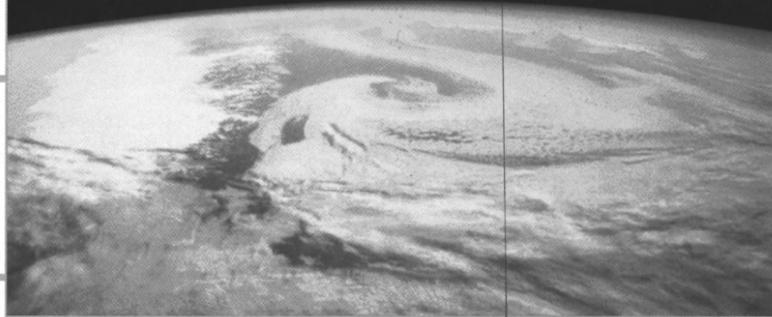


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1996 WORLD YEARBOOK



The Internet: Maritime companies tap into a sea of information



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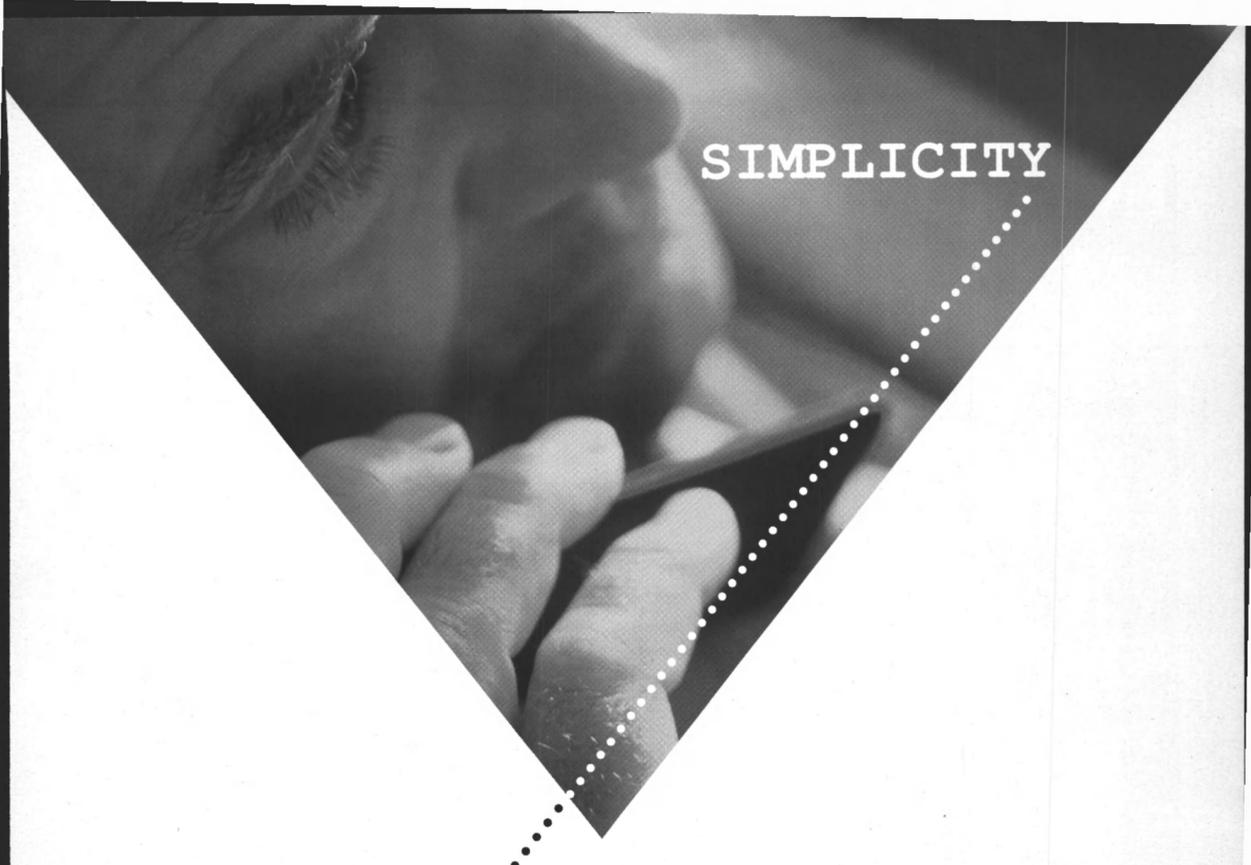
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- 22 European Update**
Passenger ship *Polarlys*, the largest ever built by Ulstein, is delivered; Cross-Channel battle escalates. — by Carol Fulford & Andy Smith
- 92 Catch the Wave**
"Surfing the Net" has new meaning with the launch of *MarineLink*, *Maritime Reporter's* new on-line information source. Senior Editor and Webmaster Dan Maniotis takes a look at the history of the Internet, including how some companies have already tapped its tremendous potential.

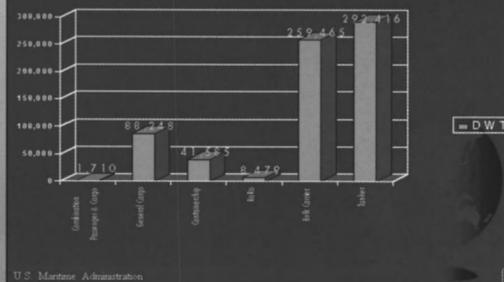
Data & Statistics

The June Yearbook is comprised of a plethora of data and statistics that shape the international maritime industry. Here is a guide to what's inside:

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EDITOR'S NOTE

If interest in maritime from the investment community is a good omen, then things are looking up. In the last four months, there have been more calls to our editorial offices from investment firms — seeking shipbuilding market trends and insight — than in the past four years combined.



Of course, reaching an overall conclusion based on such simplistic information is not possible, especially when discussing a multifaceted, international entity such as the maritime industry. But, if anything, the increased level of calls, and the apparent need for immediate information, has helped guide the editorial staff in the creation of our new information resource.

I can think of no more appropriate forum than *MREN's* World Yearbook than to announce the launch of MarineLink, an on-line source of information services for the international maritime community, now available on the World Wide Web.

Enough gratitude and appreciation cannot be given to the developer of MarineLink, Senior Editor and Webmaster Dan Maniotis. Dan has spent many early mornings, late nights and weekends cre-

ating and re-creating the prototype version of MarineLink, which can be found at <http://www.marinelink.com>.

Even though *MREN* could have easily been "on-line" many months ago — using an outside service provider — the decision was made to use in-house talent to develop and deliver a product which was uniquely ours; uniquely maritime. I believe once you sample the prototype, you'll agree it was a wise choice.

Take a few moments to visit the site, as this is in every sense a project in perpetual development. The entire staff looks forward to your comments and suggestions which will contribute to MarineLink's positioning as the maritime industry's premier on-line information resource.

Gregory R. Trauthwein, editor

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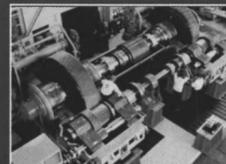
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June, 1996

Vickers Shipbuilding Upgrades Software Capability

Computervision Corporation announced that Vickers Shipbuilding and Engineering (VSEL), a leading U.K. shipbuilder, has moved forward with its Electronic Product Definition implementation, acquiring software valued at \$1.82 million from Computervision.

Computervision's software will be used to help design, build and

support VSEL's future products.

VSEL is recognized in the shipbuilding industry for its Electronic Product Definition (EPD) strategy. EPD is a tool for reducing costs and time to market in complex multi-part assemblies. Using EPD, VSEL will electronically define and analyze its ships, submarines and armament products in computer software prior to

manufacture. The data will then be used to support products throughout their life cycles, ensuring improved levels of quality. The contract involves Computervision's CADD5 5 total product modeling software, and Optegra enterprise data management software, Optegra Explorer and Concurrent Assembly Mock-Up (CAMU).

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Circle 301 on Reader Service Card

New Sulzer Reports Engine Order Influx

New Sulzer Diesel Ltd. of Winterthur, Switzerland, has reported rapid sales of its RTA48T and RTA58T low-speed marine diesel engines, initially offered in June 1995. Thirty-seven engines have reportedly been ordered for newbuilding activity in Japan and

Poland. These include 14 six-cylinder RTA48T models for handymax bulk carriers contracted at IHHI and Oshima Shipbuilding Co. Ltd. by Japanese, European and Chilean owners for delivery through 1998. In addition, 23, seven-cylinder RTA48T models are

destined for panamax bulk carriers at Sumitomo Heavy Industries Ltd., with delivery scheduled in 1997. These engines will be built under license by Diesel United Ltd. in Aioi, Japan.

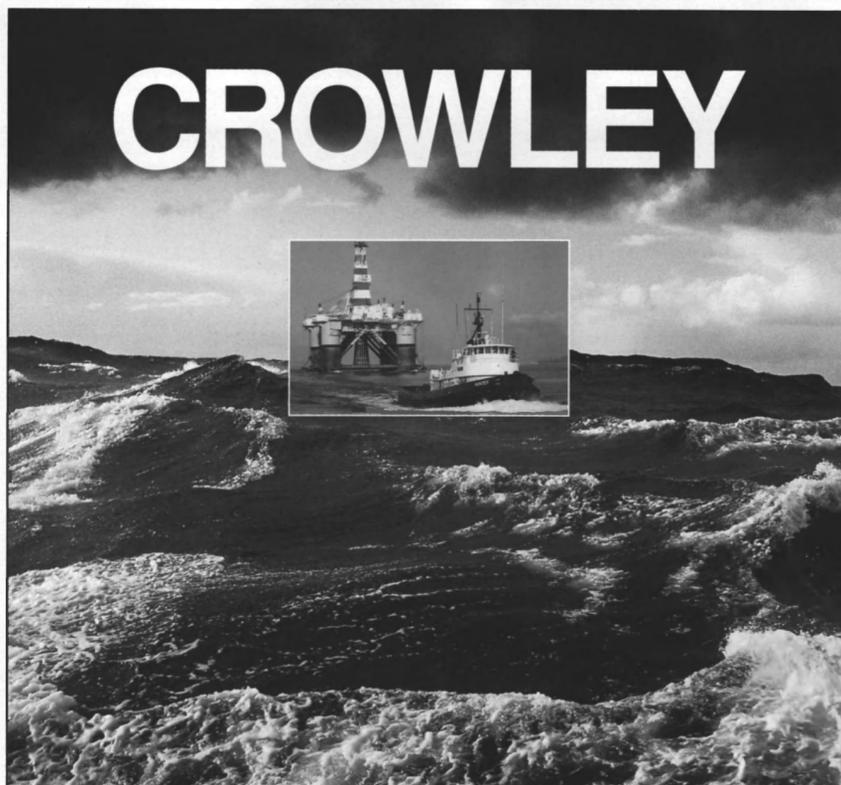
A series of 12, open-hatch, 45,000-dwt bulk carriers with

1,800-TEU capacity will each be powered by a six-cylinder RTA58T engine of 15,500-bhp output for newbuildings contracted by German and Chilean owners at Poland's Szczecin Shipyard, with delivery scheduled in 1997-1998. The engines will be built under license by H. Cegielski in Poznan, Poland. In addition, two seven-cylinder RTA58T engines have been ordered in Japan.

Sulzer RTA48T and RTA58T low-speed engines are specifically designed for the propulsion of bulk carriers and tankers in approximate range of 25,000 to 150,000 dwt. With cylinder bores of 480 and 580 mm, these engines have maximum continuous outputs of 1,850 and 2,720-bhp per cylinder. Comprising models ranging from five to eight cylinders, the engine series covers an overall power range of 5,600 to 21,760 bhp.

The first RTA58T engine, a four-cylinder prototype, has been running on a test bed since October 1995. It is employed as a research engine in New Sulzer's new Diesel Technology Center in Winterthur.

For more information on New Sulzer
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Circle 237 on Reader Service Card

Autronica To Supply Fire/Gas Detection System For Rasmussen FPSO

A networked, intrinsically-safe, fire and gas detection system from Autronica Industrial Ltd. will be installed on the new FPSO being built in Japan for Rasmussen Offshore. The equipment will be integrated with the fire, gas and safety critical control systems architecture designed by U.K.-based systems supplier Silvertch, and is scheduled for installation by the end of September 1997, after the vessel reaches the U.K. for topside fitting in mid-1997.

This FPSO is being built to meet the fast growing demand for production facilities capable of working efficiently in the remote, deep-water oil and gas reservoir environments currently being opened in northern European waters.

Autronica's system incorporates approximately 300 detectors, monitored by two BS-100 control panels. Each analog smoke and heat sensor is individually monitored. This data is used to dynamically adjust the sensitivity of the alarm threshold to optimize protection and reduce system life cycle costs by allowing precise targeting of maintenance efforts.

For more information on
Autronica Industrial Ltd.
Circle 79 on Reader Service Card

BIMCO/ISF Study Suggests Possibility Of Officer Shortage

The Baltic and International Maritime Council (BIMCO) and the International Shipping Federation (ISF) have published the results of their 1995 *Manpower Update*, a follow-up to the BIMCO/ISF study commissioned in 1990. Speaking at the presentation of the results in London, chairman of the joint steering committee, **Sudhir Mulji**, said: "The clear message of the *Update* is that even on the basis of quite conservative assumptions about future growth in the size of the new fleet, the current worldwide shortage of qualified and competent officers will escalate unless corrective action is taken. Although there has been a significant increase in the number of officer trainees recruited since 1990, the upward trend appears to have peaked in 1993, and it will be necessary to reverse the recent decline in recruitment if the future supply of seafarers is to meet demand."

The BIMCO/ISF report suggests that failure to effectively imple-

ment the revised STCW Convention could have a significant impact on the supply of seafarers in the future. Although the new STCW Convention should improve crew competence, it could reduce the number of seafarers with internationally recognized qualifications, unless the industry acts quickly to assist with the

process of implementation.

The *Update* also indicates that the number of seafarers from OECD countries has continued to decline (by nine percent since 1990), while the availability of seafarers from the Far East has increased by 22 percent.

BIMCO is a Copenhagen-based, international shipping organiza-

tion, whose membership comprises 2,600 companies including ship operators, shipbrokers, chartering and port agents, P&I clubs and defense associations from more than 100 countries. ISF is the international employers' organization for shipowners. Its membership comprises national shipowning associations from 30 countries.

USA Catamarans Offers Avenger Series RIBs

USA Catamarans offers its gas turbine-powered *Avenger* 78.7-ft. (24-m), all-aluminum, unsinkable RIB. Propulsion is through KaMeWa 45 waterjets. With a passenger capacity of 100 and a service speed of 50 knots in an operational environment that encompasses sea state 4, USA Catamarans now has a single hull that reportedly outperforms its own foil-assisted catamarans. The high deadrise hull reportedly has half the drag of the standard deep-vee. During sea trials of an *Avenger* 39.3-ft. (12-m), super critical operation was reportedly achieved at speeds of more than 40 knots. According to preliminary calculations based on the performance of the scale model, an 101.7-ft. (31-m) *Avenger* crewboat powered by two Solar centaur gas turbines with KaMeWa waterjets will carry 50 tons at 50 knots, in eight to 10 ft. (2.4 to 3-m) seas.

For more information on USA Catamarans
Circle 78 on Reader Service Card

Precision Models Available From Yokohama Seimitsu

Yokohama Seimitsu Inc., a member of General Model Industry — manufactures scale models for Land, Sea and Air Association and the Japan Industrial Model Association, specializing in precision models of ships, vehicles, appliances and machinery. Company President **Isao Horiuchi** heads up the Uokohama, Japan, headquarters.

For more information
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GE Aims To Be Single Source Supplier

General Electric's one-stop-shop approach helps land Disney cruise ship order

General Electric (GE), a company with strong maritime roots, has created a one-stop-shop approach to marketing its products to the commercial and military markets. This

integrated approach has led to lucrative contracts and helped position the company as a partner to vessel builders and owners.

"Integrated marine power

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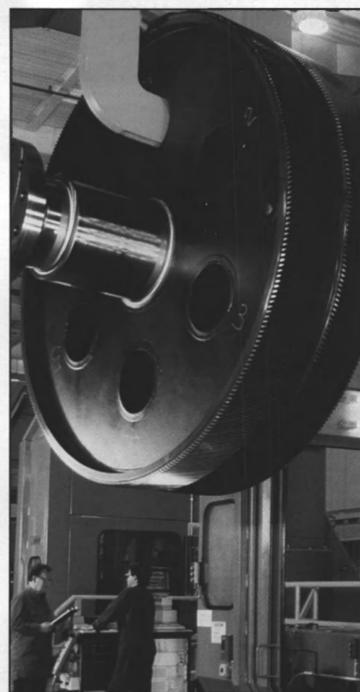
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An advanced grinding machine finishes the teeth on GE gears to tolerances which can not be seen by the human eye. GE's world-class facility in Lynn, Mass., is dedicated to the design, manufacture and test of propulsion gears for the U.S. Navy and commercial ships such as LNG tankers, the Arleigh-Burke DDG-51 destroyers and NASSCO-built Sealift ships.

propulsion and control systems and equipment for customers in the commercial and naval marine propulsion markets. The systems offered incorporate gas turbine mechanical drive, gas turbine electric drive and diesel-electric drive technologies using GE gears, power converters, motors and programmable logic (PLC)-based control systems.

"This team approach has already proven successful, with GE capturing significant orders worldwide, including projects in China with Shengli Oil for a workboat, and more recently, a contract to supply two ship sets of propulsion equipment for two new Disney cruise ships," said Rick Veltri, marine industry sales manager. "We've proven that this marine team can make it easier for our customers to access the full breadth of GE technologies and scope of products and services to meet all shipboard power requirements."

For the Disney project, GE's marine team will provide the electric drive propulsion systems and the ships' automated machinery control and monitoring systems. This will include two, 25,000-hp propulsion motors, associated LCI drives, GE Fanuc-based automation and controls, as well as other auxiliaries.

GE's marine team designs and builds entire propulsion systems, as well as supplying individual components. Equally important, all of this is backed with an international network of strategically-placed GE experts, technicians and facilities. The businesses which comprise GE's marine team, and the services each business provides are as follows:

— **GE Marine & Industrial Engines** (Evendale, Ohio) offers the LM series of aeroderivative gas turbines. These are highly

Maritime Reporter/Engineering News

efficient gas turbines which propel more than 375 vessels, from pleasure yachts and fast ferries, to frigates and destroyers for the U.S. Navy (and 23 foreign navies). The LM series ranges in power from 6,000 to 50,000 hp. Full operational availability in the world's LM-powered fleet averages more than 99 percent. In marine applications, LM gas turbines are available as base-mounted models or as a complete, packaged, shock-mounted propulsion system ready for shipboard use. Recent fast ferry programs which feature LM gas turbines are the Stena's HSS-class *Explorer*, the Aquastrada-class *Guizzo*, SEAJET 250 and Far East Hydrofoil's *Poicat*. The high-speed yacht *Destriero*, powered by three LM1600s, set the transatlantic crossing record in 1992.

Additionally, GE maintains a facility in Lynn, Mass., dedicated to the design, manufacture and testing of propulsion gears for the U.S. Navy and commercial ships. GE provides gearing for LNG tankers, including two being built by Fincantieri in Italy, slated for delivery in 1996 and 1997. GE gears are also used on the U.S. Navy's Arleigh Burke DDG-51 destroyers, and will be used on NASSCO-built Sealift vessels for the U.S. Navy.

