

MECHANERY & EQUIPMENT

	TYPE CAPACITY	LOCATION	NUMBER
103	Plate Flaner UK 800P/M 1937	Machine Shop	1
104	Rolling Machine DULPENGEMAR 1100P/M 1951	"	1
105	Rock saw 16 DPE BIPOTON 20" 1974	"	1
106	" TEPAK PELAT 16 0-1/4" 1949	"	1
107	Tool Grinding Rack UK NEJA 200x1250P/M 1922	"	2
108	" " " " " " " "	"	1
109	" " " " " " " "	"	1
110	" " " " " " " "	"	1
111	" " " " " " " "	"	1
112	" " " " " " " "	"	1
113	" " " " " " " "	"	1
114	" " " " " " " "	"	1
115	Tool Grinding Rack 1000P/M 1938	"	1
116	Grinding Rack DIA(S) 400P/M 1935	"	1
117	Portable Boring Rack (1/2") x (1/2") x 100P/M	"	1
118	Over Head Crane 10 ton	"	1
119	Press Asah Gergaji 1 1/2" x 21" 1921	"	2
120	" " " " " " " "	"	1
121	" " " " " " " "	"	1
122	Wood table DIA(S) x DISTANCE 225x50P/M 1918	Carpenter Shop	1
123	Circular saw DIA(S) 28P/M 1952	"	2
124	" " " " " " " "	"	1
125	" " " " " " " "	"	3
126	Saw mill DIA(S) of wood 600P/M 1932	"	1
127	Band saw RELIEFNESS OF WOOD 0-250P/M 1924	"	1
128	Planing Rack WIDE OF WOOD 100P/M 1935	"	1
129	" " " " " " " "	"	3
130	Beill DIA(S) 0-10P/M 1921, 1949, 1957	"	3
131	Sanding Rack PARJENDRALIS 40 P/M 1921	"	1
132	Sewing Machine for Tarpalin	"	2
133	Press Garuda 4.5 Hp	"	1 BR
134	Press Pengasah Pasir 1/2" x 1/2" 1925, 1935	"	2 BR
135	Grate Milling 100kg 1925	"	1 BR
136	LIFE BIK Vapor Best 1940	"	1 BR

MACHINERY & EQUIPMENT

	TYPE CAPACITY	LOCATION	NUMBER
137	Inertion Pyrometer PANA. 500P/M 1975	Carpenter Shop	1 BR
138	Volubar Thermo Meter PANA. 1000P/M 1975	"	1 BR
139	Pyrometer TEMP. 0-1500°C 1975	"	1 BR
140	Press Angkas 1953	"	1 BR
141	Press Ketan 1920	"	1 BR
142	Over Head Crane 5 ton	"	1
143	Drying Chamber VOLUME 111m <sup>3</sup>	Iron & Casting Shop	1
144	Castiron Melting Furnace 1 ton	"	1
145	" " " " " " " "	"	1
146	" " " " " " " "	"	1
147	" " " " " " " "	"	1
148	Non Ferrous Melting Furnace Ton MATERIAL 0.22 Ton	"	1
149	" " " " " " " "	"	1
150	Wood table DIA(S) x DISTANCE 1920	"	1
151	Sewing Rack 1913	"	1
152	Over Head Crane 1.5 ton	"	1
153	Roll Borstel Slipp Rack 0.5 HP	"	1
154	Coil Winding Machine 1950	Electrical Shop	2
155	Furnace Volume 15.6m <sup>3</sup> 1921	"	1
156	" " " " " " " "	"	1
157	Table DIA(S) DISTANCE 125P/M x 2200P/M 1940, 1962	"	2
158	Drilling DIA(S) 13P/M	"	1
159	Battery Charger VOLT/AMP 110V/5A	"	2
160	Press Box DIA(S) 0-1.5" 1940	"	1
161	" " " " " " " "	"	2
162	Over Head Crane 1 ton	"	1
163	Press Asah 2 HP	"	1
164	Bangka Penggali 5 HP	"	1
165	" " " " " " " "	"	1
166	Bengkel Tang Pakaian 18 1940	"	1
167	Braing Floor LENGKAP x WIDE 10.2x9.30 <sup>2</sup>	Roll Toft	2
168	Braing Board (table) LENGKAP x WIDE 1x1.25 <sup>2</sup>	Braing Room	2
169	" " " " " " " "	"	1
170	Braing Polishing Rack (One Paint)	"	2
171	Calcut Acor	"	2

MACHINERY & EQUIPMENT

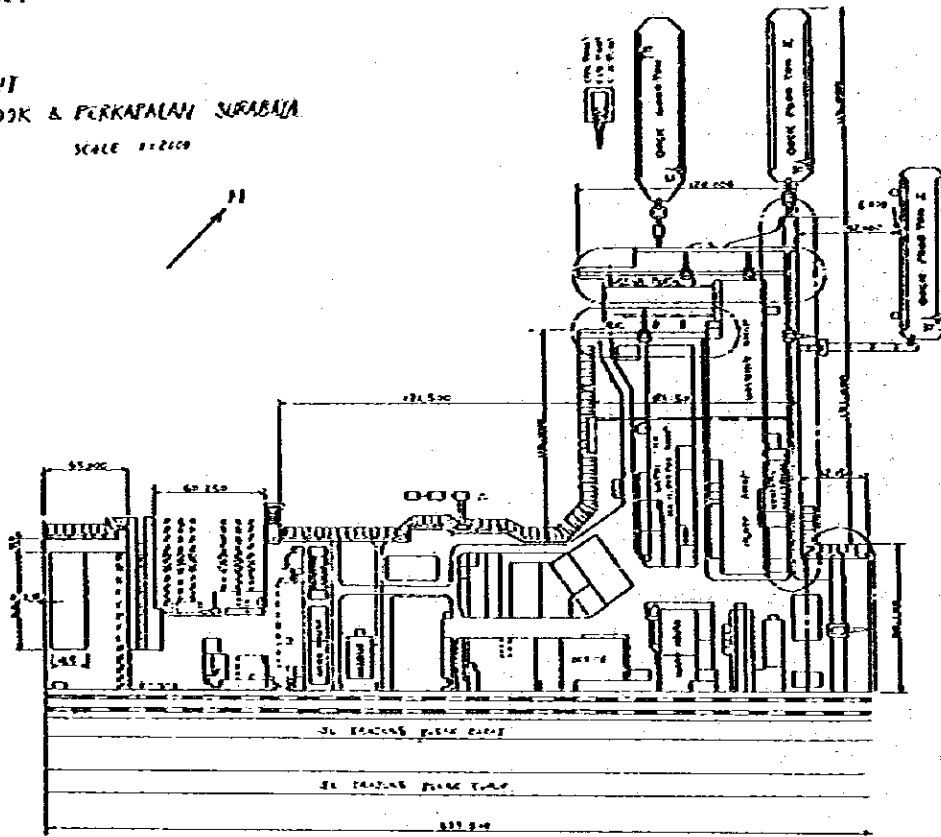
	TYPE CAPACITY	LOCATION	NUMBER
172	Calcut Acor	Braing Room	1
173	Planimeter	"	2
174	Portable Flame Cutting Machine	Plate Shop	6 BR
175	Bangka Fris Utk Roda Bglt Konta, Utkan Bglt Konta 600P/M Jarak Poton 6325, 1921	Pipe Shop	-
176	Press Slipp, Pengasah 1x1952 1100V, 45", 60"	"	-
177	Press Babut Utk Pegas Torak Pabrik 1x1916 4100000	"	-
178	Bangka Asah Poros Engkol 1x1954 4 Pata Asah, 24" Panjang Kerja 58"	"	-
179	Press Ketan Vertikal (Press steel) Gerak Pukul 3000P 1x1949	"	-
180	Press Asah Gergaji	Machine Shop	1 BR
181	Press Asah	"	2 BR
182	Press Fris Utk Pok Nout	"	1 BR
183	Roll Borstel Slipp, Rack 0.5 HP	Vape House	1 BR

Utilities

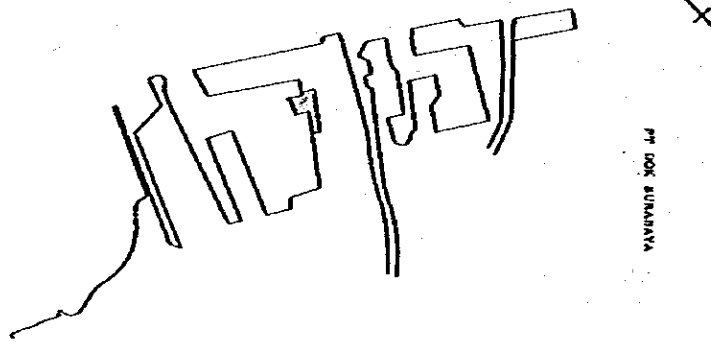
Item	Capacity
Electric Power	P.T.B. 1550 K.V.A. Generator 300 K.V.A. x 2, 140 K.V.A. x 1
Bricking & Industrial Water Facilities	Use city water line for drinking and industrial water. 10,000 Ton/1975
Compressed Air Facilities	Yes
Acetylene & Oxygen Facilities	Acetylene 118 Bottles/year L.P.G. 4 Bottles/year Oxygen 530 Bottles/year
Water pollution Control Facilities	No
Others	No

APPENDIX 1

LAY OUT  
P. T. DOK & PERKAPALAN SURABAYA  
SCALE 1:2000

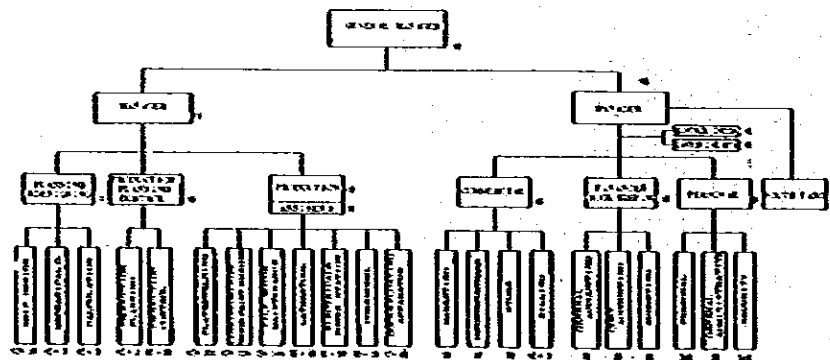


APPENDIX 2 SURABAYA PORT



ORGANIZATION P. T. DOK DAN PERKAPALAN SURABAYA

APPENDIX 3



## II. GALANGAN KAPAL GRESIK (G.R.G.)

### 7. General Situation

#### 1-1. Introduction

This is one of the four shipyards projected by the Ministry of Industry. The area is as large as 190,000sq, but due to the deficiency of construction budget, the original plan was changed and now only four shipways and minimum required machines are at work. Some of the machines are still kept in the warehouse.

For the time being, this shipyard is engaged only in repairing work, and the ships repaired here in the year of 1975 are three vessels (4372/4) for annual check, four (5072/8) for special check, and one (1322/9) for floating repair.

The shipyard is located on a river, and the draft of the quay goes below zero at low tide. So the bottom of ship touches the earth and the condition is fatal as a shipyard.

#### 1-2. Conditions of Location

According to the shipyard lay-out, the area is located on a river called Sungai Lawang, and the distance from the river-mouth is about 1.5km. The width of this river is about 75 meters. The depth indicated on the lay-out is said to have measured at several point along a crossing line to the flow, but actual depth is probably less than the values shown thereon, because as witnessed a ship moored about 5 to 6 meters from the quay completely grounding at the time of our inspection. So the area is by no means qualified for a shipyard location though they explained to us that the water level came up to 40cm below the ground level at full tide.

There are many salt fields scattering between Gresik and Surabaya, the region in which this shipyard is situated is a developing new industrial zone. EBAMA is constructing a new plant here, and new house building is also in progress.

#### 1-3. Shop Facilities

This shipyard has one reassembling berth and two shipways for repair work. The lower site (river side) of these berth and shipways, however, are all buried under the soil, and at the time of our inspection, they were trying to remove the soil.

The two machine shops have almost finished its machine installation, but there are substantial machines still left uninstalled for lack of their buildings, and one of the warehouses is packed with such machines unused yet. The overhead crane (O.H.C.) is also left uninstalled, though purchased as originally scheduled.

#### 1-4. Organization, Employees, and Labour Condition

Project manager supervises the technical department and the production department, and the sections of finance, personnel, and material also directly belong to him.

The shipyard has five directors and managers, eight section chiefs and subsection chiefs, and 94 workers. As for their academic careers, two are

university men, and one is a graduate of technical college, and nine are high-school graduates. In recent several years, no shipbuilding engineers and workers have been newly employed. The regular work hours per week here are 48h. From Monday to Friday, the work hours start at 08:00 and end at 16:00, and on Saturday, they start at 08:00 and end at 13:00. There is no allowance for overtime work, and the wages are the same as of daytime work. No wages for overtime work are paid to section chiefs and other senior staffs ranking higher than them. Two pairs of working uniform and one pair of working shoes are supplied to all the employees annually. Lunch is supplied in cash. 500 Rp/day is paid to only those workers dwelling in Surabaya as traffic expenses.

#### 1-5. Production Management and Workmanship

Their production management is insufficient mainly due to the deficient knowledge and experience of both direct and indirect managers. As for the Workmanship, they are roughly on the same level as of the other shipyards so long as the external plate replating of repairing ships, less plating in shipbuilding, etc. are concerned. Gas cutting and electric welding rely on manual work of the employees, and bending process relies only on hammer work. Naturally, the finished appearance inspected were not good.

#### 1-6. Production Efficiency and Term of Work

The annual check usually takes 1 to 1.5 months, and the special check 2 to 2.5 months. All the repair work is carried out on the shipway, and the launching means the completion of work. This seems unavoidable under such circumstances as stated hereinbefore.

#### 1-7. Subcontractors

This shipyard is usually employing 15 to 16 scraping and painting workers belonging to subcontractors.

#### 1-8. Design

This shipyard has no design staff, and all the necessary drawings are supplied from the respective client shipowners.

#### 1-9. Material Procurement

The consumption of main materials during the six month from January to June in the year 1977 is 25 tons of steel plate and 5 tons of welding rod. The consumption of the same materials during the twelve months in the year 1976 is 27 tons of steel plate and 2 tons of welding rod. In the year 1975, it is 18 tons of steel plate and 1 ton of welding rod. These materials are all purchased in Surabaya.

III QUESTIONNAIRE

1. General

- 1) Layout of shipyard (appendix 1) Glangan Kapal Gresik
- 2) Location and map (appendix 2) M. Veteran segocondalngresik
- 3) Areas: Area of premises 131,150 m<sup>2</sup>  
Area of production 151,150 m<sup>2</sup>
- 4) Annual production capacity  
New shipbuilding 350 87%  
Shiprepairing 10,150 87%
- 5) Water depth: 0.9 m
- 6) Tide: Difference 1.6 m
- 7) Currents: No

2. Yard expansion plans: Yes  
No

3. Organization and number

- 1) Tree diagram (appendix 3)
- 2) Number of employees for each rank  
Director and manager 5 persons  
Section chief and sub section chief 8 persons  
Foreman and group chief - persons  
Worker 54 persons
- 3) Ranking structure of education for fixed worker  
S.B. Elementary school (6 years) 11 persons  
S.A.T.P. (S.M.P., ST ...) Secondary school (3 years) 4 persons  
S.A.T.A. (S.M.A., S.T.A.) High school (3 years) 9 persons  
JANJAL College (3, 4 years) 1 person  
UNIVERSITY (4, 5 years) 2 persons
- 4) Annual supply of B.A. and workers  

	1971	1972	1973	1974	1975	1976	1977
B.A.	No	"	"	"	"	"	"
Workers	No	"	"	"	"	"	"

- 5) Overtime allowance for each hour  
Working time: Mon-Fri 08:00-16:00  
Sat 08:00-13:00 40 H/week  
Same as day time but section chief and above has no over time allowance.

- 6) Ratio of annual salary up Government rate
- 7) Welfare equipment  
Cloth supply overall 2/year  
Shoes supply 1/year

- 8) Meal supply  
Lunch: By money Rp 100/day Rp 125/day Rp 150/day  
Diners: No
- 9) Traffic expense Supply Rp 500/day only for employee living in SURABAYA
- 10) Insurance Shipyard pay in case of accident only.
- 11) Safety for worker No
- 12) Training of worker Sent five(5) welders to BODONG for three(3) months training and five(5) managers to SIT for one(1) month training in 1977

4. Subcontractor

- 1) Kind of skills: Scraping and painting  
Number of workers: 16 persons  
Wage:
- 2) Degree of skill
- 3) Number of company

5. Tools

- 1) Size of tool store: Has no tool store, each shop has tools itself.
- 2) Main tools  
a) Air No chipping/punching tools  
b) Electric Grinding 4, drilling 20, chain saw 2,  
c) Hydraulic Planer 4, circle saw 4  
d) Hammer, spanner, etc. Jack 100 T x 2, 50 T x 2, 20 T x 4

6. Productivity

- 1) New shipbuilding  
a) Pan-hour

	Type, Kind, D/W of Typical Ships	Null Weight	Pan-Hours (Null Part)	Total Pan-hour
I	Inspection boat 16.2m L	40 Ton	No data	No data
II	All purpose boat 15.6m L	40 Ton	"	"
III				

- b) Null construction hours/Ton
- c) Null construction cost/Ton
- d) Construction period  
i)  
ii)

2) Ship repairing

- a) Total gross tonnage per years 1976 2625.23 87/year
- b) Total man-hours per years: No data hour/year
- c) Total sales amount per years: 1976 Rp 64,718,000/year
- d) Pan-hour/steel ton (in the case of steel replacement): No data hour/Ton
- e) Cost/8T
- f) Cost/ship
- g) Repairing period i)  
ii)

7. Material procurement

Item	Purchase Price	Where Purchased from	Order-to-Delivery time	Stock Amount
Main Engine				
Generator				
Steel Plate				
Profile				
Welding Rod				
Paint				
Pipe				
Wood				

8. Design

- 1) Number of designers No
- 2) Drawing list All drawing will be supplied by owner.
- 3) Drawing method  
• Pen  
• Pencil
- 4) Photo copying machine No

9. Construction Techniques

- 1) Gas cutting work Manual
- 2) Welding work Manual
- 3) Grouping method Electro carbide method
- 4) Fitting work By Hammer
- 5) Packing work By hand chalk

10. Points to be noted on shipbuilding & repairing

- 1) Design No problem
- 2) Material procurement "
- 3) Construction Short of machinery
- 4) Manpower shortage Plenty of skilled workers in SURABAYA
- 5) Unsatisfactory quality No problem
- 6) Schedule behind Sometimes, getting additional job
- 7) Inspection trouble No problem
- 8) others "

II NEW SHIPBUILDING RECORDS (A-1-1) 1976

	NAME	OWNER	KIND	CLASS	D.W.	D.T.	Lpp	8	9	ENGINE (HP)
1	KUN FANUYU	DEPT KUNJAL	INSPECT BOAT	SMA-SANJO	49.0	82.3	15.00	0.2	0.8	110
2	SIRIK KAPAYAK	KERAPAL BASSIR	ALL PURPOSE BOAT	"	25.0	56.8	13.60	1.0	1.5	130
3	PERBENSI S.WAL	PRING BATA	SERVICE BOAT	"	7.5	18.6	6.00	2.4	1.1	30

NEW SHIPBUILDING RECORDS (8-1-2) 1976

NO	NET HULL STEEL WEIGHT	PRICE (Rp100)	COST (Rp100)	CONSTRUCTION SCHEDULE				CONSTRUCTION ALLIQUOTS					PERCENTAGE	REPAIR HOURS
				Contract	Launch- ing	Keel Laying	Delivery	Hull Fabric.	Hull Erect.	Hull Outfit.	Deck Outfit.	Elect. Outfit.		
1	30	21,258.05	25,529.00	31-10-72	30-2-73	12-11-72	31-10-72							
2	20	29,650.00	24,955.00	31-9-72	24-2-73	19-10-72	26-5-73							
3	5.5	9,700.00	3,849.515	1-12-72	30-3-73	10-1-73	11-6-73							

12 SHIP REPAIRING RECORDS (8-2-1) 1976

No	Ship Name	Port	Cargo	Survey Type	Days	Cost (Rp100)	Material (Rp100)	Wages (Rp100)
1	Chares Jaya	Tjakrajaya Ekra	Cargo	Annual Survey (Syahbandar)	90	220	21.12	7.18
2	Tjakrajaya	"	Lat/Cargo	Special Survey (Syahbandar)	160	412.50	39.25	6.50
3	Akar-Jaya	Tondjung Bona	Cargo	Annual Survey (B.K.I.)	220	625.67	33.52	6.72
4	Bila	"	"	Special Survey (B.K.I.)	233.23	377.42	29.85	5.52
5	Sambasari	P.S.C.O.	"	Floating Repair (B.K.I.)	-	-	-	-
6	Pegah Polite	Pt. Rosmas	"	Special Survey (B.K.I.)	275	62.76	38.52	7.00
7	Egon	Pt. Gelan	Lat/Cargo	Special Survey (Syahbandar)	233	52.2	35.00	10.5
8	Tjandrawasih	Tandjung Bona	Cargo	Annual Survey (B.K.I.)	185	26.88	30.65	6.00

