surveys of the stretches of river requiring surveys, reanalyse the dredging quantities to determine the percentage of maintenance dredging vs capital dredging volume from steady state conditions of the river and to determine whether or not it would be advisable to install a limited number of channel marking aids to navigation such that all dredging activities

traffic can be restricted to prescribed channel limits. The amount of money which could be saved by substantial reductions in maintenance dredging would support a considerable number of buoys and or other aids and still show a profit.

b. State of Preparation

- i. An increase in the surveying program is well underway. A number of PPA employees from the Dredging and Technical Divisions have attended a Surveying Course in Jakarta conducted by NEDCO and are ready to assist in the performance of survey work but the PPA does not have adequate survey equipment.
- ii. The Dredge Poseidon has just completed a dredging program in the lower Musi River and it is understood that a fortnightly surveying program of the dredged area has been initiated to assist in the determination of the amounts of maintenance dredging requirements for the river.
- iii. PPA has in its BFP Capital Budget for 1976 3,000,000 Rp. for the purchase of one echo sounder (Atlas Deso 10).
- iv. While the surveying program for the Musi River is well underway, it should be geared to look into the possibility of reducing the costs of dredging by limiting the area of dredging where feasible.

c. Limiting Factors

The limiting factors for this project are the usual time and money limitations of most projects.

d. Implementation Schedule

Since the dredging in the Musi River will be extensive, it will also be expensive so every effort should be made to reduce the dredging volume as soon as possible.

A followup survey on the dredging performed by the Poseidon is now underway. When this is completed, maintenance dredging percentages should be determined to be used as standards for dredging requirements.

Thereafter pre and post surveys by PPA survey boats of dredging performed should, upon analyses, indicate whether or not excessive dredging has been performed.

The dredge assigned to the Musi River should be equipped with an electronics positioning device at an early date in order that its dredging will be efficiently performed.

When the above steps have been taken and if there still exists a considerable need to eliminate excessive dredging consideration should be given to the economics offered by increasing the aids to navigation to reduce dredging.

e. Organization and Administration

During the course of the PPS investigations the fact that Pertamina is responsible for about 50 percent of the dredging on the Musi River was noted. It was also noted that Pertamina has not fulfilled its dredging responsibilities for the last two years. Pertamina does not own its own dredges and must contract for its dredging requirements. Since Pertamina is not in the dredging business it is recommended that the full responsibility for all dredging on the Musi River be assumed by the Director of Ports and Dredging, Directorate of Sea Communications.

5. Cost Estimates

a. Capital Costs

	<u>Cost US</u>
i. Conversion of pilot boat to survey boat Installation of echo sounding equipment authorized installation of electronic positioning equipment.	20,000
ii. Procure a small river survey boat equipped with the requisite survey gear	60,000
Sub-total PPA	<u>80,000</u>
iii. Outfit Palembang based dredge with electronic positioning equipment sub-	50,000
Sub-total chargeable to dredge	<u>50,000</u>
Combined total	<u>130,000</u>

b. Recurrent Costs

	<u>Cost US \$</u>
i. Maintenance	6,000 *
ii. Crew	9,000
iii. Fuel	10,000

* Not including dredge equipment maintenance.

6. Personnel Requirements

a. Conversion of pilot boat to survey boat

Since the new pilot boats will utilize the crews of the existing pilot boat the ex pilot boat converted for survey use will require separate manning. As a survey boat about six personnel a crew of about seven will be required as follows

- 1 Master
- 1 mate
- 2 deckhands
- 1 chief engineer
- 1 Asst. engineer
- 1 cook

Estimated cost

Officers	4 @ 41,500	=	Rp. 166,000
Seaman	3 @ 27,000	=	Rp. 81,000

Total per month Rp. 24,700 7200/mo.

b. Small Survey Boat

It is assumed that the small survey boat will operate with a three crew and that the survey party will assist with any necessary duties when the boat is on surveying missions etc. crew required

- 1 Master
- 1 Engineer
- 1 Seaman

Estimated cost

Officers 2 @ Rp. 30,000 = Rp. 60,000

Seaman 1 @ Rp. 27,000 = Rp. 27,000

Total per month

Rp. 87,000

2600/yr.

7. Land Problems and Requirements

None

8. Benefits and Justifications

The annual maintenance dredging volumes estimated for the Lualaba River at a depth of channel of six meters are about one million cubic meters which at a unit cost of US \$ 1.20 per M³ equals about US \$ 1.2 million per year.

It is estimated that between 25 to 50 percent of this cost may be eliminated by more carefully controlled and more productive dredging which would represent a savings of from US \$ 300,000 to US \$ 560,000 per year.

With potential savings as indicated above at stake it is considered that the proposed project is well justified.

Department :

Head No. :

.....
 Description :

Item	Year (000)					Total 1976-80	Breakdown of Capital Costs (000)					Total
	1976	1977	1978	1979	1980		Local	Foreign Exchange			Net Increase 1976 - 80	
								Import	Direct			
Capital Costs -												
Pre-Investment												
Land												
Construction		130				130						
Equipment												
Other												
Total Capital Costs		130				130						
Operating Expenses -								Breakdown of additional SS of Requirements				
Personal Emoluments		5	10	10	10	35						
Travel & Transportation of Persons												
Communications												
Utilities (Fuel)		5	10	10	10	35						
Rent or Hire												
Printing Services												
Supplies & Materials												
Maintenance Contractual Services		3	6	6	6	21						
Furniture Equipment & Livestock												
Lands												
Constructions												
Investment & Loans		19	35	33	31	118						
Miscellaneous Services												
Total Operating Costs		32	61	59	57	209						
Renewal Costs												
GRAND TOTAL		32	61	59	57	209						

Adm. & Managerial
 Professional
 Executive
 Sub-Professional
 Clerical
 Technical
 Industrial and
 Manual Group :
 Skilled
 Unskilled

3.1.16 Main Wharf Extension.

1. Project Number - 3.1.16
2. Project Title - Main Wharf Extension (180 m)
3. Background.

Cargo handled over Boom Baru wharves was 221,000 tons in 1973 with a berth occupancy in excess of 80%. During the eleven months April to March 1974 the total was 179,000 tons, and the estimate for 1975 is over 200,000 tons. At present all but a negligible amount of export cargo is loaded onto vessels from private lighters tied alongside in the stream. Imports are generally unloaded at Boom Baru with the exception of some staple foods and raw materials, and cargo destined to Pertamina and Pusri wharves. Similarly incoming inter-island and local cargo is handled mostly at Boom Baru with the exception of staple foods, while most outgoing inter-island and local cargo is handled over proprietary facilities or by lighters. The present wharf capacity is about 600 ton/m with approximately 300 m of wharfage in use. Within a few months Boom Baru wharfage will be 160 meters long with a given capacity of 276,000 tons at present berth occupancy and cargo handling rates. Given that palletization and other improvements introduce an increase in cargo transfer rate by 300 to 300 tons/m, the capacity of Boom Baru wharves in 1977 could be as much as 368,000 tons. Considering projected future demand on Boom Baru wharves (Table VI-2.1-4), we note that cargo flow in 1980 is estimated at between a minimum of 280,000 tons and 376,000 tons and by 1985 between 347,000 tons and 1,250,000 tons. The lower estimate is based on the current percentage utilization of Boom Baru while the upper limit is the maximum tonnage that could be assigned to Boom Baru given sufficient capacity. Improvements in Boom Baru equipment

and facilities as well as more equitable tariffs which levy a more reasonable and cost based charge on lighterage and Pertamina cargo operations are expected to increase the percentage of cargo handled over Boom Baru. The major candidates for these shifts are landed foodstuffs, cement and other cargoes which benefit from palletization, and use of mechanical handling equipment. While we may therefore content that capacity available in 1976 suffices to meet projected 1980 demand at current productivity and 1985 demand with a 10% improvement in productivity. It must be recognized though that present demand is equal to present capacity and it is expected that as capacity increased demand will follow. At this time cargo lighterage is somewhat faster than cargo handling at Boom Baru. It is expected that much of the presently lightered cargo will demand Boom Baru service once cargo transfer rates at the wharf are significantly better than those in the stream.

As a result it is assumed that the improvements in the availability and quality of service at Boom Baru will attract an increasing percentage of import and interisland or local in flow of rice, sugar, flour and cement as well as an increase in the general cargo handled. It is similarly believed that some of the exports transhipped via Singapore may as more long distance service develops be expected directly from Palembang. As a result we expect cargo handled at Boom Baru to exceed 500,000 tons in 1980 and 750,000 tons by 1985 independent of the development of an international deep water port. To accommodate this trade, but also to provide the ability to offer better service for unitization, bulk handling, timber handling and feeder container/trailer handling it is proposed to expand the main wharf by 120 meters.

4. Project.

a) Description.

Based upon the aforesaid traffic forecast it is recommended to construct additional wharf facilities at Boom Baru. The project involves the construction of a new wharf for ocean going vessels in a total length of 180 m with an alongside draft of 0.5 m at LLW. This wharf will be able to handle vessels with a draft of up to 8.0 m at all stages of the tide. The structure will however be designed so as to permit in future if required the increase of the alongside draft to 10.5 m at LLW. It is proposed to build new wharf adjacent to and in direct continuation of the existing "100 m wharf", thus creating continuous wharf facilities in a total length of 280 m. The 180 m wharf extension is proposed to be designed for a distributed live load of 5.0 ton/m² suitable to handle in future containers and heavy loads and to carry modern cargo handling equipment. Though it is expected that containers will initially be handled by heavy mobile cranes the main structure will be designed to carry in future a conventional gantry crane of a standard 50 ft rail-span design with a lifting capacity of 40 tons at full outreach and a 30,000 lbs/wheel load. The wharf extension will have gantry crane rails to permit the container gantry to run within 2 m. of the ends of the extension. It is proposed to leave this wharf as an open wharf (without shed) suitable for open cargo and container stacking. The stuffing and unstuffing will be done in the transit shed behind the 100 m wharf. General cargo, to be handled at the new facilities and requiring covered storage will be handled through the same transit shed.

The existing water intake of Perusahaan Air Bersih will be dismantled and the intake incorporated within the new wharf structure. Because of the proximity of the cemetery

north of the proposed wharf extension - the operational wharf area is limited. This should be increased to 15-16,000 m². It is important the BWP acquire the southern part of the cemetery, as well as some area east of the cemetery. It is important to acquire the small cemetery behind the existing water intake. The presently limited operational wharf area could be detrimental in future to efficient port operations - and all efforts should be made to acquire as much land as possible. It is recommended that land acquisition should be commenced with immediately.

