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# Global Ship-Repair Industry: Evaluation of Current Situation and Future Trends

by

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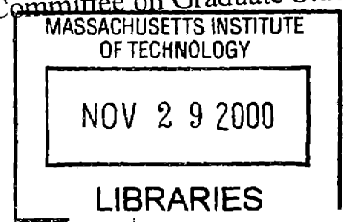
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Submitted to the Department of Ocean Engineering  
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and  
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## **Abstract**

This thesis is an analysis of the Global Ship-repair market. This subject is of great interest to all involved in the shipping industry, as it is one of the industry's major components. There are many yards that specialize in ship-repair and bear the necessary equipment and facilities to meet shipowners' needs and specifications. The service mix varies though, depending upon the strategic decisions made by the different shipyards so as to optimize their efficiencies. Different shipyards and geographical regions offer different varieties of services and specialization.

Thereby, my aim is to define, analyze, and understand the mechanisms of the ship-repair market. To do so, I will first look on the market as a single unit. I will then segment the whole ship-repair industry into geographical regions, analyze them separately, and compare them. Through this process, I shall establish a way for a shipowner to more appropriately choose the shipyard that best meets his needs.

So as to carry out the above analysis, I will have to compare the different yards on a common basis. For that purpose, a drydocking specification for an existing 34,000 dwt bulk-carrier vessel was sent to numerous yards around the globe on request for offers.

Collecting data was not trouble-free; some shipyards did not respond to our drydocking specification at all, while others did not have free space to facilitate the vessel. After several attempts, more than thirty offers from around the world were aggregated, providing an ample set of data to carry out the necessary calculations.

What follows next is a look into the future trends of the ship-repair market.

## Acknowledgments

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I wish to thank my advisor, Professor Henry S. Marcus, for all of his help and advice in the last two years. Furthermore, I would like to express my gratitude to Professors Nikolaos Patrikalakis and Paul Sclavounos for their tremendous help.

Next, I would like to thank my all of my friends in Boston and at MIT who have made my time in the US a wonderful experience, and my friends in the UK and Greece who have kept me smiling by keeping fond memories alive and making me feel missed. A special thanks goes to my classmates - especially Andri, Jon, Nikos, George, and Ayse - for their help during my studies, and to Joan for her editorial assistance.

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## **Biography of the Author**

Pantelis A. Pittas was born in Athens, Greece on the 9<sup>th</sup> of March 1977. After completing his high school education at the Ziridis Schools and simultaneously passing the GCE exams at Athens College in 1994, Mr. Pittas commenced his studies in the field of Marine Technology at University of Newcastle upon Tyne, UK. Mr. Pittas graduated from Newcastle in June of 1997, with a BEng diploma in Marine Technology with Honors in Marine Engineering.

Mr. Pittas was then admitted as a graduate student to the Massachusetts Institute of Technology in September of 1997. He followed the Naval Architecture and Marine Engineering and the Ocean Systems Management MSc courses.

During summer vacations throughout his university years, Mr. Pittas worked with Oceanbulk S.A. and Eurobulk S.A. shipping companies, both in Athens, in order to gain some practical experience in the maritime industry.



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## Introduction

This thesis will provide an analysis of the global ship-repair market. It is essential for anyone involved in the maritime industry to understand the ship-repair sector. Vessels, like all machines, need inspection and repair. The owner needs to choose the most suitable contractor to undertake the task, and must also take into account certain cost restrictions. The cost of a repair is not simply the price tag placed on the tender by the various yards; numerous variables need to be considered.

Therefore, I will initially present the reader with some basic knowledge of the industry in general and then move on to an overview of the market situation. Later, a regional breakdown of the sector will be undertaken, discussing the impact of each country active on the international level of ship-repair. I will then establish the criteria based upon which a given shipowner will be able to select an appropriate ship-repair yard. Next, by using tender data gathered from about 30 yards around the globe for the actual drydocking of a 34,000 dwt bulk-carrier vessel, I will pinpoint the most important/costly of the repair activities and demonstrate how these activities compare from region to region around the globe.

Finally, after having gathered all of the necessary information, I will make a forecasting on the ship-repair market. The purpose of the final chapter will, therefore, be an elaboration on the future state of our industry, identifying both declining and emerging ship-repair powers.

## Chapter One: Overview of the Ship-repair Market

### 1.1 Introduction

The basic function of the ship-repair industry is to maintain the sea-worthiness of the world's fleet, that is, to ensure that the vessels are safe to operate, are environmentally safe, and operate in an economically efficient manner. Worldwide, there exist numerous facilities that undertake repair tasks. These facilities can serve either the repair market alone or they can be a sector of an integrated shipbuilding and ship-repair yard. A recession of shipbuilding activities in the 1970's led yards to concentrate their efforts on ship-repair and the 1980's brought a fair number of purpose-built repair-yards into play. On top of these changes, the Asian (Singapore, Korea, Middle East) presence became stronger.

The ship-repair market, as most sectors of the maritime industry, has been going through a recession, or another way to see it, through the bottom part of the economic cycle of the industry. In Europe, this has resulted in reduced activity levels and the closing down of various yards. The recession of our market has been caused by a fall in profitability in ship transportation activities due to overcapacity. This overcapacity has led to increased buyer's power and increased competition, and thereby, it has also led to a fall in rates as well as to the reactive attitude of shipowners towards repair, in other words, the "if it ain't broken, it don't need fixin'" mentality. There is no question about the fact that repairing a vessel is costly and is a downtime for the operator. In general, a shipowner would want to minimize frequency of repairs as well as the amount of time and money spent on them.

On the other hand, since there has been increased concern about the numbers of casualties - primarily of old tonnage - safety requirement levels have risen and inspections have become more difficult to pass. Port regulations around the world tend to become stricter day by day, resulting in the need for better kept ships and the scrapping of old tonnage. ISM code requirements have recently changed the way the shipping companies operate and maintain their fleet, and this has led to proactivity. The above market changes will most likely boost ship-repair activities in the near future.

Returning to the current situation, the Middle East and Far East have absorbed repair demands more efficiently than their European counterparts by offering lower costs, better climate conditions, and better location with respect to routes - especially tanker routes. Since cost is a major factor in the process of choosing a ship-repair yard and specialization is an advantageous quality to possess, European countries have answered back to this challenge by cutting down on prices, oftentimes sinking below cost, and by targeting market segments. For example, Bulgaria and Poland have concentrated upon medium-sized vessels while Northern-Atlantic Europe takes pride in its ability to perform more sophisticated jobs such as conversions and high-tech ferries.

What is more, government interference, subsidies and regulations play a major role in shaping the shipping industry, and thus affect our market.

## **1.2 Definition of Ship-repair**

The role of ship-repair is to maintain the sea-worthiness of the world's fleet and is, thereby, a major sector of after-market marine production. It is also a major employer, providing jobs to thousands and developing local economies.

The basic components of ship-repair activity are steelworks, machinery work, electrical work, pipe work, and painting. Hence, the processes are very similar to ship production.

So as to assure the integrity of the world fleet, Classification Societies carry out periodic surveys. Ship-repair is thus a routine dictated by regular, necessary dockings, with dock intervals often lasting for several years at a time. In general, one can differentiate between types of repair according to the extent and nature of the work. Namely, there can be: major conversion or reconstruction of vessels, accidental damage repair, and regular and statutory required maintenance. The latter can be subdivided into voyage repairs, routine dockings, and major repairs associated with special surveys, and it accounts for 75% of the total revenues of the sector. Conversion activities are usually carried out in shipyards with significant newbuilding activity.

Another repair type is alongside repair on vessels outside a yard area. Companies that are involved in this type of repair are not required to own drydocking facilities or major workshops. This thesis concentrates on ship-repair companies with available docking facilities. It must be noted, though, that footloose shipyards and maintenance are becoming increasingly important.

## **1.3 Damage Repair**

Damage repair is required when a vessel is involved in an accident at sea or in port, or if an unexpected breakdown or the deterioration of vital components occurs. Some examples of breakdowns are: malfunction of the fire-fighting systems, failure of the communication systems, or engine component failure. Such problems can render a vessel un-seaworthy and must therefore be resolved in a timely manner. The choice of shipyards is limited in cases of major and immediate damage repair requirements, and the closest yard is usually the most reasonable choice, minimizing towing costs. Although there is a chance that it would be less expensive to tow the vessel further but to a cheaper yard, one must bear in mind that there may be substantial losses due to downtime, losses that must also be accounted for before any decisions can be made.

## **1.4 Conversions**

During its lifetime, a vessel is expected to change operators and is also likely to move into a different trade. The latter may require different specifications and will thus make conversion work necessary. Conversion work ranges from merely lengthening for increased capacity to turning freight Ro-Ros to ferries, bulk carriers to LPGs, and tankers to FPSOs. This activity is directly comparable to newbuilding. Shipowners send out for tenders to various yards well in advance of the actual conversion in order to make the soundest choice and to use buyer power methods such as inciting price wars between yards.

## 1.5 Regular Maintenance

Maintenance activities are scheduled - for the most part - in accordance with those inspections required by the Classification Societies. Shipowners have the opportunity to plan these repairs well in advance, as with conversions, so as to enjoy a better selection. Here again, tendering procedure is followed. The extent of the repairs is dictated by the condition and age of the vessel, by the trade in which that vessel is involved and by corresponding regulations and requirements; the shipyard is chosen based upon price, quality of work, availability of yards and downtime costs.

The drydocking cycle, that is, the time between two required consecutive drydocks (a.k.a. special surveys), has been currently set at five years, while in the past this used to be an annual procedure. A special survey calls for complete machinery inspection. An intermediate survey is also carried out. That sets, on average, a thirty-month interval between inspections. The increased interval between inspections is also due, in part, to the evolution of coatings used in corrosion prevention, which has led to both longer lasting coatings and reduced steel wear.

Routine dockings are scheduled in order to minimize trade disruptions. The aim of these dockings is to preserve the underwater hull; therefore, they involve hull cleaning and blasting, painting, tail-shaft inspection, rudder inspection and underwater fittings inspection. While at dock, routine, non-urgent activities are undertaken. These include machinery and dock equipment maintenance and accommodation maintenance. The latter is of critical importance to ferries that are highly regulated in this respect.

Routine maintenance also includes voyage repairs and afloat repairs. Voyage repairs are small-scale tasks and/or tasks that cannot be postponed until a scheduled docking. The crew, especially the fitters, works throughout the voyage, saving on lay-up time. Afloat repairs are carried out either while loading/unloading in port, in a ship-repair quay, or during any anchorage. The main characteristic of such repair is that it does not require drydocking. It can include work internal to the vessel and/or on the hull above the water. It is usually small scale and low cost and is carried out primarily by small, specialized companies with low overheads. Actually, underwater repair by highly skilled professionals can also be carried out, but this kind of work tends to be expensive though preferable to drydocking.

It is obvious that as the ship ages, increased maintenance care and major repairs will be required. In order to pass the special survey, which includes drydocking, extensive work may be necessary, as Classification Societies' standards are set rather high and are constantly being updated. Year after year, these standards are becoming harsher so as to ensure safety at sea and to impose environmental regulations. Relatively recent regulations include: retrofitting vehicle deck-flood-control barriers, modifying vehicle doors, or fitting side sponsors to Ro-Ro ferries; Enhanced Special Survey for bulkers; and a plethora of new rules for tankers.

## 1.6 Ship-repair vs. Ship-building

I have previously mentioned that there exists a similarity between ship-repair and newbuilding with respect to the rendering processes; however, the two differ in principle. Let us now have a closer look at how they relate to one another.

As far as ownership and trading are concerned, the vessel under repair belongs to an operator and has already been trading whereas the newly built ship, which has never been in service, belongs to the

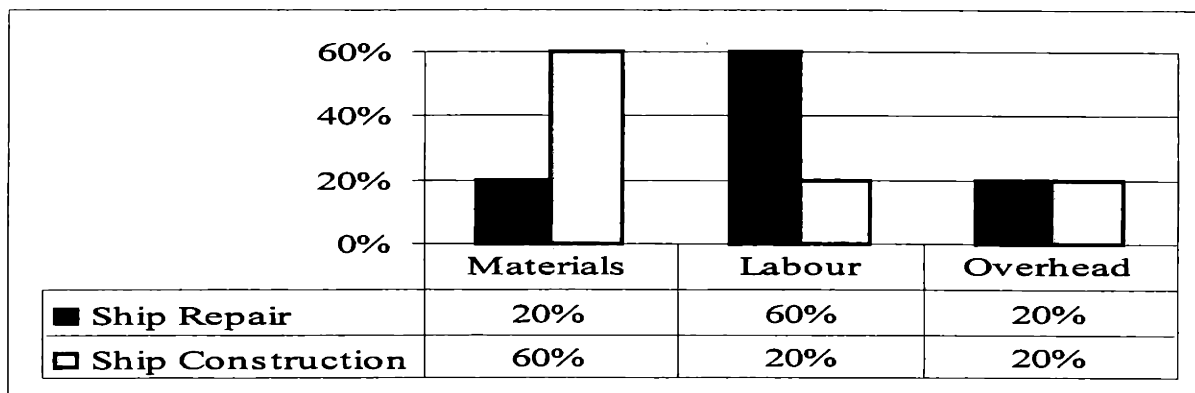
shipyard until the future owner pays in full. This means that, in the first situation, it is the operator who wants to minimize work time with work entailing the fixing of failed or worn out equipment; in the second case, it is the shipyard that wants to minimize time, with the infantile failure of equipment being of concern. It is obvious that there are different types of assignments involved.

What is more, the product mix is different. Repair is service oriented whereas newbuilding is product oriented. Hence, it requires a different marketing strategy and organization of the production process.

Furthermore, the ship-repair timescales are much shorter (several weeks as opposed to couple of years), the predictability of the workload is lower, and the labor portion of the total costs dominates at about 60%.

**Table 1.1: Differences in timescales between ship-repair and Newbuilding.**

Ship-repair time		Construction time	
Tender to contact	2 → 4 weeks	Typical ship	2 years
Contract to ship arrival	1 → 3 weeks	Small ship	1 year
Time spend in yard	1 → 2 weeks	Navy Ship	5 years
Total	4 → 9 weeks		



**Figure 1.1: Breakdown of cost structure of ship-repair and Newbuilding.**

As it can be seen from Figure 1.1, the cost structure of the two industries is substantially different. In ship-repair, labor costs dominate the final bill as opposed to ship-building, where material costs make up for 60% of the total. This disparity is to be expected, as ship-repair is labor intensive and the nature of the work is highly unpredictable, not lending itself to extensive automation. On the other hand, newbuilding utilizes automation but still requires extensive quantities of material.

Other differences between the two industries are reflected by their corresponding facilities, in terms of scale and quantity.



Table 1.2: Differences in facilities between ship-repair and Newbuilding.

	Ship-repair	Newbuilding
Steelwork facilities	Small	Large
Outfitting facilities	Medium (large machine shop)	Large
Crane size	Small	Large
Docks	Several	Couple
Quays	Several	Couple
Storage capacity	Small (JIT)	Large
Automation	Small	Large

In repair and construction, as in most businesses, quality, price and timescales are critical and competition is high.

### 1.7 Location Considerations

The ship-repair industry, a service-oriented sector, imposes restrictions upon the user with respect to location. The vast majority of repairs are being carried out on immobile ship-repair yard facilities. Therefore, the competitiveness of a yard is strongly affected by the local labor rate, local material pricing, the currency exchange rate, political stability (or lack thereof), and of course, the geographical position that defines ease of access.

An exception to the above factors lies in the existence of mobile repair services, also known as “flying squads”. Here one has the option of providing service at the present location of the customer, away from any yard. This saves the customer the expenses entailed in moving the ship to a repair yard. This kind of service is obviously limited, though, since there is a lack of extensive infrastructure that is present in a yard. However, for this same reason, there is the advantage of smaller overhead costs.

In this last section of Chapter One, I shall identify the different types of yards with respect to size and customer mix. This separation will yield major international yards, international yards, international afloat, small regional yards, and small local yards. Let us define each of these in greater detail.

A *major international yard* is a large-ship repair yard, capable of handling vessels exceeding 200m in length, with extensive drydocking and floating-dock facilities, and targeting a broad international clientele. Yards defined as plainly *international* are the smaller yards that target the international market, with facilities that can accommodate vessels over 80m but less than 200m in length. Within the international regime, the *international afloat* service is included. It involves companies operating ship-heavy-lifts, or ships-slips (used as floating docks), which define their product mix as being afloat and voyage repairs. Their target group is international, and they usually repair vessels over 80m in length. All of the above corporations feature extensive, modern, high capacity facilities/workshops and provide clients with high quality services.

On the other hand, there exist the *small regional yards* with predominately basic workshops and other facilities, repairing ships of under 100m in length and focusing on the regional and local market. The next level down brings us to the *small local yards* that provide docking and slipping

services to local markets, repairing vessels under 50m long. In both cases, the workforce is small and workshops are basic.

## Chapter Two: Supply, Demand and Performance of Ship-repair Yards

### 2.1 Introduction

The purpose of this second chapter is to examine the capacity, demand, availability and performance of ship-repair yards around the world.

### 2.2 Supply of Ship-repair Facilities

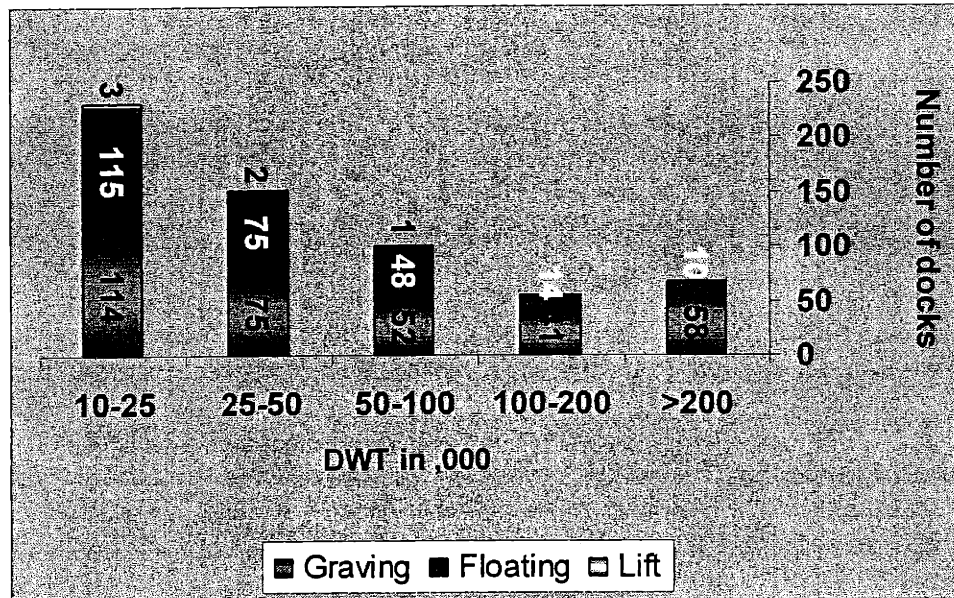
The supply of ship-repair, or available capacity, is determined primarily by the availability of drydocking facilities, since the majority of repair activities require drydocking. Therefore, this can be considered a suitable measurement tool for estimating supply, although there are, as previously mentioned, a minority of ship-repair companies without traditional docking facilities. Later on in this chapter, a table showing the number and size of docks in different geographical groups will be presented.

Initially, in order to give a more complete estimate of the global capacity of docking facilities, I shall include each type of drydock facility - such as floating docks, graving and shiplifts - with the capability of handling ships over 10,000 dwt. I will also assume a six-working day week and a ten-day (two working weeks) vacation period in order to calculate the available drydocking time. This yields 302 available days per dock per annum. This is but an approximate number, since the actual working schedule and vacation calendar varies from region to region.

**Table 2.1 Type and size break-down of docks (>10,000 dwt) <sup>1</sup>**

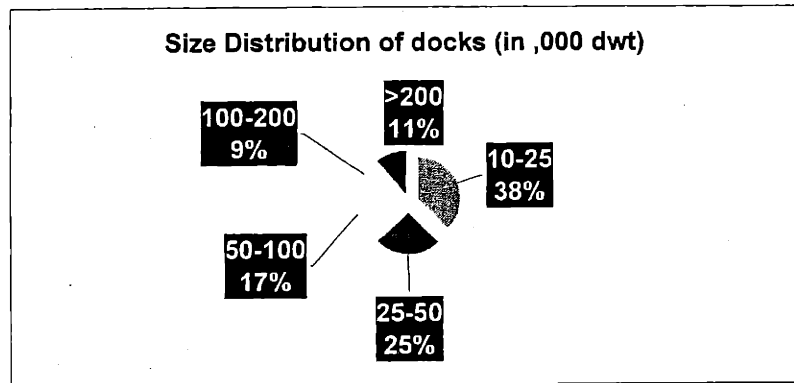
Size (dwt) ⇒ Type ↓	10-25,000	25-50,000	50-100,000	100-200,000	>200,000	Total
Floating	115	75	48	14	10	262
Graving	114	75	52	41	58	340
Lift	3	2	1	-	-	6
<b>Total</b>	<b>232</b>	<b>152</b>	<b>101</b>	<b>55</b>	<b>68</b>	<b>608</b>
<b>Dock-days</b>	<b>70064</b>	<b>45904</b>	<b>30502</b>	<b>16610</b>	<b>20536</b>	<b>183616</b>

<sup>1</sup> Data from Lloyds



Graph 2.1: Type and size break-down of docks (>10,000 dwt)

Graph 2.2: Size Distribution of docks



## 2.2 Demand

This portion of Chapter Two deals with the demand for docking facilities.

Classification societies have established certain requirements with respect to the condition of a vessel and carry out regular inspections in order to ensure compliance. What is more, as a vessel ages, the wear and fouling of the ship's hull call for regular cleaning and painting, while engine and other onboard equipment tend to deteriorate with time and need to be fixed. Also, accidents do occur, and thus further demands for repairs are made.

It is expected that as the vessel grows old, wearing and fouling frequency will increase and more regular maintenance will become mandatory. Steelwork is needed to preserve the hull's strength, as corrosion almost inevitably occurs.

Demand for repair yards also arises from projects involving conversion activities. These range from lengthening (Jumboise), which basically involves adding an extra section to the ship that is similar to the existing sections and thus allows most of the ship's original characteristics to be maintained, to major rebuilding of the vessel, usually due to a switch of trade, for example, the morphing of a commercial Ro-Ro into a passenger ferry.

The demand for repair activities depends not only upon the vessel's age, size and type, but also upon the type of employment and trading region, as well as on the strategy of her operator. For example, chemical tankers are very strictly regulated due to the highly hazardous nature of their cargo. The oil tanker trade has also become extensively regulated, especially after the creation of the OPA90. Nowadays, the level of inspection and corresponding rules with which a vessel must comply in order to trade or even enter into a region vary from port to port. Last but not least, whether an operator is proactive or reactive will affect the demand for docking facilities and repair activities.

In order to make an estimate on the global demand for drydocking capacity, the current fleet data above 10,000 dwt in size will be used. It will be assumed that on average, within a 5-year period, a small sized vessel spends about 30 days in a drydocking facility, while a large vessel spends approximately 35 days. A medium sized vessel would be drydocked for about 32 days, interpolating between boundary range values.

**Table 2.2: World's fleet (>10,000 dwt)<sup>2</sup>**

Type ⇒ Size(dwt) ↓	Oil tankers	Chemical Tankers	Gas Tankers	Bulk Carriers	Combi Carriers	Container Ships	General Cargo	Other <sup>3</sup>	Total
10-25,000	484	94	84	1,092	3	547	313	500	3,117
25-50,000	837	109	88	2,209	11	236	181	250	3,921
50- 100,000	590	-	116	905	100	116	80	100	2,007
100- 200,000	337	-	-	347	108	-	1	50	843
>200,000	435	-	-	42	17	-	-	50	544
<b>Total</b>	<b>2683</b>	<b>203</b>	<b>288</b>	<b>4,595</b>	<b>239</b>	<b>899</b>	<b>575</b>	<b>950</b>	<b>10,432</b>

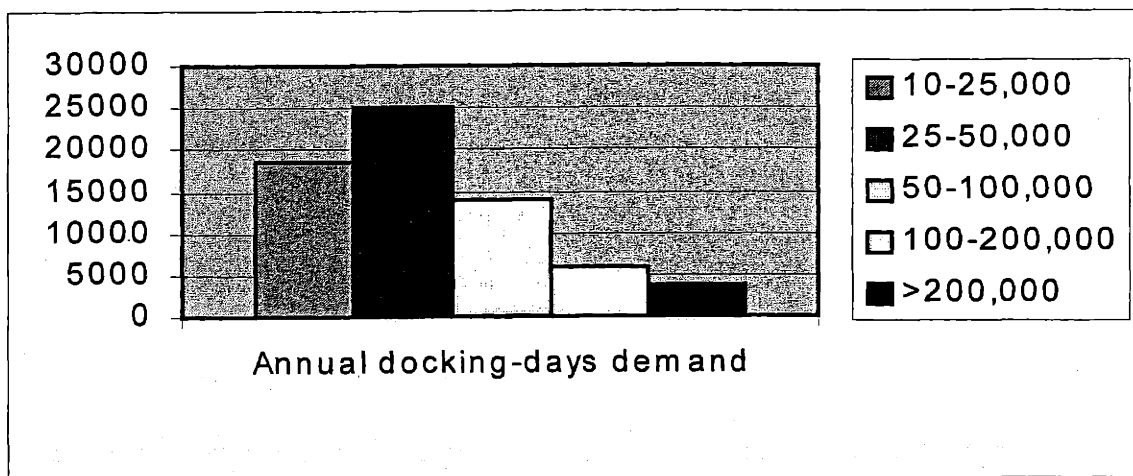
<sup>2</sup> Data from Lloyds

<sup>3</sup> includes passenger vessels, ferries and other large offshore crafts.

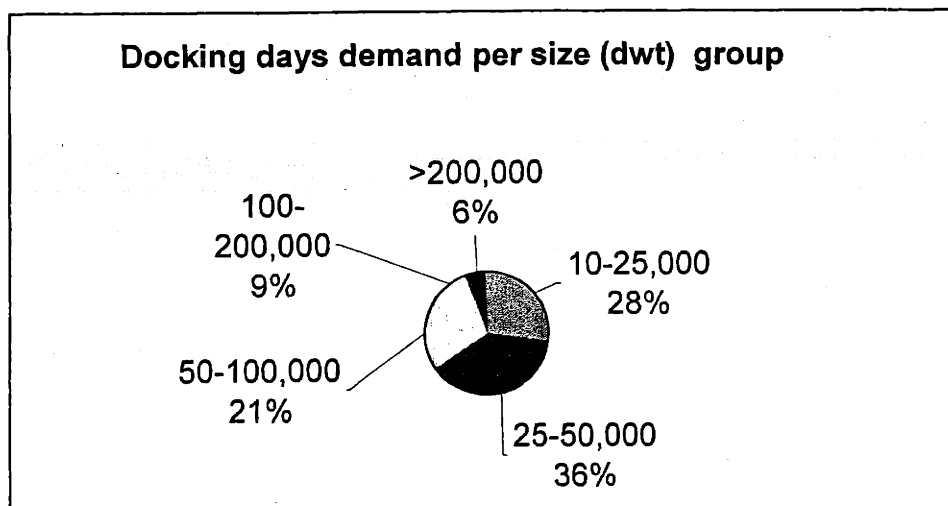
Therefore, based on the assumptions previously mentioned:

**Table 2.3: Demand of dock-days**

Size (dwt)	10-25,000	25-50,000	50-100,000	100-200,000	>200,000	Total
Avg. dock days / 5 years	30	32	35	35	35	
Avg. no of days / year	6	6.4	7	7	7	
No of ships	3,117	3,921	2,007	843	544	10,432
Days required in dock / year	18,702	25,094	14,049	5,901	3,808	67,554



**Graph 2.3: Annual demand for drydocking in days**



**Graph 2.4: Docking days demand w.r.t. size group**

One can clearly see that about 2/3 of the demand arises from the 10-50,000 dwt fleet, as expected, since it accounts for 2/3 of the world's fleet (always over 10,000 dwt).

### 2.3 Demand Vs Supply

After having made some estimates on capacity and demand, one may now compare those sets of data, carry out sensitivity analysis with regard to days of annual dock operation, and draw some conclusions.

**Table 2.4: Supply vs. Demand of dock-days plus sensitivity analysis**

Size (dwt)	10-25,000	25-50,000	50-100,000	100-200,000	>200,000	Total
No. of ships	3,117	3,921	2,007	843	544	10,432
<b>Annual demand of Dock-days</b>	<b>18,702</b>	<b>25,094</b>	<b>14,049</b>	<b>5,901</b>	<b>3,808</b>	<b>67,554</b>
Dockdays supply (200d/year)	46,400	30,400	20,200	11,000	13,600	121,600
Dockdays supply (250d/year)	58,000	38,000	25,250	13,750	17,000	152,000
Dockdays supply (302d/year)	70,064	45,904	30,502	16,610	20,536	183,616
Dockdays supply (350d/year)	81,200	53,200	35,350	19,250	23,800	212,800
Over-capacity <sup>4</sup> (200d/year)	148%	21%	44%	86%	257%	80%
Over-capacity (250d/year)	210%	51%	80%	133%	346%	125%
Over-capacity (302d/year)	275%	83%	117%	181%	439%	172%
Over-capacity (350d/year)	334%	112%	152%	226%	525%	215%
Under-demand <sup>5</sup> (200d/year)	60%	17%	30%	46%	72%	44%
Under-demand (250d/year)	68%	34%	44%	57%	78%	56%
Under-demand (302d/year)	73%	45%	54%	64%	81%	63%
Under-demand (350d/year)	77%	53%	60%	69%	84%	68%
<b>B/E demand for op. Days/annum</b>	<b>81</b>	<b>165</b>	<b>139</b>	<b>107</b>	<b>56</b>	<b>111</b>

What can be derived from the above table is that if the operation of the yards were exclusively for repair, they would then be operating in overcapacity, even if they worked a fraction of the year. The last row of the above table gives the number of days the yards should operate in order to break even with the demand. We can see that the 10-25,000 dwt and >200,000dwt facilities are heavily in under-demand. Of course, one has to bear in mind that a higher capacity dock can accommodate lower capacity demand. In other words, a facility for over 200,000 dwt can also accommodate all vessels under 200,000 dwt. Therefore, one can distribute the workload in a more smooth distribution for the above 25,000 dwt regime, yielding 117 required working days per annum or 1/3 of the year. This value was derived as follows:

**(Sum of required annual workdays for our categories of over 25,000 dwt)/(Number of categories)=(165+139+107+56)/4=117**

Similarly, the 10-25,000 dwt docking facilities will accommodate projects which fall below 10,000 dwt, which is our threshold value of consideration. This will drive utilization up. Also, the 6-7 annual days in dock is a fairly conservative estimate. Since it is assumed that there exists a linear relationship between total demand and the above estimate and also a linear relationship between supply and the number of working days, one can derive that for any percentage of increase above the assumed average days spent in repair yards, there will occur an equal decrease in overcapacity. If we

<sup>4</sup> Over-capacity expresses the available dock-days in excess of demand.

<sup>5</sup> Under-demand expresses the excess demand required to fill yards to capacity.

assume now that a vessel will spend on average 10 days in a docking facility, i.e. approximately 35% more than our initial estimate, overcapacity will decrease by 35%.

## **2.4 Repair Capacity Projections by Region**

The aforementioned over-capacity can be explained in part by the expectancy of considerable growth in demand for ship repair and conversion in the next decade. In fact, the global ship-repair capacity is expected to increase along with its utilization.

It is projected that there will be direct investments in new facilities and extensive facility upgrading, productivity improvement in existing yards, utilization of currently under-used capacity in existing yards, and transfer of capacity from naval work to commercial work.

Investments and upgrading are expected to expand capacity at about 10% of the current levels. I will next examine three very active regions: South East Asia, South Korea and China, and the Mediterranean.

In South East Asia, great activity is visible near Singapore. Major Singapore yards are investing heavily in new capacity within the area, mainly targeted at the VLCC market. Also, they are providing with the prime influx of funds towards the construction of new shipyards and the upgrading of existing shipyards in neighboring countries, such as the Philippines, Thailand, and Vietnam. Investment in those countries targets the smaller vessel market and capitalizes on both the regional low base cost and the labor rates. Sembawang Shipyard recently signed an “evergreen alliance agreement” with Shell international to refit and drydock Shell’s eastern trading fleet for some time in the foreseeable future.

The last decade has witnessed China's becoming a major player in the ship repair industry. China is now attempting a considerable expansion of its repair capacity in terms of new docks and also new greenfield shipyards. China owed its success primarily to very low labor rates and not to technical expertise. Therefore, in order to develop in a more attractive fashion, they now accept technical assistance from European and Japanese companies. Their aims are focused towards becoming both cost leaders and technically savvy. In Korea, Hyundai is now expanding its capacity at the Ulsan yard and has just announced a plan for a major new repair yard in South Korea. Whether or not this project will be carried through is still uncertain. Korean companies also grow through joint ventures abroad.

The Mediterranean region is also very active. In Portugal, new drydocks are being constructed at Mitrena as part of the rationalization of the Lisnave facilities. Also, in Greece, after the reduction of restrictions on development at Piraeus, numerous drydocking projects are being considered. Should they materialize, substantial capacity growth will result. Neighboring Italy has seen development in the floating-dock sector.

Considering the Northern European region, decreased activity in terms of expansion and investment is being observed, although there are plans for a VLCC repair dock in Bergen. On the other hand, Northern Europe has witnessed some transfer of naval capacity to commercial capacity, driven by a steady decrease in the defense markets.

In North America, there has also been a decline in naval construction, and therefore ship-repair capacity is becoming increasingly available to the commercial sector - to the cruise-ship market in



particular. The US ship-repair sector is, like the whole marine sector, affected primarily by both high labor costs and the Jones Act. The Jones Act helps yards by demanding that US owned and flagged ships trading among US ports be constructed and repaired in US shipyards only. Though quality of work is good, it lacks the edge in cost and time efficiency. There is some effort being made though, and there are plans to convert major naval-repair-bases, for example the Charleston Naval Yard, to compete in the commercial market.

Hence, there is a global ship-repair over-capacity that continues to grow. It is obvious that the industry has not yet been optimized, though there is only the slightest chance that projected market demands will not be met in the coming decade.

## 2.5 Present Docking Capacity by Region

Here I will attempt a breakdown of the current global docking capacity by geographical region, to compare region to region. Again, the threshold value of 10,000 dwt is set, thus neglecting slipway facilities, which serving only smaller vessels.

**Table 2.5: Geographical breakdown of Dock capacity<sup>6</sup>**

Size (dwt)	10-25,000		25-50,000		50-100,000		100-200,000		>200,000		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
NW Europe	74	32.3	23	15.1	16	16.5	7	13.2	11	15.5	139	22.7
Atlantic Europe	11	4.8	4	2.6	3	3.1	3	5.7	7	9.9	27	4.4
Med. Europe	18	7.9	11	7.2	16	16.5	5	9.4	7	9.9	57	9.3
NE Europe	19	8.3	9	5.9	5	5.2	1	1.9	1	1.4	34	5.5
Mediterranean	15	6.6	10	6.6	2	2.1	2	3.8	1	1.4	32	5.2
SE Europe	14	6.1	8	5.3	5	5.2	2	3.8	1	1.4	30	4.9
Africa	4	1.7	1	0.7	1	1.0	0	0.0	0	0.0	7	1.1
S Africa	1	0.4	2	1.3	0	0.0	1	1.9	3	4.2	4	0.7
Middle East	2	0.9	2	1.3	4	4.1	1	1.9	4	5.6	13	2.1
SE Asia	2	0.9	2	1.3	0	0.0	1	1.9	2	2.8	7	1.1
Far East	15	6.6	18	11.8	9	9.3	2	3.8	2	2.8	52	8.5
Singapore	2	0.9	5	3.3	3	3.1	4	7.5	6	8.5	20	3.3
Korea	3	1.3	0	0.0	1	1.0	1	1.9	4	5.6	9	1.5
Japan	17	7.4	17	11.2	9	9.3	12	22.6	13	18.3	68	11.1
Other eastern hemisphere	5	2.2	4	2.6	3	3.1	3	5.7	1	1.4	16	2.6
Istern hemisphere	27	11.8	36	23.7	20	20.6	8	15.1	8	11.3	98	16.0
Total	229	100.0	152	100.0	97	100.0	53	100.0	71	100.0	613	100.0

<sup>6</sup> Data from Lloyds, Appendix I contains similar table but with dwt as a measure of capacity and further explanations on the table's regional grouping.

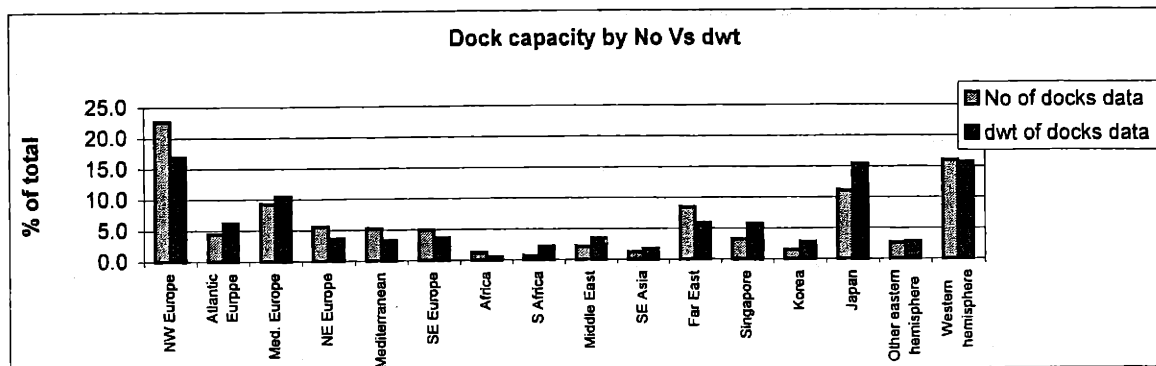


Chart 2.4: Comparison of Global Dock capacity with regard to number and dwt.

From Table 2.5 and Chart 2.4 one can see that Europe accounts for about 35% of the global docking capacity. It is also evident that the majority of docking facilities serve the smaller vessel market and that there is a strong concentration of facilities in the Northwest of Europe, especially for the 10-25,000 dwt market. In the Far East, the majority of facilities are small-to-medium size, while Japan is relatively strong in repairing all vessel sizes. It actually holds 19% of the global capacity for vessels over 200,000 dwt as opposed to Europe, which stands at about 42%. On the other hand, Japan, regardless of accounting for over 11% of the global ship-repair capacity and almost 20% of the large docks, has been losing market share due to the Asia crisis. Singapore has been facing similar problems.

What is more, the combined capacity of the former communist countries<sup>7</sup> yields approximately 10% of the global capacity. Although this is not an overwhelmingly large figure, these countries have market power on distinct market segments.

The Western Hemisphere capacity belongs primarily to the US. Bear in mind that commercial yards doing naval work have not been included and that currently there are a respectable number of these yards that are planning to target commercial projects. Their rates, as previously mentioned, are still not competitive, but US yards are striving towards this direction.

## 2.6 Global Repair-yard Productivity

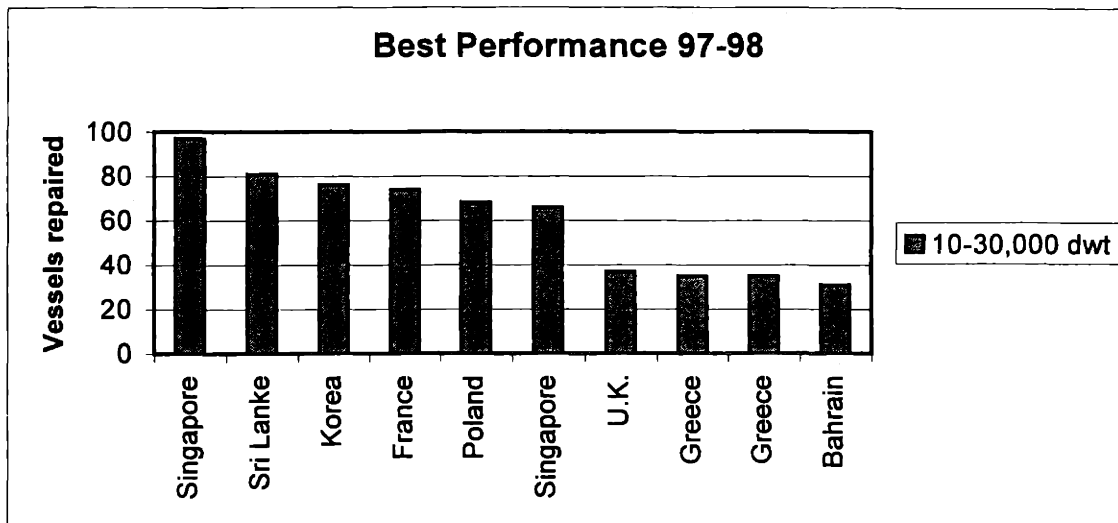
In this section of Chapter Two I will examine the productivity of almost 50 yards around the globe. To do so, I will use data from "Drydock" magazine, which publishes a review of repair yard activities. The data, which spans from February 1997 to April 1998 and can be found in Appendix II, is given for every quarter and is broken into two different size classes, 10-30,000 dwt and above 30,000 dwt. There is a possibility that the conclusions derived are biased due to a lack of data from some countries. No Chinese repair-yards were listed; perhaps they do not allow the disclosure of such information. Therefore, they are not included in the analysis that follows. Chinese ship-repair activity is actually quite strong and will be examined and analyzed later on in this thesis using the repair quota for my model vessel.

<sup>7</sup> excluding Far East Russia

Let us now have a closer look at the best 10 yards per size-category, as measured by the number of ships repaired, starting off with vessels of 10-30,000 dwt, which yield the following table:

**Table 2.6: Best Performance for the 10-30,000 dwt class<sup>8</sup>**

Ship-repair Yard	Country	# of vessels
Keppel Shipyard Singapore	Singapore	97
Colombo Dockyard Ltd	Sri Lanke	81
Hyundai Mipo	Korea	76
ARNO - Dunkerque	France	74
Gdansk Ship-repair Yard	Poland	68
Jurong Shipyards	Singapore	66
A & P Group	U.K.	37
Neorion Shipyard	Greece	35
Hellenic Shipyards	Greece	35
Arab Shipbuilding & Repair Yard	Bahrain	31



**Chart 2.5: Best Performance for the 10-30,000 dwt class**

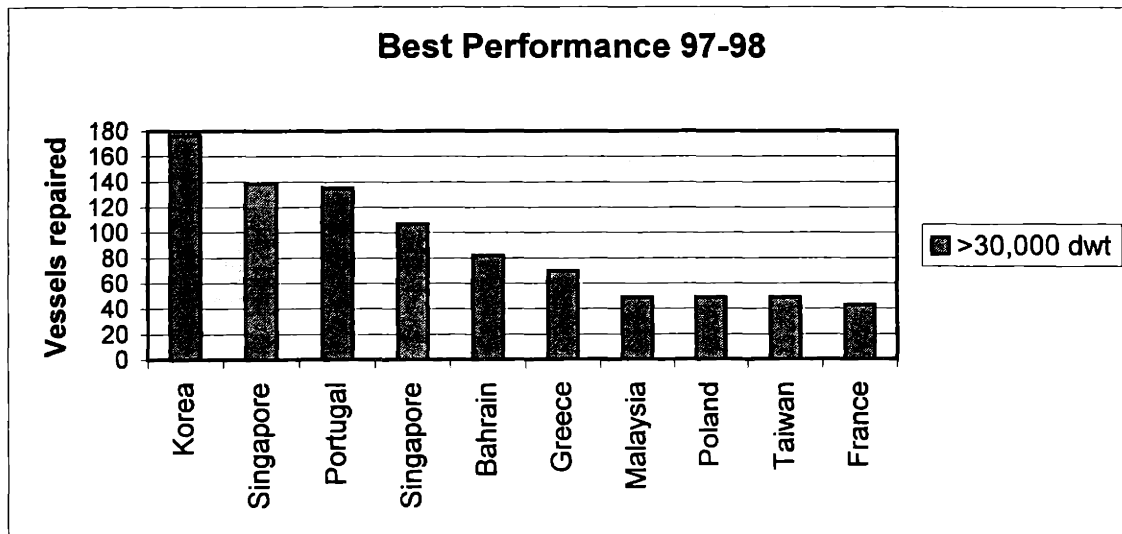
As you can see, the yards of East Asian countries dominate the market with a Singaporean yard in the lead, outperforming the Sri Lankan yard by 20% - a close second. Korea follows soon behind, as do French and Polish yards, followed by yet another Singaporean yard. Yards from Britain, Greece and Bahrain comprise the rest of our top 10 with 33% of the maximum industry output.

<sup>8</sup> Appendix III contains similar table, but with top 20 yards as opposed to top 10

The following table has been constructed for vessels of over 30,000 dwt:

**Table 2.7: Best Performance for the >30,000 dwt class<sup>9</sup>**

Ship-repair Yard	Country	# of vessels
Hyundai Mipo	Korea	177
Jurong Shipyards	Singapore	139
Lisnave Group	Portugal	135
Keppel Shipyard Singapore	Singapore	107
Arab Shipbuilding & Repair Yard	Bahrain	82
Hellenic Shipyards	Greece	70
Malaysia Shipbuilding & Engineering	Malaysia	49
Gdansk Ship-repair Yard	Poland	49
CSBC - Kaohsiung	Taiwan	49
ARNO – Dunkerque	France	43



**Chart 2.6: Best Performance for the >30,000 dwt class**

Again, we see that shipyards from Korea and Singapore lead in terms of output. For the last few years the Middle East and the Far East have led the race for the largest number of repairs of 30,000 dwt vessels, as they also did for the smaller category. From the rest of the world, we have Lisnave in Portugal operating with 80% of the leading output and the Hellenic Shipyards in Greece operating with 40%. Poland and France made it to the top 10, to 8<sup>th</sup> and 10<sup>th</sup> place respectively, with a combined outcome equal to that of Portugal.

<sup>9</sup> Appendix III contains similar table, but with top 20 yards as opposed to top 10

Based on our data, one can see that yard output drops sharply - more exponentially than linearly - as we trace the path from the best performer to the worst. Also, using data from Table 2.3 it becomes clear that there are about 4,000 vessels in the 10-30,000 dwt range and 6,500 vessels in the above 30,000 dwt range. Hence annually, assuming that each one will be drydocked an average of 2 times between special surveys, there is a market demand for repairing 1600 vessels that fall into the 10-30,000 dwt group and 2600 vessels that land above that tonnage. Also, the combined performance of the best 10 yards documented yields 600 and 900 vessels respectively. Therefore, this satisfies about 35% of the global demand.

## Chapter Three: Ship-repair Activity by Region

### 3.1 Introduction

The purpose of this chapter is to provide a synopsis of the ship-repair industry around the globe.

I will visit each continent and discuss briefly the ship-repair activity within its regions, focusing my attention on yards appealing to the international - as opposed to the regional - market.

### 3.2 America

#### 3.2.1 North America

The case of the United States is highly interesting. The USA has the largest effective repair capacity in the world. However, commercial repair revenue accounts for only 15% of total ship-repair and conversion revenues. Also, the industry works primarily for the domestic market, with only 31% of the revenue derived from work on non-US flag vessels. The US repair industry has always suffered from high price levels when compared to its nearest rivals, Northern and Southern Europe. The main work comes from Jones Act ships, the cruise industry, and contracts with the US Navy and the Military Sea-lift Command (MSC). Reduction in defense budgets is expected to contract the quantity and value of the Naval and MSC projects.

The most active yard in the US Gulf region is the Mobile-based Atlantic Marine. Recently, the yard completed modifications and conversion work on board Diamond Offshore's 11,260 dwt Ocean Clipper I, in order for her to perform deepwater-drilling operations.

In Portland, a new labor contract has just been ratified between Portland Shipyard's prime contractor, Cascade General Inc., and the 1,500 shipyard workers represented by the Metal Trades Council of Portland. Both parties are calling the contract "a significant message to the world marketplace". Cascade General President and CEO, Frank Foti, said that the contract includes several radically different approaches to wage and jurisdictional issues that he anticipates will enable Cascade to compete more effectively for foreign and domestic ship repair business. "The contract will change the way we work to assure the survival and success of the ship repair industry in Portland", Foti predicted. What is more, although the Portland ship-repair facility has been effectively operating for about 12 months, Cascade General actually began a 30-year lease as sole operator of the three floating dock facility on 5<sup>th</sup> January 1996. The lease is a five-year rolling agreement, with renegotiations carried out between Cascade and the Port of Portland at the end of each five-year period. The yard's main facilities comprise three floating docks with 15,240 tons, 27,430 tons and 88,380 tons of lifting capacity, respectively. The largest floating dock, which can take ships up to VLCC size, is the largest such facility on the US West Coast. The yard was expected to have a turnover of about \$80M, and the target over the coming years was to move this figure up to \$120M by increasing market share and also by penetrating new areas. The majority of customers come from the tanker market, which accounted for approximately 50% of their total turnover.

Furthermore, East Coast shipyard Norfolk Shipbuilding & Drydock Company, also known as Norshipco, has recently announced the expansion of its capacity at its yard in Norfolk, Virginia. This is a highly specialized division of Norshipco which functions in the reconditioning of diesel engine components. The expansion aims to reduce the turn-around time for vessels visiting the yard.

During July of 1996, San Francisco Drydock reached an historic agreement with its workforce, represented by the Pacific Coast Metal Trades, AFL-CIO. This new labor arrangement was specifically designed as an industry recovery plan to regain market share from non-union and foreign competition. This fact, coupled with continued reductions in military-related work, has left the few remaining shipyards operating on the West Coast with the arduous task of restructuring their operations, including their labor agreement, in order to accommodate a far more aggressive business environment. These major economic considerations have demanded revolutionary new approaches to allow for survival. With the implementation of this new contract, in effect through to Y2K, San Francisco Drydock has positioned itself so as to remain competitive and to expand its markets into the 21<sup>st</sup> century. Key elements in the new contract have eliminated roadblocks imposed over the years to permit maximum flexibility of the workforce and to expand the ability to offer shipowners cost-effective repairs 365 days a year. Through a cooperative agreement between union and management, traditional jurisdictional restrictions between crafts have been relaxed to permit the maximum utilization of all worker skills and abilities, thus reducing inefficiencies in the performance of work. Flexibility to perform service around the clock is offered by removing double-time compensation for work up to 12 hours per day per shift, and by offering customers the ability to have work performed on weekends and holidays with reduced overtime costs.

For the last ten years, the largest US shipyard, Newport News, a subsidiary of Tenneco Corp., was almost completely involved in navy contracts. As this market dried up, the yard was forced to turn to the commercial repair market. In seeking commercial work, US ship-repairers face prejudice from shipowners who, although they appreciate that these yards are capable of producing high quality work, voice concerns with regard to price and delivery time. Taking into account its location, the cruise market offers the best opportunities for the US East Coast ship-repair industry.

### **3.2.2 Central and South America**

The largest ship repair yard in Latin America is Brazil's Renave. In January of 1994, this yard was taken over by the Reicon Group. In 1994, 60 vessels were drydocked: 26 in the Panamax-side floating dock and 34 in the two graving docks, which are capable of holding 30,000 dwt vessels. Almost 50 percent of the vessels were from foreign shipowners.

The major repair yard in Argentina, Tandanor, owned by the shipping company Ciamar, has handled more than 250 repair contracts during 1994, which is an increase when compared to 1993. The main field of work for this yard concerns tankers. Since Tandanor's privatization in 1991, the number of employees has been reduced from 800 to 250 in 1994.

In Uruguay, Greek shipowner Tsakos operates a dockyard in Montevideo with Panamax docking facilities. Tsakos is also reported to be finalizing negotiations to take in 50 percent of the shares of the Curacao Dockyard, discussed below.

In the Caribbean, only a few yards operate on an international scale, the most important being the state-owned Curacao Dockyard. It appears that Cuban-backed support saved the yard from bankruptcy in 1993, returning it to profitable operations in 1994. The yard reorganized itself by downsizing a total of 500 employees and hiring them back on a subcontractor basis. Just over 100 persons (of 500) were taken back on fixed employment. This has allowed the yard to improve its productivity by 50% and has facilitated a price reduction of 25%. The yard has also set up a 50-50 joint venture with the Havana shipyard, involving a 15-year management contract.

Another important yard is the Braswell facility in Balboa, Panama, which has a strategically excellent location, especially when it comes to emergency repairs.

Also, a small but competitive yard is found in Trinidad, where the Caridoc facility has a 26,000 dwt floating dock. A 20,000 dwt dock purchased from the Ukraine is soon to be added, together with a small Syncrolift. Prices are claimed to be about 50% below the levels in Colombia, Curacao, and Venezuela.

### **3.3 Europe**

#### **3.3.1 Mediterranean Europe**

The majority of the EU ship-repair yards that operate in the Mediterranean area have suffered in recent years following the development and expansion of the repair capacity in the Middle East. This has led to numerous closures, privatization, and re-organization activities. However, added competition, especially for the more fundamental repair operations (such as steel-work) is coming increasingly from the former Soviet States, such as the Ukraine, and from other former centrally planned economies, such as Bulgaria and Romania. Cheaper prices, by about 10%, are also available in areas such as Croatia and Turkey, the latter being one of the main developing areas in the Mediterranean. Greece, Spain, Portugal and Italy are all on their way to finalizing privatization and reorganization plans.

The Mediterranean yards, as is the case with Northern European yards discussed later on in the chapter, suffer greatly due to the very low prices offered by former Soviet States in the Balkan area. Labor rates in countries such as Romania, Ukraine, Bulgaria, Russia are down to levels that are impossible for the majority of Western European workers to compete with, since living costs are much higher in Western European countries. The Mediterranean yards, especially those large enough to take on the large tankers, have suffered in this market in recent years as Middle Eastern yards in Dubai and Bahrain have developed.

A few years ago, there were four ship-repair companies operating in Mediterranean France in the port of Marseille, all competing for use of the 10 drydocks, which are owned by the Port Autonome de Marseilles. Over the past few years, closures and amalgamations have left the Compagnie de Reparations de Marseilles (CMR) as the sole major yard. The largest dock has recently been used for the construction of a very large concrete barge and has therefore been out of the market.

In 1994, the ship-repair facility in Gibraltar was taken over by the Norwegian-based Kvaerner Group. At that time, the forecast for the annual turnover amounted to \$23M. The yard faces competition in particular from repair yards along the Black Sea. Competition from repair facilities in Spain and Malta is also strong.

The number of facilities in Mediterranean Spain is relatively small, with AESA operating the Bazan facility in Cartagena and a small dock in Sevilla, while the private company U.N. de Levante operates two facilities in Valencia and Barcelona. The former, only partly completed, known as the Crinavis yard near Algeciras could be used for repairs, but there are no definite plans as of yet. Most yards in Spain have been successful in the conversion industry over the past few months, and they continue to be among Europe's largest players in the repair market.



In the past few years, the Greek shipyards have been in the process of privatization. After the purchase of Elefsis Shipyards by shipowner Peraticos in July of 1992, the workforce showed a stable level of 1,500 and the drydock occupancy rate of the yard substantially increased to 88%. Investments have already exceeded \$1M and there is a plan to purchase a further Panamax size floating dock on the secondhand market. Privatization of the largest repair facility, the Hellenic shipyard in Skaramanga, has yet to take place after a succession of failed attempts. A large number of private companies operate in the Perama Bay area, where they carry out afloat repairs. Occasionally, these companies rent the two docks owned by the Piraeus Port Authority to meet the needs of their customers. Shipowners may also rent these docks and organize their own repair crews. Efforts by the Perama companies to operate increased numbers of floating docks have not yet been successful. It has been stated that the total employment of the Perama Bay companies reaches up to 5,000 persons, which is more than the combined complement employed for repair activities by the four main Greek yards. The other two yards are the Chalkis yard, owned by Greek shipowner Lelakis, and the Neorion yard at Syros Island, which reopened in 1993 following closure in the previous year. Activities at this yard are now being undertaken with a much-reduced staff. Also, the Greek yards face low price competition from yards along the Black Sea, in particular Bulgarian, Croatian, Maltese, Romanian, Russian, and recently Turkish yards. Greek owners enjoy some tax benefits when they carry out repair activities in Greece.

Italy still has a large number of ship-repair yards, most of which are either owned by Fincantieri or by local communities. The private sector is not very well represented. The competitive position of Italy has improved due to the weak state of the Lire, but there is a strong dependence upon the work provided by Italian shipowners. The Italian ship-repair industry has undergone some significant changes throughout the first half of this decade, the main change being the privatization of five out of the seven yards previously operated by state-owned Fincantieri. *Arsenale Venezia* at Venice and *Cantieri Navale de Mediterraneo* at Naples are now independent companies. The Genoa facilities are now managed by a number of repair companies operating in the port, the two largest being *San Giorgio del Porto* and *T Mariotti*; Taranto is closed and Livorno was purchased by a worker's federation is now called the *Luigi Orlando Shipyard*. The only two yards to remain in the Fincantieri Group were Trieste and Palermo. The other independently-owned repair company is INMA, based at La Spezia. However, a large newbuilding order-book has forced the yard to concentrate on general repair work alone and to ignore large scale conversion and repair work, such as the rebuilding of the cruise vessel *Sally Albatross* (now renamed *Leeward*), which was completed in 1995.

The main repair-yard on Malta is the state-owned Malta Drydocks. Following a fatal tanker explosion on 3<sup>rd</sup> of February 1995, Malta Drydocks is still currently unable to utilize one of its six drydocks. The other five drydocks, the largest being 360m x 61m and capable of drydocking vessels up to 300,000 dwt, are all fully operational.

Ship-repair in Croatia can be divided into three areas: Istra, North Dalmatia and Split. The Istra area hosts seven ship-repair yards, one of which is also involved in newbuilding; the North Dalmatia area hosts four ship-repair yards, of which two also operate in the field of newbuilding. Three repair yards are situated in the Split area. Croatia's *Victor Lenac*, which has repair facilities in the port of Rijeka, was the first and therefore probably the most successful of the former eastern bloc yards to penetrate the international market. The yard has been particularly successful in attracting Italian and Greek customers.

A relative newcomer in the area is Albania, where a company has begun activities in Durres. Actually, this is a Polish-Albanian joint venture, whereby the Gdansk Ship-repair yard *Remontowa*

supplied one of their docks. In this way, Poland appears to head in the same geographical diversification direction as Singapore.

The Turkish shipyards are currently very active in attracting major repair work, offering steel prices at rock bottom levels. Although low levels of drydock capacity are available, the Turkish influence is already felt in Greece. The state-owned shipyard in Pendik has recently been put up for sale. This yard has been designed for newbuilding, and has a dock with a capacity of 150,000 dwt, which may also be used for repairs. Other yards are in Tuzla and Izmit, with maximum capacities up to about 25,000 dwt.

### 3.3.2 Atlantic Europe

The main yards along the French Atlantic Coast are located in St. Nazaire, La Pallice and Bordeaux, but their international presence appears to be restricted.

The repair yards in Atlantic Spain offer extensive repair and conversion facilities at Cadiz, Ferrol, Santander, and Sestao. All yards are owned by Astilleros Espanoles, the state-owned shipbuilding group. The competitive position has recently improved due to currency fluctuations; however, the decline of the Spanish fleet has resulted in an increasing dependence on international work. Recently, AESA was considering closing the Cadiz yard and the smaller Sevilla yard in the Mediterranean.

In Portugal, the large Lisnave ship-repair complex in Lisbon, consisting of the Margueira, Mitrena and Rocha yards, represents to a large extent the country's ship-repair industry. All repair activities are to be concentrated at the Mitrena yard near Setubal, while the Rocha yard in Lisbon will remain active for the smaller ships. The main reason behind the restructuring is the loss of much repair work on large tankers to yards in the Middle- and Far East.

### 3.3.3 North West Europe

In the UK, there are two main areas of repair activity - the North East and South Coasts - offering a wide range of docking facilities. A&P Appledore has grown to be the UK's largest ship-repairer, with yards at Chatham, Southampton, Falmouth and on the Tyne in Newcastle. The yards on the Tyne and in Falmouth have recently won the distinction of being awarded ISO 9002 accreditation for quality. The current position of these yards has been favored by exchange rate developments, as well as by the UK Government's decision to withdraw from the European Exchange Rate Mechanism. This has stimulated a number of companies to successfully explore the possibilities of reopening facilities.

The ship-repair sector in Belgium is of limited significance at the European level. In fact, there is only one major repair yard: Antwerp Ship-repair, now operated by the Dutch Kopcke Group, after a temporary stop in operations from mid 1993 till mid 1994. Staff has been reduced to just 135 persons from about 400 in 1993, and employment is on a flexible basis. A significant amount of the work originates from vessels calling at the port. Kopcke's main activity is ship-handling, and the company has an excellent client network.

For a number of years, the Danish ship-repair sector has been declining and employment has been reduced substantially. A small number of yards are still in operation and undertake conversion as well as ship-repair work. The main yards are the Svendborg yard on the southern tip of Funen, which

is also engaged in newbuilding activities, and Fredericia Skibsværft A/S, which took over a Panamax floating dock from Howaldtswerke in Kiel, and also operates one smaller graving dock. Aarhus Flydedock, Orskov Stalskibsværft and Danyard have been using their repair-docks almost exclusively for newbuilding.

The main yards in Northern France are the facilities at Brest, owned by the Chamber of Commerce, and at Le Havre and Dunkerque, both owned by Port Authorities. Hence, the repair companies have to rent the docks, as is the prevailing case throughout the rest of France. The naval facilities in Cherbourg are not in use for commercial activities. The largest dock in Brest can accommodate the largest vessels afloat. The SIREN company operates in Le Havre and now has a workforce of about 150 people and an annual turnover of about \$20M. The Dunkerque facilities are operated by what is left of the ARNO conglomerate. ARNO handled 300 ships in 1994, while in 1993 a turnover of about \$25M was realized. SOBRENA, another offshoot of ARNO, operates the Brest yard.

Germany has three major repair yards - Blohm & Voss, Bremer Vulkan, Lloyd Werft and Howaldtswerke - and a number of smaller ones, including the former Neptun Yard in Rostock, now belonging to the Bremer Vulkan Group. Germany is at the forefront in large-scale conversion and upgrading work, which the Federal Government considered eligible for subsidy under the EC-directives. Germany has seen its competitive position being eroded by its very strong currency, and is now considered one of the most expensive countries.

The Netherlands have been suffering from the same problems as Germany, albeit to a lesser extent. On the other hand, the Dutch Government did not allow subsidies for major conversion work. The main yards are Shipdock in Amsterdam, Scheldeport in Flushing, both with capacities up to Aframax size, and a number of facilities in Rotterdam, operated by the Wilton Group. The largest dock, which boasts a 500,000 dwt capacity, is being used almost exclusively for offshore craft. Smaller yards include Niehuis & van den Berg, YVC Bolnes and Vlaardingen Oost, with maximum vessel capacities up to 25,000 tons. In Delfzijl, Niester Sander now operates a floating dock from the former Finnboda yard in Sweden, with a maximum capacity of 20,000 dwt. One of the most successful Rotterdam yards is Verolme Botlek, which competes in both the conventional shipping and offshore markets. Recently, the yard, for the conventional shipping part of its activities, reduced overall prices by some 15% to improve its competitive position. More than 65% of the Dutch repair yards' yearly turnover originates from foreign companies. With respect to the importance of sub-contracting, it can be stated that Dutch ship-repair is heavily dependent on hired workers, which comprise 25-35% of the workforce. Not unlike the Danish and the German yards, Dutch yards have been forced to take cost-increasing measures at a growing rate in the name of environmental protection and safety.

The Norwegian ship-repair industry has also experienced a downturn in the level of activity in recent years. Only three yards offer significant drydock capacity, namely the Haugesund Yard, the Horten værft and the Mjelle & Karlsen owned Laksevåg yard in Bergen. Due to their distance from the major international trade routes, the yards depend heavily on local work, including the offshore industry.

Due to falling competitiveness and the loss of the Russian market, the Swedish repair industry was forced into a major restructuring. Employment decreased substantially, but due to the very weak Swedish Krone, yards have become competitive again on a Western European level. The country's major yards are the Oresundsværft yard in Landskrona, and the City Værft in Gothenburg, which in 1993 had sold its largest drydock to Howaldtswerke in Kiel. Cityværft was reactivated in 1993, and

carried out repair on 50 ships in 1994. The number of staff is now about a 100. The Oresund yard showed a profit for 1994, and has recently landed a significant order for the conversion of two ferries.

In Finland, valuable experience gained in building passenger ships has been transferred to the ship-repair and ship-conversion sector. Finnish yards mostly serve domestic shipowners, especially the large Baltic Ferries. The largest facilities are the Turku yard and the Kotka Shipyard.

### **3.3.4 Eastern Europe Baltic Sea**

Since the onset of the economic transformation processes during the early 1990s, the Eastern European countries and those of the former Soviet Union appeared to be able to offer shipowners very competitive prices. Eastern European repair quotes are so low that competitors in Western Europe charge the same amount of money merely for the repair's material. Therefore, ship owners show preference for these yards when it comes to generic repair work such as steel-work and general repairs. However, taking into account the level of productivity, delivery conditions, technology and other service aspects, many owners are still reluctant to send their ships to Eastern European yards for more sophisticated repair-contracts.

