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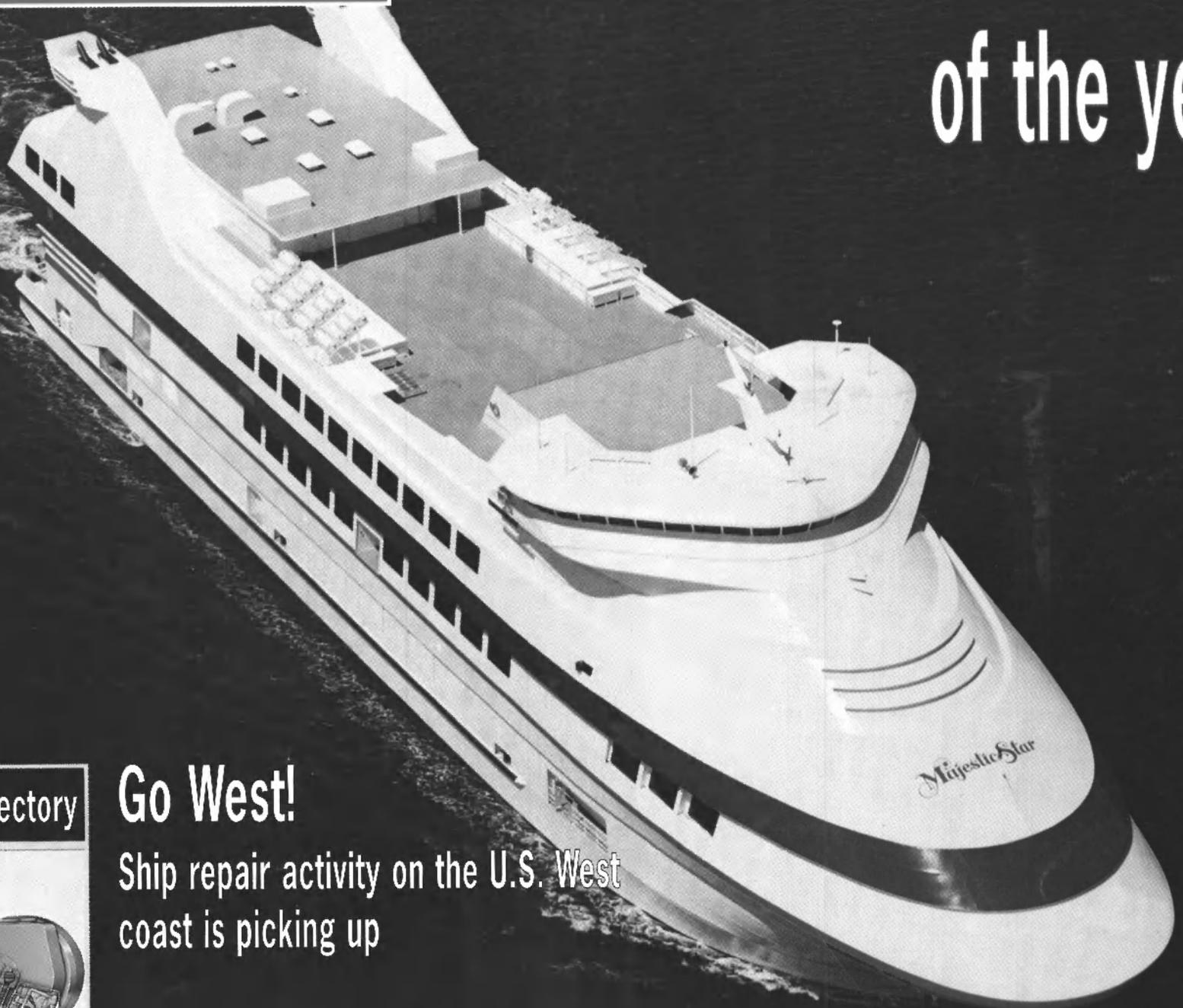
JANUARY 1998

MARITIME REPORTER

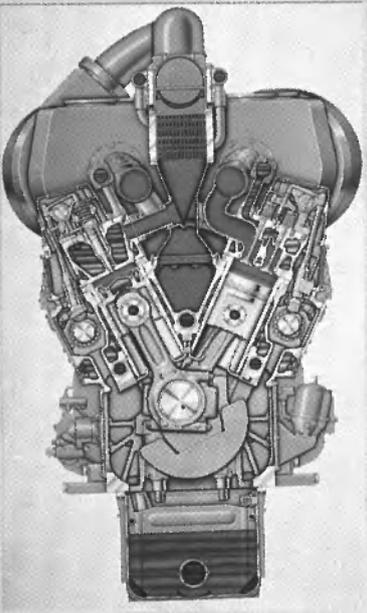
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Great Boats

of the year



Propulsion Directory



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Ship repair activity on the U.S. West coast is picking up

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In This Edition

Pictured on the cover: *Majestic Star* is a 360-ft. (109.7 m) gaming vessel built by Atlantic Marine Shipbuilding and designed by Guido Perla & Associates, Inc. (GPA), which went into service in Buffington Harbor, Ind., last September. Interior design was provided by Directions in Design.

FEATURES

- 8 Investment In Design**
Technical Editor David Tinsley's new monthly column discusses real-world commercial applications of marine technological innovation.
- 25 GREAT BOATS OF 1997**
A gallery of outstanding vessels built last year.
- 38 Fast Fun Down Under**
The Australian maritime industry — traditionally one of the world's more advanced suppliers of fast vessel technology — continues to develop and deliver world class fast ferries. (Pictured here is Incat-built *Devil Cat*)

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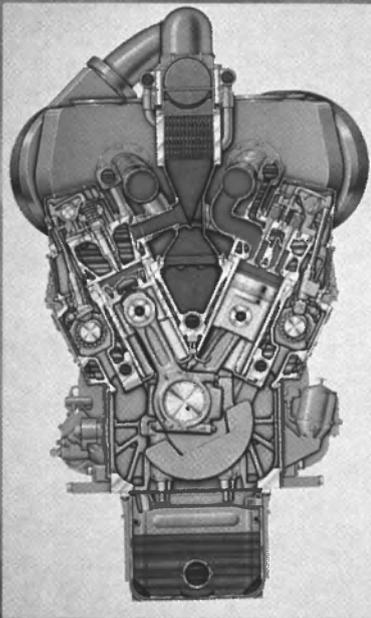
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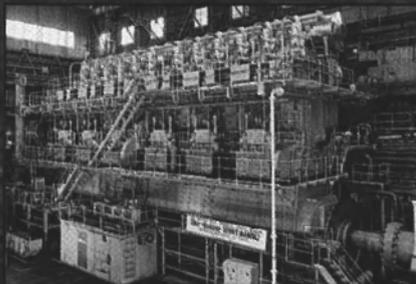
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Propulsion Directory



MR/EN's propulsion directory is an easy-to-use, comprehensive guide to manufacturers of propulsion and related equipment. (pictured here and on the cover is the CAT3618)



The DU-Sulzer 12RTA96C two stroke engine in Aioi, Japan. (See "Investment in Design," page 8)

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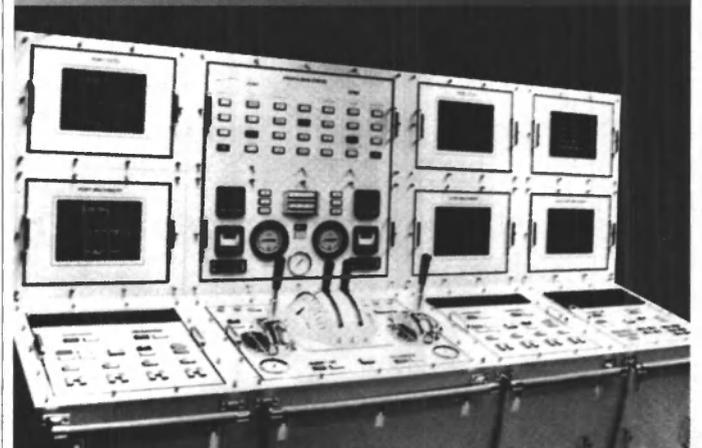
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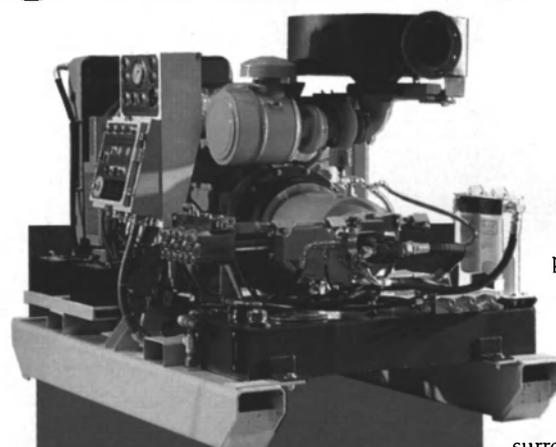
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World's Largest Cruise Ship Completes Sea Trials

Italian shipbuilder Fincantieri said preliminary sea-trials of the *Grand Princess* cruise ship have been successfully completed. The *Grand Princess*, currently under completion at Fincantieri's Monfalcone shipyard for P&O Princess Cruises, is the largest passenger ship ever built. At 109,000 gt, the ship has a capacity of 3,300 passengers and 1,100 crew. The ship will be handed over to Princess Cruises, the Los Angeles-based subsidiary of the P&O Group, in spring 1998.

FGII Wins \$264M In Contracts

Friede Goldman International Inc. (FGII) reported that its subsidiary, HAM Marine Inc., won a \$137 million contract and signed another \$127 million tentative agreement to outfit drilling rigs in the North Sea.

The company also said it had already decided to extend the expansion of offshore facilities being expanded under a project due to be completed next year. The outfitting agreements are with Ocean Rig ASA of Norway, Friede said. Options to outfit a third and fourth rig have been negotiated, the company said.

Marine Drilling Enters \$23M Agreement

Marine Drilling has reportedly entered into a \$23 million contract with Premier Oil for the use of the semi-submersible *KAN TAN 3* rig. The company said that the initial nine-month contract begins on April 1, 1998, for work offshore Myanmar in Southeast Asia. The company said it expects to formalize a contract for subsequent work within the next few months.

Texaco Signs Contract

Texaco Inc. and Falcon Drilling Co. signed a contract for Texaco to use Falcon's *Peregrine VIII*, a deepwater drillship capable of operations in 8,000 ft. of water. The contract provides for a primary term of three to five years, as elected by Texaco prior to delivery.

Falcon will convert the *Kassos*, a 921-ft. oil bulk-ore carrier with a displacement of 135,000 tons. The unit, which is expected to be ready

for service in mid-1999, will have oil storage capacity in excess of 300,000 barrels.

Texaco Exploration President **Bruce Appelbaum** said, "The addition of the *Peregrine VIII* to the fleet of deepwater rigs under contract to Texaco will enable us to pursue our aggressive plans to quickly and cost effectively evaluate Texaco's high potential deep-

water acreage off the coast of West Africa." Texaco currently holds an interest in more than 7.3 million acres in water depths in excess of 1,300 ft. off of West Africa.

Petrobras Contracts

Normand Hunter

Solstad Offshore ASA said Brazil's Petrobras had contracted

the *M/S Normand Hunter* for a three-year period for work on the Brazilian continental shelf. The contract, to begin on February 1, 1998, was worth around 98 million crowns, Solstad said in a statement. Petrobras also has two one year options to extend the contract, which would be worth a further 65 million crowns, the company said.

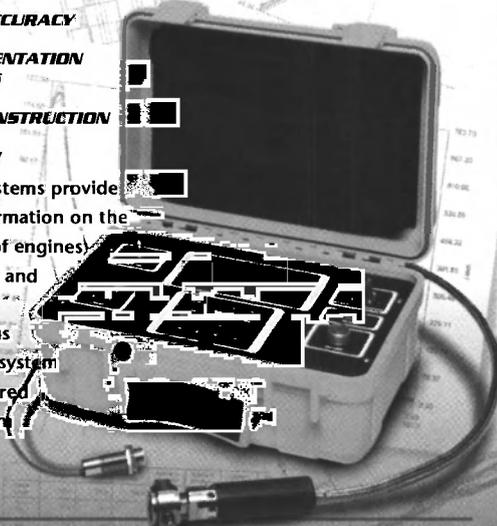
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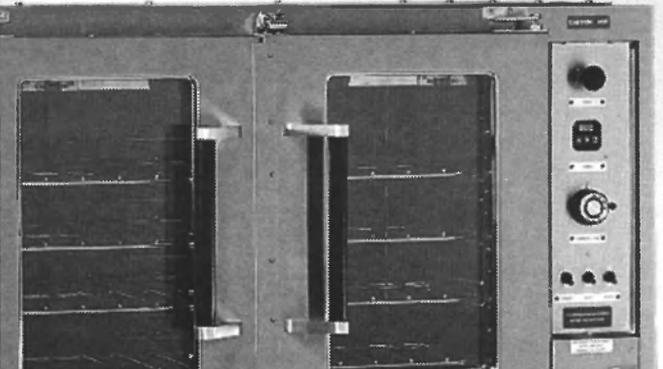
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EDITOR'S NOTE

The beginning of the year is used as a benchmark to assess the progress of personal and professional achievements and goals. In black and white business terms, the new year should mean little more than replacing the calendar. With long-term plans in place and near-term strategizing completed months ago, January 1 is, in reality, just another day. However, there is nothing black and white about the emotions which drive business decisions.



A host of factors which arose during the last three months of 1997 have conspired to leave many in the maritime industry with a certain unsettled feeling entering 1998, which has arisen out of the uncertainty about one word ... Oil.

The oil market was the big driver of maritime business in 1997. As companies activated record numbers of deepwater offshore projects, there were acute shortages of rigs, offshore supply vessels and equipment. Coupled with soaring barrel and tanker rates, the word "boom" couldn't be used enough in stories regarding the market.

But the oil boom armor started collecting dings late in the year, when a series of individual events conspired to collectively upset the oil supply-and-demand balance.

First, the economic troubles of many countries in the Far East have economists projecting — albeit with no real clarity or certainty — the short and long-term effects of oil demands for the region. (Before the troubles began, the Far East economies were seen as major drivers in boosting world oil demand). Second, OPEC's leaders decided to boost production 10 percent in an attempt to capitalize on the peaking demand. Finally, the ongoing saga regarding the on-again, off-again "oil-for-food" deal between the U.N. and Iraq promises to further muddy the supply and demand waters.

Here's the good news.

Although shaken, the foundation on which this oil boom was built remains solid. Companies now have the technologies and the tax incentives to discover and recover resources in deeper and deeper waters. Short term downturns in any business are inevitable, but the fact remains that resources are out there, and someone will get them. Also, there has been hardly a let-up in the number of rig, tanker and related offshore vessel contracts reported to this office. Despite some rumblings about down-sized E&P budgets, it appears that major offshore players are continuing to spend money on new and rebuilt equipment. Finally, word has it that the OPEC oil producers have no intention of glutting the market with unneeded oil, and will produce accordingly as events of the year unfold.

Gregory R. Tranter

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MTW Delivers First Of Five Ice-Breaking Tankers

Russia's LUKoil shipping operation has taken delivery of its first ice-breaking tanker to deliver oil to northern regions of Russia. The tanker, designed for carrying crude and oil products in the Arctic, has seven double-hulled holds and a capacity of 16,000 tons, the company said. At a speed of two knots it can break a layer of ice up to 40 cm thick. The ship, which was built by German shipyard MTW Schiffswerft GmbH, has been named *Perm* after the Russian city. A second ice breaking tanker will be delivered by the yard in February 1998. The company has ordered five tankers from the Wismar-based shipbuilder, with the last vessel scheduled for delivery before the end of 1999. The Admiralty shipyard in St. Petersburg has also contracted to

build another three ice-breaking tankers for LUKoil with the first likely to be ready by 2000.

KT&T Sells Ships, Looks For New Tonnage

Keppel Telecommunications & Transportation Ltd. (Keppel T&T) said that it had sold two vessels for about \$21 million. The vessels, *Steamers Fervour* and *Steamers Faith*, were reportedly sold to Irano-Hind Shipping Company, a joint venture between the Islamic Republic of Iran Shipping Lines and state-owned Shipping Corporation of India. The sale would provide additional resources for the company's plans to acquire other types of ships, Keppel T&T said. "We are looking at growing our tanker business," divisional director **Yong Chee Min**. After the sale, Keppel T&T now has 13 vessels in its fleet. It is building six container ships in China, the first

of which is due for delivery in January, 1998.

Conerj Privatization To Commence Soon

The privatization of Rio de Janeiro's Conerj ferry operation is set for Jan. 30. The state will offer 90 percent of the company's voting

capital, or 1.04 billion shares, at a closed-envelope auction for a base price of 26.4 million reais, it said in a statement. Conerj employees will be allowed to buy the remaining 10 percent of the shares for 1.988 million reais, it added.

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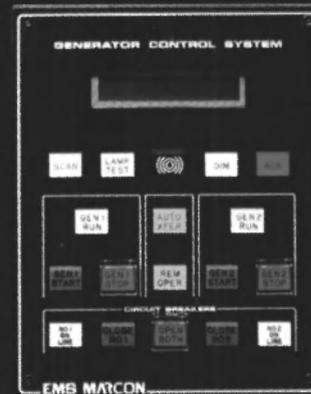
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Vision And Flexibility — Marks Of A Leader



by David Tinsley,
technical editor

RoRo innovator Stena Line has a track record of striking multiple-ship newbuilding deals for carefully crafted designs that readily find a place in the market. Its 11-unit Searunner series built 20 years ago by Hyundai Heavy Industries has proved one of the industry's most successful and versatile classes of RoRo, which has readily lent itself to jumboization and adaptation.

Stena's ability to anticipate the needs of operators and trade in its investment programs was recently demonstrated by its sale to Finnlines of two RoRo passenger ships ordered from Astilleros Espanoles (AESAs), and under construction at the Puerto Real yard in Cadiz.

Homeported in Helsinki, the newbuildings will be strengthened to Ice Class 1A standard, and will emerge with higher capacities than the 2,500 lane meters and 380 passenger berths written into the original Stena specification.

Göteborg-headquartered Stena immediately went on to reinstate its own tonnage commitments in Spain by contracting two further RoPax newbuildings from AESA based on the same concept.

In an almost parallel development, the Swedish group finalized an agreement for the transfer to Turkish account of two of its series of Stena 4-Runner RoRo freight vessels booked with Italian shipbuilder Societa Esercizio Cantieri (SEC). The sale similarly resulted in the program being extended through Stena exercising options on a fourth and fifth ship in the same class.

A total of seven 4-Runner trailer/freight carriers had been envisaged from the start, offering the prospect of one of the largest-ever export programs for Italy's independent shipbuilding sector.

Since Stena is understood to have now concluded charters for two of its newbuildings occupying 1998 delivery slots, there is every likelihood of orders for a sixth and seventh RoRo being placed with SEC.

A distributed system of production, entailing construction of different parts of each vessel at three sites on the Ligurian coast, has been implemented by SEC to enable it to cover the delivery

requirements. Handover of the first of the 12,350-dwt newbuildings is now set for next month. The vessel will be phased into service between Istanbul and the northernmost Adriatic port of Trieste by purchaser UND RoRo Isletmereli, which is also due to place the fourth of the 4-Runner class into the Turkey/Italy trade in April 1999. Turkish road hauliers are the main controlling interests in UND.

This leaves Stena with three newbuildings due to be delivered by SEC in June and October 1998, and October 1999, and with the possibility of an additional two 4-Runners being awarded to the entrepreneurial Italian shipbuilding concern.

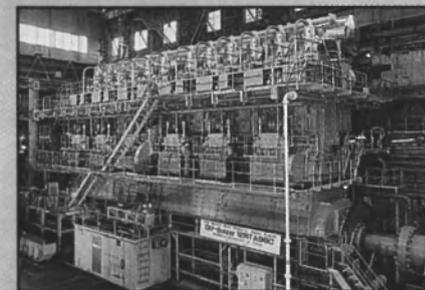
The 4-Runner type, in which the scantlings, layout, hydrodynamic design and powering arrangements facilitate future jumboization or conversion, offers a trailer laneage of 2,715-lane meters. It is equally suited to containers on chassis and mafi-type units as well as to road trailers, and has a primary plant based on four Sulzer 8ZA40S engines delivering a total 23,040-kW for a competitive service speed of 22-knots.

It can be expected to carve a market niche in the way the remarkable, South Korean-built Searunners have done. The fact that those vessels are now reaching an age when replacement will have to be contemplated gives added significance to Stena's latest newbuild initiatives.

Reliability Tantamount To Liner Trade Survival

With ongoing rationalization in the liner sector, and the growing influence of powerful groupings and operating alliances, the pressure to realize ever-greater economies of scale by reducing unit costs per shipped container is unceasing.

The creation of efficient hull designs and development of power plant technology are understated elements in the rapid evolution of the means of container freight exchange witnessed in recent years. This is expressed in the trend to a new generation of line-haul ships combining box intakes of unprecedented scale with speeds of 24 to 25 knots.



The DU-Sulzer 12RTA96C two stroke engine in Aioi, Japan.

But the enormous propulsive energy demands imposed by the post-Panamax breed, already approaching the 7,000-TEU mark, is not purely a function of ship size, dimensions and speed requirement. It is also a factor of service dependability, since schedules are sacrosanct in the liner trades, in which the stakes are getting higher all the time through the intensification of the competitive environment.

Driven by the ship operators' needs, reliability is the number one priority in designing a new large-bore containership engine, confirmed **Rudolf Demmerle**, product manager for the RTA-C range at Wartsilä NSD Switzerland. The Sulzer marque has recently broken new bounds with the 11RTA96C installation of 82,170 bhp in the 5,750-TEU NYK *Antares*, and the 12-cylinder versions of 89,640 bhp supplied to P&O Nedlloyd's 6,674-TEU newbuilds at Kure.

"The risk of missing the schedule with a ship carrying a huge quantity of high-value cargo is an economic threat of the first order," commented Mr. Demmerle. Power availability and margin has to be calculated to ensure that time lost through weather or delays in port can be rapidly made up in tightly-timetabled, high-frequency sailing rotations.

Of course, ensuring a reserve of power also has asset protection and safety implications given the exceptionally high value concentrations represented in such a vessel and its containerized payload. Mechanical reliability bears upon the whole, and upon the operational emphasis on minimum scheduled downtime as well as unscheduled time off-hire, with all which that implies for the design efforts directed toward extended times between overhaul (TBO), corresponding to the periods

INVESTMENT IN DESIGN

between ship overhauls.

Italian Technology ... With Style

Little more than 10 years after its re-entry to luxury passengership construction, determined Fincantieri has attained a highpoint in the niche business of designing and building high-capacity cruise vessels.

Holland America Line's newly-commissioned, evolutionary *Rotterdam*, claimed to be the fastest ship of its type at 25 knots, has been a particular test of the shipbuilder's project management skills and resources, necessitating greater than usual recourse to outside subcontractors for the outfitting stages.

Indeed, there has been unremitting pressure on the system and organization over the last decade to develop what has proven to be a commanding position in the cruise ship market while, at the same time, effecting a major group restructure and turning it from a consistent loss-maker into a profitable undertaking.

The current period of activity in the passenger ship field has been without parallel in a modern-day context, utilizing all efforts at Monfalcone and Venice-Marghera.

The forthcoming completion at Marghera of the 85,000-gt *Disney Magic*, promised for the end of February, will be considered an epochal stage in the industry's development.

In addition, in April, Monfalcone will set a new record with the scheduled delivery to P&O Princess Cruises of *Grand Princess*, which will rank as the world's largest cruise ship in commission at 109,000-gt. How many builders today could deliver three outfitting-intensive, seminal ships, in the shape of the *Rotterdam*, *Disney Magic* and *Grand Princess*, within a space of just six months?

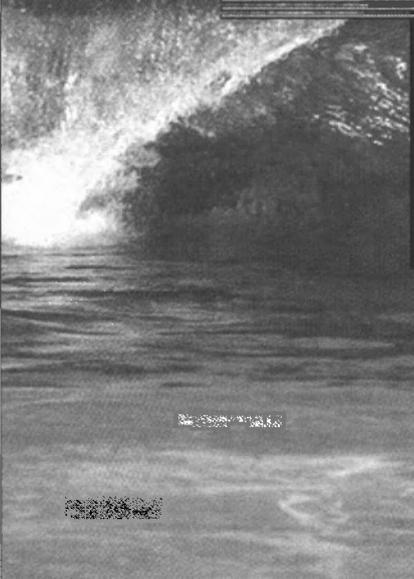
Fincantieri chairman **Corrado Antonini** regards work value

and project sophistication as more pertinent measures of business standing than market share alone, although the Italian group clearly retains the top slot worldwide. Mr. **Antonini** is confident that with the largest technical organization of any European builder, plus two yards orientated to continuous cruise ship construction, it can maintain or even build on its market position.

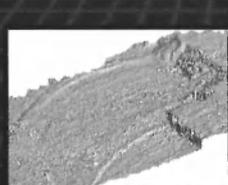
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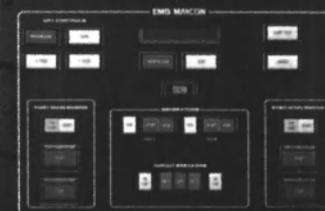
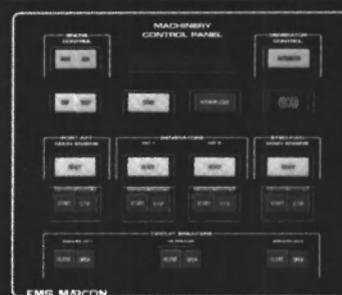
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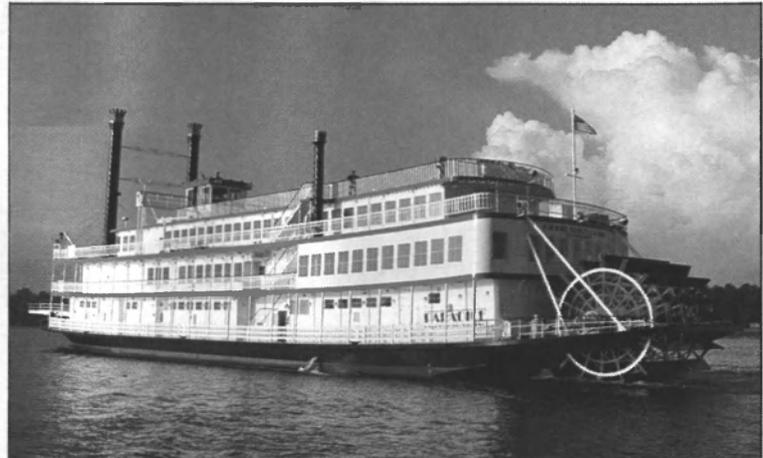
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Occidental Signs \$440M Oil Production Pact

Qatar signed a \$440 million oil production sharing agreement with Occidental Petroleum Corp. for the Idd Al-Shargi South Dome offshore oilfield. The oil field is expected to reach about 50,000 bpd within a few years of appraisal. Qatar already produces more than 670,000 bpd.

Oceaneering Tapped To Build Multi-service Vessel

Oceaneering International was contracted to build a second multi-service vessel for deepwater installation work in the U.S. Gulf of Mexico. To be named *Ocean Intervention II*, it is designed for light construction tasks in deepwater field development programs. The vessel will measure 242 x 54 ft. (73.7 x 16.5 m) with 6,150 sq. ft. of clear deck space, and will offer a fully redundant dynamic positioning system and an 80-ton deck crane.

Circle 13 on Reader Service Card

Stolt Comex Seaway Grabs \$11M Contract

Stolt Comex Seaway was awarded an EPIC contract from Total Oil Marine for the provision of a sub-sea tie-in facility to the Frigg U.K. pipeline for Talisman's Ross field development.

The \$11 million contract involves a welded hot-tap onto the Frigg U.K. export pipeline in the U.K. sector of the North Sea. Hot tapping is a means of connecting a new pipeline onto an existing pipeline, typically an export trunkline, without stopping the flow.

Litton Wins Contract From RCCL

Litton Marine Systems has won a contract to supply integrated bridge systems for the new Eagle-class ships for Royal Caribbean Cruise Lines.

The system will be installed on three ships, which are being built at Finland's Kvaerner Masa-Yards. The first of the 130,000-ton vessels, to be the world's largest cruise ship, is due for delivery in mid-1999.

Circle 17 on Reader Service Card

Bluewater To Deliver Turret Mooring System For Petrobras

A contract for the turnkey construction and delivery of a Turret Mooring system for Petrobras' FSO P-47, to be installed offshore

Brazil, was awarded to Bluewater by AESA/Maritima.

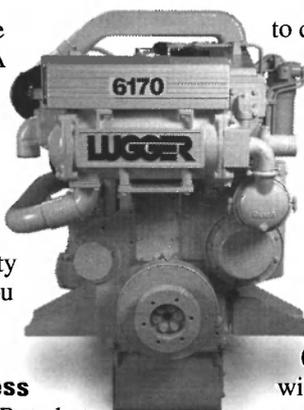
The system will be installed in a 270,000-dwt tanker that will become the storage vessel for the semi-based FPO P-36 (ex-*Spirit of Columbus*) located in the Roncador field. Bluewater also received a contract from Kvaerner Oil & Gas

Ltd. to provide a Turret Mooring System for the North Sea Bittern & Guillemot West fields FPSO. The fields — being jointly developed by Amerada Hess, Shell U.K. E&P and Texaco North Sea U.K. Co. — are due to start producing oil in May 1999.

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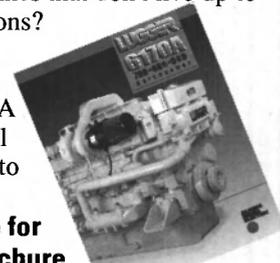
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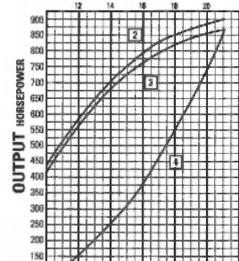
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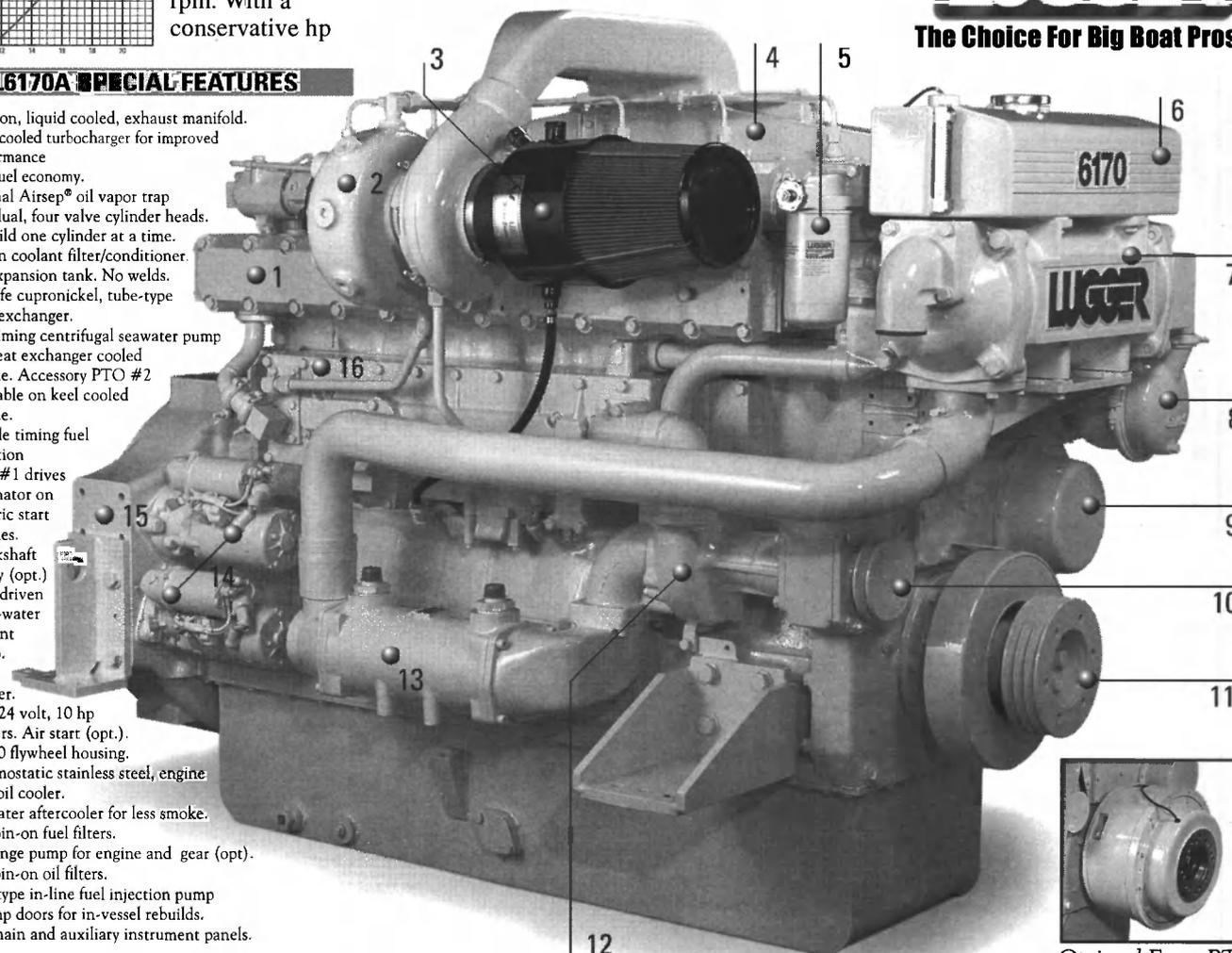
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MARINE FINANCE

Avcorp Diversifies With Fast Ferry Furnishings

Avcorp Industries Inc. signed a \$2.6 million contract and a Development and Marketing agreement with Catamaran Ferries International Incorporated (CFI), a wholly owned subsidiary of B.C. Ferries. The contract is for three shipsets of furnishings comprising more than 1,100 separate units per shipset. Production of the first shipset has already commenced at Avcorp's Aerostructures Division in Richmond, B.C.

Stolt Comex To Debut "Diverless" Ship In Mid-98

Stolt Comex Seaway is upgrading a vessel which will reportedly

be the first ship in the North Sea dedicated to deepwater diverless operations. The 1990-built *Atlantic Surveyor* will be renamed *Seaway Kingfisher* and operate in the North Sea from mid-April 1998. The upgrade, which will include equipping the vessel with remotely operated diving vehicles, will reportedly make *Seaway Kingfisher* the first ship in the North Sea to be solely dedicated to deepwater diverless inspection, repair and maintenance. Stolt Comex reportedly will charter the ship for five years from a joint venture company it owns with North Sea Shipping A/S.

Bill Brown Wins Cruise Vessel Contract

Bill Brown Enterprises has won

a contract awarded by Chesapeake Odyssey Cruises to furnish the HVAC system on a new 160-ft. (48.7-m) cruise vessel.

The Carrier Transcold unit will be installed at the Chesapeake shipyard.

Circle 12 on Reader Service Card

Friede Goldman To Build New Rig

Friede Goldman announced an agreement with Marine Drilling Co. to build a new semisubmersible drilling rig, *Marine 700*, using an existing bare hull. The project is estimated at \$87 million for HAM Marine, a Friede Goldman company. *Marine 700* currently consists of pontoons, columns and partial first deck structure only. Purchased by

Marine Drilling this year, the original Bingo 8000-designed hull was completed in March 1997, and parked offshore Stavanger Norway. *Marine 700* will be designed to work in water depths to 5,000 ft.

Circle 16 on Reader Service Card

Minoan Contemplates High Speed Vessel Order

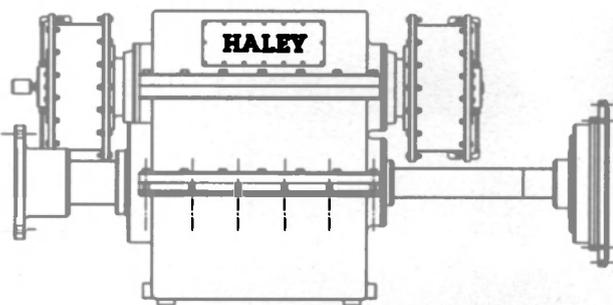
Minoan Lines is reportedly considering ordering two more high speed vessels. As it took delivery of its second high-speed ferry *Ikarus*, the company said in a statement that it intended to pursue a strategy of upgrading its fleet with new high-speed vessels. The company is considering the vessels to replace aging units on its Piraeus-Irakleion (Crete) service.

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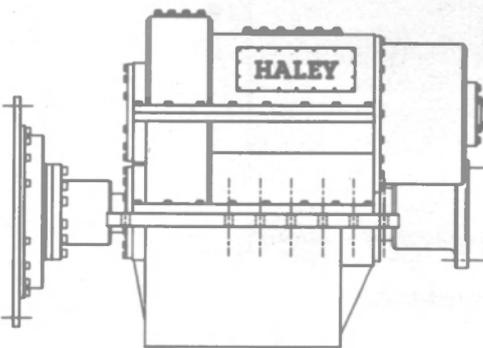
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USACE Seeks Boat Builder

The Marine Design Center (MDC) of the U.S. Army Corps of Engineers (USACE) intends to initiate a negotiated procurement to acquire one fisheries research vessel to serve the U.S. Geological Survey, Biological Resources Div. in support of its research mission on the Great Lakes.

The vessel to be acquired will be a self-propelled, steel or aluminum constructed, monohull vessel.

The vessel will support gill net and trawling operations, and will house wet and dry lab spaces where scientific research activities will take place. Accommodations for scientists and vessel crew are also required. It is anticipated that the length of the vessel will be approximately 80 ft (24.4 m).

The proposals will be evaluated on technical, management and cost factors, with emphasis in that order. A more detailed evaluation criteria will be included in the solicitation. Offerors are advised that their proposal must be within the Government's budget limitation — under \$3 million — which will be identified in the solicitation. The RFP package was scheduled to be available last month.

Interested parties may contact: U.S. Army Corps of Engineers, Philadelphia District, Wanamaker Building, 100 Penn Square East, Philadelphia, Pa. 19107-3391, Tel: (215) 656-6894; ATTN: CENAP-CT (Ms. Cheryl Watson); SOLICITATION NO. DACW61-98-R-0007.

Delmar To Provide Suction Anchor System For MODU

Delmar Systems entered a five-year agreement with Shell Deepwater Development to provide a Suction Anchoring System for rig mooring in water depths to 8,000 ft. (2,438 m). It will reportedly be the first such system used in conjunction with a Mobile Drilling Unit, and the first complete system to be installed in the Gulf of Mexico.

The mooring system allows for pre-deployment, enabling the rig to commence operations shortly

after arriving at the drilling location. The system also includes Delmar's proprietary Subsea Connector (patent pending) which facilitates deployment and allows several connection options between the anchor pile and mooring wires. The installation procedure requires only one conventional

anchor handling vessel for deployment.

Circle 14 on Reader Service Card

Consortium Tapped For Submarine Contracts

The Chilean Navy has approved

the purchase of two 1,600-ton Scorpene submarines from a Spanish-French consortium.

The Navy's admiralty has reportedly approved plans to purchase the submarines — estimated at \$200 million each — from the French DCN and the Spanish Bazan shipbuilders.

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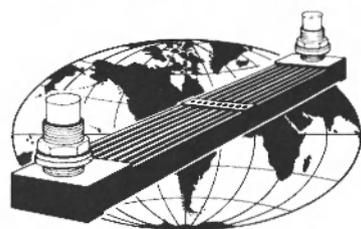


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MARINE FINANCE

ERC Wins Contract From J.J. McMullen

Energy Research Corporation (ERC) has received a \$270,664 contract from naval architectural firm John J. McMullen Associates, Inc. to design a Direct Fuel Cell Power Plant configuration for a U.S.

Coast Guard (USCG) maritime application. This design effort is expected to lead to the construction and demonstration of a fuel cell power plant in a land-based setting followed by installation on a USCG cutter.

"The project is synergistic with the company's recent contract with the U.S. Navy to develop a ship

service fuel cell announced on September 20, 1997. Power plants for naval and commercial ships offer a potentially large fuel cell application. ERC has already successfully demonstrated operation of its fuel cell on diesel fuel and other logistic fuels," said **Jerry Leitman**, president and CEO.

Circle 18 on Reader Service Card

JRM Nabs Shell Offshore Contract

J. Ray McDermott (JRM) was awarded a \$25 million contract from Shell Offshore Inc. for construction of a fixed-base platform for an offshore development in the Gulf of Mexico. The platform is a light-weight, six-well structure capable of supporting a self-contained drilling rig and equipment for a minimum production facility. JRM will fabricate the three-leg jacket and transport and install the jacket and deck for Shell's Cinnamon development at Green Canyon Block 89, located in 671 ft. of water, 176 miles southeast of the mouth of the Mississippi River.

Circle 15 on Reader Service Card

CCC Fabricaciones Wins Three Offshore Contracts

Global Industries Ltd. subsidiary CCC Fabricaciones Y Construcciones SA de CV has been awarded three offshore contracts valued at about \$160 million. CCC is to perform a range of offshore construction and support activities for Pemex Exploracion y Produccion in the Bay of Campeche.

The first of the contracts was scheduled to begin by the beginning of this year. Under the terms of the first two contracts, which are expected to take about 12 months to complete, CCC will support the development of Pemex's Cantarell Field.

