

BASIC DESIGN STUDY REPORT  
ON  
THE PROJECT FOR FISHERIES EXPLOITATION  
IN  
THE MEDITERRANEAN AND RED SEAS  
IN  
THE ARAB REPUBLIC OF EGYPT

JAPAN INTERNATIONAL COOPERATION AGENCY



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ON  
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**AUGUST 1987**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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## PREFACE


In response to the request of the Government of the Arab Republic of Egypt the Government of Japan has decided to conduct a basic design study on the Project for Fisheries Exploitation in the Mediterranean and Red Seas and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Egypt a study team headed by Mr. Masaaki SHIMAMURA, Deputy Director of the Fishing Boat Division, Oceanic Fisheries Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries from April 7 to 27, 1987.

The team had discussions on the Project with the officials concerned of the Government of Egypt and conducted a field survey in Alexandria and other areas. After the team returned to Japan, further studies were made, a draft report was prepared and a mission to explain and discuss it was dispatched to Egypt. As a result, the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Arab Republic of Egypt for their close cooperation extended to the team.

August, 1987

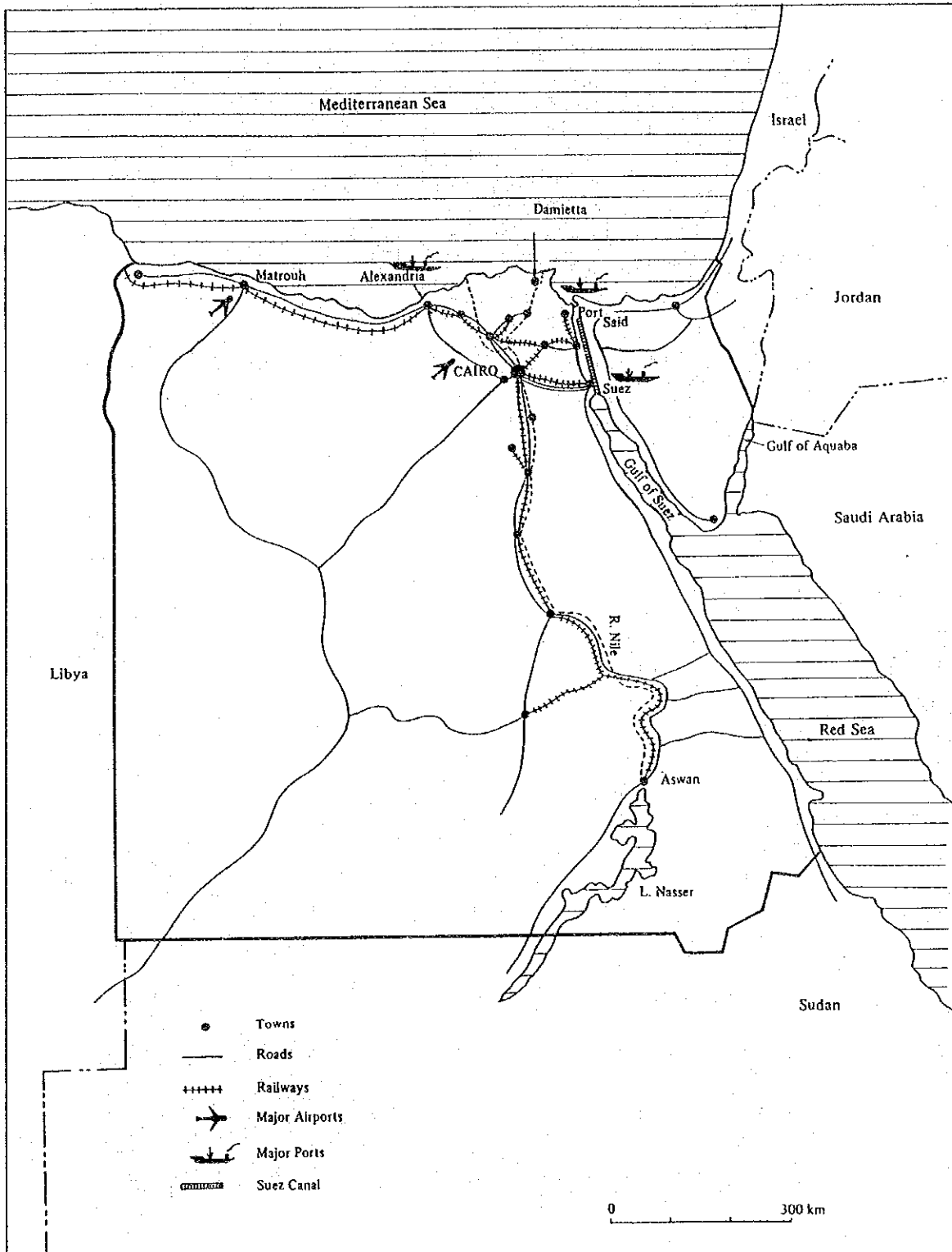


Keisuke Arita

President  
Japan International Cooperation Agency



# Map of Egypt

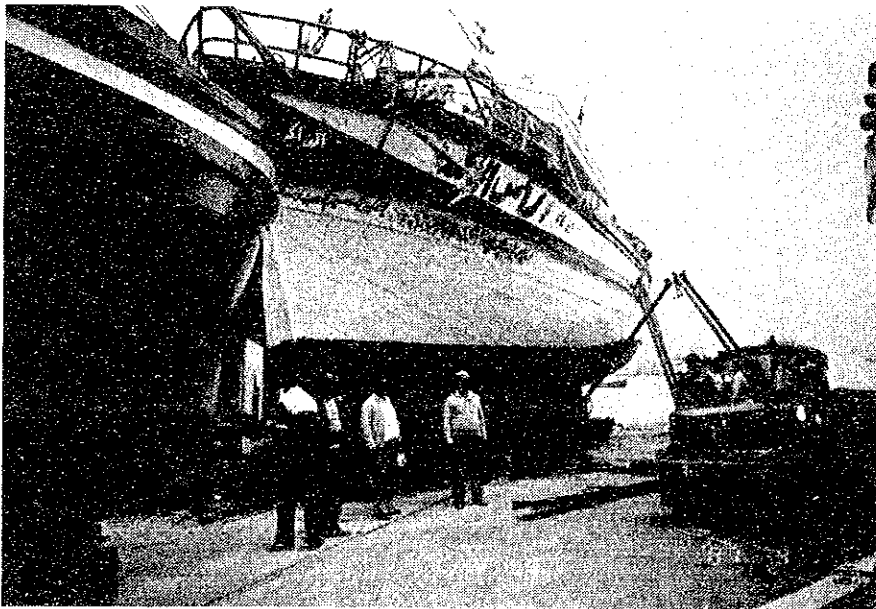




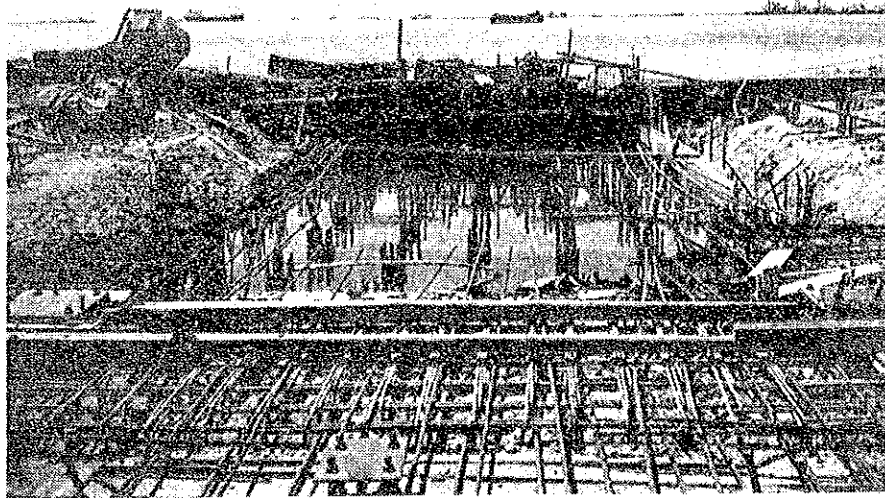




Fish Auction at Anfoushi, Alexandria



EFEC's Slipway at Anfoushi, Alexandria



EFPEC's Slipway at Suez under Construction



Trawler at Ataka Fishing Port, Suez

## Summary

Marine and inland fish production in the Arab Republic of Egypt is estimated at 150,000 to 180,000 tons per annum. This meets half of the yearly consumption of 300,000 tons and the remainder is covered by imports. Despite the stagnation in recent years of marine and inland fisheries, the importance of fish as a source of animal protein has been recognized by the government which called for an increase in production under the 5 Year Socioeconomic Plan (1987-1991). The strengthening of the fishing fleet and the expansion of facilities for fish refrigeration have been contemplated.

In consideration of the existing conditions, the Egyptian government plans to develop fishery resources under the "Project for Fisheries Exploitation in the Mediterranean and Red Seas". The Project will help attain these objectives through the operation of a fishery resources survey and training vessel to exploit dormant resources and through the training of fishermen. With a view to Project implementation, the Government of Egypt subsequently presented a request to the Government of Japan for the allocation of Grant Aid.

In response to this request, the Government of Japan decided to conduct a basic design study for the Project, and the Japan International Cooperation Agency sent a basic design study team to Egypt from April 7 to April 27, 1987. The team surveyed existing facilities in Cairo, Alexandria, Suez and Hurghada, held talks with officials of the government and related organizations, and based on the results of on-site investigations, drew up the basic design for the Project.

The team subsequently went to Egypt to explain the draft basic design from June 26 to July 4, 1987 and obtained the approval of the Egyptian side.

The team identified the possibility of exploiting pelagic and demersal resources in waters 100m to 400m deep in the Mediterranean and the Red Sea, over which Egyptian boats cannot at present operate. In addition

the team examined the problems affecting the fisheries industry. These are the following:

- 1 A shortage of modern fishing boats and fishing gear
- 2 A shortage of skilled crew members and fishermen
- 3 A deficiency of modern education regarding fisheries techniques
- 4 The inappropriateness of current techniques for fish handling and preservation

Upon consideration of these facts, the team recognized the necessity outlined below. The areas in which survey and training activities are to be conducted in the future are waters 100 to 400m deep, situated in the Mediterranean and the Red Sea. Demersal fish in the former shall be surveyed with trawl nets, longlines and gill nets while pelagic and demersal resources in the Red Sea shall be surveyed with purse seine nets, longlines and trawl nets. Such survey and training work needs to be carried out for the development of fisheries.

The executing agency of the Project is the Egyptian Fishing and Fishing Equipment Company (EFFEC), the only government-owned company involved in fisheries. Since the EFFEC currently operates a total of 12 trawlers and purse seiners there will be no problems in the administration and management of the Project. The necessary maintenance and running costs will be covered by a governmental budget allocated for the Project.

The facilities and equipment required for the Project implementation are as follows:

1. Fisheries resources survey and training vessels; 2 units

Overall length	approx. 30m
Length between perpendiculars	approx. 26m
Breadth moulded	approx. 7.2m
Depth moulded	approx. 3.2m
Draft at full load	approx. 2.8m
Main engine horsepower	approx. 850 PS
Service speed	approx. 10 knots

Days at sea (running 5 days) (fishing 20 days)	total 25 days
Capacities	
Fish hold (100% bale)	approx. 40m <sup>3</sup>
Preparation room (100% bale)	approx. 16m <sup>3</sup>
Freezing room (100% bale)	approx. 12m <sup>3</sup>
Fuel tank (100%)	approx. 80m <sup>3</sup>
Freshwater tank (100%)	approx. 10m <sup>3</sup>
Freezing capacity	1.2 tons per day
Maximum complement ( crew:8; trainees:8)	total 16 persons

2. Fishing gear and equipment

Trawl nets  
Purse seine nets  
Longlines  
Gill nets  
Spare parts for fishing gear

3. Spare parts

(all those required for two years of operation)

Fish boxes

(plastic boxes and insulated plastic boxes for the two vessels)

Execution of the Project is expected to bring forth positive results with regards to new fishing grounds exploitation and an increase in the number of trained fishermen. The call for the reinforcement of the fishing fleet found in the latest National Development Plan can be answered by the operation of these vessels. By extending the activities of Egyptian boats to offshore areas (coastal fishing grounds are being fully utilized) an enlarged fish catch will be obtained. As a consequence, this project will contribute to an increased animal protein food supply, boost fishermen's incomes and create new employment opportunities. The extension of Grant Aid can therefore be regarded as highly significant.

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- (2) Persons met and interviewed
- (3) Survey schedule
- (4) Minutes of discussions
- (5) Exploitation and Training schemes





## CHAPTER 1

### INTRODUCTION



## CHAPTER 1 INTRODUCTION

Fish consumption in the Arab Republic of Egypt amounts to 300,000 tons per annum, half of which is produced domestically or 10% of total protein intake. Three-quarters of these fisheries products originate from inland fisheries centred on the Nile River, while the development of marine fishing activities in the Mediterranean and the Red Sea has lagged behind.

These conditions have prompted the Government of Egypt, under the Five Year Socioeconomic Development Plan (1983-87), to increase its efforts to secure a reliable source of protein, reduce imports and increase employment opportunities. Accordingly, the "Project for Fisheries Exploitation in the Mediterranean and Red Seas in the Arab Republic of Egypt" was formulated with the following targets:

- (1) Exploration of new fishing grounds
- (2) Development of appropriate fishing methods and fishing gear
- (3) Training and instruction for fishermen with regards to modern fishing gear and methods
- (4) Promotion of the industrial fisheries sector

To help finance the Project, the Government of Egypt has requested from the Government of Japan the allocation of Grant Aid. In response to this request the Government of Japan instructed the Japan International Cooperation Agency to conduct a basic design study. A team of experts was dispatched to Egypt and conducted the study from April 7 to April 27 1987. The team was headed by Mr. Masaaki Shimamura, Deputy Director of the Fishing Boat Division, Oceanic Fisheries Department, of the Fisheries Agency of the Ministry of Agriculture, Forestry and Fisheries. (The Egyptian team was headed by Prof. Dr. Farouk El Gayar, Chairman of the Egyptian Fishing and Fishing Equipment Company.) The survey team surveyed the existing facilities in Cairo, Alexandria, Suez and

Hurghada, confirmed the Project's background, purpose and contents and assessed the prevalent problems affecting the fisheries sector. The team collected data and information with a view to project implementation and reviewed its appropriateness. Further, the team headed by Mr. Shimamura was dispatched to Egypt to explain a draft of the basic design of the Project from June 26 to July 4, 1987.

The Minutes of Discussions were signed respectively on April 16 and June 30, 1987 by the representatives of both sides.

Details concerning the members of the survey team, the persons met and interviewed, the survey schedule and the Minutes of Discussions are appended at the back of this report.

## CHAPTER 2

### PROJECT BACKGROUND



## CHAPTER 2 PROJECT BACKGROUND

### 2-1 Country Profile of Egypt

The Arab Republic of Egypt is a country with an area of 1 million km<sup>2</sup>, or 2.7 times the size of Japan, over 95% of which is desert. The climate is a desert one, with little rainfall, except in the northern coastal areas which benefit from a Mediterranean climate. Egypt's population numbers 50 million inhabitants with a 2.8% rate of demographic increase. Over 2 millions are employed overseas.

Gross Domestic Product was of US\$36.6 billion (1985), with a per capita GDP of US\$720 in 1984. The rate of economic growth was 8.6%, 7.1% and 5.9% in 1983, 1984 and 1985 respectively. The country's international trade deficit (L.E.13 billion in 1982) is offset by earnings from the Suez canal, financial assistance from abroad, tourism and foreign investment, besides remittances from expatriate Egyptian workers. This allows Egypt to maintain a healthy national budget.

Agriculture and fisheries contributed to 28% of GDP in 1977 but this declined to 20% in 1981. The primary sector employs 36% of the total labour force and contributes 10% of total exports but its rate of growth is comparatively lower than that of the other sectors of the National Economy. The fisheries sector represents a mere 0.1% of GDP but its contribution to the total food protein supply is considerable (10%).

### 2-2 National Development Plan

#### 2-2-1 The Five Year Socioeconomic Development Plan (1983-1987)

Egypt must accelerate economic development in order to feed a population of 50 millions which is expected to stand at some 70 million by the year 2000.

The main targets of the Five Year Plan are to:

- o Achieve an increase of 51% in GDP within five years
- o Increase real per capita income from 470 L.E. to 620 L.E. (1986)

An outline of the Five Year Plan is listed below:

- (1) To preserve the high rate of economic growth and raise the standard of living of the population at a rate over two times that of the demographic rate of increase.
- (2) To give priority in the disbursing of public investment to the agricultural (including fisheries) and industrial sectors and secure a high level of employment.
- (3) To set up the necessary infrastructure facilities and develop energy and the construction sectors.
- (4) To develop manpower by giving people educational training with regards to modern technology.

Under the Plan, agricultural policy (covering fisheries) is concerned with maintaining the current level of nutrition, raising the level of animal protein intake, improving the animal feed to meat conversion ratio, reducing waste occurring in the process of food production, and promoting scientific research for exploitation of new resources.

~Note: All figures were quoted from the Five Year Socioeconomic Development Plan (1983-1987)~

#### 2-2-2 Status of the Fisheries Sector

Attempts shall be made under the Plan to increase fish production, as the source of animal protein. To perform this it is necessary to:

- 1 improve the utilization of available resources
- 2 promote aquaculture
- 3 reinforce the marine fishing fleet



#### 4 exploit new fishing grounds.

Besides the Fishing Fleet Reinforcement and Cold Storage Expansion Project, efforts will be made to manage the fisheries resources of the Mediterranean and the Red Sea, exploit new fishing grounds and develop new fishing technology. Aquaculture shall be promoted, by both government and private initiative, and an increase in the value of fisheries products will be sought through an amelioration of the marketing system.

The self-sufficiency rate for fish in 1980 was 56%, the lowest among foodstuffs, so that an increase in production is a particular necessity.

Table 2-2-1 Self-Sufficiency (1980)

Item	Production ( <sup>'000</sup> tons)	Consumption ( <sup>'000</sup> tons)	Ratio (%)
Wheat	1,976	7,500	28
Rice	1,643	1,522	108
Meat	335	447	74
Chicken	128	186	69
Milk	1,860	3,013	61
Eggs	95	98	97
Fish	168	298	56

### 2-3 Present Situation of the Fisheries Sector in Egypt

#### 2-3-1 Governmental Organizations and the Fisheries Sector

The governing authority for the fisheries sector is the General Authority for Fish Resources Development of the Ministry of Agriculture and Food Security and the Egyptian Fishing and Fishing Equipment Co. (EFFEC) is the only governmental fisheries organization currently functioning. Figure 2-3-1 indicates EFFEC organization and staff.

