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SHIPBUILDING, DESIGN AND SHIPREPAIRING  
IN EGYPT\*

by

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(1) HISTORICAL BACKGROUND

- 1.1 The earliest knowledge of boats and ships comes from Egypt, where as early as 4000 B.C. Boats were already far advanced from the primitive form from which they must have been derived, in this case probably a bundle of reeds.

It is a historical fact that NAVAL ARCHITECTURE is an Egyptian art and that the main lines of history of shipbuilding for the whole world were laid down in Egypt towards the end of the 4th millennium B.C.

Egyptian vessels were essentially built-up dug outs, they had no keel, stem or stern post and no internal framing but, consisted simply of a heavily built skin formed of many pieces of timber dovetailed or dovetailed together.

The ancient Egyptians have also devised their ships with equipment such as masts, sails and steering gear.

The Romans applied the Egyptian ship building Technology regarding the deck beams in their gallees. A noticeable feature was that the ends of the deck beams usually projected through the side planking as they had done in ancient Egypt.

The steering gear was inherited from Egypt at least in principle and consisted of a large paddle-shaped on each quarter held to the ship's side but free to rotate on its axis worked by a thwartship tiller.

This side rudder which was found in galleys as well had obviously been evolved from a mere steering oar, free to move in any direction, and that step had been taken in Egypt before 1500 B.C.

- 1.2 As regarding docks the date and design of the earliest facilities are unknown, but it may be assumed that such structures existed as early as 4000 B.C. also in Egypt in Mesopotamia, Memphis on the Nile.

One of the earliest records of dock construction was found on a tombstone in the Nile Valley. This is the Tomb of UNI, a high dignitary in the court of the great Egyptian monarch Pepi 1, who reigned during the 6th dynasty in 3200 B.C.

According to the inscription, UNI, whose many titles included that of "Superintendent of ware houses and registrar of docks", was given the tremendous job of relocating a Pyramid.

He had to carry the stone work by boats, and it was necessary first to excavate four dock basins in which to build the Flat-Bottomed, shallow-draft vessels.

While no size of the docks is given, some idea may be had from the dimensions of the boats, which were 60 cubits long and 30 cubits wide or roughly 110 by 55 Ft.

- 1.3 In the near history under the rule of Mohamed Ali Pasha, Bolak Shipyard was established as the base of the Egyptian modern naval architect long before the establishment of the old Alexandria Yard.

In Bolak, war ships were built to form the earlier Egyptian Navy, and also cargo ships were built to transfer the cargo through the River Nile and across the coasts of the Mediterranean Sea.

After Navareno Battle in 1829 the Egyptians decided to rebuild the Naval Force and start undependantly to built their own fleet by themselves. Mohamed Ali took the decision of establishing Alexandria Yard by the help of Mr. Cerley, a French Engineer. The work started seriously in June 1829 up to 1831 and the first battle ship was launched in January 1831.

During the next 6 years they built more than 30 battle ships fully equipped in addition to cargo carriers 400 ton dead weight and hence, Egypt was completely dependant only on its own facilities without any need to buy ships from any other countries.

Alexandria Yard had 6 slipways and more than 1600 skilled shipbuilders in addition to the dry dock for shiprepair which was built in 1844 under the supervision of Mr. Mogeel, a French Engineer.

Mohamed Ali continued his developments and supported seriously the building of steam driven ships just after the development of steam utilisation.

## (2) INTRODUCTION

### 2.1 Shipbuilding industry in Egypt

- According to the regular increment in the volume of the external Egyptian trade, the Egyptian government decided in 1956 to establish Alexandria Shipyard and to establish Port-Said Shipyard in 1960, both of them can be considered as a national source for providing the Egyptian National Fleet with the required ships, and from those dates the shipbuilding industry in Egypt is considered as one of the most important strategic industries in Egypt.
- The Egyptian yards took their responsibilities seriously in order to develop the share of the Egyptian Fleet concerning the Egyptian external trade gradually, consequently Egypt could save the Freight charges and the costs of buying ships from other countries.
- Egyptian yards are still following the package deal system for building ships, i.e., a large percentage of the material and equipment required for building ships are still imported. In addition to their needs also for package design and the KNOW HOW from a foreign shipyards for building of large ships.
- The Egyptian shipyards are already able to build cargo ships at the international production level concerning the quality point of view.