GE Industrial Systems (Salem, Va.) manufactures electrical adjustable speed power converter equipment and associated motors, process controls and turbine controls. GE's adjustable speed drives and motors have been applied to main propulsion, thrusters, cargo pumps and azimuth drives, and range from 200 to 25,000 hp, for both DC and AC power propulsion systems. In addition, GE's Mark V turbine controllers are available for both steam and gas turbines. GE Industrial Systems' drives and propulsion motors can be found on dinner boat *Creole Queen* (DC thrusters), Canadian Coast Guard's Class-1200 icebreakers (AC propulsion), MSC fast sealift vessels (Mark V gas turbine controls), as well as on a variety of other workboats and oceanographic research vessels.

GE Power Systems (Schenectady, N.Y.) provides support for other activities which are crucial to optimizing customers' marine power systems. Services include marine systems application engineering and design using computer-aided engineering and design for electric propulsion systems and GE's advanced gas turbine combined-cycle propulsion systems. GE also offers system optimization, equipment selection and system layout.

GE Marine Systems (Hampton, Va.) offers two principal products: marine automation systems and marine power distribution systems. These products provide round-the-clock automatic monitoring and control over a ship's machinery plant that is tailored to meet owner and classification society requirements. GE

Marine Systems also provides project management, system engineering, integration engineering and installation/start-up engineering services to ensure GE systems meet all customer requirements.

GE marine automation systems are PLC-based systems which provide for fully automatic or remote manual control over a ship's main propulsion and auxiliary machinery. This type of system can accom-

modate a wide variety of inputs from sensors built into the ship's systems or embedded in machinery. GE works with shipbuilders and equipment suppliers to define what machinery is to be monitored and controlled, from what locations and under what modes of operation.

GE power distribution systems are designed and built to connect the ship's electrical generating

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NNS Lays Keel For First Of Nine Double Eagle Product Tankers



On April 22, Newport News Shipbuilding (NNS), a division of Tenneco, laid the keel for *Despotico*, the first of nine double-hulled commercial product tankers the shipyard is building for two different customers.

It is also the first commercial ship the company has built since 1957.

Despotico is the first of four tankers to be built for Eletson Holdings of Piraeus, Greece. The keel is made up of part of the inner bottom assembly of the ship.

It consists of the lower forward bulkhead of the engine room, the lower section of the pump room, sloptank, aft cargo tank, fresh water wash tankers and aft ballast tanks. The total weight of the unit is approximately 280 metric tons, and it is approximately 80 percent pre-outfitted. The ship is scheduled for delivery in January 1997.

In addition, NNS is building five Jones Act Double Eagle product tankers for Hvide/Van Ommeren.

During its 110-year history, Newport News Shipbuilding has built approximately 800 ships, including both commercial and naval vessels.

For more information on NNS
Circle 83 on Reader Service Card

Daewoo Completes Korea's First Autonomous Underwater Vehicle

Daewoo Heavy Industries Ltd.'s Shipbuilding division has completed production of Korea's first Autonomous Underwater Vehicle (AUV), which dives to a depth of 19,685 ft. (6,000 m). The division's Ship and Ocean R&D Institute (SORDI) completed the vessel in collaboration with the Institute for Marine Technology Problems (IMTP) of Russia, at a cost of \$2.5 million.

Shaped like a torpedo, the AUV, dubbed *Okpo*



Maritime Reporter/Engineering News

6000, is 12.5 ft. (3.8 m) long with a 2.3-ft. (.7-m) diameter. Propelled by four end thrusters, it travels at a speed of three knots. The vessel, which operates independently of its mothership, will be used for a number of purposes, including deepsea mine sourcing, search and survey for sunken vessels and scientific activities such as oceanographic data measurements.

Two monitoring PCs are connected to a variety of sensors, which control maneuvering, depth sensing, obstacles, conductivity, temperatures, communications and other facets of operations. The vessel carries out programmed missions by recording data in the hand memory board of its internal PC, using video cameras, still cameras and scanning sonars. This data is retrieved by the mothership upon return to the surface.

The propulsion system is composed of a silver-zinc battery, which provides 24 volts of energy to the four 75-watt motors. The battery reportedly activates the thrusters for an average period of 10 hours, without the need to recharge. Because the AUV dives to a depth of 6,000 m, where pressure is 600 Kg/cm, Daewoo has designed all structural, metallic and control components with special technology and materials. For example, the hull structure is made of special composite materials featuring high buoyancy. In addition, different section modules can be replaced for specific missions. Five acoustic ranging sonars analyze obstacles in front of the AUV and help to keep it at the programmed height from the sea bottom. The video and still cameras record images of the sea bottom, while two side-scan sonars scan the sea floor with a band width of 2,625 ft. (800 m). Daewoo has reportedly used the AUV on more than 30 occasions to record pictures and video films in order to map Okpo Bay.

With local development of the AUV, the world's 11th such vessel, Korea became the seventh nation to complete development, following the U.S., Canada, Japan, France, Russia and China.

For more information on
Daewoo Heavy Industries
Circle 2 on Reader Service Card

Council Member Speaks For Tanker Owners

The overall aims of Intertanko are to promote safety at sea and protect the marine environment while maintaining free competition in tanker shipping, unhindered by protectionist legislation. One of Intertanko's greatest concerns is to safeguard the tanker industry's structural integrity and ensure that tankers are being operated in accordance with internationally accepted rules and standards.

Intertanko's goal is to restore the maritime authorities' confidence in tanker owners by showing their

best endeavors to comply with international rules and regulations as enforced by flag states. But flag states must have a competent maritime authority to implement ships' safety standards based on IMO's codes, rules and regulations. Intertanko therefore welcomes IMO's efforts to set up criteria in order to ensure that maritime authorities implement administrations and ensure compliance with

international conventions. Port state control is seen as an effective means of policing the performance of flag states and classification societies, as well as an instrument for detecting substandard tankers. Intertanko follows and believes that initiatives like the U.S. Coast Guard Port State Inspection Targeting Scheme or the U.K. Targeting Scheme might eliminate ships who underperform on safety

standards by imposing severe prohibitive sanctions against them.

The preceding was excerpted from a précis of John R. Lean's speech, Cleaner Seas Program — The Need for an International Solution, given at the Maritime Technology Exhibition Conference. Mr. Lean is a council member of the International Association of Independent Tanker Owners (Intertanko).

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New Approach To Bunker Fuel Sampling

West Sussex-based Kittiwake Developments Ltd. has developed a new fuel oil bunker sampling system, featuring: stainless steel construction; full type approval from Lloyd's Register of Shipping; compliance with ISO 3170 international standards; ASTM D 4057 and

PSA recommendations; and a complementary range of cubitainer and sample bottle kits.

The sampler reportedly provides sufficient quantities of fuel in a single, five-liter disposable container, to provide for the vessel, bunker supplier, fuel analysis service and any fuel tests conducted onboard the vessel.

For more information on Kittiwake
Circle 3 on Reader Service Card

LR Consolidates Watch Rules

Lloyd's Register (LR) has announced new rules governing navigational arrangements for periodic one-person watch. The new notations, NAV and NAV1, which now form part of LR's Rules and Regulations for the Classification of Ships, replace the existing notations LNC (A) and LNC (AA).

The new rules were developed as a result of a three-year, EC-sponsored research project known as ATOMOS (Advanced Technology to Optimize Manpower Onboard Ships). The project's objective was to improve the competitiveness of the EC commercial fleet through the application of advanced technologies and their integration with suitable manning, optimum crew composite and operational strategies. LR's role in the project included responsibility for considering the integration of navigation, cargo handling and the control and monitoring of machinery for operation by one person from a centralized ship control station, under normal conditions.

For more information on Lloyd's Register
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USCG Rates Classification Societies

The U.S. Coast Guard (USCG) has created a new rating system to monitor the performance of the world's classification societies.

The initiative, launched at the request of the Senate Transportation Appropriations Subcommittee, is to focus on those organizations which may pose an increased risk to crew safety, the marine environment or U.S. ports.

Points were assigned to each performance grouping to be used in conjunction with the USCG's Boarding Priority Matrix. This matrix allows the USCG to calculate the risk of substandard conditions aboard a foreign vessel and assign inspection resources accordingly. The classification societies with the best performance were given zero points; those with exceedingly low performance were given five points. In addition, classification societies not demonstrating compliance with IMO Resolution A.739(18) automatically received five points. The 1996 rankings from the USCG are as follows:

Classification Society Ratings

Assigned Zero (0) Points

American Bureau of Shipping (ABS)
Det Norske Veritas (DNV)
Lloyd's Register (LR)
Nippon Kaiji Kakai (NKK)

Assigned One (1) Point

Bureau Veritas (BV)
China Classification Society (CCS)
Germanischer Lloyd (GL)
Korean Register of Shipping (KR)
Registro Italiano Navale (RINA)

Assigned Three (3) Points

Polski Rejestr Statkow (PRS)
Russian Register of Shipping (RS)

Assigned Five (5) Points

Indian Register of Shipping (IRS)
Hellenic Register of Shipping (HR)

*All other classification societies received five points.

Ugland & Totem Merge Ship Management Operations

Ugland International Holdings plc (UIH), a shipowner and operator with related ship management and repair activities, announced that UIH and its ship management partner, the U.S.-based Totem Resources Corporation (TRC), have formed a single ship management group under Interocean Management Ltd. and the entire 18-vessel fleet associated with the **Andreas Ugland** family.

The new structure supersedes the strategic alliance established 12 months ago between UIH and TRC, a Seattle-based liner operator and owner of some of the largest tug and barge groups in the U.S.

Interocean Ugland Management Corporation will remain jointly owned by UIH and TRC, with a wholly-owned subsidiary formed called Interocean Ugland Management A/S in Grimstad, Norway, headed up by Admiral **J.W. "Bill" Kime**, previously head of the U.S. Coast Guard. Admiral **Kime** also continues as executive chairman of the enlarged ship management group.

The newly enlarged group will manage a fleet of at least 43 vessels including 18 tankers, 12 car carriers and RoRo vessels, and eight vessels for the U.S. Maritime Administration.

Kvaerner To Deliver Second Of Four LNG Carriers

The second of four Liquefied Natural Gas (LNG) carriers for Abu Dhabi National Oil Company (ADNOC), United Arab Emirates, was named *Mraweh* at Kvaerner Masa Yards' Turku New Shipyard, Turku, Finland on April 27, 1996.

The naming ceremony, which was attended by some 200 guests, was hosted by **Martin Saarikangas**, president and CEO of Kvaerner Masa-Yards, Inc. Present at the ceremony were ambassadorial and executive figures from the countries and companies involved — including officials from Tokyo Electric Power Company, which receives LNG deliveries from *Mraweh's* older sister, *Mubaraz*.

The 135,000-cu.-m. *Mraweh*, one of the largest LNG carriers in the world, was scheduled to be delivered to her owners shortly after the naming ceremony, to be followed by two sisterships in 1997. The order for the four carriers was placed in April 1993.

The first of the series, *Mubaraz*, was delivered in January, and has since been engaged in transporting LNG from Abu Dhabi Gas Liquefaction Company to Tokyo Electric Power Company in Japan, under the operation of the National Gas Shipping Company.

The LNG cargo container system

is based on the Kvaerner Moss-type spherical aluminum tank design.

Differing from other 135,000-cu.-m. vessels built, the Kvaerner LNG carriers have only four spherical aluminum cargo tanks, which Kvaerner believes simplifies cargo systems and operations.

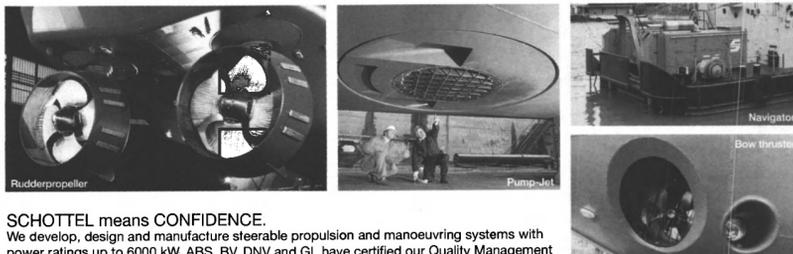
For more information on Kvaerner
Circle 89 on Reader Service Card

Newbuild Barge For Moran Begun At Trinity Yard

Moran Towing Corporation announced that a 247-ton inner bottom module for its newest dry bulk barge had been placed on the building ways at the Moss Point Marine shipyard in Moss Point, Miss., a yard of the Trinity Marine

Group. According to **David A. Beardsley**, vice president, Construction and Repair at Moran Services Corporation, the new barge will be a sister to barges *Somerset*, built in 1990, and *Bridgeport*, built in 1986. The new barge, whose principal dimensions are 418.5 ft. (126.6 m) in length overall, with a 75-ft. (22.8-m) beam and 29-ft. (8.8-m) depth, will have a cargo capacity of 14,672 short

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tons at an ocean draft of 20.4 ft. (6.2 m).

The newbuilding, as yet unnamed, will feature a single unobstructed cargo hold, measuring 296 x 55 ft. (90.2 x 16.7 m)—a feature that has contributed to the ease and speed of cargo loading and discharge on her sister barges, and thus to their popularity among customers.

The new barge was engineered

and designed by Gretna Machine and Iron Works, Inc., which, like Moss Point Marine, is a subsidiary of the Trinity Marine Group. Hatch covers will be provided by MacGregor (USA), Inc., and the hatch crane by Marine Travelift, Inc. Deck machinery is from NETEC, Inc.

When completed in October of this year, this new building will augment Moran's dry bulk fleet,

consisting of the barges *Bridgeport, Somerset, Virginia* and *Maryland*. Subsidiaries of Moran Towing Corporation operate a fleet of 54 tugs and 13 barges that provide tugboat assistance at major U.S. ports, as well as barge transportation services and worldwide ocean towing.

For more information on Trinity
Circle 85 on Reader Service Card

Sperry Integrated Bridge Chosen For Hibernia Project Shuttle Tankers

Shipowners MCM (Mobil Oil Canada, Chevron Canada Resources and Murphy Oil) and Atlantic Shuttle I (Pennecon/Ugland) have chosen the Sperry Marine Inc. Vision 2100 Integrated Bridge for the 127,000-dwt shuttle tankers to be used on the Hibernia project. The two ships are being constructed at Samsung Heavy Industries in Korea. These shuttle tankers will operate on the Hibernia Oil Field and on the East coast of Canada and the U.S.

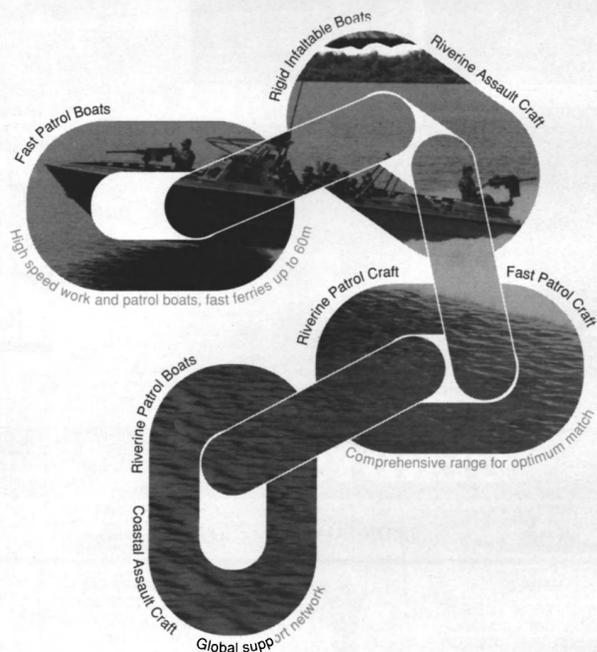
"We are especially proud to have won this project, as this firmly establishes Sperry's leadership position in ship integration systems," said J. Nolasco da Cunha, Sperry vice president for Sales and Service.

For more information on Sperry Marine
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CWF 0943

Inmarsat Launches First Third-Generation Satellite

The first Inmarsat-3 satellite, claimed by Inmarsat to be the world's most advanced commercial mobile communications spacecraft, was launched from Cape Canaveral, Fla., on the evening of April 3, 1996, aboard a Lockheed Martin Atlas IIA. This was the third launch attempt. The first two were delayed due to adverse weather. Inmarsat's third generation, which will eventually comprise five satellites, will expand the availability and usefulness of global mobile satellite communications by making lower cost communications services possible operating with even smaller, more economical mobile and transportable terminals.

For more information on Inmarsat
Circle 91 on Reader Service Card

AMSC Reports Successful AMSC-1 Satellite Tests

American Mobile Satellite Corporation (AMSC) announced positive results from tests of the reconfigured CONUS spotbeams on its AMSC-1 mobile communications satellite.

AMSC performed testing of the spotbeams throughout the U.S., with particular focus on their performance at the edge of the satellite's coverage area. The tests verified that the power levels and service capabilities were unaffected by the reconfiguration of the spotbeams to correct power fluctuations experienced in the Eastern spotbeam. "We are quite pleased, but not surprised, at the test results," said Brian Pemberton, president and CEO of AMSC.

For more information on AMSC
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Maritime Reporter/Engineering News

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GL-Led Exhaust Consortium Faces Engine Development Challenges

The reduction of fuel consumption and the improvement of reliability is a major focus of engine development, which involves studying methods of reducing carbon dioxide engine emissions. However, international regulations that limit pollutant emissions — particularly nitrogen

oxides — are beginning to influence the design of engines. Diesel development will now increasingly focus on reducing pollutants. And, diesel engine manufacturers will only be able to retain market-shares if innovative, emission-controlling technologies are developed, and speedily transformed

into products ready for the maritime market. As presented in *MR/EN's* May 1996 issue, Germanischer Lloyd (GL) has assumed overall project management of a three-year, industry wide research program — known as CLEAN, or Clean and Low soot Engine with Advanced techniques

for NOx reduction — in an effort to reduce marine diesel exhaust gas emissions. Thirteen leading German diesel manufacturers, universities and research institutions are involved in the project, which will explore ways to improve the competitiveness of engines in the future by increasing efficiency and ensuring environmental compliance. As the foundation for future engine and catalytic-reactor designs in the CLEAN project, theoretical and experimental basis research, developments on a lab and test-bench scale, as well as test series on engine test beds are being conducted, with a distribution of tasks among the project partners. At a later stage, investigative sea trials on a ferry ship will be executed in order to determine if and under what conditions electronically-controlled injection systems and catalytic reactors can be implemented for after-treatment of exhaust gas during normal operations at sea. The combination of designing engines that emit less nitrogen oxides, and improving after-treatment technology of exhaust gas should result in a significant reduction in exhaust levels.

The combination of designing engines that emit less nitrogen oxides, and improving after-treatment technology of exhaust gas should result in a significant reduction in exhaust levels.

It has been estimated by GL that about 98 percent of ships in the world fleet are equipped with diesel engines as their main means of propulsion, and the joint project is therefore centering its concentration on the propulsion plant. Research is being based on the idea that fuel quality and motor-internal measures influence the combustion process and therefore the emissions. One major challenge of the project will be to overcome the "diesel dilemma," or the counteractive relationship between optimization of the design for fuel consumption and for NOx. A possible solution may lie in the use of SCR exhaust-gas scrubbers and/or particle/soot separators — a concept which will be examined during the scope of CLEAN. By the end of this decade at the very latest, the emission limits of marine diesels will have become a decisive criterion in competition, and will enjoy priority over optimum efficiencies. It is also clear that sea transport must be included in the efforts to counteract environmental pollution, as mandated by IMO's MARPOL and SOLAS Conventions.

