

4-4-2 Plan of Jetty

(1) Target Year of the Plan

Target year and construction period shall respectively be 1986 and 1987.

(2) Fishing Fleet

1) Actual State

The number of fishing boats of large-scale fisheries which now use the Commercial Port of Quelimane is as indicated in Table 4-5.

Table 4-5 Number of Large-Scale Fisheries Fishing Boats
Using Commercial Port of Quelimane

Owner	Type (G/T)	Number	Total(G/T)
Shrimp trawlers owned by National Corporation "EMOPESCA QUELIMANE"	110 G/T	7 boats	770 G/T
Shrimp trawlers owned by Joint Venture of a Japanese Fishery Company and EFRIPEL	150 G/T	14 boats	2,100 G/T
	220 G/T	2 boats	440 G/T
	350 G/T	2 boats	700 G/T
Total (1)		25 boats	4,010 G/T

Medium-scale fishing boats now in operation are 10 sets in number (10 to 50 G/T). As for the small-scale fisheries centered on river fishery, there are now about 800 sets of fishing boats (smaller than 1 ton) in operation near Quelimane; they do not utilize the Commercial Port.

2) Future Prospects

The increased number of fishing boats after a new fishing port is constructed at Quelimane is presumed to be as indicated in Table 4-6.

Table 4-6 Increased Number of Fishing Boats after Construction of Quelimane Fishing Port

Division	Type (G/T)	Actual + Increase	Number of boats	Ground of Prevision
A	Large-scale Fisheries 110-150G/T Type	21 + 12	33	Construction of 2 boats has already been officially announced by EFRIPEL. Ten (10) boats will be transferred from Beira, Angoche or other ports. (supposition by Fisheries Agency and others)
A'	" " 220 G/T Type	2 + 0	2	
A''	" " 350 G/T Type	2 + 3	5	EFRIPE is now planning.
B	Medium-scale Fisheries 10-50 G/T Type	10 + 10	20	About 40 boats are in operation near Beira and Angoche.
C	Small-scale Fisheries 0.1-9.5 G/T Type	0 + 80	80	800 or more boats are in operation near Quelimane district.

(3) Projected Volume

Since the volume to be carried in from other districts by land is and will be null, the brailing at the Quelimane Fishing Port in the target year shall be considered as the projected volume.

1) Yield

a) Actual State

The unitary brailing by large-scale fisheries in 1985 is as indicated in Table 4-7.

Table 4-7 Unit Brailing by Large-Scale Fisheries

Yield	Overall Tonnage of Fishing Boats	Unit Brailing
4006 t	4010 t	1.0 t/GT/year

Yield is divided into shrimp and fish whose ratio is 7:3 in this order.

b) Future Prospects

Supposing 1.0 t/GT/Y as unitary brailing, the yield by large-scale fisheries, calculated simply from the overall tonnage of fishing boats is:

$$W = 1.0 \text{ t/GT/Year} \times 6,430 \text{ GT} = 6,430 \text{ t/Year}$$

When adding to this the yield by medium- and small-scale fisheries is 500 t/year and 48 t/year respectively, the total yield is:

$$W = 6430 \text{ t/year} + 550 \text{ t/year} + 48 \text{ t/year} = 7,028 \text{ t/year}$$

When this figure is roughly divided into shrimp and fish: The yield by medium and small scale fisheries are divided into shrimp and fish whose ratio is 1:4 and 1:9 respectively.

Shrimp 4616 t
 Fish 2412 t

2) Breakdown of the Volume by Utilization

a) Actual State

The results in 1985 are as follows:

Table 4-8 Breakdown of Volume by Utilization

<u>Fresh</u> <u>(30%)</u>	<u>Frozen</u> <u>(70%)</u>	<u>Canned</u> <u>(0%)</u>	<u>Total</u> <u>(100%)</u>
960 t	3046 t	0	4006 t

Table 4-9 Percentage of Volume by Destination

<u>Domestic</u> <u>(45%)</u>	<u>Export</u> <u>(55%)</u>	<u>Total</u> <u>(100%)</u>
1803 t	2203 t	4006 t

b) Future Prospects

Prevision on the basis of actual ratio and including large- and small-scale fisheries is as follows:

Table 4-10 Previsional Breakdown of Volume by Utilization

<u>Fresh</u> <u>(30%)</u>	<u>Frozen</u> <u>(70%)</u>	<u>Canned</u> <u>(0%)</u>	<u>Total</u> <u>(100%)</u>
2527 t	4501 t	0	7028 t

Table 4-11 Previsional Percentage of Volume by Destination

<u>Domestic</u> <u>(45%)</u>	<u>Export</u> <u>(55%)</u>	<u>Total</u> <u>(100%)</u>
3163 t	3865 t	7028 t

The said projected volume can be summarized as follows:

Brailing:	7,028 t/year
For fresh products:	2,527 t/year
For frozen products:	4,501 t/year
For domestic consumption:	3,163 t/year
For export:	3,865 t/year

(4) Plan of Jetty

1) Criteria for Construction of Facilities

- Fishing boats should be able to have free access.
- There must be an anchorage large enough to accomodate fishing boats.
- Fishing boats should be able to anchor in safety even under inclement weather.
- Landing of catch should be able to be done in a smooth and efficient way.
- Fishing preparation and recess of fishing boats can be done without difficulty.
- In-port burying should not occur by sand drift.
- There should be no contamination nor pollution of the river.
- The view of the city should not be spoiled.

2) Basic Conditions of the Plan

a) Natural Conditions

Water Depth	by depth curve chart
Significant	0.5 m
Wave Height	(cycle: 2.5 sec)
Tide	H.W.L. + 5.306 m
	L.W.L. + 0.114 m
Stream	5.3 km/hr
Wind Speed	70 km/hr

b) Characteristics of Fishing Boats

With the fishing boats now in operation as reference, Table 4-12 indicates the characteristics of boats such as width, etc. The figures in the table are to be considered as standard ones.

Table 4-12 Length, Width and Max. Draft of Fishing Boats

Division	Type (G/T)	Length (m)	Width (B)	Max. Draft	
A	Large-scale	150 t	29.5 m	6.8 m	3.8 m
A'	Fisheries	220 t	32.0 m	7.2 m	4.2 m
A''		350 t	48.0 m	8.4 m	4.7 m
B	Medium-scale Fisheries	10-50 t	15-21 m	4-5.2 m	2.7 m
C	Small-scale Fisheries	0.1-9.5 t	3.6-9.1 m	1.2-3.0 m	1.5 m

c) Projected Water Depth

The water depth to be used for designing shall be the after draft of the largest fishing boat to haul plus some allowance value. The largest fishing boat being of 350 G/T type, the maximum draft thereof being 4.7 m, the projected water depth shall be 4.7 m + 0.5 m = 5.2 m thus adding an allowance of 0.5 m. With backfilling by future deposit of earth and sand taken into account, projected water depth shall be decided.

(5) Calculation of Required Length of Jetty

1) Conditions of Calculation

- o Fishing boats shall be hauled alongside
- o Table 4-13 shows the exploitation of respective types of fishing boats.

Table 4-13 Exploitation of Fishing Boats

Division	Days of Navigation	Days of Preparation/Recess	Hours of Unloading
A Large-Scale Fisheries	26	4	6
B Medium-Scale Fisheries	10	2	5
C Small-Scale Fisheries	1	1	0.5

- o Large-scale and medium-scale fisheries fishing boats shall be berthed alongside with the jetty for unloading. Fishing preparation and recess of these fishing boats shall be berthed in the same place.

- o The number of fishing boats per day can be calculated as follows:

$$\frac{\text{Number of fishing boats in operation} \times \text{Frequency of Entry} \times \text{Days of preparation and Recess}}{365 \text{ days/year}}$$

$$\text{Large-scale fisheries fishing boats} = \frac{40 \text{ sets} \times 11/\text{year} \times 4 \text{ days}}{365 \text{ days/year}} = 5 \text{ sets}$$

$$\text{Medium-scale fisheries fishing boats} = \frac{20 \text{ sets} \times 27/\text{year} \times 4 \text{ days}}{365 \text{ days/year}} = 3 \text{ sets}$$

- o Small-scale fisheries fishing boats shall be berthed with the jetty for unloading, and some of the fishing boats shall be able to anchor and others shall be berthed for fishing preparation/recess.

Number of fishing boats per day can be calculated as follows:

$$\text{Number of fishing boats in operation} \times \frac{\text{Days of Navigation}}{365 \text{ days}}$$

$$= 80 \text{ sets} \times \frac{150}{365} = 33 \text{ sets}$$

And 10 sets of these fishing boats shall be berthed with jetty for fishing preparation/recess.

2) Result of Calculation

Table 4-14 Calculation of Required Overall Length of Jetty

Division	Number of Boats used (1)	Mooring Method (2)	Required number of Berths (3)=(1)/(2)	Boat Length (Width) (4)	Berth Length (5)=1.2x(4)	Required Overall Length of Stage
A			3	29.5 m	36	
A'	5	Alongside/	5	32.0 m	39	205
A''		1 Example	1	48.0 m	58	
B	3	Alongside/	3	21.0 m	26	78
C	10	Alongside/	10 (for	9 m	10	100
	33	1 Example Alongside	unloading 1	9 m	10	10
Total						393

3) Required Overall Length

The overall lengths required for unloading and preparation/recess can be calculated as 393 m. But jetty for large- and medium-scale fishing boats can be replaced by buoys for mooring or piles, etc. As for jetty for small-scale fishing boats most of which are canoes, small type buoys fixed to the control apron or to connecting bridges can replace them either partially or totally.

As a result thereof, the minimum length of the jetty required is at the moment calculated to be 80 m on the assumption that fully loaded 350 G/T type and 150 G/T type boats are to be berthed on offshore sides whereas the land side is to be used for small-scale and medium-scale fisheries fishing boats.

(6) Layout Plan of Jetty

A jetty with 80 m of length shall be provided paralleling the riverside at a water depth of 5 to 6 m. The offshore side of the stage shall be used for unloading by 110 to 350 G/T class fishing boats.

The inner side (shore side) of the jetty shall be used for medium-scale and small-scale fisheries fishing boats under 1 G/T.

The required width of the bridge shall be 10 m with utilization by 6 t class insulated van taken into consideration.

The jetty shall be equipped with lighting, power supply, water and oil feeding installations. Figure 4-6 shows the Layout Plan.

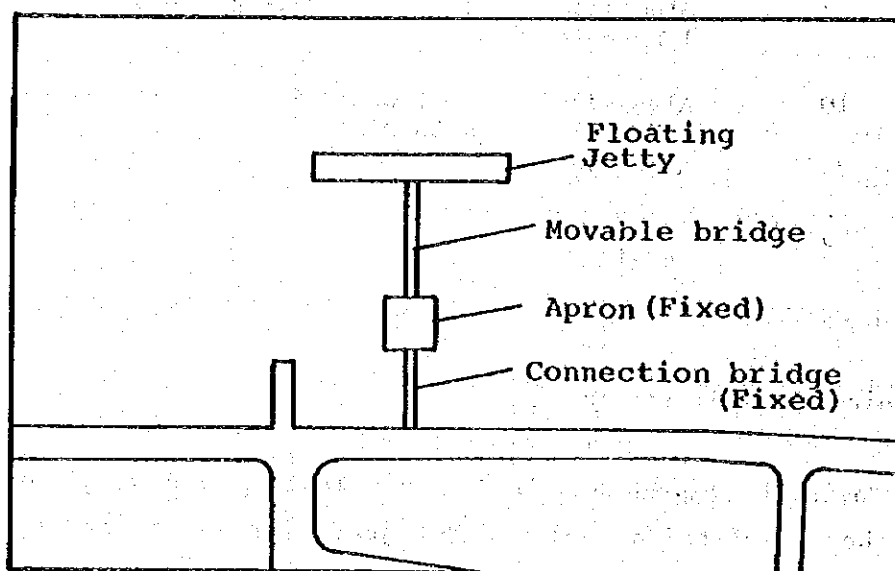


Fig. 4-6 Layout Plan

(7) Structure of the Jetty

Table 4-15 represents a comparison, by conditions, of the respective types of the jetty. The structure of the jetty shall be synthetically decided taking into due consideration not only the utilization conditions by fishing boats, etc. but also the soil of the projected site, topography of the riverbed, such natural conditions as climatic

Table 4-15 Comparison of Jetty

Type of structure	Fixed				Floating	
	Pile	Block	Embankment	Chain + Anchor	Pile Type	Spread Foundation Type
Type of installation					Dolphin	Spread
Hydro- Waves/Tidal Graphic Current Condi- tions	Almost no influence			Susceptible to these influences and often adopted when wave height is less than 1.0 m and tidal current less than 0.5 m/sec.		
Soil Condi- tion	Great influence on material handling and mooring			Suited to small fishing boats because the difference is constant between the levee crown of jetty and water surface.		
Sand Drift	Though influences thereof may be on the embankment type, but no repercussion onto the other types.			No influence		
Soil Condition	Not suitable in case of poor soil or if supporting layer is deep.			Executable even with slightly poor soil or rather deep supporting layer. But spread foundation type is not suitable.		
Earthquake and Settlement	Influence			Almost no influence		
Resis- tance to exter- nal effort	Topography is not regular and sometimes work is difficult on poor ground			Almost no influence		
Shock when Hauling	Not resistant against excessive lateral load.			Influence is weak		
Load to be supported	Heavier than for floating type			Not resistant to concentrated excessive load		
Endu- rance	Maintenance	Almost no maintenance needed and easy to repair		Some types of materials used require great maintenance in this case.		
Execu- tion	Period	Execution period on site become longer.		Execution period on site become shorter.		

and hydrographic ones, conditions of execution, maintenance and execution cost, etc.

As a result of site location survey, it has turned out that the gravity type jetty which is one of the fixed type jetty is not suitable from the technical and economical viewpoints, for the riverbed is poor ground. Therefore, as the type of the main part of jetty, pile-type jetty and floating-type jetty can be considered. The most important items to be examined in the study are the followings:

- The jetty shall allow a safe and efficient cargo unloading/loading.
- It shall be able to cope with a little more than 5 m of the difference between high and low waters without any difficulty.
- It shall hardly necessitate maintenance and be of durability to allow prolonged use.
- Full consideration should be taken for the carrying-in conditions of equipment and materials up to the site.
- Execution machinery to be used on site shall be determined with minute deliberation, and the execution plan shall be fully studied.
- Construction on site shall be carried out in a short period.

1) Comparison between Pile Type Fixed Jetty and Floating Type Jetty.

The pile type fixed jetty uses the piles vertically driven to be fixed by reinforced concrete girders and floor slab. Not being influenced by tide level or tidal current, it allows a stable brailing of catch.

It should be noted however that, on the contrary, the brailing by small fishing boats will be rather difficult at low water level (if the difference is great) because the levee crown of the jetty is fixed. For cargo handling, derrick crane onboard or crane on jetty will be required. As for execution, piles should be carried onto the site, and the top concrete must be placed after driving the piles from the floating pile driver. Once constructed, this jetty hardly requires maintenance.

In the case of floating type jetty, the body is moored either by anchor chain or steel pile. As either type moves up and down as the water level changes, landing of fish can be easily done. The material of the body of this type of jetty shall be chosen among concrete, steel and hybrid, depending on the durability and maintenance cost, etc.

If pontoons are to be fabricated in an existing dockyard, the execution to be made on site should only be the installation of these pontoons, their mooring and their equipment.

After execution, this type of jetty will require maintenance of mooring devices, connecting bridge and position adjustment, etc., for the body of jetty moves about incessantly with the tide level, tidal current, wind and hauling force of the boats.

After comparative study on the different structures of these two types, it has been concluded that the floating type jetty is the most suitable because of its outstanding ascendancy in construction conditions and use conditions, with no conspicuous differences in other conditions such as construction cost. Now we proceed to a deliberation about the pontoon structure and mooring method of the floating type jetty.

2) Pontoon Structure of Floating Type Jetty

a) Steel pontoon

The steel pontoon, which is highly resistant to shock, is easy to fabricate. Though the influence of different currents caused by high and low water levels, on this type of pontoon is little, because its draft is lower than concrete pontoon, the fluctuation thereof by waves and wind is greater than upon the concrete pontoon.

Steel pontoon suffers the problem of corrosion. But this can be fully coped with by painting and electrolytic protection, etc.

This pontoon is to be constructed in a drydock. The manufacturing period is shorter than the concrete pontoon.

As far as execution work is concerned, the work volume of this pontoon is less than the concrete one.

The size of piles used in the case of the pile mooring method, is smaller than the concrete pontoon, for the draft is lower than the latter. In case of anchor mooring, the sizes of anchor chain and anchor can be smaller than the concrete pontoon.

b) Concrete pontoon

Since concrete pontoon is highly durable and its draft is deeper than steel pontoon, its fluctuation by waves wind, etc. is small, although the influence of differential currents by different water levels is great thereon.

Concrete pontoons need no countermeasures against corrosion, but it is weak against shock. The fabrication site is drydock as is the case with the steel one. The fabrication period is longer.

Minute attention should be paid to the installation of the concrete pontoons, because it is not so resistant to shock as steel pontoons.

In case of pile mooring, the size of piles is larger than the steel pontoons. In case of anchor mooring, the sizes of anchor chains and anchors are larger than the steel pontoons.

c) Hybrid pontoon

This type combines the characteristics of steel and concrete; that is, the frame is steel and the pontoon is PC concrete. Drydock will be used to fabricate this. The fabrication period thereof is the longest among the three, and therefore, cost is the heaviest too. And hybrid pontoons need no countermeasures against corrosion.

3) Mooring Method of Floating Type Jetty (Refer to Table 4-16.)

a) Anchor mooring

The pontoon is fixed by the anchor chain, so it is displaced by the influence of stream caused by different water level, waves, wind and other ships passing nearby. For that reason, the connecting parts of the bridge and those of pontoons should be secured.

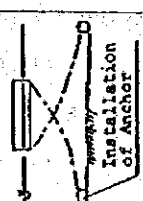
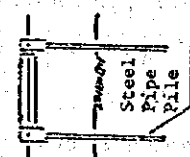
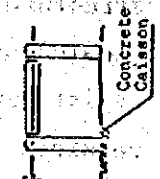
The sizes of anchor chain and anchor of concrete pontoon should be greater than the steel ones because the former must undergo a greater stress as is the case with the pile mooring.

Although the installation of the mooring anchor requires a large-sized crane, the grades necessary for on-site works are fewer than the pile mooring and the period of on-site execution thereof is shorter, too. It should be noted however that there is supplementary work: application of tension onto each anchor chain. Moreover, positioning of floating jetty requires considerable time.

b) Pile mooring

The pontoons fixed by piles are reliable as a structure, fluctuation thereof by stream caused by different water levels, waves and wind being little. No unreasonable force is applied onto connecting parts of the bridge, thus allowing a simple structure. But the connecting parts between pontoons and piles should be secured in such a way as to be able to completely resist external force. The on-site works for pile mooring requires more grades such as pile drive workers, pile connect workers, etc., so execution period on site becomes longer.

Table 4-16 Mooring Method of Floating Jetty

Method	Drawings	Water Depth	Tide Difference	Soil	Work Execution	Execution Period	Durability	Cost	Reliability	Synthetic Evaluation
Chain + Anchor		Water depth is not sufficient. So mooring rope may bring obstacle to ship operation when the water level is low.	Though there is no problem from a structural viewpoint, the floating body fluctuates too much because of different water levels. So connecting bridge is problematical.	Soil settlement is to be feared where anchor is buried.	Though installation of anchor and mooring cable require a large-sized crane, no high techniques are necessary.	The shortest	Wearing speed of chain is vital factor of durability.			
File Type Dolphin		No influence on water depth.	Necessary to have a mechanism which can follow up the change of tides.	No problem	No severe problem if elements are prefabricated. But this will require a special technique.	Execution period can be reduced if prefabrication is applied.	Wear is a problem, if steel pipe piles are used.			
Spread Foundation Type (Caisson Type)		No influence on water depth.	Same as above.	Non applicable because of poor soil.	<ul style="list-style-type: none"> Even if block foundation is used, it requires a large-sized crane. Filling materials are necessary. Placing of concrete is required. 	Curing of concrete necessitates considerable time	No particular problem.			

c) Spread foundation mooring

This process, which involves fabrication of concrete caisson to be fixed onto the spread foundation, is difficult to apply where the soil is poor.

The steel floating jetty-steel pipe pile mooring method has been selected after due comparison of respective types of pontoons and moorings. (Refer to Table 4-17). The type thus chosen is regarded as the best suited from the viewpoints of operability, executability, cost and natural conditions.