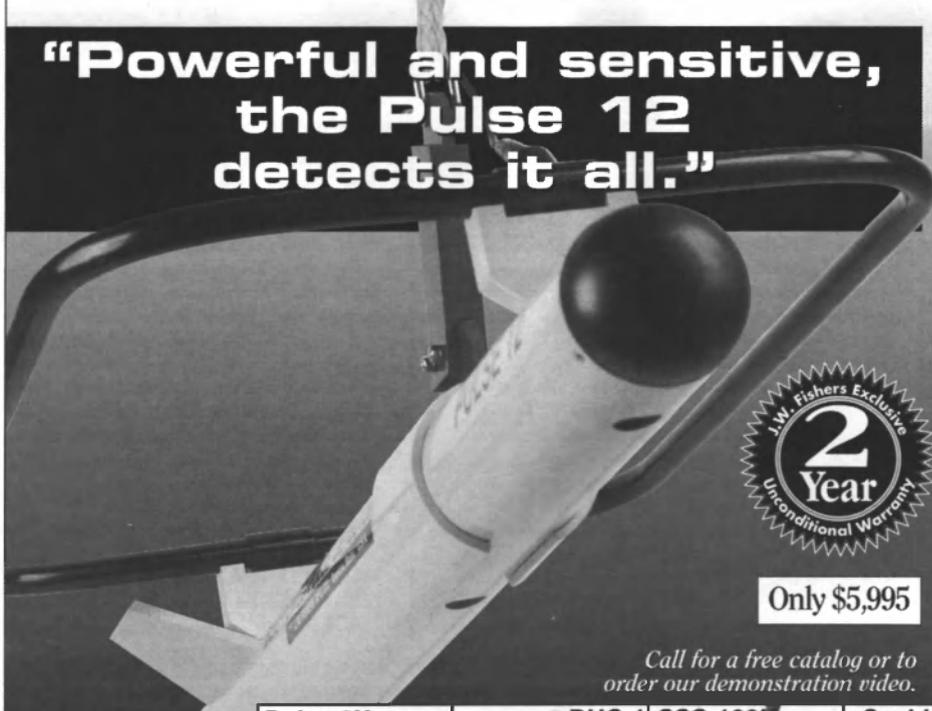
Under the third contract, CCC is to design, procure, lay, bury and test 30 km of 36-in. diameter pipeline linking the Akal J Complex to Pemex's floating storage offloading unit FSO-1.

Actinor Buys Paal Wilson Ships For \$26M

Actinor Shipping ASA has acquired 23 small bulk carrier ships from its majority shareholder Paal Wilson & Co. for \$26 million. The transaction includes the ships and their charter commitments. According to Actinor, the deal is in line with its acquisition in October of a 70 percent stake in Norwegian bulk carrier operator Jebsens SA for \$20 million.

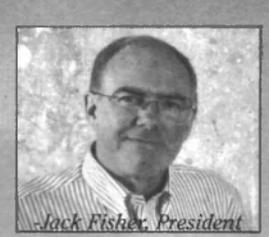
Paal Wilson, a private Norwegian firm, acquired a controlling 62 percent stake in Actinor earlier this summer.

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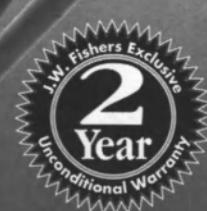
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Umoe Schat-Harding Relocates

Safety system supplier Umoe Schat-Harding has moved its corporate headquarters from Utrecht in the Netherlands to Rosendal in Norway, home of its lifeboat manufacturing subsidiary Umoe Schat-Harding AS. The switch to Norway is accompanied by changes to three key managerial positions: **Jarle Roth** has been promoted from managing director to chairman; **Svein Arne Saeberg**, who is currently managing director of Umoe Schat-Harding AS, will succeed him as managing director; and **Arne Dubvik**, managing director of Umoe Schat-Harding's Singapore office, will take over the position of marketing director from **Rob Bunders**.

Circle 20 on Reader Service Card

BV Wins Norwegian Business

Bureau Veritas (BV) has made significant in-roads to the Norwegian market of late. The largest passenger ferry ever built in Norway will be classed by BV, and most of the vessels operated by Jebesen Shipmanagement are to change class to BV.

Jebesen Shipmanagement operates a modern fleet of 32 vessels out of Norway and 12 out of London, totaling almost 300,000 gt. Forty of these will change class to BV.

Circle 21 on Reader Service Card

BIMCO Survey Shows Its Members Are Ready For The ISM Code

BIMCO recently processed the results of its survey to shipowners regarding ISM Code implementation, and the results show that more than 95 percent of the tonnage controlled by its owner members will be able to trade after June 30, 1998, according to a recent survey.

BIMCO's 1,000 shipowners represent a fleet of 12,227 ships with a capacity of 407.7 million dwt, or about 56.4 percent of the world merchant fleet.

Seven hundred and two shipowners representing 336.4 million dwt — or 89.4 percent of BIMCO's tonnage — responded to the questionnaire.

BIMCO said that 449 shipowners, representing 333.6 million dwt, replied that they either are, or expect to be, in possession of ISM certificates by the June 1998 deadline.

Another group of responding members were owners of ships that are subject to certification by the year 2002 only.

Their tonnage amounted to 18.5

million dwt, owned by 178 companies.

Further responses indicated that 65 owners with a total of 9.3 million dwt will be under third-party ship management or under bareboat charter to companies with ISM certification.

A group of 163 shipowners representing 27.8 million dwt had not responded before the deadline of

the survey, however, this category includes 131 owners whose fleets will not require certificates until 2002.

The standing of the remaining 14 owners, who do require certificates, is such that BIMCO cannot have any doubts that they will be in possession of ISM certificates by the deadline.

Circle 22 on Reader Service Card

On
The
Way

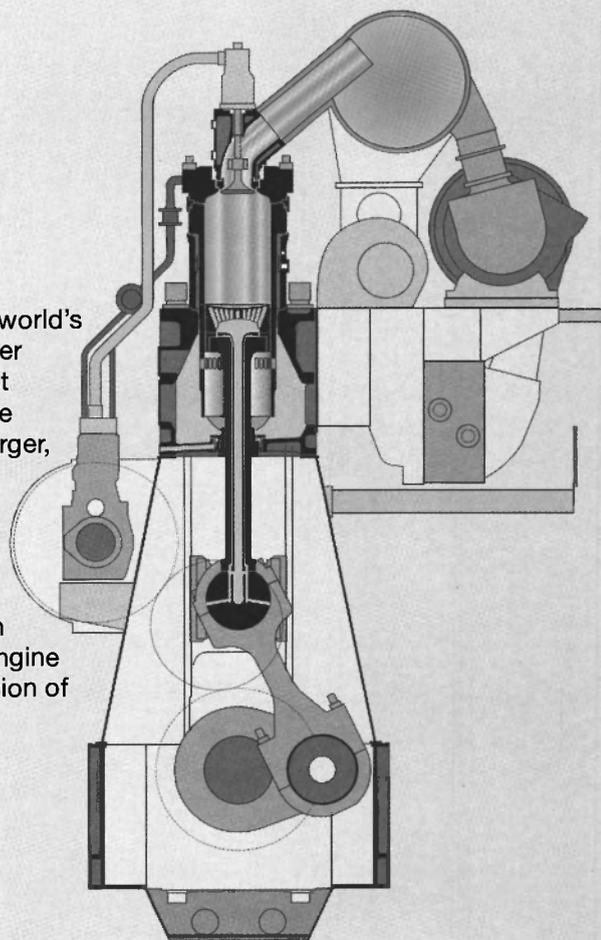
SULZER RTA96C

The World's Most Powerful Diesel Engine

The 90 000 bhp Sulzer 12RTA96C

Autumn 1997 will see the starting of the world's most powerful diesel engine, a 12-cylinder Sulzer RTA96C engine developing almost 90 000 bhp. It has been developed as the driving force for the new generation of larger, faster Post-Panamax containerships in line-haul services.

Already 11-cylinder RTA96C engines have been built since March this year. The largest diesel engine in production today, the RTA96C incorporates a wealth of experience from the Sulzer RTA84C engine which is the market leader in the propulsion of large containerships.



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Halla To Apply For Receivership

The Halla Group — Korea's 12th-largest industrial conglomerate — said its three core units planned to apply for special court protection against creditors due to financial troubles.

A company report also said that

unlisted Halla Engineering and Heavy Industry Co. (HEHI) had already applied for court receivership.

New Tank Survey System Launched

Bureau Veritas (BV) has launched HITS, a system which is

designed to improve inspection and certification of ISO tank containers.

HITS (Help for In-service/Initial Tank Survey) links tank surveyors with BV's central Info-tank database via hand-held computer. It schedules inspections and provides the surveyor with records of tanks and inspections needed. It provides

an automated format for four basic inspections, the results of which are automatically error-checked as the surveyor enters them on-site. Survey data is then downloaded to the central database by modem or LAN.

"HITS enables us to capture tank inspection data more quickly and accurately, and integrate it with our central database easily so that the right certificates can be issued," said **Michel Hennem** and, head of the transport department in Bureau Veritas' industrial division. "The system has proven itself in trials in North America, where it has cut paperwork and delivered certificates more quickly to clients."

HITS was developed for BV by New Jersey-based CTB. It is in use in the U.S. and will be introduced globally during 1998.

Circle 23 on Reader Service Card

Planet 1 Service Available For Maritime

Comsat Mobile Communications announced the availability of Planet 1 service for the maritime community. Planet 1, COMSAT's brand of Inmarsat Mini-M service, is designed to deliver reliable voice, fax, and data to boats of any size.

Circle 24 on Reader Service Card

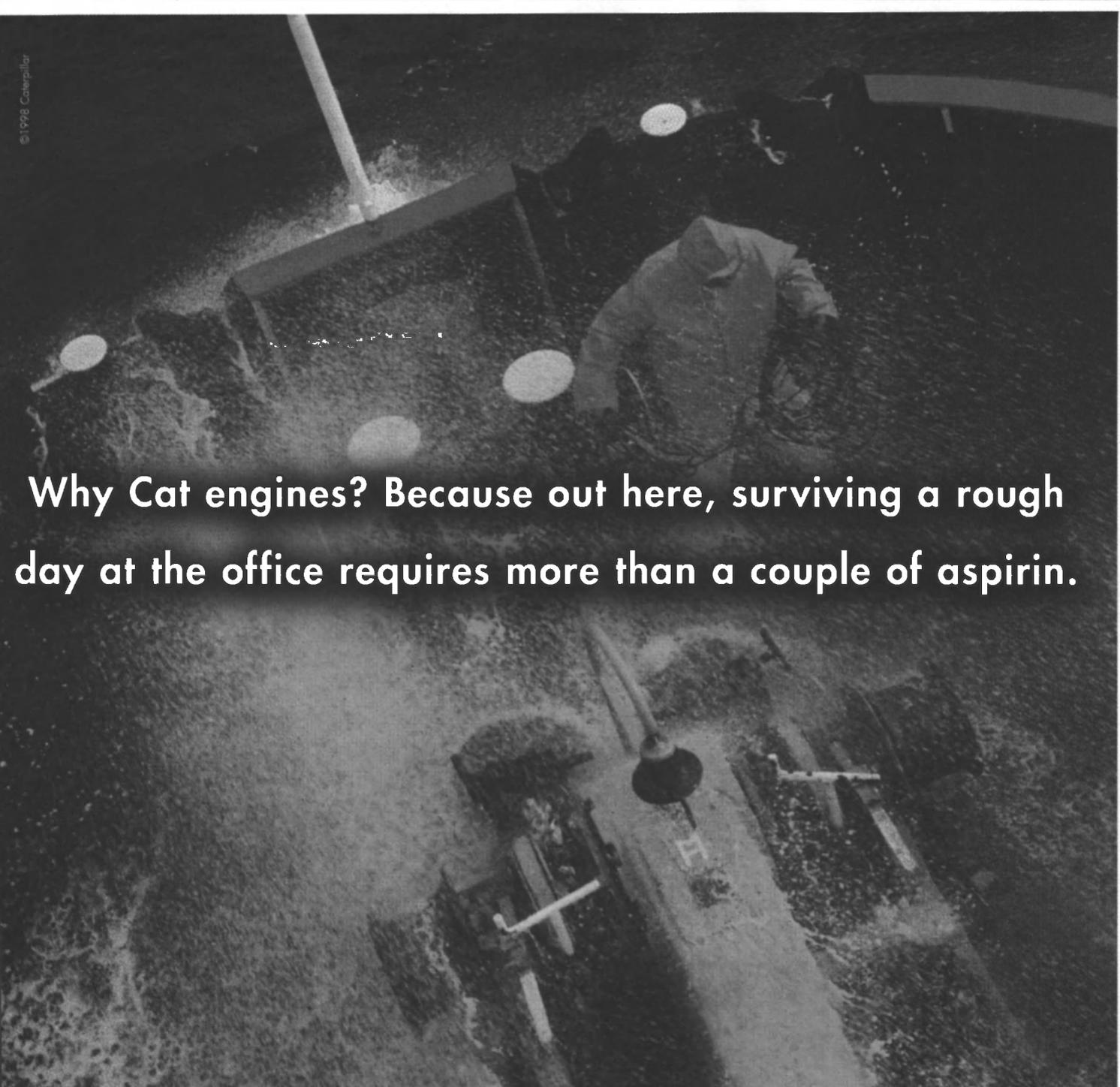
McCoy To Step Down

Hugh McCoy, managing director of Horace Clarkson Plc, will retire in February, a year earlier than planned. Mr. **McCoy**, who was also chairman of H. Clarkson & Co., is set to become the chairman of the Baltic Stock Exchange in June.

Gary Weston, a director of Horace Clarkson Plc and deputy chairman of H. Clarkson & Company Ltd. is planned to succeed Mr. **McCoy** as chairman of H. Clarkson & Company.

KOTC Earns ISM Certification

The Kuwait Oil Tanker Company (KOTC) has received new international safety documentation which will be required by oil tankers to enter major ports from July 1998. KOTC has a fleet of more than three million dwt, comprising 21 tankers and six gas carriers. It also has two tankers under construction.



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Litton Unveils ISIS 2500

Litton Marine Systems recently introduced its new ISIS machinery monitoring, alarm and condition assessment system.

The ISIS 2500 uses the advanced WindowsNT 32-bit platform to provide a powerful Information Technology (IT) tool for ship-wide alarming and condition assess-

ment for virtually all vessels.

The system features vibration analysis, cylinder firing pressure, event capture, advanced trend analysis and real-time expert analysis.

The ISIS 2500 is compatible with existing ISIS installations and is capable of accepting information from sources including portable vibration monitors and data termi-

nals. The ISIS 2500 integrates vibration and process measurements, builds and monitors performance curves and makes automatic real-time condition assessments before issuing corrective action advisories.

This workstation permits the operator to view data through intuitive information displays and analysis tools, providing a clear

picture of equipment conditions throughout the ship.

Circle 3 on Reader Service Card

NCL To Build \$300-M Cruise Ship

NCL Holding ASA will build a \$300-million, 2,000-passenger cruise ship to be named M/S *Norwegian Sky*.

The 76,000-ton vessel will be built by Germany's Lloyd Werft, under the direction of Tillberg Design, for delivery in August, 1999.

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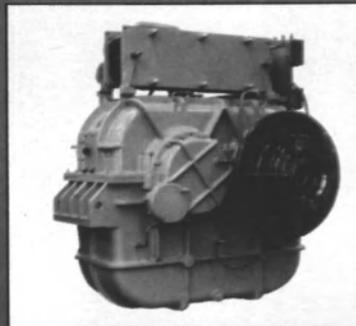


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Circle 209 on Reader Service Card

VT Designs Offshore Vessel For Naval Operations



U.K. naval shipbuilder Vosper Thornycroft (VT) has designed an offshore patrol vessel (OPV) based on leading-edge technology developed for corvettes built for service with the Royal Navy of Oman in the Arabian Gulf. The design is the basis for the 285.4 ft. (87 m) patrol vessel required by the Royal Malaysian Navy (RMN) and the 272.3 ft. (83 m) OPV being sought by the Philippine Navy.

The projected vessel will have high maneuverability, a speed in excess of 20 knots, a range of 6,000 nautical miles at full load displacement and accommodations for a crew of 90.

To minimize radar reflections, the RMN OPV has smooth topsides and the complete superstructure of the ship will be manufactured of composite materials with conducting surfaces. Weapons onboard the vessel include a naval gun and surface-to-air and surface-to-surface missiles.

Also incorporated on the vessel are landing and hangar provisions for a medium-sized helicopter.

Circle 1 on Reader Service Card

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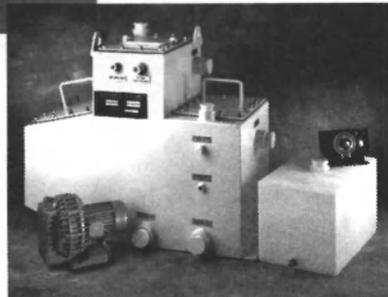
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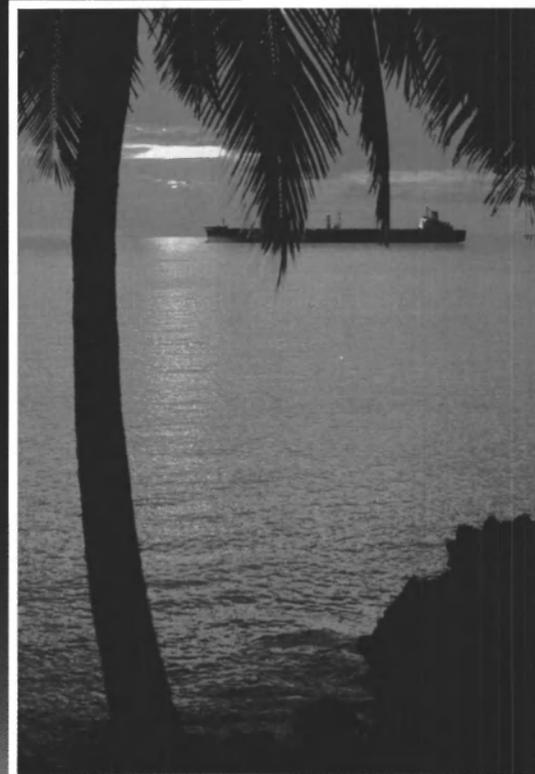
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Circle 297 on Reader Service Card

SOFTWARE SOLUTIONS

Barney Named To Top Post

Marine Management Systems Inc. (MMS) named **Michael Barney** president and CEO. **Barney**, who was previously COO, replaces **Eugene Story**, who has been named to the new position of chairman. MMS is a global marine

software provider.

Consilium Marine Presents New VDR System

Consilium Marine has launched its new Voyage Data Recorder (VDR), which is available with an

IT package for shipowners. The system can be installed to record and store successful maneuvers as well as near misses, incidents and accidents. Radar images will be recorded continuously, as will video information. The retrieved information can then be replayed onboard or in offices ashore.

Latest voyages can be reviewed and specific data can be selected. In addition cargo data can be stored and reviewed.

Circle 45 on Reader Service Card

Chilean Shipowner Selects MMS Software



CSAV vessel Santos.

Marine Management Systems (MMS), a global marine software provider, announced that Southern Shipmanagement Ltd. (SSM) of Valparaiso, Chile has purchased MMS Fleet Manager Enterprise for Windows systems for its fleet of 17 vessels, plus 20 MMS FleetLINK communications systems for its parent company CSAV. The value of the initial contract, which includes software, hardware and services, is approximately \$300,000.

Fleet Manager Enterprise for Windows is an integrated software solution that manages inventory, ordering, planned maintenance, communications and e-mail, vessel reporting, personnel and payroll, forms, ISM and classification requirements, and fleet-wide reporting.

Southern Shipmanagement also acquired SNAPS (ShipNet Advanced Purchasing System) from MMS.

Built by ShipNet AS, a MMS strategic alliance partner, SNAPS is a complete purchasing package that is seamlessly integrated with the MMS inventory and requisitions system.

"The decision to choose MMS was primarily based on the fact that MMS is an international corporation involved in the business for many years," said **Hector Arancibia Sanchez**, CEO, Southern Shipmanagement. "SSM believes that first class ship managers should ensure that all their vessels and shore systems are closely linked by using modern communication and data processing technologies. To accomplish this, SSM has chosen MMS to achieve both swifter and more rational data flows."

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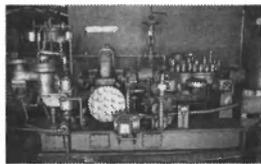


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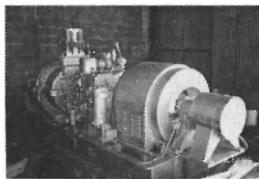
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Size	PSI	Manufacturer	Qty
24"	50	Crane	3
27"	30	Chapman-All Brz.	2
32"	50	Fabri-Cast Iron	1
48	50	Fabri-Cast Iron	1

Smaller Sizes Also Available

BRAND NEW Bingham Deep Well Pumps

Type: VTX Size: 8 X 16, 2-Stage
GPM: 2000@340' RPM: 1760

REBUILT Detroit Diesel 6-71 Diesel Generator Set

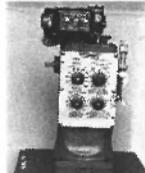
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Length: 59" Height: 3" Width: 2.5"
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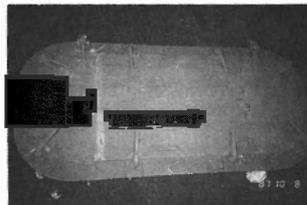
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Other Sizes Also Available

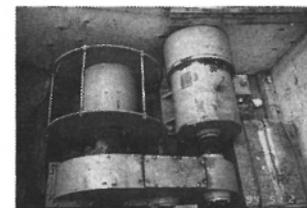
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11,000 LBS at 45 ft/min
15 HP, 440 V, Motor

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GPM: 1255 @ 1456 PSI, 1336 HP

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Capacity: 15TF x 20 M/Min
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Circle 246 on Reader Service Card

The Top 10 Things We Want You To Know About RTF Refrigerators and Freezers

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Complete Size and Style Offering From 4 Cubic Feet to 90 Cubic Feet Capacity.

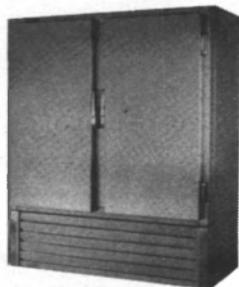
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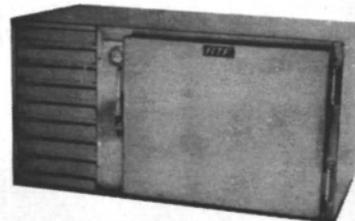


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Before TMT GreaseMaster.



After TMT GreaseMaster.

TMT Services Corp. has successfully completed soft coating removal with its GreaseMaster cleaner on the forepeak tank of Sea-Land Service Inc. vessel *Discovery*. The work was performed during a regular call at the Port of Long Beach, facilitating steel work to be done in the ballast tank during upcoming drydocking. This was reportedly the first time a major shipping line utilized GreaseMaster to perform such a task.

The process eliminates the use of toxic chemicals and/or media blasting, as well as ultra hydro blaster pumps.

The process was completed with one 3,000 psi pressure washer, operating at temperature of 130 degrees F.

Circle 10 on Reader Service Card

Dataworks Takes Over Charter Shipping Software

London-based shipping software specialist Dataworks has taken over specialist shipbroking software developer Charter Shipping Software.

Lawrence Royston, director of Dataworks said, "We are delighted to have been able to take full control of Charter. It has a uniquely strong portfolio of software for shipbrokers, which fits naturally with our message handling software and network expertise. The

take over consolidates our position as a market leader.

"It brings together two strong teams under a unified management which will be able to give better support and service to our customers and speed development of systems which meet the real practical needs of the shipping indus-

try."

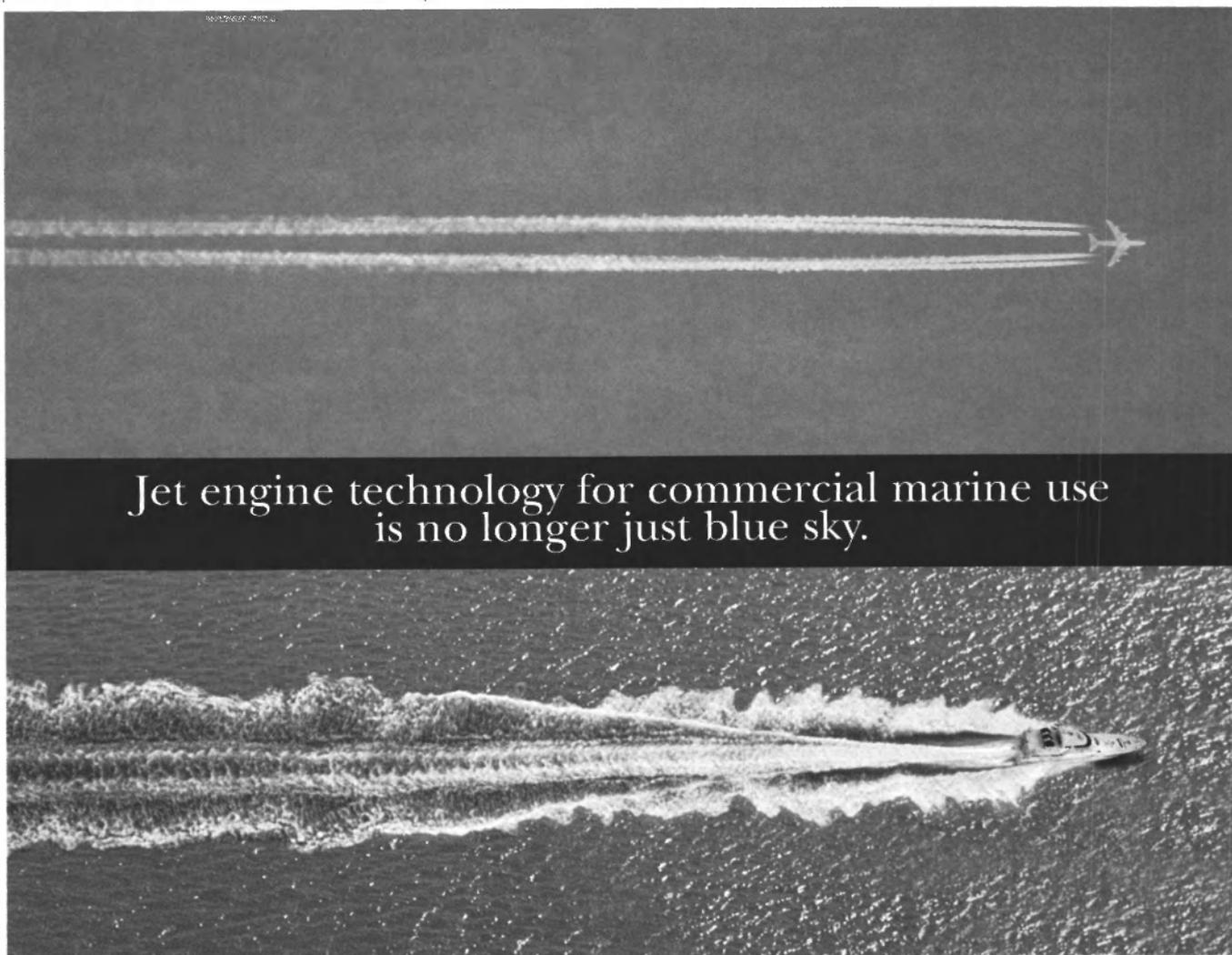
Dataworks was founded in 1989 to meet demands for easy-to-use and cost-effective PC-based Windows communications systems.

Its client base extends through distributors to Greece, the Netherlands, Australia, South

Africa, the UAE, Norway, and Hong Kong.

Dataworks has progressed to become a market leader in the software industry, and is active in the development of specialist software to solve problems in the shipping industry.

Circle 44 on Reader Service Card



Jet engine technology for commercial marine use is no longer just blue sky.

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Alabama Shipyard, Inc. - Mobile, Alabama



Atlantic Dry Dock Corp. - Jacksonville, Florida



Atlantic Marine, Inc. - Mobile, Alabama

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Great Boats Of 1997

Passenger Vessel Focus:

The Jumbo Mark IIs — Pride Of The Washington State Ferry Fleet



M/V Tacoma

by Kathleen Gleaves, contributing writer

High tide on August 21, 1997, marked a pinnacle for the Washington State Ferry System as well as millions of ferry passengers. That day the first of three new ferries joined the fleet, a second hull was launched, and the pre-constructed modules for a third ship awaited their turn on the building slip. A crowd of several hundred stood aboard the newly completed M/V Tacoma and watched as its sistership M/V Wenatchee was launched into the Duwamish Waterway in Seattle, as Tacoma had done just one year prior.

The addition of Tacoma to the Washington State Ferry Fleet was, however, the main event of the day. The vessel is one of the most modern ferries in the world, and features many unique innovations.

Passengers enjoy cruise ship quality interiors with comfortable seating areas indoors and on the open-air deck, plus, in consideration of Seattle's annual rainfall, a solarium protected from the elements by wraparound windows. Attractive commercial lighting replaces the harsh industrial fixtures commonplace on many working vessels.

Regular commuters will appreciate the special computer-users area and expanded restaurant-quality dining options.

Enhanced handicap accessible facilities, furnishings upholstered in fashionable color schemes accented with brass trim, plus attention to the needs of families traveling with young children round out a long list of amenities.

Technical Highlights

Below the main deck is where the true innovations abound. The move from bare-bones, functional vessels to vessels designed with passenger comfort in mind demanded an increase in hotel power for lighting, heat and air conditioning, as well as expanded dining and computer services. A central electric generating plant met the expanded hotel power needs and provided the reliable power generating system necessary for the specialized propulsion system, a synchronous variable-speed AC motor with cycloconverter drives. Previously used only on icebreakers and some cruise liners, this is the first known application of cycloconverters for ferry service. This system has the added benefit of saving both space and money.

Double-ended ferries are a trademark of the Washington State Ferry System. Basically the bow of two boats joined end to end, these vessels must operate identically from both ends and in both directions. This presents unique problems when each end of the vessel must operate alternately as both bow and stern. Steering, propeller shaft operation, navigation equipment, etc. must be interchangeable.

Designers and operators listed reliability as their foremost concern. A single failure of any kind must not prevent the boats from continued normal operation and must not interfere with their tight sailing schedule. To achieve the required performance reliability, the ship has a high level of redundancy including the equivalent of two complete, independent propulsion

systems on each end, with each system having additional internal redundancy.

To avoid re-inventing the wheel, Ferry System designers opted to use an existing, proven hull design, that of the Jumbo Class ferries, a series of ships built 25 years ago. The design was modified slightly to accommodate 500 more passengers and 12 additional vehicles. The interior layout of the new vessels and virtually all internal systems were designed from scratch by the Ferry System's Vessel Design Section, with input from a Steering Committee comprised of port engineers, staff chiefs, captains, deck crew and representatives from the maintenance department. The committee laid out a long list of criteria to be met, setting the general direction designers and engineers would follow.

Spacious work and storage areas were built into the below-deck areas. A large, well-equipped machine shop and electric shop are part of the design, not just improvised out of dark corners. Rows of well-lit shelving for parts storage and wide walkways in the engine room make it easier for engineering personnel to do their jobs. Staff Chief Ihor "Iggy" Husar described some of the other operating conveniences built into the ship: closed circuit TV screens monitoring all major areas of the vessel from boarding ramps to passenger spaces; a 1,700-point alarm and monitoring system which scans all points once every 200 milliseconds; a computer-controlled heating and ventilation system; low-maintenance, energy efficient lighting; and a master clock system.

Suppliers, subcontractors, designers and builders formed a team with all parties working together to produce a world-class working vessel. Todd Pacific Shipyards, Seattle Division, won the construction contract. Having the shipyard located only a few miles from the Vessel Design section offices simplified day-to-day communications between builders and engineers.

Todd selected the modular construction method used by the British Columbia Ferry System three years earlier for their Spirit-class vessels. Rolland "Rollie" Webb, vice president and general manager of Todd, oversaw the Spirit project and brought key personnel, as well as lessons learned, to the Jumbo project.

Siemens Marine Systems Division played a major role in coordinating all aspects of the propulsion and power plant, using components constructed in their German and Canadian manufacturing plants, as well as subcontracting Kato Engineering for the main alternators, and General Motors Electro Motive Division for the main engines. Siemens Project Manager Stefan Stan said, "This is one of the most

(Continued on page 29)

Great Boats Of 1997



Seacor Vision

BuilderHalter Marine Inc.
Vessel nameSeacor Vision
Vessel typeAHTS
Owner/operatorSeacor Smit, Inc.

Halter Marine Group delivered *Seacor Vision*, a 225-ft. (68.6-m), 12,280-bhp anchor handling/towing supply (AHTS) vessel to Seacor Smit, Inc.

The vessel, which was built by Halter's Moss Point Marine, is the first in a series of four contracted by Seacor to Halter.

It is designed to meet requirements for deepwater service in the Gulf of Mexico and the worldwide market, and the 23rd Halter-built offshore supply vessel to be operated by Seacor.

"This is a truly contemporary international workboat with a modern anchor handling system, a thoughtful layout to meet the needs of improved safe working conditions and accommodations to provide crew comfort, advanced position/station keeping systems that include stern and bowthrusters, dynamic positioning and enlarged cargo capacities. It represents a leap forward from the 1980s Gulf of Mexico-style vessels to an international design," said **John Dane III**, chairman, president and CEO of the Halter Marine Group.

All-steel *Seacor Vision* has a 52-ft. (16-m) beam and a 22-ft. (6.7-m) deep hull.

The vessel's double bottom hull and other safety features meet SOLAS and new U.S. Coast Guard subchapter L requirements.

Power is provided by four GM EMD 16-645-E7B diesel engines driving through Reintjes compound reverse/reduction gears. Propulsion is through Berg 140-in. four-blade controllable pitch propellers in Kort nozzles.

Maneuverability is aided by two 600 bhp, DC motor-driven bowthrusters and one 600 bhp, DC stern-thruster.

Anchor handling and towing is handled by a Smatco 116 EAQ 660 double drum waterfall, 850 hp DC electric winch with 660,000 lbs. of line pull. Each drum can reportedly hold 7,900 ft. of three-in. wire rope. *Seacor Vision* recorded a bollard pull of 158.6 metric tons during sea trials.

Additional towing and anchor handling equipment includes two retractable Triplex shark jaw chain stoppers each with a capacity of 350 tons, two retractable Triplex towing pins, an 8 x 12-ft. (2.4 x 3.6-m) stern roller, two 45,000 lb. capacity tugger winches and two wire storage reels each with a capacity of 8,000 ft. of 3.24 in. wire rope. Additional deck equipment includes two 10,000 lb. capstans, an anchor windlass and a five-ton capacity crane.

The 127 x 41-ft. (38.7 x 12.5-m) aft deck can reportedly accommodate up to 1,200 long tons of cargo.

Seacor Vision is equipped with a Simrad/Robertson DPS and its pilot house features Berg controls, Sailor VHF and SSB radios, Sperry radars, a Tokimec gyro and a Control General electro-hydraulic steering system. *Seacor Vision* is U.S.-flagged and ABS-classed, Maltese Cross A1, Maltese Cross AMS towing supply.

Seacor Vision Main Particulars

Designer	Halter Marine
Flag	U.S.
Classification	ABS
Length, o.a.	225 ft. (68.6 m)
Length, b.p.	215 ft. (65.5 m)
Breadth, molded	52 ft. (15.8 m)
Gross tonnage	2,136
Displacement	4,235 LT/4,302 MT
Lightweight	2,059 LT/2,092 MT
DWT	2,176 LT/2,210 MT
Draft, design	18 ft. (5.5 m)
Service speed	14 knots
Complement	24
Bunker fuel oil capacity	186,700 gal
Main engine	EMD
Main engine type	(4) Model 16-645E7B
Output	3,070 bhp at 900 rpm
Total hp	12,280
Propellers	(2) Berg 140-in. CP
Thrusters	SMI 650
Generator engines	CAT 3508 400 kW
Thruster motors	GE 600 hp
Generators	Kato
Emergency generators	CAT 3306 8
Reduction gears	(2) Reintjes twin input 5.5:1

Delta Linda

BuilderMarco Shipyard, Seattle
Vessel nameDelta Linda
Vessel typeZ-drive tractor tug
Owner/operatorBaydelta Maritime, Inc.

Marco Shipyard recently delivered *Delta Linda*, the first of two new Z-drive tractor tugs for Baydelta Maritime, Inc. The vessel was christened on November 14 at Bell Harbor Marina.

Delta Linda measures 105 x 37 x 16.6 ft. (32 x 11.3 x 5 m) and has accommodations for a crew of six. The tug is powered by a pair of Caterpillar 3516B diesels, providing a total of 4,400 hp driving two Aquamaster Model US2001, 360 degree-rotatable azimuthing drive units. Each unit includes a 94.5 in., four-blade NiAlBr propeller in a nozzle, providing the tug with a maximum speed of approximately 14 knots.

Auxiliary power for *Delta Linda* is achieved through two CAT 3304BT diesel gensets, with 105 kW generators and front-end PTOs for hydraulic power. The vessel's electrical system, including all distribution panels and wiring, was provided and installed by Harris Electric.

Communications and navigation electronics, also provided by Harris, include a Sperry gyrocompass and digital autopilot; a Furuno SSB radio; VHF radios by Stephens and Shipmate; and radar, GPS receiver and video plotter, color sounder and differential beacon receiver by Furuno.

Deck machinery on the new vessel includes a

(Continued on page 83)





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Great Boats Of 1997

Kukui



BuilderMarinette Marine Corp.
Vessel nameKukui
Vessel typeSeagoing buoy tender
Owner/operatorU.S. Coast Guard

Kukui Main Particulars

DesignerMarinette Marine
FlagU.S.
ClassificationABS
Length225 ft. (68.6 m)
Breadth46 ft. (14 m)
Draft13 ft. (4 m)
Main engine(2) Caterpillar 3608
Output3,100 bhp at 900 rpm
Reduction gear/propellersSingle Shaft, Bird Johnson CP
Thruster(1) bow 460 hp/DC fixed pitch; (1) stern 550 hp DC fixed pitch
Generators(2) Caterpillar 3508 450 kW
Reduction gearsPhiladelphia Gears
Crane120 ton hydraulic, 60 ft. telescoping boom
Engine controlsTano
A/CCarrier

New River

BuilderHalter Marine
Vessel nameNew River
Vessel typeShip Docking Module (SDM)
Owner/operatorHvide Marine

Hvide Marine Inc. celebrated the christening of its revolutionary Ship Docking Module (SDM) last month at Port Everglades, Fla. Built by Halter Marine at a cost of approximately \$4.75 million, SDM *New River*, the first tug of its kind, is capable of generating 100 percent of its power in any direction, lending exceptional maneuverability.



New River christening, held on December 4.

The SDM's twin Z-drives are set fore and aft and offset from center. Capable of rotating 360 degrees, they give the vessel its maneuverability and power, necessitating a crew of only two. *New River* is the first of three SDMs on order from Halter Marine and will be assigned to Hvide's Port Everglades Towing division. The remaining two SDMs are due out in the first half of 1998, and are scheduled to be based at Hvide's Mobile Bay Towing and/or Tampa Bay Towing divisions.

New River Main Particulars

Length90 ft. (27.4 m)
Breadth50 ft. (15.2 m)
Draft, design16 ft. (4.9 m)
Gross tonnageLess than 200
Total hp4,000
Engines(2) Caterpillar 3516B diesels
Z-drivesUlstein Model 1650H fixed pitch
WinchMarkey Type DYSF-39 Hawser Hydraulic with Spectra tow line
Ballard pull115,000 lbs. in all directions
Firefighting(1) 3,000 gpm firepump
ClassificationABS

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Circle 293 on Reader Service Card



(Continued from page 25)

important and complex marine projects Siemens has ever had. The reliability criteria was the most challenging part," a sentiment echoed by many others involved in the project. He credits a precisely detailed bid specification for producing a vessel of exacting standards. Step-by-step customer approval of technical documentation, engineering drawings and software programming, as well as on-site monitoring of all factory tests headed off some of the standard problems that traditionally crop up during the construction and initial operating phases of new vessels. Additionally, dock and sea trial activities have been conducted by Ferry System representatives. This committed involvement in all facets of design, construction and testing by Ferry System engineers and operators has resulted in a vessel with far fewer "bugs" than most new boats, according to those overseeing the project.

Lori Miller, spokeswoman for Kato Engineering, said the company was "... honored to be given a chance to be part of the project." Siemens selected Kato's water-cooled, 3,000 kW alternators over their own, in-house product, in part to honor the Ferry System's desire to retain a high percentage of U.S. content while still maintaining Siemens exacting quality standards.

Proven reliability and economic service were the reasons why Mike Stevens and John Wilkie of Valley Detroit Diesel feel their

General Motors EMD 16-710G7B diesels were selected as the main engines for the Jumbo Mark IIs. Their product has been an integral part of Washington State Ferry vessels for many years beginning in 1967 with the Super Class vessels where the original EMD engines are still in place, having logged more than 150,000 service hours per engine. The 710 model

is their latest release, featuring greater hp, improved fuel economy, reduced emissions and reduced lube oil consumption. Custom-designed skid mounts on the engines help reduce noise transfer from the engines to the hull. Noise reduction for the comfort and health of passengers and crew was one of the many objectives considered when designing the engineer-

ing spaces.

The uniqueness of the ship has not escaped notice in the industry. Representatives from a German/Danish consortium toured the vessel and borrowed some design concepts.