The development of 180 m main wharf will include

- 1) the dismantling of the mooring post east of the "100 m wharf"
- 2) dredging the area in front of the new main wharf to a depth of -9.0 m at LLW to extend to the deep channel of the river and extending some 100 m to the east; as well as the cutting of a 24 m wide trench to a depth of -10 m at LLW in the area where the new wharf will be constructed
- 3) the filling and consolidation of the 15,000 m wharf operational area
 - 1) the construction of the 180 m x 20 m wharf
 - 2) the paving of the open storage area, installation of lighting, services, fences, truck scales, etc.

The construction of the small craft finger pier (see Project VI-3.1.7) will be executed together and as part of the main wharf - it is therefore that the implementation schedule of the finger pier coincides with that of the main wharf.

The development of the first phase (180 m) would be adequate to meet the traffic forecast given earlier.

The second phase development may involve the construction of additional wharf facilities for future traffic growth. It is estimated that based on the untraffic forecast until 1984, development beyond the first phase (190 m) and the construction of the 40 m finger pier for small craft - is not required.

b) Capacity of the new wharf

Regarding the throughput capacity of the new wharf one should consider the total length of 280 m as the new deep water port facilities, and calculate the capacity based upon modern port operations and cargo handling concept. We consider further that at the time of completion of the new wharf, the training centre for port labor will have been set up and will be functioning and that adequate and well maintained cargo handling equipment will be available at all times.

Assumptions :

- i) Berth occupancy 70%
- ii) 360 working days/year
- iii) 3 shifts/day of 6 hours each actual working time $3 \times 6 = 18$ hours/day
- iv) 15 tons/hatch/gang hour on average
- v) 3 hatches worked per vessel
- vi) 10% time loss for berthing, unberthing and preparation for loading and unloading
- vii) 10% time loss due to rain

Capacity : $0.7 \times 2 \times 360 \times 18 \times 3 \times 15 \times 0.8 = 326,500$ tons/year
or $326,500 \div 280 \text{ m} = 1,166$ tons/m/year.

This throughput can be considered as a good average for a modern port working according to the above assumptions. We foresee no reason why this throughput should not be achieved on the new wharf area. The other 360 m wharf

should achieve a capacity of 288,000 tons/year at 300 tons/m for a total big wharf capacity of 614,000 tons/year.

c) Space of Preparation.

The basic concept of a limited expansion of 80 m has been considered so far but no design or surveys undertaken.

d) Implementation Schedule.

10 m will be constructed during	1976/1977
Survey in conjunction with the additional	
extension of 100 m	December 1976
Design and preparation of tender documents	June 1977
Letting of tenders	November 1977
Letting of contract	February 1978
Commence construction	April 1978
Complete construction	September 1978

e) Operational and Administration Arrangements

Note - this is only an expansion of existing port operations.

5. Cost Estimates

a) Capital Costs for 180 m wharf

i) Hydrographic survey	LS Rp.	4,100,000
ii) Soil investigations	LS "	10,850,000
iii) Dredging 50,000 M ³ at Rp.820/M ³	"	41,000,000
iv) Dismantling of mooring post	LS "	4,100,000
v) Filling in and consolidation of 13,000 M ² at Rp.2000/M ²	"	26,000,000
vi) Construction of 180 x 20 m wharf at 6.5 million Rp/m	"	1,170,000,000
vii) Reconstruction of water intake	LS "	26,000,000
Carried forward	Rp.	<u>1,281,450,000</u>

Brought forward		Rp. 1,281,450,000
viii) Flood light & navigation aids	LS Rp.	12,300,000
ix) Asphaltting of area 14,000 M ² at Rp.4000/m ²	"	56,000,000
x) Fence, gates, truckscalls etc.	LS "	41,000,000
xi) Ramp for small Ro-Ro	LS "	20,000,000
xii) Mechanical cargo handling equipment (see list)	LS "	265,130,000
Subtotal	Rp.	1,675,880,000
Unforeseen 10%	"	167,588,000
Engineering and Administration (civil works)	"	120,000,000
Subtotal	Rp.	1,963,470,000
Escalation on 80 m - 15% 1976 x 0.5 prorata cost Rp.583,000,000	"	51,225,000
Escalation on 100 m - 15% 1976	"	192,000,000
15% 1977	"	220,100,000
15% 1978	"	234,000,000
Subtotal	Rp.	2,680,795,000
Acquisition of land :		
Unbuilt area : 4000 m ² Rp.5000/m ²	"	20,000,000
Build up area: 5000 m ² Rp.10,000/m ²	"	50,000,000
Total	Rp.	2,750,795,000
	US\$	6,026,000

b) Operating Costs (annual)

i) Maintenance dredging (10% of capital dredging)	Rp.	8,000,000
ii) Equipment maintenance (7% of cost)	"	20,000,000
iii) Vessel general maintenance (2% of cost)	"	31,000,000
iv) Salaries 20 men = 1 x Rp.500,000/year 3 x Rp.350,000/year 16 x Rp.300,000/year		6,350,000
v) Equipment operators 61 men 10 x Rp.350,000/year 51 x Rp.300,000/year		28,350,000
Carried forward	Rp.	84,050,000

Brought forward	Rp.	81,350,000
Administration 10%		8,440,000
		<hr/>
Total	Rp.	92,790,000
	US \$	226,000

Mechanical cargo handling equipment

20 TMS of 5000 lbs at Rp.5,125,000	Rp.	102,500,000
1 TMS of 24000 lbs at Rp.29,300,000	"	29,300,000
3 Mobile cranes of 10,000 lbs at Rp.20,500,000	"	61,500,000
1 Mobile crane of 20,000 lbs at Rp.29,500,000	"	29,500,000
3 tractors at Rp.2,460,000	"	12,300,000
20 trailers of 5-10 ton at Rp.615,000	"	12,300,000
		<hr/>
Total	Rp.	265,100,000
	US\$	667,000

Equipment Operators

TMS 5000 lbs on average 13 in use x 3 shifts	39 men
TMS 24,000 lbs " 1 in use x 3 shifts	3 men
Mobile cranes 10,000 lbs on average 2 in use x 3 shifts	6 men
Mobile crane 20,000 lbs on average 1 in use x 2 shifts x 3	6 men
Tractors on average 3 in use x 3 shifts	9 men
	<hr/>
Total	63 men

C. Personnel Requirements.

a) Security	20 men
b) Equipment Operators	63 men
c) Civil work and general maintenance	10 men
d) General administration	10 men
	<hr/>
Total	103 men

7. Land Problems and Requirements.

Effective port operations require adequate and sufficient operational areas. The existing facilities have sufficient land reserves, and could expand their operational area through freeing of land belonging to the port but occupied by others. The proposed new facilities do not have similar conditions of land reserves because of the proximity of a cemetery. Some parts of the cemetery are not used and could be acquired by EPP. Similarly EPP should acquire land areas east of the cemetery, which would be required for future port operations. The proposed new facilities would require some 15-16,000 M² as operational port area. Only some 8000 M² are within the port fence, and the rest must be acquired. Of the land area to be acquired some 4000 M² is empty and is presently used for the unloading of gravel and sand, while the balance (3-5000 M²) is built up area with small wooden houses.

8. Benefits and Justification.

The benefits of the main wharf extension are difficult to quantify before reevaluation of the market and potential changes in regulation affecting lightering operations. We have assumed that essentially all cargo which is not lightered to its final destination, but was sent to port to warehouse or distribution will be handled at home port as soon as there are sufficient and effective facilities available.

The main wharf extension will permit prospective cargo to be handled at least until 1982 and possibly until 1985. As a result it offers a sufficient time to effectively plan and design the long term development of an international port. It also offers an opportunity for the introduction of limited container, dry bulk, liquid bulk and timber in bulk handling.

RESIDENTIAL AREA

JALAN MAJOR MEHET S

PROPOSED PARKING AREA

MOSQUE

CEMETERY

SCALE
1:2,000

OUT IN

PROPOSED NEW ROAD

RESIDENTIAL AREA

OIL PUMP

WAREHOUSE I

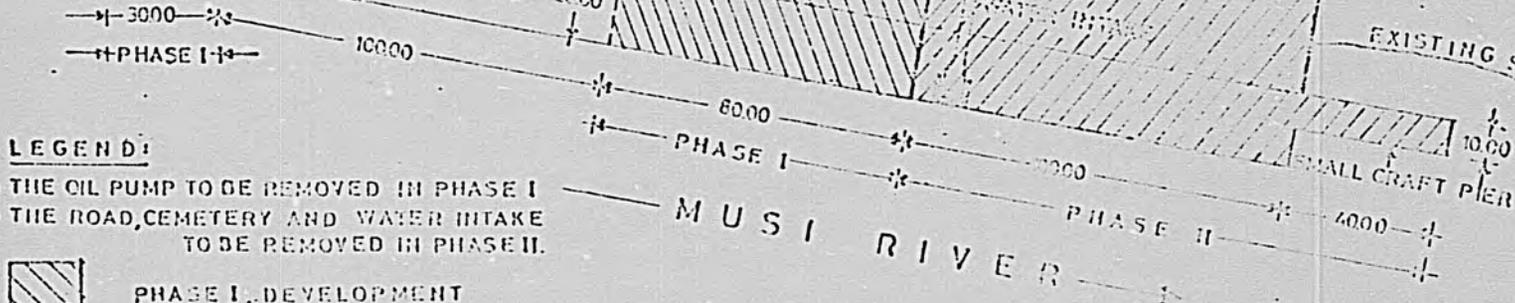
BERTH NO. 4 30 T/M2

WATER INTAKE

EXISTING SHORE LINE

SMALL CRAFT PIER

MUSI RIVER



LEGEND:

- THE OIL PUMP TO BE REMOVED IN PHASE I
- THE ROAD, CEMETERY AND WATER INTAKE TO BE REMOVED IN PHASE II.