A series of ships with different capacities from the Egyptian yard's production have already joined the Egyptian fleet.

Those ships have been fully accepted by the international classification societies and have acquired the satisfaction of the shipowners.

## 2.2 Shiprepair works in Egypt

- According to the geographical situation of Egypt in the center of the world's sea born traffic to and from the far east, where Alexandria port is considered as the most important Egyptian port on the Mediterranean sea, Port-Sea port and Suez port have the same importance because of their location on both the entrance and exist of Suez Canal, shiprepair works including all types of repair find a good chance for development in so many places on a competition basis concerning quality and prices for both the repair of foreign ships entering the Egyptian ports and repair of National Fleet too.
- Shiprepair works in Egypt is a profitable job and forms a good source of foreign currency for the country.

## (3) EGYPTIAN SHIPYARD'S TODAY

Egypt has so many places dealing with shipbuilding and shiprepair activities. Hereby we have to concentrate on the most important yards which are:

### 3.1 Alexandria Shipyard:

The most modernized shipyard in Egypt, it is located in the South of the Mediterranean in the Sheltered anchorage of the Western harbour of Alexandria Port.

Alexandria Shipyard has a big area which is equal to 400000 m<sup>2</sup> in addition to one kilometer length of fully equipped quays which are usually ready for both repair works and fitting of the Yard's ships after launching.

Alexandria Shipyard's facilities and capabilities will be



discussed separately because of its significant type as a pioneer of shipbuilding in Egypt.

### 3.2 Port Said Shipyard:

A subsidiary of Sues Canal Authority, and is located at the Sues Canal entrance, south of the Mediterranean Sea.

#### a) Facilities:

- Two floating docks (25000 ton and 5000 ton capacity).
- Six slipways for repair and two 12000 ton building berth.
- Two fitting out and repair quays 90 m and 750 m in length.
- Two floating cranes 90 ton and 200 ton.

#### b) Types of vessels built or repaired:

Dredges and small cargo ships up to 6500 ton built. The repair work covers engine repairs, both steam and diesel, beside the electrical repair works.

### 3.3 Canal Naval Construction Co.: "Port-Said"

A compact company able to build small crafts, tugs, barges, launches and other harbour crafts. The company is also able to carry out diesel and steam engines repair work.

#### a) Facilities:

- Slipway up to 300 ton.
- Floating dock up to 750 ton.
- Maintenance work shop.

#### b) Types of vessels built or repaired:

- Auxiliary ships, floating cranes, small crafts, tugs barges, launches and fishing vessels.
- A lot of repair work could be done such as diesel and steam main and auxiliary engines.

3.4 Port-Said Engineering Works:

This company has two branches one at Port-Said and the other one at Port-Tawfik in Sues. Both branches are dealing mainly with:

- Refrigeration works and metalock repairs can be provided in this company.
- Repair work (general repairs, hull works, machinery electrical works).
- Agency for leading radar companies.

3.5 Timsah Shipbuilding Company:

One of the subsidiaries of the Sues Canal Authority. The Company's head office and main yard are located at Ismailia. A branch has been founded at Alexandria which is Abou-Qir Shipyard. The Company has two main activities:

a) Shipbuilding Activity:

Timsah yard is considered as one of the most specialised Yards in design and building of all types of tugboats (River-Harbour) Coastal - Sea going - fire fighting and salvage), equipped with fixed pitch propellers, controllable pitch propellers or roith-schnider propellers.

In addition to the prementioned the company is also specialised in design and building of the following:

- Floating cranes.
- Dredgers.
- Self propelled barges and hopper barges.
- Service launches and passanger launches.

b) Off-Shore activity:

The company with its floating crane barges supply vessels, tugboats, launches and dredgers has a good chance to be specialised in the off-shore works such as petroleum sea pipe lines, floating sea berths, mooring buays, floating jetty.