In the past few years, the ship-repair industry of Poland has emerged as a considerable competitor, for Western European yards in particular. The ship-repair industry as part of the maritime industry is being restructured in line with the national transformation process. Entailed changes include: the restructuring of subsidiary services in yards and their elimination as separate economic units, the lowering of corporate income rate tax for exporters, agreements with domestic shipowners in order to increase the range of repairs in Polish yards, diversification of repair activities, and ownership changes based upon partnership set-ups with domestic participation. The Polish repair yards are concentrated in the provinces of Gdansk and Szczecin, with the Gdansk ship-repair yard Rowentowa being the largest of the yards. Other yards in the Gdansk province are Nauta in Gdynia, and the smaller yards Radunia and Baltyk. The yards Gryfia and Parnica are situated in Szczecin, and there is also a repair yard in Swinoujscie. The sales of the Polish ship-repair industry have increased substantially since 1990. Prior to the transformation, Polish yards were largely dependent upon work from shipowners from the former Soviet Union and the German Democratic Republic. The loss of this market appears to have been compensated as the share of exports in total sales has increased from 65% in 1990 to 84% in 1993. In terms of sales, the most important export markets for the Polish repair yards in 1993 were Germany with 19.5%, Russia with 19%, Greece with 15.4%, the UK with 5.2%, and Norway with 5%. With respect to costs, Poland is in a unique situation within Europe, for it boasts low labour costs and the availability of low price domestic steel to substantially undercut its nearest competitors. In 1992, the price of Polish steel in US dollars per kilogram was more or less equal to the price levels in the Far East but nearly 50% lower than the price charged in Mediterranean and Northern European yards. The important price advantage of Poland can be illustrated by a comparison of biddings in yards from Holland, Singapore and Poland for a repair job in 1998. The price quote for the same job offered by the yard in Holland was over 2.5 times higher than that of the Polish yard. The price quote offered by the Singaporean yard was more than 1.5 times higher.

Taking into account its large potential capacity, it can be expected that ship-repair yards in the Former Soviet Union will become major competitors in world ship-repair in coming years. The largest ship-repair centers in the Baltic and White Sea area are St. Petersburg, Murmansk and Archangelsk in Russia, Tallin in Estonia, Riga in Latvia, and Klaipeda in Lithuania.

### 3.3.5 Eastern Europe Black Sea

The major ship-repair yard in Romania, the Black Sea Shipyard just north of Constanza, employs 1,200 persons - a considerable increase compared to the previous number of 360 employees - and is owned by the State. The Constanza Shipyard employs 800 persons and devotes one of its two large drydocks entirely to ship-repair. The 2 Mai yard at Mangalia has 40% of its 3,500 workforce dedicated to repair. In the past year, South Korean shipbuilding giant Daewoo Heavy Industries (DHI) took a large-scale investment in Romania's 2 Mai Mangalia Shipyard, the first time that the Koreans had invested in a former eastern bloc country. During 1996, the yard had a steady workload, with a total of 15 ships undergoing repairs and maintenance, compared with 43 in 1993, 35 in 1994, and 25 in 1995. With the decrease in ships calling at Mangalia, the yard is hoping for a better future with DHI's investment program. Other yards in Romania include Galatz Shipyard at Galatz and Naviomar at Constanza.

In Bulgaria, there are two main shipbuilding and repair areas for sea-going vessels: Varna and Bourgas. In the Varna area, two yards are involved in ship-repair: Odessos and Naval. The number of direct employees at Odessos is estimated at 1,400. In the Bourgas area, there are also two yards involved in ship-repair: Bourgas, which also operates in the field of newbuilding and employs 1,500 persons directly, and Dockyard, which employs 200 persons directly. Odessos Ship-repair, the largest ship-repair yard in Bulgaria, plans to invest in a larger floating dock facility for Panamax vessels and in small machinery and other equipment. More modern equipment for steel, pipe and machinery workshops shall also be the focus of investment.

Finally, as far as the ex-Soviet ship-repair centers in the Baltic Sea area are concerned, the principal facilities are Sevastopol and Llyichevsk at Ukraine, and Novorossiysk in Russia. Ukrainian shipyards have, similar to the Russian yards, floating docks with lifting capacities ranging from 5,000 to 60,000 tons. The majority of shipyards of the "Yugrybaw" amalgamation, one of the 5 Basin Industrial Amalgamation under control of the former Ministry of Fishery, are located in the Ukraine at Kherson, Sevastopol, Kerch, Izmail, Berdiansk and Temruk. As far as employment, wages and salaries and capacity of the yards are concerned, the situation in the Ukraine is similar to Russia's.

## 3.4 Africa and Middle East

### 3.4.1 Africa

In Africa, only very few dockyard facilities exist, and these are used primarily for emergency work or by local ship owners. Only the ASTICAN shipyard on the Canaries is of international importance. The Greek Laskaridis group controls the facility, which is responsible for a considerable amount of work in the area. The facility has a 20,000-dwt Syncrolift serving 10 repair sites. Also, North African yards in the Mediterranean area include Alexandria Shipyards in Egypt, Israel Shipyards in Haifa, the Menzel yard in Tunisia, and the Erenav yard in Bejaia. All of these yards have only limited capacities and are of local importance only. The Suez Canal Authority, however, plans to acquire VLCC floating capacity, which would boost the Mediterranean capacity significantly.

The ship-repair sector in South Africa has important potential. It will surely benefit from the recent political changes, the removal of sanctions and increased trade, and also by its advantageous geographical position. The main yards are Eigin, Brown & Hamer, Dorbyl, and Globe Engineering Works. Most of the repair work undertaken in South Africa is derived from visitors to the ports of

South Africa. Elgin and Brown & Hamer offer a full spectrum of services, including blasting, painting, electrical work and scaffolding, in addition to normal repair works.

The South African state-owned port authority, Portnet, owns all of the drydocking facilities throughout South Africa. Ship-repair and maintenance work is currently spread among the various yards, but it is done mainly at Dorbyl Marine and its facilities in Durban, East London and Cape Town; Elgin Brown & Hamer in Durban; the IMAC facilities in Durban, Cape Town and Richards Bay, as well as Globe Engineering Works in Cape Town and Walvis Bay. The East London repair facility is a joint venture between Dorbyl Marine and Elgin Brown & Hamer. On many occasions, repair companies, which lease the drydocking facilities on a ship-by-ship basis, collaborate on the same repair contract. Debmar Atlantic, for example, a 6,685 dwt mining ship was being docked in Cape Town, under contract with both Globe Engineering, for general drydocking and repair work, and Dorbyl Marine, for refit and modification work.

There has been a recent upsurge in the number of voyage repairs and riding squads working on ships passing Cape Horn and having been dispatched from Cape Town, but also upon vessels reaching as far as the Far East and South America, undertaking onboard steel and pipe repairs.

Based in Cape Town, Globe Engineering Works Ltd. has been very busy with a number of major repairs and drydocking contracts. Repair and drydocking activity is expected to remain high. Expansion plans by Globe are currently focused on the yard's facility in Saldanha Bay, north of Cape Town, the plans including modernization and better service to the higher volume of ships visiting the port.

### 3.4.2 Middle East

Despite the political problems facing the Middle East for the past 10 years, the two large yards, at Dubai and Bahrain, have now forced this area into the only significant competition that the Singapore area has seen since Singapore underwent significant development during the 1970s. One area of operations that the Middle East does not suffer from to the same extent as Singapore is the immigration of labour force, the majority of which comes from the sub-continent. The key element in the strategy of the yards is alliance as opposed to fierce regional competition. The yards carry out large investments in quality, flexibility and delivery times, as well as human resources; personnel training is a high priority. The region's repairers are able to compete on an equal footing with the Singapore yards and may now have reached a competitive level above that of Singapore.

Both large yards have dominated the "Westbound" tanker market for the past few years, and have now begun to eat away at Singapore's traditional market - the "Eastbound" ships. Both yards are also eager to increase the number of large gas carriers, which visit the Middle East for drydock work, a market dominated by Japanese yards.

It is difficult to pinpoint the world's most successful ship repair yard, since there are numerous, complexly interrelated criteria to be considered. However, one such criterion, which many throughout the industry use as a yardstick, is the number of large tanker repair contracts. Following this method, Dubai Drydocks has had the best track record in recent years. The Dubai Ship Docking Yard is located at Al Jadaf, in Dubai's famous creek. The yard's facilities comprise a 2,500 dwt capacity Syncrolift, which has some 40 positions for small ships such as offshore support vessels, tugs, small tankers, small containerships, and fishing vessels. The largest contract yet undertaken -

the conversion of the OSV Blue Jaguar to a well-stimulation vessel - was recently completed at the Dubai yard.

The largest ship-repair yard in Bahrain is the Arab Shipbuilding and Repair yard (ASRY). Its main activity is the repair of large bulkers, predominantly VLCCs. The yard is able to compete with Singapore in the areas of both price and quality. ASRY employs about 1,100 persons, nearly all of whom have been trained in the yard, with up to 600 short-term workers brought in to meet contract demands. The two floating docks in the yard were purchased fairly recently from the former Jacksonville yard in the USA. ASRY is currently looking at further investment, including an extension of the afloat capacity. In 1994, ASRY handled 104 ships, generating a turnover of \$66.5M. Much work of the Bahrain Ship-repair Company (Basrec) is derived from the Bahrain defence force. Also, floating repair work is a major activity. ASRY has also joined the ranks of converters with contracts from Fred Olsen and Petrobras for the conversion of two tankers from conventional crude carriers to specialized Floating Storage Units (FSUs).

The Al-Jadaf complex in Dubai is home to a large (and growing) number of repairers and engineering service companies. Each company rents its space and has access to a pair of Synchronlifts provided by the government-owned dockyard and competes for work against its neighbors and other repair facilities in the Gulf. Albwardy, part of Singapore's Sembawang, and other general repair companies based at Al Jadaf include Arab Eagle (part of the Keppel Group), Goltens, Gomas, Gomas Tech and International Marine Services.

Many of these companies also use the Free Port at Jebel Ali to carry out alongside repairs. An example of this was the recent work carried out by Gomas Tech onboard the ULL Marine Atlantic.

The new Adyard facility in Abu Dhabi was opened in 1997 for work in the offshore oil and gas industries. The yard, owned by Nico International and developed over a very short period of 18 months, comprises a 40,000m<sup>2</sup> green field site with 106m of berthage at a depth of 6 m at extreme low tide. The facility is designed for the refit and conversion of offshore rigs, barges, and dredgers. The second development stage, comprising a mechanical shop and a rotating shop, was to be opened within a period of 18 months. When this site became fully operational, the existing mechanical workshops in Abu Dhabi would be closed down. Repair work was already under way at Adyard in 1997, with a SBM from Total being serviced along with various offshore fabrication projects.

In 1996, it was announced that US shipbuilding/ship-repairing company Newport News Shipbuilding was to open a yard in the Middle East: the Abu Dhabi Shipdocking Yard. The original greenfield site chosen for this project was at Moussafah, near Abu Dhabi. However, due to an increase in the amount of dredging work required to make this site a feasible repair and building site, a change in location has now been made necessary. The new location for the \$32.5M project is Tawelah, also near Abu Dhabi. It is expected that the facility will comprise a Synchronlift. The project started with a maintenance contract with the Abu Dhabi Navy for its patrol craft fleet.

The Singaporean influence in the Middle East is about to increase with the revelation that a new 20-30,000 dwt capacity graving dock could be the next item on the expansion program at Arab Heavy Industries (AHI) in Ajman, which is a subsidiary of Singapore's Keppel Corp. Keppel purchased the majority share in the yard from Japan's Mitsui during 1992; the deal included the management of the yard. Keppel also recently purchased Al Majid, a voyage repair specialist, and merged the company with AHI Isterm Eagle at Al Jadaf in Dubai to form Arab Eagle Marine Engineering (AEME). The company also has offices and workshops in Jebel Ali. The facilities at Ajman currently comprise four

slipways, the main market including Offshore Supply Vessels (OSVs), fishing vessels, small tankers and feeder containerships. Workload figures for AHI, in terms of ships and values, was up from last year, the yard having completed a total of 95 vessels in 1997, plus contracts for the offshore and industrial sectors.

Kuwait's Kuwait Shipbuilding & Repair Co (KSRC) in Safat is looking to the international market as the next stage in the yard's development, India and Iran being the initial marketing targets.

Saudi Arabia has two shipyards of similar capacity, including the Jeddah Shipyard in the Red Sea and the Dammam facility in the Arabian Gulf. Both yards are not known to be prominently involved in international work.

Iran has plans to upgrade their facility at Bandar Abbas, where one floating dock is available.

### 3.5 Asia and Oceania

Currently, the most competitive region in the world for ship-repair is undoubtedly the Far East, with numerous large yards in China, Hong Kong, Korea, Malaysia, the Philippines, Singapore and Taiwan.

In the early 1980s, Singapore emerged as the unrivalled centre of the world's ship-repair industry. The development of ship-repair in Singapore started about three decades ago. At that time, a commercially operating sector was established and a large growth of the capacity and upgrading of the facilities took place. Employment rose to over 27,000 people. Despite rising prosperity, Singapore has succeeded for many years in holding ship-repair prices down. In fact, its cost base has formed a benchmark for repair costs throughout the world. In addition to competitive pricing, several other factors can be indicated for the success of ship-repair in Singapore, such as low labor costs, high productivity as a result of following the Japanese paradigm, and geographical location right on the main tanker route between the Arabian Gulf and Japan. Also, Singapore's ship-repair yards have built a reputation for carrying out high quality work, as well as having a skilled and experienced workforce. Infrastructure has been built up over the past two decades, and all major equipment suppliers and service companies either have their own offices or representatives in the area allowing all types of repairs, general or specialized, to be carried out with maximum efficiency.

The main competition in the ship-repair industry is between the Singapore area, which has been world leader for many years, and the Middle East. The problem of low price levels remains throughout the industry, especially as new facilities are continuously being opened. The single fact that is keeping price levels low in the Singapore area is that in 1996 there were over 4 million dwt of repair capacity available, compared with only 2.8 million dwt in 1990 (chart 5.1). Hence there is an oversupply, and the law of supply and demand favors lower prices.



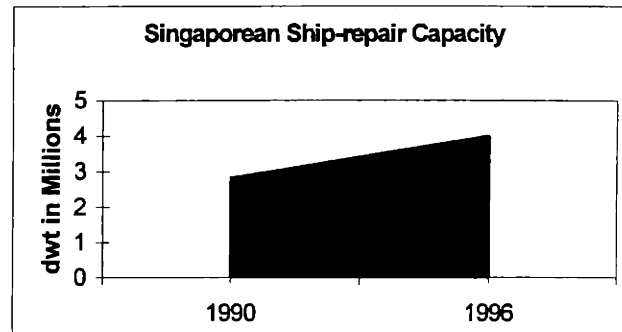


Chart 3.1: Growth of Ship-repair Capacity in Singapore

Singapore has the lion-share in tanker repairs. Singapore's four largest yards, Keppel, Jurong, Hitachi Zosen and Sembawang Shipyard, control 25% percent of the world's VLCC drydocking capacity. The yards are also estimated to serve almost 50% of the VLCC repair market. It was reported that in 1994 Singapore repaired 51 VLCC's, down on the figure for 1993, mainly due to the emergence of Dubai Drydocks. Further large investments, however, are planned in this field. Jurong Shipyard, for example, has committed Sin\$100M (USD63M) for the construction of a 400,000 dwt graving dock. The facility will increase the yard's capacity by about 60%. Also, Sembawang Shipyard invested Sin\$100M (USD63M) in upgrading and rationalizing its facilities, of which over Sin\$65M (USD41M) has been allocated to infrastructural support for repair and newbuilding projects. A higher level of computerization is also being introduced. Keppel invested in a replacement floating dock in Singapore costing \$16M, which can handle ships of up to 35,000 dwt, and is also building a 350,000 dwt graving dock at their Tuas yard. Singapore yards have also carried out the majority of the conversion jobs on tankers required for offshore oil storage and production (FPSOs). Recently, a number of smaller yards, namely Singmarine and Pan United, have entered the market for medium sized vessels, by commissioning new floating docks of Panamax size.

Ship-repair in Singapore faces two basic problems: limited labor force and limited physical capacity. The latter problem has caused pressure on land-use, and environmental problems have consequently arisen. On top of this, a relatively strong currency may also affect Singapore's competitive position. These considerations have led to a strategy of expansion overseas. Keppel group, for instance, has expanded its operations in the Philippines and formed a new company called Keppel Philippines Shipyard (KPSI). Facilities include three floating docks and a ship-lift. More than half the workforce, including management, have undergone training in Japan. The yard is reported to quote at 20-30% below other Asian yards. Keppel has also announced that it will invest \$50M on the construction of a new drydock. Keppel is also involved with yards in India (at Chokhani and at Madras), Australia (Keppel Cairncross) and Vietnam (at Bason and Vung Tau). The Sembawang group is looking for expansion in Indonesia, which presently holds only small facilities.

The competitiveness of the ship-repair sector in Japan has deteriorated considerably in recent years. The corrosive effects of the high Yen and a domestic recession are having a profound effect upon Japanese repair. Having achieved the existing high levels of productivity, Japanese shipyards experience difficulties in reducing production costs. Repairs requested by foreign ships declined as Japanese yards were squeezed into specialized niches, and work on tankers and bulkers have been lost to other parts of the Far East and South East Asia. The total number of ship-repair contracts declined from a peak of Yen324B in 1981 to Yen155B in 1992, including ship conversion sales. Sales from ship-repair activity as compared with sales from total Japanese shipbuilding and ship-repair sales stood at 15.4% in 1985 and 11.7% in 1992. Much of the ship-repair sales total are earned from servicing the domestic fleet, while only about 35% of the revenues come from foreign vessels.

Former Soviet Union yards are operating in the Japan Sea at Vladivostok and at Nahodka. Up till now, very little influence has been felt from commercial activities undertaken by these yards.

Korea, although a major ship-repair player in the Far East and enjoying the advantage of low labour costs, is not as advanced as Japan in productivity terms. Relatively large investments are made towards R&D activities. The Mipo ship-repair yard of Hyundai (HMD), situated on the Ulsan peninsula and employing 3,000, is the largest in the world, with four drydocks capable of accommodating 400,000 dwt tankers and an additional drydock able to take a 300,000 dwt ship; also 30 ships can be docked alongside repair-quays simultaneously. The yard handled 359 ships during 1992 with a turnover of about \$250M. According to the HMD management, Korean prices are about 10-15% above Singapore's prices. Another Korean company, Daewoo used one of their building docks temporarily for repair activities, but this dock is again now fully engaged in newbuilding. This leaves Daewoo with only one large drydock of 120,000 dwt capacity, however, a Panamax-size dock has recently been acquired from the Ukraine. The Samsung yard in Korea, not involved in repair activities, is trying to establish ties with India's Cochin Shipyards in order to obtain a foundation in the repair market. The Hanjin group operates a 150,000 dwt dock in Busan and a 16,000 dwt dock in Ulsan. As with HMD, an important client for Hanjin is the 45-vessel fleet of its sister company, Hanjin Shipping.

China had gained growing attention and importance in the ship-repair sector (appendix IV lists the 40 major Chinese repair-yards). In recent years, China has made substantial efforts to build up both its ship-repair and shipbuilding industries in an attempt to attract business from the international market. There has been a noticeable increase in their determination to penetrate the international market. Local yards are able to offer prices as much as 40% below the very competitive prices being offered by the Singapore area. The price advantage holds for both steel and labor rates. The main repair areas are Dalian, Tianjin, Shanghai Gan, Guangzhou Nantong and Shanghai itself, where a number of yards exist. The largest repair network remains under the umbrella of the China State Shipbuilding Corporation (CSSC), which currently deploys 23 docks. CSSC claimed to have repaired 555 vessels in the period of January-September 1994, with a turnover of \$105M. More than 25% of the vessels repaired are owned by foreigners and represent a value of \$58M. Although significant progress has been made in developing China's repair industry in the past decade, major problems still exist. Drawbacks include a lack of suitably trained personnel and low labor productivity, well below that of yards in Japan, Hong Kong, South Korea and Singapore, and hence longer turnaround times. Also, there is the issue of high inflation. The repair industry needs support from major developments in the country's infrastructure; large investments are required to upgrade and expand repair facilities so as to cope with the fast-growing economy, with special emphasis placed on the creation of more large docks.

Within both India and Sri Lanka, there exist numerous relatively small yards. Only the Colombo shipyard (CDL) in Sri Lanka has some international relevance, being owned by the Japanese Onomichi shipyard. India has seen the set-up of the Keppel owned Chokani shipyard in Madras and some repair activities at Cochin Shipyards, but productivity has not yet reached international standards. Pan United in Singapore has delivered a Panamax floating dock to Western India Steamship Ltd that is to be operated in Mormugao. This yard has been set up in cooperation with Portuguese Lisnave.

Hong Kong also hosts two ship-repair yards which play very important roles at the global level: Hong Kong United Dockyards (HUD) and Yiu Lian Dockyards. The majority of the HUD activities concentrate on containers, general-cargo ships and bulkers up to Panamax size. A new floating dock has recently commissioned, built in Singapore, with a lifting capacity of 40,000 tons. The main constraint for further development of Hong Kong's yards is available workforce. Both HUD and Yiu Lian urge a more flexible approach to labor imports from China by the Hong Kong government to overcome a shortage of local, skilled personnel. Both Yiu Lian Dockyards and HUD employ about 1,000 persons. Contractors are being employed during peak periods. The pool of workers with the right skills has shrunk considerably. Many employees have 30 to 40 years of experience. Problems are encountered when it comes to workforce replacement. Yiu Lian has recently moved one of its drydocks to Shekou in China to remedy the problem.

In Malaysia, the most important yard is the Malaysia Shipyard & Engineering (MSE). Almost 45% of the vessels repaired here are tankers. Also, container ships, bulk carriers and general cargo vessels each make up 10% of the total local deals. Prime clientele comes from Europe at 26%, Japan at 24%, Malaysia at 22%, and Middle East at 9%, according to 1997 figures.

In 1993, the small-scale shipbuilder Unithai in Thailand started operations with a very large 140,000 dwt floating dock in Laem Chabang port. So far, the yard has mainly used this dock for smaller locally owned ships, though Unithai is set to enter the international market as well. It also plans to buy a second floating dock at approximately 30,000 dwt. Asimar and Bangkok Dock operate smaller facilities of up to 20,000 dwt.

Australian yards serve the regional market almost exclusively.

## Chapter Four: Influence Factors

### 4.1 Introduction

In this chapter, I will identify the different factors that influence the repair industry and derive their relative importance. These factors can be subdivided into both internal and external, where internal describes factors that depend upon the yard and external describes factors beyond the influence of the yard but which still affect its business.

Internal factors include the yard's product mix, target group, quality of work and efficiency, marketing, and other variables that, in a nut-shell, depend upon and reflect the corporate strategy of the yard.

External factors include the political stability of the region/country, exchange rates, labor rates and the local economy in general, the global economy and the state of the ship-repair market globally, existing or potential competitors, customers, as well as the local climate and ease of access to the yard. The ease of access also depends on the initial-location-decision for the yard, internal factor, but sometimes the choices are limited due to geographical restrictions, external factor. This brings up the point that, quite often, external and internal factors interact, further complicating the modeling of the repairing industry.

The extent to which a repair-yard will be competitively involved in the market depends upon the customers, the existing and potential competitors, the amount of off-hire time involved, charter rates, production mix, costs and revenues. Also, the amount of repair-work required will depend upon the trade and age of the vessels. Each of these factors will be examined, one by one, in this chapter. Cost and revenue shall be dealt with explicitly in the second half of the chapter, analyzing the variables that influence them, including exchange rates, labor costs, material costs, overhead costs etc.

### 4.2 Customers

As I have already established, there is an oversupply of available docking capacity; although docking facilities are available throughout the globe, they are concentrated in each region. Smaller yards, providing basic services, tend to go after primarily the local/regional market, while yards with extensive, large capacity facilities tend to chase after a more international portfolio of contracts. It was revealed that Asian yards, especially those in Singapore and Japan, tend to be most popular.

Another characteristic of the market is, excluding conversions, that the work carried out falls into a few standard categories, namely steel-work, painting, and engine inspection, and is difficult to differentiate in service other than through size capabilities. Therefore, ship-repair is basically a commodity market. Add over-capacity to the play and it becomes obvious that competition is fierce.

Customers often take advantage of the situation by tendering and then using those quotes to make different yards compete in the final price. This is obviously not the environment in which long lasting relationships are forged between supplier and customer. However, some customers do attempt to partner with a yard for more than a couple of contracts, though this has been a decreasingly popular trend. These would usually be companies with large fleets that looked to enjoy economies of scale.

The primary factors that affect the selection of a yard by the owner of a vessel are the price quote and the geographical location of the yard.

The operator of any vessel trading internationally has the advantage of calling in ports around the world, and is thus in close proximity to a number of shipyards, therefore giving him increased flexibility of choice. Facilities located near the routes of a ship are preferred, even if they cost a bit more, due to savings in time and transportation costs. But if the cost differential is big enough, traveling the extra distance will be compensated for. In general, large vessel operators contribute to global demand, whereas smaller regional operators try to satisfy their demand utilizing small regional repair yards.

### 4.3 New Players/ Competitors

More competitors can enter the market either by constructing new facilities or by purchasing old ones. Entry barriers include high capital costs for yard construction and high levels of competition. Due to the commodity nature of the market, a low-cost operation edge can be crucial to obtaining market share.

In Europe, new players tend not to start from scratch but to take over existing facilities, usually after previous owners go bankrupt. There is no real money-making opportunity for extra facilities that entail substantial capital cost in a saturated market, especially in Europe, where operating costs are high compared to their Asian counterparts. On the other hand, there is an opportunity in more efficient, profitable management of the yard's operation. Some of the existing facilities, such as floating docks, can be sold and transported to other yards, if new operators choose to do so.

Outside of Europe, however, new facilities have been set-up. This would seem to conflict with what was mentioned in the previous paragraph only if one fails to take into account the low labor cost in those countries. These ventures are usually backed by established repair yards. In the past, Japan assisted the development of repair yards in Singapore. Recently Singapore, after having establishing itself as a major player in the ship-repair industry, assisted the development of repair yards in India, Indonesia, the Philippines and Vietnam.

What is more, European yards are looking into joint ventures beyond their national boundaries. Central and Eastern Europe have become popular places to look for new opportunities, while other yards go beyond Europe's boundaries. Lisnave, for example, a joint venture of Dutch and Swedish yards, is active in international projects. In the past, it assisted the development of ship-repair facilities in the Middle East and is now involved in a project with India.

Another type of competition comes from companies that focus on afloat repair service. These are easier to establish, since they do not require dock-yard facilities and high start-up capital expenses. Another advantage for such enterprises is that they can be subcontracted by other yards.

This would bring us to another important consideration: subcontracting. It has been a recent trend for ship-owners to arrange so that sub-contractors, unrelated to the yard, also carry out repair work. Their workforce has to be integrated with that of the yard, and this adds complication to repair activities. Also, the repair-facility's revenues are reduced since there is no income from the subcontractors' work, which otherwise would be the repair facility's responsibility. Other complications arise from defining the legal responsibilities for the safety of the work-force. Usually, yards have to accept full responsibility for accidents occurring at their premises, but this is partly

unfair. However, once the physical capacity of the yard is set, only labor efficiency and productivity can adjust the output. So, the yard's management can organize the work in such a way that all subcontractors, better in their job than the average yard worker, will be used in the most efficient manner. This results in the shortest turnaround time possible. Also, the yard can reduce labor-force, and subsequently, costs.

#### 4.4 Off-hire Time

As has been already pointed out, the repair quotes alone do not determine who gets the job. There are other considerations, which can readily be translated into costs. This includes the length of the idle-time, i.e. the duration of the return trip to the repair destination, deviating from normal route, plus the repair-time and exchange rates. Let us take a look an example:

**Table 4.1: Off-hire time effect**

Ship Type	Bulk-carrier (35,000dwt)	Speed: 12.5 Knots		Age: 10years	
Freight Rate (time charter)	\$8,000/day				
Daily Voyage Cost =Daily Op. Costs + Fuel Cost	\$4,000+\$2,500 = \$6,500/day	Adding freight rate loss, \$14,500/day			
	Repair Yard A	Repair Yard B		Difference	
Repair Price	\$500,000	\$400,000		\$100,000	
		Efficiency Scenario I	Efficiency Scenario II	Efficiency Scenario I	Efficiency Scenario II
Repair Duration (days)	10	20	15	-10	-5
Repair Duration losses	\$80,000	\$160,000	\$120,000	-\$80,000	-\$40,000
Repair Price + Repair Duration losses	\$580,000	\$560,000	\$520,000	\$20,000	\$60,000
Deviation time	2 days	4 days		-2days	
Deviation Costs	\$29,000	\$58,000		-\$29,000	
Total Costs	\$609,000	\$618,000	\$578,000	-\$9,000	\$31,000

The example tabulated above provides valuable insight into the off-hire effects. First we see that the effective cost of the repair goes up substantially, about 20% in this case. Also, the initial choice of yard A seems to be much more expensive, 25% more than yard B. When repair-duration entailing loss of income comes into play, the picture changes radically. For our example, I used two scenarios: a 10-day (Efficiency Scenario I) and a 5-day (Efficiency Scenario I) repair-time differential.

Under the first scenario, yard A is now only 3.5% more costly than yard B. Finally, as a 2-day deviation-time differential is introduced, we notice that choosing yard A would be the more sound choice. Excess duration of work and deviation from route drove bottom-line costs too high for our low repair quote yard.

On the other hand, for our second scenario, yard B is only 5 days less efficient. This fact still drives the relative cost differential down, but summing up all costs, yard B would still be the less expensive option. Actually, it would still be the better choice, even if 2 more days were to be spent in route deviation, a 6-day total. Hence, we see that if the quoted price is substantially low, going that extra distance is an important consideration.

It has been illustrated that off-hire time is a very important variable which has a profound effect upon the final choice of a repair yard. Its importance also depends upon the current freight rate and fuel price. The higher these are, the more important it is to minimize voyage length and repair time, and vice versa. Table 4.2 shows this effect. Figures for required repair-days, freight rates, and running costs also vary according to the type of trade and tonnage the of vessel, as well as by age.

**Table 4.2: Sensitivity analysis on total repair cost with regard to Freight Rate**

Freight Rate	Efficiency Scenario I (10 days)	Efficiency Scenario II (5 days)
	Price differential between yard A and yard B	
\$6,000	\$15,000	\$45,000
\$7,000	\$3,000	\$38,000
\$7,250	\$0	\$36,250
\$8,000	(\$9,000)	\$31,000
\$9,000	(\$21,000)	\$24,000
\$10,000	(\$33,000)	\$17,000
\$11,000	(\$45,000)	\$10,000
\$12,000	(\$57,000)	\$3,000
\$12,430	(\$62,150)	\$0
\$13,000	(\$69,000)	(\$4,000)
\$14,000	(\$81,000)	(\$11,000)

+ ve means: yard A is more expensive than yard B

#### 4.5 Trade Consideration

As previously mentioned, the type of trade in which the vessel is involved is one of the many variables that affect yard selection

Ships involved in the liner trade are employed on specified routes and run on tight schedules. There is obviously a reduced flexibility of yard selection, since both the number of yards in close proximity to the vessel's trade route and the amount of time available for deviation are minimized. In order not to fail meeting the sailing schedule, an operator should either have a redundant fleet, able to take on the extra load for a while, or charter a vessel for the duration of the repair. Ferries and container ships usually fall into this category. Ferry routes tend to be more restricted in the geographical range of service. This is of senior importance to the European yards, since there is substantial amount of ferry trade in the region.

Time-charterers must plan their repairs as best they can, since some times are more expendable to customers. Failure to meet deadlines due to any delays - including repairing - can mean loss of a customer due to breach of contract.

Vessels that trade on a more flexible schedule, such as tramp-charterers, can choose their contracts near a required docking period in such a way that trading ports are close to the repair-yard of their choice. Tankers and bulkers often trade in such fashion.

What is more, the more specialized the ship and its systems are, the more specialized the yard must be and thus ship owners are presented with fewer choices. Types of vessels that fall under this category are reefers, natural-gas-carriers, and chemical-tankers. The trade of the last two is highly

regulated due to the highly hazardous nature of the cargo. Specialized service is also required for offshore-related structures such as rigs and drill-ships. Norwegian and other Northern European yards have found a comfortable niche serving this market.

#### 4.6 Production Mix

Yard services range from regular maintenance and damage repair to specialized repair to conversion.

For a yard to be classified as a ship-repair yard, it must of course be able to undertake projects involving basic services, such as the cleaning of hull, propeller and rudder, machinery repair, painting, and steelwork. A good repair yard should be able to cope with - at least - the workload required for passing the first 6 special surveys of a vessel. Damage repair work will be less standardized than pre-scheduled repairs but usually falls into the principal categories of work.

In some regions, repair-work labor rates are much higher than in others. In order to attract market share, yards must differentiate their product. Europe is a perfect example of this. Although, as has been previously mentioned, basic repair work is a fairly standardized, commodity-minded activity, many European yards survive by focusing their services on specialized, high value vessels, such as reefers, containers, chemical tankers, ferries and short-sea vessels. This strategy has proved to be successful to a large extent, and the yards have remained competitive on global scale, regardless of the high man-hour costs. Examples include French yards' expertise in LNG vessels and Spanish yards' expertise in anti-corrosive tank-coatings.

Nowadays, conversion abilities require further commitment by investing in expensive, specialized equipment and employing highly trained and skilled personnel. The higher the capabilities, the higher the capital and running costs, and hence the higher the repair quote for compensation. What is more, conversion activities range in complexity and major conversions are regularly dealt with in the maritime press due to their high value and often innovational nature. Examples include conversions of ferries, cruise-ships and tankers to Floating Production Storage and Offloading facilities (FPSOs), used to exploit marginal oil fields. German yards have been intensely active in Ferry and cruise-ship related conversions, which usually require construction and addition of extra passenger-accommodation capacity. On the other hand, most of FPSO conversions have been undertaken by Singaporean yards, while a few Western European yards have also carried out this type of work. The technical expertise of European yards and a favorable exchange rate can give them an edge in the industry, though Singapore still holds the reins in the market share.

The yard operators must consider each of these (as well as others) before they can decide on which market to target, and thereby, which products mix to offer.

#### 4.7 Age Consideration

The amount of work necessary to maintain a vessel at a safe, seaworthy level and able to trade efficiently depends to a large extent upon her age. As with all machines, a vessel wears over time, especially considering the fact that it is mostly a steel structure operating in a very corrosive and harsh environment. Rough seas impose great damage on vessels, and these structures must be in the best possible condition to undertake the challenge. What is more, onboard equipment must operate in the worst of conditions and must be regularly inspected and serviced; such equipment ages, too.



In the first decade of its life, or couple of special surveys, the vessel is expected to require minimum maintenance and hence low service duration and cost. During her teens, more cleaning, paint work, machine repairing, and structural repair is to be expected, but the ship must be in good overall shape. In the third decade of its life, at the time of its 4<sup>th</sup> and 5<sup>th</sup> special survey, the ship will require much more attention, and repairs will become more extensive, time consuming and costly. The quality of maintenance throughout her life will determine her ability to trading past the 6<sup>th</sup> special survey. Usually, scrapping is a fair choice as a vessel nears the age of 35, when maintenance of the vessel and running costs become substantially large when compared to those of her younger counterparts.

#### 4.8 Exchange Rate

As already established, price is a primary driving force in choosing a yard. Effective pricing for a ship-owner from a different country depends not only upon the actual quote but also on the exchange rate.

The currency used in the maritime industry is that of the USD, and prices are customarily quoted in dollars. Thereby, fluctuation of exchange rates affects the relative competitive strength of the repair yards. Using data from the OECD database, I shall examine the effect of exchange rates during the last couple of years.

**Table 4.3: Exchange Rates of National Currencies against USD**

		Exchange Rates of National Currencies against USD				
		1994	1995	1996	1997	1998
Belgium	BF	33.46	29.50	30.91	36.76	37.37
Denmark	DK	6.36	5.60	5.79	6.77	6.82
EU	ECU	0.843	0.765	0.787	0.898	0.908
Finland	FM	5.223	4.367	4.583	5.289	5.458
France	FF	5.552	4.991	5.105	5.848	6.053
Germany	DM	1.623	1.433	1.502	1.742	1.811
Greece	GDM	242.2	231.6	241.4	272.1	300.4
Italy	Lit	1613	1629	1543	1740	1791
Japan	Yen	102	94	109	125	135
Netherlands	Fl	1.820	1.605	1.682	1.963	2.044
Norway	NK	7.057	6.337	6.450	7.311	7.612
Poland	Zloty	2.273	2.425	2.699	3.263	6.476
Portugal	Es	166.0	149.9	153.9	176.1	184.4
S. Korea	Won	804	771	803	1340	1393
Spain	Pts	134.0	124.9	126.4	146.1	153.9
Sweden	SK	7.716	7.134	6.685	7.764	8.037
UK	£	0.653	0.634	0.642	0.615	0.602

The above table is an overview of the rates for numerous currencies between 1994 and 1998 against the USD. Fluctuations are substantial. From the figures one can see that the price of dollars against other currencies has substantially increased, showing a strong US economy. Only the British Pound has actually gained in value with regard to USD. Now our benchmark can be changed from the USD to any currency by simply dividing all rows by the currency's row. For example, If I want to see how has Japanese Yen price compared to the Won I would calculate:

Table 4.4: Won Vs Yen

	1994	1995	1996	1997	1998
Won/Yen	7.870	8.198	7.367	10.720	10.319
Change w.r.t. 1994	0.0%	4.2%	-6.4%	36.2%	31.1%

To illustrate the effect of the exchange rates, let us deal with a hypothetical situation: The year is 1995 and a Greek shipowners wants to repair a vessel. He must first decide when and where to repair. A Japanese and a South Korean yard have provided with the best quotes of \$500,000. So, the cost to the owner will be  $\$500,000 * \text{GDM}231.6/\$ = \text{GDM}115,800,000$  and the yard revenues,  $\$500,000 * \text{Yen}94/\$ = \text{Yen}47,000,000$  and  $\$500,000 * \text{Won}771/\$ = \text{Won}385,500,000$  respectively. All other parameters - such as route deviation costs and off-hire time - being equal, the owner should be impartial to the yard selection. In one year's time, 1996, for the yards to yield the same revenues from the same project they should charge  $\text{Yen}47,000,000/109\text{Yen}/\$ = \$431,000$  and  $385,500,000/\text{Won}803/\$ = \$480,000$  respectively. So the Japanese yard, due to a 6.4% weakening of the Yen against Won, gained a competitive advantage. The cost to the Greek shipowner in 1996 would be  $\$431,000 * \text{GDM}241/\$ = \text{GDM}104,000,000$ , i.e. it will cost him 10% less to repair the vessel in a years time, although the GDM will depreciate by 4.2% compared to the USD.

The truth of the matter is that the appreciation of the USD was 15.8% and 4.1% with regard to the Yen and the Won giving a 11.7% differential. This differential establishes a threshold value. If the Greek drachma depreciates less than this value, a better tender can be sought after in a year's time; if more then now is a better time to repair. In the case that the owner needs to repair the vessel in a later time, he can hedge against rate-risk using futures or options.

In my example, I assumed, for the sake of simplification, that rate variations did not affect the required revenue by the yards in terms of their local-currency. This is not the case, since material and equipment needed for the repair might have to be imported and thus exchange rates may alter the costs. A more important effect is of exchange rates to labor-cost rates.

In some countries, labor-rates tend to cause a proportional increase with increased exchange rates. This exacerbates the total effect on the overall and shipping economy, since not only the buying power of the local currency has reduced, but also the labor costs have increased, damping the competitive advantage and leading to a vicious circle. Government subsidies might be required to recover the sector's economic health. In other countries, in order to respond more effectively to the unfavorable exchange rate, labor rates are reduced, thereby competitive advantage is increased. As the economy will improve, salaries will again raise.

#### 4.9 Labor and Steel Costs

In the previous paragraph, I brought to notice the fact that labor costs are affected by currency rates. In this section, we will examine the actual repair-yard labor compensations in different countries.

It must be said that these rates primarily reflect the local state economy or, the global state of the repair market and do not always reflect the skill, productivity or efficiency of the workforce.

Also, they do not single-handily determine the most cost efficient yard, but contributing to 60% of the total yard's cost as pointed out in Chapter One, they can make a big difference. Labor rates

increase if the local economy blooms, and especially if repair activity is high, whereas when activity is low, yards reduce their labor-rates. It is much more hurtful for a yard to have a discontinuous repair schedule and charge high labor-rates than to run on a smooth schedule with reduced labor-related revenues. Ship-repair labor rates for 1997 are quoted in the table that follows:

**Table 4.5: Ship-repair labor rates per country (1997 data)<sup>10</sup>**

Country	dollars /man-hour
Croatia	14
Eastern Europe	8
Germany	45
Holland	35
Indonesia	16
Japan	63
Mainland China	11
Mediterranean	27
Middle East	16
Northern Europe	52
Poland	21
Scandinavia	52
Singapore	25
South Korea	38
Turkey	25
UK	26
USA	28

In order to compare them a bar graph will prove useful.

<sup>10</sup> Data from "Investigation into the Nature of UK Shiprepair and its International competitiveness," DTI Report, August 1995.

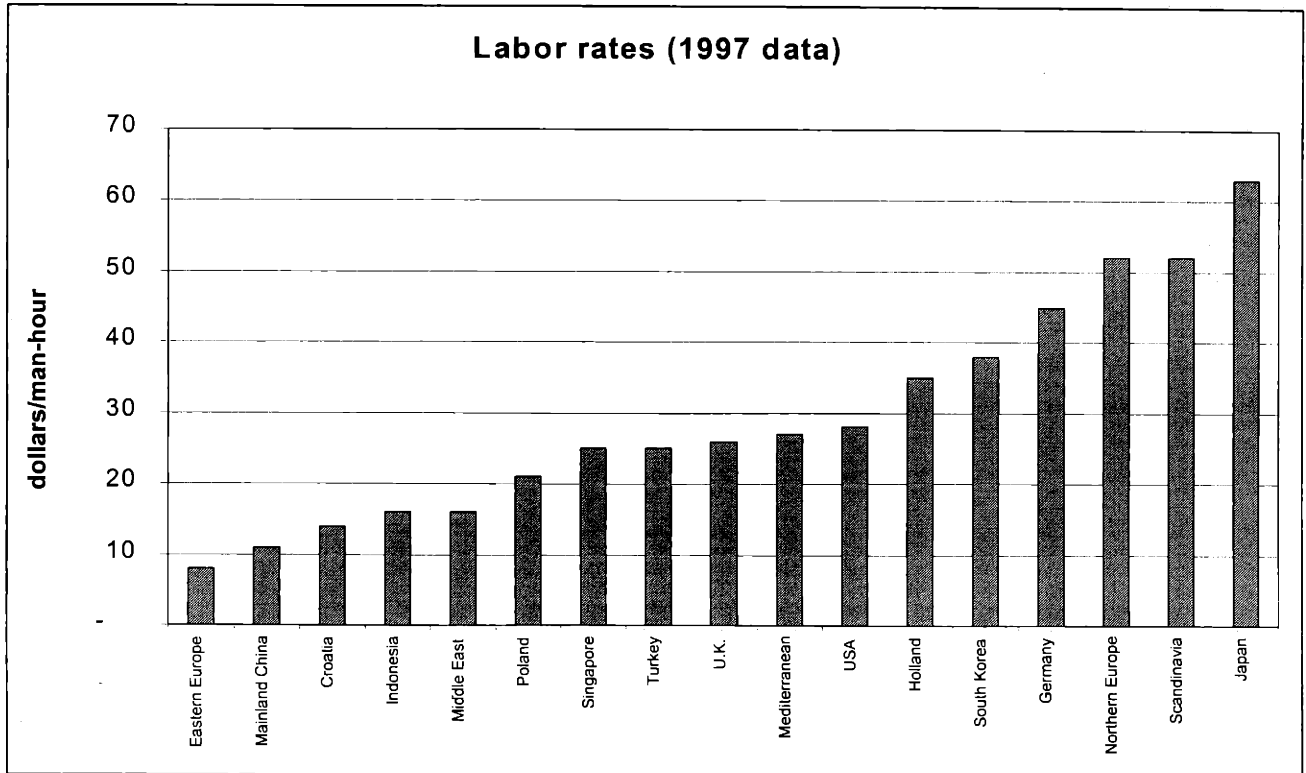


Chart 4.1: Shipyard labor rates per country in 1997

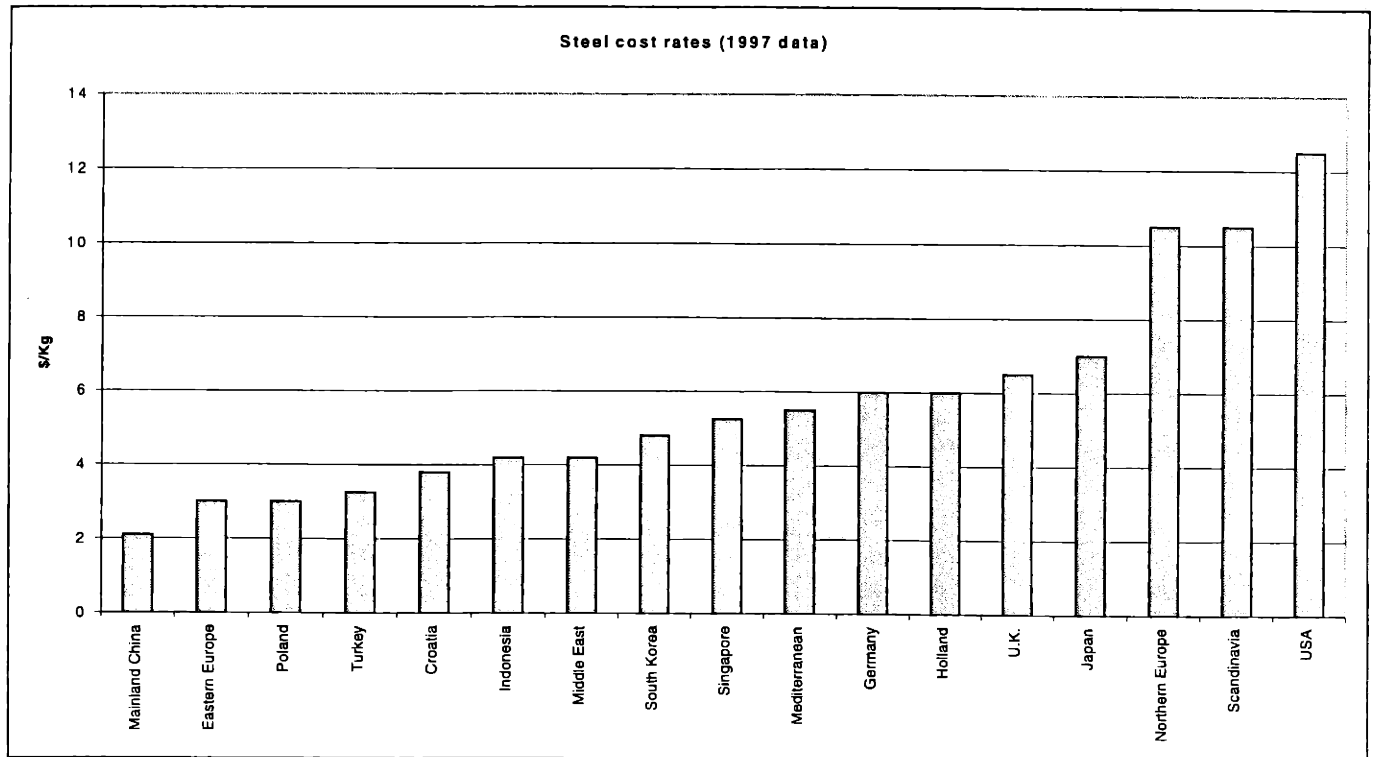
It would be wise at this time to present the reader with the equivalent table and chart for the steel-rates, since the material cost, primarily steel renewal cost, corresponds to 20% of the repair costs. Hence, Ship-repair steel-rates for 1997 are quoted in the table that follows:

Table 4.6: Repair yards' steel rates per country (1997 data)<sup>11</sup>

Country	USD/kg	Country	USD/kg
Croatia	3.8	Northern Europe	10.5
Eastern Europe	3.0	Poland	3.0
Germany	6.0	Scandinavia	10.5
Holland	6.0	Singapore	5.3
Indonesia	4.2	South Korea	4.8
Japan	7.0	Turkey	3.3
Mainland China	2.1	U.K.	6.5
Mediterranean	5.5	USA	12.5
Middle East	4.2		

<sup>11</sup> Data from "Investigation into the Nature of UK Shiprepair and its International competitiveness," DTI Report, August 1995.

In order to compare them a bar graph will prove useful:



**Chart 4.2: Shipyard steel-rates per country in 1997**

As you can see, during 1997, Mainland China and Eastern Europe have been the cost leaders in terms of labor and steel. Indonesia, Croatia, Poland, Turkey and the Middle East follow close by, whereas Northern Europe, Scandinavia and Japan charge very high rates. Mediterranean, British, Holland and Singapore stand in the middle. The US yards with very high material rates seem to struggle to compete. But how do those results affect the repair market? Who gets the lion share of the market?

For some twenty-odd years now, Singaporean yards are the most popular ship-repairing destination. Lately, and while charged rates rose, this leadership is challenged by lower cost regions, such as the Middle East, with 36% less labor costs and 20% less steel costs, and at close vicinity by the Mainland China yards, which offer services at rates 60% less than those of Singapore's yards. These yards, operating at such low costs, are able to provide price offers hard to beat - sometimes half those of Singapore. Of course, Singapore claims expertise and saviness at its trade, but customers in need of basic steel repairs will go for the lowest bidder.

Putting China aside for a moment, in the Far East region South Korean and Japanese yards charge considerably higher labor rates, giving Singapore a competitive edge.

Now, of course the power of Chinese yards cannot be overlooked. Singaporean yards reacted to the challenge by expanding beyond their country's boundaries and by merging. Keppel now owns facilities in India at Chokhani, in the Philippines at Subic Bay, Kephill and Cebu, and in Vietnam. Sembawang has actually migrated to Bohai, China, and to Karimun, Indonesia. Finally, Pan United is

considering a project in Batam, Indonesia. Sembawang has increased its share in the Jurong shipyard. That would make the company a larger, stronger regional player. There are also rumors of plans to contract the large yard capacity in the area by about 20%. This would be achieved by reducing the number of these large yards from 5 to 4. That will probably reduce regional over-capacity and drive up utilization and profitability of operation.

As previously mentioned, the Middle East ship repair industry has begun to play an important role in the market, capitalizing in cheap imported labor from poorer neighboring nations. Its focus lies on the large tanker market, which is dominant in that region. Dubai Drydocks in the UAE and ASRY in Bahrain have had a fair share in the repair of such vessels. These tankers are involved primarily in the Westbound European and US trade, and thereby frequently cross the Suez Canal on the ballast voyage back to the Arabian Gulf. Hence, the Mediterranean yards have the opportunity capture a share of this market. Unfortunately, labor rates are almost 70% higher than those in Middle Eastern yards and steel costs soar over 30% higher as well. The result is that very few such vessels drydock in Mediterranean yards. In fact, in 1996 very few VLCC got repaired in the region, with repairs occurring only in Astilleros Espanoles in Spain, Lisnave in Portugal and Elefsis Shipyards in Greece.

Another competitive force comes from the ex-eastern-block nations that now enter the international market with competitive rates. This poses a threat to the other European nations which grown used to charging higher rates. Again, we are presented with the same situation as with Singapore and China: cost versus proficiency. The ex-eastern-block nations lag in expertise with regard to other European yards but compete in price and procure the basic ship-repair contracts.

Very few projects have been allocated to countries in Central and Eastern Europe as of yet, but their quotations are used by ship-owners as a means by which to lower the contract prices offered by other European yards.

#### **4.10 Port Authorities and Regulations**

Since repair yards are, on principle, located in port areas for convenience, shipowners must comply with the local port authorities' set of rules and regulations as well as with visit charges. As far as the latter is concerned, different ports charge different fees and rates. The cost is usually marginal and will not affect the choice of a yard.

On the other hand, environmental regulations can severely impact one's choice. Environmental regulations can affect both the vessels in need of repair and the repair facilities themselves. A vessel not in compliance with the related rules and regulations will not be admitted within the port. Yards operating within the port must comply as well. An increasing number of European and American repair yards have become "green" or at least "greener".

There have been regulations on sandblasting with respect to the resulting sludge, on paints, with respect to ingredients harmful to the environment and sea-life, and on de-ballasting and a variety of other ship-repair related activities. For the yards to be able to deal with the new requirements that arise from "greener" operation and the need for additional care, new and substantial investments become necessary. Northern Europe and the US have led the way, while Southern Europe is being forced to follow through. Government help is poor in the Southern European region.

The additional investments lead to a higher capital cost and a need for better compensation. However, the ship-owner will not really notice difference in the end result he is interested in: the

repaired ship. Hence, there are no real incentives for the shipowner to choose a “green” yard over the cheaper “non-green” variety. So, competition is affected and “green” yards find themselves in a less favorable position.

#### 4.11 Overhead costs

Thus far, we have dealt with labour and material costs. The remaining costs are primarily the overhead costs (see Chapter One). Overhead costs are fees charged to compensate for the capital spending for the construction and equipping of the facilities and for necessary maintenance. Therefore, they depend on the type of depreciation that the yard is allowed or chooses to follow, their strategy on when to break-even, and of course, to the size of the investment.

The greatest cost is due to dock construction. The local port authorities and communities sometimes own such facilities and sublet them to ship-repair groups that are able to operate a shipyard without huge initial capital spending, or to shipowners who will bring in subcontractors to carry on ship-repair activities. Owning such facilities can either be a strategic decision made by local governing bodies or a necessary action to maintain employment levels in the region. The latter refers to taking over bankrupt local-repair-yards. The yards will now be able to provide more competitive rates, as the previous owners bear the capital costs; new management will therefore work under reduced overhead costs.

On the other hand, some yards would be too cost inefficient to operate within the current saturated market and with over-capacity and should either be left idle until operation can be profitable or find a different use for their premises.

Cutting down on regional capacity should not, of-course, reach the point where demand cannot be accommodated or where there is no over-capacity margin left for last-minute small-scale repair jobs.

From the above, we can conclude that it is mutually beneficial for shipyards to operate in close vicinity of each other since they then form a conglomerate, with sufficient total over-capacity to satisfy fluctuating demand, made up of yards each of minimal excess capacity. This will translate to more efficient level of operation, and to better distribution of risk. However, fierce competition can result in commodity type activities, as the yards will have similar cost structures. For this predicament, service differentiation by specialization would be the solution. Also, common agreements with regard to pricing could prove helpful to the yards.

#### 4.12 Price wars

Talking about pricing would bring us to the fact that it is not uncommon for yards to undertake projects with close to zero-effective-yield in order to keep or increase market share. Such strategy, known also as price war, can be detrimental to some competitors who either have to loose part of their share or operate with losses in order to keep up. The financial situation of the yard itself can also be in jeopardy if a more competent player beats the yard at its own game. What is more, price wars all but forge a better relationship between yards.

Also, in order to increase revenues, yards can and do claim need for additional repairs to the ones contracted. These activities are usually charged at full, not discounted rates. Excessive additional costs lead to loss of the yard’s goodwill. This means deterioration of its reputation, which in turn

leads to loss of business. Nowadays, this phenomenon is practically non-existent, and ship owners have become better at knowing what are the specific repair needs of their vessels.

Arguments and bargains on the final bill are also becoming rare, though these are less in some cultures than in others.

#### **4.13 Conclusions**

Let us now sum up the results of the identification and analysis of the different internal and external factors that affect the ship-repair industry.

Initially, I derived that the customer-power in our market is very strong, that there is an over-capacity and most of the repair-work is of commodity nature. I then moved on to consider the new and potential competing forces in our sector and to show how low labor regions attract increased market shares, while yards with high costs choose to target specialized niches. Those low labor regions that are gaining appreciable market share are Poland, the Middle East, and China. Singapore is still the most popular repair destination, though its share is eroding.

I then analyzed the off-hire factor, in terms of how it translates to additional costs. I also demonstrated how a more efficient yard with higher quota can actually be a better choice than a less efficient though (upon initial examination) cheaper yard.

Different possible production mixes were then discussed, as were the effects of the trade and age of the vessel upon its repair frequency and cost.

What followed was an analysis of the exchange rates leading to the conclusions that depreciation of one currency with respect to another can lead to a competitive advantage, and that expectations of appreciation of a ship owner's currency can lead to postponement of repair work.

Labor, steel, and overhead costs were then defined and their effects were described. Low labor is highly influential, as labor cost account for 60% of the total cost, but usually it translates to lower expertise. Low steel rates give an edge to some yards. Also, low overheads are advantageous; some of the problems with our industry are that scale effects are difficult to exploit and that smaller yards can have lower unit costs than larger ones.

Port fees and regulations were briefly discussed, and the effect of price wars concluded this chapter.

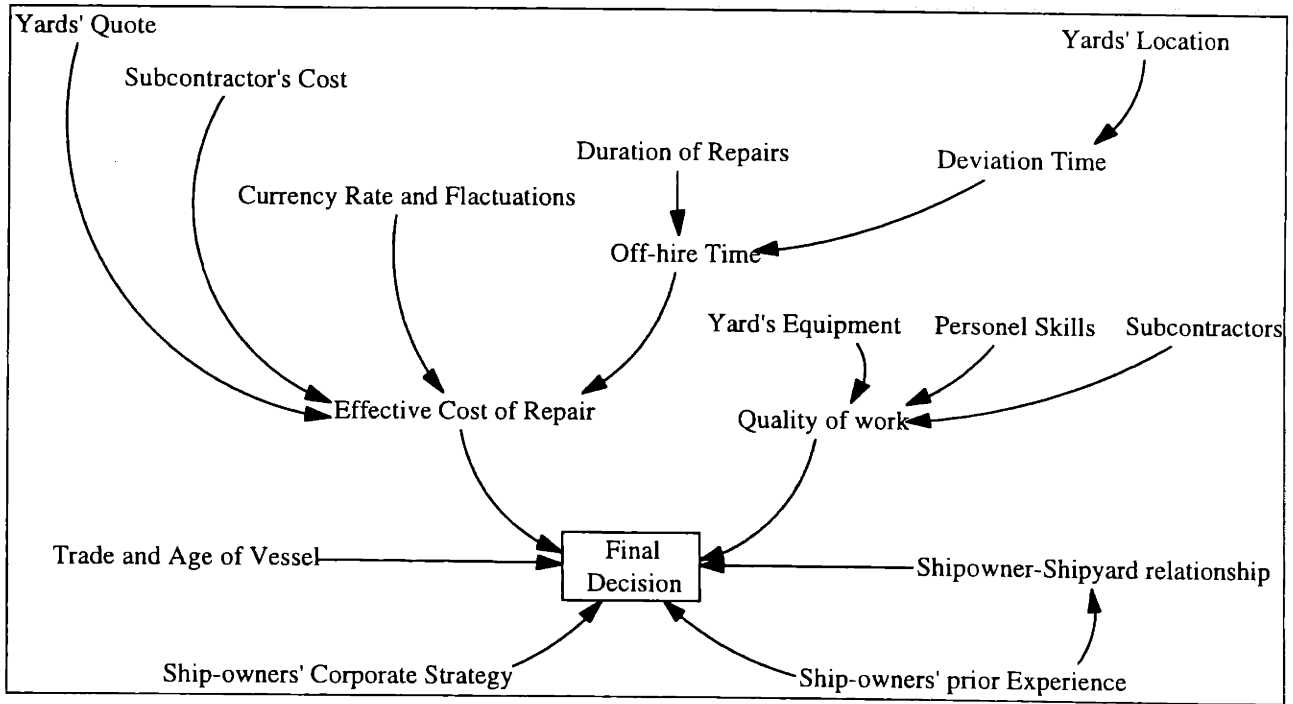


# Chapter Five: Ship-owner's Decision Criteria

## 5.1 Introduction

Chapter Five will deal with the decision criteria used by a ship-owner when choosing a repair-yard.

In the previous chapter, it was made evident that tenders alone are insufficient information upon which to base the selection of a yard. There are a variety of additional factors that should affect the final decision. These factors include the trade of the vessel and its age; the effective cost; the quality of work; the ship-owner's corporate strategy; and the relationship between ship-owner and repair-yard. The chart below depicts these decision variables and principal inter-relationships.



**Chart 5.1: Decision Factors in the final choice of a repair-yard**

Based on the above chart, we can determine that the Effective Cost of a repair depends upon both the yard's quote and the subcontractors' quotes, which give an estimate of the work-costs, as well as upon the opportunity costs incurred due to off-hire time. The amount of off-hire time is directly affected by the yard's location and the length of repair activities. A strong relationship between a ship-owner and a repair-yard is a plus, as it favors choice of that particular yard. Also, the corporate strategy and prior experience of the ship-owner, as well as the trade and age of the vessel, will shape the ultimate selection of a yard.

The previous diagram represents the decision factors used by ship-owners in choosing the most suitable yard amongst all *available* options; hence, the availability factor was not included in the diagram. This variable works through values such as yes/no or 1/0. That is, either there is availability and the yard stays under consideration or there is not and therefore the yard is discarded as a choice - nothing in between.

As a final remark, it must be noted that the type of repair in terms of urgency is also an important variable. In other words, repairs that are needed in order to comply with special survey requirements can be scheduled well in advance, allowing enough time clearance for the ship-owner to shop around and come up with the optimal yard following extensive analysis of the market. In the case of an accident, however, the vessel must be repaired immediately, most likely at a yard near her current location. Hence, there arise more extensive restrictions, under which ship-owners lack the luxuries of extensive market analysis and time for shopping around. The more severe the accident, the fewer our options. If damage is less severe, the use of flying-squads might be adequate; and if the vessel is still sea-worthy, the repair can be scheduled following the same criteria as with a standard periodic repair.

## 5.2 Effective Cost Consideration

It is clear that selecting the most appropriate repair-yard is not as straight forward as choosing the lowest bidder. The ship-owner must assess the total effective costs. The poorer the market conditions, the more critical such an assessment becomes.

First, the owner must make certain that the quote from each of the yards cover all required repair activities. Some yards might have excluded some of the activities and would seem to offer a lower initial price, thus making themselves more appealing.

In order to estimate the total effective cost, one must consider the costs incurred as a result of off-hire time, due to deviation from normal routes, and service time. These factors shall be considered in greater detail in parts 5.4 and 5.5; part 4.4, which also deals with the matter, should be consulted.

In addition to the above costs, there are port, pilotage and tug charges, as well as agent fees that must be accounted for, since most of the repair yards are located within a commercial port's domain.

Additional costs are generated through the purchase of supplies of food, water and other required services while under repair. Operational costs continue to accumulate, even while the vessel is not in use. These costs include the travel and accommodation expenses of the superintendents, and possibly of the subcontractors, sent on behalf the ship-owning company.

Finally, the owner must pay close attention to the payment arrangements. Currency is important, but more important is the interest accrued upon credit. Usually, there will be a stream of payments rather than simply a single check. Therefore, interest rates are of a critical issue in the derivation of the total effective cost in terms of present value.

### 5.3 Quality

Quality of work is a crucial factor in the selection of a repair yard. It relies upon the facility's equipment, the yard's workforce skill, and the quality of work produced by the subcontractors.

#### 5.3.1 Equipment

The quality of work depends, to a certain extent, upon the tools being used to carry out a given task. The more advanced the facility in terms of technology and equipment maintenance, the more attractive the yard. Modern facilities reduce the time and labor required for docking and un-docking by increasing labor productivity, entailing of course an increased capital cost, and consequently, an increased overhead cost. The majority of yards, however, are equipped with old docking facilities that often lack the ability to provide such essential services as compressed air and water piping systems. As a result, there is an increasing number of repair yards that strive towards modernization. It would be wise for a vessel's owner to observe what each yard's docking facilities have to offer with respect to modern technology.

Sometimes, new technology and equipment are not only preferable but also necessary in order to readily respond to and cope with the increased sophistication of ships and growing safety and environmental concerns.

Holland and Germany, in Europe, and Japan and Singapore, in the Far East, have been promoting a culture of constant improvement, a prerequisite for total quality management. In Rotterdam, five shipyards and contractors - with the assistance of the Rotterdam Port Authority - united in a venture to achieve reduced dock times and to improve the environmental friendliness of blasting and painting. In Singapore, Jurong shipyard has set up a copper slag recycling plant for the entire Singaporean ship repair industry. Copper slag is used to prepare the hull for painting and has caused a major waste disposal problem. Because of Jurong's efforts, this problem has now been solved in Singapore. Other yards in countries around the world may follow the paradigm of Singapore's recycling plant to solve similar problems.

Sophisticated equipment will also be needed by yards that consider themselves to be specialized. Those yards must offer services and capabilities beyond the ordinary competition.