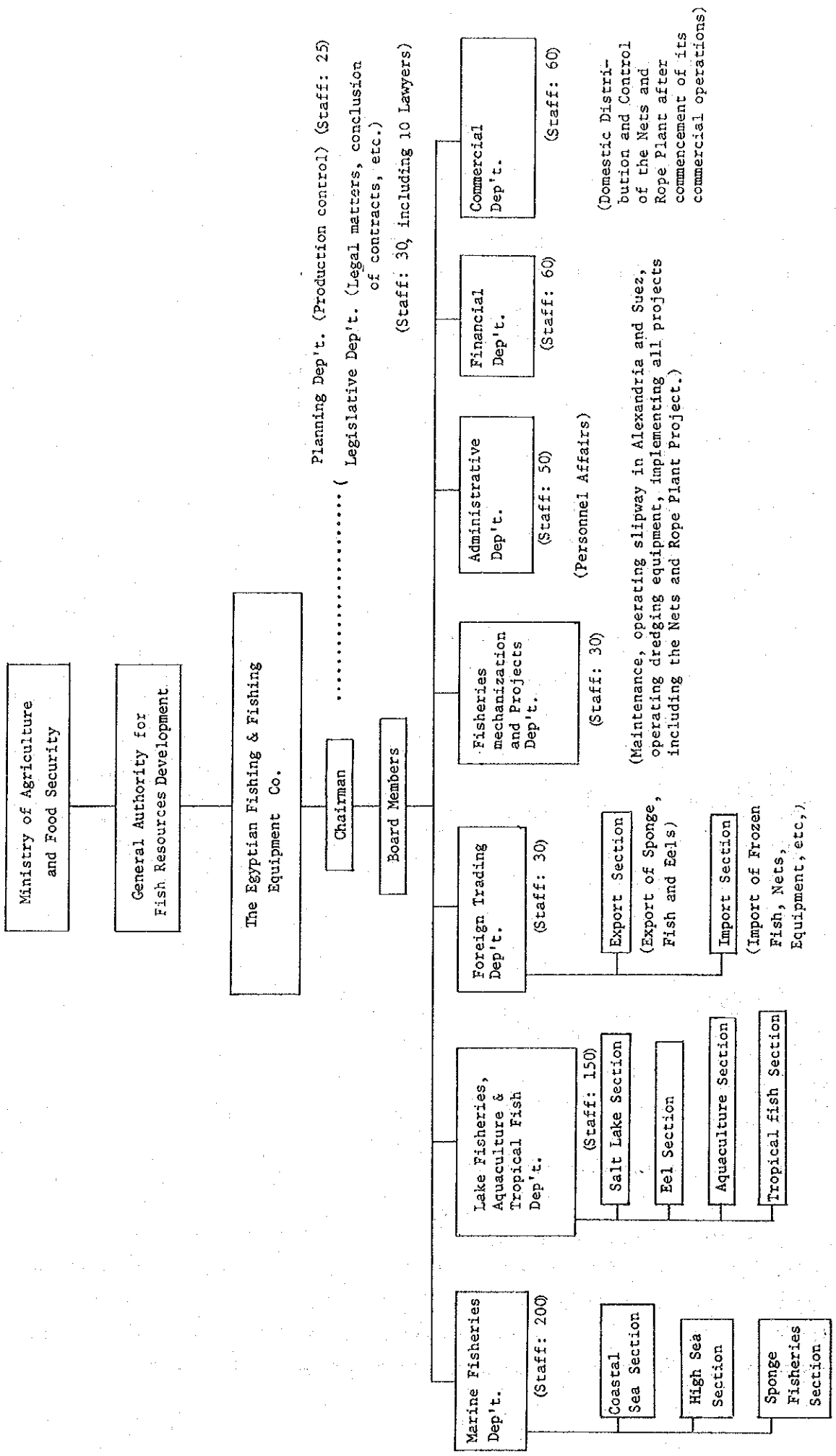


Figure 2-3-1 Organizational Chart of the EFPEC

The EFFEC was established in July, 1985 through the merging of three companies (Northern Fisheries Co., Egyptian Fishing Equipment Co., Egyptian High Seas Fisheries Co.). Authorized capital totals L.E.20 million (1.3 billion yen) and paid capital is L.E.12.5 million (0.84 billion yen). All shares are owned by the government.

The head office is located in Alexandria and is made up of 7 departments which include the Marine Fisheries Department, the Lake Fisheries Department, the Aquaculture and Tropical Fish Department and the Trading Department, etc. totalling over 500 employees.

The EFFEC's functions include fishing activities, aquaculture, the sale of fishing gear, dredging and the management of slipways and workshops. 12 trawlers and purse seiners and 16 sponge fishing boats are currently being operated. Five large trawlers (2,390 GT x 2, 1,240 GT x 3), which were owned by the EFFEC's forerunner, the Egyptian High Seas Fisheries Co., were sold overseas because of the difficulty of finding fishing grounds suited to such large ships in the Mediterranean and Red Sea and because of high operational costs.

Sales in 1986 totalled 270 million and operating profit was of 10 million yen. Sales for 1987 are expected to reach 520 million yen and revenue transferred 150 million yen.

76 fishing cooperatives are being operated throughout the country under the supervision of the Ministry of Agriculture and Food Security. The main functions of these cooperatives are to provide fishermen with loans and sell fishing gear and materials.

The Fish Marketing Co., which operated under the Ministry of Supply and Internal Trade, is charged with taking care of marketing matters.

#### 2-3-2 Structure and Characteristics of the Fisheries Sector

Egyptian fisheries consist of inland (lakes and rivers) and coastal marine fisheries in the Mediterranean and the Red Sea and marine production is roughly one third of inland fish production.

Table 2-3-1 indicates that in recent years inland fish production has stagnated at 110,000 tons in 1980 to 118,000 tons in 1985. On the other hand total marine production shows a 30% increase from an output of 32,000 tons in 1980 to 42,000 tons in 1985.

Table 2-3-1 Fish Production in Egypt  
(Unit: Tons)

Fishing area	Year	1980	1981	1985
The Mediterranean		17,466	17,790	19,444
The Red Sea		14,783	15,774	23,981
Lakes		79,004	80,099	99,445
Rivers		31,771	25,304	19,444
Total		143,024	138,967	162,864

(Source: Statistics of Fisheries in Egypt)

Table 2-3-2 indicates that the total number of fishermen in 1981 was 130,000, out of which 40,000 were engaged in marine fishing. In the same year total production was 162,000 tons, including 42,000 tons of marine products. Average catch per capita is therefore of 1.2 tons for fishing in general, with a per capita production of 1.0 ton for marine fishing.

Table 2-3-2 Number of Fishermen

Fishing area	1980	1981
Marine fisheries		
The Mediterranean	24,535	27,345
The Red Sea	11,138	12,382
Sub-total	35,673	39,727
Inland fisheries		
Lakes		
Manzala	8,346	8,308
Bardaweel	7,317	17,727
Burullus	8,496	8,385
Edco	3,912	3,896
Maruit	3,156	3,165
Karoon	4,941	4,950
Nasser Lake	2,304	8,583
Sub total	38,472	55,014
Rivers		
Nile River & channels	35,532	38,085
Total	109,677	132,826

(Source: Statistics of Fisheries in Egypt)

The number of motorized boats in 1981 was 1,252 and non-motorized boats in the same year was 408.

The number of motorized fishing boats in 1985 was estimated at 1,560 and the increase over the last 5 years is therefore approximately 25%.

(1) Inland fisheries

Inland fisheries are practiced in eight lakes, including the Manzala and Aswan High Dam, and in the Nile and its branches. Inland production makes up 75% of total fish landed.

Fishing gear used includes gill nets, trammel nets, trap nets and trawl nets. Fish caught include tilapia, mullet, eel, and Nile perch.

Table 2-3-3 Fish Catch by Origin (1981; Unit: Tons)

River		Lakes	
Nile	20,405	Manzala	26,330
Inland canals	4,899	Burullus	6,742
		Edco	442
		Maruit	11,365
		Aswan High Dam	31,418
		Other Lakes	3,802
<b>Total</b>	<b>25,304</b>	<b>Total</b>	<b>80,099</b>

(Source: Statistics of Fisheries in Egypt)

(2) Marine fisheries

Marine fishing is conducted in the Mediterranean and the Red Sea from ports located on the Egyptian coast. The ports are controlled through local governments and the table below lists the main fishing ports according to principal fishing area.

Table 2-3-4 Main Fishing Ports

Fishing area	Name
Mediterranean	Eastern fishing harbour (Alexandria)
	Abou Quir bay harbour (Alexandria)
	Rosetta harbour (Rosetta)
	Burullus harbour (Burullus)
	Damietta harbour (Damietta)
	Matrouh harbour (Marsa Matrouh)
	Port Said harbour (Port Said)
Suez Bay	Ataka fishing harbour
	Eltur fishing harbour
	Sharm El Shaikh fishing harbour
	Nuwaibe fishing harbour
	Dahab fishing harbour
Red Sea	Hurghada fishing harbour
	Ras Benas fishing harbour

(Source: Statistics of Fisheries in Egypt)

The main fishing methods are trawling and purseseining and various kinds of nets, lines and hooks are also used. The main fish species include red mullet, pilchard, boops and shrimp. Fish landed in 1981 amounted to 20,000 tons for the Mediterranean and 24,000 tons for the Red Sea and Gulf of Suez.

In the Mediterranean, fishing activities are conducted in waters of less than 100m depth over the continental shelf. In the Gulf of Suez, fishing is performed everywhere except in areas reserved for the passage of large vessels. In the Red Sea, fishing areas lie in the main in the inshore areas off the western coast.

Fishing in the Gulf of Suez is controlled by the General Authority for Fish Resources Development (G.A.F.R.D.) which regulates the number of fishing boats and the period of fishing activities. An outline of these regulations is given below.

1. Number of fishing boats allowed

- |                 |     |
|-----------------|-----|
| 1. Trawlers     | 85  |
| 2. Purseseiners | 86  |
| 3. Long-liners  | 150 |

2. Period of fishing activity

1. Trawling: from October 1st to the end of May
2. Purseseining: from November 1st to the end of May

Note: this is subject to the control of the G.A.F.R.D

A fisheries agreement with Sudan allows boats from either country to fish in the other country's territorial waters.

Fish caught and the species composition of total catch are represented in Table 2-3-5 below.



Table 2-3-5 Main Fish Caught and Percentage of Total Catch. (1981)

Fish species	Mediterranean	Red Sea (inc. Suez Gulf)
Red mullet	7.2%	6.3%
Horse mackerel	0	0.2
Anchovy	0.3	0.7
Lizard fish	3.0	3.9
Sea bream	4.6	5.3
Pilchard	31.7	26.8
Rabbit fish	0.4	0.6
Sole	2.7	2.5
Emperor	2.5	0
Mullet	2.2	4.0
Mackerel	0.5	0.9
Sea bass	0.6	0.5
Boops	7.6	5.1
Common hake	4.5	3.6
Grouper	4.5	3.6
Ray & Shark	1.4	1.5
Prawn	10.0	16.6
Mollusks	3.6	2.6
Others	12.7	15.3
	100.0	100.0

(Source: Statistics of Fisheries in Egypt)

### 2-3-3 Fish Resources

Besides fish, there are no aquatic plant resources in Egyptian waters. These fish resources are classified as belonging to two sub-groups: resources from the Mediterranean Sea and the Red Sea - Gulf of Suez.

(1) The Mediterranean

The fish resources of the eastern Mediterranean are generally poor. However the continental shelf that lies next to the Nile delta is an exception and fish production in this area kept on increasing from the beginning of the 1950s to the early 1960s. The quantity of fish landed peaked at 37,800 tons in 1962.

The Aswan High Dam was completed in 1966 so that flooding was brought under control. This affected the natural environment in the sea off the Nile delta and led to a sizeable decrease in fish production to 6,000 tons in 1966. Production of sardines and shrimp was particularly affected.

Although marine fish production transiently recovered to 20,096 tons in 1979, it eventually decreased to the present level of production. The size of production and the number of motorized fishing boats are indicated below.

Table 2-3-6 Fish Landed and Number of Motorized Fishing Boats

Year	Fish landed (tons)	Number of boats
1975	5,407	
1976	7,142	
1977	7,325	
1978	11,926	
1979	20,096	1,065
1980	19,930	1,165
1981	17,790	1,283

(Source: Institute of Oceanography and Fisheries)

In 1979, fish catch per boat totalled 18.9 tons and this fell to 13.8 tons in 1981. This implies a considerable drop in the catch per unit effort and this indicates that fish resources in the area are decreasing. In 1983, the FAO reported that this decline was caused by possible overfishing in the region.

The Egyptian government therefore conducted a joint survey and trial fishing in collaboration with Italy in 1982 to exploit new fishing grounds. The survey and trial fishing were conducted in Egyptian waters of a depth of 150-600m and it brought out the fact that, although opportunities for exploiting pelagic resources are scant, there exists attainable demersal production of 2,000 tons of common hake and red mullet.

## (2) The Red Sea

According to the results of a survey on the "Development of fisheries in the areas of the Red Sea and Gulf of Aden" conducted by the FAO and the Egyptian government from 1979 to 1983, pelagic resources in the Gulf of Suez are being exploited at a level close to the maximum sustainable yield so that there is no opportunity for further increase of the catch. However, three possible fishing grounds have been identified in the Red Sea; the Bay of Foul, Sudanese territorial waters between 20° and 21°N and the central or southern parts of the Red Sea. Attainable pelagic fish production in these regions is estimated at 2,000 tons per year.

Areas in which increased demersal fish production is possible are those grounds situated on the west coast of the Red Sea and in the Bay of Foul. The attainable demersal fish production which can be exploited is estimated at 400 tons.

### 2-3-4 Fishing Boats

According to 1981 statistics, the number of motorized fishing boats operating in Egyptian waters was 1,250 in that year. 940 of these operated in the Mediterranean and the other 310 boats operated in the Red Sea and the Gulf of Suez. Most Mediterranean fishing boats are trawlers and gill-netter/long-liners. In the Red Sea over half of the boats are gill-netter/longliners. The rest consist of trawlers and purse seiners.

Table 2-3-7 Fishing Boat by Activity and Location

	Trawlers	Purseseiners	Gill-netter/ Longliners	Others	Total
Mediterranean	50%	0%	33%	17%	100%
Red Sea	21%	18%	56%	5%	100%

(Source: Institute of Oceanography and Fisheries)

The majority of boats currently used are made of wood. These measure about 20m in length and because of low engine output, poor fishing equipment, small working space and inadequate freezing and navigation equipment, they find it difficult to engage in offshore fishing.

The following indicates the main particulars of representative fishing boats operating at present.

Trawlers

Length	about 20 m
Gross tonnage	20 to 80 tons
Main engine	150 to 250 Hp
Complement	8 to 13 persons
Fishing equipment	mainly mechanical and some hydraulic winch (1 unit) gallows, stern roller for hauling nets
Refrigeration	cooling pipes are set on the ceiling of the fish hold
Navigation equipment	Magnetic compass, fish finder (no radar)
Radio equipment	not available in most cases

### Purse seiners

Principal particulars are similar to those of trawlers, except with regards to complement and fishing equipment. The complement is slightly larger than that of trawlers due to the lesser automation of fishing gear.

Complement	20 to 30 persons
Fishing equipment	Mainly mechanical and some hydraulic winch (1 unit), davit for purse line, 4m long wooden skiff boat (1 unit), 7m long wooden life boats (2 units),

### Gill-netter/long-liners

Length	about 13 m
Gross tonnage	5 to 10 tons
Main engine	about 40 Hp
Accommodation	none
Fishing equipment	none

The EFFEC's marine fishery section possesses 12 motorized boats. These are approximately 20m long, with particulars similar to those of the various fishing boats currently operating in the country. 3 of these are made of steel and the remainder of wood. 2 of the steel boats were purchased from Japan while the third was designed in Denmark and built in Egypt. Five large trawlers (2,390 GT x 2, 1,240 GT x 3), which were owned by the EFFEC's forerunner, the Egyptian High Seas Fisheries Co., were sold overseas because of their high operational costs and the difficulty of finding suitable fishing grounds.

Table 2-3-8 Fishing Boats Owned by the EFFEC

No.	Name of boat	Material	Length (m)	Breadth (m)	Main engine (ps)	Engine maker	Year built
(Trawlers)							
1	BABEL MAGD	Wood	21	6.5	230	GARDNER	1980
2	RAS EL HEKMA	Wood	20	6.0	285	BAUDUAN	1964
3	BURG EL ARAB	Wood	20	6.3	170	CATERPILLAR	1965
4	SIDI YAKOUT	Wood	20	6.3	170	GARDNER	
5	PALESTINE	Steel	18	6.0	240	YANMAR	1983
6	SABRA	Steel	18	6.0	240	YANMAR	1983
7	ZOHOUR	Steel	20	6.3	300	KELVIN	1986
(Purse seiners)							
8	SINA EL GEDIDA	Wood	21	6.5	285	BAUDUAN	1982
9	IKTIHAM	Wood	23	8.0	218	GARDNER	1978
(Gill-netter/long-liners)							
10	HAMADNA ALLAH	Wood	14	3.5	70	VOLVO	1984
11	HEBAT ALLAH	Wood	14	3.5	130	ISUZU	1985
12	KAIRAT	Wood	13	3.2	70	ISUZU	1984

#### 2-3-5 Supporting Facilities

##### (1) Wharfs

The following wharfs were investigated. All can be used by fishing boats of up to 300 gross tons.

Anfoushi in Alexandria

Wooden wharf: 30 m x 6 m x 3.5 m  
(length x breadth x water depth)  
Stone wharf: 40 m x 8 m x 3.5 m  
(length x breadth x water depth)  
fuel, fresh water, ice available

Ataka in Suez

Concrete wharf: 200 m x 30 m x 5 m  
(length x breadth x water depth)  
fuel, fresh water, ice available

Hurghada

Wooden wharf: 15 m x 8 m x 8 m  
(length x breadth x water depth)  
fuel, fresh water, ice available

(2) Shipyards

Most ports are endowed with some small yards for building wooden fishing boats. In addition, there are eight shipyards for building large commercial vessels in Alexandria, Port Said and Suez. The EFPEC possesses its own shipyards in Alexandria (1) and Suez (1). The latter is under construction.

Most repairs, including those for the hull and shaft, can be effected in these yards. However, hydraulic pumps and engines must be sent to larger shipyards in order to be repaired. Navigation instruments must be sent to their makers for repair.