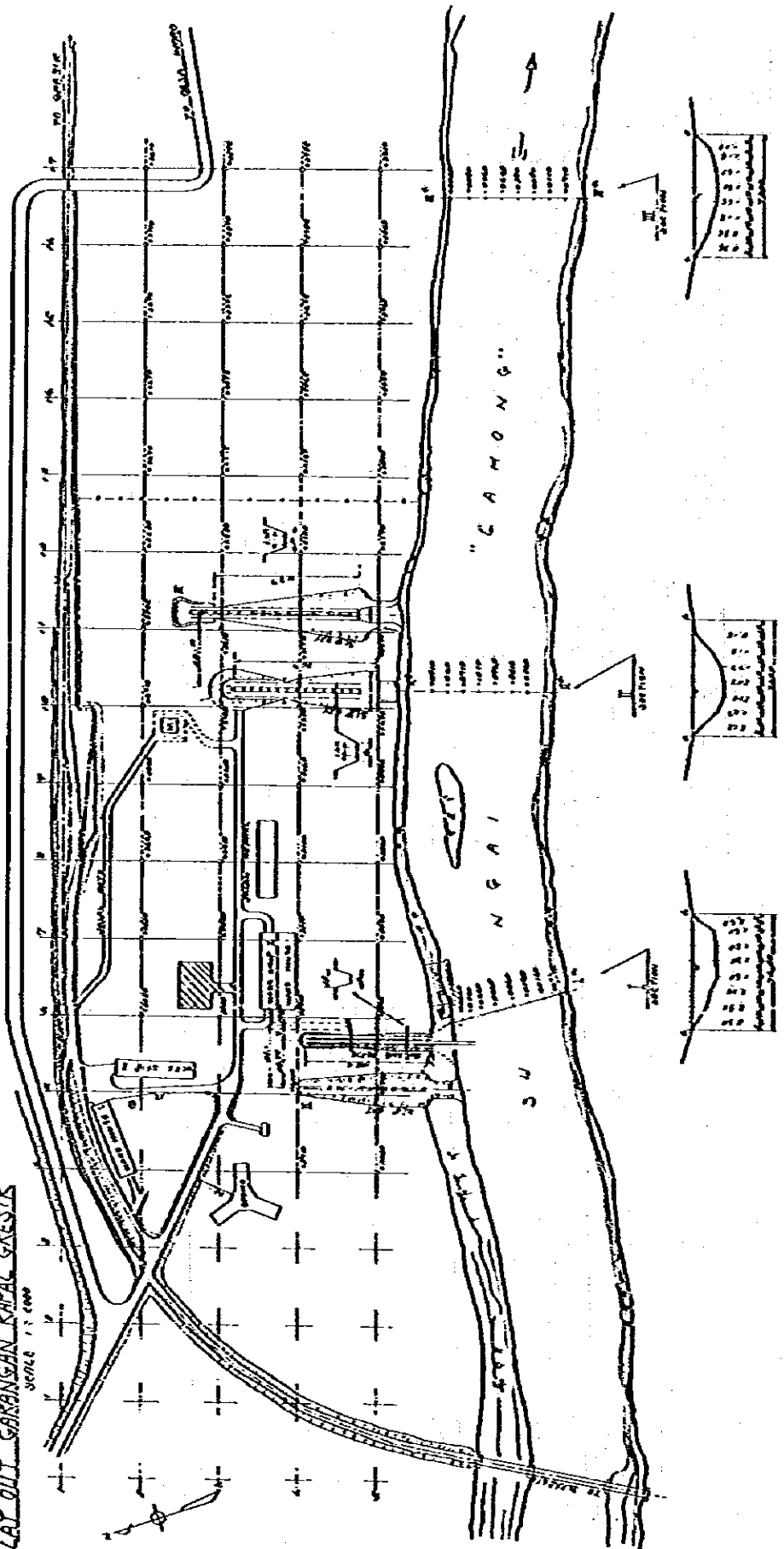
SHIP REPAIRING RECORDS (8-1-2) 1976

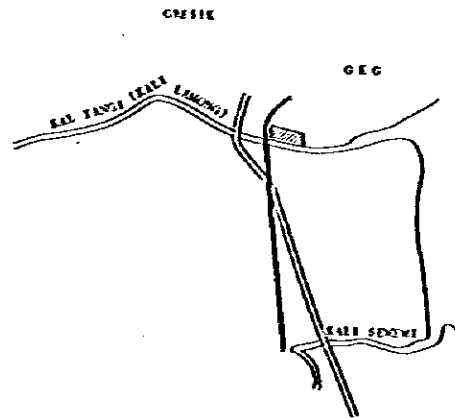
NO	SALES (Rp1000)			COST	REPAIRING PERIOD	PERIOD IN BOOK	EXPENSES		
	HULL WARE	MACHINERY WARE	ELECTRICAL WARE				HULL WARE	MACHINERY WARE	ELECTRICAL WARE
1		1.005			37	37			
2		3.763,6			75	75			
3		4.353,6			60	60			
4		6.440,3			62	62			
5		2.000,			15	-			
6		8.534,4			74	74			
7		38.543,3			-	-			
8		2.680,2			44	44			

5 Utilities

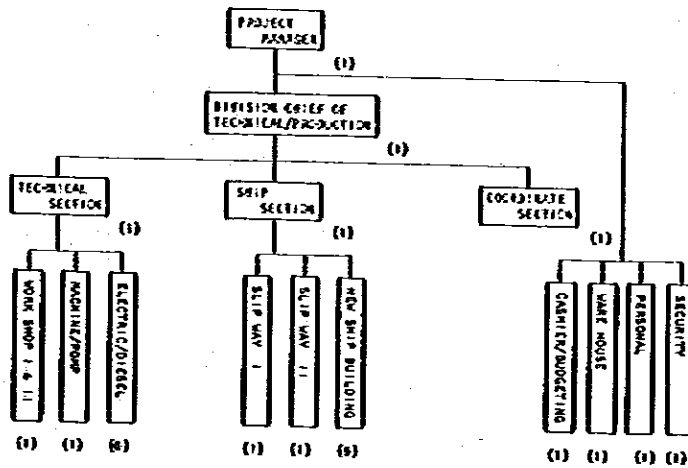
Items		Capacity
Electric Power	P.L.V. Generator	100 K.V.A. 268 K.V.A. x 2 60 K.V.A. x 1
Drinking & Industrial Water Facilities	Deep well	
Compressed Air Facilities		
Acetylene & Oxygen Facilities	Carbide Oxygen	1200 kg/month 150 Bottles/month
Water pollution Control Facilities	No	
Others	No	

LAY OUT GARONGAN KAPAL GRESIK  
SCALE 1:1000





ORGANIZATION GALASSI BAPAL KRISTIK



### III. Galangan Royal Bitung (G.R.B.)

#### 1. General Situation

##### 1-1. Introduction

Bitung is situated on the south side of North Sulawesi, and Manado on the north side. It is about one hour's drive from Manado to Bitung.

Many islands are scattered over the sea on the north side of North Sulawesi, and the coast is blocked by cliffs and mountains everywhere. So the travellers must transfer from land transportation to sea transportation on the way down. The south coast, on the other hand, has no means of land-transportation at all, and the travellers must rely only on sea-transportation. Under such circumstances, Bitung is more and more gaining in importance as a key port. The geographical conditions of Bitung are ideal for a good harbour, because the sea is deep and currents and waves are very little. In Bitung, people engaged in fisheries require repair docks for their fishing boats, and the authorities concerned require a new-shipbuilding yard and repair docks for their cargo boats. So people expect much from Galangan Royal Bitung, and its future is quite brilliant.

The business turn-out recorded in this shipyard during the six months from January to June in the year 1977 is new-shipbuilding of one 130/4 tuna fishing boat and one 200/4 tuna fishing boat. One took 17 months from keel laying to launching and 15 months from keel laying to delivery, and the other is still under building. As for the repair work turn-out, the same period records 72568/1 of annual check for 55 ships, 18726/1 of special check for 13 ships, and 1023/1 of other checks and repair for 16 ships. Most of these ships are wooden ships, and steel vessels numbers only 12. In addition to the new-shipbuilding and ship repairing work, this shipyard is also engaged in various works like welding, press work, machine processing, etc. to order. The percentage of such order work recorded during the same period is about 15% of the whole business turn-out.

##### 1-2. Conditions of Location

FISHERMEN base, the port of Bitung, the fishing harbour, and this shipyard are lined up in this order, and across the road running near the shipyard, stand the company houses in which 27 employees and their families live (the total number of employees is 23). This shipyard is surrounded neither by fences nor by walls, and part of the area has become a playground of children and the shore has been used for a mooring place of fishing boats.

It is said that they are planning to expand the port of Bitung. This extension project is closely connected with the construction of this shipyard, and if the expansion plan requires the present area of the shipyard, it seems inevitable to move to other place.

The distance between the present shipyard and the shore on the other side is said to be 5000 meters.

In Sulawesi Island, enough water depth is obtainable even near the coastal line.

##### 1-3. Shop Facilities

At present, the shipyard has one roofed berth for new-shipbuilding equipped with O.H.C. facilities, and another berth of the same type is now under construction in the vicinity. The shipyard also has four hoisting slipways for ship repairing work, and one shop building. Part of this shop building is used as the office. In this shop building, the wood work machines and the cutting machines are installed together, and the whole shop is fully-lighted including the office section.

The inside the warehouse is scattered with wood blocks, broken wheels, etc. and things stocked there are mostly out of order.

Generally speaking, all the shipyard facilities including the berths, the shop building, the office are by no means well-arranged.

##### 1-4. Organization, Employees, and Labour Condition

The shipyard do have an organization, but the system is not sufficiently staffed and the managerial work does not seem to be effectively carried out partly due to the deficiency of staffs. One of the peculiar points to this shipyard is that the number of fixed workers is 28 including the executive staffs, and all the others are daily workers. For the locational reason, it is quite difficult to employ skilled workers. Another problem is that the type of work these daily workers engaged in is not fixed, and they must do almost any kind of work. From a technical point of view, this is quite uneasy.

During the recent several years, no workers have been newly employed.

The regular work hours per week are 42h, and the daily work starts at 08:00 and ends at 16:00. This applies to all the weekdays from Monday to Saturday.

As for the allowance for overtime work, the extra wages for overtime work between 06:00 and 08:00 are 50% of the regular work hours, and between 16:00 and 18:00 are 100%, and between 18:00 and 22:00 are 200% respectively. The allowance for holiday work is 100% of the wages for regular daytime work.

Two pairs of working uniform are supplied annually to every employee, but there is no supply of working shoes.

##### 1-5. Production Management and Protection Technique

This shipyard is mainly engaged in repair work for wooden fishing boats, but at the time of our inspection, new-shipbuilding of two steel fishing boats was in progress, reflecting the recent trend to replace wooden vessels with steel vessels.

The shipyard has nowold jacks, and it is said that the framework (principal rafter) of buildings, the frame construction of ships, etc. are



drafted on the ground.

The seam-welds of steel plates inspected left vestiges of repeated welding, and the welding technique seemed relatively low.

#### 1-6. Production Efficiency and Term of Work

No data on the production efficiency were obtainable.

Most ships repaired in this shipyard so far are fishing boats of 400 to 7000 T and barges of 100 to 10000 T, and the average term of repair work is about 20 days.

#### 1-7. Subcontractors

This shipyard employs no subcontractors at all.

#### 1-8. Design

There is only one hull designer, and all the necessary drawings are supplied from the respective client shipowners.

#### 1-9. Material Procurement

The material procurement is very difficult as the shipyard is located far from big cities. The profiles, welding rods, pipes, wood materials, etc. are locally available in Bitung, though most of the main materials are purchased in Jakarta and Surabaya.

III QUESTIONNAIRE

1. General

- 1) Layout of shipyard (appendix 1) Galangas Kapal Bitung
- 2) Location and map (appendix 2) Sulawesi Utara Bitung
- 3) Area: Area of premises 28,762 m<sup>2</sup>  
Area of production "
- 4) Annual production capacity  
New shipbuilding 600 B/T  
Shiprepairing 12,500 B/T
- 5) Water depth:
- 6) Tides: Max 2.4 m  
Average 2.2 m
- 7) Currents: Under water current fast

2. Yard expansion plans:

No

3. Organization and number

1) Tree diagram (appendix 3)

2) Number of employees for each rank

- Director and manager 4 persons
- Section chief and sub section chief 10 persons
- Foreman and group chief persons
- Worker 14 persons

3) Training structure of education

- S.D. Elementary school (6 years) persons
- S.L.T.P. (S.R.P., S.V. ...) Secondary school (3 years) persons
- S.L.T.R. (S.R.A., S.T.R.) High school (3 years) persons
- AKACEM College (3, 4 years) persons
- UNIVERSITY (4, 5 years) persons

4) Annual supply of M.R. and workers

	1971	1972	1973	1974	1975	1976	1977
M.R.	No	"	"	"	"	"	"
Workers	No	"	"	"	"	"	"

5) Overtime allowance for each hour

Working time: Non-Sat 08:00-16:00 42 H/week

06:00	08:00	12:00	13:00	16:00	18:00	22:00
	15:00	16:00	17:00	18:00	19:00	20:00
Holiday		20:00		21:00		22:00
		20:00		21:00		22:00

6) Ratio of annual salary up

Adjusting for local condition only.  
Basic salary Rp15,000-Rp150,000 (1977 Jan)  
About Rp10,000 will be added to basic salary for real supply electric, water etc.

7) Welfare equipment

Cloth supply overall twice/year

Shoes supply No

8) Meal supply

Lunch: Rp150/day for fixed worker

Dinner: Supply food (Rp250/day) at 18:00

9) Traffic expense

No

10) Insurance

No

11) Safety for worker

Government rule will be applied

In case of accident

12) Training of worker

1977

One welder sent to BANGS three (3) months

One time keeper " JASARA six (6) months

One machine worker " " "

4. Subcontractor

1) Kind of skills:

Number of workers: No use

Wage:

5. Tools

1) Size of tool store

2) Main tools

- a) Air
- b) Electric
- c) Hydraulic
- d) Hammer, spawner, etc.

6. Productivity

1) New Shipbuilding

a) Man-hour

	Type, Model, B/T of Typical Ships	Full Weight	Man-hours (Full Part)	Total Man-hour
I	Fishing boat 21 B/T	8 1/2 T	No data	No data
II	" 23 B/T	15 T	"	"
III				

# Pipe and other fastening

b) Hull construction

hours/ton

c) Hull construction

cost/ton

d) Construction period

1) Fishing boat 23 B/T : four (4) months

II)

2) Ship repairing

a) Total gross tonnage per year:

67/year

b) Total man-hours per year:

hour/year

c) Total sales amount per year:

year

d) Man-hour/steel ton

(in the case of steel replacement):

hour/ton

e) Rp 12,000

Under 500 B/T for annual survey

Rp 40,000-50,000

" for special survey

Rp 70,000-80,000

" for rehabilitation

f)

Cost/ship

g) Repairing period

1)

II)

7. Material procurement

Item	Purchase Price	Where Purchased from	Order-to-Delivery Time	Stock Account
Main Engine	Rp57000/HP	JAKARTA (JASARA)		
Generator		Over supply		
Steel Plate	Rp130/kg	Surabaya	3 weeks	No
Profile	Rp730/kg	Bitung	Immediately	No
Welding Rod	Rp100/kg Rp255/kg	Jakarta Bitung	3 weeks Immediately	1 Ton
Patent	ALL Rp255/kg ALL Rp350/kg	Perabo	Immediately	1 Ton
Pipe		Surabaya Bitung	3 weeks Immediately	No
Wood 62/ASA	Rp50000/HP	Bitung	Immediately	No

8. Design

1) Number of designers

All designer One (1) person

2) Drawing list

All drawing will be supplied by owner.

3) Drawing method

Pen

4) Photo copying machine

No

No machine in city BITUNG also

9. Construction Techniques

1) Gas cutting work

No automatic gas cutting machine

2) Welding work

No automatic welding machine

3) Gouging method

Electro carbide method

4) Fabricating work

5) Packing work

10. Points to be noted on shipbuilding & repairing

1) Design

No skill worker for designing then cannot improv.

2) Material procurement

Very trouble to get material

3) Construction

No skill worker

4) Manpower shortage

Very difficult to get skilled worker but easy to get unskilled worker in BITUNG.

5) Unsatisfactory quality

Satisfy

6) Schedule behind

Finish the work on time

7) Inspection trouble

Get from W. Parding, owner must pay traffic expenses for etc.

8) Others

12 SELF REPAIRING RECORD (8-1-1) 1976

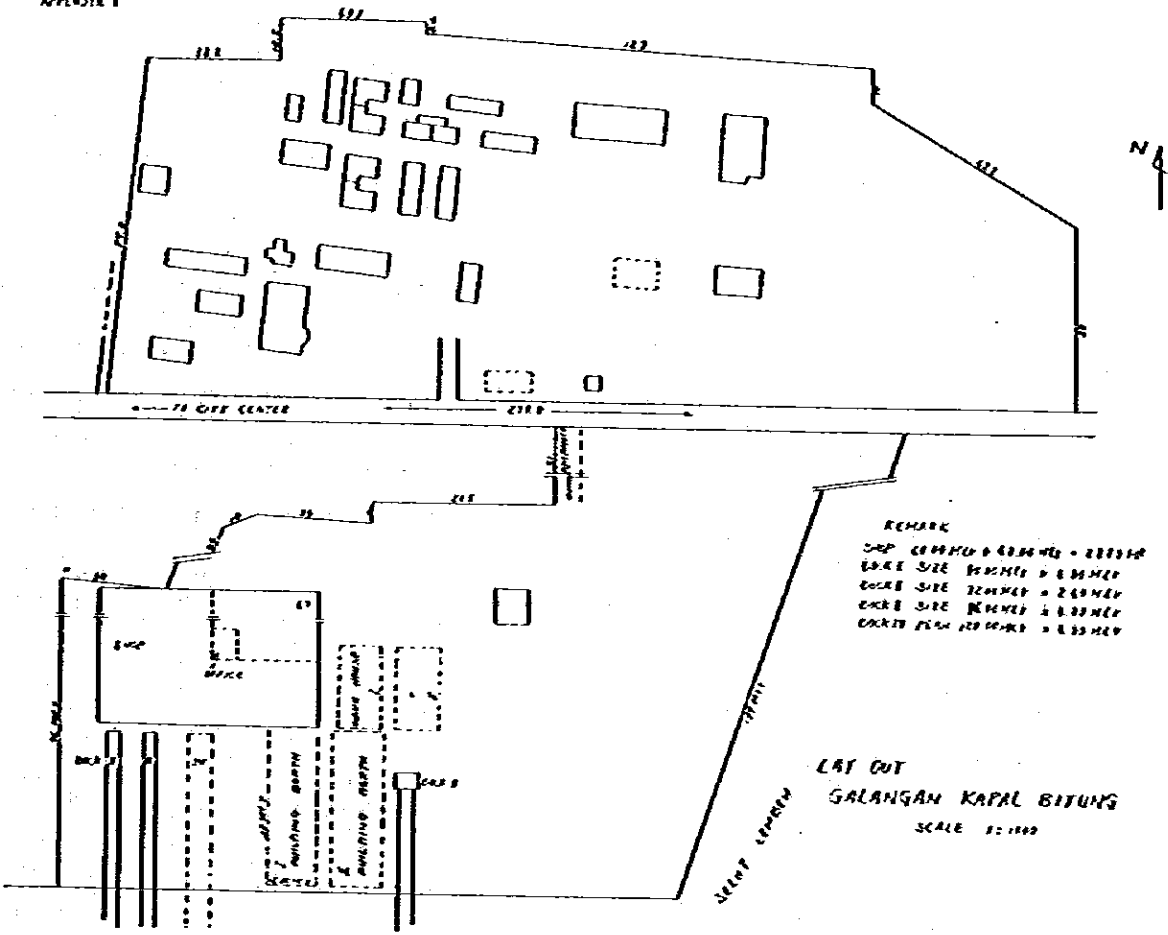
	NAME	OWNER	KIND	CLASS	P.M.T.	C.T.	COA	B	D
1	K.R. Birana no.2	PT. Dul Biru Etana Sorong	Fishing Boat	RI (AS)	-	149.7	27.14	6.50	
2	K.R. Pasikla no.1	PT. Pasikla Jaya Bitung	"	"	-	235.4	31.85	6.80	
3	K.R. Pasikla no.2	PT. Pasikla Jaya Bitung	"	"	-	119.0	26.90	5.92	
4	LOK. Vaktar 1	PT. Varasaktar Raja Paraso	Barge	"	-	67.4	22.75	6.30	
5	PVC. S. C. III	PT. Pertamina Songkang Btg	"	AS (SS)	-	324.2	42.64	17.16	
6	LOK. Vaktar 1	PT. Varasaktar Raja Paraso	"	RI (SS)	-	67.4	22.75	6.30	
7	K.R. Birana no.5	PT. Dul Biru Etana Sorong	Fishing Boat	RI (AS)	-	149.7	27.14	6.50	
8	K.R. Birana no.3	PT. Dul Biru Etana Sorong	"	"	-	149.7	27.42	6.50	
9	K.R. Pasikla no.3	PT. Pasikla Jaya Bitung	"	"	-	119.0	26.90	5.92	
10	TB. Bintang 061	PT. Poley Trading Coy Kdo	Scapal Bndara	"	-	28.5	11.40	3.70	
11	K.R. Birana no.6	PT. Dul Biru Etana Sorong	Fishing Boat	"	-	149.7	27.42	6.50	
12	LOK. DM-2	PT. DM Parabunta Timber Kdo	Barge	"	-	89.3	24.90	7.00	
13	LOK. DM-3	"	"	RI (SS)	-	89.3	24.90	7.00	
14	Songkang S-45	PT. Eastern Jaya Lwck	"	ER (SS)	-	169.1	26.82	8.53	
15	TB. Bangsal	PT. DM Parabunta The Paraso	Tug	RI (AS)	-	31.1	17.46	4.00	
16	KR. Saar-009	Bapel III Paraso	Inspection Boat	RI (SS)	-	68.1	-	-	
17	TB. Vaktar II	PT. Varasaktar Raja Paraso	Tug	RI (AS)	-	24.4	13.92	4.52	
18	LOK. DM-3	PT. DM Parabunta Timber Kdo	Barge	RI (SS)	-	213.4	32.50	8.80	
19	LOK. DM-1	PT. DM Parabunta Timber Kdo	"	RI (RI)	-	855.2	49.85	10.80	
20	TB. Poley	PT. Parabunta Timber Kdo	Tug	RI (AS)	-	31.1	17.46	4.00	
21	LOK. DM-2	PT. DM Parabunta The Paraso	Barge	RI (SS)	-	89.3	24.90	7.00	
22	K.R. Pasikla no.1	PT. Pasikla Jaya Bitung	Fishing Boat	RI (AS)	-	235.7	31.85	6.80	
23	LOK. Vaktar 1	PT. Varasaktar Raja Paraso	Barge	RI (SS)	-	67.4	22.75	6.30	