For more information on the CLEAN consortium
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P&O Looks For A Containership Kure

By Alan Thorpe, international editor

The P&O Containers' newbuilding saga continues with the company currently denying rumors that IHI's Kure shipyard has emerged as its favorite for the contract involving two ships of approximately 6,000+ TEU each. No news has emerged from the owner as to how many ships the order will finally comprise; but many believe it will be for as many as six ships. This will no doubt revive the race for the largest containerships, as illustrated by recent orders being confirmed at much higher capacities than originally ordered. For example, Hyundai Merchant Marine (HMM) increased the capacity of its ships from 5,046 to 5,551 TEU during the building project; and AP Moller increased its capacity from 4,800 to 6,000 TEU during the same period. Meanwhile, Dutch boxship operator Nedlloyd has completed a two-ship deal with Mitsubishi Heavy Industries (MHI) involving a design of 4,850-TEU containerships.

Japan's yearly figures reveal that 398 vessels were ordered from overseas owners during FY '95 on March 31, although only four tankers of VLCC size were among



these international orders, compared with 11 the previous year. The largest category was bulkers, with some 186 being ordered. However, these figures do not take into consideration domestic orders.

Norway's Statoil, the country's state-owned oil company, is rumored to be looking to increase its order for 100,000-dwt shuttle tankers from two to three ships. Two \$100-million units have already been confirmed at South Korea's Samsung Heavy Industries (SHI). Another tanker owner reportedly looking to increase its order is Cyprus-based Klaus

Oldendorff, which has exercised an option for a third 105,000-dwt tanker from Halla Engineering & Heavy Industries (HEHI), with the first two ships ordered this January.

Another South Korean shipyard busy on the export market is Hanjin Heavy Industries Co. (HHIC), which has won a \$180-million order from Germany's Hansa Treuhand for two 1,600-TEU containerships, with an option for another four sisterships.

What is thought to be an order for the largest bulk carriers currently on the world's shipbuilding orderbook is set to be placed with South Korea's Daewoo Heavy Industries (DHI), with Germany's Krupp looking for two 320,000-dwt ore carriers.

The Chinese shipbuilding industry took another step forward in April with an order from Canada's CSL group for a 71,000-dwt, self-unloading bulk carrier. Meanwhile, China's Qui Xin shipyard has increased its international orderbook with an 8,000-dwt tanker from Norway's Stenersen, which will be chartered to Norske Hydro. This

shipyard is currently building four coastal tankers for P&O Tankships. Another Chinese yard doing well on the international market is Jinling Shipyard, which has won an \$85-million order from Singapore's Steamers Maritime, part of the Keppel group, for a series of six small container feeder ships.

On the Far East conversion market, the latest contract has been won by Singapore's Sembawang Shipyard, which has been awarded a \$20-million conversion contract to convert 136,960-dwt tanker *Tantawan Explorer* (ex-Bayern) into an FPSO. Owned by Single Buoy Moorings (SBM), Monte Carlo, work on *Tantawan* will involve the installation of an IMODCO-designed, single point mooring turret (SPT) system, which will allow the vessel to weathervane freely in order to take up the position of least resistance to winds. Both upper and lower collars and columns will be installed for turret integration. The process decks also call for installation of process modules and facilities.

A substantial amount of steelwork — around 1,200 tons — will be carried out in the installation of a helideck, process deck support structures, equipment supports and tandem offloading station. In compliance with international safety standards and regulations, the fire fighting system and life-saving equipment will be upgraded, including fire and gas detection systems. Additionally, modification and upgrades will be carried



A rig conversion at FELS



VLCC repair at Malaysia Shipyard & Engineering

Far East Update

out on existing utilities systems, as well as the conversion of the main boiler to dual fuel firing. More than 30-km of pipework will be installed, and upgrading and refurbishment of accommodation areas, including the galley and laundry equipment for the 70-worker crew, will also be performed. When completed, the 1976-built unit will be stationed at the Tantau gas and oil field, located 265 miles south of Bangkok in Thailand.

Also in Singapore, Far East Levingston Shipbuilding Ltd. (FELS) has sold multi-purpose, semi-submersible vessel *Polyportia* to Sonat Offshore Drilling Inc. for \$40 million. The deal includes hull modifications to ensure proper ballast and displacement during ultra deepwater drilling operations. After hull modifications and delivery, which is expected in mid-October of this year, the vessel will be towed to the U.S. Gulf coast where it will undergo the remaining conversion work to a drilling mode. FELS' wholly-owned Texas-based subsidiary, AMFELS, will be bidding for the conversion work. In August 1995, FELS — another member of the Keppel Group — purchased *Polyportia* from Norway's Rasmussen Offshore for \$22.5 million.

The Far East repair industry picked up during the first few months of this year. Hongkong United Dockyard's (HUD) new large United floating dock, which began operation in 1995, has experienced an occupancy level of 85 percent during its first full year in service. The facility was built in 1995 by Far East Levingston, Singapore.

HUD, part of the Swire Group, has also announced the retirement of **Glynn Gough** as managing director, effective May 1. Mr. **Gough's** replacement is **Chris Pooley**, managing director of Hongkong Towage & Salvage, also part of the Swire Group. Swire's holds a 50 percent stake in both companies, which, also effective May 1, will be headquartered at HUD's Tsing Yi Island base. **Chris Pooley** will retain his position as managing director of both companies.

Malaysia Shipyard & Engineering's (MSE) Pasir Gudang has started the year with repairs on a large number of VLCCs. So far this year, MSE has completed repairs on VLCCs of approximately 1.1 million dwt, compared with 23 VLCCs of approximately 5.4 million dwt repaired last year. In 1995, Japanese shipowners stemmed 11 vessels with the yard, including six VLCCs contributing 1.66 million dwt (45 percent of the total dwt). These companies included Mitsui OSK Lines (MOL), Idemitsu Tanker Co., NYK and Koyo Kaiun Co.

The official opening of Singapore Technologies Shipbuilding &

Engineering Ltd. (STSE) was scheduled for May 18. The new Taus Yard will be declared open by RADM. **Teo Chee Hean**, the Singaporean minister for Environment and second minister for Defense. The yard was recently busy with more than 10 ships

undergoing repairs.

One of Singapore's darkest incidents is about to be put to rest: U.S. oil major Exxon will allow Keppel Shipyard to start bidding for drydocking contracts after almost nine months of receiving no opportunity to win repair contract

from the company. Keppel will reportedly be allowed to bid for the next scheduled drydocking, which involves the 307,235-dwt Bahamas-registered ULCC *Geneva*, due for repair this month.

(Continued on page 27)



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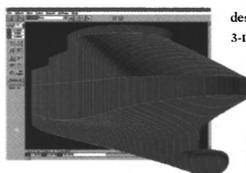
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EUROPEAN UPDATE

Polarlys



A vital passenger vessel link with cruise ship qualities

by Carol Fulford and Andy Smith, contributing editors

The latest delivery from Ulstein in Norway is not only a spectacular successor to the two previous vessels to carry the name *Polarlys*, it also maintains the Hurtigruten (or Coastal Express) combined passenger and freight service which began plying the Norwegian west coast ports over a century ago. Originally conceived as a ready means of transportation for the inhabitants and industries of remote coastal communities, the service is now dependent on tourist passengers — passengers out to see what has been dubbed the world's most beautiful sea voyage.

The \$75-million contract to build *Polarlys* was secured in May 1994 by Ulstein Verft from owner Troms Fylkes Dampskibsselskap (TFDS). Although not new to passenger vessels, *Polarlys* is — at 404 ft. (123 m) long and 64 ft. (19.5 m) wide — the largest ship ever to be built by Ulstein. Ulstein Verft's Hatloy drydock was used for the construction, leaving the building berth free at Ulsteinvik for supply vessel construction.

High on the list of design requirements were safety, economical operation and attractive appearance. Present and anticipated stability and safety regulations, as well as constraints imposed by the limited depth and quay length at several of the smaller ports on the vessel's route, had to be met. Both owner and builder were able to use their knowledge and experience in these areas; Ulstein from a long history of producing specialized vessels and TFDS from operating this coastal ferry service for many years. The vessel's roundtrips between

Bergen and Kirkenes are scheduled to take 11 days, during which time the ship will make 66 ports of call. Apart from passengers and cars, the Hurtigruten vessels carry freight, much of it refrigerated.

Ulstein's ability to build such an outfit-oriented vessel, in parallel with its mainstay activity of offshore and specialist vessel construction, has been achieved by extensive use of subcontractors, and by use of its drydock. When the ship was floated out in early December last year, it was 85 percent complete. All cabins, piping and principal machinery items — including main engines and deck machinery — were in place, and most of the major systems had been tested.

The eight-deck ship is built mainly from steel. The hull shape — which incorporates a bulbous bow and is optimized for a 15 to 17.5-knot service speed — was based on results from a model test program carried out by Marintek in Trondheim. To counteract rolling, active fin stabilizers by Brown Brothers were fitted.

Forward of the engine room bulkhead, the first deck provides the crew accommodations with single and twin-berth cabins, mess, self-service cafeteria, changing rooms and laundry. The engine room features a father and son main machinery arrangement, enabling the vessel to operate economically over four different speed ranges. The ship employs four Ulstein Bergen nine-cylinder diesel engines for supplying its electrical load, as well as propulsion power. Each of the two shaftlines has one BRM9 engine producing 3,970 kW at 750 rpm,

and one smaller 1,661-kW KRG9 engine clutchable to a Volda twin-input, single-output, two-speed gearbox. Both of the larger engines have a 1,600-kW Leroy Somer generator coupled at the free end, and installed forward of the gearbox. The smaller "K" engines, each with a 1,550-kW generator, are positioned aft. Output from each gearbox drives a CP propeller with four skewed blades.

At the highest speeds, the "B" engine turns its propeller at 146 to 162 rpm, while one of the smaller "K" units is run separately to supplement electrical power. The vessel's normal cruising speed of 15.5 to 17.5 knots is achieved at propeller speeds of 125 to 139 rpm, with the ship's electrical load also being supplied by the two larger engines. Both "K" units can be used for propulsion to achieve speeds up to 13 knots.

Maneuvering is assisted by high-lift rudders, twin 790-kW tunnel bowthrusters and an aft thruster. The aft thruster is an Ulstein 830-kW azimuthing unit mounted at the extreme stern, aft of the rudders. It may be swung up into a recess in the hull when not being used. It can act as a loitering drive for very quiet, low-speed cruising, and can also be used in combination with the bowthrusters when maneuvering to generate a total side thrust of around 60 tons and a sideways speed of 3 knots.

On deck two, there is space for accommodating 50 vehicles aft. Cars are parked around the centerline casing, having been transferred down in the MacGregor car lift from the loading station on the port side. At the extreme stern are technical stores, a CO₂ room and a

EUROPEAN UPDATE

Polarlys

compartment for the stern thruster. Ahead of the car deck are two and three-berth passenger cabins, officers' cabins, hospital, trim room, stores and the ship's prison.

Deck three is mainly devoted to passenger cabins, most of which have an outside view. All cabins were supplied on a turnkey basis as fully fabricated units, and delivered three at a time by truck under a just-in-time strategy. The units were lifted directly onboard the vessel and skidded into position. Service facilities such as stores and air-conditioning rooms are located along the centerline.

The main outside promenade is narrowed to accommodate four Harding totally enclosed lifeboats and two PP Jet-powered MOB (man overboard) boats from UFAS.

An enclosed wheelhouse features a cockpit style navigating position behind a sophisticated array of up-to-date equipment, which was delivered as a complete Kongsberg Norcontrol BridgeLine 2020 integrated navigation system with ergonomic consoles suited for efficient bridge operation. The system incorporates both X and S-band radars, ARPA and ECDIS with two 29-in. color monitors and additional monitors in the bridge wings. TFDS always has two deck officers (from a complement of captain, chief officer and two first officers) on watch.

Stability requirements for passenger vessels are changing as a result of several serious accidents worldwide, and *Polarlys* has been designed to meet all existing rules and anticipated future regulations.

For example, DNV carried out calculations on the new probabilistic A265 system to ensure that the vessel can satisfy the equivalent safety level of two-compartment damage stability, while the vehicle deck has a special flexible bulkhead subdivision to reduce the length of the floodable spaces. The vessel complies with strict new fire safety rules as well.

With a gross tonnage of 11,340 tons, *Polarlys* has 480 passenger berths. An additional 257 day passengers may be carried.

Some 120 steel sections were prefabricated and then combined for erection in the dock as 40 large blocks, the largest weighing 130 tons. Each block was extensively outfitted prior to erection, speeding the production process and reducing the outfit time after hull completion. Approximately 60 percent of the outfit was completed before the blocks were erected.

Whale watching in the Azores by inflatable

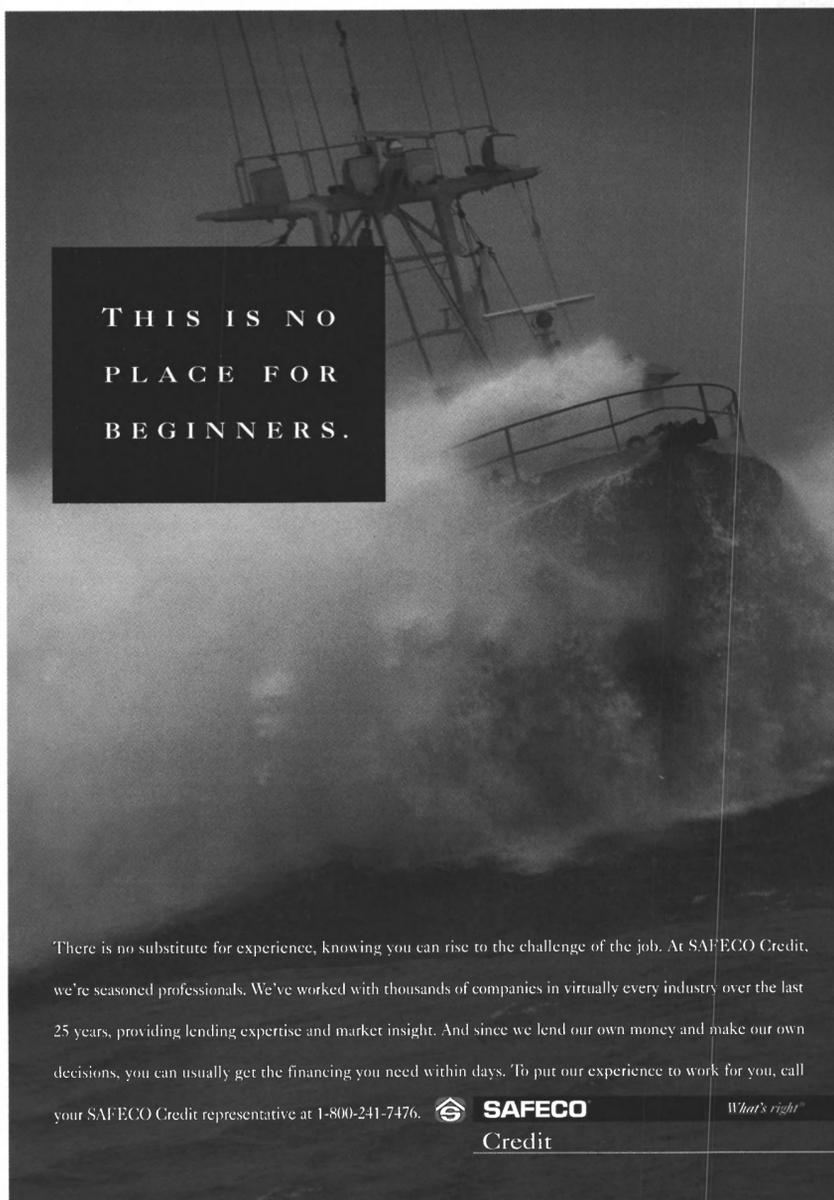
Bill Herbert, Wendy Thompson and Jose Henrique Azevedo have formed a Portuguese company to take interested groups on whale and dolphin watching trips off the island of Faial in the Azores. All three directors recently came to the U.K. to try out the water-jet-propelled rigid inflatable they had ordered from Delta Power Services, and to learn more about fast craft handling from the experts at Lowestoft Maritime College.

The 27.6-ft. (8.4-m) craft, to be named *Neptuno*, has a maximum beam of 9.8 ft. (3 m),

including the two 1.75-ft. (534-mm) diameter inflatable sponsons. Located just aft of amidship, under a hinged cover, is a flexibly mounted Caterpillar 3126TA marine diesel capable of delivering 370-hp at 2,600 rpm, coupled to a Hamilton 291 waterjet via a Twin Disc MG 507A-1 down angle gearbox and vibration-reducing, Centa-flex coupling.

The steering and instrumentation console is located directly aft of the engine and the helmsman's backrest is mounted on another fiberglass molding, square in plan, which houses

(continued on the next page)



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What's right

Ferry designs benefit from military experience

France's Leroux & Lotz has gained a distinguished reputation in the military sector, most notably in the field of offshore patrol boats. Its latest range of standard designs spanning 115 to 275 ft. (35 to 84 m) is proving particularly successful, as illustrated by recent deliveries to the navies of Morocco, France and Mauritania (see December 1995 *MR/EN*). Proven experience in fast aluminum monohull construction — coupled with a changed political climate — has induced the company to evaluate its prospects in the growing fast ferry market.

The Leroux & Lotz Corsaire range of ferries currently consists of designs designated by models 6000, 7000, 11000 and 13000, a line-up ranging in size from 217 to 450-ft. (66 to 137-m) long. To date, only a 6000 has been built and is operational, and an 11000 has just recently completed sea trials. Another 11000 is being built at the channel port of St. Malo. A 4000/5000 series of passenger-only vessels at around 165 ft. (50 m) is also planned.

French Mediterranean operator SNCM has shown faith in the Corsaire range, placing orders for an 11000 model for operation on a route linking the Port of Nice with Calvi on the French island Corsica.

Both ships will operate at a service speed of 36 to 37 knots, carrying 576 passengers with either 148 cars or a combination of 106 cars and four coaches. The journey will reportedly take approximately two and a half hours.

To achieve this level of performance, the first vessel, *Asco*, has four MTU 20V 1163 TB 73L marine diesels, with a total output of 24,000 kW, driving four KaMeWa waterjets. The second vessel, as yet unnamed, will have slightly more power, at 26,000 kW.

In preparation for tumultuous sea conditions often encountered on this route, a unique computerized stabilization system has been developed which incorporates a combination of P-foils, fins and transom flaps. Extensive tests carried out on active models at both Bassin d'Essais des Carenes in Paris and Washington's DTRC have, according to Leroux & Lotz, predicted a high level of ride comfort for the vessels with an MSI criteria of less than five percent in sea state 5 for three hours of exposure in head seas at 35 knots. The standard 11000 layout allows for a conventional RoRo operation through a bow door which swings vertically with vehicles on two decks. An additional version has also been

(continued top of next page)

special hydrophonic whale listening equipment.

During trials, the vessel achieved its design speed of 40 knots with three persons onboard for special filming and photography sessions. But for group excursions, the craft will carry 18 people at 23 knots.