Finally, it must be noted that even the best equipment, without the right personnel to handle them, or without being correctly integrated into the production system, can prove to be ineffective. Improvement needs to be administered to the weak-links or bottlenecks of the repair-activities chain.

#### 5.3.2 Workforce Skills

As previously mentioned, the skill of the yard's workers is reflected in the quality of the repair. And considering the labor-intensity of ship-repairing activities, quality and productivity are strongly dependent on workforce skills.

To quote the Japanese, ship-repair industry-related work is considered to be "dirty work," and so

the workforce supply diminishes as "cleaner" employment opportunities arise. Hence, in countries such as Japan, South Korea and Singapore, as well as in most European countries - where more promising careers entailing higher salaries and less physical exertion are offered and where the workforce is highly trained - repair-yard labor rates are raised to meet higher standards of living. In a country where the economy is in a poor state and the workforce is somehow unskilled or lacks experience, as in China and Malaysia, labor rates are much lower.

A lack of apprenticeship and training schemes over the past 10-20 years has resulted in many European yards facing a potentially devastating skill shortage. The average age of workers in many shipyards is now well over 40, and within a few years almost one half of these are expected to leave the industry.

The training budget is often the first sector to be hit during times of economic slowdown, not just in the ship repair industry but in the whole range of engineering companies. Oftentimes, the number of apprentices is governed by what companies can afford rather than by what is required. Add to that the state of our industry since 1989, and one can clearly see why there has been only minimal recruitment into the sector and an almost total absence of apprenticeships and other training initiatives.

Lately, however, some efforts have been made towards improving personnel training and apprenticeships, such as in the UK by Cammell Laird and A&P Tyne. The yards took different approaches to instituting these improvements, though, as the former chose in-house training while A&P was linked to a scheme called Training and Development Resource Ltd (TDR), which is a consortium formed by engineering companies, trade unions, education and training establishments based around Newcastle. The latter approach led to reduced training expenses. A four year training course that would cost, if administered in-house, \$59,000 (£36,000) will now cost \$31,160 (£19,000), almost 50% less than the original price. In the short term, however, we should expect to notice that the average age of the repair-yard workforce will remain high and also that there shall continue to be a significant number of retirees each year, thus gradually depleting the industry of vital skills.

#### **5.4 Location**

In this section of Chapter Five, we shall analyze the importance of location as a decision factor in process of repair-yard selection. Location is a highly important variable, as it affects the amount of off-hire time, as discussed in the previous chapter.

The most desirable location for a repair is either the last discharging port of the ship or the next loading port. This is because, when under repair, it is preferable that the vessel be empty of cargo - a fact that is especially true during major repair.

Another consideration would be the type of trade the vessel is involved in. For example, liners and ferries prefer repair yards located near their terminal ports, as care must be taken to avoid schedule disruption. Specialized yards seize such opportunities. As far as bulkers are concerned, they tend to prefer a location near the last discharging port at the end of their current charter. Tankers prefer a location between terminal ports, thus affording them some time for tank

cleaning during the voyage. Offshore supply vessels tend to prefer locations close to their operating bases.

As an illustrative example of optimal yard location, consider those tanker repair-yards located in the Persian Gulf. Being one of the tanker fleet's most popular trade routes, regional yards attract ship-owners that would prefer to have their vessel repaired somewhere close, rather than having to make an additional voyage. Ship-repair yards have concentrated in the area, so as to capitalize on the location advantage. As expected, a large proportion of the world's tanker fleet is repaired in the Persian Gulf.

Any deviation can be readily translated into opportunity cost, and therefore must be minimized. There are cases in which entailed savings counteract deviation costs, for example, savings in labor costs, and so it would seem that going that extra distance is worth it. Chapter Four dealt with the matter in greater detail.

The location of a yard also affects its accessibility. Local water depths, tides, and prevailing weather can render a yard inaccessible to certain types and sizes of vessels. What is more, it is advantageous for a yard to be accessible by both land and air. This is directly related to the local infrastructure and is necessary for the controlled and efficient influx of vital repair supplies. Furthermore, supporting industries - such as steel mills and subcontractors - must be located in close proximity to the yard. A ship-owner should consider these issues.

The geographical location of a yard also imposes several conditions, such as the local political situation/stability and the local currency. These too, must be taken into consideration before one can make the final decision on a repair-yard. It would not be advisable to have your vessels repaired in a region where war or other signs of political instability were evident, since these can have adverse effects on your contract. Apart from war-like situations, which are self-explanatory, another example of instability that could hurt the ship-owner would be a workforce strike.

### **5.5 Off-hire Time Consideration**

While under repair, a vessel does not generate any income for the ship-owner, and at the same time, crew costs run as normal and the vessel continues to depreciate. Hence, the ship-owner will, as a general rule, prefer yards with shorter repair times while avoiding yards with a history of delays. In times of good trading conditions, time can be more important than price, but in slower periods, when cost cutting is most crucial, time may be secondary to price.

What is more, the owner seeks to book cargo for his ship shortly after the scheduled date of repair completion. Thus delivery of the vessel to the owner on the promised date is critical, and repair contracts often include late-delivery penalties, so that in the occasion of late delivery yards will have to pay compensation to the owners. Such costs are substantial to the yard, providing it with an extra incentive to keep to schedule; the owner is also partly insured and has less to worry about.

## 5.6 Ship-owner-Shipyard Relationship

The relationship that exists between ship-owner and shipyard is a highly important consideration when choosing a yard. A good history of customer service can make the difference when deciding where to allocate new contracts. Good customer service includes collaboration with the owner's representative at the yard, the ability to negotiate decently, proper organization, honest reports on possible shortcomings during repair activities, and the avoidance of pushing for unnecessary additional repairs.

During the repair of a vessel, a supervisor is sent by the owner's company. His job is to ensure that the appropriate repair work is being carried out as planned. The representative meets daily with various employees of the yard, from simple workers to the yard's managers, checking up on the progress and quality of the repair activities. Hence, proper collaboration is imperative, and strong personal relationships can lead to further contracting of the yard.

Apart from negotiations with the representative regarding technical issues, economical issues may also arise and must be dealt with in a civilized manner. There are, sometimes, disputes over the size and productivity of the workforce. Strong arguments are expected in such situations, building up tension in both parties. In order to avoid unpleasant situations, such as the labor force refusing to proceed with a repair and consequently accruing severe cost penalties for the ship-owner, the ability of a yard's management to fruitfully negotiate with both workers and ship-owner is an essential skill.

In addition, the yard's management team must also demonstrate the ability to effectively distribute duties to the workers, to organize repair activities in a smooth, controlled manner, and to ensure safety conditions in the yard. The shipping company's representative is usually a highly trained and experienced individual with sufficient insight into the business to make an educated assessment of the yard's performance.

What is more, even in the most organized yard with the most advanced equipment and labor-skill, mistakes can still be made. It is advantageous for a yard to acknowledge and correct possible work errors, rather than cover them up. Such deception will most likely surface sooner or later and will impose a major wound upon the relationship between owner and yard. Though of course, it would not be wise to alarm the owner of petty mistakes that are easily correctable.

Finally, it must be mentioned that efforts by a yard to add a variety of unnecessary, extra repair activities with the sole purpose of inflating the final bill is never advisable. This was once a common practice, but as time goes by, cases of such underhanded behavior diminish. Now shipping companies provide repair lists in great detail and keep a close eye on the condition of their vessels.

## Chapter Six: Obtaining Actual Yard Quotes

### 6.1 Introduction

In this chapter, I shall present the reader with the resulting offers from various yards around the globe for the dry-docking of a 34,000 dwt bulk-carrier. The name of the yards will be disguised so as to preserve the confidentiality of the information.

The basis of the contract is the Owner's Specification. This varies in size and content, but typically describes each work item to be carried out. In many cases, however, the work to be done will depend upon the findings and agreements made following a preliminary inspection. The shipyard estimates the cost of each work item and bids accordingly. Upon the ship's arrival, the owner's representative may delete items and/or include additional work.

My aim was to cover the entire ship-repair market and to receive quotations from each of the geographical regional markets - including America, Europe, Africa, the Middle East, Africa, Asia and Australia - so that I could obtain a complete view of the ship-repair industry. Appendix V contains all necessary maps.

Some yards did not reply with an offer, either due to lack of available capacity or to lack of interest. After some time, a sufficient pool of data was established from more than 30 yards around the globe.

I shall then analyze the data, making comparisons between the different yards for different repair activities, so as to establish regional advantages and disadvantages within the ship-repair industry regime. Since the conclusions will be based on actual market prices, the study will be as realistic as possible.

### 6.2 Owner's Specification

In this section, I shall present the specification used in the request for quotations. The specification is divided into 16 separate parts; I will describe which activities are included within each group. The breakdown of work into smaller, more manageable pieces will help to more readily identify the most critical activities in terms of cost. The yards were asked to provide information with regards to availability for the indicated date, their best quotation and payment terms, as well as the amount of time needed to carry out above work. The particulars of the vessel under consideration are as follows:

**Table 6.1: Vessel Particulars**

L.O.A	180 m
L.B.P	170 m
BREADTH	27 m
GROSS/NET	19,800 / 12,750 tons
DWT	34,300 tons

### 6.2.1 Dry-docking / Cleaning

The yard must provide the necessary facilities, labour and material in order to carry out the following work:

1. to dry-dock the vessel for underwater bottom examination cleaning and painting;
2. to clean thoroughly the underwater body using high-pressure jet water;
3. to remove all marine growth and loose adhering paints;
4. to remove by scraping all hard barnacles, about 500 m<sup>2</sup>;
5. to sandblast (grade SA-2) all rusty spots, about 1000m<sup>2</sup>;
6. to allow bottom to dry up before painting.

### 6.2.2 General Services

The following services are to be provided during dry-docking and Hull/Engine repairs:

Electric Power to be provided during dry-docking period. Meter readings to be taken before connection is made after disconnection;

Sea water to be provided for the refrigerating machine and air compressors;

Fire main line to be maintained under water pressure;

Fire watchmen to be provided;

Gas-free certificate to be maintained during repairs;

Garbage to be removed daily.

### 6.2.3 Painting

1. Underwater bottom area (approx. 4860 m<sup>2</sup>)

All rusty spots are to be sandblasted (grade SA-2), covering approximately 1000 m<sup>2</sup>. The sandblasted area is to be touched up with two coats of anti-corrosive paint. The entire underwater bottom area, including flat and vertical sides, is to be painted with one full coat anti-corrosive paint and one full coat of anti-fouling paint.

2. Bottoming area (approx. 1900 m<sup>2</sup>)

All rusty spots are to be sandblasted (grade SA-2), covering approximately 1000 m<sup>2</sup>. The sandblasted area is to be touched up with two coats of anti-corrosive paint. The entire bottoming area is to be painted with one full coat anti-corrosive paint and one full coat bottoming paint.

3. Topside area (approx. 1850 m<sup>2</sup>)

All rusty spots are to be sandblasted (grade SA-2), covering approximately 1000 m<sup>2</sup>. The sandblasted area is to be touched up with two coats of anti-corrosive paint. The entire topside area is to be painted with one full coat anti-corrosive paint and one full coat anti-fouling paint.

### 6.2.4 Sea Chests

1. Sea chest strainers are to be removed for inspection.
2. Sea chests are to be cleaned and painted with two coats anti-corrosive paint and one coat of anti-fouling paint.



3. Zinc plate condition is to be checked and exhausted samples are to be replaced with fresh ones (material to be supplied by the Owners). There are 15 zinc plates weighing 5 kg each.

#### **6.2.5 Rudder**

1. Rudder pintle clearance is to be taken and readings are to be submitted to the Lloyds Registry (L.R.) Surveyor and Owner's representative.
2. Lower pintle is to be removed, and pintle bush is to be replaced (diameter is 0.28 m).

Material to be supplied by Owners (PHOENOL HFG-LITE)

#### **6.2.6 Propeller / Tailshaft**

1. Propeller is to be disconnected. Tailshaft is to be withdrawn for inspection.
2. Tailshaft taper and key way are to be magnaflux checked for suspected hairline cracks.
3. Tailshaft clearance is to be taken, and readings are to be recorded and submitted to the L.R. Surveyor and Owner's representative.

#### **6.2.7 Sterntube Simplex Compact Seals**

1. Forward and aft Simplex Compact Seals, 0.6m in size, are to be disconnected and opened for inspection.
2. Condition of the aft Chrome liner is to be checked and measured. If grooves are detected, then the liner is to be machined to the appropriate size.
3. New sealing rings are to be fitted (material to be supplied by Owners), and Simplex Compact Seals are to be reassembled and restored.

#### **6.2.8 Propeller**

Propeller blades are to be polished, and if damages are detected, to be repaired.

#### **6.2.9 Sea Valves / Overboard Dischargers**

Vital sea valves and overboard dischargers are to be opened for inspection (20 pieces).

**Table 6.2: Sea Valves Specifications**

Type	Size (inch)	pieces
Globe Valve	4	2
Globe Valve	6	2
Gate Valve	6	2
Butterfly Valve	8	2
Gate Valve	8	2
Globe Valve	10	2
Globe Valve	12	2
Gate Valve	12	2
Butterfly Valve	12	1
Globe Valve	14	2
Globe Valve	15	1

### 6.2.10 Hull Zinc Plates

Includes zinc plates on hull, rudder blades, propeller aperture, bilge keel, etc. Condition of these plates is to be checked, and if found to be exhausted, new zinc plates are to be fitted, a total of 60 pieces weighing 10 kg each. Material is to be supplied by the Owners.

### 6.2.11 Hull Repairs

Steel work is to be performed in the cargo holds. Following the shell frames, the upper and lower frame brackets are to be renewed.

1. Shell frames size  $6000 \times 300 \times 160$  (F.P.)  $\times 12 \times 18$ .
2. Total of 40 frames  $\times 311$  kg = 12,440 kg
3. Upper frame brackets size  $900 \times 600 \times 100$  (F.P.)  $\times 12$  mm. Total of 40 upper brackets  $\times 58$  kg each = 2,320 kg
4. Lower frame brackets size  $1600 \times 700 \times 100$  (F.P.)  $\times 12$  mm. Total of 60 lower frame brackets  $\times 114$  kg each = 6,840 kg

Total steel-work performed in cargo holds comes to approximately 21,600 kg.

### 6.2.12 Shell Plating Starboard Side

Due to contact damage on this side involving indented shell plating, the second plate below the shear strake, between frames  $110 \frac{1}{2}$  to  $140 \frac{1}{2}$ , is to be cropped and partly renewed together with internals (frame space 0.6 m).

Approximate amount of steel:  $24000 \times 2300 \times 16$  mm<sup>3</sup>, or about 7,066 kg.

Amount of steel for internals/frames:  $4000 \times 300 \times 160 \times$  (F.P.)  $\times 12 \times 18$  mm, at 207 kg each  $\times 30$  pieces, weights about 6,210 kg.

Hence, the total amount of steel needed for the starboard side for both shell plating and internals is approximately 13,300 kg.

### 6.2.13 Topside Tanks Port and Starboard Side Steelwork

1. All Topside Tanks, No 1 to No 6 Port/Stbd. Wasted internals such as underdeck longitudinals, bottom longitudinals, sloping plates, upper and lower brackets, web frames, stiffeners division bulkheads.
2. Condition of steel plates is to be checked and exhausted samples are to be cropped and partly renewed (location to be decided after thickness measurements are taken).

Approximate steel weight to be renewed: **20 tons**.

### 6.2.14 Cargo Holds Sandblasting

Cargo holds No. 1, No. 2 and No. 3 are to be sandblasted (grade SA-2) and then painted with two coats epoxy paint. Approximate sandblasting area: 6,000 m<sup>2</sup>.

### 6.2.15 Piping Work in the Engine Room

Necessary pipes, including flanges at both ends, are to be renewed with black-steel seamless pipe.

**Table 6.3: Piping Specifications**

Type	Size (inch)	Required length (m)
SCH 40	3	20
SCH 80	3	10
SCH 40	5	10
SCH 80	6	10
SCH 40	8	10
SCH 80	10	10

### 6.2.16 Main Engine and Auxiliary Machinery Overhauling

1. Main Engine Cylinders No. 2 and No. 4 are to be overhauled, pistons are to be drawn out, and piston rings are to be replaced. Cylinder Liners (670 mm in size) are to be drawn out and replaced with new ones (tools and spare parts shall be provided by the Owners).
2. Main Engine Turbochargers No. 1 and No. 2 (makers Brown Boveri, type VTR 501 × 2) are to be overhauled. Ball bearings, L.O. pumps, sealing bushes on both the turbine and blower sides, are to be replaced (tools and spare parts shall be provided by the Owners).
3. Daihatsu Diesel Generator type 6PSHTB-26D-720RPM-750H.P. Diesel Engine is to be overhauled for maintenance, pistons are to be drawn out, and piston rings are to be replaced.

## 6.3 Collected Quotations

After substantial time and effort, several offers from ship-repair yards around the world were received. The range of ship-repair yards was diversified enough to cover the repair market

globally. A total of just over 30 yard quotations was collected and used to establish the condition of the repair market for each geographical region. Using this information, dry-docking estimations will be presented for North America, South America, Mediterranean Europe, Atlantic Europe, Northern Europe, the Baltic Sea, the Black Sea, the Middle East, and finally, the Far East.

### 6.3.1 Quotation Values

Initially, let us examine the received quotations:

**Table 6.4a: Quoted Repair Cost (\$,000)**

Geographical Region	Yard	Country	Quoted repair Cost
N. America	US-1	USA	1,245
	US-2	USA	1,112
S. America	Arg-1	Argentina	517
Mediterranean	Sp-2	Spain	608
	Gr-1	Greece	383
	Gr-2	Greece	448
Atlantic Europe	Port-1	Portugal	712
	Sp-1	Spain	650
North Europe	Neth-1	Netherlands	745
	Neth-2	Netherlands	777
	Fr-1	France	780
	UK-1	Belfast	893
	UK-2	Falmouth	779
Baltic Sea	Ukr-1	Ukraine	267
	Rus-1	Russia	337
	Rom-1	Romania	358
	Tur-1	Turkey	353
Black Sea	Pol-1	Poland	378
	Lith-1	Lithuania	363
	Lat-1	Latvia	303
Middle East	UAE-1	U.A.E.	419
Far East	Jap-1	Japan	651
	Jap-2	Japan	479
	Kor-1	South Korea	366
	Sing-1	Singapore	464
	Sing-2	Singapore	381
	Ind-1	Indonesia	276
	Chi-1	China	213
	Chi-2	China	229
	Chi-3	China	232
	Chi-4	China	221

In the above table, we can observe that the US stands out as the most expensive repair region, with prices almost 6 times those of the cheapest yards, located in China, and more than 35% higher than the next highest cost region, North Europe.

A more condensed version of the above table follows next.

**Table 6.4b: Quoted Repair Costs (\$,000)**

Geographical Region	Repair Quoted Cost (\$,000)
N. America	1,179
S. America	517
Mediterranean	480
Atlantic Europe	681
N. Europe	795
Baltic Sea	329
Black Sea	348
Middle East	419
Japan	565
Korea	302
Singapore	422
Indonesia	276
China	224

Also ranked from most to least expensive:

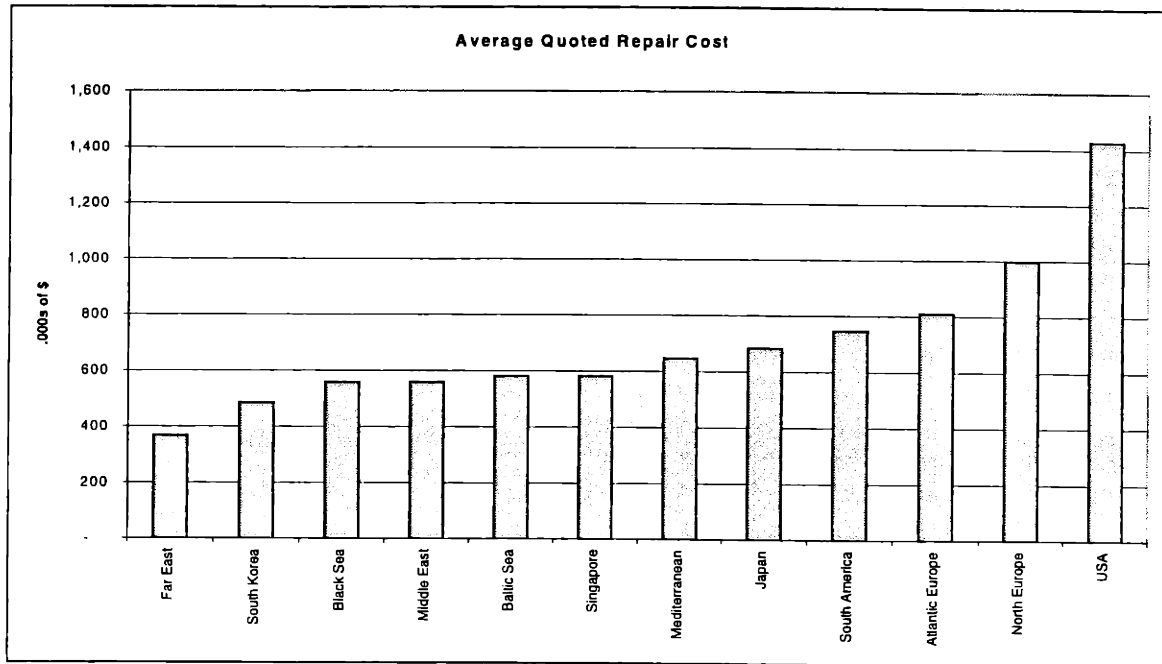
**Table 6.4c: Quoted Repair Costs (\$,000)**

Geographical Region	Repair Quoted Cost (\$,000)	% <sup>12</sup>
N. America	1,179	527%
N. Europe	795	355%
Atlantic Europe	681	304%
Japan	565	252%
S. America	517	231%
Mediterranean	480	214%
Singapore	422	189%
Middle East	419	187%
Black Sea	348	155%
Baltic Sea	329	147%
Korea	302	135%
Indonesia	276	123%
China	224	100%

The numbers are self-explanatory. China, Indonesia, Korea, and the Black and Baltic Seas offer low prices, below \$350,000 and as low as \$225,000, while the United States and Northern Europe are the most expensive, ranging anywhere from \$800,000 on up to \$1.2M. Atlantic Europe follows at \$700,000. Japan is cheaper by about \$120,000, while South America, the Mediterranean and Singapore lie in the \$420,000-\$520,000 range.

The following chart provides with a graphic illustration of the above:

<sup>12</sup> With regards to China



**Chart 6.1: Regional Cost Quotation for the Repair**

**6.3.2 Off-Hire Time**

Although some conclusions could be derived from the data above, the cost picture is not complete until we consider the off-hire time costs.

Different yards, and consequently, different regions operate at varying degrees of efficiency, and therefore offer varying repair times. The shorter the cycle, the higher the yard will charge. Dry-dock duration is one of the most crucial factors affecting a ship-owner’s choice of yard. As discussed in previous chapters, the owner seeks to minimize off-hire days, never failing to realize that in addition to the actual repair days, deviation from the original course to the repair-yard and back to the route again also contributes to off-hire time. In order to simplify calculations, we shall assume that the vessel will make no deviation from its original course as it approaches the repair-yard; the path of the vessel shall be such that the yard will be en-route.

We shall use the following table to make comparisons among the yards. The following table provides the total repair-time offered by each yard, consisting of both the required days in dry-dock facilities as well as the length of time necessary for afloat repair.

Table 6.5a: Repair Duration

Geographical Region	Yard	Country	Dry-dock days	Afloat repair days	Total repair days
N. America	US-1	USA	9	17	26
	US-2	USA	10	14	24
S. America	Arg-1	Argentina	10	13	23
Mediterranean	Sp-2	Spain	10	7	17
	Gr-1	Greece	6	9	15
	Gr-2	Greece	8	10	18
Atlantic Europe	Port-1	Portugal	8	4	12
	Sp-1	Spain	7	7	14
North Europe	Neth-1	Netherlands	6	7	13
	Neth-2	Netherlands	8	12	20
	Fr-1	France	10	16	26
	UK-1	Belfast	9	9	18
	UK-2	Falmouth	9	16	25
Baltic Sea	Ukr-1	Ukraine	15	15	30
	Rus-1	Russia	12	10	22
	Rom-1	Romania	10	10	20
	Tur-1	Turkey	12	8	20
Black Sea	Pol-1	Poland	8	14	22
	Lith-1	Lithuania	12	14	26
	Lat-1	Latvia	11	11	22
Middle East	UAE-1	U.A.E.	7	7	14
Far East	Jap-1	Japan	5	9	14
	Jap-2	Japan	7	3	10
	Kor-1	South Korea	5	7	12
	Sing-1	Singapore	5	15	20
	Sing-2	Singapore	6	6	12
	Ind-1	Indonesia	6	8	14
	Chi-1	China	6	6	12
	Chi-2	China	7	8	15
	Chi-3	China	7	6	13
	Chi-4	China	6	7	13

In the table above, we may note substantial differences from one yard to the next with regard to total required repair-time; differences exist even within the same region or country. One may observe that South America and the Black and Baltic Sea regions require approximately 23 days to complete the repair activities, while the United States holds yet another unfortunate record, requiring 25 days. Northern Europe, though expensive, asks to hold the vessel for only 20 days, while the Mediterranean and Singapore request 16 days. The Middle East, Indonesia, China and Atlantic Europe each require approximately 2 weeks. The most competitive yards are Japanese and Korean, citing anywhere from the diminutive 12 to as low as 10 days for completion of repair work - a mere 40% of the time needed by US yards.

The tables that follow present the average required times and the corresponding standard deviation per region, as well as the ranking of the yards with respect to the number of days needed to complete their repair contract.

**Table 6.5b: Repair Duration**

Geographical Region	Dry-dock days	stdv	Afloat repair days	stdv	Total repair days	stdv
N. America	9.5	0.7	15.5	2.1	25.0	1.4
S. America	10.0	n/a <sup>13</sup>	13.0	n/a	23.0	n/a
Mediterranean	8.0	2.0	8.7	1.5	16.7	1.5
Atlantic Europe	7.5	0.7	5.5	2.1	13.0	1.4
N. Europe	8.4	1.5	12.0	4.1	20.4	5.3
Baltic Sea	12.3	2.1	10.8	3.0	23.0	4.8
Black Sea	10.3	2.1	13.0	1.7	23.3	2.3
Middle East	7.0	n/a	7.0	n/a	14.0	n/a
Japan	6.0	1.4	6.0	4.2	12.0	2.8
Korea	5.0	n/a	7.0	n/a	12.0	n/a
Singapore	5.5	0.7	10.5	6.4	16.0	5.7
Indonesia	6.0	n/a	8.0	n/a	14.0	n/a
China	6.5	0.6	6.8	1.0	13.3	1.3

**Table 6.5c: Repair Duration**

Geographical Region	Total repair days
N. America	25.0
Black Sea	23.3
S. America	23.0
Baltic Sea	23.0
N. Europe	20.4
Mediterranean	16.7
Singapore	16.0
Middle East	14.0
Indonesia	14.0
China	13.3
Atlantic Europe	13.0
Japan	12.0
Korea	12.0

As a final remark, it must be noted that shipyards, in order to appear more attractive to ship-owners, often underestimate the repair period. The most notorious yards, in that sense, are those of the Baltic and Black Seas, as well as those of China. As previously mentioned, in order to hedge themselves of such risk, ship-owners include clauses on the repair contract rendering the yards responsible for any costs or loss of profit due to delays. The best tool to avoid any

<sup>13</sup> n/a in the table refers to single samples, which render standard deviation calculations inapplicable.



### 6.3.3 Effective Total Repair Cost

After having collected data for the off-hire days, we must incorporate our findings into the rest of our calculations. At this stage, we must also include the running cost of the vessel while under repair. Hence:

$$\text{Effective Total Repair Cost} = \text{Quoted Repairing Cost} + \text{Off-hire costs};$$

while,

$$\text{Off-hire costs} = \text{Off-hire days}^{14} \times (\text{daily running cost} + \text{daily loss of hire})$$

Therefore, the Effective Total Repair Cost also depends upon the current hire rates as well as upon the running costs. We observe a new table that incorporates Effective Repair Costs:

**Table 6.6a: Effective Total Repair Cost**

*(Off-hire costs = \$10,000)*

Yard	Repair Quoted Cost (\$,000)	Off-hire days	Off-hire Cost (\$,000)	Effective total Cost (\$,000)
US-1	1,245	26	260	1,505
US-2	1,112	24	240	1,352
Arg-1	517	23	230	747
Sp-2	608	17	170	778
Gr-1	383	15	150	533
Gr-2	448	18	180	628
Port-1	712	12	120	832
Sp-1	650	14	140	790
Neth-1	745	13	130	875
Neth-2	777	20	200	977
Fr-1	780	26	260	1,040
UK-1	893	18	180	1,073
UK-2	779	25	250	1,029
Ukr-1	267	30	300	567
Rus-1	337	22	220	557
Rom-1	358	20	200	558
Tur-1	353	20	200	553
Pol-1	378	22	220	598
Lith-1	363	26	260	623
Lat-1	303	22	220	523
UAE-1	419	14	140	559
Jap-1	651	14	140	791
Jap-2	479	10	100	579
Kor-1	366	12	120	486
Sing-1	464	20	200	664
Sing-2	381	12	120	501
Ind-1	276	14	140	416

<sup>14</sup> Normally, these days include the days under repair and the deviation days, but due to simplification we assume equal deviation from our route to all yards and therefore exclude it from our calculations.

Chi-1	213	12	120	333
Chi-2	229	15	150	379
Chi-3	232	13	130	362
Chi-4	221	13	130	351

Table 6.6b: Effective Total Repair Cost

Geographical Region	Repair Quoted Cost (\$,000)	Off-hire days	Off-hire Cost (\$,000)	Effective Total Cost (\$,000)	Mult. Factor <sup>15</sup>
N. America	1,179	25	250	1,429	1.21
S. America	517	23	230	747	1.44
Mediterranean	480	17	170	778	1.35
Atlantic Europe	681	13	130	811	1.19
N. Europe	795	20	204	999	1.26
Baltic Sea	329	23	230	559	1.70
Black Sea	348	23	233	581	1.67
Middle East	419	14	140	559	1.33
Japan	565	12	120	685	1.21
Korea	366	12	120	486	1.33
Singapore	422	30	300	567	1.38
Indonesia	276	14	140	416	1.51
China	224	13	133	356	1.59

It is evident that off-hire costs, assuming a \$10,000 daily cost, range from \$100,000 to \$300,000. Should the hire rates or the running costs increase, the off-hire costs would rise further, and vice versa. Hence, the better the market, the more crucial it becomes to minimize the repair period. To illustrate the effect of the added costs, I present the reader with the following table, in which regions are ranked from those with the highest costs to those with the lowest costs, before and after considering off-hire expenses.

Table 6.7: Ranking of High Cost Regions, Quoted Vs Effective cost

Quoted Repair Cost (\$,000)	Geographical Region	Geographical Region	Effective total Cost (\$,000)
1,179	N. America	N. America	1,429
795	N. Europe	N. Europe	999
681	Atlantic Europe	Atlantic Europe	811
565	Japan	S. America	747
517	S. America	Japan	685
480	Mediterranean	Mediterranean	646
422	Singapore	Singapore	582
419	Middle East	Black Sea	581
366	Korea	Middle East	559
348	Black Sea	Baltic Sea	559
329	Baltic Sea	Korea	486
276	Indonesia	Indonesia	416
224	China	China	356

<sup>15</sup> Given by effective cost/quoted cost

As one may note, the United States, Northern Europe and Atlantic Europe still control the most expensive yards, with almost \$1.5M, \$1M, \$800,000 respectively. Japan, due to its high efficiency, managed to overtake South America. The cost levels of Mediterranean yards remained stable with respect to the rest. The effective cost to the ship-owner in Black Sea and Baltic Sea yards increased substantially due to long repair times, reaching the \$560,000-\$580,000 range. Singapore and the Middle East also fall within this bracket. Korea, due to its high efficiency, looks very attractive at \$560,000, while Indonesia and China, requiring only about two weeks of repair time, kept their low-cost-leadership at \$415,000 and \$350,000 respectively.

Through a sensitivity analysis with respect to the daily off-hire cost, and noting the behaviour of the effective cost for \$5,000, \$10,000 and \$15,000 a day, we observe that there is but little change in the relative competitiveness of the yards, as noted in Table 6.7. North America, Northern Europe and Atlantic Europe are the most expensive regions, followed by South America, Japan and the Mediterranean. The lowest cost regions also kept their order with China being the lowest bidder, then Indonesia, followed by Korea. The battle occurs as the Black and Baltic Sea regions lose ground to the Middle East and Singapore as off-hire expenses rise. As a conclusion to this section, I shall present a graphic illustration of the regional off-hire days. Multiply each column with the current daily off-hire cost and the result represents regional off-hire costs.

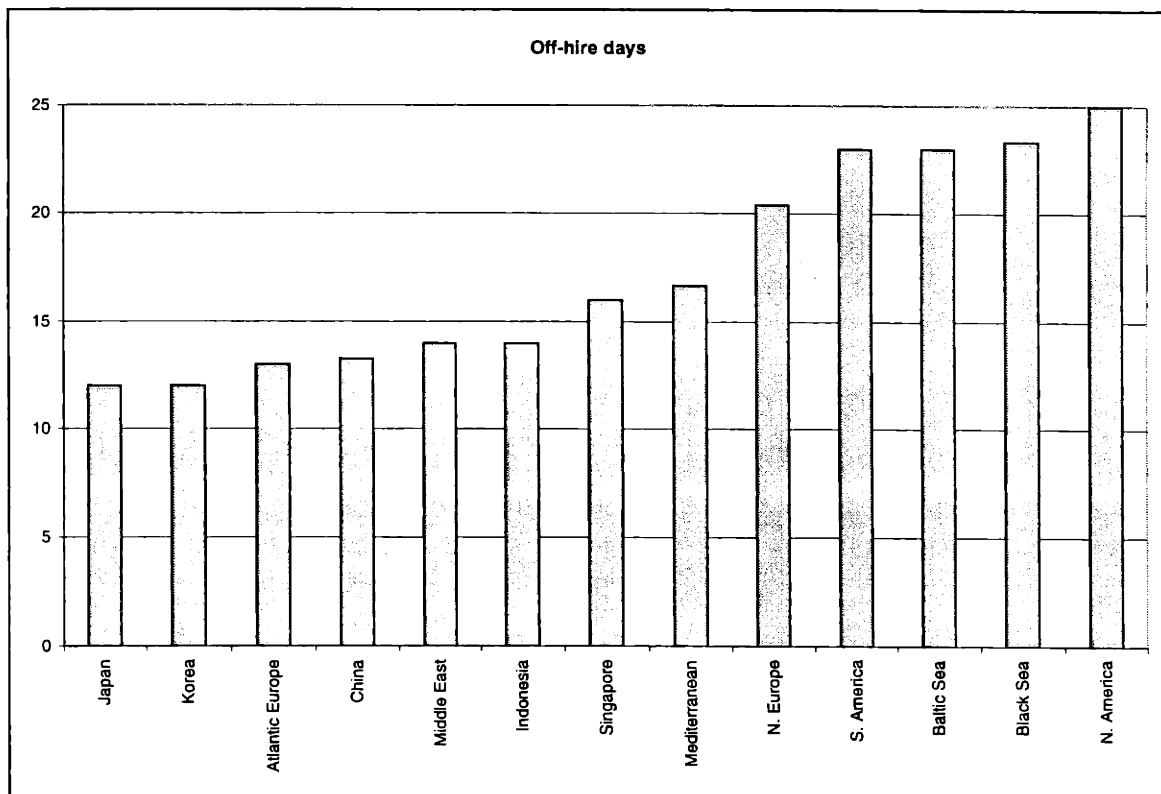


Chart 6.2: Off-hire days by region

### 6.3.4 Quality

In this segment, I will present the reader with a table summarising the ship-repair characteristics of each geographical region. Cost and efficiency conclusions are based upon findings from data analysis, whereas commentary on the quality of work in different regions finds its basis in conversations with customers and ship-owners as well as in the reading of related articles.

The table may be considered to be a brief guide to the current global ship-repair market, presenting estimates of the principal factors affecting yard selection.

**Table 6.8: Current Global Repair Conditions**

Geographical region	Repair Cost	Repair Time	Quality
N. America	V. High	V. Long	High
S. America	Average / High	Long	Low / Fair
Mediterranean	Average	Average	High
Atlantic Europe	High	Short	High
North Europe	High	Average / Long	High
Baltic Sea	Low	V. Long	Fair
Black Sea	Low	V. Long	Low / Fair
Middle East	Average	Short	Fair / High
Japan	Average / High	V. Short	V. High
Korea	Low / Average	V. Short	High
Singapore	Average	Short	High
China / Indonesia	V. Low	Short	Low

### 6.4 Segregating Repair Activities and their Costs

We have previously performed a comparative analysis between the different yards and geographical regions based upon the total repair costs. In this section, we shall more closely examine these comparisons, segregating the repair into activity-groups, as described in section 6.2. Appendix VI presents the activity-group costs for each yard, as well as the final quotation before and after any discount. Below, I have include a table citing the average costs of each activity with regard to the quoted total repair cost, the corresponding standard deviations from the mean, and the cumulative repair cost percentage.

**Table 6.9: Activity-Group Average percentage of the Quoted Repair Cost**

	average	StDev	cumul.
<b>Cargo holds Sandblasting</b>	21.3%	4.9%	21.3%
<b>Topside tanks Port/Stbd Side</b>	18.8%	3.5%	40.0%
<b>Hull Repairs</b>	17.9%	2.2%	57.9%
<b>Painting/Sandblasting</b>	11.1%	2.7%	69.0%
<b>Shell Plating Stbd side</b>	11.0%	1.3%	80.1%
<b>Dry-docking</b>	5.7%	1.9%	85.7%
<b>M/Engine &amp; Aux. Machinery Overhauling</b>	4.0%	1.5%	89.7%
<b>Piping work Engine Room</b>	2.5%	0.7%	92.3%
<b>General Services</b>	2.5%	0.8%	94.7%
<b>Propeller / Tail-shaft</b>	2.1%	0.7%	96.9%
<b>Sea valves overboard discharges</b>	1.0%	0.3%	97.9%
<b>Rudder</b>	0.7%	0.3%	98.6%
<b>Stern-tube Simplex Seals</b>	0.4%	0.2%	99.0%
<b>Sea Chests</b>	0.4%	0.1%	99.4%
<b>Hull Zinc Plates</b>	0.3%	0.1%	99.7%
<b>Propeller blades polishing</b>	0.3%	0.1%	100.0%

In the above table, we can see that, on average, cargo hold sandblasting, topside tank repair and hull repairs are the major cost activities within our contract, comprising almost 60% of the total costs. Add to that painting/sandblasting, shell plating, dry-docking activities and machinery repairs and we get almost 90% of the total. We can also see that sea valves, rudder repair, stern-tube seals, zinc plates and propeller polishing contribute less than 3% of the total costs. Such an analysis can help the ship-owner to readily identify those critical activities that demand more attention.

Now let us now have a look at each of these activities, grouping together the ones that are of a similar nature.

#### 6.4.1 Dry-docking Cost

Dry-docking costs depend upon the location of shipyard, the duration of repairs, and the shipyard's daily rate.

The location of the yard is important, since it will determine the necessary tug-boat and pilotage expenses. On a regional scale, the more difficult it is to steer the vessel into the yard - for example, due to narrow, confined waters or the presence of strong currents and tides - the higher the tug-boat and pilotage costs will be. On the global scale, it is only natural for the aforementioned costs to rise in regions with high service rates.

It is also quite clear that since the yards charge a daily rate for dock utilisation, there is a cost factor equal to the product of this daily fee and the required number of docking days.

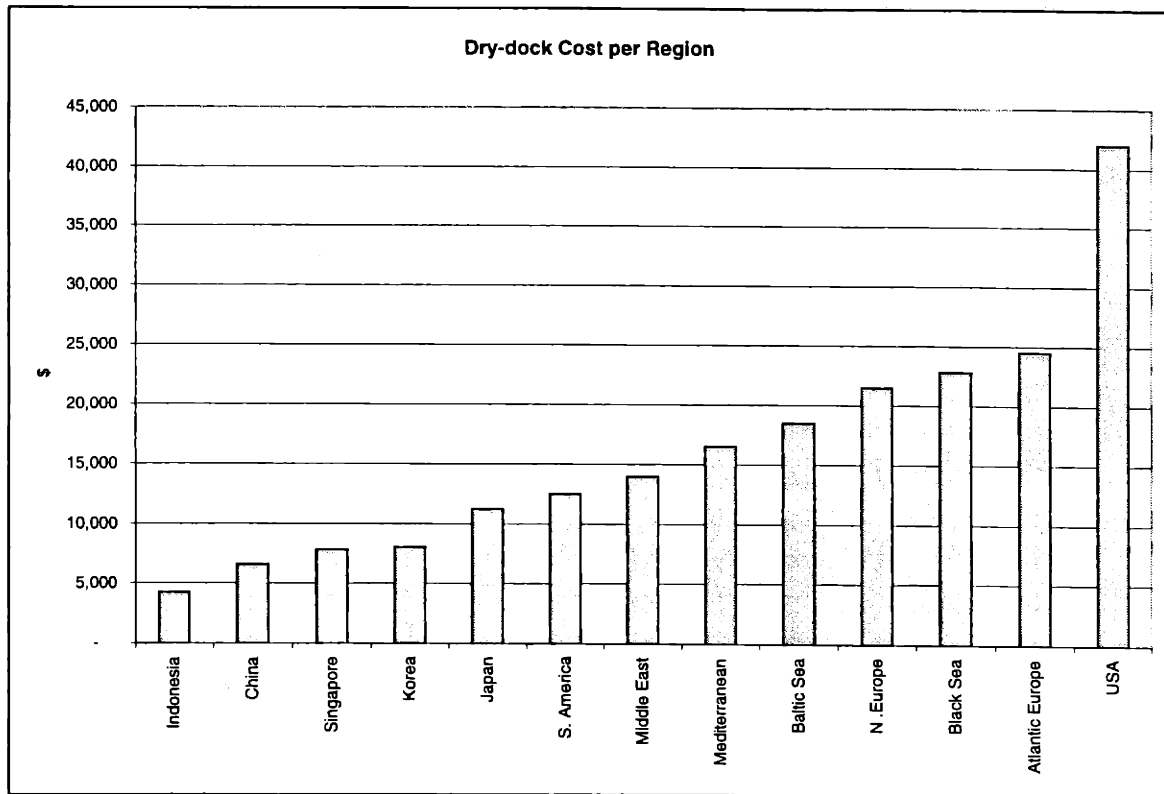
Hence:

$$\text{Docking Costs} = (\text{Tug-boat / Pilotage Costs}) + (\text{daily Dock-utilization rate}) * (\text{Days in Dock})$$

Table 6.10 deals with the second portion of the above equation. The ensuing chart presents the total dry-dock costs, after the addition of tug charges, pilot service, and other extraneous dry-dock-related expenses.

**Table 6.10: Regional Dry-docking Costs**

	Dry-dock Days	Daily Rate (\$)	Cost (\$)
USA	10	4,480	42,025
N. America	10	1,253	12,530
Mediterranean	8	2,098	16,537
Atlantic Europe	8	3,228	24,521
N. Europe	8	2,581	21,500
Baltic Sea	12	1,574	18,519
Black Sea	10	2,217	22,850
Middle East	7	2,000	14,000
Japan	6	1,937	11,271
Korea	5	1,610	8,050
Singapore	6	1,446	7,850
Indonesia	6	709	4,254
China	7	1,012	6,602



**Chart 6.3: Isolating Dry-dock Cost per Region**

Through the above chart, it has become apparent that dry-docking in the United States is quite costly at \$42,000 - about 40% more expensive than Atlantic Europe, the second most expensive region at \$24,000; such high costs are due to the high rates and long dry-docking periods demanded by the US. The cost reduces linearly, by about \$2,500, as we move left on the chart, looking to the Black Sea, Northern Europe, the Baltic Sea, the Mediterranean, the Middle East, North America and Japan. Korea and Singapore each charge about \$8,000, while once again we find Singapore, China and Indonesia at the lowest cost positions. Indonesia clearly has an edge on the market, charging the remarkably low rate of about \$700 a day, 35% of the world-average standing of \$2,000 a day.

But, as the following chart shall reveal, this is by no means the whole picture.

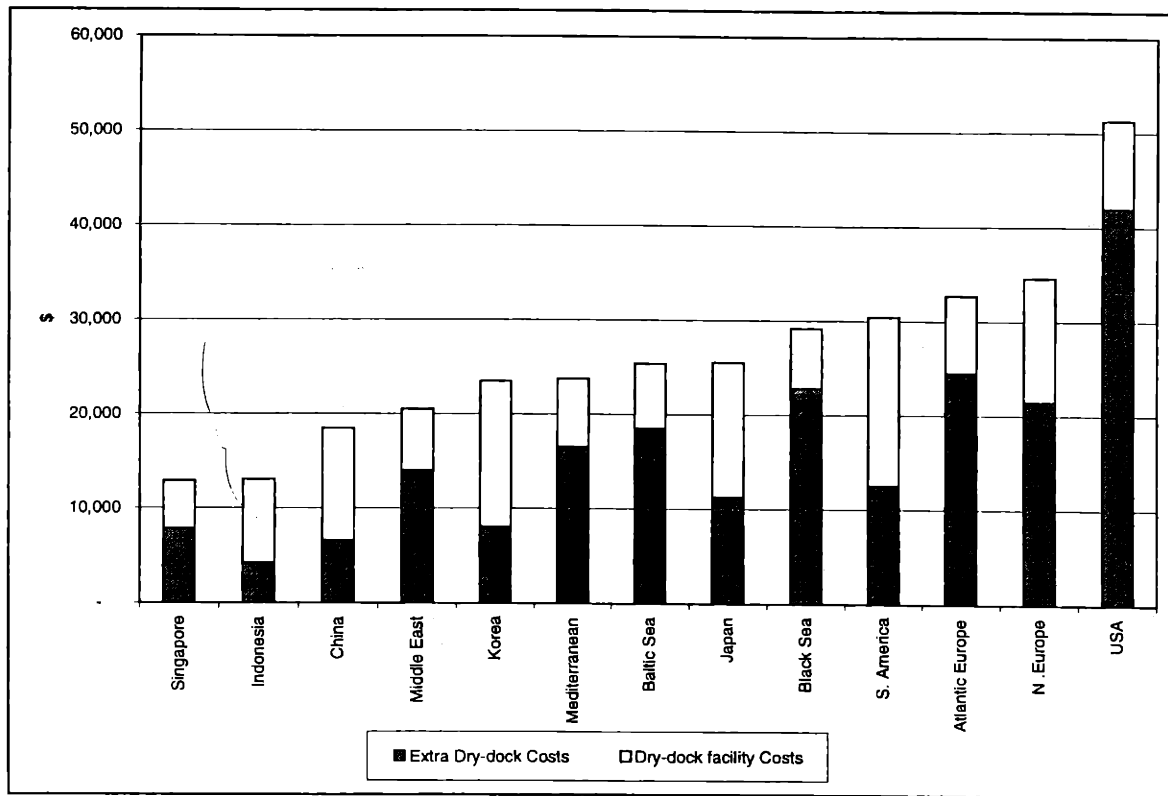
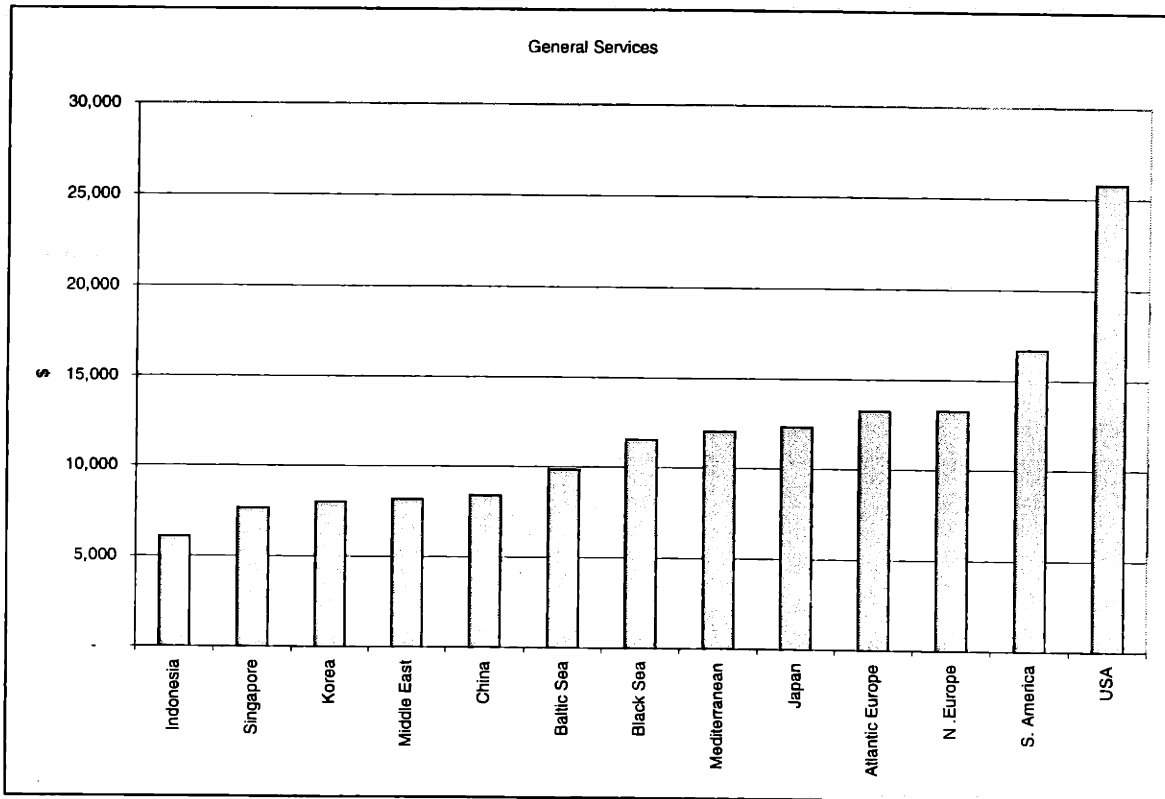


Chart 6.4: Total Dry-dock Costs

As we can see, the picture changes when additional costs are incorporated. The major competitive position shifts are those of Singapore, becoming the cheapest option, and Korea, Japan and South America, which lose ground due to substantial additional costs.

### 6.4.2 General Services Cost

General Services include a wide range of activities, such as on-shore power supply, water supply, fire-watchmen cost, garbage removal, and crane service charges. These are clearly dependent upon the local rates and upon the duration of repair. What follows is a chart of the regional General Service costs.



**Chart 6.5: General Service Costs by Region**

Again, the US is by far the highest cost region at \$26,000, followed by South America with \$17,000. Europe and Japan are in the \$10,000 to \$15,000 range, while the rest lie below the \$10,000 mark. Indonesia is the cheapest option at \$6,000.

### 6.4.3 Painting/Sandblasting

Painting and sandblasting contribute to 11.1% of the total repair cost for our vessel, according to our collected data. As we can see from the following chart, the US charge of \$145,000 once again greatly exceeds (by 100%) the next most expensive region, Japan. This huge differential can be explained in part by the strict environmental rules and legislation imposed in the US, requiring more careful and sophisticated processes for painting, sandblasting and waste disposal and thus raising the cost of such activities. That is not to say that other developed countries, such as North Europe or Japan, lack such regulations; it is only that, unlike the US, they manage to keep control of such costs and fall into the \$60-70,000 range. The cost for the rest of the Europe is approximately \$50-60,000, while costs in the Black and Baltic Seas as well as in the Far East (excluding Japan) lie between \$30-40,000. To reiterate, those shipyards that are situated in under-developed countries are much cheaper due to environmental issues. For example, when your vessel is being painted and sandblasted in a Chinese yard, disposal of the grit and the empty paint tins is of little concern. On the other hand, in developed countries the grit and the empty paint tins are being recycled. Such operations increase cost. What is more, local labor rates play a very important role.



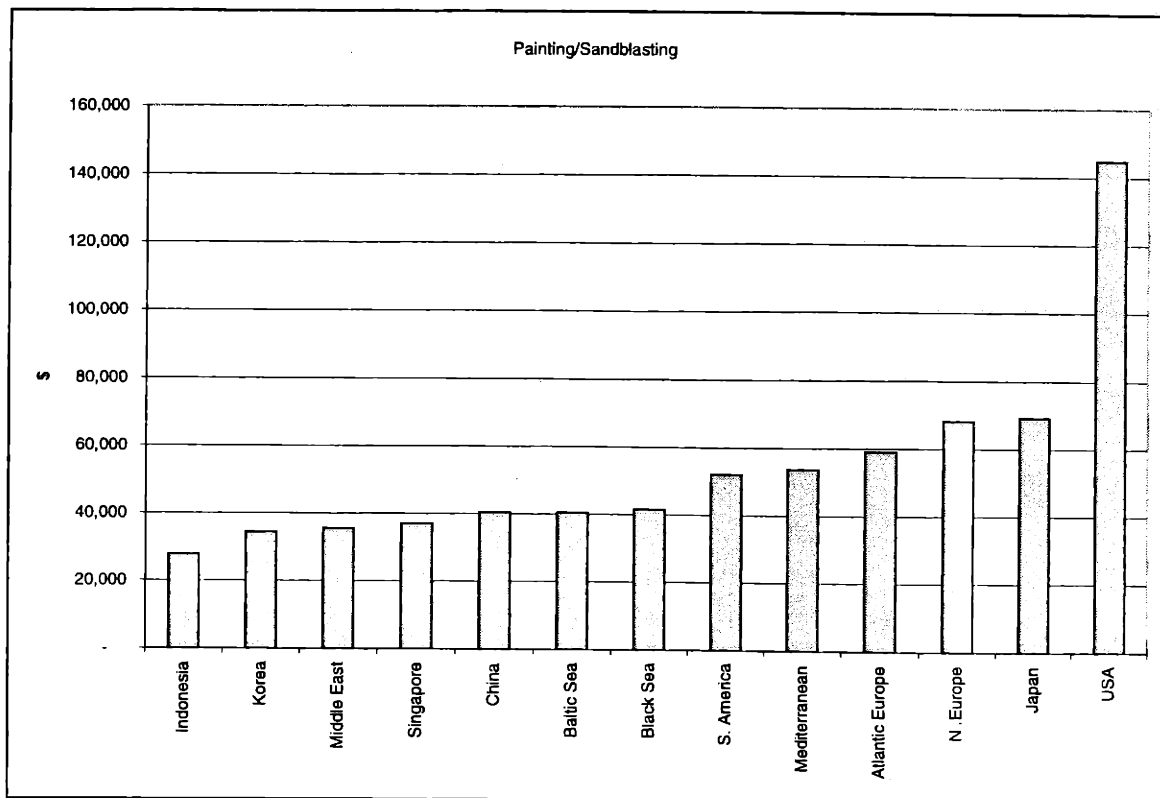


Chart 6.6: Painting/Sanblasting Costs by Region

#### 6.4.4 Cargo Holds Sandblasting Cost

Among all of the required activities for our vessel, cargo holds sandblasting was the major expense, contributing over 21% of the total quoted repair cost. As previously mentioned, labour rates and environmental regulations govern the bottom cost line. Disposal of the contaminant grit is a very costly procedure to which subcontinental countries do not afford much concern, since there is little environmental awareness; these countries also they enjoy low labour rate advantages. In Chart 6.7, we shall notice that for the first time, the US is not the most expensive option; at \$154,000, US rates are cheaper than those of Northern Europe (\$163,000) and Japan (\$190,000). These three nation obviously find it difficult to compete - price-wise - with China, the Black and Baltic Seas, and Indonesia, which offer their services in the \$53-75,000 range. The Middle East, South America and Korea each charge about \$100,000, while Atlantic Europe and Singapore charge approximately \$130,000. One must always bear in mind, however, that work quality varies from region to region (please refer to section 6.3.4).

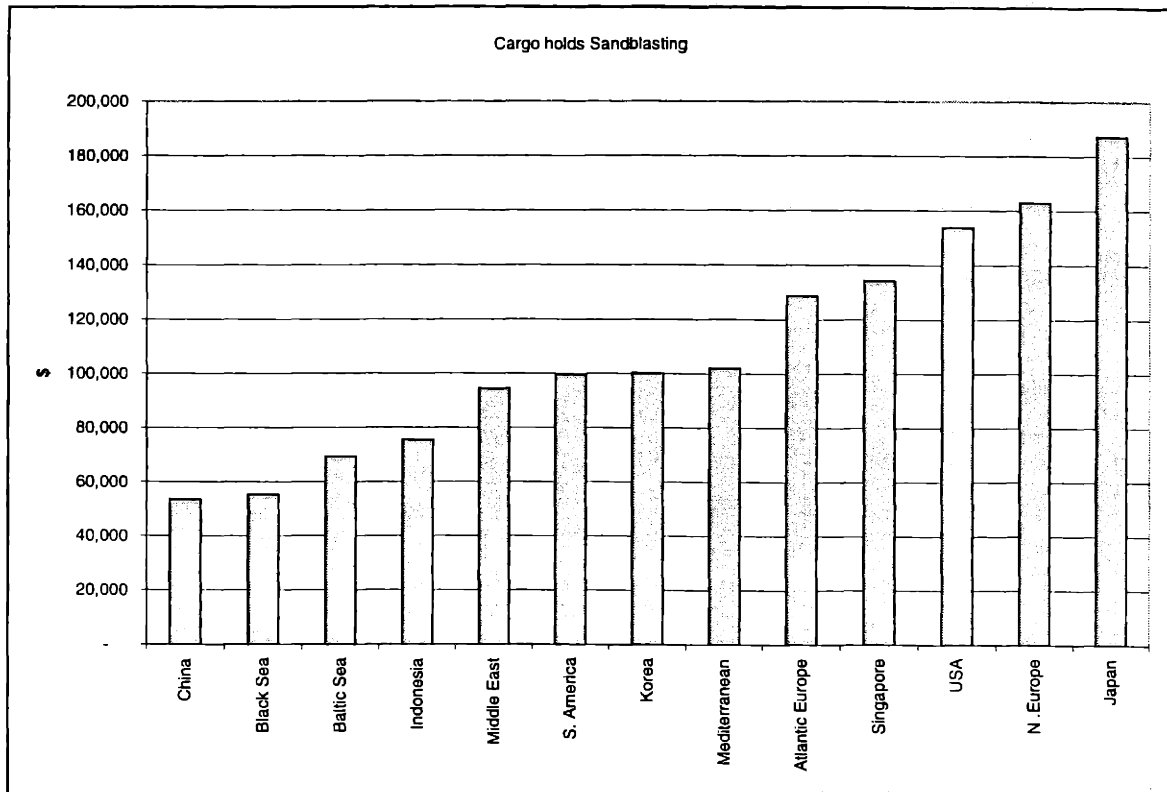


Chart 6.7: Cargo Holds Sandblasting Cost by Region

6.4.5 Minor Cost Activities

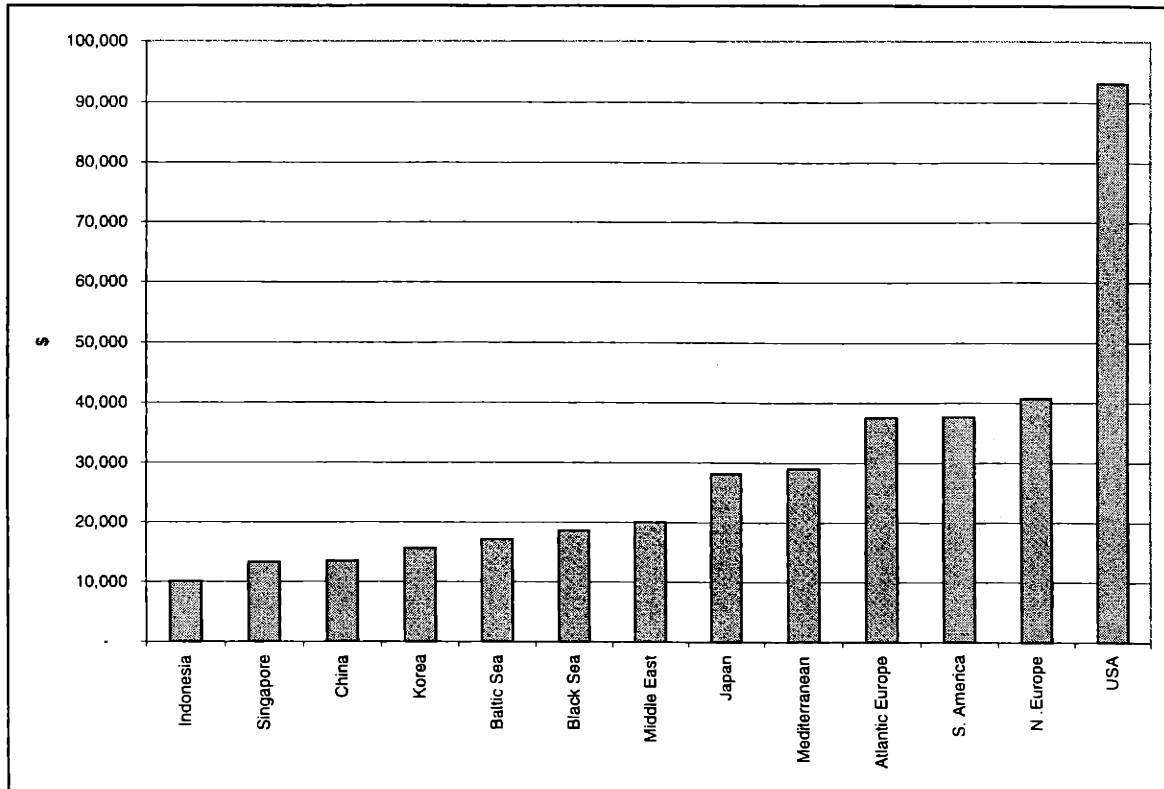
Minor cost activities are those services that do not involve extensive steelwork or machinery and whose cost percentage lies below 2.5% of the total cost. Using Table 6.9, we discover that included in minor cost activities are: cleaning sea chests, rudder repair, propeller/tailshaft repair, stern-tube simplex seals renewal, propeller blade polishing, sea valves overboard discharges repair, and hull zinc plates renewal. Chart 6.8 is the combined cost result.

Europe and Japan are high cost regions, falling into the \$28-41,000 range, while once again the United States quoted prices summing up to over \$90,000, more than 100% higher than its closest competitor, Northern Europe. The Middle East and the Black and Baltic Sea regions stand close to \$20,000, while Korea, China and Singapore charge close to \$15,000. Indonesia once again offers the lowest charge at \$10,000.

The major price modulator in this case is the labour rate, since there is little material expenditure involved and a higher rate of labour consumption. It thus becomes evident that in more developed countries - such as the US, Europe and Japan - higher rates apply, as the local workforce is well trained, more qualified, possesses greater experience, is able to provide shorter repair periods with a better quality of work. In addition, labourers must face higher living costs.

In under-developed countries, however, the man-hour rates are much lower due to low living standards and a lack of experienced, qualified personnel. This results in longer repair-time, poor workmanship and, in some cases, a total incapability of completing the necessary work.

What is more, higher automation and more sophisticated equipment come at a cost, but they allow for increased reductions in repair-time and improved repair quality.