PHASE I DEVELOPMENT



PHASE II DEVELOPMENT

FIGURE VI-3.1.16-1

BOOM BARU PROPOSED WHARF EXTENSION FOR OCEAN GOING VESSELS

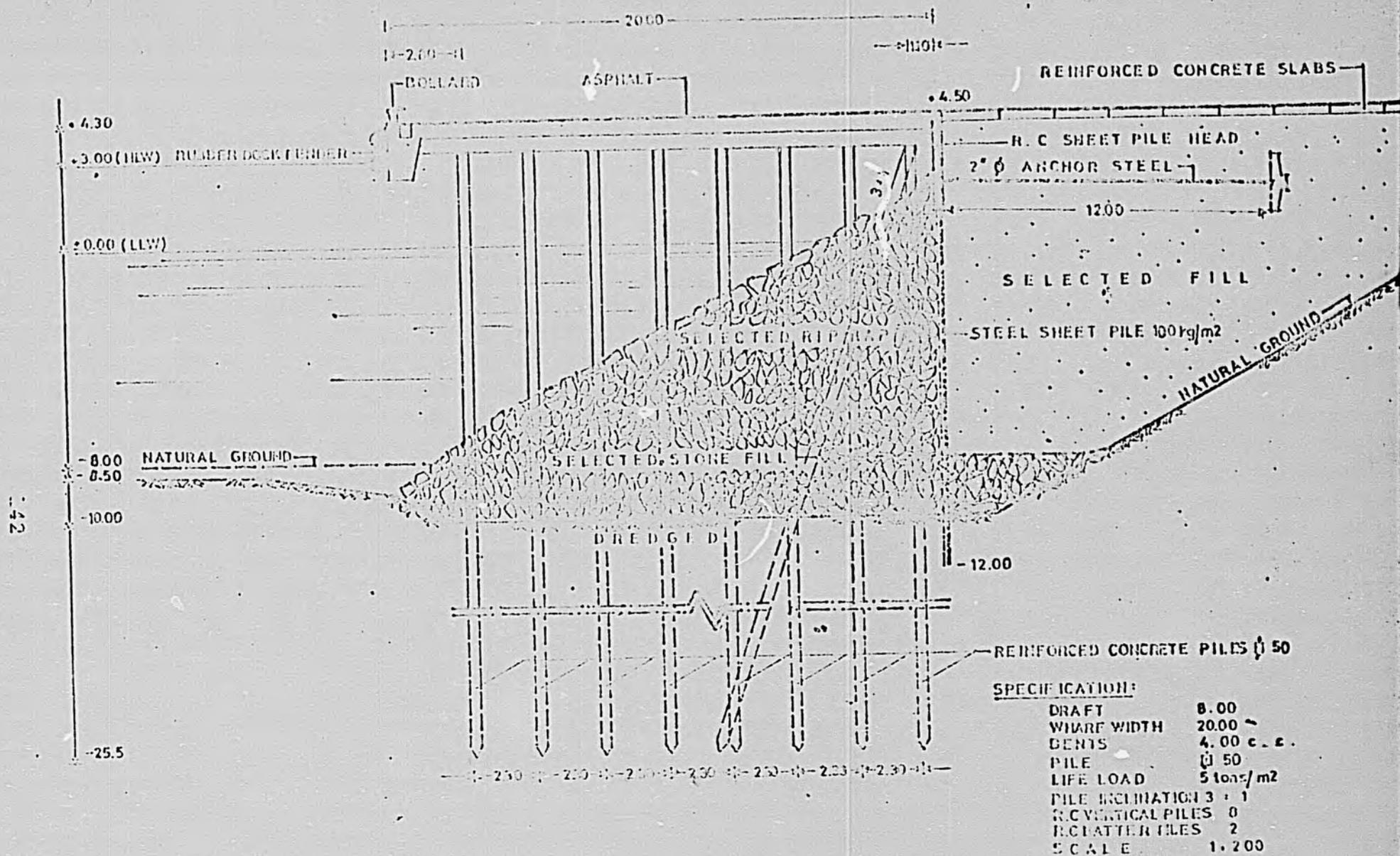


FIGURE VI-3.1.16-2

BOOM BARGE WHARF AND WHARF FOR OCEAN GOING VESSELS

Item	1976-77 (000)						1977-78 (000)					
	1976	1977	1978	1979	1980	Total 1976-80	1976	1977	1978	1979	1980	Total 1976-80
Capital Costs --												
Pre-investment	50	110	110	-	-	480						
Land	-	10	110	-	-	170						
Construction	-	170	115	120	-	515						
Equipment	-	20	20	7	-	57						
Other												
Total Capital Costs	50	210	245	237	-	672						
Operating Expenses --												
Personal Expenditure												
Travel & Transportation of Persons	-	10	15	35	65	155						
Communications												
Utilities (Fuel)												
Rent or Hire												
Printing Services												
Supplies & Materials												
Maintenance Contractual Services	-	40	60	80	110	340						
Furniture Equipment & Livestock												
Lands												
Constructions												
Investment & Loans	5	100	120	115	100	380						
Miscellaneous												
Total Operating Costs	5	150	215	230	275	875						
Renewal Costs												
GRAND TOTAL	55	360	460	467	275	1547						

Adm. & Managerial
 Professional
 Executive
 Sub-Professional
 Clerical
 Technical
 Industrial and
 Unskilled Group
 Unemployed
 Unemployed

Breakdown of additional
 State Expenditure

1976-80

3.1.17 Kertapati Coal Terminal

1. Project Number - 3.1.17
2. Project Title - Kertapati Coal Terminal
3. Background *

The Kertapati coal terminal lies about five kilometers above the Ampara Bridge Palembang on the right bank of the Musi River. It is adjacent to the PNM Palembang railroad terminal and has a spur connection to the railroad. The terminal which serves as an interface between the railroad and shipping for the transportation of coal from the Bukit Alam mines to its customers is owned by P.N. Batubara who presumably will undertake any necessary repairs or improvements of their coal terminal including port facilities required to handle the projected increase in coal traffic forecast for the Port of Palembang.

However, since the assistance of the Palembang Port Administrator was solicited on behalf of Shell International Ltd and P.N. Batubara to survey the Musi River above the Ampara Bridge and to help to have the Ampara Bridge repaired in order that large ships for which the bridge was designed can pass through the bridge.

It is conceded that the Port Administrator is not required to perform the services requested. However, the request was in the overall interest to the port and was honored as it should have been. Therefore, the following project appears to be in order.

4. Project.

a. Description

- 1) The first part of this project calls for the survey

of the Musi River above the Ampara Bridge to the Westport terminal to determine whether the river depths are suitable and whether or not there is a satisfactory turning basin or equivalent in way of the terminal to permit the operation of 120 to 135 meter ships above the bridge. While a survey is necessary it is doubtful that any dredging will be required above the bridge except for local dredging in way of the piers which may have suffered some silting since the bridge closed over two years ago.

ii) the second part of this project calls for a recommendation that the Ampara Bridge be repaired and reopened to normal river traffic. Whether or not the movement of coal increases as forecast the Ampara Bridge should be inspected, overhauled as found necessary, repaired as found necessary and returned to service. The longer the bridge is inoperable without maintenance the less the chances are that the bridge will ever open again.

The PPS has made a partial inspection of the bridge and inquired as to the mode of its failure. The PPS report indicates that the bridge lift synchronization system had an electrical failure and the bridge lifted out of phase and the bridge safety features shut down the bridge before the maximum synchronization tolerances were reached. Since the bridge shut down without exceeding the out of phase lift limits, the bridge should not have been severely damaged. However the bridge is in need of maintenance and a suitable maintenance program. It is estimated that the bridge could be restored to a satisfactory working condition for less than US\$ 100,000.

b) State of Preparation

i) No preparation is needed for surveying the Musi River between the Ampera Bridge and Kertapati excepting for the assignment of a surveying boat.

ii) The City of Palembang has had the bridge surveyed preparatory to having it repaired.

c) Limiting Factors.

There are no limiting factors insofar as the surveying is concerned. However, with regard the Ampera Bridge, the port has no jurisdiction whatsoever with regard the bridge. It is the property of the City of Palembang.

d) Implementation Schedule.

The survey of the Musi River between the Ampera Bridge and Kertapati should be done in January 1976.

The repair of the Ampera Bridge should be accomplished as soon as reasonably practical.

c) Organization and Administration

No change.

5. Cost Estimates

a) Capital Cost.

US\$ 1000

i) Survey

None

ii) Bridge repair

None by DP

b) Recurrent Costs

No change

None

6. Manpower Requirements.

No change.

7. Cost Problems and Recommendations.

None.

8. Benefits and Justification.

The history of the bridge indicates that it was not opened very often during its operational life largely due to the gradual loss of productivity in the coal mines in the late 1960s and early 1970s. However, B.M. Sathana would like to ship coal in the largest ships possible from the Sathana terminal and unless the bridge is fixed permitting ships to operate to the terminal, the export price of the coal may be such that the coal will be uncompetitive on the East Asia coal market.

If Palerang is to retain a rating as a progressive modern port it will have to repair the bridge. Not to repair the bridge will indicate incompetence or decadence on the part of the city administration and the city respectively.

3.1.18 Timber Handling

1. Project Number - 3.1.18

2. Project Title - Timber Handling

3. Background

Sawn timber and timber products loaded at Polaberg for export, inter-
national and local transport is expected to increase from 19,400 tons in
1974 to over 516,000 tons in 1980 and 645,000 tons in 1985. Saw timber
is produced by a large number of sawmills, while plywood and other products
are generated by large factories. All sawn timber and wood products are
now loaded onto lighters at the various plants and from the lighters
transferred onto RLS and other vessels in the stream. While the current
timber and wood products movements are in comparatively small lots,
future movements will be in large lots which probably demand specialized
carriers at ships and as a result specialized loading facilities are
required. Considering the future volume of saw timber and
it is expected that by 1978/79 special lumber will be required
for Polaberg. Log movements which largely consist of
collection along the Lasi, Banyasin, Mayoro and adjacent waterways
is taking at a rapid rate and are expected to reach 1,13,000 tons in 1983.
Only 15% of log movements turned up at Polaberg. Timber products loaded at Polaberg are expected to
be compared in the domestic market at the rate of 107,500 tons
in 1980 and 1985 respectively.

On the other hand, sawn timber is expected to be exported at
increasing rate. Out of a total of 173,000 tons loaded in 1980, only
10,000 tons are to be exported. Similarly we expect exports of
a total of 516,200 tons of sawn timber loaded at Polaberg in 1985.
Large quantities of logs, sawn timber and other products are
loaded in specialized carriers (barges, ships etc.) by 1978/79. This
will require effective storage, consolidation, sorting, handling and
transport and methods then currently in use. In fact one of the main

problems in export promotion of sawn timber has apparently been the lack of proper storage, bundling, grading, marking and handling of sawn timber which greatly affects its delivery quality.

4. Project

a. Description

The proposed sawn timber handling facilities will consist of a covered timber storage, bundling, grading and marking area of 2000 M² located against the port boundary in the rear of the new wharf. This storage area will be covered by an open roof shed and be accessible from 3 sides. Timber will be stacked 4 M high and handled by the side-loader/stacker which also serves container handling. In addition, a mobile lumber straddle, 4 lumber trailers and 1 tractor will be provided. Small forklifts used will come from the 20 forklift complement assigned to the new wharf extension.

b. Initial Factors

None

c. Special Consideration

None

d. Estimated Acquisition Schedule

to be constructed and equipped in 1979.