NASSCO recently met with Siemens representatives exploring the possibility of using a similar cycloconverter design on their

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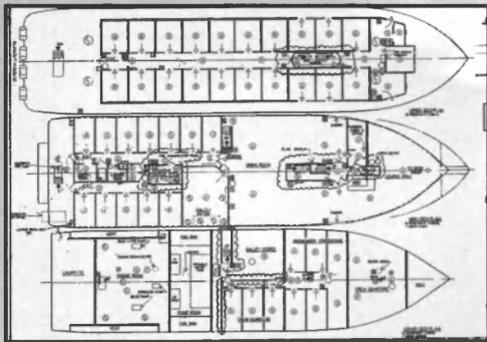
600 Shipyard Road Baltimore, Maryland, USA 21219-2599 Tel (410)388-4630 Fax (410)388-6687

Tacoma Main Particulars

Designer	Washington State Ferries with Philip F. Spaulding, Assoc
Builder	Todd Pacific Shipyards, Seattle, Washington
Type	Double-ended car/passenger ferry
Length, o.o.	460.2 ft. (140.3 m)
Breadth	90 ft. (27.4 m)
Draft	17.6 ft. (5.4 m)
Full load displacement	5,690 tons
Capacity	2,500 passengers/218 vehicles
Main engines(4) General Motors, EMD 16-710G7A rated 4,000 BPH each at	900 rpm
Total hp	16,000 BHP
Main alternators	(4) Kato Engineering -
.....	Reliance Electric rated 4,160 V AC, 3,000 kW at 900 rpm
Propulsion	(4) AC Drive Motors, Siemens Dynamowerks Division AC
.....	Synchronous TEWAC - Type 1DQ rated 6,000 HP each,
.....	1,850 volts at 215 rpm
Speed, service	18 knots
Speed, max	23 knots

Great Boats Of 1997

Grande Caribe



BuilderBlount Industries, Inc.
Vessel nameGrande Caribe
Vessel typePassenger cruise ship
Owner/operatorACCL

Blount Industries, Inc.'s *Grande Caribe* made its maiden voyage on June 29, 1997. The vessel operates overnight coastal cruises covering areas from Labrador, Canada to parts of Central and South America and the Amazon River. The vessel's hull is steel constructed with an aluminum superstructure. It is powered by two DX842LE MAN diesel engines producing 575 bhp at 1,800 rpm. The engines turn two, 4-blade 44 x 34 in. Ellis propellers through Twin Disc MG-518 gears, with a 3:1 reduction, achieving a service speed of 10 knots. *Grande Caribe* marked the 294th vessel and the tenth cruise ship designed and built at Blount Shipyard. The vessel, which replaced American Caribbean Crusie Lines' (ACCL) *Caribbean Prince*, features a 100-passenger vista view lounge on the sun deck and sound deadening enclosures for all of the ship's machinery. The vessel meets all SOLAS requirements for coastal cruising.

Grande Caribe Main Particulars

Length, o.a.	183 ft. (56 m)
Beam	40 ft. (12.2 m)
Depth	9 ft. (2.74 m)
Draft, design	6.3 ft. (1.9 m)
Complement	100 passengers plus 19 crew
Delivery date	June 29, 1997
Main propulsion	(2) MAN D2842LE
Marine gear	(2) Twin Disc MG-518 3:1 reduction
Propellers	(2) Ellis, Bronze 4Blade 44 x 34-in.
Service power	(3) MAN D2866LXE
Emergency generator	Cummins 100 kW 240 V
Bow thruster	Wesnar DPC75 hydraulic driven by Cummins 4BT3.9 64 bhp at 2,200 rpm
Engine controls	Electronic Mathers MicroCommanders
Steering system	Wagner Hydraulic
Service speed	10 knots
Marine sanitation device	Omnipure 12 MX
Water makers	(2) Sea Recovery 3,300 gal/day
Fuel oil capacity	8,424 gal
Lube oil capacity	752 gal
Waste oil capacity	752 gal
Portable water	6,094 gal
Gray water	1,475 gal
Sewage holding	2,950 gal
Radar	Furuno
VHF/SSB radios	1com
Compass	Richie magnetic; Fluxcore electronic
Flag	U.S.



Majestic Star

BuilderAtlantic Marine, Inc.
Vessel nameMajestic Star
Vessel typeGaming vessel
Owner/operator ..Majestic Star Casino LLC

Majestic Star — a 360-ft. (109.7-m) vessel built by Atlantic Marine Shipbuilding and designed by Guido Perla & Associates, Inc. (GPA) — went into service in Buffington

Majestic Star Main Particulars

Designer	Guido Perla & Assoc., Inc.
Floa	II S
Length, o.a.	360 ft. (109.7 m)
Length, b.p.	330 ft. (100.5 m)
Breadth, molded	76 ft. (23.2 m)
Gross tonnage	over 4,000 GT
Draft, design	11.4 ft. (3.5 m)
Service speed	11 knots
Complement	300 passengers plus 500 crew
Bunker	55,030 gal
Fuel consumption	250 gal/hr.
Main engine	(4) Caterpillar
Main engine type	3516B diesel electric
Total hp	4,000 hp
Propellers	(4) Schottel Z-drives SRP 550
Generator engines	(4) CAT 3516 1,825 kW
Emergency generator	CAT 3908TA

Harbor, Ind., last September. GPA Seattle provided design and project engineering support including detailed lofting, composite drawings and piping details, and electrical design for the integrated diesel electric plant. The \$40 million vessel is driven by two bow and two stern Schottel Z drives powered by 1,000 hp electric motors with power from four Caterpillar 3516 1,825-kW diesel engines. The vessel provides more than 40,000 sq. ft. of gaming space, with interior decoration by Directions in Design.

Motor starters	Square D
Reduction gears	Schottel Z-drive units
Engine controls	Schottel/Tech Power Controls
Steering controls	Schottel
Deck machinery	McElroy
Coatings	Devco Ameron
VHF Radio	Stephens
Radar	Furuno/Marine Electronics
Compass	Richie B463/Baker Lyman
GPS	SIFEX
Pumps	Goulds
A/C	Trane
Life jackets	Safeguard
Liferafts	Dunlap Beaufort
Deviants	Welin Lambie
Firefighting system	Charleston Fire & Equipment - Kidde
Doors/Ramps/Cargo lifts	Waltz Krenzer Class III doors
Elevators	Montgomery

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Great Boats Of 1997



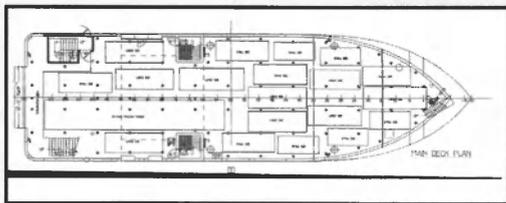
Emerald Isle

Builder.....Washburn & Doughty Assoc.
Vessel name.....Emerald Isle
Vessel type.....Passenger vessel
Owner/operator.....Beaver Island Transportation Authority

Emerald Isle Main Particulars

Designer Timothy Graul Marine Design
 Flag U.S.
 Classification USCG Subchapter K
 Contract date September 23, 1997
 Float out date June 6, 1997
 Delivery date November 10, 1997
 Length, o.a. 130 ft. (40 m)
 Length, b.p. 116 ft. (35.3 m)
 Breadth, molded 38 ft. (11.6 m)
 Gross tonnage 99 tons
 Displacement 511 tons
 Lightweight 354 tons
 Draft, design 8 ft. (2.4 m)
 Service speed 14.5 knots
 Capacity two trucks/22 cars
 Bunker 9,000 gal
 Fuel consumption 129.5 gal at 14.1 knots
 Main engine Caterpillar
 Main engine type (2) CAT 3512B
 Total hp 3,000 hp
 Propellers Krueger stainless steel, 4-blade, 60-in. diameter
 Thrusters American TRAC Series
 Generator engines CAT 3304 100 kW
 Thruster engines CAT 3116 205 hhp
 Generators Caterpillar
 Reduction gears ZF model BW 750
 Engine controls Kabel Electronic
 Steering controls Al George Inc.

Deck machinery NETCO
 Shafting Aqualy 17
 Bearing Cutless
 VHF radio (2) Icom M127 and (1) Motorola Maxtrac 100
 Radar (1) Furuno 8051/10 radar with plotter and
 (1) Furuno 1831 Mkz radar with plotter
 Compass KVH
 GPS Furuno GP-50 MK3 GPS with Furuno receiver
 Autopilot ComNav 2001 6 SYS 90031



Sassacus

Builder Pequot River Shipworks
Vessel name Sassacus
Vessel type High-speed passenger ferry
Owner/operator Hornblower Marine Services

October 31, 1997 marked the delivery of the first high-speed passenger ferry built in the U.S. to the International High Speed Craft Code and U.S. regulations, and the first vessel built by Pequot River Shipworks. Delivered to Hornblower Marine Services, *Sassacus* will carry 300 passengers per 2.5 hr. trip from New London, Conn. to New York City.

One unique feature of *Sassacus* is the stabilizing central third bow which ensures a smooth ride across the Long Island Sound. The original design of the vessel was licensed from FBM Marine (UK) Ltd., but due to U.S. Coast Guard regulations stipulating that the IMO'HSC can only be adopted under sub chapter K of the CFR 46 Regulations, the vessel underwent design changes to decrease its tonnage.

Sassacus utilizes the latest state-of-the-art technology including ARPA radar and night vision units, and is powered by Twin Solar Taurus Gas Turbines developing 5,108 hp at 13,000 rpm. Given the current trend toward faster and more efficient means of alternative transportation in congested metropolitan areas, along with the

demand for high speed passenger vessels in other markets, *Sassacus* has found its niche. A second vessel has begun construction with completion scheduled for summer 1998.

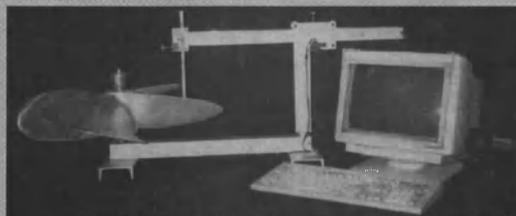
Sassacus Main Particulars

Designer FBM Marine, U.K.
 Flag U.S.
 Contract date April 1996
 Float out date June 1997
 Delivery date October 1997
 Length, o.a. 147.5 ft. (45 m)
 Length, b.p. 131 ft. (40 m)
 Breadth, molded 38.7 ft. (11.8 m)
 Gross tonnage 95.8
 Displacement 605 tons
 Lightweight 172
 Draft, design 7.8 ft. (2.4 m)
 Draft, scantling 5 ft. (1.5 m)
 Service speed 47.5 knots
 Bunker 20,000 liters
 Fuel consumption 850 gal./hr.
 Main engine Caterpillar, Solar Division
 Main engine type (2) Taurus M60 Turbines
 Total hp 13,600
 Water jets Komewa
 Generator engine CAT 3306
 Motor starters LEC Marine
 Fin stabilizers Maritime Dynamics, Inc.
 Reduction gears Philadelphia Gear Corp.
 Engine controls Caterpillar
 Steering controls Komewa
 Deck machinery Almon Johnson
 Shafting Komewa
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 Coatings Belzona
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Great Boats Of 1997

Flying Cloud

BuilderGladding-Hearn
 ..Shipbuilding, The Duclos Corp.
 Vessel nameFlying Cloud
 Vessel typeCatamaran
 Owner/operatorWater
Transportation Alternatives

Flying Cloud Main Particulars

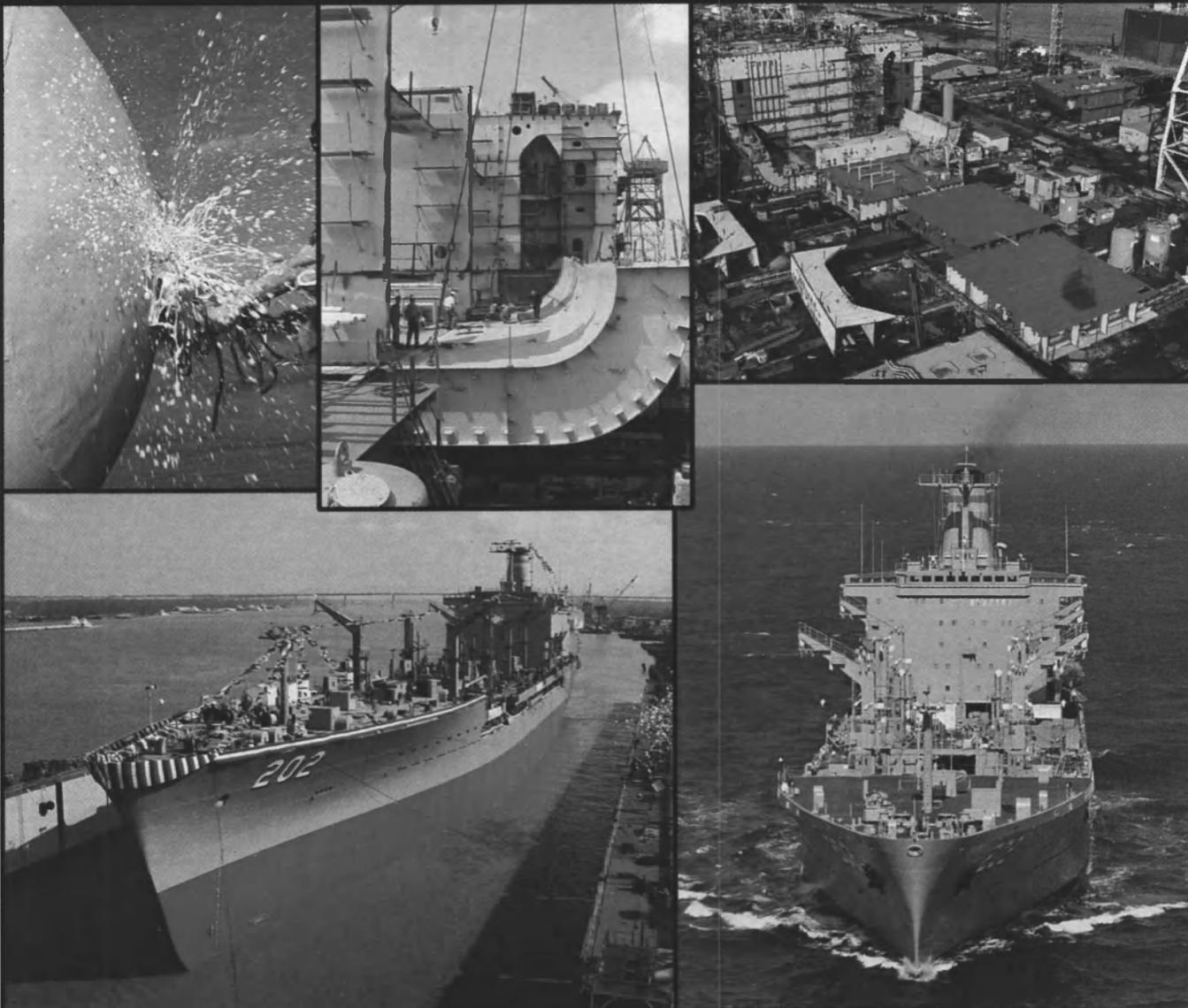
DesignerIncat
 FlagU.S.
 ClassUSCG T Boat
 Length, o.a.88.4 ft. (26.9 m)
 Breadth, molded27.6 ft. (8.4 m)
 Gross tonnage70

Draft, design3 ft. (0.9 m)
 Service speed31 knots
 Complement151
 Fuel consumption100 gal./hr.
 Main engine (2) Detroit Diesel Corp. 16 V 92 DDEC
 Total hp2,200
 Auxiliary engines ...Northern Lights, Alaska Diesel
 Generator enginesJohn Deere



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UT741

ShipbuilderUlstein
 Vessel NameUndecided
 Vessel TypeAHTS
 OwnerSaevik Supply

Ulstein's latest UT700 design — the UT741 — is part of the builder's AHTS portfolio and able to work anchors to depths down to 8,200 ft. (2,500 m). A UT741 unit was ordered for construction by the Th. Hellesoy Skipsbyggeri AS yard in Hardanger, for Saevik Supply. Delivery of the vessel is scheduled for May 1999, and the contract includes an option for two additional vessels.

The UT741 design is defined by Ulstein as a multi-function anchor handling tug, supply and service vessel, mid-range in size, fitting neatly between the company's UT740 and UT742 models.

The UT741 has an overall length of 273.2 ft. (83.3 m) and a beam of 67.3 ft. (20.5 m). It is built around a very large, triple-drum, 500-ton Brattvaag winch, which provides the vessel with outstanding deep-water anchor handling capability.

The 67.3 ft. (20.5 m) beam affords a roomy working deck area of 880 sq. m., offering a load capacity of 2,000 tons, which is sufficient for most offshore tasks and provides the ability to carry a flexible pipe basket.

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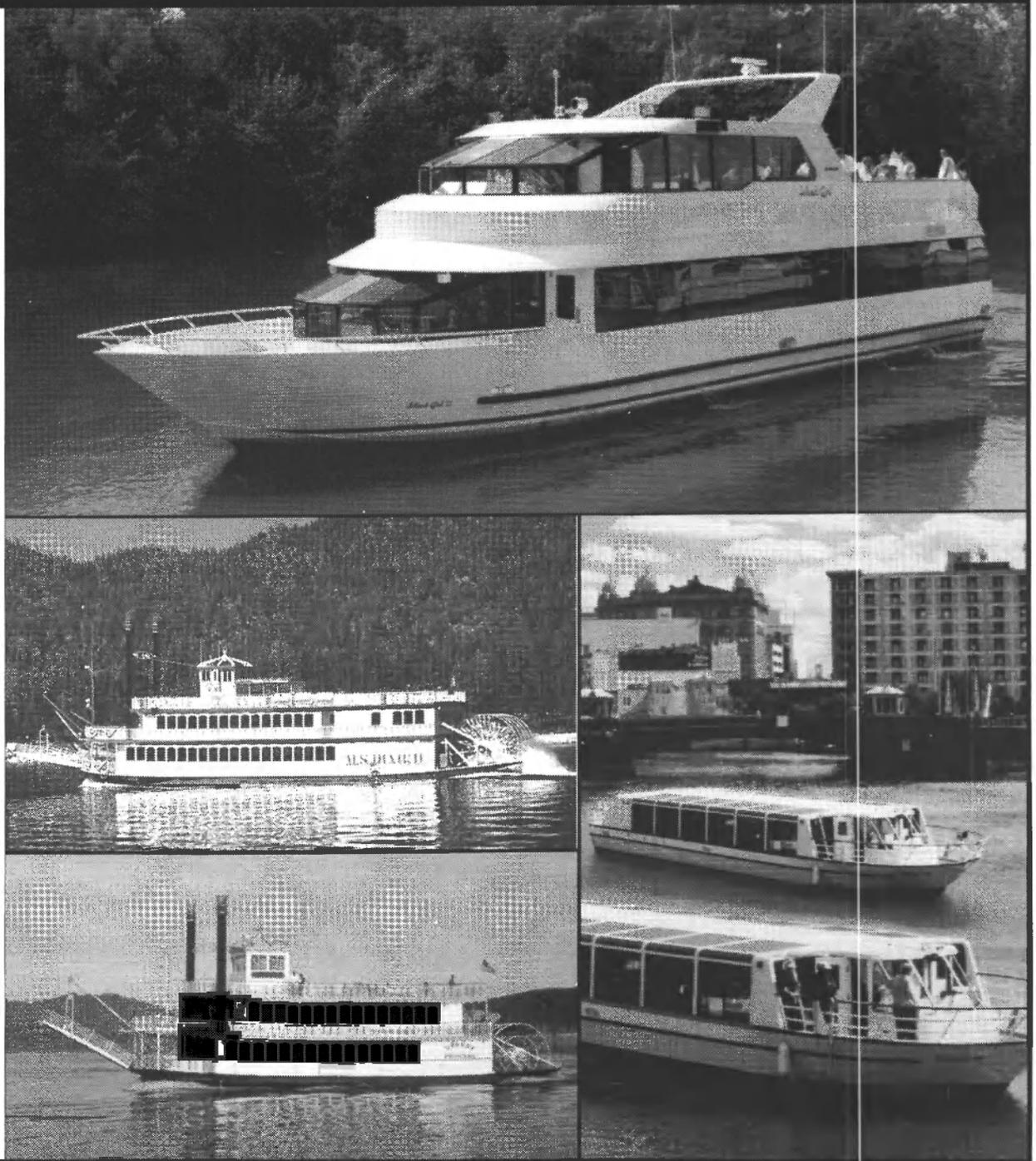
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(Center) SkipperLiner's newest sternwheeler, the M.S. Dixie II operates as a sight-seeing and dinner cruiser. At 141' x 33', certified for 600 passengers, she is one of three SkipperLiners earning for their owners on Lake Tahoe.

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stern for handling large ploughs, and 23,800 bhp is installed to provide a substantial bollard pull of 260 tons.

The vessels' power package includes a pair of Ulstein Bergen BRM-9 engines rated at 5,400 bhp (4,000 kW) each, supplemented by a swing-up azimuthing thruster driven by another Ulstein Bergen powerplant.

UT741 Main Particulars

Length, o.a.	273.2 ft. (83.3 m)
Length, b.p.	227.4 ft. (69.3 m)
Breadth, molded	67.3 ft. (20.5 m)
Depth, to main deck	31.2 ft. (9.5 m)
Design draft	23 ft. (7 m)
Max. draft midship	25.5 ft. (7.8 m)
Power	17,500 kW (23,800 hp)
Bollard pull	260 tons
Ballast water	2,000 cu. m.
Freshwater	1,100 cu. m.
Drillwater	1,900 cu. m.
Dry bulk cargo	12,000 cu. ft.
Fuel oil	2,000 cu. m.
Liquid mud	540 cu. m.
Brine	540 cu. m.
Base oil	250 cu. m.
Oil Rec.	1,050 cu. m.
Cargo chain lockers	540 cu. m.
Cargo deck area	680 cu. m.
Designer	Ulstein Industrier AS
Flag	Norway
Classification	DNV +1A1, Tug Supply Vessel, SF, EO, Oil Recovery, DynPos AUTR, Ice C, Fi-Fi I, Fi-Fi II, TMON
Contract Date	September 1997
Delivery Date	May 1999
Gross Tonnage	approx. 4,200 grt
DWI	approx. 4,400 tons
Bollard pull(approx.)	260 tons
Service speed(approx.)	17 knots
Complement	70
Main engine	Ulstein Bergen
Main engine type	(4) BRM-9 and 1 pcs. KRM-8, 750 rpm
Total power ME	17,520 kW (23,825 bhp)
Auxiliary engines	(2) 600 kW, 1,800 rpm
Emergency generator	(1) pcs approx. 120 kW, 1,800 rpm.
Propellers	Ulstein Type SLO 380-1250/4S-4270N
Generators	(2) off shaft gen. each approx. 3000 kVA, 50-60 Hz.
Reduction gears	(2) off twin input/single output reduction gears.
Eng./prop. controls	Ulstein Helicon
Monitoring/Cargo and	
Ballast control system	Ulstein Type UMAS-V
Steering controls	Ulstein Tenfjord AS
Deck machinery	Ulstein Brattvaag AS
Shafting/Bearings	Ulstein Propeller AS
Radio communications	According to GMDSS A3
Radar	1 off S-band ARPA radar, (1) off X-band RM radar, (1) off electronic charting, Navigation Monitoring and Planning Workstation (ECDIS)
Sat/Com	(1) Differential GPS (12 ch.) dual type, (1) off Lorán C Gyro Compass (2) off in Master / Slave configuration

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Great Boats Of 1997

Block Island

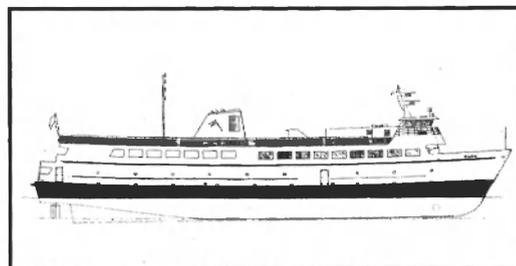
BuilderEastern Shipbuilding Group
 Vessel nameBlock Island
 Vessel typePassenger/vehicle ferry
 Owner/operatorInterstate Navigation, Inc.

Eastern Shipbuilding Group completed passenger/vehicle ferry *Block Island* last summer. The new 208 x 39-ft. (63.4 x 11.9-m), \$7.5 million vessel operates on a year-round run from Pt. Judith to Block Island, R.I., carrying approximately 45 vehicles and up to 1,000 passengers. *Block Island* is the first new ship for Interstate Navigation Company since 187 ft. (56.9 m) *Carol Jean* was commissioned in 1984, also built at Eastern.

Block Island is powered by twin 2,000 hp Model 8-710 EMD diesel engines and Reintjes Model WGV 481 marine gears with 2.509:1 reduction ratios.

During sea trials off Panama City, Fla., the vessel performed at speeds in excess of 18.2 knots. Bird Johnson furnished the 80 x 78.5-in., four-blade stainless steel propellers. Engines were furnished by Engine Systems, Inc. and gearboxes were furnished by Karl Senner, Inc. A main lever steering system was furnished by Control General,

with an auxiliary wheel system provided by Jastram. To assist in line handling and anchor retrieval, the vessel features a model MCR-16-15E McElroy electric capstan.



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Block Island Main Particulars

DesignerJohn W. Gilbert & Assoc., Inc.
 FlagU.S.
 ClassificationUSCG Certified Subchapter T
 Contract dateAugust 1, 1996
 LaunchedMay 9, 1997
 Delivery dateJune 14, 1997
 Length, o.a.208 ft. (63.4 m)
 Length, b.p.192.6 ft. (58.7 m)
 Displacement960 tons
 Draft, design9 ft. (2.7 m)
 Depth, molded14 ft. (4.3 m)
 Service speed18 knots
 Deck capacity45 vehicles plus three semi-trucks and 1,000 passengers
 Fuel capacity9,200 gal
 Water ballast16,785 gal
 Main engineEMD
 Main engine type(2) Model 8-710 diesel engines; 2,000 hp at 900 rpm
 Total hp4,000
 PropellersBird Johnson 90 x 78.5 in., 4-blade, stainless steel
 Bow thrustersSchottel Model STT 100 driven by 8V-71 Detroit Diesel
 Generator/Thruster enginesDetroit Diesel 8V-71
 Emergency generator engineDetroit Diesel 6-71
 Motor startersSquare D
 RuddersBecker
 CouplingsKohlenberg muff couplings
 Reductions gearsReintjes Model WGV 481, 2.509:1
 Engine controlsWabco pneumatic
 Steering controlsControl General/Jastram
 Deck MachineryMcElroy MCR-16-15E right angle capstan
 BearingsGoodrich cutlass bearings
 CoatingsDevoe Paint
 VHF Radio(2) Horizon Nova GX 23305
 RadarFuruno FR-8051
 CompassRitchie Globemaster B-463
 GPSFuruno GP-80-D
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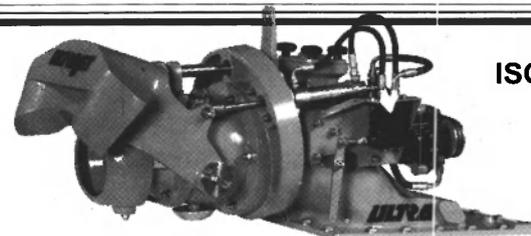
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Southport

BuilderSteiner Shipyard, Inc.
Vessel nameSouthport
Vessel typePassenger/vehicle ferry
Owner/operatorNorth Carolina Dept.
.....of Transportation



Southport Main Particulars

DesignerNorth Carolina Dept. of Transportation
FlagU.S.
ClassificationUSCG Subchapter H
Contract dateOctober 12, 1995
Float out dateOctober 19, 1996
Delivery dateNovember 1, 1996
Length, o.a.180 ft. (55 m)
Length, b.p.172.9 ft. (53 m)
Breadth, molded44 ft. (13.4 m)
Gross tonnage460 LT
Draft, design5.6 ft. (1.7 m)
Draft, scantling11 ft. (3.3 m)
Service speed13 knots
Capacity40 vehicles/350 passengers
Main engineCaterpillar
Main engine type3412 DITA
Total hp950
PropellersVoith Schneider 16G11/100
Generator enginesCAT 3304B
Generators105 kW 120/208 V 60 Hz
Emergency generatorCAT 3304B 65 kW
.....12/208 V 60 Hz
Motor starterSquare D
CouplingsVoith
Engine controlsMarine Engine Controls, Inc.
.....electro/pneumatic
Steering controlsMatthews Marine System, Inc.
ShaftingC1045 cold rolled
BearingsCooper
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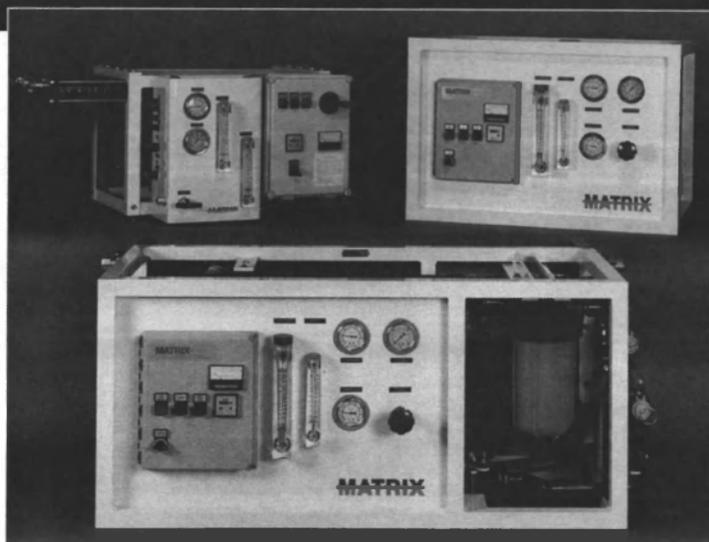


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High-Tech Wonders From Down Under



The Australian maritime market has long been synonymous with high-speed craft, more particularly perhaps, the advanced technology necessary to design, build and outfit fast, reliable craft for moving cargo and passengers efficiently. Keeping in step with this edition's focus on passenger vessel technology, the following is a review of significant vessels recently delivered from Australian yards, highlighting the advanced design and equipment features.

Austal Ships is traditionally one of the busier Australian shipyards, and 1997 was no different for the Henderson-based company. Austal's list of accomplishments is long and distinguished, and includes the building of *SuperStar Express* for Star Cruises. *SuperStar Express* is South East Asia's first fast vehicle ferry, and the 269-ft. (82-m) vessel entered service just seven months after the commencement of its construction. It is the fourth Auto Express ship delivered by Austal, and was inaugurated on the 70-nm route between the Malaysian ports of Langkawi and Butterworth.

The vessel is fitted with four MTU 20V 1163 TB74L diesel engines, with a rating of 6,500 kW each, driving four Kamewa waterjets through Reintjes gearboxes. The units drive the 340-ton vessel to a maximum speed of 41 knots and a service speed (90 percent MCR) of 38.5 knots. The Austal Ocean Leveller ride control system is fitted to ensure passenger safety

and comfort. *SuperStar Express'* electronics outfit make it one of the most advanced vessels of its kind in operation. The wheelhouse features fully integrated Kelvin Hughes navigational equipment, twin ARPA radars and Multi Feature Display electronic chart navigation. Kelvin Hughes' Ergopod system on the armrest allows total control of the radar and chart display with a tracker-ball from the seated position.

A new feature on the bridge is a Video Time Lapse Recorder, located at the engineer's, captain's and wing stations. The system comprises a VCR CCTV system which continually monitors both sound and visual action of the captain and engineer throughout the voyage. Also, a Voyage Data Recorder measuring all bridge instrumentation (which can be transmitted via satellite to shore) will be fitted.

Another recent delivery from Austal was *Zhao Qing*, a 137.8-ft. (42-m) catamaran built for the Zhaoqing Hong Kong

Transportation Co. Ltd. of China. This is the 29th fast ferry built by Austal for China.

Zhao Qing features room for 352 passengers on two decks, with the upper deck passengers (120 max.) seated in leather padded Georg Eknes 1400 High Plus chairs.

The wheelhouse is designed for operation by three crew: navigator; captain; and engineer. Electronics include a Racal Decca Bridge Master II radar, Sailor Watch Keeper and VHF radios, and Anschutz gyro compass and CCTV. Powered by two MTU 16V 396 TE74L diesel engines driving Kamewa waterjets through Reintjes gearboxes, the vessel maintains a service speed of 34 knots.

Tasmania-based Incat Australia is a builder just as readily associated with producing top quality high speed ferries. A recent delivery is Incat's largest wave piercing catamaran, 298.5-ft. (91-m) *Devil Cat* (shown above, accompanied by the Tasmanian Devil).

According to **Steve Thurlow** of Incat, the vessel is remarkable because it boasts a capacity for more than 900 passengers and 240 cars. In service at full displacement (more than 450 dwt), *Devil Cat* can maintain 43 knots; at lightship, 50.2 knots. These statistics, according to Mr. **Thurlow**, are made more fantastic by the fact that the power plant consists of four efficient medium speed diesel engines with a cumulative output of 28,320 kW.

TT-Line intends to operate the vessel on a four-month charter across Bass Strait between George Town, Tasmania and Port Melbourne, Victoria. The 227-nm route is reportedly the longest non-stop open sea fast ferry route in the world, and TT-Line has scheduled the crossing time for under six hours. *Devil Cat* is under charter to TT-Line from December 17, 1997 to April 18, 1998. Following Bass Strait, *Devil Cat* will be re-

(Continued on page 46)

Economic Crisis Poses No Eminent Threat To Adsteam

While the long-term effects are still unclear, tugboat operator Adsteam Marine Ltd. said it did not see any significant impact on its operations from the current Asian economic crisis, particularly in the short to medium-term. Adsteam Marine recently awarded a \$28 million contract for six new tugs from Oceania Marine Ltd. According to the company, three of the new tugs would go to Bunbury in Western Australia, Queensland's Townsville and Adelaide in South Australia, with the remainder to meet emerging demand. Adsteam has operations in its own right or in joint ventures in 31 of the 51 Australian ports requiring towage services.

Oceanfast Signs \$28M Contract For New Tugs

In proving that high-speed craft are not the only vessels produced in Australia, the Commercial Division of Oceanfast Marine Pty Ltd. won the largest building contract for new tug vessels in Australia in more than 30 years. Adsteam Marine Ltd. ordered six, 104.5-ft. (32-m) tugs — to be built over the next 2.5 years — for a total contract value in excess of \$28 million.

The Commercial Division is a modern steel shipbuilding and refit and repair yard occupying a waterfront shipyard in the Jervoise Bay shipbuilding harbor. Facilities include, a commissioning dock, a 2,500-ton slipway and side-slip area with in-house heavy engineering, refrigeration and air-conditioning departments.

Oceanfast reportedly won the contract against strong international competition. This contract is in line with the emerging opportunities identified in Oceanfast's Prospectus, which

indicated the likely replacement of the Australian fishing and tug (steel) fleet.

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Oceanfast: Benefitting From Sydney Olympics Already

Australia's Oceanfast signed a contract last April to build a 206-ft. (63-m) "restaurant cruise vessel," a vessel which is being built specifically because of the anticipated tourism boom expected with the year 2000 Olympics scheduled for Sydney. The vessel — to be named *Sydney 2000* —

was ordered by Carnival Cruises Pty. Ltd., a subsidiary of Captain Cook Cruises Pty. Ltd. for completion at the end of June, 1998.





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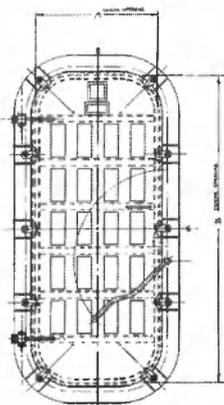
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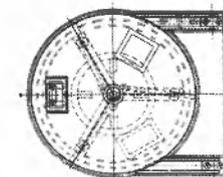
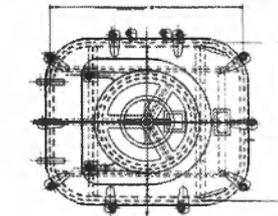
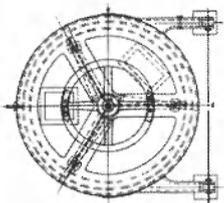
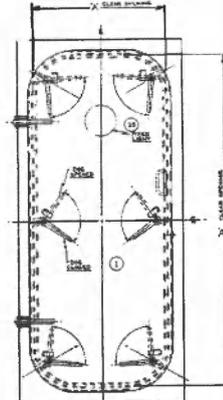
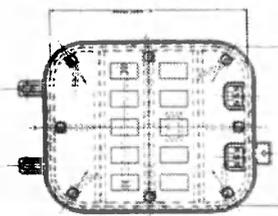
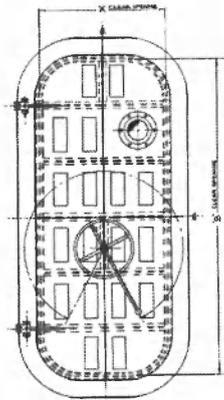
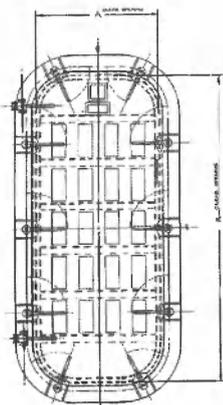


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VLCC Prospects Spawn New Facilities



by Alan Thorpe, International Editor

Competition in the VLCC repair market will again heat up with three new docks capable of dry-docking such ships to come on stream during the next two years. The locations are Shanghai Guan, in mainland China, due to begin operations during the end part of 1998; a new repair and building facility being built by South Korea's Hyundai Mipo Dockyard (HMD) in Vietnam (1998/99), and Rowdock, a project underway in Richard's Bay, South Africa (2000).

There has been some movement in the floating production, storage and offloading FPSO conversion market in Spain and Singapore. Astilleros Espanoles' Cadiz Shipyard has signed another conversion contract with Brazilian oil major Petrobras, involving the 267,577-dwt Panamanian VLCC *Eastern Strength*, which was formerly owned by World-Wide Shipping Managers Ltd., Bermuda, and will be renamed *Petrobras 47*. The work is expected to take 12 months, followed by one month in transit and two months of installations. The work will include a mooring and load turret system, new auxiliary engines, emergency generators and engine and deck equipment, fabrication of helideck, prefabrication, fitting, final tests of all equipment and systems, and increasing the units accommodation block to a new capacity of 80 persons.

Meanwhile, Petrobras is rumored to have placed two contracts with Singapore's Jurong Shipyard Ltd. (JSL) for the conversion of two of its own VLCCs to be converted to a FSU and a FPSO, respectively.

Norway's Bergesen is to convert two recently delivered 103,000-

dwt multi-purpose tankers into (FPSO) units, while also converting the 103,000-dwt tanker new-building into a drillship. The work is being spread between yards in the U.K., Norway and Singapore. All three tankers have been built by Korea's Samsung Heavy Industries (SHI). The lead vessel, *Berge Hugin* was delivered earlier this year and will be converted at the Aker McNulty yard on Tyneside in the U.K. *Munin*, delivered from Korea in the summer, has now arrived at JSL for conversion into a FPSO, while the third vessel, *Odin*, upon delivery from SHI will sail for Norway's Offshore & Marine facility, outside Stavanger, for conversion into a drillship.

Malta Drydocks has successfully completed, on schedule, the latest refit carried out by Sun Cruises, part of Airtours, involving the 23,149-grt cruise vessel *Carousel*, formerly the *Nordic Prince*. The 1971-built *Carousel* refit has cost Sun Cruises some \$7 million to complete, with the shipyard's involvement being some \$2 million. The main project has involved the removal of six diesel generating sets and replacing them with five larger Deutz/MWM type TBD 444 L6 sets, which have a total output of some 4,500 kW. The new generating units were tested while in Malta Drydock's largest drydock to an output of approximately 110 percent. When sailing, only three sets out of the five will be utilized to supply the vessel's hotel requirement. The installation has also allowed the ship to move to a single fuel basis.

Canada's Port Weller Dry Docks, a division of Canadian Shipbuilding & Engineering Ltd. (CS&E), has been awarded a \$20 million conversion project from Ontario's Algoma Central Corporation, for the conversion of the 32,420-dwt Canadian-registered bulk carrier *Algowest*. To be converted to a self-unloading bulk carrier, the contract is in addition to an \$85 million fleet modernization program for the 23-vessel Algoma fleet. The 1982-built *Algowest* was scheduled to arrive at Port Weller in December, and will be delivered in June 1998.

Conversion work is still continuing at Poland's Gdansk Shiprepair

Yard - Remontowa (GSY - Remontowa) onboard the 58,327-dwt tanker *Petroroll*, which is being converted to a shuttle tanker. Work includes the fabrication of two new compartments (bowthruster room forward and power plant STB side stern); the overhaul of machinery and electrics; the installation of a new tank measurement system; the mounting of new bowthruster and generating sets; and the installation of dynamic positioning system. The vessel is owned by Neptune Heavy Lift AS.

South Shield's Tyne Dock Engineering (TDE) has been awarded the contract to convert geophysical research vessel *Geo Pacific*, built in Poland, into a seismic survey ship for Norwegian owners Fugro-Geoteam AS. The contract, valued at \$4 million, will provide a base workload for the yard for the next five months, securing jobs of the current workforce and staff of 150 and creating an additional 150 jobs throughout the period of the contract.

Birkenhead's Cammell Laird has recently been awarded the upgrading contract onboard Denholm Ship Management's 3,060-dwt Bahamas seismic survey/research vessel *Simon Labrador*. The project, which was scheduled to commence during mid-December for a 10-week period, involves modernization work, prefabrication of a new stern and

modification of all decks.