(8) Connecting Bridge

Since a water depth of 5 to 6 m is required for fishing boat mooring at a position on the jetty which is the nearest to the riverbank, the alignment should be prolonged offshore up to a position where the required depth can be obtained.

To that effect, a connecting bridge or stage 6.0 m in depth shall be provided between the jetty and the shore. Moreover, a mobile bridge connects the connecting bridge and the floating jetty.

(9) Height of Levee Crowns of Jetty and Connecting Bridge

The said height shall be determined with the water level of river (including that by flood), height of the road and height of the levee crown of the commercial port, etc, taken into account. Figure 4-7 shows these relationships.

Table 4-17 Features of Pile Type Fixed Jetty and Floating Type Jetty

Item	Fixed Type Jetty		Floating Type Jetty	
	Concrete Pile Structure	Steel Pile Structure	Concrete Pontoon Structure	Steel Pontoon Structure
Quantity	Total weight 2,100 t Pile #500 x 45P 78P #400 x 33P 78P	Total weight 1,200 t Pile #800 x 9P #500 x 27P 69P #400 x 33P	Total weight 2,500 t Pile #600 x 10P #500 x 18P 43P #400 x 15P	Total weight 1,000 t Pile #800 x 17P #400 x 15P 32P
Structure	<ul style="list-style-type: none"> Concrete pile needs no countermeasures against the corrosion. Concrete pile is weak against shock. Steel pile is strong against shock. 	<ul style="list-style-type: none"> Steel pile suffers the problem of corrosion. But this can be fully coped with by painting and electrolytic protection, etc. Steel pile is strong against shock. 	<ul style="list-style-type: none"> Since concrete pontoon is highly durable and its draft is deeper than steel pontoon, its fluctuation by waves and wind, etc. is little. Concrete pontoon needs no countermeasures against the corrosion. Concrete pontoon is weak against shock. 	<ul style="list-style-type: none"> Steel pontoon suffers the problem of corrosion. But this can be fully coped with painting and electrolytic protection, etc. Steel pontoon is strong against shock.
Function	<ul style="list-style-type: none"> Easy connection of water supply and oil supply pipes, etc. Since the levee crown of the jetty is fixed, landing of fishing is rather difficult when the water level is low. 	<ul style="list-style-type: none"> Same as left. 	<ul style="list-style-type: none"> Cargo handling is easy because this type of jetty body goes up and down with different tide levels. 	<ul style="list-style-type: none"> Same as left.
Work Execution	<ul style="list-style-type: none"> The on-site work requires more grades such as pile drive workers, etc., so execution period on site becomes longer. Minute attention should be paid to installation of the top concrete body of jetty, because it is not so resistant to shock as the top steel body of jetty. 	<ul style="list-style-type: none"> The on-site work requires more grades as pile drive workers, etc., so execution period on site becomes longer. 	<ul style="list-style-type: none"> The on-site work shall be carried out in a start period 	<ul style="list-style-type: none"> Same as left
Execution Period	15 months	14 months	12 months	11 months
On Site Construction	9 months	8 months	6 months	4 months
Cost	<ul style="list-style-type: none"> Fabrication 35 Transportation 15 On site construction 30 Management expense etc. 24 Total 104 	<ul style="list-style-type: none"> 40 15 25 24 104 	<ul style="list-style-type: none"> 60 15 10 25 110 	<ul style="list-style-type: none"> 54 15 8 23 100

	Levee Crown of	+ 6.700
	Connecting Bridge	
		Walkway + 6.650
		Commercial Port + 6.260
	Flood Water	+ 5.656
	H.W.L.	+ 5.306
	L.W.L.	+ 0.114
	D.L.	+ 0.000

The height of levee crown of connecting bridge shall be datum level + 6.700.

Fig. 4-7 Height of Levee Crowns of Jetty and Connecting Bridge

4-4-3 Study on the Functional Facilities of the Fishing Port

(1) Equipment Standard

- 1) The following facilities indispensable for uniform control/exploitation, under direct control of the Fishery Agency, of the fishing port use should be provided:
 - o Fishing port administration bureau
 - o Fishing gear warehouse/workshop
 - o Cargo handling yard
 - o Ice maker and ice storage
 - o Freezer and refrigerator

- o Outdoor toilet
- o Emergency generator
- o Parking space

- 2) The functional facilities should be installed on the steel apron used as a platform for construction works.
- 3) Since execution conditions on the site are not favorable at all with the heavy machinery, equipment/materials, etc., each facility should be prefabricated as far as possible in order to facilitate its installation.
- 4) Room for future expansion should be left.
- 5) Workability or operability between respective facilities should be maintained good.
- 6) Urban view should be taken into consideration.
- 7) Required considerations should be taken in order that there be no obstacles to passage on the riverside road and to entering of insulated van, etc. from the road.

(2) Projected Volume of Handling

Table 4-18 presumes, as basic conditions for deciding the scale of the functional facilities of the fishing port, the yearly catch and daily brailing by large-, medium- and small- scale fisheries, respectively.

(3) Setting the Capacity of Ice Maker and Ice Storage

- 1) The yearly and daily brailings shall be about 7028 t and 19.2 t respectively.
- 2) Since large-scale fisheries' fishing boats are equipped with fast freezers on board, this fishing port does not foresee any make up of ice nor utilization of land refrigerator by them.

Table 4-18 Previsional Brailing at The Fishing Port

Division	Yearly Catch (t/year)	Daily Brailing (t/day)	Shrimps (t/day)	Category Fishes (t/day)
Large-Scale Fisheries	6,430	17.60	12.32	5.28
Medium-Scale Fisheries	550	1.50	0.30	1.20
Small-Scale Fisheries	48	0.10	0.01	0.09
Total	7,028	19.20	12.63	6.57

- 3) Presumed brailing by medium- and small-scale fisheries' fishing boats will be all fresh products. (Refer to Table 4-19).

Table 4-19 Brailing by Scale and Product Type

	Fishes	Average per Day	Brailing (t/day) (t/day)	For Fresh Products (t/day)	For Frozen Products
Large-Scale Fisheries	Shrimps	12.32		-	12.32
	Fishes	5.28		1.58	3.70
Medium-Scale Fisheries	Shrimps	0.30		0.30	-
	Fishes	1.20		1.20	-
Small-Scale Fisheries	Shrimps	0.01		0.01	-
	Fishes	0.09		0.09	-
Total		19.20		3.18	16.02
		(1.60)		(1.60)	(-)

Figures in parentheses: Sum of medium- and small-scale fisheries.

4) Therefore the tonnage of land ice shall be:

$$1.60 \text{ t/day} \times 0.5 = 0.80 \text{ t}$$

That of the ice on board shall be:

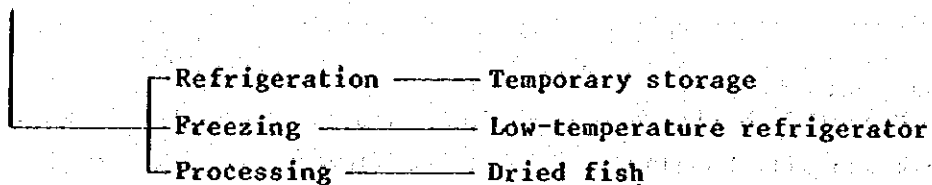
$$1.60 \text{ t/day} \times 0.5 = 0.80 \text{ t}$$

$$1.60 \text{ t/day}$$

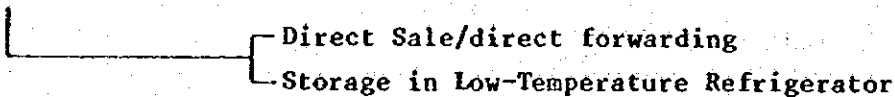
5) Land ice and on-board ice sufficient to meet five days demand should be secured in the ice storage. So an ice storage with 10 T capacity should be furnished.

6) Distribution of the landed fish should be scheduled as follows:

Fresh Fish



Frozen Fish



(4) Outline of Projected Facilities

- Fishing port administration bureau floor space: about 85 m², including indoor plumbing equipment, lighting equipment, equipment for bureau, etc.
- The catch landed from the disposal center for fishing boats shall be handled in such good order as: washing, selection, putting into cases, arrangement and carrying-out. Required working place shall be covered to keep the catch fresh, and from the viewpoint of hygiene.

The cargo handling yard shall not only be covered but also be provided with water/ice feed installations, weighing equipment, etc. so as to carry out the works as above in a smooth and rapid way. The required floor space of the center shall be 110 m², supposing 1.60 t the brailing, and disposed volume per square meter at 15 kg.

- Fishing Gear Warehouse: about 25 m²
- Workshop: about 25 m²
- Ice Making Room (including ice storage)
2 t/24 hr,
Ice storage: 10 t
- Refrigerator: -5°C,
Volume: 25 m³
- Parking Area: about 50 m²

4-5 Designing Basic Facilities

4-5-1 Design Conditions

(1) Environmental Conditions

Tide: H.W.L. + 5.306 m

L.W.L. + 0.114 m

Tidal Current: 1.73 m/sec (1.44 m/sec x 1.2) (flow when flooding to be considered)

Waves: Significant Wave Height: 0.6 m

Cycle: 2.5 sec

Wind Speed: 70 km/hr

(2) Topography

Revetment: + 7.120 m

Walkway: + 6.650 m (Height of levee crown of connecting bridge: +6.700 m)

(3) Geology

Assuming that the riverbottom is formed with mud and sand layers and that near the point of -25 m there exists a compact clay layer on which a layer composed of clay, mud and sand exists, the pile penetration is fixed -25 m tentatively.

(4) Dimensions of Facilities

Dimensions of the Jetty: 80 m (L) x 10 m (W)

Water Depth of Jetty: -6.0 m

Width of Passing Bridge: 6.0 m (roadway: 3.0 m x 2 traffic lines)

Apron: 24 m x 24 m

Movable Bridge: 39 m (L) x 4.5 m (W) (roadway: 3.0 m + walkway 1.5 m)

(5) Ships forming the Subject

Fishing Boats: 100-350 G/T

Fishing Boats: 10-50 G/T

Other Small Boats:

(6) Load

o Floating Jetty: 1.0 t/m²

o Passing Bridge: First Class Bridge (T-20)

o Movable Bridge: First Class Bridge (T-20)

(7) Seismic Force

Horizontal Seismic Coefficient: 0.15

(8) Durability: 40 years

(9) Design Basis

Both Mozambican and Japanese Design Standards shall apply for all the items.

4-5-2 Basic Design Plan

Figures 4-8 to 4-22 show the basic design plan of these facilities.

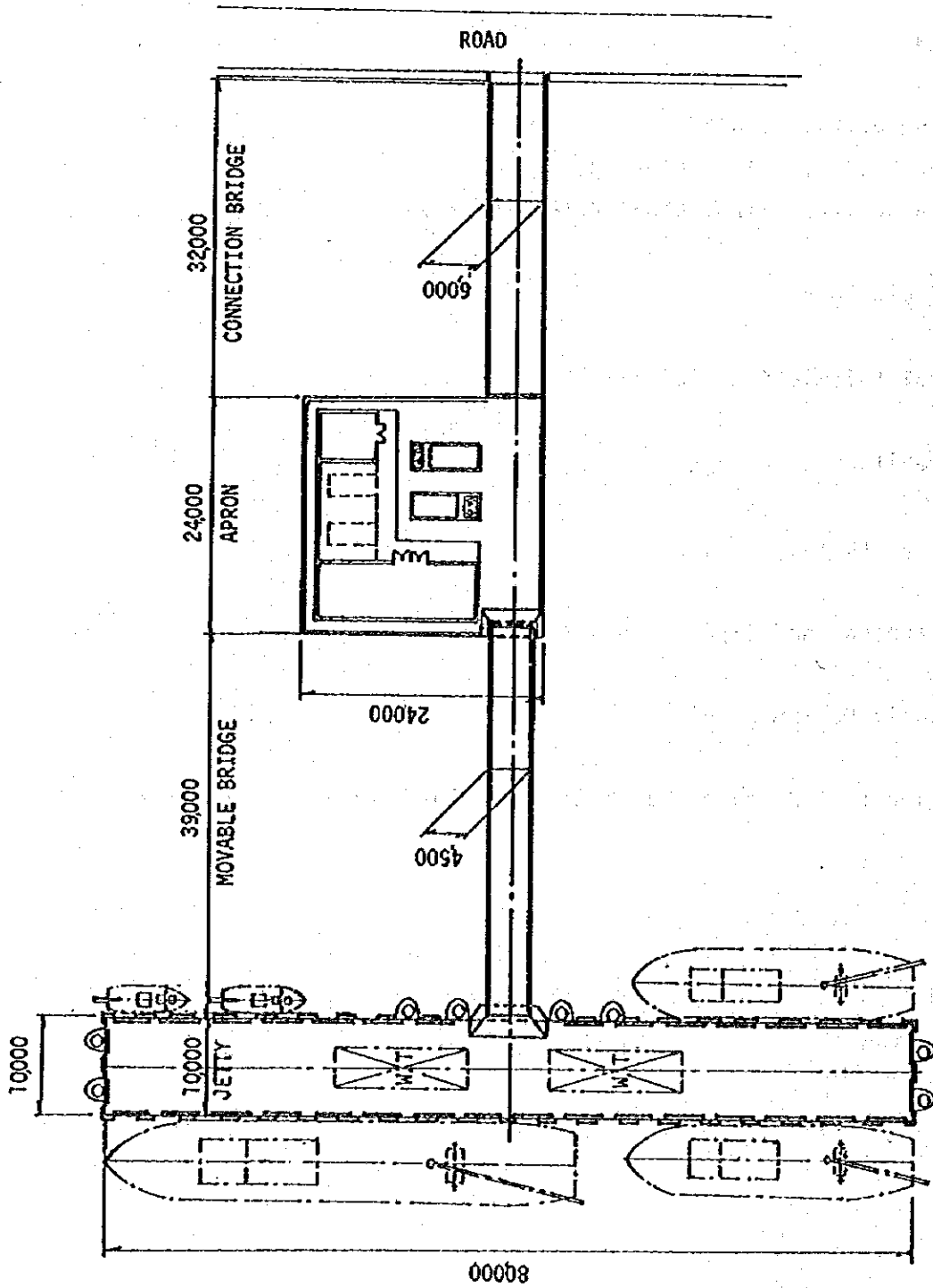


Fig. 4-8 Jetty (General Plan)

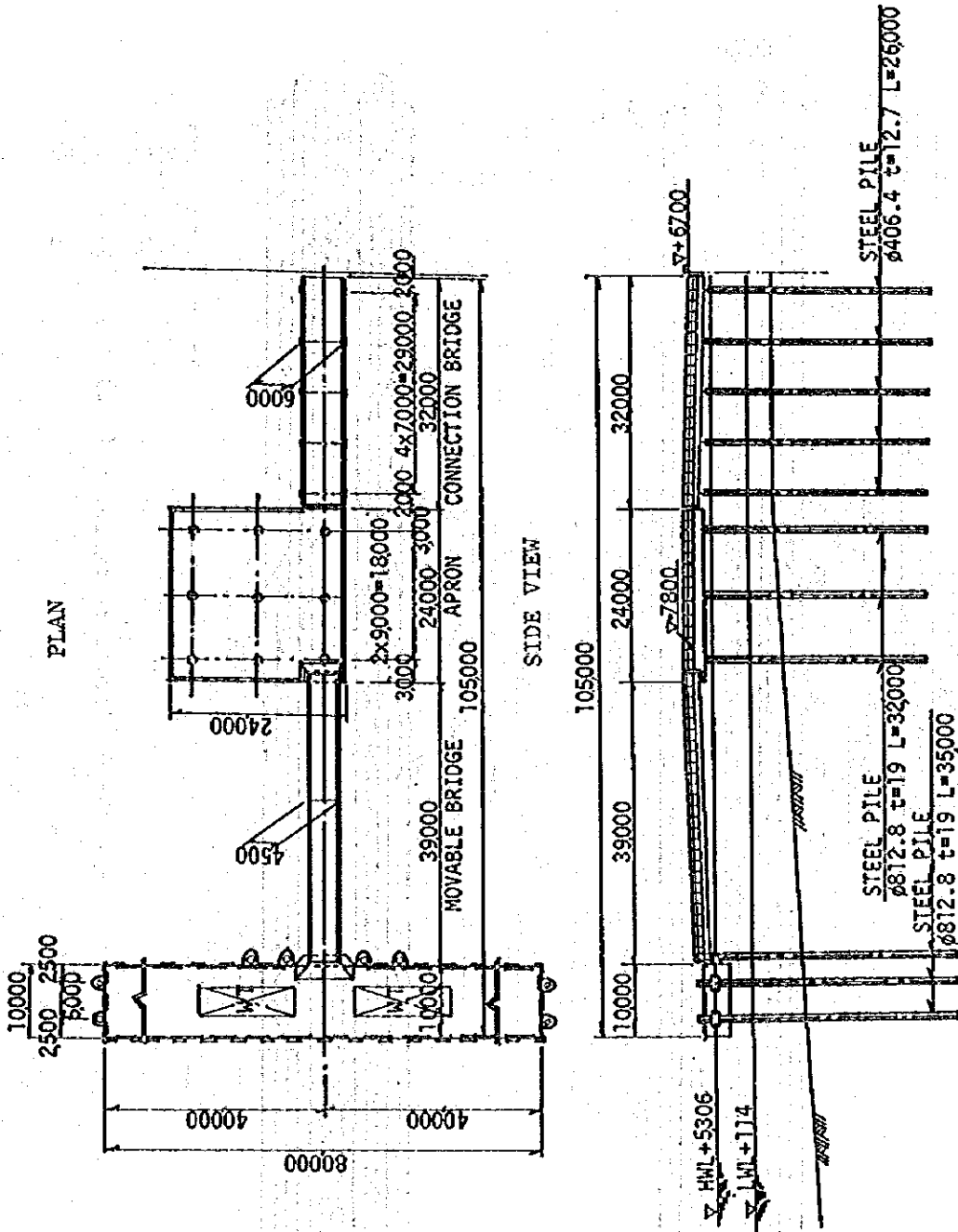
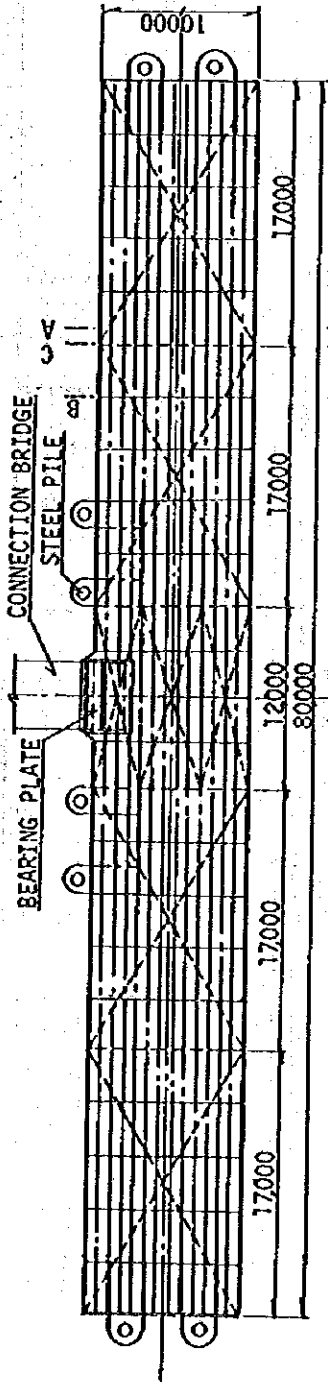


Fig. 4-9 Jetty (General Arrangement)

DECK PLAN

D⁵ PL ; 18~ (TYPICAL)

D⁵ LONG[±] ; 200×90×9/141.A. (TYPICAL)



BOTTOM PLAN

BOTTOM PL. ; 18~ (TYPICAL)

B¹ LONG[±] ; 150×90×121.A. (TYPICAL)