5. Cost estimates

a. Capital costs

Design and Engineering	\$	10,000
Open shed 2000 M ²	\$	80,000
Lumber straddle	\$	32,000
4 timber trailers	\$	10,000
1 tractor	\$	10,000
Side-loader		(charged to container facility)
TOTAL US	\$	142,000

b. Recurrent costs

Fuel	\$ 2,000
Staff	\$ 18,000
Maintenance	\$ 4,000
	<hr/>
US	\$ 16,000

6. Manpower Requirements

(EPP Personnel only)

- 1 Supervisor
- 3 Equipment Operators
- 12 Laborers

7. Land Requirements

Area within the land acquired for the new wharf extension.

8. Benefits and Justification.

At present essentially no sawn timber and timber product shipments are handled over EPP facilities. The large increase of exports and particularly exports require more orderly, centralized, controlled, and efficient handling. Proper grading, marking and bundling is expected to greatly effect exportability and price and as a result benefit to the economy. We initially expect only export timber to be handled by this facility.

Project :

Head No. :

Description :
 (The above description should - 5 pages long.)

Item	Expenditure (in Rs.)					Total 1976-80	Breakdown of Capital Cost (in Rs.)						
	1976	1977	1978	1979	1980		Local	Foreign Exchange			Net Increase 1976 - 80		
								Indirect	Direct	Grant			
Capital Costs -													
Pre-Investment				10	--	10							
Local				--	--	--							
Construction				80	--	80							
Equipment				52	--	52							
Other				--	--	--							
Total Capital Costs				142		142							
Operating Expenses -													
Personal Emoluments					18.0	18.0							
Travel & Transportation of Persons													
Communications													
Utilities (Fuel)					2.0	2.0							
Rent or Hire													
Printing Services													
Supplies & Materials													
Maintenance Contract													
Fuel Services					4.0	4.0							
Furniture Equipment & Inventory													
Leads													
Construction													
Investment & Loans				10.0	30.2	40.2							
Miscellaneous Services													
Total Operating Costs				10.0	54.2	64.2							
Removal Costs													
GRAND TOTAL				10.0	54.2	64.2							

3.1.19 Liquid Bulk Handling

1. Project Number - 3.1.19
2. Project Title - Liquid Bulk Handling
3. Background

The amount of non-petroleum liquids handled at Palembang is still small and the total amount of coconut, palm and vegetable oils handled through Palembang was only about 17,000 tons in 1974 of which nearly 15,000 tons were unloaded in barrels at Boom Baru. The present per capita consumption in the Palembang hinterland is only 7 Kgs annually. This is very low and a sharp rise to 15 Kgs per person per year is expected by 1980 a kick would result in shipments of about 35,000 tons. Thereafter shipments will increase at a slower rate and reach about 47,000 tons by 1985. While it is reasonable to land and distribute the present volume in barrels, it will be found that it is more efficient and easier to handle the shipments after 1980 in semi-bulk by the use of deep tanks in RLS ships, or portable deck-mounted tanks. To facilitate such a development the port should establish a coconut oil unloading terminal, backed up by one or more small storage tanks.

4. Project.

a) Description

The project consists of the installation of a 3" diameter coconut oil discharge pipe installation on the new 100 meter wharf extension with an unloading manifold located about 20 meters from the end of the wharf. Storage tanks of 2000 ton capacity will be located in the back area of the port. The storage tanks will be connected to

the fitting pipe and a tank truck and barrel filling station located outside the port periphery.

b) Binding Factors.

Acceptability by shippers, shipping companies and consignees of a change in handling technique. The transport and distribution cost savings can be expected to be about 50% and port berth productivity would increase 10 fold. The consultants suggest that the port make the marginal investment into the installation independent of the state of final agreements reached. Experience in other ports have indicated that once all installation is available it will be used. The tankage and tank truck/barrel filling station could be leased to operators.

c) Scope of Preparation.

None.

d) Implementation Schedule.

to be constructed in 1979.

3. Cost Estimates.

a) Capital Costs.

Pipeline installation of wharf	US\$ 38,000
Tank farm 2000 tons	" 120,000
Tank truck/barrel filling station	" 60,000
Other costs	" 30,000
Total	<u>US\$ 248,000</u>

b) Operating Costs.

Staff	US\$ 2,500
Maintenance	" 3,000
Total	<u>US\$ 5,500</u>

6. Manpower Requirements.

1 terminal manager
3 attendants

7. Land Requirements.

280 M² of land adjacent to external road for tank truck/
barrel filling station.

8. Benefits and Justification

This installation will allow an unloading rate of about 120 tons/hour which is about 10 times present unloading rates. Berth utilization will therefore be vastly improved. Considering full capital and operating costs and amortization of the investment over a 10 year period the unit cost of discharge will be about \$ 1.27/ton or Rp.520/ton, (excluding wharfage) which is a fraction of present discharge costs. Similar savings will also benefit the ship operators in ship utilization and loading costs.

3.1.20 Dry Bulk Handling.

1. Project Number - 3.1.20
2. Project Title - Dry Bulk Handling
3. Background

There is a significant movement of dry cargo in bags which could be handled in bulk. In 1974 the port handled 10,900 tons of rice, 44,800 tons of sugar, 13,200 tons of wheat flour, and 51,900 tons of cement for a total of 211,500 tons of bagged cargo. It is generally accepted that loading and unloading of bagged cargo is performed at cost which is usually 10 fold that of handling the same cargo as small or semi-bulk. Disregarding cement, which will in future be loaded at a special facility at Kertapati, at which time shipments to Palembang are expected to discontinue we obtain the following projections of future dry bulkable cargo shipments of :

	<u>1980</u>	<u>1985</u>
Rice	150,500 tons	160,000 tons
Sugar	72,400 "	100,000 "
Wheat & flour	19,500 "	24,900 "
Total	<u>245,400 tons</u>	<u>284,900 tons</u>

These very large quantities are today handled in bags by lighters or over Boom Baru wharf.

A large proportion of the above foodstuffs are imported, shipped, and distributed by the Government. Although final distribution should obviously be in bags, these large quantities may justify limited bulk handling of these commodities. It can readily be shown for example, that the savings in loading and discharge costs alone

will pay for the capital investment of a portable bulk-loading and discharge installation as well as a bagging plant over a volume of the first 100,000 tons.

Palletization at Boom Baru will go a long way in increasing unloading efficiency and therefore attract the bagged foodstuffs now handled by lightage, particularly if the bagged cargo is palletized at the bagging plant at the point of origin. On the other hand bulk handling will ensure the benefits manifold. It is therefore proposed to introduce unloading palletization of bagged cargo in 1976, complete origin to destination palletization by 1978 and limited bulk handling by 1979.

2.2.2.2.2.

a) Installation

It is proposed to procure a number of portable, self-powered vacuumers for the discharge of dry bulk cargo from the ships' hold into trucks, lighters, or onto other vessels leading to foodgrain or sugar warehouses. After a few years of experience with this arrangement and in case the Government is agreeable, the port will construct a small sugar warehouse with bulk storage capacity of 5000 tons, and a small silo with 6 x 1000 ton capacity for rice and foodgrain. The silo should be located just outside the port boundary in the back area of the small craft facility.

A recessed channel conveyor with a 250 ton/hour capacity would be used to feed the silo. Portable conveyor sections and portable vacuumers are to feed the fixed conveyor.

The silo could also be equipped with a bagging plant and a few truck loading bays.

b) Limiting Factors.

Agreement of Government and shipping companies to load and handle foodgrains partially in bulk, followed later by sugar bulk handling.

c) State of Preparation

None.

d) Implementation Schedule.

Phase I

Purchase 3 portable vacuators (100 tons/hr), three portable powered conveyor sections (12 m each) and one bagging plant in 1977. Start limited bulk handling operations with rice and wheat in January 1978.

Phase II

After using this limited system for 2 years and after completion of the main wharf extension designed with a central channel access (0.3 m x 0.3 m), design shall start and necessary facilities for construction in 1980-81.

5. Capital Costs.

a) Capital Costs.

3 Portable vacuators 100 ton/hour	US\$	180,000
Spare parts for above	"	15,000
3 Portable covered conveyor sections (12m)	"	21,000
1 Small bagging plant	"	30,000
Total	US\$	246,000

Phase II

Design, and engineering	US\$	400,000
Silo 3 x 1500 tons	"	3,000,000
Conveyor fixed (250 ton/hour)	"	300,000
Silo loading bags	"	600,000
Subtotal	US\$	4,300,000
10% Contingency	"	430,000
Escalation from 1976 - 1981	"	2,463,740
Total cost in 1980/81	US\$	7,193,740

b) Recurrent Costs.

Phase I

Staff	US\$	28,000
Maintenance	"	10,000
Fuel	"	4,000
Total	US\$	42,000

Phase II

Same assuming silo operation by lessor.

6. Manning Requirements

(BPP personnel only)

Foreman	1 man
Equipment operators	6 men
Laborers	8 men
Total	15 men

7. Land Requirements.

No land requirements for Phase I.

About 700 m2 outside port for Phase II.

8. Benefits and Justification.

The handling of quarter of a million tons or more of foodgrain and sugar in bags after 1980 will add a significant handling cost to this most important shipments. As noted in Table VI-3.1.20-1 the operating costs including the 5 year amortization (loan repayment) of all equipment (vacuators, conveyors, bagging plant etc.), interest payments at 10% and all recurrent costs comes to about \$100,000 per year for an installed unloading and bagging capacity of 100-150,000 tons per year (1000 working hours at 50% rated capacity). The resulting cost per ton is therefore less than half the present cost of Rp. 321/ton bagged cargo. The project also permits a very much higher rate of discharge (upto 150 tons/hour at 50% capacity) and as a result more efficient berth utilization and greatly reduced ship turn around. Furthermore experience shows that vacuator unloading system can, with proper shipbased and shore side arrangements continue to operate in rain.

3.2.1 Repair Pilot Station Generators.

1. Project Number - 3.2.1
2. Project Title - Repair Pilot Station Generators
3. Background

There are three generators at the pilot station, two 10 KVA and one 27 KVA which were installed in a generator building without the benefit of mufflers. They exhaust to atmosphere and have created such a noise level that the pilots will not permit their operation except for a few hours each day at specified times.

To eliminate the noise without mufflers someone devised a homemade muffler system. It consists essentially of a large concrete pit into which all exhausts were channeled. The only exit from the pit was a small pipe, which was insufficient in size and caused a high back pressure on the generator engines. The pit and the exhaust system had heavy unburned carbon deposits on all surfaces. In 1962 there was an explosion in the crankcase of the 27 KVA generator and it has been out of action for over six months waiting for new engine parts so the engine can be rebuilt.