The sale of Bethlehem Steel's repair company BethShip Sparrows Point Yard has now been completed with Veritas Capital Fund, the New York merchant banker, having reportedly paid \$20.3 million for the repair facility.

Veritas immediately renamed the shipyard operating company Baltimore Marine Industries (BMI). It is understood that the State of Maryland agreed to support the sale of the yard by providing a \$4 million loan, of which \$1 million would become an outright grant to BMI if it hires 875 workers within three years. The new union deal for yard employees reduced their hourly wage by \$0.75, to about \$12.75 per hour from what Bethlehem Steel had paid, but in return the workers will own 10 percent of BMI shares.

BMI has already won some significant contracts including Norwegian Cruise Line's 32,396-grt Panamanian cruiseship *Royal Majesty*, which was renamed *Norwegian Majesty*.

Bahrain's Arab Shipbuilding & Repair Yard (ASRY) has experienced solid demand for its services during the third quarter of this year, and revenue is ahead for the first three quarters compared with the same period in 1996. Overall, shiprepair sales were 15 percent ahead of budget for the nine-month period and 22 percent



Sun Cruises *Carousel* is shown at Malta Drydocks.

SHIP REPAIR & CONVERSION

ahead in terms of revenue from vessels repaired in its three docks.

Tankers, RoRo vessels and large passenger/car ferries have continued to dominate Sweden's Gotaverken Cityvarvet's orderbook during this year. Out of a total of 60 ships repaired so far this year, the yard has drydocked 20 RoRos, 12 chemical/products tankers and 20 passenger/car ferries. The most significant contract carried out was Silja Line's 32,940-grt passenger/car ferry *GTS Finnjet*. Apart from carrying out extensive hull treatment and major overhaul of propellers, OD boxes, shaft seals, rudders, stabilizers, etc., Gotaverken Cityvarvet's main task was the relocation of one of the bowthrusters to a new position and installation of a new and larger thruster in the bow. Greece's Hellenic Shipyards, up to September 1997, drydocked a total of 82 ships, with large repair contracts being awarded from Greece, Norway, the U.S. and particularly from the U.K. markets.

Hellenic was awarded the conversion of motor yacht *Alexander*, converting it from a 393-ft. (120-m) long yacht to a high-class passenger cruiseship. Awarded by Greece's Latsis Group, work involves extensive structural and outfitting changes to the vessel. The contract started during late-September and is expected to be completed by early February.

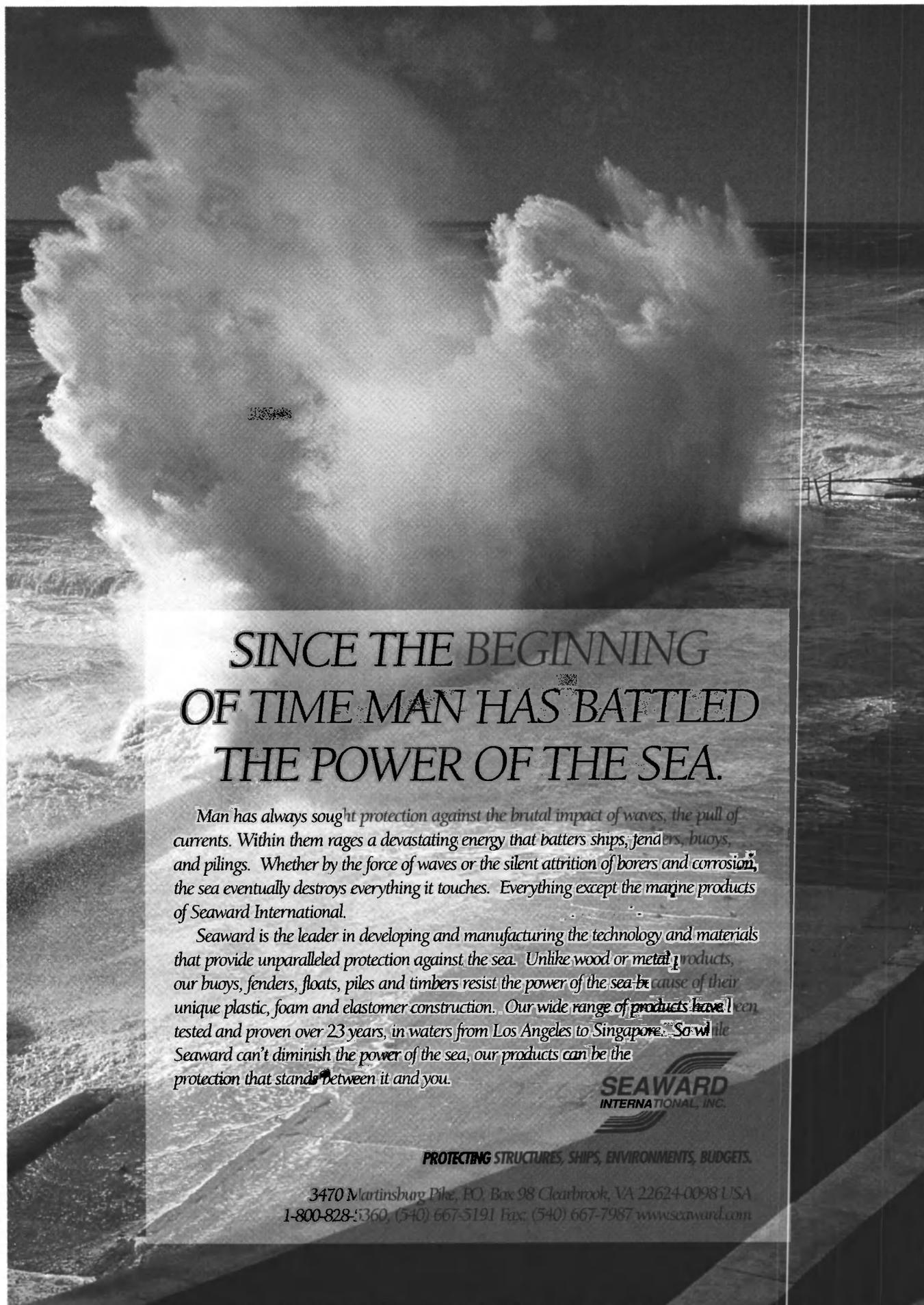
In addition to using Hellenic's yard workers, the yard is involving the services of Ippokamos SA, the cruise liner outfitting company, together with other local companies.

Singapore Technologies Shipbuilding & Engineering Ltd.

(STS&E) has been awarded a two-ship repair contract from Singapore's Semco Salvage & Marine Private Ltd. The yard won the tender on a turnkey basis to refit both vessels, 336-grt tug *Sea Lynx* and 174-grt tug *Sea Panther*, back to class. Both ships will be at the yard for 120 days. Work

includes 120 tons of steel renewal (each vessel), pipe renewal (including hydraulic system, sanitary and domestic piping system, ballast system, fuel oil and fresh water system), overhaul of all electrical motors and machinery, upgrading of accommodation block, upgrading and renewal of air-conditioning

system, installation of four-point mooring system, servicing of life-saving and fire-fighting gears and drydocking work (hull blasting and painting, complete overhaul of main and auxiliary engines, installation of new GMDSS equipment and blasting and coating of all tanks).



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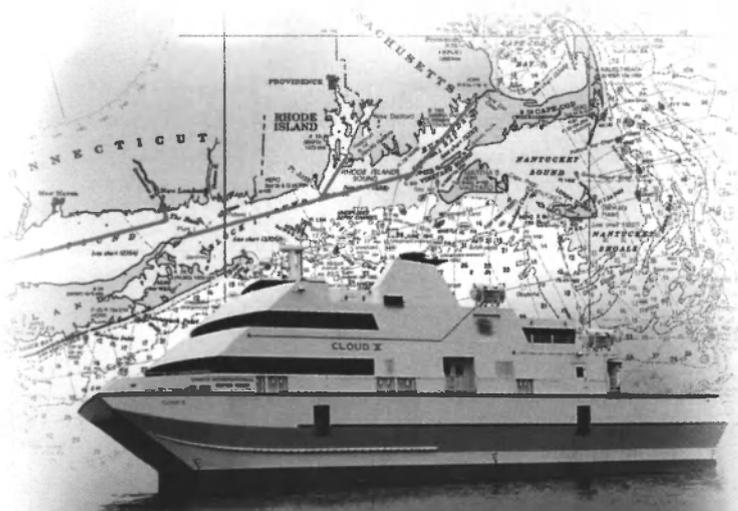
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U.S. Northwest: Shiprepair Activity Picks Up

Portland's Cascade General, one of the emergent yards in the U.S. shiprepair industry, recently completed repairs to RCCL's 78,491-grt cruise ship *Rhapsody of the Seas*. One of the vessel's main electric propulsion motors had to be replaced and tanktop work was needed, as part of guarantee work carried out following the delivery of the ship from France's Chantiers de l'Atlantique, St Nazaire.

This RCCL contract, which is classed as an emergency repair, followed the first RCCL repair contract won by Cascade General, involving the 40,132-grt *Viking Serenade*, carried out earlier this year.

Cascade General, which is expected to have a record turnover this year of some \$120 million, has also won other follow-on contracts in the cruise market. This was clearly seen following the grounding damage repair of P&O's 63,524-grt *Star Princess*, now renamed *Arcadia*, during 1996, and the 1997 repairs of 46,087-grt *Sky Princess* (April) and 77,441-grt *Sun Princess* (September), both repaired at the Oregon yard.

Approximately 45 percent of the yard's turnover involves tankers on the Alaskan trade. For this type of work, the yard has formed strategic alliances with such operators as BP, Keystone, Chevron and SeaRiver Maritime.

Recently under repair was the 91,967-dwt MOC-operated *Overseas Washington*. Alaskan trade tankers repaired or due during the winter period include: 138,698-dwt *OMI Columbia*; 71,340-dwt *Chevron Mississippi*, and two from Sea/River Maritime, 214,853-dwt S/R *Long Beach* and 152,298-dwt S/R *North Slope*. There are also three tankers for Mormac due, the 50,116-dwt *Chesapeake Trader*, 50,860-dwt *Potamac Trader* and 50,057-dwt *Delaware Trader*.

The yard has also recently completed the first phase of the conversion of drillship *Global Explorer*, which is now in Atlantic Marine, Mobile, for the second phase of the conversion.

This experience with drillships has led to the yard offering a tanker, currently laid-up in the

yard to a number of drillship operators as a possible conversion candidate. The tanker involved is

SeaRiver Maritime's 78,620-dwt S/R *Philadelphia*. This is also the case with four larger tankers cur-

rently laid-up in Portland, 165,073-dwt *Thompson Pass*, 152,405-dwt *Atigan Pass*, 125,000-



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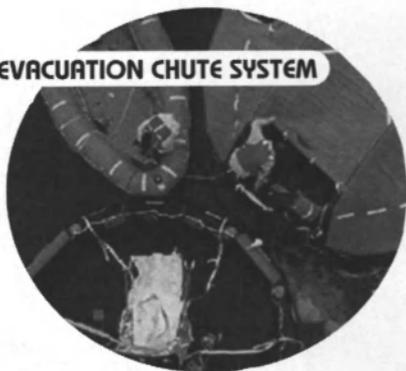


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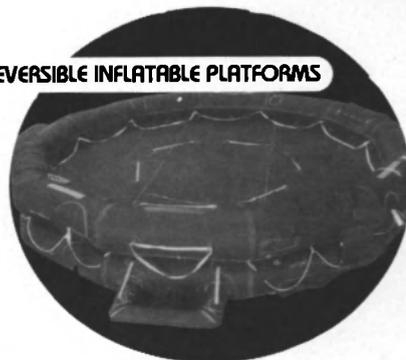
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SHIP REPAIR & CONVERSION

dwt *Keystone Canyon*, and 165,073-dwt *Brooks Range*, all these tankers are available for FPSO/FSU conversions.

On the general repair side, the yard has recently drydocked Gearbulk's 38,771-dwt Bahamas-registered bulk carrier *Raven Arrow* for grounding damage repairs.

Another area of operations is naval work, Cascade General, part of a consortium of shipyards (including Newport News Shipbuilding, Ingalls Shipbuilding and Detyens, Charleston), which has a 10-year contract with VSE Corp, Washington D.C., to carry out work onboard laid-up naval ships, being sold to ally countries under the Military Sales Program. Currently, the yard is carrying out such work onboard former U.S. Navy frigate *Ouellet*, which will be delivered to the Thai Navy during next year. The contract is worth some \$14 million to Cascade General.

Seattle

Holland America Lines' (HAL) 33,933-grt cruiseship *Noordam* was recently in Seattle's Todd Pacific shipyard, part of the Todd Corp. This is the third HAL cruiseship repaired by the yard during this year — 55,451-grt *Veendam* was completed in May and the 33,930-grt *Nieuw Amsterdam* in September.

The 55,451-grt *Ryndam* is due in May next year. All these vessels have now been upgraded to the latest SOLAS regulations.

Todd Pacific, the last remaining yard of the once very large Todd network of yards throughout the U.S., operates three floating docks, the largest of which — Emerald Sea — has a lifting capacity of approximately 40,000 tons.

The yard recently purchased, on auction, a dock from Gianotti Shipyard, Tacoma, which has now closed. The lifting capacity of this dock is approximately 16,500 tons, the same as No. 1 dock already in operation at Todd Pacific.

According to **Roland Webb**, CEO at Todd Shipyards, the yard operates in three distinct markets - newbuildings (three double-ended ferries are currently on order from Washington State Ferries (WSF) (see related story on page 25, this edition); large scale refit and conversion work, which includes SOLAS work onboard cruiseships and naval and Coast Guard work; and Jones Act and domestic repair work.

Newbuilding accounts for approximately 40 percent of the yard's turnover; Navy work, six percent; and international shiprepair, 10 percent. The remainder is Jones Act and domestic work.

An example of the domestic work is the 26,674-dwt Matson Navigation-owned containership *Manulani*, which was recently in the yard for fire damage repairs, the yard's newbuilding capability being used to rebuild parts of the vessel's cargo hold system and hatch covers, damaged in the fire.

This Matson contract followed a 70 tons steel renewal contract on a Matson-owned Integrated Tug/Barge System (ITB). U.S. Coast Guard icebreaker *Polar Sea* is due at the yard to undergo a three month refit. Another ship recently in the yard is the 18,202-dwt U.S.-registered RoRo vessel *Westward Venture*.

Vancouver

Canada's Vancouver Shipyards, part of the Seaspan Group, currently operates



Overseas Washington is shown at Cascade General.

SHIP REPAIR & CONVERSION

three repair facilities in the Vancouver area; a 1,500-ton lifting capacity Syncrolift and a Panamax floating dock in Vancouver port, and a 100,000-dwt capacity graving dock at Victoria, which is leased on a ship by ship basis from the British Columbian government by Victoria Shipyard, also part of the Seaspan Group.

However, due to the pressure of work currently being handled by the various facilities, the yard is looking to lease another facility. The facility in question is a 430 x 150 ft. (131 x 48.8 m), 30,000 tons lifting capacity unit, which was owned until recently by Canadian Maritime (CanMar) and used in the Alaskan offshore industry.

The CanMar Careen Dock was recently sold to Norway's Sea Tankers, part of the Fredriksen Group and this is where the problem for Vancouver Shipyard lies.

To lease the facility, a tax would have to be paid to the Canadian Federal government, as the facility is now foreign-registered. Negotiations are currently underway between the yard and the government to have this tax waived. If this is achieved, Vancouver Shipyards will lease the unit on an on-going 90-day basis.

The yard is currently solely involved in the general repair market with grounding damage repairs being high on the list of regular activities.

The largest such contract carried out this year was 240 tons of steel renewal (approximately \$3.7 million) onboard Canadian Transport's 42,000-dwt *Jade Forest*.

In addition, the yard also had a \$3 million three-ship bulk order this year from Panama's Promotora Navegacion. The yard also repairs the majority of the BC Ferries' fleet of passenger/car ferries operating along the British Columbian coast. The only cruise ship contract in 1997 was Cunard's *Crown Majesty*, which underwent

general repairs, SOLAS work and a name change to *Norwegian Majesty*. This work was carried out in Victoria. In addition, Alcoa Shipping's 47,535-dwt Liberian bulk carrier *Prospector 11*, was in the yard for survey work and internal blasting and coating.

The yard then repaired the log

barge *Haida Monarch*, which required some 150 tons of steel renewal after grounding during September.

Also recently repaired was Sea-Land Services' 21,345-dwt U.S.-registered containership *Sea-Land Kodiak*.

Ferries repaired this year

include 8,786-grt *Queen of New Westminster*, 18,747-grt *Spirit of British Columbia*, *Skeena Queen*, 5,864-grt *Queen of Prince Rupert*, 2,855-grt *Queen of Capilano* and 3,128-grt *Queen of Sidney*, all from BC Ferries, and 2,493-grt *Seaspan Greg* and 2,612-grt *Seaspan Doris*, train ferries from Seaspan.

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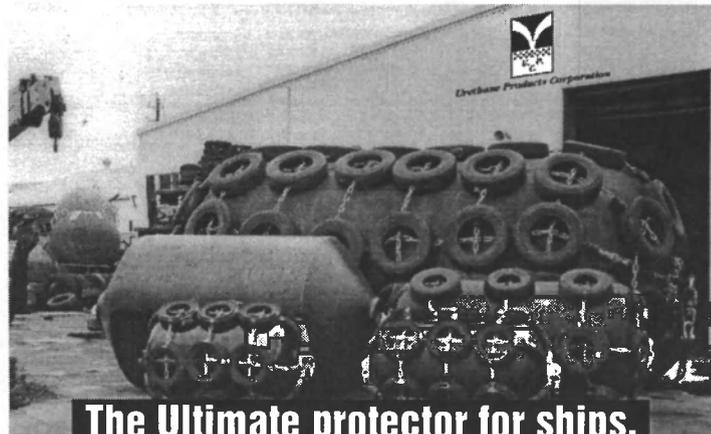
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AUSTRALIAN MARITIME REVIEW

(Continued from page 38)

AME Tackles International Maritime Problems

The Australian Maritime Engineering CRC, established in July 1992, aims to be a valuable resource for Australia's maritime and offshore engineering industry. It provides support and infrastructure for cooperative research and the facility for technology exchange. Its headquarters are in Launceston and a major node is located in Melbourne.

Current research programs focus on three principal areas: calm water performance of marine vehicles, ocean influence on ships and maritime structures, and structural design and fabrication of ships and maritime structures.

The CRC's research has worldwide implications. A current project involving BHP Transport, Lloyd's Register of Shipping, Ishikawajima-Harima Heavy Industries and P&O Bulk Shipping Ltd., has interim findings on extending the safe life of bulk carriers. The results were recently presented at seminars in Sydney, Tokyo and London. Further projects of significance include wind tunnel testing of scale models to measure ship resistance, a pipeline tow-out for a large petroleum company, hydro-mechanic loading of a bridge structure and various other wave tank tests.

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deployed to Canada under a six-month charter with Bay Ferries. It will operate 14 hours per day between Bar Harbour and Yarmouth. The vessel is powered by four Ruston 20 RK270 conventional medium speed diesel engines which develop 7,080 kW (9,500 hp) each. Each engine drives a transom-mounted Lips waterjet through a Renk reduction gearbox.

To service such demanding routes, *Devil Cat* is constructed from marine grade aluminum alloys. Incat has insisted on the earliest introduction of the rare 5383-H116 alloy — which the yard says will provide significant marine and mechanical property improvements over the superseded 5083 range. The internationally accepted 6082 T6 alloy is being used for extruded aluminum while Incat changes to the 5383 series alloy. The wave piercing catamaran was developed by Incat in the early 1980s, and has undergone 15 years of refinement. The design is characterized by long, slender, waterborne hulls, each subdivided into eight watertight compartments, with very little buoyancy at the bow. As each hull encounters a wave, it tends to pierce through, rather than ride over it. The aluminum superstructure is supported on vibration damping mounts. Passenger comfort is enhanced greatly with the hull shape and design itself, and even more so via a Maritime Dynamics Inc. ride control system.

The interior design was provided by Incat's in-house design group, and the mission to maximize onboard revenue potential while retaining a unique style was amply met. Particular attention was paid to maximizing passenger comfort for the long fast ferry routes. The main deck contains two lounges, and TT-Line plans to use the aft lounge as a mini cinema.

Wavemaster International, also of Henderson, delivered a record-breaking nine vessels last year, including Hull Nos. 152 and 153 in December. In addition to the nine, Wavemaster currently has three more vessels under construction. The latest deliveries are a pair of 102-ft (31-m) monohull high-speed ferries for Indonesian operator P.T. Marina City Indah. Marina City Indah is reportedly happy with the results of the sea trials, as well as the overall quality of construction, not to mention the build time of only eight months. The vessels achieved close to 30 knots during sea trials with simulated service deadweight

Control Units

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Quality in Command

Circle 311 on Reader Service Card

Advertorial

Karl Senner, Inc. & Reintjes: Stronger Than Ever After 25 Years

Reintjes was looking to extend its influence beyond Europe in the late 1960s, so it selected Green-Senner Inc. to help sell its marine gears in the U.S.

In 1972 Al Green and Karl Senner parted ways, and Karl Senner, Inc. (New Orleans) was founded, effectively starting one of the most successful maritime relationships in the U.S.

In 1972, Reintjes deemed it a good time for a fresh start, as demand for conventional vessels was increasing, and revolutionary developments were occurring in shipbuilding, providing promising conditions for the young Reintjes partner.

The push towing sector accounted for an impressive boom in orders, and at virtually the same time, there was a considerable upturn in offshore business in the Gulf of Mexico.

Changing With The Times

Reintjes delivered gears for a large number of supply ships. At that time, engine output was approximately 5,000 hp per vessel maximum, compared with up to 12,000 hp or more today.

Business between Reintjes and Senner steadily increased up to the begin-

ning of the 1980s. In the mid-80s, the 500th container with the 800th gear unit left the Reintjes plant in Hamelin bound for New Orleans. By then, close to 10,000 tons of gears and spare parts had been transported across the Atlantic. To date, nearly 1,000 containers and almost 2,500 gear units have been shipped to the U.S., corresponding to a total output of approximately four million hp.

Quality Maintained Despite Market Turns

The first 10 years of the Reintjes/Karl Senner, Inc. relationship were "fat," followed by 10 rather lean years. However, this did not reflect a slump in U.S. business for Reintjes and Karl Senner, Inc., rather a general slowdown in world shipbuilding. During this time, a large number of shipyards and marine equipment suppliers disappeared from the global market. However, thanks to its wise business strategy and excellent customer support and service, Karl Senner, Inc. managed not only to master this difficult period, but also to expand, making Reintjes a symbol of quality in the U.S.

Exemplary service, always a priority at Senner, was a major factor in those

years. The emphasis on service increased customer confidence in both Senner and Reintjes, an investment that was about to yield big dividends. In 1990-93, for instance, Senner beat extremely fierce international competition to win an order from the U.S. Navy for 52 gear units of the WVS 2232 series for the new Cyclone class generation. All 13 patrol coastal (PC) boats are fitted with the Reintjes active speed control system (ADS) and have been performing to the full satisfaction of the U.S. Navy.

Reintjes would certainly never have received this U.S. Navy order without the support of a strong partner like Karl Senner, Inc.

As is well-known, offshore business in the U.S. has recently picked up following a steep decline over the last 15 years, resulting in some obsolete ships being replaced by newbuildings. The opening of new oil fields in deepwater parts of the Gulf of Mexico — and in other regions — has called for new technologies involving deployment of larger and more powerful supply vessels.

This upturn in the market has meant fresh challenges for Reintjes and Karl Senner, Inc. They have jointly developed market-oriented products for this sector and have received a large number of orders, mainly for large gear units, over the past two years.

Here, too, the good name of Karl Senner, Inc. has again won the confidence of shipowners with worldwide operations.

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That was then...



Company site of Karl Senner, Inc. in 1972.

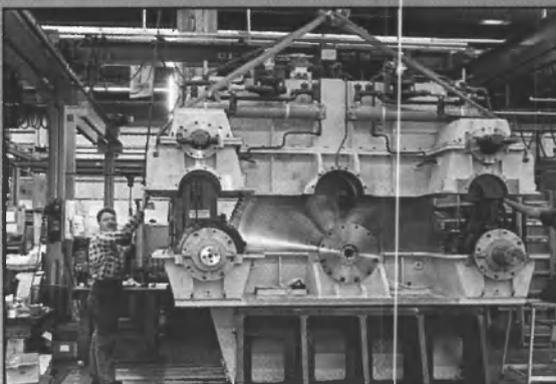


Offshore supply tug *David P. Guider*, built in 1972 with two Karl Senner supplied Reintjes SUA 560 units.

...this is now



Company site of Karl Senner, Inc. in 1997.



A Reintjes DLG 3325 unit.

Reintjes/Karl Senner, Inc. Case Study

VesselSeacor Vision
TypeAnchor Handling/Towing Supply (AHTS)
BuilderHalter Marine Group
OwnerSeacor Marine, Inc. (Houston)
Main EnginesGeneral Motors EMD 16-645 E 7 B diesel engines
Gears(2) Reintjes twin input/single output reduction gears type DLG 3325 with PTO K41

Karl Senner, Inc. ...

When Only The Best Will Do (For 25 Years)

A lot of things have changed in 25 years, but one constant has been the quality of product and service provided by New Orleans-based Karl Senner, Inc. In 1972, Karl Senner founded Karl Senner, Inc. in New Orleans, and ever since the company has been a market leader in providing superior products and services to the maritime community.



Karl Senner in 1972



Company founder Karl Senner (center) with sons, Ralph (left) and Michael (right)



Offshore supply tug, David P. Guidry, built in 1972 with 2 Karl Senner supplied Reintjes SUA 560 units.

Karl Senner, Inc. has supplied propulsion products for some of the finest boats built in the country, truly living up to its motto:

"When Only The Best Will Do"



The offshore support vessel Seacor Vision, built in 1997, featured 2 Karl Senner-supplied Reintjes DLG 3325 gears.

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 Karl Senner, Inc.
 25 W. Third St.
 Kenner, LA 70062
 (504) 469-4000
 Telefax: (504) 464-7528

EAST COAST
 Olof Wadehn Enterprises
 30 Sheppard Lane
 Huntington, Long Island
 New York 11743
 Mr. Olof Wadehn
 (516) 692-4548

loadings comfortably above the contracted speed of 29 knots. These latest deliveries are numbers five and six in a string of similar-design monohull vessels built last year, each with basically the same hull design and similar three engine/three waterjet propulsion systems. While six of the vessels delivered last year are monohulls, Wavemaster demonstrated its flexibility with the delivery of three catamarans as well. A pair of 144-ft. (44-m) vessels were delivered to Iranian operator Valfajre-8 for operation in the Persian Gulf. Each vessel can carry 236 passengers, 10 large vehicles and 16 cargo crates of up to 28.5 knots. The other catamaran was a smaller, 80.5-ft. (24.5-m) vessel built for Japan's Ezaki Kisen. Delivered in June, the vessel marked the company's first delivery to Japan.

Speed & Quality By Design

Australia's Advanced Multihull Designs (AMD) has designed what it dubs the world's fastest car ferry, a vessel built by Spain's Bazan. The 252.6-ft. (77-m) catamaran — *Luciano Federico L* — was delivered to Buquebus in October. It is a gas turbine-powered version of the AMD 1130 design and is to be operated on the 130 mile Rio de la Plata route from Buenos Aires to Montevideo. The vessel can carry 450 passengers and 52 cars, and reportedly achieved trial speeds of 58.7 knots propelled by a pair of ABB GT35 gas turbines, which together develop a shaft power of 32,200 kW. Each gas turbine is coupled to a Kamewa 112SII waterjet through a Renk gearbox.

To ensure stability, handling and comfort, the vessel is outfitted with an active Maritime Dynamics trim

tab ride control system which was especially designed for the vessel.

The design objectives clearly state that the end product must have a speed as close to 60 knots as possible, while maintaining tight control on build, outfit and operational costs. A concept design was developed by AMD based on these

designs objectives and the owner's requirements. With approval of the concept by Buquebus, AMD proceeded with a full technical design. Bazan was chosen by the owner to build the vessel, and the technical design was input into Bazan's Foran computer system to produce shipyard drawings. Due

to the high operating speed, a new hull form was developed. The design was optimized with a model test program carried out at the HWA Zhong University in China. A larger model of the final hull form was then built and tested in the El Pardo Towing Tank in Spain to verify performance.

A powerful case for...

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For additional information on the companies mentioned in this story, circle the appropriate number on the Reader Service Card in this edition.

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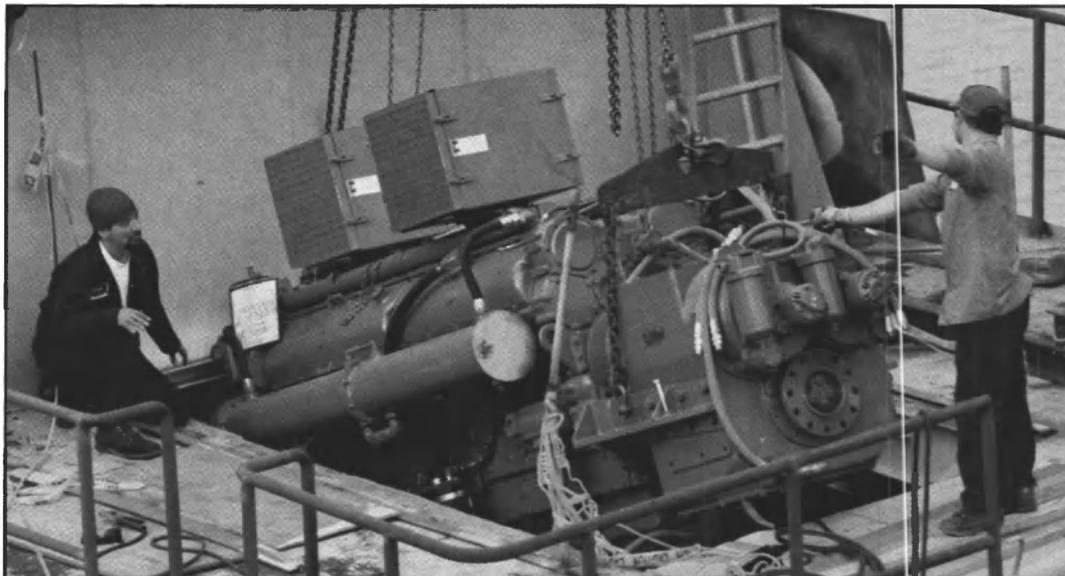
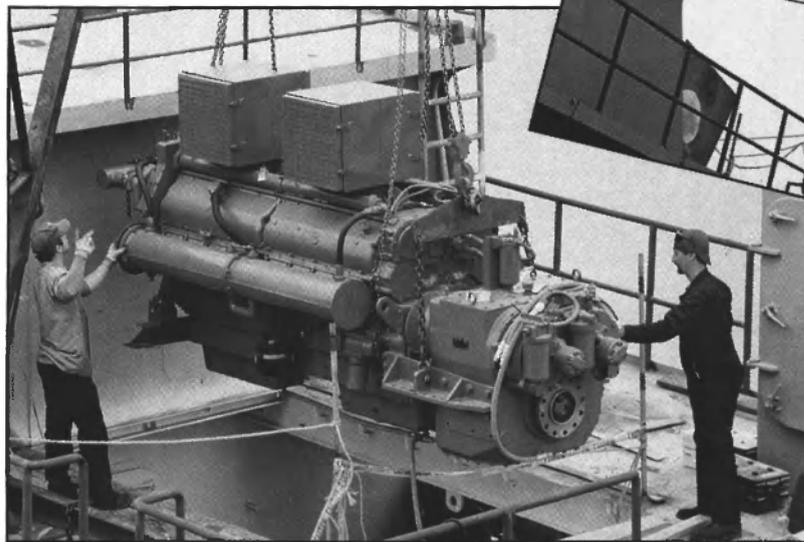
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8631 East Freeway
Houston, TX 77029
(713) 671-6100
Fax: (713) 671-6197



Motor Vessel "Gulf Dawn"

- 97 feet long x 27 feet wide
- Main Iron Works, Houma, LA USA
- Built 1966
- Hull # 162
- Originally named "Gulf Squire"
- Operated in the Gulf of Mexico
- Subsequently operated in Pacific, vicinity of Guam
- Boat originally built for Gulf Mississippi Marine Corp.
- Current Owner: Dawn Services, Inc., Gretna, LA



Above: Old engines from "Gulf Dawn"

PROPULSION SELECTION GUIDE

MR/EN's Propulsion Selection Guide is an "A to Z" listing of many of the world's top equipment manufacturers. Publisher is not responsible for errors or omissions.

A
ABB Industry Oy
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 FIN-00381
 Helsinki, Finland
 Tel: +358 9 564 2110
 Fax: +358 9 564 2350
 Thomas Hackman

ABB Drives Inc.
 P.O. Box 372
 Milwaukee, WI 53201-0372

ABB Turbocharger Systems
 CH-5401
 Baden, Switzerland
 Tel: +41 56 205-6959
 Fax: +41 56 205-5144
 Paul Russak

ABB Turbocharger Co.
 1460 Livingston Ave.
 North Brunswick, N.J. 08902
 Tel: (908) 932-6394
 Fax: (908) 932-6378
 Stephen Burak
 Product(s): TC

ABB Turbo Systems Ltd.
 CH-5401
 Baden, Switzerland
 Tel: +41 56 205 4037
 Fax: +41 56 205 5144

Alaska Diesel Electric
 4420 14th Ave. NW
 P.O. Box 70543
 Seattle, WA 98107
 Tel: (206) 789-3880
 Fax: (206) 782-5455
 E-Mail: ADE@northern-lights.com
 Kurt Hoehne
 Product(s): DE(ms,hs); GEN

Allen Gears - Allen Power Engineering Limited
 Atlas Works, Pershore
 Worcestershire WR10 2BZ
 Tel: +441386 552211
 Fax: +441386 554491
 Roger Bewley
 Product(s): G

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 P.O. Box 35690
 Louisville, KY 40432

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 Rohnert Park, CA 94928
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 Fax: (707) 586-3159
 Ken Oertel

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 Fax: (305) 978-6597
 Bob Filippino
 Apollo International

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Aquadrive System
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 Atlantic Highlands, N.J. 07716

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 Fax: +358 38 379-4804

Aquamaster-Rauma Inc.
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 Fax: (504) 883-8344
 e-mail:
 104147.614@compuserve.com
 Dave Hackney

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 Portsmouth, VA 23701

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 Fax: +358-31-2870-249

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 Fax: (513) 541-3065

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 55A Clipper St.
 Coquitlam, B.C., Canada V3K 6X2

Avondale Industries
 P.O. Box 116
 Harvey Quick Repair
 Harvey, LA 70058

B
BHS-Cincinnati Getriebetechnik GmbH
 Hans-Bockler-Str. 7
 D-87527 Sonthofen
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 Fax: +49 8321 802685
 Ralf Wydlicky
 Product(s): G

Bird-Johnson Company
 110 Norfolk St.
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 Fax: (508) 668-5638
 Gary W. Dayton
 Product(s): P; PP; WJ; TH; S; ME; C

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 Product(s): WJ

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 E-Mail: Cat_Power@Cat.com
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Coltec Industries-Fair Banks Morse
 Engine Division
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 Beloit, WI 53511
 Tel: (608) 364-8100
 Fax: (608) 364-8233
 Nancy L. Stiener
 Product(s): DE(ms)

Crone Heatex
 Unit 1 Fairview Industrial Estate,
 Curdworth
 West Midlands, United Kingdom
 Tel: +44 1675 470 042
 Fax: +44 1675 470 490
 E-Mail:
 101364.365@compuserve.com
 Andrew Statham
 Product(s): HE

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 4500 Leeds Ave.
 Suite 301
 Charleston, SC 29405
 Tel: (803) 745-1620
 Fax: (803) 745-1549
 E-Mail: wavemaster@cummins.com
 Product(s): OE(hs); GEN; PP

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 Kenner, LA 70062

Cummins-Würsilä
 BP 115-La Combe
 F-17700 Surgeres, France
 Tel: +33 5 46 303150
 Fax: +33 5 46 303151
 Product(s): DE(ms, hs); GEN; PP

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 P.O. Box 547
 Pascagoula, MS 39568

D
DMI Norshipco Co.
 P.O. Box 2100
 Norfolk, VA 23501-2100

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 2-10 Nihonbashi-honcho
 2-chome, Chuo-ku
 J-103, Tokyo
 Tel: +81-3 32 79 0827
 Fax: +81-3 32 45 0395
 Daytona Marine Engine Corp.
 1815 North U.S. I
 Ormond Beach, FL 32174

Tel: (904) 676-1140
 Fax: (904) 676-0164
 George Inhofer
 Product(s): DE(ms, hs); GEN

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 Moltkestraße 6 a
 D-26122 Oldenburg
 Tel: +49-4 41 77 60 62
 Fax: +49-4 41 77 73 37
 Jochen Deerberg

Deere Power Systems
 3801 W Ridgeway Ave.
 Waterloo, IA 50701
 Tel: (800) 533-6446
 Fax: (319) 292-5075
 E-Mail: jdpower@deere.com
 Doug Higgins
 Product(s): DE(ms)

Del Gavio Marine Hydraulics
 619 Industrial Road
 Carlstadt, NJ 70721
 Tel: (201) 843-4700

Detroit Diesel Corporation
 13400 Outer Drive West
 Detroit, MI 48239-4001
 Tel: (313) 592-5153
 Fax: (313) 592-5058
 Nancy Martin
 Product(s): DE(hs); GT; TC; C; GEN

Deutz MWM
 Carl-Benz-Straße 5
 D-68167 Mannheim
 Postfach, D-68140 Mannheim
 Tel: +49 621 38 40
 Fax: +49 621 3 84 86 92
 Friedrich Mette

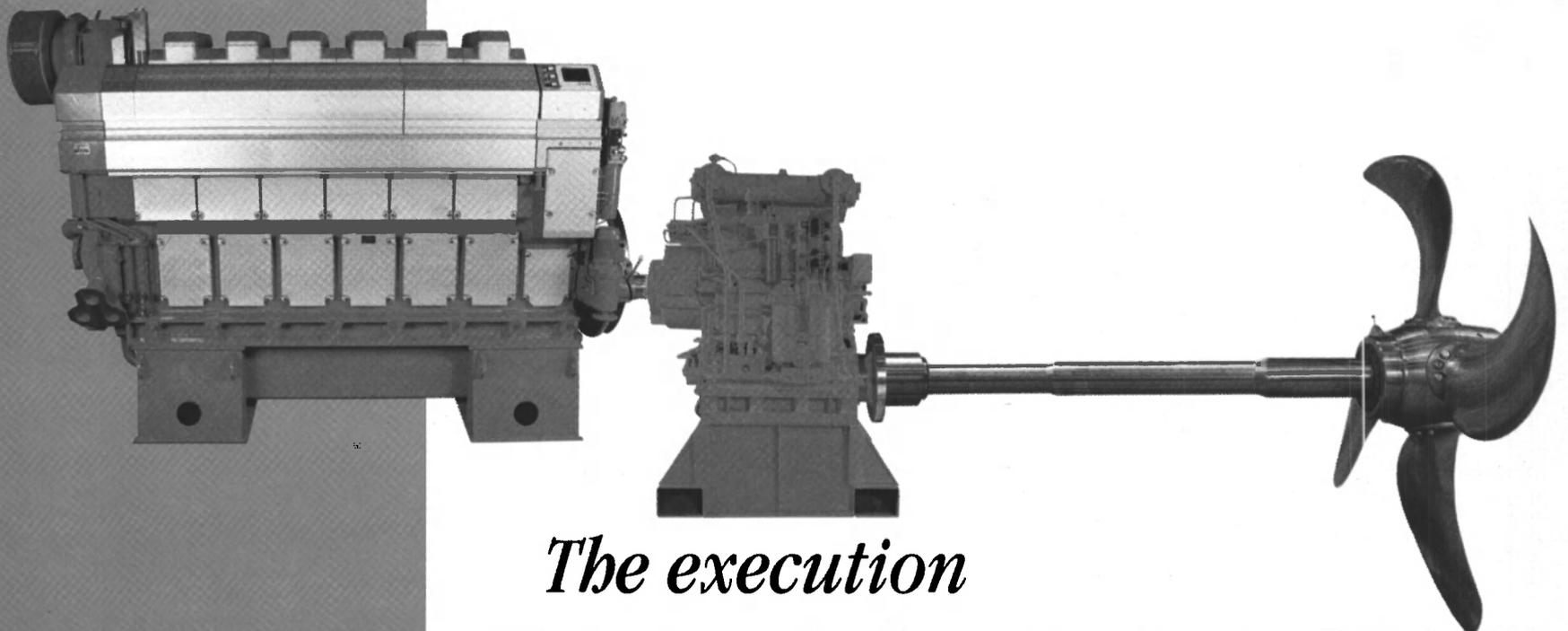
deWijns Marine International B.V.
 Postbus 320, 1969 NJ
 Dieselmotorenwerk Vulkan GmbH
 Werftallee 13
 18119 Rastock Germany
 Tel: +49 381 1232130
 Fax: +49 381 1232132
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Diesel Engines (low speed)	.DE(l)
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Diesel Engines (high speed)	.DE(hs)
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Fuel Oil	.FO
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Heat Exchangers	.HE
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Keel Coolers	.KC
Lube Oil Separators	.LOS
Monitoring Equipment	.ME
Oil Purifiers	.OP
Propellers	.P
Propulsion Packages	.PP
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Fax: (414) 937-4113
Product(s): G; PP