Table 2-3-9 Shipyards of the EFFEC

	Alexandria	Suez (under construction)
Total area	2,000 m <sup>2</sup>	40,000 m <sup>2</sup>
Type of slipway	Conventional slipway x 2 units	Conventional slipway and traverse rails (8 to 20 boats can be accommodated at one time)
Length of underwater slipway rails	40 m	102 m
Length of ground slipway rails	40 m	114 m
Maximum capacity	100 t (weight) x 2	600 t (weight)
Labour force	60 persons	---
Workshop equipment	available	available in future
Remarks	Mainly for wooden boat repair	Mainly for repairs, will be completed in June 1987. Construction cost: 470 million yen (Government budget)

## (3) Others

In addition to the shipyards, mentioned above, the EFFEC possesses its own warehouses in Anfoushi, Alexandria and Wardian. The warehouse in Anfoushi has 3 rooms totalling approximately 200m<sup>2</sup> and in which fishing gear repairs can be performed. The Wardian warehouse has 8 rooms totalling 1600m<sup>2</sup>. A machinery workshop is located next to the warehouse. Also, a fishing net factory is planned to be established. Fishing equipment, spare parts, general expendable items, small engines and propellers are stored in these warehouses.



2-3-6 Fishing Gear and Methods

The relationship between fish caught and the gear used is explained below. The table points out that trawling is the activity most engaged in in the Mediterranean, while purseseining is the predominant method in the Red Sea and the Bay of Suez.

Table 2-3-10 Relationship Between Fish Landed,  
Fishing Gear and Area of Origin.  
(Unit: %)

	Proportion of fish landed	
	Red Sea (inc. Suez Gulf)	Mediterranean
Trawl net	28.5	49.0
Beach seine	1.2	6.7
Trammel net	0	2.2
Bamboo net	0	0.1
Gill net	0	0.6
Surrounding net	0.7	0.6
Purseseine	66.3	29.0
Hooks	3.2	5.3
Others	0.1	6.5
Total	100.0	100.0

(Source: Statistics of Fisheries of Egypt)

Typical trawl nets and purseseine nets currently used are shown in Figures 2-3-2 and 2-3-3. The trawl nets have a small mesh size in order to catch various types of fish ranging from small shrimp to large grouper. The net construction is simple and spread in water is smaller than that of Japanese trawl nets. The purseseine nets also have a small mesh size in order to catch small fish such as sardines. Size of the nets is small and composition of the nets is arranged for manual operation which cannot be seen in Japan.

Fig. 2-3-2 Egyptian Type Trawl Net

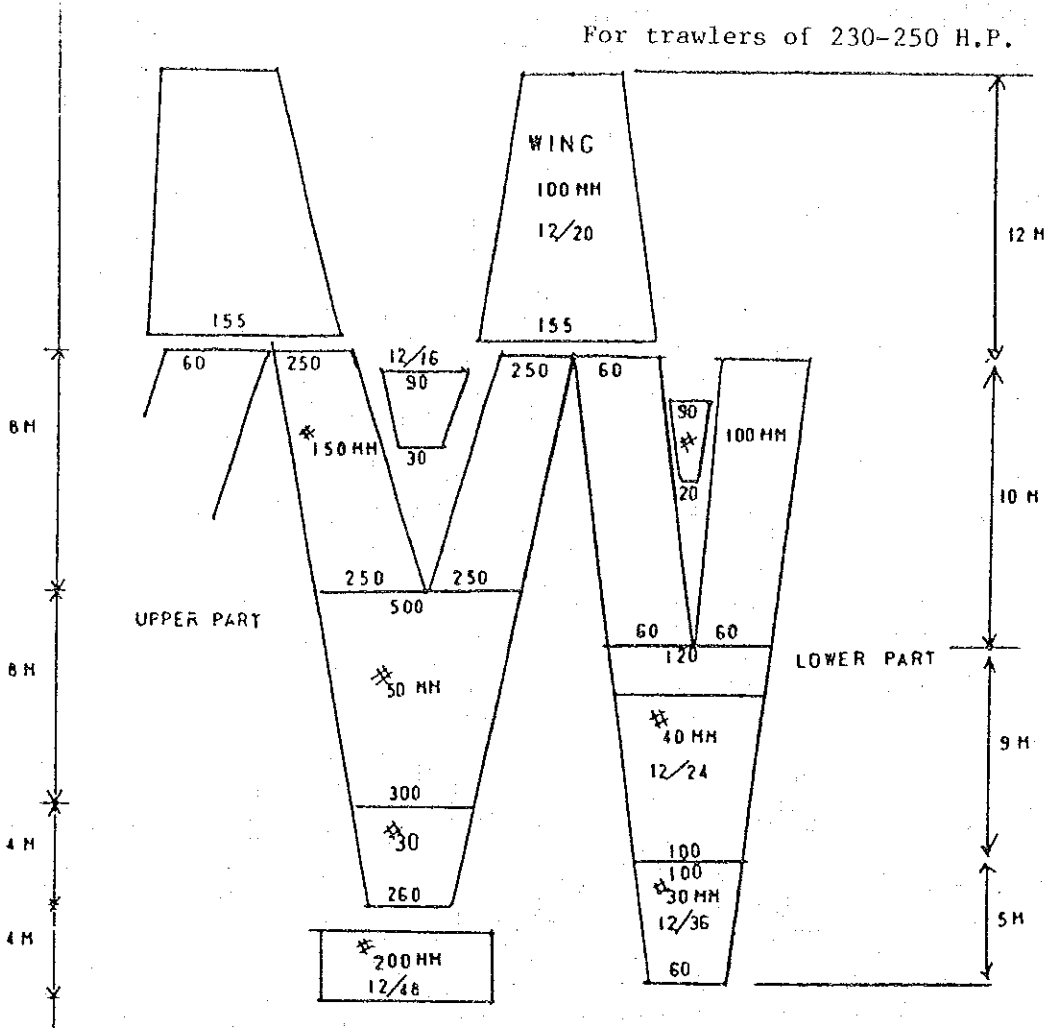
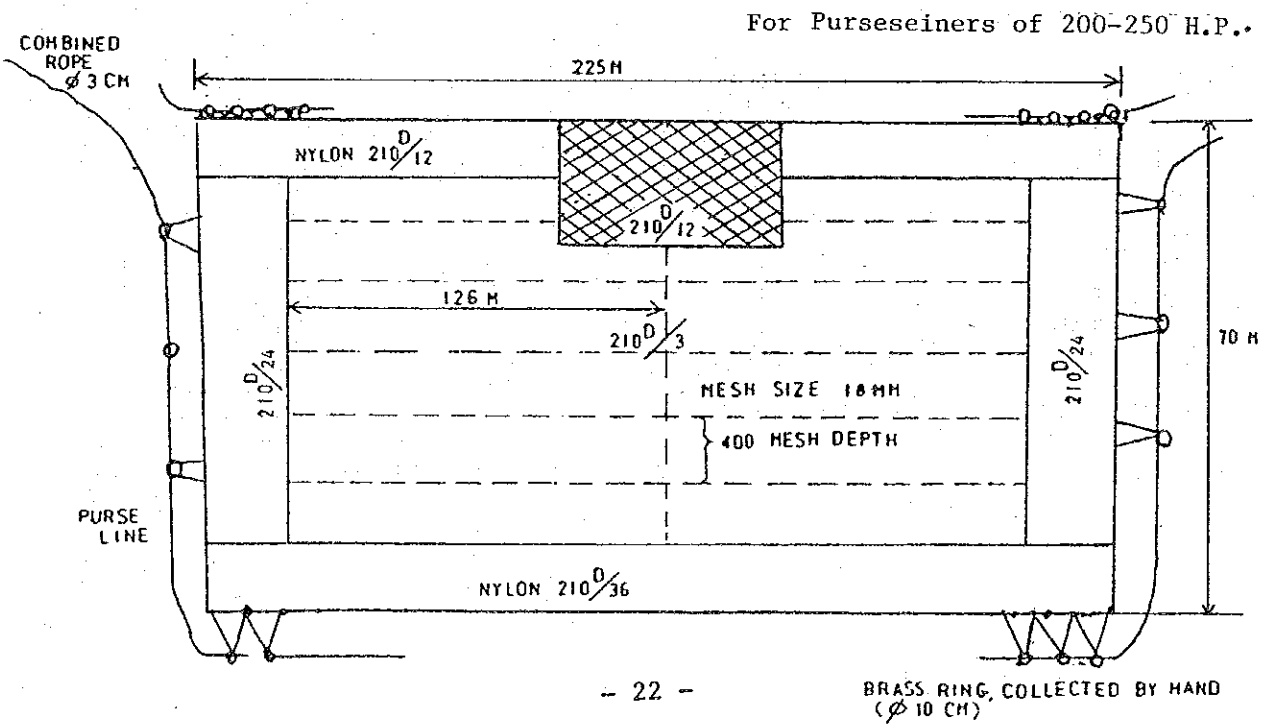


Fig. 2-3-3 Egyptian Type Purseseine Net



## 2-3-7 Marketing System

Most of the fish landed in Egypt's Mediterranean ports are demersal fish such as red snapper, sea bream, sole, red mullet, lizard fish, grouper, shrimp and cuttlefish. These are landed in Alexandria, Port Said, Marsa Matrough, etc. Most of the fish landed in Egypt's Red Sea and Bay of Suez ports are pelagic fish such as sardine, mackerel and kingfish. Grouper and red snapper are also caught. These are landed in Ataka (Suez) and Hurghada.

Most of the fish is marketed chilled with ice and some sardine or mackerel is refrigerated later on to serve as bait. Freshwater fish caught in Lake Nasser is frozen in Aswan City and transported to Cairo to be marketed. There, it is unfrozen before being sold, as customers generally tend not to like frozen fish. Sardine is sometimes salted or canned and small quantities of shrimps are frozen. It is rather difficult to find good fresh fish in Cairo, whereas it is plentiful in the markets of Alexandria and Suez, where fishing ports are located.

Fish is sold in boxes containing 25 kg of fish at the port of landing. The price of demersal fish is generally higher than that of pelagic fish. Demersal fish wholesale prices range from L.E.5 to L.E.10 per kilo; that of pelagic fish from L.E.0.5 to L.E.1.5 per kilo. In general the higher the degree of freshness of the fish, the higher the price it will fetch. From among demersal fish, the most highly valued species include sole, sea bass, red mullet, sea bream and grouper. For pelagic fish, bluefish and kingfish are comparatively highly priced.

Alexandria is a large Mediterranean fishing port located some 3 hours by car from Cairo. It is both a consumer and a producer market. Wholesaling is performed by auction in the fishing port of Anfoushi. In Alexandria 10 wholesalers conduct auctions for middlemen and they also send fish directly to Cairo. Auction and consignment fees are 5%.

The fishing bases for the Bay of Suez and the Red Sea are Ataka and Hurghada. Local government charges a L.E. 0.22 production duty per box

(25 kg of fish) on fish caught by purse seine, longline and trawling and a fixed proportion of the fish landed is purchased by the government according to a set government purchasing rate. The sale of fish purchased by local government agencies is carried out by the Fish Marketing Co. governed by the Ministry of Supply and Internal Trade. This association owns an ice making factory and cold store in Hurghada and 200 insulated trucks overall in Egypt for the marketing of fish.

Government purchasing rate

Ataka:	purse seiners 10%, trawlers 33%, long-liners 50%
Hurghada:	purse seiners 10%, trawlers 10%, long-liners 50%
Port Said (Med.):	all boats 100%
Alexandria (Med.):	no rate
Damietta (Med.):	no rate
Marsa Matrough:	all boats 5%
Eltur (South Sinai):	all boats 50%

The government of the province in which the above-mentioned ports are located purchases fish directly from fishermen and sells it to local consumers at low prices. This is also the case for agricultural production in general. Controlled prices are set in these ports, with lower and upper ceilings, to serve as standard prices (Table 2-3-11). The lower limit is the price at which fish is bought from fishermen and the upper ceiling is the retail selling price. However, the lower limit may drop if supply increases. Fish not covered by the government rate is sent to Cairo fish markets by wholesalers (5 in Ataka and 2 in Hurghada) who act as agents for fishermen at a 5% handling charge. These wholesalers also act as suppliers to fishermen of fishing gear, fuel, provisions, ice, etc.

Table 2-3-11 Controlled Prices (1980)

Fish name	Price (L.E./kg)
Mackerel tuna ( <i>Euthyunus affinis</i> )	0.25 - 0.30
Spanish mackerel ( <i>Scomberomonus</i> sp.)	1.25 - 1.40
Mullet ( <i>Mugilidae</i> )	0.40 - 0.50
Red mullet ( <i>Mullidae</i> )	0.40 - 0.50
Lizard fish (large) ( <i>Saurida</i> sp.)	0.85 - 0.95
Lizard fish (medium) ( <i>Saurida</i> sp.)	0.40 - 0.50
Lizard fish (small) ( <i>Saurida</i> sp.)	0.25 - 0.30
Bream ( <i>Lutjanus</i> sp.)	0.25 - 0.30
Snapper (large)	0.85 - 0.95
Snapper (medium)	0.40 - 0.50
Snapper (small)	0.25 - 0.30
Emperor	1.25 - 1.40
Emperor	0.80 - 0.90
Cuttlefish	0.35 - 0.45
Shrimp	3.25 - 5.50

Ice appears to be the best method for preserving fish freshness in Egypt and many ice-making plants are found in Egypt. Ice making produces two types, either flaked or block ice.

The table below shows the ice-making capacity of each fishing port.

Alexandria	Suez, Ataka	Hurghada	Cairo
500 T/D	110 T/D	25 T/D	Many
(5 plants)	(4 plants)	(2 plants)	

Exports of frozen shrimp and live eels are not considerable. Considerable amounts of fresh and frozen fish, dried or smoked fish which are not expensive are imported from neighbouring countries such as Italy, Greece and Turkey. Though canned mackerel was at one time imported from Japan, this was prohibited in 1985 in order to protect the domestic canning industry.

### 2-3-8 Education and Training

The Anfoushi Secondary Industrial School for Fisheries and Marine Mechanics was established in 1965 in Alexandria by the Ministry of Education. Students having completed 9 years of compulsory education can enroll for 3 years to follow lectures on fisheries and navigation, marine engines and refrigeration machines and receive training using small fishing boats. A total of 484 students are taught by 30 instructors.

A similar school was established in Damietta in 1980. Further plans have been made to build another one in Suez in 1988 and its marine mechanics section has already been established (in 1986).

### 2-3-9 Problems Affecting Egyptian Fisheries

Inland fisheries production has stagnated since the beginning of the 1980s. At the same time the fish catch per boat of marine fisheries displays a similar trend. The development of new marine fishing grounds has therefore become of particular urgency. It is indispensable to secure a skilled labour force in order to raise boat operation efficiency and increase production but the rapid increase in the number of fishing boats since 1979 has led to a shortage of experienced fishermen. As a matter of fact, despite the rising number of new boats some cannot be operated for this reason. The causes underlying this increase can be identified as: the stagnation of inland fishing drove some fishermen to begin marine operations with motorized boats, many Egyptian expatriates returned and invested their earnings into boat building ; and extra funds from other industries were invested in boat building.

Further, education as it is offered in fisheries schools does not meet the needs of the fishing industry since the equipment used is obsolete, and fishing education therefore needs to be modernized and efficiency raised.

## CHAPTER 3

### CONTENTS OF THE PROJECT





## CHAPTER 3 CONTENTS OF THE PROJECT

### 3-1 Objectives

In Egypt, most fishing boats are either trawlers or purse seiners operating in the Mediterranean and the Red Sea (inc. Gulf of Suez) in waters of less than 100 m in depth. The fisheries resources in these waters are fully exploited and fish production has been stagnating at approximately 20,000 tons in each area. Therefore, in general, demand exceeds supply.

From the point of view of new fishing grounds, one can identify the following potential areas. On the Mediterranean side, waters of a depth greater than 100 m off the continental shelf on both the eastern and western sides of the Nile delta (north of Alexandria and Port Said respectively) offer interesting opportunities. With respect to the Red Sea, one can identify two areas: the Bay of Foul, near the border with Sudan, and another area further south, in Sudanese territorial waters.

This Project aims at the introduction as model boats of two fisheries resources survey and training vessels in the Mediterranean and the Red Sea in order to develop new fishing gear and methods, explore new fishing grounds, train fishermen and assist in the transformation of Egyptian commercial fishing.

### 3-2 Contents of the Request

The request presented by the Egyptian government for the execution of the Project is the following:

- (1) 30 m Fisheries Resources Survey and Training Vessels: 2 units

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Particulars

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LOA	30m
LBP	24m
Breadth	7.2m
Draft, loaded	2.8m
Main Engine	850 HP
Speed, trial	10.5 kt
Bollard, pull	11.0 T
Towing, pull	7 T (at 3.5 kt.)
Endurance	20 days
Refrigerated fish hold	60m <sup>3</sup>
Freezing	4 T/D
Fresh water tank	15m <sup>3</sup>
Dry store	6 T
Refrigerated store	1.2 T
Crew	8 persons
Trainee	12 persons

---

(2) Fishing Gear

- . trawl nets
- . purseseine nets
- . longlines
- . gill nets
- . accessories and spare parts

- (3) A 5 year supply of spare parts for each vessel and fish boxes for 2 vessels

3-3 Examination of the Contents of the Request

Total fish consumption in Egypt is 300,000 tons per annum, half of which is produced in the country (domestic production is between 150,000 and

180,000 tons a year). Egyptian fisheries face the following problems:

- 1 A shortage of fishing gear and modern fishing vessels
- 2 An inadequate supply of skilled labour
- 3 An inappropriate system of education with regards to modern fishing technology
- 4 Poor fish handling and preservation techniques

In consideration of the above conditions, the latest National Development Plan aims at increasing fish production as well as strengthening the fishing fleet. Fishing grounds presenting a potential for exploitation are those areas of the Mediterranean and the Red Sea which are found in waters 100 to 400 m deep. Pelagic and demersal resources showing the highest potential for exploitation shall be surveyed by two vessels equipped with modern fishing gear and using modern fishing methods. The training of fishermen shall proceed during the course of fishery resources survey work. The plan incorporating these survey and training activities is deemed necessary.

Taking into consideration the following facts, the results to be gained by the introduction of two vessels appear to be necessary:

- 1 The importance and reliability of marine resources in both seas are roughly equal
- 2 Exploitable areas in both seas are situated at an approximate distance of 600 nautical miles from the bases envisaged under the Project
- 3 It is necessary to conduct surveys over a long period in both cases
- 4 Fishing methods to be used differ in each case.

Given its organization, management system, available facilities and the measures already taken to secure its budget, the Egyptian Fishing and Fishing Equipment Co. (EFFEC) should have no problems acting as Executing Agency for the Project.

