PN-AAH-142

THE PALEMBANG PORT AND SHIPPING STUDY

VOLUME V

INVENTORY OF PORT FACILITIES

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1.0 INTRODUCTION

This volume contains the inventory of the existing Palembang Port facilities and includes data on fixed facilities, cargo handling, floating and repair equipment and a description of existing maintenance procedures. Included in the listings of the fixed and mobile facilities of the Port are the condition of the facilities together with initial cost (where available) and the most recent available costs for maintenance.

2.0 FIXED FACILITY INVENTORY AND CONDITION

The principal facilities of the port of Palembang may be divided into several categories as follows:

a) Those operated by the Palembang Port Administration (PPA) for the public good.

b) Those that are publically owned and operated but are not under the control of PPA. These include such facilities as those at the Pertamina Plaju and Sungai Gerong refineries, Pusri fertilizer plants and the Kertapati railroad and coal terminals.

c) Those that are privately owned, but available as common user facilities, and

d) Those facilities owned and operated exclusively as private installations.

2.1 Palembang Port Administration Facilities

The Palembang Port Administration owns, operates and administeres several facilities for the use of the general public. It also owns and leases both land and facilities such as land for the construction of godowns, storage areas and other facilities for the use of both Government and commercial traders for the storage and processing of general cargo and the handling of passengers.

2.1.1 Palembang Port Administration Terminals

The Palembang Port Administration operates two terminals on the left bank of the Musi River close to the center of Palembang. The primary terminal for the handling of ocean, interisland and local shipping, which is commonly called the Boom Baru Terminal, is a quay wharf type berthing facility listed at 450 meters

in length with a depth of 5.5 meters. Actually the terminal is split into two parts by the Palembang State Electric Company (P.L.N.) power plant barge fueling jetty which occupies about 30 meters of waterfront and divides Boom Baru into a northern terminal with a 100 meter wharf and a southern terminal with a 350 meter wharf.

Down river from the Boom Baru terminal, about 600 meters on the same left bank of the river, PPC operates a sailing vessel (prahus) terminal.

2.1.1.1 Berths

Palembang has been a major ocean shipping seaport for centuries and has had port facilities to match its progress. At the present time, November, 1975, Boom Baru has three berths with a total of about 312 meters available for use. About 164.5 meters of an old badly deteriorated iron screw piling wood decked wharf built in 1918 is in the process of being replaced with a modern concrete piling and concrete decked wharf which will have a sheet piling bulkhead just inboard of the wharf and land fill to the existing shoreline. When the new wharf construction is completed in 1976, Boom Baru will have four ship berths with a total of about 476.5 meters of good modern concrete wharfs. Wharf and pier berth information for the PPA terminals is given in Table V-2.1.1-1 and Figure V-2.1.1-1.

The layout of the wharfs and warehouses, when berth No. 3 is completed in 1976, will be in general, satisfactory, with the following exceptions:

a) The distance, 12 meters, between warehouse E and H is insufficient for the primary access between the wharf of berths number 1, 2 and 3

TABLE V - 2.1.1-1

WHARF AND PIER BERTH INFORMATION (BOOM BARU)

Item No.	Berth identification usage	Length Mts. ft.	Width apron Mtrs. ft.	Depth nominal actual Mtrs/ft	Transit shed area $Mtrs^2$ ft^2	Pier load cap. F/mtr^2	Access		Type construction Year built	Pier condition	Remarks
							Rail pier shed	Truck pier shed			
1	Berth No. 1 General Cargo	100 328	14 46	8/26 7/23	1404 15045	3.0 620	None None	Good Good	Concrete pile and deck 1962-income	Good	Berth 1, 2, and 3 form a continuous wharf about 376.5 meters in length
2	Berth No. 2 General Cargo	112 367	40 130	8/26 6-7/22	2730 29325	3.0 620	None None	Good Good	Concrete pile and deck 1972-PelitaI	Good	
3	Berth No. 3 General Cargo	164.5 540	45 148	8/26 6/20	1520 16420	3.0 620	None None	Good Good	Concrete pile and deck	Under Const. Good	
4	North Berth General Cargo	100 328	18.5 60	8/26 8/26	3920 42000	3.0 620	None None	Good Good	Concrete pile and deck. 1974 Pelita II	Good	This berth is a little short for a large ships pier and is isolated.
5	Prahus Jetty Sailing vessel cargo	78 255	4 13	5/16.4 4/13.2	73 783	0.5 100	None None	None to wharfs trucks can load at plat-form	Wood piles and deck 1971-income	Good	Transit shed area not used generally

TABLE V - 2.1.1-1 (Cont'd)

WHARF AND PIER BERTH INFORMATION (BOOM BARU)

Item No.	Berth identification usage	Length Mtrs. ft.	Width apron Mtrs. ft.	Depth nominal actual Mtrs/ft	Transit shed area Mtrs^2 ft^2	Pier load cap. F/mtr^2	Access		Type construction Year built	Pier Condition	Remarks
							Rail pier shed	Truck pier shed			
6	Aids to Navigation Jetty Mooring Facility	27 95	6 20	5/16.4 4/13.2	None	0.5 100	Small railway for handling engines to shop	Poor even for hand carts None	South half wooden and north half concrete construction	Various south half poor north half good approach poor	The approach to this jetty is over a 21 M x 3 M bridge which is on widely spaced pipe piles with a wood deck.
7	Small boat jetty Not in use	24 80	1.5 5	0 0	None	Outer half zero	None None	None None	Inboard 15 M concrete pile and deck. Outboard 9 M misc. const.	Outer half danger-ous	Pier is all that remains of a former jetty and should be removed.
8	Customs Jetty Customs mooring	17 54	6 20	5/16.4 4/13.2	None	3.0 620	None None	Poor None	Concrete pile and deck. 1973	Good	The jetty approach is 27 M x 4.5 M concrete pile and deck.
9	Total and/or average	476.5+ 78	Apron width gene-rally good	Various	9647 104200	-	None None	Good	Average con-crete con-struction	Average good	

NOTE : (1) There are no gantry cranes, container handling facilities or agricultural oil facilities at Boom Baru.
(2) There are 476.5 meters of ocean and inter-island deep water berths, 78 meters of sailing vessel berthing and 27 meters of small boat mooring or outfitting berthing.

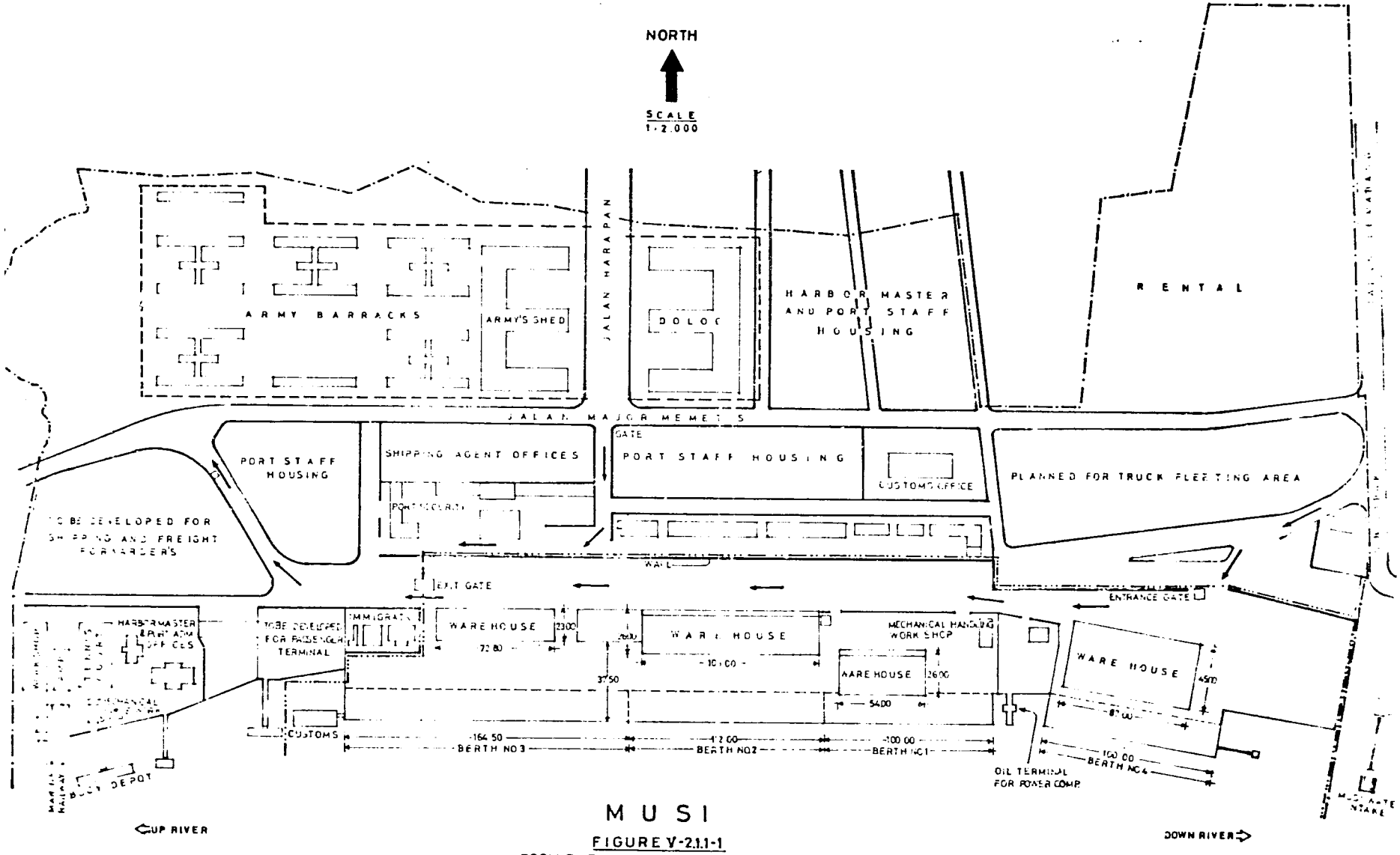

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FIGURE V-2.1.1-1
BOOM BARU WHARVES & WAREHOUSES

and the open storage and exit road inboard of the warehouses A to E. It is also insufficient to permit satisfactory access to the open storage area behind warehouse H.

b) The apron width of about 13 meters in front of warehouse H, while narrow for efficient use, is satisfactory for the time being, but may have to be increased to handle containers at Boom Baru at a later date.

c) The north berth, or berth No. 4 which is 100 meters in length, is too short to be effectively used by large ocean ships of over 140 meters in length, due primarily to the PLN power plant barge fueling jetty which prohibits a ship extending beyond the upriver wharf end of the berth. The PLN fueling jetty should be moved to a location which will not interfere with the large ship use of the Boom Baru berths.

d) There is insufficient berthing space for the PPA floating equipment.

e) There is insufficient outfitting berthing space associated with the marine railways. Berthing space for PPA floating equipment and outfitting in connection with the marine railway are further discussed in Section V-4.3.1 through V-4.3.1.3.

f) The existing and replacement wharf now under construction totalling about 476.5 metere is designed with a load limit of three tons per square meter which is satisfactory for what has been normal break bulk cargo handling, but is not adequate for the support of the

heavy lift equipment which would be required to handle containers and heavy equipment lifts. For this purpose a new section or wharf designed for a permissible loading of five tons per square meter should be constructed.

2.1.1.2 Warehouse and Other Covered Storage

The warehouse and other covered storage area at PPC facilities is given in Table V-2.1.1-2 and shown in Figure V-2.1.1-1. In summary the Palembang Port Administration owns approximately 10,660 square meters (115,170 square feet) of warehouse space, has converted about 863 square meters (9,225 square feet) to office space and passenger accommodations and actually operates about 10,000 square meters or 106,000 square feet of covered warehouse space.

There are about 680 square meters (7,380 square feet) of partially covered eave area. However, since this area is primarily covered loading platform area, it is hardly suitable for listing as storage area. There are on PPC property two large warehouses totalling 5,560 square meters or 60,000 square feet, located 50 percent on each side of Jalan Harapan and west of Jalan Mayor Memet Sastrawirya, which are owned by the Army, one of which is used by the Army and the other is leased to DOLOG, the Government Rice Agency, for the storage of rice. These warehouses which PPA expects to acquire in the future are about 800 to 1000 meters away from the wharves by truck route.

In general, the condition of the warehouses is satisfactory. Warehouses A and B have center line supports which will interfere somewhat with the use of mechanized equipment therein. However, the spacing

TABLE V-2.1.1-2

WAREHOUSE AND STORAGE AREA (BOOM BARU)

Item No.	Warehouse identification usage	Length Mtrs Ft.	Width Mtrs. Ft.	Height cargo area Mtrs. Ft.	Date built condition	Internal area Mtr^2 Ft.^{2}	Storage area eaves Mtr.^{2} Ft.^{2}	Open storage associated warehouse Mtr^2 - Ft^2	Number doors adequacy size	Warehouse access	Dist. from warehouse to pier face Mtrs.-Ft.	Comments
1	Warehouse A-B leased to agents	72.8 239	23 75	6 20	Good	1,674 17,925	--	1,520 16,420	12 2.1/2.7 7 x 9	Good except for small doors and center line stanchions	45 148	Rear entrance - ramps too steep - forklifts ground floor needs resurfacing
2	Warehouse C Office and Pass.terminal	37.5 123	23 75	6 20	Good	863 9,225	--	--	--	Now offices and pass.-terminal	45 148	Lower floor passenger space, upper floor Operations Office Condition
3	Warehouse D-E leased to agents	105 345	26 85	6 20	Good	2,730 29,325	420 4,526 Platform	1,615 17,440	14 3 x 3* 10 x 10	Good except for small doors and five sub-divisions	40 130	A large old wooden frame structure with no center supports
4	Warehouse H	54 177	26 85	6 20	Good	1,404 15,045	135 1,410 Platform	2,360 25,500	8 3 x 3* 10 x 10	Good - the appron is a little narrow but satisfactory	14 46	A good modern warehouse with rather small doors.
5	Warehouse I	87 285	45 148	6 20	Excellent	3,920 42,000	--	450 4,680	8 3 x 3* 10 x 10	Good except for small doors and two sub-divisions	18.5 60	This warehouse is isolated from others at Boom Baru by power company property which splits the port.
6	Warehouse space currently in use	--	--	6 20	Various good to excellent	9,728 104,295	555 5,936	5,945 64,200	--	Generally good	--	All warehouse space is reasonably effective except being cut up by many partitions/sector

* The nominal dimension of the doors is 4 x 4 meters, however, the actual usable dimensions are 3 x 3 meters or 10 x 10 feet.

TABLE V-2.1.1-2 (cont'd)

WAREHOUSES AND STORAGE AREA (BOOM BARU)

Item No.	Warehouse identification usage	Length Mtrs. Ft.	Width Mtrs. Ft.	Height cargo area Mtrs. Ft.	Date built condition	Internal area $Mtr.^2$ $Ft.^2$	Storage area eaves $Mtr.^2$ $Ft.^2$	Open storage associated warehouse Mtr^2 - Ft^2	Number doors adequacy size	Warehouse access	Dist. from warehouse to pier face Mtrs.-Ft.	Comments
7	Open storage not associated with warehouse	--	--	--	--	--	--	8,425 91,000	--	Access good	70/150 230/500	This space is in two areas, one of which is used for storage and the other is not used at present although it is available
8	Total warehouse and storage space available Boom Baru	--	--	6 20	Various good to excellent	10,591 113,520	555 5,936	14,370 155,200	--	Generally good	--	All space is reasonably effective though some flooring needs resurfacing.
9	Prahus Jetty	14.5 48	5 16	3 10	Good	72.5 783	125 1,350	2,500 27,000	4 2.1x2.1 7 x 7	Access good	36 118	Trucks can load at loading platforms with cargo from hand-carts or manually carried
10	Total warehouse and storage space Palembang Port Administration	--	--	--	Various good to excellent	10,660 115,170	680 7,340	16,870 182,200	--	Generally good	--	Most of the warehouses are in reasonably good condition.

between pillars, 10 meters is sufficient for most forklift truck operations.

Most of the warehouses are divided into transverse sections which are not interconnected internally. While PPA controls the warehouses, they are divided as indicated above and various agencies have a certain degree of subcontrol on the sections assigned to them. The various agencies do not pay rent on the spaces assigned except on a tonnage basis for cargo moving through the warehouses.

The above arrangement restricts the ports effective use of its facilities and sometimes there is no space available for some cargoes despite the fact that several warehouses are only partially utilized.

Apparently the warehouses are split into sections and assigned to the several agencies involved to facilitate their responsibiliey for safeguarding their cargo in the assigned warehouse spaces.

There are sufficient numbers of doors in all of the warehouses. However, the size of the doors in most instances is small for efficient use by modern forklift trucks. The doors which average about three meters square (10 feet square) are satisfactory for manual or handcart cargo handling, but are rather small for full scale mechanized cargo handling operations.

The inboard egress ramps for warehouse A - B are very steep causing the normal forklift truck tires to strike the ramp while the truck is approaching the ramp to enter the warehouse.

2.1.1.3 Refrigerated Storage Area

There is no refrigerated cargo storage area at the PPA facilities at Boom Baru. It is reported, however,

that there is substantial refrigerated capacity on Bangka Island in close proximity to the fishing industry located there.

2.1.1.4 Tanks and Other Liquid Storage

There are no tanks or other liquid bulk handling facilities for either agricultural oils or petroleum products at Boom Baru.

There are a large number of oil drums containing lubricating oil, kerosene, cleaning compounds and other petroleum and petrochemical products. The drums are generally stored on the wharf area in front of warehouse D - E, the storage area behind warehouse H and in the open storage area downriver or east of warehouse I.