Falk Corp.
PO Box 492

Milwaukee, WI 53201-0492

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Via Genova, 1
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Fax: +39 40 366649
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Fincantieri, Diesel Engines Div—GMT
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Trieste, ITALY

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Product: KC

G
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Fax: (513) 552-5001
E-Mail: BobBass@ae.ge.com
Robert Bass
Product(s): GT

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Tel: (713) 939-0073
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Product(s): DE (hs) (ms); GEN
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Paxman Works, Hythe Hill
Colchester, Essex, CO1 2HW, England
Tel: +44 1206 795151
Fax: +44 1206 797869
W. (Bill) Van-Orden
Product(s): DE (hs); GEN
GEC Alsthom Mirrlees Blackstone
Bramhall Moor Lane
Hazel Grove, Stockport, Cheshire SK7 5AH England
Tel: +44 161 483 1000
Fax: +44 161 4871465
Product(s): DE (ms); GEN

GEC Alsthom Ruston Diesels
Vulcan Works, Newton-LE-Willows
Merseyside, England, WA3 2EP
Tel: +44 1925 225151
Fax: +44 1925 222055
Malcolm Siberry
Product(s): DE(ms); GEN

Gems Sensors Division
One Cowles Rd.
Plainville CT 06062
General Motors
Electro-Motive Div.
La Grange, IL 60525
Tel: (708) 387-5842
Fax: (708) 387-5845
Product(s): DE(ms)

General Thermodynamics

PROPULSION SELECTION GUIDE

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Plymouth, MA 02360
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Brooklyn, NY 11231

H
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Greenville, MS 38702

Haley Marine Gears, Inc.
P.O. Box 689
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Greenville, MS 38702-0689
Tel: (601) 332-8716
Fax: (601) 335-4322
Gene Pigg
Product(s): CP; CL

Hamilton Jet
P.O. Box 709
Christchurch, New Zealand
Tel: +64 334 84 179
Fax: +64 334 86 969
Product(s): C; PP

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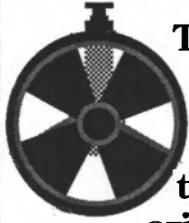
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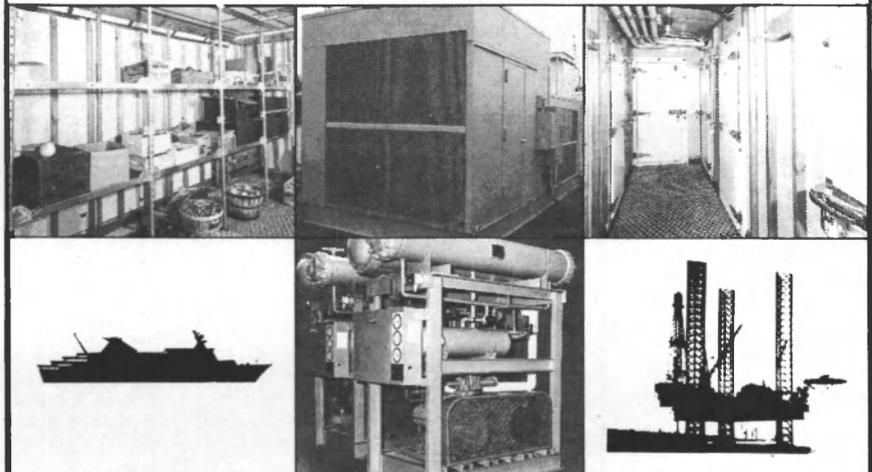
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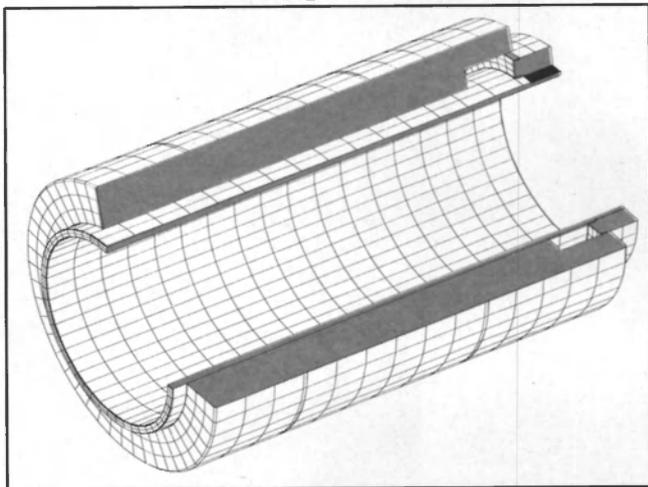


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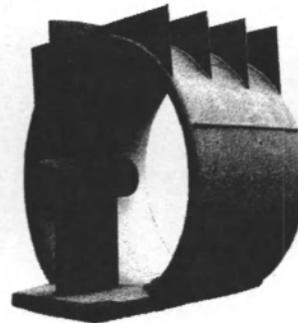
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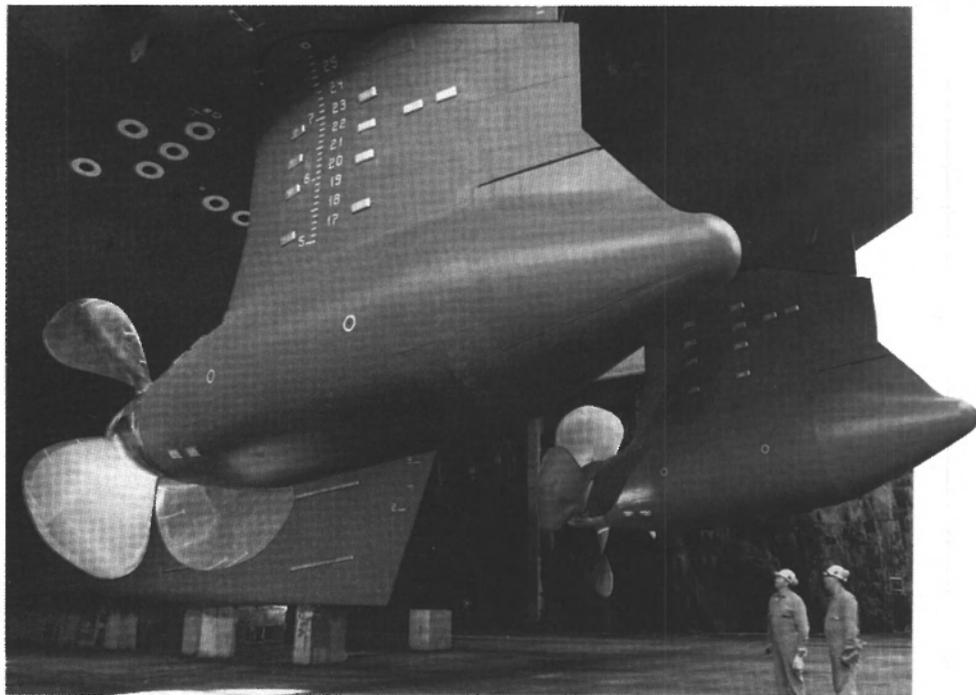
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Two 14 MW Azipod units installed on the Elation



AzipodTM Propulsion

Azipod propulsion has been selected for two of Carnival Cruise Line's newest *Fantasy*-class vessels, *Elation* and *Paradise*, the latter due for delivery in 1998 from Kvaerner Masa's Helsinki Shipyard. Each liner will be equipped with twin 14 MW Azipod units, as part of the complete electric propulsion & power plant from ABB Marine.

Two of the world's largest cruise liners, the 130 000 GRT *Eagle*-class vessels, being built at Kvaerner Masa's Turku Shipyard and due for delivery in 1999 and 2000, will feature three 14 MW Azipod units each.

Azipod propulsion offers major benefits in enhanced maneuverability and hydrodynamic efficiency, resulting in shorter harbor times, safe operation in harsh weather and restricted passages - and reduced exhaust emissions and fuel consumption. The need for long shaftlines, rudders, and stern thrusters is eliminated, resulting in space and weight savings. Azipod also features exceptionally

low noise and vibration characteristics. Azipod units are available in power ranges up to 25 MW (34, 000 hp) for cruise vessels, ro-ro ferries, tankers, container vessels and offshore DP vessels.

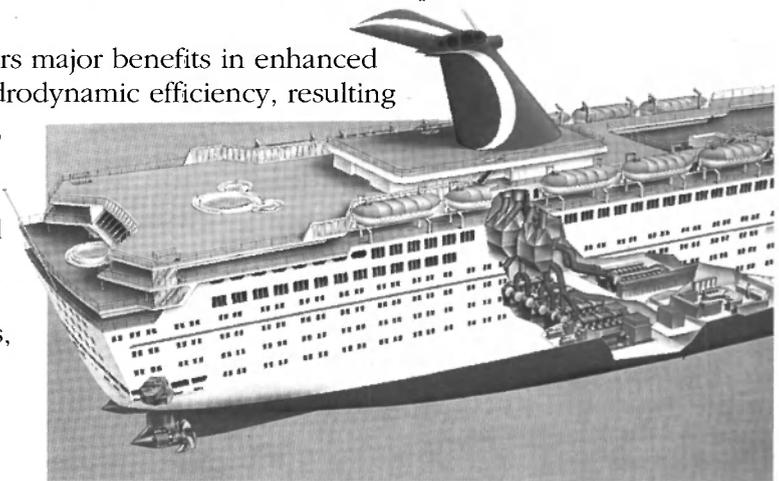


ABB Azipod Oy is a recently established company, owned by ABB, Kvaerner Masa-Yards and Fincantieri.

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COMPANY PROFILE

Staying In Control

Prime Mover Controls (PMC) is a designer and manufacturer of marine propulsion control systems and equipment. PMC manufactures a variety of marine components, as well as provides system integration for complete propulsion control systems.

Based in Burnaby, BC, Canada and employing 25, the company offers a wide range of products and services including: Azimuth control heads and indicator systems for 360° rotating thrusters; Bow & stern thruster controls; Clutch controls, propeller pitch controls, shaft brakes; Control consoles, graphics and mimics; Diesel engine propulsion controls; Distributed control and monitoring systems; Engine and shaft tachometer indicator systems; Instrumentation packages for propulsion machinery; Integrated machinery alarm and control systems; Lever and push button engine order telegraphs; Machinery alarms, horns, beacons, sensors, repeaters and watch keeping systems; Manual & automatic load control and load sharing; Navigation light control panels; Propulsion control systems, CP prop or FP prop, electric or pneumatic; Servo actuated control lever line-up systems (electric shafts); Station transfer systems; Tank level monitoring systems; and Winch controls.

PMC is currently seeing its business expand, particularly in and among large U.S. shipbuilders. Historically, the company has had strong direct sales to vessel owners and propulsion machinery manufacturers alike.

PMC's latest product introductions are a 144 mm DIN size Push Button Engine Order Telegraph and an Integrated Machinery Alarm and Control System (IMACS).

The company believes that ongoing R&D is tantamount to its future success, and it continues to expend significant funds to research new products and engineered solutions.

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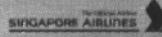
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VLCC, Containership Markets Drive Engine Builder's Business

The buoyant newbuilding market for VLCCs has brought increased order activity for Sulzer RTA84T engines. Wartsila NSD announced that orders for the year (to Oct. 1, 1997) totaled 12 VLCCs, each powered by the 7RTA84T engine. The engines have a combined output of 443,520 bhp, and are for vessels under construction in Japan and Korea (see chart below).

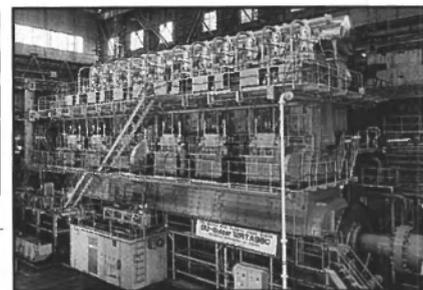
The RTA84T low-speed two-stroke diesel engine is specifically designed for the propulsion needs of large tankers. It runs at low speeds (54 to 74 rpm) to match the optimum propeller speeds of these large ships. As part-load fuel economy is important in ships which might have long periods of slow-steaming, the concept of flexible engine setting is extended in the RTA84T to include variable exhaust valve closing (VEC), load-dependent cylinder liner cooling, and variable fuel injection timing.

Wartsila NSD two-stroke diesel engine center in Switzerland as a driving force for the new generation of larger, faster containerships. The engine is the first of four 12RTA96C types that were

contracted for installation in a series of 6,674 TEU containership building for P&O Nedlloyd at IHI.

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The Sulzer RTA96C has an output of 89,640 bhp.



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300	Korea	Daewoo	KHIC	2/99
305	Greece	Hyundai	Hyundai	3/99
260	Japan	IHI	DU	10/98
260	Japan	IHI	DU	12/98
260	Japan	IHI	DU	7/99
300	Japan	IHI	DU	9/99
300	Japan	IHI	DU	11/99
300	Hong Kong	IHI	DU	1/00
265.5	Japan	IHI	DU	1/00

Driving the Containership Market

While the VLCC market is helping to drive RTA84T sales, the containership market continues to provide the engine builder with interesting prospects. It remains a strong market in terms of volume, but perhaps more importantly, it is a sector which continually challenges engine builders to devise advanced technological solutions. Larger, faster containerships require high output propulsion engines, which must operate most reliably with the least time out of service (see related story in this month's "Investment in Design" section, page 8).

The world's most powerful diesel engine — the Sulzer RTA96C two-stroke marine engine with an output of 89,640 bhp — was recently successfully tested in Aioi, Japan. The engine was designed and developed by



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Electronic Monitoring Will Lead The Way

The emerging IMO regulations for NOx and SOx emissions from marine vessels prompt the question: Does the marine diesel engine have a future, or will gas

turbines take over?

While the future of marine propulsion systems is indeed complex, with no one standard answer for every application, it is clear

that the importance of reliable operation is being stressed over and over again by ship operators. The challenge, then, for engine builders, is to identify and achieve

the margins necessary for ensuring high reliability in a product which is also competitively positioned and priced. As the market is characterized by strong competition, the first cost of the engine is often the decisive factor for securing an order. This, in turn, forces both engine developers and engine builders to focus on cost reductions in engine design and manufacturing. When assessing reliability, it is important to keep in mind that no chain is stronger than its weakest link: The reliability of the engine does not only depend on the design and manufacturing quality, but also on operational aspects such as load conditions for the engine, fuel oil quality and treatment, lube oil quality and dosage, maintenance standards and spare part quality.

While most of these are outside the engine designer's influence and control, the engine designer can contribute to improving the general running conditions and reducing the need for maintenance of the engine. Modern engine condition monitoring and maintenance planning systems may include the accumulated service know-how from a vast number of engines. If such systems are implemented and used by the vessel's staff, the engine can be kept in optimum condition with a minimum of maintenance.

The use of electronic software and hardware products will increase tremendously in the future. When properly used, they should contribute to improving engine reliability and reducing maintenance as well as running costs. While electronics and advanced monitoring and management systems have become the norm in many phases of the maritime market, the same is not true for similar systems in regard to the main engine. In the next five to 10 years, the situation is expected to change significantly, much as what has happened in the automotive industry, where technology has gone from limited use on expensive cars to extensive use even in smaller, less-costly models. This development has been triggered, largely by the need to control engine emissions, and has been facilitated by achievements in the computer industry to reduce size and cost of components.

The preceding was excerpted from Marine Propulsion Systems — An Outlook, from MAN B&W. For a free copy of the booklet:

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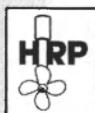
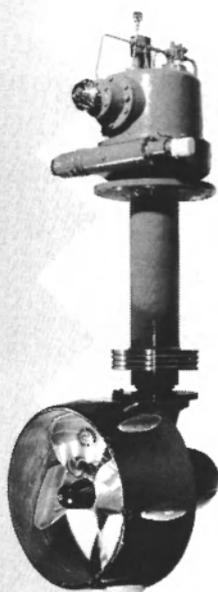
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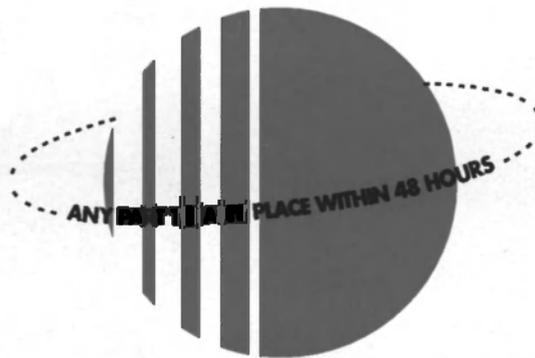
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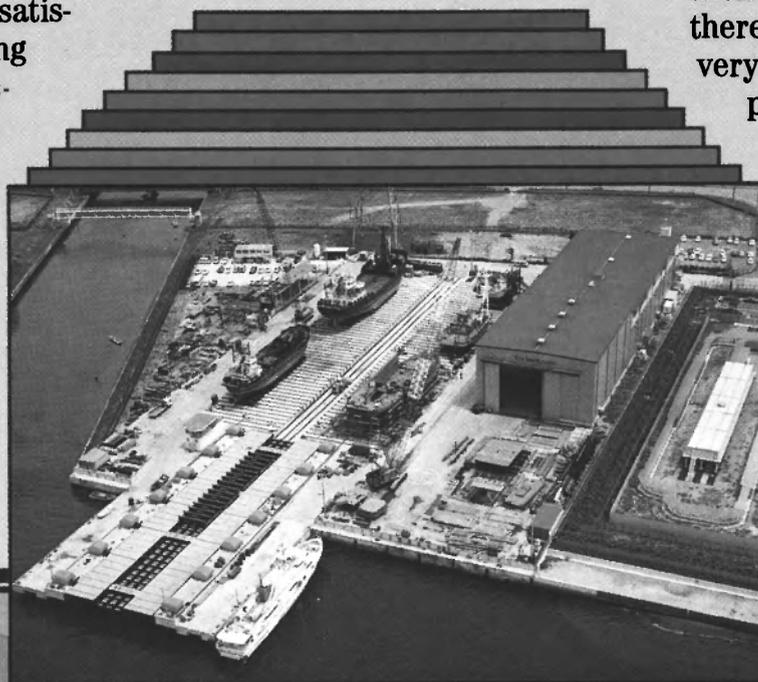
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ABB Turbo Systems of Baden, Switzerland, has enlarged and centralized its local production facilities and modernized its turbocharger testing equipment to maintain its standards and to keep

up with the shorter delivery times and demands of technology. The company designs, develops and manufactures Exhaust Gas-Turbochargers for the diesel and gas engine power range of above

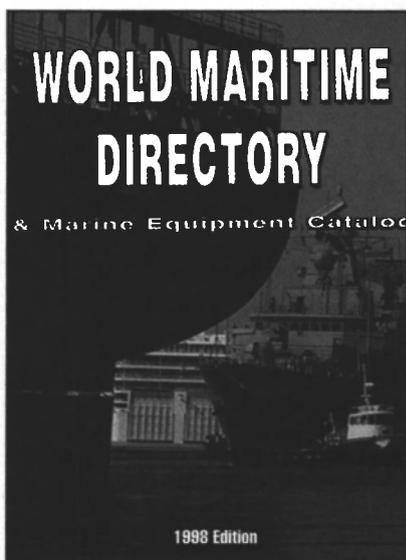
500 kW. The company recently unveiled its new production hall, which is attached to the present manufacturing premises and measures 413.3 x 98.4 x 49.2 ft. (126 x 30 x 15 m). The total investment

ABB Turbocharger's Product Line

- TPL: A new series designed for new types of four-stroke and two-stroke diesel engines with output ratings from 1,000 to 25,000 kW per turbocharger.
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- VTR: The VTR turbocharger is designed for two-stroke, low-speed and four-stroke, medium-speed heavy duty diesel engines. Unit sizes cover diesel engine outputs ranging from 700 to 18,500 kW per turbocharger.
- VTC: The VTC covers the diesel engine output range from 1,000 to 3,500 kW per turbocharger, and is regarded as an excellent compact model.
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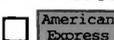
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in this new facility alone was more than \$16.5 million, with more than half of that going toward new machinery. The new hall is used for the machining of large turbocharger casings and the assembly of large turbochargers, activities that were previously done in another hall some distance further. By housing all production activities under one roof, communications and logistics are improved immeasurably. New machining centers will enable the company to produce large turbocharger casings with a more flexible schedule. In all, the new production site allows for a considerable reduction in lead time, lower tolerances in machining, more flexibility in turbocharger types and specs, and optimized stock management.

In addition to the production center, ABB introduced its new turbocharger testing facilities for efficient thermodynamic mechanical trials. The new test center includes five independent test halls with seven test beds, to accommodate the entire range of ABB turbochargers. The highly automated center allows for 24-hr. un-manned operation. By concentrating all turbocharger trial in one building, the manufacturer expects to receive more efficient operations and fast successions of tests; faster analysis of results leading to shorter re-design cycles; and a massive reduction in gas and noise emissions.

Circle 88 on Reader Service Card

PROPULSION NOTES

Deere Power Systems Group offers five marine diesel engine in 3.9, 4.5, 6.8, and 7.6 L configurations, with horsepowers ranging from 71 to 300. The largest is the 6076AFM, an aftercooled 7.6 L model, which offers 215 and 250-hp ratings at 2,200 rpm, and a 300-hp rating at 2,400 rpm.

The **International Council on Combustion Engines (CIMAC)** is making finishing touches for its 22nd Congress, to be held May 18-21 in Copenhagen. The event, held every three years, should prove to be a lively one, with legislative and technical issues topping the agenda. The CIMAC group is also planning an initiative to examine engine failures, with the intent to publish a paper in the future to help facilitate improved engine design.

Caterpillar's Engine Products Div. announced the new CAT 3406 marine engine was the winner of an OEMmie Award for production innovation, market impact, advancing the state of the art and increasing performance. The 3406E was released in 1997, and is a totally electronic marine diesel engine with ratings up to 800 bhp at 2,300 rpm.

Volvo Penta recently launched the first integrated waterjet system. The advanced system is the result of a collaboration with **Kamewa**, a relationship formed to develop and market a complete waterjet system in the 200 to 800 hp range. The system combines Volvo Penta's four to 16 liter marine diesels with Kamewa waterjet units.

The consortium of **Siemens** and **Schottel** have announced that the Siemens Schottel Propulsor (SSP) now offers 10 percent higher efficiency and a wider spectrum of use. The consortium was formed to jointly

develop the SSP for the international market. The ship propulsion unit will reportedly achieve a 10 percent higher level of efficiency, as compared to conventional systems. Additional stated advantages include improved maneuverability, reduced vibration and noise, better utilization of storage

space and flexibility.

Alaska Diesel Electric announced the availability of a new 10 kW Northern Lights genset (model M843JK), which was built to fill a growing demand for 10 kW gensets. Commercial operators, cruisers and sportfishermen that formerly required a bare minimum

of power now feature power-hungry electronics and other equipment. The new 10 kW genset runs at a lower speed of 1,800 rpm to help ensure long life and quiet operation. The M843JK's generator end is a completely new design, which features more copper windings.

ICOM

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Meets Mil Spec 810 C/D Standards

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45 WATTS
PC Programmable by Channel

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POWERFUL HANDHELD VHF

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LIMITED COAST BASE STATION VHF

The ideal radio for marine business and service organizations that must communicate with vessels underway.
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<p>EMT Electronics, Houma 504-879-2084</p> <p>Frank L. Beier, Harvey 504-341-0123</p> <p>MacKay Communications, Harahan 504-733-5824</p> <p>MI Electronics, Houma 504-868-3425</p> <p>Morgan Communications, Harvey 504-362-4820</p> <p>Radio Holland, Harahan 504-733-4024</p> <p>Rice Electronics, Morgan City 800-899-5950</p> <p>Seatrac Offshore, New Orleans 504-737-0591</p> <p>Wheelhouse Electric, Paradis 504-758-1010</p>	
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For additional information on the companies highlighted in this section, circle the appropriate number on the Reader Service Card in this edition.

Alaska Diesel	90
Caterpillar	91
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Kamewa	93
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Volvo Penta	96

Marine Literature Review

Ferry, Boat Design & Equipment Suppliers Guide



Maritime Satellite Telephone Service

SKYCELL® maritime satellite telephone service provides vessels of any type with the lowest cost satellite voice, data and fax communications available. It can help you maximize your time at sea by providing immediate communication to other vessels or to shore operations.

CIRCLE NO. 100



A New Generation of Diesel Engines

The Wartsila 200 is a high-speed diesel engine designed to be as safe, simple and easy-to-maintain as a medium-speed engine. The Wartsila 200 is virtually pipeless thanks to a modular structure and 40% fewer parts compared to a conventional engine. This brochure includes dimensions and technical data.

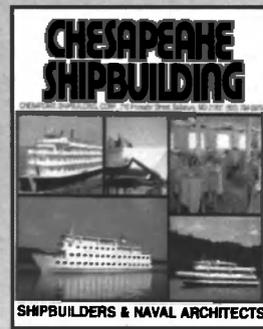
CIRCLE NO. 101



Business Management

Hornblower Marine Services helps marine businesses meet changing market conditions by utilizing high-technology resources and sophisticated management skills. Our service-oriented product line reflects an in-depth knowledge of regulatory standards, client needs and emerging trends within the passenger vessel industry.

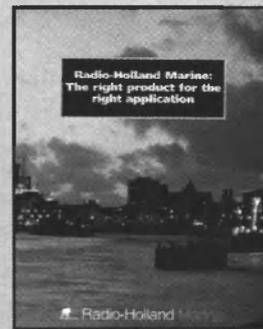
CIRCLE NO. 102



Chesapeake Shipbuilding

Located in Salisbury, MD, Chesapeake Shipbuilding's construction yard is located on 13 acres of land with 2000 ft. of deepwater bulkhead on the Wicomico River. Chesapeake is usually able to deliver custom vessels in eight months from contract signing. Custom designs are available.

CIRCLE NO. 103



Climate Control for Tough Environments

Radio-Holland Marine is one of the leading specialists in the supply, integration, installation, and maintenance of ships' radio stations and to supply, operating, installation and service of advanced equipment for all electronic functions on board.

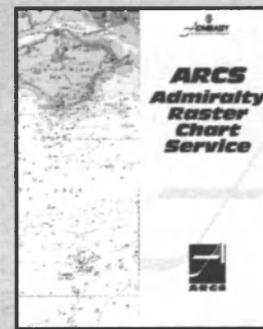
CIRCLE NO. 104



Innovators in Control

Kongsberg Norcontrol is world-renowned for having pioneered the development of modern Vessel Traffic Services (VTS) with deliveries to many of the major and busiest ports and waterways. Their Propulsion Control System was a major innovation; today the AutoChief is in its fourth generation.

CIRCLE NO. 105



British Admiralty Charts

Developed by the UK Hydrographic Office, ARCS (Admiralty Raster Chart Service) provides these world renowned charts and updates on CD-Rom. ARCS is suited to a wide range of navigational applications at sea. Being platform independent, ARCS can be used in a wide range of equipment, from full integrated bridge systems to stand-alone PCs.

CIRCLE NO. 106



Orkot Composites

A non-asbestos laminated material incorporating solid lubricants, Orkot® "TLM Marine" has exceptional wear resistance, and virtually no swell in water, providing dimensional stability. Orkot tolerates edge loading and misalignment even with the heaviest loads. It is particularly suited to freeze fitting, without the danger of shattering.

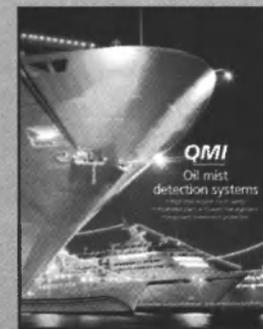
CIRCLE NO. 107



American Technology That Talks to the World

The SEASAT 3 GMDSS System is your ultimate choice for global Inmarsat-C communication links, offering fast and reliable connections to any worldwide fax, data subscriber directly to and from another Inmarsat unit. It ensures fast and reliable transfer of information and supports all Inmarsat communication modes.

CIRCLE NO. 108



Oil Mist Detection

The QMI MULTIPLEX Atmospheric Oil Mist Detection system is crucial to safety at sea. A large percentage of machine room fires start because there is oil mist in the atmosphere. The accumulation of oil mist in a confined area is caused by leaking fuel, hydraulic, and lubricating oils escaping from pipework and injectors.

CIRCLE NO. 109



Nucleus2 5000

This radar has been designed to meet the growing demand for a small professional radar that conforms with IMO requirements. Features include the automatic tracking of up to 50 targets, enhanced signal processing and extensive interfacing capability.

CIRCLE NO. 110



Interior Panels

Norac Akerpanel is a complete interior paneling system for use onboard ships, cruise vessels, and drilling rigs. The system comprises non-combustible and sound-absorbent elements, and has been developed with a to simple and rapid installation. The system includes walls lining and partitions, ceilings, doors and floating doors, and floating floors.

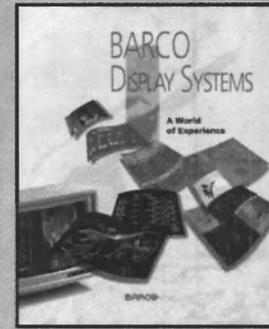
CIRCLE NO. 111



Teakdecking Systems

Teakdecking Systems, the largest supplier in North America of teak decks and custom wood floors for the marine industry, is pleased to announce the opening of its new 60,000 ft² manufacturing facility. Located in Sarasota, Fla., the new factory provides enough space to pre-assemble in one place modular teak decks for vessels up to 250' long.

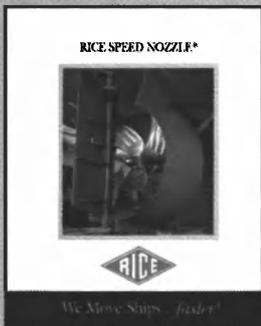
CIRCLE NO. 112



Linear Bi-directional Driver

Barco designs high quality displays, high resolution graphics generators and video products with worldwide recognition for advanced technology, user-friendliness and minimum maintenance. Barco's displays, controllers and video products are utilized in aircraft, ships, submarines and land-based vehicles as well as Air/Vessel Traffic Control and C4I.

CIRCLE NO. 113



Speed Nozzles Move Ships ... Faster!

Rice Speed Nozzles (patent pending) offer less resistance, more thrust and fuel savings with a special shape and skewed propeller. They are geared for smoother performance, vibration-free operation and longer life. Made by computerized cutting equipment and certified welders from electrolytic material.

CIRCLE NO. 114



Innovation Bridge Series

This ergonomic multi-function bridge workstation by Litton Marine Systems concept uses the latest advances in flat-panel display technology. The workstation's compact, uncluttered design makes it suitable for virtually any bridge size and configuration. Inputs from radar/ARPA, AECDIS, autopilot, GPS, gyrocompass, speed log, echo sounder, engine monitoring systems, shipboard IT systems. **CIRCLE NO. 115**



On The Wave

Station 12 is the world's most successful satellite service provider. They offer quality voice telephony, telex, messaging and data applications. On the Wave is the Station 12 newsletter that gives you news about their products and services, as well as developments and events concerning satellite communications.

CIRCLE NO. 116



Marine Weather Satellite Receiver

The latest Weather Satellite receiver system from ICS Electronics Ltd. offers dramatic improvements to the facilities offered by existing systems. The WS5 M uses Windows 95 compatible software to receive and display startlingly detailed satellite weather images directly on a PC screen, even when at sea.

CIRCLE NO. 117



New Viking Liferaft

The new Viking self-righting liferaft for 50 persons has been developed and approved to the new international regulations applying to ro-ro passenger ships. Other Viking lifesaving products include rescue boats, Marine Evacuation Systems, personal protective equipment, training, inspection and servicing.

CIRCLE NO. 118



Gas-Tight Chemical Tank Gauging

MMC International (Inwood, NY) designed this Closed TrimodeTM to deliver fast and accurate gauging, sounding and sampling for tanks carrying chemicals, while keeping operators in compliance with the growing body of safety and environmental regulations. When this instrument is installed in an MMC vapor-control valve, it assures a gas-tight barrier that locks in fumes.

CIRCLE NO. 119



Surveillance Made Easy

The NightMaster, by Cincinnati Electronics Corp., can see in the dark. With infrared imaging, this advanced, hand-held compact unit can magnify, provide digital data output, and operate in extreme weather from -32o to 55oC. RemoteMaster is specially designed naval and marine detection, identification and navigational missions.

CIRCLE NO. 120



Luxe Interiors

MSC (Maritime Services Corp.) provides the marine industry with planning, design, engineering, construction supervision, materials and project execution relating to new building and refurbishment of cruise ships, ferries and gaming vessels. They produce furniture, furnishings and finished surfaces; gallery ad mess; doors; bulkheads, linings and ceilings; restrooms and more.

CIRCLE NO. 121



High-Speed Gears for Fast Ferries

Demand for fast ferries with an overall length of up to 100 m and over has increased recently. Some of these vessels carry more than 1,000 passengers, and some travel at speeds of over 40 knots. Reintjes guarantees the finest gear cutting, design and processing work to ensure smooth running and reliability.

CIRCLE NO. 149



Puget Sound Rope

Puget Sound Rope, founded on the principles of change, innovation and new technology, is a major supplier of high performance ropes. They are a major supplier of braided rope to the U.S. D of Defense, as well as manufacturing for commercial applications, offshore oil operations and the commercial fishing industry. Website: www.psrope.com. E-mail: sales@psrope.com. **CIRCLE NO. 122**



Hand Winches

Jeamar Winches is an ISO 9002 registered company that manufactures six different types of heavy duty industrial type hand winches, all of which conform to world-wide standards. This ensures superior quality, long life and low maintenance costs. Standard features include completely automatic fail-safe braking including non-recoiling of the handle plus high drum-to-rope ratios. **CIRCLE NO. 123**



S&S Propellers

Family owned and operated for over 50 years, S&S Propeller, with locations in Flushing, New York, and Pompano Beach, Florida, offers a lengthy list of products and services, including computerized propeller sizing. Both locations stock propellers, shafting and all related hardware to accommodate boat sizes from 15' to 150'. **CIRCLE NO. 124**



Harbormaster Tunnel Thrusters

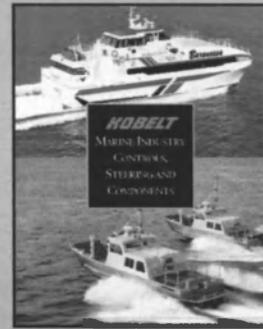
Since 1946, Harbormaster has been a pioneer in the development and application of tunnel-type thrusters to commercial vessels. Today, Harbormaster Tunnel Thrusters are built for adaptability, high efficiency and rugged service, ensuring improved vessel control and easier maneuvering over a long life.

CIRCLE NO. 125



Marine Monitors

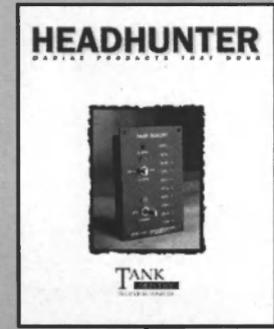
Intecolor Corporation designs and manufactures the world's leading ruggedized computing equipment – monitors, workstations, and custom products. Founded in 1973, Intecolor is headquartered 25 miles north of Atlanta, GA. A European subsidiary in the Netherlands and a network of independent distributors sell and service Intecolor products worldwide. **CIRCLE NO. 126**



Engine Control and Steering

Since 1962 Kobelt Manufacturing has been building engine control systems for the Marine Industry. The latest brochure shows some applications of Engine Control and Steering systems in a Commercial Marine Environment. Mechanical, pneumatic and electronic controls are featured as well as the hydraulic steering systems. Please write for our free catalogue.

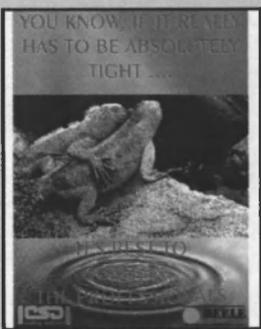
CIRCLE NO. 127



Fluid Level Monitoring

Headhunter Tank Sentry programmable fluid level monitors provide reliable and accurate level indication. There are no moving parts to foul or electrical components inside the tank. Unaffected by floating solids or stray current, Tank Sentry is the ideal solution for the toughest of fluid level monitoring assignments. This brochure describes both single and multi-tank systems.

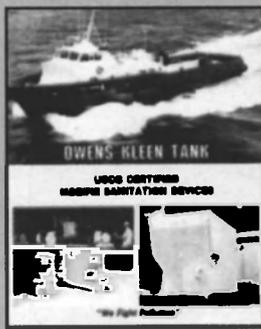
CIRCLE NO. 128



Fire Safe Sealing Systems for Cable and Pipe Penetrations

Beele Engineering/CSD International offers an extensive line of fire safe & watertight products for sealing all types of multi-cable and pipe penetrations on vessels and offshore rigs. Approved by classification societies worldwide for A0 up to A60, & H0 up to H120.

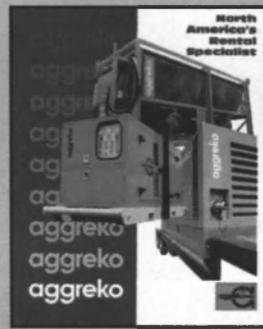
CIRCLE NO. 129



Marine Wastewater Treatment Systems

The OWENS KLEEN-TANK utilizes aeration and operates as an extended biological aeration system. It is self-contained and delivered to site ready for operation when site electrical and mechanical connections are in place. The Kleen Tank can be designed for small, hard to fit areas and have a capacity range from 33 GPD to several thousand GPD.

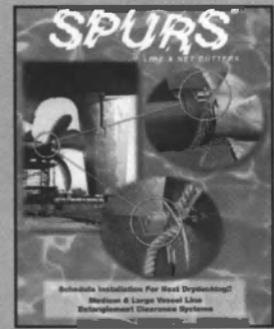
CIRCLE NO. 130



Rental Temperature Control

Aggreko is the largest worldwide supplier of rental power, temperature control and oil-free compressed air equipment. Our product line includes silenced generators, HVAC and process chillers, air-conditioners, electric heaters, dehumidifiers, 100% oil-free air compressors and a complete line of accessories. Aggreko offers 24-hour emergency assistance from over 70 locations throughout the world.

CIRCLE NO. 131



American Technology That Talks to the World

Spurs is a two-part assembly, one or more rotating cutting assemblies and one stationary cutting assembly, attached to a vessel's propeller hub and to the ropeguard or strut respectively. The purpose is to engage lines and other debris caught by the propeller and cut them free instantly with each revolution of the propeller.

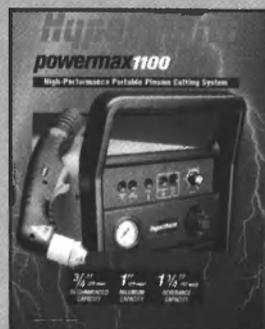
CIRCLE NO. 132



Sailsafe Automated Navigation System

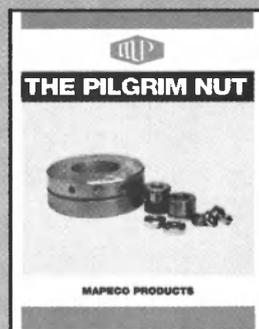
The Sailsafe navigation system from Q-Mar integrates digital marine maps with DGPS. It runs on a standard Windows NT or Windows 95 operating system. It allows for planning and recording of routes taken, viewing of multiple maps, and creation of alternative scenarios and the importation of radar data.

CIRCLE NO. 133



Powermax 1100 Portable Plasma Cutting System

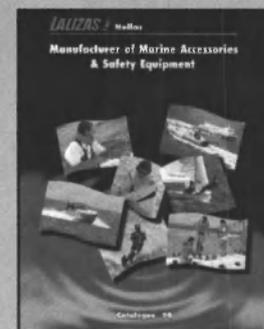
Color brochure details Hypertherm's Powermax1100, a portable plasma cutting system for heavy-duty, high-capacity metal cutting. The unit has a recommended capacity of 3/4 inch with a severance capability of 1 1/4 inches. The system features a multi-voltage power supply and shielded torch which allows drag-cuts at full power. **CIRCLE NO. 134**



Pilgrim Nuts

Pilgrim Nuts, by Mapeco, utilize the almost limitless "leverage" of hydraulics to quickly, safely and accurately tension studs and bolts. The main advantages are the simplicity of operation and the precision of the applied loads. Pilgrim Nuts can provide sufficient friction grip to improve the operations of engine parts.

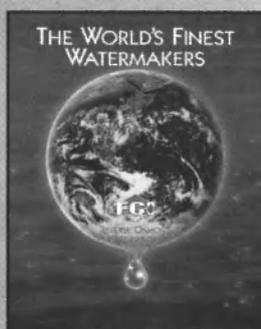
CIRCLE NO. 135



Lalizas Worldwide

Lalizas are manufacturers of safety accessories, clothing and gear including flotation suits, lifevests, canopies, lights, paddles and more. This brochure gives an overview of the company's organization as well as its various products.

CIRCLE NO. 136



FCI Watermakers

FCI (Filtration Concepts Inc.) Watermakers apply high pressure – approximately 800 PSI – to the salt-water, removing 98.7% of its salts, contaminants and pollutants. FCI manufactures watermakers for every size vessel, from the Aquamiser Plus, suitable for cruising yachts, to commercial watermakers that produce up to 26,000 GPD.

CIRCLE NO. 137



Hose-McCann Telephone Co., Inc.