One of the two 10 KVA generators has been out of action for almost a year waiting for spare parts. If the generator the station is dependent upon one 10 KVA generator and is running an abbreviated communications schedule. If maintenance steps to alleviate the problems are not taken, the pilot station will soon be without communications excepting for the pilot stations small emergency transmitter which has very limited power and range.

4. Project

a) Description:

- 1) Overhaul, repair as necessary and place in first class operation the three pilot station generators.
- 2) Purchase and install adequate mufflers for the three generators and
- 3) Direct the exhausts through the west wall of the generator building.

b) State of Preparations

Parts for the damaged machinery have apparently been ordered along with some of the spare parts required. No known action has taken place with regard correcting the faulty muffler systems.

c) Limiting Factors.

Perhaps the principal limiting factor in effecting repairs to the diesel engines is the slowness in obtaining spare parts which will be further discussed in section.....

d) Implementation schedule.

This project should have top priority for immediate action or the pilot station will soon be without communications except for an inadequate emergency radio system.

e) Organization and Administration

The organization and administration of the maintenance and repair of PPA equipment will be further discussed in Volume IX-6.0.

5. Cost Estimates.

Under normal conditions the capital costs hereunder given would be considered to be maintenance costs but since some of the costs may not be recurrent they are listed as capital costs.

a) Capital Costs

1) Overhaul and repair one 27 KVA generator	US\$ 2,000
2) Overhaul and repair two 10 KVA generators	" 2,000
3) Purchase and install a muffler system for all three generators	2,000
Total capital costs	US\$ 6,000

b) Recurrent Costs.

None - It can be argued that the mufflers will have to be replaced, this is true, but this cost should be assumed by normal maintenance on the equipment and not by a supplemental maintenance assessment.

6. Proposed Improvements.

No operational changes are indicated and maintenance requirements will be addressed, as noted above, in Volume IV-4.0.

7. Unresolved Problems and Requirements

None

8. Summary and Justification

- a) The generator engines require overhaul and without this status or the pilot station will be without an adequate communications capability which in turn will cause all sorts of untenable situations including the delay of ships enroute to Palembang.

- b) The exhaust systems should be correctly installed such that the muffled engines will not disturb the sleeping pilots thus permitting radio operations on a 24 hour basis if necessary.
- c) The cost of this item is quite low, what is needed is action to correct the lingering deficiency.

Recd No. :

Project No. :

Description : REPAIR PILOT STATION GENERATORS

Item	Year ('000)					Total 1976-80	Breakdown of Capital Costs ('000)					
	1976	1977	1978	1979	1980		Local	Foreign Exchange				Net Increase 1976 - 80
								Indirect		Direct		
Capital Costs -												
Pre-Investment												
Land												
Construction												
Equipment	3											
Other	4											
Total Capital Costs	7											
Operating Expenses -							Breakdown of additional Staff Requirements					
Personal Emoluments							1976	1977	1978	1979	1980	
Travel & Transporta- tion of Persons												
Commissions												
Utilities (Fuel)												
Rent or Hire												
Printing Services												
Supplies & Materials												
Printing & Commu- nication Services												
Furniture Equipment & Livestock												
Loans												
Constructions												
Investment & Loans												
Miscellaneous Services												
Total Operating Costs												
Total												

3.2.2. Increase the Number of Pilots.

1. Project Number - 3.2.2.

2. Project Title - Increase in the Number of Pilots.

3. Background.

The shipping industry has been quite strong in voicing their concern about the shortage of pilots and the fact that many of their ships have been delayed both by a lack of pilots and by a lack of pilot boats or broken down pilot boats. Most agents point out that any delay to a deeply laden vessel generally results in a loss of the tide and a wait of about 25 hours for the next successive higher high tide.

PPA has recognized the shortage and is in the process of training additional pilots at the new pilot school which is being established in Palembang.

Pilot utilization studies on the Musi River or Bar pilots indicate that if the pilots worked about a 40 hour week that seven additional river pilots or a total of 29 river pilots will be required during the next five years. Similar studies on the utilization and time requirements for harbor pilots made by PPS indicate that four additional harbor pilots or a total of 12 harbor pilots will be required in order that the pilots will work about a 40 hour work week.

In addition to the above operational requirements it is estimated that on average at least three pilots will be required full time to staff the pilot academy in Palembang which is scheduled to provide basis pilot indoctrination and training for all of the pilots required in the Republic of Indonesia.

4. Project.

a) Description

This project is to increase the number of pilots authorized for the combined Musi River Bar pilots, the Palembang harbor pilots and the staff of the Palembang pilot academy to a total of 44 pilots with the following distribution

<u>Utilization or pilot assignment</u>	<u>Presently assigned</u>	<u>New pilots needed</u>	<u>Total pilots required</u>
River or bar pilots	22	7	29
Harbor pilots	6	4	12
Pilot school staff	0	3	3
Totals	<u>30</u>	<u>14</u>	<u>44</u>

b) State of Preparation

The shortage of pilots for the Palembang Musi River operation has been recognized along with a general shortage of pilots in Indonesia and the establishment of a pilot training facility has been started in temporary quarters and the construction of a permanent pilot academy has been authorized and funded in the BPP capital budget for 1976.

c) Limiting Factors.

None.

d) Implementation Schedule.

There are at the present time about five pilot students in training to become Musi River pilots. They will become operational in 1976. This will ease the burden now carried by the pilots. The balance of the pilots required should be trained as quickly as convenient to the pilot academy but not less than five five in 1977 and the remainder four plus any replacements in 1978.

e) Organization and Administration

It will be necessary to establish an organization along with a set of administrative procedures for the pilot academy. However it is not anticipated that any major changes will be required in the PPA organization. Any recommended organizational or management changes will be covered in a later PPS study on organization and management procedures.

5. Cost Estimates.

a) Capital Costs

Since it is assumed that the construction and equipping of the Palembang Pilot Academy has been funded there are no capital funds included in this project.

b) Recurrent Cost.

The primary recurrent costs involved are pilot salaries, other emoluments and benefits which are as follows given in rupiahs.

<u>Position</u>	<u>Number additional</u>	<u>Average wages, extras and benefits</u>	<u>Total annual requirements</u>
River pilot	7	67,500	472,000
Harbor pilots	4	76,500	306,000
Academy staff	3	71,000	212,000
Totals/month	14	--	990,000
Yearly average			Rp. 12,000,000
		or about	US\$ 30,000

6. Manning Requirements.

The project itself prescribes the additional manning requirements which are the addition of 14 pilots.

7. Land Problems and Requirements.

The land required for the new Pilot Academy has been acquired by PPA and while additional land may require funds to clear the land no land problem is foreseen.

8. Benefits and Justification.

The benefits to be derived from increasing the number of pilots are as follows.

- a) There will be sufficient pilots such that it should not be necessary to cause ships to be delayed by a lack of pilots as is the case at the present time.
- b) The pilots will be able to handle a substantial temporary overload without causing ships to be delayed by pilots on the Musi River.

The justification for the number of pilots required is contained in Volume IV Section 2.3.2 Utilization of Pilots.

Analysis of River Pilots

In order to analyze the pilot operations to determine the normal or average pilot cycle time it is necessary to make some assumptions which are listed as follows.

1. It is assumed that a pilots cycle starts when he arrives on scene at the pilot office and concludes when he arrives back at the pilot office having completed one complete cycle from Palembang to the outer bar and return and that he has had a rest and recreation (R + R) and is ready for his next pilot assignment.
2. In order to identify the various steps in a pilot cycle, the quantifiable time consuming events in the average pilot cycle are shown in table IV-2.3.2-1.
3. The following minimum rest and recreation (R + R) periods are required prior to proceeding to the next cycle step.
 - a. Six hours at the pilot station.
 - b. Twelve hours at Palembang.
4. That there are now 22 river pilots and eight harbor pilots.
5. That the average age of qualifying as a pilot is about 25 years, the retirement age is 55 years and the useful pilot career of a pilot is about 30 years.
6. Notes amplifying entries on Table IV-2.3.2-1.
 - a. Assumes that deeply laden ship must wait for a second high tide for one of various reasons (inadequate speed, late start, etc.)

TABLE IV-2.3.2-1

Analysis of Events Constituting a River

Pilot Cycle on the Musi River

<u>Item No.</u>	<u>Description of event</u>	<u>Estimated time hours minimum</u>	<u>Estimated time hours maximum</u>	<u>Estimated time hours average</u>	<u>Estimated time hours standard allowable</u>	<u>Comment</u>
1(a)	Wait in pilot office	0.25	0.25	0.25	0.25	
(b)	Pilot boat to ship	0.25	0.25	0.25	0.25	
(c)	Time on board before departure	0.5	0.5	0.5	0.5	
	Sub-total	1.0	1.0	1.0	1.0	
2	Running time Palembang to outer bar	6.0	18/030/30	6.0	6.0	Note (a)
3(a)	Time waiting on ship for pilot boat	0.25	0.25	0.25	0.25	
(b)	Time on pilot boat before starting for pilot station	0.25	1.25	0.75	0.4	
(c)	Running time to pilot station	2.5	2.5	2.5	1.4	
	Sub-total	3.0	4.0	3.5	2.0	Note (b)
4	Time at pilot station required R+R prior to qualifying for next pilot position	(6)	(6)	(6)	(6)	

TABLE IV-2.3.2-1

(Cont'd)

No.	Description of event	Estimated time hours minimum	Estimated time hours maximum	Estimated time hours average	Estimated time hours standard allowable	Comments
1	Average time before retiring to rest	0.5	4.0	1.0	1.0	
2	Average time sleeping	2.0	8.0	4.0	6.0	
3	Average time up and about before leaving pilot station	0.5	6.0	1.0	1.0	
	Sub-total	3.0	18.0	6.0	8.0	Note (c)
4	Pilot boat running time to ship at outer bar	2.0	2.0	2.0	1.4	
5	Average waiting or delay time at outer bar prior to entering bar channel upbound	1.0	1.0	1.0	0.6	
	Sub-total	3.0	3.0	3.0	2.0	Note (b)
6	Average running time of ships outer bar to Palembang	5	6	6	6	
7	Time required to return to office write reports and depart for R + R	1	2	1	1	
8	Total time requirements working phase of pilot cycle Palembang to outer bar and return	21	50	26.5	26	

TABLE IV-2.3.2-1

(cont'd)

No.	Description of event	Estimated time hours minimum	Estimated time hours maximum	Estimated time hours average	Estimated time hours standard allowable	Comments
9	Time requirements for R+R prior to next assignment	12	25	23.5	49	
10	Total time required for one complete pilot cycle	33	75	50	75	Note (d) (e)
11	Average hours worked per week	82	74	69	40.2	Note (E)

- b. Assumed that new faster pilot boats will permit a reduction in running time to and from the pilot station of about two hours which will permit the pilots to have about six hours sleep before starting upriver rather than the approximate four hours at the present time.
 - c. Three Hours R + R is below the minimum standard but pilots have returned to work with this R + R to prevent a ship from missing a tide which could delay the ship 24 hours.
 - d. Assumes the average day from a pilots point of view is 25 hours or the time interval between successive higher high tides.
 - e. To maintain this schedule every other ship assigned must be a shallow draft ship.
 - f. R + R at pilot station not included as work.
7. In the year from April 1, 1974 to March 31, 1975 there were a total of 133 ships in the Musi and Banyuasin rivers to load logs in cargo. The average time outer bar to outer bar of ships loading logs is four days during which time a pilot continuously attends the vessel. It is assumed that when a pilot completes his assignment to a log carrier he will be credited to two days R + R.
8. The average number of ships requiring pilot service to Palembang in a year is now about 3000.