According to Hamilton U.K.'s David Eaton, these widely differing characteristics required extreme care in the choice of impeller. The Twin Disc marine gear selected has a ratio of 0.92:1, thus increasing the maximum jet impeller speed to 2,826 rpm which, claimed Mr. Eaton, assisted in obtaining the best results.

Mr. Herbert explained that Delta was approached to design the vessel in accordance with established ideas, based on his own whale and dolphin watching experience. "The RIB is simply the best boat to enable us to successfully conduct our project, and the use of a waterjet minimizes waterborne noise pollution. Dolphins and whales live in a world of sound, so we are trying to alleviate the impact of our presence in their world when in close contact," he said. The three owners, who call their company Baleia A Vista — Actividades Turísticas Recreativas Lda. — said that the vessel performs above their expectations.

Cross-Channel battle escalates

Although still operating at a substantial loss, the tunnel linking England and France is grabbing an increasing share of the cross-channel traffic and forcing ferry companies to adopt bolder marketing initiatives. Faster vessels are being planned and land-based operations streamlined to match the advantages currently offered by the "channel." Although many observers believe that rationalization of ferry capacity is urgently required, either through merger or agreement, a third ferry company has joined the big two — P&O and Stena — on the popular short Dover-Calais route, with extensively refurbished vessels.

The new enterprise is the result of the end of the pooling arrangement between France's leading operator SNAI and Stena Sealink. Dubbed SeaFrance, the company has brought existing vessels into service under the new names *SeaFrance Cezanne* and *SeaFrance Renoir*, following major refits at the SNACH yard in Le Havre, which cost a total of \$6 million. The majority of the modification work was carried out on *SeaFrance Renoir* (formerly *Cote d'Azur*), where a complete new mezzanine deck was added to the aft bar, the duty-free shop rebuilt and increased in size by 30 percent and the forward bar extended.

The declared aim of SeaFrance is to attract British customers to

the traditional French atmosphere. Managing director Robin Wilkins believes strongly that the British who visit mainland Europe are attracted to continental offerings including the wine, food, fashion and style.

"SeaFrance passengers will not have to travel to Calais to enjoy France — it greets them from the moment they step on board," he added.

A more innovative experiment in increasing customer appeal, as yet only installed aboard *SeaFrance Cezanne*, is an area developed by London's acclaimed Science Museum. Comprising interactive galleries which are designed to provide younger passengers with an exciting and stimulating experience of science and technology, the floating science museum is intended to be both educational and fun.

Employing these two vessels, SeaFrance is offering 14 departures per day and with a third freight ship, is capable of a combined daily capacity of 34,000 passengers, 8,300 cars and 2,400 trucks. Its announced goal is to capture 12 percent of the market — or around 2.7 million passengers.

ISU announces pollution survey results in London

The International Salvage Union (ISU) chose the grandiose setting of the U.K. Institute of Directors on London's Pall Mall to announce the results of its annual pollution prevention survey.

MR/EN was on hand to hear ISU President Arnold Witte outline the main findings of the report. He was assisted in answering a large number of probing questions by Legal Advisor Archie Bishop and Special Advisor, Michael Lacey.

Mr. Witte, who claims that ISU represents more than 90 percent of the salvage companies of consequence throughout the world, drew attention to the fact that members had responded to 141 vessels in need during 1995, 21 of which were tankers. Seven of these fell into the VLCC or ULCC category.

"The total oil cargoes involved amounted to 1,977,800 tons of crude oil. But for the intervention of salvors, a significant proportion of this oil would have polluted the ocean," he affirmed. "Ships' bunkers also pose a pollution threat and ISU salvors assisted vessels carrying a total of 54,123 tons of fuel. Some vessels had as much as 3,500 tons of bunker fuel on board," said Mr. Witte.

Twenty-one ship-to-ship transfer operations were reportedly

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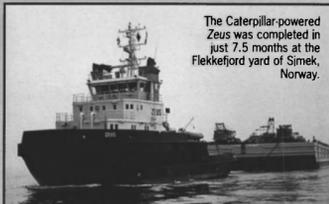
Dutch lease Finnish tug

Dutch towage and salvage specialist Ton Kooren International (KOTUG) has leased *Zeus*, one of Europe's most powerful fire-fighting, anchor-handling tugs for operation in the southern North Sea area. The vessel was completed in December after a build-time of just 7.5 months at the Flekkefjord yard of Simek, Norway, for Finnish operator Alfons Hakans of Turku.

Designed by cooperative agreement involving the yard, Alfons Hakans and Polarkonsult AS of Harstad, *Zeus* is DNV-classed +1A1 with ice class 1A Super and FIFI 1 notations.

Measuring 147.9 ft. x 45.9-ft. (45.1 m x 14-m) with maximum draft of 22 ft. (6.7 m), she has a maximum bollard pull of 110 tons. For anchor handling and towing, *Zeus* is equipped with a low pressure Ulstein Brattvaag E12A-BJB 1P 1MB hydraulic winch with two separate compartments on one drum, and a Mampaey disc-type towing hook with 100-ton SWL with local and remote release. Deck equipment includes an Effer 4400-5S 44-ton/m crane, two Brattvaag anchor winches and two, two-ton Speckanchor anchors with chains.

Accommodation is provided for a maximum of 10 officers and crew with seven single cabins, one double and one cabin with four bunks. The master's cabin and dayroom are located on the fore-castle deck along with the galley, mess and crew dayroom. Deck



The Caterpillar-powered *Zeus* was completed in just 7.5 months at the Flekkefjord yard of Simek, Norway.

four is dedicated to operations with a command center, store room and conference/day room.

The twin berth cabin can be converted for hospital use if needed, and all single cabins have private toilet and shower facilities.

The bridge deck on level five reportedly benefits from good high rise visibility and a comprehensive package of navigation and communications equipment. Radios, modem, telex, telephone and fax are all from Sailor and Navtex by Furuno. The hub of the navigation kit is a Racal Decca Bridgemaster CB 251/6 with Decca ARPA and Phillips DGPS Navigator.

A Sailor chartplotter, Robertson gyrocompass, gyro repeater

and AP9 Mk II autopilot, and Furuno FCV 581 echosounder are also incorporated.

Zeus is powered by a single-screw propulsion system driven by Caterpillar engines and augmented by side thrusters. The twin 3608 type engines offer a total of 7,370 bhp at 5,420 kW, for a maximum speed of 16 knots and cruising speed of 13 knots. They are coupled to a Volda twin-input, single-output gearbox driving an Ulstein 4200-mm diameter CP propeller. An Ulstein bowthruster and stern thruster offer enhanced maneuverability.

Survivor recovery and rescue equipment center around a davit launched 13-ft. (4-m) fast rescue boat of DSB type. Two powerful searchlights are mounted atop the wheelhouse, along with two Kvaerner EF 211E fire monitors.

Controlled from the bridge, each monitor has a throw height of 164-ft. (50-m), length of 393.6-ft. (120-m) and capacity for 2,900-sq.-m/hr of foam. The monitors are driven by two Kvaerner fire pumps, powered by the main engines via a Kumera/Norgear step-up gearbox.

The vessel is currently stationed at the Dutch port of Den Helder and has already undertaken several towage tasks, including transfer of the 300 x 100-ft. (91.4 x 30.4-m) barge *AMT Explorer* from Tilbury to Ijmuiden.

developed, at the request of certain operators on routes subject to seasonal variations, with reinforced access ramps and a main vehicle deck to accommodate trailers with a 13-ton axle load. The company is also investigating the use of gas turbine propulsion for customers looking for operational speeds in excess of 40 knots, and CODAG systems involving a central turbine-driven waterjet with wing diesel/jet arrangements. The largest design in the Corsaire family is the 13000, measuring 450 ft. (137 m) and featuring a steel hull and aluminum superstructure. This vessel is designed to be capable of transporting 1,000 passengers, 290 cars and six coaches. Vehicles will be accommodated on three decks, with passenger seating restricted to a single deck in three separate lounges. The fore part of the ship is of unique design, featuring two symmetrical bow visors and a watertight door located well aft of the forward ramps. Access at the stern will be by four ramps to speed up loading, with both port and starboard entry to each of the two car decks. A CODAG propulsion system comprising two 23-MW General Electric LM 2500 gas turbines and two 6-MW diesel engines is specified to provide operational speeds of approximately 42 knots.

While a natural market extension of its naval vessel expertise, the move by Leroux & Lotz into fast ferries has not exactly been smooth and trouble free.

The Corsaire 6000 for Emeraude Lines — built in 1994 to carry 400 passengers and 42 cars at 30 knots — was only used on the St. Malo-Channel Islands route for four months. Teething troubles caused a degree of unreliability, and a first set of modifications were carried out. Following completion of this work, sea trials apparently failed to convince Emeraude that the vessel would perform as needed, and the company declined to take the vessel back.

More extensive alterations have been made by the builder, and while specific details were not yet available, the company reported: "The ship was completely re-engined during the last quarter of 1995 with four new engines, and performed extremely well in extensive trials. Adverse weather conditions encountered during these trials were again the occasion to demonstrate the high level of performance and comfort of the ship. The vessel is currently on her way to a new owner in Tahiti where she will enter service on the Papeete to Moorea route."

Shortly after announcing its decision regarding the Corsaire 6000, Emeraude ordered a 197-ft. (60-m) JumboCat 50 from Kvaerner, specifying a 430-passenger/52-car payload with a full load operational speed of 33 knots.

In spite of these initial difficulties, Leroux & Lotz persevered with its research and development program. Model testing of the 11000 and experience gained with the first 6000 have led to a more

cost-effective Corsaire 7000 design. Differing from the earlier version by the addition of 20 ft. (6 m) in length and a raised wheelhouse, the vessel will reportedly be able to transport 450 passengers and 50 cars at a service speed of 32 knots. The 7000 features a similar, unusual, propulsion configuration, compared with the original 6000, comprising four Paxman-type 12VP185 diesels driving three waterjets.



Leroux & Lotz's entrance into the growing fast ferry market has not been all smooth sailing, but its Corsaire class of monohulls is reported to provide a smooth ride via a unique stabilization system.

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German operator Deutsche Seereederei Touristik will use the Kvaerner Masa-built *Aida* in its attempt to attract young, affluent travelers to its "club ship" concept.

German Operator promotes the "club ship" concept to woo young, affluent travelers

With the cruising boom tempting many Europeans to set sail on their annual vacation, operators are keen to ensure that every possible market gap is filled with the ideal vessel offering the perfect cruise. Therefore, German operator Deutsche Seereederei Touristik (DST) has made one of the boldest

moves to date by launching its "club ship" concept — cruises aimed at the affluent younger person.

An informal atmosphere was demanded by DST for its first ship, *Aida*, with emphasis on renouncing conservative elegance and promoting fun and activity. The vessel, now launched at Kvaerner Masa's Turku New Shipyard in Finland, is not designed without flair, but spurns ideas such as maintaining traditional central feature, in favor of devoting all possible space to a free flow layout. Passengers will need to explore all public spaces in order to gain access to their chosen facilities.

At 634 x 105.6-ft. (193.3 x 32.2-m) with a design draft of 19.6 ft. (6 m), *Aida* is powered by four MAN 6L48/60 diesel engines with total output of 21,720 kW, driving twin KaMeWa CP propellers via MAAG reduction gears.

Auxiliary power is provided by three Wartsila Vasa 8R32D engines with outputs of 3 x 3,500-kVA (AE driven) and 2 x 4,500-kVA (PTO driven). The package is enhanced by two semi-balanced spade rudders, two 1,000-kW KaMeWa bowthrusters and fin stabilizers from Blohm+Voss.

The ship, which will undertake western Mediterranean cruises in the summer and Caribbean trips in the winter, will carry approximately 1,200 passengers in 593 cabins, 202 inside staterooms, 94 outside staterooms, 281 deluxe staterooms and 16 suites.

Sports facilities are a major focal point, with areas for volleyball, swimming, aerobics, weight training and general fitness programs built into the ship's structure.

Due for delivery in June, *Aida* represents a \$200-million investment for DST.



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Circle 210 on Reader Service Card

(continued from page 24)

ISU announces pollution survey results in London

completed during the year, including the transfer of 330,000 tons in one incident involving a damaged ULCC. Sulfuric and hydrochloric acids, isobutylene and ammonium nitrate were among the 56,365 tons of chemical cargo onboard 14 assisted vessels.

"Recent casualties have emphasized the need to continue to work closely with governments, the shipping industry and its insurers in order to deliver effective pollution prevention services," said Mr. Witte. "However, there is still a fundamental issue. Salvage cover needs to be reinforced if environmentally sensitive coastlines are to be protected."

The ISU also invited discussion on the allocation of salvage and pollution liabilities on a casualty. With an obvious reference to the inadequacies of Article 14 of the 1989 Convention on Salvage as interpreted by the British High Court in the now famous *Nagasaki Spirit* case, the president pointed out that many ISU members had expanded their activities to include a formidable pollution response. "There must be a certainty, however, that the underwriting community will work towards a prompt and fair allocation of payments," Mr. Witte added.

Far East Update

(Continued from page 21)

Since June 1995, when a bribery scandal broke, Petroleum Shipping, which operates the Exxon international fleet, has drydocked four of its tankers in other Singaporean yards. The bribery case resulted in Cees van der Horst of Petroleum Shipping convicted of fraud by a U.K. court and being sentenced to three years in prison. After the scandal, many oil majors appeared to avoid placing repair contracts with Keppel, which resulted in a lack of orders in the second half of 1995.

Kvaerner Ships Equipment (KSE), part of Norway's Kvaerner Group, is reportedly planning to move its headquarters from Tranby, Norway, to Singapore. The reason for this move includes the development of a number of new worldwide maintenance contracts signed with various shipowners, including its latest with Sweden's Wallenius Lines. KSE believes Singapore is a better location from which to handle such contracts.

The repair industry in mainland China appears to be strengthening. Qingdao Beihai is currently completing a new 28,000-ton lifting capacity floating dock — 755.9 x 144.3 ft. (230.4 x 44 m) — which will be ready for use in October. The unit has been designed in cooperation between the shipyard and the Shanghai Design & Research Institute, Shanghai. Meanwhile, the first floating dock of 30,000-ton lifting capacity — measuring 738 x 141 ft. (225 x 43 m) — is in place at the new Da Dong Shipyard on Cho Mung Island; the new shipyard venture being a joint venture between Hudong Shipyard and the local Cho Ming government. The shipyard is scheduled to open for repair operations this month.

South Korea's Hyundai Mipo Dockyard (HMD) is reportedly planning to proceed with the building of a new \$100-million shipyard in Vietnam, in a joint venture with the state-run Vinashin Group.

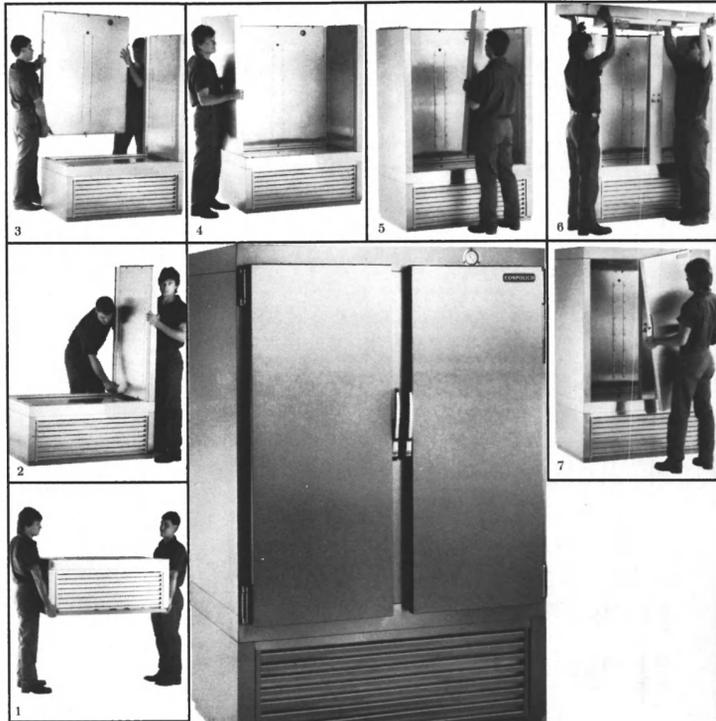
The deal stipulates that construction of the new yard will be completed by January 1998. HMD will hold a 70 percent stake in the new yard, which will be built on a 990,000-sq.-m. green field site. Details of the yard's location, dock capacity and workforce have not yet been released.

In what is the first significant move by HMD to diversify its increasingly expensive ship repair and building facilities away from its home base, HMD said it must begin to search for lower cost centers around Asia for ship repair work and the building of less sophisticated, smaller tonnage.

In 1995, HMD handled 425 vessels, of which 410 were repaired and 11 constructed for domestic owners. Of the total, 77 percent of the repair work was carried out for foreign owners, the rest for Korean shipping lines.

According to M.S. Byun, senior manager, Overseas Sales Department, HMD, the average contract value at the yard, located in Ulsan, has dropped. Today it stands at around \$450,000 to \$600,000 per job. The number of vessels repaired at HMD decreased for the first time in three years, but Mr. Byun reported that this was insignificant and the figure compared well with the 300 vessels repaired in 1990.

There have been some developments at the Netherlands' Sigma Coatings, Uithoorn. Sigma has signed an agreement with Philippines' Mata Marine, part of Singapore's Keppel Group, for the stocking and distribution of marine coatings within the territory. Sigma Coatings has also announced that a license agreement has been signed with Taiwan's Yung Chi Paint and Varnish Mfg. Co. Ltd. for the manufacture and marketing of the marine product range of Sigma Coatings within the territory of Taiwan.



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McDermott Completes First Year In Mexico

It has been one year (March 10, 1995) since McDermott took over the shipbuilding/repairing facility Talleres Navales del Golfo (TNG) in Veracruz, Mexico. Since then, the management team, headed by Paul Albert, has concentrated on refurbishing the yard — for which

approximately \$12 million has already been invested — for the ship repair (70 percent) and the offshore (30 percent) industries. Both docks, the larger with an 80,000 dwt capacity, have been used solely in the ship repair industry while McDermott looks

for suitable newbuilding contracts. It is expected that such contracts will be placed by this summer, at which time the yard will commence the building of a Panamax-sized floating dock, the design of which has been supplied by Crandell Industries.

The recent North American Free Trade Association (NAFTA) agreement allows the yard to bid for Jones Act ships from the U.S. at a reduced rate of import duty; the import duty is to disappear by 1998. Workhour rates and steel prices at the yard are more in line with levels Singapore.

Since the yard opened last year, 28 ships have been drydocked, mainly for repair work. This list has included two ships from Houston-based tanker owner Coastal Corp., the 51,313 dwt *Coastal Corpus Christi* and the 39,357 dwt *Coastal New York*, which are operated by Coscol Marine Corp., and the 65,402-dwt Bahamas self-unloading limestone carrier *W.H. Blount*, owned by Bulica Shipping Co. of Pasadena, Calif., and managed by Barber Ship Management.

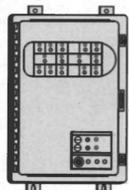
Currently in the yard are two former Russian super-Atlantik class trawlers, which are being converted to fish processing ships for Ocean Resources Management, Seattle. Undergoing general repair work were two Mexican-owned offshore supply vessels *Don Henrique II* and *Don Rodriguez II*, products carrier *Navado* and Navimin's 23,420-dwt, Mexican-registered sulfur carrier *Otapan* (alongside repairs). Also under repair is jack-up rig *Jalapa*. Another visitor to the yard was the 38,200-dwt Bahamian self-unloading bulk carrier *Atlantic Erie*, which is owned by CSL International, and is due in the yard for 29 days of steel renewal and general repairs.