SELF REPAIRING RECORD (8-1-2) 1976

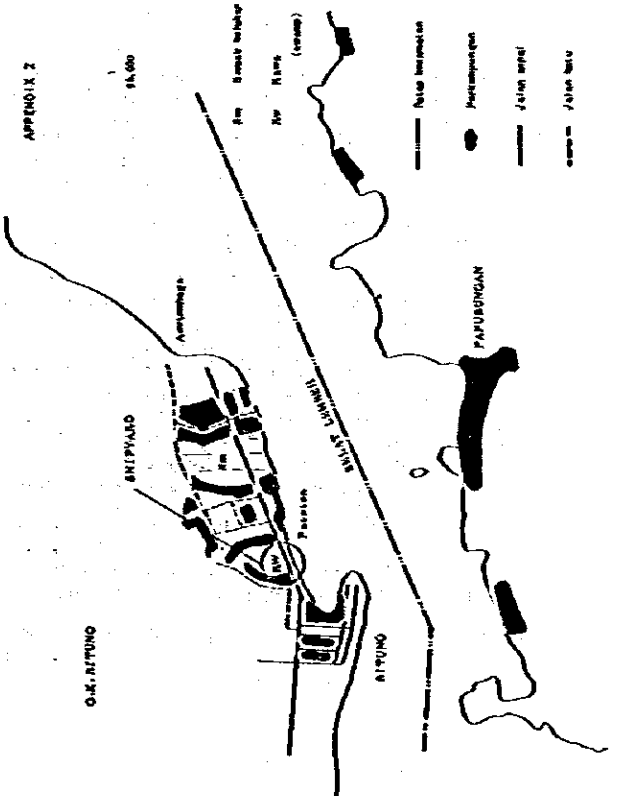
	SALES (M1000)			COST	REPAIRING PERIOD	PERIOD IN DOCK	REPAIRS		
	RUER YEAR	MACHINERY YEAR	ELECTRICAL YEAR				RUER YEAR	MACHINERY YEAR	ELECTRICAL YEAR
1		1,831.00			5	5			
2		1,285.00			20	20			
3		1,300.00			5	5			
4		2,614.00			22	22			
5		6,714.69			15	15			
6		1,015.00			10	10			
7		1,754.50			5	5			
8		2,685.50			6	6			
9		1,508.00			8	8			
10		2,415.00			38	38			
11		2,005.00			6	6			
12		1,754.00			16	16			
13		3,577.00			16	16			
14		5,119.60			17	17			
15		1,337.00			8	8			
16		0,640.50			56	56			
17		1,620.00			15	15			
18		2,104.00			5	5			
19		2,379.00			17	17			
20		0,331.00			12	12			
21		2,111.00			4	4			
22		2,431.40			6	6			
23		2,527.00			10	10			



APPENDIX 1

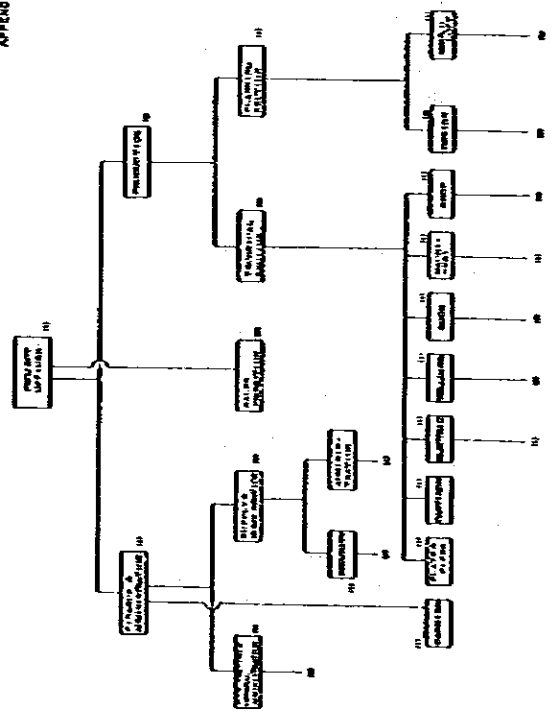


APPENDIX 2



APPENDIX 3

ORGANIZATION GALANGAN KAPAL BITUNG



IV. P. T. DE PASASSAR  
(FORMER NAME: GALANAN RAJAL PASASSAR)

1. General Situation

1-1. Introduction

This was also one of the four shipyards projected by the Ministry of Industry, and was transferred to P. T. in 1977. A canal runs through the site, and the whole area is divided into two blocks by the canal. In the original plan, the berths and shops were scheduled to be constructed in the spacious area on the other side, but this plan was changed by the deficiency of budget, and now all the shipyard, plater shop, machine shop, wood machine shop, etc. are standing in the narrow area on the road side. These facilities, however, have been a little distasteful from those originally designed.

So far as the civil engineering work is concerned, the berth facilities seem quite satisfactory, but the hoisting facilities (such as winch, wire, block, etc.) seem to require reinvestigation and removal.

For the time being, the shipyard has only one outfitting quay, approximately 40 meters in length, and the extension or additional construction seems essential in consideration of the future increase in ship repairing work. It seems also necessary to equip the outfitting quay with other facilities like bollard, winch, etc. The present quay is furnished with only one tower crane, and at the time of our survey, this crane was out of the order.

The hoisting slipways respectively have five slide tracks, three on one side and two on the other, and there is enough mooring space of ship. So the operation of working efficiency of shipbuilding and repairing seems to be drastically improved if the shop facilities are duly consolidated.

Judging from the annual consumption of steel material recorded from 1971 to 1975, the business turn-out is gradually increasing, and at the time of our inspection, the volume of work was quite substantial and the production control was systematically going on. The western part of the block on the road side in which the present berths and shops stand leaves more space to allow future expansion, but the immense area on the other side where the main part of this shipyard was originally scheduled to be constructed is much more suitable for the large-sized new shipbuilding facilities to be established in the future. Effective utilization of this huge area will be most profitable.

There is a shipbuilding course in the college in Pasassar, and a seaman's training school financed by the Japanese Government is scheduled to be established here. So Pasassar can be said to be one of the excellent places for construction of a shipyard.

1-2. Topography

The existing facilities are located on the landward side. The new building site is approximate rectangular land covering the area of 475m x 295m which was reclaimed preparing for the new shipyard.

The reclaiming work and the shore protection work were almost completed. The leveling of ground has not been carried out as yet because of partial insufficient land reclamation.

Accordingly, if the construction of shipyard is formally decided, dredging, raising the ground level and leveling of ground of the surrounding area is necessary. Average water depth around the shipyard is 2.5m. Water depth near the north eastern coast is less than 1m.

1-3. Building Facilities

1) Building Berths: The building berths are of slide slipway system provided with 5 slide tracks and can be used not only for new ship building but also for repairing.

Capacity: 2-berths of 500 GT and 3-berths of 200 GT provided with winches of 500 T.U.C.

2) Quay: At present, the length of mooring quay is limited to 40m.

1-tower crane is installed, which is not yet completed and not ready for use.

3) Crane: 1-3t Mobile crane is provided.

4) Workshop: The plater shop and the carpenter shop seemed to be short of work. The floor level is not even. Only 1-tatbe is installed for woodwork.

The trainees are making an effort for practical training under the guidance of JICC instructors in the welding training center which is provided in fitting shop. Fitting shop have 1-press and 1-shearing machine. The press is used for bending plates and pipes. Machine shop is fairly well equipped with machines. These equipment is sufficient for new shipbuilding and repairing.

5) Work Spots: Repair work of wooden boats, tug boats and barges is almost carried out outdoors.

The space in between the slide tracks is used for work spot and the storage place for welding machines, gas bottles and steel materials.

6) Welding Machines: Both generator type and transformer type are used.

7) Gas Cutting Machines: Semi-automatic gas cutting machines are used for long size steel materials.

8) Electricity: Shipyard fully depends on commercial power supply. At present they can buy it at need, but generators for emergency use should be provided.

9) Water: Shipyard depends on municipal water supply, but now and then water supply is suspended. At present, they say have no trouble at all. When new shipyard is completed, however, a deep well should be provided for emergency use.

10) Oxygen and Acetylene Gas: Shipyard buy both oxygen and acetylene gas from outside.

Because of higher price in comparison with those in Java, they intend to install an individual gas generating plant, if possible.

Future development of other local industry in this district will accelerate increase of demands for gas supply. In such case, the individual gas generating plant will be materialized.

1-4. Organization and Labor Force

1) Organization: The staff members, Administration secretary, General Administration and Planning departments are under Project manager. The production line is classified into Production department and Business department. Production department is subdivided into 3 sections. Hull, Berth and Machine and Electric. Planning and Design assist each Manager as staff members. Meanwhile, Business department is subdivided into 4 sections, General affairs, Purchasing, Accounting and Cashier. Judging from the existing scale of shipyard, it seems better to put all the planning member under Project manager as his staff members.

Total number of employees is 133. 153 out of them are workers including foremen. The number of managers and staff (including Design) is 40. The number of direct workers is 131, while indirect workers (including maintenance, guard, warehouse keepers) is 12.

The above personnel organization can be said well balanced. About 20 to 50 workers hired from sub-contractors as extra workers are doing painting and grinding work.

At present, they hold almost no new ship, and most of works are repairing. For the reason as above.

They may need the extra workers to promote repair schedule. However, they hold regular workers as many as 131. It seems that there is no reason to take the trouble to hire the extra workers because they hold sufficient number of regular workers to deal with repairing.

- 2) Working Hours: 7:30 to 16:00 from Monday to Friday. (Lunchtime: 11:30 to 13:30 on Friday only.) 7:30 to 13:00 on Saturday. Weekly working hours is 42 hours.
- 3) Workers: More than 50% of total employees are high-school graduates or have higher school career. 50% of the repairings finished elementary school. Educational level is rather high and age structure is well balanced. 30% of employees are about 20 years old.

#### 1-5. Production Control

- 1) Shipbuilding Instructions: At present, they have no new ship on hand. Repairing is limited to wooden ships, barges and tug boats. The repairing instructions to be made before the start of work, based on the drawings as well as the results of the previous arrangement with shipowners, have not been prepared as yet. As the work records have been so far kept after completion of each order, the photo-copied and analyzed data of the above record can be applied to future work.
- 2) The repairing work as of August 1, 1978 is 1 cargo at mooring quay, 1 each of tug boat, wooden boat and cargo on slipway berths. The repair work is replacing shell plates, keel reinforcement, repair of rubber and propeller and painting. In order to accelerate the progress of work keeping the time of delivery and checking over and shorts of workers, it is necessary to make a general schedule in case of such various kind of repairing. According to the achievement records the size of new ships so far built by MANDARA Shipyard have never exceed 150 DT at most. In case of repairing, a fishing boat of 523 GT was recorded.
- 3) Standards and Criteria: So far neither standards nor criteria have been made as yet. Work has been carried out depending on their own experience only. The rules of Ship's Classification Society are used, as the criteria.
- 4) Quality Control: Appearance inspection, ultrasonic faults detector and dye check are applied as means of non destruction inspection. These inspections seem to be made by ICI inspectors. No internal inspection is so far made.  
Any way, it is quite difficult to get precise condition of internal defects. In case of thick steel plate welding which will be applied as the size of ship increases, the decision of inspection will be made by means of X-ray film.
- 5) Technical Level:
  - (1) Welding: Welding applied to the barges and tug boats is not good viewed in every aspect. Breach beads and overlapping were observed.  
During survey team's visit to this shipyard, training class for welders was held under the guidance of the instructors from NISC in Bandung. 25 welders dispatched from four shipyards of ICI group enrolled in a class at the above training. Judging from the above, some of welding show ability.

- (2) Gas Cutting: Manual gas cutting is almost applied to the work of repair ships.

The fenders of tug boat were removed by gas cutting. Cutting was carefully carried out by a welder with protection glasses on in accordance with the rules.

#### 1-6. Productivity

Working hours per ton of new ship is 470 H/Ton. Other data shows that working hours per ton is 120 H/T without welding. Meanwhile, in case of repairing the above coefficient is said to be 150 H/T or 60 H/GT. Judging from the above, productivity is considerably low in comparison with those of other shipyards in Indonesia. In conclusion, judging from increased working hours at the same technical level with other shipyards, it is quite natural that production control as well as labour control still leave something to be desired.

The business turn-out of new shipbuilding recorded during the five years from 1973 to 1975 is one each of 3 DT cruiser and 6.5 DT cruiser, two each of 100 DT barge, one barge of 50 DT, one each coaster of 25 DT, 50 DT and 70 DT, and five motor boats of 6 DT. This total turn-out of 13 ships is quite insufficient for a shipyard of such scale.

As for the term of newshipbuilding work, a 150 DT barge of the III class requires about ten months. This average term of work seems too long.

#### 1-7. Subcontractors

This shipyard is now employing two subcontractors, though most work is basically carried out by the direct workers. One company supplies about 30 workers for the scriplog and painting work, and the other supplies about 20 workers for the caulking work of wooden decks. The technical level of workers belonging to these subcontractors is said to be satisfactory.

#### 1-8. Design

The design section is staffed with 9 design workers, and all the necessary drawings are domestically supplied. The design room is furnished with a blue-print machine.

#### 1-9. Material Procurement

Profiles, pipes, and wood are procurable in W. Bandung, but steel plates, welding rods, pellets, etc. are purchased in Surabaya and Jakarta. Long-spaced scheduling and early preparation for material procurement are essential to this shipyard handicapped by the long distance from these central cities.

### III QUESTIONNAIRE

#### 1. General

- 1) Layout of shipyard (appendix 1) Galangan Kapal Kelassar
- 2) Location and map (appendix 2) Jl. Bukit Rekreasi Tello U. Padang
- 3) Area: Area of premises 367.235 m<sup>2</sup> including canal  
Area of production 112.000 m<sup>2</sup>
- 4) Annual production capacity  
New shipbuilding 1,500 B/W  
Shiprepairing 42,000 B/W  
3.0m - 2.0m
- 5) Water depth: 3.0m - 2.0m
- 6) Tides: max 1.3m  
min 1.0m Difference 0.3m
- 7) Currents:

#### 2. Yard expansion plans: Yes

#### 3. Organization and number

- 1) Tree diagram (appendix 3)
- 2) Number of employees for each rank
 

Director and manager	2 persons
Section chief and S.B. section chief	20 persons
Foreman and group chief	18 persons
Worker	155 persons
- 3) Training structure of education
 

S.B.	Elementary school (6 years)	58 persons
S.L.T.R. (S.M.R., ST ...)	Secondary school (3 years)	28 persons
S.L.T.R. (S.M.R., S.T.R.)	High school (3 years)	24 persons
MAJLIS	College (3, 4 years)	18 persons
UNIVERSITY	(4, 5 years)	5 persons

#### 4) Annual supply of B.A. and worker

	1971	1972	1973	1974	1975	1976
B.A.	No	1	No	No	1	No
Workers	No	No	No	44	3	

#### 5) Overtime allowance for each hour

Working time:	Mon-Thu	Fri	Sat	16:00-24:00	24:00 - 6 Holiday
	07:30-12:00, 13:00-16:00	07:30-11:30-, 13:30-16:00	07:30-13:00	100%	100%
					42 B/week

#### 6) Ratio of annual salary up

#### 7) Welfare equipment

- Tennis court, Badminton court, Volley court.
- One(1) guest house with six(6) rooms.
- Two(2) working dresses/year
- Company residence sixty eight (68) houses
- Residence allowance Rp1000-2000/month (except 68 family)

#### 8) Meal supply

- Lunch: No supply
- Dinner: Rp200 for overtime worker more than 20,000.

#### 9) Traffic expense

- No supply

#### 10) Insurance

- Accident beside of shipyard only

#### 11) Safety for worker

- Government

#### 12) Training of worker 1977

- One(1) welder to Bandung for 3 months
- Two(2) welders here for 1 month
- One(1) manager to university for 3 month
- Two(2) crews here for 1.5 months.

#### 4. Subcontractor

- 1) Kind of skills: Scraped painting 30 workers  
Wood casting 20 workers  
Wages:
- 2) Degree of skill Good
- 3) Number of company Two(2) companies

#### 5. Tools

- 1) Size of tool store

#### 2) Main tools

- a) Air Grinding machine (portable) 8  
Chipping machine ( " ) 10
- b) Electric Grinding machine ( " ) 1  
Drilling machine ( " ) 1
- c) Hydraulic Jack 100 T x 4, 50 T x 5, 20 T x 5
- d) Faner, sparker, etc. Automatic gas cutting machine 3 sets

#### 6. Productivity

##### 1) New Shipbuilding

##### a) Pan-hour

	Type, Kind, B/W of Typical Ships	Kill Weight	Pan-hour (Kill Part)	Total Pan-hour
I	1973 KARITA PPM 25 B/W	12.163 T	No data	9.358 H
II	1976 KARAJINTA 150 B/W	51.108 T	"	21.920
III				

- b) Kill construction 620 hours/ton
- c) Kill construction Rp 200,000 price/ton
- d) Construction period  
i)  
ii)

##### 2) Ship repairing

- a) Total gross tonnage per years 67/year
- b) Total man-hours per years hour/year
- c) Total sales amount per years /year
- d) Pan-hour/steel ton (in the case of steel replacement): 150 hour/ton  
e) Rp 16,312 Price/ST  
f) Rp 3,425,262 Price/Ship  
g) Repairing period i)  
ii)

#### 7. Material procurement

Item	Purchase Price	Where Purchased from	Order-to Delivery Time	Stock Amount
Pafo Engine	No data			
Generator	12 KVA Rp 1,000,000	Local (India) Kialokhar	Immediate	
Steel Plate	Rp 150/kg	Local (ISI) (KAPAS)	1-2 weeks	196T
Profile	Rp 250/kg	Local (M. Padang)	Immediate	2.6T
Welding Rod	Rp 400/kg	Local (ISI) (M. Padang)	"	2.3T
Pafo	Rp 3000/kg	Local (ISI)	1-2 weeks	0.1T
Pipe	Rp 500/1"p"m	Local (M. Padang)	Immediate	1.5T
Wood	Rp 200,000/m <sup>3</sup>	Local	"	0

#### 8. Design

- 1) Number of designers 4 persons
- 2) Drawing list
- 3) Drawing method \* Pen  
\* Pencill
- 4) Photo copying machine Yes  
Blue printing machine

#### 9. Construction techniques

- 1) Gas cutting work
- 2) Welding work
- 3) Gauging method
- 4) Falsing work
- 5) Parting work

#### 10. Points to be noted on shipbuilding & repairing

- 1) Design All drawings made themselves
- 2) Material procurement Local market limited then try to get from ISI and JKR. Only import sometimes make trouble.
- 3) Construction No problem
- 4) Manpower shortage Amount and skill, enough
- 5) Unsatisfactory quality Trying to improve but owner and B.K.I. appreciate this shipyard's quality
- 6) Schedule behind Sometimes
- 7) Inspection trouble No problem
- 8) Others



11 NEW SHIPBUILDING RECORDS (A-1-1) 1976

NO	NAME	OWNER	KIND	CLASS	D.W.	G.T.	Length	B	D	ENGINE (HP)
1		GO BUN LAY	TANJANG BER- KUTOR	ISI	150	-	25.50	6		150
2		P.T. GALAJ	KAPAL TARIK (HOOKING BOAT)	-	5	-	9.60	3.20		65

NEW SHIPBUILDING RECORDS (A-1-2) 1976

NO	NET HULL STEEL WEIGHT	PRICE (Rp1000)	COST	CONSTRUCTION SCHEDULE				CONSTRUCTION PERIODS			DESIGN PER- IODS	
				Con- tract	Lay- ing	Keel laying	Deliv- ery	HT Fabri.	HT Erect.	HT Outfit.		HT Outfit.
1		25,043.50		11-2-76	24-5-77	12-2-77	24-5-77					
2		5,674.23		12-2-76	14-10-76	6-8-76	19-10-76					

12 SHIP REPAIRING RECORDS (B-1-1) 1976

NO	NAME	OWNER	KIND	CLASS	D.W.T.	G.T.	Length	B	D
1	P. B. HARIANA-3	P.T. Pertamina Tong Rang	Tug	ABS(ES)	-	128	23.22	7.4	
2	B. S. P. T. K. III	P.T. Pertamina Tong Rang	Oil Barge	"	600	-	33.75	12.3	
3	K.R. BONEGOR-2	P.T. Borecon	Fishing Boat	ISI(AS)	55.46	-	28.6	5.6	
4	K.R. SUNGAI JANG-1	P.T. Arela Tarbang	Cargo	ISI(AS)	300	-	33.8	7.5	
5	K.R. BONEGOR-7	P.T. Borecon	Fishing Boat	"	50.69	-	30.08	5.85	
6	K.C.P. KUNJASSET	C.V. Pallias	Cargo	ISI(AS)	180	-	27.61	6.11	
7	K.R. PALW BUDO	P.T. Kartika Balera	"	"	195	-	35.00	6.9	
8	K.R. PULAU LAUT	P.T. Siantan Coy	"	"	300	-	43.42	7.3	
9	K.R. SUNGAI JANG-1	P.T. Arela Tarbang	"	"	300	-	33.8	7.5	
10	KOTOR BAJI POLISI-251	Kondor VIII Salsitra	Light-Sealing Boat	- (ES)	5	-	9.0	3.2	
11	DBB P.C.S.C.-7	P.T. Pertamina Tong Rang	Oil Barge	ABS(AS)	540	-	42.8	12.0	
12	DB PERTAMINA SARAPAN III	P.T. Pertamina Tong Rang	"	"	800	-	33.6	10.66	
13	K.P.S.C.-117	P.T. Pertamina Tong Rang	Roaring	- (AS)	7	-	12.5	6.00	
14	PONTON PERTAMINA IV	P.T. Pertamina Tong Rang	Oil Barge	ABS(AS)	550	-	37.37	8.84	
15	K.R. SARAN	Keuskapan Rantau Rantau IRIA	Coaster	ISI(AS)	70	-	26.0	5.20	