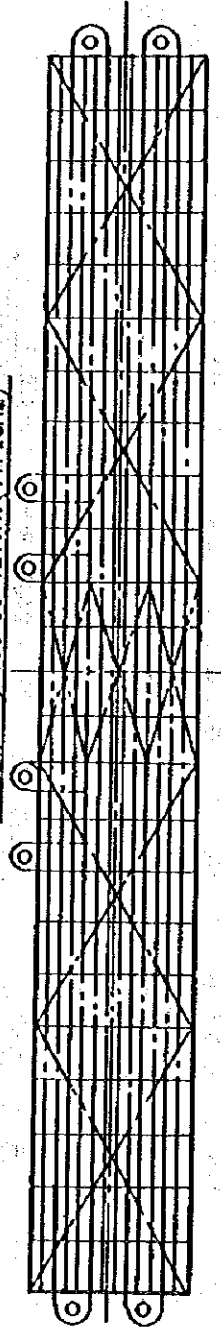
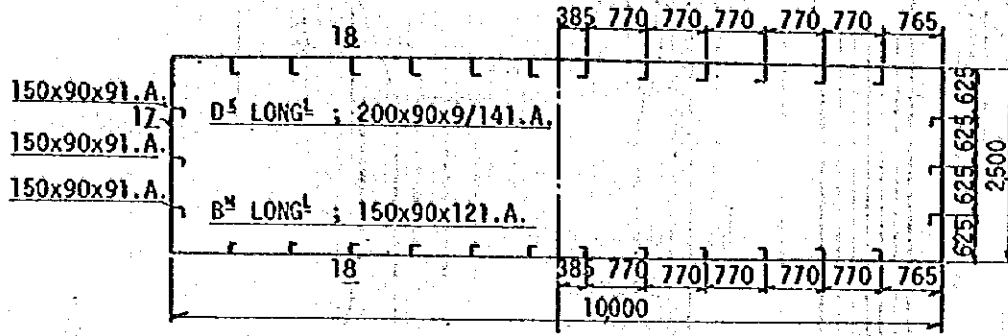
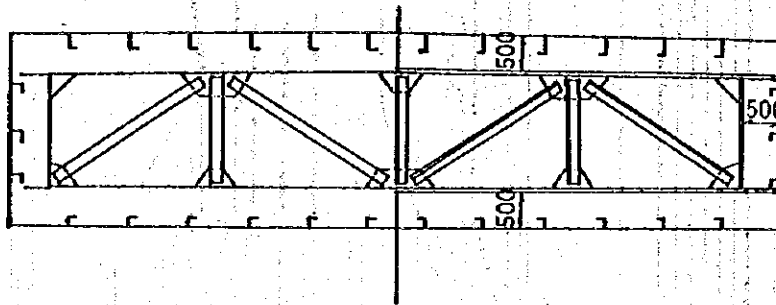


Fig. 4-10 Structure of Jetty (1/2)

A-A SEC. (TYPICAL)



B-B SEC. (TYPICAL)



C-C SEC. (W.T. B^{HD})

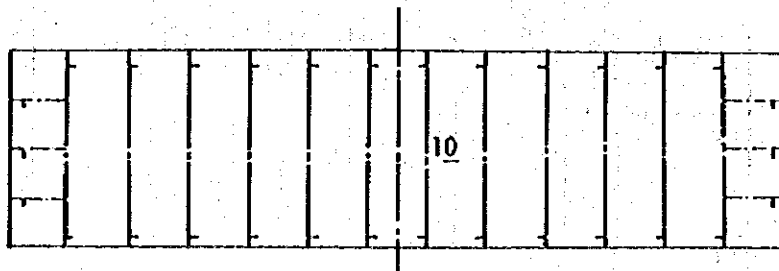


Fig. 4-11 Structure of Jetty (2/2)

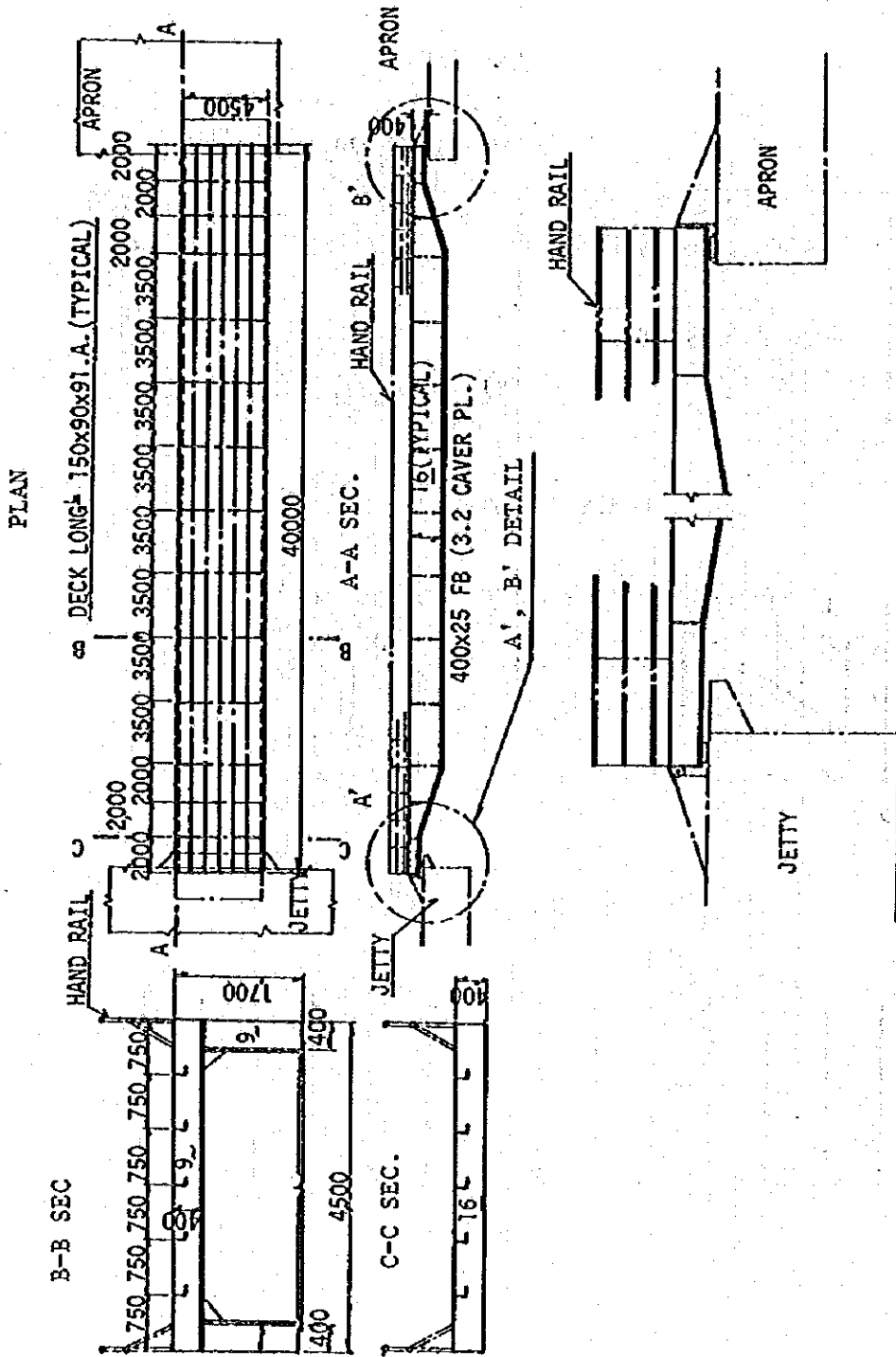
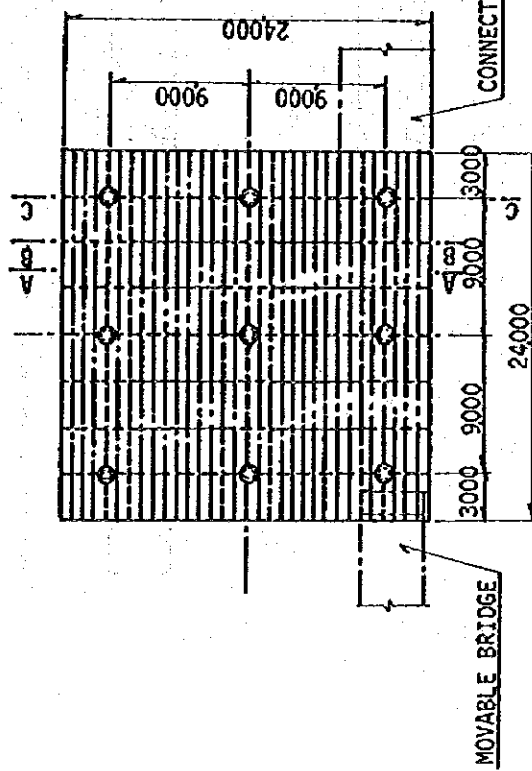


Fig. 4-12 Structure of Movable Bridge

DECK PLAN

D₁ LONG₁ : 297x9+125x16FB(T) (TYPICAL)



BOTTOM PLAN

BOTTOM LONG₁ : 150x90x91.A. (TYPICAL)

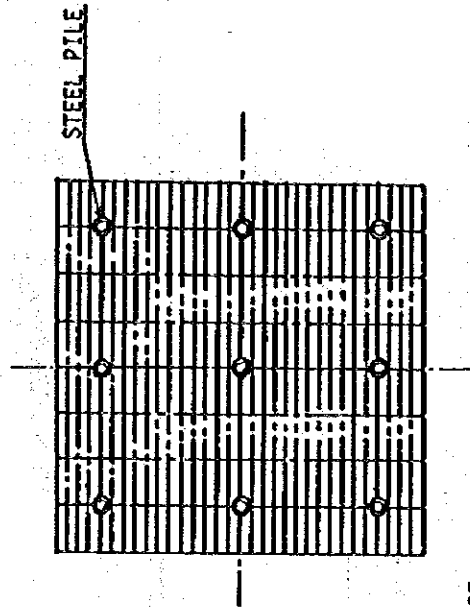


Fig. 4-13 Structure of Apron (1/2)

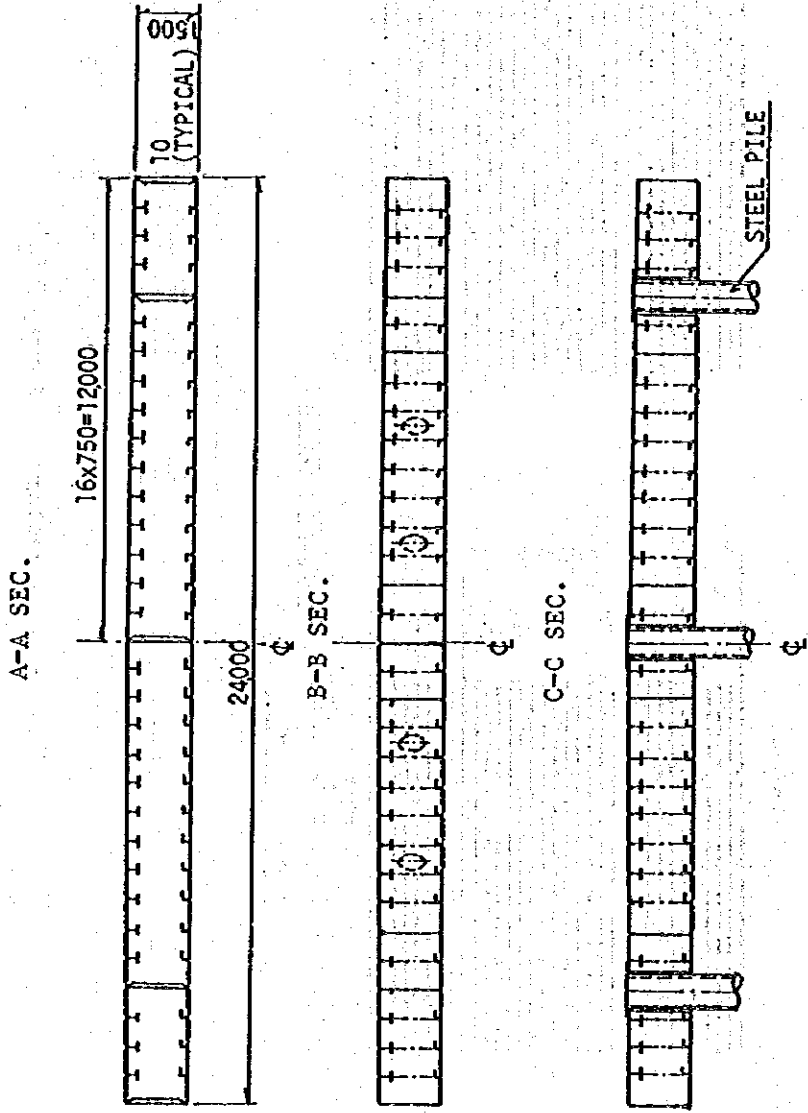


Fig. 4-14 Structure of Apron (2/2)

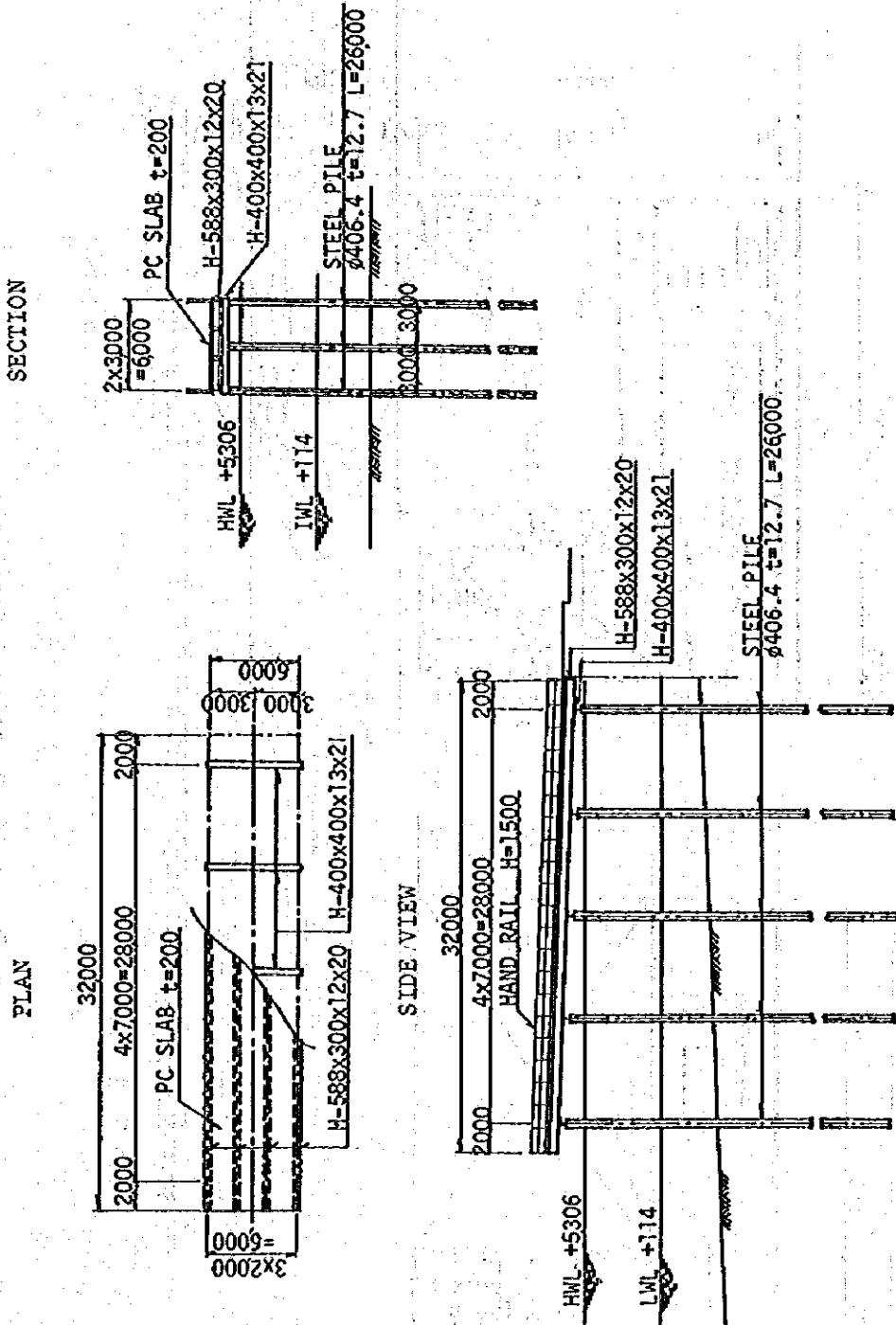
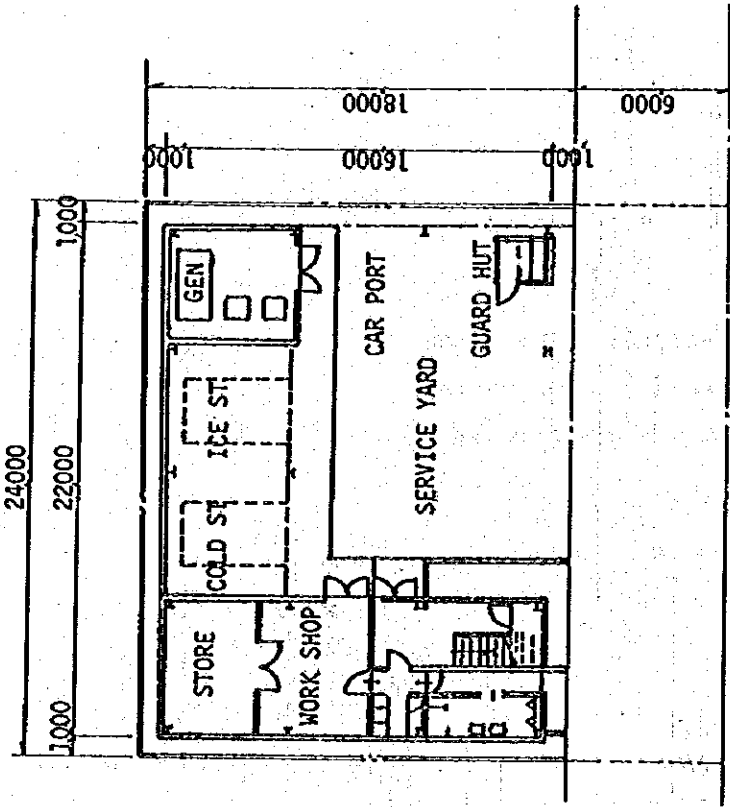


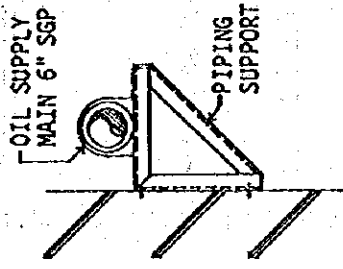
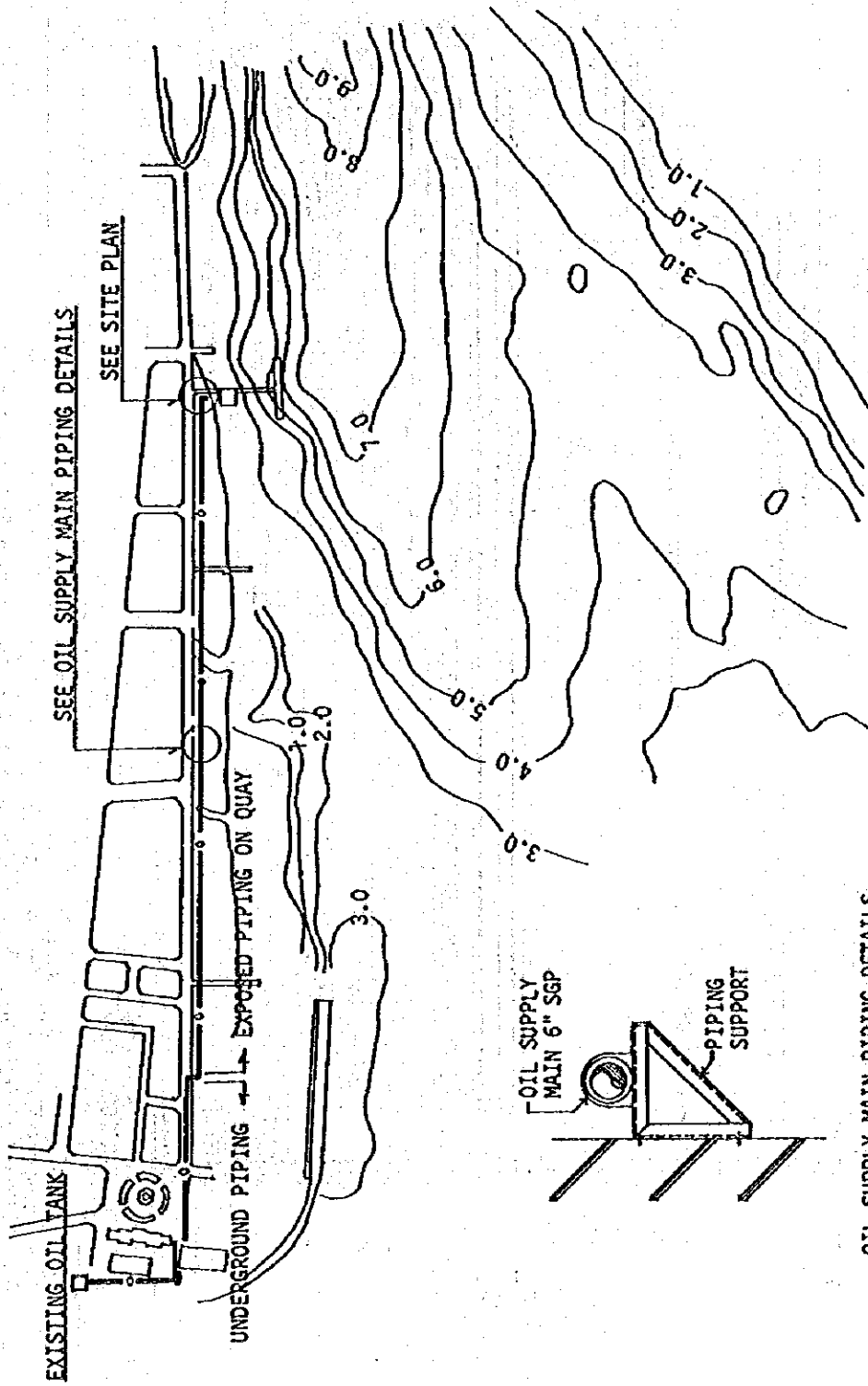
Fig. 4-15 Connection Bridge