Requirements for River Pilots

The number of river pilots required by the Port of Palembang is computed as follows :

a. The number ships per year	=	3000 ships
The cycle time for a pilot	=	<u>3 days</u>
Sub-total time river pilots to Palembang	=	9000 pilot days
b. In the logging operation		
The number ships per year	=	133 ships
The cycle time for a pilot	=	<u>6 days</u>
Sub-total time river pilots log ships	=	.798 pilot days
c. Total time river pilots (a) + (b)	=	9798 pilot days
d. Assuming that a pilot will have two weeks vacation and two weeks sick leave per year he will be available for pilot duty 335 days per year	=	335 days per year
e. Number of river pilots required	=	29 pilots
= 9798 ÷ 335		

Since there are now 22 river pilots the port is short about 7 river pilots. If the pilots were working a normal 40 hours work week they could absorb, on a temporary basis, a 50 percent increase in the number of ships handled by increasing their weekly work load to 60 hours. In the interest of justice for the pilots and to provide sufficient pilots such that ships will not be delayed for a lack of pilots, the port should determine the number of pilots required on a normal 40 hours work week.

One of the basic problems causing long down time on most equipment, but especially on machinery whether it be in mechanical handling equipment or electrical equipment is the lack of an adequate spare parts procurement and storage system. This is a problem common to many Asian and developing countries as well. There are a number of equipments items in Palembang which are theoretically repairable but nonetheless have been out of commission for more than a year or two due to the lack of spare parts to repair them.

There is no country so well off that it can afford to buy new equipment whenever a piece of equipment breaks down. The best way to insure that the maximum availability of any piece of equipment will be realized is to stockpile the spare parts for that piece of equipment for the parts usually requiring replacement on a periodical basis. The necessary spare parts should be purchased ahead of time such that they are really spare parts and they should be securely stored and regularly accounted for in order that they will be available when needed. Each piece of equipment particularly internal combustion prime mover engines have a recommended kit of spare parts which should be available prior to the time of overhaul in order that the machinery can be returned to service with a minimum of down time.

Probably the best system for providing the necessary spare parts to support an operating unit, such as the Palembang Port Administration, is a variation of some version of the spare parts system in use by many government agencies in the United States.

Essentially the system consists of providing each major shore unit or base with a revolving fund against which the unit may order spare parts to be used by the unit for which it is responsible. When the spare parts

have been issued or expended, the credit returns to the revolving fund and new spare parts may be ordered for whatever equipment is most in need of spare parts. The system has worked well for many government agencies for a number of years and it is recommended that the Republic of Indonesia adopt the system and initiate the system on a total basis in Palembang.

4. Project

a. Description

It is proposed that the Republic of Indonesia authorize the establishment of a revolving fund for the purchase of spare parts for a total in the amount of about 20 million rupiahs and that the government advance that sum of money to initiate the revolving fund spare parts program.

Other requirements for the program are a building in which the spare parts can be securely stored and a supply clerk and a keeper to administer the system.

It is suggested that a part of the new aids to navigation building be converted into a spare parts store room and that the spare parts program be operated by the PPA for all of the units for which the port is responsible.

b. State of Preparation

None

c. Limiting Factors

Approval by the responsible government agencies.

d. Implementation Schedule

Since the building is now available and it will take time to accumulate the necessary spare parts it is recommended that the program be given high priority and that it be initiated promptly, hopefully in 1975.

e. Construction and Administration

No significant change.

5. Cost Estimates

a. Capital costs

	<u>Cost. Furnishes</u> x 1000
Initial investment which will be returnable when and if the program closes	20,000

b. Recurrent costs

i. Maintenance	200
ii. Crew 1 clerk @ Rp. 27,000	600
1 assistant @ Rp. 22,000	
iii. Fuel	200

6. Personnel Requirements

The operation of the spare parts store room will require the services of a stock room clerk and an assistant stock room clerk.

7. Local Problems and Requirements

None

8. Analysis and Justification

The proposed system will provide most of the spare parts normally required on a timely basis and will greatly reduce the down time on most of the parts mechanical equipment. The increased revenue for the equipment now normally down will more than pay the cost of the spare parts system and will significantly increase the capacity of the port to handle cargo.

3.2.5 Setting up of Training Centre.

1. Project Number - 3.2.5
2. Project Title - Setting up of Training Centre and Provision of Training Schemes for Port Labor, Mobil Equipment Operators and Maintenance Personnel.
3. Background.

See as well Project 3.1.5 Palletization.

Introduction of Mechanical Cargo Handling Equipment will no doubt increase the overall effectiveness of the existing facilities, and increase the port's cargo throughput. In order, however, to utilize the equipment to the fullest possible extent it is of utmost importance that all port personnel engaged in cargo handling: stevedores, signalmen, winchmen, shore labor, FLT's, cranes and tractor-trailer operators and godown foremen receive adequate and effective training in their respective fields. Equipment operators for example should not only know how to efficiently operate their equipment to handle the various types of cargoes with, but know the basis of routine maintenance, daily checks, preventive maintenance. Such training no doubt will provide efficient working equipment whenever required.

4. Project.

a) Description

It is proposed that BPP set up a training centre for its port personnel. This training centre will run various training schemes, starting initially with the training of trainers and then extending to schemes for the various groups engaged in cargo handling. The training centre will prepare syllabus for the various courses, choose equipment and engage instructors in addition to its regular

staff for special courses. The training centre would eventually handle the training of other port personnel as well. The establishment and the efficient operation of a full scale training centre requires many years, and it is therefore proposed to start initially with the basic courses for equipment operators expanding then as required. Most equipment and materials required for the training centre are ready available at the port and no acquisitions are required.

b) State of Preparation.

BPP has sent some of its staff to Tanjung Priok to receive first training in operating FLT's and handling of pallet. It is proposed that some of this staff should serve as the centre's first trainers.

c) Training Factors.

The training of stevedores and shore labor should naturally be mainly for personnel engaged permanently in these activities. UKA is supposed to train stevedores and shore labor working in the port. As we understand BPP intends in future to take a more active part in the allocation of UKA labor to the various port activities. One would expect that a small number - say 150-200 - of UKA port workers would thus emerge who would be working continuously in the port and would form the nucleus of the port's labor force. These permanent workers could then receive additional training at the centre if so desired. The "non-permanent" UKA port workers would supplement the permanent gangs when required.

Equipment operators are employed directly by BPP, and the above limitations do not apply.

d) Implementation Schedule.

Founding of training section at BPP	April	1976
Organization of class rooms and training areas	June	1976
Procurement of training equipment	July	1976
Preparation of syllabus and schemes	July	1976
Preparation of training	September	1976
Opening of classes	January	1977

The length of various courses differ according to subject and according to the educational level of the trainees but should take 4-10 weeks at the outset.

5. Cost Estimate

a) Capital Costs.

None.

b) Recurring Costs (Annual)

Use of equipment and small acquisitions	LS	Rp.	4,100,000
Use of rooms and training areas	LS	Rp.	400,000
Staff 5 men =			
1 x 500,000 + 4 x Rp.350,000/year		Rp.	1,900,000
Outside experts one man/year		Rp.	8,200,000
			<hr/>
Subtotal		Rp.	14,600,000
Unforeseen 15%		Rp.	2,200,000
			<hr/>
Subtotal		Rp.	16,800,000
Administration		Rp.	1,200,000
			<hr/>
Total		Rp.	18,000,000

6. Manpower Requirements.

School staff	5 men
Administration	1 man
	<hr/>
	6 men

7. Land Problem and Requirement.

None - the training centre should use space available to the port.

8. Benefits and Justification.

The proposed establishment of the Training Centre will no doubt increase the port's overall efficiency, by increasing its cargo handling output, and throughputs. Furthermore proper cargo handling will reduce the breakage of cargo while training of equipment operators will ensure more prompt and effective use of all port cargo handling equipment.

3.2.6 Gudangs (Godown) Improvements

1. Project Number - 3.2.6
2. Project Title - Improving Ramps of Gudangs "A" and "B"
Enlarging Doors, Removal of Partitions
and Designate Storage Areas.

3. Background

- a) The ramps leading from the open storage area to gudangs "A" and "B" are very steep and their gradient would not permit the use of FLT's and tractor-trailers. With the introduction of mechanical cargo handling equipment these ramps must be rebuilt to permit the undisturbed operation of equipment.
- b) All doors to this gudang (6 front and 5 rear) are 2-2.4 meters wide and are too narrow to permit the effective use of FLT's and tractor-trailers. The gates should be at least 4.0 meters wide and if structurally possible - have same height.
- c) The reconstruction of ramps and doors should be commenced soonest so as to be ready when the wharf reconstruction works are completed.
- d) The existing partition walls in the gudangs are detrimental to efficient utilization of the available space and should be removed so as to enable effective use of FLT's and permit proper stacking of pallets.
- e) All gudang bays should be designated by painted lines on floor leaving sufficient width between bays for two FLT's to operate. All bays should be marked by overhead numbers and letter for easy identification.

4. Project

a) Description

- i) Rebuilding the 5 ramps leading from the open storage into the rear of gudangs "A" and "B" from their present slope into a slope of 1:12.
- ii) Rebuilding the 11 doors of gudangs "A" and "B" and widening them from their present width to 4.0 meters. If structural possible - increasing their entrance height to 4 meters.
- iii) Removing partition walls in the gudangs.
- iv) Designate bays in gudangs by painted lines on the floor and displaying overhead numbers and letters.

b) Survey of Information.

None.

c) Problem Factors.

It seems that the ramps will have to be extended partially into the gudangs "A" and "B" as otherwise the 1:12 ramp will take up some 7 meters from the open storage area (h = 0.6 meters) which should be avoided.

d) Implementation Schedule.