Hose-McCann is now your complete Maritime Communications Superstore! Our expanded manufacturing capability now includes fully Integrated Marine Communications Systems, Sound Powered Telephones, Dial Telephones, General Alarms, Horizon 2000 (Dial Telephone/Public Address System Integration), Back-lit Sound Powered Telephones, and Alarm and Monitoring Panels. **CIRCLE NO. 138**



Shipbuilders, Architects and Engineers

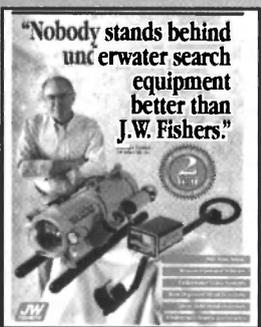
Washburn & Doughty builds and designs steel and aluminum boats, up to 200', in a 50,000 sq. ft. indoor facility. Washburn & Doughty is committed to building hardworking and seaworthy boats and, consequently, enjoys success constructing fishing and research vessels, barges, car ferries, passenger vessels, floating docks, tugs, and workboats.

CIRCLE NO. 139



Atlantic Marine, Inc.

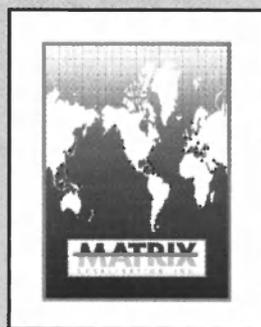
Atlantic Marine, Inc. founded in 1964, is a full service shipyard located on 49 acres on the St. Johns River and Intercoastal Waterway in Alabama, only two miles from the Atlantic Ocean. Atlantic Dry Dock Corp, located in Jacksonville, Fla. is its affiliate repair and conversion yard. Both facilities are known throughout the world for high quality workmanship. **CIRCLE NO. 140**



Underwater Search Equipment

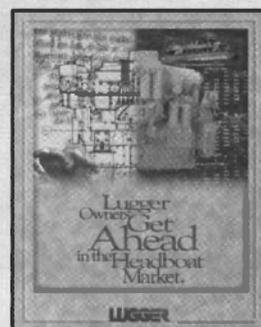
J.W. Fisher produces Side Scan Sonar, remote operated cameras and video systems, and boat-deployed and diver-held metal detectors. All equipment is low cost, yet ruggedly constructed. Products in this brochure include the SSS-100K Side Scan Sonar, which comes with a built-in 17" thermal printer as standard equipment; it has 300% better resolution than video monitor systems.

CIRCLE NO. 141



Reverse Osmosis

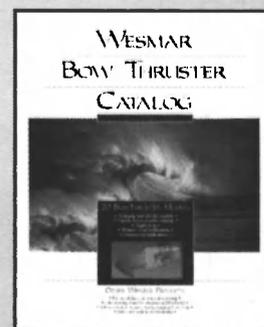
Matrix Desalination, Inc. was established in 1987 to manufacture high quality reverse osmosis systems for sea water, brackish water, chemically polluted and biologically fouled water. Services include pilot plant design and operation, project engineering, site investigations, and more. This brochure includes specifications for various systems as well as replacement parts. **CIRCLE NO. 142**



They Run On and On and On...

When you need reliable, efficient power, specify Lugger Diesel Engine. From 70 to 900 HP, Lugger diesels have the heavy duty features your passenger vessel needs. The great advantage of a diesel engine is it operates without an electric ignition system that is vulnerable to the marine environment. The brochure on each model has details.

CIRCLE NO. 143



WESMAR Bow Thrusters

WESMAR bow thrusters are available up to 40" 400 horse power for pleasure and workboats. With this range, WESMART bow thrusters are suitable for boats from 25' to 200'. Utilizing dual prop counter rotating technology and 4-blade stainless steel props, WEMAR manufactures the most efficient product on the thruster market.

CIRCLE NO. 144



Reliable Workboats

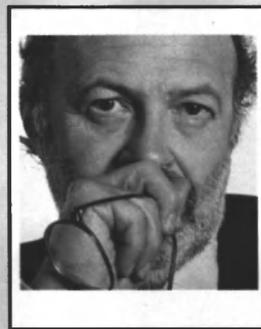
Whether it's oil spill response, research or enforcement, commercial fishing, or general commercial use, every boat Kvichak Marine builds is a workboat. Your operation depends on your boat, which is why quality and reliability are the hallmarks of every Kvichak Marine design.

CIRCLE NO. 145



Silsan Cylinder Liners

High technology and stringent measures of quality control are a must in manufacturing cylinder liners. Silsan, which has almost thirty years of experience, is based in Adana in the south of Turkey. Their liners are manufactured using the latest technology, quality materials, casting and machining, to the original standards and specifications or to the customer's special request. **CIRCLE NO. 146**



Rolla Propellers

The services, consultation and designs of Rolla Propellers include: performance and power prediction for displacement and planing craft; propeller design; manufacturing of propeller models; full-scale tests; propeller re-design and re-calculation for existing vessels; designing of conventional and unconventional propeller systems; and consultation on propulsion problems.

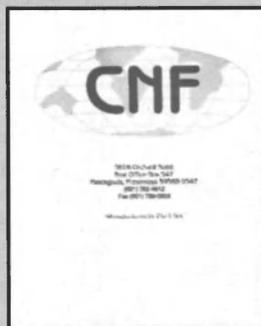
CIRCLE NO. 147



Comprehensive Consumer Catalog

Get your FREE 1998 LFS catalog, 272 pages packed with the products and information you need! Fishing essentials, raingear, marine hardware, rope, safety equipment, pumps, paint and painting supplies, boat accessories, and equipment. Plus 150 original cartoon drawings by Rik Dalvit! LFS Marine Supplies: 800-426-8860.

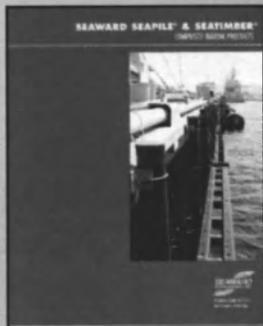
CIRCLE NO. 148



Custom Nozzle Fabrication

CNF features Kort Nozzles, all sizes, with ABS Certification upon request. Products are "Manufactured in the USA," with quick delivery. They are built to customer specifications.

CIRCLE NO. 150



Fendering Made Easy

Seaward International's newly released SEA GUARD® Foam-Filled Marine Fenders technical manual is now available. Providing comprehensive technical data on standard and custom fenders in both English and metric specifications, and offering a step-by-step guide to designing fendering systems. For a copy, please contact Seaward at 1-800-828-5360, mail@seaward.com, or fax to 540-667-7987. **CIRCLE NO. 151**



Enviropak

Tech Oil Products, Inc. was established in New Iberia, LA in 1980. The expansion of our product line has satisfied customers from every segment of the industrial community. One of ENVIROPAK's compactors or crushers can minimize general waste, galley waste, or fuel and oil filters and cut disposal costs significantly. **CIRCLE NO. 152**



Joiner Bulkhead Wall Panels

Thermax non-combustible, non-toxic, marine construction boards are used worldwide for joiner bulkheads, panels, liners, ceilings, door cores and furniture cores. Thermax has all major regulatory body certifications and meets the requirements of IMO/SOLAS resolutions. Thermax is sold, distributed warehoused, laminated, and cut to size in North America by PSI. **CIRCLE NO. 153**



The Ultimate Protector

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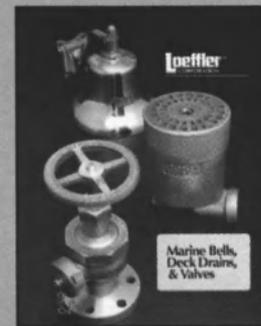
"The Gauger" manufactured by Electronic Marine Systems Inc. (EMS), delivers 1/10 of an inch level accuracy for all liquid cargo. Readouts in BLS/TONS/GAL, constructed of teflon and stainless steel. Requires no in-tank support, includes complete milspec self-diagnostics, USCG and ABS approved for closed tank gauging. **CIRCLE NO. 155**



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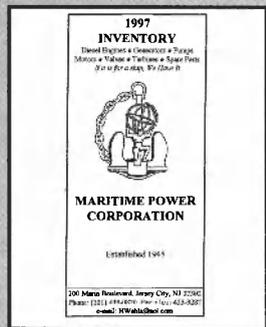
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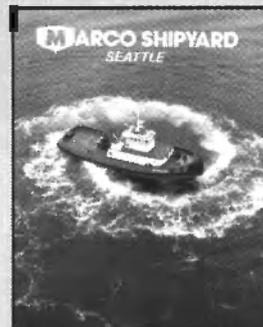
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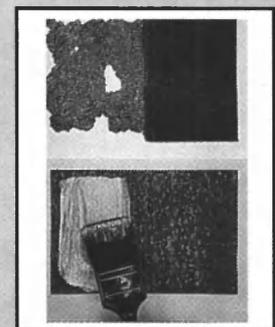
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"LIT REVIEW" Publication Guide

The Marine Literature Review is scheduled for the following issues of *MR/EN* in 1998:

- **March** (Deadline: Feb. 10)
- **May** (Deadline: April 7)
- **August** (Deadline: July 7)
- **October** (Deadline: Sept. 8)
- **December** (Deadline: Nov. 10)

Mobil To Reenter South African Market

After an eight year hiatus, Mobil will return to South Africa to provide marine lubricants and related services for the shipping industry. As of December 15, the company

will offer a full range of marine lubricants, including synthetic oils at the Durban/Richards Bay ports. Service at Cape Town/Saldanah Bay, Port Elizabeth and East London is scheduled to begin in early 1998.

Mobil first started trading in South Africa more than 100 years

ago, and by 1989 had a significant presence in the region. Due to economic considerations, including changes to U.S. tax policies for American companies doing business in South Africa, Mobil withdrew from the country in 1989. It sold its assets to South African company Gencor in an agreement

which precluded Mobil from reentering the South African market before July 1, 1997.

Circle 61 on Reader Service Card

Bobbitt Joins Friede & Goldman

Friede & Goldman, Ltd., a subsidiary of Friede Goldman International, has named **Larry W. Bobbitt** as vice president of Marketing and Business Development. He will be based in the company's Houston office. Mr. **Bobbitt** brings 16 years of experience in the offshore drilling and construction business to his new position, and most recently served as vice president of Marketing for Aker Marine Contractors.

MR&S Achieves ISO 9001 Certification

The San Francisco, San Diego and Bremerton, Wash., branch offices of M. Rosenblatt & Son, Inc. (MR&S) have been certified by the ABS Quality Evaluations, Inc. (ABS QE) to the ISO 9001 Quality System standard. These three offices comprise the firm's Western Division and represent the first phase of MR&S' effort to achieve certification for the entire company.

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Oceaneering And Chance To Form Alliance

Oceaneering International, Inc. has entered into a letter of intent with John E. Chance & Assoc., Inc., a member of the Fugro Group, to form an alliance offering integrated remotely operated vehicle (ROV)/Survey services to the offshore oil and gas industry in the Gulf of Mexico. The initial primary focus of the alliance will be to serve the ROV/Survey service needs of operations exploring for and developing hydrocarbon reserves located in the Gulf of Mexico's deepwater areas. To its end, Chance will install dedicated survey spreads onboard all of Oceaneering's dynamically positioned and four-point moored vessels in the gulf.

This is expected to reduce mobilization costs and systems integration time with the ROV equipment.

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PEOPLE & COMPANY NEWS

Flow Promotes Lawrence

Flow International Corp. has promoted Executive Vice President **R.B. (Brad) Lawrence** to the position of COO. In his new position, Mr. Lawrence will have operational responsibility for all of Flow's businesses in the U.S. and Canada.

MTC Moves

Marine Technology Corp. (MTC) has moved its Williamsburg, Va. office to 2600 South Gessner, Suite 312, Houston, Texas 77063, tel: (713) 953-9199; fax: (713) 953-9499. In addition, the company's London operations are now centered at Highlands House, Mereworth, Kent ME18 5NF, U.K. Tel: +44 1622 813539; Fax: +44 2622 814880.

MTC offers strategic advice on matters related to the marine and offshore oil & gas industries, as well as consulting and management services for the improvement of performance of shipyards and other marine-related activities.

GL Announces Retirements

At the end of February 1998, Germanischer Lloyd (GL) senior staff members **Gerd Beckedorf**, chief surveyor and executive director of the Survey division, and **Gerhard Fischer**, executive director of the Machinery and Electrical division, will retire. Mr. Beckedorf's replacement will be **Hans-Joachim Fösterling**, and Mr. Fischer's replacement will be **Jakob Gätjens**.

SingTel Globalizes Services

Singapore Telecom (SingTel) Inmarsat B, M and MPLUS services can now be accessed over the Atlantic Ocean regions. Previously, such coverage was available only in the Pacific and Indian Ocean regions.

"With this latest move, SingTel now provides global coverage for both analog and digital mobile satellite communications services," said **Wan Tong Weng**, SingTel's director of International Mobile Services. "By offering a comprehensive range, we are able to meet demands from customers who have worldwide operations."

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ICO Names Frost VP/Manager

ICO Global Communications Services Inc. has appointed **Mary Frost** vice president/regional manager, ICO North America. Ms. Frost's responsibilities will involve the development of commercial sectors in the U.S. and Canada. ICO Global Communications provides global mobile personal communications services via satellite, including digital voice, data, fax and messaging services. The company has received or committed equity contributions in excess of \$1.7 billion and has 50 investors comprising telecommunications and technology companies

from 47 countries worldwide.

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SPD Technologies Acquires Power Paragon

SPD Technologies, Inc. has acquired Power Paragon, Inc. (PPI) from private investment

group The Carlyle Group. It is planned that PPI will be a wholly owned subsidiary of SPD.

The acquisition provides SPD with vast capabilities in the design and manufacture of complete source-to-load electrical power delivery products for Navy and commercial markets including marine, rail transportation and utilities.

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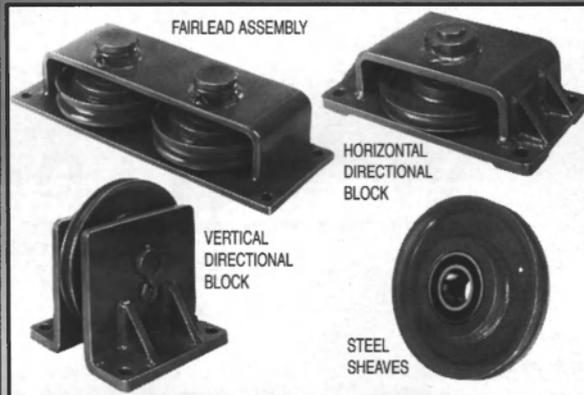
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Hein Joins Port Of Long Beach

The Port of Long Beach Board of Harbor Commissioners has appointed **Gus Hein** to the position of director of governmental affairs. The position was formerly held by **A. Richard Aschieris**, who left the Port of Long Beach to become the executive director of the Port of Anacortes, Wash.

Mr. Hein was formerly the government relations officer for the Metropolitan Water District of Southern California. He also served as the manager of Local Government and Community Affairs for the Southern California Rapid Transit District of Los Angeles County.

Maritime Alliance Group Formed

Ledbetter & Assoc., Inc. and Mid-Atlantic Marine Surveyors, Inc. have finalized a merger to form Maritime Alliance Group, Inc. The new company will offer clients full OPA 90 compliance and spill management services at minimal retainer fees.

The services will include Qualified Individual Services; Spill Management Team services; customized training courses and drills; resource identification and evaluation; port entry assistance; third-party invoice auditing and negotiations; general consulting services; and full traditional marine surveying skills.

Station 12 Introduces New Services

Station 12 has launched two new services permitting maritime industries to be more competitive by making private, two-way communications possible between fleet managers and their vessels.

Altus Maritime provides two-way voice, fax and data communications for small ships and boats in port, coastal waters and at sea almost anywhere in the world. This mobile satellite system operates on closed, digital connections. TelexConnect allows shore-based, regional or head offices to transmit telex messages through the global Station 12 satellite network to ships equipped with terminals to receive Inmarsat A, B or C satellite transmissions.

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Maritime Reporter/Engineering News

Approach To Engine Room Design

This is the second article in a four-part series describing a project executed by the U.S. Navy in partnership with domestic and international shipyards, shipowner/operators and marine equipment vendors. As mentioned in the first article, the project involved an Engine Room Arrangement Model (ERAM) study, sponsored by the Mid-Term Strategic Sealift Technology Development Program (MTSSTDP) and orchestrated by the Shipbuilding Technology Department of the David Taylor Model Basin (DTMB).

The vision of the project was to initiate a customer-focused process that would enable the U.S. shipbuilding industry to design and build engine rooms which would promote internationally competitive commercial ships.

The objectives were:

- To provide a forum for U.S. shipbuilders to present views and needs for product and process design;
- To develop, within 12 months, a process using Integrated Process and Product Development (IPPD) for industry use;
- To design engine room arrangements that provide the basis for the design of internationally competitive commercial ships;
- To demonstrate, within 24 months, the process by designing three (later increased to four) world-class engine room arrangements;
- To achieve customer-focus and buy-in of product design;



The ERAM Team consists of a group of individuals from companies around the globe with one goal in mind: to design a better engine room arrangement for commercial ships.

- To achieve U.S. shipbuilding industry-focus and buy-in of process design;
- To establish baseline commercial ship engine room designs as benchmarks for evaluation of future government-initiated studies; and
- To document both the product and process design with rationale for use and further refinement.

One medium-speed diesel (MSD) and three slow-speed diesel (SSD) engine rooms were designed in the course of two years. Each article focuses on one of the four engine room design products, the evolution of applying the IPPD methodology process, and the lessons learned from each stage of the project. The first article (which appeared in the September 1997 edition of *MR/EN*) focused on

SSD#1. The SSD#1 design was a first step in achieving the project goals, which were to develop product (ship) designs that could be built with a construction schedule reduction of 40 percent (down to 18 months) and acquisition cost reduction of 15 percent (down to \$25 million for the engine room).

The SSD#1 design was based on M/V *Betelguese*, a Brazilian-designed RoRo/LoLo convertible ship. SSD#1 achieved a schedule reduction of 20 percent (down to 24 months) at a cost of \$21.5 million if built in a European yard and \$35 million if built in a U.S. shipyard. This article will describe the second design, MSD#1.

Product

The product modeling effort continued to use Intergraph workstations with increasing effectiveness.

During the MSD design, the 3-D product model (See Figure 1, to the left) was becoming a useful tool. The team was becoming accustomed to looking at 3-D images and understanding the presentation of the product model, which proved useful in the development of the system arrangements in the product model, as more time was spent at the product model terminal by the system engineers.

The 3-D product model images also had a major impact on improving the design reviews and project reports. After expending a high level of effort creating drawings on the previous design, it was the consensus of the team to use

KEY

MSD	.....	medium-speed diesel
SSD	.....	slow-speed diesel
ERAM	.....	Engine Room Arrangement Model
MTSSTDP	.....	Mid-Term Strategic Sealift Technology Development Program
DTMB	.....	David Taylor Model Basin
IPPD	.....	Integrated Process and Product Development
MEL	.....	Master Equipment List
SWBS	.....	System Work Breakdown Structure
QFD	.....	Quality Function Deployment

graphic images derived directly from the 3-D product model where ever possible. Drawings were used, but kept to the minimum, as: the CAD team would spend a minimum amount of time creating 2-D drawings, as time previously devoted to creating 2-D drawings could be used to complete the product model; and the product model images could be quickly created from the workstation, which would allow the system engineers to obtain an exact, real-time configuration of the product model.

On the SSD#1 design, the cognizant system engineers used several different software packages (AutoCAD, Corel Flow, Intergraph EMS 2-D.) This caused some problems, as each software package produced a different looking image; information could not easily be shared between systems; and the system engineers spent a lot of time on the non-technical development of the diagrams, which was not cost effective.

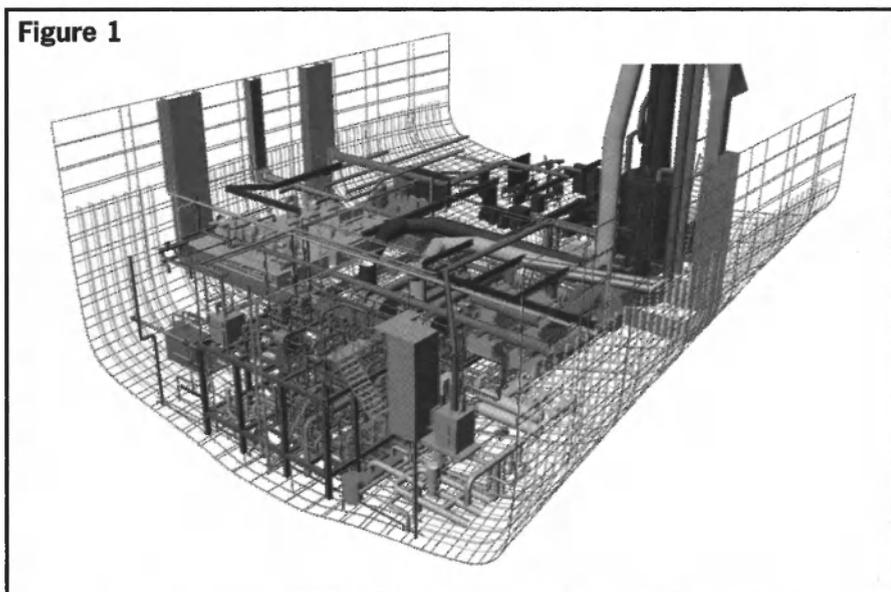
The process that produced an improved and consistent product at a reasonable cost involved:

- A set of standards developed by a subteam to be used that covered software, data and final approval of the diagram and data to appear on the diagram.
- A CAD designer added to the team as a part-time resource, who used one software package (AutoCAD) to develop all the diagrams with technical support from the project engineers. This allowed for easy application of the newly developed diagram standards.

Making Time For Vendors

A recurring issue throughout this project was insufficient schedule time, and consequently, several things were sacrificed. For example, some on-site presentations by

Figure 1



equipment vendors were not attended, and meetings and modeling standards were not properly documented. A prime example was a presentation by Boll & Kirch on its filter line that was not attended by the CAD team, even though Boll & Kirch filters were used on each of the four ERAM designs. The knowledge of the available products and configuration options described (ex. left hand v. right hand options, reversible inlets/outlets) would have had a much greater impact on reducing the time needed to create the 3-D equipment library than the two to three hours it took for the presentation.

A significant improvement in the team's output occurred with the project report. Several 3-D images were added which provided a quick and accurate picture of the system. Also, the project report was created concurrently during the project.

Information is the cornerstone of every project, this one notwith-

standing. This project clearly shows the advantages of computer-based information, which can be updated much more easily and efficiently and makes possible the long range goal of providing all of the information to support the total life cycle "on-line."

Making The MEL List ... And Checking It Twice

A phased approach was taken to define the data required to support the ERAM team. The first step was to provide all of the information required to complete a Master Equipment List (MEL). One of the first decisions was the form, function and location of the database. This was set up as two unrelated applications — the MEL and the vendor database. During the MSD project, the format and content of both of these databases evolved.

The goal was to make the entry and retrieval of information user-friendly by eliminating multiple data entries and easily recognized grouping of equipment. The use of the Navy System Work Breakdown Structure (SWBS), although an old familiar approach, did not completely satisfy those goals. Consequently, this subject remained open at the end of the MSD design. Attempts were made to integrate the MEL with the vendor database and to allow the sys-

tem engineer to group equipment into units, and to assemble equipment and units into additional units.

The fuel oil system was originally modeled using a world class design. However, after developing two other designs (SSD#2 and SSD#3) it became apparent that significant improvements in ease of operation and maintenance could be achieved by eliminating multiple suction and discharges directly from and to the associated tanks, and instead using common suction and discharge headers (See Figure 2).

This allowed the associated valves to be placed directly in the area of the supporting equipment for ease of operation, and to help eliminate piping and 14 tank connections.

The arrangement of equipment was slightly altered to include a much greater use of level 2 units (Level 2 units are defined as an assembly of equipment, valves and piping mounted on a secondary foundation, all of which are designed to be constructed in a shop. Figure 3 is an example of a typical ERAM Level 2 unit). Also a large integrated level 3 unit (Level 3 units are defined as an assembly of equipment, valves, piping and electrical mounted on a secondary foundation with all local wiring

installed, all of which are designed to be constructed in a shop) was developed causing several changes in the product model work flow. Figure 4 is the MSD Level 3 unit.

All of the technical changes listed later in this article under the design process section were incorporated into the product model.

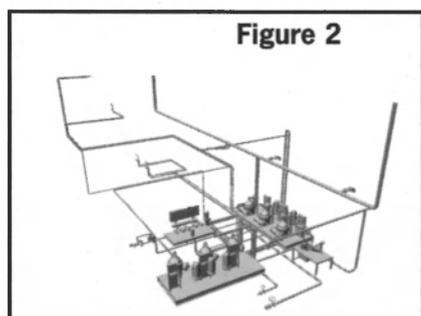


Figure 2

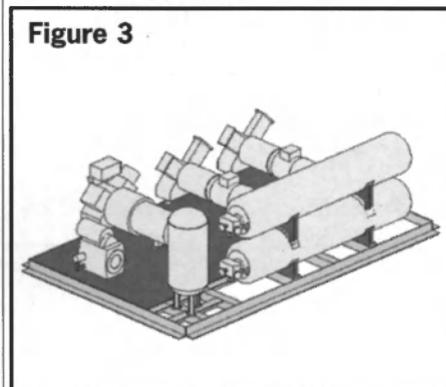


Figure 3

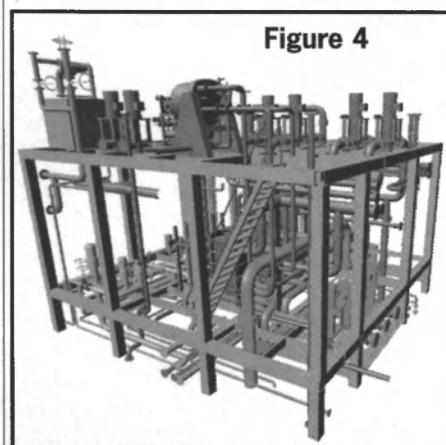
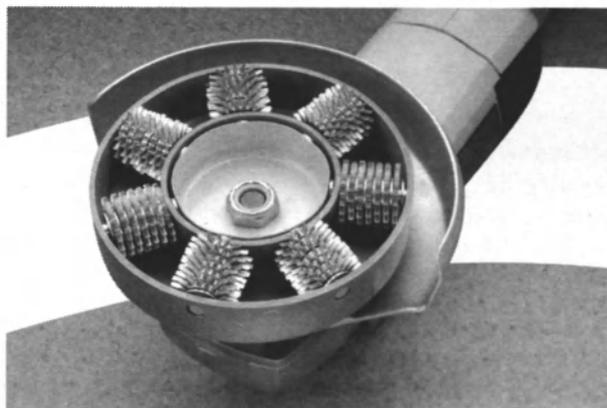


Figure 4

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Team Process

The need for a User's Guide as the product of the process was identified during the development of the initial Strategic Design Brief (SDB). Beginning with the SSD#1 project, the User's Guide was updated throughout the MSD project's progress, with the goal of creating a guide which a new team could apply to its needs. In an attempt to create a training atmosphere among such a diverse group, a guide of 33 team norms was developed to ensure the group worked to its peak capacity and capability. The norms were created to foster a common vision of goals, and developed to ensure that personal and professional standards were adhered to. During the early stages of MSD, the team, in an effort to make the norms more concise and easier to use, consolidated the original 33 into 15 new norms.

Processes were developed for three basic types of meetings used to manage an Integrated Product & Process Development (IPPD) team, and found that the Week In Review Meeting (WIRM) — used to self-manage the team and maintain focus on the overall objectives and goals of the project — was one of the most important management tools. Providing a location for a co-located, cross functional team is not an easy task. During this phase of the project, a growing concern for foreign national corporate espionage resulted in additional restrictions on the foreign national team members in the form of shoulder to shoulder escort. This created a huge burden on the government personnel due to the added escort responsibility. Other government personnel were added to the cost burden of the project to help escort. It was perceived that Foreign National availability was reduced by 30 percent due to escort requirements with an even larger reduction in the availability of government personnel who were team members. The underlying irony of this was that originally, foreign vendors and shipyards were sought out to participate on this project due to the wealth of information they could bring with them to the project, not take away from it.

Design Process

During the design of MSD, the goals were to verify the repeatability of the processes developed during SSD#1 to verify its application on a significantly different ship and reduction of the cycle time. The design cycle for SSD#1 required 27 weeks to complete. Part of this time was consumed in developing the design processes, however, significant time was required to prepare for and conduct the design reviews. The design cycle for MSD was 16 weeks. One of the primary areas of cycle time reduction were the design reviews. The process was reviewed in detail with the focus on incorporating an in-process review concept. This was achieved by providing the Steering Committee with a biweekly report of all the activities throughout the MSD design cycle. This significantly reduced the number of unanticipated responses at the design reviews and therefore the amount of rework.

The design process used during the SSD#1 design was verified during the MSD design. Eight arrangement options using hand sketches on CAD-generated background views, that had the main engines and reduction gear located, were developed for the arrangement options process. The arrangement selection process revealed several areas where improvements in the arrangement could be realized, this included several changes identified by using the

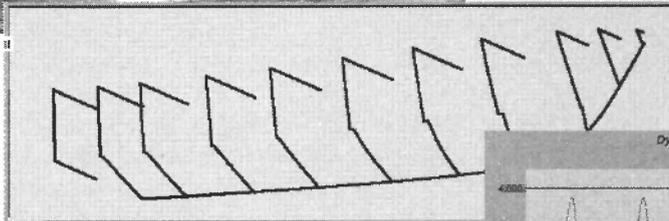
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Quality Function Deployment (QFD) matrix. During this period of the design cycle, a design engineer from the reduction gear manufacturer was a part of the team and provided on-site design support.

The in-process review of the engine room systems by a classifi-

cation society was accomplished by having an ABS representative at the design site reviewing the systems with the cognizant engineers.

Design Is Money

To reduce the construction cycle time, a large Level 3 unit (a self supporting assembly containing all

equipment, fittings, piping and electrical wiring and controls that is tested to the maximum extent possible prior to erection on the ship) was incorporated into the design. This unique feature separated a large portion of the engine room structural design from the ship's structure. This allowed the

parallel development of both the Level 3 unit and the ship's structure, and also reduced the design cycle time.

Chief engineers from Maersk Lines and Crowley Marine were part of the team on a two-week rotating basis. They continued to supply valuable life cycle, operational and maintenance input throughout the design process. Features they recommended were the use of an off-the-shelf, commercial, service air compressor unit, also adding a recirculation feature to the seawater cooling system at the central coolers, thereby increasing maintenance intervals.

Trade-off studies were expanded to include operating costs and the impact of cargo revenue. Increased cargo carrying capacity and the projected increase in life cycle revenue were considered as two of the predominate factors in locating the stack and justifying the use of medium speed diesel engines as the prime movers. Reduced diesel generator operating time, and logically maintenance and the elimination of a third generator were the primary considerations in selecting a reduction gear/shaft generator arrangement. Three 50 percent capacity sea water cooling pumps in lieu of two 100 percent capacity pumps were selected based on ease of maintenance, due to smaller size, and commonality with other pumps on the ship.

Metrics

During the SSD#1 design, metrics for the product and process were defined, and an attempt was made by the team to apply them. A struggle between the team's approach and what the Steering Committee felt was the way metrics should be applied resulted in unsatisfactory results. During MSD, an attempt was made by the team to resolve the metrics dilemma. The approach was to identify all potential shortcomings of the ERAM metrics measurement process for the product and process.

During the MSD design phase, the product and process metrics were assigned to individuals of the core team. Occasional meetings were planned to discuss the metric data being collected. This information was passed on to the Steering committee via biweekly reports. Two product metrics were given special attention:

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- **Producibility:** will the design reduce the cost or schedule to build?
- **Affordability:** a cost comparison between Slow Speed and Medium Speed Diesel engine rooms.

The Producibility metric rated each ship system based on information from the cognizant system engineers. The rating values were derived from QFD analysis and cost estimate rationale. The results constituted an in-process method that could be easily evaluated during the design evolution.

The costs for the Affordability metric were derived from vendor quotes and costs from active ships. Labor hours were from the Odense shipyard. The results were used as in-process cost monitoring.

The product and process spider charts developed during the SSD#1 design were also maintained. Agreement was reached during this phase, that these spider charts would reflect the cumulative measurements for each project.

The team dynamics measurement tool developed during the SSD#1 design was refined, and toward the middle of the MSD design the tool was used biweekly. The team analyzed the information, collected from the previous two weeks, with decent results. At this time, prior data was not used in the analysis.

Product Lessons Learned

The 3-D-product model continued to gain importance to the project as more and more of the team members became acclimated to the information (both graphical and technical) that could be extracted from it.

The Level 3 Unit simplified the integration of the equipment arrangement and piping with the support structure. In addition, the ability to complete assembly and a significant portion of the testing of the Level 3 unit in the shop prior to erection was projected as having a significant impact on the erection schedule and the completion of the engine room at launch. The elimination of the space required for the upper portion of the slow speed diesel engine and its service area on the 12 m deck resulted in an increase of cargo space of 1,100 cu. m. The side stack potentially increased the container capacity by 40 TEUs. The potential annu-

al revenue increase was \$7.5 million at 75 percent utilization, which was offset by an estimated annual increase of fuel consumption costs of \$50,000 over the baseline SSD#1 design. Consensus on the maintenance cost impact of the slow speed design with a total of 31 cylinders versus the medium speed

diesel design with a total of 30 cylinders was not achieved and remained as a point of contention within the team and the Steering Committee.

Although the material cost of the three 50 percent seawater cooling pumps was equal to that of two 100 percent pumps — and the

installation cost was increased — there would be an estimated \$36,000 annual decrease in fuel cost by coupling the three pumps to the Alfa-Laval ENGARD system. In addition the design provided an increase in reliability, availability and maintainability due to the flexibility of three

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pumps.

Process Lessons Learned

Further improvements in cycle time could have been achieved if the team's request for a full time structural engineer had been provided by the Steering Committee. This highlights the need for good communications. Listen to the team.

With four design reviews scheduled during the MSD design, the reduction of preparation, presentation and rework time in comparison to the SSD#1 approach to design reviews is significant. The 11 week reduction in cycle time can

largely be attributed to the In-Process Design Review approach and the existence of an improved design process.

Metrics Lessons Learned

During the MSD design, product and process metrics were applied more by the team. Product wise, the team developed a few more techniques for in-process monitoring and review. As more concrete product metric data was collected and applied to the design, the more receptive the Steering Committee became to the metric concept. As for process metrics, the team was still struggling somewhat with

how to apply this information toward improving team performance, buy-in and creativity. Unknowingly, the seeds were planted at this time for the development of a true performance team.

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ERAM Team Participants for the MSD Design

Country	Company	Name	Expertise
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U.S.	DTMB	Ben Kassel	MIS Manager
U.S.	Avondale Shipyard	Watson Perrin, II	Arrangements, HVAC
Brazil	CONSUNAV	Jorge Ribeiro	Arrangements, Piping
U.S.	D&P	Frank Woronkovic	Control Systems
U.S.	Bath Iron Works	Steve Bradbury	Arrangements, Piping
U.S.	Bath Iron Works	Mark Cote	Arrangements, Piping
U.S.	NASSCO	Mike Barton	Arrangements, Piping
U.S.	NASSCO	Lee Duneclift	Arrangements, Piping
Finland	Wartsila	Seppo Rautava	Arrangements, SSDG
Denmark	Odense	Carsten Sjoberg	Arrangements, Piping

A key element of the project was the on-site CAD designers from Designers & Planners, Inc., InfoTech Enterprises, Inc. and DTRC. Other resources/expertise utilized on a part-time or rotating basis included: A&T/Vector Research (management consulting); Alfa Laval (fuel treatment); Allweiler (pumps); Boll & Kirch (filters and strainers); Crowley Marine (ship operator); D&P (electrical and structural engineering); Maersk Lines (ship operator); and Tranter (heat exchangers). The Strategic Design Method (SDM) was utilized to define the two outputs of the project: the Team Process and the Engine Room Arrangement Models. The Team Process would evolve during the four engine room designs and be documented at the conclusion of the project as the USER'S GUIDE.

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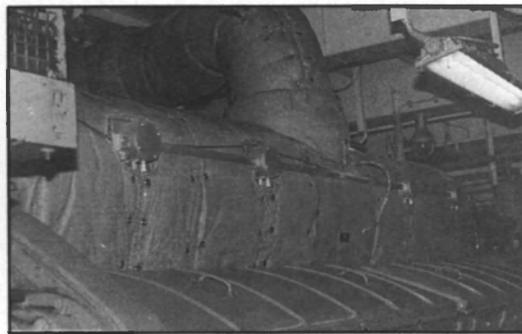
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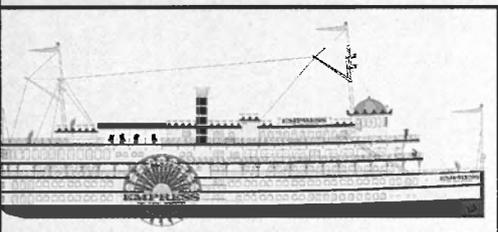
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Bids Put Out For New Sidewheeler Cruiseship



American West Steamboat has sent bid packages to six shipyards to compete for the construction of the company's second U.S.-flagged, overnight cruise vessel. The sidewheeler cruiseship, to be named *Empress of the North*, will accommodate a crew of 76, in addition to 248 passengers in 116 suites. The vessel will be built for ocean passenger service on International waters, and will be built to meet all U.S. Coast Guard (USCG), SOLAS and applicable IMO regulations. *Empress of the North* was designed by Guido Perla and Associates of Seattle.

The vessel's itinerary will be between Seattle and Alaska during the summer months, cruising the Canadian/Alaskan Inside Passage Route. During the winter months, the vessel will operate Hawaiian Inter-Island Cruises. The 300 x 82 ft. (91.4 x 25 m) vessel is designed for high style and comfort, and will offer spacious high-ceiling, a single-seating dining room; a main showroom and lounge capable of seating the ship's full complement of passengers; and a unique Sidewheeler Showboat Cabaret. The design provides for the 42-ft. diameter Sidewheels to actually provide full propulsion for the vessel up to seven knots. Two large Z-drive units will provide the additional thrust when faster cruising — up to 14 knots — is desired. The diesel-electric system is designed to provide quiet, efficient propulsion. A 360-degree bowthruster jet pump will help provide steering when the vessel is propelled by only the side-wheel. Four active fin stabilizers will be electronically controlled together using angle, velocity and acceleration sensor to provide the maximum in stability and passenger comfort. American West Steamboat currently operates the 163-passenger sternwheeler *Queen of the West*, which cruises the Columbia, Willamette and Snake Rivers on one-week itineraries.

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(Continued from page 26)

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tow pins were provided by Smith Berger Marine.

Delta Linda Main Particulars

Designer	.....	Marco Shipyard Seattle
Flag	.....	U.S.
Length, o.a.	.....	105 ft. (32 m)
Breadth, molded	.....	34 ft. (10.4 m)
Draft, design	.....	13 ft. (4 m)
Complement	.....	6
Main engine	.....	(2) Caterpillar 3516B diesels

Total hp	.....	4,400 bhp at 1,600 rpm
Auxiliary engines	.....	(2) Caterpillar 3304BT diesels
Propellers	.....	Aquamaster Model US2001 Z-drive units;
	.....	94.5 in. four blade propellers in nozzles
Generators	.....	(2) 105 kW
Engine controls	.....	Caterpillar electronic
Steering controls	.....	Aquamaster
Deck machinery	.....	Burrard Mode HE headline winch;
	model HJD two winch VHF radio
	(2) Stephens SEA-156, (1) Shipmate RS-8300
SSB radio	Furuno FS-1502
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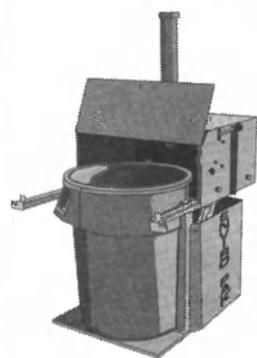
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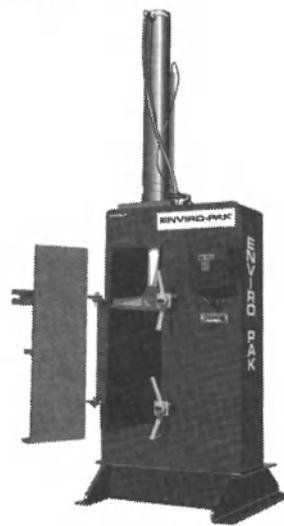
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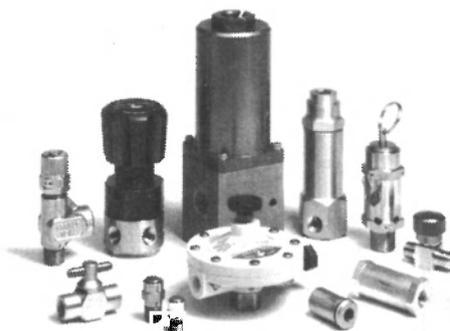
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Shuja

ShipbuilderSkipperLiner
 Vessel nameShuja
 Vessel type ...Passenger charter
 Owner/operatorCity of
 Abu Dhabi

SkipperLiner was contracted in July by the city of Abu Dhabi in United Arab Emirates to build

Shuja. The Persian Gulf city was looking for an attraction to its waterfront. SkipperLiner designed a vessel to perform under ambient air temperature of 112 degrees F, 85 percent humidity and ambient water temperature of 92 degrees F. *Shuja* is equipped to operate to the new British Standards for electrical generation, distribution and hardware.