GF PLAN

1ST F PLAN

Fig. 4-16 Functional Facilities



OIL SUPPLY MAIN PIPING DETAILS

Fig. 4-17 Oil Supply Main Piping Plan

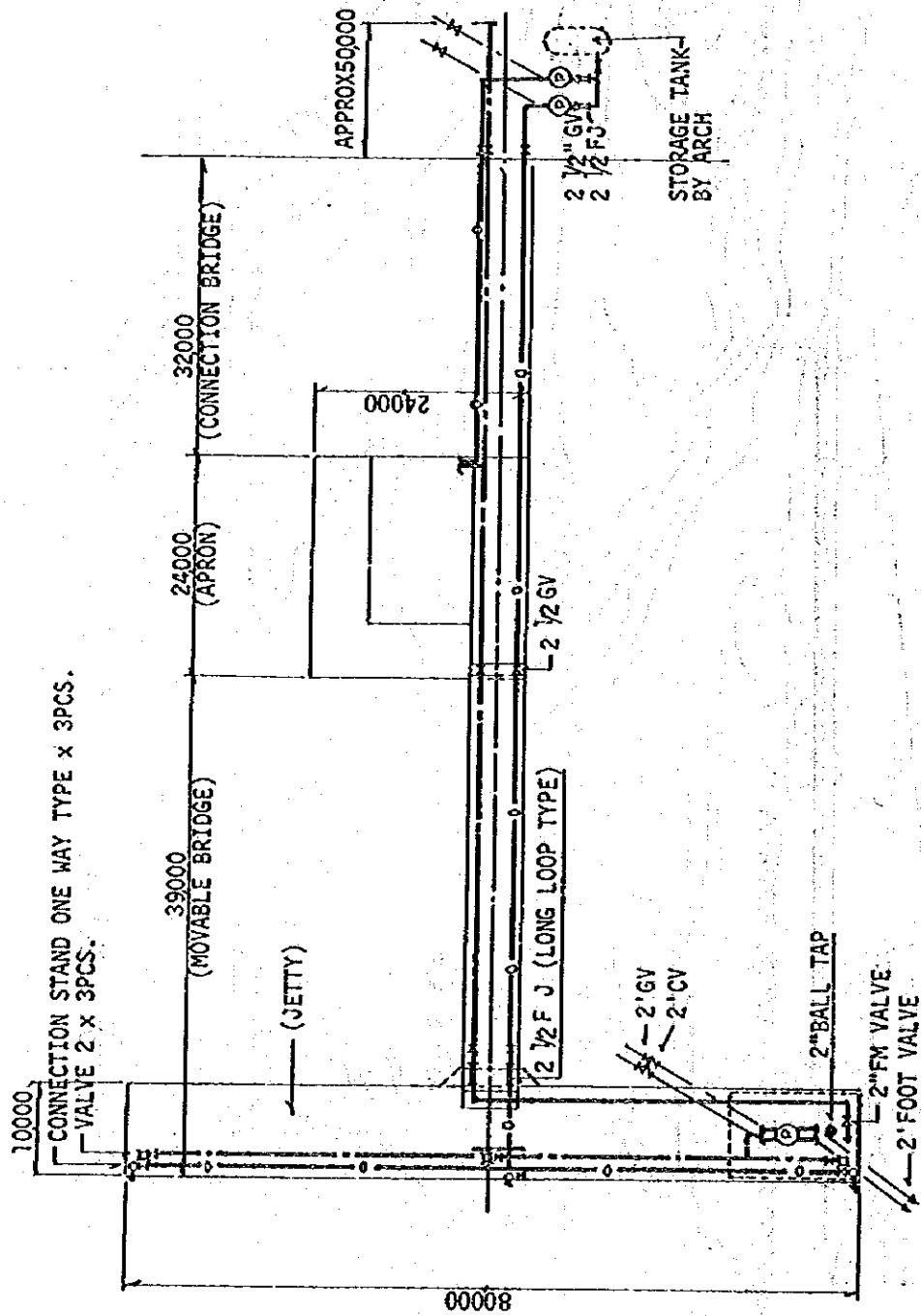
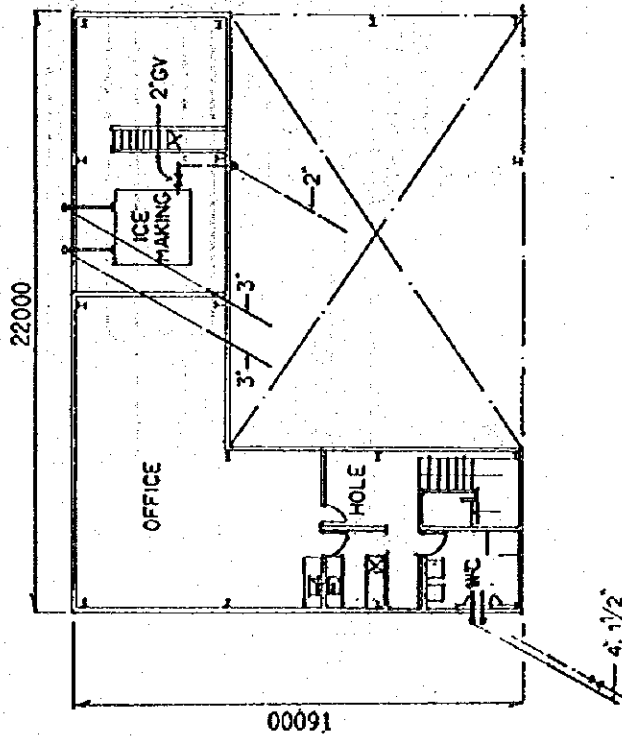


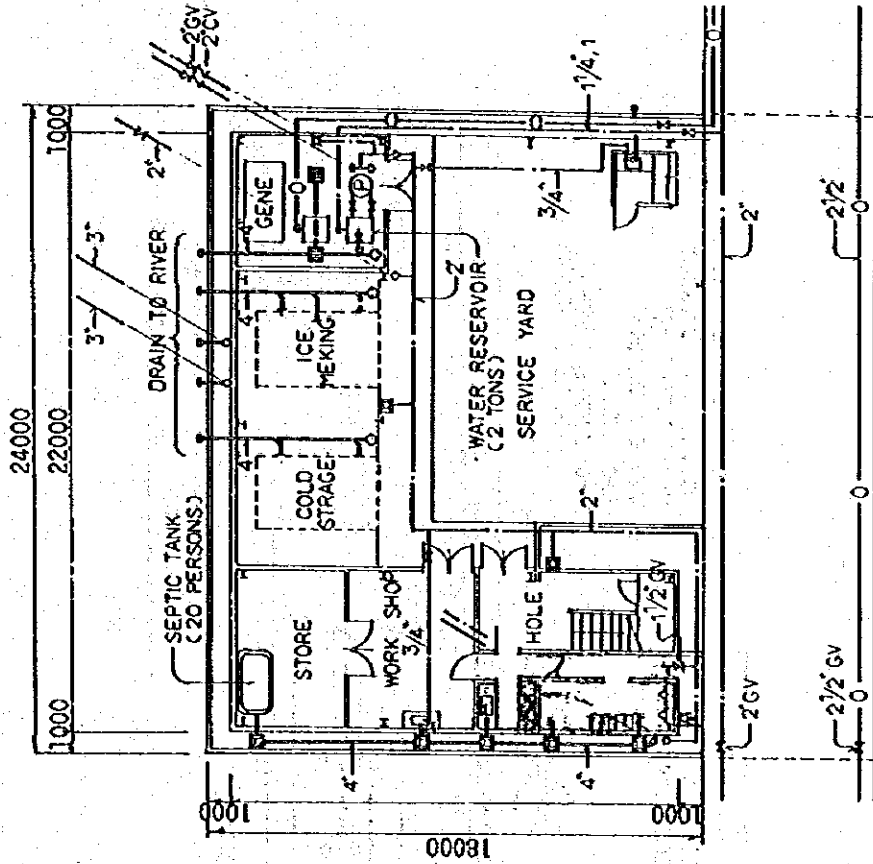
Fig. 4-18 Water/Oil Supply System Exterior Plan

LEGEND

- WATER SUPPLY PIPE
- OIL DISTRIBUTION PIPE
- DRAINAGE PIPE
- INVERTED MANHOLE (W/C.I. COVER)
- CATCH BASIN (W/C.I. GRATING COVER)
- BALL VALVE & GATE VALVE
- CHECK VALVE
- FLEXIBLE JOINT
- STRAINER Y TYPE
- FAUCET & HOSE BIBB



FIRST FLOOR PLAN



GROUND FLOOR PLAN

Fig. 4-19 Water/Oil Supply System Interior Plan

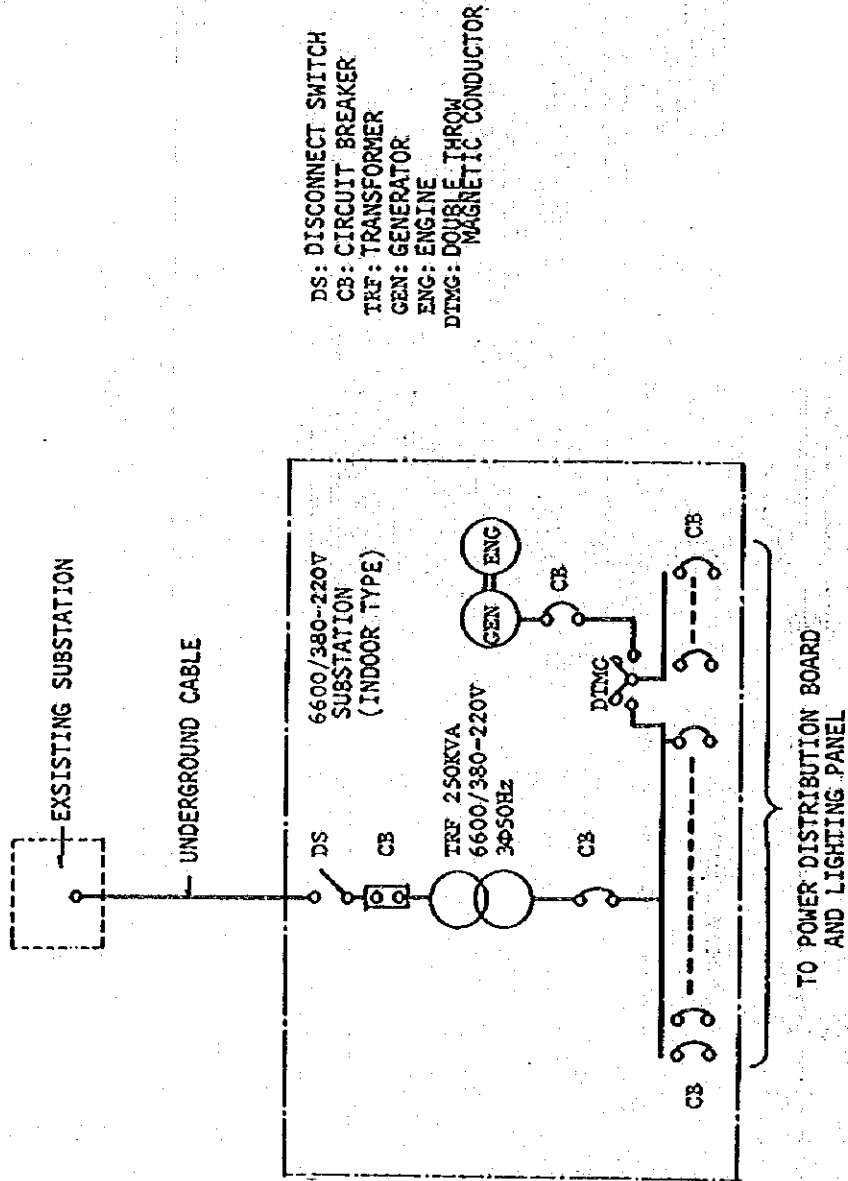
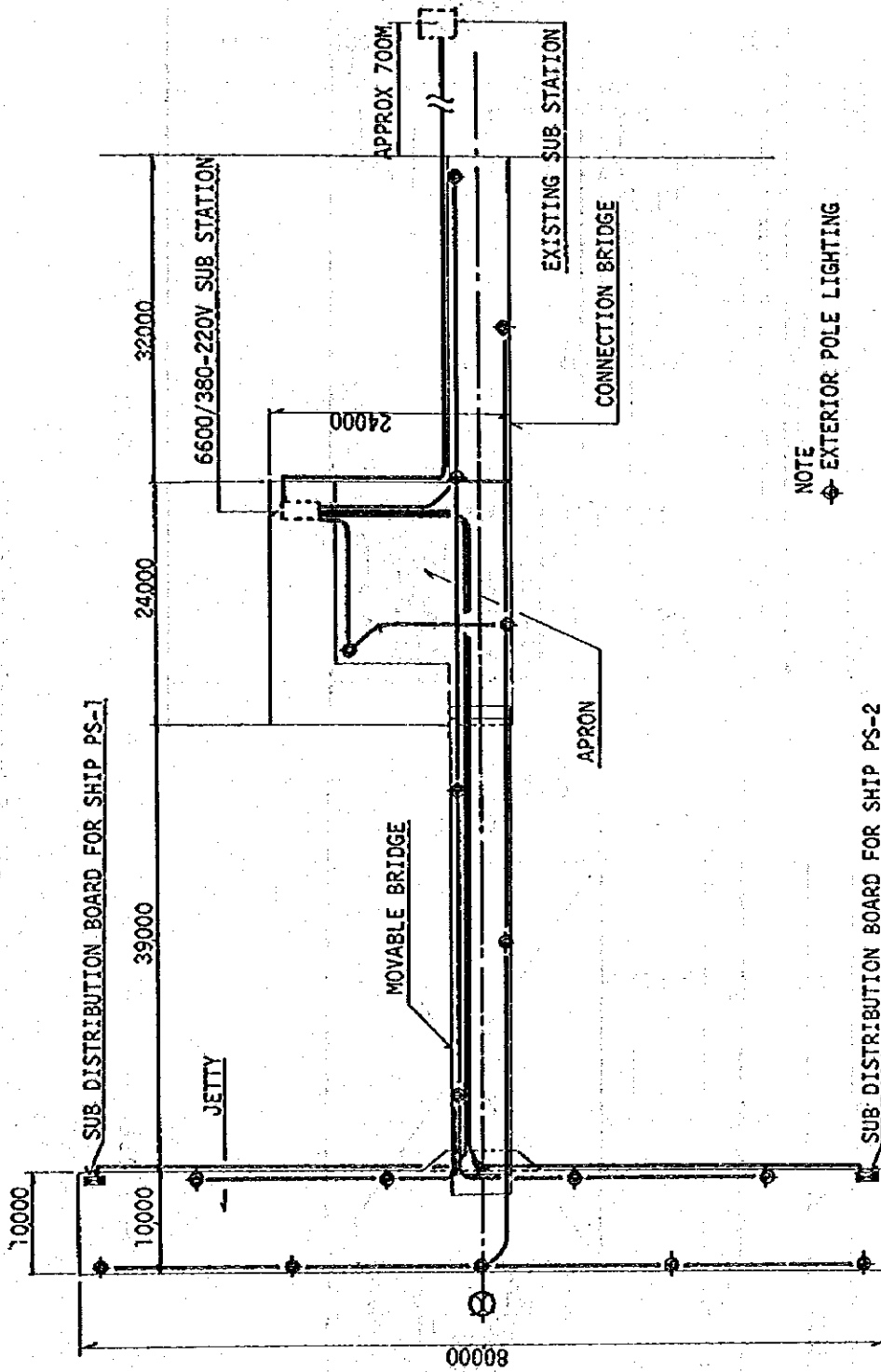


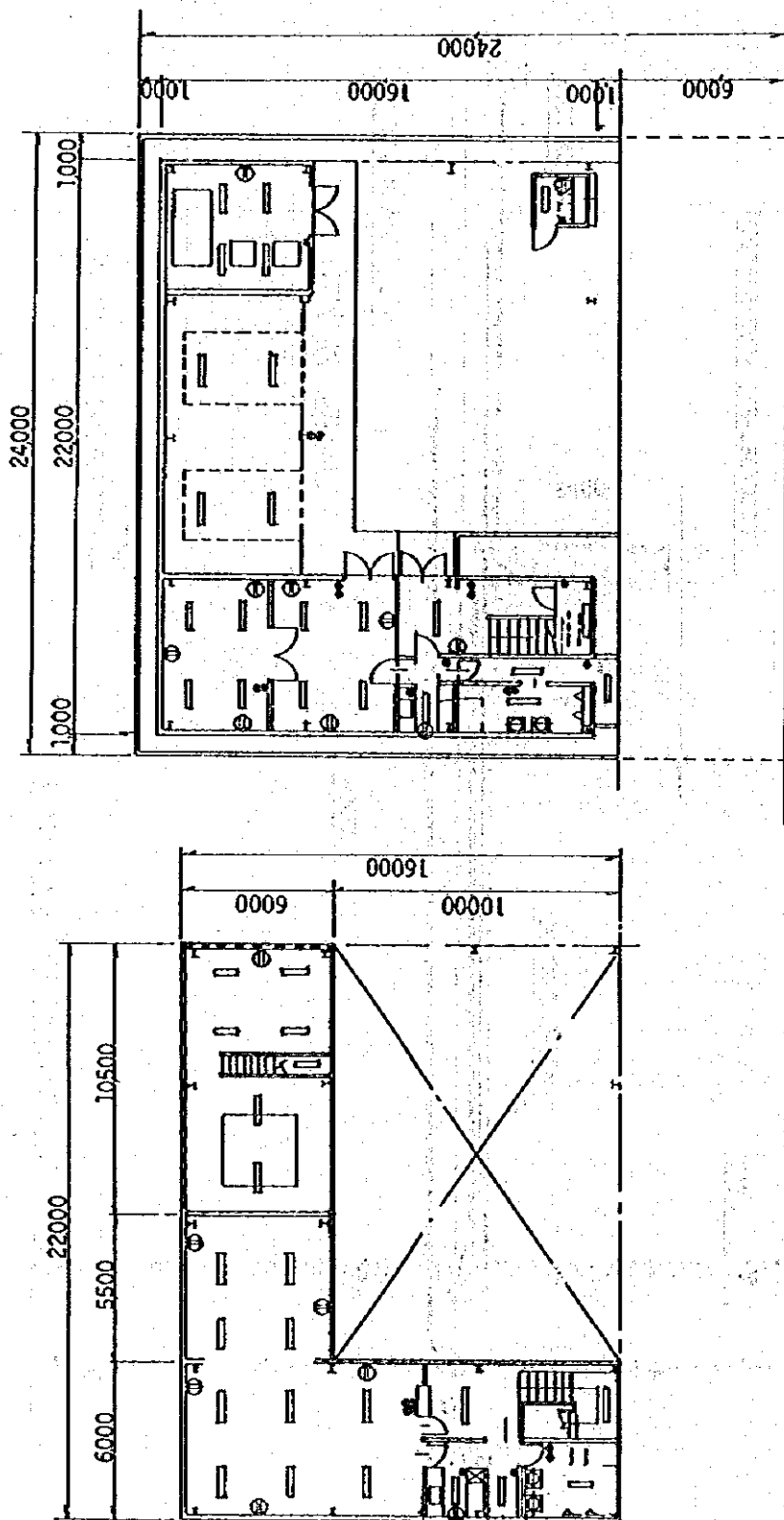
Fig. 4-20 Power Supply Diagrams



NOTE
 ⬢ EXTERIOR POLE LIGHTING

SUB DISTRIBUTION BOARD FOR SHIP PS-2

Fig. 4-21 Electrical Exterior Plan



GF PLAN

1ST F PLAN

Fig. 4-22 Electrical Interior Plan

Chapter 5
PROJECT IMPLEMENTATION
SCHEME

5-1 Scope of Implementation and Sharing of Responsibility

(1) Work to be undertaken by the Japanese Side

1) Jetty Facility

- a. Body (80 m long)
- b. Mooring
- c. Ancillaries
 - o Connection bridges (about 100 m long in total, fixed and movable bridges)
 - o Fenders
 - o Mooring columns
 - o Water supply system
 - o Oil supply system
 - o Power supply system
 - o Lighting system

2) Features Functioning as a Fishing Port

- a. Apron (576 m² in area)
- b. Ancillaries
 - o Administration office
 - o Working yard
 - o Warehouse
 - o Cargo handling yard
 - o Ice makers and ice storages
 - o Refrigerators

(2) Responsibilities of the People's Republic of Mozambique

- a. To secure the sea waters to implement the Project
- b. To secure the land required to execute the work planned in the Project
- c. To provide the power outlets required for the work and administration
- d. To ensure unloading and custom clearance at port of disembarkation
- e. To apply for the permits and/or approvals necessary for the work

- f. To exempt the construction-related Japanese from various internal taxes in Mozambique and take tax-exempt measures for all of the machinery and equipment that may be carried in for the Grant Aid

The scope of works and measures between the People's Republic of Mozambique and Japan in the above, are described in the Minutes. The following Table 5-1 shows the responsibility of the scope of works shared by the Government of Japan regarding aid facilities and materials and equipments.