2.1.1.5 Dry Bulk Storage

There is no dry bulk storage at Boom Baru. All materials susceptible of dry bulk storage are handled in bags, barrels, bundles and cases.

2.1.1.6 Container Storage Areas

There are no specific areas designated for the storage of containers nor is there an existing facility for the stuffing and unstuffing of containers. Containers have not been handled in the port to date although it would not take much equipment to facilitate the handling of a limited number of containers carried to the port by self-sustaining container ships whether they are break bulk/container ships or container feeder ships.

There is a limited amount of space available for handling containers and stuffing and unstuffing same in the open storage area behind or north of warehouses A through H.

2.1.1.7 Open Storage

As indicated in Table V-2.1.1-2 and Figure V-2.1.1-1, PPA has about 8,425 square meters (90,639 square feet) of open storage area in addition to about 5,945 square meters (64,000 square feet) of open storage space associated with warehouses and about 2,500 square meters (27,000 square feet) of open storage space at the prahus jetty for a total of 16,870 square meters (182,000 square feet) of open storage area.

The storage area is somewhat cluttered now with the construction of berth No. 3 now in progress and appears to be about 50 to 60 percent utilized mainly with the storage of drums of petroleum and other products.

2.1.1.8 Access

The access to the Boom Baru port facilities is shown on Figure V-2.1.1-2, Terminal Access and the access opening data is given in Table V-2.1.1-3.

2.1.1.8.1 Highway Access To and Around the Port

The area is generally unsatisfactory, although the traffic congestion does not cause serious delays in truck movements at the present time. There are four roads leading to the port area which are listed as follows:

a) Jalan Pasar Kuto approaches Boom Baru from the old central city of Palembang. The road is narrow with heavy traffic of all types. This road cuts through the Boom Baru port area and congests the port exit gate, the ports vehicle and personnel entrance as well as the truck entrance. When the port is next expanded, a new through traffic highway

Figure V-2.1.1-2

Access to Boom Baru Port Facilities

To Be Included in Final Report

TABLE V-2.1.1-3

ACCESS GATES OPENING AND SECURITY POSTS (BOOM BARU)

Item No.	Access Identification Usage	Type	Width M/Ft.	Security	Comment
1.	Main personnel and pass vehicle gate end Jalan Harapan.	Double swing	6/20	Gate generally open during working hours and closed at night.	A general entrance to the Port area but not the customs area - will be under surveillance from Guard Port # 4.
2.	Main truck entrance into customs/Port area.	Double swing and one one-meter personnel gate.	6/20	Guard Port # 1	Truck entrance off Jalan Lemabang.
3.	Main truck exit from customs/Port area.	Two double swing and two one-meter personnel gates.	6/20	Guard Port # 2	Truck exit to Jalan Belinyu and thence to main exit Gate # 4 to Jalan Pasar Kuto.
4.	Main vehicle exit from Port area.	One double swing and two one-meter personnel gates.	6/20	Guard Port # 3	Exit leads to Jalan Pasar Kuto and the Palembang traffic stream.
5.	Personnel entrance to customs/Port area.	Three single swing gates.	1/3	Guard Port # 4	A new guard house is being erected. These gates are the primary stevedore entrance.
6.	Truck entrance and exit north end - warehouse "E" to wharf custom's area.	Double swing	6/20	Guard Port # 5	Primary customs gate from wharf area.
7.	Truck entrance and exit south end - Warehouse "A"	Double swing	6/20	Locked	Under surveillance by guard Port # 3. Not now in use due pier construction in area.
8.	Gate between warehouses B & C - from passanger terminal to terminal exit road.	Double swing and one meter personnel gate	4.5/15	Usually open under surveillance Guard Port # 2 and pass. terminal.	Passanger terminal entrance - vehicle gate not used.
9.	Gate between warehouses B & C from passanger terminal to wharf area.	Double swing and one meter personnel gate.	4.5/15	Usually locked under surveillance pass. terminal.	Passanger terminal to vessels - vehicle gate not used.

TABLE V-2.1.1-3

(Cont'd)

ACCESS GATES OPENINGS AND SECURITY POSTS (BOOM BARU)

Item No.	Access Identification Usage	Type	Width M/Ft.	Security	Comment
10.	Gate between warehouse I and power company property West gate between warehouse.	Double swing	4.5/15	Usually locked under surveillance Guard Post # 1.	Available for use.
11.	Gate between warehouse I and Power Company property East or wharf end.	Double swing	4.5/15	Usually locked.	Available for use.
12.	Gate to north end open storage.	Double swing.	4.5/15	Usually 1	Fence is broken or missing in some areas under surveillance by Guard Post # 1.
13.	Jalan Pasarkuto vehicle gate.	Double swing with one-meter pergate.	6/20	Normally locked	Gate in housing area and normally not used.
14.	Prahus jetty main gate	Double swing	4.5/15	Usually open	Gate under surveillance of guard at prahus warehouse.
15.	Jalan May.Memet Sastrawirya vehicle gate next to Customs area	Double swing with one meter personnel gate	6/20	Normally locked	Gate normally not used.

should be constructed around the principal port facilities.

b) Jalan Harapan is the primary approach road from the newer part of Palembang. It is a busy highway and terminates on Jalan Pasar Kuto directly in front of the vehicle and personnel Gate No. 1. All traffic for Pusri and downriver left bank below Boom Baru generally use this road in order to reach Jalan Lamabang headed downriver. A highway around the port area as described above will eliminate most of the traffic not destined for or associated with the port facilities.

c) Jalan Lemabang runs downriver from the port area to the Pusri facilities and the Pertamina ferry terminal. This road handles mostly passenger vehicles and some trucks. However, it could and should be developed as a primary access route from the expanding part of Palembang to the Boom Baru facilities.

d) Jalan Belabak runs downriver from the port area and connects to the PPA-Prahus Terminal about 1000 meters downriver left bank from Boom Baru. This road will be absorbed in later planned port facility expansion projects.

2.1.1.8.2 Terminal Access

The interior access at Boom Baru is in general satisfactory, although it could be materially improved and is slated for considerable improvement in future

development plans. While the interior roadway access is good, some of the access gates are too narrow to justify two-way traffic through the gates.

Gate 6 is a case in point. This gate serves as the primary entry and exit gate to the customs area of the port. When the wharf reconstruction is completed in way of warehouses A, B and C, it is assumed that Gates 6 and 7 will be used; one as an entry gate and the other as an exit gate. Providing adequate access lanes through cargo stowed in front of warehouses A, B, C, D and E will improve transportation within the customs area of the facility.

2.1.1.8.3 The Power Company Pumping Station

The Palembang Power Company (P.L.N.) owns and operates a fuel pumping station between Boom Baru's berth No. 1 and berth No. 4. The fuel pumping station occupies about 35 meters of waterfront and separates PPA's wharf facilities into two sections between which there is no waterfront or pier facility access. In the interests of efficient port operations, the Power Company fuel pumping station should be moved to a more suitable site such as just up river from PPA's marine railways.

2.1.1.8.4 Warehouse Access

The warehouse access was designed primarily for the manual or handcart handling of cargo into the buildings, consequently the access openings are in general a little small for efficient operations with forklift trucks.

Secondly, the access ramps in back of warehouses A and B are too steep for the satisfactory use of fork-lift trucks in the area. One solution would be to

construct a truck loading ramp behind warehouses A and B.

2.1.1.9 Utilities - Distribution Systems

2.1.1.9.1 Electrical System

The consumption of electricity at the Boom Baru facility is minimal being only about 6000 kilowatt hours per month. While the consumption is slated to be increased to about 7500 kilowatt hours per month, the fact remains that the electric power consumption is very low.

There are frequent power blackouts throughout the city for long periods of time. That the city is short of electrical power is obvious and this condition will remain with the port until a new power plant is built to supply Palembang's growing electrical needs.

The electrical distribution system for the PPA facility is shown in Figure V-2.1.1-3.

The port does not have an emergency generator and when the power fails, radio communication also ceases.

2.1.1.9.2 Water System

The water distribution system for the port is shown in Figure V-2.1.1-4. While there is fresh water available in the port, its deliverable quantities are subject to variation dependent largely on the supply of electrical power to the water department for pumping purposes.

Water is rationed in Palembang by the simple procedure of shutting off the supply of water on a rotating basis throughout many sections of the city.

Figure V-2.1.1-3
Electrical Distribution System
for the PPA Facility

To Be Included in Final Report

Figure V-2.1.1-4

Water Distribution System

for the Port

To Be Included in Final Report

All of the wharves at Boom Bari hav water lines for supplying ships with water. However, the number of fire hydrants for fire protection is minimal and insufficient to provide adequate fire protection.

2.1.1.10 Pipeline Cargo

There are no cargo pipelines installed at the PPA Boom Baru facility.

2.1.1.11 Repair Facilities

There are four separate repair facilities in operation at Boom Baru for the maintenance of both floating and mechanical handling equipment. All three are separately operated as follows:

a) District Navigation operates a small repair shipyard facility with two marine railways (slipways), one with a lift capacity of 60 tons and the other with a capacity of 25 tons. The shipyard also contains a good sized marine repair shop (see A and B Figure V-2.1.1-5).

b) District Navigation operates a small aids to navigation repair facility whose primary function is to maintain aids to navigation lights (see C Figure V-2.1.1-5).

c) PPA operates a small marine engine repair shop for the maintenance and overhaul of engines from Port Administration boats (see D Figure V-2.1.1-5).

2.1.1.11.1 Shipyard Repair Facility

District Navigation operates a small shipyard with two slipways with the following capabilities:

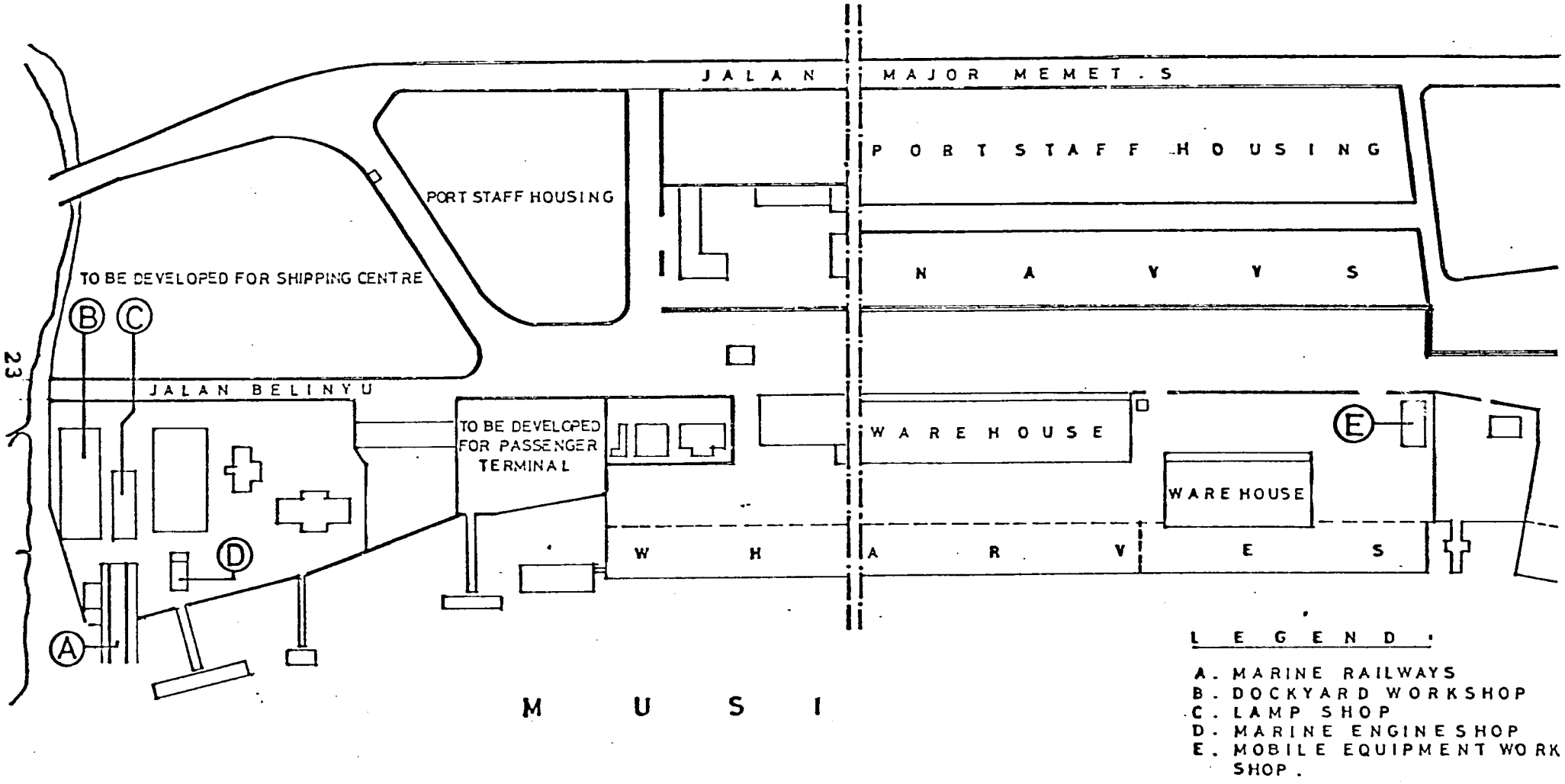


Figure V-2.1.1-5

Maintenance Facilities - Port of Palembang

Slipway No.	Length	Width	Lift Capacity Tons
1	30	5	60
2	15	5	25

The slipways have been recently rehabilitated and are in very good condition. They represent an asset valued at about US$600,000.

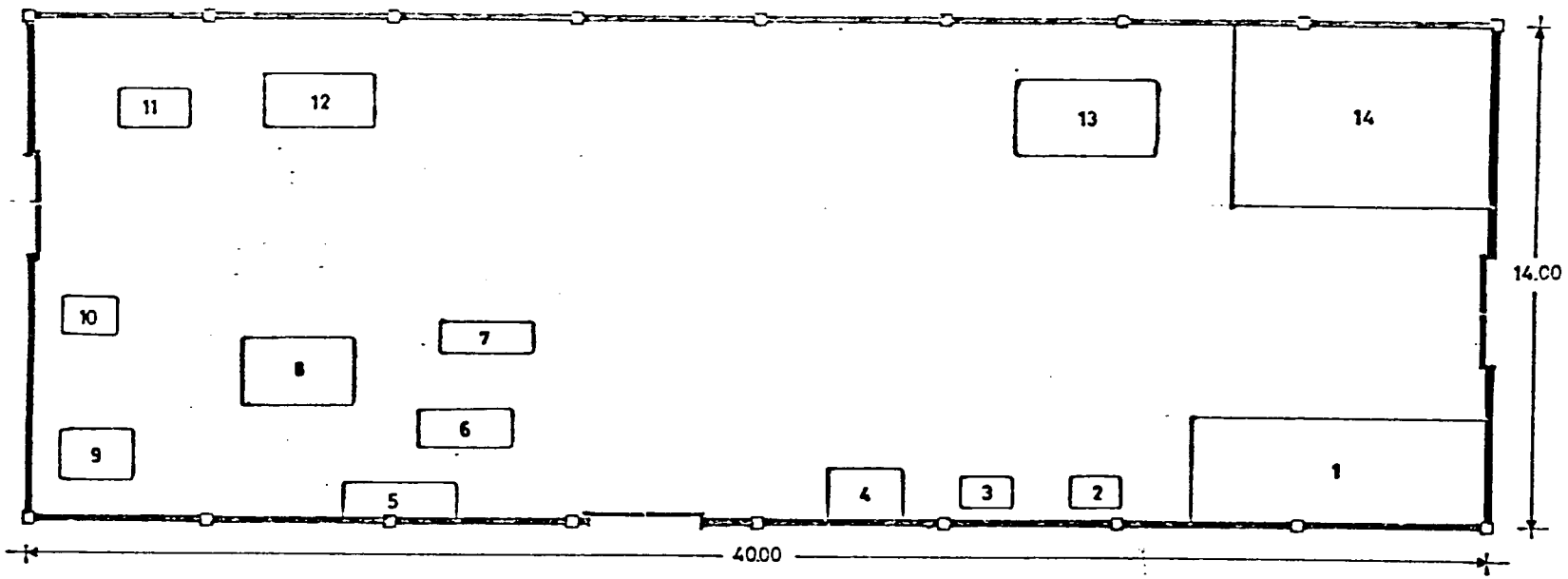
The slipways are supported by a good sized marine repair shop (see Figure V-2.1.1-6). The marine repair shop building is in good to excellent condition. However, it is inadequately equipped to satisfactorily perform its mission.

The shipyard as a whole is badly cluttered with old scrap iron which should be disposed of as scrap metal and the yard area made available for useful work space. The marine repair shop is also cluttered with old diesel engines, crankshafts, motors and generators which have not received any preservation car appear to be completely useless and should be scrapped.

Much of the equipment in the repair shop is inoperable or in poor condition, and should be replaced and/or supplemented. The shipyard is further discussed in Volumes IV - Port Operations and VI - Short Term Improvements.

2.1.1.11.2 Aids to Navigation - Lamp Shop

District Navigation operates a repair shop with about 192 square meters of floor space in which Aids to Navigation (A to N) lamps are repaired and calibrated. The facility appears to be adequate for its intended purpose. Its primary problem is that it has no spare parts allowance and must requisition spare parts as they are required from a central spare parts center in the Jakarta area. This causes considerable delays in



L E G E N D :

1. OLD CRANKSHAFT MOTOR, GEARS ETC (GENERALLY USELESS)
2. DRILL PRESS
3. DRILL PRESS AND SHAPER
4. BATTERY CHARGING STAND
5. LATHE 6'X18' WORKING ABOUT 60% ACCURATE
6. LATHE SMALL ABOUT 50% OLD
7. LATHE SMALL 100% - 1972
8. BORING MACHINE ABOUT 25%
9. WELDING MACHINES (1= NOT WORKING, 1= 100%, 1= 75%, 1= 60%)
10. CARBIDE CUTTING MACHINE (DOES NOT WORK)
11. G . M DIESEL SPARES
12. WORK TABLES WITH VICES
13. 3 WELDERS
14. OLD DIESELS FOR PARTS.