SHIP REPAIRING RECORDS (B-1-2) 1976

NO	SALES (Rp1000)			CASE	REPAIRING PERIOD IN DOCK	MANOURS		
	HULL WORK	MACHINERY WORK	ELECTRICAL WORK			HULL WORK	MACHINERY WORK	ELECTRICAL WORK
1		8,050.255			40	30		
2		4,187.34			26	24		
3		1,276.54			5	6		
4		6,228.61			181	150		
5		6,474.32			43	37		
6		28,143.96			34	26		
7		2,001.72			21	17		
8		3,000.00			11	9		
9		1,818.43			32	25		
10		342.00			11	10		
11		2,523.50			12	11		
12		11,850.915			26	26		
13		285.72			2	2		
14		6,558.72			43	18		
15		5,411.84			50	30		

SHIP REPAIRING RECORDS (8-2-1) 1976

	NAME	OWNER	KIND	CLASS	D.V.T.	G.T.	CG	B	B
16	T.B. BARIHO	P.T. Pertamina Tong Rang	Tug	ABS(ES)	93	-	22.26	7.53	
17	R.H. TOUSA	C.V. Kalinantan	Cargo	- (AS)	-	93.24	18.90	6.64	
18	T.B. ANGGRIH	P.T. Pertamina Soltra	Tug	BKI(AS)	80	-	16.80	4.20	
19	T.B. GRUB	P.T. 1968	Tug	RI(AS)	139	-	17.85	4.90	
20	T.B. MARTANA	P.T. Pertamina Tong Rang	Tug	ABS(AS)	-	128.0	29.22	7.40	
21	R.H. KAPITA no.2	P.T. Alfa Kuala Jkt	Fishing Boat	- (AS)	-	523.0	30.10	7.20	
22	R.H. SUNGAI JANG II	P.T. Acha Tarabang	Cargo	BKI(PS)	300	-	33.80	7.50	
23	D.B. MANASA -X	P.T. Pertamina Tong Rang	Oil Barge	ABS(AS)	800	-	27.0	9.90	
24	R.H. KURUUA no.3	P.T. Alfa Kuala Jakarta	Fishing Boat	(AS)	-	523.0	30.10	7.20	
25	R.H. SUNGAI JANG II	P.T. Acha Tarabang	Cargo	BKI(PS)	300	-	33.80	7.50	
26	R.H. PERASAI	P.T. Paprodin Jakarta	Fishing Boat	BKI(ES)	90	-	31.60	6.00	
27	R.H. PERATI	P.T. Paprodin Jakarta	"	BKI(AS)	90	-	36.61	7.20	
28	TK.S.T.B-5	Stralls Engineers(s) 119, Singapore	Barge	- (ES)	550	-	45.00	13.50	
29	TK.007	Port Administrator PKS	Oil Barge	- (PS)	250	-	30.00	6.00	
30	R.H. KURUUA no.5	P.T. Alfa Kuala Jkt.	Fishing Boat	- (AS)	-	523.0	30.10	7.20	

SHIP REPAIRING RECORDS (8-2-2) 1976

	SALES (Rp1000)			COST	REPAIRING PERIOD	PERIOD IN DOCK	MANO-AS		
	ROLL WORK	MACHINERY WORK	ELECTRICAL WORK				ROLL WORK	MACHINERY WORK	ELECTRICAL WORK
16		724.14			5	4			
17		2,000.0			39	23			
18		1,867.23			41	15			
19		3,876.45			31	18			
20		973.35			12	7			
21		2,245.34			26	8			
22		105.0			7	1			
23		1,725.88			42	31			
24		3,422.42			7	7			
25		1,119.38			108	180			
26		1,583.69			5	3			
27		3,722.9			17	4			
28		4,559.49			6	2			
29		-			2	1			
30		2,839.91			37	35			

SHIP REPAIRING RECORDS (1974)

	NAME	OWNER	KIND	CLASS	D.V.T.	G.T.	CG	B	B
31	R.H. PERASAI	P.T. Paprodin Jkt	Fishing Boat	BKI(AS)	90	-	29.50	5.60	
32	R.H. PERASAI	P.T. Paprodin Jakarta	"	BKI(PS)	90	-	27.99	5.50	
33	R.H. PERASAI	P.T. Paprodin Jkt	"	"	90	-	29.50	5.60	
34	D.B. PTC-III	P.T. Pertamina Tug	Oil Barge	ABS(AS)	600	-	33.60	12.20	
35	R.H. SARUNG PANTAI	P.T. Alfa Bandarasin	Fishing Boat	BKI(PS)	90	-	25.94	5.80	
36	T.B. GRUB-1	C.V. Gelat	Tug	- (AS)	5	-	9.00	2.50	
37	ECT. GANTONG	C.V. Gelat	Cargo	BKI(AS)	120	-	27.50	6.00	
38	R.H. KURUUA no.8	P.T. Alfa Kuala Jkt	Fishing Boat	- (AS)	147	-	23.45	7.32	
39	R.H. KURUUA no.7	P.T. Alfa Kuala Jkt	"	- (AS)	147	-	23.45	7.32	
40	R.H. TOUSA	C.V. Kalinantan	Cargo	RI (AS)	-	93.24	18.90	6.64	
41	D.B. PTC-V	P.T. Pertamina Tug	Oil Barge	ABS(AS)	600	-	33.50	12.20	
42	R.H. KURUUA no.6	P.T. Alfa Kuala Jkt	Fishing Boat	- (AS)	147	-	-	-	
43	T.B. RENCING	P.T. Acha Tarabang	Tug	BKI(PS)	-	23.00	-	-	
44	ECT. BUAN GELI	P.T. Polaka	Cargo	"	90	-	26.80	5.40	
45	D.B. PCC-12	P.T. Pertamina Tug	Oil Barge	ABS(AS)	940	-	44.70	12.30	

SHIP REPAIRING RECORDS (1976)

	SALES (\$1000)			COST	REPAIRING PERIOD	PERIOD IN DOCK	WORKS		
	HULL WORK	MACHINERY WORK	ELECTRICAL WORK				HULL WORK	MACHINERY WORK	ELECTRICAL WORK
31		3,637.43			24	8			
32		19,832.32			67	23			
33		3,637.43			13	8			
34		1,967.68			27	21			
35		7,575.32			62	9			
36		-			19	13			
37		7,293.35			31	30			
38		6,665.64			43	14			
39		6,663.50			42	9			
40		157.97			5	5			
41		938.45			21	13			
42		4,717.95			36	13			
43		22,541.09			187	150			
44		8,911.29			207	30			
45		1,351.55			19	12			

SHIP REPAIRING RECORDS (1976)

	NAME	CARRIER	TYPE	CLASS	D.V.T.	G.T.	TON	H	0
46	T.B. RIJANG	P.T. Anala Padang	Tug	BSI(S)	-	128	24.60	7.60	
47	O.B. BANGKAL-III	P.T. Pertamina Tug	Oil Barge	ABS(S)	800	-	33.00	9.00	
48	K.A. BORECOM-I	P.T. Borecom	Fishing Boat	BSI(S)	95	-	21.60	5.60	
49	O.B. BICCOL-I	P.T. Pertamina Tug	Oil Barge	ABS(S)	800	-	33.62	10.67	
50	EEF. SIFOL C41	P.T. Polcho	Cargo	BSI(S)	215	-	32.80	7.50	
51	OPB. P.O.S.C.-VIII	P.T. Pertamina Tug	Oil Barge	ABS(S)	940	-	42.70	12.25	
52	K.R. SIANTAR	P.T. Siantan	Cargo	BSI(S)	300	-	43.00	7.30	
53	K.R. BATA	Bijaya Perla	Patrol Boat	BSI(S)	60	-	26.50	4.50	
54	T.B. SIKATA	P.T. Inec	Tug	BSI(S)	-	133	13.85	6.30	
55	O.P.B. P.O.S.C.-VIII	P.T. Pertamina Tug	Oil Tug-der	ABS(S)	940	-	42.65	12.28	
56	K.M. RINGS TIKSER	P.T. Central Timber Jack Corp	Fishing Boat	BSI(S)	40	-	29.50	3.25	

SHIP REPAIRING RECORDS (1976)

	SALES (\$1000)			COST	REPAIRING PERIOD	PERIOD IN DOCK	WORKS		
	HULL WORK	MACHINERY WORK	ELECTRICAL WORK				HULL WORK	MACHINERY WORK	ELECTRICAL WORK
46		1,778.53			24	8			
47		2,433.43			27	24			
48		7,118.68			34	25			
49		2,067.64			32	23			
50		7,136.97			67	27			
51		2,710.39			29	13			
52		5,068.32			48	53			
53		3,942.00			29	20			
54		5,298.43			38	29			
55		2,964.86			22	15			
56		7,643.81			43	40			

13 YARD FACILITIES

① BERTH & DOCK

NO.	NAME & TYPE	DIMENSION		MAX. SIZE OF SHIP						D.W.T.	# GSE
		L (M)	B (M)	APP (M)	B (M)	D (M)	D (M)	G.T.			
1	NO.1 Slip way with side track	70	3.20	50	12.4	-	3.4	500		6A	
2	NO.2 Slip way with side track	70	3.20	50	12.4		3.4	500		"	
3	NO.3 Slip way with side track	50	2.40	35	12.4		2.1	200		"	
4	NO.4 Slip way with side track	50	2.40	35	12.4		2.1	200		"	
5	NO.5 Slip way with side track	50	2.40	35	12.4		2.1	200		"	

② CRANES

	# TYPE	MAX. LIFT LOAD	MAX. ELEVATION	MAX. REACH	NUMBER	LOCATION
1	R.C.	3 T	8 m	2.75 m	1	
2	O.R.C.	0.5 T	7.5 m	17 m	1	Plate shop
3	T.C.	0.5 T			1	
4	O.W.C.	7.5 T	3.45	9.30	1	Machine shop

③ YARD & SHOP

Stage & Shop	Total area	Area (m <sup>2</sup> )	
		Shop area	Slab area
Shipbuilding			
Steel stock yard	1,117m <sup>2</sup>		
Fabrication shop			
Subassembly shop & yard	456m <sup>2</sup>		
Assembly shop & yard			
Grand assembly yard			
Block stock yard			
Berth & Dock			
Pipe shop	220 m <sup>2</sup>		
Pipe stock yard	152m <sup>2</sup>		
Machinery shop	350m <sup>2</sup>		
Carpenter shop	500		
Plater shop	631.0		
Electrical shop	150		
Painting shop			
Outfitting shop			
Rigging shop			
Iron & Casting shop			
Warehouse	2043		
Mould loft	1000'x1, 500'x1		
Drawing room	1000'x1		
Repairing			
Berth & Dock			
Mill shop			
Machinery shop			
Outdoors working area			
Stockyard			
Warehouse			
Overfall			

④ MACHINERY & EQUIPMENT

	TYPE CAPACITY	LOCATION	NUMBER
EX			
1	Bending Roll 6m <sup>2</sup> 1962	Plate Shop	1
2	Plate Shear 6m <sup>2</sup> 1960	"	1
3	Press 1964	"	1
4	Drilling Machine 25 hp/rd 1962	"	1
5	Grinding Machine 3200/rd 1962	"	1
6	Welding transformer 210 Amp 1974	Welding Shop	8
7	" 225 Amp 1974	"	1
8	" 600 Amp 1964	"	2
9	Welding Converter 300 Amp 1962	"	3
10	" 600 Amp 1963	"	2
11	Acety line generator 2.5 hp/cm <sup>2</sup> 1963	"	5
12	Pipe bending machine 500/rd 1962	Pipe Shop	1
13	Thread cutting machine 500/rd 1963	"	1
14	Lathe 2500m x 1100m 1965	Machine Shop	3
15	" 1000m x 1600m 1961	"	1
16	" 600m x 1200m 1961	"	1
17	Vertical drilling machine 250/rd 1962	"	2
18	Horizontal drilling machine 15000/rd 1961	"	1
19	Horizontal milling machine 600x3000m 1961	"	1
20	Turning Machine 6000/rd	"	1
21	Press 1961	"	1
22	Pack saw 125m 1962	"	1
23	Tool grinding machine 2000/rd 1963	"	1
24	Grinding machine 3500/rd 1962	"	1
25	Surface grinder 220/rd 1961	"	1
26	Wood lathe 300x1200m 1961	Wood Machine Shop	1
27	Circular saw 4100/rd 1961	"	1
28	Band saw thickness 30m 1961	"	1
29	Planing machine 600m wide 1961	"	1
30	Drill 5/8" 1962	"	1
31	Sanding machine 1200/rd 1961	"	1
32	Drilling machine 1961	"	1
33	Steam boiler 1962	"	1

MACHINERY & EQUIPMENT

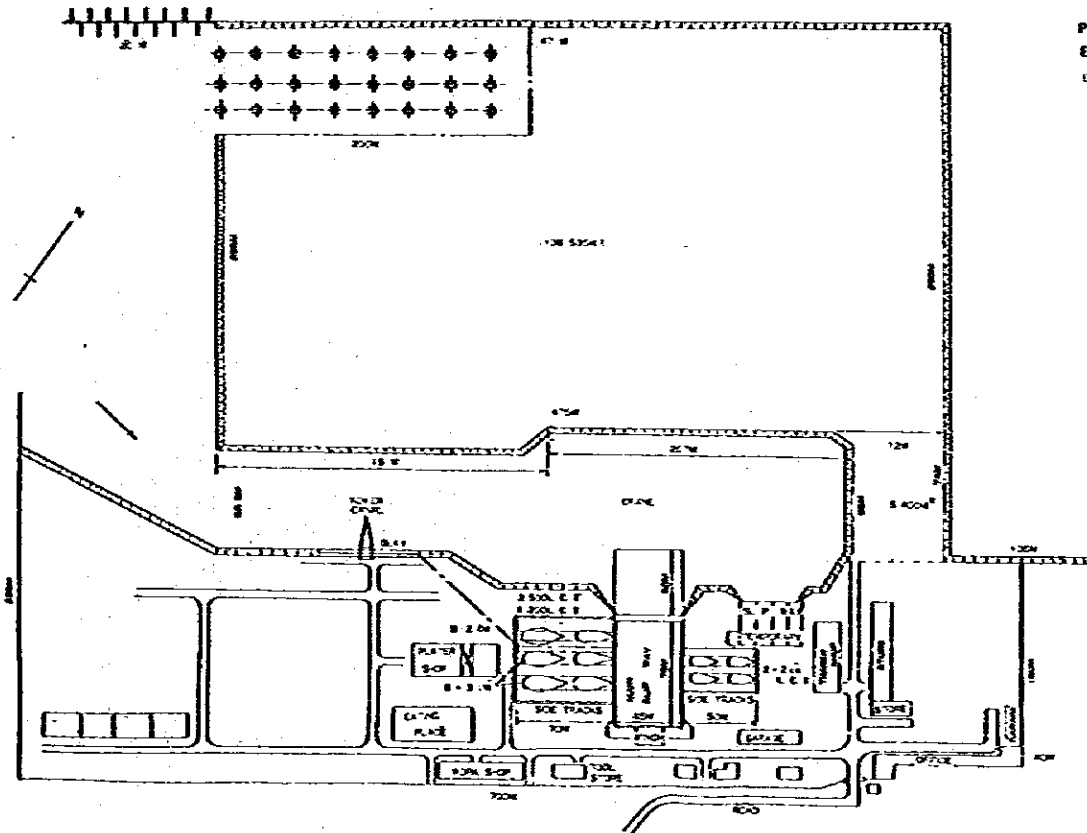
	TYPE CAPACITY	LOCATION	NUMBER
34	Sewing machine 1963	Wood Machine Shop	2
35	Cold winding machine 11hp/rd 1964	Electric Shop	1
36	Furnace 1.5m <sup>3</sup> 1962	"	1
37	Desk 1.5m x 1m	Drawing room	2
38	Calculator 50AM	"	1
39	Flanmeter	"	1

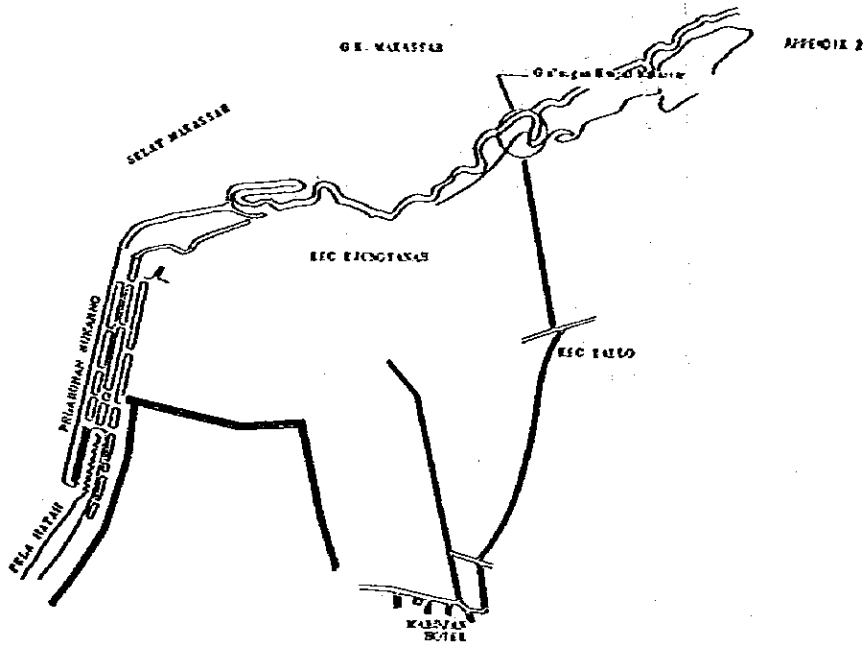
⑤ Utilities

Items	Capacity
Electric Power	P.L.N. 250 K.V.A.
Drinking & Industrial Water Facilities	City water line 10 Ton/day
Compressed Air Facilities	8 kg/cm <sup>2</sup> x 50 m <sup>3</sup> x 2
Acetylene & Oxygen Facilities	1925 Cu-ftide 15.6 T/year ac. 50 kg/day Oxygen 10.509 m <sup>3</sup> /year
Water pollution Control Facilities	No
Others	No

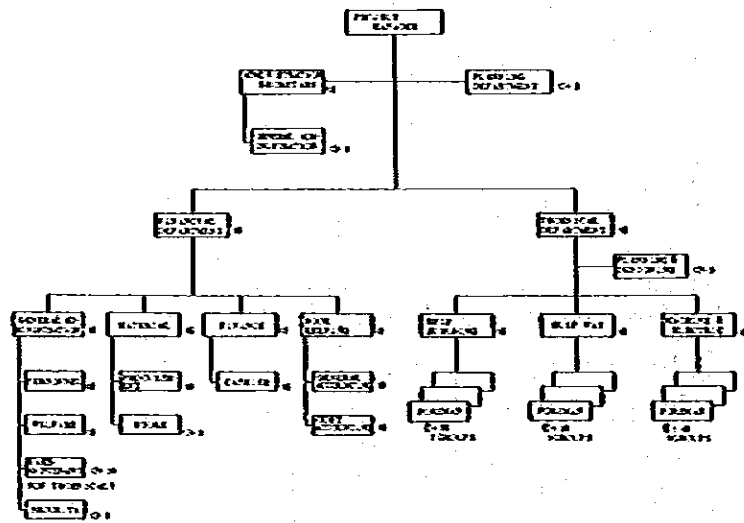
APPENDIX I

P.T. IKI MAKASSAR  
Existing lay out  
(Scale 1:2500)





ORGANIZATION GELANGAN KAPAL MAKASSAR



## IV. P.T. Perushan Dock dan Perkapalan BIANE

### 1. General Situation

#### 1-1. Introduction

Atlen is one of the main ports in Maluku district, and also an important fishery base. There are many fishing companies under joint management with foreign enterprises, and a large number of fishing ships come into this port every day. So it has substantial locational advantages for a dockyard.

BIANE Dock was founded in February, 1965, on the floating dock transferred from a Dutchman named Vereloo *Verf*. Since then this dockyard has been engaged chiefly in repair work of fishing ships belonging to a fishing company under joint-management with a Japanese enterprise, and recorded almost no newbuilding turn-out except only one 96GT ferry boat which was completed and delivered in October, 1971.

Collection of bills for fishing ship repair work is quite smooth, and all the bills are paid on delivery or within 14 days after delivery. So the financial condition of this dockyard is quite excellent, and the company has no debt and is covering all the money for business operation by its own funds.

This dockyard is positively promoting its plan of improving the repair technique to cope with the recent modernization of fishing facilities, and is occasionally sending engineers abroad for their technical enlightenment and inviting foreign engineers for employee's training.

Mostly most fishing ships are equipped with freezer facilities, and there is a substantial call for freezer repairing. But for lack of knowledge and technique of the mechanical system of freezers, the dockyard is not yet in a stand to accept such repair orders. The dockyard is ready to send engineers for their technical training if any company offers an aid in this matter. Thus the attitudes of this dockyard toward technical introduction and improvement are really progressive.

The workers, on the other hand, are rather indifferent to "technical feeling" and like to learn the working procedure. This often causes delay in working schedule, and the dockyard is also positively promoting the spot training of skilled workers to lead the others.

#### 1-2. Conditions of Location

As already stated, this dockyard is located in a fishery base where a large number of fishing ships come in every day, and occupies a vantage ground for profitable business operation.

The water depth around the floating dock is 13 meters, and in front of the dockyard is about 10 meters or over.

In spite of this sufficient water depth, the dockyard is not so favored by marine and meteorological conditions. The base of the slipway tip under the water is sometimes washed by the swift current, and requires constant check. And in some cases, the floating dock must be moved behind the island nearby to avoid strong wind.

All the electric power required for the dockyard is supplied from the private power plant of its own, and only the electricity for office lighting at night relies on commercial power service.

#### 1-3. Shop Facilities

Reconstruction work of replacing the foundation for the relative part of the slipway under the water with a concrete base is now going on so as to protect the slipway from the swift current.

The machine shop is well-equipped, and seems sufficient for repairing work of small-sized fishing ships and also of other types of vessels.

The floating dock is moved behind the island approximately 400 meters from the dockyard, and the communication between the dockyard and the floating dock is maintained by a tugs with outboard engine.

The past turn-out for newbuilding of steel vessel is only one 96GT car ferry, and consolidation of the newbuilding facilities is one of the problems to be solved in the near future.