### 3-4 Project Outline

#### 3-4-1 Executing Agency and System of Management

The Egyptian Fishing and Fishing Equipment Co., under the supervision of the General Authority for Fish Resources Development of the Ministry of Agriculture and Food Security, will select the Project Manager, prepare the necessary staff, formulate the resources survey and training plans, undertake Project management and resolve any problems that may arise.

#### 3-4-2 Basic Plan

The basic plan of this Project consists of a fishery resources exploitation plan and a training plan.

##### (1) Fishery resources exploitation plan

Surveys of new fishing grounds and fisheries resources are planned for potential areas in the Red Sea and Mediterranean.

##### 1) The Mediterranean

The survey vessel shall be based in Alexandria and conduct fishing operations with trawl nets, bottom trawls, midwater trawls, longlines and gill nets. Target fish species will include such demersal resources as red mullet and common hake. Survey areas are east and west of Alexandria, within 300 nautical miles from the base and over waters of a depth ranging between 100m and 400m. These waters lie over the continental shelf and continental slope.

##### 2) The Red Sea

The survey vessel shall be based in both Ataka and Hurghada and conduct fishing operations with purse seine nets, longlines and trawl nets. Objective fish species will include such pelagic fish as anchovy and boops. Demersal fish such as lizardfish, red snapper and grouper will also be covered. Survey areas are

within 600 miles of Ataka in a southern direction, including the Bay of Foul and Sudanese territorial waters lying 3 to 5 miles from the coastline.

(2) Training plan

In order to foster the development of fishermen able to engage in offshore fishing, training for graduates of fisheries schools shall be available on board the vessels. Eight trainees shall be allowed per trip and they shall be instructed in fish school finding, fishery grounds surveying, the use of various fishing methods and fish handling.

3-4-3 Outline of the Facilities and the Equipment

(1) Facilities

Fisheries resources survey and training vessels: 2 units

1 unit: Activities in the Mediterranean; trawling, longline fishing,  
gill-netting

1 unit: Activities in the Red Sea; purseseining, trawling,  
longline fishing

(2) Equipment

1) For fishing in the Mediterranean

a) trawl nets, longlines, gill nets, spare parts and accessories

b) spare parts and fish boxes

2) For fishing in the Red Sea

a) purseseine nets, trawl nets, longlines, spare parts and accessories

b) spare parts and fish boxes

### 3-4-4 Manning Plan

The manning plan required for the resources survey training vessels is as follows:

	Mediterranean Section		Red Sea Section
Manager (in charge of resources survey/training)		1	
(On Sea)			
Captain	1		1
Instructor	1		1
Fish Master	1		1
Chief Engineer	1		1
Second Engineer	1		1
Crew	3		3
Trainee	8		8
(On land)			
Staff member and employee (in charge of food stuff, Fuel oil, Lub oil, Fresh water, Landing fish)	3		3
Technician			
Electrician	1		1
Electronics Expert	1		1
Mechanic	1		1
Carpenter	1		1
Total	23	1	23

Total number of manning required is 47 persons including one manager in charge of resources survey/training and 23 persons each for the Mediterranean and Red Sea sectors, respectively.

(Refer to Fig. 3-4-1)

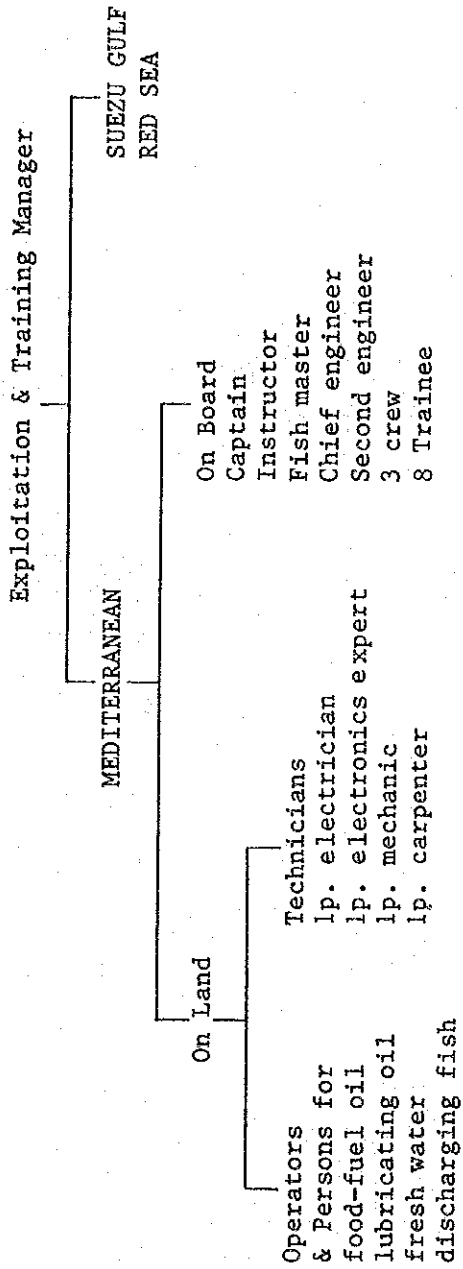


Fig. 3-4-1 Organization chart for implementation of the Project





## CHAPTER 4

### BASIC DESIGN



## CHAPTER 4 BASIC DESIGN

### 4-1 Design Procedure

#### 4-1-1 General Approach and Methodology

The steps followed to determine the Project scale are the following:

- (1) To clarify the current state of fisheries resources and confirm the possibility of exploiting dormant resources
- (2) To investigate the conditions of exploitable fishing grounds
- (3) To determine fishing methods based on the results of (1) and (2) above
- (4) To identify the appropriate type of survey and training vessel to be introduced and estimate the minimum size of fish catch necessary to cover operational costs
- (5) To design the appropriate type and size of fishing gear according to the given environmental conditions
- (6) To estimate the main engine power necessary to operate the fishing gear designed
- (7) According to the conditions investigated in the steps outlined above, the speed of the vessels, and the fishing operation days/ navigation days shall be calculated.
- (8) The capacities of the fuel oil tank, the fresh water tank and the fish hold shall be calculated based on the navigation days. The size of the engine room shall be deduced from the size of the main engine, accommodation quarters shall be designed according to the number of the crew and the trainees.

- (9) Based on (6) and (7) the dimensions of the vessels shall be calculated.
- (10) Equipment specifications shall be drawn with respect to the vessels' functions and the crew members' handling and maintenance abilities.
- (11) The design of the quantity, type and size of spare parts and fish boxes shall be drawn with respect to the tasks to be performed.

#### 4-1-2 Design Policy

- (1) Fishing gear and fishing method
  - 1) Fishing gear and fishing methods shall be designed in consideration of prevalent Egyptian fishing technology.
  - 2) The selection of complicated fishing gear shall be avoided.
  - 3) Ease of maintenance shall be considered.
  - 4) The safety of fishing gear operation shall be fully considered.
- (2) Survey and training vessels
  - 1) While the main purpose of the vessels is to conduct survey and training activities similar to commercial fishing as a model ship to facilitate future offshore fishing from present inshore fishing, commercial fishing must also be considered in order to meet the cost of operations.
  - 2) The vessels shall be made of steel, for the following reasons:
    - Egyptian boats are generally made of wood but such boats quickly become obsolete and maintenance is difficult.

- It is almost impossible to build wooden boats in Japan for lack of wooden boat builders and materials.
  - Few Egyptian fishermen have any experience of FRP boats and their maintenance.
  - Steel boats are relatively easy to maintain and have high endurance.
- 3) The two vessels shall be of the same design with regard to building costs and time, and spare parts shall be interchangeable. Fishing gear and deck machinery, however, shall be designed to suit each boat's fishing activities.
  - 4) Fishing and navigation equipment shall be kept simple and at the appropriate necessary level.
  - 5) The vessels shall be provided with the appropriate necessary equipment required to conduct fisheries resources surveys.
  - 6) Equipment selected shall be easy to maintain.
  - 7) The type of vessel shall be a single-deck vessel with a long forecastle for the following reasons:

A working deck is necessary on the aft side of the vessel for trawling and purseseining operations.

Space is needed above the deck and to the fore of the vessel for the crew room, mess-room, galley, etc.

Below the deck shall be the engine room, fish hold, fuel oil and fresh water tanks and the trainees' room. The engine room shall be on the aft side to enable the intermediate propeller shaft to be made shorter and facilitate maintenance.
  - 8) A controllable pitch propeller shall be used because such a propeller can select the most effective pitch for trawling and navigation respectively, and is useful for trawlers.

- 9) Since navigation days shall be longer than with current fishing vessels, refrigeration equipment shall be provided in order to maintain the freshness of fish caught.

#### 4-2 Examination of Design Conditions

##### 4-2-1 Fishing Gear and Methods

The design of fishing gear and methods shall proceed as follows:

- (1) Fishing grounds and fish species.

In the Mediterranean, demersal resources are known to exist in waters over the continental shelf and its slope at depths greater than 100m. Fish can also be found at depths of over 400m but such resources are of little commercial value. In view of these considerations, it has been decided to exploit resources lying in waters between 100 and 400m in depth.

Figure 4-2-1 indicates that these new fishing grounds are approximately 20 to 50 nautical miles off the Egyptian coast, some 15 nautical miles wide and 250 nautical miles long. Objective demersal fish include common hake and red mullet and the exploitable stock is estimated at 2,000 tons.

In the Red Sea, new exploitable fishing grounds can be found in the Bay of Foul, the area between 20°N and 21°N, and the area lying between 18°N and 19°N in the inshore area off the western coast. Objective pelagic fish species include spotted herring and anchovy. Demersal resources include lizard fish and emperor. Dormant pelagic resources are estimated at 2,000 tons while demersal resources approximate 400 tons.

Figure 4-2-1 and 4-2-2 illustrate potential fishing grounds in the Mediterranean and the Red Sea.

Figure 4-2-1 New Mediterranean fishing Grounds

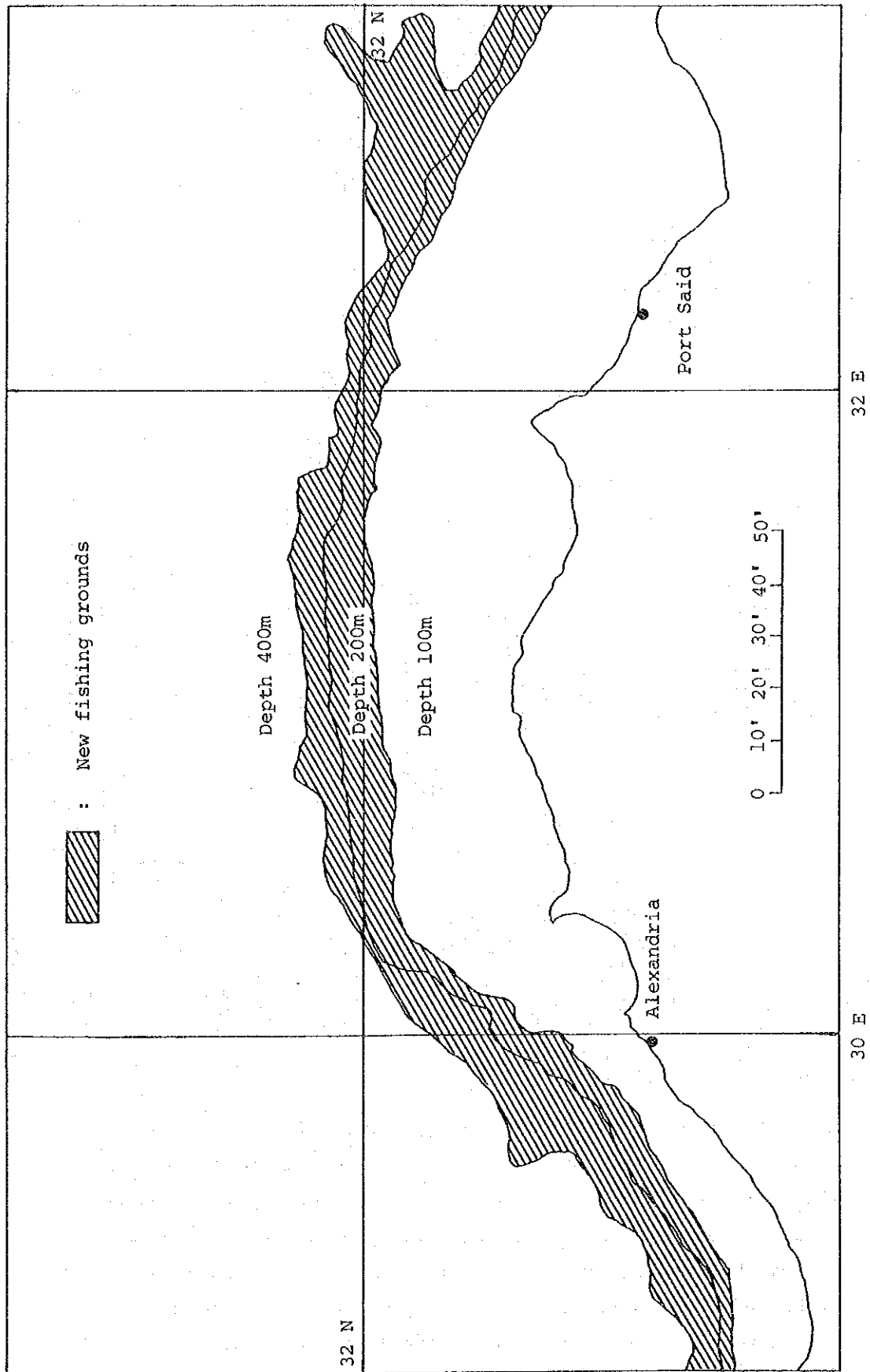
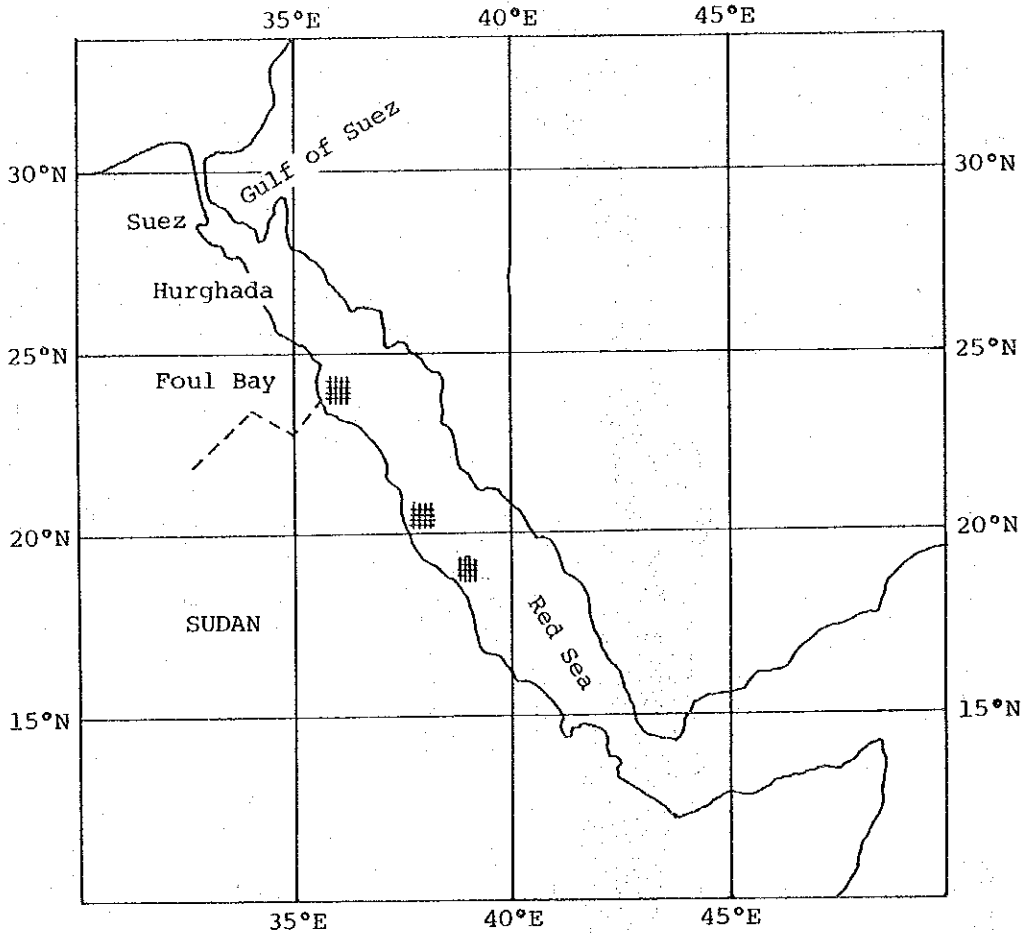


Figure 4-2-2

New Fishing Grounds in the Red Sea



### : New fishing grounds

(2) Natural environment

As wind force and currents in the Mediterranean are comparatively mild the year round and directions from west to east vary little, there are no serious obstacles to fishing activities. The main fishing ground off the Nile delta is situated in flat and muddy bottom over the continental shelf. Further from the coast, the seabed of the continental shelf changes from one of mud to one of mud with sand, and then to one constituted by rocks.



From November to May, wind force in the Red Sea is less than 3 in 70% of instances, in which condition purse-seining can be conducted. From August to October wind force is greater than 5 in 25% of instances, in which trawling cannot be conducted. Wind blows in a northerly direction from November to May and southerly winds prevail from June to October. Currents are generally weak and their directions are affected by winds.

A 1,000 to 3,000m deep trench runs from north to south along the centre of the Red Sea. The coastline on both sides of the sea is covered with reefs and the narrow continental shelves are dotted with small islands in some cases. The western continental shelf is larger than that on the eastern side.

### (3) Selection of fishing methods

#### 1) The Mediterranean

Exploitable demersal stocks should be tapped with trawl nets and bottom gill nets for muddy and sandy seabeds while bottom longlines and bottom gill nets are to be used for areas in which the seabed is rocky. Some demersal fish, such as common hake and horse mackerel, are known to swim away from the bottom towards the midwater according to the time of the day. Midwater trawling methods should therefore also be adopted to the exploitation of such resources.

#### 2) The Red Sea

Pelagic and demersal resources can be exploited in waters off the west coast. Pelagic fish can be tapped with purse-seine nets, while demersal stocks can be tapped with longlines and trawl nets, as is the case for Mediterranean fish. Bottom gill nets cannot be utilized due to the presence of reefs.

(4) Identification of the standard vessel

In this section, the appropriate type of vessel and the size of the catch necessary to cover operational costs shall be identified. The catch rate of the standard vessel shall be compared to the catch of existing trawlers currently operating, since it is one of the factors determining the scale of fishing gear. The minimum necessary gross tonnage for deep sea trawlers operating up to 400m in depth is 150 to 200 tons. Trawlers of this class are usually 30m long, 6m wide, 2.5m deep and powered by a main engine of 850 Hp.