Figure V-2.1.1-6

Layout Marine Repair Shop
Scale 1:200

the repair of lamps and prolongs Aids to Navigation light outages.

In the same building Aids to Navigation maintains a facility for the handling of propane cylinders for the powering of lighted airds for the whole of Indonesia. The facility handles about 2000 propane tanks in and out per year. The handling of propane cylinders is unsatisfactory in several respects.

a) The cylinders are haphazardly rolled around the (A to N) pier and cluttered repair yard.
b) The cylinders are bounced off of trucks onto stacks of old tires at Boom Baru.
c) A high percentage of the tanks are handled without the benefit of having their protective caps in place.

2.1.1.11.3 Marine Engine Repair Shop

The marine engine repair shop is a small building, about 90 square meters, at the head of the (A to N) pier upon which there is a small fixed crane for lifting engines out of boats and placing them upon a rail car to be rolled into the engine repair shop.

The building is jammed full of old boat engines, engines undergoing repair, fire pumps, outboard engines and other miscellaneous junk. There is virtually no place to work in this building which is the primary engine repair shop for PPA craft. Many of the engines laying around the facility are awaiting spare parts, which is one of the primary problems in maintaining district craft which are now subject to a very high percentage of downtime awaiting spare parts.

The consolidation of the marine engine repair shop with the shipyard repair shop is discussed in Volume

VI and in Section 4.3 of this volume.

2.1.1.11.4 Mechanical Handling Equipment Repair Shop

The mechanical handling equipment workshop is a frame building, about 180 square meters and appears to have an oil soaked bare earth floor, although there may have been some asphalt applied at some prior date. The building is dark, poorly equipped and is generally unsuitable for its intended purpose. In it are several forklift trucks which have not operated for years and will apparently never operate again. A surveying procedure should be adopted similar to that suggested for marine craft in order that old useless machinery may be promptly disposed of and not sit around and occupy otherwise useful space.

A new mechanical handling equipment workwhop has been authorized and will soon be built. While the building has been authorized, its proper equipping has not yet been approved. The PPS Short Term Improvement recommends the equipment considered to be essential to the satisfactory operation of the workshop.

2.2 Pertamina

2.2.1 General

Pertamina's Unit II is located on the right bank of the Musi River about ten kilometers below the center of Palembang. It consists of two refineries; one located at Plaju with a capacity of 110,000 bbl/day and the other at Sungai Gerong with a capacity of about 80,000 bbl/day. Both plants are presently operating at about 60 percent capacity.

In addition to the Palembang facilities, Pertamina also operated refineries in three other areas,

at Dumai for middle Sumatra, Balikpapan for East Kalimantan and Surabaya for Java (primarily asphalt).

Pertamina is a state owned corporation which now owns and operates oil fields, refineries and other oil industry facilities which were formerly operated by Stan-Vac, Caltex, etc. As a result, Pertamina has excellent data starting in 1973, but has rather sketchy data prior to 1973.

Figure V-2.2.1-1 shows the Pertamina Unit II facilities at Plaju and Sungai Gerong.

2.2.2 Pertamina Operations

Pertamina operation in the Palembang area is basically that of transporting crude oil to the refineries at Plaju and Sungai Gerong where the oil is processed into refined products which are, in turn, transported to the user market. Most of the products of the refineries are used for domestic consumption, although in years past, considerable quantities were exported. Shell Oil Company at one time operated an offshore tanker loading facility in Bangka Strait off Muntok on Bangka Island. The size tankers which were loaded at the offshore loading facility ranged up to about 35,000 to 40,000 DWT ships which were operating on a draft of about 11 meters (36 feet). Today most of Pertamina's deep water export operations are handled at the oil ports of Dumai and Sungai Pakning. Batam is another deep water port across the straits from Singapore which has been developed by Pertamina as a port for the supply of both offshore and onshore oil exploration and oil production operations in Indonesia.

Most of the crude oil used to supply the refineries comes in by ship. However, about 8,500 bbls per day come

Figure V-2.2.1-1

Pertamina Unit II Facilities at Plaju and Sungai Gerong

To Be Included in Final Report

into the area by pipeline along with gas from the South Sumatra oil fields, see Figure V-2.2.2-1.

2.2.2.1 Ships Calling at Pertamina

Pertamina does not have precise information on the ships which called at Plaju and Sungai Gerong going back to 1967, as the industry was then in the hands of Stan-Vac, Caltex, etc. However, the following generalizations were made:

a) The number of ship calls between 1970 and 1975 have not varied significantly.

b) Prior to 1970 the number of ships calling was up about 20 percent.

The following information on ship calls and the sizes of ships calling at Plaju and Sungai Gerong were obtained from Pertamina's recent records. The number and type of ships calling at Pertamina-Palembang facilities are shown in Table V-2.2.2-1. The average number of ships by month and size are contained in Table V-2.2.2-2.

2.2.2.2 Future Ship Calls at Pertamina

Due to the depth of the Musi River, Pertamina had reevaluated its position at South Palembang and the following general conclusions have apparently been reached.

a) It is not economically feasible to dredge the Musi River deeper than six meters.

b) At six meters it is not economical in todays tanker and petroleum market to continue to operate Plaju and Sungai Gerong as normal refineries.

c) There is a need for petrochemical plants in

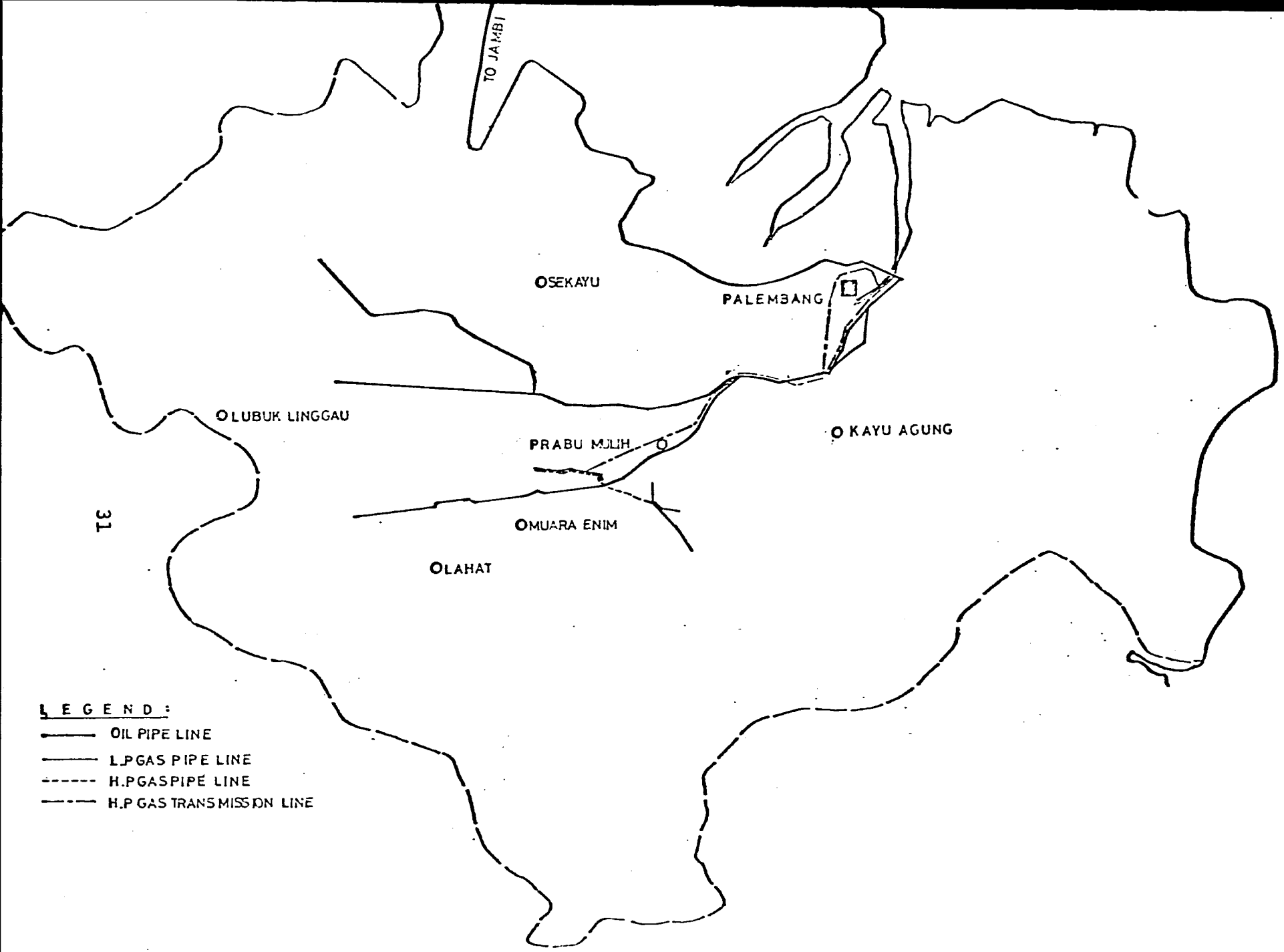


FIGURE V-2.2.2-1

SOUTH SUMATRA OIL & GAS PIPE LINES TO PALEMBANG

Table V-2.2.2-1

Number of Ships Calling at Pertamina Palembang Facilities

Year	Ocean Tankers	Bulk Lighters	Oil Barges Tug Boats	Bunkering Vessels	Freighters General Barges	Total	Total Cargo Disch. Load	General Cargo
1973	1228	466	3284	100	361	5415	8,900,229	101,766
1974	1073	490	5475	64	445	7547	8,059,287	104,159
1975 till Oct.	845	450	4663	52	372	6382	5,904,934	63,236

Table V-2.2.2-2

Average Number of Ships Per Month

Ship category - length	Number of Ships
Under 60 M	20
Between 60 and 100 M	65
Between 100 and 150 M	40
Over 150 M	15
Average Total Tankers	140
Average Total General Cargo Ships	40
Total Ships Per Month (Average)	180
Tongkangs or lighters (Average/month)*	400

*The latter are mostly lighters in bulk oil.

Pertamina handles very little product in drums. However, some of its customers buy in bulk and drum the oil for transportation upriver etc. The oil handled both in and out by ship in 1973 was about 8.9 million tons and about the same in 1974. The general cargo handled at Pertamina's facilities in Palembang was 0.1 million tons in 1973 and about the same in 1974.

Indonesia.

d) The size of ships required to handle the delivery transportation of petrochemicals will be relatively small due to the size limitations of the customer facilities.

e) Plaju and Sungai Gerong can operate more profitably as petrochemical plants than as standard refineries.

As a result, Pertamina Unit II is scheduled to be converted to a petrochemical plant. Just when it will open in this new category is not precisely known and is dependent upon the availability of conversion funding. The plant, however, is in the process of making some of the changes necessary to convert the facilities to petrochemical use.

Pertamina personnel state that the throughput of Pertamina II as a petrochemical plant will be about the same as it is now as a regular refinery and that the number of ships calling at the facility should not vary significantly.

As a guide to future growth in the oil industry in Indonesia, the following excerpt from the booklet - Indonesia Develops Repelita II, Second Five Year Development Plan 1974/75 - 1978/79 - is pertinent.

Production of oil is projected to increase by 8% annually and will contribute to about 51% of the country's foreign exchange earning. The oil production during Repelita II is estimated to increase from 529 million barrels in 1974/75 to 720 million barrels in 1978/79. The availability of large gas reserves in North Sumatra, South Sumatra, East Kalimantan and West Java provides the basis for expanding the production of fertilizer, LPG and petrochemical products.

2.2.3 Imports

Most of the crude oil used as a base product in the refineries comes in by ship mainly from Middle Sumatra and some from Singapore, Kalimantan, Java and East Indonesia. Some of the crude oil comes from South Sumatra. The latter is piped into Palembang in two 6 inch and one 8 inch pipelines running close together from the Baturaja, Pendopo, Bajubang and Jambi areas. The three lines carry about 8,000 bbls/day.

There is also a 12 inch methane gas line from the Baturaja and Prabumulih areas to Palembang where the gas is used by Pusri, Pertamina and the electric power company.

At the present time there is no Middle East crude used in the Palembang refineries. The crude oil from Singapore is apparently of East Malaysian origin.

2.2.4 Exports

The exports from the Plaju and Sungai Gerong refineries has in the past been refined petroleum products ranging from the lighter distillates to bunker fuel oils. The Sumatran crude is a (sweet crude) paraffin based oil of low sulphur content and is a prime source of lubricating oils.

Additional statistical information relative to the crude oil inflow and product outflow operations at Pertamina's Unit II is contained in Table V-2.2.4-1

2.2.5 Hydrography and Hydraulics

Pertamina maintains that in 1966 21,000 tons tankers drawing 25 feet of water carrying 13,000 tons of cargo frequented the port of Palembang. In 1975 the maximum size tankers operating to Plaju were 15,000 ton

Table V-2.2.4-1
Additional Statistical Data - Pertamina Unit II

Statistical Data

1. Number of ships calling at special wharves Unit II/month

a.	Tankers	135
b.	Bunker vessel	10
c.	Freighters	30
d.	Oil barges	275

2. Bunker fuel supplied to ship — 7700 tons/month

3. General cargo

Loaded	2800 tons	
Unloaded	5700 tons	
Total		8500 tons/month

4. Oil cargo handled

a. Oil cargo loaded	483,800 tons/month
b. Oil cargo unloaded	264,400 tons/month

5. Drinking water supplied — 13,000 tons/month

6. Boiler feed water supplied — 25,000 tons/month

7. Capacities

	Plaju Refinery	S.Gerong Refinery	Total Unit II
Capacity refinery crude oil barrels	110,000	80,000	190,000
Capacity crude oil storage tanks/tons	195,000	99,500	294,500
Capacity intermediate production storage tanks/tons	448,000	405,700	853,700

8. Refinery Input and Outflow Pertamina Unit II in tons.

Refinery crude oil inflow	1972	1973
Crude oil via pipeline	4,009,000	3,258,700
Crude oil via tanker	2,052,000	3,173,900
Total	6,061,000	6,632,600

Table V-2.2.4-1

Additional Statistical Data - Pertamina Unit II
(contd)

Refinery product outflow	1972	1973
Tanker	5,334,900	5,548,300
Bunker to ships	84,900	92,200
Barge	221,800	256,500
Tank trucks	9,400	11,700
In drums	12,400	17,900
Total	5,663,400	5,926,600

tankers drawing 22.5 feet of water carrying about 8,000 tons of cargo. Thus, in the last nine years, the useful depth of the river has decreased about 2.5 feet or 33 inches (8.5 cm per year).

The shoaling in the river is considered to be caused by increased siltation in the river which is attributed to increased land development programs.

Pertamina studies have indicated that it would be economically infeasible insofar as maintenance dredging is concerned to dredge the Musi River deeper than six meters LWS.

Pertamina is committed to dredging 50 percent of the Musi River dredging volumes, but did not do its share in 1975 due to cash flow problems and next year, 1976, appears to be questionable at the moment.

Note: Splitting the responsibility for dredging on the Musi River may have been expedient several years ago, but basically it is an inefficient system of conducting dredging operations. The dredging on the Musi River in its entirety should be performed by one state owned or state sponsored organization for the following reasons:

a) It is more efficient to have all of the dredging under the control of one organization.

b) The scheduling of dredging would be simplified.

c) While Pertamina may be a public spirited corporation, the fact remains that its own interests come first and in times of tribulation such as Pertamina has had recently, the public interests in the form of Musi River dredging has suffered.

d) At the moment the Outer Bar is dredged to 7 meters LWS and the west passage at Payung Island to 6 meters LWS. However, the river is not usable to 6 meters LWS because Pertamina has not dredged its share of the upper Musi; consequently, the dredging benefits from the dredging performed by the state on the lower Musi may never be fully realized because by the time Pertamina gets around to dredging the upper Musi, the lower river may have to be redredged.

e) While the scenario outlined in the previous paragraph may seem to be a little extreme, the fact remains that it is occurring now in December 1975.

2.2.6 Pertamina Facilities

2.2.6.1 Fixed Facilities

Pertamina has more port facilities on the Musi River in the Palembang harbor area than any other organization and has 12 jetties, most of which are for the accommodation of oil tankers. The wharf and berth information is contained in Table V-2.2.6-1 and the comments associated with the table follow. Figure V-2.2.6-1 shows the waterfront layout at Pertamina's Plaju and Sungai Gerong refineries.

2.2.6.2 Cargo Handling Facilities

The cargo handling facilities are divided into two general categories, those for handling liquid cargo and those for handling general cargo.