#### 1-4. Organization and Employees

This dockyard has a total of 230 employees, and 68 of them have academic careers in high schools or higher educational institutes, and 140 of them have experience of more than five years. This means that about one-fourth of the total employees are educated workers, and more than half are experienced workers.

The director supervises three departments of operation and production, financial, and personnel, and the operation and production department has slipway, floating dock, design, new ship and work shop, and store sections. These sections form the productive division.

#### 1-5. Production Management and Production Technique

The floating dock and the dockyard are connected by a tugs with outboard engine. The dock and the repair shop are connected by a communication boat. This is also true of the communication between the dock manager and the director. Thus the communication between the managerial staff and the work spots is not a direct communication, and the managerial control is indirect.

The main work of this dockyard is repairing of foreign fishing ships, and the facilities of these fishing ships are being modernized year after year. So the repair technique must keep pace with it. This dockyard is weak only in respect of the freezer repairing and trying to acquire this technique most urgently, though the technical level of other repair work is gradually going up by the consistent training of dockyard engineers.

#### 1-6. Production Efficiency and Term of Work

The dockyard is energetically promoting the technical training of intermediate managerial staffs admitting the fact that most workers lack "technical feeling". But judging from the statistic data, the repair work of this shipyard is quite efficiently carried out. The man-hours per tonnage of steel constructed, for instance, are 2000 which are almost half of those recorded in most other shipyards.

The past turn-out of newbuilding, on the other hand, is only one 96GT car ferry, and the man-hours per tonnage of steel processed for hull construction is 2,500. This indicates that a drastic reorganization of both the processing schedule and the production management is essential for the future newbuilding plan.

The term of check work is said to be two days from the check order acceptance.

#### 1-7. Design

The design section is staffed with three designers, and all the necessary drawings are domestically available.

#### 1-8. Material Procurement

The procurement of spare parts takes one month by way of Jakarta, and often causes delay in the repair work. The annual consumption of materials is as follows.

Steel plates	18 tons
Welding rods	1.25 tons
Paints	2.151 tons
Pipes	0.443 tons

#### 2. Problems

2-1. This dockyard is advantageously located in an important local port and fishery base and the business operation is stabilized by sufficient orders for fishing ship repair in spite of the rather disadvantageous marine and meteorological conditions. As already stated, the business operation money is completely covered by self-funds. The facilities for ship repairing work are occasionally renewed to improve the production efficiency. The dockyard is energetically promoting the policy of acquiring new repair technique to cope with the steady progress in marine facilities, and the whole business seems to have a brilliant future.

2-2. As for the newshipbuilding of steel vessels, the problem of facilities consolidation still remains unsettled.



111 QUESTIONNAIRE

1. General

- 1) Layout of shipyard (appendix 1) WAHANE DOCK
- 2) Location and map (appendix 2) ALHANI Road, A-bon, Osaka
- 3) Area: Area of premises  
Area of production  
Area of production
- 4) Annual production capacity  
New shipbuilding 1977年 SOGI Car Ferry 1隻建造(6件)の計画が  
あり、  
Shiprepairing 8,262 G/T 10,500 DM
- 5) Water depth: Floating Dock 周辺13m、最近有最深10m以上の水深がある。
- 6) Tides: 5m
- 7) Current: 潮流は速いが、工事には支障がない。然しShipwaysの先端部は潮流の激しさを受け、下部支柱が多少の支障を受けることがあるので常に注意を要する。

- 2. Yard expansion plans: Yes  
No

3. Organization and number

- 1) Tree diagram (appendix 3)
- 2) Number of employees for each rank 230 persons in all  
Director and manager \_\_\_\_\_ persons  
Section chief and sub section chief \_\_\_\_\_ persons  
Foreman and group chief \_\_\_\_\_ persons  
Worker \_\_\_\_\_ persons
- 3) Family structure of education  
S.D. Elementary school (6 years) \_\_\_\_\_ persons  
S.L.T.P. (S.M.D., ST ...) Secondary school (3 years) \_\_\_\_\_ persons  
S.L.T.A. (S.M.A., S.T.M.) High school (3 years) 50 persons  
KODOKU College (3, 4 years) 8 persons  
UNIVERSITY (4, 5 years) 18 persons

- 4) Annual supply of H.A. and workers  
1971 1972 1973 1974 1975 1976  
H.A. 12年以内6名以内1名 H.A.  
Workers 年間10名程度採用

- 5) Overtime allowance for each hour 3-4)  
一律1時間当たり Rp. 300
- 6) Ratio of annual salary -5)  
平均 Rp. 20,000
- 7) Welfare equipment -6)  
新築住宅は全部会社負担  
Managerに対する住宅貸与(敷金)
- 8) Meal supply -8)  
Lunch: 昼食給食あり  
Dinner: \_\_\_\_\_
- 9) Traffic expense -9)  
Manager及びChief of sectionにのみ支給(但し、海外の者に限る)
- 10) Insurance -10)  
疾病補償あり
- 11) Safety for worker -11)  
労働者の安全法則を遵守している
- 12) Training of worker -12)  
6人海外派遣の計画がある。現在2人日本で研修中。  
1976年3人をSingaporeのLandonのtraining centerに派遣、及び6人  
をSingaporeにtrainingのため派遣。  
年間平均3人を研修する予定にしている。 留年奨励あり

4. Subcontractor

- 1) Kind of skill: \_\_\_\_\_  
Number of workers: \_\_\_\_\_  
Vape: \_\_\_\_\_
- 2) Degree of skill: \_\_\_\_\_
- 3) Number of company: \_\_\_\_\_

5. Tools

- 1) Size of tool store: \_\_\_\_\_
- 2) Main tools -5)  
a) Air Hammer, grinder, drill  
b) Electric 3 air compressors  
c) Hydraulic Jack, press 200 T, Shearing machine (刃板刃長12m)  
d) Hammer, spawer, etc.  
作業を行うのに十分を数量を保有している。

6. Productivity

- 1) New Shipbuilding
  - a) Run-hour
- | Type, Kind, No. of typical Ships | Ball Weight | Par-Dowes (Ball Part) | Total Par-Dowes |
|----------------------------------|-------------|-----------------------|-----------------|
| I Car ferry 30 47                | 42 T        | 100,000 H             | 183,000 H       |
| II                               |             |                       |                 |
| III                              |             |                       |                 |

Referential indices for english translated from Japanese partially in Questionnaire

( Code No. )

(Contents of Answer )

- 1-4) The actual business turn-out is only one 90 of car ferry built in 1977.
- 5) The water depth around the floating dock is 13 meters and in front of the yard is more than 10 meters.
- 7) The yard work itself is not affected by the swift current but the low support of the base under the slipway end is often undermined by the current and requires constant inspection.
- 3-4) 6 in these 12 years. (1 H.A.) About 10 workers are newly employed annually.
- 5) Evenly Rp. 300 per hour.
- 6) Rp. 20,000, average.
- 7) All the medical expenses are covered by the company. Managers are granted the use of company houses, free of charges.
- 8) So, called.
- 9) Supplied only for managers and section chiefs, confined to those residing outside the urban district.
- 10) No fraternal insurance system.
- 11) Subject to the safety regulations issued by the Ministry of labour.
- 12) 6 workers have been sent abroad for technical training so far and 2 are now being trained in Japan. In the year 1976, 3 workers were sent to the training center in London for technical training, and 6 were sent to Singapore for the same purpose. Actually 3 workers are scheduled to be trained likewise in the future.
- 4.- 30 subcontractors have ever been employed
- 5-2)-c) Cutting thickness of plate is 12mm.
- 5) The yard owns a sufficient number of these tools for the present work volume.

- b) Hull construction 2,579 hours/Ton
- c) Hull construction 船体全長160m 船体重量 cost/Ton
- d) Construction period

1) 船底不明、進水不明、予設1977年10月  
11) —

2) Ship repairing

- a) Total gross tonnage per year: 8,260 Gt/year
- b) Total man-hours per year: 658,320 hour/year
- c) Total sales amount per year: Rp. 234,000,000 /year
- d) Man-hour/steel ton (in the case of steel replacement): 200 hour/Ton
- e) Rp. 25,000 sales/Gt
- f) Rp. 2,500,000 sales/ship
- g) Repairing period
  - 1) Annual survey 50 days
  - 11) Special survey 10 days

7. Material procurement

Item	Purchase Price	Where Purchased from	Order-to-Delivery Time	Stock Amount	年別使用量
Main Engine		輸入業者より			
Generator		"			
Steel Plate	Rp. 550/kg	Local	-	1.5 months	10 T
Profile	-	-	-	-	-
Welding Rod	Rp. 500/kg	Local	既得	-	1.25T
Paint	Rp. 1500/kg	Local	既得	-	2.453T
Pipe	Rp. 28,000 60 for 2.5"	Local 近距離のパイプは 船内から購入	既得		0.445T
Wood	-	Local	既得	-	
修繕用品等	-	Jakarta 船内	1ヶ月		

8. Design

- 1) Number of Designers 3 persons
- 2) Drawing list 一般図面、中央図面、船底、機室等図面、船体重量図面等
- 3) Drawing method
  - Pen
  - Pencil
- 4) Photo copying machine 1 unit

9. Construction techniques

- 1) Gas cutting work 気割りは量が多いが、必要に応じて grinder 仕上げをする  
ることである。一般的である。
- 2) Welding work 特に欠陥は見当たらない。
- 3) Bending method 全量加工が主体で、熱加工は少ない。
- 4) Fairing work 特に気流する部分なし。一般的に技術水準である。
- 5) Marking work 修繕作業が多く Marking work は少ない。

10. Factors to be noted on shipbuilding & repairing

- 1) Design —
- 2) Material procurement 輸入品の入手に時間を要する。
- 3) Construction —
- 4) Manpower shortage Technical feeling に乏しく、作業手順が理解できていない  
ため作業の遅延に繋がります。熟練した従業員が欲しい。
- 5) Unsatisfactory quality —
- 6) Schedule behind 輸入品の遅延に起因する。  
技術水準が低いための工事遅延も発生。
- 7) Inspection trouble 検査や決まり日を要する。
- 8) Others  
多数の修理手帳の管理が難しくなっている。技術がないため受注できない。  
修繕の受入れを断るため多くの修理手帳を返却している。

6-11-c)  
-d)

So reply, no data.

Both data of keel laying and launching are unknown.  
date of delivery is Oct. 1977.

7-"Item"

- "Main Engine"
- "Welding Rod"
- "Paint"
- "Pipe"
- "Wood"
- " --- "

Annual consumption

Not purchased so far  
Instant  
Instant  
Line galvanized pipes are purchased ahead.  
Instant  
Instant  
Repair machines & parts  
by way of Jakarta, 1 month

2-2)

All the necessary drawings such as general arrangement drawing, midship section drawing, line drawing, engine room arrangement drawing, graphic drawing (like displacement chart) etc.,

9-1)

Cut surfaces are not smooth, and require grinding finish on occasion demands. the technical level is average.

-2)

No particular deficiency is found.

-3)

Coating work is very little, as this yard is mainly engaged in repairing small-sized ships.

-4)

Nothing to be specified here. the technical level is average.

-5)

Marking work is very little, though the volume of repair work is quite substantial.

10-2)

Procurement of imported materials takes much time.

10-3)

Most of present workers lack "technical feeling" and slow in learning the working procedure, therefore, the production schedule is apt to be delayed and the yard is looking for skilled workers.

-6)

Purchase of imported goods takes much time and the term of work is often prolonged due to the deficient level inspection.

7)

It takes 2 days after the check after acceptance to start the actual inspection.

-8)

There is an increasing demand for repair work of freezing system of fishing ships, but for lack of the relative technique, such repair orders are virtually unacceptable. the yard has an intention to send engineers to any country if there is a company to offer the relevant technical training.

13 YARD FACILITIES

① BERTH & DOCK

NO.	NAME & TYPE	DIMENSION		MAX. SIZE OF SHIP					G.T.	D.W.T.	# USE
		L (M)	B (M)	LP (M)	B (M)	D (M)	D (M)				
1	Slipway Repair	150	7					500T		R	
2	Slipway Repair	130	4					200T		R	
3	Slitting Dock	100	22					2000T		R	

② CRANES

	A TYPE	MAX. LIFT CAP.	MAX. ELEVATION	MAX. REACH	NUMBER	LOCATION
1	R.C.	5 TON				
2	Fork lift	0.5 TON				

③ YARD & SHOP

Stage & Shop	Total area	Area (sq)	
		Shop area	Slab area
Shipbuilding			
Steel stock yard			
Fabrication shop			
Subassembly shop & yard			
Assembly shop & yard			
Grand assembly yard			
Block stock yard			
Berth & Dock			
Pipe shop	90x2x3		
Pipe stock yard			
Machinery shop	455x2x3		
Carpenter shop	90x2x3		
Plater shop	125x2x3		
Electrical shop	52.5x2x3		
Painting shop			
Outfitting shop			
Rigging shop			
Iron & casting shop			
Warehouse	150x2x3 375x2x3		
Welding shop	115x3x2x3		
Roof loft	52.5x2x3		
Braving room	85x2x3		
Repairing			
Berth & Dock			
Hull shop			
Machinery shop			
Outdoors working area			
Stockyard			
Warehouse			
Quarrel			

④ MACHINERY & EQUIPMENT

	TYPE CAPACITY		LOCATION	NUMBER
EX				
1	Sand blasting 7kg/cm <sup>2</sup>	1972	Plate Workshop	3
2	Plate Shear 12m <sup>2</sup>	1972	"	1
3	Rolling Press 250 Ton	1972	"	1
4	Pneumatic Chipping chisel 7kg/cm <sup>2</sup>	1969	"	1
5	Drilling Machine 32m <sup>2</sup>	1969	"	1
6	Planer 600m <sup>2</sup>	1968	"	1
7	" 500m <sup>2</sup>	1967	"	1
8	Grinding Machine 310m <sup>2</sup>	1968	"	1
9	Furnace Pan-Cast		"	2
10	Working Table 2.5m <sup>2</sup>		"	1
11	Welding Generator 300 Amp	1968	Welding Workshop	2
12	" 400 Amp	1968	"	1
13	Welding Transformer 145 Amp	1966	"	2
14	" 125 Amp	1966	"	2
15	" 92 Amp		"	1
16	Welding Converter 150 Amp	1966	"	1
17	Welding Place 1900J	1975	"	1
18	Acetylene generator 5kg	1975	"	1
19	" 5kg	1976	"	2
20	Cutting Torch		"	3
21	Cutting floor 500m <sup>2</sup>		"	1
22	Pipe bending Machine 8/12"-61"	1973	Pipe Workshop	1
23	Bending Table 6m <sup>2</sup>		"	
24	Worktable 3.11m <sup>2</sup>		"	1
25	" 3.11m <sup>2</sup>		"	1
26	" 2.5m <sup>2</sup>		"	1
27	" 0.5m <sup>2</sup>		"	1
28	" 2m <sup>2</sup>		"	1
29	Lathe 4500x1000	1963	Machinery Workshop	1
30	" 4500x1500	1963	"	1
31	Turret Lathe 4500x3500	1968	"	1
32	" 4500x5000	1968	"	1
33	Vertical Drilling Machine 60m <sup>2</sup>	1968	"	1
34	Vertical Drilling Machine 25m <sup>2</sup>		Machinery Workshop	1
35	Horizontal Milling Machine 600x200	1968	"	1
36	Table Planer 2 1/2 x 1 1/2 m		"	1
37	Table Planer 3x2m		"	1
38	Planer 350m <sup>2</sup>	1967	"	1
39	" Hand saw 250m <sup>2</sup>	1975	"	1
40	Tool Grinding Machine 150m <sup>2</sup>	1976	"	1
41	Grinding Machine 250m <sup>2</sup>	1968	"	2
42	Portable Grinder	1973	"	1
43	Universal Grinder	1970	"	1
44	Braving floor 7x3m		Roof Loft	1
45	Braving Board (table) 2x1.15m		Braving/Best-spring Room	1
46	" 2x1.15m		"	1
47	" 2x1.15m		"	1
48	Braving Board (table) 2x1.15m		"	1
49	Braving Drilling Machine CASIO FX-101		"	1
50	Plastimeter		"	1
51	Integrator		"	1

⑤ Utilities

Items	Capacity
Electric Power	自來電 1 x Generator 150 KVA 自來電 1 x Generator 150 KVA
Drinking & Industrial Water Facilities	自來水 1 日 10 噸
Compressed Air Facilities	2 台 X Compressor
Acetylene & Oxygen Facilities	-
Water pollution Control Facilities	-
Others	Sand Blast 1 台 Water Jet 1 台 75 kg/cm <sup>2</sup>

⑤-(5)-"electric power"

Capacity 1  
supplied from the private power plant of its own, 1 generator 150 KVA.  
At night 1  
only the office lighting electricity relies on commercial power service.

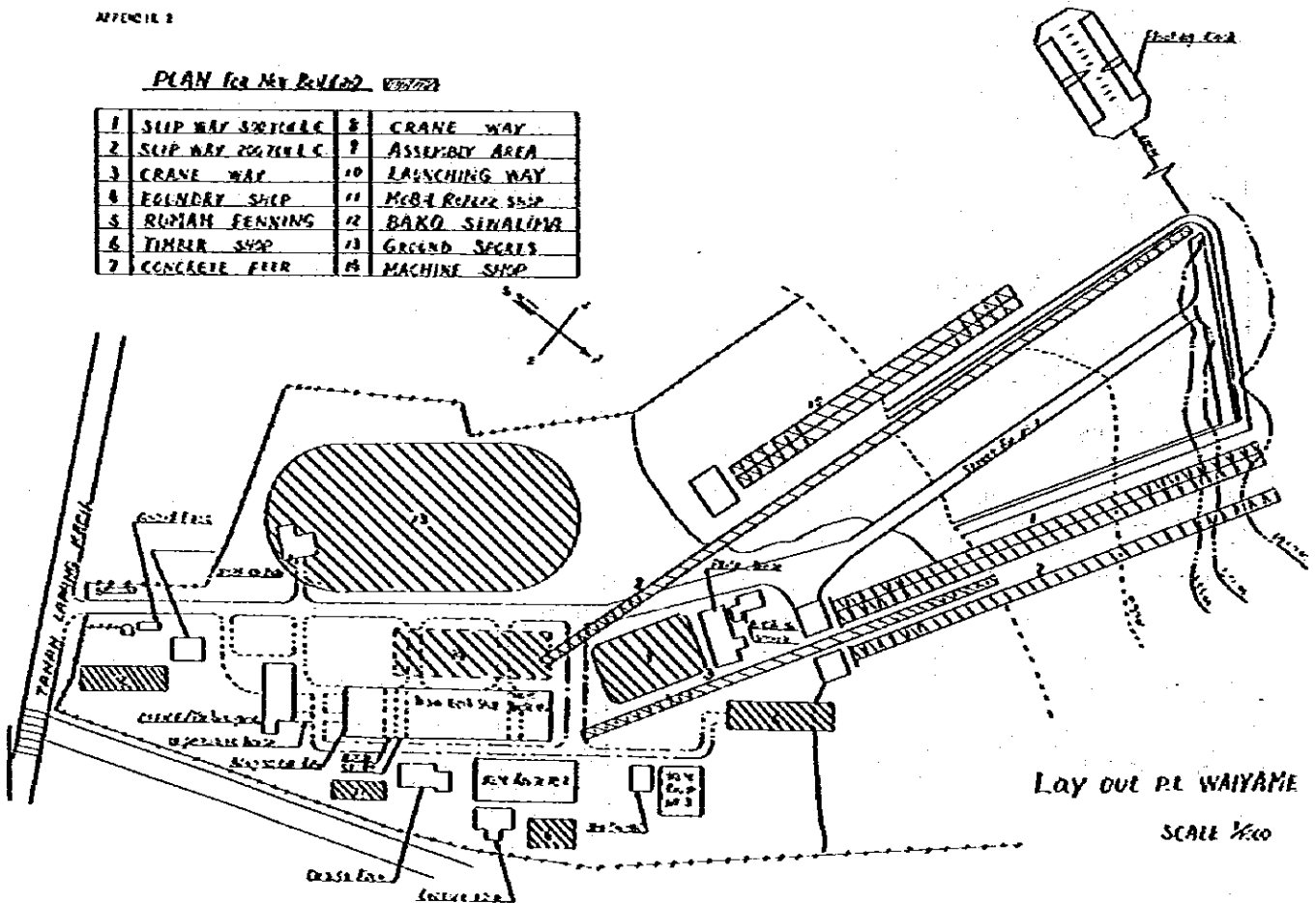
"Drinking & Industrial water facilities"

A well in the yard, acquired water volume is 1 T/day.

APPENDIX 2

PLAN FOR NEW BUILDING

1	SLIP WAY SOUTH	8	CRANE WAY
2	SLIP WAY NORTH	9	ASSEMBLY AREA
3	CRANE WAY	10	LAUNCHING WAY
4	FOUNDRY SHOP	11	MECH. REPAIR SHOP
5	RUMAH PENING	12	BAKO SINALOMA
6	TIMBER SHOP	13	GROUND STORAGE
7	CONCRETE FILL	14	MACHINE SHOP



## XVI. PERTAMINA DOCK DUMAI

### 1. General Situation

#### 1-1. Introduction

This shipyard is situated in the main island of Sumatra on the other side of Bayat Island half way down the Strait of Malacca.

The north-eastern coast of Sumatra is a swamp and flood area covered with thick jungles.

The city of Dumai was developed in 1950's as a leading port of high quality crude oil produced in that famous Minas, Pontal, and Duri, and about 80% of the crude oil which Indonesia exported to various countries was sent off from the port of Dumai.

In 1970 the construction of Dock Dumai was initially planned as a repair base of oil tankers belonging to Pertamina, and in 1972, the dockyard was established in the jungle.

The dockyard started its business with only one floating dock of 20,000 TPC and a working boat moored approximately 1km from the coast, as sea area of 100 to 150 meters from the coast line was covered with mud. The water depth of the sea area more than 1000 meters off the shore is 10 to 20 meters. In 1974 the coastal area was dredged and a wooden jetty of about 250 meters in length was constructed at a right angle to the coast line. Now the floating dock and the working boat are moored in parallel with each other perpendicularly to this jetty projecting into the sea.