The vessel features an 85 kW, 380/220 VAC three phase system for offshore supply. In addition, *Shuja* features two shore power alternatives: a 100 amp 380 VAC three phase for complete shore-side services; and a shore tie of 50 amp 220 VAC one phase to provide minimal security and hotel services when three phase power is not available. The vessel's DC sys-

tem was upgraded to 24 volts to provide reliability under the extreme environmental requirements. An independent 24 VDC system in the pilothouse provides navigational and emergency lighting power.

Shuja Main Particulars

Length, o.a.91 ft. (27.7 m)
 Beam20 ft. (6.1 m)
 Hull depth6 ft. (1.8 m)
 Hull materialSteel
 Screw propulsionTwin Caterpillar 3208 NA
 Generator, mainCaterpillar, 85 kW @ 50 Hz
 Marine gearCaterpillar MG 507
 Engine mountsCaterpillar
 Propeller shaft couplerCaterpillar
 Steering systemHynautic
 Shifting, propulsionMathers Micro Commander
 VHF/FM Marine radioIcom M56
 HornKohlenberg D2
 Radar systemRaytheon R10XX
 Gauge systemHart, pneumatic
 Fuel capacity1,000 gallons
 Waste capacity800 gallons
 Fresh water capacity800 gallons
 HVACCruisAir, 372,000 BTU
 Displacement94 tons
 Naval architectSkipperLiner Industries, Inc.;
 Elliott Bay Design Group

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The catamaran will be fitted with a new Maritime Dynamics full ride control system which involves aft trim tabs and newly developed, electronically controlled T-Foils beneath the bows of the vessel's hulls.

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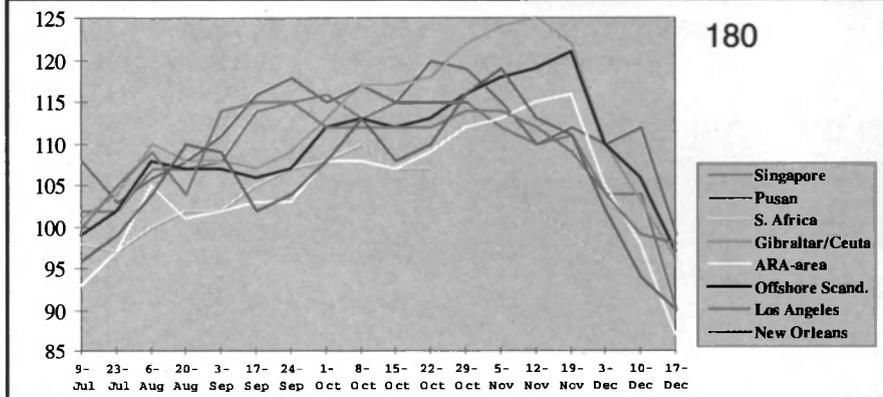
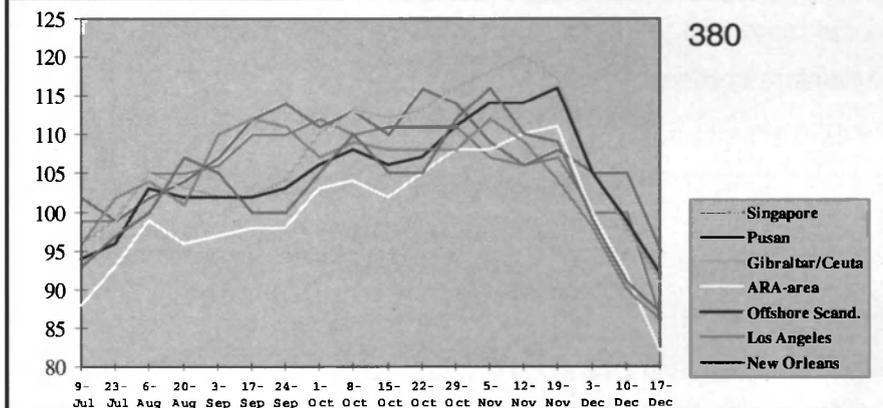
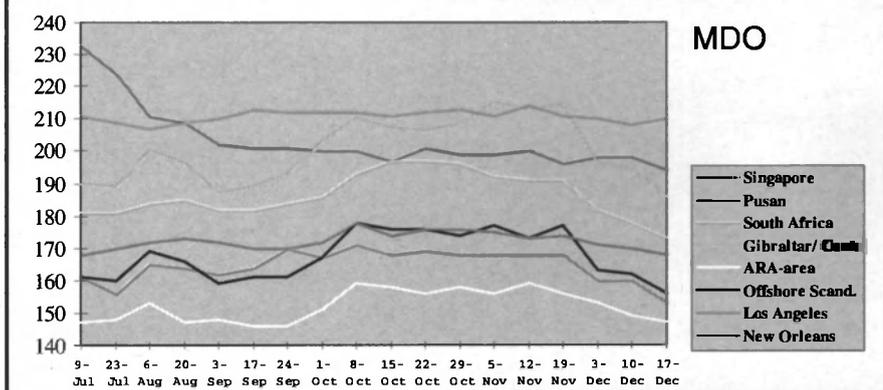
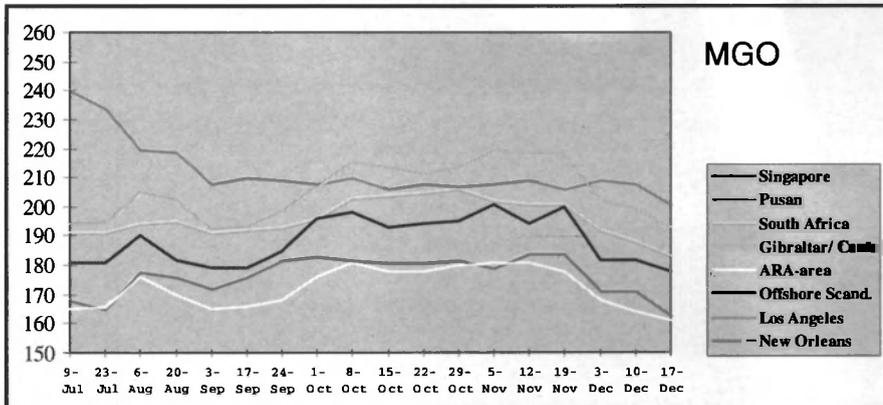
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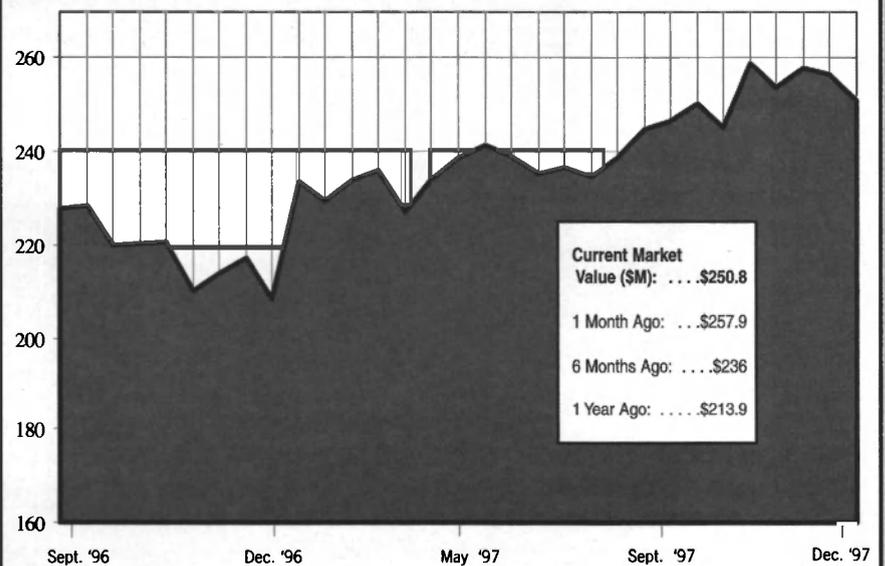
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Recent Ship Sales

This report, compiled by Shipping Intelligence, Inc., a New York maritime consulting firm, tracks sale prices of secondhand bulk carriers and tankers. For more information, call tel: (212) 997-0966.

Date Reported	Vessel Name	Vessel Type	DWT	Year Built	Sale Price (M)
11/21/97	Fonina	Bulker	12,352	82	\$4.9
11/28/97	Magdalene	Bulker	18,801	78	\$2.3
11/21/97	Silver Fena	Bulker	18,880	77	\$1.8
11/14/97	Eurasian Cnarm	Bulker	22,558	82	\$6.3
11/21/97	Hanjin Jedita	Bulker	25,057	82	\$5.5
11/21/97	Asturias	Bulker	25,357	84	\$7.9
11/28/97	Manila Bellona	Bulker	28,259	85	\$9.3
11/7/97	Sea Crystal	Bulker	28,269	85	\$9.4
11/28/97	Broompark	Bulker	30,670	82	\$7.5
11/28/97	World Quince	Bulker	41,538	82	\$8.4
11/28/97	Maritime Pearl	Bulker	42,025	90	\$16.8
11/7/97	Glory Hope	Bulker	68,158	87	\$16.3
11/28/97	Endeavor	Bulker	122,933	75	\$3.9
11/14/97	Jostelle	Bulker	122,970	75	\$4.8
11/14/97	White Rose	Bulker	149,228	96	\$39.5
11/14/97	Portland Star	Bulker	150,660	83	\$14.5
11/7/97	Global Spirit	Bulker	224,666	83	\$19.7
11/21/97	Aries Eree	Tanker	15,767	75	\$3.5
11/7/97	Nello D'alesio	Tanker	20,007	75	\$4.2
11/14/97	Formosa Three	Tanker	29,870	86	\$14.6
11/7/97	Campo Duran	Tanker	30,300	77	\$3
11/7/97	Lady Ina	Tanker	31,502	75	\$6.1
11/7/97	Sulby	Tanker	84,464	81	\$13.5
11/28/97	Hellespont Prosperity	Tanker	89,467	75	\$5.4
11/7/97	Pacific Mercury	Tanker	94,998	88	\$30
11/21/97	Girraween	Tanker	101,604	79	\$13.7
11/7/97	Bunga Kesuma	Tanker	102,719	75	\$5.5
11/21/97	Nol Lynx	Tanker	105,684	79	\$8.9

Index Fleet Valuation



The Index Fleet Valuation is representative of the resale market for Bulk Carriers and Tankers as a whole. The Index Fleet consists of 15 vessels, nine Bulk Carriers and six Tankers, of various sizes and ages. Fluctuations in the value of the world fleet are mirrored in the Index Fleet. This report, compiled by Shipping Intelligence, Inc., a New York maritime consulting firm, tracks sale prices of secondhand bulk carriers and tankers. For more information, call tel: (212) 997-0966.

Ferliship's New Contracts

Orders are listed alphabetically, by vessel type. Publisher is not responsible for errors or omissions. For additional information on this, or other ship market information, contact: Ferliship, Paseo De San Francisco De Sales, 8, 28003 Madrid, Spain, tel: +341 441 4138; fax: +341 441 4138.

OWNER/OPERATOR	SHIPYARD	TYPE	No.	DWT	DELIV	OWNER/OPERATOR	SHIPYARD	TYPE	No.	DWT	DELIV
GULFMARK	BENDER SHIPBUILDING & REPAIR	AHTS	2	2,800	99	TOISA LTD/SEALION SHIPPING	APPLEDORE SHIPBUILDERS	OFFSHORE SUPPLY	2	3,200	99
BROVIG	KVAERNER GOVAN	ANTI-POLLUTION	1	—	99	SAEVIK SUPPLY	HELLESOY	OFFSHORE SUPPORT VESSEL	2	4,000	00
ANTARES SHIPPING	MITSUBI	BULK CARRIER	1	75,000	00	ISHIZAKI KISEN	HITACHI ZOSEN	PASSENGER / FERRY	1	—	98
MITSUBI O.S.K. LINES (MOL)	SANOYAS	BULK CARRIER	1	75,000	98	DISCOVERY BAY	MARINTEKNIK SING.	PASSENGER / FERRY	2	—	—
OAK MARITIME	HALLA	BULK CARRIER	1	170,000	99	BUILDER'S ACCOUNT	AUSTAL SHIPS	PASSENGER / VEHICLE	1	—	98
UNKNOWN	MITSUBI	BULK CARRIER	2	46,000	98/99	SAMSO LINIEN	ORSKOV	PASSENGER/CAR FERRY	1	—	98
UNKNOWN	SUMITOMO	BULK CARRIER	3	73,500	98/99	NISSAN MOTORS	SHIN KURUSHIMA	PCC	1	15,000	98
SEMBAWANG MARINE LOGISTICS (SMI)	HALLA	BULK CARRIER	1	170,000	00	AUGUSTEA MARITIME	ORSKOV	PLATFORM SUPPLY	1	—	98
WORLD-WIDE SHIPPING	DAEWOO	BULK CARRIER	1	170,000	00	RIMORCHIATORI NAPOLETANI	SOVIKNES VAERT	PLATFORM SUPPLY	1	—	98
K LINE	MITSUBISHI H.I.	BULK CARRIER	1	150,000	00	ROVDE SHIPPING	MYKLEBUST	PLATFORM SUPPLY	1	—	98
KOREA LINE	DAEDONG SHIPBUILDING	BULK CARRIER	1	72,700	99	STIRLING SHIPMANAGEMENT	FERGUSON SHIPBUILDERS	PLATFORM SUPPLY	2	4,700	99
WORLD-WIDE SHIPPING	SASEBO	BULK CARRIER	1	74,100	99	PETAMINA	SURABAYA	PRODUCT TANKER	2	6,500	98/99
AUGUSTEA	MITSUBI	BULK CARRIER	1	75,080	99	MARITIMA FLUVIALE DI NAVIGAZIONE	CANTIERE NAVALE FRATELLI	PRODUCT TANKER/CHEMICAL	1	15,000	99
NICHIMEN	IMABARI ZOSEN	CONTAINERSHIP	2	—	98	UNKNOWN	IMABARI ZOSEN	REEFER	1	24,200	98
BEFRACHTUNGSKONTOR	TILLE SCHEEPSBOUW	CONTAINERSHIP	2	—	99	UNKNOWN	IWAGI	REEFER	1	10,000	—
A. P. MOLLER	HYUNDAI	CRUDE CARRIER	2	308,300	00	UNKNOWN	IWAGI	REEFER	4	9,700	98
JAHRE DAHL BERGENSEN	HALLA	CRUDE CARRIER	1	153,000	99	ENGSHIP	FINNYARDS	RoRo	1	9,300	98
LYKIARDOPULO	DAEWOO	CRUDE CARRIER	1	300,000	99	GODBY SHIPPING	SIETAS	RoRo	2	7,250	99
SHIPPING CORP OF INDIA	HALLA	CRUDE CARRIER	2	104,600	99/00	US NAVY	NATIONAL STEEL	RoRo	1	—	01
UNKNOWN	HALLA	CRUDE CARRIER	1	35,000	99	US NAVY	AVONDALE SHIPYARD	RoRo	1	—	—
CHINA JIANGHE WATER RESOURCES	TIANJIN SHIPYARD	CUTTER DREDGER	1	—	98	COMPAGNIE TUNISSENE DE NAV	FOSEN MEK VERKSTEDER	RoRo FERRY	1	—	99
AB INITIA	FACTORIAS VULCANO	CHEMICAL TANKER	1	18,800	01	HARREN & PARTNERS SCHIFFS	PEENE-WERFT	RoRo/GENERAL CARGO	2	—	99/00
UNITED TANKERS	FACTORIAS VULCANO	CHEMICAL TANKER	1	18,800	00	WESTERN GEOPHYSICAL	ULSTEIN VERFT	SEISMIC	2	—	99
NAVIS	SAMSUNG	DRILLSHIP	2	70,000	00	FARSTAD SHIPPING	KVAERNER GOVAN	SUPPORT VESSEL	1	4,500	98
NORWEGIAN INTERESTS	SAMSUNG	DRILLSHIP	2	—	00	NOVOSHIP	NKK CORP.	TANKER	2	110,000	00
CHILES OFFSHORE	HALTER MARINE INC.	DRILLSHIP	2	—	99/00	SEATANKERS MANAGEMENT	HYUNDAI	TANKER	1	306,700	99/00
IRVING & JOHNSON	NORTHERN SHIPYARD	FISHING	2	—	—	UNKNOWN	DALIAN NEW SHIPYARD	TANKER	2	44,375	99/00
BITTERN & GUILLEMOT WEST	KVAERNER OIL & GAS	FPSO	1	—	99	NOVOROSSISYSK SHP CO	NKK CORP.	TANKER	2	106,000	00
ICB SHIPPING	DAEWOO	FPSO	1	158,000	99	VALLES STEAMSHIP CO	IMABARI ZOSEN	TANKER	1	107,000	98
DUTCH INTERESTS	FERUS SMIT	GENERAL CARGO	2	5,500	98	CAMBRIDGE PARTNERS	SAMSUNG	TANKER	4	300,000	99
WAGENBORG SHIPPING BV	BIJLSMA	GENERAL CARGO	1	—	99	MOSVOLD-FARSUND	HYUNDAI	TANKER	2	153,000	99/00
WAGENBORG SHIPPING BV	FERUS SMIT	GENERAL CARGO	2	6,250	99	MITSUBI & CO.	MITSUBI	TANKER (DH)	1	280,000	99
UNKNOWN	BODEWES BV	GENERAL CARGO	2	8,700	99	ADSTEAM MARINE	OCEANFAST MARINE	TUG	6	—	—
HYUNDAI MERCHANT MARINE (HMM)	HYUNDAI	LPG	2	8,000	98	JUTHA MARITIME	HIGAKI SHIPBUILDING	TWEEN DECKERS	2	10,000	99
EIDESVIK & CO.	UMOE STERKODER	OFFSHORE SUPPLY	1	5,000	99	MITSUBI & CO.	MINAMI NIPPON	VEHICLE CARRIER	2	15,000	99/00
FARSTAD SHIPPING	ULSTEIN VERFT	OFFSHORE SUPPLY	1	—	00	MITSUBI & CO.	KANASASHI CO.	VEHICLE CARRIER	2	18,500	99/00
PORTOSALVO LTD	BRATTVAG SKIPVERFT AS	OFFSHORE SUPPLY	1	—	—						

RAM



At the WorkBoat show held in New Orleans in November, SeaArk Marine introduced the new RAM class, soft-sided patrol boat featuring a D-shaped tube which can be filled with air or foam and allows for the use of the bow, side and quarter decks for boarding operations. Launched in a 24-ft. (7.3-m) model, the RAM class is available in various sizes up to 28-ft. (8.5-m) long.

Argosy

Shipbuilder SMI
 Vessel name Argosy VI
 Vessel type Casino riverboat
 Owner/operator Argosy Gaming

Service Marine Industries (SMI) delivered \$36 million riverboat gaming vessel Argosy VI to Argosy Gaming Company affiliate Indiana Gaming Company, LP. The 408 x 100 ft. (124.3 x 30.5 m), four-level, sidewheel style vessel,

touted as the largest self-propelled riverboat style casino yet built, was developed by the SMI Technical Operations Division and reportedly provides approximately 75,000 sq. ft. of gaming space.

Argosy Main Particulars

Designer	SMI
Flag	U.S.
Classification	ABS and USCG Sub H River service
Contract date	November 1995
Floated out date	December 1996
Delivery date	September 1997
Length, o.a.	408 ft. (124.3 m)
Breadth	100 ft. (30.5 m)
Gross tonnage	under 1,600 grt
DWT	5,175 lt
Draft, design	7.5 ft. (2.3 m)
Complement	400 crew/4,000 passengers
Bunker	50,000 gal. storage and service
Main engine	(3) 16V149TI Detroit main gensets
	@ 1,400 kW each
Thrusters	(2) pump jets, 600 hp each
VHF Radio	(2) Horizon Infinity
Radar	(2) Furuno 1930

Bollinger To Build Patrol Boats

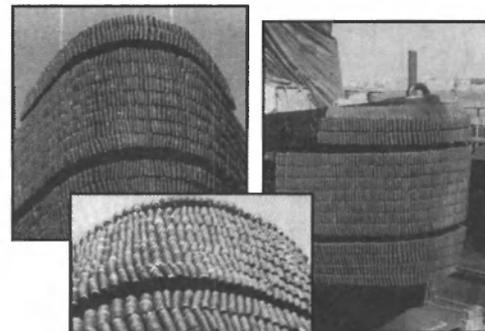
The U.S. Coast Guard (USCG) has awarded an option for six additional coastal patrol boats to Bollinger. The contract has a total value of \$24.1 million and is for the USCG cutters with the associated spare parts and logistic support.

The first vessel was awarded in May 1996 and will be delivered in February 1998, and the first vessel awarded on the option will be delivered in May 1998, to be followed by the remaining five over a six week period. The coastal patrol boat is an 87-ft. (27-m) vessel carrying a crew of 10 and berthing for 11. The craft will have a top speed of 25 knots and will perform patrols up to 200 miles offshore. If all 50 vessels of the class are awarded to Bollinger, the contract will have an ultimate value of \$200 million and will run into the next century.

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OCEAN CHEMICAL CARRIERS, INC.
Public Apology

Ocean Chemical Carriers, Inc. recently pleaded guilty in Federal Court to illegally discharging approximately 60,000 gallons of oil and oil mixtures into the Atlantic Ocean, and to illegally failing to report the discharge to the United States Coast Guard. The company was sentenced on December 5, 1997 to serve two years' probation and to pay a \$50,000 fine. The company also agreed to make a \$200,000 non-deductible contribution to an environmental trust fund. In addition, the company was required to conduct an internal investigation, and to conduct special training of its employees to ensure that no similar crimes will be committed in the future. In a related proceeding, the captain of the vessel that discharged the pollutants admitted to giving the order to his crew to commit the crimes, and has entered into a plea agreement agreeing to plead guilty to the same charges. The captain has not yet been sentenced, he is facing a maximum possible penalty of ten (10) years imprisonment and a \$500,000 fine. In addition, the captain agreed to a suspension of his license and documents for twenty-four months. As part of the company's plea and sentence, the company paid for this published apology. We hope that our plea of guilty will be a lesson to others that environmental laws must be respected.

NASSCO Grabs \$490M Navy Contract

National Steel and Shipbuilding Co. (NASSCO) was awarded a seven-year contract, with an option for two additional years, for the phased maintenance of six LHA and LHD-class ships for the U.S. Navy. The estimated total value over the full nine-year contract would be \$490 million.

P&O Orders Two \$425M Cruise Ships

The latest announcement of yet two more mega-ships to join the cruise competition indicates that the best in the cruise industry is still yet to come. P&O's Princess Cruises subsidiary will reportedly pay \$850 million for two large cruise ships recently ordered from Italy's Fincantieri.

The 107,000-ton ships are capable of carrying 2,600 passengers. The vessels are sisterships to *Grand Princess*, which will make its debut as the world's largest cruise vessel in May 1998. The new vessels are expected to be delivered in the spring and fall of 2001.

\$55M Loan Guarantee To Help MHI Modernize Shipyard

Massachusetts Heavy Industry (MHI) was granted a \$55 million federal loan guarantee under the Title XI program in an effort to help modernize the Fore River

Shipyard in Quincy, Mass, which has been closed since 1985.

Hvide Acquires Kirby Product Tankers

Hvide Marine Corp. acquired two clean oil products carriers from Kirby Corp. in a \$31.4-million deal that also involves the purchase of Kirby's seven-strong harbor tug fleet.

Kirby plans to concentrate on inland tank barge business and is also selling its other five product tankers to private U.S. group

August Trading Incorporated for a further \$7.2 million.

Hvide has also acquired 36,600 dwt product tanker *Willamette* and 32,200 dwt *Concho* from Kirby. Hvide currently operates five out of 12 chemical carriers trading in the Jones Act markets and has five double hull products tankers on order in a joint venture partnership with Netherlands transport and storage group Van Ommeren NV. The first of these \$43.4 million ships is due for delivery by Newport News Shipbuilding Inc. at the end of this year, with three more ships arriving in 1999. The

final vessel will be delivered in 2000.

First Olsen Appoints Managing Director

First Olsen Tankers Ltd. has appointed **Per-Oscar Lund** as managing director to replace **Jon Edvard Sundnes** who left the company at the end of December 1997. Mr. **Lund** is a lawyer and since 1992 has been president of Western Bulk Shipping, a bulk carrier shipping company listed on the Oslo Stock Exchange.

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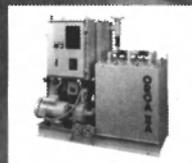
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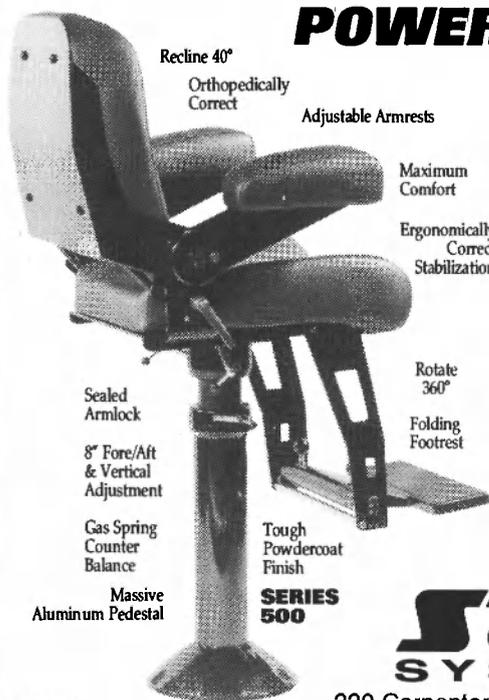
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photo by Dan Nerney

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Niestern Sander Captures Two New Orders

Niestern Sander B.V. was selected to build two motor cargo vessels by Navigia Shipping B.V. The ships, which will be yard Nos. 810 and 811, will be containerships of the so-called Conofeeder 300 type.

The ships will be classed by Bureau Veritas and will measure 304 x 52.5 x 16 ft. (92.8 x 15.9 x 4.9 m).

The 2,550 gt vessels will be capable of carrying 301 TEU at a speed of 15 knots. The first vessel is due for delivery in late 1998, with the second to follow in the first quarter of 1999.

Bollinger Launches New Lift Boat

The Lockport new construction facility of Bollinger Shipyards launched a 117-ft. (36 m) lift boat for Cardinal Services. After the launch, the vessel was to travel to Bollinger Marine Fabricators for

installation of its 200-ft. (61 m) legs.

Main propulsion on the unit is provided by a pair of Caterpillar 3508 DITA engines, rated 855 bhp at 1,800 rpm. Stewart-supplied marine gears are from Twin Disc; propellers are from Michigan Wheel; and cranes are from Amclyde.

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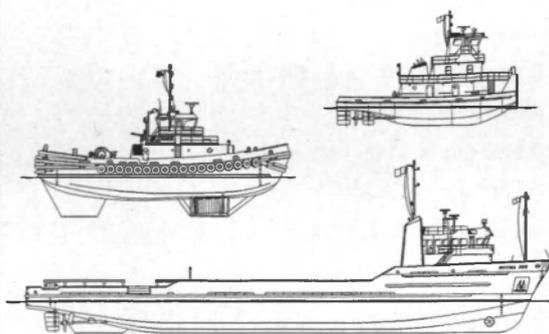
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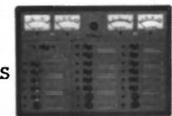


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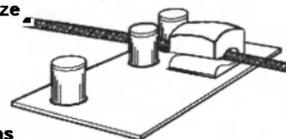
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Aker RGI Wins Farstad Deal

Langsten Slip & Baatbyggeri, a yard of the Langstengruppen group, has won a contract from Farstad Shipping ASA to build a multipurpose anchor-handling/supply vessel. No value was given for the contract, but according to industry sources, the vessel is reportedly priced around \$40.3 million. Following the deal, Langstengruppen has an order reserve of approximately \$470.5. Langstengruppen is 67.5 percent owned by Norwegian holding company Aker RGI ASA.

Halter Marine Buys McElroy

Halter Marine Group, Inc.'s Engineered Products Group has acquired all of the operating assets McElroy Machine & Manufacturing Company, Inc. Established in 1915, McElroy, a subsidiary of New Jersey-based Predco, Inc., is a leader in the design and manufacture of an extensive line of marine deck equipment for commercial, fishing, government and military vessels including anchor windlasses, capstans, shipboard booms, double drum winches, and topline reels. Terms of the transaction were not disclosed.

World Orderbook Hits New Heights

According to Lloyd's Register, the world merchant shipbuilding orderbook is at an all-time high, standing at 50.5 million gt (representing tonnage under construction and on order at the end of September 1997), compared with 48.9 million gt for the quarter ending June 1997. About 70 percent of the orderbook is due for completion by the end of 1998. In the constant jockeying for the top spot, Korea emerged as the world's largest shipbuilding nation with 33 percent of the market, an increase of 10.3 percent over the previous quarter. Japan ranked number two with a 31.3 percent share.

Maritime Reporter/Engineering News

BUYERS DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR/EN assumes no responsibility for errors. If you are interested in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 477-6700.

ABRASIVES

Western Garnet Int'l, P.O. Box 3389, Kirkland, WA 98083

AIR CONDITIONING AND REFRIGERATION - Repair & Installation

Stork Canada, 47 boul. Marie-Victorin, Candiac, Quebec, Canada, J5R 1B6
ABB Flakt Marine, Box 1043, S-436 21 ASKIM SWEDEN
Adrick Marine, Adrick Marine, 81 Mahan St., West Babylon, N.Y. 11704
Carrier Transicold, P.O. B. 4805, Syracuse, NY 13221
Refrigeration Resources, 210 West Side Ave., Jersey City, NJ, 07305
Adrick Marione, 81 Manhattan Street, West Babylon, NY 11758

ALARMS, FACTORY MUTUAL-APPROVED

SELCO 353 A Asbury Commons Dr., Atlanta, GA 30338

ALLOY

Almpco Pumps, 4000 West Burnham St., Milwaukee, WI 53215

ALUMINUM BOATS

American Eagle Mfg., 780 Pearle Jensen Way, La Conner WA 98257
Munson Mfg., 780 Pearle Jensen Way, La Conner WA 98257
Workskiff, Inc., 10824 Bothell Hwy S.E., Bothell, WA 98012-6599

ANCHORS AND CHAINS

All Alpha Int'l., Inc. P.O. Box 498985, Cincinnati, OH 45249
Baldt, Inc., 801 W. 6th St., Chester, PA 19013
Crandall Dry Dock Engineers Inc., P.O. B. 505804, MA 02150
G.J. Wortelboer Jr. BV, P.O.B. 5003, 3008 AA Rotterdam, Nether Marit Chain, 230 Avenue Desandrouins, 59300 Valenciennes FRANCE
Washington Chain & Supply Inc., Box 3645, Seattle, WA 98124
Waterman Supply Co., P.O. Box 596, Wilmington, CA 90748
Willem Pot, P.O.B. 29102, 3001 GC Rotterdam

AUCTIONEERS

MACI Auctioneers, 2334 Willis Rd., Richmond, VA 23230

AUTOPILOT SYSTEMS

ComNav Marine, 1915 Stainsburg Ave., Vancouver, B.C. CANADA

BALLAST

Mineral Research & Recovery Inc., 4620 S. Coach Dr., 85714 Tucson, AZ
Redland Genstar Inc., Executive Plaza IV, Hunt Valley, MD 109121031
Universal Minerals, P.O.B. 986, Tucson, AR 85714

BASKET STRAINERS

Beard Industries Inc, 601 Benton Kelly Street, Shreveport, LA 71106-7198

BATTERY CHARGERS

Newmar, 2911 West Garry Ave., Santa Ana, CA 92663

BEARING - Rubber, Metallic, Non-Metallic

Blohm & Voss Industrie GmbH, P.O. B. 100720, D-2000 Hamburg 1, GERMANY
Simplex-Turmar Inc., P.O. B. 168, Little Neck, NY 11363-0168 U.S.A. Repts:
Raikko Ltd., Loudwater, High Wycombe, Bucks
Hamshire ENGLAND HP109QV
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Orion Corp., 1111 Cedar Creek Rd., Grafton, WI 53024
Thordon Bearings Inc., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6
Vesco Plastics, P.O. B. 40647, Cleveland 2022 SOUTH AFRICA

BILGE SYSTEMS

RGF Marine, 3875 Fiscal Ct., West Palm Beach Florida 33404
Nelson Div., Exhaust & Filtration Sys., Hwy. 51 West, P.O. Box 428, Stoughton, WI 53589

BLOCKS & RIGGING

Skookum, P.O. Box 280, Hubbard, OR 97032

BOAT BUILDER

Blount Marine, 461 Water Street, Warren, RI 02895

BOAT RENTAL

Edison Chaiset, P.O. Box 309, Galland, LA 70354

BOAT SHAFTING

Western Branch Metals, Inc., 2401 Wesley St., Portsmouth, VA 23707

BOILERS

Clarke Chapman Canada, 1075 North Service Rd. West, Oakville, Ontario CANADA

BOX COOLERS

Ships Machinery Int'l, 8375 N.W. 56 St., Miami, FL 33186

BRIDGE WIPERS

In-Mar Systems, Yellowstone Street, Kenner, LA 70064

BROKERS

151 Maritime Services, 34062 El Encanto/B, Dana Pt. CA 92629
Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale, FL 33335
Jack Faulkner, 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960

BULKHEAD SEALS/PANELS

CSD North America, 250 Commercial St., UNit 2006A, Manchester, NH 03101
Blohm & Voss Industrie GmbH, P.O. B. 100720, D-2000 Hamburg 1, GERMANY
Panel Specialists, Inc./Thermax, 3115 Plange Rd., Temple, TX 76501
Raikko Ltd., U.S.A. Repts: Simplex-Turmar Inc., P.O.B. 675, Tonawanda, NY 14151-0675
Rox Corp., 12402 E. 60th St., Tulsa, OK 74146-6922
Toddo, P.O.B. 1087, Marion, OH 43302

CABLE TRANSIT SYSTEMS

CSD North America, 250 Commercial St., UNit 2006A, Manchester, NH 03101
O-Z Gedney • Nelson Firestop, P.O. B. 726, Tulsa, OK 74101-0726
Rox Corp., 12402 E. 60th St., Tulsa, OK 74146-6922

CAD/CAM SYSTEMS

Albacore Research, 3080 Uplands Rd., Victoria, B.C. CANADA V8R 6B4
All Alpha Int'l., Inc. P.O. B. 498985, Cincinnati, OH 45249
Autoship Systems Corp., #403, 611 Alexander St., Vancouver, BC, Canada V6A 1E
Creative Systems, Inc., P.O. B. 1910, Port Townsend, WA 98368
Kockums Computer Systems AB, PO Box 50555, S-202 15

Malmo SWEDEN
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
TIMSCO, P.O. B. 91360, Mobile, AL 36691
Ship Motion Associates, 10 Danforth St., Portland, ME 04101-4567

CARGO MONITORING & CONTROL SYSTEM

Ian-Contrad Bergan, Inc., 3409 Gulf Breeze Parkway, Golf Breeze, FL 32561
Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017

CEILING

Toddo, P.O.B. 1087, Marion, OH 43302

CHARGE AIR COOLERS

Crane Heater, 17 Grandview Ave., W. Orange, NJ 07052

CHEMICALS

Ashland Chemical/Drew Ameroid Marine, One Drew Plaza, Bountion, NJ 07005
Unisevice Americas, 57174 Hardin Rd., Slidell, LA 70461
Unitor Ship Service Inc., 2375 W. Esther St., Long Beach, CA 90813

CLAMPING - Pipe, Tubes, Hose

ZSI, 39074 Webb Ct., Westland, MI 48185

CLASSIFICATION SOCIETY

American Bureau of Shipping, 2 World Trade Center, 106th Fl, New York, NY 10048
Det Norske Veritas, 70 Grand Ave., Riveredge, N.J. 07661

CLUTCHES

Centra Corp., 8185 Cass Ave., Darien, IL 60561
Haley Clutch and Coupling Corp., 1820 Hwy. 1 North, Greenville, MS 38702

COATINGS/COATINGS PROTECTION

Corrosal Inc., 1045 12th Ave. NW F5A, Issaquah, WA 98027
Hempel, 6901 Cavallade St., Houston, TX 77028
Royal Chemical Corp., 2705 Concord Rd., Belle Chasse, LA 70037
TMT Services Corp./RUSTECO, P.O.B. 11398, Torrence, CA 90510-1398

COMMERCIAL DIVING COMPANIES

Cruzan Diver's Inc., 300 Strand St., Frederiksted Sterox, Virgin Islands 00840

COMMUNICATIONS SERVICE

Hose McCann, 1241 W. Newport Gender, Deerfield Beach, FL 33442
ICG Satellite Services, 8400 NW 52nd St., Suite 110, Miami, FL 33166
Maritime Telecommunications Networks, Inc., 8400 NW 52nd St., Suite 110, Miami, FL 33166
Ascorm Talcote AB, Eppendorfer Weg 234, D-20251 Hamburg, GERMANY
AT & T Maritime Services, 412 Ml. Kemble Ave 5170, Morristown, NJ 07960
Newmar, 2911 West Garry Ave., Santa Ana, CA 92663

COMPACTORS/FILTER CRUSHERS

Tech Oil Products Inc., 4308 W. Admiral Doyle Dr., New Iberia, LA 70660

COMPOUNDS

ITW Philadelphia Resins, 130 Commerce Dr, Montgomeryville, PA 18936

COMPUTER LOFTING

Barataria Lofting Co., Inc., 1616 Barataria Blvd., Ste. 4, Marrero, LA 70072

COMPUTER/COMPUTER SOFTWARE

Dry Air Technologies Corp., #403, 611 Alexander St., Vancouver, BC, CANADA V6A 1E
Chand Corporation, 157 Hwy 654, Mathews, LA 70375
Coastal Oceanographics, Inc., 11-G Old Indian Trail, Middlefield, CT 06455
Creative Systems, Inc., O. Box 1910, Port Townsend, WA 98368
Marine Management System, 470 West Ave., Stamford, CT. 06902
Sener, C/Severo Ochoa, 4 Parque Tecnologico de Madrid, 28760 Tres Cantos - Madrid SPAIN
Intecolor Corp., 2150 Boggs Rd., Deluth GA 30096

CONDENSERS/REPARATORS

Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130

CONSOLE-GMDSS

Furuno USA, Inc., 271 Harbor Way, S. San Francisco, CA 94080

CONSOLE

Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017
Sea, Inc., 7030 220th S.W., Mountlake Terrace, WA 98043

CONSULTANTS

Resolution Management, 11 Eves Drive Suite 140, Marlton, NJ 08053
Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL 36691

CONTROL SYSTEM - Monitoring

Engine Monitor, Inc., 179 Hickory Ave. Harahan, LA 70123
GEC ALSTHOM Diesels Inc., 10801 Kempwood Drive, Suite 1, Houston, TX 77043-1412
Ian-Contrad Bergan, 3409 Gulf Breeze Pkwy, Gulf Breeze, FL 32561
Gems Sensors Division, One Cowles Rd., Plainville CT 06062
MMC International, 60 Inip Dr, Inwood NY 11096
Prime Mover Controls, 3600 Gilmore Way, Burnaby V5G 4R8 CANADA
Robertson Marine Systems, 3000 Kingman St., Suite 207, Metairie, LA 70006
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
Stork-Kwant BV, P.O. B. 23, 8600 AA Sneek, Netherlands
Electronic Marine Systems, 800 Ferndale Pl., Rahway, N.J. 07065

CONTROL SYSTEM - Steering

AutoNav Marine Systems Inc., 55A Clipper St., Coquitlam, B.C., Canada V3K 6X2
Engine Monitor, Inc., 179 Hickory Avenue Harahan, LA 70123
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Stork-Kwant BV, P.O. B. 23, 8600 AA Sneek, Netherlands

CONTROL VALVES

Leslie Controls, 12501 Telecom Dr., Tampa, FL 33637

CONVERSIONS & REPAIRS

Vancouver Shipyards, 50 Pemberton Ave., N. Vancouver, B.C. CANADA V7P 2F2

CORROSION CONTROL

Corrosal Inc., 8114 304th Ave., SE, Preston, WA 96050
Nace Int'l, 1440 South Creek Dr., Houston, TX 77084
TMT Services Corp./RUSTECO, P.O.B. 11398, Torrence, CA 90510-1398

COUPLINGS

Mapeco Products, 90 Forest Ave., Locust Valley NY 11560

Apollo International, 78 Degraw St., Brooklyn, NY 11231
Aquadrive System, 17 Ave. D, Atlantic Highlands, N.J. 07716
Centa Corp., 8185 Cass Ave., Darien, IL 60561
Haley Clutch and Coupling Corp., 1820 Hwy. 1 North, Greenville, MS 38702

Lo-Rez Vibration Control, Ltd., 186 West 8th Ave., Vancouver, B.C. V5Y 1N2
Mapeco Products, 90 Forest Avenue, P.O. Box 382, Locust Valley, NY 11560
Walz & Krenzer, 90 FForest Ave., Locust Valley, NY

CRANE-HOIST-DERRICK-WHIRLEYS

Bisso Marine Co. P.O. Box 4113, New Orleans, LA 70178
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi MS 38535 4454
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150

CRANES

Clarke Chapman Canada, 1075 North Service Rd. West, Oakville, Ontario CANADA
Lakeshore, Inc., P.O. Box 809, Iron Mountain, MI 49801

CRANKSHAFT DEFLECTION ANALYZER

FCS, Inc., 22 Main St., Centerbrook, CT 06409

CRANKSHAFT REPAIR

Goltens Worldwide, 160 Van Brunt St., Brooklyn, NY 11231
In-Place Machining Co., Inc. 1929 North Buffum Street, Milwaukee, WI 53212-3793