The products handled, the mainline sizes, the

TABLE V-2.2.6-1

WHARF AND PIER BERTH INFORMATION (PERTAMINA II)

Item No.	Berth identification usage	Length Mtrs. ft.	Width Mtrs.	Depth nominal actual Mtrs/ft	Maximum dimension safely acceptable			Pier condition	Remarks
					Length in feet	Draught in feet	Dwt.		
1.	Jetty No. 1 Petroleum	19	36	9 7.5	560	25'01"	21,000	Good	Jetty and dolphins
2.	Jetty No. 2 Petroleum	100	28	9 7.5	560	25'01"	21,000	Good	Wharf gantry crane
3.	Jetty No. 3 Petroleum	19	18	10 8.5	560	25'01"	21,000	Good	Jetty and dolphins
4.	Jetty No. 4 Petroleum	18	25	9 7.5	560	25'01"	21,000	Good	Jetty and dolphins
5.	Jetty No. 5 Petroleum	114	20	9 7.5	560	25'01"	21,000	Good	Wharf
6.	Jetty No. 6 Petroleum	9	21	9 7.5	Special barge facility		300	Good	Jetty and dolphins
7.	Lemabang barge terminal	12	43	4.5	Special barge facility		300	Good	Jetty and dolphins
8.	Jetty No. 7 Petroleum	62	54	9 7.5	400	21'06"	5,000	Good	Jetty and dolphins
9.	Jetty No.8	34	32	9 7.5	560	25'01"	21,000	Good	Jetty and mooring dolphins

TABLE V-2.2.6-1 (Continued)

WHARF AND PIER BERTH INFORMATION (PERTAMINA II)

Item No.	Berth identification usage	Length Mtrs Ft.	Width Mtrs.	Depth nominal actual Mtrs/ft	Maximum dimension safely acceptable			Pier condition	Remarks
					Length in feet	Draught in feet	Dwt.		
10	Jetty No. 9	35	47	9.0 7.5	560	25'01"	21,000	Good	Jetty and mooring dolphins
11	Jetty No. 10	34	32	9.0 7.5	560	25'01"	21,000	Good	Jetty and mooring dolphins
12	Jetty No. 11 General cargo and bunkering	100	29	9.0 7.5	525	25'01"	--	Good	Wharf general cargo Transit shed
13	Jetty No. 12	36	38	12 10.5	-	--	--	Good	Jetty and dolphins
	Ferry piers	-	-	-	-	--	--	Good	Most ferries are towed barges basically for passengers and baggage etc.

Table V-2.2.6-1

(contd)

Wharf and pier berth information - Pertamina Unit II.

1. The apron width of the Pertamina wharfs is not of real significance since the wharfs are used almost exclusively for oil transfer purposes.
2. Generally speaking there are no transit sheds associated with the oil piers although one or two of the piers are regularly used to offload general cargo.
3. Jetty No. 11 is the primary Pertamina II general cargo berth although jetties Nos. 2 and 5 have regular type wharfs which could be used for general cargo.
4. The nature of the bottom soil at all jetties at Pertamina is basically mud and sand.
5. Jetty No.11 is equipped with four cranes ranging from about three to ten tons capacity. While the jetty is not equipped with container handling facilities, the fact remains that this facility could handle an occasional container if required to do so.
6. All piers are rigged with cargo hose cranes or arms for handling cargo hoses of one kind or another except Jetty No.11 which is equipped for handling general cargo and bunkers.
7. Pier loads are not an important factor on oil jetties. Jetty No.11 a wharf structure has a deck load capacity of 5 tons per square meter.

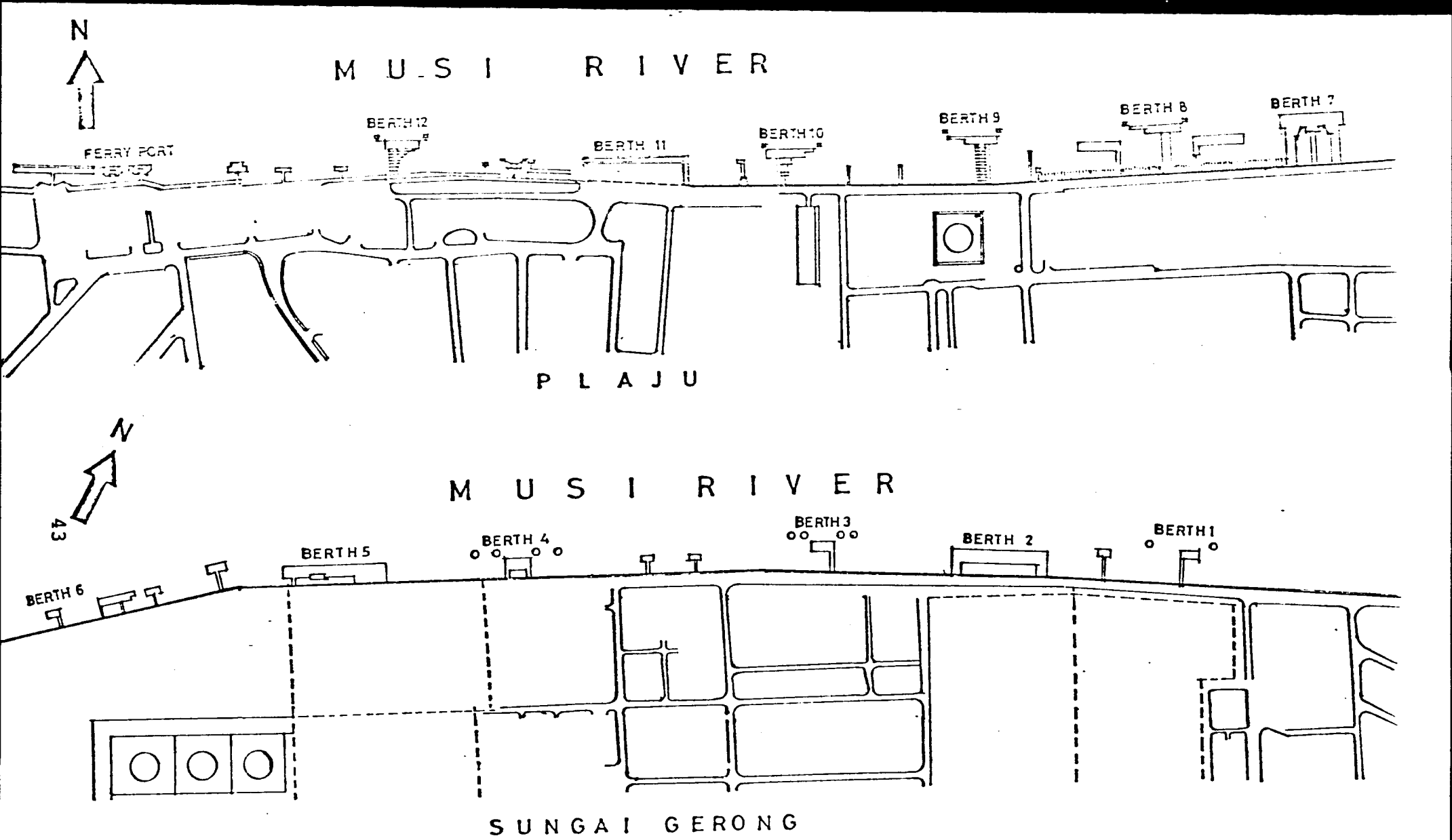


FIGURE: V-2.2.6-1

PERTAMINA UNIT II WATERFRONT FACILITIES

SOURCE : PERTAMINA UNIT II

hose sizes, working pressure and maximum loading and discharging rates for the berths at Plaju and Sungai Gerong are given in Table V-2.2.6-1. Table V-2.2.6-2 shows the general cargo handling and other terminal facilities available at Pertamina Unit II.

2.2.6.3 Floating Equipment

The floating equipment available at Plaju and Sungai Gerong are shown in Table V-2.2.6-3.

The docking and undocking regulations in effect at Pertamina II require one tugboat to assist in docking operations and turning ships of over 100 meters in length.

Pertamina Palembang is scheduled to obtain a 1500 HP tug in February 1976 in order to be able to handle ships of about 165 meters length at its terminals. They have been using two 800 HP tugs and find that they are inadequate for the handling of large tankers around short jetty type wharfs, where it is frequently not possible to turn a ship against the wharf face.

2.2.6.4 Bunkering Facilities

The bunkering facilities in the port of Palembang are inadequate. Pertamina offers bunkering services at several, if not most, of its jetties at Plaju and Sungai Gerong; however, it does not supply bunkers by barge.

Since many of the ships operating in the Palembang area are small, going to an oil terminal to fuel is not a problem. However, large ships with cargo for Palembang may come up the river very light on fuel in order to make the necessary draft and may require fuel to leave the port. A large ship should not be required

TABLE V-2.2.6-2

PERTAMINA - UNIT II

GENERAL CARGO HANDLING AND OTHER TERMINAL FACILITIES

Unit No.	Unit description	Area M^2	Capacity tons	Number units	Condition	
1.	Warehouse	3428	10019	1	Good	
2.	Cold storage	140	—	1	Good	
3.	Intermediate temporary storage	1500	—	1	Good	
4.	Open storage	5667	—	—	—	Capacity depends upon land
5.	Forklift trucks	—	3	4	Operable	
6.	Cranes shore	—	15	1	Operable	
7.	Cranes shore	—	5	2	Operable	
8.	Cranes mobil	—	15	1	Operable	
9.	Cranes mobil	—	30	1	Operable	
10.	Cranes mobil	—	45	1	Operable	
11.	Fire station unit	—	—	2	Operable	

Source : Pertamina

TABLE V-2.2.6-3

FLOATING EQUIPMENT - PERTAMINA II

Item No.	Unit description	No. Units	Size unit	Capacity tons	SHP	Normal use	When built	Condition	Comments
1.	Tug boat	1	—	—	750	Ship building	1957	Good	Equipped for fire fighting.
2.	Tug boat	1	—	—	800	Ship handling	1969	Good	Equipped for fire fighting, twin screw.
3.	Mooring boats	4	—	80	(240)	Ship handling		Good	
4.	Deck lighters	7	—	30-60	—	General cargo		Good	
5.	Hold lighters	13	—	40-125	—	General cargo		Various	
6.	Water barges	1	—	40	—	Water barge		Good	Unit is small
7.	Oil barges	1	—	40	—	Bunker oil		Good	Unit is small
	Misc. equipment and/or facilities								
8.	Dry dock	1		40	—	Small boats		Good	
	Bunkering Facilities								
9.	Oil	11 berths		125				Good	Capacity 125 tons/hou
10.	Water	11 berths		10				Good	Capacity 6-12 tons/ho

(240) Estimated

Source : Pertamina Data.

to undergo the added risks of docking at South Palembang to fuel and to waste the time required to do so.

If Palembang is to attract large ships here, it should have a satisfactory bunkering service.

There are at the present time a few small bunkering services provided by private operators, but generally they are too small to be effective and multiple trips by small slow pumping barges is too time consuming for the modern large and expensive ships.

2.3 Pusri Facilities

Pusri is a large urea fertilizer producing corporation which is operated as a private company, although all of its stock is Government owned. It is situated on the left bank of the Musi River several kilometers downriver from the PPA facilities at Boom Baru, Palembang. The next few sections give a brief description of Pusri's operation with emphasis on its shipping and port facility requirements and facilities.

2.3.1 Pusri Operations

2.3.1.1 Imports

There are no raw materials shipped into the Pusri plant. The basic elements of the fertilizer (urea) manufacturing process are methane gas which is piped in from the oil fields and nitrogen which is extracted from the atmosphere. Pusri's primary general cargo requirement is for spare parts which are shipped into Palembang via the facilities of Boom Baru. Pusri used to import paper bags, but are now using plastic bags shipped through Boom Baru.

2.3.1.2 Outgoing Cargo

In 1975 Pusri expects to ship out about 480,000 tons of urea fertilizer, 100,000 tons in bags from the Pusri I plant and 380,000 tons in bulk from its Pusri II plant.

In 1977 the Pusri III plant is scheduled to come on line with 570,000 tons of urea fertilizer; most of it is in bulk, but enough in bags to insure a continuous output of about 100,000 tons in bags. In 1978 Pusri IV plant is scheduled to add another 570,000 tons of annual urea production, making the total plant production about 1,620,000 tons of which about 100,000 tons will be shipped in bags and the balance will be handled in bulk.

2.3.1.3 Transport of Pusri's Production

The entire production of the Pusri plant is intended for Indonesian consumption. Therefore, the maximum distance the fertilizer is transported is about 2,000 miles with most being consigned to shorter distances. Pusri ships its bagged cargo via RLS when available, otherwise it ships via chartered vessels. The present ship loadings at Pusri are about as follows:

i. Bagged cargo about 10,000 tons/month in from 6 - 10 ships
ii. Bulk cargo about 30,000 tons/month in from 9 - 10 ships/month or 2 - 3 ships/week
iii. There is also a small movement of ammonia from Palembang to Bangka, but this is only about 3,000 tons/year and is basically space available capacity.

The present operation in Palembang requires about 25 hours (Pusri statistics) for 3,000 tons, although the

loader is rated at 500 tons per hour and is averaging 300 tons/hour. The source of delays at berth are mechanical/electrical problems with the loader, weather delays, and the requirement to shift the vessel to trim the cargo because the loader is a fixed position unit. A new loader is to be shipped to Palembang from Canada to begin operation after July of 1976. It will be a quadrant beam loader with a rated capacity of 750 tons/hour. The other sources of delay at Palembang are the delay for tides and pilots. The former will be solved with the introduction of the shallow draft vessels which are designed to go at either tide.

Pusri is now chartering four vessels, three 3,300 DWT and one 4,200 DWT bulk carriers. The former were designed for hauling coal. The smaller ships can come in on any tide, but the larger must wait for high tide.

The Pusri shipping people say that they experience very little delay due to weather while underway; the only potential trouble is at the Outer Bar. This occurs about two weeks in the year and rarely causes delay. One source of delay for Pusri is water supply, at present they are able to pump only 25 tons/night from their own facilities.

It has been suggested to Pusri that in order to avoid pilot delays they should have their masters qualify as pilots on the Musi; no decision has yet been made on the subject.

At present Pusri receives Bunkers for her vessels from lighter operated by private contractors. Pertamina does not provide lighter bunkers, but private contractors do at a surcharge of 2-3 Rp/liter which is more acceptable to Pusri than waiting for berthing space at Pertamina wharves.

Pusri now has new vessels being built in Japan by Mitsubishi with World Bank financing with a 7,000 DWT capacity and a draft of 6 M will be delivered on the following schedule: 1 - end of 1976, 1 - February 1977, 1 - April 1977. They are designed for all weather operation and are self-unloading using conveyors and bucket loaders. They should begin operations about the time that Pusri III comes on stream. They will carry bulk urea from Palembang to the bagging stations at Surabaya, Tanjung Priok, (245,000 tons/year), and Cilacap (100,000 tons/year) as well as those planned for Padang, Belawan and possibly Ujung Pandang (Sulawesi). The bagged urea will then be moved inland.

In addition to the existing order for three shallow draft vessels, Pusri intends to place an order early next year for one or two more ships. The exact number will depend on the plans for new bagging facilities and the anticipated quantity of imported TSP which Pusri will distribute along with the urea. The new bulk cargo carriers will be self-unloading ships. The selection of the self-unloading vessels is based partly on the lack of exclusive facilities at the receiving ports. At present the delays at the receiving ports is causing schedule delays which result in congestion at the single berth at Palembang. Pusri has been able to secure a priority for berthing at Surabaya, but has not had similar luck at Tanjong Priok where delays can be severe.

2.3.1.4 Cargo Handling

2.3.1.4.1 Bagged Fertilizer

Pusri I produces 100,000 tons/year of bagged fertilizer which is stored in two huge modern warehouses about 400 meters from the pier face. Total capacity of

the warehouses is 25,000 tons. The cargo is stacked one ton per pallet and pallets are stacked three high in the warehouse. The cargo is then loaded by forklift to trucks, four pallets per truck (about a ten-ton truck) for transfer to the wharf where the pallets are lifted by ships gear into the hold of a ship where the pallets are unloaded and returned to the truck. The loading rate for bagged fertilizer is about 25/tons/hour/gang. Cargo is loaded 24 hours a day with four breaks for meals, etc. Pusri has its own standard and operates with two 15 men gangs per hatch per ship, one on the ship and one on the wharf. For the gang on the wharf about 8 to 10 men are actually on the wharf and the rest work in the warehouse.

2.3.1.4.2 Bulk Fertilizer

Pusri II produces about 380,000 tons/year of bulk fertilizer which is conveyed to several huge piles in a heavily constructed storeroom with a 15,000 tons capacity. The cargo is then moved by a large end loader and dumped into a hopper which feeds a conveyor system to the pier about 400 meters distant. The nominal loading capacity of the conveyor system is 400 tons/hour. However, the actual capacity of the system with all components working satisfactorily is about 350 tons/hour. The conveyor system has a design deficiency. The discharge chute of the system is fixed and it is necessary to move the loading ship about every four hours using the ships winches and the average moving time is about one hour. On average 4 moves per ship are required; thus reducing the overall capacity of the system by about 20 percent. Pusri is considering modifying the discharge mechanism of the system to permit

the chute movement enough to serve more than one hatch without moving the ship.

2.3.1.5 Hydrographics and Hydraulics

The nominal depth of water listed at the Pusri piers is 8 meters and the actual depth is now about 6.5 meters. The Pusri waterfront has to be dredged about every four years. It was last dredged to 8 meters in 1972 and will be dredged to 8 meters again in 1976.

The maintenance dredging performed indicates an annual dredging requirement of about 25 percent would be appropriate for limited dredging in the Musi River.

Many ships loading at Pusri are delayed waiting for high water in order that they may navigate the Musi River enroute to their destinations.

2.3.1.6 Barges and Tugs

The barges and tugs at Pusri are used to transport construction equipment and materials (i.e., stone is barged in as a construction aggregate, etc.). Pusri's tugs with their pushing knees are not suitable for handling ships during berthing operations.

2.3.1.7 Inventory of Equipment

The Pusri plant is well equipped to handle the fertilizer it produces. It has two wharves which are described in Table V-2.3.1-1 and two huge warehouses which are described in Table V-2.3.1-2. The floating equipment is given in Table V-2.3.1-3 and the mechanical handling equipment is listed in Table V-2.3.1-4.