Design and preparation of tender documents	1 month
Issuing tender document, bidding and award	1 month
Construction work	2 months

e) Organizational and Administrative Arrangements.

None

5. Cost Estimate

a) Capital Costs.

Rebuilding of 5 ramps at Rp.1,000,000	Rp.	5,000,000
Rebuilding of 11 door frames at Rp.1,000,000		11,000,000
Rebuilding of 11 steel doors at Rp.1,000,000		11,000,000
Removal of partitions	LS	2,000,000
Painting lines on floor and overhead numbering		1,000,000
		<hr/>
	Rp.	30,000,000
Engineering and supervision	Rp.	1,000,000
		<hr/>
Subtotal	Rp.	31,000,000
Administration	Rp.	1,000,000
		<hr/>
Subtotal	Rp.	32,000,000
10% unforeseen	Rp.	3,200,000
		<hr/>
Subtotal	Rp.	35,200,000
Escalation 15% - 1976 x 0.3	Rp.	1,580,000
		<hr/>
Total	Rp.	36,780,000
	US\$	89,000

b) Recurring Costs - Annual

None - maintenance of doors as part of port's general maintenance.

6. Manpower Requirements.

Administration - for duration of work 1 man

7. Land Problems and Requirements.

None.

6. Benefits and Justification.

Rebuilding of ramps and doors, removal of partitions and designation of bays in the gudangs will permit the effective use of FLT's in the gudangs permitting better utilization of areas by increased stacking heights of cargo. These, together with the designation of bays, will increase the overall effectiveness of the port facilities.

Project Number - 3.2.7

Project Title - Miscellaneous Small Cargo Handling
Equipment for Handling Steel Products.

Background

The port now has no equipment specially designed to handle steel products. As steel plates and shapes are of unwieldy size, they are handled with difficulty using conventional wire slings and are very easily damaged (ie bent). Approximately 5% of all light flat bars, angle bars and plates are bent severely enough to require straightening before use. Steel products can easily cause injuries. Productivity is very low when workers do not have leather work gloves or steel toed shoes as they are afraid to really tackle the job.

Project : Purchase following equipment.

- 1) Electromagnet for handling scrap iron - to be hooked to existing crane and driven from small gasoline driven generator. Seldom do two ships load scrap simultaneously so only one magnet is required. Two generators should be purchased.
- 2) 6 sets of four corner plate grabs - to be hooked to existing crane. This will double productivity handling plates and eliminate damage due to inadequate support of plates.
- 3) 6 sets small angle bars and pipe lifters.
- 4) 3000 pairs work gloves and 1000 pairs steel toed work shoes. Work gloves to be issued once a quarter and work shoes once per worker. After issuance of this clothing worker is not to be permitted to work unless it is worn. There are currently 800 working scissorcranes

and the above quantities are sufficient for one year. On subsequent years 3000 pairs gloves and about 100 pairs of shoes would be required.

Costs :

First year

1) Electromagnet	3,500
Generator 3 KW 2 @ 1500	3,000
2) Plate grabs 6 @ 300	1,800
3) Angle bar lifters 6 @ 200	1,200
4) Gloves 3000 @ 2.50	7,500
5) Shoes 100 @ 50	5,000
	<hr/>
	67,000

Subsequent years

1) Gloves 3000 @ 2.50	7,500
Shoes 100 @ 50	5,000
	<hr/>
	13,500

Manpower Requirements

Nil

Land Problems & Requirements.

Nil

Benefits Justification

Benefits.

5 ships a week call at Boom Baru with about 20 tons of steel each aboard = 100 tons of steel a week. It takes about 4 1/2 hours to unload the average consignment so 225 x 15 = 3375 manhours per week spent handling steel.

Productivity increase about 10% stevedoring

Savings	$\frac{337 \times 735}{7}$	=	35,365
Foreman	22.5 x 975/7	=	3,133
Crane operator	22.5 x 805/7	=	2,587
			<hr/>
			41,105

2 ships a week are loaded with scrap usually about 100 tons about 24 hours work is required magnet would cut in half

SAVINGS

Stevedores	12 x 15 x 735/7	=	18,900
Foreman	12 x 975/7	=	1,671
Crane operator	12 x 805/7	=	1,380
			<hr/>
			21,951

Total weekly savings = 21,951 + 41,105 = 63,056

General improvement from shoes and gloves and equal the steel benefit = 63,056

Weekly productivity benefit = Rp. 126,112/week

= US\$ 15,817/year

Crane Damage

About 5 percent of product or 5 tons are damaged and must be straightened. These small shapes weigh about 3 lbs/foot or 375 linear feet must be straightened, this is 600 bars about 1 hour apiece

$$\text{Cost} = 600 \times 1 \times 105 = \text{Rp. } 63,000/\text{week}$$

$$\text{Crane damage benefit} = \frac{63,000 \times 52}{112} = \text{US\$ } 7,951/\text{year}$$

Shipping Benefit

Two hundred ton ship costs about \$20 per hour

In vessel loading we save

$$4.5 \times .1 \times 5 \text{ hours} \times \$20 = \text{US\$ } 45/\text{week}$$

In scrap loadings we save

$$1 \times 12 \text{ hours} \times 20 = \text{US\$ } 240/\text{week}$$

$$\text{US\$ } 525/\text{week}$$

$$\text{Ship-time saving} = \text{US\$ } 27,300/\text{year}$$

Total yearly benefits

$$\text{Labor costs} = \text{US\$ } 15,917$$

$$\text{Ship costs} = \text{US\$ } 27,300$$

$$\text{Crane damage} = \text{US\$ } 7,951$$

$$\text{Total benefit} = \text{US\$ } 51,168$$

3.2.8 Small Boat Operation.

1. Project Number - 3.2.8
2. Project Title - Small Boat Operation
3. Background

The Cucut was inspected enroute from Palembang to the pilot station on September 23, 1975 and its operation was also observed at night enroute from the pilot station back to Palembang. The Cucut broke down about one hour from the pilot station and has to be towed back to the station by a passing private tug. The next morning the crew of the Cucut again tried to run the boat without success and the boat was towed back to Palembang by the AP-032.

On the way from the pilot station to Palembang the engine overheated and stopped. The engine was being operated completely enclosed. It has no source of air when the doors panel is in place and the engine hatch is down.

Apparently the engine was running with insufficient air with incomplete combustion and the engine became fouled with carbon deposits. The engine could not be started on the Sungs River the evening of the 23rd. When the engine was started with a recharged battery at the pilot station the next morning the engine coughed and sputtered, would not deliver any power, could not be used and as stated above was towed to Palembang. The engine exhibits evidence of being badly fouled with carbon deposits.

When the engine broke down the Cucut was without lights and the boat was not equipped with a flash light.

Inspection also revealed that the boat did not have the following equipment, normally associated with the safe

operator of a boat such as the Cucut which is used to transport pilous etc.

1. No fire extinguisher (bracket but no extinguisher)
2. No life preservers or buoyant cushions.
3. No anchor or anchor line.

In addition the Cucut had two old and deteriorated mooring lines, one of which parted when used to accept a tow from the AP-032.

The crew of the Cucut gave evidence of being insufficiently trained for their job. The Serang of the boat was unable to successfully handle the boat in a knowledgeable seaman-like manner on several occasions and the engineer was not knowledgeable about his power plant.

4. Propose.

a) Responsibility

Provide the necessary equipment and crew training for the safe operation of small boats.

Equipment

- 1) That the engine compartment be provided with a ventilation system such that the engine will always have sufficient air to operate.
- 2) That the Cucut be outfitted with the following emergency equipment.
 - a. One fire extinguisher
 - b. One life preserver or buoyant cushion for each person the boat is certificated to carry
 - c. An anchor and anchor line
 - d. A flash light
 - e. Two new mooring lines of suitable size and each about 10 meters in length
 - f. Two paddles.

It is realized that some of this equipment will be difficult to keep on the boat, therefore adequate secure storage facilities should be provided on the boat in some form of secure locker etc.

Training.

That the Serang of the Cucut be given training in the handling and maneuvering of the boat and that the engineer be given practical instruction in the operation of internal combustion engines. It is further recommended that correspondence school courses in small boat seamanship and the operation and maintenance of internal combustion engines be considered for those handling and maintaining of small boats.

Note : The necessary information for the courses could be derived from Chapman's Small Boat Piloting and Seamanship and from various Correspondence School Courses for motor mechanics. A course in small boat seamanship could be run in conjunction with the pilot academy. In addition to the theoretical instruction outlined above it is suggested that the Serang be given practical experience on a pilot boat and the engineer in a Port Administration Maintenance Shop.

b) State of Preparation

FPA has the requisite staff and talent to handle the requirements of this recommended improvement.

c) Human Resources

None.

d) Implementation Schedule

As soon as possible.

e) Organization and Administration

The organization is adequate and the administration requires no significant change only that the problem be recognized and someone assigned the responsibility of following through on the outfitting of the small boats and the training of their crews.

5. Cost Estimates

a) Manpower Costs

There should be costs associated with this project.

b) Material Costs

None.

6. Manpower Requirements

There should be no additional manpower requirements although the experienced personnel in the FPA fleet will have to impart some of their practical seamanship knowledge to the small boat personnel.

7. Land Programs and Requirements.

None.

8. Benefits and Justification.

The benefits to be derived from this project are the operation of a safe and reliable small boat service particularly that service downriver from Palembang to the pilot station.

3.2.9 Resurfacing of Open Storage Areas.

- 1) Section Number - 3.2.9
- 2) Section Title - Resurfacing of Open Storage Areas.
- 3) Background

On average the surfacing of open storage areas is in satisfactory condition; with the exception of the areas around podium "H" and some other dispersed areas. The area around podium "H" has an asphalt surface of low quality and has been used for the unloading of 90% and above. This together with the lack of proper surface drainage caused rapid deterioration of the asphalt surface. After the introduction of mechanical equipment handling equipment all open storage and covered areas must be in good condition that 70-ton tractor-trailer can freely move without losing their cargo. In other parts of the port the surface is damaged in various places and need urgent repairs:

1. Repairs

2. Resurfacing

a) Digging-up of all broken asphalt surfaces around podium "H" and replacing it with high quality Portland-concrete slabs placed on a well consolidated sand bed. Similar concrete slabs are presently used in some areas of the port. Though the initial investment required for these concrete slabs is higher than that required for high quality asphalt - it is recommended to use concrete slabs, as these are less vulnerable than asphalt and their maintenance requirements are by far lower. These slabs should be placed at pre-determined levels so as to permit an adequate surface drainage. Area to be

resurfaced : 5000 M². The implementation should be started as soon as possible.

ii) Ripping up of broken and unsuitable surfaces in various areas in the port and replacing these with reinforced concrete slabs, or with high quality asphalt cement, wherever the placing of concrete slabs is not feasible. Estimated areas requiring surfacing: 1000 M².

b) State of Preparation.