3.6 Egyptian Shipbuilding and Repair Company:

Located at Alexandria and has the following facilities:

- a) 600 ton capacity floating dock.
- b) 3 Slipways 250, 500 and 600 tons.
- c) Repair quays more than 380 metre length.

Types of vessels can be built or repaired:

Tugs, barges, dredgers, trawlers, passenger ferries coastal tankers up to 3000 ton dead weight.

Other activities:

The company can carry on engine repairs up to 30000 HP MAN AND MWM, Mitsubishi repair center, the company has a fully equipped diesel shop.

- Other activities can be done in that company such as electrical, navigational, refrigerating and air conditioning equipments.
- Repairs a float to vessels up to 80000 dwt.
- Work in the industrial field including water desalination plants, oil and chemical tanks, thomas steel convertors, pipe lines and spare parts for marine and industrial purposes.

3.7 Suez Marine Arsenal:

The company located at Suez and it is specialized in general ship repairs, hull, machinery and electrical repairs. The repair activity of this company based on dry dock of 141 m x 21 m and slipway with 250 ton lifting capacity.

Other facilities:

Welding marine boiler, burner installation and conversion in addition to cast iron and brass foundries.

### 3.8 Expansion at Suez Canal Authority's Yards:

Under a contract awarded by the Suez Canal Authority, the U.K. Consultant (A and P) Appledore International is assessing the development prospects of the authority's Suez Yard strategically situated on the east bank of canal.

The Suez Yard undertakes shiprepair, new construction and general engineering and employs around 2600 men to date, work has been mainly for the Canal Authority, but plans for the future to continue to build vessels carrying the Egyptian Flag and to use its strategic position for international repairs. The project will be financed by the World Bank and completion is anticipated in four years. A and P's work also includes a complete revision of the yard's operating system.

### 3.9 Ship Care Egypt:

Snipcare Egypt is a newly formed marine engineering and servicing company at Port Said. The new enterprise is consortium of three companies, John Swire and the Petrocon group of U.K. and their Egyptian partners (National Shipping Enterprises and Services Co. (Nashipcon)). The company has already started its activities and will be the first (U.K.) backed marine enterprise to be established in Egypt since the reopening of the Suez Canal.

The services will include the technical engineering support, machinery maintenance, procurement and installation of marine equipment, and replacement parts. Number of voyages surveys and repairs have been carried out by a team of (U.K.) and Egyptian engineers operates from the Port-Said work shops and company's branch office in Cairo and Port-Suez.

3.10 In addition to the pre-mentioned companies there are some other small companies in Cairo, Ismailia.... etc. are capable for building of small crafts to be work in the River Nile and other coasts.

Mainly in Cairo we can refer to El Nil Company for river transport with its branches, Arab Contractors in both Cairo and Ismailia, and other small governmental and private companies for building of the same light crafts.

(4) ALEXANDRIA SHIPYARD:

THE PIONEER OF SHIPBUILDING IN EGYPT

One of the largest shipyards in the Middle East. It is an independent enterprises established by the Egyptian government as one of the most strategic and vital project in Egypt. The establishment of the yard has been taken place over rather a long period comprising the following stages:

- Planning and design	1956 + 1962
- Construction and training	1962 + June 1970
- Implementation of production	July 1970 + Dec. 1975
- Regular production form since	January 1976

a) Main activities:

- 1- Shipbuilding and shiprepair for all types of merchant and war ships.
- 2- Manufacturing of all engineering work or ers.
- 3- Manufacturing of all types of steel works.

The design capacity of the shipyard is 70% of the total capacity for shipbuilding works and the other 30% for shiprepair.

b) Production resources:

Since Alexandria shipyard has a marvellous geographical situation as a heart of the world's sea born traffic to and from the far East, it is located as mentioned before in the south of the Mediteranean in the sheltered anchorage of the Western Harbour of Alexandria Port.