There is no outfitting way because no water front is obtainable along the coast line. So the only way usable as a outfitting way is the shore side end of the floating dock.

The largest vessel that has ever entered this floating dock is the 35,000 DWT tanker which came in in the year 1974. The main business this shipyard is engaged in is such simple work as bottom cleaning, painting, shaft repairing, etc.

The working boat is equipped with a full set of repair facilities like shop machines, forging machines, electrical machines, etc., but the size of the vessels perfectly repairable here is confined approximately to 10,000 DWT because the size of the repairing materials carried into this working boat is limited.

Reconstruction of the present warehouse standing on the ground area into a machine shop is now being planned to settle this problem and to make full use of the dock potential.

The repairing materials, however, will have to be transferred from jetty to machine shop by forklift and the problem of connection between dock and machine shop still remains unsettled.

Construction of a new floating repair shop may be one of the conceivable measures to drastically resolve this problem.

#### 1-2. Conditions of Location

The neighbouring port of Dumai is the largest crude oil loading port in Indonesia, and at the same time, the marshalling port of the tankers

belonging to Pertamina to send off the petroleum products for the domestic markets. So this locational condition makes Dock Dumai more meaningful as a ship repairing base.

On the other hand, these parts of sea area lying near the shore are mud, and water front construction is almost impossible. Furthermore, the current in this narrow strait is swift, and the floating dock must be moored in parallel with the coastline. Thus the natural conditions are quite restrictive.

#### 1-3. Shop Facilities

The 20,000 TPC floating dock is 127m x 45m in size, and as previously mentioned, it has an experience of having accepted a 35,000 DWT tanker.

The 12500 working boat is 155.0m (LBP) x 23.0m x 7.6m in size, and equipped with a full set of repairing facilities such as machine shop, boiler shop, plate shop, electric shop, carpenter shop, etc. These shops are separated by dock and jetty, and transportation of repairing materials inside the working boat is not easy.

When the installation of shop machines stopped or kept in the working boat is finished as originally planned, the repairing capacity will be drastically increased.

#### 1-4. Organization and Employees

This dockyard has a total of 454 employees, and 260 of them are working in the direct division.

The dockyard employs about 100 to 150 workers belonging to subcontractors. These workers are not skilled workers with special technique, and engaged in such auxiliary work as tank cleaning, chain locker cleaning, etc.

#### 1-5. Production Management and Production Technique

The production management of this dockyard is going well as the work is confined to ship repairing and the work spots are concentrated to a relatively narrow area. The method of gas cutting adopted in this dockyard is semi-automatic gas cutting. Cut surfaces are finished by chipping, and also by grinding if necessary.

Welding relies solely on manual work of the employees. The dockyard has 55 qualified overhead welder by GMAW and technical level of the employees is relatively high.

The dockyard owns a training center for the employees of various shipyards belonging to Pertamina, and is training the electric, welding, and machine workers. The dockyard has also sent many workers abroad to improve their shipbuilding technique, and is energetically promoting the plan of bringing up technician engineers. It is also interested in adopting such high-level technique as of turbine, radio, electronics, inspection, etc. which most large-sized vessels are more or less involved in.

The dockyard owns a total of 10 electrodes gouging machines, and the finishing is mostly

agreeable. A high level of repairing technique is required of this dockyard in which foreign vessels often come for repairing work.

#### 1-6. Production Efficiency and Term of Work

Man-hours for repair work per tonnage of steel materials recorded so far varies from 2500H to 5000H, but the average man-hours are about the same as of the other shipyards. The average term of repairing work per vessel is four weeks for annual check, and eight weeks for special check. These terms for repairing work are relatively short compared with those of other shipyards.

A high level of technique is required of the repairing work as most ships repaired here are large-sized vessels, and the procurement of imported repairing parts takes much time. For lack of the outfitting quay, a large number of problems remains unsettled. So both production management and process control requires careful attention.

#### 1-7. Design

The design work is only for ship repairing, and the dockyard has only three designers. All the necessary drawings, however, are domestically available.

#### 1-8. Material Procurement

As a rule, all the materials are procured through the procurement headquarters of Pertamina by way of Jakarta. In case of urgent need, how-

ever, any materials can be purchased directly.

## 2. Problems

2-1. Geographically, water front construction is almost impossible. This problem should be settled by introduction of a marine floating type repair shop or some other efficient means.

2-2. The present large capacity floating dock virtually defies efficient operation of the repairing work especially in the case of small-sized vessels. So another floating dock of small capacity (for instance 5,000T) equipped with a outfitting quay should be additionally constructed to improve the dock work efficiency and smooth the dock rotation. It goes without saying that this plan should be promoted in due consideration of the changing trend of repair work volume.

III QUESTIONNAIRE

1. General
- 1) Layout of shipyard (appendix 1) Pektania Dock Bural
  - 2) Location and map (appendix 2) Pargalan Sessal, Bural, Biza
  - 3) Area: Area of premises 2,000 m x 1,000 m
  - Area of production Total area x 2/3 (On planing)
  - 4) Annual production capacity
    - New shipbuilding - B/V (6/7)
    - Shiprepairing 104,400 B/V (6/7)
  - 5) Water depth: 100-110 m from shore as depth of mud  
10-20 m depending after distance of 1,000 m
  - 6) Tide: 2-3 m
  - 7) Currents: near 2 kt, max 2,3 kt

2. Yard expansion plans: Yes

3. Organization and number

- 1) Tree diagram
- 2) Number of employees for each rank
  - Director and manager (include Junior MG) 454 persons in all
  - Section chief and sub section chief 18 (14) persons
  - Foreman and group chief 80 persons
  - Worker
    - Direct 265 ps
    - Indirect 57 ps
    - 237 persons
- 3) Planning structure of education
  - S.B. Elementary school (6 years) persons
  - S.R.V.P. (S.A.P., ST ...) Secondary school (3 years) persons
  - S.R.V.A. (S.A.A., S.T.A.) High school (3 years) persons
  - AMDAKA College (3, 4 years) 5 persons
  - UNIVERSITY (1, 5 years)

4) Annual supply of H.A. and workers

	1971	1972	1973	1974	1975	1976
H.A.	-	-	-	-	-	-
Workers	-	-	-	-	-	-

- 5) Overtime allowance for each hour
  - 50 % up
  - 休日労働 100 % up
- 6) Ratio of annual salary up
  - Pektania の決定に依り
- 7) Welfare equipment
  - 船長以上の住宅あり、通車可範囲に従業員アパート建設中 Sports center, Recreation center, Hospital 等 Pektania の施設を共有できる。
- 8) Meal supply
  - Lunch: 支給なし、但し Lower time に購買して昼食に充てている。
  - Dinner: 67% を過労者 Over time に支給。
- 9) Traffic expense
  - 船長以上の車と賃金
  - 乗用自動車は支給
- 10) Insurance
  - 失業保険あり (Pektania の決定による適用)
- 11) Safety for worker
  - 従業員を優先し、安全指示を重視
  - Pektania Fire Regulation を適用
- 12) Training of worker
  - Training Center あり
  - 70 men/year (Dock Bural area & other of echelon of Pektania)

4. Subcontractor

- 1) Kind of skill: unknown, as helper
- Number of workers: 100-110 persons
- Wage: Rp. 850/day
- 2) Degree of skill: unskilled
- 3) Number of company: 下請企業といふ企業はない。専ら石炭部提供に過ぎない。 5 group

5. Tools

- 1) Size of tool store: -
- 2) Kinds of tools
  - a) Air: Hammer, grinder
  - b) Electric: drill
  - c) Hydraulic: press 2 台、100T
  - d) Pencil, spanner, etc. Plenty

Referential indices for English translated from Japanese partially in questionnaire

(Code No.)	(contents of answer)
3 - 5)	Holiday work, 100% up.
- 6)	Subject to the decision of Pektania.
- 7)	Section chiefs and other senior staff ranking higher than them are granted to use of company houses. An apartment house for the employees is now under construction in the yard. The employees of this yard can use the sport center, recreation center, hospital and other facilities belonging to Pektania.
- 8)	Lunch is not supplied. However, the allowance for lunch time work calculated in terms of overtime work wages is paid included in the salary. Dinner is supplied in the case of overtime work after 18.00/
- 9)	Section chiefs and other senior staffs ranking higher than them are granted to use company cars. The yard also owns private buses for employees.
- 10)	There is general insurance system, in accordance with Pektania's rules.
- 11)	The yard has a safety committee, and a safety indication system has been introduced, according to the regulations of Pektania.
- 12)	The yard has a training center.
4 - 3)	The yard employs certain sub-contractors, but they only supply workers to labour power.
5 - 2) - c)	2 units of 100T press.

6. Productivity

1) New Shipbuilding

a) Man-hour

	Type, Kind, B/W of Typical SSips	Roll Weight	Man-hours (Roll Part)	Total Man-hour
i)	-	-	-	-
ii)	-	-	-	-
iii)	-	-	-	-

- b) Roll construction — hours/Ton
- c) Roll construction — cost/Ton
- d) Construction period
  - i) —
  - ii) —

2) Ship repairing

- a) Total gross tonnage per year: 104,400 DWT/year
- b) Total man-hours per year: 636,500 hour/year
- c) Total sales amount per year: Rp. 2,262,525,000 /year
- d) Man-hour/steel ton in the case of steel replacement: 2 - 3 kg/ton hour/ton
- e) Rp. 22,672 sales/MT
- f) Rp. 44,364,215 sales/ship
- g) Repairing period
  - i) Annual survey 4 weeks
  - ii) Special survey 8 weeks

7. Material procurement

Item	Purchase Price (Rp)	Where Purchased from	Order-to-Delivery Time	Stock Amount
Main Engine				
Generator				
Steel Plate	275/kg	Local	2 weeks	200 ton
Profile	300/kg	Local/Import	2 weeks	
Welding Rod	250/kg	Local/Jakarta	1 week/2 weeks	
Paint	21,000/ltr 34,000/ltr	Local/Jakarta	2 weeks	250 ton 2 22kg
Pipe	21,000/length P3", Sch 60	Jakarta	2 weeks	
Wood	40,000/m <sup>3</sup>	Local	4 weeks	

8. Design

- 1) Number of designers 3 men 資料調査は Pertamina 委託を  
通じ購入。資料の入手、Jakarta  
の調査出張を済む。輸入  
手続は同業者が作り、Pertamina  
社長の承認を得たのみ資料の  
調査購入が許されている。輸入  
保証に約 3-6 月を要する。
- 2) Drawing list 船体工事計画書
- 3) Drawing method
  - Pen
  - Pencil
- 4) Photo copying machine 2 units

9. Construction Technique

- 1) Gas cutting work Semi automatic gas cutting machine あり、切断面  
は chipping によって仕上げられる。必要に応じて grinder 仕上げを行っている。
- 2) Welding work SS 鋼板厚の 04 鋼の電流電圧である。Class Boat の合意に別し安全技  
術を有している。
- 3) Gouging method  
electrode gouging 10 units あり
- 4) Filling work  
船体工事 only で、外板取替部分について技術的に困難な作業はない。
- 5) Parking work

10. Points to be noted on shipbuilding & repairing

- 1) Design -
- 2) Material procurement  
船体取替の調査に長期が必要とする。
- 3) Construction -
- 4) manpower shortage  
船体工、技術者の不足が深刻である。
- 5) Unsatisfactory quality  
Turbine, Boiler, 電子機器、船体取替に関する品質を改善したい。技術者の質  
が劣悪である。
- 6) Schedule behind  
Water front がなく、dock 内での仕事が長期に必要とする。dock の回転率が遅  
く、工場の遅れの原因となっている。
- 7) Inspection trouble  
品質の自主検査に際して技術者が少ない。海外に研修生を送るなど良策を怠りて  
いない。
- 8) Others  
(1) 工場の作業能力が低下してきている。10,000 DWT 程度の Tanker (Tugboat Vessel)  
の調査は船体取替を含む全ての修理工事に対して支障はない。これ以上の大きさの  
調査になると作業費に多量な差支を発生させている。現在海上に船体  
工場を建設中である。

8.

the materials are procured through the  
headquarter of Pertamina by tender among  
relative distributors.  
Some materials are supplied by the agents  
in Jakarta.  
The import procedure is left to each  
importer.  
If the dockyard belonging to Pertamina,  
only this dockyard is allowed to purchase  
materials directly from distributors in  
the case of urgent need.  
The procurement of imported materials  
usually takes 3 to 6 months.

- 2)

Drawings for repair work.

9 - 3)

Gas cutting is by semi-automatic gas  
cutting machine, cut surfaces are finished  
by chipping, and also by grinding if  
necessary.

- 2)

There are 55 qualified overhead welder by  
oil. The technical level in class boat  
work is satisfactory.

- 3)

10 units of electrode gouging machines.

- 4)

All the work is repair only, and there  
is no technical difficulty in shell plate  
replacement.

10 - 2)

The procurement of imported materials  
takes much time.

- 4)

Employment of skilled workers and of  
engineers is quite difficult.

- 5)

The yard is eager to acquire the technical  
knowledge of turbine, boiler, electronic  
instrument, radio equipment, etc.,  
up-bringing of engineers to cover these  
fields is essential.

- 6)

For the lack of water front, the dock  
work often takes much time.  
The bad rotation of the dock causes delay  
in the processing schedule.

- 7)

There is insufficient number of engineers  
to carry out the spot self-inspection.  
The yard is now positively sending many  
workers abroad for technical training.

10 - 8)

The working space in the working boat  
is limited. However, there is no trouble  
at all in the repair work for any tanker  
(total vessels up to 10,000 DWT  
including the repairing of engine part.  
In the case of larger vessels than the  
above, the repairing parts may not be  
carried into the work spot.  
The yard is now building a machine shop  
in the ground area.



12 SHIP REPAIRING RECORDS (B-1-1) 1976

	NAME	OWNER	KIND	CLASS	D.W.T.	G.T.	HP/0	H/m	B/m
1	PERANA 102	PERTAMINA	TANKER	G.L	8514 T	-	122.272	12.132	9.569
2	PERANA 1007	"	"	L.R	12362 T	-	135	21.4	10.3
3	PERANA 51	"	"	G.L	5000 T	-	58.00	15.20	7.90
4	SCAMET XIV	"	"	OKU	787 T	-	61.50	8.83	3.65
5	SCAMET XV	"	"	H.V	625 T	-	19.75	8.64	5.02
6	PANGAR	"	TUG BOAT	OKU	850 HP	-	26.40	7.21	3.30
7	KAKOP	"	"	"	375 HP	-	18.50	5.43	2.50
8	BONTANG 02	"	"	"	4200 HP	-	29.00	9.00	4.60
9	BATU BINTANG	"	BARGE	"	-	-	32.617	8.833	2.438
10	PAL REDDONS	"	"	"	-	-	32.617	8.833	2.438
11	P.M.B.I.	"	ROCKING BOAT	"	125 HP	-	14.750	3.350	1.850
12	C. NEI-LEE	"	CRANE	"	-	-	-	14.80	3.30
13	D.B. PONTON I	"	PONTON BOAT	"	4370 T	-	28.700	39.800	4.150
14	AP-631	REPAIRING BOAT	BLAFTER	"	-	-	18.00	5.25	2.82
15	SALU	PERTAMINA	ROCKING LAUNCH	"	-	-	18.45	5.34	2.70

SHIP REPAIRING RECORDS (B-1-2) 1976

	SALES			COST	REPAIRING PERIOD	PERIOD IN DOCK	REPAIRS		
	RUPEE WORK	MACHINERY WORK	ELECTRICAL WORK				RUPEE WORK	MACHINERY WORK	ELECTRICAL WORK
1	Rp 25,624,072-	Rp 42,440,640-	Rp 5,429,734-	Rp 103,262,419	117 DAY/AS	48 DAY	15.831	28.852	3.853
2	Rp 7,244,367-	Rp 14,161,960-	Rp 129,218-	Rp 32,531,710	13 DAY/AS	28 DAY	5.132	10.909	70
3	Rp 19,554,056-	Rp 29,444,653-	Rp 2,251,953-	Rp 69,273,220	120 DAY/AS	33 DAY	5.651	12.510	1.258
4	Rp 8,500,236-	Rp 13,274,542-	Rp 2,504,637-	Rp 32,963,233	82 DAY/AS	16 DAY	5.962	8.265	1.775
5	Rp 45,319,353-	Rp 16,623,865-	Rp 1,136,671-	Rp 45,254,624	131 DAY/AS	46 DAY	9.520	19.137	8.3
6	Rp 854,643-	Rp 2,540,385-	Rp 1,124,084-	Rp 8,524,626	57 DAY/AS	16 DAY	435	1.624	653
7	Rp 4,529,726-	Rp 5,438,962-	Rp 259,164-	Rp 19,643,719	80 DAY/AS	41 DAY	3.853	2.863	543
8	Rp 1,117,666-	Rp 3,363,518-	Rp 403,636-	Rp 8,226,371	82 DAY/AS	21 DAY	620	2.112	216
9	Rp 349,145-	Rp 1,412,613-	-	Rp 3,421,423	27 DAY/AS	19 DAY	20	560	-
10	Rp 669,258-	Rp 423,374-	-	Rp 4,969,867	18 DAY/AS	16 DAY	578	254	-
11	Rp 5,664,582-	Rp 618,184-	Rp 105,300-	Rp 7,630,532	82 DAY/AS	63 DAY	3.286	352	60
12	Rp 13,529,086-	Rp 311,165-	Rp 2,332,587-	Rp 18,363,626	85 DAY/AS	28 DAY	2.882	183	847
13	Rp 6,753,229-	Rp 1,647,406-	-	Rp 28,186,661	45 DAY/AS	29 DAY	3.870	352	-
14	Rp 5,447,218-	Rp 2,608,679-	-	Rp 9,800,679	42 DAY/AS	29 DAY	2.837	1.358	-
15	Rp 181,165-	Rp 1,781,175-	Rp 67,563-	Rp 3,362,832	56 DAY/AS	20 DAY	112	547	34

SHIP REPAIRING RECORDS

	NAME	OWNER	KIND	CLASS	D.W.T.	G.T.	HP	B	D
16	KASSA	PERTAMINA	TUG BOAT	OKU	345 HP	-	17.668	1.267	1.829
17	ENCUNAS	"	"	"	1700 HP	-	25.822	7.417	3.353
18	INDOJAS	"	"	L.R	1200 HP	-	26.00	8.00	3.600
19	EL BHARTA	"	"	L.R	1500 HP	-	26.00	8.00	3.600
20	PERANA VI	"	TANKER	OKU	3000 T	-	86.00	19.40	5.00
21	P. SANGKA I	"	"	H.V	27250 T	-	128.418	22.500	13.800
22	PERANA I	"	"	OKU	4125 T	-	83.550	14.00	7.37
23	SCAMET VIII	"	"	LYONS	710 T	-	51.490	10.360	3.516
24	PERANA III	"	"	OKU	2225 T	-	72.470	11.70	5.85
25	PERANA 1002	"	"	L.R	4000 T	-	128.00	19.40	9.15
26	WARTANTI	"	TUG BOAT	OKU	1200 HP	-	26.822	7.416	3.353
27	P.M.B. III	"	BARGE	"	400 T	-	35.000	8.850	3.200
28	D.B. PONTON III	"	PONTON BOAT	"	4370 T	-	28.700	39.818	4.150
29	ELR. SCAMER	"	CRANE	"	1135 T	-	-	-	-
30	UNCI	"	TANKER	G.L	10000 T	-	118.00	19.40	9.15

SHIP REPAIRING RECORDS (8-2-2) 1976

	SALES			COST	REPAIRING PERIOD	PERIOD IN BOOK	MANOURS		
	NULL WORK	MACHINERY WORK	ELECTRICAL WORK				NULL WORK	MACHINERY WORK	ELECTRICAL WORK
16	Rp 6,581,232-	Rp 1,256,676-	Rp 933,066-	Rp 19,536,315	69 DAY/AS	30 DAY	3.635	521	559
17	Rp 2,436,777-	Rp 3,129,931-	Rp 481,738-	Rp 9,543,477	54 DAY/AS	19 DAY	1.413	1,686	265
18	Rp 2,363,931-	Rp 886,236-	Rp 1,013,066-	Rp 8,263,750	62 DAY/AS	24 DAY	1.341	566	634
19	Rp 2,751,731-	Rp 1,289,269-	Rp 1,142,202-	Rp 15,116,629	54 DAY/AS	24 DAY	1.459	2,460	649
20	Rp 2,253,521-	Rp 10,791,569-	Rp 217,582-	Rp 40,473,542	53 DAY/AS	56 DAY	1.042	10,129	122
21	Rp 28,627,085-	Rp 6,580,661-	Rp 9,552,231-	Rp 80,849,591	20 DAY/AS	37 DAY	17.139	9,228	1,020
22	Rp 10,757,502-	Rp 2,005,051-	Rp 562,068-	Rp 24,473,325	43 DAY/AS	15 DAY	5.859	1,029	370
23	Rp 20,342,921-	Rp 25,549,236-	Rp 2,643,760-	Rp 60,599,988	28 DAY/AS	57 DAY	11.533	14,083	1,800
24	Rp 4,965,837-	Rp 1,614,691-	Rp 65,075-	Rp 12,437,201	88 DAY/AS	14 DAY	2.206	850	95
25	Rp 21,212,336-	Rp 13,253,988-	Rp 2,615,600-	Rp 111,593,411	129 DAY/AS	37 DAY	14.505	24,326	1,470
26	Rp 4,328,884-	Rp 4,429,626-	Rp 1,107,408-	Rp 14,579,426	36 DAY/AS	19 DAY	2.429	2,350	259
27	Rp 23,582,550-	Rp 4,785,645-	Rp 195,115-	Rp 39,235,499	101 DAY/AS	69 DAY	11.828	950	110
28	Rp 10,735,952-	Rp 2,349,609-	-	Rp 30,683,579	34 DAY/AS	23 DAY	5.590	1,297	-
29	Rp 1,617,322-	Rp 2,375,378-	Rp 776,350-	Rp 10,500,406	51 DAY/AS	24 DAY	1.439	1,578	345
30	Rp 29,754,961-	Rp 37,258,230-	Rp 1,779,632-	Rp 93,732,555	80 DAY/AS	61 DAY	18.343	18,500	1,126

13 YARD FACILITIES

① BERTH & DOCK

NO.	NAME & TYPE	DIMENSIONS		APP. SIZE OF SHIP				R.T.	D.V.T.	USE
		L (M)	B (M)	Lpp (M)	D (M)	D (M)	E (M)			
1	DRY DOCK	227	45						20,000 <sup>TON</sup>	B

② CRANES

	# TYPE	MAX. LIFT LOAD	APP. ELEVATION	APP. REACH	NUMBER	LOCATION
1	T.C.	15	15	25	2	20,000 TON DRYDOCK
2	R.C.	5	5	-	-	Pk.
3	R.C.	15	25	-	-	Pk.