Table V-2.3.1-4 indicates that most of the heavy lift cranes are in the construction section. These cranes have been used to handle heavy equipment

TABLE V -2.3.1-1

WHARF AND PIER BERTH INFORMATION (PUSRI)

Item No.	Berth identification usage	Length Mtrs. ft.	Width apron Mtrs. ft	Depth nominal actual Mtrs/ft	Transit shed area Mtrs^2 ft^2	Pier load cap. F/mtr^2 Ft/ft^2	Access: Rail pier shed	Access: Truck pier shed	Access: Location local roads highways	Pier condition	Remarks
1	PUSRI I (1) Bag Fertilizer	140 460	15 50	8/65 26/21.3	None	5T/mtr^2 1000#/ft^2	None None	Good Good	N.A. N.A.	Excellent	Berth used exclusively to handle about 100,000 ton bagged fertilizer per year.
2	PUSRI II (2) Bulk Fertilizer	116 380	12 40	8/65 26/21.2	None	5T/mtr^2 1000#/ft^2	None None	None None	N.A. N.A.	Excellent	Berth used exclusively to handle bulk fertilizer via a conveyor system.

(1). This pier is a standard T shapped jetty designed to handle general and/or bagged cargo.

(2). This pier is designed for the loading of bulk fertilizer via a conveyor. It is a multiple island island cluster dolphin piling pier with the concrete decked clusters interconnected by wickways.

(3). There are no gantry cranes, container handling facilities or agricultural oil facilities at Pusri.

TABLE V - 2.3.1-2

WAREHOUSE AND OTHER STORAGE AREA (PUSRI)

Item No.	Warehouse Identification Usage	Length mtrs. ft.	Width mtrs. ft.	Height cargo area mtrs. ft.	Number floors	Internal area mtrs.^{2} ft^2	Open storage area associated warehouse mtr^2 ft^2	Number doors adequacy size	Warehouse access	Warehouse condition	Dist. from warehouse to pier face mtrs. ft.	Comment
1	PUSRI I Bag fertilizer	-	-	6 20	1	18,750 200,000	None	Good	Good	Excellent	400 1300	Warehouse used exclusively for bagged fertilizer. Storage capacity 25,000 tons.
2	PUSRI II Bulk Fertilizer	-	-	10 32	1	2520	None	Good	Good	Excellent	400 1300	Warehouse used exclusively for handling bulk fertilizer. Storage capacity 15000 tons. Cargo stored and removed by conveyors.

TABLE V - 2.3.1-3

PORT FACILITIES - FLOATING EQUIPMENT (PUSRI)

Item No.	Vessel identification usage	Type	Length Mtrs. ft.	Width Mtrs. ft.	Tons or cap.	Propulsion HP	No. vessels in class	Condition	Remarks
1	Tow boats Pushing Pusri barges	Push type with bow knees	18 60	6 20	-	Diesel 240	2	Good	Not suitable for handling ships in docking due to towing knees.
2	Barges Construction and general work	Flat decked with raised rakes	36 120	11 35	300	Non propelled	6	Good	Barges used for transporting construction equipment and materials.

TABLE V - 2.3.A-4

PORT FACILITIES - MOBILE EQUIPMENT (PUSRI)

Item No.	Vehicle identification usage	Type	Number	Capacity tons	Suitability	Condition	Comment
	Shipping Section						
1	Mobile crane	Truck	1	7.5	Good	Good	
2	Mobile crane	Truck	1	7.5	Good	Good	
3	Forklift trucks	Toyota	1	5	Good	Good	Used in warehouse handling one ton pallets.
4	Trucks	Stake	4	2	Good	Fair	Used to transport bag cargo from warehouse to pier.
5	Fire pump	Truck	4	10	Good	Good	
6	Water pump	Mobile	1	-	Good	Good	
	Construction Section						
1	Mobile crane	Truck	2	100	Good	Good	
2	Mobile crane	Truck	2	70	Good	Good	
3	Mobile crane	Truck	1	50	Good	Good	
4	Mobile crane	Truck	2	40	Good	Good	
5	Mobile crane	Truck	1	25	Good	Good	

for a number of customers at the Pusri general cargo type wharf for the last few years.

Pusri was reported to be considering establishing a plant construction sideline business for its large mobile cranes. However, Pusri has just contracted to construct a new urea fertilizer (Pusri V) in West Java and recent reports indicate that Pusri's large cranes will not be available to handle heavy cargo lifts in Palembang when the Pusri IV plant is completed.

2.4 Kertapati Coal Terminal Facilities

Palembang has been a coal port for many years. The Bukit Asam coal mines are located about 173 kilometers to the south and west of the port and the coal arrives by rail at the Kertapati coal terminal about five miles upriver from the primary port facilities at Boom Baru.

Some years ago about 800,000 tons of coal per year were mined in the area, but lately the production has dropped to less than 100,000 tons due to the booming oil market. As a result of the drop off in the coal trade, the Kertapati coal handling facilities have received scant maintenance and much of the equipment should now be rehabilitated, although much of the equipment should be surveyed and disposed of as scrap metal.

2.4.1 General

The terminal which apparently was designed to handle up to about 2 million tons of coal in the 1940s, according to old records, was redesigned for a one million ton coal capacity in 1963.

The Kertapati coal terminal has a multiple rail

connection to the PJKA terminal about 500 to 1000 meters from the coal terminal. However, the coal terminal is under the jurisdiction of the Department of Mines, Coal Division (Bukit Asam Mines, etc.) and is not under the jurisdiction of the railroad, although they are close together.

The main PJKA passenger and freight terminal for Palembang lies adjacent to the coal terminal and has their own marine terminal about 500 to 1000 meters down river from the coal terminal. The PJKA facilities include a ferry terminal.

All standard South Sumatra railroads are about 1.07 meters or 42 inch gauge, which is narrow gauge by western standards.

2.4.2 Coal Terminal Operations

The terminal receives its coal by railroad car from the Bukit Asam coal mines, a distance of about 173 km. The coal is transported in open hopper coal cars about 36 feet between coupling centers and with a hopper length of about 32 feet. The empty weight of the coal cars is 17,500 kg and their rated capacity is 30 tons. However, the actual capacity is about 29 tons to avoid excess spillage. The maximum car load is 47.5 tons or about 12 tons per axle and 6 tons per wheel.

The coal hopper cars have double bogey trucks at each end for a total of eight wheels and have side dumping hoppers. There are about eight to ten side hopper doors which must be manually opened and closed to unload the cars.

The cars are pulled across a bridge trestle at ground level over depressed Vee shaped troughs into

which the coal is dumped. The coal is then trimmed back to pits, where it is picked up by a system of conveyors, about 1.2 meters in width, and transported to the coal stacker a distance of about 800 to 1000 meters.

Four coal cars are pulled into position on the trestle for simultaneous dumping manually by a large gang of men. While the discharge of coal hopper cars by this system was not witnessed under service conditions, the manual operation of the side hopper doors appears to be a very slow and semidangerous operation.

The speed of unloading the coal cars is a function of the skill of the men and the number of men involved in the operation. The terminal normally works one shift and the rate of unloading coal from railway and transporting same to the stacked is about 1000 to 1500 tons per shift. Additional workers can be added to form a second shift if required.

To accomplish the above rate, the required equipment must be operable, which includes the train locomotive, the coal cars, two mechanical trough trimmers, the conveyor system from the coal pits to the stacker, the stacker, and two of the three 300 kilowatt diesel powered generators which power the terminal equipment.

The terminal now has one hopper car unloading trestle, trough, pit and conveyor system in operation and has a second system partially rehabilitated (about 50% less equipment) which can and will be completed when funds are available.

The coal upon arrival at the stacker is stacked in a coal pile with a capacity of 80,000 tons. This coal is stacked such that it can be picked up by a second conveyor system which transports the coal to the

shiploader at the wharf. This shiploader unit moves on rails at the wharf and has a loading arm with a radius of 27 meters or about 88.6 feet.

The nominal capacity of the conveyors and shiploader is 1000 tons per hour; however, the actual capacity is about 350 tons per hour.

2.4.3 Kertapati Coal Wharf

Originally the coal terminal had about 240 meters of coal pier (wharf) on which ran four large gantry cranes. There were, in addition, four large gantry cranes in the coal unloading, conveyor and stacking operation. All of these cranes were steam cranes, only one of which is in operation today. The remaining seven were reported to be last in operation in 1952 and not repairable now. A visual inspection of the cranes confirms the fact seven of the old steam cranes should be scrapped for junk and the last one, still in service, should be replaced in the near future.

The present coal pier consists of about 120 meters of stone quay wharf in fair and serviceable condition and about 120 meters of deteriorated unusable old wharf. The coal pier is serviced by bulk ship loader and the one remaining operable steam crane. The latter was observed in operation loading spare parts for the bukit Asam mine onto an eight wheel 32 foot long flatbed railcar with a load capacity of 24 tons.

2.4.4 Cargo Handling

The conveyor-shiploader unit has an actual ship loading capacity of about 350 tons per hour while the rate of loading coal onto a ship or barge manually is about 30 tons per hour. The latter operation is usually

performed by contract labor at the expense of the coal purchaser.

Approximately 500 tons of coal were bagged per month of the tin mine on Bangka Island due to the difficulty of landing coal in bulk quantities at that facility. During the last few months the tin mine has been obtaining its coal from Taiwan, but is expected to receive coal again from Kertapati about 1 January 1976.

Other regular deliveries of coal are about 1000 tons per month to Mentok and about 3000 tons per month to Belinyu, both of Bangka Island.

The bulk coal handling equipment at Kertapati is not suitable for handling bulk cement and would require substantial alterations in order to handle that commodity. Coal is not damaged by rain, whereas cement must be protected from rain and other water at all times.

2.4.5 Manning

The normal crew required to fully operate the coal terminal at its present capacity of about 350 tons of coal per hour into a ship is 33 men per shift. The terminal has 33 men permanently employed, consequently every effort should be made to increase the coal flow at Kertapati to reduce the terminal overhead.

2.4.6 Coal Quantity

The tin mines will accept coal with less than 70% carbon while the electric power plants specify a carbon content in their coal of at least 70%.

2.4.7 Ampera Bridge

The Ampera Bridge spans the Musi River about a mile above Boom Baru and about five miles downriver from

the Kertapati terminal. The bridge was constructed between 1962 and 1964 and was commissioned in 1966.

The Ampera Bridge is a type lift bridge with the following general characteristics:

Characteristic	Meters	Tons	Time
The bridge overall:			
Length	1177.0		
Width	22.0		
Vertical clearance roadway	11.5		
Moving part of bridge:			
Length	71.9		
Width	22.0		
Lift	32.0		
Weight		944	
Time of lift			10 M/min
Fairway under bridge:			
Height max. elev. HWS	44.5		
Height bridge closed HWS	9.0		
Width	60.0		
Sungai Musi under bridge:			
Depth 1962	20.0		
Current			1.5 M/sec
Tide differential	3.5		

The bridge went into operation in 1966 and was operated about 20 times until the bridge failed in 1973. Since that time, the bridge has not been repaired and is not in use.

A survey of the bridge was made and the senior operating personnel were interviewed relative to the sequence of events leading up to its failure and the following comments are considered to be worthy of note.

1. On the day the bridge experienced trouble, the west side of the bridge elevated faster than the east side and the bridge safety interlocks shut down the bridge presumably before any substantial damage occurred. Apparently the bridge lift synchronization system failed and the bridge stopped. It was eventually lowered to its roadway position and has not moved since 1973.
2. It is the opinion of several survey groups that there is very little wrong with the bridge and that a good electrical and electronic tune up would probably permit the bridge to operate.
3. The maintenance procedures on the bridge have been inadequate. There has been little or no maintenance for some time for the lift cables are dry as are the winch gears. In addition operating the bridge on an average of three (3) times a year is not sufficient operation to keep the bridge lubricated, loose and operable.
4. It is concluded that the bridge can be restored to service for a reasonable sum of money and that it should be restored to service if only as a signal that Palembang is a progressive city and can maintain a bridge.
5. That when the bridge is fixed that a suitable maintenance program be instituted which would include the following as a minimum:
   a. Monthly operation of the bridge for test and lubrication purposes
   b. Monthly or weekly tests of the electrical systems including the bridge life synchr-

onization system.

c. A progressive maintenance system be prescribed and installed.

d. A lubrication maintenance schedule be formulated and adopted.

e. The bridge be carefully inspected for locations of excessive corrosion and that guards be installed where necessary to protect the bridge structure.

The Kertapati coal terminal operations are at the present time hindered by the fact that the bridge is not operable. Shell Mijnbouw Ltd. has an interest along with P.N. Batu Bara in the operation of the bridge for they find that without the bridge being operable the cost of moving coal into the East Asia market including Japan and Taiwan may make coal shipments out of Palembang not competitive which could slow down the production of coal at the Bukit Asam coal mines.

It is recommended that steps be taken to return the Ampera Bridge to its intended operation as a lift bridge.

2.5 Palembang Power Company (PLN)

The Palembang Power Company has two marine facilities on the Musi River. They are of significance insofar as port facilities only in that they are in the way of efficient operations on the present Boom Baru facilities and for expansion of the present facilities down river as planned.

PLN operates a small power plant fueling operation on about 30 meters of prime water front property right in the middle of the Boom Baru facilities. It has been proposed the PPC acquire PLN's rights to this

property and complete the construction of the Boom Baru Wharf in this area.

PLN also operates a water intake from the Musi River to the water plant about 50 meters east of Boom Baru in way of PPA's planned wharf expansion downriver toward its prahu wharf. The Boom Baru expansion plans can be coordinated with the PLN requirements such that both interests may be served.

2.6 Private Sector Facilities

2.6.1 Jetties and Wharfs

Most of the Palembang port facilities have been or are described in other sections of this report. The miscellaneous waterfront facilities not already listed for primary cargo handling are shown in Figure V-2.6.1-1 - Land Use Along the Musi River.

2.6.2 Warehouse and Storage Areas

Figure V-2.6.1-1 also shows the general warehouse and storage areas along the Musi River. It should be noted that many of the saw mills, rubber plants and other facilities have very poor roads and must depend upon water transportation for all primary transport needs.

2.6.3 Bunkering Water and Other Petroleum Storage and Distribution Facilities

2.6.3.1 Marine Fuel and Diesel Oil

The bunkering facilities available at Palembang are listed as coal from the Government mines at Kertapati, oil from the refineries at Plaju and Sungai Gerong, light diesel and gas oil at Sungai Gerong owned by Pertamina. Payment for fuel must be arranged in advance

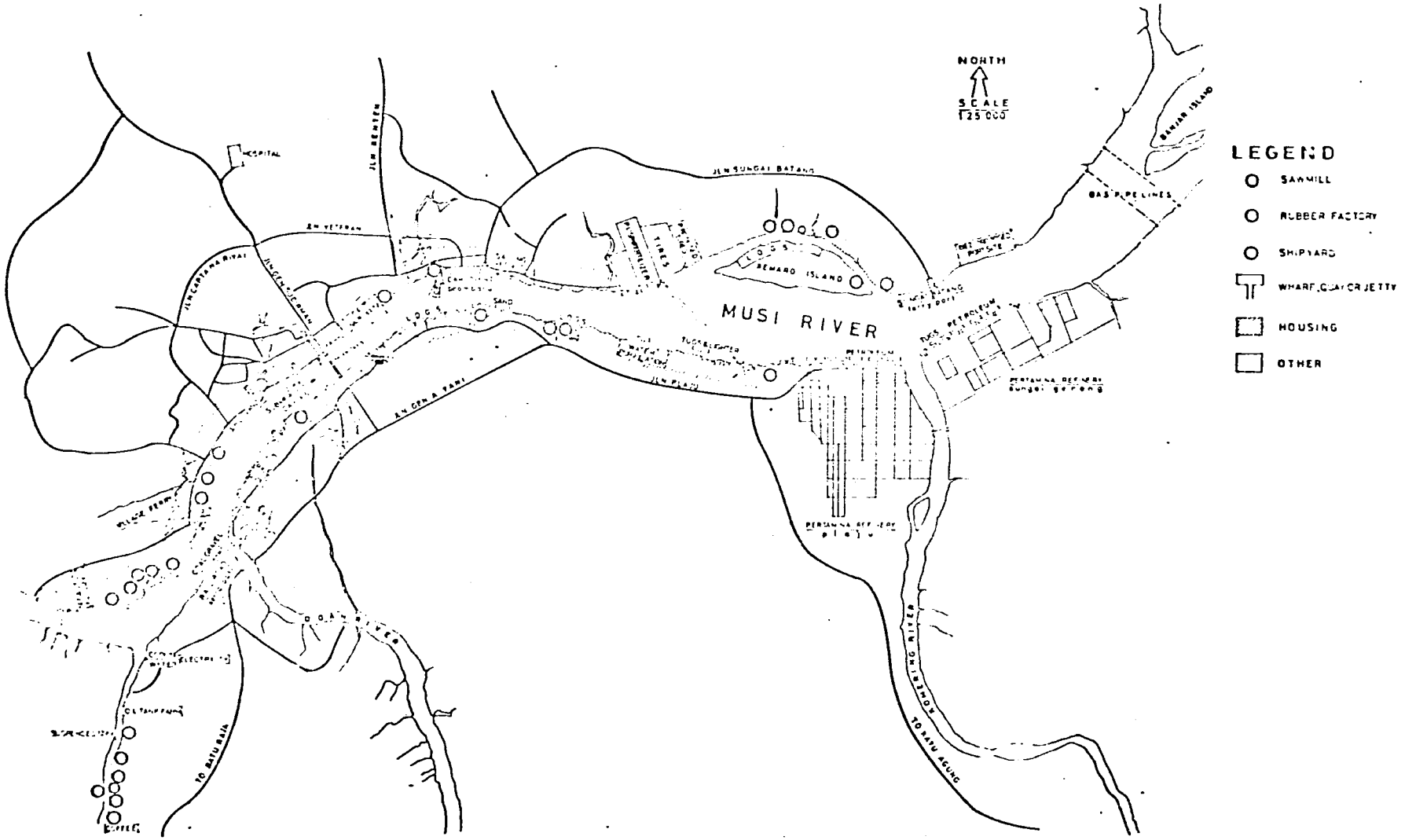


Figure V-2.6.1-1

Land Use Along Musi River

Source: E.G.F.Survey

through Pertamina's Jakarta office.