**Chart 6.8: Minor Activities Cost by Region**

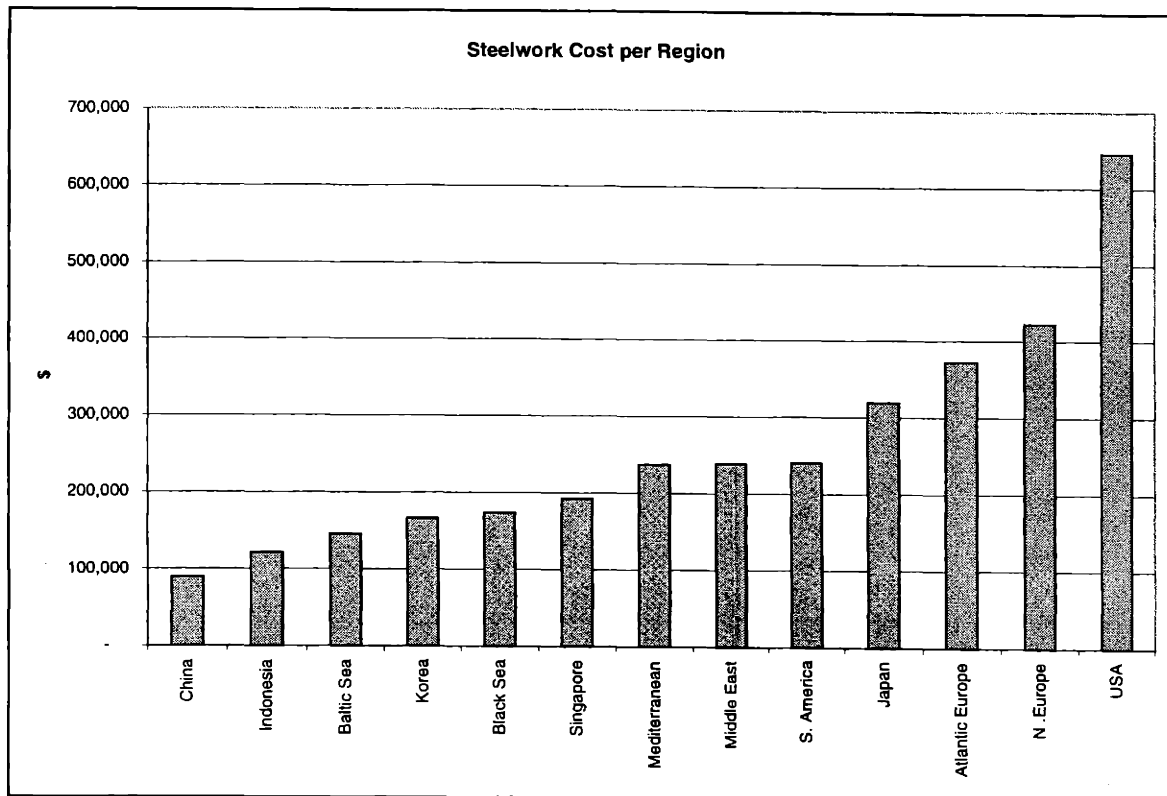
#### 6.4.6 Cost of Steel Repair Activities

This section deals with the cost of those repair activities that involve substantial material consumption, almost exclusively steel. Such activities include, in our case: hull repairs, shell plating starboard side repair, and the repairing of topside tanks port/starboard side. Mainly, these services involve flat steel plates; piping repair will be addressed later on. On average, according to the collected offers, the steelwork makes up for an average of 48% of the total quoted repair costs, as can be seen in Table 6.11.

**Table 6.11 Steelwork Cost Vs Total Cost**

Region	Steelwork Cost	Total Repair Cost	% of Total Cost
USA	\$ 645,860	\$ 1,178,731	55%
S. America	\$ 240,553	\$ 517,075	47%
Mediterranean	\$ 237,165	\$ 487,417	49%
Atlantic Europe	\$ 372,864	\$ 680,800	55%
N. Europe	\$ 423,033	\$ 794,513	53%
Baltic Sea	\$ 145,600	\$ 328,694	44%
Black Sea	\$ 173,647	\$ 353,836	49%
Middle East	\$ 238,940	\$ 441,366	54%
Japan	\$ 319,028	\$ 673,599	47%
Korea	\$ 166,629	\$ 365,577	46%
Singapore	\$ 192,124	\$ 422,173	46%
Indonesia	\$ 121,204	\$ 275,556	44%
China	\$ 89,610	\$ 247,838	36%
Averages	\$ 258,943	\$ 520,552	48%

Also:



**Chart 6.9: Steelwork Cost per Region**

As we can see, steelwork is most expensive in the United States, at \$650,000, a mere \$230,000 more than in Northern Europe, the second most expensive locale. Atlantic Europe and Japan charge \$50,000 and \$100,000 less than Northern Europe, respectively. The aforementioned

regions suffer from high labour rates, but also from very high steel rates. Far Eastern regions, excluding Japan and the Baltic and Black Seas, are found in the low cost region, charging anywhere from \$90,000 to \$190,000 for steelwork activities. The Mediterranean, the Middle East, and South America each charge about \$240,000.

Care must be taken by the ship-owner to read more deeply into these comparisons. He must also consider the grade of the steel. Neither the same quality of steel nor the same degree of steel preparation is found in all of the yards. It's critical for the owner to be sure that the repair will leave the vessel structurally sound and able to withstand the harsh test of the ocean's ambient forces.

### 6.4.7 Piping work Cost

Another, more specialized type of steelwork is piping work, which shall comprise approximately 2.5% of the final bill.

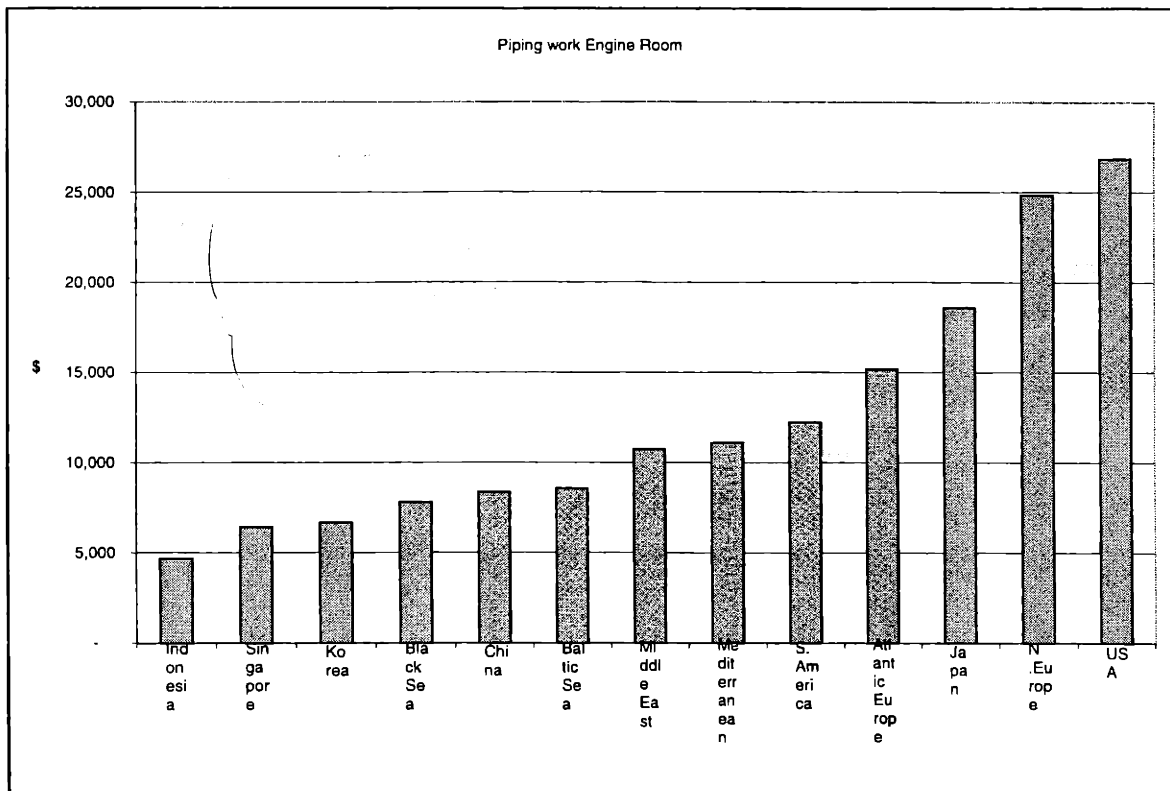
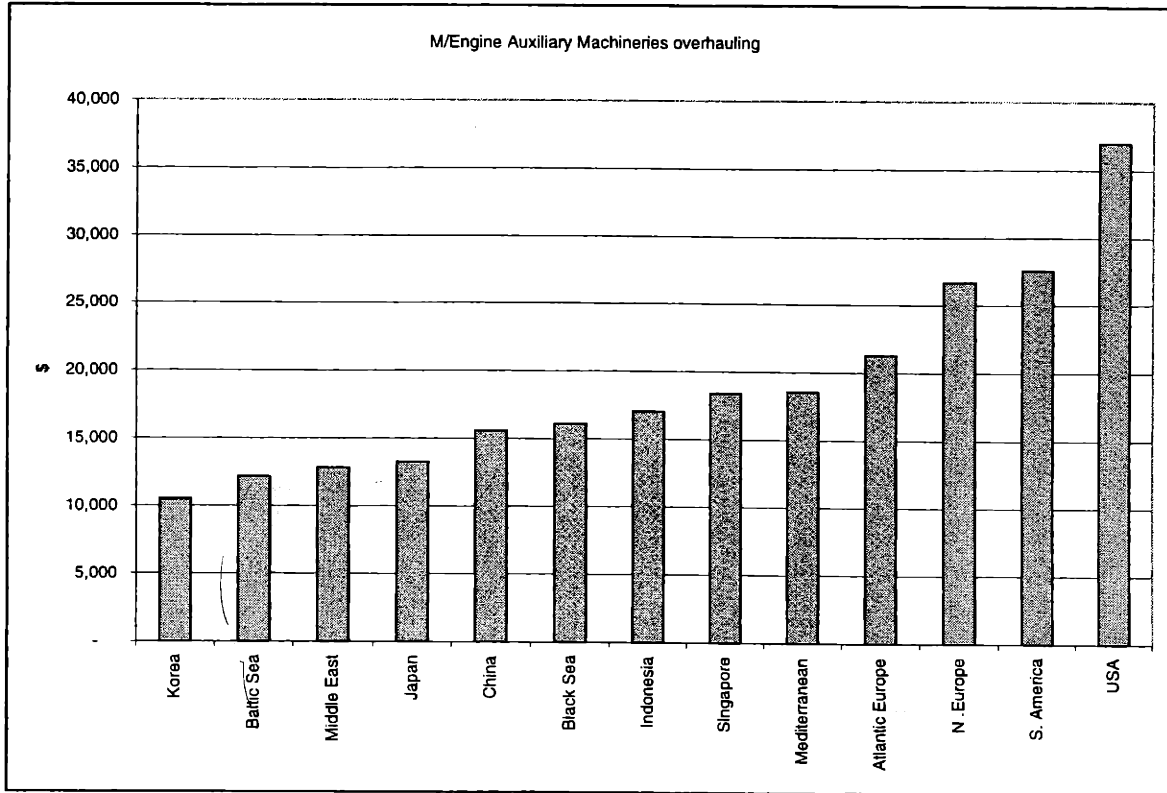


Chart 6.10: Piping Cost per Region

As viewed in Chart 6.10, the situation is similar to the steelwork global cost structure. The prices offered by shipyards in developed regions such as the US (\$27,000), Northern Europe (\$25,000), Japan (\$18,500), and Atlantic Europe (\$15,000), appear to be quite high when compared with the prices of shipyards in the Baltic and Black Seas, Singapore, Korea and China, found on the \$6-8,000 range, and Indonesia, at \$5,000. Again, local labor rates play an important role in the outcome.

### 6.4.8 Main Engine and Auxiliary Machinery Overhauling Cost

Main Engine and Auxiliary Machinery maintenance is vital to safe operation and proper performance of the ship. The following chart reveals the quoted costs of different regions for the contracted activities.



**Chart 6.11: Main Engine and Auxiliary Machinery Overhauling Cost by Region**

In order for the overhauling to be successfully carried out, highly skilled and qualified technicians with broad experience are needed. Accuracy in measurement and instrument calibration is mandatory. The ship-owners may choose a yard highly reputable for such activities, and thus more expensive; or they may choose a cheaper yard, but will bring in expert subcontractors or flying maintenance teams. In doing so, ship-owners ensure quality while enjoying cheaper prices on the rest of the activities, which comprise, on average, 96% of the total cost.

Not surprisingly, US overhauling expenses soar well above the rest at about \$37,000, with South America and Northern Europe each charging \$10,000 less. Atlantic Europe stands at \$22,000, while Mediterranean, Singaporean, Indonesian, Black Sea, and Chinese yards are willing to undertake the task for \$15,000 to \$20,000. Japan, the Middle East, the Baltic Sea and Korea charge even less, somewhere in the range of \$11,000 to \$13,000.

High man-hour rates and those qualified, expert technicians found in major shipyards have their price. However, since the cost is but a fraction of the total, repairing your vessel in a high cost region is not worth the extra expense if you can bring in your own skilled subcontractors and enjoy a lower final bill.

### **6.5 Conclusions**

From the above analysis, a variety of conclusions can be made. Initially, it's more than evident that regions such as Northern Europe and the United States have alarmingly high labour and material rates, and should be considered only in the case of emergency repairs. Unfortunately, lead times in the US are large and therefore no competitive advantage is evident, and it seems as though the Jones Act and military contracts keep US ship-repair alive. What is more, though not evident by the numbers, quality of work differs from region to region. Hence, the ship-owner must find the golden cut amongst cost, quality, and duration of repair work. There is no universal solution; the strategy of the owners is crucial. It has been also made evident that the Far East can offer very competitive rates. Also, Singapore is losing its position as lowest bidder to countries such as China and Indonesia, countries that lack Singapore's expertise. Another issue is the opportunity to hire subcontractors for those tedious activities requiring great skill while choosing an economically practical yard. As a final remark, a wise ship-owner does his homework and shops around before making his final selection.

## Chapter Seven: Future Trends

### 7.1 Introduction

Chapter Seven provides a view of the future trends of the ship-repair industry by region based upon the data collected as well as the materials read in the compilation of this thesis. Effort is made to predict both near and distant future trends of the industry through data analysis, evaluation of results, and the use of common logic.

### 7.2 USA

US ship-repair yards are quite capable and possess the required facilities and experience; however, due to high material and labor rates as well as low productivity, they still remain non-competitive. Strict environmental legislation and safety issues also contribute to high costs. Military projects and the Jones Act keep the yards alive.

Unfortunately, nowadays the government is reducing military spending, and the lost contracts must be compensated for by reaching out to the global market. Efforts are being made towards this end, but the prices commanded by US yards are still more than double those of most other regions.

Hence, in order to achieve its goal, we should see the US increase its productivity by reducing excessive manning, improving management of repair processes, and having a greater number of concurrent activities. Better financing terms can also be offered and government subsidizing can prove crucial.

For the time being, foreign demand is virtually non-existent and local ship-owners frequently opt to repair their vessels in yards abroad.

### 7.3 Europe

High labor costs (as compared to those of Far Eastern regions) will cause further loss of basic, commodity-like repair jobs. However, European ship-repair yards seem to retain their market position, serving a diversified regional demand and being considered a major competitor. Fighting back, Europe attempts to offer a better array of specialized, high-end services such as the repair of capital intensive ships, i.e., reefer ships, container vessels, chemical tankers, ferries, off-shore suppliers, dredges, ice-breakers, LNGs and LPGs, as well as carrying out conversion work. We should expect to see increasing concentration in niche markets. What is more, European Union is now attempting to assist the ship-repair industry and shipping in general by adopting favorable policies.



## 7.4 Baltic and Black Sea

The Baltic and Black Sea regions are struggling to retain and increase their market-share in the ship-repair industry.

The collapse of the Former Soviet Union (FSU) has had a major impact on the volume of trade that transits this specific region. Huge, government-controlled fleets have been succeeded by a variety of chartered vessels that are operated by private enterprises, keen to provide an increasingly diverse range of consumer goods to the growing FSU market. Initially, most of the ship-repair yards in this region were trying, after the political and economical crisis, to re-enter the ship-repair market, but unfortunately many problems have arisen as a result of capital deficiency. What is more, obsolescence of equipment and facilities as well as insufficient docking capacity sometimes renders ship-owners reluctant to having their vessel repaired in the region, despite the low and negotiable state of prices.

Nowadays, all efforts are being made to improve their competitive position. Times have changed since the days when ship-owners viewed the Baltic and Black Seas with a measure of reticence, merely hiring them for simpler tasks on account of their low labor costs. Now the cost factor is merely a bonus, their much-criticized repair cycles are rapidly adjusting to regional norms, their customer-friendliness is taken for granted and they count on a regular return trade.

A great deal of work must be completed in order for the region to be considered a major player in the ship-repair market, but it can be done. Major foreign ship-repair yards are also investing in these two geographical regions, including Daewoo in Romania, and bring their expertise along with their investments. The verdict is that there is potential; whether or not the area will bloom into a strong ship-repair force is for time to tell.

## 7.5 South Africa

As far as South Africa is concerned, the infrastructure, in terms of facilities for all purposes of ship-repair and maintenance, is in good shape. The problem is that the local state has control over the nation's dry-docking facilities. Until control is passed on to individual yards, it is unlikely that there will be any investment in them. This is because Portnet, the state body responsible for the facilities, does not enjoy great profits from leasing the various docks and piers to the ship-repairers, and hence they are reluctant to invest in them. Also, while these facilities remain under Portnet's control, the private repairers are unwilling to pay for their refurbishment. This can prove to be a problematic situation, especially as these facilities age. There is a need for action should South African yards consider maintaining their market share. The yards must invest in upgrading their facilities, and this could conceivably involve foreign parties. There is no doubt that owners do, in many cases, find it convenient to repair in South Africa and that local yards are capable and provide good service.

The proposed revamping of the existing Directorate of Shipping into the South African Marine Safety Authority will result in more funds being made available for a variety of marine tasks, including sorting out the problem regarding the docks. Due to political instability, ship-owners are reluctant to have their vessel repaired in this region. Therefore, should such issues be

resolved, the area will benefit with market growth; on the other hand, should the situation remain unstable, the potential loss of market share can be expected.

## **7.6 Middle East**

The Middle Eastern region is strategically important; however, it is to a large extent politically unstable. The crossroads linking the trading nations of the West and the Far East, the Middle East has been traditionally a major trading and oil exporting area.

Oil exports are now supplemented by an increasing growth in containerized cargoes. Much of this type of cargo is transshipped through the region's ports to countries throughout the Middle East, as well as to Northern and Eastern Africa. Also, the region is becoming a hub for liner operators, with services from the Far East linking with those from the USA and Europe. The large number of vessels that trade in the region have given rise to another significant industry, ship-repair.

Formerly dominated by Dubai Drydocks in the United Arab Emirates and Arab Shipbuilding and Repair (ASRY) in Bahrain, the regional repair market is being strengthened by Kuwait Shipbuilding and Repairyard Co (KSRC) in Kuwait. Having recovered from the effects of the invasion by Iraq, KSRC had reported a positive year for 1994 in both the marine and industrial contracts divisions. The most significant event for the yard was its return to the international market following the Iran/Iraq conflict, with contracts for the repair of vessels from Russia, Ukraine, India and Greece.

During the war, few ship-owners would have considered the Gulf an attractive - or even a suitable - area for major repairs and overhauls. Now, the member states of OPEC recognized the logic of establishing repair facilities close to oil loading terminals where tankers arrive empty, gas free and in large numbers. Their initiative, backed initially by management and technicians from Lisnave of Portugal, proved to be an immediate success. After Bahrain, yards were opened in Dubai, Jeddah and Dammam.

Ship-owners tend to be conservative by nature, and so there were initial doubts as to the wisdom of entrusting a new area with repairs of more than minor sophistication. In fact, Texaco was the first major owner in 1979 to entrust Special Survey work to ASRY, and this was followed by retrofits of inert gas and COW systems to numerous vessels, bringing added expertise and experience to the area.

The impact of the Gulf War in the early 1980s was, at first, quite moderate. After a while, however, war-risk insurance was introduced and rose sharply, so that many owners having to trade in the area preferred not to stop their vessels in the Arabian Gulf for repairs.

Contrary to the belief of many, the Gulf yards lost more than they gained during the war. Most attacks on vessels caused light damage and owners saw no reason to stop their vessels for minor repairs. On the other hand, heavily damaged vessels were either scrapped or sometimes towed to larger yards outside the Gulf for major reconstruction. However, yards in the Gulf did benefit by

increasing their experience of steel renewals and are now well able to compete on even terms with older shipyards.

Early doubts about repairing in the Gulf due to its status as a new and untried area have long since dissipated. Communications are recognized to be equal to the best in the world, and over 20 airlines are serving major cities with frequent services, thus facilitating the quick and easy procurement of spares not locally available in major yard inventories. Also, there are neither customs clearance problems nor delays in Bahrain or the UAE. All countries in the area also benefit from the most modern telecommunications based on satellite stations.

The climate has come to be regarded as an asset. Except for three to four months of hot weather during which large internal tank coating jobs are usually avoided, conditions are favorable and humidity is less than that of shipyards further east. As owners who have used the Gulf yards know, all the facilities are modern, hotel accommodations are excellent, restaurants are plentiful, and there are no nagging restrictions upon daily life or upon movement in major repair centers.

Over the last decade, the concept of turning the Arabian Gulf into a major center for ship-repair has proved to be triumphantly successful and, since hostilities are now a thing of the past, the area is on course to enjoy its expanding potential.

Hence, we can easily conclude that the Middle East is currently and will become even more of a threat to the leading ship-repair industries. In the future, we should expect to witness growth of the ship-repair market in this area, especially in the tanker trade.

## **7.7 Far East**

In the following segments of this chapter, we shall focus upon the Far Eastern region, where the strongest players in the repair-industry are found, including as Japan, South Korea, Singapore and China.

### **7.7.1 Japan**

Higher prices than competitors in Singapore and South Korea have progressively squeezed the Japanese ship-repair yards into specialized niches. The region suffers from very high labor rates, but offers great efficiency and quality. Unfortunately for the yards, which are renowned for high levels of automation, the unpredictability of repair work does not lend itself to automation, but rather requires plenty man-hours.

Mainstream repair work on tankers and bulkers has been surrendered over the years, forcing a further dependence upon container-ship and gas-carrier overhauls as well as conversions demanding a high level of expertise and support from the group's machinery divisions.

As far as the future is concerned, we should expect to witness efforts by the Japanese to stabilize their declining market-share in the ship-repair market.

### 7.7.2 South Korea

The massive devaluation of the South Korean Won may turn out to be a mixed blessing for the country's ship-repairers and ship-builders. One of the immediate effects of this depletion has been the boost of short-term profitability, as most building contracts are priced in US dollars.

As South Korea became engulfed in the Asian financial crisis, the Won lost 46% of its value in four months during the second half of 1997, falling from Won900/ \$1 in September to Won1,333/ \$1 by the end of 1997. However, South Korea's shipping industry hoped for currency stabilization, "[o]therwise inflation will increase and put upward pressure on wages," said a spokesman from Hyundai Heavy Industries. The weaker yen has made Japanese shipyards more competitive, but it has also caused Japanese materials imported by South Korean yards to become cheaper.

According to the Dongwon Economic Research Institute, a 10% depreciation of the Won improves the profit/sales ratio of the three listed shipyards – Daewoo, Hanjin and Samsung by 0.8% to 1.9%. Since most of their earnings are in dollars, their foreign currency debt should not be a major problem.

A report by the Korea Development Bank indicated that shipbuilding orders would decline due to a fall in global demand for new ships and to competition from Japan. The institute added that investment in new shipbuilding facilities is likely to drop from the 1997 figure of 950bn Won because of the financial crisis affecting the country. On the other hand, the fall in the value of the won will increase the competitiveness of South Korean exports.

South Korean ship-owners are taking a cautious view as to how the economic crisis will affect them. The main concern is that there will be a downturn in South Korean trade, with imports in particular, which will restrict cargo liftings. This may result in fleet rationalisation and delays. They may also adopt a more aggressive stance in cross trades in an effort to boost foreign currency earnings. Also, some South Korean owners have not escaped the financial difficulties that have beset the economy. The impact is especially severe for those companies that must service big foreign currency loans.

Still, Hyundai Mipo remains the leading ship-repair yard for vessels over 30,000 dwt, and for vessels 10,000 to 30,000 dwt, it is among the top five leading yards. Ship-owners are willing to have their vessels repaired there due to the fact that the economic crisis allows them to negotiate better prices. The future mainly depends upon Won exchange rate fluctuations.

### 7.7.3 Singapore

The Port of Singapore prides itself in providing a one-stop centre for marine services, including ship-repair. Due to the critical mass of shipyards in Singapore, there is an unparalleled source of ship-repairing and specialist marine support services. Suppliers, specialists and the ever-available subcontractors have created an all-round industrial environment.

Today, most major equipment and material suppliers have positioned themselves in Singapore, so as to take advantage of the maritime market concentration. The major classification societies and most insurance companies have set up businesses or representative offices in the area. Sub-contracting companies are readily available to supplement the labour required during peak periods. Thus shipyards do not have to incur direct cost for employment of surplus staff to meet demands during peak workload.

Another factor for the growth of the Singaporean marine industry is the excellent infrastructure. Singapore, with its efficient network of air, sea and road transportation, together with the latest in telecommunications, has provided a reliable and economic central hub for investment and nation building. The strong financial and industrial sectors have also indirectly supported the economy as a whole. Industrial and fiscal incentives draw investors from all over the world.

The Government and Port of Singapore Authority have also assisted greatly in making Singapore a ship-repair centre. The ease of customs clearances in trade, imports and exports - even in immigration of personnel - draws ship-owners to Singapore. Ship-owners face minimal hassle in sending their ships for repairs in Singapore and are even awarded tax incentives if their ships are registered with Singapore, that is, tax exemptions for profits derived from operation of Singapore-registered vessels. Thus the favorable political and industrial stability assists growth.

In examining the reasons why Singapore is so successful, we can identify several factors, such as its strategic location at the center of world shipping routes, plying between the Middle East and the Far East. The Strait of Malacca itself channels some 2,000 vessels daily through Singapore. Singapore is the world's busiest port, handling up to 700 ships at any one time. On average, 15 vessels arrive each hour, totaling some 80,000 vessels annually. The port serves more than 600 shipping lines and provides links to some 800 ports worldwide. Location is an important factor as ship-owners are increasingly finding themselves locked into regional or route-related repair centers due to the high costs of deviation. What is more, Singapore holds a deep, natural harbor that is enjoyed by only a few countries in the region, allowing easy navigational passage for deep draught vessels such as VLCCs.

But location alone does not guarantee work. Ship-repair is a labour-intensive industry, and Singapore has the skilled, reliable and readily available workforce needed. This has contributed to the growth of the industry and has also enabled the Singaporean marine industry to build up a reputation for quality. Shipyards are implementing quality management systems to meet this challenge. Here also, skill and experience at all levels of the organization enable the implementation process to be carried out more expeditiously. In the future, however, one major problem for Singaporean yards might actually be a shortage of labor, as the ship-repair industry is no longer attractive to the younger generation and also because there is a strict immigration campaign by the Singapore Government. The current workforce consists of both local and foreign workers from Malaysia, India, the Philippines and China.

What is more, the dominance of Singapore's yards can be partially attributed to their high efficiency, leading to quick turnaround times and high cost efficiency. Ship-repair competitiveness is based not only upon cost or availability of labour, but also upon the efficient and productive utilization of available labour.

Competition is fierce, both from Europe and Asia. The dynamic growth of the Asia Pacific region is tremendous. While industrialised nations such as Japan, Germany and the United States are struggling to recover from the 90's recession, the Asia Pacific nations are enjoying rapid growth. Growth in China is so strong that the authorities must forcefully cool down the overheating economy. South Korea has been very successful in the repair of dry bulk carriers, in view of its proximity to the dry bulk terminal ports. However, Korea is losing its competitive edge due to rising wages and labour problems, as well as to the recent economic crisis. China and India, with abundant supplies of low cost labour, have the potential to rival Singapore as the leading repair centre. However, they will have to develop to a reasonable extent essentials such as resources and infrastructure. The gestation period for new entrants is at least five to ten years. Meanwhile, Singapore can take advantage of this time to prepare to meet the next challenge.

Singapore's repair yards are also concerned that they are losing increasing amounts business to Middle Eastern yards. Some are also concerned about competition from India, Thailand and the Philippines. Commented Singmarine: "The Philippines is taking a lot of repair although owners are not going to China unless they want a cheap job". Singaporean yards believe that repair work in China takes up to 40% longer than if stemmed in Singapore. Shipyards in Vietnam, Indonesia, Malaysia, Thailand, the Philippines and Sri Lanka may take away some market share, but in the foreseeable future would not produce any serious competition due to several economic factors. Hong Kong's yards, which have made plans to expand, have positioned themselves for the growing Chinese domestic market since their move to the Republic of China. The Middle Eastern shipyards have expanded their capacity considerably and have the advantage of a cheap labour force. They have also enjoyed good growth in the past few years and have secured a niche in the tanker market. The majority of the work done, however, comes from the westbound tanker trade. The Middle East is by far the biggest threat to Singapore due to its good geographical location, proximate trade routes, and low labor cost.

A common complaint in Singapore is that the Middle Eastern yards are able to undercut Singapore because they have longer base costs. The Singaporean yards believe that the total costs in the Middle East are about 10% less than their own for standard voyage repairs to a VLCC. "They are hungry to take our business," comments Singmarine. One thought is that safety regulations in Singapore lead to higher costs; for example, ships in the Middle East are allowed to clean tanks alongside. The reason for this is that Singaporean yards have suffered a number of tragic accidents that have led to legislation and higher costs. Middle Eastern yards do not have the same bad track record.

Some companies, however, believe that the Middle East has a natural advantage due to the popularity of VLCC trading in the region. Notes Chua Teck Lian, Jurong's general manager: "People like to talk about the Gulf taking business but the trend of tanker is in their favor."

Finally, Singapore's yards have carried out ship conversions along with ship-repairs. The conversions involved small to large vessels and covered a wide range of services, such as lengthening, conversion to livestock carriers, factory ships, self-discharging bulk carriers and floating production facilities, as well as passenger modification.

In conclusion, we can say that in the near future, Singapore will maintain its global ship-repair dominance, despite the high rates of evolution from China and the Middle East. In the long run, proper strategic planning and the upgrading of facilities and service will ensure an enviable position in the repair-industry.

#### 7.7.4 China

China has a long history in shipbuilding and ship-repair. Thanks to the adoption of an open door policy during the late 1970's and a rapid economic and foreign trade growth in the 1980's, China's ocean-going fleet, coastal and river transportation fleet have developed quite rapidly in the past ten years. To cope with this development, China's ship-repair industry has also expanded gradually.

A great deal of progress has been made in the improvement of management, and considerable efforts have been put into technical advancements. In the past ten years, Chinese ship-repair yards have not only provided services to the domestic fleet, but they are also active in competing for foreign business. China's ship-repair capabilities have grown rapidly in recent years, matched by an increase in revenue from the industry. The China State Shipbuilding Corp. alone had earnings of over \$5,250M in 1997, more than double those of the entire ship-repair industry in 1993. The most successful yards - Beihai, Chengxi, Nantong, Shanghaiguan and Wenchong - have become very dependent upon the repair of foreign vessels, which now account for 70%-80% of their revenues.

Although the shiprepair business has steadily expanded since the beginning of China's reform policy in 1978, as recently as 1992 the country had only one dock, at Shanghai, able to take panamax size vessels. Nowadays, two 220,000 dwt graving docks are available, in Dalian and Wenchong, though docking capability has largely expanded through the use of floating docks. The Shanghaiguan yard will soon have a VLCC - capable yard. Table 7.1 provides the size and location of the major dry-dock facilities in China.

**Table 7.1: Chinese Major Dry-docking Facilities**

Port	Max Ship Size (dwt)	Type
Shanghaiguan	50,000	Floating
Lixin	80,000	Floating
Chengxi	100,000	Floating
Huanrun Dadong	100,000	Floating
Beihai	120,000	Floating
Nantong	150,000	Floating
Dalian	200,000	Graving
Wenchong	200,000	Graving

Labor rates are relatively low in China, but that does not necessarily guarantee an overall better competitive position. So, for a standard 'haircut and shave', yards in South Korea and Singapore can compete with China's yards. Consequently, most vessels arriving at Chinese yards are in for large-scale steel renewal and hold-blasting. Chinese yards quote prices between \$1.6 and \$2/kg

for steelwork, although industry officials say prices have been falling over the past few years; in fact, some yards attempting to penetrate the market have quoted as low as \$1.3/kg. Price cuts have been achieved in spite of the doubling of labour costs over five years with material costs increasing by 10% to 15% a year.

While Chinese pricing is obviously attractive, international owners have had serious reservations about the quality of the work and the abilities of yards to keep to schedule. There have been problems in the past, but as the yards have gained experience they have reportedly made great improvements. Claus Muller, Germanischer Lloyd's divisional director for the region, commented that the yards are capable of good quality steelwork under supervision, and would happily recommend owners to go there. "It has changed completely over the last ten years" he said. Several European owners have also noted marked improvements over the last two or three years and have been quite satisfied with the quality of work, and especially with the price. Efficiency has improved, the yards are keeping to schedules, and they have begun accepting penalty clauses on delays so as to reassure clients. As one agent put it, "there are very few disputes these days." Language capabilities are improving too; most yards targeting non-domestic tonnage have placed English speaking staff in key roles.

Strong supervision is regarded as essential by practically everyone who has been to yards in the region. If the work is supervised, it will probably be done to the superintendent's satisfaction. Likewise, owners and agents recommend preparing good specification to avoid problems and delays.

Reservations are still expressed about mechanical work, but again the situation seems to be improving. Many of the bigger yards are setting up joint ventures with overseas equipment suppliers and manufacturers to offer fully qualified services. Poor availability of parts used to create problems, but now it is much easier to get good service, particularly in the Shanghai area and the south, where parts can easily be accessed from Hong Kong. However, according to one agent, this can still cause problems in the northern yards.

Chinese yards are continuously improving quality and expertise and are likely, within 10 years time, to become competitive over an increasing range of repair and conversion work. This is because although China's ship repair industry in past years has achieved great progress, there are still some problems that need to be solved, such as poor productivity, lack of sufficient infrastructure, and the need for larger capacity.

Productivity in Chinese shipyards is not satisfactory when compared with shipyards in Japan, Hong Kong, South Korea and Singapore, reflected in their longer delivery time. Therefore, first class ship-owners are hesitant to repair their vessels in China. With a continued high inflation rate in the last few years, if the industry cannot improve management and increase the productivity and at the same time adopt new incentive measures to encourage workers to work harder, the competitive price advantages will disappear as rapidly as they arrived. What is more, there is still a long way to go in the development of China's infrastructure so as to support the ship-repair industry, and substantial investment is required to upgrade and expand its facilities to cope with the fast growing economy.









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**Appendix I: Global Docking Capacity by Region**

## Appendix I

**Eastern Europe** includes: Croatia, Latvia, Yugoslavia and the Ukraine.

**Mediterranean** includes: Israel and Turkey, excludes: African countries.

**South East Asia** includes: Malaysia, Indonesia and the Philippines.

**Far East** includes: Taiwan, China and Vietnam.

**Other Eastern Hemisphere** includes: India, Pakistan, Sri Lanka and Australia.

Existing idle yards are included and yards operating exclusively on naval contracts have been excluded.

On the table that follows we use the data from table 2.5 to get global percentages w.r.t.dwt capacity as opposed to number of docks.

Average Size (dwt)	17500		37500		75000		150000		200000		Total	
Region	dwt	%	dwt	%	dwt	%	dwt	%	dwt	%	dwt	%
NW Europe	1295000	32.3	862500	15.1	1200000	16.5	1050000	13.2	2200000	15.5	6607500	16.9
Atlantic Europe	192500	4.8	150000	2.6	225000	3.1	450000	5.7	1400000	9.9	2417500	6.2
Med. Europe	315000	7.9	412500	7.2	1200000	16.5	750000	9.4	1400000	9.9	4077500	10.4
NE Europe	332500	8.3	337500	5.9	375000	5.2	150000	1.9	200000	1.4	1395000	3.6
Mediterranean	262500	6.6	375000	6.6	150000	2.1	300000	3.8	200000	1.4	1287500	3.3
SE Europe	245000	6.1	300000	5.3	375000	5.2	300000	3.8	200000	1.4	1420000	3.6
Africa	70000	1.7	37500	0.7	75000	1.0	0	0.0	0	0.0	182500	0.5
S Africa	17500	0.4	75000	1.3	0	0.0	150000	1.9	600000	4.2	842500	2.2
Middle East	35000	0.9	75000	1.3	300000	4.1	150000	1.9	800000	5.6	1360000	3.5
SE Asia	35000	0.9	75000	1.3	0	0.0	150000	1.9	400000	2.8	660000	1.7
Far East	262500	6.6	675000	11.8	675000	9.3	300000	3.8	400000	2.8	2312500	5.9
Singapore	35000	0.9	187500	3.3	225000	3.1	600000	7.5	1200000	8.5	2247500	5.7
Korea	52500	1.3	0	0.0	75000	1.0	150000	1.9	800000	5.6	1077500	2.8
Japan	297500	7.4	637500	11.2	675000	9.3	1800000	22.6	2600000	18.3	6010000	15.4
Other eastern hemisphere	87500	2.2	150000	2.6	225000	3.1	450000	5.7	200000	1.4	1112500	2.8
Western hemisphere	472500	11.8	1350000	23.7	1500000	20.6	1200000	15.1	1600000	11.3	6122500	15.6
Total	4007500	100.0	5700000	100.0	7275000	100.0	7950000	100.0	14200000	100.0	39132500	100.0



**Appendix II: Repair Activity of Major Shiprepair Yards (1997-1998)**

## Appendix II

Repairing activity during 1997-1998<sup>1</sup>

Shiprepair Yard	Country	Vessel Size										Totals
		> 30,000	10-30,000	> 30,000	10-30,000	> 30,000	10-30,000	> 30,000	10-30,000	> 30,000	10-30,000	
Arab Shipbuilding & Repair Yard	Bahrain	22	7	8	7	12	6	20	6	20	5	113
Odessos Shiprepair Yard	Bulgaria	3	3	1	1	6	6				14	
Enawi SA	Brazil	7	5			4	5				21	
ASTICAN	Canary Is		2		2	4	4		4	3	15	
ASMAR	Chile	1	1	1	3	1	3	2	2	2	16	
Viktor Lenac - Rijeka	Croatia	2	6	8	6	1	7	2	6	18	59	
Dubai Drydocks	Dubai									28	39	
ARNO - Dunkerque	France	7	15	9	12	8	15	8	17	11	117	
Chambre De Commerce Et D'Industrie De Brest	France	6	1	4	1	11	1			4	28	
Compagnie Marseillaise De Reparations	France	1	3	1	2	1	2	2	1	6	22	
Le Haere Port Authority	France	2		1	2	1	1	2	1	2	12	
Siren SA	France			1	1	2	2				6	
Blom + Voss AG	Germany	11	8	8	8						27	
Neoron Shipyard	Greece	5	8	4	5	8	8	8	7	7	64	
Hellenic Shipyards	Greece	17	9	15	7	14	8	10	6	14	105	
Hong Kong United Dockyards	Hong Kong	8		9	2	7	6	1	2	3	44	
Fincantieri - Arsenale Triestino San Marco	Italy	1		4	1	1				1	10	
Suritomo Heavy Industries,Oppama	Japan							1			1	
Hyundai Wipo	Korea	34	23	28	10	42	14	27	14	46	253	
KSRC	Kuwait	2	3	2	4	3	3	2	2	5	21	
Malaysia Shipbuilding & Engineering	Malaysia	7	4	9	5	13	4	10	2	10	68	
Wilton - Fijenoord BV	Netherlands	7	7	8	4	4	6	6	10	8	63	
Mjellem & Karlsen	Norway			1							1	

<sup>1</sup> Data gaps, either represent lack of activity or lack of recorded information.

## Global Ship-repair Industry: Evaluation of Current Situation and Future Trends



**Appendix III: Most Productive Shiprepair Yards (1997-1998)**



## Appendix III

<b>Shiprepair Yard</b>	<b>Country</b>	<b>10-30,000 dwt</b>
Keppel Shipyard Singapore	Singapore	97
Colombo Dockyard Ltd	Sri Lanke	81
Hyundai Mipo	Korea	76
ARNO – Dunkerque	France	74
Gdansk Shiprepair Yard	Poland	68
Jurong Shipyards	Singapore	66
A & P Group	UK	37
Neorion Shipyard	Greece	35
Hellenic Shipyards	Greece	35
Arab Shipbuilding & Repair Yard	Bahrain	31
Wilton - Fijenoord BV	Netherlands	30
Viktor Lenac - Rijeka	Croatia	28
Astilleros De Santander	Spain	27
Lisnave Group	Portugal	26
ASTANO	Spain	20
CSBC - Keelung Shipyard	Taiwan	20
Malaysia Shipbuilding & Engineering	Malaysia	19
Astilleros Espanoles S.A, Cadiz	Spain	19
Gotaverken Cityvarvet AB	Sweden	19
KSRC	Kuwait	17

<b>Shiprepair Yard</b>	<b>Country</b>	<b>&gt;30,000 dwt</b>
Hyundai Mipo	Korea	177
Jurong Shipyards	Singapore	139
Lisnave Group	Portugal	135
Keppel Shipyard Singapore	Singapore	107
Arab Shipbuilding & Repair Yard	Bahrain	82
Hellenic Shipyards	Greece	70
Malaysia Shipbuilding & Engineering	Malaysia	49
Gdansk Shiprepair Yard	Poland	49
CSBC - Kaohsiung	Taiwan	49
ARNO - Dunkerque	France	43
Wilton - Fijenoord BV	Netherlands	33
CSBC - Keelung Shipyard	Taiwan	32
Viktor Lenac - Rijeka	Croatia	31
Subic Shipyards & Engineering Inc	Phillipine	30
Neorion Shipyard	Greece	29
Dubai Drydocks	Dubai	28
Hong Kong United Dockyards	Hong Kong	28
Astilleros Espanoles S.A, Cadiz	Spain	26
Chambre De Commerce Et D'Industie De Brest	France	25
A & P Group	U.K.	22

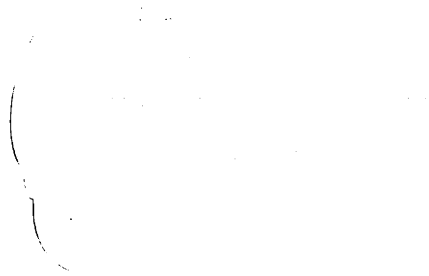
**Appendix IV: Major Chinese Shiprepair Yards**

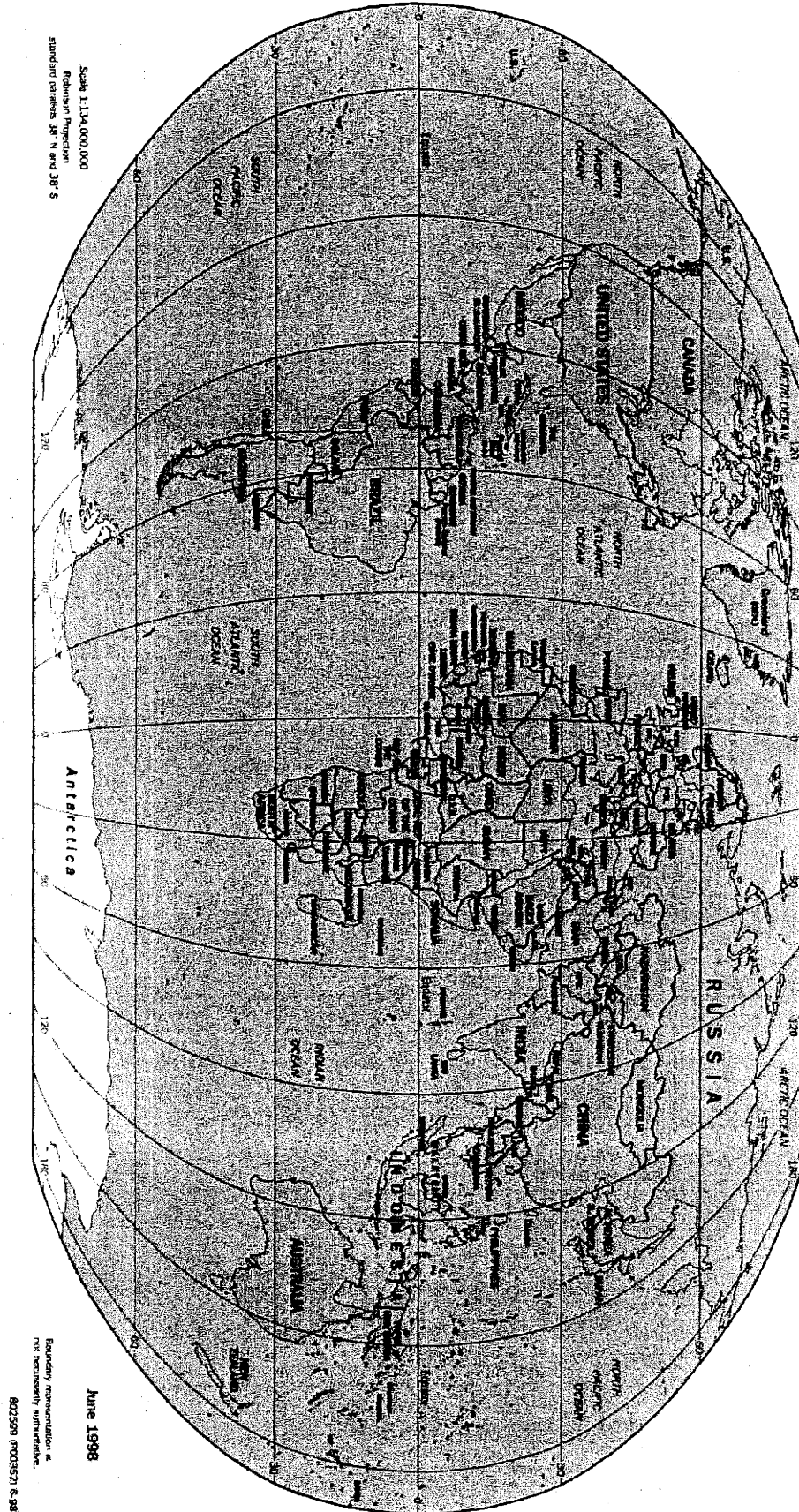
## Major ship-yards in China according to the Seatrade Periodical:

Seatrade Yard Number	Shipyards	Province/City
1	Beihai Shipyard	Shandong
2	Bohai Shipyard	Liaoning
3	Chengxi Dockyard	Jiangsu
4	Chongqing Shipyard	Sichuan
5	Chuandong Shipyard	Sichuan
6	Dalian New Shipyard	Liaoning
7	Dalian Shipyard	Liaoning
8	Donghai Shipyard	Shanghai
9	Guangzhou Shipyard	Guangdong
10	Guijiang Shipyard	Guangxi
11	Haidong Shipyard	Zhejiang
12	Huangpu Shipyard	Guangdong
13	Hudong Shipyard	Shanghai
14	Jiangdu Shipyard	Jiangsu
15	Jiangnan Shipyard	Shanghai
16	Jiangyin Shipyard	Jiangsu
17	Jiangzhou Shipyard	Jiangxi
18	Jingjiang Shipyard	Jiangsu
19	Jinling Shipyard	Jiangsu
20	Mawei Shipyard	Fujian
21	New China Shipyard	Guangdong
22	Oingdao Shipyard	Shandong
23	Oingshan Shipyard	Hebei
24	Oinhuangdao Shipyard	Hebei
25	Oiuxin Shipyard	Shanghai
26	Runzhou Shipyard	Jiangsu
27	Shanghai Shipyard	Shanghai
28	Shangaiguan Shipyard	Hebei
29	Tangu Shipyard	Tianjin
30	Weihai Shipyard	Shandong
31	Wenchong Shipyard	Guangdong
32	Wuchang Shipyard	Hubei
33	Wuhu Shipyard	Anhui
34	Xngang Shipyard	Tianjin
35	Xinhe Shipyard	Bohai, Hebei
36	Xinhua Shipyard	Jiangsu
37	Xinhua Shipyard	Zhejiang
38	Zhejiang Shipyard	Zhejiang
39	Zhenjiang Shipyard	Jiangsu
40	Zhonghua Shipyard	Shanghai

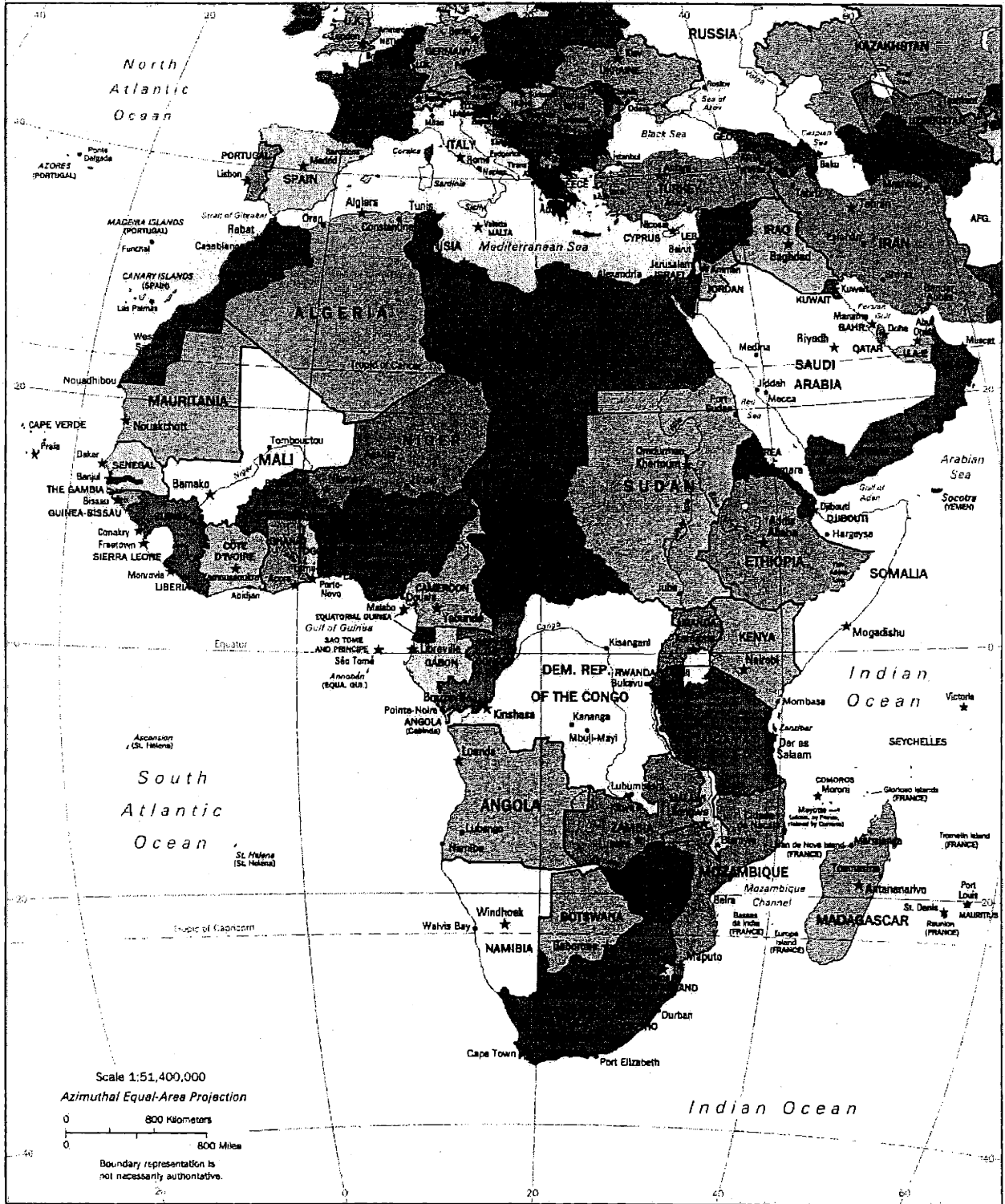


**Appendix V: World Maps**

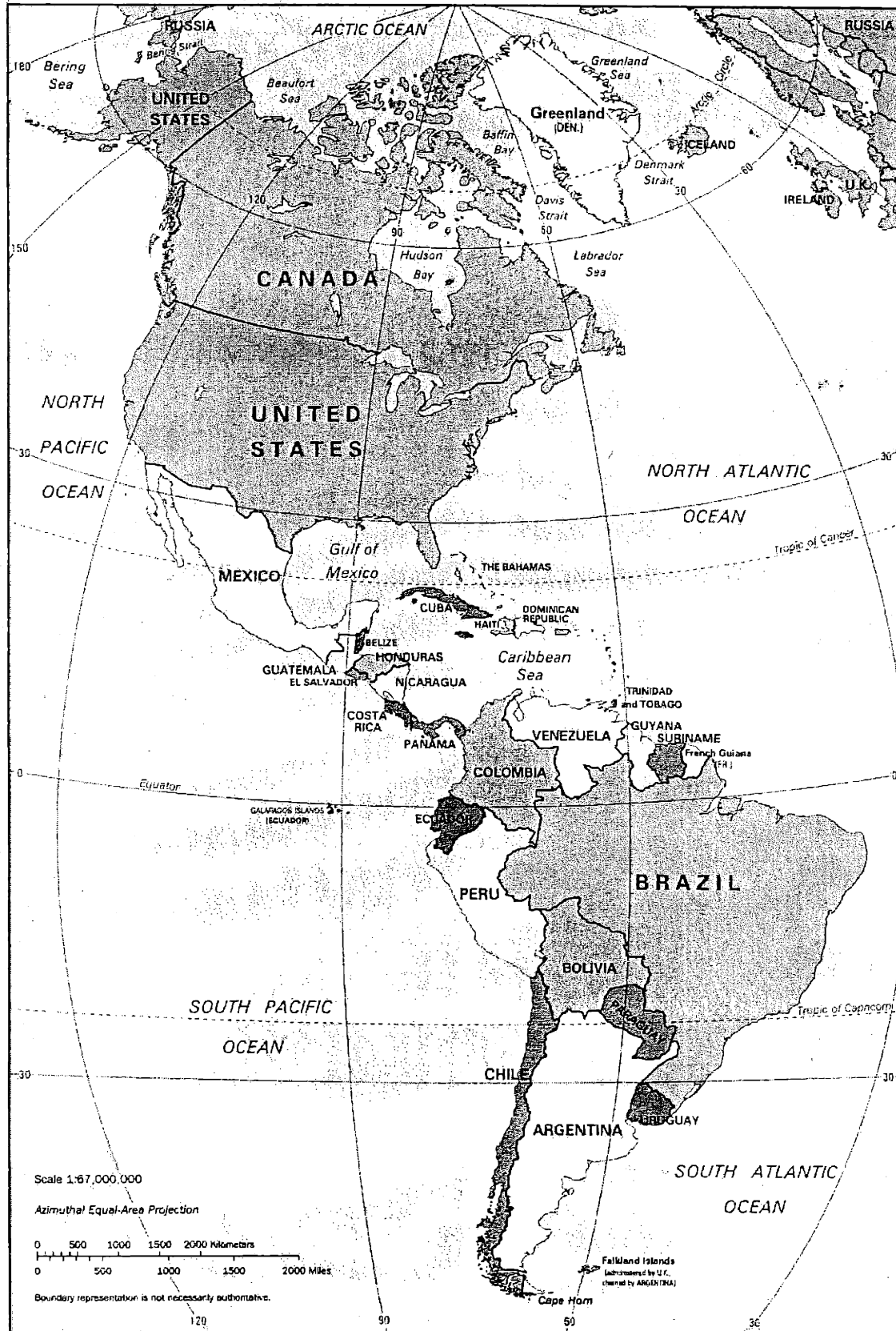




Africa



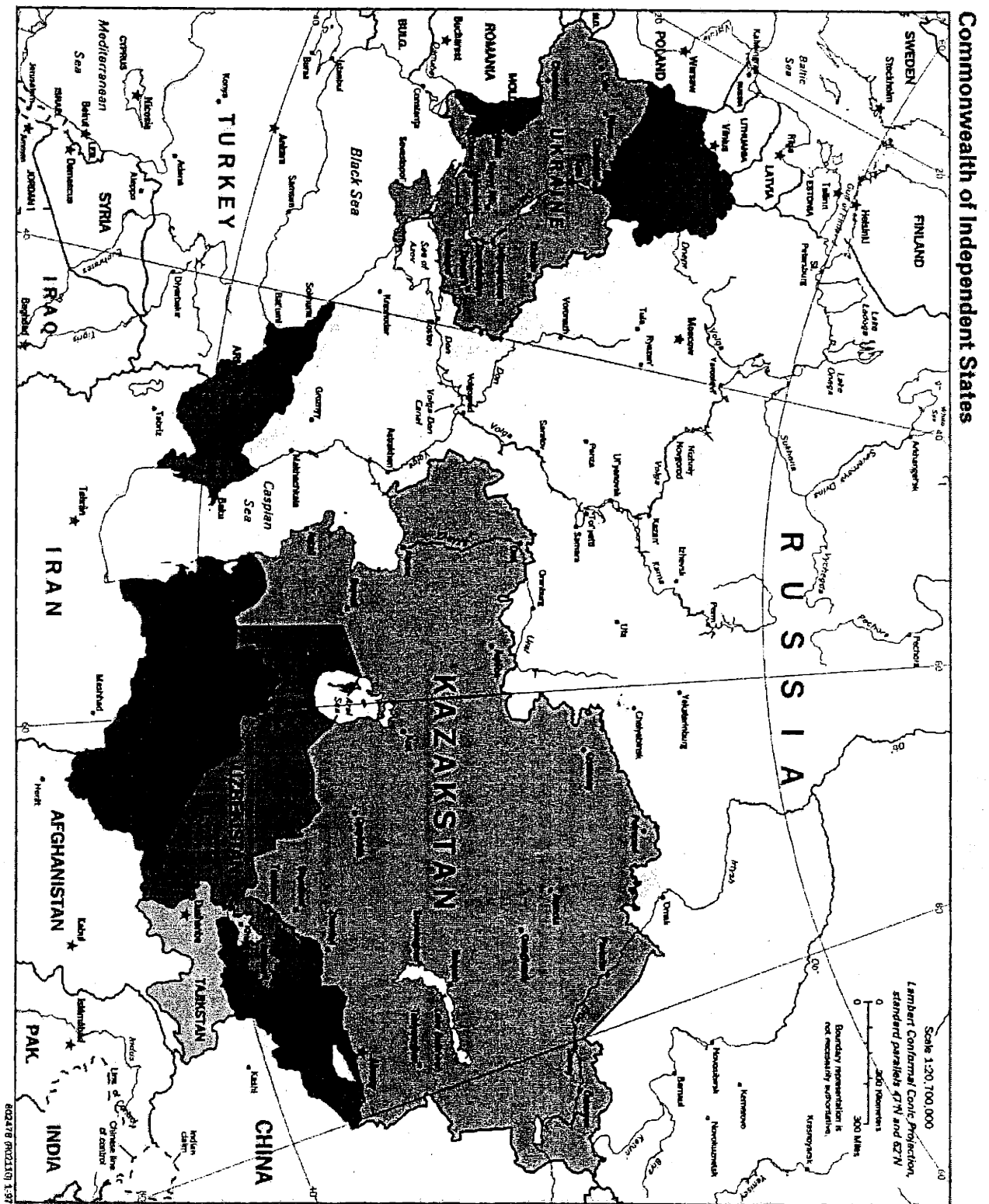
### North and South America



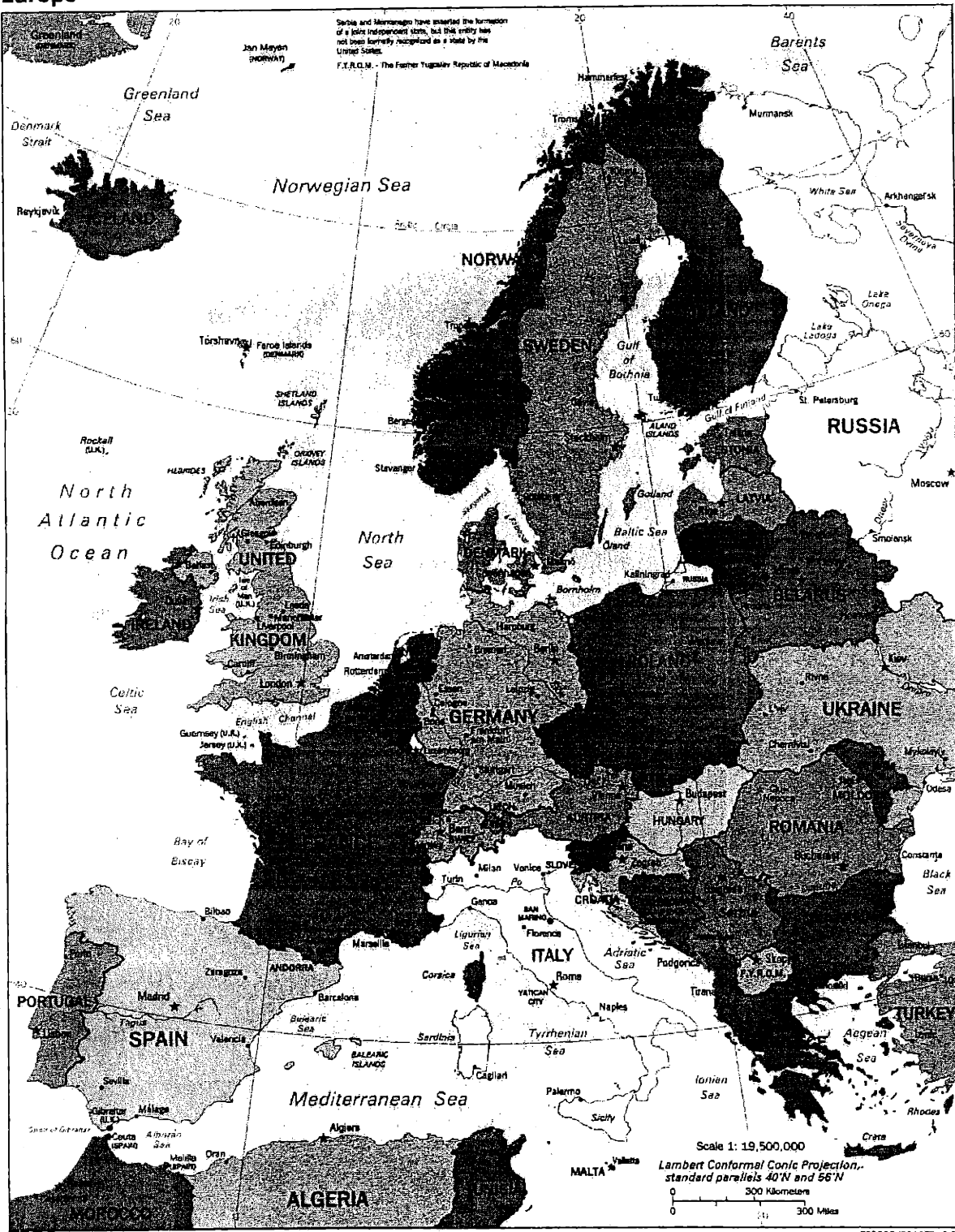
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Asia