③ YARD & SHOP

Shop & Shop	Total area	Area (sq)	
		Shop area	Yard area
Shiplifting			
Steel stock yard			
Fabrication shop			
Subassembly shop & yard			
Assembly shop & yard			
Grand assembly yard			
Block stock yard			
Berth & Dock			
Pipe shop			
Pipe stock yard			
Machinery shop			
Carpenter shop			
Plater shop			
Electrical shop			
Painting shop			
Outfitting shop			
Rigging shop			
Iron & Casting shop			
Warehouse			
Repairing			
Berth & Dock	22745m		
RUB shop			
Machinery shop			
Outdoors working area			
Stockyard			
Warehouse			
Over-hall	20400m		

④ MACHINERY & EQUIPMENT

	PIPE CAPACITY	LOCATION	
EX			
1	BAND SAW	MACHINERY SHOP I	1 "
2	RAND HYDRAULIC PRESS	"	1 "
3	ACCURATE UNIVERSAL LATHE	"	2 "
4	UNIVERSAL MILLING MACHINE	"	2 "
5	SHAPER MACHINE	"	1 "
6	UNIVERSAL LATHE MACHINE	"	8 "
7	GRINDING MACHINE	"	2 "
8	TURRET LATHE MACHINE	"	1 "
9	COLUMN DRILLING MACHINE	"	2 "
10	VERTICAL UNIVERSAL MILLING MACHINE	"	1 "
11	UNIVERSAL LATHE MACHINE	MACHINERY SHOP II	6 "
12	PRESS MACHINE	"	1 "
13	BLANKING MACHINE	"	1 "
14	UNIVERSAL MILLING MACHINE	"	1 "
15	HORIZONTAL BORING & DRILLING MACHINE	"	1 "
16	VERTICAL LATHE MACHINE	"	2 "
17	RADIAL DRILLING MACHINE	"	1 "
18	MAGNETIC FLAMER GRINDER	"	1 "
19	PLANER MACHINE	"	1 "
20	CIRCULAR SAW	"	1 "
21	CYLINDRICAL GRINDER	"	1 "
22	VERTICAL SLOTTING MACHINE	"	1 "
23	GRINDING MACHINE	"	3 "
24	PIPE BENDING MACHINE	BOILER SHOP	1 "
25	BRILL PRESS MACHINE	"	1 "
26	GRINDING MACHINE	"	2 "
27	ELECTRIC FLANCE	"	2 "
28	BAND SAW	PIPE SHOP	1 "
29	PIPE BENDING MACHINE	"	3 "
30	PIPE TREAD CUTTING MACHINE	"	1 "
31	GRINDING MACHINE	"	1 "
32	BAND SAW	FLANCE SHOP	1 "
33	ELECTRIC INDUCTION FLANCE	"	2 "

MACHINERY & EQUIPMENT

	TYPE CAPACITY	LOCATION	NUMBER
31	GRINDING MACHINE	FURNACE SHOP	1 UNIT
32	SAND POLY ROLLER	"	1
33	BURNER	"	1
34	DRY BLAST CLEANING MACHINE	"	1
35	ROLLING MACHINE	PLATE SHOP	2
36	CUTTING MACHINE	"	2
37	PLATE BENDING MACHINE	"	2
38	HYDRAULIC RAMMER MACHINE	"	1
39	DRILL PRESS MACHINE	"	1
40	GRINDING MACHINE	"	1
41	SAND SAW	"	1
42	PUNCH & DIE CUTTER MACHINE	"	1
43	SPOT WELDING MACHINE	"	1
44	SAND SAW	CADENTER SHOP	1
45	WOOD LATHE MACHINE	"	1
46	WOOD SHAPER MACHINE	"	1
47	GRINDING MACHINE	"	1
48	CIRCULAR SAW MACHINE	"	1
49	DRILL PRESS MACHINE	"	1
50	VERTICAL HACK SAW	"	1
51	WOOD THICKNESS PLANNER MACHINE	"	2
52	WOOD GRINDER	"	2
53	CIRCULAR SAW	"	1
54	GRINDING MACHINE	ELECTRIC SHOP	1
55	DRILL PRESS MACHINE	"	1
56	COIL WINDING MACHINE	"	2
57	SAND BLASTER	"	1
58	SAND HYDRAULIC PRESS	"	2
59	ELECTRIC FURNACE	"	3
60	TANK PAINTISH	"	1
61	COIL CUTTER	"	1

Utilities

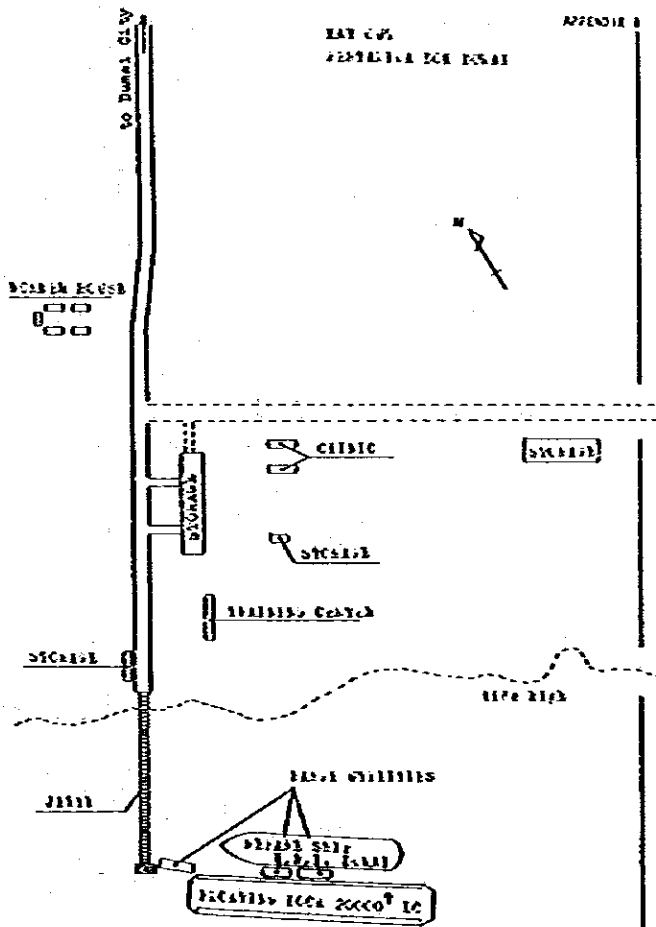
Items	Capacity
Electric Power	全廠自設發電。平均使用電力量 1,000 KVA/day 600 KVA x 2 1,000 KVA x 1 75 KVA x 1 予備 1,000 KVA x 2
Brickling & Industrial Water Facilities	Aokan River の水を strainer を通し、タンクに貯蔵する。 能力 100 t/day
Compressed Air Facilities	25.5 m <sup>3</sup> /min x 1 15 m <sup>3</sup> /min x 1 10 m <sup>3</sup> /min x 2
Acetylene & Oxygen Facilities	-
Water pollution Control Facilities	-
Others	-

13 - 45) - "Electric Power"

All the necessary electricity is supplied from the private power plant of its own. The average power consumption is 1,000 KVA/day. The generators of this power plant are 600 KVA x 2, 1,000 KVA x 1, 75 KVA x 1, 1,000 KVA x 2 ( as spare )

"Brickling & Industrial Water Facilities"

Water from the Aokan River is led to a tank through a strainer. Storing capacity of the tank is 100 t/day.



## 1. General Situation

## 1-1. Introduction

This is one of the shipyards in the Pertalina Base. Each of these shipyards in Pertalina belongs to the Harbour and Maintenance Division supervised by the director of shipping and communication, and is engaged in maintenance and repair of those ships working in the base. The repair materials are directly supplied from the base, and repair expenses are considered to be part of base expenses. So the total expenses per repair work are not recorded.

The shipyards belonging to Pertalina are now scattered in six various parts of Indragiri, and a total of 715 employees is working in them. Of these six shipyards, only Dusat Shipyards has been looking to America for its maintenance and technical guidance, and has been filing detailed data of each repair work following the advice given in the above guidance. (The data are on the same level as of the questionnaire drafted by the study team on that occasion.)

## 1-2. Conditions of Location

This shipyard is located in the Pertalina Base of Pangkalan Susu at the north end of Sumatra. It is about two hours' drive from Medan up to Pangkalan Susu.

The shipyard is situated in the Pertalina Base, and has a 1000 P.L.S. floating dock in front of a piled (12x piles) reclaimed area. The shipyard buildings such as machine shops, warehouses, etc. are standing in the old site across the road. The scale of the Pertalina Base is so large that the area of the shipyard lying at a corner thereof does not look clear. Due to the insufficient water depth at piling, part of the piles is now broken down. The floating dock is far away so much from the office and shop area that communication between them even seems inconvenient.

## 1-3. Shop Facilities

The shipyard has a 1000 P.L.S. floating dock. This floating dock is substantially old, and some part of the deck plate and the hull-plate is rotten to a dangerous degree, though the repair and reinforcement work is now going on.

There are two machine shops and one machine overhaul shop in the shipyard, and two other buildings are planning to construct.

Most of the machines installed in the shops has too large capacity for the ship repairing work now being covered by this shipyard, and the whole facilities look a little unbalanced. All the machines are hand-operated, and seem to be of little use of. Some of them are still left uninstalled. In the machine shops, the lathe is installed in parallel with the turning roller, and the space between the turning roller and the shop wall is too narrow for its effective use. The tools are also sufficiently prepared, and even seem too luxurious for the present business conditions of this shipyard. Both electric power and water are supplied directly from the Pertalina Base.

## 1-4. Organization, Employees, and Labour Condition

The shipyard is managed by the same control system as of the port business. The organization of the shipyard division is supervised by managerial staffs and office engineering staffs. There are dock master group to cover the dock and hull work and work shop group to cover the mechanical works and tool control under the manager's administration.

As for the labour condition and salary, the same rules as of the Pertalina Base are being applied.

The weekly work hours are 42H. The allowances of overtime work are 50% for the first one hour after the regular daytime work, and 100% for the second hour onward. The basic salary is as low as about one-fourth of the whole income wage. The basic salary of a college graduate newly employed in the year 1977 is Rp. 75,000 to 80,000 per month, and of a high school graduate Rp. 30,000 per month.

As for the welfare facilities, all the employees can use the welfare facilities of the Pertalina Base such as swimming pool, reading center, etc.

All the medical expenses are covered by the company. The company also pay the life insurance bills of all the employees, though part of the welfare annuity bill must be covered by each employee.

## 1-5. Production Management and Production Technique

All the work is systematically carried out according to the annual repair work schedule drafted at the beginning of each year.

## 1-6. Production Efficiency and Term of Work

This shipyard files no record of detailed business turn-out. But judging from the various environmental conditions, both the production efficiency and the term of work are supposed to be on the same level as of the other shipyards.

## 1-7. Subcontractors

Usually, the shipyard does not employ any subcontractors, and such special work as repair of radio equipment, freezer, etc. are transferred to the relative manufacturers through the Pertalina Shipping Division.

## 1-8. Design

The design room is staffed with only two draughtsmen.

## 1-9. Material Procurement

All the materials required for the work are supplied from the Pertalina Base on request. So what the shipyard has to do is only to receive the supplied goods, and the shipyard does not even know the purchase prices.

## 101-11, DOCK PANGRAJAN SUSU

### 1. General Situation

#### 1-1. Introduction

Like DOCK PANGRAJAN SUSU, this is one of the ship repairing facilities in the PANGRAJAN base, and located near H. SUSU, one and half hour's drive north from MEDAN.

The wharves has two 2500/T hoisting berths and one 500/T hoisting berth. They were built only several years ago, and are quite solid berths made of concrete.

The dock is situated on a quay about five miles from the river-mouth, and the water depth of 5m is sufficient for 5000/T ships. The machine shop of this dock is also used as repair facilities for the PANGRAJAN base in general, and located far away from the hoisting berths.

III QUESTIONNAIRE

1. General

- 1) Layout of shipyard (appendix 1) Pertanisa Dock Karim
  - 2) Location and map (appendix 2) Karim, Sorong, Irian Jaya
  - 3) Area: Area of premises 19,000<sup>2</sup> (英畓坪)  
Area of production
  - 4) Annual production capacity  
For shipbuilding - 0/N (6/1)  
Shiprepairing 2,500 0/N
  - 5) Water depth: 5 m
  - 6) Tide: 0.3 m
  - 7) Current: -
2. Yard expansion plan Yes

3. Organization and number

- 1) Tree diagram (appendix 3)
- 2) Number of employees for each rank 65 persons in all  
Director and manager 1 person  
Section chief and sub section chief 3 persons  
Foreman and group chief 6/6 persons  
Worker 53 persons
- 3) Family structure of education  
S.B. Elementary school (6 years) - persons  
S.L.T.P.(S.A.B., ST...) Secondary school (3 years) - persons  
S.L.T.A.(S.A.A., S.T.A.) High school (3 years) 35 persons (include S.T.A. 15)  
ACADEMY College (3, 4 years) 2 persons  
UNIVERSITY (4, 5 years) - persons
- 4) Annual supply of H.A. and workers  
H.A. 1971 1972 1973 1974 1975 1976  
Workers - - - - -

5) Overtime allowance for each hour

- 5) Overtime allowance for each hour  
50% up  
Holiday 100% up
- 6) Ratio of annual salary up  
Pertanisa 上げらう。

7) Welfare equipment

- 7) Welfare equipment  
住宅-本工員及びその家族用  
Pertanisaの施設費用を支出しており、(病院、(0後)
- 8) Meal supply  
Lunch:支給無し、但し、over timeに換算して、費用に含まれている。  
Dinner: -
- 9) Traffic expense  
車賃交通費支給無し  
(交通費)
- 10) Insurance  
失業補償あり (Pertanisa の規定による運用)
- 11) Safety for worker  
Pertanisa fire Regulation を遵守
- 12) Training of worker  
Dural training center に 6 months を派遣している。

4. Subcontractor

- 1) Kind of skill: 船体塗装等  
Number of workers: -  
Wages: -
- 2) Degree of skill: -
- 3) Number of company: -

5. Tools

- 1) Size of tools store 150 x 100
- 2) Main tools  
a) Air grinder, hammer, drill  
b) Electric  
c) Hydraulic jack  
d) Hammer, sparrow, etc. plenty

6. Productivity

- 1) For Shipbuilding 船体塗装等

	Type, kind, D/M of typical Ships	Bill Weight	Per-hour (Bill Part)	Total Per-hour
I	-	-	-	-
II	-	-	-	-
III	-	-	-	-

Referenced indices for English translated from Japanese partially in the questionnaire

( Code No. )	( Contents of Answer )
A - 3)	at the high tide
3 - 6)	Same as Pertanisa
7)	Company boss : Supplied to all the direct employees and 1/3 of the periodical employees. they also can use the welfare facilities of Pertanisa. (hospital, etc..)
8)	Not supplied, but paid included in the salary by calculating in terms of overtime work wages.
9)	The yard owns private transportation facilities.(communication cost)
10)	There is a fraternal insurance system. (subject to the same rules as of Pertanisa)
11)	Subject to the pertanisa fire regulation
12)	Annually 6 workers are sent to the training center in Irian for technical training.
4 - 3)	No subcontractors have ever been employed.
6 - 1)	Not engaged in new shipbuilding.

- b) Full construction - hours/Ton
- c) Full construction - cost/Ton
- d) Construction period
  - i) -
  - ii) -
- 2) Ship repairing
  - a) Total gross tonnage per year: 2,500 GT/year
  - b) Total man-hours per year: 15,000 hour/year
  - c) Total sales amount per year: Rp. 56,870,000 /year
  - d) Man-hour/steel ton (in the case of steel replacement): 330 hour/Ton
  - e) Rp. 38,660 sales/GT
  - f) 1977 実績  
Rp. 3,451,600 sales/ship
  - g) Repairing period
    - i) Annual survey 6 days
    - ii) " " 40 days の caseが最多

7. Material procurement

Item	Purchase Price(Tp)	Where Purchased from	Order-to-Delivery Time	Stock Amount
Main Engine				
Generator				
Steel Plate	600-815/kg 200/kg	Singapore Jakarta	1-1.5 months 1.5 years の 実績あり	
Profile				
Welding Rod	1,000-1,200/kg Right action 2,000/kg	Local	即 座	
Paint	-	Local	即 座	
Pipe	-	大量 Singapore 少量 Jakarta	1-1.5 months 1.5 years の 実績あり	
Wood	-	Local	即 座	

8. Design

- 1) Number of designers 1 person *Pertamina Jakarta 興業本部を通じて購入することとされている。P&K Karita の場合又買手が入選するので Jakarta 経由での買付が少なく過ぎて工事現場に合わないのを補うため Singapore or Klang Porting へも購入する。船荷買付先により担当員が異なる。買付場と買主の手続きをとっている。*
- 2) Drawing list 船渠工事関係図面
- 3) Drawing method
  - Pen
  - Pencil
- 4) Photo copying machine 1 units

9. Construction Techniques

- 1) Gas cutting work
  - 1) 気割機は金剛を磨き、磨らないうちは、一般には Chipping 仕上げのみとしている。必要に応じて grinding 仕上げを行う。
- 2) Welding work
  - 1) 技能水準は普通
- 3) Gouging method
  - 1) 小量船の修理につき適用すること無し
- 4) Fitting work
  - 1) 小量船の修理につき、技能者に依頼を申し
- 5) Parting work

10. Points to be noted on shipbuilding & repairing

- 1) Design
- 2) Material procurement  
Jakarta 経由での買付が少なく過ぎる。買付買主によると cost 高となる。
- 3) Construction
- 4) Man-power shortage  
Expert, skilled worker が足りない。
- 5) Unsatisfactory quality
- 6) Schedule behind
- 7) Inspection trouble  
PIS, A.B.S. Rule などを見直ししている。
- 8) Others
  - 1) 金剛磨き機が不足している。(Shearing machine, crane etc.)
  - 2) 金剛磨き機は 1 年間で 1 台しか買付ていない。買付先は 1 年間で 1 台しか買付ていない。買付先は 1 年間で 1 台しか買付ていない。買付先は 1 年間で 1 台しか買付ていない。

- 2) - f Actual record in 1977  
- g + 41 the longest case is 40 days.

7 - "Steel Plate"

- "Steel Plate" 1.5 years.
- "Welding Rod" Instant
- "Paint" Instant
- "Pipe" Mostly Singapore rarely Jakarta, ecce took 1.5 years.
- "Wood" Instant

6 -

The material are normally purchased through the procurement headquarters of Pertamina Jakarta. In the case of set Karita, however, materials are sometimes purchased from Singapore or Klang Porting to expedite the repair work for private vessels because the normal procurement by way of Jakarta usually takes too much time. In such cases, the previous consent of the client shipowner is essential because the repair charge varies with the route of material procurement.

- 2) Drawing chart for repairing.
- 2 - 1) Cut surfaces are often treated and set smooth.
- 2) The technical level is average.
- 3) Little gouging work for small sized ship repair.
- 4) no technical difficulty in small ship repair.

10- 2)

The normal procurement by the way of Jakarta takes much time and special procurement often caused cost-up.

- 4) Employment of experts and skilled workers is quite difficult.
- 7) Usually refers to PIS, ABS rule, etc..
- 8) - (1) The production facilities are insufficient.
- (2) Terms of payment:  
In the case of foreign fishing ships, cash on completion.  
In the case of government ships, deferred payment of 1 year after.  
Singapore, private and state shipowners, payment is often delayed.  
Negotiation is proceeding right now for the improvement of payment-term in ship at contract ..... 10p  
on completion ..... 20p  
one month after .. 30p

13 YARD FACILITIES

① BERTH & DOCK

NO.	NAME & TYPE	DIMENSION		MAX. SIZE OF SHIP				D.T.	D.W.T.	USE
		L (M)	B (M)	Lpp (M)	D (M)	D (M)	F (M)			
1	SLIP WAY	125	12.5	37.5	9.72	-	3-3	215	300	R

USE: Building (B), Repairing (R), Building & Repairing (B & R)

② CRANES

	A TYPE	MAX. LIFT LOAD	MAX. ELEVATION	MAX. REACH	NUMBER	LOCATION
1	P.C.	5 T			1	PLATE SHOP
2	M.C.	5 T	2	2.6	3	PLATE SHOP
3	FLOATING CRANE	15 T			1	DOCKING BERTH

Type: Portal crane (P.C.) Over crane (O.C.), Tower crane (T.C.)

Level Luffing crane (L.L.C.) = L = Slope Crane (S.C.) Mobile crane (M.C.)