GEMS Closed Loading Liquid Level Indicators

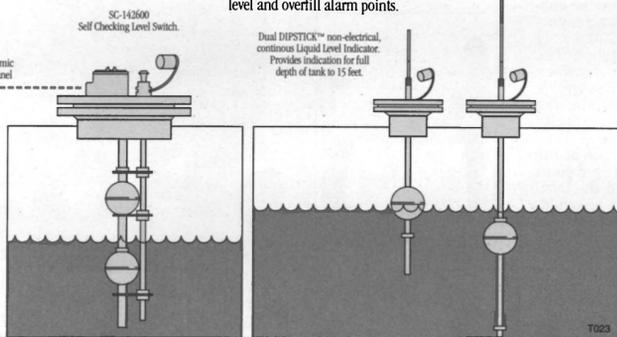
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Marine Electronics To Rep For Five Companies

Florida-based Marine Electronics Solutions, Inc., has been named the manufacturer's representative in the Southeast and Gulf Coast regions for Transas Marine, Marisys, Inc., Mitel-Marine Adaptive Systems, Norselight/Kockum Sonics, and Sunair Communications. Transas manufactures user-friendly electronic charting systems. Marisys, Inc. manufactures fully ruggedized, waterproof Mil-Spec, Pentium computers, designed with internal screens which can be adjusted for lighting conditions and requirements. Mitel-Marine Adaptive Systems specializes in commercial and fully ruggedized marine main-frame dial telephone systems for applications with requirements for 20 to more than 500 telephone extensions. Norselight/Kockum Sonics supplies marine lighting and alarms.

Maritime Reporter/Engineering News

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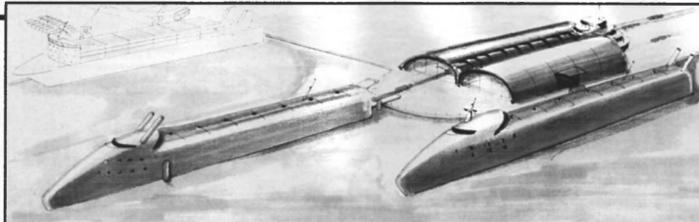
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Pictured is an artist's rendition of port facilities operating under the consortium's improved port/ship interface.

Kvaerner Leads Port/Ship Interface Project

Norway's Kvaerner Ships Equipment is leading a Pan-European consortium which has been given the task of developing an improved port/ship interface (IPSI) for Europe, to improve door-to-door logistic chains in the continent by increasing the use of waterborne transport, including short sea and inland waterway routes. The project officially began on April 11, and is scheduled to last 36 months, at the end of which the results and conclusions will be made public.

The project is designed to result in lower cost port facilities and cargo handling equipment, as well as new ship types, cargo handling technology and management and information exchange systems. The goals of the IPSI project are:

- To develop new concepts for flexible port/ship interface based on increased use of waterborne transport, including the utilization of inland waterways;
- To develop methods and equipment for effective cargo and information transfer in land/water interfaces, focusing on high efficiency and low investment; and
- To demonstrate the new "port/ship and ship/ship interface concept" to verify the effectiveness of multi-modal cargo exchange in a door-to-door context.

The contract to carry out the project was awarded by the European Union in Brussels, and in addition to Kvaerner, several other companies are involved in fulfilling the contract, namely: SAGA of France; Port and Transport Consulting Bremen GmbH and Fraunhofer Gensellschaft of Germany; and Jebsen Eurocarriers, SINTEF and MARINTEK of Norway.

This consortium of companies has a combined expertise in transport and port operations, specialist short sea shipping, maritime consulting and research and development.

A key element of IPSI, with regard to port facilities and cargo handling equipment, is making adequate infrastructure — such as quays and equipment for prestow, handling and interchange of cargoes — available at lower cost without other new investments in order to decrease overall port costs.

New vessel types to be developed in conjunction with IPSI will be capable of handling a variety of cargoes, and will include short sea, inland waterway craft and combined sea/river ship types.

For more information on Kvaerner Ships Equipment AS
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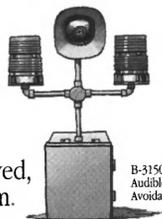
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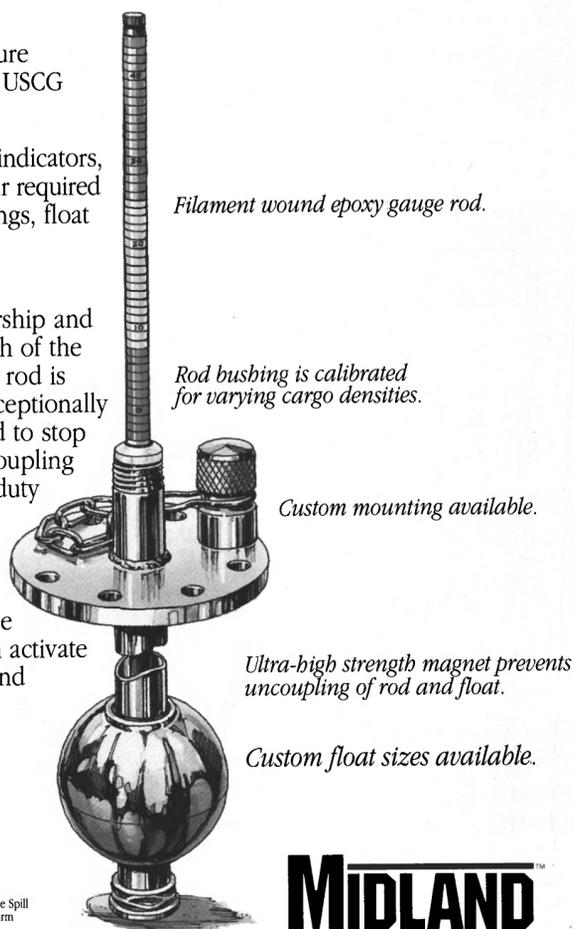
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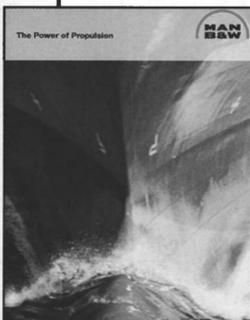
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Maritime Products

MAN B&W Offers Presentation Brochure On Alpha Propulsion Systems

MAN B&W Alpha offers a brochure positioning the company as part of the MAN B&W Diesel group. The contents of the brochure focus mainly on the "Genuine Propulsion Package," which includes propulsion packages in the power range of 800 to 12,300-kW, based on MAN B&W medium-speed, four-stroke engines with reduction gearboxes or MAN B&W low-speed, two-stroke engines for direct drive of controllable pitch propellers, served by appropriate control systems. More than 900 small-bore, two-stroke engines from the 26, 35 and 42 MC series, and approximately 7,500 four-stroke engines from the 23/30 and 28/32 series in the MAN B&W program have been ordered for marine duties. Total worldwide sales of all two-stroke MC engines have reportedly exceeded 50 million bhp.

For more information on MAN B&W
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Product Guide Available From Falk

A 16-page, four-color, full-line product guide is available from the Falk Corporation, covering its complete line of industrial power transmission machinery, including standard and custom gear drives, flexible shaft couplings, back stops, fluid power drives and also couplings and custom castings. Torque ranges, power ratings and available ratios are included.

The brochure also includes product cut-away illustrations and photos depicting applications in the broad range of markets served by Falk.

An ISO-certified company with offices worldwide, Falk manufactures machinery that serves a broad range of markets including the mining, metal processing, and transportation industries.

For a free copy of the Falk product guide
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PC Maritime Windows Navigation Software

Navmaster Professional is an electronic chart system for Windows with a range of unique user interface, navigation and safety features. PC Maritime has designed Navmaster with major emphasis on ease of use, navigation information management and compatibility with current and future developments in electronic charting. The development approach taken by PC Maritime is for Navmaster to be independent of chart type, allowing the user to have choice of cartography while also ensuring that navigation calculations are consistent. Navmaster supports the U.K. Hydrographic Office ARCS raster charts and Livechart vector charts. Navmaster displays on-screen all information on the current chart as provided by the chart manufacturer. Navmaster has been closely designed to the International Hydrographic Office's provisional specification for electronic chart systems, and subjected to stringent design and performance standards during development. Used ashore, Navmaster is a comprehensive route-planning and voyage management system for coastal and ocean navigation. Onboard, Navmaster is an electronic chart system providing the navigator with real time information, simultaneously displayed, and tools for rapidly adjusting and recalculating plans.

For more information on PC Maritime, Circle 31 on Reader Service Card



Photos, video, graphics and text can be attached to any point, in this case a waypoint at the entrance to Southampton water. Users can create their own databases and distribute them throughout a fleet or shore-based site.

Simrad Introduces Shipmate RS2400 Chartplotter

Simrad, Inc. has introduced the Shipmate RS2400, a 10-in. dedicated watertight chartplotter with advanced GPS positioning and detailed C-Map electronic charts. The RS2400 employs newly



developed Mark II software enhancements including fast chart updating, instant zoom repeat, way-

point and route editing by "rubberbanding" and navigation on track with autopilot output.

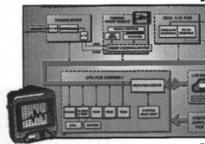
Available in color or monochrome, in a large LCD display, both versions offer 1,000 waypoints/marks plus nine tracks. In addition, the color version reportedly offers excellent readability for indoor installation, and the black and white version provides optimum readability in any lighting condition. Important features include: dual speed indicator; external memory capability; and for improved accuracy, RS2400 is differential ready to receive RTCM 104 data from land-based reference stations via a connected differential GPS receiver.

For more information on Simrad
Circle 30 on Reader Service Card

Raytheon Offers High-Res Digital Data From Portable Unit

Raytheon's DE719D MK2 is a state-of-the-art electronic survey instrument used to generate precision depth recordings and digital data output. Low power consumption, portability, ease of use, rugged construction and built-in communication interfaces for navigation/data logging devices reportedly make the DE719D MK2 ideal for field use. The instrument is housed within a splash-proof aluminum enclosure and comes complete with a 200 KHz transducer and an integral thermal chart enclosure recording mechanism. Digital processing enables the instrument to offer automatic bottom digitizing capabilities. When interfaced to an NMEA 0183-compatible position sensor, the DE719D MK2 reportedly provides the user with a complete, integrated hydrographic survey environment. The instrument features a built-in digitizer with RS232 and RS422 data output interface ports; user-selectable DC or AC input power; automatic chart annotation for date, time, depth and position data; non-volatile internal clock and important parameter setup memory; and remote even mark input.

For more information on Raytheon
Circle 29 on Reader Service Card



Powder Coatings Line Available From Eutectic

Eutectic Corporation has introduced its E+C EverTuff line of protective polymer powder coatings which reportedly extend the life of parts and equipment without harming the environment. E+C EverTuff powder coatings are reportedly inert against most chemical solutions, acids, bases and salts, and help operators to meet increasingly stringent environmental regulations. According to the company, these coatings contain no Volatile Organic Compounds (VOCs).

For more information on Eutectic
Circle 73 on Reader Service Card

Swedish Club To Consider Hull Insurance Refund

Gothenburg-based marine insurance mutual the Swedish Club will make a premium refund to loyal members covered for hull insurance. The Club's board will recommend at the Club's annual general meeting on June 13, that such members receive a five percent premium refund worth approximately \$3.5 million. As of April 1, the Swedish Club had 641 ships insured for hull and machinery and 490 for protection and indemnity.

Schuyler Awarded Two Major Offshore Contracts

Schuyler Rubber Co., Inc. of Woodinville, Wash., has been awarded two major contracts to provide fendering for offshore boat landings.

The first project, for Texaco Inc. located offshore near Columbia, specifies Schuyler's model SR3D-type rubber. This model reportedly allows greater deflection and energy absorption over traditional molded rubber products.

The second project, for Conoco Inc. in the Gulf of Mexico, will reportedly be Schuyler's largest ever. Model SR3D rubber has been on the market for the past five years and, according to company Vice President Greg Armfield, it has become Schuyler's number one selling model.

For more information on Schuyler Rubber Co.
Circle 71 on Reader Service Card

New GPS Receiver Available From Ashtech

Ashtech, Inc. has introduced the G12 receiver, a new OEM board

June, 1996

intended for integration into a wide variety of high-accuracy marine, avionics and land navigation applications.

The G12 receiver is reportedly the first of its kind to offer 20 Hz update rates for position and raw data output.

The G12's all-in-view tracking, timing options and 40-cm differential accuracy reportedly make it ideal for all GPS applications

requiring high-precision.

Designed to be fully upgradeable from its precursor — Ashtech's Sensor II — the G12 is manufactured to mechanical specifications compatible with the Sensor II. Ashtech will continue to produce the Sensor II along with the G12. The G12's incorporation of receiver autonomous integrity monitoring (RAIM), multipath mitigation and high dynamic capability help to

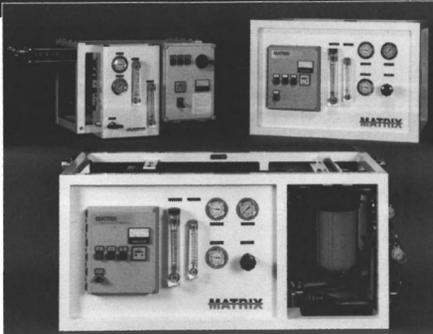
ensure its integration into a broad assortment of GPS systems.

Ashtech is an ISO 9001-certified company, involved in telecommunications and in finding precision solutions for global positioning tasks through the use of Navstar satellites.

For more information on Ashtech
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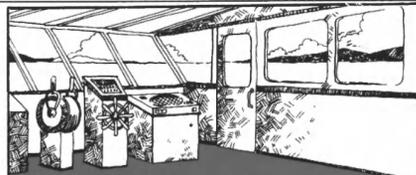
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Blount Lands Oyster Boat Contract

Tallmadge Brothers, Inc., a South Norwalk, Conn.-based oyster grower, has signed a contract with Blount Shipyard in Warren, R.I., to design and construct a 104-ft. (31.7-m), 6,000-bushel, welded steel oyster dredge vessel. At this bushel capacity, the vessel could

reportedly be the largest oyster dredger ever built in the U.S., and is reportedly the first new oyster boat built in the U.S. in the last 10 years. The vessel is scheduled to be completed by November 1996. It will be the 25th oyster boat in the Tallmadge fleet; the 6th built by Blount. Contract price is listed at \$1,200,000, which includes complex machinery and specialized equipment. The new vessel will

have 1,835 sq. ft. of working deck space served by hydraulic conveyors and a loader on deck. The 104 x 34 x 9-ft. (31.7 x 10.4 x 2.7-m) dredger will be propelled by a Caterpillar 3408 DITA diesel engine. It will have a pair of CAT 3306 engines for hydraulics and deck washdown pump, as well as a Northern Lights generator.

For more information on Blount
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IMO Adopts Hazardous Substance Convention

An international convention on liability and compensation for damage in connection with the carriage of hazardous and noxious substances (HNS) by sea was adopted on May 3 at the end of a three-week conference held at the London headquarters of the International Maritime Organization (IMO). The conference was attended by delegates from 73 countries and representatives of inter-governmental and non-governmental organizations. Professor W. Müller of Switzerland was elected president of the conference.

The adoption of this convention will make it possible for the equivalent of up to \$375 million to be paid out in compensation to victims of accidents involving HNS.

In principle, compensation will be paid from the HNS fund when shipowner liability is insufficient to provide full compensation, or when no liability rises under the first tier. Contributions to the second tier will be levied on persons in the Contracting Parties who receive a certain minimum quantity of HNS cargo during a calendar year.

The tier will consist of one general account and three separate accounts for oil, liquefied natural gas (LNG) and liquefied petroleum gas (LPG). This system with separate accounts has been seen as a way of avoiding cross-subsidization between different HNS substances.



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STN Atlas Receives Italian And French NACOS Orders

STN Atlas Elektronik has received orders for 14 NACOS integrated navigation command systems for major newbuildings by Fincantieri in Italy and Ateliers et Chantiers du Havre in France. Of the 11 systems ordered by Fincantieri, two 45-2 units have been commissioned for 100,000-gt cruise liners being built for Carnival Cruise Lines and Princess Cruises.

In addition, 25-2 and 35-2 systems are to be fitted to a series of nine RoRos for delivery to Grimaldi during 1997-1998.

Three 25-2 systems are also to be installed on 25,000-gt chemical products tankers being built by the French yard on behalf of Stolt-Nielsen for delivery in 1997-1998. The systems will form part of new STN Atlas Ship Control Centers which combine all basic navigation, communications, engine control and ship management functions.

For more information on
STN Atlas Elektronik
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Blind Spot

Other Satcom-B systems need to rewind the antenna when it reaches the limit of its rotation, then re-acquire the satellite, resulting in a "blind spot" in phone, fax, telex and data communications that may last several minutes.

Common to most other Satcom-B systems, "antenna rewind" interrupts the critical communication satellite link, creating a "blind spot" in your vessel's voice, fax, telex or data traffic that may last up to several minutes.



Continuous Coverage

Furuno's Felcom 80 Satcom-B system offers continuous 360° operation, eliminating "antenna rewind" and "blind spots," for an uninterrupted satellite link and disruption-free phone, fax, telex and data communications at sea.

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the stringent Class I requirements of GMDSS as well as the Class II requirements for minimum phone and fax services at sea.

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National Weather Service Modernization to provide the maritime industry with improved weather prediction

The National Weather Service (NWS) is making its most ambitious change in its 125-year history. New technologies are going into operation, and services expected to bring major improvements in weather warnings and forecasts for the nation's maritime community are being reorganized. Technological advances are taking place in four major areas: weather radar; surface weather observation; weather satellites; and information processing and communications. The following is an article which assesses the current situation, the changes to come, and the benefits to the maritime community.

by **Paul A. Jacobs**, manager, marine weather services, Office of Meteorology, National Weather Service

NEW TECHNOLOGY

Forty-year-old weather surveillance radars are being replaced by new radar systems. The old radars only display reflected echoes of precipitation patterns and coarse estimates of storm intensity and vertical extent. The new radars are based on the Doppler principle in which transmitted radio waves change frequency when reflected from a moving target. Doppler weather radars, known as WSR-88D, measure internal storm structure in fine detail and calculate wind fields within storms.

In addition, the radars can detect wind patterns in clear air by reflection of the radio waves from suspended particles such as aerosols, dust, and insects.

The radar's capabilities enable it to detect the conditions that lead to severe storm formation, helping to increase the lead time and accuracy of severe weather warnings.

The NWS is installing 120 WSR-88D Doppler radars around the country. Doppler radars, also being installed by the military and the FAA, will support NWS operations in certain areas of the lower 48 states and in Puerto Rico, Alaska, Hawaii, and Guam.

A major part of weather forecasting is taking and reporting weather observations from 1,200 locations around the country. Observations have been taken by personnel in the NWS, FAA and the military. However, the issuance of a warning to save lives and property can delay an important weather observation.

The Automated Surface Observing System (ASOS) solves this problem by allowing people to devote more time and expertise to the service



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coastal landmarks as the individual Doppler radars become operational.