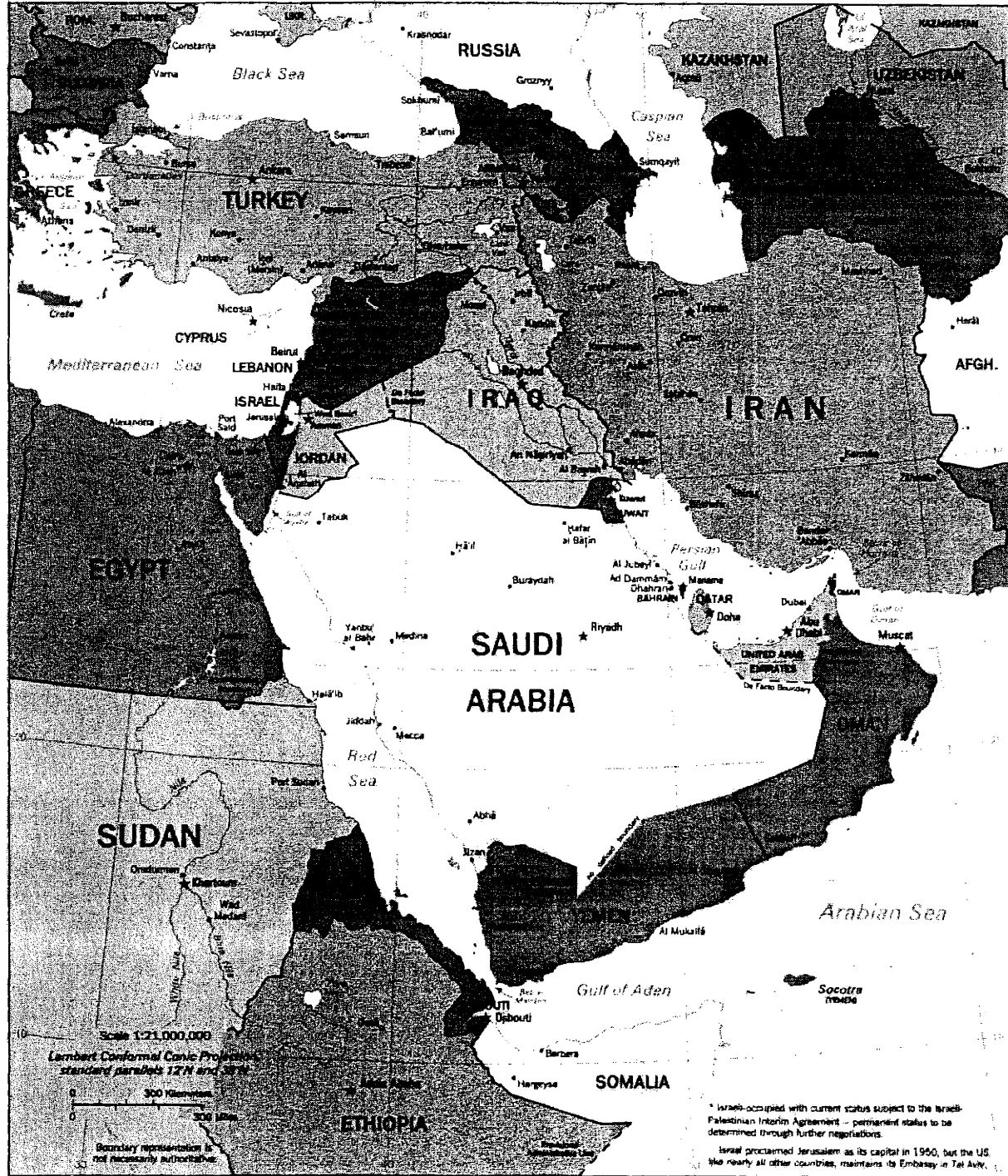


Europe

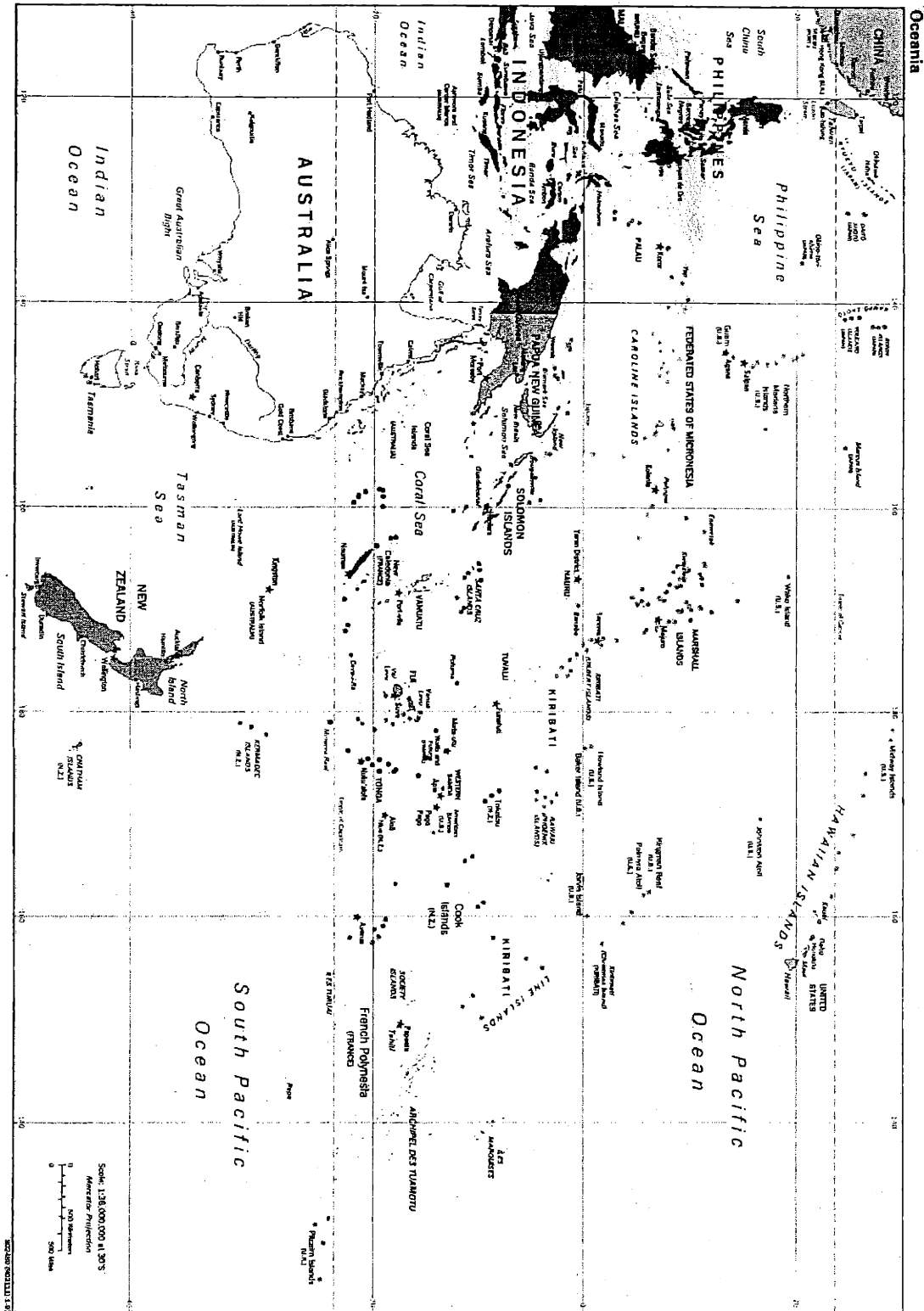




**Middle East**







**Appendix VI: Shiprepair Cost by Activity**

Prices are quoted in \$,000	US-1	US-2	Arg-1	Sp-2	Gr-1	Gr-2	Port-1	Sp-1
Dredging	59.1	43.5	30.5	28.0	17.7	25.6	36.4	29.0
General Services	26.3	25.3	16.7	14.4	9.5	12.2	10.7	15.8
Painting/Sandblasting	170.4	119.4	52.2	49.1	52.8	59.3	60.3	58.1
Sea Chests	6.3	5.6	2.0	2.5	1.6	2.2	3.8	1.8
Rudder	7.7	7.6	6.2	5.5	2.3	5.1	5.9	6.7
Propeller - Tailshaft	41.4	34.5	17.3	13.5	8.3	9.0	16.6	12.4
Stern tube Simplex Seals	13.4	12.9	3.1	3.1	1.8	3.5	2.8	2.0
Propeller blades polishing	4.5	3.9	1.8	1.9	0.8	1.0	2.9	3.5
Sea valves overboard discharges	21.1	18.7	5.6	7.2	4.7	6.6	6.7	5.8
Hull Zinc Plates	5.1	3.6	1.8	2.5	1.6	2.4	1.9	2.4
Hull Repairs	209.1	224.0	89.8	106.9	70.8	90.1	143.8	121.6
Shell Plating Stbd side	131.8	141.0	56.8	69.1	45.9	49.4	92.5	78.1
Topside tanks Port/Stbd Side	317.8	268.0	94.0	113.9	66.0	99.5	154.0	155.8
Cargo holds Sandblasting	165.4	142.4	99.6	144.5	76.8	84.6	133.2	124.2
Piping work Engine Room	28.5	25.2	12.2	15.5	7.7	10.1	16.1	14.3
M/Engine Auxiliary Machineries overhauling	37.4	36.6	27.6	30.1	15.1	10.5	24.2	18.3
Total Amount	1,245.3	1,112.2	517.1	607.9	383.3	471.1	711.7	649.9
Total Amount after Discount								447.5

Prices are quoted in \$,000	Neth-1	Neth-2	Fr-1	UK-1	UK-2	Ukr-1	Rus-1	Rom-1
Drydocking	24.2	35.2	33.5	45.7	34.4	22.1	19.5	28.5
General Services	9.9	10.0	10.9	20.8	14.7	9.0	7.2	8.7
Painting/Sandblasting	66.2	67.6	66.1	80.6	61.3	33.9	38.5	46.7
Sea Chests	2.3	2.0	3.5	3.9	2.2	0.6	0.9	1.0
Rudder	14.3	6.9	2.9	5.0	4.7	1.3	4.1	1.3
Propeller - Tailshaft	18.7	13.8	13.1	24.3	13.0	4.7	5.2	7.7
Stemtube Simplex Seals	2.5	1.1	1.8	3.3	3.7	0.7	1.2	0.5
Propeller blades polishing	2.4	2.9	0.8	4.7	1.8	0.8	0.4	0.6
Sea valves overboard discharges	7.8	6.3	7.0	7.7	5.3	0.9	4.0	3.3
Hull Zinc Plates	3.3	2.0	3.3	3.6	2.1	0.8	0.9	1.1
Hull Repairs	156.5	157.6	164.1	175.3	161.0	51.5	60.2	55.8
Shell Plating Stbd side	80.3	89.0	75.2	106.5	100.0	33.3	37.3	35.9
Topside tanks Port/Stbd Side	146.2	174.0	161.5	197.1	170.8	48.0	58.0	76.0
Cargo holds Sandblasting	154.3	150.0	197.0	147.6	165.7	44.8	79.2	76.1
Piping work Engine Room	27.6	33.0	21.3	25.9	16.4	5.6	10.1	7.1
M/Engine Auxiliary Machineries overhauling	28.1	25.4	17.9	40.7	21.4	9.4	10.1	7.7
Total Amount	744.6	776.7	779.9	892.9	778.5	267.2	336.5	358.2

Prices are quoted in \$,000	Tur-1	Pol-1	Lith-1	Lat-1	UAE-1	Jap-1	Jap-2	Kor-1
Drydocking	31.5	28.6	32.1	26.9	20.5	31.0	20.1	23.5
General Services	14.6	13.6	10.7	10.3	8.2	11.8	12.9	8.0
Painting/Sandblasting	43.0	48.1	43.2	33.6	35.6	84.3	54.5	34.5
Sea Chests	1.0	1.5	1.5	1.1	1.5	1.4	1.8	1.7
Rudder	3.0	3.0	4.0	1.2	3.0	5.1	2.7	0.9
Propeller - Tailshaft	15.0	5.5	7.7	5.1	7.0	13.0	10.0	7.3
Stern tube Simplex Seals	2.0	1.6	1.1	1.4	1.7	3.8	1.6	1.5
Propeller blades polishing	0.6	2.0	1.6	0.7	1.8	0.7	0.9	0.4
Sea valves overboard discharges	4.1	5.3	4.3	3.4	3.8	5.6	5.3	2.0
Hull Zinc Plates	1.0	1.7	1.1	1.0	1.2	3.0	1.4	1.7
Hull Repairs	50.5	74.0	65.8	59.1	90.4	138.2	78.9	63.0
Shell Plating Sthd side	29.9	49.2	41.9	37.9	54.5	85.1	60.6	39.6
Topside tanks Port/Sthd Side	46.0	71.0	63.0	59.0	94.0	192.0	83.2	64.0
Cargo holds Sandblasting	77.6	62.6	60.0	43.3	94.5	256.3	118.3	100.1
Piping work Engine Room	11.6	8.9	7.7	6.8	10.8	22.2	15.0	6.7
M/Engine Auxiliary Machineryes overhauling	21.5	18.8	17.4	12.2	12.8	14.3	12.2	10.5
Total Amount	352.9	395.4	363.0	303.1	441.4	867.8	479.4	365.6
Total Amount after Discount		377.7			419.3	650.9		

Global Ship-repair Industry: Evaluation of Current Situation and Future Trends

Prices are quoted in \$,000	Sing-1	Sing-2	Ind-1	Chi-1	Chi-2	Chi-3	Chi-4
Drydocking	12.5	13.3	13.0	17.4	17.7	24.5	14.1
General Services	8.5	6.8	6.1	8.9	7.8	9.6	7.4
Painting/Sandblasting	40.6	33.6	27.9	45.8	35.8	40.7	39.4
Sea Chests	1.0	0.7	0.5	1.4	0.8	1.2	0.9
Rudder	1.6	1.4	1.1	2.0	1.7	1.5	0.7
Propeller – Tailshaft	5.2	5.2	4.3	5.9	5.6	6.5	5.2
Sterntube Simpler Seals	1.9	1.5	1.5	1.1	1.0	0.9	0.7
Propeller blades polishing	0.7	0.3	0.1	0.6	0.6	0.4	0.4
Sea valves overboard discharges	2.7	2.6	2.3	2.6	2.8	3.1	2.8
Hull Zinc Plates	1.4	0.6	0.4	1.0	1.0	1.0	0.8
Hull Repairs	83.8	61.9	47.8	33.4	39.6	36.4	32.4
Shell Plating Stbd side	51.7	40.7	29.5	22.5	23.8	22.5	20.0
Topside tanks Port/Stbd Side	81.3	65.0	44.0	32.0	34.0	32.0	30.0
Cargo holds Sandblasting	142.5	126.0	75.6	54.2	51.0	56.7	52.0
Piping work Engine Room	5.5	7.4	4.7	8.7	8.5	8.2	8.0
M/Engine Auxiliary Machineryes overhauling	22.7	14.1	17.0	17.3	12.0	15.6	17.5
Total Amount	463.5	380.8	275.6	254.6	243.6	260.8	232.4
Total Amount after Discount				212.9	229.3	232.5	221.0

**Appendix VII: Shiprepair Yard Directory**

# SHIPREPAIR YARD DIRECTORY

The following pages list shiprepair yards on a geographical basis running along coastlines and around the world as indicated on the map. Detailed facilities at yards are restricted to docks of at least 150mtr in length and mechanical lifts of at least 1,000 tonnes capacity. All dock sizes are shown in metres. Services key provided at the bottom of this page.

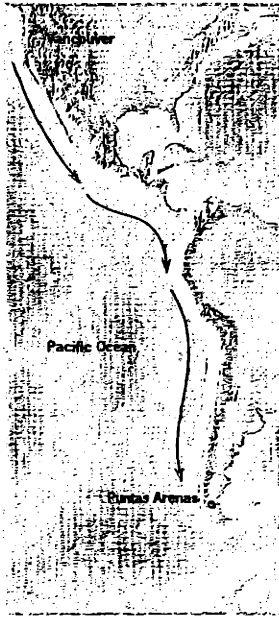
<b>AMERICAS - PACIFIC COAST</b>							
Canada	78	Iceland	83	Bulgaria	92	<b>INDIAN SUBCONTNENT</b>	
USA	78	Faroes	83	Romania	92	Pakistan	96
Mexico	78	Norway	83	Ukraine	92	India	96
Panama	78	Denmark	85	Russia	93	Sri Lanka	96
Ecuador	78	Sweden	85	Turkey	93	Bangladesh	96
Peru	78	Finland	85	Israel	93		
Chile	78	Russia	85	Egypt	93	<b>SOUTH EAST ASIA</b>	
		Baltic States	85	Tunisia	93	Malaysia	97
		Poland	85	Algeria	93	Singapore	97
		Germany	85			Indonesia	97
<b>AMERICAS - ATLANTIC COAST</b>				<b>AFRICA - ATLANTIC COAST/ INDIAN OCEAN</b>		Thailand	97
Argentina	79	<b>NORTH SEA/ENGLISH CHANNEL/ NORTH ATLANTIC</b>		Morocco	93	Vietnam	97
Uruguay	79	Germany	87	Madeira	95	Philippines	98
Brazil	79	UK	87	Canary Islands	95		
Venezuela	79	Eire	90	Cape Verde	95	<b>AUSTRALASIA</b>	
Colombia	79	The Netherlands	90	Senegal	95	Australia	98
USA	79	Belgium	90	Ghana	95	Tasmania	98
Canada	81	France	90	Cameroon	95	New Zealand	98
St Lawrence/Great Lakes	81	Spain	90	Angola	95	New Caledonia	98
		Portugal	91	South Africa	95	Fiji	98
<b>CARIBBEAN/GULF OF MEXICO</b>				Madagascar	95	Samoa Islands	98
Netherland Antilles	81	<b>MEDITERRANEAN/BLACK SEA</b>		Kenya	95		
Trinidad	81	Gibraltar	91	Somalia	95	<b>FAR EAST</b>	
Barbados	81	Spain	91			Hong Kong	98
Martinique	81	France	91	<b>RED SEA/THE GULF</b>		Taiwan	98
Puerto Rico	81	Italy	91	Saudi Arabia	95	China,PR	99
Cuba	81	Malta	92	UAE	95	South Korea	99
Mexico	81	Slovenia	92	Bahrain	96	Japan	99
USA	83	Croatia	92	Kuwait	96		
		Greece	92	Iran	96	<b>HAWAIIAN ISLANDS</b>	
<b>NORTH ATLANTIC/BALTIC</b>						Hawaii	100
Greenland	83						



- |                  |                            |                                |                           |                        |
|------------------|----------------------------|--------------------------------|---------------------------|------------------------|
| 1 Steam          | 9 Overhauls                | 17 In situ grinding/machining  | 25 Gas freeing station    | 33 Reactivation        |
| 2 Compressed air | 10 Flying squads           | 18 Underwater surveys          | 26 Electrical repairs     | 34 Underwater repairs  |
| 3 Ballast water  | 11 Underwater cleaning     | 19 Offshore & semi submersible | 27 Metal spraying         | 35 Welding services    |
| 4 Fresh water    | 12 Voyage repairs          | 20 Propeller repairs           | 28 Engine repairs         | 36 Repairs afloat      |
| 5 Acetylene      | 13 Slop disposal/reception | 21 Tank coating                | 29 Hull repairs           | 37 High pressure water |
| 6 Oxygen         | 14 Tank cleaning           | 22 Precision machining         | 30 Refurbishing           | 38 Re-engining         |
| 7 Conversions    | 15 Oil cleaning            | 23 Lpg/Lng & chemical services | 31 Anchor & chain repairs | 39 Steel fabrication   |
| 8 Lengthening    | 16 Grit/sand blasting      | 24 Retrofits                   | 32 Refrigeration          | 40 Refits              |



# THE AMERICAS- PACIFIC COAST



## NORTH AMERICA

### CANADA

#### VANCOUVER SHIPYARDS CO LTD

50 Pemberton Ave, N Vancouver,  
BC V7P 2R2  
Tel: (604) 9886361  
Telefax: (604) 9903290

Manager, business development: D.A. Reid

Marketing manager: W.J. Armstrong

Shiprepair manager: S. Andrew

Facilities: Floating dock 220.0 x 45.80mtr with 36,000 tons lifting capacity and 85 ton crane; also a floating dock under 150.0 mtr, 30,000 tons lifting capacity.

Services: 1-12, 14, 16-22, 26-31, 34-40

#### ESQUIMAULT GRAVING DOCK

Public Works & Government Services Canada,  
825 Admirals Rd, Victoria, BC V9A 2P1  
Tel: (604) 3805679

Operations Manager: E.A. Domingo

Facilities: Drydock, 358.63 x 38.18 x 10.97mtr with 150,44 and 30 ton travelling cranes, 9 ton mobile crane. Sheltered dock 300mtr and 300mtr wet berth. Public docks used by private contractors for ship repair and construction.

Services: 2-4, 7-9, 11-12, 16-18, 20-22, 24-31, 34-40

#### YARROWS LTD

PO Box 1030, 615 Casteen Road, Victoria,  
BC V8W 2S9  
Tel: (604) 3848424  
Telefax: (604) 3857213

Shiprepair manager: R. Watson

Facilities: Uses public dock at Esquimalt (see

above). Marine railway with 2,500 ton lifting capacity and repair wharves of 243mtr, 213mtr and 152mtr lengths with travelling cranes up to 150 tons.

Services: 1-9, 12-14, 16, 22, 26-29, 30, 35-37, 39, 40

### USA

#### TODD PACIFIC SHIPYARDS CORP

PO Box 3806 (98124), 1801 16th Ave SW,  
Seattle, Washington 98134  
Tel: (206) 6231635

Telefax: (206) 442 8505

President & COO: Roland Webb

Director of marketing: Ed Zajonc

Assistant gen manager: Robert Gilbert

Facilities: Three floating drydocks, 266.2 x 40.8 x 9.1 mtr with 40,000 ton lifting capacity, 150 and 2 x 25 ton cranes; 182.3 x 26.5 x 8.4 mtr with 16,500 ton lifting capacity, 100 and 45 ton cranes; 125.6 x 20.1 x 3.8 mtr with 5,400 ton lifting capacity and 40 ton crane.

Services: 1-12, 14, 16, 18, 20-21, 25-32, 34-39

#### CASCADE GENERAL PORTLAND SHIPYARD

5555 N. Channel Ave, Portland, Or 97217

Tel: (503) 2851111

Telefax: (503) 2850361

E-mail: info@casgen.com

Chief executive officer: Frank Foi

Executive vpr: Andrew G. Rowe

Sales director: Ms Terri Deskins

Director, voyage & small ship repair: Roy McKay  
Facilities: Three floating docks ranging from 182.3m in length up to 299.3m for vessels up to 275,000 dwt.

There is a total of 3,569mtr of berthage maximum draught of 12.2 mtr and cranes with a tandem lift capacity of 223 tonnes.

Services: 1-10, 12-18, 20-24, 26-40

#### SAN FRANCISCO DRYDOCK INC

PO Box 7644, San Francisco, Ca 94120

Tel: (415) 8617447

Telefax: (415) 3588466

E-mail: havent@sfdrydock.com

Managing director: Carl Hanson

Project development: Richard Haver

Facilities: Two floating docks available, 274.39 x 45.10 x 11.43mtr, with 66,043 ton lifting capacity and two 60 ton travelling cranes; 199.39 x 29.87 x 8.39mtr with 21,337 ton lifting capacity and 50/60 ton travelling crane also 35 ton mobile crane and a 90 ton floating crane.

Services: 1-7, 9, 10, 12-18, 20-22, 24, 26-33, 35, 37, 39, 40

#### SOUTHWEST MARINE INC

PO Box 3600, Terminal Island, San Pedro,  
Ca 90731  
Tel: (310) 5190600

Telefax: (310) 8332222

Vice president: M. Spaleta

Facilities: Floating dock of 170.3 x 30.48 x 6.09mtr with 15,300 ton lifting capacity and 60 ton travelling crane. Also one floating dock facility under 150mtr in length.

Services: 1-10, 12-14, 16-18, 20-22, 24-40

#### SOUTHWEST MARINE INC

PO Box 13308, San Diego, Ca 92170

Tel: (619) 2381000

Telefax: (619) 3389375

President/CEO: Ed Ewing

Sr VP Operations: David Engel

Facilities: Floating dock of 173.11 x 32.00 x 11.00mtr with 22,300 ton lifting capacity and 90 ton crane and 35 ton travelling crane. Mobile crane with 120 ton lifting capacity and 150 ton floating crane.

Marine railway of 71.60 x 7.20 x 6.70mtr with 1,200 ton lifting capacity and 15 ton crane, 150 ton floating crane and two 120 ton mobile cranes. Also floating dock facility under 150mtr in length.

Services: 1-10, 12-14, 16-18, 20-22, 24-40

#### NATIONAL STEEL & SHIPBUILDING CO

2798 E. Harbor Dr, San Diego, Ca 92113 or PO  
Box 85278, San Diego, Ca 92186-5278

Tel: (619) 544 3400

Telefax: (619) 544 3541

President & CEO: R.H. Vortmann

Director repair: Jan Erikson

Facilities: Drydock 304.80 x 51.80 x 9.10mtr, 200,000 dwt. Floating dock 182.90 x 42.70 x 11.62mtr with 25,400 ton lifting capacity and 35 ton crane. Also floating dock facility under 150mtr in length.

Services: 1-4, 7-9, 11-18, 20-22, 24-40

## CENTRAL AMERICA

### MEXICO

#### ASTILLEROS UNIDOS DE ENSENADA SA CV

Bld Jose Azueta SN, 22850 Recinto portuario,

Ensenada, Baja California

Tel: 81901, 40490

Telefax: 56424 area mx

Telefax: 667 40478

Director: Fernando Zolozano

Facilities: 3,000 ton lifting capacity Syncrolift.

Services: 2-8, 11-16, 18-22, 24-26, 29, 31,

34-38, 40

#### DIRECCION GENERAL DE REPARACIONES Y CONSTRUCCIONES NAVALES

Head Office Londres 38, Col. Juarez Deleg.

Cuauhtemoc 06600 Mexico DF

Tel: 5121184, 512915

Director general: G.G. Zamudio

Facilities: Drydock 201.30 x 20.00, 25,000dwt and 2 x 50 ton cranes. Syncrolift 101.00 x 21.00mtr and 2,500 lifting capacity. Slipway 72.50 x 12.80mtr, 1,500 lifting capacity, 2 x 10 ton, 25 and 15 ton cranes. Also two floating docks under 150mtr in length.

Facilities at Salina Cruz, Tampico, Manzanillo, Coahuacalcoas, Acapulco, Guaymas and Veracruz.

Services: Full repair service 1-40

### PANAMA

#### ASTILLEROS BRASWELL INTERNATIONAL SA

Apartado 3666, Balboa, Ancon

Tel: (507) 232562/63/66

Telefax: (507) 2325851

E-mail: braspen@panama.c-com.net

Presidents: Eliott S. Braswell, Jr.

General manager: Richard Owen

Sales & marketing manager: Davor Turina

Facilities: Drydock 318.19 x 33.58 x 12.77mtr capacity 80,000 dwt with 2 x 6 tons, 1 x 8 tons, 1 x 50 tons and 1 x 25 tons travelling cranes. 50 ton and 15 ton cranes. Also two drydock facilities under 150mtr in length. Wet berths 146mtr.

Services: 2-7, 9, 11, 14-16, 18, 20-22, 24, 26-31,

33-40

## SOUTH AMERICA

### ECUADOR

#### ASTILLEROS NAVALES ECUATORIANOS - ASTINAVE

PO Box 7175, Osayquil

Tel: (4) 445361, 331656, 441837

Telefax: (4) 441838

General manager: Hugo Caliente Jalón

Production manager: Xavier Mancheno

Facilities: Two floating docks 150.58 x 18.64mtr with 3,500 ton lifting capacity and 4 x 10 ton cranes.

Services: Full repair service

### PERU

#### SERVICIO INDUSTRIAL DE LA MARINA CHIMBOTA (SIMACH)

Ave Los Pescadores Sona Industrial 27 de

Octubre, Chimbote

Tel: 32 4601

Telefax: 94026 pe

Repair manager: C. de P. Manuel Diaz Salgado

Facilities: Floating dock 195.00 x 34.00 x 10.00mtr, 40,000 dwt with 15,000 ton lifting capacity and 2 x 15 ton cranes.

Services: Syncrolift 210.00 x 40.00 x 18.00mtr with 1,000 ton lifting capacity.

### SERVICIO INDUSTRIAL DE LA MARINA CALLAO (SIMAC)

Ave Construinantz Mora 1102, PO Box 112,

Callao 01

Tel: (465) 3420, 5541

Telefax: 26128 pe

Telefax: (465) 7966

Executive director: Cesar Martinelli Freundt

Facilities: Drydock 194.85 x 26.80 x 10.06mtr,

25,000 dwt with 45, 25 and 15 ton cranes.

Also three floating dock facilities under 150mtr in

length. Two slipways.

Services: 2-12, 14-18, 20-22, 26-39

### CHILE

#### SOC IBEROAMERICANA DE REPARACIONES NAVALES LTDA - SOCIBER

Prta 827, Office 1101, Valparaiso

Tel: (32) 213032, 257900

Telefax: (32) 254162

Telefax: 330437 socib ch

General manager: Marcantonio Mongillo

Commercial manager: Rene G. Segura

Facilities: Floating dock 167.00 x 26.00 x 4.50mtr, 10 000 ton lifting capacity. Fully equipped workshops.

Services: 2-6, 13, 14, 16, 20-22, 24-29, 31, 32,

35, 37, 39

#### ASMAR SHIPBUILDING & DOCKING CO

Prta 856, Floor 13, PO Box 150-V,

Valparaiso

Tel: (56-32) 260508, 260509

Telefax: (56-32) 260157, 260158

Managing director: Sergio Martinez

Business development manager: Emilio Cabrera

Marketing manager, shipbuilding: Jorge Cea

UK Agent: Ship Repairers and Shipbuilders Ltd,

150 Waterloo Road, London, SE1 8SB,

United Kingdom.

Tel: (171) 9285265; Telefax: (171) 9285346

Services: 1-12, 14-18, 20-24, 26-29, 31-32, 35-40

#### Valparaiso Yard:

Av. Altamirano 1015, PO Box 150 V,

Valparaiso

Tel: (56-32) 272400, 272402

Telefax: (56-32) 260157, 260158

Telefax: (56-32) 272499, 214032

Commercial contact: Tomas Dagnino

#### Magallanes Yard:

21 de Mayo 2421, PO Box 65-D,

Puntas Arenas

Tel: (56-61) 261315, 262143

Telefax: 280038 asmar cl

Telefax: (56-61) 261399, 262447

Commercial contact: Gustavo Bahamondes

#### Magallanes Yard

(Bahia Catalina)

Av Bulnes 05275, PO Box 110-D,

Punta Arenas

Tel: (56-61) 214151; Telefax: (56-61) 211143

Commercial manager: Esteban Saenz

#### Talcahuano:

PO Box 104-D, Av. Jorge Montt 250,

Talcahuano

Tel: (56-41) 504200, 504000

Telefax: (56-41) 504004, 504001

E-mail: alca.bord@asmach.cl

Commercial manager: Reinaldo Roeppke

Facilities: Drydocks 242.00 x 38.80mtr,

95,000 dwt; 175.00 x 21.50mtr, 18,000 dwt.

Also 4 floating dock facilities up to 3,500 tons

lifting capacity, and over 2,000 mtr berths.

Services: 1-18, 20-40

#### SAEM ASTILLERO ESTRECHO DE MAGALLANES LTDA

Avenida Bulnes 05275, PO Box 110 - D,

Punta Arenas

Tel: (61) 214151; Telefax: 680269 ca, 280093 cl

Telefax: (61) 211143

General manager: Heinz Pearce

Repair manager: Miguel Angelo

An ASMAR joint venture

Facilities: Marine railway 130.00 x 24.00 x

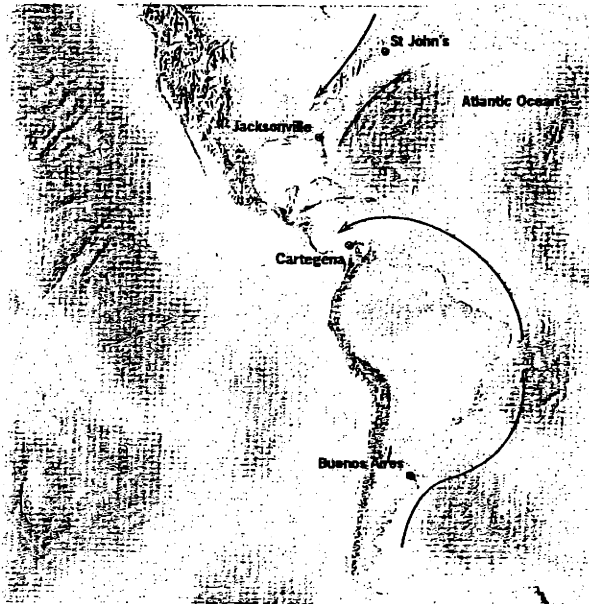
6.00mtr with 4,000 ton lifting capacity, 99.00mtr

transfer cradle with 45 ton mobile crane and 5

ton hoist.

Services: 1-8, 9, 13, 14, 16-20, 26, 28-40

# THE AMERICAS - ATLANTIC COAST



## ARGENTINA

### TALLERES NAVALES DARSENA NORTE SA - TANDANOR

Ave Espana 3091, 1107, Buenos Aires  
Tel: (1) 361 9689/7986/2140/8795  
Telex: (1) 361 5255/8448  
President & gen manager: Andres Vlaso  
Facilities: Synchronlift with 15,000 tons lifting capacity, 11,600 tons transfer capacity, lifting platform 185mtr in length, 32.90 mtr width. Four working cradles with total length of 695 mtr; 1,400 mtr berthing facilities. Cranes and floating docks for ships under 100 mtrs. Gantry and floating cranes from 7 to 73 tons.  
Services: 1-22, 24-26, 28-40

### CROMWELL & CIA SA

Shipbuilding, ship repairs, conversions  
California St 733, Buenos Aires 1168  
Tel: (1) 43014124, 43015069, 43010620, 43014125; Telex: (1) 43028016, 43027407  
General manager: John Hampton  
Works manager: Lino Aurigoni  
Representatives: Copenhagen, Denmark - Eberhardt Agencies & Shipping ApS, Tel: (33) 136616; Telex: (33) 320314; Piraeus, Greece - SRSR Ltd, Tel: (1) 4221956; Telex: (1) 4224328 Norway - Storm & Bull, Tel: (67) 566070  
Telex: (67) 565222; Germany - Peter Gast Shipping, Tel: (40) 374989; Telex: (40) 362525  
Facilities: Dry docks - use of public docks (150.00 x 25.00 mtr, 8,000 ton lifting capacity, 170.00 x 27.00 mtr, 12,000 ton lifting capacity, 234.00 x 25.00 mtr graving dock).  
Services: 2-12, 14-20, 22, 24, 26-40

### ASTILLEROS ALIANZA SA

Ribera Sud del Riachuelo, Carlos Pellegrini, Isla Maciel, Avellaneda, Buenos Aires  
Tel: (1) 2010069; Telex: 2017018  
General manager: Ruben Coci  
Facilities: Synchronlift of 150.00 x 32.00mtr with 9,600 ton lifting capacity.  
Services: 2-9, 15-18, 20, 21, 24, 26-29, 31-37, 39, 40

## URUGUAY

### DUQUE DE LA ARMADA

Punta Lobos s/n, Montevideo  
Tel: (598 2) 915 5902/2802/5401  
Telex: (598 2) 915 0375

General Manager: Capt. Alberto Falco

Facilities: Drydock 150 x 19 x 7 mtrs  
Services: 2-9, 14-18, 20-22, 25-40

### TSAKOS INDUSTRIAS NAVALES SA

Ave Gral Rondeau 2023, POB 532, Montevideo  
Tel: (2) 948336 38; Telex: 22251  
Telex: (2) 947095  
President: Capt. P. Tsakos  
General managers: E. Scayola, S. Giannoula  
Facilities: Floating dock 200.00 x 33.00mtr with 20,000 tons lifting capacity, 15, 10 and 5 ton cranes. 600 mtr repair quay with 5 and 2 ton cranes. Workshops/in transit bonded warehouse.  
Services: 2-7, 9-18, 20-22, 26-40

## BRAZIL

### WILSON SONS SA - COMERCIO INDUSTRIA E AGENCIA DE NAVEGACAO

Rua Padre Amalco Caiatta, 24 - Vila Ligeia, CEP 11430-020  
Tel: (13) 3582660; Telex: (13) 3582748  
Director: A. Calbuco  
Technical manager: Adalberto Souza  
Facilities: Drydock/shipway 205mtr, 5,000 dwt (combined).  
Services: 2-6, 9, 12, 14-16, 21-22, 26-29, 32, 35-39

### ARSENAL DE MARINHA DO RIO DE JANEIRO - AMRJ

Praca Barao de Ladario, Ilha das Cobras, Edificio 24, 4° andar, Rio de Janeiro  
Tel: (21) 2535435, 2534336; Telex: 53216 br  
Telex: (21) 2534484, 2113622  
Facilities: Two drydock facilities 250.00 x 44.12 x 11.10mtr and 165.15 x 25.00 x 7.00mtr. Also floating dock and drydock facilities under 1500mtr in length and shipway under 1,000 tons lifting capacity.  
Services: Primarily naval, 1-6, 14-17, 20, 22, 26, 28, 29, 31, 32, 35, 37, 39, 40

### ESTALEIRO MALU

Ave Rio Branco 103, 22 fl, Rio de Janeiro  
Tel: (21) 2210117, 7228423  
Telex: 22593, 31300 cmo br; Telex: (21) 7224995  
Facilities: Drydock 167.50 x 22.50mtr, 30,000 dwt.

### EMPRESA BRASILEIRA DE REPAROS NAVAIS SA - RENAVE

Rua do Acre, 9077 Andar, Centro Rio de Janeiro  
Tel: (21) 2533036, 2533656; Telex: 21993 ebrn br

Telex: (21) 2635092

Managing director: Sergio Romay  
Commercial managers: Helioimar Pires, Shiguero Asakura

Facilities: Two drydocks 184.00 x 27.00 x 7.45mtr, 30,000 dwt with 30 and 15 ton cranes; 167.50 x 22.50, 30,000 dwt. Two floating docks 215.00 x 36.20 x 9.50mtr, 60,000 dwt with 20,000 ton lifting capacity with 2 x 20 ton cranes; 170.00 x 26.00 x 6.00mtr, 20,000 dwt with 100,500 ton lifting capacity and 2 x 7 ton cranes.  
Services: 2-8, 14-17, 20, 22, 23, 26, 28-32, 34-39

### ENAV REPAROS NAVAIS LTDA

Rua Silva Jardim, 212 Poeta D'Árcia, Niterói CEP 24030-000, Rio de Janeiro

Tel: (21) 6203370

Telex: (21) 6204420, 6207862, 6204620

Managing director: Ronaldo Pucci

Commercial manager: Luiz Eduardo Almeida

Facilities: Two floating docks 220.00 x 35.00mtr with 21,000 ton lifting capacity; 200.00 x 32.80 mtr with 18,000 ton lifting capacity. Graving dock 184.00 x 27.00 mtr, 30,000 dwt. Cranes up to 30 tons. Also a floating and a graving dock facility under 150mtr in length.  
Services: 1-10, 12, 14, 16, 20-22, 26-33, 35-40

### BASE NAVAL DE ARATU

São Tomé de Paripe, Salvador, Bahia

Tel: (071) 3073511, 3073516/18

Telex: 711440 br

Telex: (071) 3073567, 3073568

Facilities: Drydock 230.00 x 30.00 x 11.50mtr; 7.70 mtr water depth above blocks, 35,000 dwt and synchronlift with 1,200 ton lifting capacity.  
Services: Primarily naval, 1-6, 12, 14, 16, 17, 21, 26, 29, 32, 35, 36

### ESTALEIROS AMAZONIA SA - ESTANAVE

Posta do Ovidor, Rio Negro, Km4 PO Box 831, 69000 Manaus, Amazonas

Tel: (92) 2381799

Telex: 2286 esm br

Yard manager: Maurício Camara Piques

Facilities: Floating dock 168.00 x 23.50mtr, 1,000 dwt, 2 x 10 ton cranes. Two synchronlifts 280.00 x 23.00mtr each.

## VENEZUELA

### DIQUES Y ASTILLEROS NACIONALES CA (DIANCA)

Valle Santa Lucia, Puerto Cabello

Tel: (42) 613452, 614922, 615672

Telex: (42) 613140

President: Carlos Moreno Bonilla

Commercial manager: Eng Ruben Diaz Peredes

Facilities: Drydock 220 x 32 x 9.2mtr, 30,000 dwt

Synchronlift 125 x 7mtr, 5,000 ton lifting capacity.

Services: 2-10, 12-18, 20-22, 25-40

Plans to build a 350 x 54mtr dry dock, 100,000 dwt capacity.

## COLOMBIA

### COMPANIA COLOMBIANA DE ASTILLEROS - CONASTIL SA

POB 1258, Manonai, Cartagena

Tel: (953) 685295, 685547

Telex: (953) 685133

President: Luis Alberto Camargo

General manager: Guillermo Quijano Ardila

Commercial manager: Roberto Spicker

Facilities: Synchronlift 117 x 21.50 x 6.10mtr, maximum lifting capacity 5,600 tons. Cranes up to 100 tons.

Services: 2-6, 8-9, 14-18, 20-22, 25-26, 28-29, 31-32, 35-36, 39

## NORTH AMERICA

### USA

### ATLANTIC DRYDOCK CORP

8500 Heckscher Drive, Jacksonville, FL 32226

Tel: (904) 2513111; Telex: (904) 2513500

President: Ed Flemming

Facilities: Atlantic Dry Dock operates 1,250 and 4,000 ton railways with two repair quays 178 and 137mtr long. Sister company Atlantic Marine specializes in new construction.

Services: 1-9, 13-17, 19-22, 24-33, 35-40

### NORTH FLORIDA SHIPYARDS

PO Box 3255, Jacksonville, FL 32206

Tel: (904) 3543278; Telex: (904) 3532665

President: J.B. Shiffert

General manager: Matt Self

Yard manager: J. Becker

Facilities: Floating dock 118.00 x 17.00mtr with 2,800 lt, 2 x 15 ton cranes and 100 ton floating crane with tug, 1,500 mtr wet berth with three mobile cranes of 100, 125 and 50 ton lifting capacity. Repairs and new construction.

Services: 1-10, 12-18, 20-24, 26-40

### INTERMARINE USA

PO Box 3045, 301 N. Lathrop Ave, Savannah, Ga 31402-3045

Tel: (912) 2346579; Telex: (912) 2340717

Chief operating officer: Jim Berulia

General manager: Giorgio Magliulo

Business development: Tom Wright

Facilities: 40.80 x 12.50mtr marine railway with 1,000 ton lifting capacity. Graving dock 164.5 x 21.9 mtr.

Services: 2-10, 12-18, 20-22, 24-26, 28-31, 35-40

### NORFOLK SHIPBUILDING & DRYDOCK CORP

750 West Berkley Avenue (23523), POB 2100, Norfolk, Virginia 23501-2100

Tel: (757) 4944000; Telex: (757) 4944030

Internet: <http://www.norshipco.com>

E-mail: [salesmarketing@norshipco.com](mailto:salesmarketing@norshipco.com)

Marketing & sales: C. Agnese, D. Everton

Facilities: Floating docks: 289.60 x 48.80 x 11.00mtr with 54,250 ton lifting capacity and 70 and 50 ton cranes; 204.21 x 30.40 x 7.90mtr, with 20,000 ton lifting capacity and 2 x 12.5 ton cranes. Also floating dock facility under 150mtr in length.

Services: 1-9, 13-24, 26-33, 35-40

### METRO MACHINE CORP

POB 1860, Norfolk, Va 23501

Tel: (804) 5436801; Telex: (804) 4940430

President: R.A. Goldbach

Facilities: Floating dock 201.16 x 29.26 x 8.53mtr, 50,000 dwt (14,000 ton lifting capacity).

Services: 1-9, 14, 16

### COLONNA'S SHIPYARD INC

400 East Indian River Rd, Norfolk, Va 23523

Tel: (757) 5452414; Telex: (757) 5432480

President/CEO: Thomas W. Godfrey Jr

Vice President: J. Douglas Forrest

Production manager: Ken Inoumi

Facilities: Drydock 188.98 x 25.60 x 8.89mtr with 7,200 ton lifting capacity and 2 x 15 ton cranes.

Two marine railways: 128.10 x 21.34 x 4.27mtr with 5,000 ton lifting capacity, 25 and 10 ton cranes.

109.73 x 19.50 x 4.27mtr with 1,500 ton lifting capacity and 10 ton crane. Also marine railway facilities under 1,000 ton lifting capacity.

Services: 1-18, 21-22, 24-40

### NEWPORT NEWS SHIPBUILDING

4101 Washington Ave, Newport News, Va 23607

Tel: (757) 3802000, 6677447

Telex: (757) 6889263

E-mail: [www.nns.com](http://www.nns.com)

Director, shiprepair: Rebecca Stewart

Managers, shiprepair: Jack Finnegan, John Schoeb, Keith Sadler

Facilities: Seven drydock facilities: 662.00 x 76.20 x 9.95mtr with 900, 200, 60 and 3 x 30 ton cranes; 335.57 x 41.85 x 11.6mtr with 310, 84 and 3 x 28 ton cranes; 262.57 x 35.94 x 8.51mtr; 198.05 x 28.0 x 8.50mtr. Floating dock 195.00 x 42.60 x 11.40mtr. Two piers 154 mtr and 259 mtr and two outfitting berths available.

Services: 1-18, 20, 22, 24-40

### BALTIMORE MARINE INDUSTRIES, INC

600 Shipyard Road, Baltimore, Maryland 21219-1023

Tel: (410) 4777800; Telex: (410) 4777609

President: D. Watson

Manager, marketing: R. Fiorelli

Facilities: Drydock 365.70 x 60.90 x 8.40mtr, 300,000 dwt with 4 x 200 ton travelling cranes.

Floating dock 269.00 x 42.67 x 9.14mtr, 40,000 dwt with 2 x 50 ton travelling cranes.

Services: 1-9, 12-17, 19-33, 35-40

### NEW YORK SHIPYARD CORP

One Beard St, Brooklyn, NY 11231

Tel: (718) 2374040; Telex: (718) 8551313

President: Jim Murphy

General manager: Steve Dilco

**APPROXIMATELY** 10.00 x 28.00 x 9.00mtr with 40,000 ton lifting capacity. Two floating docks: 182.88 x 30.00mtr with 16,000 ton lifting capacity also one under 150mtr in length. Also 5 outfitting piers up to 380mtr in length.  
**Services:** 1-7, 9, 11, 16, 18, 20-22, 26-29, 31-33, 35-37, 39-40

**GND SHIPYARD**

Brooklyn Navy Yard, Building 595, Flushing Avenue & Cumberland Str, Brooklyn, NY 11205  
**Tel:** (718) 2609200; **Telefax:** (718) 2609284  
**President:** Michael Cranston  
**Facilities:** Two graving docks 305 mtr, 275 mtr wet berth with 3 x 75 ton and 1 x 200 ton cranes

**GENERAL SHIP CORP**

Fish Pier, West I, Suite 302, Boston, MA 02210  
**Tel:** (617) 946 8777; **Telefax:** (617) 946 8773  
**Chairman & CEO:** Arnold L. Meade  
**Executive vice president & COO:** Bob Cotes  
**VP marketing:** Jim Campbell  
**Facilities:** Two graving docks for vessels up to 358 mtrs x 36.6 mtrs with draft of 12.2 mtrs. Six gantry cranes (15-56 tons). Yard access 7 miles from open sea. Extensive industrial shop facilities. Minutes from Black Falcon Cruise Ship Terminal, with major container facilities.  
**Services:** 1-9, 12-17, 20-22, 24, 26, 28-33, 35-40

**BATH IRON WORKS**

40 Commercial St, Portland, Me 04101  
**Tel:** (207) 776 6448  
**Telefax:** (207) 776 6336  
**General manager:** D. W. Dailey  
**Facilities:** Floating dock 226.77 x 78.02 x 8.53mtr with two travelling cranes 60 and 25 tons  
**Services:** 1-7, 9, 12, 14, 16, 20-22, 24, 26-40

**CANADA**

**HALIFAX SHIPYARD**

c/o Irving Shipbuilding Inc, PO Box 5300, 300 Union St, (Off Ft. Saint John, NB ZELZLA)  
**Tel:** (506) 6325939  
**Telefax:** (506) 6325912  
**E-mail:** marketing@irvingshipbuilding.com  
**Website:** www.irvingshipbuilding.com  
**President:** J. Thomas  
**Facilities:** Drydock: 427.00 x 38.10 x 12.80mtr (can be subdivided into three of 137.00 x 18.50 x 6.40 mtr). One tidal graving dock 137.00 x 18.30 x 6.4 mtr, 100,000 dwt. Cranes: 2 x 600 ton, 100 ton, 75 ton, 68 ton and 33 ton lifting capacity. Transporters: 2 x 350 ton and 2 x 180 ton transporters can be synchronized for loads up to 1,000 tons.  
**Services:** 1-22, 24, 26, 28-32, 34-40

**STEEL & ENGINE PRODUCTS LTD**

POB 1120, Liverpool, NS BOT 1K0  
**Tel:** (902) 3543483; **Telefax:** (902) 354 4308  
**General manager:** R. Malcolm  
**General sales manager:** L. Perry  
**Plant manager:** D. Keameady  
**Facilities:** Slipway 76.20 x 17.37 x 5.79mtr, 1,800 dwt.  
**Services:** 1-4, 7, 9, 14, 16, 21, 24, 26, 28-30, 33-40

**LUNenburg INDUSTRIAL FOUNDRY & ENGINEERING LTD**

PO Box 1240, 53 Falkland St, Lunenburg, NS BOT 2C0  
**Tel:** (902) 6348827  
**Telefax:** (902) 6348886  
**President & CEO:** Peter J. Kaley  
**Vice President:** David P. Allen  
**Facilities:** Marine railway facilities: 67.00mtr cradle and 1,600 ton lifting capacity; 54.80mtr cradle and 1,200 ton lifting capacity. Also marine railway facility of 450 tons lifting capacity and mobile boat hoist of 75 tons.  
**Services:** 4-9, 11, 13-18, 20-22, 26, 28-32, 34-40

**HALIFAX SHIPYARD LTD**

Barrington St N, POB 9110, Halifax NS B3K 5M7  
**Tel:** (902) 4239271  
**Telefax:** (902) 4925818  
**General manager:** Robert Shepherd  
**Facilities:** Two floating docks: 257.00 x 38.00 x 9.00mtr, 100,000 dwt with 36,000 ton lifting capacity, 2 x 40 ton cranes and 140 ton floating crane; 161.19 x 32.61 x 5.09 mtr with 24,500 ton lifting capacity, one 8 ton and one 5 ton crane. Drydock: 173.00 x 23.00 x 9.00mtr. Two slipways: 107.00 x 17.4 with 3,000 ton lifting capacity.  
**Services:** 1-11, 13-22, 24-26, 28-40

**NEWFOUNDLAND DOCKYARD**

Job's Bridge Crossing, POB 97, St John's, Nfld A1C 5H5  
**Tel:** (709) 7723420; **Telefax:** (709) 7723427  
**President:** M. Apostolides  
**Facilities:** Drydock 173.25 x 21.33 x 8.23mtr with 6,000 ton lifting capacity and 50 and 25 ton cranes. Synchroft 86.50 x 20.00 x 8.00mtr with 4,000 ton lifting capacity and three wet berths of 100mtr length.  
**Services:** 1-40 (except 10)

**ST LAWRENCE & GREAT LAKES**

**DEPT OF PUBLIC WORKS OF CANADA**

395 St Joseph St, Levis, Quebec  
**Facilities:** Two drydocks: 359.66 x 36.60 x 12.20mtr; 182.90 x 18.30 x 7.00mtr.  
**Services:** 1-4 (see also Davie Industries below)

**DAVIE INDUSTRIES INC**

22 George D, Davie St, Quebec, Canada G6V 8V5  
**Tel:** (418) 8375841; **Telefax:** (418) 8351017  
**President:** Basim Haid  
**Vp operations:** J.Y. Rhadane  
**Facilities:** Two drydocks: 364.23 x 36.57mtr, 70 000 dwt; 182.58 x 18.89 x 7.82. Cranes up to 880 ton. Four slipways and six repair/outfitting quays 91.4mtr to 269.8 mtr.  
**Services:** 1-9, 13-16, 18-22, 24-33, 35-40

**PORt WELLER DRY DOCKS**

(A division of Canadian Shipbuilding & Engineering Ltd) POB 3011, 340 Lakeshore Road East, St Catharines, Ont L2R 7C1  
**Tel:** (905) 9342581; **Telefax:** (905) 9348135  
**Email:** pwdd@niagara.com  
**Internet Website:** www.pwdd.com  
**General manager:** Charles H. Payne  
**Operations manager:** John McWhirter  
**Facilities:** Drydock shiprepair 228.60 x 24.40 x 8.00 mtrs, 30,000 dwt with 125 ton crane; Repair and newbuilding 244 x 24.80 x 4.40 mtrs; 120, 55 and 45 ton travelling cranes. Also 365mtr long jetty with 200, 150 and 50 ton mobile cranes.  
**Services:** 1-9, 16-17, 21-22, 24, 26, 28-31, 35-36, 38-40

**PASCOL ENGINEERING**

(A division of Canadian Shipbuilding & Engineering Ltd) POB 2690, Thunder Bay, Ont P7B 5G2  
**Tel:** (807) 6836261; **Telefax:** (807) 6833607  
**General manager:** Wesley Allan  
**Facilities:** 442mtr long jetty with 200 ton mobile crane and two travelling cranes of 45 and 40 ton.  
**Services:** 2-4, 7-10, 12, 14-16, 20-22, 24, 26-33, 35-36, 38-40

**USA - GREAT LAKES**

**TOLEDO SHIPREPAIR CO**

Marinovic Marine Group, 2245 Front Street, Toledo, Oh 43605  
**Tel:** (419) 6988081; **Telefax:** (419) 6993066  
**Exec VP & general manager:** Randy P. LaCrosse  
**Manager marine operations:** James M. Lynch  
**Facilities:** Two drydocks: 243.84 x 28.65 x 4.27mtr with 2 x 40 ton cranes; 166.10 x 24.38 x 3.84mtr.  
**Services:** 1-4, 6-9, 11-17, 20-22, 25-26, 28-33, 35-37, 39-40

**BAY SHIPBUILDING CO**

605 North 3rd Ave, PO Box 800, Sturgeon Bay, WI 54235  
**Tel:** (920) 7435524; **Telefax:** (920) 7432371  
**President:** Bruce Shaw  
**Vp contract services:** Patrick J. O'Hern  
**Facilities:** Floating dock steel 184 x 23 x 5.1mtr x 6,200 tons. Graving dock steel 78 x 11.8 x 4.5mtr x 1,600 tons. Graving dock concrete 351 x 42.6 x 7.6mtr x 15,000 tons. Gantry 180 tons and 4 mobile cranes up to 80 tons lifting capacity.  
**Services:** 1-2, 4-9, 12, 16, 20-21, 26, 28-30, 33, 35-36, 38-39

**FRASER SHIPYARDS INC**

3rd St & Clough Ave, Superior, WI 54880  
**Tel:** (715) 3947787  
**Vice president & general mgr:** T. White  
**Facilities:** Two drydocks: 253.30 x 25.90 x 5.64mtr with 150, 125, 75 and 50 ton cranes; 191.40 x 20.11 x 4.42mtr. Also drydock facility under 150mtr in length.  
**Services:** 2-9, 12-16, 20-22, 24, 26-31, 35-40

**CARIBBEAN/  
GULF OF MEXICO**

P. Pittas



**CARIBBEAN**

**NETHERLANDS ANTILLES**

**CURACAO DRYDOCK CO INC**

Dockweg No 1, Koningsplein, POB 3012, Willemstad, Curaçao  
**Tel:** (599-9) 7330000  
**Telefax:** (599-9) 7379950, 7365580  
**E-mail:** info@curacao-drydock.com  
**General manager:** M.R. Everstaz  
**Commercial manager:** E. Stantz  
**Production manager:** H. Scherpenhuyzen  
**Int marketing & communication msc:** S. Marcano  
**Facilities:** Drydock 280.00 x 48.00 x 8.48mtr, 155,000 dwt with three travelling cranes 75, 60 and 25 ton lifting capacity; 193.00 x 26.50 x 6.30mtr, 28,000 dwt with three travelling cranes, 2 x 75 and 10 ton, 13 mobile cranes ranging from 4.5-140 ton lifting capacity. Floating dock 165.00 x 30.00 x 5.87mtr with 10,000 ton lifting capacity with 2 x 12.5 ton travelling cranes. Also drydock facilities under 150mtr in length.  
**Services:** 2-40

**TRINIDAD**

**CARIBBEAN DRYDOCK LTD (CARIDOC)**

POB 1147, Port of Spain  
**Tel:** (868) 634 4127/30; **Telefax:** (868) 625 1215  
**E-mail:** caridoc@trinidad.net  
**Managing director:** Karyann Babooyal  
**Director:** Roxban S. Babooyal  
**Facilities:** Floating dock 168.00 x 24.40 x 7.92mtr with 11,380 ton lifting capacity, 25,000 dwt, 20 and 10 ton cranes and 2 x 20 ton mobile cranes. Jetty 760.00 x 12.00mtr.  
**Services:** 2-17, 20-22, 25-31, 34-40 and specialised castings

**BARBADOS**

**CENTRAL FOUNDRY LTD**

Whitepark Rd, Bridgetown W1  
**Tel:** (809) 4264084; **Telefax:** 2494 simpsons wb  
**General manager:** L. Sealy  
**Facilities:** Marine railway 73.14 x 14.02mtr with 1,000 ton lifting capacity.

**MARTINIQUE**

**SOCIETE INDUSTRIELLE DE GESTION DU BASSIN DE RAOUBO - SGBR/ MARTINIQUE DRYDOCK**

Bassin de Radoub - Boite Postale 995, 97247 Port de France Cedex  
**Tel:** (0596) 726940; **Telefax:** (0596) 631769  
**President:** Jacques Bailly  
**Manager:** Bruno Rossovich  
**Facilities:** Drydock 180.00 x 23.50 x 7.60mtr with 30,000 ton lifting capacity. Two repair quays 140mtr (5mtr draft) - 90mtr (5mtr draft).  
**Services:** 2-9, 11-16, 18, 20-22, 25-32, 34-37, 39-40

**PUERTO RICO**

**PEREZ Y CIA DE PUERTO RICO INC**

PO Box 2209, San Juan, Puerto Rico 00902  
**Tel:** (809) 7216010, 7259480  
**Telefax:** (809) 7237533  
**President:** Francisco J. Garcia  
**Vice President:** Jose M. Ribera  
**Facilities:** Drydock of 210.60 x 25.30 x 7.31mtr, 20,321 dwt. Also floating dock facility under 150mtr in length.  
**Services:** Full repair service 2-40

**CUBA**

**CDM HAVANA SHIPYARD**

(Managed by Caruso Dockyard Co)  
**Facilities:** Drydocks 280.00 x 48.00 x 8.48mtr, 155,000 dwt with three travelling cranes 75, 60 and 25 ton lifting capacity; 193.00 x 26.50 x 6.30mtr, 28,000 dwt with three travelling cranes, 2 x 75 and 10 ton, 13 mobile cranes ranging from 4.5-140 ton lifting capacity. Floating dock 165.00 x 30.00 x 5.87mtr with 10,000 ton lifting capacity with 2 x 12.5 ton travelling cranes. Also drydock facilities under 150mtr in length.  
**Services:** 2-40

**CENTRAL AMERICA**

**MEXICO**

**TALLERES NAVALES DEL GOLFO SA DE CV**

loteo San Juan de Uta S/N, PO Box 657, 91809 Veracruz  
**Tel:** (29) 892509, 892535, 892504  
**Telefax:** (29) 892510, 892500  
**Managing director:** David Sweatman  
**Business development msc:** Sidney J. Sissac  
**Facilities:** Drydocks 271.0 x 36.0mtr, 157.00 x 19.51 x 5.23mtr; 1,200mtr wharves. Cranes 25 - 100 tons.  
**Services:** 1-9, 13-14, 16-17, 19-21, 26, 28-32, 35-37, 39-40

**ASTILLERO MADERO 2000**

Margen del Rio Panuco, Ciudad Madero, Tampico, Tamaulipas  
**Tel:** 50008, 50441  
**Facilities:** Drydock 250 x 40.36 x 9.50mtr, 55,000 dwt.  
**Services:** Full repair service. Repair and maintenance of the Pemex fleet

## NORTH AMERICA

## USA

**BETHLEHEM STEEL CORP**  
Bethship-Sabine Yard,  
PO Box 1448, 2500 Martin Luther King Drive,  
Port Arthur, Tx 77641  
Tel: (409) 9850371  
Telefax: (409) 9850355  
President: R.F. DeVinsky  
Facilities: Floating dock 252.67 x 37.18 x 7.62mtr  
with 64,000 ton lifting capacity. Can be converted  
to 110.67 x 126.22 x 7.62mtr.  
Services: 1-9, 12-13, 16, 19, 21, 26, 28-31, 33, 35-37, 39

**AVONDALE INDUSTRIES INC SHIPYARDS  
DIVISION**  
POB 50280, New Orleans La 70150  
Tel: (504) 4365393  
Telefax: 266070 avon w  
Telefax: (504) 4365375, 4365280  
President: A.L. Bossier, Jr  
VP commercial repairs: W.S. Rownd III  
Facilities: Two floating docks: 274.00 x 79.20 x  
23.80mtr with 81,000 ton lifting capacity with 2 x  
50 ton, 200 ton cranes plus 600 ton floating  
crane, 200.00 x 36.20 x 9.50mtr with 20,000 ton  
lifting capacity and 2 x 25 ton cranes.  
Services: 1-9, 12, 14, 16, 19-22, 24-31, 33, 35-40

**INGALLS SHIPBUILDING INC  
LITTON INDUSTRIES INC**  
POB 149, Pascagoula, Ms 39368  
Tel: (228) 9351420  
Telefax: (228) 9354611  
President: G. J. St. Pe  
VP business development: R.S. Schenk  
Facilities: Floating dock 195.07 x 33.94 x 10.36mtr  
with 38 000 ton lifting capacity. Also drydock  
facilities under 150mtr in length and 300 ton cranes.  
Services: 1-9, 14, 16, 19-22, 24-33, 35-40

**ATLANTIC MARINE INC- MOBILE**  
Main Gate, Dunlap Drive, PO Box 3202,  
Mobile, AL 36652  
Tel: (334) 690 7100  
Telefax: (334) 690 7107  
E-mail: www.atlanticmarine.com

President: E.C. "Buddy" McCormick  
Vice President: J.J. Berghand, Jr (Jack)  
Facilities: Two floating docks 260.0 x 53.0mtr, max  
draught 9.8mtr, 49,250 tonnes lifting capacity with  
2 x 35 ton cranes; 190.5 x 27.4mtr, max draught  
6.4mtr, 14,200 tonnes lifting capacity. Five repair  
quays with 2 x 35 ton and 4 x 50 ton cranes.  
Services: 1-9, 13-17, 19-22, 24-33, 35-40

**BENDER SHIPBUILDING & REPAIR CO INC**  
POB 42, 265 S Water St, Mobile, AL 36601  
Tel: (334) 4318000  
Telefax: (334) 4322260  
President: T. B. Bender jr  
Vice President: R.A. Beckmann  
Facilities: Four floating docks: 189.60 x 28.50 x  
7.90 mtr with 18,000 ton lifting capacity; 222.00 x  
36.00 x 8 mtr with 24,350 ton lifting capacity.  
Also 2 dry dock facilities under 150mtr in length  
(one of which is temporarily out of service).  
Services: 1-9, 12-16, 20-22, 24, 26-27, 29-33,  
35-40

**TAMPA BAY SHIPBUILDING  
& REPAIR CO**  
1130 McClintock Blvd, Tampa, FL 33605  
Tel: (813) 2489310  
Telefax: (813) 2489806  
E-mail: www.tampabayship.com  
President: Michael Kennan  
Facilities: Three graving docks available 276.45 x  
45.72 x 7.92mtr, (125,000 dwt), two of 228.60 x  
38.10 x 8.53mtr; 166.42 x 23.77 x 6.05mtr, seven  
gantry cranes - 6 x 40 ton and 85 ton; four hoists; 3 x  
500 ton and 1 x 700 ton. Covered erection building  
182.88 x 44.20 x 35.05 capable of 880 ton lifts.  
Services: 2-9, 11-16, 18, 20-21, 24-29, 31, 33-40

## NORTH ATLANTIC

## GREENLAND

**AMUTSVIT**  
POB 339, 3900 Nuluk  
Tel: 299 21560; Telefax: 299 22705  
Facilities: Slipway with 1,800 ton lifting capacity.  
Services: 2, 4, 7, 9, 12, 14, 16, 18, 20, 22, 26, 28, 29,  
31, 32, 35, 40

## ICELAND

**SLIPPELAGID I REYKJAVIK LTD**  
Myrsgata 2, POB 468, Reykjavik  
Tel: 9110123; Telefax: 2074 evropa is  
Facilities: Two slipways: 230.00mtr, 70.70 cradle  
with 2,000 ton lifting capacity; 210.00mtr, 48.70  
cradle with 1,400 ton lifting capacity. Also  
slipway facility under 1,000 ton lifting capacity.