Table 5-1 Scope of Works

Item	Works	Japanese Side	Mozambican Side
Temporary Work	<ul style="list-style-type: none"> • Maintaining the site for temporary bureau/warehouse and worksite • Construction of temporary bureau, etc. 	○	○
Foundation Work	<ul style="list-style-type: none"> • To be executed by design drawings 	○	
Electricity	<ul style="list-style-type: none"> • Power supply for construction work • Piping and wiring works on secondary side downstream of distribution board to be carried out 	○	○
Water Supply	<ul style="list-style-type: none"> • Supply of water required for construction work • Piping to related facilities to be executed 	○	○
Drainage	<ul style="list-style-type: none"> • Required piping work to be executed for drainage 	○	
Transportation Cost	<ul style="list-style-type: none"> • Cost of marine transportation of equipment/materials from Japan up to Quelimane • Custody fee 	○	
Custom Clearance & Fees	<ul style="list-style-type: none"> • Actions to be taken for obtaining custom clearance permission and tax exemption for equipment/materials as well as cost of custom clearance, etc. required for inland transportation 		○
Conveniences to be given to Japanese superintendents	<ul style="list-style-type: none"> • Required steps to be taken for obtaining permission of custom clearance for Japanese superintendents 		○
Superintending	<ul style="list-style-type: none"> • As counterparts of Japanese superintendents, Mozambique superintendents are to be appointed at the expense of the Mozambican side 		○
Construction Management	<ul style="list-style-type: none"> • All the works of construction shall be managed by Japanese consulting engineers • As counterparts of Japanese supervisors, Mozambicans shall be appointed at the expense of the Mozambican side 	○	○
Instatation	<ul style="list-style-type: none"> • Cost relating to dispatching of Japanese engineers 	○	
Authorization/Permission	<ul style="list-style-type: none"> • Personnel fees concerning related Mozambican persons and other fees, all the measures to be taken to that effect 		○

5-2 Work Execution Plan

5-2-1 Construction Conditions

(1) Construction Materials

1) Cement

- o It is impossible to procure the cement in the city of Quelimane. In the city of Maputo however, it is possible to obtain the cement produced in South Africa.

2) Sand

- o Sand can be taken from the Nicuadara River located 35 km away from the city and transported with trucks.
- o Price: 200 MT/m³ (including the freightage covering 10 km)

3) Crushed Stone

- o Crushed stone is produced in Mocuba at a distance of 200 km away from the city. At present, however, the production has been impossible because the crusher failed. To transport the crushed stone, moreover, railroad or trucks are to be used.
- o Quality: Granite
- o Type: two types of 1 1/2 inches and 3/4 inches
- o Price: 740 MT/m³ (ex quarry)
(A freightage of 105 MT/m³ is estimated on the assumption that the crushed stone is transported over 10 km with trucks.)

4) Bricks

- o 30 cm x 20 cm x 18 cm 7 MT/piece
- o 30 cm x 20 cm x 11 cm 6 "
- o 30 cm x 20 cm x 8 cm 4.5 "
- o 25 cm x 11 cm x 8 cm (hot) 10 "

5) Reinforcements, Steel Materials, Asphalt, Gas, Acetylene and Other Materials

- o It is impossible to produce them in either territory or city. All have to be imported from foreign countries.

(2) Construction Equipment

1) Transport Trucks

- o 10 seven-ton trucks: 525 MT/hr (with driver)
- o 3 or 4 eight-ton trucks: 560 MT/hr (with driver)
- o 3 or 4 ten-ton trucks: 600 MT/hr (with driver)
- o 2 twenty-ton trucks: 850 MT/hr (with driver)

2) Ocean Transport Vessels

- o 2 tug boats: 15,000 MT/day
- o 3 sixty-ton pontoons
- o 3 forty-ton pontoons
- (tag boat + pontoon (40 t) 30,000 MT/day)

3) Commercial Port Quay

- o Crane moving on the quay (Two of the five cranes are to be operated.): 600 MT/hr for max. 5 t
- o Forklift truck: 750 MT/hr for 6 t type
- o Wharf charges: 330 MT/hr for 150 t fishing boat
4,000 MT/hr for 1000 t carrier
- o Day laborer: 55 MT/hr

(3) Infrastructure

1) Power Supply

The power availability could not always be considered always favorable. Nevertheless, the lighting lamps along the road on the coast of the river are illuminated in the nighttime. Wiring, thereof, is buried underground.

To execute the work, it is necessary to provide a generator, including its component parts.

- o Power rates (for lighting): 2.8 MT/kWh
- o Power for drives: 400 volts, 50 Hertz
- o Power for lighting: 220 volts, 50 Hertz

2) Water Supply

It is possible to supply water at a rate of 8 m^3 per day.

At present, water has been being supplied on a time-limiting basis. For vessels, water is supplied at the time specified below. The time to supply the water for general use, however, is considered shorter than that specified below.

o City water rates: 12.5 MT/m^3

o Time to supply vessels with water: 11 hrs/day

3) Drainage

In the vicinity of the planned point, there is a sewage effluent port. Therefore, the main is considered buried in the city. At present, sewage is not treated or disposed.

To execute the construction work, it is necessary to bring in a disposer and sewage piping materials.

4) Oil

The oil is totally imported. Therefore, it is not fully supplied. Nevertheless, it is considered possible to secure the oil for the construction work.

For vessels, the commercial port quay has two oil supply outlets, with which the oil is secured with the first priority.

It is necessary to bring in the quality oils other than light oil and gasoline.

Prices: 50 MT/liter for light oil

27 MT/liter for gasoline

(4) Temporary Equipment for Work

1) Materials/Equipment Storage Yard and Assembly Yard

- o It is possible to secure both yards at a distance of 250 m away from the construction point.

Area: 10,000 m² (100 m x 100 m)

- o To store materials and equipment, due care must be used.

- o Once equipment has been brought in, electric power and water may be made available in both yards at a short distance.

2) On-site Office

It is possible to build a prefabricated house inside the material storage yard. Except a movable house, it must be approved by the Urban Planning Bureau. It is impossible to rent lodgings.

3) Roads for Work

Roads are very poorly paved. There is a distance of approximately 1 km between the commercial port to the material storage and the road in the city is used. The yard is located at a distance of approximately 250 m from the construction site.

4) Communications

A domestic telephone network is available but talking over the telephone is nearly impossible. The Fishery Agency has been using telex and radio communications.

(5) Miscellaneous

1) The construction is required to be approved by the following governmental agencies:

- o State Agency of Fisheries

- o Ministry of Transport and Communications

- o Ministry of Construction and Water

- 2) Construction design, workmanship and work execution are to conform to the Japanese and Mozambican laws, regulations and standards.
- 3) Applications for buildings, civil engineering, electricity, water and so on are to be submitted to and approved by the three agencies referred to in 1) above.
- 4) PETROMOC under the control of the Ministry of Mineral Resources (Ministerio dos Recursos Minerais) have an authority over the oil.
- 5) The importation of those materials and equipment which are related with the Project is not restricted at all but tax-free. However, the materials and equipment for the work remain tax-free under the condition that they are carried back to Japan after being used. If Mozambican local contractors are employed and reimbursed with the construction materials and equipment in kind, however, they will be taxable.

In case of the in-kind reimbursement, a certificate of ownership must be attached to the related materials and equipment.

6) Construction-Associated Contractors

- * GEOMOC: A drilling company (with analyses undertaken by LEM)
- * ADUCO: A joint venture of a West German contractor with the Mozambican Government. This joint venture was established to maintain roads.
- * SEA: A transmission line construction company which has come there under an agreement signed between the Italian and Mozambican Governments.
- * MADAL: Originally a farming company, cultivating co-bras in the interior. It has come to be engaged also in ocean transport, now serving as a shipping agent, too.
- * NULIU: Carrier

* CIS-CT: Carrier

* DIMAC: Construction equipment seller

* CFN: Administering the commercial port, cranes and port laborers

* CIZAM: Construction contractor

This contractor executed the concrete foundation work for a 500-ton refrigerator constructed by EFRIPEL around 1980.

7) There is no special taboo relating to the construction.

5-2-2 Work Execution Plan

(1) Method

To construct the jetty, it is necessary to execute the following types of works:

1) Preparatory Works to Be Executed in Japan

- o Constructing a floating jetty
- o Constructing an apron
- o Constructing a movable bridge
- o Constructing the superstructure of a connection bridge
- o Constructing a building
- o Arranging the equipment and materials
- o Making preparations transport

2) Ocean transport

3) Installing the floating jetty

4) Installing the apron

5) Installing the connection bridge

6) Installing the movable bridge and

7) Installing the building and equipment

(2) Fabrication

- o The floating type jetty, apron and movable bridge shall be constructed monobloc on the dry dockyard or elsewhere.
- o The functional facilities shall be prefabricated as far as possible in order to facilitate its installation.
- o From Japan to the mouth of Bons Synais River, Quelimane, the floating jetty and apron are to be towed with an ocean-going tag + semisubmergible barge.
- o From the river mouth to the site, an assisting tug is to be added. Utilization of trawlers shall be discussed.
- o All the execution machinery, equipment and materials used on site shall be previously mounted on the jetty or on the apron.

(3) On-Site Construction

- o Installation of the floating jetty shall be made by the steel pipe pile type mooring dolphin method.
- o The execution machinery used on site shall be winch, crane, and vibrohammer or dieselhammer. The floating jetty or apron (described hereafter) shall be made use of, as the working platform for these heavy machinery. Utilization of trawlers shall be discussed for displacement of the floating jetty or apron.

(4) Apron

- o Small pontoons shall be prepared to be used as a floating platform for pile driving work and as an apron for functional facilities of the fishing port after completion of the construction work. Penetration holes for pile driving shall be provided on the apron. After termination of pile driving, the apron shall be lifted up to a pre-determined position using a jack-up device. Then this jack-up shall be removed to allow the apron to be welded onto the pile.

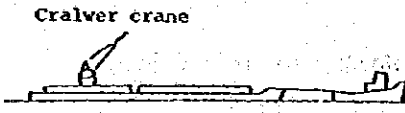
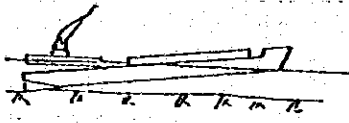
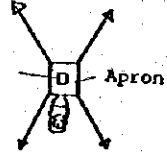
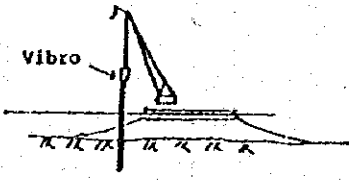
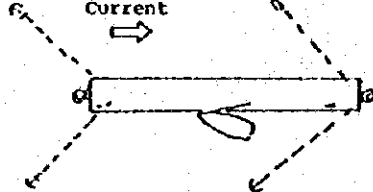
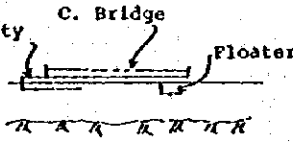
(5) Connecting Bridge

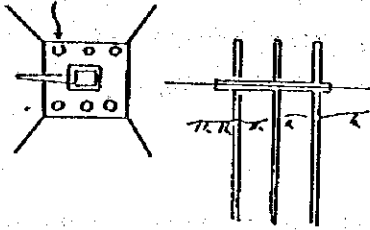
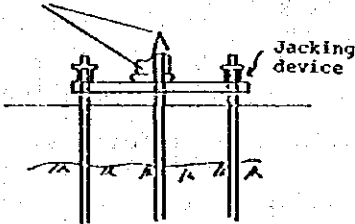
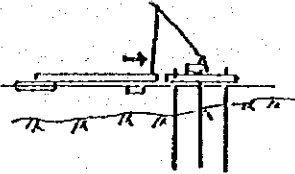
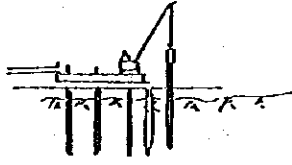
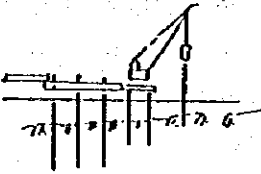
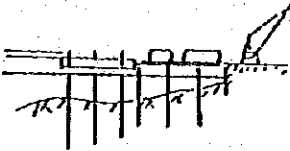
- o This bridge shall be a steel pipe type landing stage.
- o The apron and the floating jetty shall be linked by a movable bridge.

(6) Work Execution Steps

The steps of executing the work are shown in Table 5-2.

Table 5-2 Work Execution Steps

<p>①</p>	<p><u>Towing</u></p> <p>A dry towing system is to be employed.</p> <ul style="list-style-type: none"> • A crawler crane is to be previously mounted on the apron. • From Japan to the mouth of the Bons Synais River, the jetty is to be towed with an ocean-going tug only. From the river mouth to the site, however, an assisting tug is to be added. 	 <p>Crawler crane</p>
<p>②</p>	<p><u>Unloading</u></p> <ul style="list-style-type: none"> • Since there is a tidal current, the assisting tug is to help the ocean-going tug unload. • After completion of unloading, both ocean-going tug and barge are to return to Japan. A water depth of about 9 meters is required. 	
<p>③</p>	<p><u>Piling for Mooring</u></p> <ul style="list-style-type: none"> • Mooring piles are to be driven, with a vibro-piling machine suspended from a crawler crane. • Use the assisting tug and a temporary anchor winch to carry out positioning the pontoon for the apron. • Set every pile with supplementary winding. 	 <p>Apron</p>  <p>Vibro</p>
<p>④</p>	<p><u>Mooring the Jetty</u></p> <ul style="list-style-type: none"> • The jetty temporarily moored at an appropriate location is to be moved to a specified location with the assisting tug and the temporary mooring unit. Then, the mooring hardware is to be set. 	 <p>Current</p>
<p>⑤</p>	<p><u>Temporarily Locating the Movable Bridge</u></p> <ul style="list-style-type: none"> • The movable bridge temporarily moored at an appropriate location is to be moved to the jetty by use of the assisting tug and lifted on one side with the crawler crane. Then, the movable bridge is to be placed tentatively placed on the jetty. 	 <p>Jetty C. Bridge Floater</p>

⑥	<p><u>Piling for Support of the Apron</u></p> <ul style="list-style-type: none"> Set the apron pontoon in position. (Using the assisting tug and the temporary anchor winch.) Hang the vibro-piling machine from the crawler crane and hit the piles to support the apron. The apron pontoon is to have holes pierced in advance for piling. 	
⑦	<p><u>Apron Jack-up</u></p> <ul style="list-style-type: none"> After completion of piling, set a temporary jacking device and lift the apron pontoon up to a specified position. After completion of the jack-up, the pontoon is to be welded with piles. 	
⑧	<p><u>Installing the Movable Bridge</u></p> <ul style="list-style-type: none"> The movable bridge temporarily moored is to be awaged onto the apron by use of the crawler crane. 	
⑨	<p><u>Executing the Work of Connection Bridge</u></p> <ul style="list-style-type: none"> Hang the vibro-piling machine from the crawler crane and hit the piles for the Connection Bridge. After completion of the piling, the slabs will be installed. 	
⑩	<p>Repeat Step ⑨ above.</p>	
⑪	<p><u>Executing the Work of Facilities on the Apron</u></p> <ul style="list-style-type: none"> Execute the works of constructing an administrative office, cargo handling yard, etc. 	

5-3 Executing Organ and Management System

The Fishery Agency of Mozambique has a schedule to establish the Quelimane Fishing Port Management Center as a public corporation under the direct control of this Agency for management of this newly constructed fishing port.

This will be a fishing port management center smaller in scale than that of the Maputo Fishing Port. They are also planning to establish a similar center at Beira.

The functions of the Quelimane Fishing Port Management Center as a public corporation are as follows:

- (1) Fishing port service (management of pier, supply of fuel and water, storage of fish catch, etc.)
- (2) Management of refrigerating facilities
- (3) Control of fishing operation
- (4) Security of fishing boats

Refer to "Management Plan for Quelimane Fishing Port" prepared by the Fishery Agency for details. The personnel allocation, indicated in the above plan is as follows:

Secretariat: 3

Director - 1

Secretary for the above - 1

Assistant for the above - 1

Management and Finance Department: 6

Certified accountant - 1

Account clerk - 1

Service clerk - 1

Security guards - 4

Fishing Port Operation Department: 6

Chief - 1

Inspector - 1

Crane operators - 2

Forklift operator - 1

Fuel and water supply clerk - 1

Refrigeration Facility Management Department: 6

- Chief - 1
 - Inspector - 1
 - Ice sales clerk - 1
 - Electrical engineer - 1
 - Mechanical engineer - 1
 - Assistant - 1
-

Total: 21

Management is carried out by the three departments as above. The contents of its activities differ from those of the Quelimane Fishing Port, the management of the Sopinho Fishing Complex is carried out by six persons; the management chief, his assistant, a machinist, a refrigerator operator, a storehouse clerk, and an accountant.

The personnel plan is prepared as under for Quelimane Fishing Port Management Center at its starting stage.

Secretariat:

- Director - 1 (for general management and part of secretarial work)
- Clerk - 1 (assistant for the director, general secretarial work and wireless services)

Management and Finance Department: 3

- Certified accountant, accounting clerk - 1
- Accounting clerk - 1
- Guards - 2 (24 hour working system)

Fishing Port Operation Department: 2

- Fuel and water supply worker - 1 (also for electrical service in the port)
- Operator of crane and other related worker - 1

Refrigeration Facility Management Department: 3

- Ice making and refrigerating engineer - 1
 - Sales worker - 1 (also for disposal and measurement)
 - Machinist - 1 (also for operation of standby subsidiary generator and as warehouse worker)
-

Total: 10

The above will be needed at least when its starting operators will be temporarily employed for odd jobs.

Registration of vessels and export of shrimp, etc. are carried out by other Agencies. Therefore, it is unnecessary for the Management Center to participate in these works at the start. It is desired to appoint the people who has received education and training at the Fishery Training Center at Maputo to these works.

The following is the estimation for Quelimane port and harbor administration bureau's operational cost.

(1) Revenue

1) Cost for Using Jetty

o Large-scale fishing boat

Number of boats 40, 26 operating days per one voyage, four days anchoring and docking for about a month - thus amounted to eleven voyages/year. Cost for using jetty is same as commercial port in operation is to 330 MT/hr (150 t class fishing boat), so total hours for using jetty is eight hours, thus yearly hours will be

$$40 \text{ boats} \times 11 \text{ voyage} \times 330 \text{ MT/hr} \times 8 \text{ hr} = 1,161,600 \text{ MT}$$

o Medium-scale fishing boat

One voyage for ten days, anchoring for two days, dock for a month, thus amount to twenty-seven voyages/year. Supposedly, twenty operational boats and cost for using jetty will be 40 MT/hr, and time for using jetty is six hours.