While it is true that bunkers are available as described above, all ships must go to the fueling location to fuel as neither the port nor Pertamina provide a bunkering barge service. There are a few small fuel oil distributors who will deliver fuel oil to ships in the stream; however, their facilities are quite small and numerous trips would have to be made to deliver a substantial quantity of bunkers to a large ship.

Palembang will never be a major bunkering port for international ships due to the limited depth of the Musi River. On the other hand ships may come to Palembang light on bunkers in order to navigate the Musi at minimum draft and these ships could and probably would take on a limited supply of bunkers locally provided:

a) That they could obtain the bunkers by barge and did not have to spend the time and expense of redocking or docking at Pertamina to obtain fuel.

b) That the cost of the fuel is at least competitive with that which they may obtain in Singapore which is essentially a free trade zone.

2.6.3.2 Water

Water of excellent quality is readily available at Boom Baru, Pertamina and Pusri and by water barge. The advertized delivery rate for water is about 15 to 20 tons per hour at the wharfs and from 50 to 60 tons per hour from the available 100 ton water barge. The 15 tons per hour is the average daytime rate while the

20 tons per hour is the usual nighttime rate.

Pusri reports problems with the delivery of water due to low pressure in the water lines. This is probably more a delivery problem than a supply problem and is caused by an inadequate distribution system and the fact that electrical power is both in short supply and rationed by cutting off service in all areas for specific periods of time.

2.6.3.3 Other Petroleum Storage and Distribution Facilities

Most of the petroleum storage and distribution facilities are owned and operated by Pertamina at Plaju and Sungai Gerong. There is, however, an oil tank farm on the Kramasan River south southwest (about 200°) from Kertapati. Oil is barged to the tank farm wharf where it is stored and used to fill barges or drums for further transportation up river. See Figure V-2.6.1-1.

There are a large number of small tank barges or semi tank barges in use transporting oil from the refineries to various distribution points both within the port area and for distribution at some of the ports hinterland area.

2.6.4 Commercial Ship Repair Facilities

The latest listing of Palembang drydocking and repair facilities is as follows:

> "Slipway maximum capacity 200 tons, only minor repairs can be effected."

There are a number of small shipyards in the Palembang area which fit the above description. However, there are two shipyards in the area which exceed

the minimum capabilities listed above. They are the P.N. Alir Menjaya (shipyard) and the P.T. Intan Sengkunyit (shipyard) which are described in the following sections.

2.6.5 P. N. Alir Menjaya (Shipyard)

This shipyard is an old established dockyard with an aggressive management which is striving to increase the capacity of the yard and to modernize its facilities and techniques.

2.6.5.1 Yard Capabilities

The yard builds new ships up to 500 tons and has the capability of hauling out vessels up to 500 tons. It also performs floating repairs to ships at anchorage.

The capacity of the railway is:

Slipway No.	Length	Width	Capacity/Tons
I	100	9	500
II	100	9	500
III	80	6	60
IV	80	9	100
V	80	9	100

Slipways IV and V are to be combined and expanded into one slipway as follows:

IV & V	150	18	1000

The shipyard is both a new construction and repair yard. Among the vessels which have been constructed here are the following:

Item No.	Date	Place Built	Type	DWT or SHP	Cost Rp. in Millions	Comments
1	1975	Jakarta	Coaster	750 tons	600	
2	1971	Palembang	Coaster	350 tons	105	Steel plate 70 Rp/kg

Item No.	Date	Place Built	Type	DWT or SHP	Cost Rp. in Millions	Comments
3	1975	Palembang	Coaster	350 tons	315	Steel plate Rp 200/kg
4	1972	Palembang	Tugboat	165 SHP	25	
5	1975	Palembang	Tugboat	165 SHP	75	
6	1975	Palembang	Barge	200 tons	40	Really sea-going barges-over designed and with wooden hatch boards
7	1975	Palembang	Mooring boat	83 SHP	23	
8	1975	Palembang	Mooring boat	33 SHP	14	
9	1975	Palembang	Speed-boat	6mx2x40 HP	3	No spare parts
10	1974	Palembang	4 coas-ters	250 tons	--	

Item 6 above is a barge for Belaway. It is about 36 x 6 m shipshape in design with time consuming wooden hatch boards with canvas covers. Barge for short trip use should have metal sliding hatch covers particularly in the rainy weather of Sumatra. The TB 007, TB 006, TB 005 and TB 004 are examples.

The building way crane has a capacity of 1500/3000 kgs but is now limited to 1500 kgs.

2.6.5.2 Ship Repairs

The shipyard makes all kinds of repairs including floating repairs. However, they concentrate on vessels of between 1000 to 2000 DWT with engines up to 1500 SHP and with gererators up to 40 KW. They also handle a number of smaller ships as well.

The yard has an electric shop capable of rewinding motors equipped with a baking oven, a reasonably well

equipped machine shop with a 5 ton overhead travelling crane, a carpenter shop and a plate shop as well as storage rooms.

In 1976 the yard expects to be able to dock 1000 ton ships.

The yard overhauls engines up to about 300 SHP at about 2500/3000 Rp./SHP with the total cost for a 300 SHP diesel engine overhaul averaging about 5 million rupiahs and requiring 10-15 days.

The minimum drydock time for the usual underwater work without plate renewal is about 7-10 days.

Annual repairs require about 20 days.

Special repairs involving plating renewal usually run to 45 days. However, a 500 ton ship requiring about 80% plate renewal may run to 2.5 months.

The cost of replacing steel is about Rp. 630/kg and the cost of painting a vessel is about Rp. 2,400/m^3 for 3 to 4 coats.

Further details on repair costs can be obtained from Table V-2.6.5-1 - A Tariff Scale.

2.6.5.3 Usual Painting Schedule

Bottom	-	Anticorrosive	-	two coats
		Anti fouling	-	two coats
Topside	-	Anticorrosive	-	two coats
		Topside paint	-	one coat

2.6.5.4 Port Authority Work

The B-125 was in the yard for special repairs involving about 4 tons of steel replacement, an engine overhaul and painting at a cost of 4.5 million rupiahs and an estimated time in shipyard of 25 days.

TABLE V-2.6.5-1

P. N. ALIR MENJAYA.

(SHIPPING & DOCKYARD)

T A R I F F

I. DOCKING.

Type of dock	Docking/Undocking	Daily Rent
1. Slipway I	Rp. 90,000.-	Rp. 9,000.-
2. Slipway II	90,000.-	9,000.-
3. Slipway III	60,000.-	3,500.-
4. Slipway IV	75,000.-	5,500.-
5. Slipway V	75,000.-	5,500.-

II. HULL REPAIR

a. Below water-line per square meter = Rp. 990.-

b. Above water-line per square meter = Rp. 800.-

III. COST OF DRILL-TEST - PER HOLE

a. Drilling & welding = Rp.1600.-

b. Drilling only = Rp. 800.-

IV. COST OF STEEL PLATE RENEWAL.

a. Replacement with new steel plate = Rp. 640.- /Kg.

b. Patching with new steel plate = Rp. 590.- /Kg.

V. COST OF REWELDING = Rp.1750.- /M

VI. COST OF INSTALLING ZINKPLATE AND CLEANING THE OLD ONE = Rp.7000.- each

VII. COST OF PAINTING THE HULL (OUTSIDE ONLY)

a. Below waterline using AC & AF paint

- two coatings per square meter = Rp.1600.-
- three coatings per square meter = Rp.2400.-

Table V-2.6.5-1

(contd)

b. Above waterline using AC Paint and Colored Paint.

- two coatings per square meter = Rp. 1,400.-
- three coatings per square meter = Rp. 2,000.-

VIII. COST OF MOUNTING/DISMOUNTING PROPELLER SHAFT.

a. 3" diameter = Rp. 90,000.-

b. 4" diameter = Rp.115,000.-

c. 6" diameter = Rp.150,000.-

IX. COST OF PREPARING DRAWING

For report of drilling test and replating = Rp. 25,000.-

ACTIVITIES OF PN ALIR MENJAYA.

I. SHIPBUILDING

1. Ships up to 500 tons (coasters)
2. Cargo & fuel barges
3. Ferry boats
4. Tug boats
5. Speed boats, etc.

II. DOCKING - INCLUDING FLOATING REPAIR.

1. Ships
2. Marine engines
3. Other works related to ship repair.

III. STEEL CONSTRUCTION.

1. Buildings
2. Godowns
3. Bridges
4. Oil tanks

Table V-2.6.5-1

(contd)

5. Pipe installation (big & small)
6. Wharf - pontoon
7. Small steel construction, etc.

IV. WOOD CONSTRUCTION

1. Houses
2. Windows
3. Furnitures, etc.

For the above activities, P.N. Alir Menjaya has the following facilities :

1. Docking - with 5 slipways.

1.1	Slipway I	- 100 x 9 meters	-	up to 500 tons
1.2	Slipway II	- 100 x 9 meters	-	up to 500 tons
1.3	Slipway III	- 80 x 6 meters	-	up to 60 tons
1.4	Slipway IV	- 80 x 9 meters	-	up to 100 tons
1.5	Slipway V	- 80 x 9 meters	-	up to 100 tons

2. WORKING FACILITIES.

2.1 Machine Shop.
Lathe - c.l. 6,000 mm dab c.h. 600 mm

2.2 Sheet Metal Shop.
Steel press machine and cutting machine

2.3 Welding Shop.
Electric welding and acetylene welding

2.4 Carpenter Shop.
Sawing machine, etc.

2.5 Electrical Shop -
Limited to lighting and small motors (up to 10 KVA)

2.6 Engine Shop.
Overhaul all kinds of engines.

2.7 Foundry.
Non ferrous metals (up to 100 kgs)

2.8 Lift Equipment.
Cranes - maximum 10 tons

2.6.5.5 Shipyard Availability

The shipyard is now operating at full capacity and handles about 80 ships per year on its six slipways for a slipway average of about 13.2 ships per year. The yard has been operating with a waiting list, with many ships waiting 20 to 30 days for drydocking. A Bangka Tin Mine tugboat has been waiting 35 days for a slipway schedule.

2.6.6 P.T. Intan Sengkunyit (Shipyard)

This shipyard is a large modern completely new facility which has only been in operation for about one year. Most of the yard is still being completed. During the past year 60 vessels were completed. Many of these vessels were small unpowered barges. Ten ships were currently under construction (November 1975):

5 - 900 ton cargo vessels

5 - 650 horsepower tugboats

The yard was also completing 46 oil containers. Three lighters were laid up 95% complete because of a few vital pieces of machinery had not yet arrived.

The maximum size ship which can be built at the yard is 1000 DWT. Next year this will be increased to 3000 tons. At the completion of the yard, ships up to 6000 tons will be possible.

The capacity of the plate shop will be 6000 tons per year. Thus the maximum new building capacity of the yard will be six to eight 3000 ton ships per year.

Vessels up to 1000 tons can now be repaired. This will grow to 3000 tons next year. The largest engine overhauled in the history of the yard is 1000 HP.

2.6.6.1 Equipment

The yard will have two slipways of 3000 ton capacity and two of 250 ton. One 1000 ton slipway and one 250 ton slipway are completed now. Next year the existing 1000 ton way will be upgraded to 3000 tons. The slipway depth at high water is 4 meters.

Vessels are now built on ten temporary building ways of packed earth construction. This complicates construction because the blocks settle making it necessary to periodically adjust their height.

The following cranes are now being used:

1) one 100 ton mobile crane
2) seven 15 ton mobile cranes
3) one 30 ton level luffing crane on rails

A generating plant of 3200 KW has been completed.

The mold loft is completed. The work produced by the mold loft is fairly accurate and all the pieces of vessels fit together with very little fit up.

Under consturction are a machine shop and plate shop. The plate shop will have steel preprocessing line, bending role and burning equipment. The machine shop is fitted with many very excellent quality machine tools. These are being installed now. Six 20 ton bridge cranes will be in the shop.

The current workforce at the yard is 715. Next year employment will rise to 1600.

2.6.6.2 Prices and Workload

Approximate prices of vessels built in the yard are listed below.

Ship	Cost/ton	Cost
900 ton dry cargo	Rp. 700,000	Rp. 630,000,000
500 ton dry cargo	Rp. 800,000	Rp. 400,000,000

Ship	Cost/ton	Cost
200 ton barge	Rp. 400,000	Rp. 80,000,000
400 ton lighter	Rp. 400,000	Rp. 160,000,000
650 HP tug	--	Rp. 200,000,000
1200 HP tug	--	Rp. 350,000,000

Tankers cost about 20% more because of increased complexity of the machinery and piping.

For repairs steel work is priced at 580 Rp/Kg including material and engine work at 4800 Rp. per man day. For annual repairs, the expected bill is Rp. 2,000,000 for 500 ton and Rp. 2,500,000 for 900 ton. This includes only minor every day machinery items.

At present the yard is operating at about half capacity for new construction. The additional production will be obtained when all machinery is installed, more workmen are added as second shift.

For repairs the capacity of the yard is 70 vessels per year. This is set by the tidal situation in the river. At present 40 to 50 vessels a year call at the yard. Additional ships could be dealt with a second shift.

The price of steel replacement of 580 Rp/Kg breaks down into

Labor	400 Rp/Kg
Material	180 Rp/Kg (Japanese steel)
Total	580 Rp/Kg

The above is for flat plate work to which 10% is added for curved plates. A 500 HP engine requires about 25 man days to overhaul at 4800 Rp/manday = Rp. 120,000.

2.6.6.3 Financing Arrangements

The financing arrangements available to owners are quite typical of world practice. For repairs the terms are 30 days net on presentation of invoice. Very

large corporations and the Government sometimes take six months. For new construction the following is their practice on signing contract 20%

keel laid	10%
launching	30%
delivery	remaining

The yard is able to get financing at 12% interest rate.

2.6.6.4 Yard Problems

The major problem confronting the yard is that its construction is not yet complete. When the shops and permanent building ways are completed, immediate improvements in productivity and quality will occur.

The second problem is the skill level of the yard employees. The skill and educational background of the yard employees is well below that in the industrial countries. To raise the overall skill level, the yard has a comprehensive training course.

The last problem is one of coordinating the flow of raw materials into the yard. In November 1975 the yard has only a few days stock of steel plate on hand. 3,000 tons was due to arrive shortly. Four months was required to obtain the steel from Singapore.

The delivery of two landing craft type lighters had been delayed almost six months because of difficulties in getting propeller shaft bushes and main switchboard equipment.

2.6.6.5 Comments on Vessels

The vessels being built at the yard seemed well designed, extremely simple, adequately assembled ships.

They were designed for small crews, 400 ton barge (powered) 12 men and a 900 ton ship 18 men. The most notable vessel there was a lighter of landing craft type. Oil was carried in the hull and Ro-Ro cargo on deck, loaded via a ramp door.

The quality of construction is adequate, but the welding could be improved. Vessels are delivered with hardly any spare parts creating operational problems from the beginning. The level of spares is of course the owners decision.

The yard and vessels are all kept extremely clean.

3.0 EQUIPMENT INVENTORY AND CONDITION

3.1 Cargo Handling Equipment

Cranes, forklifts, trailers, tractor trucks, handcarts, etc.

3.1.1 Boom Baru

3.1.1.1 General

At Boom Baru the major cargo handling equipment consists essentially of four small cranes and nine fork-lift trucks. The port has no fixed wharf cranes nor does it have any floating cranes or tractor trailers. The port does not have any portable conveyors or other similar mechanical loading devices.

The general practice within the port area at Boom Baru appears to be to handle as much of the cargo as possible by manual labor using hand trucks and to use cranes and forklift trucks only when cargo operations would be difficult without the mechanized equipment.

The decision on what equipment will be used to discharge cargo from a ship at Boom Baru is usually not made by the port, but by the ships agent and/or freight forwarder, usually the same agent.

Despite the fact that PPA has four cranes and nine forklift trucks the P.T. Djakarta Lloyd Handbook on Indonesian Ports lists only two cranes and two forklifts as being owned by PPA.

3.1.1.2 Cranes

The cranes in use at Boom Baru are general service mobile truck cranes. While they have great versatility, they are rather slow at handling cargo in a repetitive situation. Of the four mobile cranes one no longer has its own traction and must be pushed

from position to position usually by one or two forklift trucks. This crane is the fastest acting crane PPA has and consequently it receives the greatest use. Future crane acquisitions by PPA should be in the small rapid handling category and in large cranes for heavy lifting and container handling assignments.

3.1.1.3 Forklift Trucks

There are generally one to two PPA forklift trucks in operation at the Boom Baru terminal. There are one or two more that are repairable and about six which have not been used for some time and which are considered to be beyond repair. Seven of the nine FLTs were built in 1960 and most appear to be of United States origin although they were apparently delivered via Russia. Many of the old forklift trucks have been inoperabe for several years, in some cases up to seven to ten years. It is recommended that the old unrepairable FLTs be scrapped and removed in order that they do not clutter the mechanical handling equipment (MHE) workshop unnecessarily.

Further details on the Boom Baru MHE is given in Table V-3.1.1-1 and the number of cranes considered to be needed in order to provide reasonable mechanical handling equipment in the port is contained in Table V-3.1.1-2.

The tendency to purchase oversized equipment should be reversed in the interests of more economy and more efficient operations.