**SLIPSTODIN H/F**  
Hjaleysvegata 20, 680 Akureyri  
Tel: 4607600; Telefax: 4607601  
E-mail: slipp@slipp.is  
Managing director: Ingi Björnsson  
Manager propeller repair: Martein Hamundarson  
Facilities: Floating dock 5,000 ton lifting  
capacity, Slipways.  
Services: 1-9, 12-18, 20-22, 24, 26, 28-31, 35-40

## FAROE ISLANDS

**P/F TORSHAVNAR SKIPTSMDJIA**  
PO Box 65, FR 110 Torshavn  
Tel: 11155; Telefax: 17627  
Telefax: 81256 slipp fa  
Chief executive: P. Mohr  
Facilities: Two slipways: 182.9mtr, 54.90  
cradle with 1,000 ton lifting capacity and 3 x 35  
ton mobile cranes; 2,000 ton lifting capacity  
slipway.  
Services: 2-9, 20, 26, 28, 29, 31, 35-37, 39, 40

**KLAKSVIKAR SLEPUSTOO & MEKANISKI  
VERKSTADUR**  
Klaksvik  
Facilities: Slipway 57.90mtr, 50.30 cradle.

**P/F SKIPTSMDJIAN FOROYAR**  
480 Skala  
Tel: 41260; Telefax: 41748  
Telefax: 81231 yard fa  
General manager: B. Joensen  
Facilities: Slipway 90.00mtr, 75.00 cradle with  
1,200 ton lifting capacity. Also drydock facility  
under 150mtr in length.  
Services: 2-9, 16, 18, 22, 24, 26-32, 35-40

## SCANDINAVIA

## NORWAY

**KAARBOVERKSTEDET**  
PO Box 70, N-9401 Harstad  
Tel: (82) 77 064520; Telefax: (82) 77 064633  
Managing director: Eivald Olsen  
Yard manager: Rolf S. Madson  
Facilities: Five slipways up to 3,000 ton lifting  
capacity and 24 ton crane. Also drydock under  
150mtr length.  
Services: 4, 7-9, 11, 13, 14, 16, 19-21, 26, 28, 29,  
31, 32, 34, 35, 37, 39

**FOSEN MEK VERKSTEDER A/S**  
N-7100 Risna  
Tel: (76) 73851400; Telefax: (76) 51615  
Telefax: 55228 fosen a  
General manager: Arna Synnove Bye  
Facilities: Drydock 215 x 40mtr  
Services: 8

**STERKODER AS**  
Dalegaten 71, 6500 Kristiansund  
Tel: (71) 588200; Telefax: (71) 588300  
Facilities: Shipway: 100.00 x 20.00mtr cradle with  
2,500 ton lifting capacity. 12 cranes up to 147 tons  
capacity. Also 300mtr length quays.  
Services: 2-9, 13-18, 20, 21, 25, 26, 28-33, 35-40

**SOVKNES VERFT AS**  
PO Box 204, 6280 Sjøvik, Alesund  
Tel: (71) 12300; Telefax: (71) 12661  
Telefax: 42319  
Managing director: Peter Tzornford  
Repair manager: B. D. Gods  
Facilities: Slipways: 130mtr long with 3 500 tons  
lifting capacity and one under 1,000 tons lifting  
capacity.  
Services: 1-9, 13-18, 20-22, 24, 26-33, 35-37, 39, 40

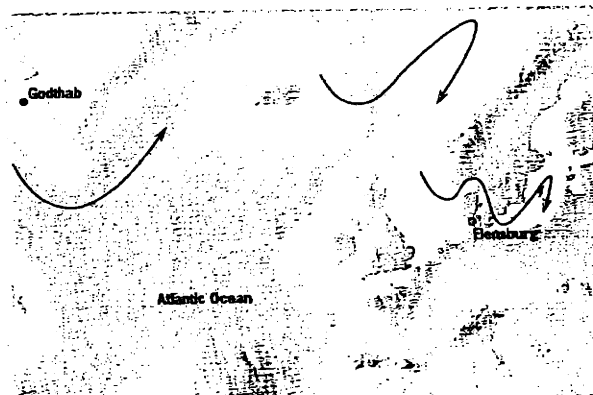
**ULSTEIN VERFT AS**  
N-6065 Ulsteinvik  
Tel: (700) 14000; Telefax: (700) 14009  
Repair manager: Hakon Langeland  
Facilities: Drydock 192.00 x 21.99 x 6.50mtr,  
20,000 dwt with 2 x 20, 85 and 150 ton cranes.  
Slipway 76.19mtr, 73.14 cradle with 1,000 ton  
lifting capacity.  
Services: 1-9, 16, 20-22, 26, 28, 29, 35, 37, 39

**MJELLEM & KARLSEN VERFT AS**  
N-5028 Bergen, PO Box 4333  
Tel: 55 54 22 00; Telefax: 55 54 22 01  
Managing director: Per Kristian Knutsen  
Repair manager: Mindor Kwarmse  
Facilities at Lakseveg Verft: Floating Dock A: 207  
x 32.5 (draft 8.75) 28,000 ton capacity; Dock B:  
167 x 21.9 (draft 6.7) 7,500 tons capacity.  
Facilities at Mjellen & Karlsten Verft: Slipway  
A: 3,400 ton capacity; Slipway B: 1,800 ton  
capacity. Additionally, the shipyard group have  
a major shipbuilding hall, floating docks, dry  
docks (less than 150 tons in length), MTU  
workshop and MTU test facility etc.  
Services: 2-14, 16, 18, 20-21, 26-32, 35-40

**HAUGESUND MEK VERSTED AS**  
N-5500 Haugesund  
Tel: (52) 733000; Telefax: (52) 733073  
Managing director: Agnar Grøvdal  
Facilities: Drydock 283.00 x 46.00 x 8.50mtr,  
155,000 dwt with 3 x 75 ton cranes. Floating dock  
150.00 x 21.00 x 8.00mtr, 17,000 dwt, 2 x 10 ton  
cranes and 80 ton floating crane.  
Services: 1-9, 11, 13-22, 25-40

**KVÆRNER ROSENBERG AS**  
POB 139, N-4001 Stavaanger  
Tel: (4) 865000; Telefax: (4) 865119  
Repair manager: O. Antonsen  
Facilities: Two drydocks: 279.50 x 43.00 x  
8.73mtr with 1 500 ton lifting capacity; 171.00 x  
22.86 x 7.46mtr, 22,000 dwt and cranes up to 300  
ton lifting capacity.  
Services: 2, 4-7, 9, 16, 17, 19, 22, 29, 35, 40

**WESTAMARIN AS**  
Andøyveien 23, POB 115, N-4602  
Kristiansund  
Tel: (42) 87500; Telefax: (42) 85012

NORTH ATLANTIC/  
BALTIC

**Managing director:** Ole Holback-Hansen  
**Repair manager:** Arne Thorbjørnsen  
**Facilities:** Drydock: 210.00 x 28.50 x 7.60mtr, 40,000 dwt with 2 x 90 ton, 2 x 45.5 ton cranes and 2 x 50 ton travelling cranes. Also drydock facilities under 150mtr in length.  
**Services:** Full repair service

**DENMARK****DANYARD A/S**

Ø-Pladsen 2, POB 719, DK-9900  
 Frederiksbavn  
 Tel: 98422299  
 Telefax: 98432930

**Managing director:** Torben Mejnertsen

**Repair manager:** Flemming K. Bertelsen

**Facilities:** Two drydocks: 215.00 x 34.00 x 7.30mtr, 60,000 dwt with 4 x 50 ton cranes; 170.70 x 25.40 x 6.30mtr with 2 x 20, 100 and 10 ton cranes.

**Services:** 1-18, 20-22, 24, 26-40

**AARHUS FLYDEKOK AS -****AARHUS DOCKYARD LTD**

Balkisgade, POB 23, DK-8100 Aarhus

Tel: 86134000

Telefax: 86134038

**Repair manager:** Hans Peter Nylykke

**Facilities:** Floating dock 190.00 x 26.70 x 7.30mtr, 30,000 dwt with 19,000 ton lifting capacity, 11 ton and 10 ton cranes. Also two floating docks under 150mtr in length with 2,000 and 800 ton lifting capacity

**Services:** 1-9, 12-17, 20-24, 26-29, 31, 32, 33, 35-40

**SVENDBORG VAERFT AF****1997 A/S**

DK-5700 Svendborg

Tel: 63217300

Telefax: 63217302

**General Manager:** Hans Peter Nylykke

**Repair manager:** Jørgen Nielsen

**Facilities:** Floating dock 160.80 x 30.00 x 7.30mtr with 10,000 ton lifting capacity, 36, 12.5, 12 and 7 ton cranes. Also three floating dock facilities under 150mtr in length.

**Services:** 1-9, 13-14, 16-17, 20-22, 26-32, 35-40

**SWEDEN****GÖTAVERKEN****CITYVARVET AB**

POB 8045, S-40277, Gothenburg

Tel: (31) 502000

Telefax: (31) 227931, 228743

**Managing Director:** Magnus Ringner

**Production manager:** Leif Lindgren

**Facilities:** Four outfitting/repair quays, total length 850 mtrs, crane capacity 40-180 tons. One Panamax floating dock, lifting capacity 25,000 tons, one floating dock 155.00 x 33.00 mtr, 7.00 mtr draught over blocks, 10,500 ton lifting capacity with 3 cranes 3, 4 and 7.5 tons. Extensive hull, engine, propeller shops.

**Services:** 1-10, 12-17, 19-31, 35-40

**ÖRESUNDSVARVET**

POB 701, S-26127, Landskrona

Tel: (418) 56500; Telefax: (418) 10965

E-mail: oresundsvarvet@pop.landskrona.se

**Managing director:** Sigurd Axelsson

**Facilities:** Drydock 195.00 x 34.00 x 7.00mtr, 50,000 dwt with two cranes, 50 and 30 ton lifting capacity. Also floating dock facility under 150mtr.

**Services:** 1-9, 13-18, 20-22, 26-32, 35-40

**KARLSKRONAVARVET AB**

POB 1008, S-37182 Karlskrona

Tel: (455) 19440; Telefax: 43056 kvrv s

**Facilities:** Drydock 200.00 x 24.00 x 7.50mtr with five cranes, 100, 27, 25, 20 and 14 tons.

**Services:** 1, 2, 4, 13

**OSKARSHAMNSVARVET SWEDEN AB**

Gövedalsgatan 17, S-572 35 Oskarshamn

Tel: (491) 57650; Telefax: (491) 57670

E-mail: info@oskarshamsvarvet.se

**Repair manager:** Ronnie Petersson

**Managing director:** Curt Tappert

**Facilities:** Floating dock facility under 150mtr in length.

**Services:** 1-9, 11-22, 24, 26-40

**FINLAND****FINNYARDS LTD**

PO Box 139, SF-26101, Rauma

Tel: (38) 83611; Telefax: (38) 836 2366

**Production director:** Lassi Savonius

**Managing director:** Kari Aikarinen

**Facilities:** Drydock 260 x 85 mtr. Mainly newbuilding and conversion works.

**Services:** 2-10, 12-14, 16-18, 20, 21, 26-30, 35-37, 39

**TURKU REPAIR YARD LTD**

PO Box 430, SF-20101 Turku

Tel: (7) 358711; Telefax: (7) 3387250

**Managing director:** Ari Puroja

**Marketing pr:** Juhani Marttila

**Facilities:** Turku: One drydock 183.00 x 26.00 x 8.20mtr, 2 x 25 ton, 15ton and 10 ton cranes. Jetty 1,000mtr length, cranes 1 x 100, 1 x 60 and 3 x 25 tons. Naantali: one drydock 250mtr x 70mtr served by 1 x 150 and 1 x 30 ton cranes. Two berths 124mtr and 110mtr, 1 x 30 ton crane, floating dock 101 x 18.9 x 6.1mtr with 5,000 ton lifting capacity (from spring 1999).

**Services:** 2-9, 12-17, 20-22, 25-33, 35-40

**KOTKA SHIPYARD INC**

PO Box 72, SF-48101 Kotka

Tel: (5) 212300; Telefax: (5) 2186989

**Managing director:** Matti Tuomi

**Sales Manager:** Erkki Miettinen

**Production Manager:** Haas Sundquist

**Facilities:** Floating dock 165.00 x 28.00 x 7.80mtr with 12,000 ton lifting capacity and 2 x 15 ton cranes. Also two floating dock facilities under 150mtr in length.

**Services:** 1-9, 12-18, 20, 21, 24, 26-31, 35-40

**KVÄRNER MASA-YARDS INC**

Munkkisarvankatu 1, PO Box 132,

SF-00151 Helsinki Tel: (9) 1941

Telefax: (9) 650051; Telefax: 121246 massh of

**Marketing & sales:** Kaj Liljestrand

**Facilities:** Drydock 280.50 x 34.00 x 9.50mtr.

**Services:** 7, 8, 40

**BALTIC****RUSSIA****KANONERSKIY SHIPREPAIR YARD**

Kanonerskiy Ostrov, 198184 St Petersburg

Tel: 2519890; Telefax: 2519884

Telefax: 121626 kvrv sa

**Marketing/sales director:** Anatoly Shorunov

**Facilities:** Five floating docks, max 226.00 x 35.60 x 10.80 mtrs, lifting capacity 35,600 tons.

269.00 mtr repair berth.

**Services:** 1-6, 9, 12, 16, 20-22, 26-29, 31, 35-38

**ESTONIA****BALTIC SHIPREPAIRERS**

103 Kopli St, Tallinn, EE 00117

Tel: 6102408, 6102425

Telefax: 6102999; Telefax: 173120 rema ee

**Deputy director general:** Valery Karchachyev

**Facilities:** Three floating docks, 4,500, 8,500 and 10,500 tonnes lifting capacity. Largest 153.6 m x 27.40 mtrs.

**LATVIA****ROGA SHIP YARD**

2 Gales St, Riga LV 1015

Tel: (7) 353290; Telefax: 161751 locia lv

Telefax: (7) 353 293, 353 910

E-mail: kuga@masibox.riga.lv

**Director:** Sergey K. Golitsin

**Chief engineer:** Anatoly N. Ustinov

**Production manager:** Igor L. Komarov

**Facilities:** Three Drydocks; Dock I - 220 x 36mtr with lifting capacity of 30,000 tons, Dock II 205 x 29mtr with lifting capacity of 27,000 tons, Dock III 130 x 22mtr with lifting capacity of 4,850 tons. Repair berth in excess of 2,000mtr length with max water depth of 7.5mtr. Floating crane of 25 tons lifting capacity plus 12 cranes up to 30 tons.

**Services:** 1-7, 9, 12-14, 16-17, 20-22, 24, 26-33, 35-36, 37-39

**LITHUANIA****WESTERN SHIPREPAIR YARD**

180 Minijor St, Klaipeda 5816

Tel: (6) 355031, 355192, 355388

Telefax: (6) 355114; Telefax: 278125 west lt

E-mail: western@tiskas.lt

**Director general:** Algirdas Kazanaviskas

**Facilities:** Three floating docks 8,500, 12,000 and 27,000 tonnes lifting capacity, the largest 216.00 x 30.00mtr. Six repair piers.

**SHIPREPAIR YARD JSC LAIVITE**

N. Uosto 3, LT-5800 Klaipeda

Tel: (6) 394000, 394004

Telefax: (6) 394111, 394110

E-mail: laivite@klaipeda.omninet.net

**General director:** Dr Gediminas Radzevicius

**Production director:** Sigita Senkus

**Head of marketing:** Justinas Drumsas

**Facilities:** Floating dock 150.00 x 20.00 x 5.80 mtrs with 6,000 ton lifting capacity (limited to vessels 140mtr length, 18mtr width, max draught 5.8mtr). 3 quays 100, 110 and 210 mtrs, up to 8 mtr draught and 255 mtr pier with 3 x 20 and 2 x 10 ton capacity cranes.

**Services:** 3-4, 9, 14, 16-17, 20-21, 26-29, 31, 35-37, 39-40

**Agents:** Oy Partab Ltd, Finland, Tel: 9 4776450; Novimor, Poland, Tel: 58 3011831; Saga Agency, Norway, Tel: 370 47544

**POLAND****GDAŃSK SHIPREPAIR YARD,****BEHMONTOWA**

ul Na Ostrowiu 1, 80-958 Gdańsk

Tel: (58) 3071300, 3071500, 3071600

Telefax: 512263/512149

Telefax: (58) 3011281, 3012532

**General manager:** Piotr Sojka

**Facilities:** Floating docks: 244.00 x 44.00 x 9.00, 33,000 tons lifting capacity 2 x 25 ton cranes; 225.00 x 37.00 x 9.00, 25,000 ton lifting capacity 2 x 20 ton cranes; 176.00 x 26.00 x 6.30, 11,000 ton

lifting capacity 2 x 10 ton cranes; 164.40 x 25.80 x 6.80, 9,000 ton lifting capacity, 2 x 10 ton cranes;

floating dock under 150m in length, 6,400 tons lifting capacity and postman with 1,000 ton lifting capacity. Floating crane. Also 3,500mtr repair quays and 120mtr slipway.

**Services:** 1-40 (except 11, 19, 23, 34)

**SZCZECIN SHIPREPAIR YARD,****GRYPFA**

71700 Szczecin, ul Londowa 13

Tel: (91) 242551, 242353; Telefax: (91) 242319

Telefax: 422726 szwp pl

**General manager/president:** Janusz Jagielski

**Commercial director:** Andrzej Słotwinski

**Ship repair manager:** Jozef Kaczmarewski

**Technical director:** Henryk Grzesiek

**Facilities:** Floating docks: 216.30 x 34.80 x 11.80 mtr, 40,000 dwt, lifting capacity 15,000 tons; 156.50 x 26.00 x 10.50 mtr, 10,000 dwt with 7,200 ton lifting capacity. Also two floating dock facilities under 150mtr in length.

**Services:** 1-9, 14, 16-17, 20-22, 26-32, 35, 37-38, 40

**NAVAL SHIPYARD GOYNIA**

ul. Świdowicza 48, PL 81919 Gdynia

Tel: (58) 6254361; Telefax: (58) 6250147

**Managing director:** Edward Osowski

**Manager, marketing division:** Roman Jasiński

**Facilities:** Floating dock of 8,000 tons and mechanical lift of 2,500 tons capacity. Repairs ahead up to Panamax size.

**Services:** 1-5, 7-9, 14-17, 20-21, 25-26, 28-29, 31, 35-37, 39-40

**GERMANY****PEENE-WERFT GMBH**

Member of the Hergemann Group

Postfach 11 64, 17431 Wolgast

Tel: (3836) 250155; Telefax: (3836) 250506

**Repair manager:** Rainer Kadow

**Facilities:** Mechanical lift 100.00 mtr long, 15.80 mtr wide, with 2,500 ton lifting capacity. Dry dock for vessels up to 160 mtr length and 27 mtr width. Welding procedures and technologies for processing steel, aluminium, high-grade steel and metallic special materials. Facilities for the mopping of complete ships' hulls and painting.

**Services:** 2-10, 12, 14, 16, 17, 20-22, 24-26, 28-30, 35-40

**NEPTUN REPARATURWERFT****GMBH (A Meyer Werft Company)**

Lübbecke Straße 30, D-18057 Rostock

(PO Box 10 72 20, D-18011 Rostock)

Tel: (381) 384 3073, 384 3070

Telefax: (381) 3843303, 4923008

E-mail: neptun\_reparaturwerft\_rostock@t-online.de

**Repair manager:** Manfred Harig

**Mobile:** 0172 3800225

**Facilities:** Two floating docks: 210 x 37mtr, 23,000ton lifting capacity; 140 x 24mtr, 8,000 ton lifting capacity. Repair quays 1,570 mtr total length.

**Services:** 1-6, 9-18, 20-22, 24-40

**FLENDER WERFT AG**

POB 140129, D-23516 Lubeck

Tel: (451) 30010

Telefax: (451) 3001-202

**Repair manager:** W. Skierlo

**Facilities:** Floating dock 180.00 x 34.00 x 7.50mtr with 16,000 ton lifting capacity, 200 ton floating crane. Also floating dock under 150mtr, 4,500 tons lifting capacity, 50 tons floating crane.

**Services:** 1-11, 13-18, 20-22, 24-30, 33-40

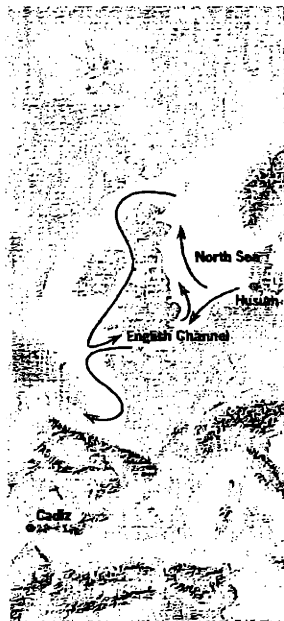
**LINDENAU GMBH SCHIFFSWERFT & MASCHINENFABRIK**

Skagerrakufer 10, D-24159 Kiel-Friedrichsort  
Tel: (431) 39930; Telefax: (431) 393062  
Facilities: Floating dock 165.00 x 25.00 x 7.50mtr with 10,000 ton lifting capacity, 10 and 5 ton cranes. Also floating dock facilities under 150mtr.  
Services: 1-4, 7-10, 16-17, 19-21, 26, 28-31, 35-40

**HDW-NOBISKRUG GMBH**

Kieler Straße 53, D-24768 Rendsburg,  
POB 160, D24757 Rendsburg  
Tel: (4331) 2070; Telefax: (4331) 207117  
Managing directors: Dr Thomas Kusznau, Martin Beckmann  
Repair manager: Horst Hoheisel  
Facilities: Two drydocks: 193.00 x 31.60 x 6.30mtr, 30,000 dwt; 151.75 x 22.40 x 5.80mtr, 20,000 dwt with 100, 60, 30 and 15 ton cranes.  
Services: 2-18, 20-22, 26, 28-30, 32, 34-40

## NORTH SEA/ ENGLISH CHANNEL/ NORTH ATLANTIC

**GERMANY****KRÖGER WERFT GMBH & CO KG**

Hüttenstraße 25, D-24790 Schachtel-Andorf,  
PO Box 460, D-24754 Rendsburg  
Technical director: Siegfried Evers  
Tel: (4331) 951 244; Telefax: (4331) 951-145  
Director sales & repair: Max Kusznorowski  
Tel: (4331) 951 218; Telefax: (4331) 951 233  
Facilities: Slipway 50.00 x 14.00 mtr, 1,100 tons lifting capacity. Also floating dock under 150 mtr.  
Services: 1-11, 13-18, 20-40

**HUSUMER SCHIFFSWERFT**

Rodensis-Hallig, POB 1320, D-25803 Husum  
Tel: (4841) 6300  
Telefax: 28527 werft d  
Telefax: (4841) 63010/81  
Managing director: U. Niemann  
Repair manager: U. Postmeyer  
Facilities: Drydock 150.00 x 22.00 x 5.20mtr. Also drydock under 150mtr in length. Cranes of 60, 30 and 3 x 12 tons and slipway with 800 and 400 tons lifting capacity.  
Services: 1-10, 12-16, 20-22, 24-33, 35-40

**BARTHELS & LUDERS GMBH**

Nordelbstrasse 15, 20004 Hamburg  
Tel: (40) 31198000; Telefax: (40) 31181111  
Branch: Schliefwiger Strasse 2, 25341 Brunsbüttel  
Tel: (4852) 8870; Telefax: (4852) 88786  
Managing director: Gerhard Klärs  
Sales port repairs: Siegfried Kammann  
Sales manager: Ulrich Meiser  
Facilities: Wet berth 310.00 x 9.00mtr with four cranes 12-45 tons.  
Services: 1-22, 25-33, 35-40

**BLOHM + VOSS REPAIR AG**

POB 100526, D-20004 Hamburg  
Tel: (40) 31198000  
Telefax: (40) 31193305  
Member of exec board: Helmut Nadler  
GM sales & accounts: Hans M. Meissner  
Facilities: Drydock 351.20 x 59.20 x 9.45mtr, 320 000 dwt with 2 x 50 ton and 2 x 10 ton cranes. Floating docks: 320.00 x 52.00 x 10.80mtr, 250,000 dwt with 65 000 ton lifting capacity, 2 x 35 and 2 x 10 ton cranes; 287.50 x 44.20 x 10.21mtr, 130,000 dwt with 50,000 ton lifting capacity and 2 x 35 and 2 x 15 ton cranes; (217.00 x 31.80 x 9.15mtr, 50,000 dwt with 25,000 ton lifting capacity and 2 x 10 ton cranes); 162.5 x 24.5 x 8.00mtr, 18,000dwt with 9,000 ton lifting capacity and 2 x 5 ton cranes  
Services: 1-9, 12-17, 19-22, 24-26, 28-33, 35-40  
\* Dock in brackets is for sale in Kirkcaldy

**J.J. SIETAS KG SCHIFFSWERFT GmbH & CO**

Nussfelder Fabrikdeich 88, D-21129 Hamburg  
Tel: (40)74511-01  
Telefax: 217740 siewa d; Telefax: (40) 74511295  
Facilities: Two dedicated repair floating docks up to 5,400 ton lifting capacity. Slipway with 800 ton lifting capacity. Floating dock 150.00 x 23.50 mtr, 6,000 ton lifting capacity mainly for newbuildings. Also one newbuilding floating dock under 150 mtr.  
Services: 2-9, 11-14, 16-18, 20-22, 26, 28, 29-31, 34-40

**KOMMANDITGESELLSCHAFT NORDERWERFT GmbH & CO**

Ellerholzdam 13, D-20457 Hamburg  
Tel: (40) 311001  
Telefax: 214177; Telefax: (40) 31100288

Facilities: Floating dock 165.00 x 25.00 mtr, 12,500 tons lifting capacity, also a floating dock under 150 mtr.

**MAN B&W DIESEL AG**

Service Center Werk Hamburg, Hachmannkai, Rosweg D-20457 Hamburg  
Tel: (40) 74090; Telefax: (40) 7409104  
Vice president: Rudolf Erhart  
General manager: Bernd Oehlken  
Managing manager: Peter Lambrecht  
Facilities: Factory-owned quay for ships up to 90,000 dwt with crane of 25 ton/7.5 ton, (1540 mtr outreach).  
Services: 2, 4-5, 7, 9, 10, 12, 17, 22, 24, 26-28, 30, 35, 36, 38, 40  
Repairs, overhauls and modernisation of MAN B&W and other engines and spare parts supply.

**LLOYD WERFT BREMERHAVEN GMBH**

POB 12 05 42, 27519 Bremerhaven  
Brucknerstraße 25, 27568 Bremerhaven  
Tel: (471) 4780; Telefax: (471) 478-280  
Managing directors: Dieter Haack, Werner Lüdken, Hans-Jürgen Schumann  
Technical director: Rüdiger Palfenstein  
Facilities: Two drydocks: 335.00 x 35.00 x 11.50mtr; 222.00 x 26.00 x 10.50m. Two floating docks: 286.00 x 38.00 x 9.40, 39,500 tons lifting capacity and one under 150mtr in length. Cranes: 2 x 60, 50, 3 x 30 and 2 x 25 tons capacity. Also 1,400mtr length wet berth.  
Services: 7-10, 12, 19, 20, 26, 28-30, 36, 38, 40

**MWB MOTOREN & ANLAGEN GMBH & CI MARINETECHNIK KG**

Bäckhausstr. D-27568 Bremerhaven, POB 120352, Bremerhaven  
Tel: (471) 9450202  
Telefax: (471) 9450260  
E-mail: webmaster@mwb-bremerhaven.de  
Internet: www.mwb-bremerhaven.de  
Facilities: Floating dock 162.00 x 24.00mtr with 9,000 ton lifting capacity and mobile cranes up to 14 ton. Also floating dock facility under 150mtr.  
Services: 1-10, 12-17, 20-22, 24-33, 35-40

**BREMER VULKAN WERFT GMBH**

in administrative receivership  
POB 750262, Bremen  
Tel: (0421) 668 2332  
Telefax: (0421) 668 2278  
Repair manager: Jürgen Peters  
Facilities: Sheltered dock 170.00 x 25.00 x 7.20mtr and floating dock 170.00 x 23.00 x 6.00m with 8,500 ton lifting capacity.  
Services: 1-40 (except 13 and 25)

**LURSSEN WERFT GMBH & CO**

PO Box 750662, Friede Klippert Str 1, D-28759, Bremen 70  
Tel: (421) 66040  
Telefax: (421) 6604443  
Chairman: G. Lurssen, F. Lurssen  
Facilities: Three slipways with 540 ton, 1 200 ton and 2 000 ton lifting capacity. Also 1,000mtr repair quays.

**ELSFLETHER WERFT GMBH & CO KG**

Am Tidehafen 3, 26931 Elsfleth, PO Box 120, 26925 Elsfleth  
Tel: (4404) 5030; Telefax: (4404) 50310  
Managing directors: Dieter Gröbel, Kurt Wiedemann  
Repair manager: Arnold Adicks  
Facilities: Three slipways: 105.00 x 14.60mtr

cradle: 81.00 x 13.10mtr cradle: 50.00 x 9.00mtr. Also facility under 1,000 tons lifting capacity. 420m repair quay.  
Services: 1-13, 17, 20, 22, 28-31, 35, 36, 38-40

**TURBO-TECHNIK REPARATUR-WERFT GmbH & CO**

Hannoversche Str 11, 26384 Wilhelmshaven  
Tel: (4421) 3078-0; Telefax: 253409 turbo d  
Telefax: (4421) 305086  
Managing director: Dietrich E. Dausler  
Executive manager: Herbert Dausler  
Technical director: W. Bohlen-Janssen  
Repair manager: I. Möhring  
Assistants technical manager: B. Poppen  
Branch: Alsterwiese 5, D-20099 Hamburg  
Tel: (40) 2801055; Telefax: 217536 turbo d  
Telefax: (40) 2803396  
Sales & marketing manager: Maria M. Dausler  
Sales & marketing: H. Buchholz  
Repair manager: B. Stephan, K.W. Kirsch  
Facilities: Repair berth 315.00 mtr max draft 11 mtr. Additional repair dolphins available. 200 ton floating crane.  
Services: 9, 10, 12, 17, 22, 26-33, 35, 36, 38-40 also boiler repairs/propeller shaft seals

**THYSSEN NORDSEEWERKE GMBH**

Am Zungenkai D-26725 Emden POB 2351, D-26703 Emden  
Tel: (4921) 852481; Telefax: (4921) 852447  
E-mail: info.rep@thysn.thysen.com  
Board of directors: H. Ratzmann, Dr Walter Klausmann  
Repair manager: B. Djeran  
Facilities: Drydock 218.00 x 30.00 x 8.20mtr with 45 and 32 ton cranes. Floating dock 176.50 x 27.00mtr with 2 x 10 and 3 ton cranes. Also boating dock facilities under 150mtr in length.  
Services: 1-12, 14-18, 20-22, 24, 26-40

**MEYER WERFT**

Industriegebiet Sud, D-26871 Pepernborg PO Box 1555, D-26855 Pepernborg  
Tel: (4961) 810  
Telefax: 27118 meyp d  
Telefax: (4961) 81300  
Repair manager: M. Muller-Fahrenholz  
Facilities: Drydock 240.00 x 35.00mtr with adjustable bulkhead to divide dock, 4 x 60 ton cranes. Covered dock 358.00 x 39.00mtr divisible, 600 ton crane.  
Services: 1-9, 11-18, 20-21, 24, 26, 28-30, 32, 35, 37-40

**UNITED KINGDOM****CROMARTY FIRTH SERVICE CO**

Shore Rd, Invergordon IV18 0EX  
Tel: (1349) 853535  
Telefax: (1349) 853785  
Base manager: T.N. Savage  
Facilities leased from Cromarty Firth Port Authority: Wet berth 150.00 x 12.00mtr. Jetties 275.00 x 11.00mtr, 244.00 x 11.50mtr and 288m x 8.9m draft (minimum).  
Services: 4, 7, 11, 14, 16, 18-19, 31, 34

**PORT OF DUNDEE LTD**

Harbour Chambers, Dock St, Dundee DD1 3RW  
Tel: (1382) 224121; Telefax: (1382) 200834  
Port manager: Calum Begg  
Marine manager: Capt Martyn Clark MNI  
Facilities: 157.38 x 14.94mtr L.A.T. facility managed by Dundee Drydock Management Co.  
Services: 4, 9, 12, 13, 16, 18, 19, 28, 36, 39

**FORTH PORTS PLC**

1 Prince of Wales Dock, Edinburgh, EH6 7DX  
Tel: (131) 555 8750; Telefax: (131) 555 1212  
Port manager: Leith & Granton: A.C. Burns  
Facilities: Drydock 167.60 x 21.30 x 7.30mtr with 15 ton travelling crane, also two drydock facilities under 150mtr in length. Facilities used by private companies.  
Services: 2-14, 16-22, 24-40

**FORTH ESTUARY ENGINEERING LTD**

Edinburgh Dock, Leith, Edinburgh EH6 7DJ  
Tel: (131) 554 64345; Telefax: (131) 555 1890  
Managing director: G. Hughes  
Facilities: Uses facilities at Forth public docks also private drydock under 150mtr in length x 12.5mtr entrance  
Services: 3-7, 9-18, 20-22, 26-32, 34-40

**A & P TYNE LTD**

Benton Way, Wallsend on Tyne,  
Tyne & Wear NE28 6EY  
Tel: (191) 295 0777; Telefax: (191) 295 0888  
Managing director: Denis Scott (Northern operations)  
Managing director: Clive Towl (Southern operations)  
Sales director: Tom Chapman  
Facilities: Wallsend: Drydocks 170.70 x 23.20 mtr, 149.40 x 21.30 mtr, 173.80 x 24.40 mtr, 218.00 x 32.00 mtr. 18 cranes, SWL range 1.5-40 tons. North Shields: Drydock 216.10 x 28.9 mtr, 7 cranes, SWL range 2.5-40 tons.  
Services: 1-9, 12-17, 19-22, 26, 28-31, 35-40

**CANNELL LAIRD - TYNESIDE**

Hebburn on Tyne NE31 1SP  
Tel: (191) 430 1446; Telefax: (191) 430 1447  
E-mail: mail@lairds.co.uk  
Facilities: Two drydocks 259.0 x 44.0 mtr with 2 x 100, 1 x 50 and 1 x 25 ton cranes. 153.0 x 20.0mtr and 900mtr repair quay.  
Services: 3, 6, 35

**CANNELL LAIRD - SOUTH SHIELDS**

PO Box 7, Hill Street, South Shields,  
Tyne & Wear NE33 1RN  
Tel: (191) 4555515; Telefax: (191) 4544090  
Managing director: A. Brewster  
Facilities: Drydocks 195.07 x 24.38 mtr; 152.40 x 19.51 x 5.64mtr. 13,300 dwt with 15 and 2 x 10 ton travelling cranes. Also drydock facility under 150mtr in length.  
Services: 1-9, 12-16, 18, 20, 21, 23, 24, 26-33, 35-40

**CANNELL LAIRD - TEESSIDE**

Tees Offshore Base, South Bank,  
Middlesborough, Cleveland TS6 6UH  
Tel: (1642) 440043  
Telefax: (1642) 440078  
Managing director: Alex McAndrew  
General manager: Bill Adamson  
Facilities: Drydock 175.26 x 22.25 x 7.92m with 30, 15, 10 and 5 ton cranes. Also drydock facility under 150mtr in length and 310mtr jetty (total) also with crane. Part of Wear Dockyard Group which also has dock facilities under 150m in length at South Docks, Sunderland  
Services: 1-9, 12, 14-17, 20-22, 25-31, 35-40

**ASSOCIATED BRITISH PORTS**

PO Box 1, Port Hse, Northern Gateway,  
Hull HU9 5PQ  
Tel: (1482) 327171  
Telefax: (1482) 326283  
Port manager: Mike Fell

Facilities: 1 drydock at William Wright dock  
Contact: F. McGuire, Denton Shiprepairers Ltd,  
Wm Wright Dock, Hull; Tel: (1482) 326774  
Telefax: (1482) 226815  
Alexandra Dock - 2 Drydocks  
Contact: R. Langton, Mobile Marine Services,  
Alexandra Dock, Hull; Tel: (1482) 219278  
Telefax: (1482) 588061

**GREAT GRIMSBY SLIPWAY CO**

Wickham Rd, Fish Docks, Grimsby,  
South Humberside, DN31 3SL  
Tel: (1472) 346113  
Manager: J.R. McLeilan  
Facilities: Slipway 46.04mtr long, 7.32mtr breadth cradle with 1,200 ton lifting capacity. Also one slipway under 1,000 tons lifting capacity.  
Services: 2-10, 12-22, 26-32, 35-40

**A & P SOUTHAMPTON LTD**

Western Ave, Western Docks, Southampton  
SO15 0HR  
Tel: (1703) 704488  
Telefax: (1703) 704735  
Managing director: Mike Smith  
Sales director: Paul Georgeon  
Afloat repairs manager: Len Warren  
Facilities: Drydock 365.00 x 41.00, 11.00mtr water over sill at low tide. 50, 20, 10 and 6 ton deckside cranes. 200 ton floating crane available. New steel, pipe, electrical and mechanical fitting shops.  
Services: 1-10, 12, 14-17, 20-22, 24, 26, 28-31, 33-40

**ASSOCIATED BRITISH PORTS**

Ocean Gate, Atlantic Way, Southampton SO11XQ  
Tel: (1703) 330022  
Telefax: (1703) 336402  
Facilities: Drydock 278.00 x 30.50 x 6.20mtr with 50 and 2 x 5 ton cranes operated by A&P.

**HUSBANDS SHIPYARDS LTD**

Cracknowe Hard, Marchwood, Southampton  
SO4 4ZD  
Tel: (1703) 663555  
Telefax: (1703) 663094  
Repair manager: M.R. Husband  
Facilities: Two slipways 183.00mtr, 61.00mtr cradle with 1,000 ton lifting capacity. Wet berth 228mtr.  
Services: 2-8, 11, 12, 16-18, 20, 22, 26-29, 35-37, 39, 40

**A & P FALMOUTH LTD**

The Docks, Falmouth  
Tel: (1326) 212100  
Telefax: (1326) 319433  
Managing director: Ian Pike  
Production director: Martin Bentley  
Facilities: Three drydocks: 259.00 x 39.62 x 10.88mtr, 100 000 dwt with 61 and 12 ton cranes and 25 ton mobile crane; 228.60 x 26.82 x 8.44mtr, 38 000 dwt with 30 and 5 ton cranes; 197.50 x 26.21 x 8.13mtr, 30 000 dwt; 169.20 x 22.90 x 7.90mtr with a 10 ton crane. Jetty 250.00mtr.  
Services: 1-9, 11-14, 16-19, 21, 22, 25, 26, 28-40

**SHARPNESSE SHIPYARD**

Dock Rd, Sharpness Docks, Berkeley,  
Gloucestershire, GL13 9UD  
Tel: (1453) 811261, 811422  
Telefax: (1453) 811423  
Shipyard superintendent: Bob Cross  
Facilities: Jetty 152.00mtr length. Also drydock facilities under 150mtr in length.  
Services: 2-7, 9, 13-17, 20-22, 25-31, 35-40

**SWANSEA DRY DOCKS LTD**

Prince of Wales Dry Dock, Swansea, West  
Glamorgan SA1 8RX  
Tel: (1792) 641391; Telefax: (1792) 645996  
Managing director: Eric Mackie  
Facilities: Drydocks: Duke of Edinburgh - 204.5 x 27.8 x 6.7mtr; Prince of Wales - 172.7 x 22.26 x 7.00mtr. Served by 30, 25 and 2 x 10 ton mobile cranes. Machine shop, steelwork, pipework, shipwrights & electrical shops. Off site repair crews available.  
Services: 1-17, 19-24, 26, 28-40

**MILFORD HAVEN SHIP REPAIRERS**

The Docks, Milford Haven, Pembrokeshire, SA73 3DJ  
Tel: (1646) 696320; Telefax: (1646) 696321  
Managing director: A.K.L. Brown  
Production manager: M.C. Ashworth  
Commercial manager: T.G. Symmonds  
Facilities: Drydock 183.00 x 19.00, three wet berths totalling 410 mtr. Slipway 1, 60.00mtr x 14.00 mtr, 900 ton displacement; slipway 2, 35.00 x 12.00 mtr, 200 ton displacement. Three quays totalling 366 mtr. Heavy lift crane barge and crane hire (various sizes).  
Services: 3-6, 9-10, 12-14, 16-18, 20-22, 25-29, 31-32, 35-40

**MERSEY DOCKS & HARBOUR CO**

Maritime Centre, Port of Liverpool L21 1LA  
Tel: (151) 949 6000; Telefax: 626264 props  
Marine operations manager: Capt B.G. McShane  
Facilities: Two drydocks: 282.20 x 28.65 x 9.09mtr; 228.75 x 26.04 x 8.08mtr. Also drydock facility under 150mtr in length. Two of the drydocks are leased on long terms to outside contractors, the third may be used by private companies.  
Services: 2-7, 9-12, 14-15, 17-18, 20-22, 26-32, 34-40

**MANNINGS MARINE LTD**

186 Regent Road, Bootle, Merseyside  
L20 4RD  
Tel: (151) 9330820; Telefax: (151) 9441514  
Marine ops mgr: J. Tyson  
Facilities: 3 drydocks under 150m in length and also able to use facilities at Mersey Docks & Harbour  
Services: 2-7, 9-10, 12, 14, 16-17, 21-22, 24, 26-30, 33, 35-40

**CANNELL LAIRD - MERSEYSIDE**

Cannell Laird Shipyards, Campbelltown Road,  
Birkenhead, Merseyside L41 9BP  
Tel: (151) 650 4000  
Telefax: (151) 650 4050  
E-mail: mail@lairds.co.uk  
Directors: J. Syrett, J. Stafford  
Facilities: Three drydocks, 298 mtr x 42.7 mtr, 250 mtr x 26.3 mtr, 215 mtr x 23.3 mtr, with extensive fabrication, engineering and outfit facilities. 900 mtr of quay space in non-tidal wet berth for repairs afloat.  
Services: 1-22, 24-40

**WRIGHT & BEYER LTD**

70 Old Bidson Rd, Birkenhead, Merseyside  
L41 8BL  
Tel: (151) 652 9900; Telefax: (151) 653 0690  
Managing director: Peter Wright  
Ship repair manager/director: Alex Jackson  
Workshop manager/director: Keith McKeivley  
Facilities: Drydock 228mtr long, 25.9mtr.  
Services: 1-7, 9, 10, 12, 16, 21-22, 25-26, 28-33, 35-40

**LENGTHLINE LTD**

Dry Dock House, Manchester Dry Docks,  
Trafford Wharf Road, Manchester M17 1HA  
Tel: (161) 8489405/9427  
Telefax: (161) 8738706  
Managing director: W. Jackson  
Repair manager: Peter Lye  
Facilities: Two drydocks: 163.06 x 19.80 x 6.17mtr; 152.39 x 19.80 x 5.49mtr. Docks leased from Manchester Ship Canal Co  
Services: 1-10, 12-17, 20-22, 24-33, 35-40

**ASSOCIATED BRITISH PORTS**

Dock Office, Floorwood, Lancashire  
Tel: (01253) 872323  
Telefax: (01253) 777549  
Port manager: Callum Couper  
Facilities: Slipway 163.40mtr, 53.19mtr cradle with 1,050 ton all up lifting capacity.  
Services: 2, 4-6, 9, 11-13, 16, 18, 20-22, 24, 26-32, 34-40

**BELFAST HARBOUR COMMISSIONERS**

Harbour Office, Corporation Sq, Belfast BT1 3AL  
Tel: (1232) 554422  
Telefax: (1232) 554411  
Chief executive: G. Irwin  
Facilities: Two drydocks: 335.26 x 50.30 x 12.20mtr, 220 000 dwt with 2 x 40 and 80 ton travelling cranes; 259.07 x 29.26 x 10.00mtr with a 15 ton travelling crane. Also drydock facilities under 150mtr in length. Facilities used by Harland & Wolff and other companies.  
Services: 1-9, 12, 14-17, 20-23, 26-33, 35-40

**HARLAND & WOLFF - SHIPREPAIR AND MARINE SERVICES LTD**

Queen's Island, Belfast BT3 9DU  
Tel: (1232) 457079; Telefax: (1232) 738999  
Director & gen. manager: James Echels  
Director, marketing & sales: Iain Campbell  
Facilities: Repair wharf 550.00mtr with 2 x 40 ton cranes and drydock facilities owned by Belfast Harbour Commissioners. 550.00 x 93.00 mtr dock for new-buildings only.  
Services: 1-9, 13-14, 17, 19-21, 24, 26, 28-30, 35-40

**CAMPINA LTD**

5B Channel Commercial Park, Queen's Island,  
Belfast BT3 9DT  
Tel: (21232) 452301  
Facilities: Use drydocks owned by Belfast Harbour Commissioners

**CLYDE PORT OPERATIONS LTD**

16 Robertson Street, Glasgow G2 8DS  
Tel: (141) 2218733; Telefax: (141) 2483167  
Director new business: Peter McKeller  
Facilities: Kingston Yard, Port Glasgow, Renfrewshire PA14 5DR  
Telefax: (1475) 727006  
Facilities: Drydock 304.00 x 47.00 x 14.00 mtr with numerous mobile and travelling cranes; 420 mtr jetty; 212.00 x 85.00 mtr wet berth. Available for lease

**YARROW SHIPBUILDERS LTD**

South St, Scotstoun, Glasgow G14 0JN  
Tel: (141) 9591207; Telefax: (141) 9580642  
Managing director: S. McComas  
Facilities: Three drydocks: 207.22 x 28.95 x 7.82mtr; 36,000 dwt with 2 x 30 ton travelling cranes; 201.16 x 25.90 x 8.53mtr with 25 and 2 x 10 ton travelling cranes; 159.93 x 18.90 x 6.10mtr with 2 x 15 ton travelling cranes.  
Services: 1, 2, 4, 6, 22, 35, 40

## EIRE

## DUBLIN PORT &amp; DOCKS BOARD

Alexandra Rd, Dublin 1  
Tel: (1) 855 0888/874 8771  
Telefax: (1) 836 3850

Chairman: J. Bolger

General manager: Eada Conaolain  
Facilities: Drydock 202.10 x 24.38 x 7.92mtr with 25 ton crane. Facilities used by private company  
Services: 1-18, 20-33, 35-40

## CORK DOCKYARD LTD

Rushbrooke, Co Cork

Tel: (21) 811831  
Telefax: (21) 811595

General manager: K.H. O'Galligan

Repairer: L. Cotter, L. Barry

Facilities: Drydock 163.80 x 21.33 x 8.19mtr, 17,000 dwt with 40 and 20 ton cranes. Also floating dock facilities under 95mtr in length.  
Services: 1-9, 12-16, 19-23, 25, 26, 28-33, 35-40

## NETHERLANDS

## CONOSHIP INTERNATIONAL BV

PO Box 6029, 9702 HA Groningen NL  
Tel: (50) 5268822

Telefax: (50) 5252223

E-mail: conoship@conoship.com

E-mail sales & marketing: sales@conoship.com

Web site: HTTP://www.conoship.com

Managing director: Philippe Swolfs

Sales/marketing manager: Dik Kuiper

Engineering/design manager: Johan Verema

A joint marketing/sales and engineering/design organisation for the following ten shippers located in the northern part of The Netherlands: Barkonzeijer Strooban, Bijlma, Bodewes, Bodewes Volharding, Friesland Shipyard Welgelegen, Hartlingen, Metz, Nriester Sander, Panje Shipyard, Tille Schepshouwe Koesterlille.  
Services: 7-9, 16, 20, 28-29, 31, 35-36, 30-40\*  
\* Also shipbuilding

## SHIPDOCK AMSTERDAM BV

PO Box 37020, 1030 AA Amsterdam

Tel: (20) 6318218

Telefax: (20) 6315791

Managing Director: R.R. Srijland

Facilities: Four drydocks: 250.00 x 36.25 x 8.00mtr, 85 000 dwt; 205.00 x 26.75 x 8.20mtr, 32,000 dwt; 165.00 x 21.50 x 6.00 mtr, 18,000 dwt. Also drydock facility under 150mtr in length. Jetty 1,200 mtr total length. Cranes nine of 15-60 tons capacity and 300 tons floating crane.  
Services: 1-10, 12-18, 20-22, 25-26, 28-33, 35-40

## ORANJEWERF

## SCHEEPSREPARATE BV

P O Box 37050, Nieuwendammerdijk 542, 1030 AB Amsterdam

Tel: (20) 6347511

Telefax: (20) 6347533

Director: J.C. Swart

General manager: J. van On

Facilities: Slipway up to 100mtr in length with 17 carriages 150/180 tons per carriage lifting capacity. Also floating dock under 150mtr in length.  
Services: 2-4, 7-9, 13, 16, 20-21, 26, 28-29, 36-38

## YVC BOLNES DOCKYARD

PO Box 9357, 3007 AJ Rotterdam

Tel: (10) 4799799

Telefax: 20459 viest al

Telefax: (10) 4793760

Managing director: H.R. Godlieb

Commercial manager: A. de Kock

Head project management dept: J. Bakker

Facilities: Two floating docks: 175.00 x 25.80 x 7.40mtr, 25,000 dwt with 2 x 15 ton cranes; 160.00 x 23.85 x 7.00mtr, 18 000 dwt with 2 x 15 ton cranes. Two slipways: 123.00mtr with 6 ton crane; 97.00mtr with 12 ton crane. Also 90mtr jetty with 12 ton capacity crane.  
Services: 1-10, 12-13, 14-17, 20-22, 24, 26-32, 35-40

## VEROLME BOTLEK BV

POB 1001, 3180 AA Rozenburg

Tel: (181) 234300

Telefax: (181) 234346

Managing director: M.J. van der Wal

Manager Sales & Marketing: R.J.P. Haseveer

10.36mtr, 500,000 dwt; 275.00 x 41.00 x 10.36mtr, 120,000 dwt; 230.00 x 35.50 x 7.01mtr, 50,000 dwt.

Services: 1-9, 12-14, 16-17, 19-22, 24, 26-32, 35-40

## DOK EN WERF M.J.

## WILTON FLENOORD BV

POB 22, 3100 AA Schiedam

Tel: (10) 4269200

Telefax: (10) 4732577

Managing director: M.J. van der Wal

Facilities: Three drydocks: 307.38 x 47.27 x 9.75mtr, 160,000 dwt, 2 x 100 ton and 2 x 12 ton cranes; 216.55 x 29.08 x 9.17mtr with 40 and 15 ton cranes; 210.83 x 28.34 x 9.17mtr (sheltered dock) with 2 x 50 ton cranes. Two floating docks: 231.33 x 39.00mtr with 48,000 ton lifting capacity, 15 and 10 ton cranes; 195.45 x 29.26mtr with 20,500 ton lifting capacity and 6 cranes ranging from 5-10 ton lifting capacity. Wet berth 2400.00mtr length.  
Services: 1-9, 12, 13, 16, 17, 21, 22, 26-33, 35-40

## NIEHUIS &amp; VAN DEN BERG BV -

## SHIP REPAIR YARD

POB 5801, 3008 AV, Rotterdam

Tel: (10) 4381100

Telefax: (10) 4381997

E-mail: shiprepair@niehuis.nl

Managing director: Ir P. Roos

Repair manager: A. den Arend

Commercial manager: J. den Damme

Facilities: Floating docks: 175.00 x 26.40 x 7.00mtr with 12,000 ton lifting capacity and 3 x 30 ton travelling cranes; 170.00 x 25.00 x 7.50mtr with 15,000 ton lifting capacity and 30, 7 and 3 ton cranes; 217.00 x 31.80 x 9.00mtr with 25,000 tonnes lifting capacity and travelling cranes 25, 15, 7 and 3 tons and cranes of 15 and 12 ton capacity. Also floating dock facilities under 150mtr in length.  
Services: 7-12, 16-18, 20-22, 26-31, 36-40

## VAN DER GIESSEN-DE NOORD

PO Box 13, 2950 AA Alkmaar

Tel: (78) 6913700

Telefax: (78) 6913514

Facilities: Slipways: 115.00 x 20.20mtr 3,000 ton lifting capacity; 105.00 x 20.20mtr 3,000 ton lifting capacity; 125.00 x 13.80mtr 1,500 ton lifting capacity; 80.00 x 9.50mtr and 51.00 x 14.40mtr both 1,200 ton lifting capacity.

## VLAARDINGEN OOST SHIPREPAIR

Schiedamsdijk 2, 3134 KK Vlaardingen

Tel: (10) 4342744

Telefax: (10) 4340887

E-mail: info@vlaardingen-oost-shiprepair.nl

Managing director: J.A. Raasdorp

Commercial manager: W. Kruyswijk

Facilities: Slipway 125.00 x 25.00 x 3.00mtr with 3 500 ton lifting capacity and eight cranes of up to 17.5 ton. Jetty 550.00mtr in length also floating dock facilities under 150mtr in length.  
Services: 1-17, 20-40

## SCHELDEPOORT REPAIRYARD

A Royal Schelde Company

POB 565, 4380 AN Vlissingen

Tel: (118) 483000

Telefax: (118) 483010

Managing director: P. Dénis

Commercial manager: K. Spaepen

Production manager: A. van Oers

Facilities: Two drydocks: 216.80 x 29.74 x 8.66mtr, 45 000 dwt with 55 and 20 ton cranes; 176.82 x 25.30 x 8.07mtr, 25,000 dwt with 35, 20 and 15 ton cranes. Floating dock 229.00 x 36.50m, 90 000 dwt with 40 and 2 x 12 ton cranes.  
Services: 1-15, 17-40

## BELGIUM

## ANTWERP SHIPREPAIR NV

Haven 403, Industrieweg 11, B-2030 Antwerpen

Tel: (3) 5401211

Telefax: (3) 5401200

Managing director: Frans van der Zaai

Commercial director: Jaap Haseveer

Facilities: Six drydocks: 312.25 x 50.00 x 8.00mtr with 100 and 25 ton cranes; 255.00 x 39.00 x 8.00mtr with 100 and 40 ton cranes; 207.00 x 27.00 x 7.00mtr with 2 x 25 ton cranes; 193.00 x 26.00 x 7.00mtr with 25 ton crane; 166.00 x 21.00 x 7.00mtr with 20 ton crane; 2 wet berths of 2,000 mtr total length with 25 and 10 ton cranes.  
Services: 7-9, 12, 16-17, 20-22, 24, 26-31, 35-40

with 20 ton crane. 2 wet berths of 2,000 mtr total length with 25 and 10 ton cranes.  
Services: 7-9, 12, 16-17, 20-22, 24, 26, 28-31, 35-40

## FRANCE

## PORT AUTONOME DE DUNKERQUE

Terre Plein Guillain, BP 6534, 59386 Dunkirk

Tel: 3 28 29 7070

Telefax: 820055; Telefax: 3 28 29 7106

Facilities: Drydock 310.00 x 50.00 x 9.50mtr, 170,000 dwt with 50 and 20 ton cranes. Floating dock 215.00 x 30.00 x 8.50mtr with 20,000 ton lifting capacity and 2 x 7 ton cranes and 250 ton floating crane. Also two drydock facilities under 150mtr in length. Repair berth 645mtr in length with 50 ton crane. Public facilities used by other companies.  
Services: 2-9, 16, 18, 19, 20-24, 26-40

## SOCIETE D'EXPLOITATION D'INSTALLATIONS PORTUAIRES (SEIP)

Terre Plein Nord de la Forme de Radoub no. 8, 59140 Dunkerque

Tel: 3 28 59 0665

Telefax: 3 28 29 7305

Manager: Francis Trotin

Uses Dunkerque port facilities

## ARNO-DUNKERQUE

BP 2074, Route des Docks, F-59376 Dunkerque Cedex 1

Tel: 3 28 66 4800

Telefax: 3 28 66 5928, 2821 0114

Yard manager: Willy Salomon

Repair manager: Serge Mahieu

Facilities: Uses Dunkerque port facilities, see above

Services: 2-7, 9-18, 20-24, 26-40

## CHAMBRE DE COMMERCE

BP 199, 62104 Calais Cedex

Tel: 3 21 46 0000

Telefax: 3 21 46 0099

Facilities: Drydock 155.00 x 21.00 x 7.62mtr with 15 and 2 x 9 ton cranes. Public facilities used by other companies.

Services: 2-7, 9, 11, 14-17, 20, 22, 25, 26, 28, 31, 35-38, 40 - provided on the spot by local companies

## CHAMBRE DE COMMERCE

98 Blvd Gambetta, BP 269, 62204

Boulogne-sur-Mer Cedex

Tel: 3 21 99 6200; Telefax: 3 21 99 6201

President: M. Francis Leroy

Facilities: Two slipways with 2,500 ton, 1,500 ton lifting capacity and two grinders of 96.50 x 8.30mtr and 19.00 x 6.30mtr.

## PORT AUTONOME DE ROUEN

5 Blvd de Crouais, BP No 1013, 76380 Casteles

Tel: 2 35 52 5588; Telefax: 771541

Telefax: 2 35 52 5438

Facilities: Floating dock 180.00 x 25.20mtr with 14,000 ton lifting capacity, 15 and 10 ton cranes. Public facilities used by other companies.  
Services: 2-4, 9

## ARNO-NORMANDIE

BP 255, Blvd de Stalingrad, 76124 Grand

Quevilly Cedex

Tel: 2 35 69 6000

Telefax: 2 35 68 6855

Yard manager: Jacques Fortier

Facilities: Use Port Authority facilities.

Services: 2-9, 12, 14-16, 18, 20-22, 24, 26-30, 32, 33, 36-40

## PORT AUTONOME DU HAVRE

Ship Repair Department, BP 1413,

76067 Le Havre Cedex

Tel: 2 32 74 7400

Telefax: 190663 havavre f

Telefax: 2 32 74 7429

Facilities: Four drydocks: 319.00 x 38.00 x 12m, 90 000 dwt with 2 x 45 ton cranes; 184.10 x 28.00 x 6mtr; 168.75 x 19.00 x 6mtr + one drydock facility under 150mtr in length. Floating dock 310.00 x 53.00 x 10mtr, 220 000 dwt with 50, 600 ton lifting capacity and 2 x 40 ton cranes. Repair piers available length 1,700mtr, 400mtr with 20 and 2 x 5 ton cranes, 1 x 90 ton and 1 x 200 ton floating cranes. Public facilities used by other companies.

## SIREN - SOC. INDUSTRIELLE DE

## REPARATION ET D'ENTRETIEN NAVAL

Route du Mole Central, BP 1286, 76068 Le

Havre Cedex

Tel: 2 35 24 7272; Telefax: 190964 epia f

Telefax: 2 35 24 7296

General manager: C. Tessandier

Commercial manager: R. Gac, Tel: 2 35 24 7280

Production manager: J. Soulet

Facilities: Use Port Authority facilities.

Services: 1-18, 20-40

## CHAMBRE DE COMMERCE ET INDUSTRIE

## DIRECTION DES EQUIPEMENTS

Place du 9eme RI, BP 126, 29200 Brest

Tel: 2 98 46 2380; Telefax: 2 98 43 2456

Telefax: 941 460

Operations manager: Nicolas Bos

Facilities: Three drydocks of 420.00 x 80.00 x 16.00mtr, 555,000 dwt capacity. One crane of 150,000 x 38mtr and 2 x 15 ton cranes; 338.00 x 55.00 x 14.25mtr, 280,000 dwt capacity with 80 ton crane at 25mtr, 12 ton at 40mtr and 4.5 ton cranes at 38mtr; 225.00 x 26.60 x 14.25mtr, 40 000 dwt capacity with a 20 ton crane at 22.70mtr; 400.00mtr x 32mtr, 320,000mtr length - 9.5mtr depth; 400.00mtr - 10.50mtr depth; 400.00mtr length - 10.00mtr depth. Facilities owned by Chamber of Commerce & Industry, actual repair works performed by private companies.  
Services: 1-10, 12-14, 16-30, 32-40

## SOBRENA SHIPYARD

Port de Commerce, BP 340, 29273 Brest Cedex

Tel: 2 98 43 4343

Telefax: 2 98 44 7722

Manager: B. Faric

Sales manager: Maurice Robic

Production manager: Y. Floch

Facilities: 3 dry docks; 225mtr x 27mtr; 338mtr x 52mtr; 420mtr x 80mtr  
Services: 2-9, 12-14, 16-17, 19-22, 28-30, 35-38, 40

## MILNER NAVAL

Brest Cedex

Manager: Roger Valere

Facilities: Usa 220,00m length drydock of Chambre de Commerce facilities at Brest

## REPARATION NAVALE MAZARBRINE

Quai des Frigates, 44600 Saint Nazaire

Tel: 2 40 22 9405; Telefax: 2 40 19 0053

Chairman: Jean Claude Branellec

Director: René Riffault

Deputy director: Jean Michel Poirier

Facilities: Three drydocks: 350.00 x 50.00 x 13.00mtr, 226.00 x 30.00 x 9.00mtr; 159.00 x 17.00 x 9.00mtr; and a drydock facility under 150 tons in length  
Services: 1-10, 12, 13, 14, 16, 19-40

## PORT AUTONOME DE BORDEAUX



**Commercial manager:** E. Blanco  
**Production manager:** R. Puente  
**Facilities:** Two drydocks: 231.00 x 32.00, 50,000 dwt and 160mt x 23.8mt, 15,000dwt. Slipway, 3,500 dwt, 1,500 lifting tons. 13 cranes (5-200tons)  
**Services:** 2-9, 12-17, 20-24, 26-33, 35-40

**JULIANA CONSTRUCTORA GJONESA SA**  
 Montemayor 2, POB 49,33212 Gijón  
 Tel: (985) 178200  
 Telex: (985) 178350  
 Internet: <http://www.juliana-es.com>  
**Facilities:** Two berths of 175.00 x 23.50mt each, drydock of 175.00 x 25.00 mt, one outfitting basin (325 mt quay), 9 rig cranes of 12-50 tons, 1 gantry crane of 120 tons.  
**Note:** For the time being and the near future, activities focussed on newbuilding.

**EMPRESA NACIONAL BAZAN - CARENAS**  
 POB 1-15403 Ferrol, La Coruña  
 Tel: (81) 352040  
 Telex: (81) 352115  
**Repair manager:** Javier Goñicelaya Avana  
**Facilities:** Two drydocks: 330.00 x 50.00 x 14.40mt, 230,000 dwt with 100 and 4 x 25 ton cranes; 205.22 x 25.00 x 8.25 mt, 25,000 dwt with 26 cranes, max capacity 100 tonnes. Total quay length 1,700 mt, 12 mt depth.  
**Services:** Full repair service

**ASTILLEROS Y TALLERES DEL NOROESTE SA-ASTANO**  
 15500 Partio-Fene, Ferrol, La Coruña  
 Tel: (981) 343211, 342991, 342798  
 Telex: (981) 343252  
 E-mail: [comdep@rep.astano.com](mailto:comdep@rep.astano.com)  
**Shiprepair director:** Nicasio Sande  
**Commercial manager:** Jesus Reizo  
**Facilities:** Two drydocks: 260.00 x 36.00 x 10.60mt, 80 000 dwt; 160.00 x 26.00 x 7.60mt, 20 000 dwt. Jetty 2700mt total length. 19 cranes ranging from 10-800 tons.  
**Services:** 2-9, 11, 13-32, 35-40

**AUTORIDAD PORTUARIA DE LA CORUÑA**  
 Avda de la Marina 3 La Coruña  
 Tel: (981) 227402, Telex: (981) 205862  
**President:** Juan Manuel Paramo Neyra  
**Director:** Guillermo Grando  
**Technical director:** Javier de la Riva Fernández  
**Facilities:** 13 slipways up to 251 mt length and up to 3,000ton cranes. Facilities also operated by Varadero Cerca-Grande and Soc. Cooperativa del Mar de Armadoras de Buques de Pesca  
**Services:** 2-6, 12-13, 16, 18, 21, 23, 26, 28-29, 31-32, 35-37

**BARRERAS SA, HIJOS DE J.**  
 Beiramar 2 36208-Vigo  
 Tel: (34 86) 231400; Telex: (34 86) 204415  
**Commercial manager:** Fernando Portanet  
**Facilities:** Two slipways: 251.95mt, 77.01 cradle with 1 900 ton lifting capacity; 220.00mt, 70.00 cradle with 1 200 ton lifting capacity.  
**Services:** 1-9, 11-22, 26-32, 34-40

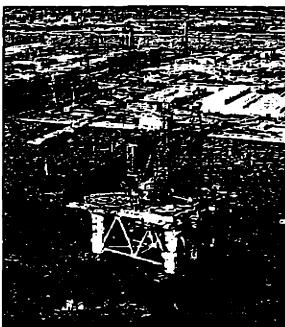
**CONSTRUCCIONES NAVALES P. FREIRE SA**  
 Avda. Beiramar, 1R, 36208 Vigo  
 Tel: (986) 233000, 203800  
 Telex: (986) 237284  
 E-mail: [freire@freire-cnpl.es](mailto:freire@freire-cnpl.es)  
**Managing director:** Jesus Freire  
**Commercial director:** José del Río  
**Facilities:** Material warehouse. Sand-blasting, steelworks and fabrication shops, mechanical and piping shop. Two building berths, two outfitting quays. Three slipways: two 3,000 ton and one 800 ton lifting capacity. One gantry crane 100 tons.  
**Services:** 1-9, 11-17, 20-22, 26-32, 35-40

**FRANCISCO CARDAMA SA**  
 Avd Beiramar, 12 36208 Vigo  
 Tel: (86) 231662  
 Telex: (86) 234051  
**General manager:** Mario Cardama Barrientos  
**Facilities:** Six slipways: 233.00mt, 63.00 cradle with 3,000 ton lifting capacity; 225.00mt, 60.00 cradle with 2,000 ton lifting capacity; 223.00mt, 45.00 cradle with 1 500 ton lifting capacity; 220.00mt, 50.00 cradle with 1,000 ton lifting capacity, and repair dock.  
**Services:** 1-11, 13-18, 20-22, 26-29, 31, 32, 35-37, 39, 40

## PORTUGAL

**ESTALEIROS NAVAIS DE VIANA DO CASTELO SA**  
 PO Box 530, 4900 Viana do Castelo  
 Tel: (58) 828230 (16 lines)  
 Telex: 32485 navais p  
 Telefax: (58) 8282478  
**Chairman:** Mario Pinho  
**General manager:** F. Laranjeira  
**Repair manager:** Santos Lima  
**Facilities:** Drydock 1: 203.00 x 30.00mt. Two drydocks under 150 mt in length. Buildingplatform 140.00 x 30mt, outfitting bay with two quays of 190mt and mooring quay of 300mt  
**Services:** 1-9,11,13-17,20-23,26,28-30,32,35-40

**LISNAVE ESTALEIROS NAVAIS DE LISBOA SARL**  
 PO Box 2138, Lisbon Codex, P-1103  
 Tel: (1) 2754121  
 Telefax: (1) 276 4670  
**CEO:** Martin Cabral  
**Commercial director:** Donald McLean  
**North Yard**  
 POB 2138, 1103 Lisbon Codex  
 Tel: (1) 606171  
 Telex: 44531 lisnav p  
 Telefax: (1) 3961169  
**Facilities:** Four drydocks: 173 x 22 mt, 21,000 dwt; three under 150 mt in length. Five repair jetties of 520 mt total length. 10 rail cranes up to 25 tons and three mobile cranes up to 18 tons.  
**Services:** 1-14, 17-40



**South Yard**  
 Margueira  
 Tel: (1) 2754121, 2750811  
 Telex: 18172 lisnav p  
 Telefax: (1) 2764670, 2752469, 2745706  
**Facilities:** Four drydocks: 520 x 90 mt, 1,000 000 dwt; two drydocks of 360 x 54 mt, 325 000 dwt; 265 x 42 mt, 100,000 dwt. Eight repair jetties 2,143 mt total length. 19 rail cranes up to 100 tons, 10 mobile cranes up to 40 tons, 2 floating cranes up to 100 tons, 1 gantry crane 300 tons.  
**Services:** 1-14, 16, 17, 19, 20-33, 35-40  
**Mitrena Yard**  
 POB 135, 2902 Setúbal  
 Tel: (65) 7071100, 7091305, 719045  
 Telex: 16170 setnav p  
 Telefax: (65) 719407  
**Facilities:** Three drydocks: 450.00 x 75.00mt, 700,000 dwt; 350.00 x 55.00mt, 300,000 dwt, 420 x 75 mts, 700,000 dwt. Also 6 repair jetties, 801 mt total length. 500 ton gantry crane, 12 rail cranes up to 100 tons, 7 mobile cranes up to 20 tons.  
**Services:** Full repair service

## SPAIN

**ASTILLEROS ESPAÑOLES SA CADIZ SHIPYARD**  
 Caretera Industrial S/N, 11007 Cadix  
 Tel: (56) 27335054  
 Telex: (56) 278362/256828  
**Managing director:** Francisco Gallardo  
**Commercial Director:** Juan Macías  
**Production Director:** Angel Diaz  
**Facilities:** Two drydocks: 385.00 x 66.60mt, 400,000 dwt with cranes between 50-100 ton lifting capacity; 234.00 x 34.00mt, 60,000 dwt. Floating dock 246.00 x 42.00mt, 120,000 dwt and jetty 325.5mt total length. 25 cranes ranging from 4.5 to 400 tons  
**Services:** 1-9, 13-16, 19-33, 35-40

MEDITERRANEAN/  
BLACK SEA

## MEDITERRANEAN

## GIBRALTAR

**CAMBELL LAIRD - GIBRALTAR**  
 PO Box 858, The Dockyard  
 Tel: (350) 59400; Telex: (350) 44404  
 E-mail: [mail@lairds.gi](mailto:mail@lairds.gi)  
**Yard manager:** Mel Smith  
**Operations director:** Tom Parry  
**Facilities:** 3 drydocks: 275 x 38 x 10mt, 90,000dwt; 2 x 45 ton and 8 ton cranes. 190 x 29 x 11mt, 25,000dwt; 2 x 15 ton. One dock under 150mt. 800 berths with four 8 ton tower cranes and 45 ton crane.  
**Services:** 1-7, 9, 10, 12-16, 18-22, 24, 26-40

## SPAIN

**EMPRESA NACIONAL BAZAN-CARENAS**  
 POB 47, 30205 Cartagena (Murcia)  
 Tel: (68) 128350/128331  
 Telex: 67460 gale e; Telefax: (68) 507242  
**Repair yard manager:** Manuel de la Cruz Moreno  
**Facilities:** Drydock 210.00 x 22 x 8.3 mts, 35,000 dwt with 2 x 20 ton cranes. Syncrolift 148.00 x 23.00 x 9.00 mts with 9,928 ton lifting capacity. 7 x 30 ton cranes. Total quay length 1,300 mt, depth 10.5 mt.  
**Services:** Full repair service.