Then,

$$20 \text{ boats} \times 27 \text{ voyage} \times 40 \text{ MT/hr} \times 6 \text{ hr} = 129,600 \text{ MT}$$

No charge from small-scale fishing boat, large-scale boat, together with medium-scale boat, we estimate that revenue with approximate 80 percent consideration will be 1,291,200 MT/year $\times 0.8 = 974,400 \text{ MT/year}$.

Then, 1,032 thousand MT.

2) Charge for Using Forklift and/or Crane

Charge for using forklift and/or crane is 800 MT/hr and average time for use when large- and medium-scale fishing boats coming to the port is about two hours and one hours, respectively,

$$40 \text{ boats} \times 11 \text{ voyage/year} \times 800 \text{ MT/hr} \times 2 \text{ hr} = 704,000 \text{ MT}$$

$$20 \text{ boats} \times 27 \text{ voyage/year} \times 500 \text{ MT/hr} \times 1 \text{ hr} = 270,000 \text{ MT}$$

Total 974,000 MT/year

80 percent consideration will be 779 thousand MT.

3) Selling of ice

1.60 t ice is necessary per day. Price of ice is 1,000 MT, Then, with 80 percent consideration, we estimate, revenue amounts to 467 thousand MT/year.

4) Sales Commission of Water

Type 150 GT - average $50 \text{ m}^3/\text{voyage}$

Type 50 GT - average $10 \text{ m}^3/\text{voyage}$

Utility cost for water-supply 14 MT/m^3 (10% commission)

$$40 \text{ boats} \times 11 \text{ voyage/year} \times 50 \text{ m}^3 \times 1.4 \text{ MT/m}^3 = 30,800 \text{ MT/year}$$

$$20 \text{ boats} \times 27 \text{ voyage/year} \times 10 \text{ m}^3 \times 1.4 \text{ MT/m}^3 = 7,560 \text{ MT/year}$$

Therefore, total yearly revenue amounts to 38,360 MT. 80 percent consideration will be 30 thousand MT.

5) Commission for Fuel Oil

Large-scale fishing boat consumption - 30 - 45 kl/voyage

Medium-scale fishing boat consumption - 10 kl/voyage price of fuel oil 50 MT/kl and 10 % commission therefore,

$$\begin{aligned} & (40 \text{ boats} \times 11 \text{ voyage} \times 40 \text{ kl}) + (20 \text{ boats} \\ & \times 27 \text{ voyage} \times 10 \text{ kl}) \times 50 \text{ MT/kl} \times 10\% \\ & = 115,000 \text{ MT/year.} \end{aligned}$$

Yearly basis - 115,000 MT revenue. 80 percent consideration will be 92 thousand MT.

6) Commission for Electricity

Amount of electric power used for large-scale fishing boat 45 kVA (8 hours) and medium-scale fishing boat 5 kVA (6 hours), and price of electricity 3 MT/kWh (1 % commission)

$(40 \text{ boats} \times 11 \text{ voyage} \times 8 \text{ hr} \times 45 \text{ kVA} \times 0.8) + (20 \text{ boats} \times 27 \text{ voyage} \times 6 \text{ hr} \times 5 \text{ kVA} \times 0.8) \times 3 \text{ MT/kWh} \times 10 \% = 41,904 \text{ MT/year}$

80 percent consideration will be 33 thousand MT.

7) Commission for Catch Yield

0.1 percent commission - yearly yield 7028 t

Yield by category		Average price	
Shrimp	4616 t	Shrimp	120 MT/kg
Fish	2412 t	First class fish	75 MT/kg
First class	10 %	Second class fish	50 MT/kg
Second class	10 %	Third class fish	20 MT/kg
Third class	80 %		

Total commission earned/year (projected)

$622,662 \text{ MT} \times 0.1/100 = 622,662 \text{ MT/year}$

80 % consideration will be 498 thousand MT.

Total revenue earned yearly amounts to 2,931 thousand MT/year

(2) Expense

1) Administration Cost (Labor cost)

	Monthly	Person	Monthly Total (MT)
Director	17,000	1	17,000
Clerk	7,500	1	7,500
Accountant	8,000	1	8,000
Security	4,000	2	8,000
Worker for fuel and water supply	4,500	1	4,500
Crane operation and other workings	5,000	1	5,000
Engineer for ice making and freezing	13,000	1	13,000
Salesman for ice supply	4,500	1	4,500
Mechanic	9,000	1	9,000
Total		10 persons	76,500 MT/month

$76,500 \text{ MT/month} \times 12 \text{ months} = 918 \text{ thousand MT/year}$

2) Welfare cost

Calculated 15 percent of administration cost
 $918,000 \text{ MT/year} \times 0.15 = 138 \text{ thousand MT/year}$

3) Utility Cost (Electricity)

Amount of electric power used for ice maker, refrigerator, lighting are to be estimated; Basically 45 kVA

80 % operation rate

$45 \text{ kVA} \times 0.8 \times 24 \text{ hrs} \times 0.8 \times 365 \text{ days} \times 3 \text{ MT/kWh}$
 $= 757 \text{ thousand MT/year}$

4) Water Consumption

Mineral water for ice maker $2.5 \text{ m}^3/\text{day}$

$2.5 \text{ m}^3/\text{day} \times 365 \text{ days} = 912.5 \text{ m}^3$

Water to drink - $0.03 \text{ m}^3/\text{day}/\text{person}$

$50 \text{ persons} \times 0.03 \text{ m}^3/\text{day} \times 365 \text{ days} = 547.5 \text{ m}^3$

City water rate estimates to be $14 \text{ MT}/\text{m}^3$ and operation ratio - 80 %

$1,460 \text{ m}^3/\text{year} \times 14 \text{ MT}/\text{m}^3 \times 0.8 = 16 \text{ thousand MT/year}$

5) Maintenance Cost for Machinery and Equipment

Calculated one percent of machinery and equipment cost 380 thousand MT/year.

6) General Administration Cost

10 % of total from 1) to 5) amounts to 221 thousand MT/year

All amounted to incur operation costs 2,430 thousand MT/year

Therefore,

$(\text{revenue}) - (\text{expense}) = 2,931 \text{ thousand MT/year}$
 $- 2,430 \text{ thousand MT/year}$
 $= 501 \text{ thousand MT/year}$

All necessary costs to maintain and manage administration bureau can be paid by revenue incurred from facilities.

The facilities construction cost is not expenses on the side of Mazanbican Government, and we estimate this expenses as initial investment. The facilities depreciation expense can be estimated as follows;

o Facilities durability time period

 Jetty - 40 years

 Ancillaries facilities - 10 years

o Residual evaluation price - 10%

o Flat sum system

Then the facilities depreciation expense is 8,685 thousand MT/year
and profit often depreciation is minus 8,184 thousand MT.

5-4 Execution Schedule

After completion of this basic designing, exchange of Notes stipulating the aid contents, the limited amount of grant, and terms thereof shall be concluded with regard to the Quelimane Fishing Port Complete Equipment Plan, between the Japanese and the Mozambican Governments. Within the framework of the scope of this Exchange of Notes, Consulting Contracts shall be concluded between the Mozambican Government and a Japanese consulting company to proceed to concrete designing.

The consulting company shall prepare the design drawings, specifications, figures and other documents required for bid of facilities, equipment and materials forming the subject of grant.

After completely establishing the execution design documents, with approval thereof by the owner, subcontractors shall be called for bidding.

The successful bidder shall, after signing the Agreement with the Mozambican Government, get start on such tasks as procurement, fabrication and finally construction work after due authorization by the Japanese Government to complete and deliver the Object of Contract by the stipulated date.

For the facilities accompanied by construction works, the consultant shall dispatch his engineers starting from the commencement of the foundation work on site in order to effectuate construction management.

Execution Planning (draft) is as shown in Table 5-3.

Table 5-3 Execution Schedule

Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
E/N Consultant Contract	E/N Consultant Contract	Execution Designing	Contracts with Suppliers	Tender Evaluation	Contracts with Suppliers	Approval of Drawings	Product Inspection in Factory	Loading Inspection	Work Execution Schedule Meeting	Final Inspection for Completion	Completion Ceremony						
Contract	Contract	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender	Approval Tender
<p> Execution Designing (1-2), Contracts with Suppliers (3-4), Tender Evaluation (4-5), Contracts with Suppliers (5-6), Approval of Drawings (6-7), Product Inspection in Factory (7-8), Loading Inspection (8-9), Work Execution Schedule Meeting (9-10), Final Inspection for Completion (10-11), Completion Ceremony (11-12). </p> <p> Approval Tender (3-4), Contracts with Suppliers (5-6), Approval of Drawings (6-7), Bid Contract Execution Drawings (7-8), Fabrication Domestic Transportation (8-9), Procurement (9-10), Packing, Loading Lacing (10-11), Temporary Mooring (11-12), Transportation (12-13), Pass the Customs (13-14), Connecting Bridge Work (14-15), Nevabla Bridge Work (15-16), Building/Equipment Works (16-17), Removal (17-18). </p> <p> Temporary Work (11-12), Construction of Pilearing Jetty (12-13), Apron Work (13-14), Resident Management (14-15). </p>																	

Chapter 6
EVALUATION OF
THE PROJECT

6-1 Economic Evaluation

To measure the investment effect, a cost-benefit analysis is to be applied by calculating the cost-benefit ratio and internal rate of return, that is a general method of economic evaluation in a development project.

With regard to the effect of the Quelimane Port for the national economy, let us illustrate concrete factors such as Table 6-1, which can be summarized up as follows;

- (1) Development of physical constitution of the people by supplying cheap and fresh animal-protein smoothly.
- (2) Decrease of distribution expenses and stability of consumer prices.
- (3) Development in employment by consolidating marine product distribution and treatment facilities.
- (4) Expansion of foreign trade centering on aquatic resources.
- (5) Economical and effective use of space of the Quelimane fishing port.

6-1-1 Method of Economic Evaluation

The economic evaluation of this project has enormous impact on various fields, and evaluation must be made not only on construction of the Quelimane fishing port itself, but on collaboration of many projects centered on integral fishing port base.

Economic evaluation of this project, taking from the standpoint of national economy of the People's Republic of Mozambique, should be applied to in this analysis. We herein consider direct effects coming from the completion of the Quelimane as a beneficiary, then compare this with the incurred expenses and seek for the ratio of internal revenue during the analyzing period.

Table 6-1 Items on Evaluation of Investment Effect in Fishing Port

Direct Investment Effect		Indirect Investment Effect	
Production	<ul style="list-style-type: none"> o Yield catch, increase in brailing and new findings o Increase in sailing days o Diversification of type of trawling and fishery occurring of new fishing 	Bettering of local economy	<ul style="list-style-type: none"> o Trader, finished product factory increase in income of shops o Increase district tax earnings o Increase on chances of employment o Citizen settlement by yearly operation o Development on related enterprises (ship builder, repair, oil trader, material vender finished product factory)
Distribution fresh endurance	<ul style="list-style-type: none"> o Raising of fish prices and stabilization (making good price zone by increase on the amount of transportation) o Raise in keeping fish fresh 		
Unloading preparation for fishing	<ul style="list-style-type: none"> o Eliminating labor force at the loading and unloading working of the boat o Shortening preparation time for fishing (fueling, water supply, food and water to drink) o Loading materials & equipment 	Increase in supply area	Increase in the amount of intake portion of district citizen
Safety on fishing boat	<ul style="list-style-type: none"> o Shortening time of towing and saving materials such as ropes, etc. o Decrease air breakage and damage of hull o Extension of the years for endurance of hull 	The healthiness of fishery management Increase in eagerness of productivity	<ul style="list-style-type: none"> o Decrease in marine product concentration and loading cost o Increase in income by loading from self-employment (union)
Increase in safety level of fishing crew		Increase in productivity by saving labor force	<ul style="list-style-type: none"> o Expanding fishing area o Utilization of buried resources
Stop evading emergency to other port	<ul style="list-style-type: none"> o Saving round sailing expenses (personnel expenses, food expenses fuel expenses) o Sophisticating fishing industry and working 	Increase in income of fisher men	Earning wages of residual labor by engaging in other industry
Re-modeling land for fishing port	Making public facilities by land remodeling in and around the sea area (co-op office, good disposal center, finished product factory fueling, crew's lodging roads, parking area, fisher's city hall, and training room)	Leveling up fishing gears and modernization	
		Better off life, environment	<ul style="list-style-type: none"> o By sanitary arrangement, transportation, communication, security education, accident, injury etc. reduction of medical expenses o Increase of leisure time making people healthier
		Better off environment	<ul style="list-style-type: none"> o Increase in land area, environment consolidation by way of efficiency of utilization of land o Making density of demography, centralization of economy. o Rapid transportation of import goods and promotion of acquisition of goods
		Bettering off daily life & education, reduction in working out in other countries	

Excerpt from
 "Study on evaluation basis of investment effect of port & harbor"
 Fishery Agency (Japan), March, 1975

As the method of measurement about the beneficiary, we would like to compare the case of using the fishing port with the case of using the commercial port, and consider quantitatively measurable beneficiaries coming out of this differentiation as a beneficiary of construction of the fishing port.

6-1-2 Benefit

As has been stated earlier on Table 6-1, economic effect brought about by the construction at Quelimane port and harbor shows diversity. Let us discuss three quantitatively econometric and analytic benefits on the direct effect in the main analysis,

1. Benefits for increase in yield with the increased rate of fishing boats in operation
2. Benefit of the effects on the freshness and durability by using ice
3. Benefit of shortening time of loading and working

(1) Benefits for Increase in Yield with the Increased Rate of Fishing Boats in Operation

The yield catch of large-, medium- and small-scale fisheries is estimated, as we set the target in Chapter 4, to be 7028 t in 1988. Calculations are to amount to 3865 t in all shrimp for export. Average price is approx. 120 MT/kg.

We estimate the total quantity of fish for domestic market to be 3163 t, the ratio of yield catch;

First class fish	10 percent
Second class fish	10 percent
Third class fish	80 percent

Price;

First class	75 MT/kg
Second class	50 MT/kg
Third class	20 MT/kg

then, revenue from yield catch sales: (See Fig. 6-2.)

Table 6-2 Calculation on Benefit for Increase in Yield with Increase Rate of Fishing Boats in Operation

Item	Yearal	1988
The amount of unload in the Quelimane commercial port (A)	Shrimp	4,006 t
	Fish	2,804 t
The amount of unload in new port (B)	Shrimp	1,202 t
	Fish	7,028 t
Increase in yield catch (A-B)	Shrimp	4,616 t
	Fish	2,412 t
Average fish price (C)	Shrimp	3,022 t
	Fish 1 class	1,812 t
	Fish 2 class	1,210 t
	Fish 3 class	120 MT/kg (10%)
Benefit (D)		75 MT/kg (10%)
		50 MT/kg (10%)
		20 MT/kg (10%)
Total benefit (D x 10%)		251,925,000 MT
		25,192,500 MT

(2) Benefit of the Effects on the Freshness and Durability by Using Ice

By consolidating the port and harbor facilities, we consider the differences between the increase in fish price from the changes of the fish dealing situation, toward the unloading of fishing boat and utility cost for ice as a benefit.

We do not have to think about large-scale fisheries because of having rapid refrigerator. We herein think much of medium- and small-scale fish's yield catch both of fresh fish to eat and fresh fish to freeze. Therefore, considering that 1st class, 2nd class and 3rd class fish turn to be frozen fish by using ice, we calculate an increase in fish prices to be the benefit. (See Table 6-3).

Table 6-3 Benefit of the Effects on the Freshness
and Durability by Using Ice

Items	Breakdown	Total Amount
Quelimane commercial port		
Yield catch of fresh fish	275 t	
	Shrimp 55 t	
	Fish 220 t	
Fish price	Shrimp 120 MT/kg 20%	11,000,000 MT
	Fish 3rd class 30 MT/kg 100%	
New port		
Yield catch of fresh fish	598 t	
	Shrimp 114.8 t	
	Fish 483.2 t	
Fish price	Shrimp 120 MT/kg	27,547,200 MT
	Fish 1st class 75 MT/kg 10%	
	2nd class 50 MT/kg 10%	
	3rd class 20 MT/kg 80%	
Benefit		16,547,200 MT

(3) Benefits of Shortening the Time of Unloading and Working

By matured port basic facilities in the Quelimane port and consolidation of distribution function facilities, in promoting various technological innovation and rationalization in fishery production activities, we consider mainly that the ratio of shortening the time with raising efficiency of unloading and working as a benefit.

The concrete measurement of benefit, with regard to the amount of shortening the time of unloading per boat, is to be calculated in the following manner. We consider that in the implementation of the port basis construction design, time of unloading to be used as a basis, and discuss on days to be working and the number of boats entering the port, thus calculate as in Table 6-4, expenses per hour of the crew member's engaging as a benefit.

Table 6-4 Benefit for Shortening Time of Unloading an Working

Number of boats entering the port (110-150 t)	The amount of shortening the unloading time	Unloading hour	Saving days (day)	Saving benefit
A	B	C	$D = \frac{A \times B}{C}$	$E = D \times F^*$
15	120	360	5	143,000

* F = crew x (labor wages + food expenses) = (Japanese workers x 4,000 MT/day + local workers 10 x 200 MT/day) x expense
 = 22,000 MT x 1.3
 = 28,600 MT

6-1-3 Estimation of Expenses

(1) Jetty Construction Cost

Jetty consists of construction fee and consultant fee.

(2) Facility Renewal Cost

Facilities are supposed to be renewed within the number of years depreciated. During the above period, we have to re-invest if necessary, and calculate as temporary credit payment.

* Facility Number of years depreciated.

Table 6-5 Number of Durable Years by Facility

Number of durable years	Facilities
10	Ancillaries
40	Jetty, apron, movable bridge, connection bridge

(3) Maintenance/Administration Cost

Yearly maintenance/administration cost is calculated in Chapter 5, 5-3. Maintenance/administration cost is 380 thousand MT/year.

6-1-4 Comparison with Cost and Benefit

The following is the result of quantitative cost-benefit analysis (see Fig. 6-6), based on the all these estimations.

Judging from this result, we can calculate the internal revenue ratio (IRR) is 11.602 percent with equivalent to cost and benefit, and B/C ratio in the 8 percent discount rate is 1.566.

This project objective is to analyze

- Port basic design construction corresponding to in- and out-port activity of fishing boats
- Fishing port functional facility toward keeping fish fresh

As an integral fishery base, by introduction of aquatic-finished product industry and related industry, it is highly desirable. Also, by providing measurable fresh and cheap animal-protein, we consider benefit factors of people's physical body shape, etc.

We believe that this national economical benefit-effect can be large enough for people.

So, it is concluded that the said project should be feasible from a national economic viewpoint.