1) The Mediterranean

The operational costs of the vessel identified above are estimated at L.E. 230,000 per annum. Given an average price of L.E. 2.18/kg for Mediterranean fish, necessary demersal catch size can be calculated at:

$$230,000 \div 2.18 = 105 \text{ tons}$$

The standard vessel for the Mediterranean must therefore land 105 tons of fish each year in order to meet its costs of operation only.

At present, the average yearly fish catch of trawlers operating in waters of less than 100m in depth is 75 tons, so that fish catch ratio can be worked out as follows:

$$105 : 75 = 1.4 : 1$$

The multiplication of the fish catch ratio with the fish concentration ratio will in turn give the necessary fishing gear scale.

2) The Red Sea

The operational costs of the vessel identified for the Red Sea are estimated at L.E.206,000 per annum. The average price for pelagic fish caught by purseseiners is L.E. 0.55/kg. For

demersal fish, the same price as that used to calculate the necessary catch size of the Mediterranean vessel shall be used. The EFPEC estimates that the fish catch ratio for one operation of Mediterranean and Red Sea trawlers is 1 : 0.7.

In the Red Sea the purse-seining season and the trawling season last 5 months each. Upon these considerations the necessary catch size of the Red Sea standard vessel can be estimated.

$$206,000 \times 50\% \div 2.18 \times 0.7 = 33 \text{ tons (demersal fish)}$$

$$206,000 \times 50\% \div 0.5 = 206 \text{ tons (pelagic fish)}$$

Total 239 tons

Thus, the standard vessel for the Red Sea must land 239 tons of fish each year in order to meet its costs of operation.

At present the average yearly catch per fishing boat operating in the Red Sea is 180 tons of pelagic fish and 21 tons of demersal fish, totalling 201 tons. Fish catch ratios can be worked out as follows:

$$239 : 201 = 1.2 : 1$$

The multiplication of the fish catch ratio with the fish concentration ratio will in turn give the necessary fishing gear scale.

#### (5) Fishing gear design

##### 1) The Mediterranean

###### a) Trawl net

Demersal fish concentration varies according to depth. If we assume fish concentration in continental shelf waters down to 200m to be equal to 1, then the concentration of fish found beyond 200m shall be 0.27. Figure 4-2-1 indicates that the area over waters of a depth ranging from 100m to 200m is roughly equal to the area of waters situated in the 200m to 400m zone. The fish concentration in the new

fishing grounds (100m to 400m in depth) can therefore be estimated at 0.6. Taking into account the poorer fish concentration of the new grounds and the necessary catch per operation, we can obtain the necessary catching ability rate compared to the existing trawlers of the new trawl nets for the survey and training vessel operating on these grounds:

$$1.4 \div 0.6 = 2.3 \text{ times}$$

The catching ability of a trawl net depends upon the length between the extremities of both wing nets. This length is decided by the length of the head rope. In the case of the two-panel trawl nets currently used, the length of the head rope is 25m. That of the new net shall be 52m.

$$[25 \times 2.3 \times 1/1.1 \text{ :(coefficient)}] = 52\text{m}$$

The main nets to be used in waters less than 200m deep shall be two-panel nets of rather small mesh sizes. In addition, six-panel nets of larger mesh sizes shall be designed for taking demersal fish in waters of a depth greater than 200m in which two-panel nets cannot be efficiently used.

Four-panel nets with large mesh sizes shall be designed for midwater trawling activities.

b) Bottom gill net

Mesh size is determined by the size of the target fish. Thus, common hake and grouper shall be caught by using 20cm mesh size nets, and shark and ray shall be caught with 30cm mesh size nets. Nets shall be made of multifilament, and with a hanging ratio of 55% for a good catch rate. The number of net sets is approximately 200 and a radio buoy shall be attached at both ends of the net line to facilitate recovery in rough seas.

c) Bottom longline

Fish species include grouper, common hake, snapper, ray and other such large fish. The length of the line is determined by the total number of hooks to be used. Existing fishing boats currently use longlines of 1,100 hooks so that a line of 2,500 hooks shall be used, in consideration of the necessary catching ability of 2.3. A radio buoy shall be attached at the end of each line in order to facilitate recovery.

d) Spare materials

Materials such as net web, net twine and metal fittings shall be supplied to cover two years of operations and enable repairs.

2) The Red Sea

a) Purse seine nets

The objective fishing area off the west coast of the Red Sea is 70m to 100m deep. The nets shall be about 700m long and 100m high, the length usually being 6.5 times the height.

The mesh size of the main body of the net shall be 1.5cm and that of the sinker line's selvage shall be bigger. Spotted herring is 1.5cm high and boops of a 2cm body circumference can be caught in such a net.

To achieve a fast sinking rate for the net and high safety when heaving the purse line, the purse wire to be used needs to be of 1,400m in length (16 to 18mm in diameter). In order to use it in the fishing grounds of less than 70m depth, it is necessary for the composition of the net to be such that its depth and length can be easily altered. In this

Project, a low hanging percentage has been selected in order to enhance the safety of fishing operations and ease net handling, even though a fish hanging percentage facilitates net expansion in water.

b) Bottom longlines

Fish species sought include emperor, Indian snapper, shark and grouper. The line consists of lead lines, a main line, branch lines, fish hooks, etc. The number of fish hooks is 2,500, as for the Mediterranean, and a radio buoy shall be attached at each end of the line to facilitate recovery.

c) Trawl net

The necessary catching ability of the trawl nets is calculated using the same method as that used for the Mediterranean. The necessary fish catch ratio for the Red Sea standard vessel is 1.2 and the fish concentration ratio of the new grounds is 0.6. The necessary fish catching ability of the net is therefore 2. The catching ability of a net depends upon the length separating the extremities of both wing nets, and this length is dictated by the length of the head rope. That of trawl nets currently used is approximated 25 meters so that the necessary length of the standard vessels head rope shall be  $(25m \times 2 \times 1/1.1) = 45m$ .

Fish catch per unit operation in the Red Sea being inferior to that of the Mediterranean, the catching ability of the survey and training vessel needs to be raised through an increase in the scale of fishing gear. In order to be able to use trawl nets interchangeably between the Mediterranean and the Red Sea it has been decided to increase the length of the head rope necessary for Red Sea trawling by 7m which, added to the 45m length calculated above, gives a total length of 52m of head rope.

Two-panel nets with small mesh sizes will be designed for operation in waters less than 200m deep and six-panel nets with large mesh sizes will be designed for waters over 200m deep. Four-panel nets will be used for midwater trawling.

d) Spare materials

Net web, twine, metal fittings and other spares will be supplied to enable repairs over a period of two years.

(6) Estimation of necessary engine output

The rated output of the main engine is decided by the trawl net used, which, under the Project, shall mostly be two-panel nets. The resistance in water of such nets at a towing speed of 3.5 knots is of 6,000 kg. At such speed and with a main engine load of 75%, necessary engine output is:

$$(6,000 \times 1.78) / [(0.75 - 0.05) \times (0.85 \times 0.28) \times 75] = 854 \text{ PS}$$

$$* 3.5 \text{ knots} = 1.78\text{m/s}$$

$$0.75 = \text{coefficient}$$

$$0.85 \times 0.28 = \text{coefficient}$$

$$1 \text{ PS} = 75\text{kg.m/s}$$

This coincides with the engine output of 850 PS previously identified.

4-2-2 Fisheries Resources Survey and Training Vessels

The vessels shall be designed according to the flow chart below. The vessels' principal dimensions are determined by engine room dimensions, the capacity of the fuel tanks, fresh water tanks, fish holds, quick freezing and preparation rooms and space needed for accommodation. These are in turn determined by the following factors:

Spaces and Capacities

Engine room dimensions  
Fuel oil tanks

Fresh water tanks  
Fish hold

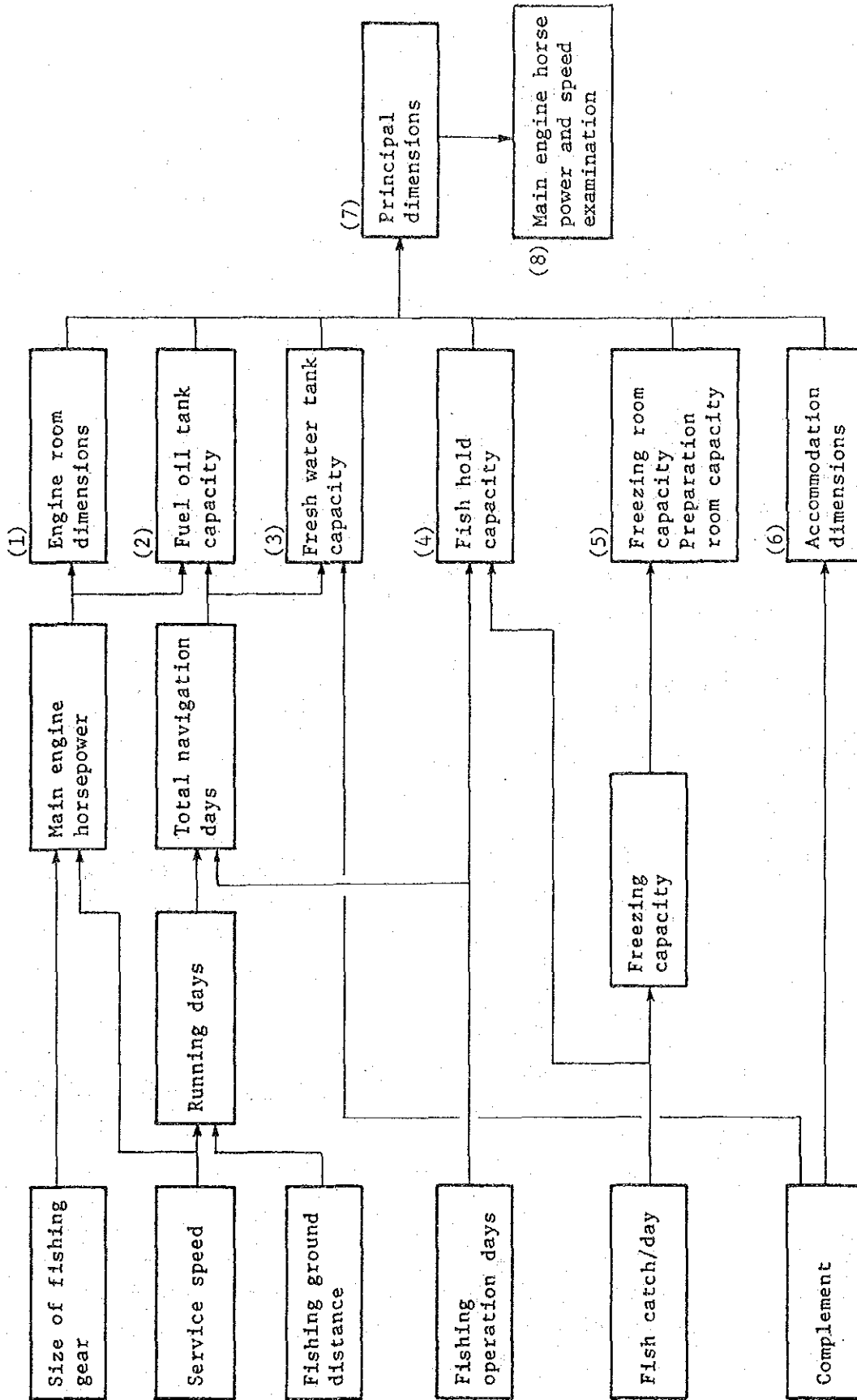
Quick freezing room  
Preparation room  
Accommodation

Deciding Factors

Main engine size  
Main engine horsepower,  
navigation days  
Complement, navigation days  
Fish catch, fishing operation  
days  
Fish catch  
Fish catch  
Complement



Boat Design Flow Chart



(1) Engine room dimensions

Based on the fishing gear to be used, the necessary main engine horsepower is 850 PS. The length of such an engine usually is approximately 3.5m, the intermediate shaft measures about 1m, the necessary space for the hydraulic pump unit at the front of the engine is 2m and space for pipes and valves requires 1.5m. Given these factors, the engine room needs to be approximately 8m long.

(2) Fuel oil tank capacity

Distance to fishing grounds

The farthest fishing grounds are situated about 600 miles from Hurghada, in Sudanese waters.

Service Speed

Current fishing boats reach fishing grounds 50 to 60 miles away from the coast at a speed of 8 knots. The new vessels' fishing grounds lie much farther, so that an identical running speed is not adequate. The service speed of similar Japanese fishing boats is usually 10 to 12 knots. However, to reduce fuel consumption, a service speed of 10 knots shall be adequate.

Running days per trip

Five days running are necessary to reach the farthest fishing grounds and return.

$$600 \text{ miles} \div (10 \text{ knots} \times 24 \text{ hrs}) \times 2 = 5 \text{ days}$$

### Fishing operation days

Current fishing boats run for 1 day and conduct fishing operations for 4 to 6 days. Since the running days of the new vessel is 5 times that of current fishing boats, fishing operations need to be 20 to 30 days long per trip. However, since a short time at sea is preferable from the point of view of fish conservation, 20 days duration of fishing operations shall be adequate.

Daily fuel consumption for an 850 PS main engine and two 80 kw generators is 2.71 tons when running and 2.18 tons when conducting fishing operations. Fuel consumption per trip can be calculated as follows:

$$2.71 \text{ tons/day} \times 5 \text{ days} + 2.18 \text{ tons/day} \times 20 \text{ days} = 57.15 \text{ tons}$$

Other factors:

Fuel remaining after trip = 10% (Japan Fisheries Agency criteria)

Fuel oil density = 0.86 tons/m<sup>3</sup> ( " )

Stowage factor = 90% (space must remain in the tank to avoid an overflow)

Based on the above, the fuel oil tank's capacity must be of 81m<sup>3</sup>:

$$57.1 \text{ tons} \times 110\% \div 0.86 \text{ tons/m}^3 \div 90\% = 81\text{m}^3$$

### (3) Fresh water tank capacity

#### Complement

The crew members necessary for fishing research comprise the captain, an instructor, a master fisherman, a chief engineer, a second engineer, an oiler and two sailors, totalling 8 persons. In addition eight trainees (navigation: 1; engine work 1, fishing methods: 6) will also be on board. A radio operator is not needed, because of the scale of the communication equipment, so that the total complement shall number 16 persons.

Navigation days per trip

5 days of running and 20 days of fishing operations total 25 days.

As fresh water consumption is 20ℓ/person/day and a 10% reserve is necessary upon arrival at the port, according to Japan Fisheries Agency criteria, a fresh water tank capacity must be of 9m<sup>3</sup>:

$$20\ell/\text{person}/\text{day} \times 16 \text{ persons} \times 25 \text{ days} \times 110\% = 9\text{m}^3$$

(4) Fish hold capacity

Estimating the necessary fish hold capacity is difficult when dealing with purseseining activities, because fish catch by purse seining is not stable. On a good purseseining day, the vessel can return to port early to unload the fish and resume activities afterwards. On the other hand, the quantity of the fish catch by trawling is relatively stable so that this shall serve as a base in order to establish the required capacity.

Trawl catch per day

Current trawlers catch an approximate 500kg of fish per day. Since the new vessels' catching ability is to be 2.3 times that amount, the daily catch shall become:

$$500\text{kg}/\text{day} \times 2.3 = 1200\text{kg}/\text{day} = 1.2 \text{ tons}/\text{day}$$

Given a stowage factor of 0.6 tons/m<sup>3</sup> (if fish is stored in boxes, Japan Fisheries Agency criteria) and 20 days of activity, the necessary fish hold capacity is:

$$1.2 \text{ tons}/\text{day} \times 20 \text{ days} \div 0.6 \text{ tons}/\text{m}^3 = 40\text{m}^3$$

(5) Quick freezing room and preparation room capacity

1) Quick freezing room

### Freezing capacity

Target fish is demersal and includes grouper, common hake and emperor. Based on the estimated fish catch of trawl fishing of the new vessel, the necessary freezing capacity shall be of 1,200kg per day.

### Freezing method

Since target fish are large, air blasting will be adequate. This method is already used in Egypt's cold storage facilities.

### Fish size

Length, approx. 50cm  
Breadth, approx. 20cm  
Height, approx. 10cm  
Weight, approx. 2kg

### Number of shelves

The height of the top shelf is set at 2m to enable easy reach. Space between the shelves needs to be 20cm so that the number of shelves will be 10.

### Fish per shelf per shift

Assuming 3 freezing shifts per day, 10 shelves and 1,200kg of fish, the fish per shelf per shift is:

$$1,200\text{kg/days} \div 3 \text{ shifts/day} \div 10 \text{ shelves} = 40\text{kg/shelf/shift}$$

The number of fish per shelf is the following:

$$40\text{kg/shelf/shift} \div 2\text{kg/piece} = 20 \text{ pieces/shelf/shift}$$

Consequently, the necessary shelf surface is:

$$20 \text{ pieces} \times 50\text{cm} \times 20\text{cm} = 2\text{m}^2$$

As 1m depth of a shelf is adequate, adequate breadth becomes 2m. A 1m space is needed on both sides of the shelves for the air cooler unit. A 0.5m passageway is required in front of the shelves. Consequently, the freezing room capacity is as follows:

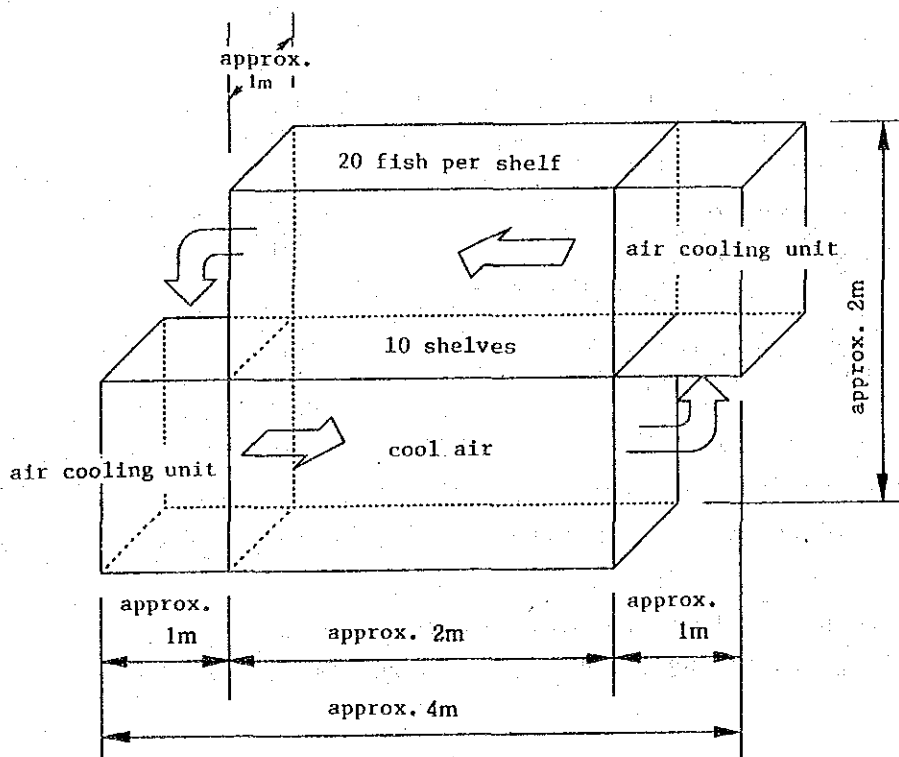
$$\begin{aligned}
 & (\text{shelf breadth} + \text{air cooler space}) \times (\text{shelf depth} + \text{passage way}) \times \text{height} \\
 & = (2\text{m} + 1\text{m} \times 2 \text{ units}) \times (1\text{m} + 0.5\text{m}) \times 2\text{m} \\
 & = 12\text{m}^3
 \end{aligned}$$

## 2) Preparation room

The capacity is determined by the working space needed to pack frozen fish. Packing is carried out by 2 persons, each needing  $2\text{m}^2$  of working space and  $4\text{m}^2$  are needed for the fish boxes, Therefore, the necessary space is the following:

$$(2\text{m}^2 \times 2 + 4\text{m}^2) \times 2\text{m} = 16\text{m}^3$$

(See Figure below.)