**UNION NAVAL DE LEVANTE SA**  
 Paseo de Caro, s/n 46024 Valencia  
 Tel: (96) 3678099  
 Telex: 62877 unale e; Telefax: (96) 3670793  
**President:** Rafael Benjomea  
**Managing director:** Luis de Miguel  
**Facilities:** Floating dock 155.00 x 24.60x 7.30mt with 8 000 ton lifting capacity and 2 x 7 ton cranes.

**UNION NAVAL DE LEVANTE SA**  
 Muelle Catalana, S/N, 08039 Barcelona  
 Tel: (3) 2214200  
 Telex: 52030 unale e;  
 Telefax: (3) 2215952  
**Shipyard manager:** Francisco Arderius  
**Commercial manager:** Julian Saenz  
**Facilities:** Drydock 215.00 x 35.00 x 8.00mt, 50 000 dwt. Also floating docks up to 4,500 tons lifting capacity.  
**Services:** Full repair service 1-40

## FRANCE

**PORT AUTONOME DE MARSEILLE**  
 Marseilles Operations Department, Ship Repair and Heavy Loads Office, 12 Rue Saint Cassien, 13002 Marseille Codex  
 Tel: 4 91 39 4951;  
 Telex: 4 91 39 4051  
**President:** Henry Roux Alezais  
**Director:** Eric Brusart  
**Facilities:** Ten drydocks: (Dock 1) 171.10 x 19.75 x 6.35mt, 2 x 9 ton cranes; (Dock 7) 204.60 x 23.00 x 8.65 mt with 1 x 6 and 1 x 20 ton cranes; (Dock 8) 320.00 x 53.00 x 11.70 mt with 1 x 6, 1 x 9 and 1 x 50 ton cranes; (Dock 9) 250.00 x 37.00 x 8.70 mt with 1 x 6, 1 x 9 and 1 x 50 ton cranes. Remaining drydock facilities under 150mt in length. Five wet docks of various lengths, with a maximum length of 853 mts, draught 13.50 mts. Public facilities used by other companies.  
**Services:** Full repair service 2-40

**CIE MARSEILLAISE DE REPARATIONS-CMR**  
 BP 57, 13315 Marseille Codex 15  
 Tel: 4 91 03 5200  
 Telex: 420163 comar; Telefax: 4 91 69 6961  
**Commercial manager:** Bernard Perolini  
**General manager:** Maurice Laroche  
**Facilities:** Uses Port Authority facilities.  
**Services:** Full repair service 1-40

**MARINE TECHNOLOGIES**  
 BP 156, 13318 Marseille Codex 15.  
 Tel: 4 91 69 9860; Telefax: 4 91 69 9891  
**CEO:** M. Dorand  
**General manager:** M. Taverna  
**Facilities:** Uses Port Authority facilities.

## ITALY

**REPRAZIONI NAVALI PORTO DI GENOVA**  
 Via al Molocagni, 16123 Genoa  
 Tel: (10) 2412213  
 Telex: 216579 portge i; Telefax: (10) 2412378  
**General manager:** F. Ciccolo  
**Facilities:** Five drydocks: 277.30 x 40.00 x 12.65mt, 95,000 dwt with 40 and 2 x 10 ton cranes; 258.50 x 30.00 x 10.36mt, 60,000 dwt with 20 ton crane; 249.00 x 38.00 x 8.80mt, 80,000 dwt with 2 x 7 ton cranes; 211.00 x 16.00 x 7.50mt with 10 ton crane; 170.40 x 23.00 x 8.20mt with 20 ton crane. Also floating dock facilities under 150mt in length. Public Docks used by other companies.  
**Services:** 2-9, 14, 16-2, 24, 26-32, 35-40

**SAN GIORGIO DEL PORTO SPA**  
 Officine Meccaniche Navali E Fonderie  
 Calata Boccardo, 8-16128 Genova  
 Tel: (10) 2461068-72; Telex: (10) 2461123  
**Technical director:** Emilio Pedrocchi  
**Facilities:** Uses public docks  
**Services:** 7-10, 12, 20, 28-29, 31, 35-36, 38-39

**T. MARIOTTI SPA**  
 Via Dei Pescatori, 16129 Genova - Molo Cagni  
 Tel: (010) 24081  
 Telex: 270297 omagi i; Telefax: (010) 240824  
**President:** M. Bisagno  
**Facilities:** Use Port Authority facilities.

**GESTIONE BACINI LA SPEZIA SPA**  
**PINCANTIERI GROUP**  
 Viale San Bartolomeo 440, La Spezia  
 Tel: 560751; Telex: 270397 frncms i  
**Facilities:** Floating dock 265.00 x 41.80 x 9.00mt, 100,000 dwt with 40,000 ton lifting capacity and 24, 12, 8 and 6 ton cranes. Public docks used by other companies.

**INMA SPA - INDUSTRIE NAVALI MECCANICHE AFFINI**  
 Viale San Bartolomeo 362, La Spezia  
 Tel: (187) 544111  
 Telex: 270297 inma i; Telefax: (187) 560246  
**Facilities:** Two floating docks 265.00 x 41.80 x 9.00mt, 100,000 dwt, 180.00 x 34.00 x 9.00mt, 30,000 dwt.  
**Services:** 1-11, 13-18, 20-24, 26-40

**CANTIERI DEL MEDITERRANEO SPA BACINI NAPOLETANI SPA**  
 Via Marinaella, Varco 6, 80133 Naples  
 Tel: (81) 7858111;  
 Telex: (81) 7858232  
**President:** Piero Piccelli  
**Managing Dir:** Franco Salerno, Renato Salvatore

**Facilities:** Five docks maximum length 335 x 40 x 11.40mtr for vessels up to 100,000 dwt. Repair and outfitting berths 1,300m  
**Services:** 2-9, 12, 16, 20-22, 24, 26-32, 35-40

**OFFICINE MECCANICHE NAVALI CARRINO GIOVANNI FIGLI SNC**  
 Calata Pollena, Zma S. Erasmo, Naples  
 Tel: (81) 7524582, 7524601  
 Telex: 710132 pjoear i; Telefax: (81) 7520945  
 President: Luigi Carrino  
 Repair manager: Giovanni Carrino  
**Facilities:** Use public drydocks up to 335mtr in length.  
**Services:** 9, 11-12, 14-15, 17-18, 21-22, 26-32, 35-37, 40

**G & R SALVATORI SPA**  
 Calata Villa del Popolo, 80133 Naples  
 Tel: (81) 5535937, 262166; Telefax: (81) 201374  
 General manager: L. Salvatori  
 Repair manager: A. Salvatori  
**Facilities:** Drydocks up to 335mtr in length, used with subsidiary company. Mobile cranes and floating crane up to 70 ton.  
**Services:** 2, 9, 10, 12, 15, 17, 18, 22, 26, 28, 29, 32, 34, 38-40

**FINCANTIERI CANTIERI NAVALI ITALIANI SPA-PALERMO YARD**  
 Via Dei Cantieri 75, 90142 Palermo  
 Tel: (91) 6206111  
 Telex: 910041; Telefax: (91) 547228  
 Yard director: Claudio Bucci  
 Repair manager: Vito Bualacchi  
**Facilities:** Two drydocks, 370.00 x 68.00 mtr; 163.35 x 22.8 mtr. Two floating docks, 286 x 46.2 mtr; 193 x 30 mtr. Repair and outfitting berths 1.5 km.  
**Services:** 1-3, 5, 6, 9, 11, 12, 16-20, 22, 26-33, 35-40

**ARSENALE MARINA MILITARE**  
 Messina, Sicily  
**Facilities:** Drydock 156.66 x 24.80mtr. Also drydock facilities under 150mtr in length. Public docks also used by other companies.

**SMEB-CANTIERI NAVALI SPA**  
 Via S. Raineri, POB 733, 98100 Messina, Sicily  
 Tel: (090) 775951; Telex: 980183 smeb i  
 Managing director: M. Di Lella  
**Facilities:** Drydock 274.00 x 38.00mtr, 70,000 dwt with 40 and 7 ton cranes.  
**Services:** 7, 14, 25

**CANTIERE NAVALE ROSSINI SPA**  
 Via S. Raineri 22, 98122 Messina, Sicily  
 Tel: (91) 774862; Telex: 980030 rodrin i  
 Yard manager: G. Palza  
**Facilities:** Use public docks

**CANTIERE NAVALE NOE SPA**  
 PO Box 88, Molo Divesca, 96011 Augusta, Sicily  
 Tel: (0931) 521779; Telefax: (0931) 975811  
 Managing director: Alberto Alberti  
**Facilities:** Floating drydock 160.0 x 23.2 mtr, lifting capacity 8,500 tonnes with two cranes of 5 tonnes. Also a floating dock of 3,000 tonnes lifting capacity.

## MALTA

**MALTA DRYDOCKS**  
 The Docks, POB 581, Valletta  
 Tel: (356) 822451, 822491; Telefax: (356) 800021  
 E-mail: info@maltdrydocks.com.mt  
 General manager: S. Aquilina  
**Facilities:** Drydocks: 350.00 x 62.00 x 10.22mtr, 300,000 dwt with 150 and 2 x 30 ton cranes, 1 x 40 ton; 252.60 x 33.50 x 10.50mtr, 111,000 dwt with 50, 10 and 2 x 5 ton cranes; 213.10 x 22.04 x 10.25mtr, 35,000 dwt with 50, 10 and 2 x 5 ton cranes; 163.00 x 22.66 x 6.66mtr, 20,000 dwt with 20, 4 and 3 x 5 ton cranes; 155.22 x 21.64 x 3.37mtr, 12,000dwt with 50 and 5 ton cranes. Also drydock facilities under 150mtr in length.  
**Services:** 1-18, 20-22, 25-32, 34-39

## ITALY

**ARSENALE VENEZIA SPA**  
 Castello, Campo Caletta 2737, 30122 Venice  
 Tel: (41) 798511; Telefax: (41) 3200982  
 Web site: www.arsenale-venezia.com  
 President: Giancarlo Zucchetto  
 Managing director: Davino de Poli  
**Facilities:** Drydock 200.00 x 45.00 mtr, 100,000 dwt with 150 and 2 x 30 ton cranes; 150.00 x 30.00 mtr, 70,000 dwt with 100 and 2 x 30 ton cranes; 100.00 x 20.00 mtr, 50,000 dwt with 100 and 2 x 30 ton cranes; 50.00 x 10.00 mtr, 25,000 dwt with 100 and 2 x 30 ton cranes; 25.00 x 5.00 mtr, 12,500 dwt with 100 and 2 x 30 ton cranes. Also floating dock facility under 150mtr in length.  
**Services:** 1-18, 20-22, 25-32, 34-39

## ITALY

**ARSENALE VENEZIA SPA**  
 Castello, Campo Caletta 2737, 30122 Venice  
 Tel: (41) 798511; Telefax: (41) 3200982  
 Web site: www.arsenale-venezia.com  
 President: Giancarlo Zucchetto  
 Managing director: Davino de Poli  
**Facilities:** Drydock 200.00 x 45.00 mtr, 100,000 dwt with 150 and 2 x 30 ton cranes; 150.00 x 30.00 mtr, 70,000 dwt with 100 and 2 x 30 ton cranes; 100.00 x 20.00 mtr, 50,000 dwt with 100 and 2 x 30 ton cranes; 50.00 x 10.00 mtr, 25,000 dwt with 100 and 2 x 30 ton cranes. Also floating dock facility under 150mtr in length.  
**Services:** 1-18, 20-22, 25-32, 34-39

and 65 ton mobile cranes; 160.00 x 23.80 x 7.20mtr, 20,000 dwt with 2 x 10 ton cranes. Also drydock facilities under 150mtr in length. Repair berths 550mtr in length. Manufacture of air preheaters and auxiliary machinery.  
**Services:** 2-10, 12-14, 16, 18, 20-24, 26-33, 35-40

**AJSM TRIESTE**  
 via K.L. Von Bruck on 32, 34143, Trieste  
 Tel: (040) 3185811; Telefax: (040) 3185802  
 Director: R. Giuliani (Tel: 3185800)  
 Dock master: G. Bassani (Tel: 3185803)  
**Facilities:** Two docks up to 295.00 x 56.00 x 11.00mtr 140,000 dwt. Repair and outfitting berths 2,300mtr.  
**Services:** Only docking operations

## SLOVENIA

**IZOLA SHIPYARD LTD**  
 Cankarjev Drevored 23, 66310 Izola  
 Tel: 63321; Telefax: 63915  
 General manager: R. Krejcaric  
 Repair manager: B. Francescica  
**Facilities:** Floating dock 165.00 x 23.40 x 6.70mtr with 8,500 ton lifting capacity and 2 x 5 ton cranes.  
**Services:** 1-9, 11-17, 20, 21, 24-26, 28-33, 35-40

## CROATIA

**BRODOGRADILISTE VIKTOR LENAC**  
 POB 210, Martinska Bay, 51001 Rijeka  
 Tel: (51) 216255; Telefax: (51) 217033, 216551  
 Tel: 24194, 24305 rh podla  
 President & managing director: D. Vrhovnik  
**Facilities:** Three floating docks: 201.50 x 33.82 x 16.25mtr with 24,000 ton lifting capacity and 2 x 15 ton cranes; 165.00 x 27.40 x 13.20mtr with 12,000 ton lifting capacity and 2 x 12.5 ton cranes; Jetty 930mtr and 220mtr length. Mobile cranes up to 150 tons, floating cranes with up to 110 ton lifting capacity and floating crane of 300 tons available for special lifts. Also floating dock facility under 150mtr in length located in Rijeka port.  
**Services:** 1-40 (except 10 & 12)

**TROGRIN SHIPREPAIR LTD**  
 Brodogradilista 16, 58220 Trogir  
 Tel: (358) 21 881488  
 Tel: 26244 brotg rh; Telefax: (358) 21 881744  
 Repair manager: Nikša Tomas  
 General manager: Josko Bubic  
**Facilities:** Floating dock 176.30 x 25.30 x 7.73mtr with 10,000 ton lifting capacity, 70 ton floating crane and 6 x 20 ton travelling cranes.  
**Services:** 1-10, 12, 14, 16, 18, 20-22, 24, 26-29, 31-33, 35-40

## YUGOSLAVIA

**ADRIATIC SHIPYARD BIJELA**  
 85343 Bijela, Boka Kotorska  
 Tel: (82) 81122, 32007-9; Telefax: (82) 32010  
 E-mail: bijela@cg.yu  
 General manager: Stanko Zlotovic  
**Facilities:** Two floating docks: 252.00 x 44.00 x 9.70mtr, 120,000 dwt with 33,000 ton lifting capacity and 2 x 12 ton cranes; 184.00 x 25.50 x 7.80mtr, 26,500 dwt with 10,000 ton lifting capacity and 2 x 7 ton cranes.  
**Services:** Full repair services

**TOLE TRAT SHIPBUILDING & SHIPREPAIR**  
 Zrenjanina, Gromaznjaska 3  
 Tel: (23) 66 496; Telefax: (23) 60095  
 Tel: 15605 mci zr yo  
 General manager: Zirojica Maricic  
**Facilities:** Floating dock 165.00 x 27.80, depth over blocks 5.8 mtr, 11,500 tons lifting capacity with 2 x 15 ton cranes. Also floating dock under 15 mtr and 900 ton lifting capacity synchrolift.

## ALBANIA

**SHIPYARD DURRES-GRANSK SA**  
 Durres  
 Tel: (52) 22249, 22842  
 Telefax: (52) 23362, 22335  
 Managing director: Ljashbi Huta  
 Marketing director: Wlodzislaw Klasek  
**Facilities:** Floating drydock 156.8 x 26.0mtr lifting capacity 8,200 tonnes for vessels up to 15,000 dwt, 2 x 10 ton cranes. Synchrolift 60.0 x 10.0mtr lifting capacity 600 tonnes. Slipway

Repair quay 80.0mtr; pier 185.0 mtr, 1 x 20 and 1 x 5 tonne cranes.  
**Services:** 2-7, 9, 14, 16, 20, 26, 28-29, 31, 35-37, 39

## GREECE

**ELEFSIS SHIPYARDS SA**  
 Elefsina, Elefsis 19200  
 Tel: (1) 5535111; Telefax: (1) 5546016  
 General manager: C. Kokkalis  
 Commercial manager: A. Logothetis  
**Facilities:** Three floating docks: 252.00 x 41.00 x 9.70mtr, 115,000 dwt with 28,000 ton lifting capacity and 2 x 12 ton cranes; 227.50 x 35.00 x 8.00mtr, 60,000 dwt with 18,000 ton lifting capacity and 2 x 15 ton cranes; 162.00 x 24.00 x 6.50mtr, 20,000 dwt with 7,500 ton lifting capacity and 2 x 10 ton cranes. Postpone 105.00mtr with 3,000 ton lifting capacity.  
**Services:** 1-40

**HELLENIC SHIPYARDS OF PERAMA SA**  
 40 Dimokratias Ave, Perama, Piraeus  
 Tel: 4410851-4410881, 4412834-4412859  
 Tel: 211162; Telefax: 4412131  
**Facilities:** 150.00mtr jetty, 120,000 dwt  
**Services:** 2-7, 9-12, 14, 15, 17, 18, 21-26, 28-40

**HELLENIC SHIPYARDS - SKARAMANGA YARD**  
 13 Amerikias Street, POB 3480, 10233 Athens  
 Tel: (1) 5578315; Telefax: (1) 5570700, 5570719  
 Tel: 215567, 215396 hays gr  
 Managing director: David Groves  
 Commercial director: David Blincow  
**Facilities:** Two drydocks: 425.00 x 75.00 x 9.50mtr, 500,000 dwt with 120, 50 and 17 ton cranes, 130 and 30 ton floating cranes; 335.30 x 53.60 x 8.75mtr, 250,000 dwt with 2 x 100 and 17 ton cranes. Three floating docks: 251.70 x 36.90 x 8.50mtr, 72,000 dwt with 30,000 ton lifting capacity and 2 x 5 ton cranes; 231.60 x 33.80 x 8.50mtr, 60,000 dwt with 22,500 ton lifting capacity and 2 x 5 ton cranes; 205.00 x 32.00 x 8.50mtr, 37,000 dwt with 22,000 ton lifting capacity and 2 x 5 ton cranes.  
**Services:** 1-10, 12-22, 24-31, 35-36, 38-40

**PIRAEUS PORT AUTHORITY-PPA**  
 10 Akti Miaouli, Piraeus 18538  
 Tel: (1) 4410271, 4410391 (floating docks), 4612402 (dry docks), 4426912 (foreign relations)  
**Facilities:** Floating dock 202.00 x 32.00mtr, 400,000 dwt with 15,000 ton lifting capacity. Drydock 151.35 x 26.00 x 8.25mtr, 10,000 dwt. Also floating dock facilities under 150mtr in length. Facilities at the Perama shiprepair base used by 34 private companies.  
**Services:** 3-4, 13. All other services by private companies.

**NEORON NEW SA SYROS SHIPYARDS**  
 1 Neorion St, 84 100 Syros  
 Tel: (221) 8200177; Telefax: (281) 82008  
 E-mail: neorion@neorion.gr  
 Managing director: C.G. Koldkalis  
 Comm manager: A. Anagnostis  
**Facilities:** Two floating docks: 230.00 x 35.00mtr, 75,000 dwt with 25,000 ton lifting capacity and 2 x 10 ton cranes; 195.00 x 33.50mtr, 40,000 dwt, 15,000 ton lifting capacity, 15 and 10 ton cranes. Jetty 1800mtr with 220 ton floating crane, 2 x 40 tons and 2 x 25 travelling cranes.  
**Services:** 1-9, 12-40

**AVLIS SHIPYARD**  
 Khalkis  
 Tel: (221) 31512; Telefax: (221) 32009  
 Tel: 272180, 272143 masa gr  
 Managing director: E. Georgiadis  
**Facilities:** Two floating docks up to 195 x 33.50mtr and slipway.

## BLACK SEA

### BULGARIA

**ODESSOS SHIPREPAIR YARD**  
 9015 Varna  
 Tel: (52) 600560, 222012; Telefax: (52) 601104  
 E-mail: odesos@odesos-yard.bg  
 Managing director: Nedyalko Panev  
 Production manager: L. Zhivkov  
**Facilities:** Drydock, 240.00 x 27.00 x 10.00mtr, 28,000 dwt with 150 and 2 x 30 ton cranes; 150.00 x 20.00 mtr, 12,000 dwt with 100 and 2 x 30 ton cranes; 100.00 x 15.00 mtr, 8,000 dwt with 100 and 2 x 30 ton cranes; 50.00 x 10.00 mtr, 4,000 dwt with 100 and 2 x 30 ton cranes. Also floating dock facility under 150mtr in length.  
**Services:** 1-18, 20-22, 25-32, 34-39

with 12,000 ton lifting capacity, 2 x 15 ton cranes and 100 ton floating crane. Also floating dock facility under 150mtr in length. 1,200mtr jetty with 8 x 16 ton cranes.  
**Services:** 1-11, 13-18, 20-31, 34-40

**TEREM PLC**  
 9000 Varna  
 Tel: (52) 772351; Telefax: (52) 776561  
 E-mail: ter-fa@mbos.dgsvn.bg  
 Managing director: Filip Markovskii  
**Facilities:** Floating dock: 155.0 x 23.80mtr, 8,000 tonnes lifting capacity. Also floating dock under 150mtr, 2 x 16 ton and 1 x 25 ton cranes; 2 x 50,000mtr slipways, repair berths totalling 800mtr.  
**Services:** 1-9, 14-16, 18, 20-22, 25-29, 31, 35-37

**ROUSSE SHIPYARD LTD**  
 5 Masey Stoikov str, Rousse  
 Tel: (82) 222703, 225887  
 Tel: 62515; Telefax: (82) 237111  
 General manager: Dipl. Eng. Stephan Angelov  
**Facilities:** 95.00 x 18.00mtr synchrolift with 1,200 ton lifting capacity. Over 200mtr quays with 15 & 5 ton cranes, also covered and uncovered docks  
**Services:** 2-6, 26, 28, 29, 35 on vessels up to 2,000dwt

## ROMANIA

**GALATZ SHIPYARD SA**  
 132 Al. Muresian St, 6200 Galatz  
 Tel: (36) 460456, 460680  
 Telefax: (36) 461943, 461152  
 Tel: 51288, 51297, 51336  
 General manager: Ion Mocanu  
 Marketing director: Nicolae Margarit  
 Production director: Alexandra Vartan  
**Facilities:** Drydock 230 x 35 mtr with 320 tonne gantry crane. Repair quay 300 mtr served by 1 x 50 tonne and 1 x 15 tonne jib cranes. 100 tonne floating crane.

**NAVLOMAR CONSTANTZA PORT**  
 Constantza  
 Tel: 169705; Telex: 14226 r  
**Facilities:** Floating dock 200.00 x 32.00 x 9.02mtr with 14,764 ton lifting capacity and 2 travelling cranes. Also floating dock facilities under 150mtr.

**SANTIERUL NAVAL SA**  
 8700 Constantza  
 Tel: (41) 616970, 613398; Telefax: (41) 611651  
 Tel: 14226  
 General manager: Aurel Dambou  
**Facilities:** Drydock 350.0 x 38.0 mtr, 100,000 dwt with 2 x 120 and 1 x 50 ton cranes, floating dock of 180.0 x 32.0 x 8.30mtr, 15,000 lifting capacity with 2 x 15 ton cranes. Also floating dock under 150mtr.  
**Services:** 1-9, 11-16, 18, 20-23, 26-29, 31-32, 34-39

**BLACK SEA SHIPYARD ROM SA**  
 Tacuata Port 2, PO Box 1164, Constantza 67900  
 Tel: (41) 618350, 762990  
 Telefax: (41) 760689 or 690360  
 E-mail: eleva@rta.ro  
 Director general: Ion Barca  
**Facilities:** Two floating docks of 168.4 x 32.20 x 7.40 mtr, 10,000 dwt lifting capacity with 2 travelling cranes 100 tons; one floating dock of 230.60 x 45.00 x 9.45 mtr, 20,000 dwt lifting capacity with 2 travelling cranes 200 tons.

**DAEWOO-MANGALIA HEAVY INDUSTRIES**  
 1st Partului Street, 8727 Mangalia, Constantza  
 Tel: (41) 753309, 756941; Telefax: (41) 756041  
 E-mail: rmd@dmbi.cl.ro  
 President: Wan-Chil Suh  
 Shiprepair marketing director: Sebastian Paek  
**Facilities:** One dry dock. Repairs on ships up to 200,000dwt.  
**Services:** 2-9 13-22, 24-40

## UKRAINE

**LYCHEVSK SHIPREPAIR YARD**  
 Lychevsk, Odessa 27091  
 Tel: (482) 696600, 696670  
 Telefax: (482) 667076, 651173  
 E-mail: shipyard@ta.odessa.ua  
 Managing director: Leonid Koshornikii  
 Commercial director: Alexander Yavorovskiy  
**Facilities:** Floating dock: 240 x 45 mtr, 60,000 dwt with 3 x 20 ton cranes; two 225 x 36 mtr, 30,000 dwt with 2 x 10 ton cranes; one 190 mtr, 12,000 dwt with 100 and 2 x 30 ton cranes; one 150 mtr, 8,000 dwt with 100 and 2 x 30 ton cranes. Also floating dock facility under 150mtr in length.  
**Services:** 1-18, 20-22, 25-32, 34-39

length 2,600 mt, lifting capacity of floating cranes 5-100 tons.  
 Services: 1-10, 12-17, 20-23, 25, 27-29, 31-33, 35-40

**AZOV SHIPYARD**

2 Lunina Ave, Mariupol, 341010  
 Tel: (629) 378564, 378459  
 Telex: (629) 378459; Telex: 115156 mcf uk  
 General director: Vyacheslav Ilyin  
 Facilities: Two docks 145.0 x 23.0mt, 5,000 ton lifting capacity, one dock 196.0 x 28.5 with 8.0 mt water depth, 15,000 ton lifting capacity, up to 40,000 ton dwt, 900mt berthing, 15-40 ton gantry cranes, two floating cranes of 60 and 140 ton.

**ODESSA SHIPREPAIR YARD UKRAINA**

3 N. Gell Str, Odessa 270003  
 Tel: (482) 230373, 238262; Telex: (482) 235233  
 E-mail: shipyard@fadep.net  
 Contact: marketing department  
 Tel: 205885, 205659, 205852  
 Facilities: Floating docks: 168.5 x 31.4mt, 15,000 ton lifting capacity; 199.7 x 30.5mt, 27,000 ton lifting capacity for vessels up to 215mt in length; cranes up to 30 ton lifting capacity, floating cranes up to 100 ton lifting capacity. Also floating dock under 150mt.  
 Services: 2-11, 13-22, 24-40

**SEVASTOPOLSKYI MORSKOY ZAVOD**

Gorov Sevastopolya Str 13, Sevastopol 335011  
 Tel: (69) 324320, 363091  
 Telex: (69) 461515; Telex: 197315 barco us  
 Vice president: Mikhail Sarokin  
 Marketing/sales director: Konstantin Tchernovskiy  
 Facilities: Two floating docks 152.0 x 26.0 x 8.0mt with 1 x 10 and 1 x 16 ton cranes, 173.0 x 26.0 x 9.0mt with 2 x 10 ton cranes  
 Services: 7, 13, 16, 25, 36, 37, 40. Also newbuildings

**ZALIV SHIPYARD**

4 Tankov Str, Kerch 334504, Crimea  
 Tel: (6561) 33055, 20308; Telex: (6561) 33060  
 Director general: Evgeniy Zhukov  
 Foreign relations dept: Valeriy Belozorov  
 Facilities: Dock 354.0 x 60.0 x 11.0mt for ships up to 350,000dwt. For repairs and newbuildings

**RUSSIA**

**SUDOREMONTNIIK SHIPREPAIR YARD**

2 Mira Str, 353900 Novorossiysk  
 Tel: 8 96134 52793/90322  
 Telex: 279119 okana us; Telex: 8 86134 52793  
 Managing director: G.A. Borodin  
 Facilities: Floating dock 100.00 x 22.00 mt, 280 mt jetty with crane facility.  
 Services: 1-40  
 Agent: YVC Boines Dockyard  
 Telex: 31 10 47393760

**NOVOROSSISK SHIPREPAIR YARD**

Sukhmatovye Shosse, Novorossiysk, 353902  
 Tel: (8617) 64783, 22035  
 Telex: (8617) 56924; Telex: 279113  
 Director general: Alexander Khitrov  
 Marketing director: Alexander Glazov  
 Facilities: Two floating docks max 311.0 x 50.0mt, 60,000 ton lifting capacity, 1,200.0mt berth

**TUAPSE SHIPREPAIR YARD**

9 Gorkiy Str, Tuapse 352800, Krasnodar Region  
 Tel: (86167) 71439, 71320, 21256  
 Telex: (86167) 21151; Telex: 191412 roby  
 Deputy director general: Andrey Tatyayev

**MEDITERRANEAN**

**TURKEY**

**TURKISH SHIPBUILDING INDUSTRY INC - TURKIYE GEMİ SANAYİİ AS**

Mecidiyeköy Mebusan Cad No 66, 80040 Salıpazarı, Istanbul  
 Tel: (212) 2498317; Telex: (212) 2513251  
 General manager: Ünlüner Akoguz  
 Facilities: Responsible for all shiprepair activities in the state sector.

**GEMAK SHIPBUILDING INDUSTRY AND TRADING SA**

Tersaneler Cad No 38, 81700 Tuzla, Istanbul  
 Tel: (216) 3957870; Telex: (216) 3950685

**Chairman: Ismet Ucer**

Managing director: Birol Ucer  
 Facilities: 9,000 ton lifting capacity floating dock, 28,000 ton lifting capacity floating dock, two piers 12 x 210 mtrs and 10 x 60 mtrs.  
 Services: 1-9, 11, 13-24, 26-40

**TURKISH SHIPBUILDING INDUSTRY INC - HALIC SHIPYARD**

80560, Kasimpasa, Istanbul  
 Tel: (212) 2383400; Telex: (212) 2383337  
 Manager: Erol Aksoy  
 Facilities: Drydock 153.40 x 16.30 x 9.56mt, 4,000 dwt with 100 ton floating crane, 30 15 and 5 ton cranes. Jetty 450m with 25, 15 and 5 ton mobile cranes. Also drydock facility under 150mt in length.

**TURKISH SHIPBUILDING INDUSTRY INC PENDIK SHIPYARD**

Kaynarca, 81504 Pendik, Istanbul  
 Tel: (216) 3903010/3903323/3903440  
 Telex: 36500 dtd tr  
 Telex: (216) 3544995  
 Manager: Ferhat Ozer  
 Facilities: Drydock 300.00 x 70.00 mtrs, 170,000 dwt max tonnage; 450 and 250 ton gantry cranes; 202.00 x 38.00 mtrs semi-dock/struck; 188.00 x 29.40 mtrs floating dock; also floating dock under 150 mtrs in length.  
 Services: 2-9, 11, 14-16, 18-29, 31-33, 36-40

**TUZLA SHIPYARD**

Tersaneler Bölgesi No 23, 81700, Tuzla, Istanbul  
 Tel: (216) 4460070; Telex: (216) 4460072  
 Manager: Haluk Togan  
 Facilities: Floating dock 350.00 x 80.00 mtr.

**TURKISH SHIPBUILDING INDUSTRY INC ALAYBEY SHIPYARD**

35609, Karsiyaka, Izmir  
 Tel: (232) 3653980/3654381/3657259  
 Telex: 53557 dtd tr; Telex: (232) 3653987  
 Manager: Ismet Ergezgin  
 Facilities: Three slipways for vessels up to 2,000 dwt. Floating dock 7,500 ton lifting capacity. 400 mtrs total quay length.  
 Services: 2-9, 11, 13-18, 20-22, 24-40

**ISRAEL**

**ISRAEL SHIPYARDS LTD**

Julius Simon Rd, Haifa Bay, POB 10630, Haifa Bay 26118  
 Tel: (4) 8460337; Telex: (4) 8419219  
 V. president ship repair sales: M. Cohen  
 Managing director: Y. Herzani  
 Facilities: Floating dock: 227.50 x 45.10 x 8.00mt with 20,000 ton lifting capacity and 2 x 15 ton cranes  
 Services: 1-9, 11, 14-16, 20, 24, 26, 28-32, 35-37, 39-40

**EGYPT**

**PORT SAID SHIPYARD**

POB 62, Port Fouad  
 Tel: (66) 400339; Telex: (66) 400324  
 Managing director: Eng Ahmed Deghady  
 Facilities: Floating docks: 210.00 x 34.00 x 9.70mt with 25,000 ton lifting capacity and 16, 12 ton cranes; 185.00 x 25.00 x 8.30mt with 10,000 ton lifting capacity, and 10, 5 ton cranes and floating cranes between 40-500 ton lifting capacity. Two slipways 55.00mt, 54.00 cradle with 1,000 tons lifting capacity. Also floating dock facility under 150mt in length.  
 Services: 1-9, 16, 18, 21, 26, 28, 29, 31, 34-38, 40

**CANAL NAVAL CONSTRUCTIONS CO**

Custom Gate 57, Port Fouad, POB 550, Port Said  
 Tel: (66) 240598, 240471  
 Telex: 63010 naval un  
 Chairman: Eng. Ahmed El Sayed Yousef  
 Facilities: Floating dock 230.11 x 35.00 x 9.70mt, 25,000 dwt with 12 and 17.5 ton cranes. Also slipway facilities under 1,000 ton lifting capacity with 22 and 14.5 ton travelling cranes.

**SUEZ SHIPYARD**

POB 5, Suez  
 Tel: (62) 20620; Telex: 66041 suex un  
 Facilities: Floating dock 182.50 x 62.30 x 7.95mt, 30,000 dwt with 2 x 10 and 15 ton cranes. Can be used as trip dock up to 30,000 dwt. Also drydock facilities under 150mt in length.  
 Services: 7, 16, 36

**SUEZ ODENSE MARINE SERVICE (SOMS)**

5 Shohadas El Yeman Street, Port Tawfik  
 Tel: (62) 341 460; Telex: (62) 341 470  
 A JV between the Suez Canal Authority and Odense Steel Shipyard (a member of the A.P. Moller group).  
 MD/Chairman: Wael S. Kaddour  
 MD/General manager: Mogens E. Johansson  
 Facilities: Floating dock 302.00 x 56.00 mt, lifting capacity 55,000 tonnes fitted with a 150 tonne gantry and two 15 ton lifting cranes. Also a graving dock under 150 mt and a syncofirt.  
 Services: 9, 11-12, 14, 16, 21, 26, 28-29, 34-36

**TINSAH SHIPBUILDING CO**

PO Box 126, Ismailia  
 Tel: (64) 327373, 320390; Telex: 327353  
 Chairman: Eng. Maged Abu-Zaid  
 Repair manager: Eng. Ibrahim Sekni  
 Facilities: Syncofirt with 1,500 ton lifting capacity.  
 Services: 11, 14, 16, 18, 20, 26, 29, 31, 35, 39, 40

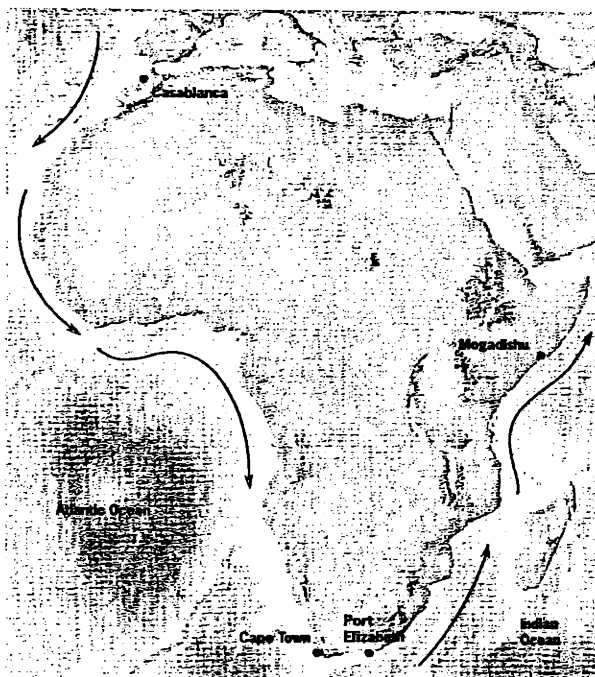
**ALEXANDRIA SHIPYARD**

Gate No 36, Kabbasy, Alexandria 21553  
 Tel: (03) 4461897/4455090; Telex: 54069, 55486 un  
 Telex: (03) 4454672/4461605  
 Chairman & MD: Eng. A. Elawang  
 Facilities: Two drydocks: 267.00 x 39.60 x 9.50mt, 85,000 dwt with a 10 ton crane; 158.50 x 18.90 x 4.60mt, 10,000 dwt with 16 ton crane. Slipway 60.00 x 12.00 x 3.45, 1,500 dwt.  
 Services: 1-7, 9, 11-18, 20-22, 24-32, 34-40

**EGYPTIAN SHIPBUILDING & REPAIRS CO**

Customs Area, Gate No 1, Alexandria  
 Tel: (03) 4803588, 4803859

**AFRICA - ATLANTIC COAST/INDIAN OCEAN**



**MOROCCO**

**OFFICE D' EXPLOITATION DES PORTS**

4 Rue Moussa Bouou Noussair, Casablanca  
 Tel: (2) 200064/200070  
 Telex: 28732, 28722; Telex: (2) 200071/2  
 Manager: Mohamed Hassad  
 Facilities: Drydock 156.96 x 22.25 x 4.50mt, 10,000 dwt with cranes up to 32 ton lifting capacity and 3 slipways under 1,000 tons lifting capacity.

Telex: 54717 repco us; Telex: (03) 4837417

Chairman: Dr Adel M. Salem  
 Facilities: Floating dock 152.00 x 23.00mt with 6,000 ton lifting capacity. Also slipway facilities under 150mt in length. 560mt of repair quays. Floating cranes up to 120 tons.  
 Services: 2-4, 6-9, 12-22, 25-26, 28-29, 31-32, 35-40

**TUNISIA**

**SOC TUNISIENNE DE CONSTRUCTIONS & DE REPARATIONS MECA-NIQUES & NAVALES - SOCOMENA**

Menzel Bourguib, BP 10, Bizerte  
 Tel: (2) 60155, 60636  
 Telex: 21016 rcaav tn  
 Managing director: Abdelwahab Layoumi  
 Facilities: Drydocks: 240.00 x 35.00 x 12.09mt, 2 x 190.00 x 30.00 x 9.00mt with 45 ton crane. Also drydock facility under 150mt in length.  
 Services: 2-7, 9, 12, 14-22, 26-31, 35-37, 40

**ALGERIA**

**ENTERPRISE NATIONALE DE REPARATION NAVALE (ERENAV) URNAB**

BP 41, Arrière Port Bejaia  
 Tel: 928184, 921660  
 Telex: 83049  
 Telex: 921027  
 Director: R. Chabano  
 Facilities: Floating dock 190.00 x 30.00 x 7.50mt with 15,000 ton lifting capacity with 2 x 6.5 ton cranes  
 Services: 2-6, 9, 12, 14-17, 20-21, 26, 28-29, 31, 35-37, 39-40

**MADEIRA**

**ESTALEROS NAVALS DE MADEIRA (MECNAVIS)**

Facilities: 4,000 ton lifting capacity syncrolift, 75 mt repair jerry with 10 and 35 ton mobile cranes. 51% owned by Lisave International

**CANARY ISLANDS**

**ASTILLEROS CANARIOS SA - ASTICAN**

Dársena Exterior, Puerto de la Luz 35008, PO Box 2046, Las Palmas de Gran Canaria Tel: (928) 463266, 479200  
 Telex: (928) 479220  
 Telex: 95147 nsvas e, 96502 yard e  
 President: German Suarez  
 General manager: Jose Romero  
 Facilities: Syncrolift 175.00 x 30.00mtr, 36,000 dwt with 10,000 ton lifting capacity. Wet berth 560.00mtr with 8 x 40-45 ton lifting capacity cranes. Seven drydocks: 2 x 220.00mtr and 5 x 180.00mtr in length.  
 Services: 2-9, 11, 13-18, 20-22, 24, 26-40

**REPARACIONES NAVALES CANARIAS SA - REFINAVAL**

PO Box 2045, Las Palmas Tel: (28) 466168 ; Telex: (28) 466177  
 President: Pedro Garaygorriola  
 General manager: Roberto Reyes Alzola  
 Facilities: Two slipways with 4,000 ton lifting capacity. 120mtr length. One slipway with 2,000 ton and 120mtr in length.  
 Services: 2-7, 9-23, 26-40

**INTERBURGO**

Via Litoral, PO Box 847, Tenerife Tel: (22) 790069 ; Telex: (22) 240169  
 Contact: Antonio Sien  
 Facilities: Syncrolift 80.50mtr with 2,000 ton lifting capacity, also floating dock under 150mtr in length.  
 Services: 2-7, 26, 30, 40

**CAPE VERDE ISLANDS**

**ESTALEIROS NAVALS DE CABO VERDE SARL - CABNAVE**

Mindelo, St Vincent Tel: 314122, 314233, 314389  
 Telex: (238) 312874 ; Telex: 3033 cabo cv  
 Chairman & MD: Humberto Cardoso  
 Commercial director: Patricia Silva  
 Production director: Domingos Santos  
 Facilities: Slipway 110.00 x 18.00mtr with 2,900 ton lifting capacity 6 repair berths, 110 mtr in length.  
 Services: 2-10, 12-14, 16-18, 20-22, 26-32, 35-38

**SENEGAL**

**DAKAR MARINE**

Bldv du Conteneur de la Commune de Dakar, BP 438, Dakar Tel: (21) 238216 ; Telex: 61104, 51409  
 Telex: (21) 238399  
 Chairman: Yoro Kane  
 Commercial manager: Ndiroua Lo  
 Technical manager: Ousmane Wane  
 Facilities: Drydock 188.00 x 24.00 x 9.00mtr, 25,000 dwt, 2 x 40 ton and 15 ton travelling cranes

and 140 ton mobile crane. Floating dock 235.00 x 37.00mtr, 60,000 dwt with 6,000 ton lifting capacity and 50 ton crane. Syncrolift 63.00 mtr, 13.00 cradle with 1,200 ton lifting capacity. 1,000 mtr pier.  
 Services: 1, 9, 12, 14-17, 20-22, 26-30, 35-37, 39-40

**GHANA**

**PSC TEMA SHIPYARD LTD**

POB 454, Tema Tel: (22) 206517, 206832  
 Telex: (22) 206536, 206832  
 E-mail: PSCT@Africaonline.com.gh  
 Asst gen manager: Raiban Oson  
 Commercial officer: J.M. Sedor  
 Facilities: Drydock 277.40 x 45.40 x 6.70mtr, 100,000 dwt with 60, 20 and 15 ton cranes. Also drydock facilities under 150 mtr in length and 25 ton mobile crane. Also slipway under 200 tons lifting capacity and 182mtr long repair quay  
 Services: 2-6, 9, 13-14, 16, 20-22, 24, 26, 28-29, 31-32, 35-40

**CAMEROON**

**CAMEROON SHIPYARD AND INDUSTRIAL ENGINEERING LTD**

BP 2389 Douala Tel: (237) 401560, 403488, 404771  
 Telex: (237) 406199; Telex: 5479 km  
 President: Louis Claude Nyassa  
 General manager: Z.M. Forjandam  
 Facilities: Floating dock 180.00 x 33.00mtr, 30,000 dwt with 10,000 ton lifting capacity and 2 x 15 ton travelling cranes. Floating dock facilities under 150mtr in length. Also 150 mtr repair quay, 120 ton floating crane.  
 Services: 2-4, 12-14, 16, 17, 19-22, 25-32, 34-40

**ANGOLA**

**ESTALEIRO NAVAL DO LOBETO (LOBINAVAL)**

POB 480/69, Lobito. Tel: (72) 23497, 23004; Telex: 8283 stanav an  
 Telex: (72) 2405  
 Facilities: One floating dock 170.00 x 28.00 mtr, draught 7.5 mtr, lifting capacity 10,000 tons. Four slipways, max length 73 mtr, capacity 1,000 tons.

**SOUTH AFRICA**

**PORTNET CAPE TOWN**

POB 4245, Cape Town Tel: (21) 405 3790; Telex: 526726  
 Telex: (21) 252656  
 Marine manager: John Cochet  
 Facilities: Two drydocks: 360.00 x 45.10 x 13.70mtr, 110,000 dwt with 50, 5 x 4 and 10 ton cranes; 161.20 x 20.70 x 7.90mtr with 15 and 3 x 4 ton cranes. Syncrolift 61.00 x 15.00mtr with 1,750 ton lifting capacity. Repair quay 457.50mtr in length, 2 x 15 ton cranes.  
 Services: All services available, supplied by local private contractors.

**DORBYL MARINE PTY LTD**

POB 2616, 8000 Cape Town Tel: (21) 475170; Telex: 527981 dmar sa

Telex: (21) 476038

Managing director: R.K. Bradshaw  
 Repair manager: D.A. Winkelman  
 Facilities: Use public dock facilities.  
 Services: 1-40

**GLOBE ENGINEERING WORKS (PTY) LTD**

POB 11, Woodstock, 7915 Cape Town Tel: (21) 4484640  
 Telex: (21) 4484652  
 E-mail: globeeng@iafrica.com  
 Managing director: T.B. Baia  
 Commercial director: Tom Larkin  
 Operations director: J. Steward  
 Facilities: Use public docks facilities.  
 Services: 7, 9-16, 19-24, 26-40

**PORTNET PORT ELIZABETH**

POB 162, 6000 Port Elizabeth. Tel: (41) 5072604  
 Port manager: Jan Jansen  
 Facilities: Slipway 247.00mtr, 72.00 cradle with 1 219 ton lifting capacity.  
 Services: 2-4,7,9,11-14,16,18,22,26-29,32,34-37, 39.  
 Various other services can be supplied by contractors

**EAST LONDON SHIPYARD (PTY) LTD**

PO Box 14014, West Bank, East London 5218 Tel: (431) 433717/434558;  
 Telex: (431) 437343  
 Managing director: W. Krug (cell 0982 5700293)  
 General manager: C. Alexander (cell 083 3759029)  
 Ship repair manager: R. de Vries  
 Facilities: Drydock 200.00 x 27.20 x 10.20mtr with 2 x 15 ton, 5 and 4 ton cranes, 72 ton mobile crane.  
 Facilities used by various companies.  
 Services: 2-4,7-9,10,12-14,16,21-22,26,28-32,35-40

**DORBYL EASTERN CAPE PTY LTD**

POB 373, 5200 East London. Tel: (46) 3470  
 Telex: 250249 sa  
 Manager: R. de Vries  
 Facilities: Use public dock facilities.

**PORTNET DURBAN**

POB 1027, Durban Tel: (031) 3615291  
 Telex: (031) 255769  
 Port manager: Bax Nonvise  
 Dockyard manager: Capt Mike Dominy  
 Facilities: Drydock 350.50 x 33.00 x 12.50 mtr, 80,000 dwt with 50/10 ton hook crane, 2 x 10 ton cranes, 2 x 8 ton cranes and 1 x 4 ton crane, 200 and 60 ton floating cranes. Also floating dock facilities under 106 mtr in length, 2,500 tons lifting capacity, 4 ton crane. Facilities used by various companies.  
 Services: 1-40.

**DORBYL MARINE PTY LTD**

POB 932, Durban 4000 Tel: (31) 251511  
 Telex: (31) 258941  
 Repair manager: Trevor Burnett  
 Facilities: Use public dock facilities. Jerry 206.00m. Also two slipways under 150 mtr in length and 219 mtr, 180 mtr repair quays served by 50 ton and 25 ton mobile cranes.  
 Services: 2-6, 9-12, 14, 18, 20, 22, 24, 26-32, 34-40

**ELGIN BROWN & HAMER PTY LTD**

POB 29079, Maydon Wharf, 3 Clydebank Road, Bayshead, Durban Tel: (31) 256391  
 Telex: (31) 251785  
 E-mail: shiprep@iafrica.com  
 Chairman: Tony Bennett  
 Managing director: Rob Deane  
 Commercial manager: Pieter van der Wal  
 Associate companies: Port Marine Contractors  
 Tel: (31) 256396; Telex: (31) 251785  
 Managing director: Willem Krug  
 Contract manager: Shaun Crowcott  
 Operation manager: Rob Nicolai  
 Electro Marine - Tel: (31) 256395;  
 Services: 7, 9-16, 19-24, 26-40  
 Managing director: John Flynn  
 Branch manager: Larry Crook  
 Port Staff - Tel: (31) 256394; Telex: (31) 251785  
 Manager: Stan Nelson.  
 Facilities: Use public dock facilities.  
 Jerry with 45 and 10 ton travelling cranes.  
 Services: 2-22, 24-32, 34-40

**MARTHUSEN LH**

POB 2515, Durban Tel: (31) 257211; Telex: 622569 sup  
 Telex: (31) 257339  
 General manager: J. Boddy  
 Marine manager: V.F. Jones  
 Facilities: Use public dock facilities  
 Services: 10, 12, 26-28, 32

**MADAGASCAR**

**SECRETAN SA (SOCIETE D'ETUDE DECONSTRUCTION ET DE REPARATION NAVALES)**

POB 135, Antsirana Tel: (261) 8 22684, 21265, 29321/25  
 Telex: 93 103 mg; Telex: (261) 8 29326  
 General Manager: Christophe Jerome  
 Facilities: Use docks owned by Direction des Constructions et Armes Navales at Diego Suarez. Drydock 200 mtr x 26.4mtr x 8 mtr with 2 x 18 and 3 ton cranes dockside, 30,000 dwt in drydock, 20-28 and 45 ton mobile cranes.  
 Services: 2-6, 14, 16, 20-21, 26, 28-29, 31-32, 35-37, 39-40

**KENYA**

**AFRICAN MARINE & GENERAL ENGINEERING CO LTD**

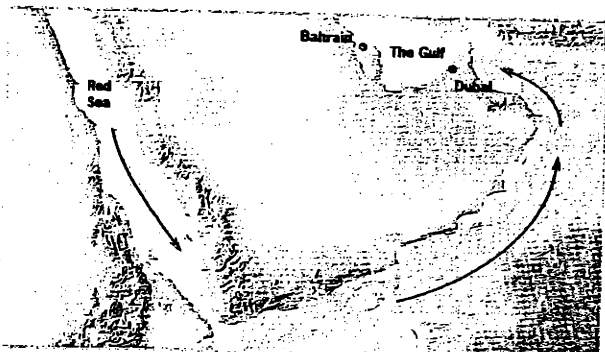
POB 90462, Mombasa Tel: (11) 316689, 221651/4  
 Telex: 21090 afridock ke; Telex: (11) 313168  
 Managing director: Andrew C.W. Sinclair  
 General manager: Nicodemus Mueti  
 Facilities: Drydock 180.00 x 4.75 x 7.90mtr, 18,000dwt.  
 Services: 2-7, 9, 12-14, 16, 18, 20-22, 25-32, 35-37, 39-40

**SOMALIA**

**WAKAALADDA DEKEDAHA SOOMALIYEED - SOKALI PORT AUTHORITY**

POB 935, Mogadishu Tel: 34081/3; Telex: 708 somport mog so  
 Chairman: Ali Elahi Barre  
 Facilities: Slipway with 1,000 ton lifting capacity.

**RED SEA - THE GULF**



**RED SEA**

**SAUDI ARABIA**

**KING FAHD SHIP REPAIR YARD - JEDDAH**

POB 3757, Jeddah, 21481 Tel: (2) 6477764, 6477781  
 Telex: 601557 bakri sj; Telex: (2) 6485074  
 Manager: Middle East Repair & Building Yard  
 Executive director: Eng. Mohammed Jassar  
 Facilities: Two floating docks of 16,000 and 45,000 dwt capacity and two repair berths with 15 ton cranes for vessels up to 200mtr length.  
 Services: Full repair service 1-40

**THE GULF**

**UAE**

**ARAB HEAVY INDUSTRIES LTD SA**

PO Box 529, Ajman

Telex: (6) 422137  
 General manager: K.L. Tob  
 Commercial/marketing manager: K.K. Khaw  
 Facilities: Two floating docks of 16,000 and 45,000 dwt capacity and two repair berths with 15 ton cranes for vessels up to 200mtr length.  
 Services: 1-9, 12, 14-16, 19-22, 24, 26-33, 35-40

**DUBAI DRYDOCKS**

POB 8988, Dubai Tel: (971 4) 450626  
 Telex: 48838 docti em  
 Telex: (971 4) 450116  
 Website: http://www.drydocks.gov.ae  
 E-mail: drydocks@emirates.net.ae  
 Chief executive: K. Bugeen  
 Production director: Alex McAndrew  
 Facilities: Three drydocks: 525.00 x 100.00 x 12.00mtr, 1,000,000 dwt with 120 and 20 ton cranes; 415.00 x 80.00 x 12.00mtr, 500,000 dwt with 120, 20 and 15 ton cranes; 370.00 x 66.00 x 12.00mtr, 350,000 dwt with 120, 50, 20 and 15 ton cranes. Floating dock 200 mtr x 36 mtr with lifting

not total with 50, 25, 20 and 15 ton cranes.  
Services: Full services (except for 15)

**DUBAI SHIP DOCKING YARD-AL JADAF**

PO Box 5642, Dubai  
Tel: (971 4) 341217; Telex: 47943 jadaf em  
Telefax: (971 4) 341722  
Manager: Derek Petrie  
Facilities: Two Synchrolifts of 400mt and 2,500 tonnes lifting capacity.

**ALBWARDY MARINE ENGINEERING LLC**

POB 6515, Dubai  
Tel: (4) 342001/341561; Telex: 47263 bwdy em  
Telefax: (4) 341005/341252  
Managing director: Rob Banks  
Facilities: Uses Al Jadaf Synchrolift.  
Services: 7-12, 16-18, 20, 24, 26, 28-29, 33-40

**INTER OCEAN SHIP REPAIRS LLC**

PO Box 3322, Al Jadaf  
Tel: (4) 341166; Telefax: (4) 341800  
Managing director: Virah Chhabra  
Facilities: Uses Al Jadaf synchrolift  
Services: 9, 12, 36

**NICO INTERNATIONAL (UAE) LTD**

POB 12068, Dubai  
Tel: (4) 382135; Telefax: (4) 381872

Repair manager: Charlie Zickerman  
Facilities: Uses Al Jadaf Synchrolift.  
Services: Full repair service

**ATOS INTERNATIONAL LLC**

POB 2159, Dubai  
Tel: (4) 341702  
Tel: (4) 341706  
E-mail: atos@emirates.net.ae  
Facilities: Uses Al Jadaf Synchrolift.  
Services: 7-9, 12, 14, 16-17, 20-22, 24, 26-31, 33, 35-40

**BAHRAIN****ARAB SHIPBUILDING & REPAIR YARD CO-ASRY**

POB 50110, Hidd  
Tel: (973) 671111; Telex: 8455 asry ba  
Telefax: (973) 670236  
E-mail: asryco@btelco.com.bh  
Chief executive: Mohamed M. Al-Khatib  
Production manager: Chris Potter  
Facilities: Graving dock 375.00 x 75.00mt, 500,000 dwt and two floating docks 252.00 x 44.00, 120,000 dwt and 227.00 x 40.00mt, 80,000 dwt. Ten repair berths 2,500mt total length, 100 tonne crane, 4 x 15 tonne, 6 x 12 tonne cranes and a 200 tonne floating crane.  
Services: 1-10, 12-24, 26-40 (11 on request)

**BAHRAIN SHIP REPAIRING & ENGINEERING CO - BASREC**

POB 568, Manama  
Tel: (973) 727129, 725300  
Telefax: (973) 728891  
General manager: Michael J. Crieve  
Assistant gen. mgr: Richard Knights  
Commercial manager: Didias Saadi  
Facilities: 2 slipways for vessels up to 80,00 mt in length and 1,000 tonne capacity. Two cranes at 30 tonne. Also floating dock facilities under 150mt in length. Repair facilities alongside up to 6,000 dwt.  
Services: 2-4, 7, 9-10, 12, 16-17, 20-22, 24, 26, 28-32, 35-40

**SAUDI ARABIA****KING FAHAD SHIPREPAIR YARD**

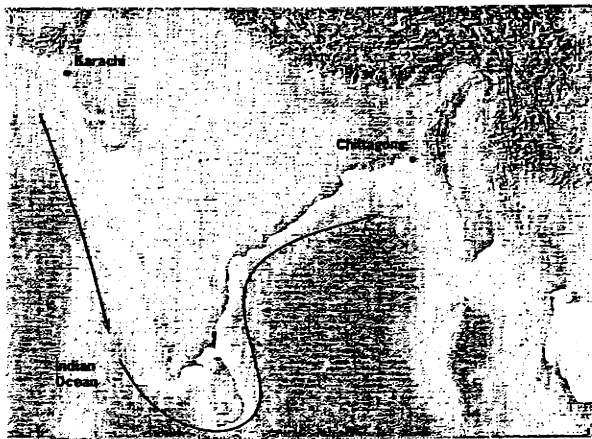
POB 28069, King Abdul Aziz Port, Dammam 31447  
Tel: (3) 85835478  
Telefax: 8583557  
Manager: Deas Marine Co Ltd  
Tel: 8583553  
Facilities: Two floating docks: 200.00 x 36.00 x 7.00mt with 22,000 ton lifting capacity; 150.00 x 26.00 x 6.50m with 10,000 ton lifting capacity. Jetty 400mt with 200 ton floating crane.  
Services: 1-40 (except 8)

**KUWAIT****KUWAIT SHIPBUILDING & REPAIR YARD CO (SAK)**

POB 21998, Safat 13080  
Tel: (965) 4835488, 4830808  
Telex: 22438 sakyl kt  
Telefax: (965) 4830291, marine sales 4815947  
Chairman & managing director: M.J. Maraf  
Commercial manager: Bill Purdie  
Facilities: One floating dock 190.00 x 32.00mt, maximum capacity 35,000dwt with 1 x 10 tonne and 1 x 7 tonne cranes. Also over 500 mt of repair quayside. One synchrolift 90.00 x 23.00 mt, with seven repair bays for vessels up to 5,000dwt with 2,000 ton lifting capacity and 1 x 10 tonne and 1 x 15 tonne cranes.  
Services: 2-7, 9-12, 14, 16-18, 20-21, 26-32, 34-39

**IRAN****PERSIAN GULF SHIPBUILDING CORP**

POB 1166, Bandar Abbas  
Tel: (21) 589133, 0761 27420  
Telefax: (21) 0761 27120  
General manager: Mr Hashemzadeh  
Facilities: Floating dock 240.00 x 39.00 x 10.00mt, 28,000 dwt, Synchrolift with 10,000 dwt capacity.  
Services: 2-7, 9, 11-18, 20-22, 26-40

**INDIAN SUBCONTINENT****PAKISTAN****KARACHI SHIPYARD & ENGINEERING WORKS LTD**

POB 4419, West Wharf, Karachi 2  
Tel: (9221) 202760; Telex: 20229 ksw pk  
Telefax: (9221) 210952  
General manager: F.A. Anari  
Facilities: Two drydocks: 189.00 x 27.00 x 8.00 mtrs, 26,000 dwt with 30 and 10 ton cranes; 171.00 x 24 x 8.00 mtrs, 18,000 dwt with 15 and 10 ton cranes. One marine trolley for underwater repair of small craft, two jetties 500.00 x 165.00 mtrs with 15 and 30 ton cranes, three slipways 213, 169 and 118 mtrs in length.  
Services: 2,3,6,9,11,12,16,20,25,28,29,31,32,34-40

**INDIA****MUMBAI PORT TRUST**

Vijay Deep, Shoorji Vallabhdas Marg, Mumbai 400001  
Tel: (22) 2614321; Telefax: (22) 2611011  
Chairman: Shri R.K. Bhanani  
Facilities: Two drydocks: 304.00 x 30.48 x 11.50mt, 60,000 dwt with 60, 20, 5 and 3 ton cranes; 160.00 x 19.96 x 8.50 mt, 20,000 dwt and 15 and 1.5 ton travelling cranes.  
Services: 2-6, 9, 11-14, 16, 18, 20-22, 26-29, 31-37, 39-40 Provided by private companies

**MAZAGON DOCK LTD**

Telex: 011 75568 mdi in, 011 75814 mdi in  
Telefax: (91) 22 3719767/3711209  
Director: R. Adm. D.N. Thevaral  
General Manager: D.J. Correa  
Facilities: Drydock 216 x 18.9 x 5.49mt, 10,000 dwt with 4 x 140, 40 and 5 x 15 ton cranes.  
Services: 2-7, 9, 12, 14-16, 18-20

**PATEL ENGINEERING WORKS**

Mahavir Dargah 4th Fl, 12 M.N. Koli Marg, Bombay 400003  
Tel: 3436562/6971/733441/4673/442348  
Telex: 011 76802 ptew in, 76861 srp in  
Telefax: (22) 3427477  
Managing director: M.M. Sanghvi  
Director: Karam Sanghvi  
Chief executive: D.U. Dave  
Facilities: Use public dock facilities.  
Services: 2-6 (Port Trust hired services) 9-12, 14, 15, 18-22, 24, 26-36, 39, 40

**COCHIN SHIPYARD LTD**

POB 1653, Cochin 682015  
Tel: 91 0484 361181/3551181, 366340  
Telex: 81885 63605485 cal in  
Telefax: 91 0484 370897  
Chairman & managing director: Cdr M.K. Murthy  
Chief general manager: A.J. Anisay  
Facilities: Two drydocks: 255.00 x 43.00 x 9.00mt, 86,000 dwt with 150 and 50 ton cranes, 270.00 x 45.00 x 12.00mt, 100,000dwt with 40,10 and 5 ton cranes. Three jetties: 280, 208 and

**CHOKHANI INTERNATIONAL LTD**

Chokhani Shipyards, near Coimbatore Terminal, Madras Port Trust, Rajaji Salai, PB No. 1742, Madras 600 001  
Tel: 564236, 564195, 564027, 562919, 566520  
Telex: 041 796071 cil in; Telefax: (044) 564031  
Head office: Chokhani House, D-3/2 Okhla Industrial Area Phase II, New Delhi 110020  
Tel: 91 11 631602  
President: C.K. The  
Managing director: Jagdish Chokhani  
A collaboration between Keppel Corp of Singapore and Chokhani International.  
Facilities: Floating docks, 190.00 x 32.20 x 8.00mt, 14 000 ton lifting capacity also 2,400 ton lifting capacity under 150mt in length. Coverage up to 15 ton. 218mt x 2 of berthing space.  
Services: 2-9, 12, 14-17, 22, 24, 26-32, 35-40

**HINDUSTAN SHIPYARD LTD**

(A Government of India Undertaking) Gaudhigram, Visakhapatnam 530005, Andhra Pradesh  
Tel: (91) 578450-69  
Telex: 0495 224 ship, 0495 227 hayd, 0495 435 opt  
Telefax: (91) 577502, 577667  
Chairman & mt: Rear Adm. Ravinder Mohan Bhatia  
Technical director: Cdr K.V. Raghavan, IN (ret)  
Senior general manager: N. Venkatarayappa  
Facilities: Repair dock: 244.00 x 38.00mt (70,000 dwt), 2 x 40 ton and 2 x 10 ton cranes. Covered dock: 240.00 x 53.00mt (80,000 dwt), 2 x 150 ton gantry cranes and 1 x 100 ton crane. Three wet berths: 226mt, 168mt and 460mt served by 1 x 125 ton, 1 x 50 ton, 1 x 40 ton, 1 x 20 ton, 3 x 10 ton and 1 x 5 ton cranes.  
Services: 1-6, 16, 26, 28, 29, 31, 35-37, 39, 40

**CALCUTTA PORT TRUST**

15 Strand Rd, Calcutta 700001  
Tel: 2203451  
Telex: 217336 calp in  
Telefax: 033 20 4901  
Facilities: Four drydocks: 181.75 x 26.73 x 9.75mt, 26,000 dwt; 177.15 x 26.73 x 9.75mt, 26 000 dwt; 166.71 x 21.18 x 7.62mt; 151.63 x 21.18 x 8.23mt. Also drydock facilities under 150mt in length and two slipways under 1,000 tonne lifting capacity. Public docks used by other companies.  
Services: 2-9, 11, 12, 14-22, 24-32, 34-40

**CALCUTTA DOCKING & ENGINEERING CO**

12 Government Place, Calcutta 700069  
Tel: (248) 28782921; Telex: 21 5324 epl in  
Telefax: (033) 247 4217  
Chief executive: A.K. Bagla  
Facilities: Use public dock facilities.