The total area of the yard is about 400,000 square meter with a total quay length of 1000 m. So it is in a position to render any required service to all ships entering the port of the Alexandria.

The Yard's shops are divided as follows:

- 1 - Hull shops.
- 2 - Out fitting shops.
- 3 - Engineering industries shops.
- 4 - Mechanical slipway area.
- 5 - Docks area.

1 - Hull Shops:

The hull shops consist of:

Hull processing shop - assembly and welding shop and the main berths shop.

The processing shop: Has a big area totally equipped with the required equipment such as shot blasting machine, fully automatic gas cutting machines "Hancock Type" working by both numerical control and photo cell scale (1:10), guillotine shears 6, 13 and 25 MM thickness, rolling machines for bending 8, 16 and 32 MM thickness in addition to Hydraulic presses for plate bending 400 ton and 800 ton and frame bending press 200 ton, more over straightening machines for plates 16, 32 MM thickness and flanging machine 160 ton for bending of small details.

The whole shop equipped with 10 overhead cranes capacity 10 ton each one of them provided with magnet head.

Assembly and Welding Shop: is divided to certain specified bays covers the following activities:

- a) Assembly and welding the side sections by means of universal stands.
- b) Assembly and welding of hatch covers on specified stands.
- c) Assembly and welding of panels which depends mainly on a flux stand for welding of panels (decks, BHD's and partitions) by means of automatic submerged arc welding machines.
- d) Assembly and welding of double bottoms on beds.
- e) Assembly and welding of units, foundations and masts.

- f) Assembly and welding of volumetric sections.
- g) Assembly and welding of multi layers super structures.

The shop in general has the most up to date means of welding machines such as semi automatic and automatic sub. Arc, mag welding machines and gravity method of welding for welding the stiffeners.

All these facilities form a good volume mechanisation in welding which is nearly 60%.

The whole shop is covered by means of 8 cranes each 30 tons lifting capacity (i.e.) the maximum weight of section can be built in 60 tons by means of two cranes. The multi layers super structure can be built in the pre-berth area with the help of the portal cranes of the berth shop.

Berth shop: The shop has two inclined semi submerged building berths. Northern berth and southern berth each 180 M length 28 M breadth. The two berths are provided with 6 portal cranes each 30 tone (i.e.), the maximum weight of block can be lifted by means of 4 cranes is 120 tone. These two berths giving facilities for the building of vessels up to 30000 tone.

The berth shop has also a lot of semi aut, sub-merged arc welding machines, Mag welding type and electro slag welding M/C's (vertical aut welding of mounting joints).

Other facilities on the hull shops: The hull shops completely covered by pipe lines for both acetylene and oxygen used for cutting comes directly from the centralized gas delivery units.

Pipe lines for compressed air.

Welding current sources supplied mainly through busbars covering the shops by means of electric central substations.

## 2 - Out-fitting Shops:

Out-fitting shops consists mainly of the following work shops:

- a) Main out-fitting shop.
- b) Mechanical erection shop.
- c) Electrical mounting shop.
- d) Piping shop.
- e) Painting and insulation shop.
- f) Wood work shop.

Main out-fitting shop: The shop has 3 main sections which are fabrication section, mounting section and repair section. The fabrication section has a fully equipped work shop depending mainly on guillotine shears 4 and 6 mm thickness, rolling machines 4 mm thickness, straightening machines for thin plates, presses 65 ton capacity, flanging machines, planners, milling machines, lathes and combined sheers.

The basic work of this section is the manufacturing of all types of fittings required for both building projects and repair activities such as (davits, accommodation ladders, ventilation pipes and ducts, doors, fittings for hatch covers, sleeves, pipe hangers, deck machinery foundations...etc.).

Both (MIG) and (MAG) means of welding are used in this shop.

The mounting section is completely responsible for mounting all of these fitting works on board using two portal cranes capacity 30 tons each.