The general concept of resurfacing inadequate areas within the port area especially around godown "H" has been discussed with the Port Administrator.

c) Limiting Factors.

None, except that the sequence of resurfacing work should be such as to interfere as little as possible with the day to day operations of the port. The contract documents should stipulate the time allowed for resurfacing work. The supervising engineer should make sure that the contract programme should be actually kept.

d) Implementation Schedule.

Survey, design and preparation of tender documents	1 month
Issuing of tender documents, bidding and award	1 month
Resurfacing work	1 month

e) Operational and Administrative Arrangements.

None.

3. Basic Facilities

1) Surface Pavement

Resurfacing with 10 cm high-quality-reinforced-concrete slabs, including ripping and gravel base

$3000 \times 1000 = 3000 \text{ m}^2$ at Rp. 10,000/m² Rp. 30,000,000

Survey and engineering including supervision Rp. 2,000,000

Rp. 32,000,000

Administration Rp. 2,000,000

Subtotal Rp. 34,000,000

Underdrain 100 Rp. 1,000,000

Subtotal Rp. 5,000,000

Excavation 134 1976 x 0.4 Rp. 2,000,000

Total Rp. 7,000,000

US\$ 1,000,000

2) Construction Plant (annual)

Maintenance 2% of cost including material Rp. 1,400,000

4. Personnel Requirements

Maintenance worker 1 man

Administration for duration of contract 1 man

5. Design Problems and Requirements

One.

1. Design and Justification

Providing open storage areas will increase the efficiency of port operation, especially when extensive use will be made of mechanical cargo handling equipment. Proper drainage of open storage areas will not only increase the available open storage areas of the port as such, but will decrease the spoilage of cargoes by water.

1. Project Number - 3.2.10
2. Project Title - BPP Central Office Staff Training
See as well Project 3.25
3. Background.

Modern and efficient ports require not only modern and efficient cargo handling techniques, but an administration having improved capabilities for discharging management, administrative, regulatory planning and development functions on a commercial basis. It is therefore desirable to include in future in the program of BPP's training center training schemes for central office staff.

4. Projects.

- a) General

It is proposed to include in the program of BPP's training centre, schemes in the following areas :

- i) Institutional development comprising policy and organization aspects, personnel development and training and personnel administration.
- ii) Port operations - comprising the administrative and technical/operational aspects of port operations.
- iii) Financial planning and management and
- iv) Management information and control systems.

The above are the general outlines of the various schemes - a more detailed program will be developed in the Full Report.

- b) State of Preparations.

BPP intends to send some of its staff to Singapore for a one-month general operations course.

c) Initial Factors.

Training of Central Office staff is a long range planned operation requiring elaborate preparations and extensive training experience and knowledge of the various subjects. The training of Central Office staff should therefore be undertaken at a later stage when the centre will have had accumulated sufficient training experience. It would be advisable to seek initially assistance from outside instructors who are experts in the various fields. The training scheme should be coordinated with and follow the organizational structure of the Central Office.

d) Implementation Schedule.

The project could be initiated some 1-2 years after start of work of the training centre.

e) Personnel and Administration

None.

f) Staff Requirements.

a) Capital Costs

None - part of EPP's Training Centre.

b) Equipment Costs.

None - except for outside experts if so required.

g) Staffing Requirements.

None - part of EPP's Training Centre.

h) Staff Problems/Requirements.

None - part of EPP's Training Centre.

8. Benefits and Justification

Improving the capabilities of the Central Office staff will no doubt increase the overall efficiency of the Post of Palembang..

d. Implementation Schedule

The sooner the program is adopted and approved the sooner work will be performed on the maintenance aspects of the equipment and future operations should result in less equipment down time.

e. Organization and Administration

In order to make such a program work it must have support from the top echelon of command and the responsibility for the program should rest with the maintenance officer of the port.

3. Cost Estimates

- a. Capital cost
- b. Recurrent cost

None
None
None

There are no real costs involved in this program. It is simply a program to apply preventive maintenance to the equipment in the port. The major benefit of the equipment and so on is to prevent the occurrence of breakdowns or accidents of equipment failure. The program is a cost-free program.

Manpower Requirements

There is no need to increase manpower in order to maintain the program. However, the maintenance officer should be given the authority to organize a small preventive maintenance program.

Equipment Requirements

None

Other Considerations

Preventive maintenance programs are in use in many governments and are successful in many cases and they have been found to generally be cost-effective.

With good preventive maintenance, the repair costs on a fleet are kept to a minimum. With good preventive maintenance, the availability of equipment is increased. The establishment of a preventive maintenance program is justified on the basis that it saves time and money on repairs and overhauls.

3.2.12 Safety Program

1. Project Number - 3.2.12

2. Project Title - Safety Program

3. Background

- a) Shipbuilding and ship repair are industries which worldwide are usually rated as hard hat high accident ratio industries. In most industrial countries, today, extensive safety programs are carried out in order to reduce the number and severity of lost time accidents in all high exposure industries. It has been found that good sound safety programs, well enforced, more than pay for themselves from a cost benefit analysis consideration.

b) Unsafe Practices Noted

In our examination of the District Navigation dock and its operational procedures and individual work habits, the following unsafe practices have been noted :

- (i) Most of the dockyard workers do not wear nor are they equipped with hard hats.
- (ii) Most of the dockyard personnel do not wear hard top protective shoes.
- (iii) Welders and acetylene torch burners were observed working with open sandals on their feet and without protective glasses, gloves and/or protective clothing of any kind.
- (iv) Investigation revealed that the dockyard does have protective dark glasses for welders and burners but that the employees do not always wear them. In some instances they are using their own sun glasses.

- v) Grinding operations were noted where protective glasses were not used.
- vi) The access to vessels moored at the repair berths is frequently a narrow plank which is inadequate from a safety view point and also inadequate from the standpoint of production worker access efficiency, particularly when the worker is laden with equipment or supplies.
- vii) The condition of the access ladders and the floor plates on some of the pilot vessels and other powered vessels both in the dockyard and on the run is well below acceptable safety standards. The handrails, ladder foot treads and floor plating and everything on touches in the engine rooms in question are greasy, slippery and dangerous to personnel.
- viii) The dumps and scrap piles throughout the dockyard area are not only unsightly but interfere with access in the dockyard and greatly reduce the already limited working area.

Summary

v) Recommendation

The basic elements of the proposed basic safety program for the District Navigation Dockyard (D.N.D.) are the following.

- a) The following minimum safety programs should be developed at the District Navigation Dockyard as soon as practicable.
- a) Equip and require all production personnel to wear hard hats, hard toed shoes and protective non-shatterable glasses. All personnel normally required to wear glasses should be provided with protective non-shatterable prescription glasses.

b) Welders and burners should be equipped with the helmets, gloves and protective clothing required to make their occupation as non-hazardous as reasonably possible. In this connection portable ventilation blowers should be available to provide a suitable atmosphere for breathing when workers are performing in poorly ventilated compartments.

ii) The above safety equipment should be provided to the dockyard employees at no cost to them and they should be required to wear the prescribed safety equipment at all times while on the job. This equipment is usually company furnished in most well developed industrial countries and it should be furnished to the District Navigation Dockyard employees. Since the pay and morale of the dockyard workers is now generally considered to be low, it is strongly recommended that all safety equipment be company furnished. While the purpose of sponsoring and providing safety equipment to the workers is based on sound economical considerations, it will have the additional effect of appearing to be a fringe benefit and will result in improvement of the morale of the workers involved.

iii) The access in and around the dockyard and to the floating units secured to its repair berths should be maintained clear at all times. All large vessels should have the means of access to the piers such that in the event of fire or other emergency and one means of access to the berth would remain usable. In this regard it should be noted that a Singapore Coast Guard vessel shipyard responsible for not providing sufficient clear access to a ship's engine room while the vessel was in a repair status. The dockyard management must

you around and not only appreciate the adequacy of the access but take the necessary steps to ensure that the access is always adequate under the conditions to be encountered in ship repair work (i.e. welding in a greasy or oil filled bilge of most any port and vessel).

3) State of Cooperation.

There appears to have been little effort channelled into any consideration of a shipyard safety program.

4) Limiting Factors.

The only real limiting factor here is the reluctance on the part of both management and labor to take safety seriously. This was a problem in Western shipyard and shipyard industries which was finally overcome by the advent of a group of conscientious and highly motivated management of the yard. When established the program paid handsome dividends in lower accident statistics, lower insurance claims and greater productivity on the part of the shipyard workers.

5) Implementation Schedule.

The safety program should be set in motion at an early date, say late 1976.

6) Organization and Administration

The prime requirements of a safety program are twofold.

- 1) that it has the backing of management and
- 2) that some officer in the organization be assigned the responsibility of directing the safety program.

3. Cost Estimates.

a) Capital Costs

The primary cost of a safety program are usually recurrent costs for renewing equipment and for paying salaries. However, an initial outfit of safety equipment is sometimes purchased on a capital investment basis. An initial investment in safety equipment for the Port Administration would be as follows :

i) District Navigation Dockyard

a)	hard hats @	=
b)	hard toe shoes @	=
c)	sets welders protective clothing @	=
d)	protective (safety glass) glasses @	=
e)	grinding goggles @	=
f)	compartment ventilating fans for removing welding fumes @	=

ii) Mobile Equipment Workshop

iii) Boom Barm Operations

b) Recurrent Costs

i) Maintenance of the safety program equipment will consist essentially of equipment replacements on a scheduled basis as follows. Assume average life of hard hats - 5 years, shoes - 1 year, welding clothing - 6 months, protective glasses - 6 months, ventilating equipment - 1 year/ etc.

a) District Navigation workshop	=
b) Mobile equipment workshop	=
c) Port Bar operations	=
Sub-total	✓

ii) Staff

One administrative officer	=
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Other

None

Summary of Requirements

More than one medium sized dollar

Comments and Justification.

Since casualty records are generally not well maintained and further since employee longevity has been short and employee protective rights rather limited the necessity for a good sound safety program has probably not been apparent or appreciated. However Indonesia is moving into a more highly industrialized phase in its quest for an increase in its gross national product. With the increase in GNP will come a greater awareness of social benefits and greater employee benefits which will undoubtedly

make a sound safety program produce accidents as it does in most industrialized nations. At the present time the benefits and justification would have to rest largely on humanitarian grounds and time saved by accident prevention programs.