Table 6-6 Result-Quantitative Cost-Benefit Analysis

(Unit: 1,000 MT)

Annual cost	Construction investment cost	Facility renewal cost	Maintenance cost	Total cost	Yield		Fresh endurance effect	Shortening unload	Benefit total	Net benefit total	Cost	Benefit	Net benefit
					catch	increase							
1988	272,018	0	0	272,018	0	0	0	0	0	0	272,018	0	Δ272,018
1989	0	0	380	380	25,192	16,547	143	143	41,882	41,882	351	38,779	38,428
1990	0	0	380	380	25,192	16,547	143	143	41,882	41,882	325	35,907	35,582
1991	0	0	380	380	25,192	16,547	143	143	41,882	41,882	301	33,247	32,946
1992	0	0	380	380	25,192	16,547	143	143	41,882	41,882	279	30,784	30,505
1993	0	0	380	380	25,192	16,547	143	143	41,882	41,882	258	28,504	28,246
1994	0	0	380	380	25,192	16,547	143	143	41,882	41,882	239	26,392	26,153
1995	0	0	380	380	25,192	16,547	143	143	41,882	41,882	221	24,437	24,216
1996	0	0	380	380	25,192	16,547	143	143	41,882	41,882	205	22,627	22,422
1997	0	0	380	380	25,192	16,547	143	143	41,882	41,882	190	20,951	20,761
1998	0	38,003	380	380	25,192	16,547	143	143	41,882	41,882	17,778	19,339	1,621
1999	0	0	380	380	25,192	16,547	143	143	41,882	41,882	162	17,962	17,800
2000	0	0	380	380	25,192	16,547	143	143	41,882	41,882	150	16,319	16,169
2001	0	0	380	380	25,192	16,547	143	143	41,882	41,882	139	15,399	15,260
2002	0	0	380	380	25,192	16,547	143	143	41,882	41,882	129	14,259	14,130
2003	0	0	380	380	25,192	16,547	143	143	41,882	41,882	119	13,202	13,083
2004	0	0	380	380	25,192	16,547	143	143	41,882	41,882	110	12,224	12,114
2005	0	0	380	380	25,192	16,547	143	143	41,882	41,882	102	11,319	11,217
2006	0	0	380	380	25,192	16,547	143	143	41,882	41,882	95	10,480	10,385
2007	0	0	380	380	25,192	16,547	143	143	41,882	41,882	88	9,704	9,616
2008	0	38,003	380	380	25,192	16,547	143	143	41,882	41,882	8,235	8,985	750
2009	0	0	380	380	25,192	16,547	143	143	41,882	41,882	75	8,320	8,245
2010	0	0	380	380	25,192	16,547	143	143	41,882	41,882	69	7,703	7,634
2011	0	0	380	380	25,192	16,547	143	143	41,882	41,882	64	7,133	7,069
2012	0	0	380	380	25,192	16,547	143	143	41,882	41,882	59	6,604	6,545
2013	0	0	380	380	25,192	16,547	143	143	41,882	41,882	55	6,115	6,060
2014	0	0	380	380	25,192	16,547	143	143	41,882	41,882	51	5,662	5,611
2015	0	0	380	380	25,192	16,547	143	143	41,882	41,882	47	5,243	5,196
2016	0	0	380	380	25,192	16,547	143	143	41,882	41,882	44	4,854	4,810
2017	0	0	380	380	25,192	16,547	143	143	41,882	41,882	40	4,495	4,455
2018	0	38,003	380	380	25,192	16,547	143	143	41,882	41,882	3,814	4,162	348
2019	0	0	380	380	25,192	16,547	143	143	41,882	41,882	34	3,853	3,819
2020	0	0	380	380	25,192	16,547	143	143	41,882	41,882	32	3,568	3,536
2021	0	0	380	380	25,192	16,547	143	143	41,882	41,882	29	3,304	3,275
2022	0	0	380	380	25,192	16,547	143	143	41,882	41,882	27	3,059	3,032
2023	0	0	380	380	25,192	16,547	143	143	41,882	41,882	25	2,832	2,807
2024	0	0	380	380	25,192	16,547	143	143	41,882	41,882	23	2,622	2,599
2025	0	0	380	380	25,192	16,547	143	143	41,882	41,882	22	2,428	2,406
2026	0	0	380	380	25,192	16,547	143	143	41,882	41,882	20	2,248	2,228
2027	0	0	380	380	25,192	16,547	143	143	41,882	41,882	18	2,082	2,064
2028	0	272,018	380	272,398	25,192	16,547	143	143	41,882	41,882	12,538	1,927	Δ10,611
Total	272,018	386,027	15,200	673,245	1,007,680	661,880	5,720	1,675,280	1,002,035	318,580	499,094	180,514	

6-2 Financial Evaluation

In the preceding chapter, we have executed an analysis of the national economy and found that this construction work has a substantial economic effect and is a worthwhile investment. In this chapter, we would like to execute the said facility's financial analysis and whether it will be successful or not from a management aspect, and evaluate, together with the national economic analysis.

This chapter's objective lies in not only the analysis, but the said facilities with non-reimbursable funds given the burden of financing and whether the Mozambican Government can manage by themselves or not. The said facilities are to manage under direct control of the Fishery Agency.

The Quelimane Fishing Port Administration Bureau and its sales revenue is according to Chapter 5, 5-3 (administration/execution project) as follows;

(1) Projection of Sales Revenue

Charges for jetty	1,032 thousand MT
Charges for forklift and/or crane	779 thousand MT
Sales revenue of ice	467 thousand MT
Dealing commission for water	30 thousand MT
Dealing commission for oil	92 thousand MT
Dealing commission for electricity	33 thousand MT
Dealing commission for catch	498 thousand MT

Total:	2,931 thousand MT/year

(2) Projection on Operation Cost

Personnel cost (wages)	918 thousand MT
Benefits and welfare cost	138 thousand MT
Electricity cost	757 thousand MT
City water rate	16 thousand MT
Maintenance fee	380 thousand MT
General administration cost	221 thousand MT

Total:	2,430 thousand MT/year

(3) Cash-flow

The said facility's cash flows is shown in Table 6-7. The construction work facility fee is not expenses on the side of Mozambican Government, and we estimate this expenses as initial investment.

The said facilities durability time period:

Jetty - 40 years

Ancillaries facilities - 10 years

Table 6-7 Cash-Flow

Annual	Sales revenue	Assets sales	Cash revenue	Operational cost	Investment	Total cash expenses	Net currency inflow	Accumulation
0	0	0	0	0	272,018	272,018	Δ272,018	Δ272,018
1	2,931	0	2,931	2,430	0	2,430	501	Δ271,517
2	2,931	0	2,931	2,430	0	2,430	501	Δ271,016
3	2,931	0	2,931	2,430	0	2,430	501	Δ270,515
4	2,931	0	2,931	2,430	0	2,430	501	Δ270,014
5	2,931	0	2,931	2,430	0	2,430	501	Δ269,513
6	2,931	0	2,931	2,430	0	2,430	501	Δ269,012
7	2,931	0	2,931	2,430	0	2,430	501	Δ268,511
8	2,931	0	2,931	2,430	0	2,430	501	Δ268,010
9	2,931	0	2,931	2,430	0	2,430	501	Δ267,509
10	2,931	3,800	6,731	2,430	38,003	40,433	Δ33,702	Δ301,211
11	2,931	0	2,931	2,430	0	2,430	501	Δ300,710
12	2,931	0	2,931	2,430	0	2,430	501	Δ300,209
13	2,931	0	2,931	2,430	0	2,430	501	Δ299,708
14	2,931	0	2,931	2,430	0	2,430	501	Δ299,207
15	2,931	0	2,931	2,430	0	2,430	501	Δ298,706
16	2,931	0	2,931	2,430	0	2,430	501	Δ298,205
17	2,931	0	2,931	2,430	0	2,430	501	Δ297,704
18	2,931	0	2,931	2,430	0	2,430	501	Δ297,203
19	2,931	0	2,931	2,430	0	2,430	501	Δ296,702
20	2,931	3,800	6,731	2,430	38,003	40,433	Δ33,702	Δ330,404
21	2,931	0	2,931	2,430	0	2,430	501	Δ329,903
22	2,931	0	2,931	2,430	0	2,430	501	Δ329,402
23	2,931	0	2,931	2,430	0	2,430	501	Δ328,901
24	2,931	0	2,931	2,430	0	2,430	501	Δ328,400
25	2,931	0	2,931	2,430	0	2,430	501	Δ327,899
26	2,931	0	2,931	2,430	0	2,430	501	Δ327,398
27	2,931	0	2,931	2,430	0	2,430	501	Δ326,897
28	2,931	0	2,931	2,430	0	2,430	501	Δ326,396
29	2,931	0	2,931	2,430	0	2,430	501	Δ325,895
30	2,931	3,800	6,731	2,430	38,003	40,433	Δ33,702	Δ359,597
31	2,931	0	2,931	2,430	0	2,430	501	Δ359,096
32	2,931	0	2,931	2,430	0	2,430	501	Δ358,595
33	2,931	0	2,931	2,430	0	2,430	501	Δ358,094
34	2,931	0	2,931	2,430	0	2,430	501	Δ357,593
35	2,931	0	2,931	2,430	0	2,430	501	Δ357,092
36	2,931	0	2,931	2,430	0	2,430	501	Δ356,591
37	2,931	0	2,931	2,430	0	2,430	501	Δ356,090
38	2,931	0	2,931	2,430	0	2,430	501	Δ355,589
39	2,931	0	2,931	2,430	0	2,430	501	Δ355,088
40	2,931	27,201	30,132	2,430	272,018	274,448	Δ244,316	Δ599,404

Chapter 7
CONCLUSION AND
RECOMMENDATION

7-1 Conclusion

As a countermeasure toward overcoming the food shortage and economic crisis from which the Mozambican Government now suffers, the Government concentrates its energy on acquiring foreign currency through large-scale fisheries, and to raise the efficiency in small-scale fisheries. For this, the consolidation of ports is urgently needed.

In order to put forward these fishing ports' improvement/ development plans, the Mozambican Government requested the Japanese Government to extend a Grant Aid by, and based on this, a basic design survey. As it turned out, the survey team concluded that it is indispensable to improve fishing ports in Quelimane, Zambezia.

When this plan is implemented, unfavorable conditions will be resolved thoroughly although the use of ports for mercantile ships is given priority because only a part of the commercial port is utilized for fishing boats at present and existing fixed quay with a maximum tide level difference of 5.3 m is an inconvenience to fishing boats in accessing the quay. Thus, the fishing boat operating ratio for the shrimp fishery which now gains the largest sum of foreign currency will increase and the operating conditions will also be greatly improved.

Use of the fishery port by the small- and middle-scale fisheries which is yet to be organized will also be promoted rapidly. Promotion of small- and middle-scale fisheries which targets mainly fish for domestic use must be required at any cost as the urgent measures for facing scarce foodstuffs both at home country and in this district.

Needless to say, the jetty, service of the functional facilities of the fishing port such as the cargo handling yard and ice-making facilities will greatly contribute to organizing these small- and middle-scale fisheries industries and to improving their operating conditions to a large extent. It is anticipated when the exclusive-use fishery port is prepared, this facility will become the center of economic and social activity in the Quelimane district as well as the commercial port.

Then, the strong fishery industry activity will vitalize the economic activity in the district.

The planned exclusive-use fishery port facilities will be installed at approximately 100 m offshore from the river bank at the center of the Quelimane city. To facilitate the landing of fishing boat cargos in this location where the difference of tide level is great, the jetty should be of a floating type with a length and width of 80 m and 10 m, respectively.

The functional facilities of this fishing port will be installed on the apron in the river considering the necessity to cope with truck noises and bad smell which could occur when the fishery activity is conducted vividly.

In the long run, by accumulation of river sands, utilization of fishing boats has been deteriorating. In this project, there is need to tackle this problem. This matter must be dealt with careful consideration, lest the accumulation allunial layers should be brought about. The resolutions to these problems are that the jetty and connection bridge are made by piles, as said earlier, functional facilities of this fishing port is not to construct in a reclaimed land but to install on the piles for bridge.

This project will benefit the Mozambican national economy, and it is of great significance to be carried out under the grant aid by the Japanese Government. Urgent execution of the project is highly desirable. The causes for the Japanese Government is highly significant.

7-2 Recommendation

In order to promote the effective implementation of this project in a developing manner, it is recommended that the Government of Mozambique give consideration to the following points and measures that should desirably be adopted.

- (1) The management of this fishing port has an independent settlement of accounts within the various types of services operated, but if too much emphasis is placed on the settlement of the accounts alone, then it is likely that excessive jetty charges for fishing boats and

handling charges for oil and water, etc. will create pressures for fishing boats management. Furthermore, if the jetty charges are made too little, then the facilities will be held in an undesirable state for extended periods and result in not enough money being secured for the purposes of maintenance and management in particular. This will serve to accelerate the deterioration of the facilities. It is therefore necessary that the jetty charges and the management system be determined along with the content of the operations.

- (2) It will be possible to enlarge the catch and develop new and efficient fisheries work for the boats as the provision of the fisheries port facilities progresses. However, there is a limit to the amount of resources and it must be remembered that the indiscriminate fishing will eventually lead to their depletion. It is already said that the production of shrimp is already approaching the maximum and so it is necessary that further efforts to increase the catch be directed towards other fishes. In addition, the provision of the fishing port facilities and placing the emphasis on the previously described measures is important for planning the effective utilization of the fisheries resources and the consolidation of the fisheries, and at the same time, it is necessary to make efforts for the provision of a distribution route that utilizes icemaking plants and refrigerators.
- (3) The promotion of small-scale fisheries can be expected since the provision of this fishing port will provide a basis for the unification of the fisheries that up till now have been without organization and dispersed, with practically all of the catch being for self-consumption. Provision of Quelimane should be performed in a manner similar to the fisheries complex at Sopinyo. The creation of an organization for this small-scale fisheries requires that a detailed investigation be implemented into the content of the operations and the organizational policy separate from the management of the fishing port itself.

- (4) In the future, it is expected that the fishing port will act as the center for the formation of a comprehensive fisheries base. The jetty facilities and other facilities in this plan place emphasis on the provision of the core functions of a fisheries base and in the future, fishing boats repairing facilities, processing facilities and fisheries training facilities and other will need to be provided. However, the provision of these facilities requires implementation at the stage when the plan progress to being a comprehensive development plan.

APPENDIX

Appendix 1 Minutes of Discussions (Basic Design Study)

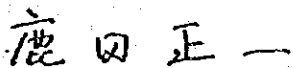
MINUTES OF DISCUSSIONS
ON
THE QUELIMANE FISHING PORT
IMPROVEMENT PROJECT
IN
THE PEOPLE'S REPUBLIC OF MOZAMBIQUE

In response to the request of the Government of the People's Republic of Mozambique, the Government of Japan decided to conduct a basic study on the Quelimane Fishing Port Improvement Project (hereinafter referred to as the Project) and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the People's Republic of Mozambique the study team headed by Mr. Shoichi Shikada, Planning Division, Fishing Port Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries from February 23rd to March 24th, 1986.

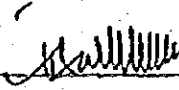
The team has held a series of discussions on the Project with the officials concerned of the Government of the People's Republic of Mozambique headed by Mr. Francisco David e Silva, Director of Economy, Secretariat of State of Fisheries and has conducted a field study in Quelimane area.

As a result of the study, both parties have agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Maputo, March 11st, 1986



Mr. Shoichi Shikada
Leader, Japanese Study Team
Japan International Cooperation Agency (JICA)



Mr. Francisco David e Silva
Director of Economy
Secretariat of State of
Fisheries
People's Republic of Mozambique

1. Objective of the Project

The objective of the Project is to provide necessary facilities and equipment for improvement of the fishing port in Quelimane.

2. Executing Body

Secretariat of State of Fisheries will be the executing body of the Project.

3. Site of the Project

The proposed site of the Project is shown in Annex I.

4. Request by the Government of Mozambique

The Japanese Basic Design Study Team will convey the desire of the Government of the People's Republic of Mozambique to the Government of Japan that the latter will take necessary measures to cooperate in implementing the Project and provide necessary facilities and equipment as listed in Annex II within the scope of the Japanese Economic Cooperation in grant form.

5. Measures to be taken by the Government of the People's Republic of Mozambique

The Government of the People's Republic of Mozambique will take the necessary measures listed in Annex III on conditions that the Grant Aid by the Government of Japan is extended to the Project.

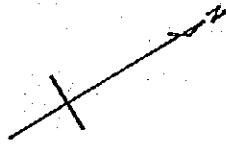
6. System of Japan's Grant Aid

Both sides have confirmed that the Japanese Basic Design Study Team explained Japan's Grant Aid System and the Mozambican side understood it.

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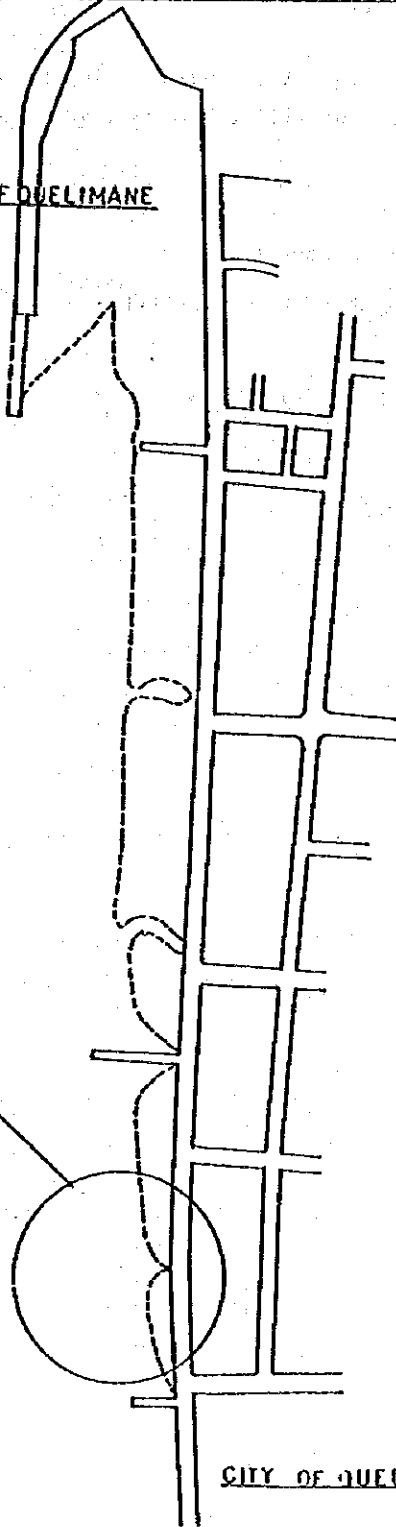
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ANNEX - 1



PORT OF QUELIMANE

PROJECT SITE



CITY OF QUELIMANE

ANNEX II

Items requested by the Government of the People s Republic of Mozambique
whose cost will be covered by the Government of Japan.

1. Jetty
2. Ice making machine
3. Other supplementary facilities

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ANNEX III

The following measures will be required to be taken by the Government of People's Republic of Mozambique;

1. To secure and clear land necessary for the construction of the facilities;
2. To provide facilities for distribution of electricity, water supply, drainage and other incidental facilities up to the site;
3. To ensure prompt unloading, tax exemption and customs clearance at ports of disembarkation in Mozambique and prompt internal transportation therein of the products purchased under the grant;
4. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Mozambique with respect to the supply of the products under the verified contracts;
5. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry to Mozambique and their stay therein for the performance of their work;
6. To maintain and use properly and effectively the facilities constructed and equipment purchased under the grant; and
7. To bear all the expenses, other than those covered by the grant, necessary for the construction of the facilities and provision of the equipment.

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Appendix 2 Minutes of Discussions (Explanation of Final Draft Report)


MINUTES OF DISCUSSIONS
ON
THE QUELIMANE FISHING PORT
IMPROVEMENT PROJECT
IN
THE PEOPLE'S REPUBLIC OF MOZAMBIQUE

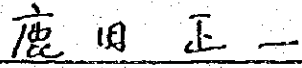
In response to the request of the Government of the People's Republic of Mozambique for Grant Assistance for the Quelimane Fishing Port Improvement Project (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the People's Republic of Mozambique the team headed by Mr. Shoichi Shikada, Planning Division, Fishing Port Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries from February 23rd to March 24th, 1986.

As a result of the study, JICA prepared a draft report and dispatched a mission to explain and discuss it from June 8th to June 20th, 1986.

Both parties had a series of discussions on the Report and agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Maputo, 17th June, 1986


Mr. Francisco David e Silva
Director of Economy
State Secretariat of Fisheries


Mr. Shoichi Shikada
Leader, Japanese Study Team
Japan International Cooperation
Agency (JICA)

1. The Mozambican side has principally agreed with the basic design study report but requested that, as far as the type of structure and construction materials are concerned, a more detailed comparative study shall be included in the Final Report.

2. The Final Report (10 copies in English) on the Project will be submitted to the Mozambican Government by the end of September 1986.

3. The Mozambican side understood the system of Japan's Grant Aid Programme and the arrangements to be taken by the Mozambican side in realization of the Project.

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Appendix 3 Formation of the Survey Team

(1) Basic design study

Mr. Shoichi Shikada	Leader Planning Division Fishing Port Department Fisheries Agency
Mr. Shozo Ohira	Project Coordinator Grant Aid Cooperation Division Economic Cooperation Department Ministry of Foreign Affairs
Mr. Sadao Watase	Fisheries Development Planner Techno Consultants, Inc.
Mr. Shigeru Kawamukai	Coastal Civil Engineer Techno Consultants, Inc.
Mr. Hiromi Matoi	Facilities Engineer Techno Consultants, Inc.
Mr. Minoru Kawada	Equipment Planner Techno Consultants, Inc.
Mr. Akira Kusunoki	Interpreter Techno Consultants, Inc.

(2) Explanation of Final Draft Report

Mr. Shoichi Shikada	Leader Planning Division Fishing Port Department Fisheries Agency
Mr. Takashi Saito	Project Coordinator Institute for International Cooperation Japan International Cooperation Agency
Mr. Sadao Watase	Fisheries Development Planner Techno Consultants, Inc.
Mr. Shigeru Kawamukai	Coastal Civil Engineer Techno Consultants, Inc.
Mr. Hideki Ishii	Cost Estimation Techno Consultants, Inc.
Mr. Kenji Kurokawa	Interpreter Techno Consultants, Inc.