- Transfer of responsibility for Lake Superior warnings and forecasts from the Romeoville, Ill., office to the future WFO in Marquette, Mich., after the AWIPS computer system becomes operational.

COOPERATION WITH THE PRIVATE SECTOR

The NWS marine warnings and forecasts are general products designed to provide basic information on winds, waves, weather, ice, and visibility as they affect safety of life and property at sea. These marine products and services are developed and refined from a broad consensus of requirements put forth by all sectors of the maritime community.

Specialized marine weather analyses, forecasts, data sets, and packaged information to meet specific requirements of individual maritime users or segments of the community are the responsibility of the private weather information industry. For example, the NWS will not issue forecasts of wind or wave conditions for specific locations and times upon request of a marine user requiring such services. It is the strict policy of the NWS to refer all such requests for specialized or tailored services to the private sector.

To assist the private sector in providing specialized products and services and to promote the economic viability of the industry, the NWS provides subscriber access to the Family of Services computer system for receipt of a whole range of data and products. The NWS encourages users to take advantage of these specialized services offered by the private weather information industry in the hope that access to a combination of NWS and private sector weather products will provide the user with the most complete and comprehensive weather information to enhance maritime safety and productivity.

The Doppler radar and the other new observing technologies are proving to be valuable tools for predicting severe weather conditions that

impact marine safety ranging from localized severe thunderstorms and squalls, to major ocean storms. Installation of AWIPS systems is scheduled to begin in 1997, soon after completion of the coastal Doppler radar network. A more streamlined field office structure, staffed with highly trained meteorologists and supported by improved National Center guidance, will allow NWS to derive maximum benefit from the technological advances. The growing partnership between NWS and the private

weather information industry will afford marine users an extra margin of safety and efficiency through a combination of basic warnings and forecasts, and highly specialized weather information to meet unique operational requirements. NWS is confident that by the end of the decade, people who live, work and play along the nation's coastline and at sea will experience a substantially higher level of weather services for the protection of life and property in support of their daily activities.

COASTAL AND OFFSHORE RECONFIGURATION

After delivery and operation of the new AWIPS computer system to the field, the WFO office structure will begin to take effect. At that time (early 1998), the new coastal marine forecast areas shown in Figure 3 will start to be redistributed as coastal WFOs are commissioned, resembling that shown in Figure 4.

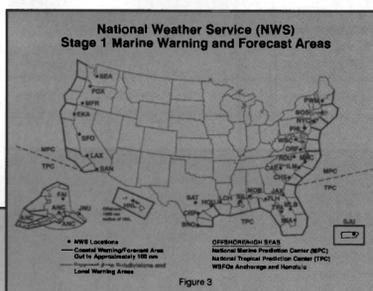


Figure 3. This change is planned to occur in the Spring of 1997. These areas are assigned to the same offices as shown in Figure 2. The other offices in Figure 3 will issue only localized "short fuse" warnings for segments of the reconfigured forecast areas prior to becoming WFOs. In addition, each area will be subdivided into near shore and offshore "zones" in order to describe warnings and forecasts in more detail.

Due to the extension of the coastal forecast boundary further out to sea, it will be impractical to describe the overwater area of the forecast by simply giving coastal landmarks and saying "out to 100 nm." To ensure that the marine community understands and becomes accustomed to the descriptions, NWS will advertise the new areas through revised Marine Weather Service Charts, revised nautical charts, updated

NWS brochures, U.S. Coast Guard and Defense Mapping Agency publications, articles such as this and other outreach efforts. A dual description (geographic coordinates plus descriptor) will also be used for a period of time in the coastal forecast heading to help mariners become accustomed to the descriptors.

As indicated earlier, the present marine warning and forecast program includes services for offshore and high seas areas. Figure 2 shows these areas and the NWS offices responsible for them.

In spring 1997, when all the coastal Doppler radars are operational and the coastal forecast areas are extended uniformly out to about 100 nm from new coastal landmarks, the offshore forecasts will no longer be issued by the field offices.

Except for the NWS offices in Anchorage and Honolulu, all warnings and forecasts for the ocean beyond the coastal areas shown in Figure 3 will be issued in conjunction with the High Seas program operated by the National Marine Prediction Center and the National Tropical Prediction Center.

At this time, it is uncertain whether the offshore forecasts shown in Figure 2 will continue to be issued in their present form or as part of the High Seas forecast package. The NWS is examining several options to ensure that maritime interests operating beyond 100 nm from shore receive the weather information necessary to their safety and productivity.

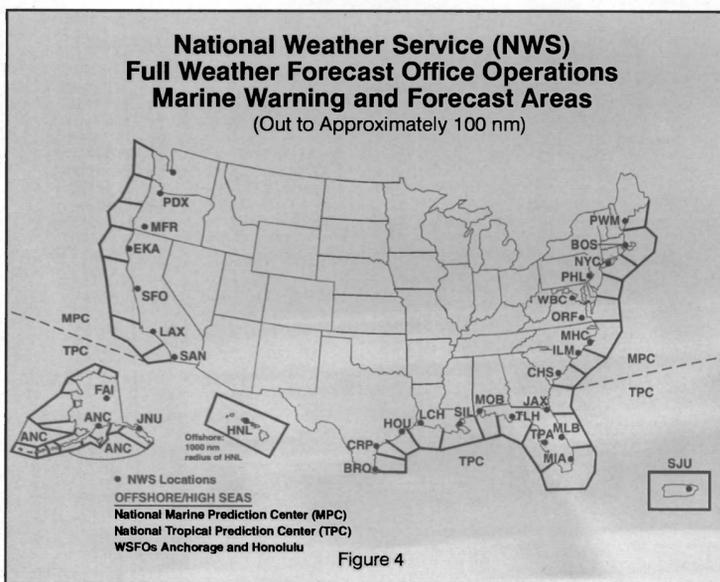
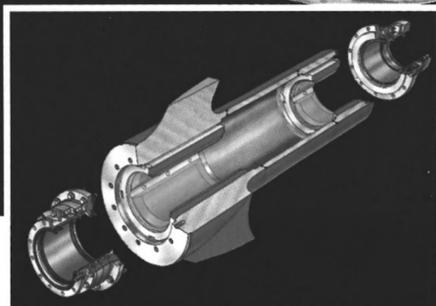
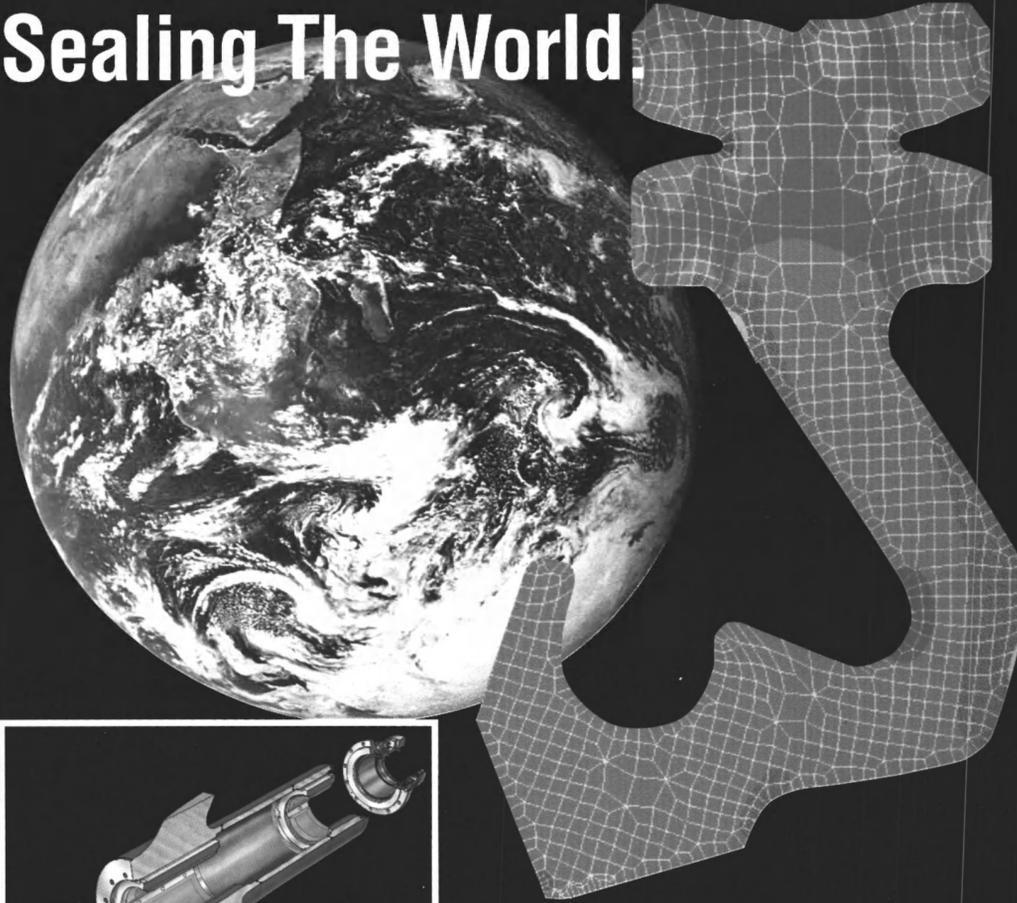


Figure 4

Figure 4 shows why, in some parts of the country, "out to 100 nm" has different meanings in terms of the direction in which the seaward boundary is measured (is it 100 nm southeast from the coast, east from the coast, etc.?). Instead, each forecast area assigned to a coastal NWS office, as shown in Figures 3 and 4, will be described by use of a well-known geographic descriptor, such as MARVA SHELF for the coastal marine area assigned to the Norfolk weather office, similar to the method of description used by Canadian and European weather services.

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COMPANY PROFILE: IDB Mobile changes to compete



Competition in the satellite communications service provider business has grown exponentially in the past year and a half — specifically, Inmarsat satellite services have become much more price competitive, and users are becoming more sophisticated in how they choose and use satcom services. In

the meantime, companies such as IDB Mobile (IDBM) have been closely monitoring market demand and altering their broad range of products and services to meet customers' needs.

The near-term market for all satellite communications providers poses many challenges, but

promises rich rewards for those companies positioned correctly. It is apparent that technology and price will drive the increasing use of satellite communications, as users find new reasons to transmit and receive data.

Positioned as a leading supplier of Inmarsat-based mobile services,

IDBM links satellites to remote land/sea bases, airplanes, mobile units and marine vessels, providing some of the most advanced telecommunications services available.

The company's primary target is the oceangoing vessel market, and its service additions and improvements have all been geared towards gaining a lead in this market, while expanding presence in the land mobile market.

A significant step in achieving this goal was the introduction of its "One World, One Price," simplified pricing program, which according to company officials was market driven and greeted with anticipation and praise. "Customers have embraced the program, even more so than we expected," said Rich Carlson, vice president, marketing.

Another sign of IDBM's commitment to the market was the recent expansion of its operator and customer service center, which included adding operators and enhancing training. IDBM responded to the need for reliable, clear and concise service by creating an operator and customer service center that is staffed around the clock.

To provide additional value, IDB Mobile has expanded its custom-designed, help-desk software to include a database of satellite terminal manufacturers providing manuals, customer equipment lists and billing history as well as other vital information designed to speed the delivery of help. This allows IDBM customer service representatives to attend to customers even when their problems may not be directly associated with IDBM's service.

Fitting the budget

To provide its customers with responsive Inmarsat services, IDBM introduced what it terms a simplified pricing and billing procedure. Entitled "One World, One Price," IDBM now offers one price for voice, fax and data traffic that includes landline charges to any destination in the world for Inmarsat A, B and M mobile satellite services.

"The best surprise is no surprise, especially when it comes to making Inmarsat calls and getting the bill," said Jerry Shipley, senior vice president, sales and marketing. IDBM said the program is a result of listening to its customers.

"Customers get sticker shock every month when the communications bill comes in and there are excessive landline charges. This makes trying to plan for, and control costs impossible," said Mr. Carlson. "Eliminating hidden or extra costs allows for much better budgetary planning and control."

For more information on IDB Mobile
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Port Of Portland Contracts Liftech For Crane Upgrade

The Port of Portland Commission recently contracted with Oakland, Calif.-based Liftech Consultants, Inc. for the design of an upgrade for one of the Port's oldest container cranes at Terminal 6 (T-6). The new design will serve as the blueprint for engineers to retrofit the 1970s-era crane to post-panamax capability, in order to enable it to better serve vessels that call at T-6, especially during high water conditions, and facilitate the servicing of a larger, new generation of ships calling at the Port.

The redesign will involve increasing the crane's height by 19 ft. (5.7 m) to 95 ft. (28.9 m), extending its boom by 26 ft. (7.9 m) to 145 ft. (44.1 m), reducing its overall width by 19 ft. to 88.5 ft. (26.9 m), and doubling the distance or gauge between the unit's legs.

Last fall, the Port installed its first 100-ft. (30.4-m) gauge, post-panamax container crane at T-6. To serve the new crane, a new set of rails had to be laid that were twice as wide as the existing rails used by the other five panamax-sized cranes at the container terminal. The Port's only other post-panamax crane was recently relocated from Terminal 2 on the Willamette River, to its new working home at T-6 on the Columbia River. This move was necessary to increase T-6's container handling capacity and productivity as the Port's container business continues to expand. The crane and rail upgrades are part of a three-year, approximately \$40-million Terminal 6 enhancement and expansion program.

Sonsub And Seateam Team To Provide ROV And Survey Services

Sonsub International Ltd. has announced the formation of a worldwide cooperative agreement with The Seateam Group, covering the provision of totally integrated remotely operated vehicle (ROV) and survey services. The agreement is designed to provide industry with access to the technical and innovative capabilities of Sonsub's global intervention services, coupled with Seateam's extensive survey capabilities, including the company's Dolphin data capture and management system.

Both companies have reportedly mobilized onboard STM *Markab* to support a project in the North Sea off the Norwegian coast. Sonsub will deploy an ROV through the vessel's new moon-pool, which is an innovative new design aimed at increasing the vessel's all-weather capabilities. A second, fully-integrated ROV and survey spread onboard STM *Atria* was scheduled to be mobilized in April to support inspection and construction projects on the northwest European continental shelf.

Seateam offers a wide range of survey support services covering offshore exploration, construction and inspection, including digital and analog site investigations, ROV and analog route surveys, ROV and analog pipeline inspections and construction support.

Sonsub develops and applies solutions for subsea and hazardous environments, providing environmental remediation, cable and pipeline burial, remote systems engineering, subsea production systems and ROVs. The company also recently contracted with McDermott Subsea Contractors Ltd. in the U.K. to provide ROV services to support British Petroleum's project off the West coast of Shetland. Sonsub will reportedly mobilize two, 100-hp Triton Advanced Remotely Operated Work Systems (AROWS) and one 75-hp ROV to complete the job.

For more information on Sonsub International Ltd.
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June, 1996

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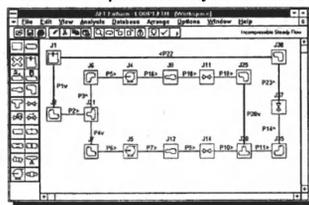
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COMPANY & PEOPLE NEWS

Bureau Veritas Launches New Rules On CD-Rom

French classification society Bureau Veritas (BV) has launched a completely revised version of its Rules and Regulations for the Classification of Ships, which is available on CD-ROM in addition to the traditional book format.

According to **Pierre de Livois**, head of BV's Marine division, "We wanted to simplify the rules, give them a more logical structure and make them user-friendly. Making them available on CD-ROM means yards and owners can have a powerful and easily accessible rules database on their desk." The new rules take into account the new design and approval soft-

ware available in the VeriSTAR package. On CD-ROM, the rules are configured as an interactive database, accessible in Windows 3.1 or Windows 95. Powerful search capabilities are reportedly built in, and the screen can display several windows with content lists and active text.

Prior to this update, the last BV revision took place in 1985. The

Paris-based classification society reportedly classes 6,118 ships, totaling more than 32 million gt, and maintains offices with skilled surveyors worldwide.

For more information on Bureau Veritas
Circle 7 on Reader Service Card

LR Appoints Robertson And Hubbard To Senior Management Team

As part of a reorganization and strengthening of its senior management team worldwide, Lloyd's Register (LR) has announced two key executive appointments.

Ken Robertson was named group regional manager for the Middle East and Indian subcontinent based in Dubai, and **Geoff Hubbard** has been appointed to the position of group regional manager for South America, based in Rio de Janeiro. LR's group regional managers are responsible for overall management of company activities within their respective regions, and for ensuring cooperation between the running of LR's business and the local offices of its subsidiaries.

For more information on Lloyd's Register
Circle 6 on Reader Service Card

How To Reduce Human Error!

Most ship casualties are caused by a lack of "people" management skills... not technical knowledge. This is why RTM STAR Center's outstanding Bridge Resource Management course returns big dividends. The course objective is to equip mariners with the people skills necessary to recognize and break potential error chains that might lead to groundings, collisions, and environmental damage.

The course includes all the elements of the proposed ruling for Bridge Resource Management Training for Single Hull Tank Vessels. It has the approval of

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the National Transportation Safety Board, American Pilots Association and U.S. Coast Guard.

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Circle 299 on Reader Service Card



Capt. Robert L. Clinton

The American Waterways Operators (AWO) named Capt. **Robert L. Clinton**, a 20-year veteran of the commercial tugboat industry, as its director of Safety and Responsible Carrier Program Implementation. In this position, he will oversee the association's marine safety initiatives, including the Responsible Carrier Program, created to encourage compliance with safety and environmental protection standards that exceed U.S. Coast Guard requirements.

Capt. Clinton has extensive experience in safety, training, vessel operations and facilities management. In the past, he was employed by Crowley Marine Services, managing various phases of the Oakland, Calif., company's operations, both aboard vessels and in a shoreside supervisory capacity. Capt. Clinton also worked as a captain and chief mate aboard tugboats calling at West Coast ports, and before entering the maritime industry, served four years in the U.S. Air Force as a law enforcement specialist.

For more information on AWO
Circle 8 on Reader Service Card

Maritime Reporter/Engineering News

The Wärtsilä Nohab 25 is used to being followed



-especially by other Wärtsilä Nohab 25 engines.

We believe there's no better proof of a customer's confidence in an engine than a large number of repeat orders. In the case of the Wärtsilä Nohab 25 medium-speed engine it is commonplace that the first order is followed by other ones. What could be the reason? Is it the unquestionable reliability and long maintenance-free periods? Or its extremely compact size and outstanding power / weight ratio? Or perhaps the combination of high performance and low fuel consumption? Or the special skills of the Wärtsilä Diesel team in installations for navy, tugs and special ships? Most likely it's all of those reasons which together have made the Wärtsilä Nohab 25 an engine whose installed base is no less than 1.800 engines!

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Circle 374 on Reader Service Card

COMPANY & PEOPLE NEWS



Pictured (left to right) are MKW President Daniel W. Kabel; Richard C. Seyfreh, Centerior Registration Services; and MKW Quality Control Services General Manager Michael Nuding.

MKW Power Systems Gains ISO 9001 Certification

MKW Power Systems, Inc. has achieved ISO 9001 certification. The company was certified by Centerior Registration Services, specifically for the design, supply and servicing of specialized diesel generation equipment, hydrogen ignitor assemblies and customized

training services.
For more information on MKW Power Systems, Inc. Circle 14 on Reader Service Card

Grit Blasting Co. To Pursue Maritime Business

IPEC, a Foxboro, Mass.-based developer and manufacturer of equipment for recyclable steel grit blasting, has been purchased by an investment group led by CEO **William D. Gluck**. The company, which had been operating under receivership, has relocated from Providence, R.I., and is restructuring to take advantage of its patent-protected technology. The company is pursuing market opportunities for its entire product line, which includes vacuum, vacu-blasting, dust collection and air drying equipment used for lead abatement and surface preparation in painting and recoating projects.