Shelf for Air Blast Freezing

(6) Accommodation space.

8 beds for the crew are necessary above the deck and 8 beds are needed for the trainees below the deck. The space needed for the beds below the deck affects the dimensions of the vessel. Beds will be superimposed by twos on each side of the vessel, so that two beds set lengthwise will determine the length of accommodation. Two 1.9m long beds with fore and aft sidewall spaces of 0.1m each gives the total length of the trainees' accommodation, or 4m. A mess-room, galley, shower-room and lavatories are also needed and they are arranged above the deck.

(7) Principal dimensions

The lines of the vessels are drawn and the principal dimensions are calculated to satisfy the conditions outlined above.

Length between perpendiculars	26.00 m
Breadth moulded	7.20 m
Depth moulded	3.20 m
Full loaded draft	2.80 m

(8) Examination of service speed and main engine horse power

Given the principal dimensions, the necessary horsepower needed to obtain a speed of 10 knots can be calculated. Total resistance at 10 knots (5.14 m/s) is 5,336kg, from which effective horsepower is:

$$5.336\text{kg} \times 5.14 \text{ m/s} \div 75\text{kg.m/s} = 368 \text{ PS}$$

With a propelling efficiency of 0.6, an 85% normal output and sea margin of 20%, the necessary horsepower of the main engine is 866 PS.

$$(368 \text{ PS} / 0.6 \times 0.85) \times 1.2 = 866 \text{ PS}$$

This is almost similar to the horsepower of 850 PS estimated by fishing gear scale. Therefore, with such an engine, the principal

dimensions, the scale of fishing gear, service speed and main engine horseposer will balance each other.

#### 4-2-3 Spare Parts and Fish Boxes

##### (1) Spare parts

It is difficult to obtain a supply of spare parts for Japanese equipment in Egypt and this shortage hinders the operation of vessels. In one case, a boat whose Japanese engine needed to be repaired could not be operated for a period of two months as spare parts were unavailable and had to be imported. Obtaining spare parts is possible but this takes time, as illustrated in the example above. Parts to be supplied are therefore those needed to overhaul the vessels after two years of operations. Spare parts needed are those of the following major equipment:

Main engine

Generator

Hydraulic fishing equipment

Electric navigation and fishing equipment

Spare propellers for FPP - solid-type      1 set

   CPP - blade                      1 pc

##### (2) Fish boxes

The wooden fish boxes with a capacity of 25 kilograms which are currently used in Egypt raise problems with regard to handling and sanitary aspects. Plastic fish boxes of a similar capacity will be supplied under the Project to handle and preserve the catch more efficiently and to facilitate transportation from the vessel to fish markets. A second type of fish box of identical proportions shall also be supplied for the same purposes as those outlined above but the latter type of box shall be insulated. These boxes shall be for demonstration purposes only. Approximately 50 units of each type per one survey and training vessel shall be supplied, which gives a total handling capacity of 2 tons.



#### 4-3 Principal Particulars Designed

##### 4-3-1 Fishing Gear

The particulars of fishing gear designed in the previous section are the following:

Item	Specifications	Supply description	Quantity
<u>The Mediterranean</u>			
Trawl nets	Two-panel nets (for waters less than 200m deep)	5 sets are needed because of rapid deterioration	5 sets
	Four-panel nets (for mid-waters)	2 sets per year since these will rarely be used	2 sets
	Six-panel nets (for deep waters)	1 year supply	2 sets
	Wire ropes	Length 1,500 m, at least 2	2 coils
	Otter boards (for two-pannel nets)	3 couples are needed each year because of rapid deterioration	3 couples
	Otter boards (for four and six-pannel nets)	2 couples are needed each year for 4-panel nets and 6-panel nets	2 couples
Bottom gill nets	Mesh size 20 cm	200 nets per boat	200 nets
	Mesh size 30 cm	200 nets per boat	200 nets
Bottom longlines	Two types of hooks, (2,500 pieces each)	Materials only, 1 year supply	For 1 year
Radio buoy	For bottom gill nets	3 buoys, including 1 spare	3 buoys
Spare nets and twine for repairs		For 2 years, to extend net life	2 year supply

Item	Specifications	Supply description	Quantity
<u>The Red Sea</u>			
Purse seine nets	For small fish		1 set
	Wire rope	Length 1,400 m, minimum of of 1 coil	1 coil
Bottom longlines	Two types of hooks (2,500 pieces each)	Supply materials only, 1 year	For 1 year
Trawl nets	Two-panel nets (for waters less than 200m deep)	3 sets are needed because of rapid deterioration	3 sets
	Four-panel nets (for mid-waters)	1 set per year since these will be rarely used	1 set
	Six-panel nets (for deep waters)	1 year supply	2 sets
	Wire ropes	Length 1,500 m, at least 2	2 coils
	Otter boards (for two-pannel nets)	2 couples are needed each year because of rapid deterioration	2 couples
	Otter boards (for four and six-pannel nets)	2 couples are needed each year for 4-panel nets and 6-Panel nets	2 couples
Radio buoy	For bottom longlines	3 buoys, including 1 spare	3 buoys
Spare nets and twine for repairs		For 2 years, to extend net life	2 year supply

#### 4-3-2 Fisheries Resources Survey and Training Vessels

##### (1) Principal particulars

Based on the design conditions examined above, the vessels' lines were drawn and their displacement and capacities calculated. The adequate principal particulars of these vessels are as follows,

Length overall	approx. 30 m
Length between perpendiculars	approx. 26 m
Breadth moulded	approx. 7.2 m
Depth moulded	approx. 3.2 m
Draft at full load	approx. 2.8 m
Main engine horsepower	approx. 850 PS
Service speed	approx. 10 knots
Total navigation days	25 days
Capacity	
Fish hold (100%, bale)	approx. 40 m <sup>3</sup>
Preparation room ( " )	approx. 16 m <sup>3</sup>
Quick freezing room ( " )	approx. 12 m <sup>3</sup>
Fuel oil tank (100%)	approx. 80 m <sup>3</sup>
Fresh water tank (100%)	approx. 10 m <sup>3</sup>
Freezing capacity	approx. 1.2 tons/day
Maximum complement	
Total (8 crew + 8 trainees)	16 persons

##### (2) Main equipment

Equipment necessary for the resource survey and training vessels is the following. Specifications shall be as simple as is practicable and the quantity adequate. Each vessel shall need the following equipment and fishing gear, according to each vessel's distinct activities.

Item	Number	Specifications
1) Engine room machinery		
Main engine	1	4 cycle diesel, approx. 850 PS Power output is suited to running and trawling speed.
Propeller	1	Controllable pitch propeller, 4 blades. Such a propeller is adopted to enable adjusting propeller pitch to the activity performed and 4 blades eliminate vibrations. (for the Mediterranean)
	1	Fixed pitch propeller, 4 blades. (for the Red Sea)
Electric generators	2	80 kw x 2. Calculating necessary electric power, number of sets and capacity have been decided. 2 sets are used in navigation and 1 set in port.
Refrigeration machines	2	20 kw x 2. 1 spare in case of a breakdown.
Freshwater generator	1	1 ton per day. A generator is necessary for long trips and a 1 ton/day generator is the smallest available prototype for commercial use.
2) Steering and anchoring equipment		
Steering gear	1	Electrohydraulic, 1.5 ton·m. Such a gear is used for manoeuvring while using manpower is difficult for such a vessel.
Windlass	1	Hydraulic, 2 tons x 10 m/min. The anchor weighs over 200 kg and this necessitates the use of a hydraulic windlass.
3) Fishing equipment for the Mediterranean		
Trawl winch	1	Hydraulic, 5 t x 60 m/min x 2 drums. For hauling trawl nets
Cargo winch	2	Electric, 1.5 t x 30 m/min. For (un)loading cargo.
Line and net hauler	1	Hydraulic, 0.2 tons x 250m/min. For hauling longlines and gill nets
Electric hoist	1	Electric, 0.25 for cargo handling
4) Fishing equipment for the Red Sea		
Purse winch	1	Hydraulic, 5 tons x 60 m/min x 2 drums.

Item	Number	Specifications
		For hauling the purse wire. When trawling it can be used as a trawl winch.
Tow line winch	1	Hydraulic, 2 tons x 50 m/min. For hauling purseseine float lines.
Cork line winch	1	Hydraulic, 2 tons x 25 m/min. For hauling purseseine float lines.
Power block	1	Hydraulic, 3 tons x 40 m/min. For hauling purseseine nets.
Purse davit	1	Deployable hydraulically. To hold the purse line guide blocks when heaving.
Cargo winches	2	Electric, 1.5 tons x 30 m/min. For (un)loading cargo.
Line hauler	1	Hydraulic, 0.2 tons x 250 m/min. To haul longlines.
Electric hoist	1	Electric, 0.25 tons for cargo handling.
5) Navigation equipment		
Magnetic compass	1	Desk type, compass card $\phi = 150$ mm. For taking bearings. Legal inventory.
Gyro compass	1	Fixed in the steering stand. For taking bearings.
Anemometer	1	For safe fishing activities and setting the direction of fishing gear.
Radio direction finder	1	200 kHz/9 MHz. For finding the ship's position. Joint use with gyro compass.
Omega receiver	1	10.2 kHz. For finding the ship's position.
Radar	2	Range 48 and 72 miles. One set each. To avoid collisions. One set is spare.
Weather facsimile receiver	1	To obtain weather maps and facilitate navigation. The service station is in Cairo.
6) Electronic fishing equipment		
Fish finder	1	28/200 kHz, CRT display with recorder. For finding demersal fish.

Item	Number	Specifications
Scanning sonar	1	28 kHz, omni-direction. For the Red Sea vessel only. For finding pelagic fish schools in surface layers.
Electromagnetic log	1	Flat type. For measuring boat speed.
Net recorder	1	50 kHz. For measuring the depth and shape of the net to raise catching efficiency.
Sea water thermometer	1	Recording type. For measuring sea water temperature and helping find fish schools.
7) Radio equipment		
SSB	1	150 W, 1.6 to 16 MHz. For communication with the coastal station. The range is of about 1,000 miles.
All wave receiver	1	90 kHz to 30 MHz. For receiving weather and navigational information and the accurate time.
VHF	1	25 W, 55 channels. For use when entering the port, for communications with the port master.
8) Observation equipment		
Observation winch	1	Electric, 1.5 kW, 500 m. For use with the water thermometer, the plankton net and the water sampling bottle.
Salinometer	1	Digital display. For measuring water salinity in fishing grounds.
Bathythermograph	1	Electric type. For measuring water depth and temperature of fishing grounds.
Plankton net	1	L = 95 cm. For collecting plankton during scientific analysis.
Reversing water bottles	5	1,300 cc. For sampling sea water and measuring salinity. Spares are included due to high fragility.
Reversing thermometers	10	Protected type. 2 protected thermometers and 1 unprotected thermometer

Item	Number	Specifications
	5	Unprotected type. are usually attached to each reversing water bottle.
9) Tender boat for purseseining		
Skiff boat	1	6.0 mL x 2.6 mB x 1.0 mD, 100 PS, steel hull. To assist purseseining operations.
Light boats	2	6.0 mL 10 PS, FRP. For aggregating fish schools when purseseining. Two boats are necessary to raise fishing efficiency.

#### 4-3-3 Spare Parts and Fish Boxes

Item	Quantity	Remarks
Spare parts for main engine, auxiliary engine and generator	For 2 overhauling	
Spare parts for other machinery and equipment	For 2 years	
Fish boxes	100 units	25kg capacity
Insulated fish boxes	100 units	25kg capacity

4-3-4 Design Drawing

(Survey and Training Vessel)

1. General Arrangement Type I
2. General Arrangement Type II

(Fishing Gear)

1. Bottom trawl net (two-panel net)
2. Midwater trawl net (four-panel net)
3. Bottom trawl net (six-panel net)
4. Bottom gill net (Type A)
5. " (Type B)
6. Bottom longline
7. Purses seine net

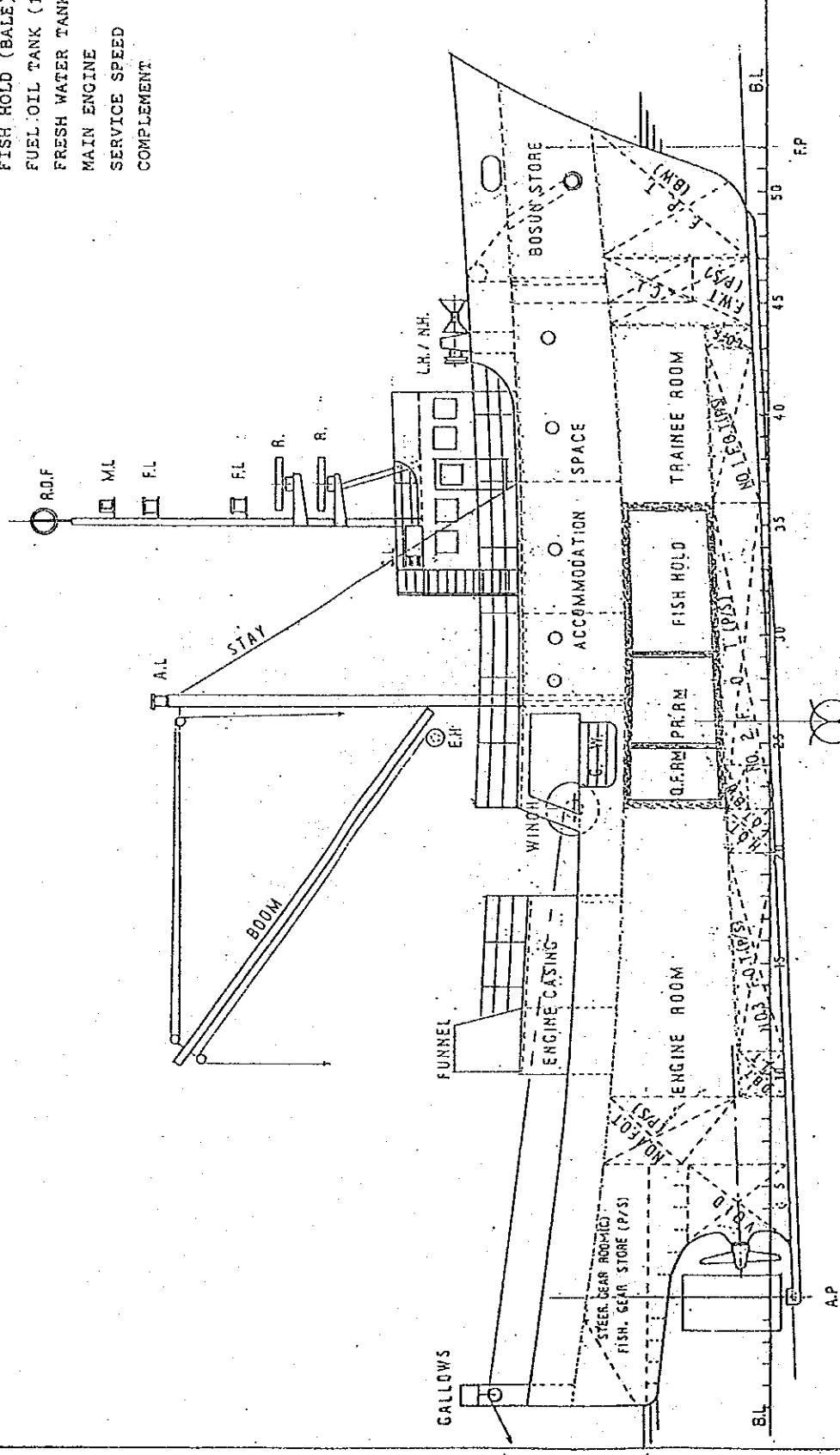




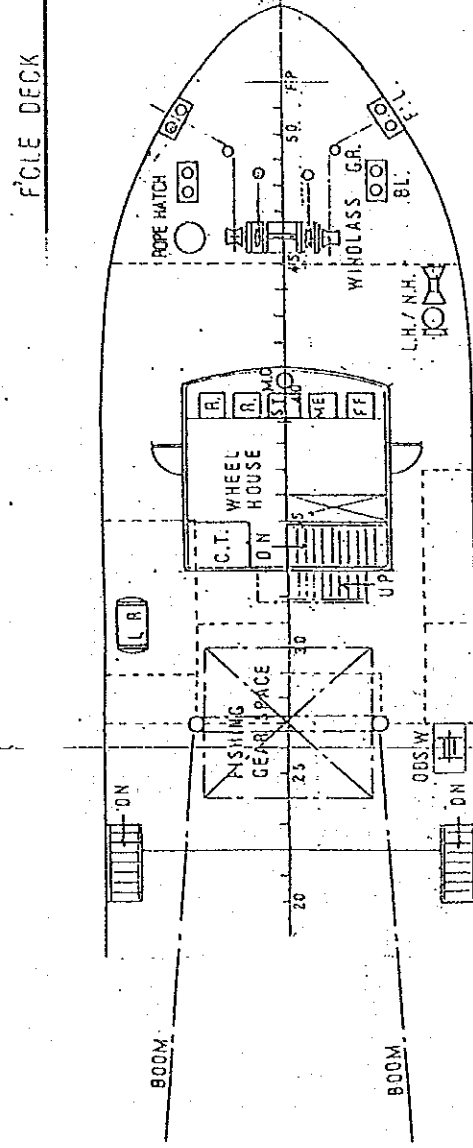
FISHERIES RESOURCES SURVEY & TRAINING VESSEL  
FOR THE MEDITERRANEAN SEA (TYPE: I)