Appendix 4 Schedule of Basic Design Study

(1) Basic Design Study

	Date	Description
1	Feb. 23 (Sun)	LV. Narita (20:55) BA006
2	24 (Mon)	AR. London (05:15), LV. London (15:20) BA728 AR. Frankfurt (17:45), LV. Frankfurt (19:10) RH532
3	25 (Tue)	AR. Harare (06:10) Courtesy call on Japanese Embassy
4	26 (Wed)	LV. Harare (13:30) TM343 AR. Maputo (16:30)
5	27 (Thu)	Courtesy call on Ministry of Foreign Affairs and Fisheries Agency Explain the outline of basic study, Meeting in schedule
6	28 (Fri)	Discussion on the plan, Data collection
7	Mar. 1 (Sat)	Visit to fisheries facilities, Data collection
8	2 (Sun)	Visit to fisheries facilities Meeting in survey team
9	3 (Mon)	Travelling Site survey, Data collection
10	4 (Tue)	Site survey, Data collection Visit to fisheries facilities
11	5 (Wed)	Visit to EFRIPPEL Quelimane Base Traveling
12	6 (Thu)	Discussion on the plan Visit to fisheries facilities, Data collection
13	7 (Fri)	Discussion on the plan Visit to fisheries facilities

	Date	Description
14	8 (Sat)	Visit to fisheries facilities
15	9 (Sun)	Meeting in survey team Discussion on the Minutes
16	10 (Mon)	Discussion on the plan and the Minutes
17	11 (Tue)	Discussion on the plan Signature of Minutes of Discussions
18	Mar. 12 (Wed)	Government officials among team members leave for Japan Travelling
19	13 (Thu)	Site survey Construction equipments, materials, cost survey
20	14 (Fri)	Site survey and hearing
21	15 (Sat)	Visit to fisheries facilities Data collection
22	16 (Sun)	Site survey and hearing Meeting in survey team
23	17 (Mon)	Site survey and hearing Travelling
24	18 (Tue)	Discussion on the plan Survey process & rule relate to civil & architecture
25	19 (Wed)	Discussion on the plan Survey foreign country assistance
26	20 (Thu)	Final discussion on the plan Data collection
27	21 (Fri)	Meeting in survey team
28	22 (Sat)	LV. Maputo (21:10) TM634
29	23 (Sun)	AR. Paris (07:00) LV. Paris (12:20) AF274
30	24 (Mon)	AR. Narita (14:00)

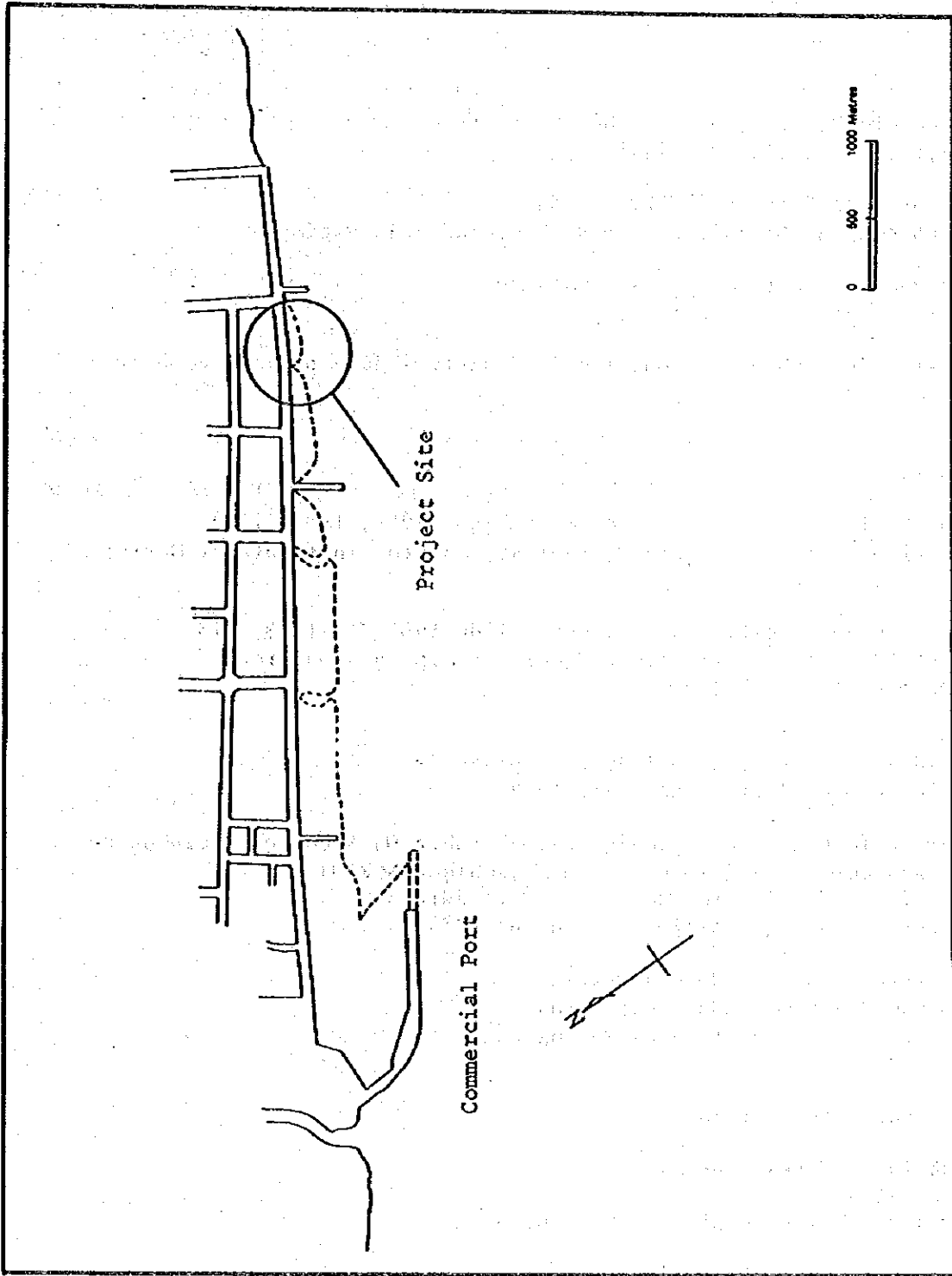
(2) Explanation of Draft Final Report

	Date	Description
1	June 8 (Sun)	LV. Narita (20:45) LH651
2	9 (Mon)	AR. Frankfurt (07:50) LV. Frankfurt (20:00) UM 532
3	10 (Tue)	AR. Harare (06:00) Courtesy call on Japanese Embassy
4	11 (Wed)	LV. Harare (12:45) TM 343 Mr. Maputo (15:25)
5	12 (Thu)	Courtesy call on Ministry of Foreign Affairs and Fisheries Agency Explain the Final Draft Report Visit to fisheries facilities, data collection
6	13 (Fri)	Discussion on the Final Draft Report Meeting in PETROMOC Courtesy call on Ministry of International Cooperation
7	14 (Sat)	Discussion on the Executing Organ and Management System of Quelimane Fishing Port
8	15 (Sun)	Discussion on the outline of Fisheries in Mozambique
9	16 (Mon)	Discussion on the Final Draft Report about structure & material of the Jetty Discussion on the Minutes Draft
10	17 (Tue)	Signature of Minutes Courtesy call on Ministry of Trade LV. Maputo (21:05) TP 224
11	18 (Wed)	AR. Lisbon (21:05) LV. Lisbon (10:45) AR. Paris (14:10)
12	19 (Thu)	LV. Paris (13:20) AF 274
13	20 (Fri)	AR. Narita (14:05)

Appendix 5 List of Counterparts

Américo Antonio Fortuna	Chefe de Europa e America Departamento Comissão Nacional de Plano Secretaria de Estado do Internacional Cooperación
Gonçalves Sengo	Director Asia e Oceania Ministerio dos Negocias Estrangeiro
Chico Vernig Mortar	Assistente Europa e America Departamento Comissão Nacional de Plano Secretaria de Estado do Internacional Cooperacion
Ernesto Têmbé	Assistente Internacional Cooperacion Comissao Nacional de Plano Secretária de Estado de Internacional Cooperacion
Mario Machungo	Ministro do Plano
Daniel F. Gabriel	Vice - Ministro do Comercio
Joaquim Tenreiro de Almeida	Secretario do Estado das Pescas
Francisco David E. Silva	Director de Economia Secretaria de Estado das Pescas (SEP)
Elisa dos Sontos	Chefe de Departamento de Planificação, Secretaria de Estado das Pescas (SEP)
Oscal Fernandes	Consultor de FAO Secretaria de Estado das Pescas (SEP)
Francisco Carreiro	Tecnipesca, Secretaria de Estado das Pescas (SEP)
Alcantara Santos	Ministro dos Portos, Caminhos de Ferro e Marinha Mercante
Kalman Kiskun	Engenheiro Civil Ministerio da Construção e Aguas Direcção Nacional de Tecnologia da Construção
Margarite Lovise Misteli	Chefe de Departamento de Planeamento Urbano Instituto Nacional de Planeamento Urbano (INPU)
Manuel Armando	Instituto Nacional de Planeamento Urbano (INPU)
Domingo Maluarte	Instituto Nacional de Planeamento Urbano (INPU)

Rocha de Souza	Planeamento Físico
José Macedo	Delegado Provincial do Planeamento Físico
Mario Machungo	Governador da Provincia de Zambesia
João Manuel Reynolds Marques	Assistente Pessoal para os Assuntos Económicos do Dirigente da Provincia de Zambesia
Jafer Marcelina C. Ruby	Engenheiro Técnico Hidrografo Serviço de Hidrografia
Samel D. Panouava	Director Porto de Pesca de Maputo
Fracisco S. Candido	Director Adjunto Porto de Pesca de Maputo
Cardino Joao Jiaupela	Departamento de Internos Escola de Pesca
Léong Moy	Chefe de Produção CIMA
Raul Dias	Director NAVIPESCA
Joaquim Cruz	Director EMOPESCA de Quelimane
Awcandio Rodeges Madein	Director Ferrol dos Pescas e Quilimane de Pescas de Zambesia



Topography near the Project Site (2)

Appendix 7 List of the Collecting Data

(General)

- o Economic Report January 1984
National Planning Commission
- o Informaçao Estatística 1975-1984
1985 Ano do 10º Aniversario da Independencia Nacional
- o 1º Recenseamento Geral da Populaçao
1983 - Ano do iv Congersso
- o Lista dos Membros do Conselho de Ministros da Republica Popular de Moçambique

(Fishery)

- o The Marine Fish Resources of Mozambique 1979, 1982, 1983
Servico de Investigaçoes Pesqueiras, Maputo, Institute of Marine Research, Bergen
- o Revista de Investigaçao Pesqueira 1980-1985 No. 1, 3 - 13
Instituto de Investigaçao Pesqueira - Maputo Republica Popular de Moçambique
- o VDIP
Unidade de direccas da industria pesqueira
Relatorio de Actividade Anual 1982
- o Semirário Conjunto Moçambique/NORAD Sobre Os Recursos Marinhos de Moçambique (Semirário Conjunto Moçambique/NORAD)
Instituto de Ciências Médicas e Paramédicas
Maputo Moçambique 12-15 de Junho de 1984
- o Secretaria de Estado das Pescas
Estudo dos Combinados Pesqueiros
Marco, 1982, Hidrotecnica Portuguesa

(Civil and Architecture)

- o Tabela de Mares 1986 Ano 1
Moçambique
1985 Republica Popular de Moçambique
- o Electicidade de Moçambique
Servico de Distribuicao
Projecto Tipo Monobloco

- o Regulamento de Segurança de Instalações de Utilização de Energia Eléctrica
Regulamento de Segurança de Instalações 1975
Imprensa Nacional Casa da Moeda
- o Port de Quelimane Rampa da Boror
Ministerio dos portos Caminhos de Ferro e Marinha Mercante, 1953

(Map)

- o Chart: Porto de Quelimane
1952 - 1973
- o Depth Curve Chart: Port de Quelimane
1/5,000
Setembro 1985
- o Map of the Quelimane City: Planta da Cidade de Quelimane
- o Topography Near the Quelimane City: 1/5,000

CAPITULO I

ORGANIZACAO

Apos terminus do projecto "Construção de um Cais de Pesca em Quelimane", sera constituida uma empresa estatal que tera a responsabilidade da gestao do mesmo.

A empresa a constituir denominar-se-à "Porto de Pesca de Quelimane", tera autonomia financeira e administrativa, e ficara sob tutela directa da Secretaria de Estado das Pescas.

CAPITULO II

ORGANIZACAO E ARTIBUICOES

1. O Porto de Pesca de Quelimane tera como objectivo a prestação de serviços às embarcações de pesca nacionais, de modo a facilitar o seu abastecimento, a descarga e armazenamento de pescado, de acordo com as normas vigentes no sector pesqueiro e as normas de utilização portuaria e de segurança marítima.
2. Serão suas atribuições gerais:
 - (a) A prestação de serviços às embarcações de pesca, nomeadamente a atracação ao cais, e o seu abastecimento em combustível, água, gelo e energia eléctrica;
 - (b) A armazenagem frigorífica de pescado desembarcado através do Porto sempre que necessário;

- (c) O controle dos acessos à zona portuária e a fiscalização da correcta utilização da area portuária por parte dos utentes, nomeadamente os armadores, as empresas de apoio à frota pesqueira e outras entidades intervenientes na actividade portuária;
- (d) A administração e a segurança marítima das embarcações de pesca que frequentem o Porto, nos termos da competência que lhe for conferida pela autoridade marítima.

3. Tendo em consideração o objectivo e as atribuições gerais do Porto de Pesca de Maputo, a empresa terá a seguinte orgânica:

- Direcção
- Divisão Administrativa e Financeira
- Secção de Segurança Portuária
- Divisão de Operações Portuárias
- Divisão de Instalações Frigoríficas

4. Divisão Administrativa tem como objectivo a execução das tarefas de natureza administrativa ou gerais de apoio e resultante da actividade produtiva da empresa.

São suas atribuições:

- (a) Controlar o expediente quer interno quer externo, procedendo ao seu encaminhamento;
- (b) Assegurar o economato geral da empresa, constando exclusivamente de artigos de consumo geral;
- (c) Zelar pela limpeza, arranjo geral, segurança e funcionamento das instalações sociais e administrativas da empresa;
- (d) Assegurar a execução de serviços gerais de apoio à Direcção e à empresa em geral, tais como o sistema de comunicações telefónicas (PBX), recepção de visitantes, organização de reuniões da Direcção, dactilografia, preparação de informações estatísticas, coordenação da utilização de viaturas comuns, e quaisquer outros serviços gerais de que seja incumbida;
- (e) Controlar os recebimentos e pagamentos da empresa;
- (f) Elaborar a contabilidade geral da empresa e apurar os resultados da sua actividade;

- (g) Fornecer à Direcção as informações económicas e financeiras necessárias à gestão da empresa;
- (h) Fazer o registo e o controle administrativo da actividade profissional dos trabalhadores da empresa;
- (i) Coordenar a nível interno e externo a formação geral técnico-profissional dos trabalhadores;
- (j) Participar nas análises de organização do trabalho e dos salários;
- (l) Ocupar-se dos assuntos de segurança social dos trabalhadores;
- (m) Fazer a aquisição no mercado local dos aprovisionamento requeridos à actividade da empresa;
- (n) Zelar pela adequada armazenagem e controle de estoques de materiais e outros bens necessários à actividade da empresa;
- (o) Realizar a facturação e promover a cobrança dos serviços e assegurar o contacto comercial com os utentes do Porto;
- (p) Zelar para que os meios de produção utilizados pelo Porto, se mantenham em bom estado de funcionamento.

4.1. A divisão administrativa e financeira tem uma secção de segurança portuaria, que tem como objectivo assegurar o respeito pela legalidade na utilização da area portuaria por parte de utentes, trabalhadores e demais pessoas que a frequentem.

Sao suas atribuições:

- (a) O controle dos portoes de acesso da area portuaria;
- (b) O policiamento da area portuaria;
- (c) A acção preventiva da pratica de ilegalidade na area portuaria;
- (d) O encaminhamento para a Direcção do Porto de Pesca ou para as autoridades de defesa e segurança externas ao Porto de quaisquer infractores que sejam detectados e em que a gravidade da infracção o justifique.

5. A Divisao de Operações Portuarias tem como objectivo a prestação de serviço às embarcações de pesca.

Sao suas atribuições:

- (a) Dar instruções sobre a atracação, estadia e desatracação das embarcações de pesca, bem como sobre a sua mudança de lugar, de acordo com as necessidades da operação portuaria;
- (b) Proceder, de acordo com o pedido do armador da embarcação ou do seu representante, ao abastecimento às embarcações em combustível, agua e energia eléctrica;
- (c) Zelar para que os abastecimentos realizados pelo armador às embarcações de pesca, assim como os trabalhos de manutenção e reparação executados pelo armador ou por empresa por ele contratada, se realizem de acordo com as normas de exploração do Porto;
- (d) Coordenar o manuseamento de pescado e de mercadorias, sempre que intervenham entidades exteriores ao Porto;
- (e) Zelar pela adequada armazenagem de mercadorias desembarcadas durante o periodo de permanência na area portuaria sempre que para tal seja requerido.
- (f) Assegurar a limpeza e arrumação das areas atribuidas às operações portuarias;
- (g) Registrar e enviar para os serviços administrativos a relação dos serviços prestados às embarcações ou a outras entidades do Porto, para sua facturação e cobrança;
- (h) Zelar pela boa operação e conservação dos equipamentos e outros instrumentos utilizados.

6. A Divisao de Instalações Frigorificas tem como objectivo proceder à armazenagem de pescado nas instalações frigorificas e fabricar e fornecer gelo às embarcações de pesca.

Sao suas atribuições:

- (a) Receber e registar o pescado desembarcado das embarcações de pesca que seja armazenado nas instalações frigorificas de Porto de Pesca;
- (b) Zelar pela sua adequada armazenagem, nomeadamente no que respeita ao manuseamento, à arrumação nas câmaras e à manutenção da temperatura aconselhada;

- (c) Fazer a entrega do pescado armazenado;
- (d) Operar a instalação de fabrico de gelo e proceder ao seu fornecimento às embarcações de pesca ou a outros clientes;
- (e) Registrar e enviar para os serviços administrativos a relação dos serviços prestados, para sua facturação e cobrança.

6.1 A Divisão de Instalações Frigoríficas tem uma Secção de Condução dos Equipamentos de Refrigeração, que tem as seguintes atribuições:

- (a) Operar e fazer manutenção corrente dos equipamentos de refrigeração do armazem frigorífico e da fabrica de gelo;
- (b) Operar e fazer a manutenção corrente do grupo gerador de emergência do Porto de Pesca de Quelimane;
- (c) Participar nos trabalhos de manutenção e reparação, programadas ou não, realizados por empresas de assistência externas.

CAPITULO III

PESSOAL

Direcção:	1 Director
	1 Secretaria de Direcção
	1 Servente
Divisao Administrativa e Financeira:	1 Contabilista
	1 Escriturario
	4 Guardas
Divisao de Operações Portuarias:	1 Chefe de Divisao
	1 Conferente
	2 Operadores de guindastes
	1 Operador de fork lift
	1 Bombeiro
	(para gasoleo e agua)
Divisao de Instalações Frigorificas:	1 Chefe de Divisao
	1 Conferente
	1 Carregador
	(vendedor de gelo)
	1 Electricista
	1 Mecânico
	1 Ajudante

CAPITULO IV

PREVISAO DE RECEITAS E CUSTOS

Previsao de Receitas

Aluguer de guindaste	720
Aluguer de fork - lift	750
Venda de agua	180
Venda de gelo	4200
Taxa de circulação de produtos	(1)
Taxa de atracação	<u>200</u>
Total	6050

Previsao de Custos

Salarios	2200
Gastos com pessoal (fardamento e seguros)	400
Agua	190
Energia	300
Manutenção de viaturas e equipamentos	400
Manutenção das instalações	1000
Combustivel e lubrificantes	100
Diversos	200
Impostos	200
Amortizações (5% do valor das instalações)	<u> </u>
Total	4990

Aspectos Diversos

1. Os guardas indicados na divisao administrativa - finaceira, trabalharao por termos nos portoes de acesso à zona portuaria.
2. Nao se prevê carregadores, pois o trabalho de estiva sera efectuado pelos proprios armadores.
3. Sera necessario prever no projecto:
 - 1 Fork - lift (electrico)
 - 2 Viaturas (Jeep 4x4)
 - 1 Mini - bus
 - 2 - 3 Gruas moveis
4. Taxa de manuseamento de produto.