Mechanical erection work shop: The shop has degreasing section to prepare the equipments for proper erection, in addition to a specialised section for the pre-mounting of equipment and performance of required tests before the final erection on board.

Electrical mounting shop: The shop has a section for the pre-mounting works, a special laboratory for the testing of all the types of Navigation, radar and wireless equipment before the final erection on board.

In addition it has an area for cable preparation before laying,



a winding section equipped with blancing units, electrical machine repair section and electrical equipment repair section.

The shop is also dealing with the repair works on board in addition to building projects.

Piping Shop: The shop consists of the following sections: Sand filling section, hot pipe bending section, cold pipe bending and pipe preparation section, flame cutting and welding section, pipe assembly section, pipe insulation section and copper smith's section.

The whole shop is mainly equipped with cold pipe bending machines for diameters (38 + 159 mm) (38 + 108 mm) (1 + inches) and up to (60 mm diameter).

In addition to boring machines, different types of SAWS and drilling machines.

The flame cutting section has advanced means of cutting using a Messer Griesheim pipe cutting machine.

Painting and Insulation Workshop: The shop has all the facilities required for insulation works and painting of ships in both building and repair activities.

Wood Workshop: The shop has all types of machines required for a manufacturing the wood works on board the ships under construction, repair works and for different external orders for other customers.

The shop has different sections such as manufacturing, assembly modeling for foundry and a special section for wood treatment as impregnation and drying.

### 3 - Mechanical Engineering Industries Shop:

To cover the manufacture of mechanical engineering parts the

shipyard has the following shops:

- a) Main machining shop.
- b) Black-smith shop.
- c) Foundry shop.
- d) Galvanising and metal coating shop.
- e) Tool shop.

Main Machining Shop: The shop has a very big area which exceeds more than 4600 square meters on two floors. The whole area is completely equipped with all types of machining equipment such as screw cutting lathes, copy cutting lathes, turret cutting lathes, automatic lathes, single and double column vertical lathes, horizontal, vertical and universal milling machines, horizontal boring machines, planing machines, shaping machines, slotting machines, radial and vertical drilling machines, gear hobbing machines, bevel gear machines, balance machines, circular grinding and surface grinding machines.

The largest screw cutting lathes are 10 mt and 16 mt in (C.D.), 650 mm, 1040 swing and 1.25 mt and 2 mt in diameter consecutively. These large lathes provide the shop with good facilities for machining of machine required for repair works.

The shop is also equipped with over-head cranes of capacities 5, 10, 15 and 30 tons. The shop covers all (MEP) required for shipbuilding projects and shiprepair in the shipyard. It is also loaded by other external orders on a competition base in the Egyptian engineering industry market.

Black-Smith Shop: The shop is equipped with all necessary equipments for the steel forging such as pneumatic hammers of pressure force 75 Kg, 150 Kg, 400 Kg, and 1 ton. Frictional and crank presses up to 160 ton nominal pressure in addition to the furnaces for heat treatment.

The shop is using an over-head crane of 3 ton lift. It has mainly a good role in the external orders on a competition base in forging work beside the required works for both building and shiprepair activities.

Mechanical Foundry Shop: This shop could be considered as one of the best equipped foundries. It plays a very good role in the external work orders on a competition base in the country, in addition to the required works to cover the shipyard demands in both shipbuilding and shiprepair activities.

It depends on two induction furnaces 160 Kg and one ton capacity, producing alloy steel mainly, cast iron, brass, bronze alloys and aluminium.

Castings prepared by gravity die castings method. The sands are subjected to laboratory control and technical preparation to attain the proper quality of castings.

The shop is provided with belt conveyors for different stages, 3 over-head cranes 5 ton capacity each, shot-blasting M/C for cleaning the castings and furnaces for different purposes. The capacity of the foundry shop ranges between 40 : 60 ton/month of different casts.

Galvanizing and metal coating shop: The shop is completely able to do electro-plating by nickel-copper, chrom and nickel up to 100 micrones, cadium up to 60 micrones, and coating by hard chrome. Hot galvanizing by zinc can be done.