③ YARD & SHOP

Shop & Shop	Area (m <sup>2</sup> )		
	Total area	Shop area	Slab area
Shipbuilding			
Steel stock yard			
Fabrication shop			
Subassembly shop & yard			
Assembly shop & yard			
Grand assembly yard			
Block stock yard			
Berth & Dock			
Pipe shop			
Pipe stock yard			
Machinery shop	16 x 15		
Carpenter shop	20 x 5		
Plater shop	26 x 15		
Electrical shop	11 x 5		
Painting shop			
Outfitting shop			
Rigging shop			
Iron & Casting shop			
Warehouse	15 x 8		
Repairing			
Berth & Dock			
Null shop			
Machinery shop			
Outdoors working area			
Stockyard			
Warehouse			
Overhaul			

④ MACHINERY & EQUIPMENT

EA	TYPE CAPACITY	LOCATION	NUMBER
1	SHEARING MACHINE 1200A	PLATE SHOP	1
2	DOUBLE GRINDING MACHINE	"	1
3	HORIZONTAL BENDING MACHINE 100T	"	1
4	PLATE ROLLER 1200A x 2.50A	"	1
5	BLOWER 4 KW	"	1
6	WELDING TRANSFORMER 47/20 A-wp	"	4
7	WELDING TRANS 23/20 A-wp	"	3
8	ENGINE DRIVEN WELDER 100 A-wp	"	1
9	PLATE SAWING MACHINE 0.5 KW	MACHINE SHOP	1
10	GRINDING MACHINE 0.75 KW	"	1
11	PLATER MACHINE 1.5 KW	"	1
12	BOOKING MACHINE 1 KW	"	1
13	" 1/3 HP	"	1
14	" 0.5 HP	"	1
15	" 3 HP	"	1
16	CATHE 2500 x 10	"	1
17	CATHE 2300 x 20	"	1
18	CIRCLE SAW 0.5 KW	CARPENTER SHOP	1
19	PLANNER	"	1
20	PLANNER 0.5 KW	"	1
21			
22			
23			

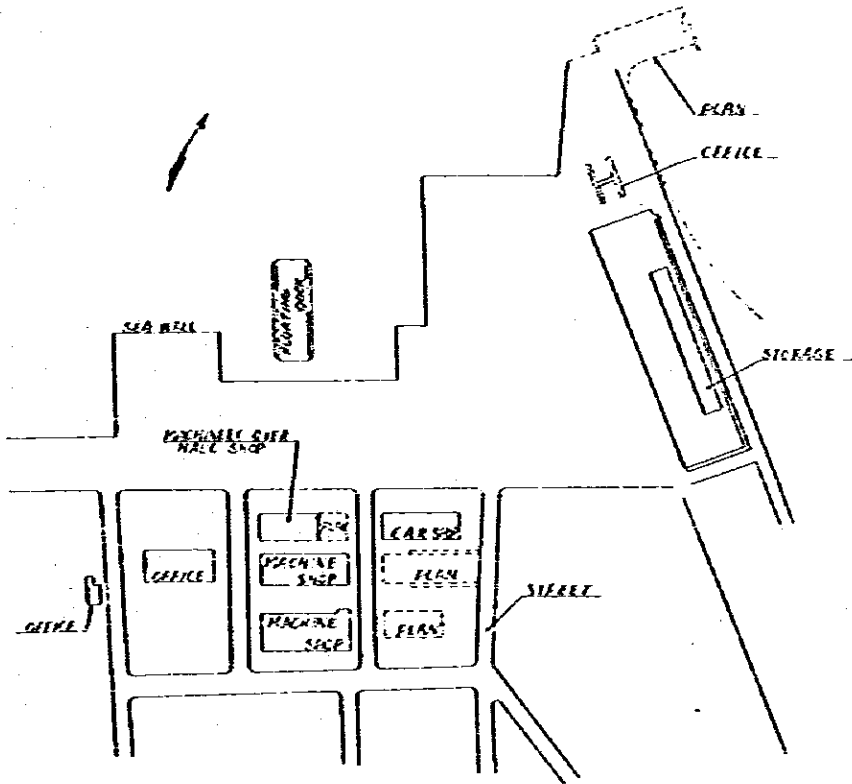
⑤ Utilities

Items	Capacity
Electric Power	600 KW { 2 x 15 KW 2 x 35 KW
Bleking & Industrial Water Facilities	5 - 10 l/ty
Compressed Air Facilities	2 x { 7 kg/cm <sup>2</sup> 7 kg/cm <sup>2</sup> Used for Chipping Hammer, Grinding etc.
Acetylene & Oxygen facilities	
Water pollution Control facilities	No
Others	



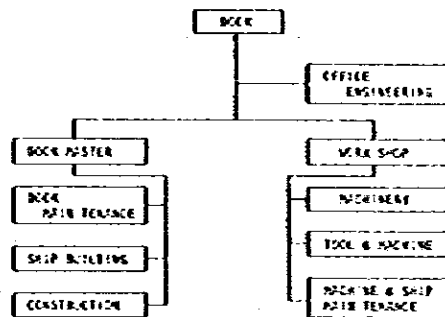
DOK PANGKALAN SUSU

(Appendix 1)



APPENDIX 3

ORGANIZATION DOK PANGKALAN SUSU



## 1. General Situation

## 1-1. Introduction

There are several coral reefs lying about 5 km off the shore of the city of Sorong, Irian Jaya. One of them is called Karik, and the effective land area at the full tide amounts to about 10,000 m<sup>2</sup>. The whole island of this reef forms Pertamina Dock Karik.

Dock Karik was constructed by Mr. Van den Bos, a Dutchman, in 1966, and Pertamina took it over in May, 1975.

Pertamina has a petroleum development base in the city of Sorong, and this shipyard is engaged in repairing of the workboats belonging to Pertamina. This shipyard, however, is allowed to repair any other vessel than those belonging to Pertamina, which is not allowed to all the other echelons of Pertamina dockyards.

The existing berth originally had a hoisting capacity of 500t, but now the gear is limited to 250 to 300t due to the superannuation of the sleepers. As for the crane facilities, only the stand is lying there, and the construction work is suspended now. For the time being, there is no plan to continue the construction work. So the transportation of weighty materials in this shipyard relies on manual labour. The range of possible repair work is naturally limited since the facilities are the same facilities installed at the time of foundation.

The present range of work is docking service, repair of propellers and valves, exchange of shell plates, roller check, electric resistance test, rewinding of coils, etc., and the overhaul of engines is not included.

The intended term of payment is 40% at the time of contract, 30% on completion of work, and 30% within one month after completion. This is a basic policy of the business, and the final term is decided through negotiation with each client shipowner.

Under the present circumstances, the business operation is not so easy because the governmental offices, shipowners in Singapore, and state marine company all insist on deferred payment, though only private foreign fishing ships pay the charge in cash. The biggest work amount that has been recorded so far is Rp. 5,000,000 to 6,000,000.

As it is located in an out-of-the-way place, the procurement of materials takes much time. In case of urgent need, the materials are often purchased from Ujung Pandang or Singapore despite of the relatively high cost. As a rule, all the necessary materials are procured through the procurement headquarters in Jakarta, but this normal procurement takes much time.

The shipyard usually sends about six employees to the training center in Dinal to improve their sailing, machine, electric, and other technique.

Recently there is an increasing demand for repair work of freezer systems, but the shipyard cannot accept such work order for lack of both

knowledge and technique in this field.

The actual repair work turn-out recorded during the ten months from January to October, 1977, is Rp. 101,442,000 for dock repair of 31 ships and Rp. 16,846,000 for running repair of 74 ships. This ten-month turn-out is bigger than that recorded during the full year of 1976.

In the near future, another jetty and shipway may be additionally constructed, but such construction plan requires precious careful investigation as the base is a coral reef.

## 1-2. Conditions of Location

This is the only shipyard in Irian Jaya that can repair steel vessels. Originally, Pertamina dockyards confine its business to repair work of only the ships belonging to Pertamina, so as not to disturb the business of other private shipyards. But this shipyard has become a godsend to those ships sailing near Sorong.

## 1-3. Shop Facilities

The sleepers of the existing berth are superannuated. From a safety point of view, some measures should be taken quite immediately, though the hoisting capacity is duly reduced now. For lack of the crane facilities, loading and unloading work of the berth and shops relies on manual labour. And new investment in the facilities can hardly be expected in consideration of the special circumstances of this dockyard which also repairs other vessels than those belonging to Pertamina. Even so, the consolidation of the facilities is essential because insufficient facilities inevitably cause deterioration of work quality and delay in production schedule.

The complete furnishment of staying machine, generator, crane, etc. is one of the main problems which require urgent solution.

## 1-4. Organization and Employees

There are three sections of administrative, operating, and planning under the control of the manager. This shipyard has one manager, four staffs, and 61 workers. Of these 61 workers, 51 belong to the operating section, and 20 are direct employees. In other words, 31 of them are periodical employees. 90% of these periodical employees have experience of more than five years, and most of them are settled down here. Of the total 65 employees, 37 have academic careers in highschools or other higher educational institutes, and the educational level of the employees is relatively high.

## 1-5. Production Management and Production Technique

This is a special shipyard for repairing small-sized ships, and the scale is small. As the number of workers is small, the production management is satisfactorily going on.

It seems essential for safe and efficient work to secure a wide working space by rearranging the things around the shipway in consideration of the deficient space of the area.

The technical level of gas cutting and welding work is average.

#### 1-6. Production Efficiency and Term of Work

The daily work hours are from 07:00 to 14:30. The regular work hours per week are 42H, but the employees are doing overtime work as occasion demands.

According to the annual survey, the average docking period for small-sized ship repairing work is six days. This indicates the efficient production management of this shipyard. The average term of steel plate exchange work is about 1KM<sup>2</sup>/F. This is on an average level.

#### 2. Problems

- 2-1. It is essential to secure the safety of work by exchanging the superannuated sleepers of the slipway at an earliest opportunity because they are basis of production.
- 2-2. It is also essential to secure the safety of work and improve the working efficiency by rearranging things in consideration of the insufficient space of the shipyard area.
- 2-3. The consolidation of the machine and crane facilities is a problem to be settled in the near future. The improvement of production quality and working efficiency, and the security of safety are most expected of this shipyard.
- 2-4. The working efficiency will drastically be improved if a material supply center is established in Ujing Factory.

III. QUESTIONNAIRE

1. General

- 1) Layout of shipyard (appendix 1) Dock Pangkajene Suka
- 2) Location and map (appendix 2) Pang Kalan Suka
- 3) Area: Area of premises FERTANING Base 中の一部は着て島  
Area of production 広域と他船渠との境界ははっきりしない。
- 4) Annual production capacity  
New shipbuilding 無し 0/0  
Shiprepairing 12,000 0/0
- 5) Water depth: 6 m
- 6) Tides: Max 2.5 m  
Min 0.5 m Difference 2 m
- 7) Currents: low current

2. Yard expansion plan: Yes Plate shop, Assembling shop を新設し機具の移設を行う計画有り。

3. Organization and number

- 1) Tree diagram (appendix 3)
- 2) Number of employees for each rank  
Director and manager 1 person  
Section chief and sub section chief 3 persons  
Foreman and group chief 9 persons  
Worker 58 persons
- 3) Training structure of education  
S.D. Elementary school (6 years) 21 persons  
S.L.T.P. (S.R.P., ST ...) Secondary school (3 years) 20 persons  
S.L.T.A. (S.R.A., S.T.R.) High school (3 years) 29 persons  
SUCCEAN College (3, 4 years) 1 person  
UNIVERSITY (3, 5 years) persons

4) Annual supply of H.A. and workers

	1971	1972	1973	1974	1975	1976
H.A.	No	"	"	"	"	"
Workers	No	"	"	"	"	"

- 5) Overtime allowance for each hour FERTANING Rate  
Working time: Mon-Thur 07:00-14:00  
Fri 07:00-11:00  
Sat 07:00-13:30 38.5 H/week  
Week day 1st one hour 150%  
2nd one hour and above 200%  
Holiday below 2 hours 200%  
above 2 hours 300%
- 6) Ratio of annual salary up FERTANING Rate up 25000  
基本給は少くてもその半額が全額入となる。基本給(1977)大学卒 50000/月  
1976年 Base upは10%, Bonusは2ヶ月/年。 高校卒 30000/月

7) Welfare equipment  
分館にJISより派遣されて来て居るStaff以上の人数に於ては週2/年、1ヶ月に1ヶ月の休暇が与れJIS迄の航空員が支給される。  
厚生施設は ALL FERTANING に対しPool, Bowling場等完備して居る。

- 8) Food supply  
Lunch: 無し  
Dinner: 自費2時間位の残業をやって居るが1時間以上をすれば給食がある。
- 9) Traffic expense  
Staff: 2-3名/日の車代金あり  
Worker: 無し

10) Insurance  
会社が従業員全員の生命保険をかけて居る。厚生年金は一部個人負担有り。  
病院は従業員専用。

11) Safety for worker  
FERTANING safety Rule適用される。

12) Training of worker  
1977 1名 BOE DOKU 1-3ヶ月派遣教育した。  
FK. SCSの手にtraining center有り。

4. Subcontractor 一般に使用しない。修理修理、汚染機修理等もFERTANING

- 1) Kind of skill: Shipping 多数派遣 orderされる。  
Number of workers:  
Voyal:  
2) Degree of skill  
3) Number of company

5. Tools

1) Size of tool store

Referential notices for English translated from Japanese partially in questionnaire

(Code no.)	(Contents of answer)
1 - 3)	The area is located at a corner of the reclamation case, and even the boundary of the shipyard is unclear.
- 4)	No new shipbuilding.
2.	The yard is planning to build a plate shop and assembly shop and to rearrange the machine allocation to each shop.
3 - 6)	The basic salary is as low as about 1/4 of the whole income wage. The rate of annual wage increase in 1976 is 10%. The bonus is equivalent to 2 months salary per year. The basic salary of a college graduate (1977) is Rp. 25,000 to 30,000 per month and of a high school graduate, Rp. 20,000 per month.
- 7)	Holidays: Staff from JIS and other senior staffs ranking higher than them can take 2 weeks holidays each year, and every fourth year can take a month holidays with an air-ticket to JIS paid by the company. As for the welfare facilities, all the employees can use the facilities belonging to the Fertanina case such as swimming pool, bowling center, etc.,
- 8)	No lunch supply. Dinner: Average overtime work is 2 hours, and dinner is served in any overtime work beyond 1 hour.
- 9)	Staff: usually 1 car is served and shared by 2 to 3 staffs. Worker: 1 car.
- 10)	The company effects life insurance on all the employees, part of the welfare mainly will be covered by each employee. All the facilities of employees can use hospitals, free of charge.
3 - 11)	Subject to the safety rules of the reclamation case.
- 12)	4 workers were sent to BOE DOKU for technical training for 3 months in 1977, there is no training center in Suka.
4.	not usually employed. special work such as repair of radio equipment, freezer, etc., is transferred to the relative manufacturers through the reclamation shipping division.

- 2) **Welding tools**
- a) Air
  - b) Electric
  - c) Hydraulic
  - d) Hammer, spawner, etc. Auto gas cutting machine(自動ガス切断機) 2台 straight use 1台 Auto pipe cutter(自動パイプ切断機) 1台使用。
6. **Productivity**
- 1) New Shipbuilding No new shipbuilding
  - a) Man-hour
  - 2) Ship repairing
    - a) Total gross tonnage per years: 2,000-2,500 GT/year
    - b) Total man-hours per years: 1975 133,000 hour/year
    - c) Total sales amount per years: /year
    - d) Man-hour/steel ton (in the case of steel replacement): /hour/ton
    - e) /Cost/MT
    - f) /Cost/Ship
    - g) Repairing period
      - i) 2 weeks for tug boat
      - ii)
7. **Material procurement** PERTANISA Baseより支給されるので詳細不明。
8. **Design**
- 1) Number of Designers Brewer 2 persons only
  - 2) Drawing list
  - 3) Drawing method
    - Pen
    - Pencil
 共に使用している。
  - 4) Photo copying machine 無
9. **Construction Techniques**
- 1) Gas cutting work 機械作業なし。
  - 2) Welding work 全 手
  - 3) Gouging method Gouging machine(自動) & grinder(手) 使用する。
  - 4) Fitting work Jack を使う。
  - 5) Marking work Panel Chalk を使う。
10. Points to be noted on shipbuilding & repairing
13. **Yard facilities**
- ① **MACHINERY & EQUIPMENT**

5 - 2) - 0)

The shipyard owns 3 circle automatic gas cutting machine and 2 straight machines of the same type. The 4 automatic pipe cutters equipped are not used yet.

7 -

Details are unknown as all the materials are supplied from the PERTANISA Base.

8 - 3)

both are being used.

- 4)

furnished.

9 - 1)

No spot-work.

- 2)

No spot-work.

- 3)

Gouged by grinder for lack of the gouging machine.

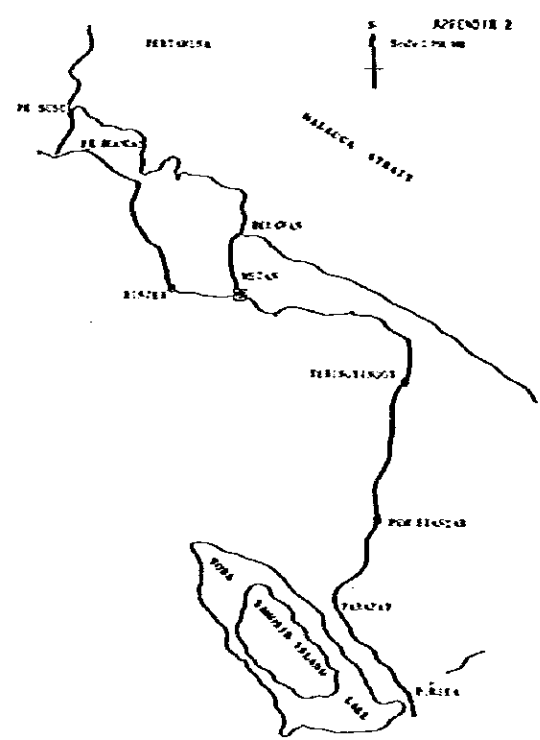
- 4)

By jack.

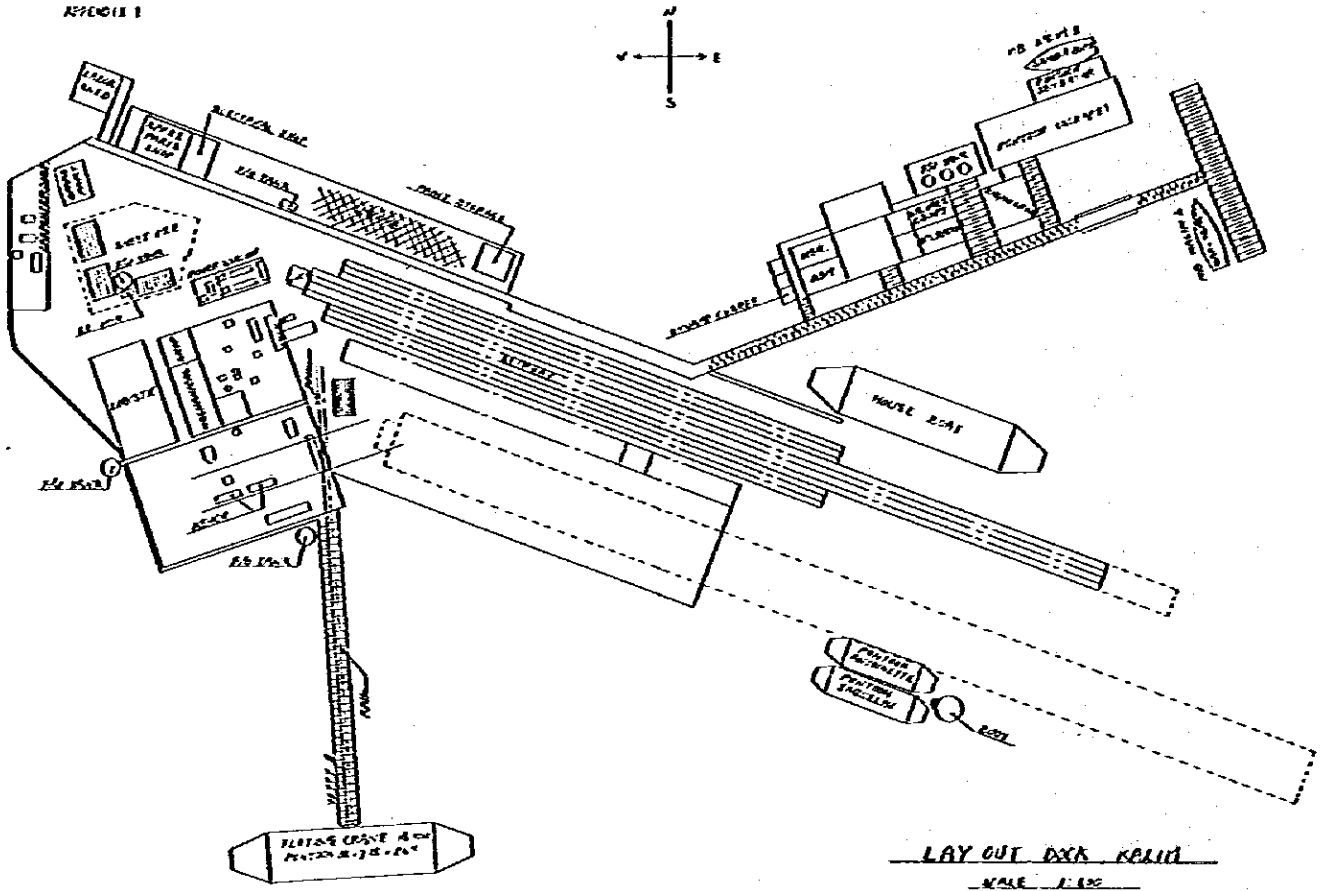
- 5)

Marked in Panel chalk.

EX	TYPE CAPACITY	LOCATION	NUMBER
1	SHEARING MACHINE	PAIR SHOP 2	1
2	COMPRESSOR	"	1
3	FLOOR GRINDER	"	1
4	BOULDER BENDER MACHINE	"	1
5	ROLLING MACHINE	"	1
6	LATHE (EX. 10")	"	1
7	LATHE	"	1
8	LATHE	"	1
9	SQUAP	"	1
10	PRESS	"	1
11	ROLLING MACHINE	"	1
12	PIPE BENDING MACHINE	"	1
13	SQUATTING MACHINE	PAIR SHOP 01	1
14	LATHE	"	1
15	ROLLING/TURNING/ROLLING MACHINE	"	1
16	RADIAL DRILLING/ROLLING MACHINE	"	1
17	UNIVERSAL CUTTER/GRINDER MACHINE	"	1
18	HORIZONTAL/ROLLING MACHINE	"	1
19			
20			
21			
22			
23			
24			
25			



APPENDIX I



APPENDIX B

ORGANIZATION  
DCA KOLIN