PRINCIPAL PARTICULARS

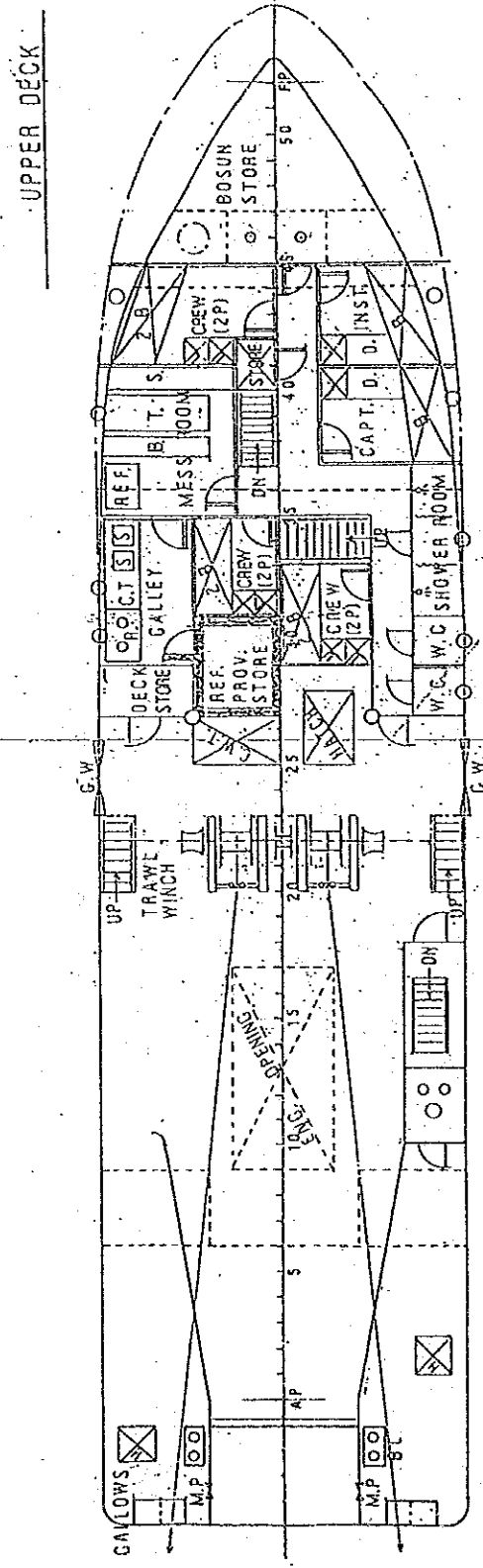
LENGTH (OA)	abt. 30.00m
LENGTH (BP)	" 26.00m
BREADTH (MLD)	" 7.20m
DEPTH (MLD)	" 3.20m
DRAFT (FULL LOAD)	" 2.80m
FISH HOLD (BALE)	" 40 m <sup>3</sup>
FUEL OIL TANK (100%)	" 80 m <sup>3</sup>
FRESH WATER TANK (100%)	" 10 m <sup>3</sup>
MAIN ENGINE	" 850 PS
SERVICE SPEED	" 10 Kts
COMPLEMENT	16 P.



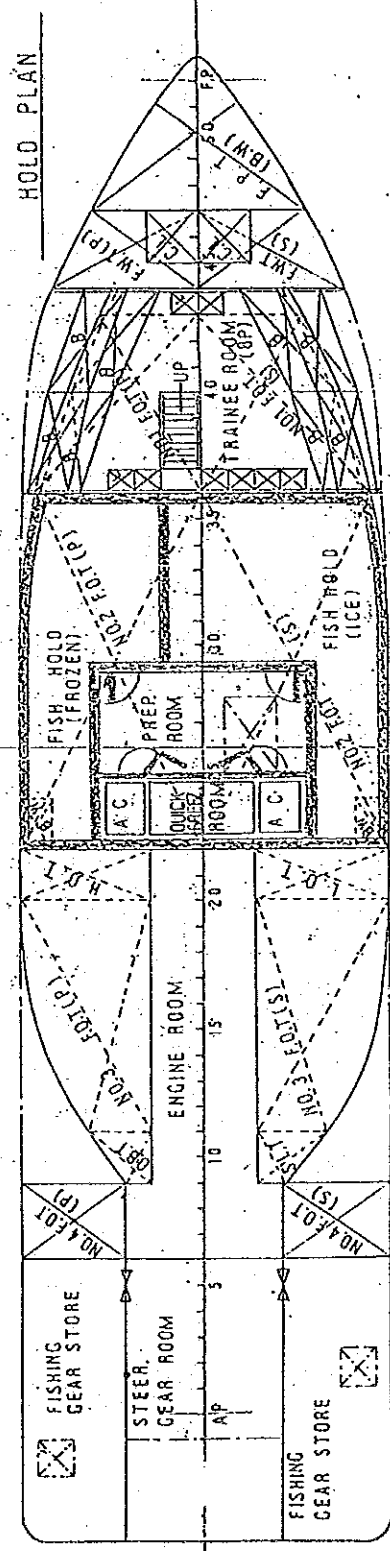
FRAME SPACE 500MM (THROUGH OUT)



SOLE DECK



UPPER DECK



HOLD PLAN

FOR THE ARAB REPUBLIC  
OF EGYPT

GENERAL  
ARRANGEMENT  
(TYPE I)

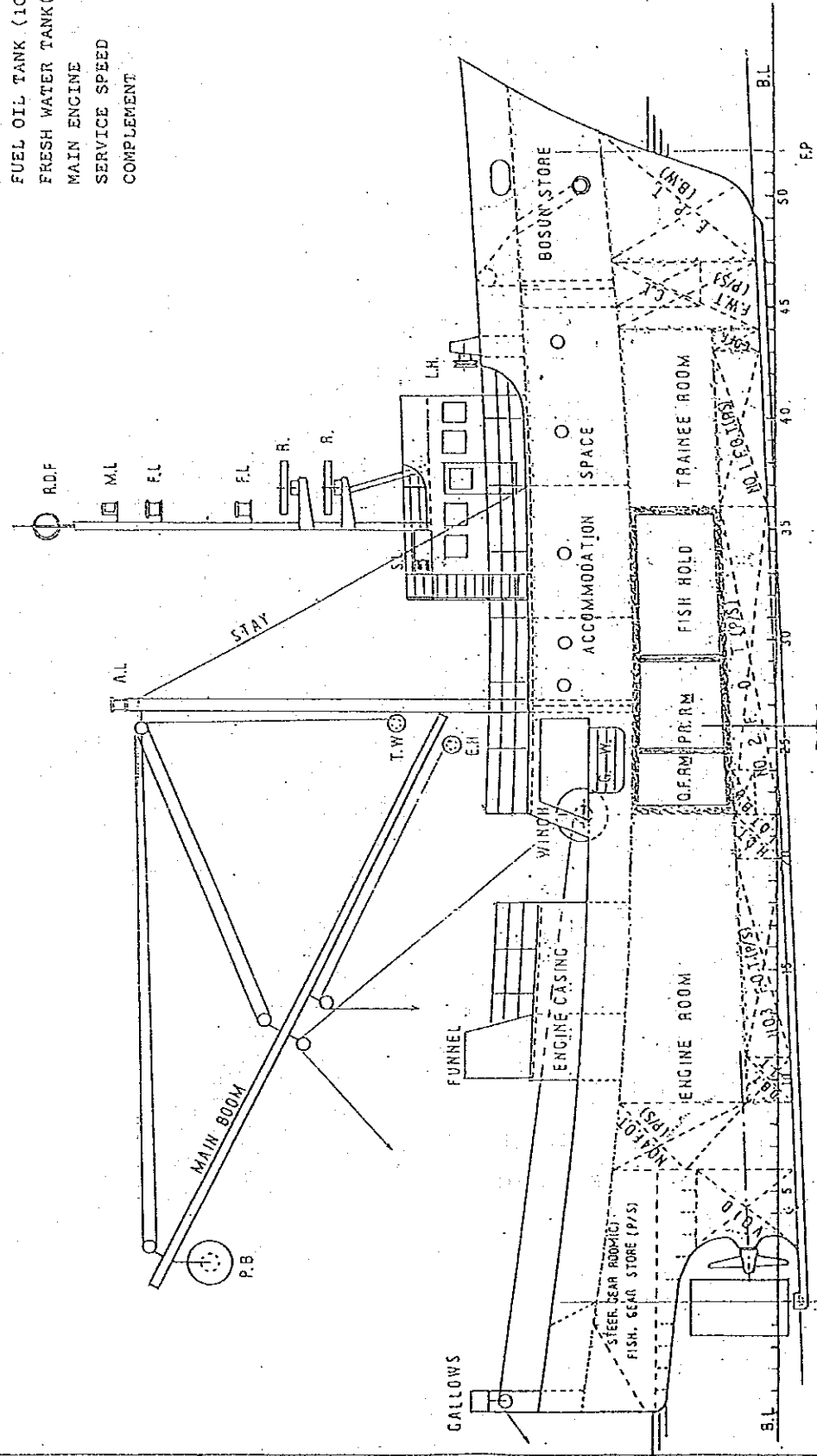
TRAWL, LONG LINE &  
GILL NET FOR THE  
MEDITERRANEAN SEA

SCALE 1 : 200

FISHERIES RESOURCES SURVEY & TRAINING VESSEL  
FOR THE RED SEA (TYPE:II)

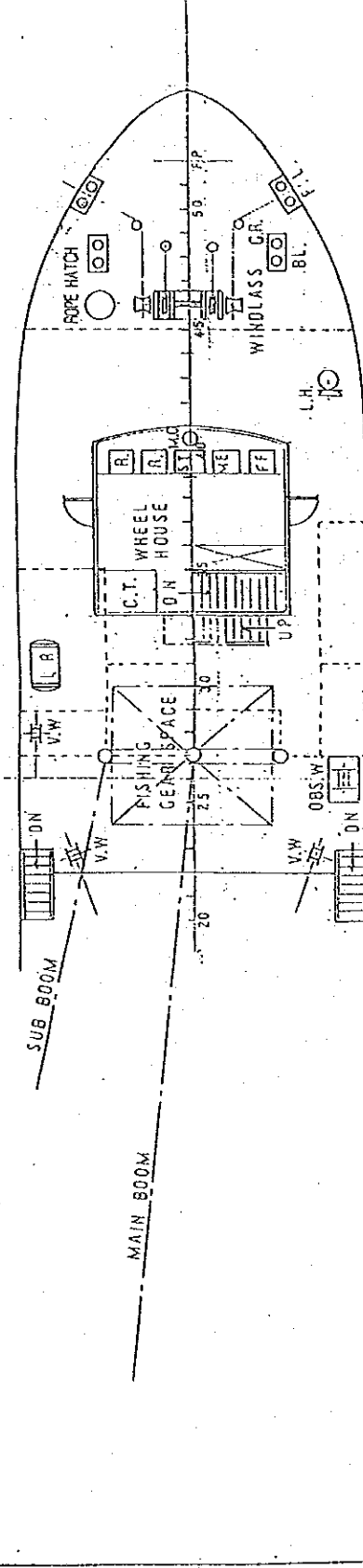
PRINCIPAL PARTICULARS

LENGTH (OA)	abt. 30.00m
LENGTH (BP)	" 26.00m
BREADTH (MLD)	" 7.20m
DEPTH (MLD)	" 3.20m
DRAFT (FULL LOAD)	" 2.80m
FISH HOLD (BALE)	" 40 m <sup>3</sup>
FUEL OIL TANK (100%)	" 80 m <sup>3</sup>
FRESH WATER TANK(100%)	" 10 m <sup>3</sup>
MAIN ENGINE	" 850 PS
SERVICE SPEED	" 10 kts
COMPLEMENT	16 P.

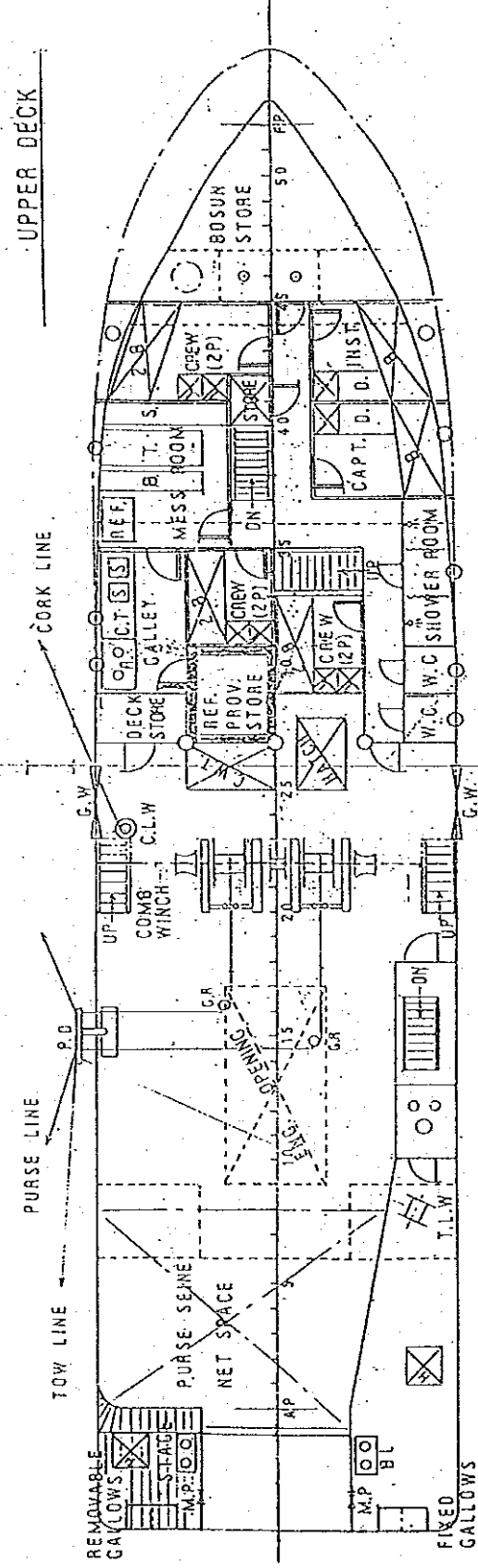


FRAME SPACE 500MM (THROUGH OUT)

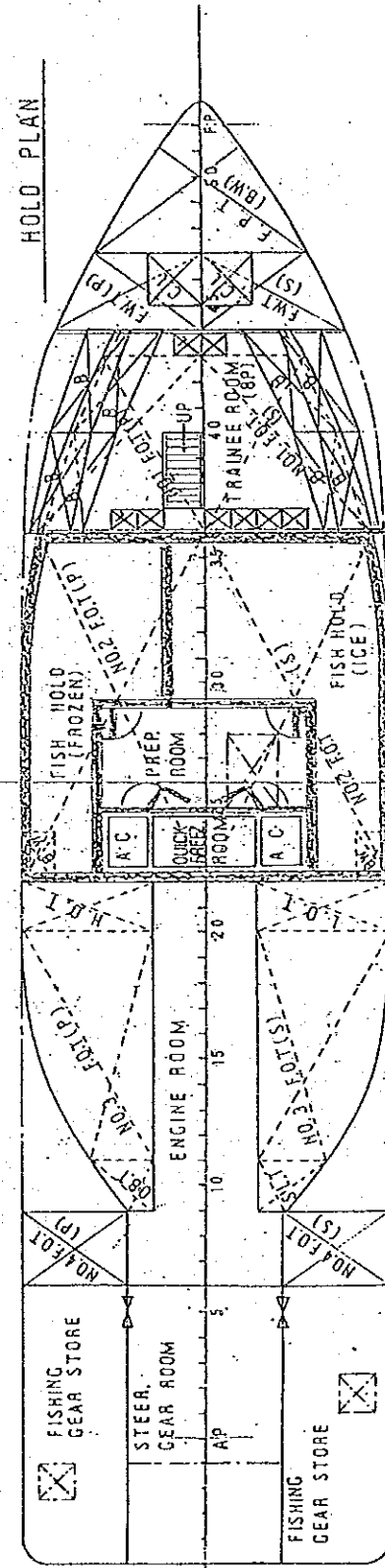
UPPER DECK



UPPER DECK



HOLD PLAN



FOR THE ARAB REPUBLIC  
OF EGYPT

GENERAL  
ARRANGEMENT

(TYPE II)

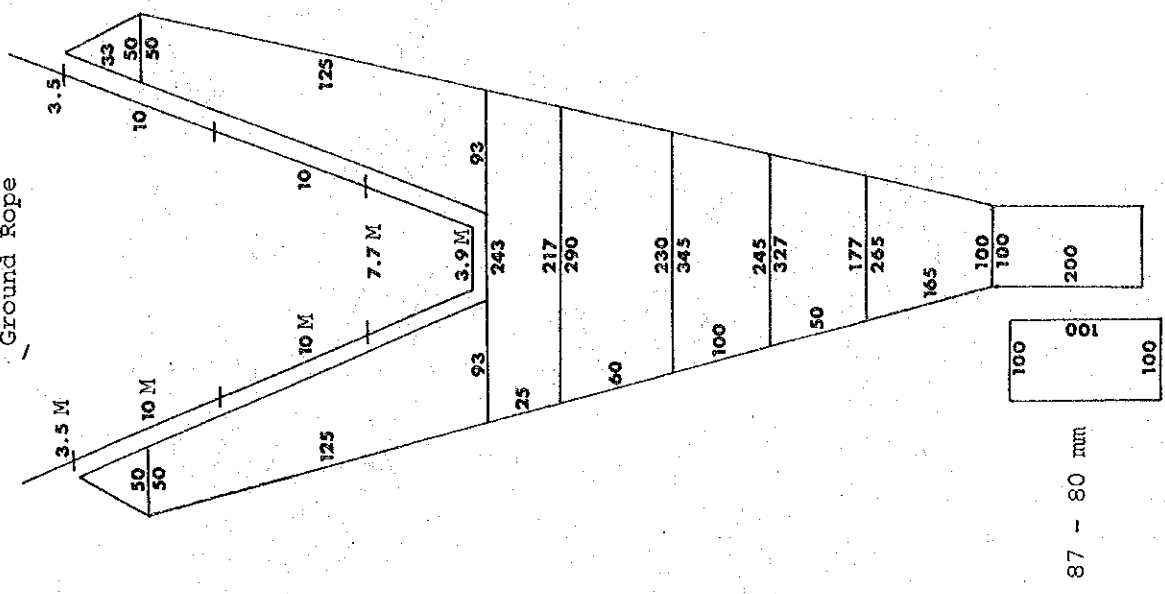
PURSE SEINE, TRAWL  
& LONG LINE FOR THE  
RED SEA