The cranes and forklift trucks are used to handle special assignments not usually associated with palletized cargo. None of the FLTs are equipped with barrel, box, pipe and other special cargo holders which are

TABLE V-3.1.1-1

BOON BARU MECHANICAL HANDLING EQUIPMENT ETC.

Item No.	Description or other Identification - Capacity	Place of Manufacture	Name of Manufacturer	Type	Year		Capacity		Condition	
					Built	Delivered	Original	Allowed		
A	CRANE DERMAGA	--	--	--	--	--	--	--	--	--
B	MOBILE CRANE									
1	Tadano (15 ton)	Japan	Tadano	Hydraulic	1974	1974	15 ton	15 ton	100 %	
2	Loraine (10 ton)	Japan	Loraine		1972	1972	10 ton	7 ton	60 %	
3	Link Belt (7ton)	U.S.A.	Link Belt		1946	--	7 ton	3.5ton	40 %	Crane works fine but has no mobility now except by forklift pushing it into position.
4	Elan (8 ton)	Poland	Elan		1965	1965	8 ton	8 ton	60 %	
C	FLOATING CRANE	--	--	--	--	--	--	--	--	
D	FORKLIFT									
1	Clark 5 ton	USA via Russia	Clark	--	1960	--	5 ton	--	0 %	
2	Clark 5 ton	USA via Russia	"	--	1960	--	5 ton	--	0 %	
3	Clark 3 ton	USA via Russia	"	--	1960	--	3 ton	--	0 %	
4	Clark 3 ton	USA via Russia	"	--	1960	--	3 ton	--	0 %	
5	Clark 2 ton	USA via Russia	"	--	1960	--	2 ton	--	0 %	
6	Clark 2 ton	USA via Russia	"	--	1960	--	2 ton	--	Good	In use
7	Lauton 4 ton	--	Lauton	--	1960	--	4 ton	--	0 %	
8	Komatsu 2 ton	Japan	Komatsu	Hydralic	1971	--	2 ton	--	60 %	Under repair
9	Komatsu 2 ton	Japan	"	"	1971	--	2 ton	--	60 %	in use

TABLE V-3.1.1-1 (cont'd)

BOOM BARU MECHANICAL HANDLING EQUIPMENT ETC.

Item No.	Description or other Identification - Capacity	Place of Manufacture	Name of Manufacturer	Type	Year Built	Year Delivered	Capacity Original	Capacity Allowed	Condition	Remarks
E	TRACTOR & TRAILER	--	--	--	--	--	--	--	--	
F	MISCELLANEOUS									
1	Fire Truck	Japan	Colt	Gas	1971	1971	--	--	Good	Operational
2	Water pump/fire	--	--	Port/gas	1967	1967	60g/m	--	Poor	Repair
3	Water pump/fire	--	--	Port/gas	1967	1967	60g/m	--	Poor	Repair
4	Water pump/fire	--	--	Port/gas	1967	1967	60g/m	--	Poor	Repair

TABLE V-3.1.1-2

MECHANICAL HANDLING EQUIPMENT

FORKLIFT TRUCK AND MOBILE CRANE REQUIREMENTS

Item No.	Equipment Assignments	Forklift Truck Capacity in Pounds			Mobile Cranes Capacity in Pounds			Heavylift Cranes
		5000	10,000	20,000	6000 @ 10 M	10,000 @ 10 M	20,000 @ 10 M	
1.	Ocean Berths							
	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.	Warehouses							
	A - B	1						
	D - E	2						
	H	1						
	T	2						
	Operating spares	1						
3.	Operational Requirements	17	2	1	5	1	1	1
4.	Maintenance and Repair allowance 20 %	4	-	-	1	-	-	-
5.	Total MHE Requirements	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 Authorizations	10	(+ 4)	1	3	(+ 1)	(+ 2)	-

COMMENTS ASSOCIATED WITH TABLE V-3.1.1-2

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 V-3.1.1-2

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 simultaneou
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 spare parts at a cost of about 15 percent of cost of equipment. A spareparts allowance of 15% will be included in MHE pricing.

intended to make mechanized cargo handling simpler.

3.1.1.4 Trucks, Tractor-Trailers and Handcarts

PPA operates no trucks, no tractor-trailer units and no four wheel handcarts. There are no tractor-trailer operations at the Boom Baru terminal or for that matter in the Palembang area.

Basically cargo at Boom Baru is handled pretty much by manual labor and for this purpose, the port has about 200 two-wheel hand trucks which are used to move cargo from wharf side to the warehouses.

3.1.2 Private Sector Equipment

3.1.2.1 General

The cargo handling operations at the Pusri fertilizer plant, the Pertamina refineries at Plaju and Sungai Gerong and the Kertapati coal terminal are mechanized and their MHE is described in Sections V-2.3.1.7, V-2.2.6 and V-2.4.4 of this volume, respectively. While Kertapati has a mechanical coal loader rated at 100 tons per hour, a considerable quantity of coal is still bagged at the facility and loaded by manual labor for delivery to nearby ports particularly those on Bangka Island.

3.1.2.2 Cranes

A survey of the port facilities indicate that there are a total of about 15 cranes of various sizes in the port area facilities including shipyards.

At the present time most of the heavy lifting in the port is performed at the Pusri general or bagged cargo wharf. Pusri has about seven cranes with the

largest ranging up to 100 tons capacity. The primary purpose of the Pusri cranes is new plant construction and they may not be available after the Pusri IV plant is completed in about 1978. Prior to that time PPA should have a large crane serving the dual purpose of a heavy lift and container handling crane. Other than at the facilities mentioned above, the shipyards and construction companies, there does not appear to be any cranes in cargo handling services. All timber and bagged cargo is generally manually handled.

Cranes are rarely transferred from one location to another and commercial outside cranes are not used at Boom Baru.

3.1.2.3 Forklift Trucks

A majority of the forklift trucks operating at Boom Baru are the property of the shipping agents or freight forwarders. Several of the larger companies each operate one or two FLTs at Boom Baru, which are generally used exclusively for the handling of their own cargo. Pusri and Pertamina are equipped with FLTs. However, FLTs are scarce at other Palembang waterfront facilities.

3.1.2.4 Trucks, Tractor-Trailers and Handcarts

Practically all of the cargo leaving Boom Baru by highway is transported in 2 1/2 ton trucks, most of which are equipped with special shocks in way of their springs. The average cargo load per vehicle appears to be about five tons, although it is not unusual to see trucks carrying loads up to about 10 tons.

Most of the cargo trucks are quite old with very few, if any, new vehicles in use in the port area.

There are no ten ton trucks or tractor-trailers in service in the Palembang area due primarily to the limiting axle load of from 3 1/2 to 5 tons on most South Sumatran and Indonesian highways.

Pushcarts are in use in the city of Palembang, but are rarely seen in the Boom Baru port area.

3.2 Floating Equipment

3.2.1 Boom Baru

The marine fleet operating at Boom Baru consists basically of three separate fleets, one operated by District Navigation which is concerned with the maintenance of aids to navigation, etc., one operated by the Palembang Harbor Master and one operated by the Palembang Port Administrator. The vessels in the various fleets consist of light attendant vessels, pilot boats, mooring boats, and other miscellaneous craft including several speedboats. Technical and other data on the floating equipment is contained in Table V-3.2.1-1.

3.2.1.1 Aids to Navigation Light Attendant Boats

The Aids to Navigation boats are in general old former naval patrol boats and while they are perhaps satisfactory for looking at the lights, they are not very useful for Aids to Navigation work in general. These ex-patrol boats should be replaced with modern small buoy boats which would be much more useful for Aids to Navigation work. Considerable effort has been devoted to experimenting with the design of small buoy boats, some of which have small cranes either on the bow or on the stern. It is suggested that the Government of Indonesia inquire about the latest designs of small buoy boats now being used by the United States Coast Guard.

TABLE V-3.2.1-1

FLOATING EQUIPMENT (POH BARU)

Item No.	Vessel identification usage	Length M Ft	Beam M Ft	Draft M Ft	Engine make	Shaft RPM HP	Fuel	Hull built year	Engine built year	Condi-tion hull	Condition engine	Remarks
1	K.M. Suar No.1 D. Navigation	17	5	2.5	Cater-pillar D-1980	1200 120	Diesel	--	—	DN-60% Fair	Operating	Should be replaced with more useful buoy boat
2	K.M. Suar No.003 D. Navigation	22.16	4.3	2.5	Yanmar 6KDX	1450/ 1550 165	Diesel	1970	1970	DN-75% Good	Good	Should be replaced with more useful buoy boat
3	K.M. Data D. Navigation	24	5	2.5	Deutz 6 cyl	255	Diesel	--	—	DN-60%	Operating	Freight service vessel tanks
4	A.P. - 032 Pilot Boat-PS	20	5	2.5	Krom-hout TS-117	140	Diesel	1969	1969	PPA-80% Good	PPA - 80% Good Under powered	Too slow for pilot station work
5	A.P. - 17 Pilot Boat	20	5	2.5	Cater-pillar D-337	1200 210	Diesel	1953	1953	PPA-75% Fair to good	PPA - 50% Operating	Too slow for pilot station work
6	A.P. - 18 Pilot Boat	20	5	2.5	Gray - Marine -671	1800 165	Diesel	1953	1953	PPA-75% Fair to good	PPA - 60% Operating Under powered	Too slow for pilot station work
7	K.M. B - 025 Harbormaster	20	5	2.5	GM-671	1800 165	Diesel	1962	—	PPA-40% Fair to good	Operating	Should be replaced
8	K.M. B - 125 Harbormaster	22	5	2.5	Man 06/UB/6	1600 220	Diesel	1962	1962	PPA-60% Fair to poor	Operating	Should be replaced

TABLE V-3.2.1-1 (cont'd)

FLOATING EQUIPMENT (BOOM BARU)

Item No.	Vessel identification usage	Length M Ft	Beam M Ft	Draft M Ft	Engine make	Shaft RPM HP	Fuel	Hull built year	Engine built year	Condition hull	Condition engine	Remarks
9	K.M. AE - 04 Harbormaster	17	3	2.5	GM-671	1800 165	Diesel	1948	--	HM-25% Poor	Operating	Personnel carrier
10	Tirta Musi Port tug	10	2.5	1.5	Yanmar 4 cyl.	1000 60	Diesel	1966	1966	PPA-75% Good	PPA - 80%	Tows water barge primarily for pilot station
11	K.M. - B - 126 Harbormaster	22	5	2.5	Cater-pillar	1600 220	Diesel	1962	--	PPS-50% Fair	Being re-engined	Should be replaced
12	Tongkang/water barge Port Administrator				--	--	--	1971	--	Good	--	100 ton capacity
13	K.M. AC - 05 Harbormaster	10	2.5	1.5	GM-371 3 cyl.	1800 80	Diesel	--	--	PPA-40% Poor	Operating	
14	K.M. Syabanda No.1 Harbormaster	10	2.2	1.5								
15	K.M. Syabanda No.2 Harbormaster	10	2.2	1.5								
16	Cucut - Speed boat (in/out) Port.Adm.	6	1.5	1.0	Volvo Penta inboard outboard	140	Gas	1972	1972	Good	Good	Engine compartment needs ventilation
17	AP-02 Mooring boat Port Administrator	10	2.5	1.5	GM-371	1800 80	Diesel	1951	1951	PPA-20%	PPA-60%	Wood hull
18	MTS-004 Mooring boat Port Administrator	9	2	1.5	Yanmar 3 KDE	1450 82	Diesel	1975	1975	Good	Good	
19	MTS-005 Mooring boat Port Administrator	9	2	1.5	Yanmar 3 KDE	1450 82	Diesel	1975	1975	Good	Good	

TABLE V-3.2.1-1 (cont'd)

FLOATING EQUIPMENT (BOOM BARU)

Item No.	Vessel identification usage	Length M Ft	Beam M Ft	Draft M Ft	Engine make	Shaft RPM HP	Fuel	Hull built year	Engine built year	Condi-tion hull	Condition engine	Remarks
20	SB - 503 Port Administration	5	2	0.6	Johnson 100	--	Gas	Yamaha 1974	1974	Good	Good	
21	SB - Dredging Port Administration	5	2	0.6	Johnson 40	--	Gas	1974	1974	Good	Good	
22	SB - Survey Port Administration	5.2	2	0.6	Mercury	50	Gas	1975	1975	Excel.	Excel.	Received late in 1975
23	KM HO-92	8	2.5	1.0	GM-371	80	Diesel	--	--	0%	None in hull now	This boat is a useless wreck and should not be repaired

3.2.1.2 Harbormaster Boats

The Harbor Master is using three ex-Dutch patrol craft for various duties including those of harbor pilot boats and mooring boats. The three boats in question, the KM-B-025, KM-B-125 and KM-B-126, which have been in service over 30 years, should not receive any further major overhaul, but should be scrapped and replaced at the first opportunity. They are unsuitable for their intended purpose and as thinly hulled vessels, there is nothing left to repair after 30 years.

It is economically unsound to extensively replace both plating and framing in any vessel, but this is especially true with old thinly plated and expendably produced small patrol vessels. No one can afford to pay for major replacement programs for such craft because the return is so little on the high investment involved.

It is recommended that the port obtain two, preferably three, small combination tugs and mooring boats and that the above described ex-patrol boats be removed from service with the Harbor Master.

It may be advisable upon receipt of new tug and mooring boats to utilize the best remaining of the above three vessels as a survey boat for a short period of time until a satisfactory permanent survey boat may be obtained.

3.2.1.3 Pilot Boats

The operation of pilot service was described in sections IV-2.3.2 and IV-2.3.2.1 for river or bar pilots and harbor pilots respectively. The primary problem with the pilot boats in operation, particularly those in use between the pilot station and the Outer Bar,

is that the boats are too slow.

One of the best criteria for determining the adequacy of the pilot boat service is the opinion of its customers. As a group, their concensus 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 more 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 knot boats of about 40 to 45 feet length powered with about 400 to 480 SHP.

Two pilot boats fitting the above general description should be procured at an early date following which one of the existing pilot boats, particularly the AP-032 could be converted into a good medium sized tug with a little more power or to a good survey boat.

3.2.2 Private Sector Floating Equipment

The floating equipment owned and operated by Pusri and Pertamina are listed in Sections V-2.3.1.7 and V-2.2.6.3 respectively of this volume.

A survey of the harbor on 13 October 1975 during which time the approxiamte number of vessels including ships, tugs, barges and village or river boats were

counted, revealed the number of boats and other miscellaneous equipment present in the port to be about as listed in Table V-3.2.2-1.

With the exception of the Pusri and the Pertamina floating craft and the equipment is use by the plywood and Kertapati interests, the balance of the marine equipment in the port is quite small in size and, while satisfactory for servicing some of the smaller interisland ships, are generally too small for satisfactorily servicing the larger international ships on a satisfactory turnaround time basis.

It is anticipated that larger barges and tugs will become prevalent in the port in the future.

TABLE V-3.2.2-1

MISCELLANEOUS FLOATING AND MECHANICAL EQUIPMENT

PORT OF PALEMBANG - 13 OCTOBER 1975.

Item No.	Type of vessel	Approx. number in port	Approx. length in ft.	Approx. capacity in tons	Condition general	Estim. total lighter cap. in tons	Comments
1	Small tugs approximately 120 - 220 SHP	55	40-50	--	Various Little paint	--	Used to move barges, prahus and log rafts
2	Medium size tugs approx. 240-480 SHP	9	50-60	--	Good	--	Used to move large barges & large log rafts
3	Large inland tugs approx. 500-960 SHP	7	70-80	--	Good	--	Used for towing large coastal barges
4	Large ocean tugs approx. 1000-2000 SHP	3	100-125	--	Good	--	Ocean towing
5	Harbor barges wooden	95	60-70	50	All ages Various condition Little paint	4,750	Move export cargo to ships & general cargo
6	Steel barges harbor	45	75-90	60	Good	3,550	Move export and import cargoes to and from ships and general use
7	Village or upriver houseboat barges	225	60-70	30	All ages Various condition Thatched roofs	6,750	Usually towed upriver
8	Village or upriver houseboats small	250	40-50	10	All ages Various condition Little paint	2,500	Usually towed in rafts of six to ten by small tugs

TABLE V-F.2.2-1 (continued)

MISCELLANEOUS FLOATING AND MECHANICAL EQUIPMENT

PORT OF PALEMBANG - 13 OCTOBER 1975.

Item No.	Type of vessel	Approx. number in port	Approx. length in ft.	Approx. capacity in tons	Condition general	Estim.total lighter cap.in tons	Comments
9	Small cargo ships	30	120-180	50-200	All ages Various condition		Primarily used in the local and coastal trades
10	Estimated total capacity of harbor barges					10,000	Assuming 80% in port
11	Estimated total capacity of village barges					20,000	Assuming 50% in port

Miscellaneous ships

1) The Haji ship - Mei Abeto of Panama - length and depth 6.8 meters or 22.3 feet was at the Boom Baru wharves.

2) There were 21 ships anchored in the harbor, 6 tankers at Pertamina, 1 bulk carrier at Pusri and three ships at Boom Baru.

3) Motor vessel Hensa Nord loaded to about 20 ft draft with pilot on board.

Miscellaneous vessels noted in the harbor included the following

1) Dredge Lombok 2) LCT-Lumba-Lumba II, 3) several LCMs including LCM-18, 4) several cutter head suction dredges, 5) a grab-bucket dredge.

Miscellaneous equipment

1) There were about 30 cranes visible from the harbor of various sizes and conditions, not counting those at Boom Baru, Pusri and Pertamina.

2) Two conveyors were observed at Kertapati.