In addition to the pre-treatment of aluminium surfaces by (ANODI ZING) can be done in this shop.

Consequently the shop offer service mainly to the shipbuilding, shiprepair works and the external works orders for different customers.

Tool Shop: The shop has a significant role in both the yard's requirements and the external customer's orders.

The shop is involved with manufacturing of different tools, dies, spare parts ...etc.

Tool shop has a lot of different advanced equipments such as universal grinding machines, circular, surface and internal grinding machines, vertical and horizontal milling machines, jug boring machines, shaping machines, relief and screw cutting lathes, engraving machines, testing of grinding wheel machines, lapping machines and drilling machines.

In addition the shop has a specialised section for heat treatment equipped with all necessary thermal equipments. Hardness tests can also be done satisfactory in the tool shop.

#### 4 - Mechanical Slipways Area:

The mechanical slipways area can be considered as a completely independant yard for building of small vessels up to 1000 ton dead-weight in addition to the shiprepair work.

Both facilities can be done on mechanical slipways each is 60 mt length and 12 mt in breadth, a transboarder of 600 tons lifting capacity.

The four ways are provided with two cranes with a capacity of 25 tons each.

The mechanical slipways area has a specialised shops as follows:

- 1) Open shop for assembly and welding of small vessels under construction, the shop is provided with a gantry crane of capacity 25 tons.
- 2) Out fitting, mechanical erection and piping shop which is rendering its services to the whole area in building of small vessels and repair activities.

In addition to the pre-mentioned facilities there is an out-fitting quay with a portal crane of 25 tons capacity for the completion of ships launched from the mechanical slipways.

5 - Docks Area:

The shiprepair activities are concentrated mainly in this area which has two graving docks with the following specifications:

<u>Dock</u>	<u>Length</u>	<u>Breadth</u>	<u>Depth</u>	<u>Cranage</u>
Dock No. 1	263 m.	39,6 m.	9,5 m.	1 x 30 tons + 1 x 10 tons
Dock No. 2	158,5 m.	18,9 m.	6,4 m.	1 x 16 tons

- Docking facilities are afforded for vessels up to 10000 ton D.W. in the small dock No. 2 and for vessels up to 85000 ton D.W. in the big modern dock No. 1.
- The repair activities are served by highly skilled craftsman-ship and modern facilities enabling the yard to undertake any repair jobs, survey work, regular hull or engine servicing and damage repair.
- Facilities exist for complete over haul and reconditioning of all types of merchant, military ships.
- The shiprepair works can also be done on a quay of about 1000 m length served by two 30 tons travelling cranes and one 25 tons tower crane.
- In addition the yard mechanical slipways afford repair facilities for all types of small vessels up to 60 m in length and about 1000 tons (D.W.) as mentioned before.
- The shiprepair activity form a significant source of foreign currency for the yard's income, so Alexandria Shipyard is one of the authorized repair service centers and spare parts supplier for (Burmester and Wain), Denmark.

(4A) OTHER FACILITIES AT ALEXANDRIA SHIPYARD:

4A.1 Shipyards Training Center:

The shipbuilding industry is considered one of the most important branches in the heavy industries that need highly qualified and specialised workers, hence the Shipyards was keen to establish its own training center for preparing the required qualified manpower graduating about 250 worker annually.

The first group graduated in May 1966.

14 groups already graduated up to 1978 equal to 3330 workers. The training center has about 3000 square meter area including a fully equipped shops, class rooms provided with the most modernized illustrating means for 20 different specialities.

4A.2 Laboratories:

The shipyard has a fully modernized laboratories that able to do the following activities:

a) Mechanical tests:

Tension, compression, impact and hardness tests.

b) Radiography and non-destructive tests:

Gamma Ray, X-Ray and ultra sonic tests.

c) Metallorgraphy tests for different alloys and metals.

d) Chemical Tests:

- For ferrous, non-ferrous metals and alloys.
- For lubricating oils-fuel and grease.
- For all material used in building and repair activities.
- Daily checking for oxygen purity and acetylene leakage in ships under construction or under repair.

e) Spectro graphic analysis for metals and alloys.

f) Repair and calibration for measuring, control instruments and also for metalurgical and thermal measuring instruments.