SCALE 1 : 200

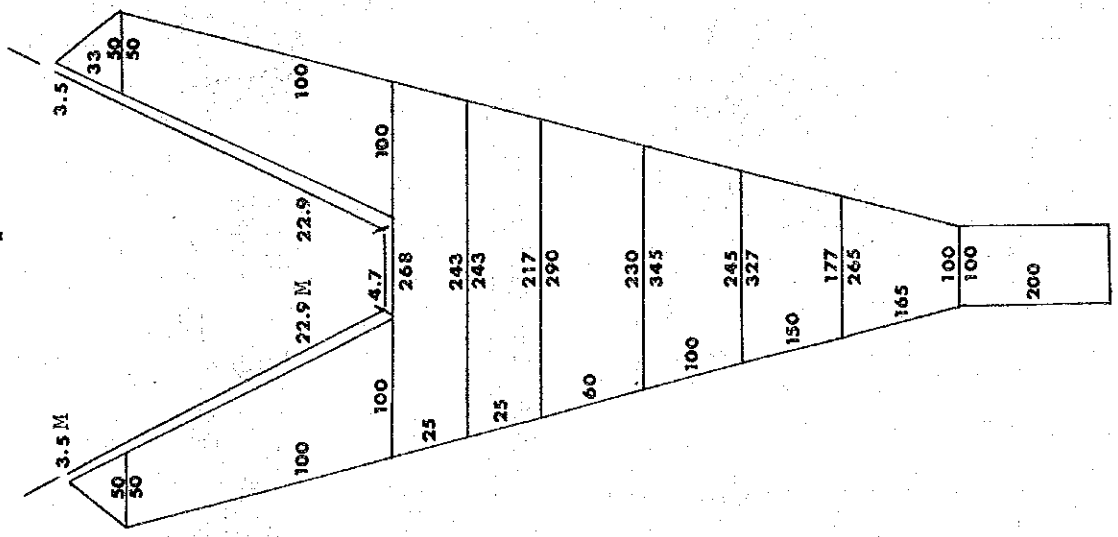


Netting PE. 360D  
 HR. Vinylon  
 S.W.R. 14 m/m

Ground Rope



Head Rope



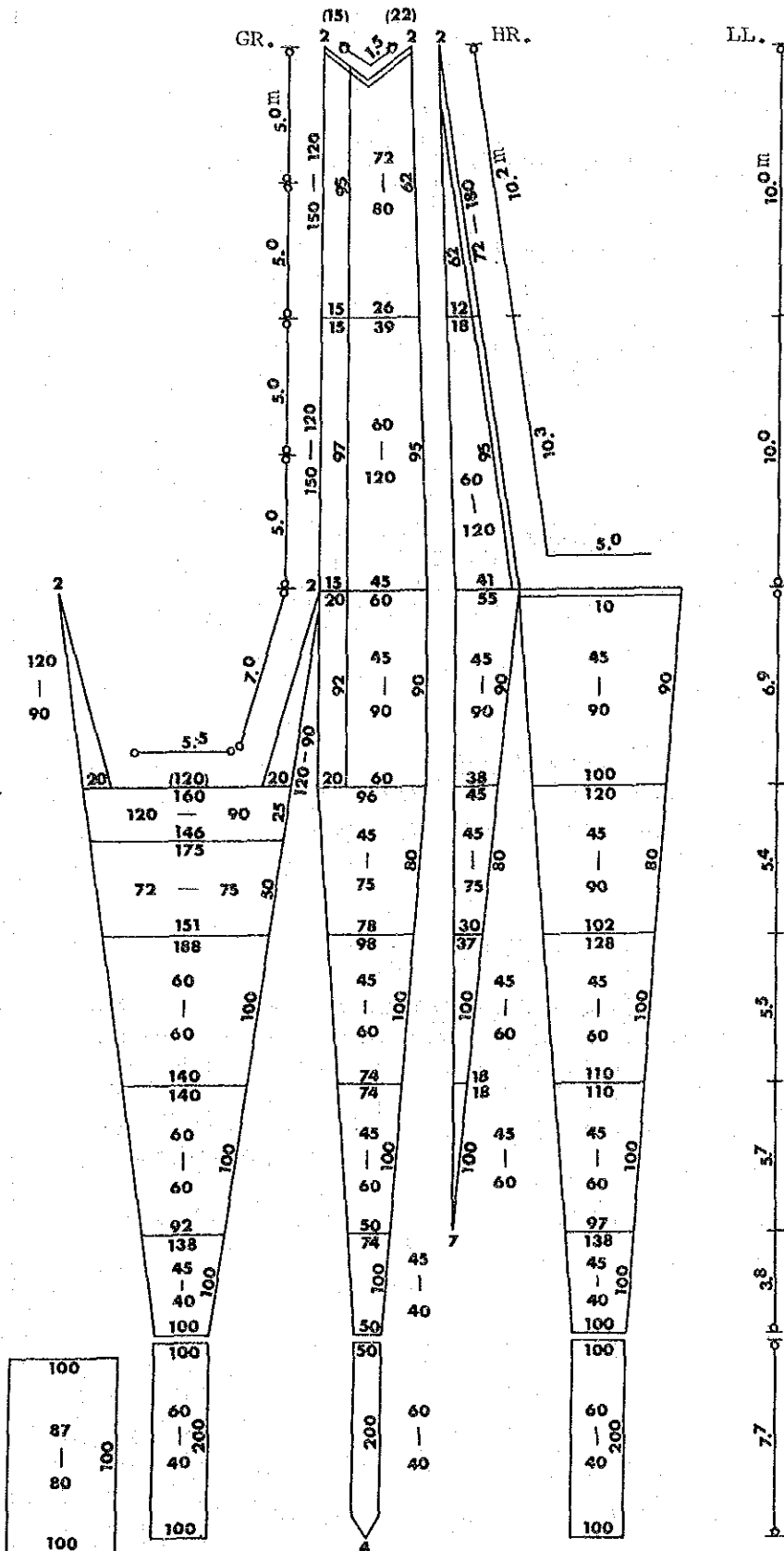
BOTTOM TRAWL NET  
 (TWO-PANEL NET)

- 72 - 160 mm
- 72 - 160 mm
- 72 - 160 mm
- 60 - 120 mm
- 45 - 80 mm
- 45 - 60 mm
- 45 - 40 mm
- 60 - 40 mm



BOTTOM TRAWL NET  
(SIX-PANEL NET)

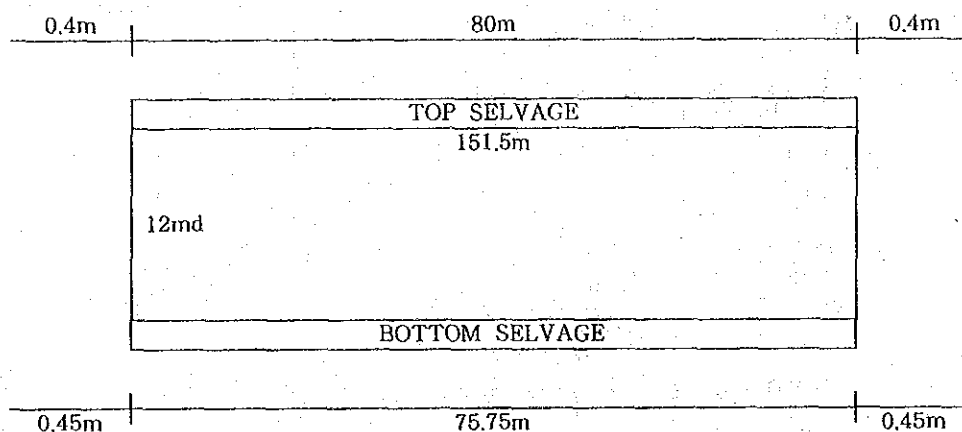
Neting  
Polyethylene 360<sup>D</sup>



- HR. Vinylon S.W.R. 14 mm
  - LL. Vinylon C.P.R. 18 mm
  - WL. Vinylon S.W.R. 14 mm
  - FL. Poly-Vinylon R. 18 mm
  - MR. Vinylon C.P.R. 20 mm
  - BR. Polyethylen R. 18 mm
- 3.0 m X 5 Pcs

Total Length 55.0 m

BOTTOM GILL NET - A TYPE



NETTING : NYLON 210D 3/21 200m/m str.

TOP & BOTTOM SELVAGE : NYLON 210D 3/36 0.5 mesh (retwisted)

NYLON 210D 3/30 0.5 mesh (retwisted)

FLOAT : C - 53 BUOYANCY 170 g/pc 16 pcs

FLOATLINE : P.P. 6m/m dia. each end 0.4m flying S-twisted 80.8m 1 pc

P.P. 6m/m dia. each end 0.4m flying Z-twisted 80.8m 1 pc

SINKERLINE : P.P. 10m/m dia. 100g/m lead core each end 0.45m flying

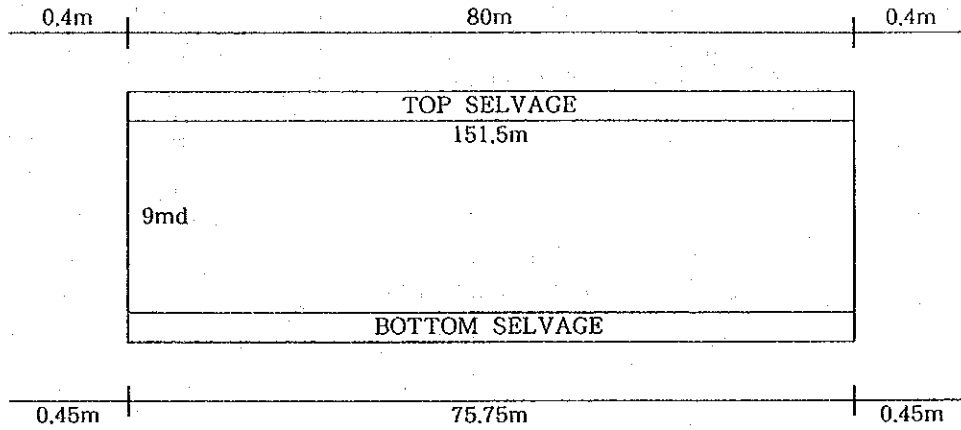
S-twisted 76.65m 1 pc

P.P. 10m/m dia. 100g/m lead core each end 0.45m flying

Z-twisted 76.65m 1 pc



BOTTOM GILL NET -- B TYPE



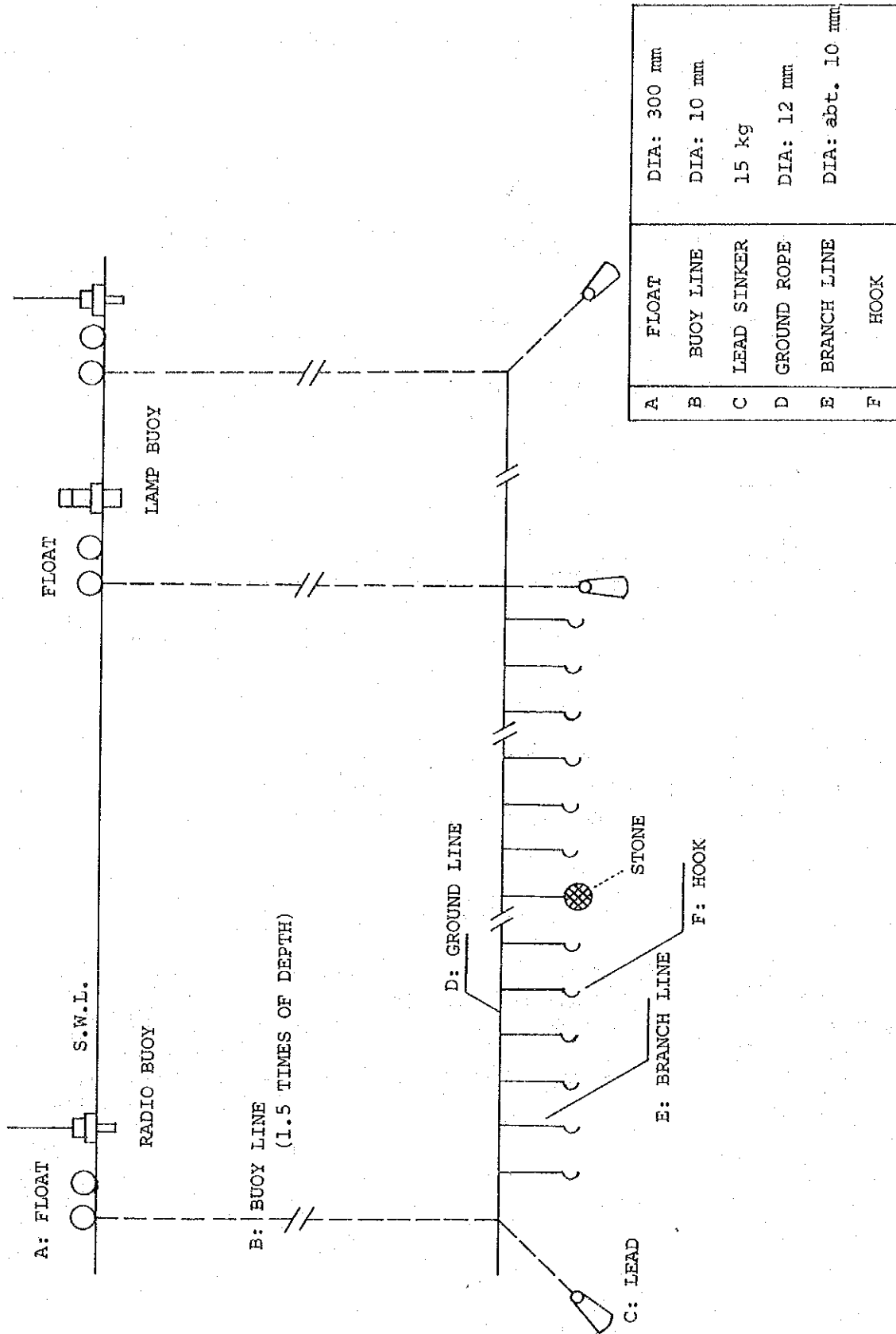
NETTING : NYLON 210D 3/21 300m/m str.  
 TOP & BOTTOM SELVAGE : NYLON 210D 3/36 0.5 mesh (retwisted)  
 NYLON 210D 3/30 0.5 mesh (retwisted)

FLOAT : C - 53 BUOYANCY 170 g/pc 16 pcs

FLOATLINE : P.P. 6m/m dia. each end 0.4m flying S-twisted 80.8m 1 pc  
 P.P. 6m/m dia. each end 0.4m flying Z-twisted 80.8m 1 pc

SINKERLINE : P.P. 10m/m dia. 100g/m lead core each end 0.45m flying  
 S-twisted 76.65m 1 pc  
 P.P. 10m/m dia. 100g/m lead core each end 0.45m flying  
 Z-twisted 76.65m 1 pc

BOTTOM LONG LINE





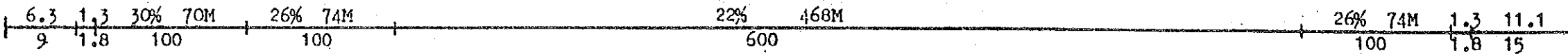
PURSE SEINE NET FOR SMALL FISH

APP. DIM. : 706 M x 103 M (550 M x 84 M)

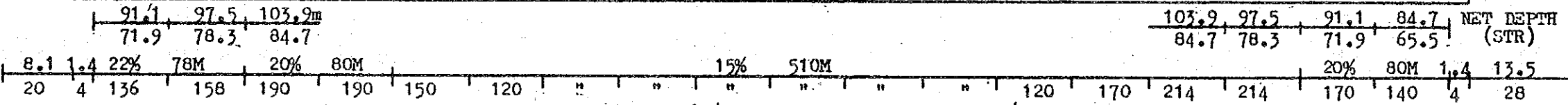
TOTAL FLOATLINE LENGTH 706.0M(550.0M)

FLOATLINE : PP 16m/m dia. & 14m/m dia.  
 FLOAT : K - 7N

NET LENGTH(STR) : 50M x 18SEC  
 NET COLOR : DYED BROWN

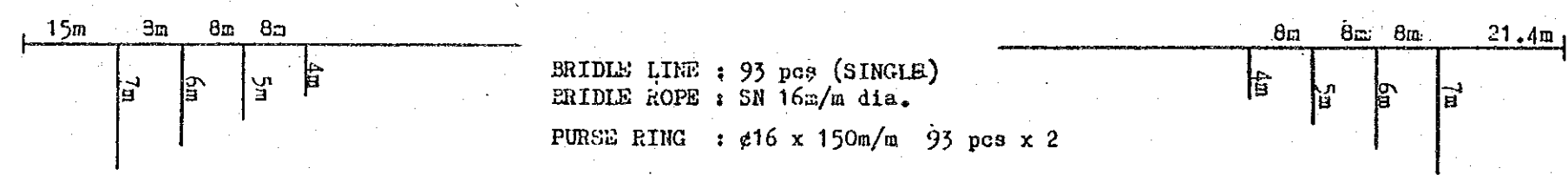


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
PE 200 90m/m 2md x 900m																		
N 3/60 38m/m 20md x 900m																		
N 3/9 16m/m 200md x 50m 16 pcs																		
N3/12 16m/m 400md 50m 7 pcs	N3/12 16m/m 400md 50m 7 pcs	N3/9 16m/m 400md 50m 400md 50m 15 pcs	N3/6 16m/m 400md 50m 400md 50m "	"	"	"	"	"	"	"	"	"	"	"	"	"	N3/6 16m/m 400md 50m 13 pcs	N3/9 16m/m 400md 50m 12 pcs (3)
(3)	6 pcs	7 pcs	(3)											15 pcs	(3)	14 pcs		
N12 16m/m 200																		
N 3/9 16m/m 200md x 50m 16 pcs																		
N 3/60 38m/m 20md x 900m																		
PE 200 90m/m 2md x 900m																		



TOTAL SINKERLINE LENGTH 772.4M(602.4M)

SINKERLINE : SN 16m/m dia. SINKER : LEAD 375g/pc



BRIDLE LINE : 93 pcs (SINGLE)  
 BRIDLE ROPE : SN 16m/m dia.  
 PURSE RING : ø16 x 150m/m 93 pcs x 2