4.0 MAINTENANCE PROCEDURES

4.1 General

Maintenance of equipment in Indonesia has not and does not receive the attention and effort it deserves. Palembang is perhaps no better and no worse than other Government agencies when it comes to having maintained or at the present maintaining Government equipment. The problem is not so much one of fault on anyone's part, but as it is:

a) a failure to realize the benefits which are derived from a good maintenance program and more particularly from a good preventive maintenance program.

b) the lack of funds, particularly foreign currency with which to buy spare parts.

c) the time consuming process required to obtain spare parts and the problems frequentl occurring with regard clearing spare parts through customs.

d) the apparent assumption on managements' part that someone down the chain of command will look after maintenance or the failure to assign a senior enough officer the duties and responsibility of maintaining the plant and equipment of units such as a Port Administration.

e) a lack of definition of the purpose of a good maintenance program which should be to maximum availability of all equipment with a minimum of down time and at a minimum life cycle cost.

No country can really afford not to maintain its plant and equipment and this is particularly true of

developing countries. Good maintenance procedures are generally practiced by all successful Government and industrial plants in the developed countries and should be practiced to the maximum extent possible in developing countries.

Indonesia has had many valid excuses for the lack of maintenance of its physical plant and equipment in the past. However, conditions are changing rapidly in Indonesia and the country will soon have to provide better maintenance for its assets or see its development fail to achieve its planned and achievable goals.

The designation of the officer responsible for the maintenance of the physical plant and equipment will be discussed in Volume IX - Management. The maintenance procedures for the mechanical handling equipment and the floating equipment are discussed in the following sections.

4.2 Boom Baru Workshops

The repair facilities in operation at Boom Baru are described in Sections V-2.1.1.11 through V-2.1.1.11.4.

4.2.1 Mechanical Handling Equipment Repair Shop

The maintenance procedures now in use at Boom Baru are in general inadequate for their intended purpose. The down time on the forklift trucks, while difficult to determine precisely, appears to have of the order of 75 to 85 percent for the past several years. This is in part due to the inability of the unit to dispose of old and no longer serviceable equipment. Therefore, useless equipment occupies valuable space in the workshop due primarily to a

lack of decision on what to do with the outmoded and overage equipment for which spare parts can no longer be obtained.

4.2.2 Recommendations for Improving Maintenance of MHE

The following steps are suggested for improving the maintenance of the MHE.

a) Assign the responsibility for supervision of the MHE workshop to someone with experience and knowledge of equipment maintenance.

b) Assign the responsibility for the MHE workshop to the Engineering and/or Maintenance Division of the Port Administration.

c) Establish a survey board and charge the board to survey the existing mechanical handling equipment and make recommendations for its disposal, by scrapping, repair or otherwise. The survey board should consist of three members as follows:

   1) Chief Technical Division
   2) Chief Operations or Traffic Division
   3) A Finance Officer

d) Establish a suitable spare parts supply system such as the rotating fund system recommended in Volume VI - Section 3.2.3.

e) Construct a new mechanical handling equipment workshop as described in the following section.

4.2.3 Recommended Layout and Equipment for MHE Workshop

The existing small MHE workshop is unsatisfactory for its intended purpose and its replacement by a larger

facility has been approved in the ports budget for 1976.

The arrangement of the workshop and the equipment to be furnished therein have not been specified, therefore the following recommendations are submitted

1) It is recommended that the layout of the workshop be similar to that shown in Figure V-4.2.3-1 and
2) That the workshop be furnished with the equipment listed in Table V-4.2.3-1.

4.3 Maintenance Marine Facilities

The maintenance of marine facilities at Boom Baru is in general inadequate for satisfactory availability of the craft. The downtime on District Navigation vessels, and some others too, is reported to average about four months per year.

Let us assume that a 20 meter Aids to Navigation boat costs new about US$100,000 and that the average life of the vessel is twenty years. Under these circumstances the average monthly cost of such a vessel would be $\frac{100,000}{20 \times 12}$ = US$416/month and with recurrent costs of 10% finance, 10% operational and 5% maintenance, the total cost of the vessel per month would be about US$2,500. Now if the vessel is down four months per year in lieu of one month per year, the loss to Indonesia per vessel would be about US$7,500 per year or about three million rupiahs per year. This extra cost usually surfaces as a requirement for more boats than actually needed to perform the specified amount of work.

Let us now assume that the average cost of all 22 boats at Boom Baru was originally US$50,000 per

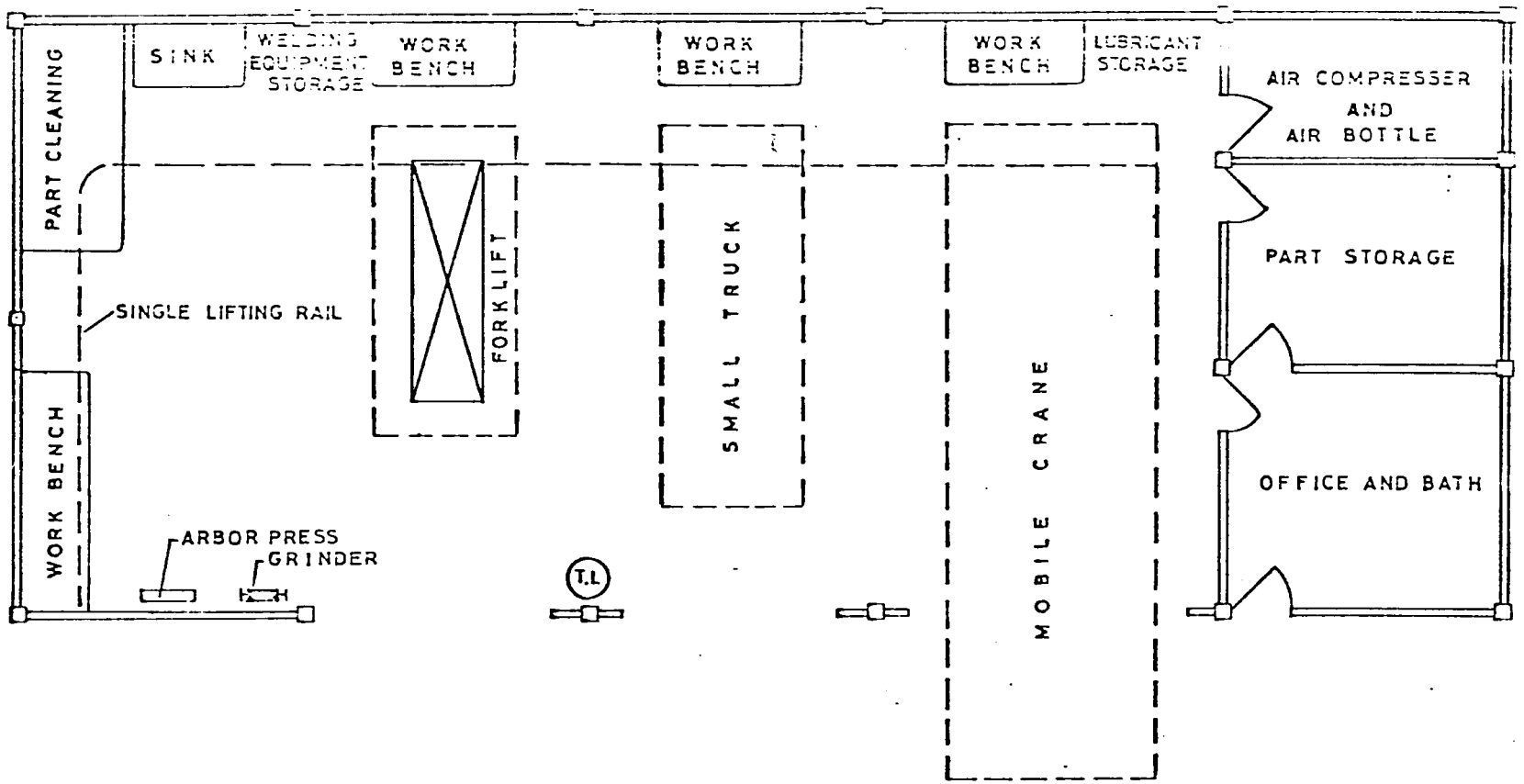


FIGURE.V-4.2.3-1

PROPOSED LAY OUT OF MECHANICAL. EQUIPMENT MAINTENANCE SHOP

Table V-4.2.3-1

Mechanical Handling Equipment Workshop

Required Equipment List

Item No.	Item Description	No. Required	Unit Price	Total Cost US $
1.	Parts cleaning tank	1	1,000	1,000
2.	Racks to stow tools	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 forklift 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 Grinder	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

boat which represents a total cost of US$1,250 per month. If the down time remains at about four months per year in lieu of a normal one month per year, the combined loss to Indonesia will amount to about 1250 x 3 x 22 US$82,500 per year of approximately 35 million rupiahs per year.

In other words by improving the capacity and efficiency of the dockyard facilities at Boom Baru, it would be possible to realize a saving in vessel down time value of up to 35 million rupiahs per year.

When one considers the above possible savings, it becomes quite obvious that a substantial improvement in the Boom Baru dockyard is economically justified and is recommended.

The organization of the dockyard and its management will be further discussed in Volume IX. However, for the present, the following general guide lines appear to be appropriate and are recommended.

a) The dockyard capacity should be increased to handle all vessels assigned to Boom Baru whether they belong to District Navigation, the Harbor Master, the Port Administration and perhaps a few other government vessels.

b) The dockyard should not undertake the major rebuilding or replating of old unsuitable vessels.

c) The dockyard should only work on vessels which have been surveyed and found by a board to be suitable for repairs at a reasonable cost.

d) Efforts should be made to adjust the wages of the skilled workers in the dockyard such

that additional employees may be obtained in the critical skills of welders, motor mechanics, electricians, etc.

e) The dockyard and its primary workshop should be cleared of all scrap by accepted scrap disposal procedures in order to provide reasonable working spaces.

4.3.1 District Navigation Dockyard

District Navigation Dockyard (DND) is a dry-docking, 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 PPA activities and a few other Government vessels as well.

e) The dockyard does not have any crane or lift capability over its slipways which severly handicaps the facility in making engine or other lifts. The Republic of Indonesia has a substantial investment in the DND about US$600,000, 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.

4.3.2 Marine Railways

The marine railways at DND, two in number, are under the control of the District Navigation officer and have the following general characteristics:

Characteristic	Large Railway	Small Railway
Length of cradle	30 mtrs	15 mtrs
Width of cradle	5 mtrs	5 mtrs
Tons capacity	60 tons	25 tons

The two marine railways handle the maintenance and repair drydocking for the motor vessels belonging primarily to District Navigation or a total of about ten vessels. The larger railway is utilized almost exclusively in maintaining the three light attendant vessels, while the smaller railway handles the smaller boats which belong to the Harbor Master or the Port Administration. It is interesting to note here that the pilot boats and the mooring boats which are under the jurisdiction of the Port Administration are not maintained by DND. Their hull repairs and drydocking are usually contracted to the private sector shipyards, while a small poorly equipped workshop is attempting to maintain and overhaul the pilot boat engines.

Since the marine railways have sufficient size to haul out any of the Port Administration vessels, there is no apparent reason why the existing slipways should not maintain all of the Directorate General of Sea Communications vessels in the Palembang area.

4.3.3 Recommended Improvements for Dockyard

The recommended improvements consist of providing the following facilities, equipment, personnel and operational guidance such that the DND will be

capable of servicing all of the PPA 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 PPA fleet, Tables V-4.3.3-1 and V-4.3.3-2 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 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. 50 meters of outfit berthing would provide the necessary outfit berthing and would 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 an access wharf running adjacent to the northeast wall of the larger slipway from the shoreline to

Table V-4.3.3-1

Maintenance and Repair Requirements for Large Marine Railways and Outfitting Berths

Item No.	Vessel Description Vessel Owner	Drydocking		Outfit Berthing		M & R Totals		Total M & R Time*	Percent Time M & R	Percent Time Available
		Annual	Emergency	Annual	Maintenance periods	Drydocking	Outfit Berthing			
1	KM. Suar #1 D. Navigation	2	1	2	2	3	4	7	13.3	86.7
2	KM. Suar #003 D. Navigation	2	1	2	2	3	4	7	13.3	86.7
3	KM. Data D. Navigation	2	1	2	2	3	4	7	13.3	86.7
4	AP-032 Pilots	2	1	2	2	3	4	7	13.3	86.7
5	AP - 17 Pilots	2	1	2	2	3	4	7	13.3	86.7
6	AP - 18 Pilots	2	1	2	2	3	4	7	13.3	86.7
7	KMB - 025 Port Administrator	2	1	2	2	3	4	7	13.3	86.7
8	KMB - 125 Port Administrator	2	1	2	2	3	4	7	13.3	86.7
9	KM. AE-04 Harbormaster	2	1	2	2	3	4	7	13.3	86.7
10	Tirta Musi Port Tug	2	1	2	2	3	4	7	13.3	86.7
11	Tongkang Water Boat	2	1	1	1	3	2	5	9.6	90.4
12	TOTALS					33	42			

* All times are in weeks.

Table V-4.3.3-2

Maintenance and Repair Requirements for Small Marine Railways and Outfitting Berths

Item No.	Vessel Description Vessel Owner	Drydocking		Outfit Berthing		M & R Totals		Total M & R Time*	Percent Time M & R	Percent Time Available
		Annual	Emergency	Annual	Maintenance periods	Drydocking	Outfit Berthing			
1	KM AE-05 Harbormaster	2	1	2	2	3	4	7	13.3	86.7
2	KM Syabanda #1 Harbormaster	2	1	2	2	3	4	7	13.3	86.7
3	KM Syabanda #2 Harbormaster	2	1	2	2	3	4	7	13.3	86.7
4	Cucut Speedboat Inboard Outboard Port Administrator	2	1	2	2	3	4	7	13.3	86.7
5	AP-02 Mooringboat Port Administrator	2	1	2	2	3	4	7	13.3	86.7
6	MTS-501 Mooringboat Port Administrator	2	1	2	2	3	4	7	13.3	86.7
7	MTS-502 Mooringboat Port Administrator	2	1	2	2	3	4	7	13.3	86.7
8	SB-503 Port Administrator	2	1	2	2	3	4	7	13.3	86.7
9	SB - Dredging Port Administrator	2	1	2	2	3	4	7	13.3	86.7
10	Totals					27	36			

* All times are in weeks.

the new A to N operations wharf. This access should accommodate forklift trucks and small to medium sized mobile cranes.

iii) Table V-4.3.3-3 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.

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 an effective use of the improved facility.

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.

4.4 Inspection and Survey

The inspection and survey of Indonesian vessels falls into two general categories. Those vessels certi-

Table V-4.3.3-3

Equipment Required to Reasonably Outfit the District Navigation Dockyard for Modern and Efficient Ship M&R Performance

No.	Item Description	Quantity	Unit Cost US $	Total Cost US $	Year Required
1	2 1/2 T forklift truck	1	12,500	12,500	1977
2	20 T mobile crane	1	100,000	100,000	1977
3	Bench Grinders	2	500	1,000	1976
4	Welding Machines	6	2,500	15,000	1976 1977
5	3 T Chain falls	6	500	30,000	1976
6	Air Compressor	1	10,000	10,000	1977
7	Pneumatic chipping hammers	6	1,000	6,000	1977
8	Power Head Tools	-	-	20,000	1976
9	4" Lathe Small	1	10,000	10,000	1977
10	Manual Transport Units Small Shop	2	500	1,000	1976
11	Trailer Wagons	2	500	1,000	1976
12	Sets Mechanics Tools	2	1,000	2,000	1976 1978
13	Parts Cleaning Tank	1	1,000	1,000	1976
14	Spray Painting Equipment	1	15,000	15,000	1977
15	Prime mover and three trailers	1 set	40,000	40,000	1977
16	Additional spares to be determined	-	-	50,000	1976
	Total			195,000	
	Contingencies 20%			39,000	
	Grand Total			234,000	

ficated for the home trade or other commercial trade are inspected and/or surveyed by the Marine Department under the jurisdiction of the Harbor Master and are usually maintained in class. These vessels are progressively maintained to stay in class and usually present few problems insofar as inspection as inspection and survey are concerned.

However, most of PPA's floating craft are not licensed for any service and as such are not subject to inspection and survey by the Government's Marine Inspectors under the jurisdiction of the Harbor Master. The inspection of these vessels is the responsibility of PPA personnel and is usually delegated to the Dockyard Manager who serves also in the capacity of Port Engineer for PPA's fleet.

Since the procedure for repairing vessels is much simpler than for surveying and retiring craft, vessels appear to be continually repaired at high cost despite the fact that some of the vessels should be surveyed and scrapped. The Dockyard Manager wearing his Port Engineer's hat usually makes the decision to repair rather than replace and since he is not involved in replacement considerations, the trend has been to continually repair vessels with little apparent consideration of the life cycle of economics of this practice.

4.4.1 Inspection and Survey Board

The decision making process relative to the acquisition, repair and disposition of PPA floating craft should be vested in an Inspection and Survey Board consisting of three members; the Harbor Master, the District Navigation Officer and the Chief Engineering

Division. Once a year this Board should review each PPA craft with an age multiple of four. In other words, each vessel would receive specific consideration at the ages of 4, 8, 12, 16, 20, etc. The Board's consideration for the first three surveys would center on the usefulness of the craft and the need for its services in the light of PPA changing requirements. At the fourth and later surveys the physical condition of the hull becomes of paramount importance and the Board should cause the craft to be surveyed in order to determine the cost of maintaining the vessel in satisfactory condition for the next four years. It should be the responsibility of the Board to recommend the scrapping and replacement of overage craft and those requiring excessive repairs due either to physical damage or due to normal or accelerated wear and tear.

The criteria used by the Board to evaluate whether or not any given vessel ought to be repaired or replaced should be one based upon the predicted and/or calculated life cycle costs of repairing or replacing the vessel under survey.