**CENTRAL INLAND WATER TRANSPORT CORP LTD**

44 Garden Reach Rd, Calcutta 700024  
Tel: 452371  
Facilities: Two drydocks: 182.92 x 20.12 x 7.30mt; 160.00 x 18.00 x 7.50mt. Also drydock

**GARDEN REACH SHIPBUILDERS & ENGINEERS LTD**

43/6 Garden Reach Rd, Calcutta 700024  
Tel: 711660; Telex: 8019, 8110  
Telefax: 711614  
Chairman: R. Adm D.V. Taneja  
Technical director: Cnd S.R. Chanda  
Facilities: Drydock: 180.00 x 27.00 x 8.00mt, 28,000 dwt with 10,000 ton lifting capacity and 2 x 40 ton cranes. Slipway: 98.00 x 75.00mt cradle with 1,000 ton lifting capacity and 30 and 25 ton cranes. Jetty 193.80 x 43.00mt with 25 ton crane and 229.00 x 50.00mt with 25 ton crane. Also wet basin and slipway facilities under 150mt in length and uses public dock facilities.  
Services: 11, 12, 17, 18, 24, 26, 28, 29, 31, 32, 35, 36, 39, 40

**HOOGLY DOCK & PORT ENGINEERS LTD**

12 Mission Row, Calcutta 700001  
Tel: 66 2001/5  
Telex: 021 5519 mbcl in  
Facilities: Use public dock facilities. Also drydock facility under 150mt in length and slipway facility under 1,000 tonne lifting capacity.  
Services: 2-9, 12, 14, 15, 20, 22, 26, 28, 29, 31, 32, 35, 36, 39, 40

**SRI LANKA****COLOMBO DOCKYARD (PTE) LTD**

POB 906, Colombo 15  
Tel: 522542, 522461-5  
Telefax: 4464441  
Telex: 22794, 21269 coldock co  
Chairman: T.D. Peiris  
General manager: L.P. Dassanayake  
Business manager: B.J. Subasinghe  
Facilities: Two drydocks: 263.00 x 44.00 x 8.90mt, 125,000 dwt with 50 and 20 ton cranes; 213.00 x 26.00 x 9.70mt, 30 000 dwt with 25 and 2 x 20 ton cranes. Also two drydock facilities under 150mt in length. Wet berths 1,225mt total length.  
Services: 2-7, 9, 11-18, 20-22, 25-32, 34-40

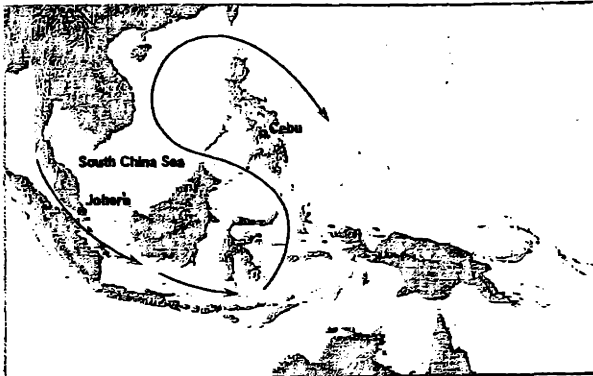
**WALKER SONS & CO LTD**

POB 166, Colombo  
Tel: 434365; Telex: 21118  
Telefax: 432846  
Chairman: H.G. Fonseka  
Facilities: Uses facilities at Port of Colombo.  
Services: 11, 14, 18, 27, 34-36, 39

**BANGLADESH****CHITTAGONG DRY DOCK**

POB Bandar - 2007, East Patenga, Chittagong  
Tel: (31) 740375/974/922/928  
Telex: 66327 cld bj; Telefax: (31) 740974  
Facilities: Drydock: 182.90 x 27.43 x 13.10mt, 16,500 dwt with 40 and 15 ton cranes (portal). Jetty 342mt with 50 ton and 15 ton portal cranes.

## SOUTH EAST ASIA



## MALAYSIA

## MALAYSIA SHIPYARD &amp; ENGINEERING SDN BHD

Guang Gudang Industrial Estate, 81707 Pasir Gudang, Johor  
Tel: (07) 2593300  
Telex: (07) 2513997  
E-mail: looi@mseng.com.my  
Internet website: <http://www.mse.com.my>  
Director (marketing & sales) shiprepair: Louis Wan Ching

**Facilities:** Two drydocks: 385.00 x 80.00 x 14.00mtr, 450,000 dwt; 270.00 x 46.00 x 12.00mtr, 140,000 dwt. Eight wet berths, maximum 390 x 8 mtr. Slipway 135 x 25mtr, 10,000 dwt. Syncrolift 188.4 x 33.8 mtr, 50,000 ton max capacity. Lifting cranes, 15-80 tons. 6 crawler cranes, 150-250 tons. Covered workshops with machinery for hull, piping, electrical and machining works; specialised shops for rolling stock, auto sheetblasting, pipe roll mill and CNC profile cutting. Autoblasing workshop, waste-to-energy facility, abrasive plant.  
Services: 1-40

## SABAH SHIPYARD SDN BHD

KM9, Jalan Ranca Ranca, POB 203, 87008 FT Labuan  
Tel: (087) 414792, 413919  
Telex: (087) 80252, 80797 saship ma  
Telex: (087) 412228, 414176  
Chairman: Tan Sri Ghazali Shafie  
General Manager (marketing): John P. Cummings  
Facilities: Syncrolift 140.00 x 28.00mtr, lifting capacity of 6,970 tons and 50 tons dockside crane.  
Services: 2-12, 14-22, 24-40

## SINGAPORE

## ATLANTIS SHIPYARD PTE LTD

43 Tuas Rd, Singapore 638498  
Tel: 8620368  
Telex: 8610026  
E-mail: asplatin@pacifi.net.sg  
Managing director: Chen Yau Poy  
General managers: Chan Nai Eng, Lee Chak Tiong  
Commercial Manager: Tan Meng Kian  
Facilities: Floating docks 155.00 x 24.00mtr, 7,500 ton lifting capacity; 116 x 23 mtr with 5,000 ton lifting capacity. Also additional dry dock at Jurong Shipyards (parent company) and three newbuilding berths. Repair quay 323mtr. Cranes: 1 x 136T, 1 x 80T, 4 x 50T, 1 x 40T, 1 x 35T, 1 x 25T, 2 x 10T and 3 x 5T. Floating crane 2 x 30T.  
Services: 2-9, 11-12, 14, 16-17, 20-22, 24, 26-40

## EAGLE ENGINEERING &amp; CONSTRUCTION PTE LTD

55 Gul Road, Singapore 2262  
Tel: 8620277  
Telex: RS39186 wesa  
Telex: 8620159  
Repair Manager: Dennis Menno  
Facilities: Slipway 70mtr, 13.50 crane with 1,500 ton lifting capacity. Also drydock facilities under 150 mtr in length.  
Services: 22, 26, 36, 40

## KEPPEL FELS LTD

31 Shipyards Rd, Singapore 628130  
Tel: (65) 2616700, 8637200  
Telex: (65) 2617719/2651927  
Chairman/nd: Chian Beng Choo  
General managers: Michael Hock Chye Chia, Ping Wong Yick, T.K. Koh  
Marketing manager: Keith Hoo  
Facilities: Drydock 380.00 x 80.00 x 13.00mtr, 400,000 dwt. Three floating cranes, 3,200, 1,600 and 267 ton lifting capacity; 1 gantry crane 500 ton; 7 monitowac cranes 200-300 ton capacity; 8 lifting cranes from 6-140 tons.  
Services: 7-8, 19, 30 - offshore units

## KEPPEL HITACHI ZOSEN LTD

15 Benoi Rd, Jurong, Singapore 629888  
Tel: 8616622  
Telex: 8614393  
Managing Director: Charles Poo  
Senior marketing manager: Peter Tan  
Facilities: Two drydocks: 350.00 x 60.00 x 11.50mtr, 300,000 dwt; 300.00 x 60.00 x 11.50mtr, 170,000 dwt. Slipway 190.00 x 50.00 mtr; 4 x 20 ton, 1 x 80 ton, 2 x 25 ton and 14 gantry cranes. Four repair quays between 217 mtr and 352 mtr in length, maximum water depth 10 mtr.  
Services: 1-18, 20-31, 34-37, 39, 40

## JURONG SHIPYARD LTD

29 Tanjong Kling Road, Singapore 628054  
Tel: 2651766  
Telex: RS24318  
Telex: 2651736, 2610738, 2650201  
Chairman: Lua Cheng Eng  
Managing director: K.K. Tan  
Facilities: 4 drydocks: 380.00 x 80.20 x 14.00 mtr, 500,000 dwt, with 100, 60, 35, 20, 15, 10 and 2 x 5 ton cranes; 335.00 x 56.00 x 11.00mtr, 200,000 dwt with 150, 80 and 2 x 5 ton cranes; 350.00 x 56.00 x 12.00mtr, 300,000 dwt with 80, 45 and 10 ton cranes; 270.00 x 40.00 x 10.00mtr, 100,000 dwt with 80, 45, 10 and 5 ton cranes. 1x 35 ton floating crane.  
Services: 1-9, 11, 12, 14-24, 26-40  
\* Sembcorp Industries Ltd to increase shareholding stake to 59.8%.

## KEPPEL SHIPYARD

51 Pioneer Sector I, Singapore 628437  
Tel: (65) 8614141  
Telex: RS21367 keppel  
Telex: (65) 2742176/9617767  
Executive director: Nelson Yeo  
General manager (commercial): B.K. Yap  
Facilities: Tuas Yard - drydocks: 355.00 x 60.00, 330,000 dwt with 80, 30 and 20 ton cranes; 350.00 x 66.00 mtr, 360,000 dwt with 80 and 30 ton cranes; 301.00 x 52.00 mtr, 150,000 dwt with 80, 30 and 15 ton cranes. Also additional drydock of 400,000 dwt available at Pioneer Yard  
Services: Full repair service 1-40

## KWONG SOON ENGINEERING CO

15 Tuas Crescent, Singapore 638709  
Tel: 8619311, 8632552 (24 hour)  
Telex: 8619211; Telex: RS21379 kwsoon  
E-mail: kwsoon@mba.singtel.com.sg  
Managing director: Louis Ching

## Asst director: George Ching

Facilities: Repair quay of 89mtr length with tower and crawler cranes, open fabrication area, building berth area suitable for building vessels up to 75mtr length, fully equipped workshop facilities with overhead cranes.  
Services: 2, 4-12, 14-22, 24, 26-40

## PAN-UNITED SHIPYARD PTE LTD

33 Tuas Crescent, Singapore 2263  
Tel: 8621188 (20 lines)  
Telex: RS 26692 pan u; Telex: 8612452  
Managing director: Henry Ng  
General manager: K.W. Mok  
Facilities: 180 x 41 mtr floating dock with 16,800 ton lifting capacity. 3-lane slipway up to 75 mtr length. Shore and mobile cranes up to 220 tons including 2 floating crane barges up to 50 ton lifting capacity. Also floating docks facilities under 150 mtr in length.  
Services: 2-12, 14, 16-21, 24, 26, 28-40

## SEMBAWANG SHIPYARD PTE LTD

(A member of SembCorp Industries)  
Admiralty Road West, Singapore 759956  
Tel: (65) 7522222; Telex: (65) 7581025  
E-mail: sembship@sembcorp.com.sg  
Managing director: Hong Chiang Grace  
General manager: Jerry Koh  
Deputy General manager: Ma Wong Lee Lin  
Facilities: Two floating docks: 290.00 x 48.00 mtr, 8.5tr depth, 150,000 dwt; 202.00 x 43.00 mtr, 8.00 mtr depth, 60,000 dwt. Two graving docks: 384.00 x 64.00 mtr, 9.00 mtr depth, 400,000 dwt; 318.50 x 39.60 mtr, 13.6mtr depth, 100,000 dwt.  
Services: 1-40 (except 13)

## SINGAPORE TECHNOLOGIES MARINE LTD

7 Benoi Road, Singapore 629882  
Tel: 8612244  
Telex: RS21206 singa  
Telex: 8613028  
Chairman: Tan Guong Ching  
Chief executive officer: See Leong Teck  
VP (Benoi): Han Yew Kwang  
VP (Tuas): Ting Tong Kai  
Facilities: Benoi yard: Syncrolift 110.00 x 20.00mtr with lifting capacity of 4,000 tonnes, 100 x 20mtr with lifting capacity of 6,000 tonnes. Transfer and docking area of 15,000 sq mtr; 2 building berths; 5 covered construction/repair hall. Deep water wharfage of 500 mtr, cranes up to 150 tonnes capacity.  
Tuas Shipyards: Two floating docks: 240.0 x 52.5mtr with 28,000 tonnes lifting capacity, a x 15 and 1 x 10 ton cranes; 185.0 x 40.0mtr with 17,000 tonnes lifting capacity, 4 x 5 ton cranes, 100 tonne floating crane. Deep-water wharfage with full cranes cover: 2 x 250 mtr finger piers with travelling crane; two 180 mtr x 26 mtr building berths.  
Services: 1-9, 11, 14-18, 20-22, 24, 26-40

## SINGAPORE DOCKYARD &amp; ENGINEERING PTE LTD

55 Gul Rd, Singapore 629353  
Tel: 8613007  
Telex: 8623645, 8623647  
Executive director: Goh Boon Kiat  
General manager: Alan Tam Kok Han  
Assistant general manager: Fok Swee Yin  
Commercial manager: Ronald Lim Wei Tung  
Marketing executive: Kelvin Wong Kai Fun  
Facilities: Four floating docks: 190.00 x 27 mtr, 14,000 ton lifting capacity; 120.00 x 13 mtr, 5,000 tons lifting capacity; 79.00 mtr, 2,500 tons lifting capacity; 158 mtr, 7,500 tons lifting capacity; 190.00 x 33.00 mtr, 14,000 tons lifting capacity; 158.00 x 23.00 mtr, 7,500 tons lifting capacity plus 2 under 150.00 mtr.  
Services: 2-10, 12, 14-17, 20-24, 26-40

## SIANG HUAT SHIPYARD PTE LTD

1 Psalms Rd, Jurong Singapore 2260  
Tel: 2616084  
Telex: RS25659  
Facilities: Two slipways 110.00 x 33.00mtr, 3,000 dwt with 4 x 10-100 ton cranes.

## INDONESIA

## PT KARIMUN SEMBANG SHIPYARD

Teluk Pabu, PO Box 76, Karimuna 29161, Propinsi Riau  
Tel: (777) 23365  
Telex: (777) 23385

## International marketing office: c/o Sembawang

Shipyards, Singapore  
Facilities: One floating dock 230.00 x 35.00 mtr, 7.3 mtr depth over blocks. Max capacity 65,000 dwt with 1 x 15 ton crane, 400 mtr pier, mini-over draught 10 mtr, 1 x 15 ton crane.  
Services: 2, 5-6, 9, 16, 28-29, 35-36

## PAN-UNITED SHIPYARD (BATAM)

c/o 33 Tuas Crescent, Singapore 2263  
Tel: 8621188  
Telex: 8612452  
Facilities: can accommodate capsize tonnage. Development plans call for a new floating dock, syncrolift and expanded workshop facilities to be introduced over the next eight years.

## LABROY SHIPBUILDING AND ENGINEERING PTE LTD

Jl Brigien Katarso Tanjung Uraang, Batam Island 29432  
Tel: (778) 391960; Telex: (778) 391961  
General manager: Michael Xie  
Sales & marketing manager: Steven Chew  
Singapore office: No. 2, Stadium Walk, Katong, Singapore Indoor Stadium Singapore 397691  
Tel: (65) 4402355; Telex: (65) 3480237  
Facilities: Floating dock 166.00 x 32.00mtr, 12,000 tons lifting capacity; also one under 150mtr. Berthing wharf 1,500mtr, floating cranes 1 x 125 tonnes and 1 x 150 tonnes, 3 building berths up to 170mtr length.  
Services: 1-9, 13-24, 28-40 (10-12 available on request)

## PT DOK &amp; PERKALAN KODJA BAHARI (PERSERO)

Head office: Jalan Martadana 1/2, Tanjung Priok, Jakarta 14310  
Tel: (021) 491127, 491269  
Telex: 64025 pa kodja ia  
Telex: (021) 495232  
President: Brawan Sa'adjidipura  
Repair director: Anas Sar'an  
Facilities: Floating docks 175.00 x 29.00 x 6.80mtr with 12,000 ton lifting capacity; 151.00 x 23.00mtr with 8,000ton lifting capacity. Also 50,000dwt building berth, 100, 50 and 15 ton floating cranes. Yards at Jakarta, Palembang, Padang, Belawan, Sabang, Banjarmasin  
Services: 2-4, 6-7, 9-10, 12, 14, 16-17, 19-21, 25-26, 28-32, 35-40

## THAILAND

## ASIAN MARINE SERVICES PCL (ASMAAR)

128 MU 3, Sukrawad Road, Prasanatjodee, Samutprakarn 10290, Bangkok  
Tel: (2) 815 2060/67, 815 3811/14  
Telex: 82924 asmar th  
Telex: (7) 425 0823, 425 8514  
Marketing manager: Nathaniel L. Medalle  
Facilities: Floating dock 161.22 x 28.50 mtr, 7.50 mtr depth over keel blocks, 8,200 tons lifting capacity with 2 x 12.5 ton cranes. Also floating dock under 150 mtr.  
Services: 2, 5-6, 9, 11, 14, 16, 20, 28-29, 35-37, 40

## UNI THAI SHIPYARD &amp; ENGINEERING (UTSE)

Lam Chabang Port Industrial Estate, PO Box 42, Ao-Udon Post Office, Srirachai, Choburi 20110  
Tel: (38) 491 688  
Telex: (38) 491 677  
E-mail: unithai@loxinfo.co.th  
Gen man business: Spiro Risvas  
Operations director: K.C. Leong  
Gen manager shiprepair: S.W. Yau  
Facilities: Floating dock: 282.2 mtr x 47.0 mtr x 8.0 mtr. Lifting capacity 40,000 tonnes. 2 x 10 tonne cranes. Repair quay: length 540 mtr, cranes up to 45 tonnes capacity.  
Services: 2-6, 9, 12, 14, 16, 20, 21, 26, 28-30, 32, 36-40

## VIETNAM

## PHARUNG SHIPYARD CO

Minhch Town, Thuanguyen District, Hai Phong City  
Tel: 84 31 875066, 875128, 875134  
Telex: 84 31 875067  
Managing director: Tran Ngoc Ninh  
Marketing manager: Vu Van Tam  
Facilities: Drydock 156.00 x 25mtr with 15 and 10 ton cranes, 200 mtr pier with 15 and 10 ton cranes.  
Services: 1-7, 9, 12, 14-16, 20-21, 26-29, 31-32, 35-40

**KEPPEL BASON SHIPYARD**

Ho Chi Minh City  
 Facilities: Drydock 152.00 x 23.50 x 8.00 mtrs, 16,000 tons lifting capacity, 15 ton crane; one further dry dock and two floating docks under 150 mtrs in length.

**PHILIPPINES****KEPPEL BATANGAS SHIPYARD**

Unit 3-B, Country Space 1 Bldg,  
 Sen. Gil Puyat Ave, Salcedo Village,  
 Makati City, Manila  
 Tel: (632) 892 1816/892 1820-24  
 Telefax: (632) 815 2581, 892 6510  
 Shipyards address: Barrio San Miguel, Batangas, Philippines  
 Tel: (63 43) 7271532-36  
 Telefax: (63 43) 7271453  
 President: Hoe Eng Hock  
 Marketing manager: Vladimir A. Tena  
 Facilities: Two floating docks under 150 mtr in length. Mechanical lift drydock up to 20,000 dwt. New 40,000 dwt graving dock.  
 Services: 2-9, 14-16, 20-21, 23-24, 26, 28-32, 35-36, 38-40

**SUBIC SHIPYARD & ENGINEERING INC**

Cabangan Point, Bo Crang, Subic Bay,  
 Zambales, Philippines 2209  
 Tel: (477) 232 2380 (11 lines)  
 Telefax: (2) 892 6619-20  
 President & general manager: Toh Ko Lio  
 Yard manager: S. T. Fong  
 Commercial manager: Froilan P. de la Cruz  
 Facilities: Graving dock 350.00 x 65.00 x 12.50 mtr, 340,000 dwt. Repair berth 750 mtr mooring length. Cranes: 15 tons; 30 tons; 80 tons; 25 tons and a 33 ton floating crane.  
 Services: 2-9, 11, 13-18, 20-22, 24-26, 28-40

**CEBU SHIPYARD & ENGINEERING WORKS INC**

Dad Cleland Ave, Lapu-lapu City, Cebu  
 Tel: (32) 340-0081-89; Telefax: (32) 340-0068/0077  
 President: Charles Yap Cink Twes  
 Vice president operator: Barry Chia Soo Hock  
 Commercial/marketing manager: Khew Kah Khim  
 Facilities: Drydock 210.00 x 33.00 x 10.00mtr, 35,000 dwt. Slipways: 4,000 tons, 2,000 tons, 1,000 tons, 800 tons, 400 tons. Berthage 152.00 and 120.00 mtr length (7 mtr draft).  
 Services: 1-9, 14-17, 20, 25-26, 28-40

Facilities: Synchronift 60.00 x 18.00 x 5.50mtr with 2 160 ton lifting capacity. Two jetties: 105.00mtr with 17.5 ton crane and up to 60 ton mobile cranes: 100mtr. Also drydock facilities under 150mtr in length.  
 Services: 1-9, 11, 12, 14, 17, 20, 26, 35, 37

**NEW ZEALAND****MARINE STEEL LTD**

POB 1919, Auckland  
 Tel: (9) 3773311  
 Telefax: (9) 3071050  
 General manager: Phil Cameron  
 Project development: Chris Cartwright  
 Facilities: Slipway 140.00mtr, 80mtr cradle with 1,500 ton lifting capacity. Jetty 90mtr length.  
 Services: 2, 4-10, 12, 14, 16, 17, 20-22, 24-33, 35-40

**NALDER & BIDDLE (NELSON) LTD**

PO Box 746, Nelson  
 Tel: (3) 5469200  
 Telefax: (3) 5469192  
 E-mail: info@nbgroup.co.nz  
 CEO: Grant Barrie  
 Facilities: Slipway 1,900 tons lifting capacity.  
 Services: 1-18, 20-22, 24, 26-32, 34-40

**NEW CALEDONIA****PORT AUTONOME DE NOUMEA**

Av. James Cook, POB 14, Noumea  
 Tel: 275966  
 President: Patrice Muller  
 Manager: Philippe Lafleur

Facilities: Slipway 164.42mtr, 61.00 cradle with 1,000 ton lifting capacity.  
 Services: 26,36

**FUJI****CARPENTERS SHIPREPAIRS**

Eliza St, Wala Bay, Suva  
 Tel: 312133  
 Telefax: 301364  
 Facilities: Slipway with 1,000 ton lifting capacity. Also slipway facilities under 1,000 tons lifting capacity.  
 Services: 2-4, 7, 9, 20, 22, 26, 28-29, 31-32, 35-37, 40

**SHIPBUILDING (FUJI) LTD**

Sansargren Drive, Korevua, Wala Bay, PO Box 16695, Suva  
 Facilities: Slipway up to 67.00mtr with 1,000 ton lifting capacity. 1 x 30 ton and 1 x 9 ton cranes.  
 Services: 2-9, 11-18, 20-22, 26-40

**SAMOAN ISLANDS****SOUTHWEST MARINE OF SAMOA INC**

POB 1299, Pago Pago 96799  
 Tel: (684) 6334123  
 Telefax: (684) 632529  
 Facilities: Marine railway 91.44mtr cradle, 3,000 ton lifting capacity with 60 ton floating crane, 35 and 20 ton mobile cranes. Drydock 152.40mtr. Also marine railway under 800 tons lifting capacity.  
 Services: 2, 4, 9, 12, 14, 16, 21-22, 23, 27, 29, 30, 35, 39, 40

**AUSTRALASIA****AUSTRALIA****TRANSFIELD SHIPBUILDING (WA)**

775 Cockburn Rd, Henderson, WA 6163  
 Tel: (9) 4370437  
 Telefax: (9) 4102065  
 General manager: Chris Evans  
 Jervis Bay Shipyards  
 Facilities: Slipway with 3,000 ton lifting capacity and deepwater jetty with 8m draft and 2,000 ton capacity. Mobile cranes up to 300 tons.  
 Cockburn Road  
 Facilities: 3,500 ton capacity shiplift; 90mtr dry berth and mobile cranes up to 300 ton capacity.  
 Services: 2-18, 20-40

**CMJ RIPPLESIDE SHIPREPAIRS**

Liverpool St, PO Box 622, Nth Geelong 3215  
 Tel: (52) 721010; Telefax: (52) 721241  
 Director: Steve Cahill  
 Manager: Tom Carroll  
 Foreman: Les Marasfalvi  
 Facilities: Slipway 193.00 mtr, 48.02 cradle with 1,400 tons lifting capacity.  
 Services: 2-9, 12-16, 18, 20-22, 25-32, 35-40

**FORGACS DOCKYARD**

PO Box 90, Carrington, NSW 2294  
 Tel: (49) 62 2866  
 Telefax: (49) 62 2848  
 Chief executive: S. Forgacs  
 Facilities: Floating dock 195.00 x 33.50 x 8.50mtr, 45,000 dwt with 15,000 lifting capacity and 2 x 10 ton cranes. Slipway 71.00mtr, 12.80 cradle with 1,250 ton lifting capacity. Floating crane with 85 ton lifting capacity. Refit berth 220mtr length.  
 Services: 1-40 (except 10, 11, 18, 19, 34)

**KEPPEL CARRICROSS SHIPYARD LTD**

Lot 2, Thyone Rd, Morningside, PO Box 425  
 Bulimba 4171 Queensland  
 Tel: (7) 3227 0888; Telefax: (7) 3399 6161  
 Managing director: Charles Chinn  
 Business manager: Trevor G. Reangrey  
 Facilities: Drydock 263.00 x 33.50 x 9.10mtr, 83,000 dwt. Jetties: 306.70, 112.30, 75.60mtr lengths. 4 x 5 ton travelling dockside cranes, one 50 ton and one 30 ton travelling portal crane.  
 Services: 1-40

**BRISBANE SLIPWAYS & ENGINEERING PTY LTD**

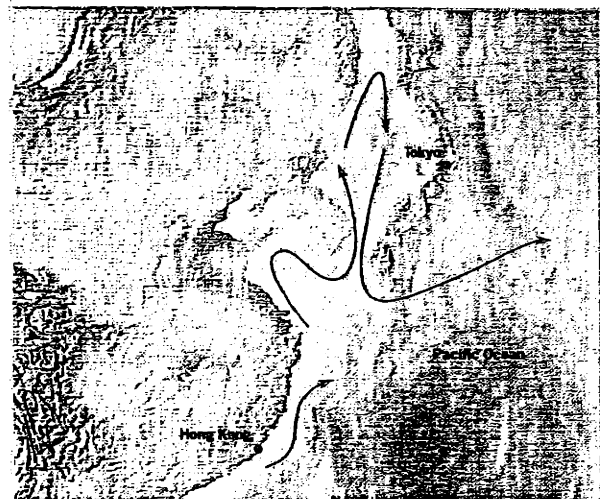
PO Box 350, Bulimba 4171, Queensland  
 Tel: (7) 3395 7544; Telefax: (7) 3899 0588  
 Managing director: Carola Melville  
 Manager: Ray Walters  
 Facilities: Slipway of 2,500 tonnes handling capacity, 25 tonnes mobile crane.  
 Services: 2-9, 13-17, 20-22, 25-32, 35-40

**TASMANIA****HOBART PORTS CORPORATION**

1 Franklin Wharf, GPO Box 202, Hobart  
 Tel: (3) 62351000; Telefax: (3) 62310693  
 Chief executive: C. Drinkwater  
 Facilities: Slipway 204.00mtr, 55.00 cradle with 1,200 ton lifting capacity. Also slipway facilities under 1,000 tons lifting capacity.  
 Services: 2-7, 9, 10-18, 20-22, 26-30, 32, 34-36, 39 (some of which are provided by contractors)

**LD MARINE**

c/o William Hart Dock,  
 Lower Charles Street, Launceston  
 Telefax: 345164

**FAR EAST****HONG KONG****HONG KONG UNITED DOCKYARDS LTD-HUD**

Sai Tao Wan Road, Thing Yi Island,  
 New Territories  
 Tel: (852) 24312828; Telex: 43547 budkik hx  
 Telefax: (852) 24330180  
 Managing director: Christopher Pooley  
 Marine manager: George Windman  
 Facilities: Floating docks suitable for ships size 300mtr x 41 mtr, with 40,000 ton lifting capacity.  
 Services: 1-6, 9-18, 20-22, 26-40

**YU LIAN DOCKYARDS LTD**

1-7 Sai Tao Wan Road, Thing Yi Island,  
 New Territories  
 Tel: (852) 24367800, 24367730, 24360690  
 Telefax: (852) 24360590  
 Production & commercial manager: P.Y. Li  
 Facilities: Four floating docks at Hong Kong, 190.00 x 26.80mtr with 12,000 ton lifting capacity, 257.00 x 45.90mtr with 36,000 ton lifting capacity.

155.00 x 23.40 mtr with 8,500 ton lifting capacity. 85.00 x 15.00 mtr with 1,800 ton lifting capacity. Sheltered berth 91.2mtr with max draft 8.0 mtr. One floating dock at Shekoi; 190.00 x 27.80mtr with 12,500 ton lifting capacity  
 Services: 2-7, 9, 11-20, 22, 24-32, 34-40

**TAIWAN****CHINA SHIPBUILDING CORP - KAOSHUNG YARD**

3 Chung Kang Rd, Waterfront Industrial Zone,  
 Haiao Kang, Kaohsiung 812  
 Tel: (07) 8010111  
 Telefax: 71271 cabcky tp  
 Telefax: (7) 8021940  
 Contact: H.C. Yang  
 Facilities: Drydock 950.00 x 92.00 x 14.00mtr, 1,000,000 dwt with 2 x 350, 3 x 20 and 3 x 3.5 ton cranes (can separate into three lengths of 390, 380 & 180.00m). Drydock 270 x 45mtr, 150,000dwt capacity. Jetty 180 x 10mtr.  
 Services: Full marine services



**CHINA SHIPBUILDING CORP -****KEELUNG YARD**

224 Ho 1 Rd, Ho Ping Island, Keelung

Tel: (02) 24631842

Telex: 31288 cskzke

Telefax: (02) 246293997026

General manager: W.S. Lina

Repair manager: T.H. Yu

Facilities: Three drydock: 275.00 x 45.00 x 10.20mtr, 130,000 dwt with 30 and 10 ton cranes; 270.00 x 45.00 x 11.60mtr, 130,000 dwt; 210.00 x 26.40 x 12.40mtr, 30,000 dwt with 40 and 2 x 20 ton cranes. Jetty 1600mtr. Uses facilities at Keelung Harbour Bureau.

Services: 1-9, 13-17, 20-23, 25-33, 35-40

**CHINA, PR****GUANG ZHOU SHIPYARD**

Baibedong, Guangzhou

Tel: (20) 891712

Telefax: (20) 8891575, 8896341

Telex: 44418 gzy ch

Commercial manager: Ye Peihua

Facilities: Drydock: 156.00 x 19.00mtr with cranes ranging from 3-15 tons; Jetty 480.00mtr with 2 x 25 ton mobile cranes. Three slipways 200.00 x 36.00mtr, 170.00 x 27.00mtr and 150.00 x 22.00mtr with 2 x 120 ton and 3 x 100 ton mobile cranes.

Services: 1-9, 11-12, 14-18, 20-21, 23, 25-33, 35-36, 38-40

**YU LIAN DOCKYARDS (SHEKOU) LTD**

Haiwan Road, Shekou, Shenzhen

Tel: (86 755) 6684165, 6696554

Telefax: (86 755) 6684860

Facilities: Two floating docks at Shekou - 190.00 x 27.80 mtrs with 12,500 tons lifting capacity; 220.00 x 32.30 with 20,000 ton lifting capacity. Sheltered berth 650 mtrs with max draft 11.5 mtrs.

**GUANG ZHOU WEN CHONG SHIPYARD**

Huangpu, Guangzhou

Tel: (20) 82389873

Telex: 440522 wcy cn

Telefax: (20) 82397534

Manager/repair branch: Wu Hongjin

Facilities: Three drydocks: 300.00 x 62 mtr, 200,000 dwt; 202.00 x 28.00 x 11.20mtr, 25,000 dwt with 100, 40, 6 x 25, 2 x 15 and 2 x 10 ton cranes; 180.00 x 24.00 x 9.50mtr, 15,000 dwt with 40 ton floating crane, 3 x 30 and 40 ton mobile cranes. Slipway 168.00 x 22.00mtr with 7,000 ton lifting capacity. Jetty 1,200mtr total length. Max draft 7 mtr.

Services: 2-9, 12-16, 20-21, 24, 26-33, 35-40

**CHENG XI SHIPYARD**

PO Box 108, Jiayang, Jiangsu

Director: Huang Tianming

Facilities: Three floating docks - 257 x 42 mtr, lifting capacity 26,000 tons; 189 x 28 mtr, lifting capacity 13,000 tons; 158 x 24.5 mtr, lifting capacity 6,500 tons.

Services: 1-32, 34-40

**JANG NAN SHIPYARD**

PO Box 3206, Shanghai 200011

Tel: (21) 377010

Telex: 33027 jnan cn

Telefax: (21) 3770297

Repair manager: Bo Liangchen

Facilities: Three drydocks: 332.20 x 40.00 x 11.30mtr, 65,000 dwt with 150, 60 and 15 ton cranes; 184.00 x 24.00 x 9.10mtr, 20,000 dwt with 60 and 15 ton cranes; 153.80 x 17.60 x 8.80mtr, 5,000 dwt with 30 ton crane. 328mtr repair quay with 30 and 2 x 15 ton cranes, 35,000 dwt floating dock under construction.

Services: 1-9, 12-17, 20-22, 24, 26, 28-32, 35-40

**SHANGHAI SHIPYARD**

108 Jimo Rd, Pudong, Shanghai

Tel: (21) 8404510

Telex: 33030 shyd cn

Telefax: (21) 8842840

Repair manager: Cheng Bao Shen

Wang Shen Guang

Facilities: Drydock 179.50 x 18.70 x 8.80mtr with 10,000 dwt and 7 x 15 ton cranes, 60 ton floating crane, 3 x 40, 30 and 4 x 15 ton mobile cranes. Floating dock 190.00 x 27.00 x 13.00mtr, 25,000 dwt with travelling cranes 10-30mtr (160 in total). Two slipways: 40,000 dwt; 20,000 dwt. Jetty 800mtr. Four mechanical lift with 15 ton

lifting capacity. Also drydock facility under 150mtr in length.

Services: Full repair service 1-40

**QINGDAO BEI HAI SHIPYARD**

1 Yan er Dao, Qingdao 266071

Tel: (532) 5812233, 5814207

Telex: 321187 bhayd cn, 32247 bhayd cn

Telefax: (532) 5814466, 5814066

Managing director (shiprepair): Pan Jianyi

Facilities: Two drydocks: 192.00 x 28.00 x 10.80mtr, 37,000 dwt; 176.00 x 26.00 x 9.80mtr, 20,000 dwt. 150 ton mobile crane, 40 ton and 2 x 10 ton job cranes. Floating dock 230.4 x 45.0 x 18.0mtr, 28,000 tonnes lifting capacity, 2 x 10 ton cranes.

Services: 1-40 (except 10, 11, 18, 33, 34)

Awaiting finance to build a new dockyard which will take over from this facility. This will feature an 800mtr repair berth and a 300,000 dwt capacity graving dock.

**XIN GANG SHIPYARD**

1 Fichang Jie, Xingang, Tanggu, Tianjin

Tel: (22) 5780244

Telex: 23165 xgdyb cn

Telefax: (22) 5795860

Business director: Xiao Zhi Qian

Facilities: Drydock 212.00 x 28.00 x 10.60mtr, 25,000 dwt with 25 ton crane. Also drydock facility under 150mtr in length with 15 ton crane. 756mtr repair quay with 3 x 25, 5 ton cranes and 60 ton floating crane.

Services: 1-9, 12-16, 19-22, 24, 26-33, 35-37, 39-40

**XIN HE SHIPYARD**

8 Xindu Lu, Tanggu, Tianjin 300450

Tel: (22) 589 5951

Telefax: (22) 589 9038

Managing director: Hua Xinfu

Facilities: Slipway 7,000 ton lifting capacity.

Drydock under 150mtr in length.

Services: 3-7, 12, 16, 26, 27, 29, 35, 39

**SHAN HAI GUAN DOCKYARD**

Qidongdao City, Hebei Province 066206

Tel: (335) 5081350

Telex: 27131 qhgdy cn

Telefax: (335) 5081350, 5081140

Facilities: Three drydocks: 340.00 x 64.00 x 12.80 mtrs, 300,000 dwt, with 2 x 30 and 1 x 100 ton cranes; 240.00 x 38.00 x 11.40mtr, 75,000 dwt with 1 x 63 and 2 x 25 ton cranes; 170.00 x 27.00 x 9.80mtr, 15,000 dwt with 3 x 25 ton cranes. Wet berths totalling 1,263 mtrs in length.

Services: 1-9, 12-16, 18-21, 24, 26-29, 31, 32, 35-40

**DALIAN SHIPYARD**

No 1, Yan Hai Jie, Dalian, Liaoning 116002

Tel: (411) 2634111 ext 3984

Telex: 86164 dlypy cn

Telefax: (411) 233461

Repair manager: Tang Shiyuan

Facilities: Drydock 164.00 x 21.60 x 9.41mtr, 10,000 dwt with 100 ton floating crane, 25, 9, 6 and 3 ton cranes. Also drydock facility under 150mtr in length. 200,000 dwt drydock under construction.

Services: 1-40 (except 23)

**SOUTH KOREA****HALLA ENGINEERING & HEAVY INDUSTRIES LTD**

104-1, 7-ka Hae Dong, Chung-Ku, Incheon

Tel: (32) 8803376/8

Telex: 25220 hallah k

Telefax: (32) 8859487

Chairman: In Yong Chung

President: Byung Kwon Choi

Repair manager: W.J. Park

Facilities: Floating dock 190.00 x 43.00 x 5.35mtr, 40,000 dwt. Also floating dock facility under 150mtr in length.

Activities: 2-9, 12, 14-18, 20-22, 25, 26, 28-33, 35-40

**DAEWOO HEAVY INDUSTRIES LTD**

Shiprepair Division

1 Ajoo-Dong, Koje-Si, Kyungnam-Do

Tel: (558) 680 3921/4

Telex: dwokpo k 52131-4

Telefax: (558) 681 7445, 681 4030

Division director: H.W. Kim

Shiprepair marketing manager: D.S. Park

Facilities: Three floating docks 256.00 x 40.5mtr, 1 x 25 ton and 1 x 15 ton cranes, 38,000 ton lifting capacity; 236.00 x 38.5 mtrs, 28,000 ton lifting capacity, 2 x 20 ton cranes, 2 x 30 ton shore cranes; 141.00 x 25.00 mtr, 7,000 ton lifting capacity with quay cranes. Repair quays, total length 2,288 mtr, 30, 50 and 200 ton cranes.

Services: 1-9, 11-18, 20-40

**HANJIN HEAVY INDUSTRIES CO LTD**

29 5-ka, Bongae-dong Yeongdo-ku, Busan

Tel: (51) 494161/9

Telex: 53330 k

Facilities: Three drydocks: 302.00 x 50.00 x 11.50mtr, 150,000 dwt with 2 x 80 ton cranes; 270.00 x 30.00 x 11.50mtr, 150,000 dwt with 3 x 100 ton cranes; 232.50 x 35.00 x 9.00mtr, 60,000 dwt with 40, 20 and 4 x 80 ton cranes.

Services: Full repair service

**HYUNDAI NEPO DOCKYARD CO LTD-HMD**

1381 Baegoe-Dong, Dong-Ku, Ulsan 682-020

Tel: (52) 250 3032/44

Telefax: (52) 250 3056

Telex: hmdyard 52202 k

E-mail: sales@hmd.co.kr

President: J.L. Lee

Executive vice president: J.S. Yang

Director: M.S. Byun

Facilities: Four drydocks: 3 of 380.00 x 65.00 x 12.50mtr, 400,000 dwt capacity; 1 of 300.00 x 76.00 x 12.50mtr, 350,000 dwt capacity. With 3 x 200mt, 2 x 80mt, 5 x 30mt and 1 x 20mt cranes. Quay with total length of 2,610mtr, max draft 8.0 mtr, with 4 x 30mt and 3 x 20mt cranes.

Services: Full repair service

**HYUNDAI HEAVY INDUSTRIES CO LTD**

1, Chonha-dong, Ulsan Kyongnam 682-792

Tel: (552) 30-3001/12

Telefax: 30-3487

President: J.K. Kim

Facilities: Nine drydocks: 390.00 x 80.00 x 12.7mtr, 500,000 dwt and 500.00 x 80.00 x 12.7mtr, 700,000 dwt both with 2 x 450 ton gantry cranes and 3 x 30 ton job cranes; 640.00 x 92.00 x 13.40mtr, 1,000,000 dwt with 2 x 450 ton gantry cranes, 1 x 150 ton job crane and 1 x 18 ton job crane, 1 x 30 ton job crane; 380.00 x 65.00 x 12.70mtr, 400,000 dwt and 260.00 x 65.00 x 12.00mtr, 250,000 dwt both with 1 x 200 ton, 2 x 150 ton and 2 x 80 ton job cranes; 260.00 x 43.00 x 12.00mtr, 150,000 dwt; 175.00 x 25.00 x 11.00mtr, 15,000 dwt with 2 x 30 ton overhead cranes; 360.00 x 70.00 x 12.7 mtr, 400,000 dwt and 360.00 x 70.00 x 12.7 mtr, 400,000 dwt, both with 2 x 900 ton crane and 3 x 30 ton job cranes. Ship lift 130.00 x 20.00 mtr, 3,300 ton lifting capacity with 1 x 60 ton and 1 x 30 ton job cranes. Total outfitting quays 5,000mtr in length.

Services: 2-8, 13, 14, 16, 28, 37, 40

**RUSSIA (FAR EAST)****DALZAVOD**

2 Dalzavodskaya Str, Vladivostok, 690001

Tel: (7) 4232 223 353, 269 372

Telefax: (7) 4232 223 002, 269 372

Telex: 213251 dok

Director general: Sergey Kucherenko

Marketing director: Vladimir Girich

Facilities: Two drydocks, max 195.00 x 32.5 mtr, floating dock 139.00 x 25.5 mtr, 1,500 mtr repair berth.

Services: 1-6, 9, 26-32, 35-36

**NAKHODKA SHIPREPAIR YARD**

59 Nakhodka Ave, Nakhodka-13, 692900

Tel: (7) 42366 235 99, 220 00

Telefax: (7) 42366 472 58

Telex: 213817 yard ru

Director general: Evgeniy Chizh

Marketing director: Sergey Sazonov

Facilities: Two floating docks: 140.00 x 23.00 mtr, 8,500 ton lifting capacity; 185.00 x 30.00 mtr, 25,000 ton lifting capacity, ships up to 40,000 dwt, 800.00 mtr repair berth, two deep-water piers 210.00 and 170.00 mtr, 2,000 ton slipway, 12 cranes 10-30 tons.

Services: 1-6, 9-22, 26-40

**SLAVYANKA SHIPREPAIR YARD**

Slavyanka, Primorsk Reg, 692730

Tel: (7) 42331 91 122, 911 733

Telefax: (7) 42331 41 109

Telex: 713821

Director general: Zhan Mazmina

Facilities: Three floating docks: max 246.00 x 35.00 mtr with 8,500, 30,000 and 36,600 ton lifting capacity; 1,200 mtr repair berth, two floating cranes 90 and 100 ton lifting capacity, 2 piers 300 mtr each, three portal cranes 30 tons lifting capacity on each pier.

Services: 1-6, 16-17, 20, 26-33, 35-36

**VLADIVOSTOK SHIPREPAIR YARD**

3 Nizhneponoyaya Str, Vladivostok 690600

Tel: (7) 4232 221 063

Telefax: (7) 4232 268 145

Director general: Felix Sasa

Facilities: Two floating docks, 150 mtr with 6,000 and 8,000 ton lifting capacity, for ships up to 30,000 dwt afloat; two floating cranes 25 ton lifting capacity.

Services: 1-6, 16-17, 26-29, 31-32, 35-38

**JAPAN****HAKODATE SHIPYARD**

20-3 Benten-cho, Hakodate

Tel: (0138) 22150

Telex: 0992652 hdnk j

Telefax: (0138) 221941

Manager (ship dept): R. Nakama

Facilities: 170.00 x 23.10 x 9.05mtr, 17,100 grt with 20 and 2 x 10 ton cranes. Also drydock facility under 150mtr in length.

Services: 2, 4, 7-9, 16, 20, 26, 28, 29, 35-37

**HITACHI ZOSEN CO - Maizuru Works**

1180 Aza Anarobe Shimo, Maizuru, Kyoto 625

Tel: (773) 631000; Telex: 5734441 hz mii j

General manager: T. Kondo

Facilities: Drydock 198.00 x 26.00 x 10.00mtr, 35,000 dwt with 80, 20 and 8 ton cranes.

**MITSUBISHI HEAVY INDUSTRIES LTD -**

Shimonoseki Shipyard &amp; Machinery Works

16-1, Hironobu, Enoura-cho 6 chome,

Shimonoseki, Yamaguchi Prefecture

Tel: (832) 665991

Telex: 682284 mshimo j

Telefax: (832) 661900

General manager: Kikuo Sato

Repair manager: Hiroshi Hanishige

Facilities: Two drydocks: 190.00 x 30.00 x 6.20mtr, 40,000 dwt with 45 and 40 ton cranes; 158.00 x 22.86 x 5.80mtr, 17,000 dwt with 45 and 25 ton cranes. Also facilities under 194.5 mtr in length.

Services: 2-9, 12-13, 16-17, 19-20, 22, 26-40

**SASEBO HEAVY INDUSTRIES CO LTD**

Tateyama-cho, Sasebo, Nagasaki

Tel: (956) 25-9160

Telex: 748219 ssk j

Repair manager: K. Toka



**KANDA SHIPBUILDING CO LTD**

14-21 Higashi 2-chome, Kawajiri-cho, Hiroshima  
Tel: (823) 874000; Telex: 662451  
Telex: (823) 873800  
Repair manager: Y. Takaoka  
Facilities: Floating dock 181.00 x 31.00 x 18.00mtr, 25,000 grt. Also floating facilities under 150mtr in length. 2 x 10 and 5 ton cranes also 1 x 20 ton floating crane.  
Services: 1-40

**ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES CO LTD - Kure Shipyard**

2-1 Showa-cho, Kure, Hiroshima 737  
Tel: (0823) 262371  
Telex: (0823) 262379  
Repair manager: Yukiozori Obo  
Facilities: Drydock 273.00 x 41.70 x 8.00mtr, 160,000 dwt with 10 and 2 x 20 ton cranes.  
Services: 2-9, 11, 13-18, 20-22, 24-40

**SHIN KURUSHIMA DOCKYARD CO LTD**

945 Shimachi, Onishi-cho, Ehime  
Tel: (898) 532311  
Telex: 5845525  
Repair manager: K. Murakami  
Facilities: Drydock 190.00 x 28.00mtr, 24,000 grt with 120, 2 x 60, 20 and 5 ton cranes.  
Services: 2-4, 11, 16, 17, 20, 21, 26, 28, 29, 31, 35-37, 39, 40

**KOYO DOCKYARD CO LTD**

544-13 Noji, Saizaki-cho, Mihara, Hiroshima Pref 729-22  
Tel: (848) 691200  
Telex: 642281 koyo j  
Telex: (848) 692400  
General manager: M. Kohda  
Repair manager: N. Fujiki  
Facilities: Four drydocks: 330.00 x 53.50 mtr, 300,000 dwt with 50 and 2 x 35 ton cranes; 273.00 x 42.00mtr, 140,000 dwt with 50, 20 and 10 ton cranes; 235.00 x 36.50mtr, 100,000 dwt with 50 and 2 x 20 ton cranes; 158.00 x 23.80mtr, 30,000 dwt with 35 and 10 ton cranes.  
Services: 2-9, 14-17, 20-21, 26, 28-29, 31-32, 35, 37-40

**NAKAI ZOSEN CORPORATION**

226-6 Setoda-cho, Toyota-gun, Hiroshima Prefecture  
Tel: (8452) 72111  
Telex: 649996 nze j  
Senior managing director: T. Shigejimi  
Major shareholder: Hitachi Zosen  
Facilities: Drydock 220.00 x 34.60 x 9.00mtr, 60,000 dwt with 30 and 25 ton cranes. Also 175.00 x 23.10 x 6.60mtr, 25,000 dwt with 20 ton crane at Inanoshima Dockyard and four drydock facilities under 150mtr in length (two at Setoda and two at Tagama Shipyard).  
Services: 1-9, 12, 15-17, 24, 26, 28, 29, 32, 35-40

**HITACHI ZOSEN CO - Inanoshima Works**

2477-16 Habu-cho, Inanoshima, Hiroshima 722-23  
Tel: (8452) 21212  
Telex: 649991 hz int j  
Telex: (8452) 28774  
General manager: M. Ohno  
Facilities: Three drydocks: 265.00 x 44.20mtr, 150,000 dwt with 16, 10 and 2 x 20 ton cranes; 250.00 x 42.20mtr, 130,000 dwt; 168.00 x 24.00 mtr.  
Services: 1-40 (except 23, 24, 25, 27, 33)

**ONOMICHI DOCKYARD CO LTD**

1005 Saeba-cho, Onomichi City, Hiroshima  
Tel: (0848) 371111  
Telex: 642213 onoz j  
General manager, business dept: M. Kambara  
Facilities: Drydocks: 203.00 x 33.00mtr, 53,000 dwt with 60, 20 and 10 ton cranes; 175.00 x 28.40mtr, 40,000 dwt with 2 x 20 ton cranes. Total 1,260mtr mooring quays.  
Services: 2-40 (except 19)

**TSUNESHII SHIPBUILDING CO**

1083 Onza Tsuneshii, Numakura-cho, Numakura-gun, Hiroshima  
Tel: (849) 871118  
Telex: 643559 kmship j  
Telex: (849) 873658  
General manager: M. Okazaki  
Facilities: Drydock: 310.00 x 48.80 x 7.75mtr, 200,000 dwt with 60, 35 and 15 ton cranes; 237.00 x 38.50 x 8.05mtr, 120,000 dwt with 80 and 30 ton

cranes; 150.00 x 33.60 x 6.25mtr, 40,000 dwt with 25, 20 and 10 ton cranes. Also drydock facilities under 150mtr in length. 9 jetties of 1,720mtr total length with up to 200,000 dwt lifting capacity and cranes up to 60 tons.  
Services: 1-9, 13, 14, 16-18, 21, 39, 40

**MIYABARI SHIPBUILDING CO LTD - Marugame Works**

30 Showa-cho, Marugame, Kagawa  
Tel: (877) 255000; Telex: 5825586 imazono j  
Telex: (877) 255090  
Repair manager: T. Ozawa  
Facilities: Drydock 268.00 x 53.60mtr, 150,000 dwt with 2 x 100 and 2 x 30 ton cranes.  
Services: 2-9, 11, 12, 16, 18, 20, 21, 26-29, 31, 32, 34-40  
Iwagi Works  
Facilities: Drydock 152.00 x 22.00mtr, 12,000 grt. Also drydock under 150 mtr.

**KAWASAKI HEAVY INDUSTRIES LTD**

1, Kawasaki-cho, Sakai-ke, Kagawa  
Tel: (877) 467003; Telex: (877) 455168  
Tel: (898) 532311  
Repair manager: S. Nakamura  
Facilities: Drydock 400.00 x 68.00mtr, 500,000 dwt with 2 x 80, 1 x 10 ton cranes.  
Services: 1-40 (except 11, 25)

**SANOYAS HISHINO MEISHO CORP - Mizushima Works & Shipyard**

2767-21 Shionomae, Kojima, Kurashiki City, Okayama  
Tel: (864) 751551; Telex: 5933762 saoyoa; Telex: (864) 750523  
Yard manager: K. Yamashita  
Facilities: Drydock 270.00 x 45.60mtr, 60,000 grt with 30, 20, 5 and 2 x 240 ton cranes. Also two dry docks at Osaka under 150mtr.  
Services: 2-9, 12, 14, 16-18, 20-22, 26-29, 31-32, 35-38, 40

**MIYAZAKI ENGINEERING & SHIPBUILDING CO LTD-Tamano Works**

1-1 Tama 1-cho, Tamano, Okayama 706  
Tel: (863) 232300; Telex: 5946861 j  
Telex: (863) 232283  
Repair manager: K. Murashima  
Facilities: Two drydocks: 200.00 x 30.30 x 9.75mtr, 46,000 dwt with 150 and 2 x 10 ton cranes; 170.00 x 40.00 mtr, 39,400 grt capacity.  
Services: 1-12, 15-22, 24, 26-37, 39, 40

**IHI AMTEC CO LTD (subsidiary of Ishikawajima-Harima Heavy Industries Co Ltd)**

Aioi Shipyard, 5292 Aioi, Aioi-cho, Hyogo 678-0041  
Tel: (7912) 42414; Telex: (7912) 42494  
Tel: 24104 ihisen j  
Repair manager: M. Inoue  
Facilities: Two drydocks: 330.00 x 54.50 x 6.00mtr, 150,000 dwt with 80, 45, 30 and 10 ton cranes; 230.00 x 33.00 x 6.00mtr, with 15 and 3 x 6 ton cranes; facilities available under 150 mtr length.  
Services: 1-9, 12-13, 15-22, 24, 26-33, 35-40

**MIYAZAKI HEAVY INDUSTRIES - Kobe**

1-1, Wadazaki-cho, 1-cho, Hyogo-ku, Kobe 652  
Tel: (78) 6725030

Telex: 78846 hisaja j

Telex: (78) 6725023  
Repair manager: H. Nobuzono  
Facilities: Two drydocks: 296.00 x 41.00 x 8.00 mtr, 150,000 dwt with 70 and 45 ton cranes; 153.00 x 21.50 mtr. Floating dock 220.00 x 33.00 x 6.55 mtr, 55,000 dwt with 2 x 10 ton cranes. Also floating dock facility under 150 mtr in length.  
Services: 2-9, 12, 15-18, 20-22, 24, 26, 28-40

**KAWASAKI HEAVY INDUSTRIES LTD - Kobe Yard**

Higashi Kawasaki-cho 1-1, 3-cho, Chuo-ku, Kobe  
Tel: (78) 6825155  
Telex: 5623931 ihikob j  
Telex: (78) 6825515  
Commercial manager: Yuzo Kasama  
Facilities: Floating dock 226.00 x 41.50mtr, 120,000 dwt with 33 and 16.5 ton cranes. Two drydocks: 205.00 x 30.50 mtr, 50,000 dwt with 30, 20, 8 and 5 ton cranes; 153.00 x 20.00mtr, 18,000 dwt with 10 and 4 ton cranes. Also floating dock under 150 mtr.  
Services: 1-9, 12, 13, 16-23, 26, 28-32, 34-40

**NAKURA DOCK CO LTD**

1-55 Kinokogaya 4-cho, Suminoe-ku, Osaka  
Tel: (6) 681141; Telex: 5267763 nj dock j  
Repair manager: Y. Ohnme  
Facilities: Drydock 180.00 x 27.50 x 9.30mtr, 28,000 dwt with 20 and 6 ton cranes. Also drydock facility under 150mtr in length.

**SANOYAS HISHINO MEISHO CORP - Osaka Works**

13-7, 5-cho, Minami-Tsumori, Nishinari-ku, Osaka  
Tel: (6) 6611221; Telex: 5267729 saoyoa j  
Telex: (6) 6512205  
Yard manager: H. Higa  
Facilities: Drydock 155.00 x 21.70 x 7.40mtr, 10,500 grt with 18 and 10 ton cranes.  
Services: 2-9, 12, 14, 16-18, 20-22, 26-29, 31, 32, 35-38, 40

**MIYAZAKI ENGINEERING & SHIPBUILDING CO LTD - Yura Dockyard**

Yura-cho, Hidaka-gun, Wakayama  
Tel: (738 65) 1112; Telex: 5547610 mayur j  
Telex: (738 65) 2054  
Repair manager: S. Ohashi  
Facilities: Drydock 340.00 x 61.00 x 14.30mtr, 330,000 dwt with 50, 20, 10 and 6 ton cranes.  
Services: 1-10, 12, 14-24, 26-40

**NIKKO CORPORATION - Tsu Works**

1 Kurozaki Kotan-cho, Tsu, Mie  
Tel: (592) 462120; Telex: 4922134 j  
Telex: (592) 462788  
Works manager: Y. Shinozaki  
Facilities: Drydock 470.00 x 72.00 x 14.10mtr, 500,000 dwt with 120 and 2 x 40 ton cranes.  
Services: 1-10, 12, 16-22, 24, 26-31, 34-40

**ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES - Aichi Works**

11-1 Kirabama-machi, Chita City, Aichi  
Tel: (562) 328020; Telex: 4486510 aicht j  
Repair manager: T. Yabuuchi

Facilities: Drydock 309.50 x 59.20 x 7.20mtr, 260,000 dwt with 400, 100 and 20 ton cranes.  
Services: 1-9, 11-13, 16-18, 20-22, 24-40

**SUMITOMO HEAVY INDUSTRIES LTD Uruga Works**

7 Uruga-cho, 4-cho, Yokosuka 239  
Tel: (468) 462001; Telex: (468) 462142  
General manager: Y. Tomita  
Facilities: 171.10 x 19.50 x 10.76mtr, 9,500 grt with 20 and 7 ton cranes. Drydock under 150mtr in length.  
Services: 1, 11, 15, 18, 19, 23, 25, 34

**IHI AMTEC CO LTD (subsidiary of Ishikawajima-Harima Heavy Industries Co Ltd)**

Yokohama Yard  
1 Shin Nakahara-cho, Isogo-ku, Yokohama, Kanagawa 225-8501  
Tel: (45) 7511750; Telex: (45) 7592810  
Repair manager: M. Kawamura  
Facilities: Two drydocks: 280.00 x 56.00 x 8.50 mtr, 91,000 grt with 80 and 30 ton cranes; 240.00 x 38.00 x 8.50 mtr, 55,000 grt with 15 ton crane.  
Services: 1-9, 12-13, 15-22, 24, 26-33, 35-40

**MIYAZAKI HEAVY INDUSTRIES LTD - Yokohama Dockyard & Machinery Works**

12 Nishiba-cho, Naka-ku, Yokohama  
Tel: (45) 6291331  
Telex: (45) 6291332  
General manager, ship repair: Y. Hata  
Business manager, ship repair: M. Tomiyama  
Facilities: Three drydocks: 331.00 x 55.00 x 8.50mtr, 270,000 dwt with 80 and 40 ton cranes; 255.00 x 46.00 x 8.50mtr, 120,000 dwt with 40 and 16 ton cranes; 172.80 x 28.80 x 9.50mtr, 38,000 dwt with 16 and 10 ton cranes.  
Services: 1-9, 12-18, 20-24, 26-33, 35-40

**NIKKO CORPORATION - Asane Dockyard**

2-1 Hashimoto-cho, Kanagawa-ku, Yokohama  
Tel: (45) 4617800; Telex: 3822466 asano j  
Telex: (45) 4617801  
General manager: Tatsuo Hasegawa  
Facilities: Two drydocks: 252.00 x 38.10mtr, 106,500 dwt with 10, 5 and 2 x 30 ton cranes; 170.00 x 25.00mtr, 30,000 dwt with 25 and 10 ton cranes.  
Services: 1-9, 11, 16-22, 24, 26-40

**HITACHI ZOSEN - Kanagawa Shipyard**

4-1 Mizue-cho, Kawasaki-ku, Kanagawa 210  
Tel: (44) 2881111  
Telex: 3842524 hz kan j  
General manager: H. Yamada  
Facilities: Drydock: 225.00 x 35.00mtr, 60,000 dwt with 45 and 25 ton cranes  
Activities: 1-9, 12-18, 20-22, 24, 26-40

**ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES CO LTD - Tokyo Shipyard**

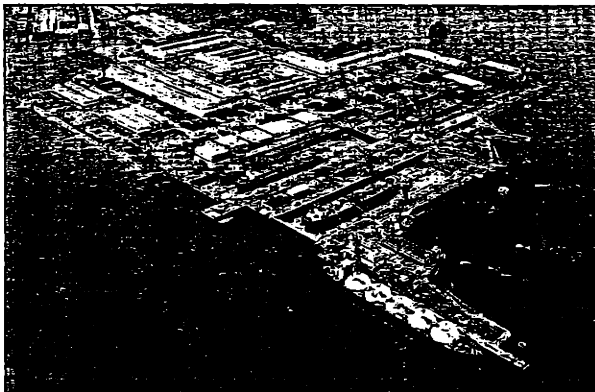
2-1-1 Toyosu, Koto-ku, Tokyo 135  
Tel: (3) 3534-2747/8; Telex: 2350778 ihiry j  
Telex: (3) 3534-2630  
Repair manager: K. Hayashi  
Facilities: Drydock 180.00 x 23.40 x 5.50mtr, 23,000 dwt with 2 x 45 ton cranes. Also drydock facility under 150mtr in length.  
Services: 1-9, 11-13, 16-18, 20-22, 24-40

**MIYAZAKI ENGINEERING & SHIPBUILDING CO LTD - Chiba Works**

1 Yawata Kaigan-dori, Ichihara, Chiba  
Tel: (436) 411111; Telex: 22889 j  
General manager: T. Ishizaki  
Facilities: Drydock 304.00 x 44.00 x 10.50mtr, 150,000 dwt with 20 and 2 x 150 ton cranes.

**HAWAIIAN ISLANDS****HONOLULU SHIPYARD INC**

Pier 41, POB 30989, Honolulu, Hawaii 96820  
Tel: (808) 8486211; Telex: 7238607  
Telex: (808) 8486279  
General manager: Bruce Young  
Director, sales: Eric Schiff  
Production manager: Tom Croft  
Facilities: Slipway 67.66 x 18.29 x 2.60mtr with 1,400 ton machine railway, 75, 50 and 17 ton cranes. Also floating dock facility under 150mtr in length. Drydock with 2,200 ton lifting capacity.  
Services: 2-9, 11-12, 14, 16, 21-22, 24, 26, 28-30, 32-36, 39-40



Mitsubishi's Nagasaki shipyard