CYLINDER LINERS

Silsan Silindir Ve Motor Elemanlar, P.O. Box 127, Carsi, Adana, Turkiye 01210

DECK MACHINERY - Cargo Handling Equipment

Alman A. Johnson, 615 Hope Road, Eatontown, NJ 07724
Lakeshore, Inc., P.O. Box 809, Iron Mountain, MI 49801
Markey Machinery Co., Inc., P.O. Box 24788, Seattle, WA 98124 0788
McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, Biloxi, MS 38535-4454
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Skookum, Inc., P.O. Box 280, Hubbard, OR 97032
Smith Berger Marine Inc., 516 South Chicago Street, Seattle, WA 98108

DECK MACHINERY

Skookum, P.O. Box 280, Hubbard, OR 97032
Clarke Chapman Canada, 1075 North Service Rd. West, Oakville, ONTARIO CANADA
Intercontinental Engineering, P.O. Box 9055, Kansas City, MO 64168
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 38535 4454
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Pusnes, P.O. Box 102, N-4818, Faevik, NORWAY
Skookum, P.O. Box 280, Hubbard, OR 97032
Smith Berger Marine Inc., 516 South Chicago St., Seattle, WA 98108
Timberland Equipment, P.O. Box 490, Woodstock, Ontario N4S 7Z2 CANADA
Waterman Supply Co., P.O. Box 596, Wilmington, CA 90748

DEHUMIDIFIERS

Dry Air Technologies, 313 N. Oak St., Burlington, WA 98233

DESALINATION - REVERSE OSMOSIS

Offshore Marine Laboratories, 22994 El Toro Rd., Lake Forest, CA 92630
Lifestream Watersystems, Inc., P.O. Box 634, Huntington Beach, CA 92647
Matrix Desalination, 3295 S.W. 11th Ave., Fort Lauderdale, FL 33315
Reverso Osmosis of South Florida, 12301 SW. 133 Court, Miami, FL 33186

DIESEL ACCESSORIES

Hermont Marine, Inc., 3528 Griffith, St-Laurent, QUEBEC CANADA H4T 1A7
Kiene Diesel Accessories, 325 S. Fairbanks St., P.O. Box 386, Addison, IL 60101
Liberty Technologies, 555 North Lane, Conshohocken, PA 19382

DIESEL ENGINE ANALYZER

FCS, Inc., 22 Main Street, Centerbrook, CT 06409
Hermont Marine, Inc., 3528 Griffith, St-Laurent, QUEBEC CANADA H4T 1A7

DIESEL ENGINE - Spare Parts & Repair

Alaska Diesel, 4420 14th Ave., NW, Seattle, WA 98107
Brigantine Services Ltd, 48 Wang Lok St., Yuen Long Industrial Estate, New Territories, HONG KONG
Caterpillar, Inc., Engine Div., P.O. Box 610, Mossville, IL 61552-0610
Castoldi S.p.A., Viale Mazzini, 161, 20081, Abbiategrosso, ITALY
Cummins Engine Co., 4500 Leeds Ave., Ste. 301, Charleston, SC 29405 8521
Cummins Mid-South, Inc., 110 E. Airline Highway, Kenner, LA 70082
John Deere, John Deere Rd., Moline, IL 61265
DMI Norshippo Co., P.O. Box 2100, Norfolk, VA 23501-2100
GEC ALSTHOM Diesels Inc., 10801 Kempwood Drive, Suite 1, Houston TX 77043-1412
Goltens Worldwide, 160 Van Brunt St., Brooklyn, NY 11231
In-Place Machining Co., Inc. 1929 North Buffum Street, Milwaukee, WI 53212-3793
Kiene Diesel, 325 S. Fairbanks, Addison, IL 60101
Klattenberg Marine, 17 Grandview Ave., W. Orange, NJ 07052
Liberty Technologies, 555 North Lane, Conshohocken, PA 19382
MAN B&W Diesel AG, Stadtbachstrasse 1, D-86153 Augsburg 1, GERMANY
MAN B&W Diesel A/S, Teglhjolsmødegade 41, DK-2450 Copenhagen SV, DENMARK
MAN B&W Diesel, 17 State St., New York, NY 10004
Motor-Service AB, Box 2115, S-144 04 Ronninge, SWEDEN
Motor Service-Hugo Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
Paxman Diesels, P.O. Box 8, Paxman Works, Colchester, Essex, CO1 2HW ENGLAND
Ulstein Bergen AS, PO Box 924, N5002 Bergen, NORWAY
Wartsila Diesel, 201 Defense Highway, Annapolis, MD 21401
Nace Int'l, 1440 South Creek Dr., Houston, TX 77084
TMT Services Corp./RUSTECO, P.O.B. 11398, Torrence, CA 90510-1398

DIVING & SALVAGE

Coast Marine Services, 793 B Mira Flores, San Pedro CA 90733
Bisso Marine Co. P.O. Box 4113, New Orleans, LA 70178
H.J. Merihue, P.O. Box 23123, New Orleans LA 70183

JW Fishers, 65 Anthony St., Berkley, MA 02779
Muldron Marine Services, Inc., P.O. Box 3221, Terminal Island, CA 90731

DOCK FENDERING SYSTEMS

Poly Hi Solidur, 2710 American Way, Fort Wayne IN, 46899

DOORS - MARINE & INDUSTRIAL

Branton Ind., 1101 Edwards Ave., Jefferson, LA 70181
Commercial Products, 3924 Forest Drive, Ste. 11, Columbia, SC 29204-4148
Insulations, Inc., 1101 Edwards Ave. Harahan, LA 70123
Mapeco Walz & Krenzer, Inc., 90 Forest Ave., Locust Valley, NY 11560
Marine Accomodations, 3830 Willaimsburg Park, Suite 7 Jacksonvill FL 32257
Toddo, P.O.B. 1087, Marion, OH 43302

DREDGING

Sterling Equipment, (J. Cashman Inc.), 285 Dorchester Ave., South Boston 02127

DRIVE SHAFTS

Aquadrive System, 17 Ave. D, Atlantic Highlands, N.J. 07716

DRY DOCKS - Design

Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381
Crandall Dry Dock Engineers Inc., P.O. Box 505804, Chelsea, MA 02150
Heger Dry Dock Engineers, Inc., P.O.B. 6605, Holliston, MA 01746
Poly Hi Solidur, 2710 American Way, Fort Wayne, IN 46899

DUCTORS

Vita Motivator, 566 Parker St., Newark, NJ 07104

ELECTRICAL EQUIPMENT

Askew Hardware Products, Inc., 2920 Supply Ave., Commerce, CA 90040
Baylor Co., 500 Industrial Blvd., Sugarland, TX 77478
L. F. Gaubert & Co., Inc., P.O. Box 50500, New Orleans LA 70150
MMC International, 60 Inip Dr, Inwood NY 11096
Semco Marine Inc., 3721 SW 47th Ave., Ste 309, Ft. Lauderdale, FL 33314

ELECTRICAL MOTOR DRIVES

Tech Power Controls, 10850 S. Wilcrest, Houston, TX 77099

ELECTRONICS/ELECTRONIC DISPLAY

Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY

ELECTRONIC INFORMATION SUPPORT

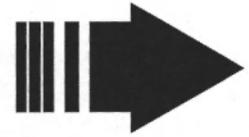
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The listings above are an editorial service provided for the convenience of our readers.

FIRE FIGHTING EQUIPMENT
IMSSCO, 2040 Harbor Island Dr., Suite 201A, San Diego, CA, 92101

FIRE RESISTANT PANELS
Bainbridge Aquabatten, 252 Revere St., Canton, MA 02021
Panel Specialists, Inc./Therma, 3115 Range Rd., Temple, TX 76501

FIRE SUPPRESSION EQUIPMENT
American Pacific Corp., 3770 Howard Hughes Pkwy, Las Vegas, NV 89100

FLAME RETARDANT TEMPORARY COVERING
Bainbridge, 252 Revere St., Canton, Mass. 02021

FUEL CONSERVATION
Instruments Computer & Controls, Inc., 70 South Bow Rd., Hookset, NH 03106

FUEL DECONTAMINATION
Enviro Response Prod., P.O. Box 4011, Ft. Meyers, FL 33932
Environmental Solutions Int'l, 11002 Raccoon Ridge, Reston, VA 20191-4911

GALLEY EQUIPMENT
Commercial Products, 3924 Forest Drive, Ste. 11, Columbia, SC 29204-4148
Cospolich Refrigerator Co., 949 Industry Rd., Kenner LA 70062
Jamestown Metal Marine Sales, Inc., 4710 Northwest Second Ave, Boca Raton, FL 33431
Lang Manufacturing, P.O. B. 905, Redmond, WA 98073
Marine Accommodations, 3830 Williamsburg Rd., Jacksonville, FL 32256

GANWAYS, LADDERS
SlipNot Safety Flooring, 2545 Beaufait St., Detroit, MI 48207
Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

GEAR REPAIR
Haley Marine Gears International, Inc., 2600 N. Concord Belle Chasse, LA 70037
Cincinnati Gear Company, 5657 Wooster Pike, Cincinnati, OH 45227

GENERATOR
Alaska Diesel, 4420 14th Ave., NW, Seattle, WA 98107
Baylor Co., 500 Industrial Blvd., Sugarland, TX 77478

GLARE PROTECTOR
McInnis Industries
2301 Hwy 365
Port Arthur, TX 77640

GMDS
Northern Airborn Tech., 28 Lord Road, Suite 130, Marlborough, MA 01752

HATCH COVER SEAL RENOVATION
Baywood Inc., 3841 Soundway, Bellingham, WA 982263

HEAT EXCHANGERS
Alfa-Laval Separation Inc., 955 Mearns Rd., Warminster, PA 18974
Beard Industries Inc., P.O. Box 31115, Shreveport, LA 71130
Crane Heatex, 17 Grandview Ave., West Orange, NJ 07052

HIGH PRESSURE WATER JETTING
Aqua-Dyne, Inc., 3620 W. 11th Street, Houston, TX 77008-6004

HOISTS
JD Neuhaus Corp., 2603 Rolling Rd., Gwynn Oak, MD 21207

HORNS/WHISTLES
Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068

HOSES
Apollo International, 78 Degraw St., Brooklyn, NY 11231

HYDRAULICS
Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken, NJ 07030
Engine Monitor, Inc., 179 Hickory Ave. Harahan, LA 70123
Hamilton Jet, P.O. Box 709, Christchurch, NEW ZEALAND
Ultra Hydraulics Limited, Cheltenham Road East, Gloucester, GL2 9QN, ENGLAND

INFORMATION TECHNOLOGIES
Marine Management Systems, 470 West Ave., Stamford, CT 06902

INSTRUMENTATION
Instruments East, Inc., 1037 West 45th St., Norfolk, VA 23508
Gems Sensors, Inc., 1 Cowels Rd., Plainville, CT, 06062

INSULATION
Blohm & Voss Light Insulation, Bartels & Laders GmbH, Norderelbstrasse 1S, 20457 Hamburg GERMANY
Panel Specialists, Inc./Therma, 3115 Range Rd., Temple, TX 76501
Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123
Superior Energies Inc., P.O. Drawer 386, Grovas, TX 77619

INTERIORS
Custom Ship Interiors, Inc., P.O. Box 882, Solomons, MD 20688
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
Insulations, Inc., Rt. 5, 12360 Leisure Rd, Baton Rouge, LA 70807
Jamestown Metal Marine Sales, Inc., 4710 NW Second Ave, Boca Raton, FL 33431
Marine Accommodations, 3830 Williamsburg Rd., Jacksonville, FL 32256
TODCO, Inc., P.O. Box 1087, Marion, OH 43302
Directions in Design, 1848 Craig Road, St. Louis, MO 63146

JOINER—Watertight Door—Paneling—Ceiling System—Decking
All Alpha Int'l, Inc. P.O. Box 498985, Cincinnati, OH 45249
Branton Ind., 1101 Edwards Ave., Jefferson, LA 70181
Commercial Products, 3924 Forest Drive, Ste. 11, Columbia, SC 29204-4148
CustomShip Interiors, Inc. P.O. Box 882, Solomons MD 20688
Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123
Marine Accommodations, 3830 Williamsburg Park, Suite 7 Jacksonville, FL 32257
Panel Specialists, Inc./Therma, 3115 Range Rd., Temple, TX 76501
Waltz & Krenzer, Inc., 90 Forest Ave. Locust Valley N.Y. 11560

KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49868
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LASER ALIGNMENT
Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL 36691

LIFEBOATS/RAFTS
American Eagle Mfg., Inc., 780 Pearie Jensen Way, LaConner, WA 98257
DBC Marine Safety Systems, 12351 Bridgeport Rd., Richmond, B.C. CANADA V6V1J4
Norsate AS, P.O. Box 115, N-4818 Faevik, Norway
Viking Life Saving Equipment, 1625 N. Miami Ave., Miami, FL 33136
Willard Marine Co., Inc., 1250 N. Grove St., Anaheim, CA 92806
Zodiac of North America, P.O. Box 400, Stevensville, MD 21666

LIFESAIVING EQUIPMENT

MGI International, 119-225 West 1st St., North Vancouver, B.C. CANADA
Stearns Manufacturing, P.O. Box 1498, St. Cloud, MN 56302

LIGHTING SYSTEMS/EQUIPMENT—Lamps, Fixtures, Searchlights
ACR Electronics, Inc., 5757 Ravenswood Rd., Ft. Lauderdale, FL 33310-5247
Archway Marine, 4501 Swan Ave., St. Louis, MO 63110
Gotten Marine, 160 Van Brunt St., Brooklyn, NY 11231
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Pauluhn Electric Mfg. Co., Inc. 1616 N. Main, P.O. Box 53, Pearland, TX 77581
Francis Searchlights/Stam Supply Co., 4415 6th N.W., Seattle, WA 98107

LINE HANDLING VIDEO
Moxie Media, Inc., 5734 Jefferson Hwy., Harahan, LA 70123

LIQUID LEVEL GAUGES
King Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106

LIQUID OVERFILL PROTECTION SYSTEMS
E.R.L. Marine Products, P.O. Box 1026, New Albany, IN 47151-1026
Metriape, Inc., 59 Porter Rd., Littleton, MA 01460
Gems Sensors, Inc., 1 Cowels Rd., Plainville, CT, 06062

LOGISTICS
VL Logistics Consultants, Inc., 3420 Bienville Blvd., Ocean Springs, MS 39564

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
Gotten Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231
Maritime Power 200 Henderson St., Jersey City, NJ 07302
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Wallace Coast Machining, 1920 Waukegan Rd., Glenview, IL 60025

MARINE & INDUSTRIAL DOORS
Railway Specialties Corp., 2979 State Rd., Bristol, PA 19007

MARINE CALIBRATION DEVICES
Hermont Marine, Inc., 3528 Griffith, St.-Laurent, QUEBEC CANADA H4T 1A7

MARINE CEILING
Hydro-Aluminium, Vik Verk, N-5880 VIK I SOGN, Norway
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Panel Specialists, Inc., 3115 Range Rd., Temple, TX 76501

MARINE CONSULTANTS
Kvaerner Masa Marine, 201 Defense Hwy., Annapolis, MD 21401

MARINE DECKING
E.H. O'Neill Co., 1405 Chippendale Rd., Lutherville, MD 21093
Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Selby, P.O. Box 1600, Sapulpa, OK 74067

MARINE DRILLING & BLASTING
Marine Drilling & Blasting, Inc., P.O. Box 18098, Beverly Hills, CA 90209-4098

MARINE ELECTRONICS
Frank L. Beier Radio, 2001 Ridgeway Drive, Metairie, LA 70001
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Saab Marine Electronics AB, Box 13045, 40251 Gotaborg, SWEDEN
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

MARINE ELEVATORS
McElroy Machine, 1101 Lorraine Rd., Biloxi, MI 39535-4454

MARINE EQUIPMENT
Waterman Supply, P.O. Box 596, Wilmington, CA 90748
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Northeast Technical, P.O. Box 38189, Olmstead Falls, Ohio, 44138
Bohnet & Associates, 1150 Rute Rochelle, Sidell, VA 70458
McElroy Machine, P.O. Box 4454, Biloxi, MS 39535-4454

MARINE FINANCING
Safeco Credit Co. Inc. 4909 156th Ave. NE, Redmond, WA 98052

MARINE FIRE PROTECTION
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Unitor Ship Service Inc., 2375 West Esther Street, Long Beach, CA 90813

MARINE GEARS
The Falk Corp., P.O. Box 492, Milwaukee, WI 53201-0492
Haley Marine Gears, Inc. P.O. Box 689, Greenville, MS 38702
Marine Gears, P.O. Box 689, Greenville, MI 38701
Cincinnati Gear Company, 5657 Wooster Pike, Cincinnati, OH 45227

MARINE INSURANCE
John G. Alden, 1300 SE 17th St., Fort Lauderdale, FL 33316

MARINE PAINTINGS
Saba Art Studio, 6 Ridge Drive, Old Saybrook, CT 06475

MARINE PUMPS
Gilkes Inc., P.O. Box 628, Seabrook, TX 77586

MARINE SAFE VIDEO
Moxie Media, Inc., 5734 Jefferson Hwy., Harahan, LA 70123

MARINE SHAFTING
Kahlenberg Bros, P.O. Box 358, Two Rivers, WI 54241

MARINE SURPLUS SALES
Defense Reutilization & Marketing Service, 2163 Airways Blvd., Memphis, TN 38114

MARINE SYSTEMS SIMULATION
Applied High Technology, 4 Place Dee Commerce
Brossard, Suite 201 Quebec Canada J4W-3B3

MECHANICAL PUMP SALES
John Crane Marine, USA, 1536 Barclay Blvd, Buffalo Grove, IL 60089

METERS
Selco USA, 2508 Lakebrook Ct., Atlanta, GA 30360

MONITORS
Intercolor Corp., 2150 Boggs Rd., Deluth GA 30096

MOORING LINES
Phillystran, Inc., 151 Commerce Drive, Montgomeryville, PA 18936-9628

MOTOR PROTECTION EQUIPMENT
Marine Safe Electronics, 37 Staffern Dr., Concord, Ontario L4K CANADA

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Northeast Technical, P.O. Box 38189, Olmstead Falls, Ohio, 44138
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Bay Engineering, 253 N. First Ave., Sturgeon Bay, WI 54235
Donald L. Blount, 2550 Ellsmere Ave., Ste. K, Norfolk, VA 23513
C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609
CDI Marine Co., 4040 Woodcock Dr., Suite 200, Jacksonville, FL 32207

Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., P.O. Box 505804, Chelsea, MA 02150
Crane Consultants, 15301 First Ave. S., Seattle WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
CT Marine, 56 Crooked Trail, Rowayton, CT 06853
Cunningham & Walker, 1762 Providence Hollow Lane, Jacksonville, FL 32223
Arthur D. Darden, 3200 Ridgeway Dr., Suite 403, Metairie LA 70002
DeJong & Lebet, Inc., 1734 Emerson Street, Jacksonville, FL 32207
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, 2120 Washington Blvd. Ste. 200, Arlington, VA 22204
Elliott Bay Design Group 5301 Shilshole Ave. N.W. Ste. 200, Seattle, WA 98107
Encan Mgmt & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
GHM Inc. (Ind. Measurement Consultants), P.O. Box 1836, Newport News, VA 23601
Gibbs & Cox, Inc., 50 West 23rd St., New York, NY 10010
Heger Dry Dock Engineers, Inc., P.O.B. 6605, Holliston, MA 01746
J.J. McMullen, 2341 Jefferson Davis Hwy, Arlington, VA 22202
John W. Gilbert & Assoc., Inc., 199 State St., Boston, MA 02109
The Glosten Assoc. Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
Guido Perta & Assoc., 720 3rd Ave., Ste. 1200, Seattle, WA 98104
Morris Guralnick Associates, Inc., 130 Sutter St., Ste. 400, San Francisco, CA 94104
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
J.H. Inc., 3412 Progress Dr., Bensalem, PA 19020
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
Kvaerner Masa Marine Inc., 201 Defense Highway, Suite 202, Annapolis, MD 21401
James S. Kroger, 799 Brickell Plaza Ste. 701, Miami, FL 33131
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
MCA Engineers, Inc., 2960 Airway Ave., #A-103, Costa Mesa, CA 92626
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535 4454
John J. McMullen Associates, Inc., 1 World Trade Ctr, Ste 3000, NY, NY 10048
Fandall Marbury, P.O. Box 2321, Annapolis, MD 21401
Marine Design & Operations, Inc., 225 E. 1st Ave., Roselle, NJ 07023
Marine Management Systems Inc., 470 West Ave., Stamford, CT 06902
Marine Power Associates, 1010 Turquois St., Ste 217, San Diego, CA 92109
Maritech, Seacoff, Bay Road, Newmarket, NH 03857
Maritime Design, Inc., 3020 Hartley Rd., Jacksonville, FL 32257
R.J. Mellusi & Co., 71 Hudson St. New York, NY 10013
Nautical Designs, Inc. 2101 S. Andrews Ave, Suite 202, Ft Lauderdale FL 33316
Olsen Marine Surveyors Co., P.O. Box 283, Port Jefferson, NY 11777
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 620 Fulson St., Ste. 301, San Francisco, CA 94107
Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
Sea School, 10812 Gandy Boulevard, St. Petersburg, FL 33702
Seaworthy Systems Inc., P.O. Box 965, Essex, CT 06426; 17 Battery Pl., New York, NY 10004; P.O. Box 975, Bamegat Light, NJ 08006; 2001 N. Beauregard Street, Alexandria, VA 22311; 50 Vashell Way, Orinda, CA 94563
George G. Sharp, Inc., 100 Church St., New York, NY 10007
R.A. Steam, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
A.K. Suda & Ass., 3004 19th St., Metairie, LA 70002-4989
TIMSCO, P.O. Box 91360, Mobile AL 36691

NAVIGATION & COMMUNICATIONS EQUIPMENT
Northern Airborn Tech., 28 Lord Road, Suite 130, Marlborough, MA 01752
Electronic Marine Systems, 800 Ferndale Pl., Rahway, N.J. 07065
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
ICS Electronics Ltd., Unit V, Rudford Industrial Estate, Ford, Arundel, West Sussex, UK
KVH Industries, Inc., 110 Mackay Communications, 2721 Discovery Dr., Raleigh, N.C.
KVH Industries, 110 Enterprise Center, Middletown, RI 02842-2528
Negron Marine Consultants, 840 Bond Street, Elizabeth, NJ 07201
Offshore Systems, 930 West 1st Street, North Vancouver BRITISH COLUMBIA
Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017
Scandinavian Micro Systems P.O. Box 155, N-1411, Kolbotn, NORWAY
Sea, Inc., 7030 220th St. W., Mountlake Terrace, WA 98043
Simrad, 19210 33rd Avenue West, Lynnwood, WA 98036
Simrad Robertson, 10801 Hammerly, Suite 100, Houston, TX 77043-1923
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Transas Marine, 19105 36th Ave. West, Bldg. #2, Suite 101, Lynnwood, WA 98036
Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94086
Waterway Communications System, Inc. 453 E. Park Pl., Jeffersonville, IN 47130
Offshore Systems International, 5013 Pacific Hwy East, Fife, WA 98424
Q-Mar Inc., 1801 McGill College, Montreal, Quebec H3A2N4
Land Sea Systems, 849 Seahawk Circle, Suite 103, Virginia Beach, VA 23452
Litton Marine Systems, 1070 Seminole Trail, Charlottesville, VA 22901-2591

NOZZLE SYSTEM
Custom Nozzle Fabrication, P.O. Box 547, Pascagoula, MS 39568
Rice Propellers, Av Rios Espinoza #88, Mazatlan, MEXICO 82180

OIL—Marine—Additives—TESTING
Mobil Oil Corporation, 3225 Gallows Road, Fairfax, VA 22037-0001

OIL CONTENT METERS/CALIBRATION
Hermont Marine, Inc., 3528 Griffith, St.-Laurent, QUEBEC CANADA H4T 1A7

OIL—LESS FRYER
Ro-Fry, 1400 Toastmaster Dr., Elgin, IL 60120

OIL MIST DETECTORS
Autronica Marine, 234 Industrial Pkwy, Northvale, N.J. 07647
Hermont Marine, Inc., 3528 Griffith, St.-Laurent, QUEBEC

CANADA H4T 1A7

OIL TANK CLEANING
Brain Industries Australia, Pty. Ltd., 21 Bearing Rd., Seven Hills, NSW 2147 AUSTRALIA

OIL/WATER SEPARATORS
Alfa-Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974-0556
Blohm & Voss U.S.A. Repps-Simplex-Turmar Inc., P.O. Box 168, Little Neck, NY 11363-0168
Fast Systems, 3240 North Broadway, St. Louis, MO 63147
MMC International, 60 Inp Dr, Inwood NY 11096
Westalia Soperators, 100 Fairway Ct., Northvale N.J. 07647
Nelson Industries, Highway 51 West, Stoughton, WI 53589
RGF Marine, 3875 Fiscal Ct., W. Palm Beach, FL 33404

PAINT—COATING—CORROSION CONTROL
Corroseal, Inc., 1045 12th Ave. NW-F5A, Issaquah, WA 98027
Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
Ferro Corp., 1301 North Flora St., Plymouth, IN 46563
Jamestown Distrib., 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02835
Hempel Coatings, 6901 Cavalcade St., Houston, TX 77028
Microphor, Inc., Marine Div., 452 E. Hill Rd., P.O. Box 1460, Willits, CA 95490
Sigma Coatings, 8979 Market St., Houston, TX 77029, 330 Rover Rd., Harvey, LA 70059, 1100 Adams St., Hoboken, NJ 07030
TNO Institute of Industrial Technology, P.O.B. 3, 2600 AA Delft, Netherlands
Unitor Ship Services Inc., 2375 West Esther Street, Long Beach, CA 90813

PIPE FITTINGS/CUTTINGS/CONNECTING/SYSTEMS
Georg Fischer DISA Pipe Tools Division, 407 Hadley St., Holly, MI 48442
Lokring Corp., 396 Hatch Drive, Foster City, CA 94404
Vicaluic Co., 4901 Kesslersville Rd., Easton, PA 18042

PIPE JOINING PRODUCTS
Vicaluic Co., 4901 Kesslersville Rd., Easton, PA 18042

PNEUMATIC HOISTS
J.D. Neuhaus, 9 Lovston Circle, Sparks, MD 21152

POLLUTION CONTROL/PRODUCTS/MARINE SERVICES
Oil Mop, Inc., 221 Rue De Jean, Lafayette, LA 70508

Ports
Port of Olympia, 915 Washington NE, Olympia WA 98501

POWER GENERATORS
Aggreko, Inc., 4607 W. Admiral Doyle Dr., New Iberia, LA 70560
FCS, Inc., 22 Main St., Centerbrook, CT 06409

PROPELLERS
Rolla Propellers, P.O. Box 25, Via Silva 5, Balema, Switzerland
Kahlenberg Bros, P.O. Box 358, Two Rivers, WI 54241
Associated Marine Technologies, 4016 Seaboard St., Portsmouth, VA 23701
Holland Ror Propellers, 2273 Batataria Blvd, New Orleans LA, 70072
Rice Propellers, Av. Rios Espinoza #88, Mazatlan, MEXICO 82180
Rolla SP Propellers SA, P.O. Box 251, Via Silva 5, 6828 Balema, SWITZERLAND
S&S Propellers, 26-15 123rd St., Flushing, N.Y. 11354
Sound Propeller, 1608 Fairview Avenue E., Seattle, WA 98102
General Thermodynamics, 210 South Meadow Rd., Plymouth, MA 02360

PROPULSION EQUIPMENT
—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
Avondale Industries, Harvey Quick Repair, P.O. Box 116, Harvey, LA 70058
American Air Filter, P.O. Box 35690, Louisville, KY 40432
ABB Drives Inc., P.O. Box 372, Milwaukee, WI 53201-0372, USA
ABB Industry Oy, P.O. Box 185, 00381 Helsinki, FINLAND
ABB TURBOCHARGER INC., 1460 Livingston Avenue, N. Brunswick, NJ 08902
Aquamaster-Rauma Ltd., Box 220, SF-26101, Rauma, FINLAND
Aquamaster-Rauma Inc., 2315 North Woodlawn Ave., Ste. 103, Metairie, LA 70001
Brunvoll A/S, P.O. Box 370, N-6401, Moie, Norway
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320
Centa Corp., 8185 Cass Ave., Darien, IL 60561
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
deWijns Marine International B.V., Postbus 320, 1969 NJ Heemskerk, Nederland
The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492
Fincantieri, Diesel Engines Div.—GMT, Bagnoli della Rosandra 334, Trieste, ITALY
GE Naval & Drive Turbine Systems, 166 Boulder Dr., Fitchburg MA 01420
GEC ALSTHOM Diesels Inc., 10901 Kempwood Dr. Ste 1, Houston, TX 77043-1412
Gottens Worldwide, 160 Van Brunt St., Brooklyn, NY 11231
Harbormaster Marine Inc., 31777 Industrial Rd., Livonia, MI 48150
Harrington Metal, 6720 124th Ave. Lennoxville, MI 49408
Holset Engineering, Inc., 1320 Kemper Meadow, Ste. 500, Cincinnati, OH 45240
In-Place Machining Co., Inc. 1929 North Buffum Street, Milwaukee, WI 53212-3793
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp Mak., 7555 Danoro Crescent, Mississauga, Ontario, CANADA L5N 6P9
LIPS B.V., P.O. Box 6, 5150 BB Drunen, The Netherlands
Lohmann & Stolterfoht, P.O. Box 1860, D-58408 Witten, Germany
Lo-Rez Vibration Control, 186 West 8th Ave., Vancouver, BC CANADA, V5Y 1N2
Mapeco Products Inc., 90 Forest Ave., Locust Valley, N.Y. 11560
Markisches Werk, P.O. Box 1442, D-5884 Halver GERMANY
MAN B&W Diesel, 17 State St., New York, NY 10004
MAN B&W Diesel A/S, Ostervog 2, DK-4860 Holeyby, DENMARK
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15, DK-9900 Frederikshavn, DENMARK
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-86153 Augsburg 1 GERMANY
Omnitruster, Inc., 743 N. Main St., Orange, CA 92868
Orion Corp., 1111 Cedar Creek Rd., Grafton, WI 53024
Oy Wartsila Ab, Vasa and Abo Divisions, P.O. Box 244, SF65100 Vasa, FINLAND
Rolla SP Propellers SA, Via Silva 5, P.O. Box 251, 6828 Balema SWITZERLAND
S&S Propellers, 26-15 123rd St., Flushing, N.Y. 11354
Karl Senner Inc., 25 W Third, Kenner LA 70062
Schottel-Werft, Manizer Strasse 99, D-56322 Spay/Rhein, GERMANY
Schottel North America, Inc., 1505 Corbin Ave., Hammond, LA 70403
Siemens Electric Ltd., 1180 Courtney Park Rd., Mississauga, ONTARIO

Stewart & Stevenson, 1400 Destrehan, P.O. Box 8, Harvey LA 70059-0008
Thrustmaster of Texas, P.O. Box 840189-12227 IFM 529, Houston, TX 77284-0189
Ulstein Bergen Diesel A/S, P.O. Box 924, N-5002, Bergen, NORWAY
Ultra Hydraulics Limited, Cheltenham Road East, Gloucester, GL2 9QN, ENGLAND
Voith Hydro Marine Technology, P.O.B. 1125, D89509, Heidenheim, GERMANY
U.S. Rep: Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021

PUMP—Repair—Drives
Gilkes, Inc., PO Box 628, Seabrook, TX 77586
Hamworthy Marine, Inc., 1129 Hospital Dr. Ste 3C, Stockbridge, GA 30281
Kraissl Company, 299 Williams Ave., Hackensack, N.J. 07601-5225
Vita Motivator, 566 Parker St., Newark, NJ 07104
Ampco Pumps, 4000 West Bumham St., Milwaukee, WI 53215

RADARS—ARPAS
Furuno USA, Inc., 271 Harbor Way, S. San Francisco, CA 94080
Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017

REFRIGERATION EQUIPMENT/SERVICES
Adrick Marine, 81 Mahan St., West Babylon, N.Y. 11704
Ashland Chemical Co., Drew Marine Co., One Drew Plaza, Boonton, NJ 07005
RTF Mfg., RD #1 Route 66, Hudson, NY 12534
Unitor Ship Service Inc., 2375 West Esther Street, Long Beach, CA 90813
Refrigeration Resources., 210 West Side Ave., Jersey City, NJ, 07035

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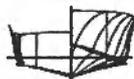


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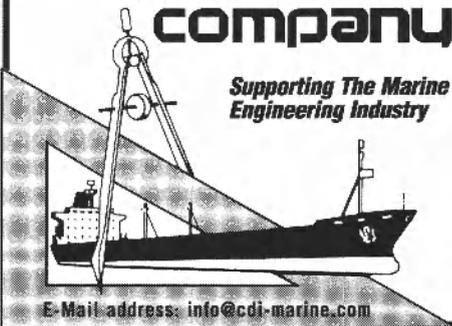
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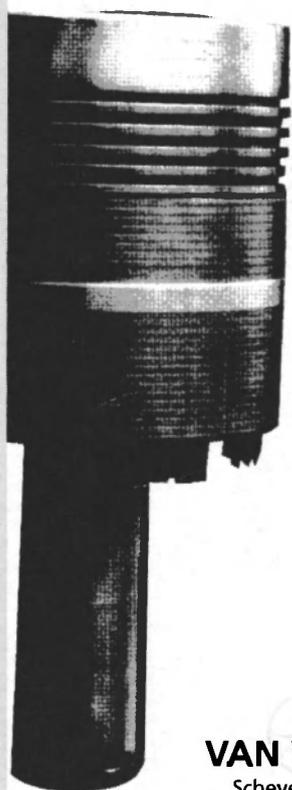
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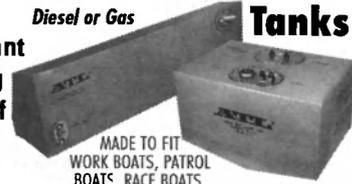
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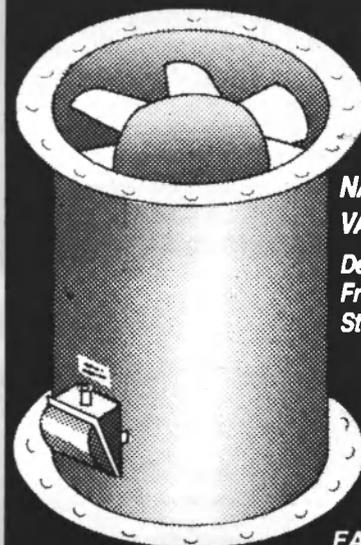
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Oil and gas West Asia '98: February
16-19, Sultanate of Oman.

Contact: LMC, Mrs. Sord, tel: +44 171
453 2712; fax: +44 1992 570853.

**SPE India Oil and Gas Conference
and Exhibition:** February 17-19, New
Delhi, India.

Contact: SPE, Dan Lipsher, tel: +1
972-952-9306; fax: (972) 952-9435;
e-mail: dlipsher@spelink.spe.org

**Worldwide Deepwater Technologies
Forum:** February 23-24, London, UK.

Contact: IBC, Emmah Tamlyn, tel: +44
171 453 2712

Liner Shipping, 2001 and Beyond:

February 24-25, London, UK.
pacific@nexusmedia.co.uk.

**UDT Pacific '98, Undersea Defence
Technology:** February 24-26, Sydney,
Australia.

Contact: Nexus Information
Technology, Beverley Lucas, tel: +44
1322 660010; fax: +44 1322
661257; e-mail: udt.pacific@nexus-

media.co.uk.

UDT Pacific '98: February 24-26,
Sydney, Australia.

UDT.Pacific@nexusmedia.co.uk

MARCH

**ASNE Day 1998 (10th Anniversary
of the American Society of Naval
Engineers):** March 3-4, Washington,
DC.

Contact: ASNE, Sally Cook, tel: +1
703 836 6727; fax: +1 703 836
7491.

IADC/SPE Drilling Conference: March
3-6, Hotel Inter-Continental Dallas,
Dallas, Texas, USA.

Contact: SPE, Dan Lipsher, tel: +1
972-952-9306; fax: (972) 952-9435;
e-mail: dlipsher@spelink.spe.org

**Seatrade Cruise Shipping
Convention:** March 3-7, 1998, Miami
Beach, FL.

Contact: Seatrads, Maureen Standing,
tel: +44 1206 545 121; fax: +44
1206 545 190.

Fish Canada '98: March 6-8,
Moncton Coliseum/Agrena, Moncton,
N.B., Canada.

denman@ns.sympatica.ca.

**International Oil Spill Conference &
Exposition:** March 8-11, Washington
State Convention and Trade Center,
Seattle, WA.

Contact: Trade Associates, Inc., tel: +1
301 468 3210; fax: +1 301 468

3662

**Ports '98, "Ports - transportation link
to global trade":** March 8-11, 1998,
Long Beach, CA.

Contact: The Office of the U.S.
Section, PIANC, tel: +1 703 428
6286, fax: +1 703 428 8171

**CHC '98, Canadian Hydrographic
Conference:** March 9-12, 1998,
Victoria, BC, Canada
chc98@ios.bc.ca.

**Oil Spill Response - The National
Contingency Plan:** March 10-11,
Cophorne Effingham Park Hotel,
Gatwick, UK.

Contact: IP, Jane Hill, 61 New
Cavendish Street, London, W1M 8AR,
tel: +44 171 255 1472; fax: +44 171
255 1472.

**Oceanology International '98, The
Global Ocean:** March 10-13,
Brighton, UK.

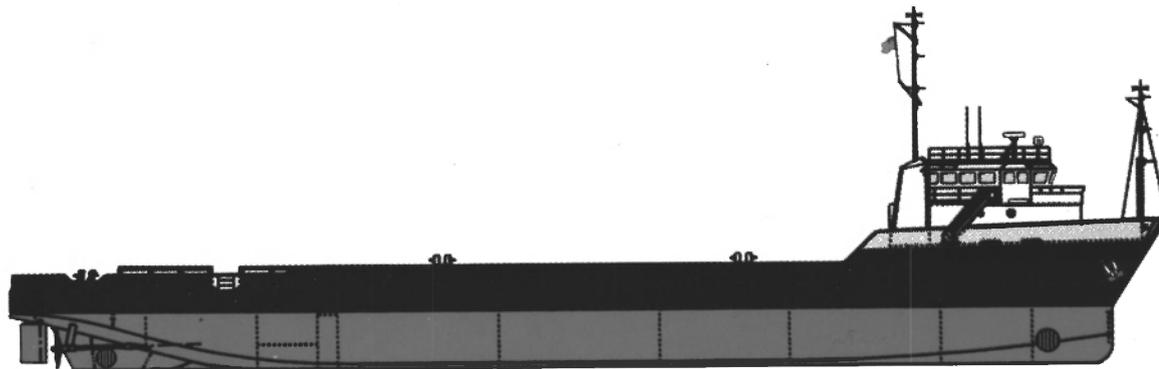
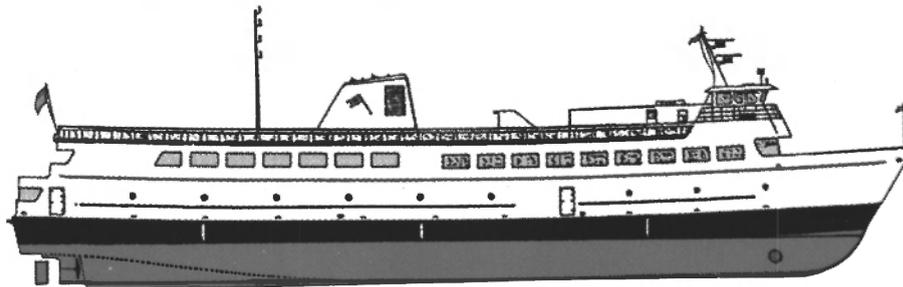
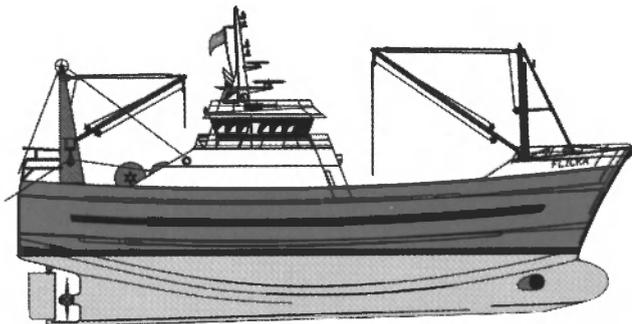
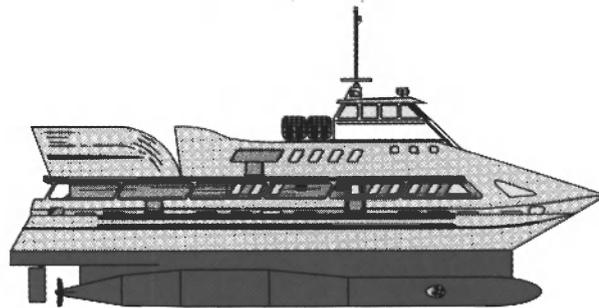
bob@spearhead.co.uk.

Sea Japan '98: March 11-13, 1998,
Yokohama, Japan.

Contact: Seatrade, Maureen
Standing, tel: +44 1206 545 121;
fax: +44 1206 545 190.

**The Institute of Marine Engineers
annual general meeting:** March 12,
London, UK

Contact: ImarE, Mr. P. Buckton, tel:
+44 171 481 8493; fax: +44 1206
545 190.



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