IPEC's patented recyclable steel grit blasting technology reportedly reduces hazardous waste by as much as 99 percent during lead abatement and repainting projects on large steel structures. Company plans include rebuilding a position in the ship construction and repair market.

For more information on IPEC Circle 9 on Reader Service Card

M. Rosenblatt Names San Francisco Branch Manager

Gary M. Thompson has been appointed to the position of assistant vice president and branch manager of M. Rosenblatt & Son, Inc.'s San Francisco office. He will also serve as acting Western Division manager for the naval architecture and marine engineering firm.

Most recently employed as head of the Hull Department, Mr. Thompson will replace **Stephen Halpern**, vice president and Western Division manager, who has announced his retirement this month. Mr. Thompson is a past chairman of the Northern California section of SNAME, and the current treasurer of ASNE's Golden Gate section.

M. Rosenblatt & Son, Inc. specializes in both commercial and naval ship design.

For more information on M. Rosenblatt & Son, Inc. Circle 10 on Reader Service Card

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Circle 227 on Reader Service Card

COMPANY & PEOPLE NEWS

Denison Hydraulics Names National Sales Manager

Denison Hydraulics, Inc. has appointed **Gary J. Grauer** to the position of national sales manager, with responsibility for the company's U.S. sales efforts through distribution. Mr. Grauer was previously employed as hydrostatic product manager responsible for sales and marketing for Voith, in York, Pa.



Gary J. Grauer

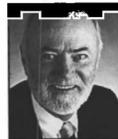
Denison Hydraulics manufactures hydraulic components and systems for ships and for other industrial equipment such as construction vehicles, chemical and processing equipment and in-plant machinery.

For more information on

Denison Hydraulics

Circle 11 on Reader Service Card

ACBL Names Gardner VP



Robert L. Gardner

Robert L. Gardner has joined American Commercial Barge Line Co. (ACBL) as vice president of Special Projects/ Business Development. Mr. Gardner was formerly employed as vice president and general manager of Conticarrriers & Terminals. He is reportedly active in inland waterway advocacy efforts and holds a U.S. Coast Guard First Class piloting license.

National Marine Appoints New VPs

New Orleans-based river transportation company National Marine, Inc. has named two new vice presidents.



Jack Wershale



Michael J. Thibodaux

Jack L. Wershale has been promoted to vice president of Transportation Services, with responsibility for all aspects related to towing services, contract operators, and towboat and barge repair and maintenance. **Michael J. Thibodaux** has been named vice president of Information Systems, with responsibility for managing computer systems' applications and maintenance, database management, capacity planning and hardware evaluation and installation.

According to company reports, National Marine operates a fleet of

55 towboats and more than 700 barges.

For more information on

National Marine, Inc.

Circle 12 on Reader Service Card

Wilson Walton Int'l Promotes Kuzmich

Wilson Walton International Inc.



John Kuzmich

of Hoboken, N.J., a marine corrosion control company, has announced the promotion of **John Kuzmich** to the position of executive vice president. Mr. Kuzmich, who has been employed by the company for 20 years,

will report directly to company President **Michael Long**.

Wilson Walton provides products and services to the maritime community from its Houston, Texas foundry, as well as its Hoboken, N.J., and Norfolk, Va., offices.

For more information on

Wilson Walton

International Inc.

Circle 18 on Reader Service Card

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Circle 246 on Reader Service Card

COMPANY & PEOPLE NEWS

SPD Technologies Names Halferty VP/Chief Engineer

Philadelphia, Pa.-based SPD Technologies has announced the appointment of **John P. Halferty** to the position of vice president and chief engineer.

Mr. Halferty's professional career includes 26 years in the electrical

distribution and controls industry, servicing the residential, commercial, industrial, U.S. Navy and marine electrical power distribution markets.

Prior to his latest appointment, he served as director of R&D for Siemens Energy & Automation. In the past, Mr. Halferty was also employed in an engineering management capacity for I-T-E

Imperial Corporation. For more information on SPD Technologies Circle 16 on Reader Service Card

Rabuck Assumes Leadership Of Pathway Bellows

Pathway Bellows, an Oak Ridge,

Tenn.-based division of Dover Corp., and manufacturer of custom engineered metal and fabric expansion joint products, has announced the

recent appointment of **Robert L. Rabuck** to the company's presidency. Mr. Rabuck has served as president for several other companies, and was also formerly employed as manager of Shop Operations for General Electric's Main Steam Turbine Division. **Mike Malkmus** has been named vice president of Metal Expansion Joints for the company.

Pathway Bellows' metal and fabric expansion joint products are applied in refineries, power generation facilities and other process industries.

For more information on Pathway Bellows, Inc. Circle 13 on Reader Service Card



Robert L. Rabuck



Mike Malkmus

Ritchie sets a new standard in Electronic Compass Technology...



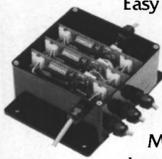
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Circle 337 on Reader Service Card

Southern Marine Hires Surveyor/Construction Manager

Mr. E. "Bernie" Szetela recently joined Southern Marine Inc. (SMI), Ft. Lauderdale, Fla., as staff surveyor and construction manager. For the past ten years, Mr. Szetela has owned MBT Marine Survey Co., a Morehead City, N.C., and Ft. Lauderdale company engaged in performing surveys, damage claims service, refit supervision and expert witness testimony. In his new position, he will conduct independent surveys; manage newbuild construction, refits and repairs; and assist in the preparation of insurance claims as related to major repairs and refits.

SMI is a vessel construction management firm, focused on representing owners' interests during newbuilding, repairs and refits.

For more information on Southern Marine, Inc. Circle 17 on Reader Service Card

Moran Towing Elects New Executives

Malcolm MacLeod, president and CEO of Greenwich, Conn.-based Moran Towing Corporation, recently announced that **Jeffrey J. McAulay** will serve as vice president of Finance and Administration for the company, replacing **Lee R. Christensen**, who has retired. **Robert J. Patten** was elected controller, filling Mr. McAulay's former posi-

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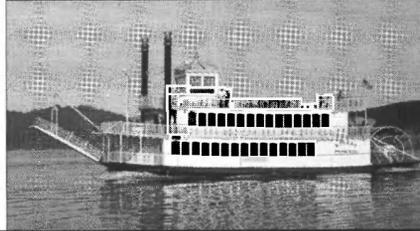
(Top) SkipperLiner luxury vessels rank among the finest and strongest, and earn profits in a variety of configurations. 30' to 160' lengths. 14' to 60' beams. We have excellent custom design/build abilities.

(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.

(Bottom) Nostalgic SkipperLiner paddlewheelers from 49 to 800 passengers generate significant revenues for dinner cruise operators throughout the U.S.

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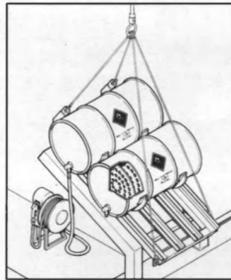
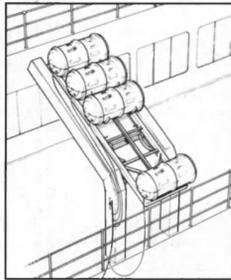
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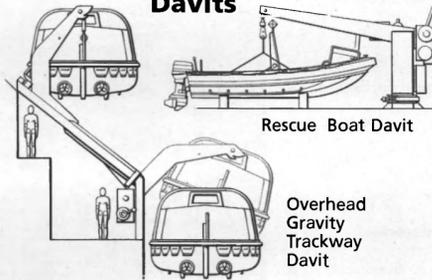


North Vancouver, B.C. Canada
Life Raft Rack System (LRS)
Fuel Rack System (FRS)
Code Red Mariner (CRM)



Brierley Hill, West Midlands, England, U.K.

Davits



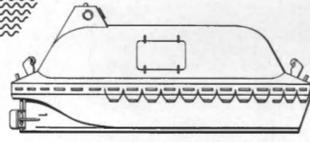
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Life Rafts, MEC System, Evacuation Slides

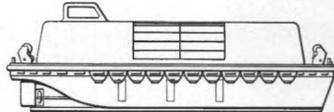


Peterlee, County Durham, England, U.K.

Lifeboats



Phoenix



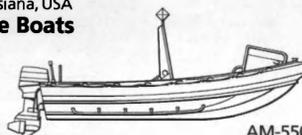
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COMPANY & PEOPLE NEWS

tion. Mr. McAulay will also serve on Moran's board of directors.

Moran, through its subsidiaries, operates 54 tugs and 13 barges along the Atlantic and Gulf coasts.

For more information on
Moran Towing Corp.

Circle 19 on Reader Service Card

LR Approves Vosper Quality Standard

Vosper International Ltd., a ship design specialist and naval engineering consultancy bureau, has reportedly achieved EN 9001 QA certification following appraisal of the company's design and engineering practices by Lloyd's Register Quality Assurance (LRQA), the QA arm of Lloyd's Register of Shipping. Certification covers all facets of the company's activities, including naval and commercial ship design, naval architecture and marine engineering consultancy, naval engineering and logistic support services.

According to Vosper Senior Consultant **Stephen Carey**, "We will be working closely with LRQA to monitor our in-house systems and practices on a continuous basis to ensure that our reputation for excellence and innovation in the field of small warship and specialist craft design is maintained ... This ongoing investment will further strengthen customer confidence in the company's ability to provide cost-effective, state-of-the-art ship design technology, and to reduce lead times associated with major new construction programs."

For more information on Vosper
International Ltd.

Circle 20 on Reader Service Card

Collins Named COMSAT Mobile VP/GM

On May 3, COMSAT International Communications announced the promotion of **Thomas Collins** to the position of vice president and general manager of COMSAT Mobile Communications. In his new position, Mr. Collins will be responsible for the company's existing mobile business, directing the unit's sales, business development, engineering, operations and government relations.

Previously, Mr. Collins was vice president of COMSAT International Communications. He will replace **Christopher J. Leber**, who will become vice president and general manager of the newly created Personal Communications division.

COMSAT Mobile Communications is the business unit of COMSAT Corp. that provides mobile satellite communications to maritime, aeronautical and land-mobile customers worldwide via the Inmarsat satellite system.

For more information on COMSAT
Circle 21 on Reader Service Card

Blue Star Announces Executive Appointments

Mark Tanelli has been named vice president and trade manager for Blue Star Line's (BSL) Pacific Coast Island Service (PCIS). Mr. Tanelli has most recently served as vice president of sales for the company's East Coast Container Service (ECCS).

William G. Roche was recently appointed to vice president of sales, Eastern zone; prior to which, he was employed as assistant vice president for the division. **James DiMatteo** will serve as regional marketing analyst in San Francisco, where he will be responsible for sales strategies and market analysis for BSL's West Coast Container Service (WCCS).
Blue Star Line's North American

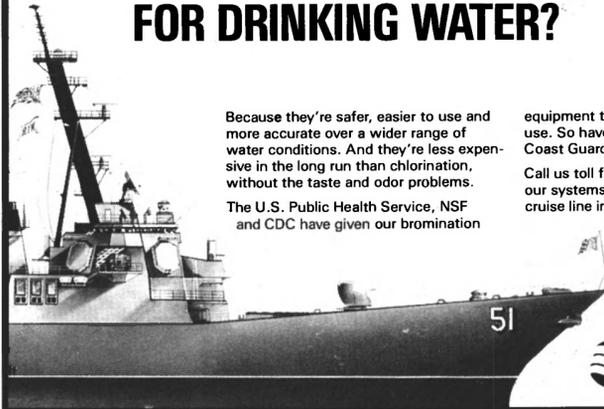


Mark Tanelli



William Roche

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Circle 395 on Reader Service Card

COMPANY & PEOPLE NEWS

unit has sailings from the East, West and Gulf coasts of the continent, shipping refrigerated cargo as well as dry, breakbulk and heavy lift shipments.

Bulis Joins ACR Electronics As Soles Director

Bob Bulis recently joined ACR

Electronics, Inc., located in Fort Lauderdale, Fla., as the company's director of North American Sales. In this position, he will be responsible for supervision of all aspects of the company's domestic sales, and will lead an aggressive



Bob Bulis

growth program to expand product sales into new markets.

ACR Electronics designs and manufactures a complete line of safety and survival products, including EPIRBs, personal utility lights, marker lights, radios and SARTs.

For more information on ACR Electronics, Inc. Circle 25 on Reader Service Card

Cassar Named Kings Pt. Department Head

Dr. Laurence Cassar has been named head of the Department of Mathematics and Science at the U.S. Merchant Marine Academy at Kings Point, N.Y. He will be responsible for overseeing the mathematics, chemistry and physics courses at the Academy. Dr. Cassar joined the Academy in 1967, attained the rank of professor in 1980, and shortly thereafter was appointed assistant department head in mathematics and science. He has also completed post-doctoral studies in astrophysics, performing several research projects in the field.

Kings Point is operated by the Maritime Administration of the U.S. Department of Transportation. The federal maritime college trains students to be licensed officers in the U.S. Merchant Marine — the fleet of U.S.-flagged vessels involved in foreign and domestic waterborne commerce — and in the U.S. Naval Reserve.



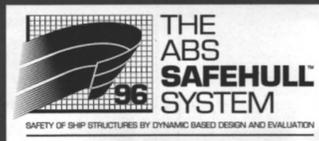
Laurence Cassar

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EA Global Hires Dredging Consultant

EA Global, Inc., Hunt Valley, Md., announced that William R. Murden will serve as senior technical consultant for international dredging projects. Mr. Murden served as the chief of the Dredging Division of the U.S. Army Corp of Engineers, providing approval for the design and construction of major marine plant equipment for 38 Engineer Districts.



William R. Murden

EA Global is an international division of EA Engineering, Science and Technology, Inc., a multidisciplinary environmental services firm. The firm provides the port industry with a variety of services, performing environmental assessments of dredging impacts, sediment management, health and safety monitoring during construction and human health and ecological risk assessment.

For more information on EA Global, Inc. Circle 26 on Reader Service Card

Alpha Wire Names New VPs

Alpha Wire Corporation, an Elizabeth, N.J.-based supplier of wire, cable and shrinkable tubing products, has appointed two new vice presidents. Allan Marconi will serve as vice president of

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Increase to 350,000 bhp expected in Marlim Field, Brazil

Cádiz yard is actually converting a semisubmersible rig into the Floating Production

System P-26, and the VLCC Cairú into the Floating Production, Storage and Offloading Unit P-32 for Brasoil, for the giant Marlim Field, offshore Brazil. These orders underscore Astilleros' strong position in conversion of offshore units.

Two of four containerships handed over ahead of schedule

Container ships are currently featuring in the Juliana yard's output. The yard is actually involved in a four-in-a-row newbuilding operation for Malaysian International

Shipping Corp (MISC). The first two vessels were handed over ahead of schedule. This Far East operation may be a good case for actual European worldwide competitiveness.

Product tanker Lista, one of twelve outstanding ships of the year, as selected by American Maritime Reporter

Lista, is a 33,000-cu.-m product tanker built for Mowinckel Kystanker AS at Seville yard. The vessel is a new type of oil

tanker designed to meet the most rigid standards of safety, ecological criteria and low consumption.

Maritime Reporter
& Engineering News

**Great
ships
of 1995**

AESA in Sestao, Seville, Cádiz and Puerto Real; ASTANO in Ferrol; ASTANDER in Santander; JULIANA in Gijón; BARRERAS in Vigo and MDE in Manises

Circle 213 on Reader Service Card

COMPANY & PEOPLE NEWS



Allan Marconi



Bob Williams

Marketing, and will be responsible for worldwide strategic marketing and new product development. **Bob Williams** has been named vice president of Sales, after serving the company in a number of positions, including managing director of Alpha Wire Ltd. in Europe.

For more information on Alpha Wire
Circle 109 on Reader Service Card

Earp To Head Bardex European Operations

Hal Earp has been named director of European Operations for Bardex Corporation, a Goleta, Calif.-based company which manufactures heavy load handling and positioning systems. In his new position, he is responsible for sales and marketing, conceptual design

and installation and commissioning of the company's equipment for use on North Sea and European offshore oil and gas installations.

Prior to joining Bardex, Mr. Earp was employed as senior engineer for Det Norske Veritas' OIS Department in London, and as engineering manager for the Certification of Materials and Components Department of the classification society.

For more information on Bardex Corp.
Circle 27 on Reader Service Card



Hal Earp

AE Clevite Engine Parts Appoints Engelbrecht VP

Charles K. Engelbrecht was named vice president of Light Vehicle Sales for AE Clevite Engine Parts in Ann Arbor, Mich.

Prior to this appointment, he served as vice president of Marketing and Aftermarket Sales for Camshaft Machine Company/ Crane Technologies Group, AE Clevite, part of the T&N Group, serves the light vehicle and heavy replacement markets with a full line of internal engine parts, valvetrain components and gaskets, marketed under the Clevite Engine Parts, Clevite 77 and McCord brand names.

For more information on
AE Clevite Engine Parts
Circle 28 on Reader Service Card



Charles K. Engelbrecht

Petro-Marine Relocates

Petro-Marine Engineering has announced the relocation of its New Orleans, La., office to the Westpark Building, located at 1 Seine Court, Suite 400. The company's telephone and fax numbers are unchanged.

Datamarine Names Northeastern Sales Rep

Datamarine International, Inc., a Mountlake Terrace, Wash., manufacturer of marine electronics for the recreational marine market, has named Janson & Company of Newport, R.I., as its sales representative for New England, New York and eastern Canada. **Joe Janson**, president of Janson & Company, is a former Datamarine employee, and is therefore already familiar with the company's line of products.

For more information on
Datamarine International, Inc.
Circle 54 on Reader Service Card

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Circle 200 on Reader Service Card

ABB

COMPANY & PEOPLE NEWS

C.N. Watson Passes Away

C. Neville Watson, executive chairman of Steamers Maritime Holdings, passed away in late April. Mr. **Watson** was involved in the maritime industry in Singapore for 27 years, working with the British Swan Hunter Group to help the government corporatize the British naval base in Sem-

bawang, and later becoming managing director of Keppel Shipyard. He then served a 16-year stint at the helm of Sembawang Shipyard as group chief executive.

After retiring in 1991, Mr. **Watson** became Keppel Corporation's director of U.K. Operations, based in London. In January 1993, he returned to Singapore to head Steamers Maritime Holdings. **Teo Soon Heo**, Keppel Group

finance director and a director of Steamers, will oversee the company's business operations.

AMSC Names New VP/GM For Satellite Telephone Unit

American Mobile Satellite Corporation (AMSC) has announced the appointment of **Randolph K.**

Piechocki to the position of vice president and general manager of the company's Satellite Telephone Service (STS) division. Mr. **Piechocki** will lead STS's marketing, operational support and program management initiatives. He has been involved in telecommunications for more than 20 years, and prior to receiving his new appointment, served as president of TIE Systems, Inc. Mr. **Piechocki** has also been employed as vice president and general manager of CTG/British Telecom, and as corporate vice president at Teltronics. AMSC offers a wide range of satellite-delivered mobile communications, including telephone, data, fax and position reporting services to the transportation, maritime, land mobile, aeronautical and fixed site markets. The company provides services to the continental U.S., Alaska, Hawaii, Puerto Rico, the Virgin Islands and hundreds of miles of U.S. coastal waters.