4A.3 Automation Facilities:

Following the international developments in shipbuilding industry, the shipyard has equipped the hull processing shop with (NC) gas cutting machines of W. Germany production using (NC) controllers of Norwegian production.

This ensures the high quality of steel cutting. The (NC) tapes are prepared on a programming center based on a 32 K word mini computer with a disk storage. The center is also capable of tape verification.

4A.4 Welding Laboratory:

One of the sections headed by the chief welder of the yard, the main role of the welding laboratory is choosing and testing of the new equipments, new welding techniques as well as welding materials.

A small shop relating to the Laboratory deals with re-manufacturing of all quick wearing parts of welding and cutting equipments.

Welding Laboratory specialists are also responsible for carrying out the periodical examinations of the yard's welders in accordance with classification societies requirements.

4A.5 Energy Sources:

The yard depends on its own energy sources such as steam plant, compressed air plant, water oxygen producing units (4 units each 25 cubic metres/hr and one of 60 cubic metres/hr).

In addition to acetylene producing unit with a capacity of 40 cubic metres/hr. The output of all those sources covers the whole yard through pipe lines.

(4B) ORGANIZATION:

The yard's organization principle is rather wide, and the organization covers the production department, design and drawing office, technological department, production planning department and economical planning department, maintenance, shiprepair department and supply department, shipbuilding department, quality control department. In addition to Administrative and financial affairs departments.

(4C) CAPACITY:

The total number of personnel employed by the Shipyard is about 6400 who are able to carry out specialized work covering all the demands of modern shipbuilding and shiprepairing techniques.

The yard program in shipbuilding is geared towards 52000 T.D.W. annual building capacity until it reach 100,000 T.D.W. within 5 years as the (RO-RO) multi purpose type of ships take place in the production line.

(4D) YARD PRODUCTION:

- A series of general cargo vessels 13740 (T.D.W.).
- A series of cargo liner 8230 (T.D.W.).
- A series of dry cargo vessels 6500 (T.D.W.).
- A series of small coastal tankers (replenishment) 500 (T.D.W.).
- Light crafts such as dumb general cargo barges (500/600 ton) salvage and fire fighting tugs 2000 H.P. and small navy vessels.
- New projects (RO-RO) multi purpose type of ships 13000 (T.D.W.).
- 800 (T.D.W.) dry cargo push and pusher barges.
- All types of steel structures including petroleum towers.

(N.B.) The Egyptian Merchant fleet depends mainly on the yard's production.



**(4E) NEW EXPANSIONS AT ALEXANDRIA SHIPYARD:**

Following the international developments in shipbuilding industry, the shipyard is always looking forward to get the most modernized equipment to its existing facilities.

The expansion's plan has the following items:

- a) Automation of the cutting line inside the hull processing shop.
- b) The most up to date hydraulic presses 500 tons for plates and another one 400 ton for frame bending.
- c) Advanced horizontal shot blasting machine provided with automatic painting and spraying unit and drying unit recently under mounting.
- d) Providing the stock yard and steel hull shop with magnet over head cranes.
- e) New oxygen delivery unit capacity 120 cubic meter/hr.
- f) Advanced equipment for the foundry shop including a centrifugal casting machine and other laboratories equipments.
- g) A serious study is taken place for replacement the berth cranes with more lifting capacity to use the block system methods of building in order to minimize the time of erection.
- h) Recently there is a mutual company operation between Alexandria Shipyard and (B and W) shipyard Denmark - in a wide scope such as a technical assistance through technical advisors from (B and W) and Egyptian to be trained in Denmark, package deals for projects under construction with the necessary design assistance for building projects.
- i) Studies is taken place between Alexandria Shipyard and (IRI) organization through (E.E.C.) concerning the training of Alexandria technicians in Italy.

R E F E R E N C E S

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