For more information on American Mobile Satellite Corporation
Circle 55 on Reader Service Card

Hellespont Steamship Achieves ISM Code Compliance

Hellespont Steamship Corporation has achieved ISM Code certification from the American Bureau of Shipping (ABS). The ABS certificate for ISM compliance was issued on April 16, following a successful audit, which also forms the basis of Quality Assurance certification for ISO 9002.

The Hellespont fleet is commercially managed by Piraeus-based Seatrap Tankers Inc., which is represented in London by Papachristidis Ltd. and Seatrap (U.K.) Ltd. According to **John Dunn**, managing director of Papachristidis Ltd., Hellespont will achieve ISO 9002 certification within the next three months. "We took this initiative because we wanted to anticipate and exceed the statutory ISM Code requirements which come into force in 1998," said Mr. **Dunn**.

Hellespont Steamship Corp. has a financial interest in 12 oil tankers — six of which are ULCCs over 300,000 dwt — with the rest of the fleet consisting of Aframax vessels of between 80,000 and 100,000 dwt.

For more information on Hellespont Steamship Corp.
Circle 56 on Reader Service Card

Int'l Shipholding Corp. Announces New Appointments

New Orleans, La.-based International Shipholding Corp. (ISC) has announced eight promotions — three on its corporate staff and five

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MARINE TRAVEUFT



COMPANY & PEOPLE NEWS

on the executive staff of its ship management subsidiary, Lash Marine Services, Inc.

At ISC, **Deanie E. Jones** was named vice president, Administration; **Manuel G. Estrada** was named vice president and controller; and **David E. Drake** was appointed to the position of vice president and treasurer.

At Lash Marine, **W. Michael Cameron** has assumed the responsibilities of senior vice president; **Kevin M. Wild** has been named vice president and controller; **Robert K. Lansden** was appointed vice president of Marine Personnel; **Brooke Y. Grehan** was appointed vice president of Claims; and **Grace J. Russell** will assume the responsibilities of Procurement vice president.

For more information on International Shipholding Corp. Circle 57 on Reader Service Card

MMS Names New Israeli Agent

Stamford, Conn.-based Marine Management Systems, Inc. (MMS) has named Totem Plus Ltd., headquartered in Herzliya, Israel, as its distributor to promote and support MMS' products and services to the Israeli shipping market. Totem Plus Ltd. is the latest organization to join MMS' Global Agent Program, a worldwide network of trained, certified agents offering MMS' shipboard information technology to the marine industry. Through the agreement, Totem will add MMS' Fleet Manager Series — an integrated suite of software for PC-based fleet management — to its current product line. Totem, specializing in marine software and control systems, has a product line which includes its Reefer Master for control and monitoring of reefer ships, and Motor Keeper, which provides engine room monitoring and alarm systems.

MMS' Fleet Manager Series offers a practical solution for automating shipboard management functions such as spare parts inventory control, maintenance planning, requisitioning, ship/shore communications and cargo loading, as well as administrative and reporting functions.

For more information on Marine Management Systems, Inc. Circle 58 on Reader Service Card

Welter Joins Network Americas

Louis J. Welter has joined Network Americas, Inc., located in Roselle Park, N.J., as a senior sales executive. He was previously employed as director of Sales and Marketing at Select Cargo Services, Inc., a Sea-Land Service affiliate. Mr. Welter has also worked for Hapag-Lloyd Line. Network Americas is a general

agency company founded in 1993 by former Sea-Land President **R. Kenneth Johns**. The company provides a broad range of containerized intermodal transportation services to commercial and government shippers from points throughout North America, to more than 400 locations in Russia and the Commonwealth of Independent States and Western Europe. In addition to New Jersey,

Network Americas maintains offices in New York City, Baltimore and Alexandria.

For more information on Circle 59 on Reader Service Card

Lang Manufacturing Announces New Hires

Lang Manufacturing, a Red-

mond, Wash.-based commercial and marine cooking equipment manufacturer, has recently announced a number of new hires and promotions.

Randy Scott has assumed charge of national account sales for the West coast. **David Menzimer** was named director of Business Administration, and is in charge of assessing and supervising development of multiple corporate areas,

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Circle 34 on Reader Service Card

COMPANY & PEOPLE NEWS

including pricing and operational and sales business objectives. **David Olsen** was promoted to the position of Western Zone national accounts manager, in which capacity he oversees all regional and national account activities for the zone. **Mark Sparacio** was promoted to national sales manager, Convenience Store Division, and is responsible for overseeing activities within this division and the

Petroleum segment. **Mark Jones** was appointed to Eastern Zone national accounts manager, after four years with the company.

For more information
Circle 60 on Reader Service Card

"K" Line Promotes Mori To Assistant VP

"K" Line America, Inc., an inte-

grated intermodal transportation company linking the Pacific Rim with North America, has appointed **Mamoru Mori** to the position of Liner assistant vice president. He will be responsible for commercial liaison between the Liner Services division and the marketing, pricing and sales functions of the company. Prior to his new appointment, Mr. Mori served as assistant general manager of the same

company division, responsible for overall management of container services.

JMS Establishes Far Eastern Company

James Marine Services, Ltd. will be incorporating a separate company — James Marine Services (Far East) Ltd. — to administer business presently being handled by its Japanese branch office in Kobe. The Far Eastern company will introduce British-manufactured marine products to Japanese and Korean yards.

The new company will be registered in Japan, and will have British, Japanese and Korean directors, namely: **Peter Craggs**, managing director of JMS Ltd.; **Paul Meddle**, manager of the Kobe office; **Terao Sunami** and **Minao Hashimoto**, directors of Sunami Marine Co. Ltd., Japan; and **S.B. Park**, president of Jonghap Maritime Engineering Co. Ltd. of Korea.

James Marine Services, Ltd. supplies marine spares and equipment to the worldwide shipping industry.

For more information on
James Marine Services, Ltd.
Circle 61 on Reader Service Card

Norton Lilly Acquires TheoDavies Marine

Norton Lilly International has announced the extension of its network of agency offices to the state of Hawaii through its acquisition of TheoDavies Marine Agencies in Honolulu, now called Norton Lilly Hawaii. The company represents a number of liner operators serving the islands, and under its specialty division — Kerr Norton Marine — provides services to the cruise ship trade and to bulkship and tanker vessels at Hawaiian ports. Mr. **Frank Abreu**, former president of TheoDavies Marine, has been named president of Norton Lilly Hawaii.

In other company news, Mediterranean Shipping Company (MSC) (USA) Inc. has appointed Norton Lilly International as its U.S. West coast agent for all services. According to MSC company reports, **Nicola Arena**, president of MSC (USA), said that Norton Lilly's strong marketing and operational presence on the West coast will be a natural complement to the MSC organization.

Norton Lilly has also announced that Madrigal-Wan Hai Lines, a Philippines-based shipping line, has expanded its transpacific service to include direct calls at Xiamen in the People's Republic of China, from Long Beach and Oakland, Calif. The line offers scheduled container service and breakbulk services capable of lifting large dimension, non-containerizable cargo, such as trucks, tractors, cranes and yachts.

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COMPANY & PEOPLE NEWS

New Va. Maritime Consultancy To Offer Safety Compliance Services

A new, independent, maritime consulting company — Marine Technology Corporation — has formed in Williamsburg, Va. The company will advise shipyards on strategy matters, as well as provide assistance in selected areas related to operations, facilities and marketing. For example, the company will offer marine safety services, including compliance assistance, response plan development and spill management services, and productivity enhancement programs. **A. Manchinu** is the company president and a partner in the firm, joined by partners **Steinar Draegebo** and **Olav Furnes**.

For more information on
Marine Technology Corporation
Circle 62 on Reader Service Card

Osprey-Acomarit Operations Meet ISM Requirements

Bethesda, Md.-based ship manager Osprey-Acomarit Ship Management, Inc. has met the quality and safety standards of ISO 9002, and Det Norske Veritas' (DNV) Safety and Environmental Protection (SEP) Management standards — standards which exceed those required under IMO's ISM Code. This joint venture company, owned by American Automar, Inc. and international ship management and consultancy group Acomarit, is reportedly one of the first U.S.-based ship managers to attain this accreditation.

American Automar's U.S.-flagged M/V *Cormorant* has also been certified to DNV's SEP standard. This semi-submersible, heavy-lift vessel participates in the U.S. Navy's prepositioned fleet under charter to the Military Sealift Command.

In other company news, Osprey-Acomarit has been contracted with managing the reactivation and operation of 32,000-dwt, U.S.-flagged, clean product tanker *Falcon Leader*.

For more information on Osprey-Acomarit Ship Management, Inc.
Circle 63 on Reader Service Card

Dubai Drydocks Earns ISO Certification

French classification society Det Norske Veritas (DNV) has certified Dubai Drydocks for ISO 9002 standards. The accreditation, which was ratified by the U.K. National Accreditation Council for Certification Bodies, was the culmination of two years of efforts directed towards formalizing the yard's operating systems covering

23 departments and functions.

The yard's certification is valid for drydocking facilities and ship repair work, including pipework, steelwork, galvanizing, internal and external hull treatment, mechanical and electrical repairs and ancillary services.

For more information on
Dubai Drydocks
Circle 64 on Reader Service Card

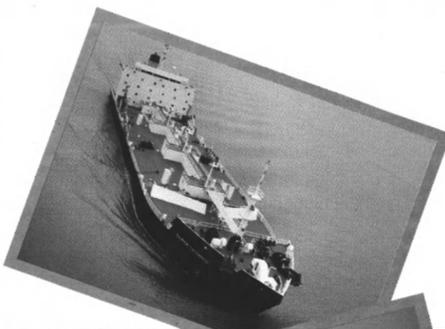
CIT Group Makes Executive Appointments

The CIT Group/Capital Equipment Financing, located in N.Y., N.Y., has announced several new appointments. **Terrence McNamara** has joined the company as vice president, district manager. **Julie Rogers**, **Thomas W. Boegel** and **V. Michael Salatino** have

joined the company as district managers.

The CIT Group/Capital Equipment Financing is involved in financing different types of specialized equipment, evaluating financing alternatives and custom designing programs to meet the needs of companies in the transportation industry.

For more information
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McDermott is a leading U.S. builder of brown-water barges, including construction of fuel, bulk and hopper barges at its Morgan City Shipyard in Louisiana.

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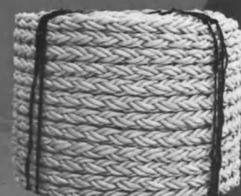
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7"	662 LBS.	66,000 LBS.	720 LBS.	113,000 LBS.	1,130 LBS.	138,000 LBS.	979 LBS.	137,000 LBS.
8"	864 LBS.	86,000 LBS.	943 LBS.	145,000 LBS.	1,469 LBS.	178,000 LBS.	1,267 LBS.	176,000 LBS.
9"	1,102 LBS.	110,000 LBS.	1,188 LBS.	183,000 LBS.	1,858 LBS.	220,000 LBS.	1,606 LBS.	219,000 LBS.
10"	1,388 LBS.	131,000 LBS.	1,476 LBS.	222,000 LBS.	2,290 LBS.	270,000 LBS.	1,980 LBS.	268,000 LBS.

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Circle 206 on Reader Service Card

COMPANY & PEOPLE NEWS

TT Club Appoints New Divisional Directors

Through Transport Mutual Services (U.K.) Ltd., responsible for management of the TT Club, has announced the appointments of five new divisional directors — **David Barnett**, **Louise Bradley**, **Annie Filar**, **Ian Hyslop** and **Brian Wood**.

Mr. **Barnett** has worked within the Club's Finance department for eleven years, and is responsible for day-to-day accounting functions and preparing financial reports, regulatory returns and financial accounts for the board. Ms. **Bradley** joined the TT Club in 1986, and is the principal underwriter working in the French, German, U.K. and Irish markets, and has a particular interest in port authorities and vessel operators. Ms. **Filar** joined the Club in 1982 and specializes in the Benelux market and the underwriting of freight forwarders. Mr. **Hyslop** has been with the Club since 1990, specializes in claims in the Baltic states and Middle East, assists in the Loss Prevention program, and was responsible for writing the Club's claims manuals. Mr. **Wood**, vice president of Bradshaw Insurance Services in Miami, is responsible for the Central and South American markets. All appointments came into effect at the beginning of the year.

For more information on the TT Club
Circle 66 on Reader Service Card

Totem Resources Appoints New Board Members

Totem Resources Corporation (TRC) recently announced that **Morris Thompson**, president and CEO of Fairbanks, Alaska-based Doyon, Ltd., and **Ev Trout**, retired vice president of Sales and Operations for TRC's Seattle subsidiary Totem Ocean Trailer Express, Inc. (TOTE), will serve on the company's board of directors.

In the past, Mr. **Thompson** served as special assistant to the Secretary of the Interior during the Nixon Administration, and as director of the Bureau of Indian Affairs in the Juneau area office. He is also a past vice president of Northwest Alaska Pipeline Company.

Mr. **Trout** served in the U.S. Navy where he was the officer in charge of the last PT boat in naval service. He worked in heavy haul trucking as a corporate consultant and part owner before joining TOTE as a marketing representative in 1976. He has served as chairman of the Maritime Committee of the Greater Seattle Chamber of Commerce, and currently chairs the Odyssey Contemporary Maritime Museum capital campaign.

TRC was founded in 1982 by a group of Northwest investors who acquired Alaskan shipping company TOTE from Sun Co. TOTE

operates three RoRo cargoships exclusively in the Alaskan trade between Tacoma and Anchorage.

Kilgore Joins TOTE's Alaskan Sales Force

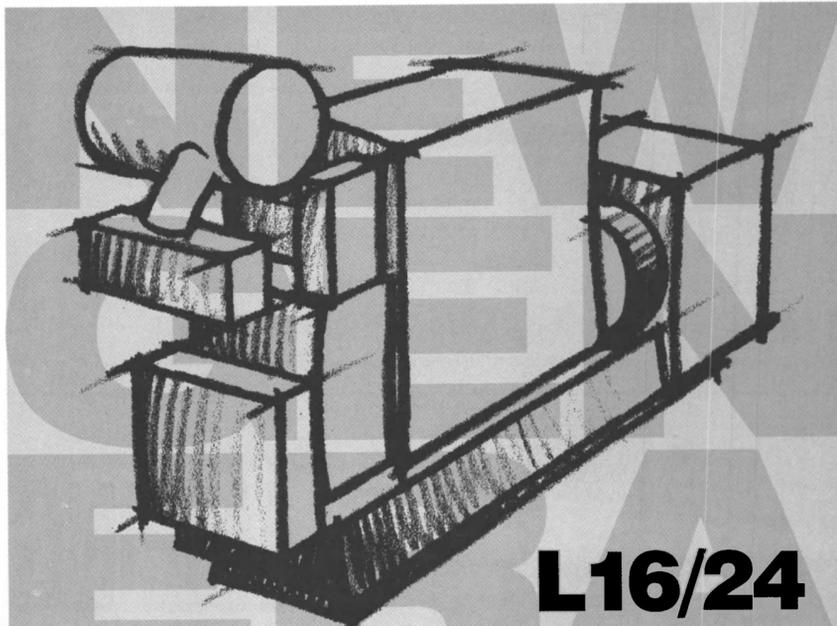
Patrick Kilgore has joined the Alaskan sales force of Totem Ocean Trailer Express, Inc. (TOTE). Prior to this move, he was

employed by Crowley Marine Services as a senior account executive in the company's Petroleum Division in Anchorage. Mr. **Kilgore** has also worked for several other Crowley subsidiaries, including Pacific Alaska Fuel Services, Puget Sound Tug and Barge and Kuskokwim Transportation Co.

In other company news, **Jack Martin**, TOTE's vice president of

Human Resources and Administration, was selected by Green River Community College in Auburn, Wash., to chair the Transportation Advisory Committee of its General Council Advisory Committee. Mr. **Martin** will act as a curriculum consultant and evaluator in an effort to keep courses on target for students choosing to work in the transportation field. TOTE is an Alaskan corporation

The first of a new generation



L16/24

MAN B&W Holeby announces the L16/24 GenSet, a family of engines that delivers 500-900 kW at 1,200 rpm they are the first of a new generation. Your first look will tell you that it is a very special GenSet. You will be surprised by its clean, streamlined exterior, uncluttered by tubes and pipes. You will be even more surprised when you discover the many technical innovations we have built in to make it the most cost-effective GenSet in its class. State-of-the-art computer-aided engineering has been used to create a compact, easily maintained engine which uses the same inexpensive heavy

fuel oil as the vessel's propulsion engines. With optimal efficiency across the entire power spectrum, from idle to full load, including the start/stop phase. MAN B&W Holeby has been producing fine diesel engines since 1910. Engines renowned for their reliability, operating economy and ease of maintenance.

That is why we can say with confidence that the L16/24 sets the standard for the auxiliary diesel engines that will provide power for the world's merchant fleet long into the 21st century.

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Østervej 2, DK-4960 Holeby. Telephone: +45 54 69 31 00

HOLEBY
GENERATING SETS

Circle 306 on Reader Service Card

COMPANY & PEOPLE NEWS

which provides RoRo cargo transportation between Seattle and Tacoma, Wash., and Anchorage, Alaska, with connections throughout greater Alaska, the continental U.S. and Canada.

Marine Loudspeaker Co. Names California Sales Rep

Technomad, Inc., of Northamp-

ton, Mass., announced the appointment of New Times Marketing as its exclusive sales representative organization for Southern California. Technomad manufactures a line of high-performance, fully weather and water resistant loudspeakers that reportedly meet military specifications 810E and ATA III. Current applications include installation on cruise ships, casinos, seaside resorts, and other gov-

ernment and military applications. For more information on Technomad Circle 67 on Reader Service Card

Chevron's Oronite Division Announces Management Changes

Houston, Texas-based Chevron

Chemical Company has recently named **James R. Lieto** to the position of vice president of its Oronite Additives Division. He succeeds **John Sanders**, who has retired after 37 years of service. Prior to assuming his most recent appointment, Mr. Lieto managed the division's Americas Region, and in the past, has also held the position of vice president and general manager of Chevron Chemical's Consumer Products Division.

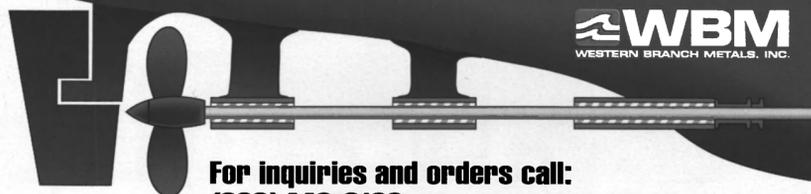
Terrell R. Street will replace Mr. Lieto as regional manager of the Americas Region. He was previously employed as general manager of International Business Development for Chevron Chemical.

For more information on Chevron Chemical Company Circle 68 on Reader Service Card

Western Branch Metals

America's Number One Source for Quality AQUAMET Boat Shafting

Around the country and around the world, the marine industry turns to Western Branch Metals for AquaMET boat shafting. Stocking the full line of AquaMET shafting: AquaMET 17, 18, 19 and 22 in all sizes from 1" to 7", no other company can ship out a shaft faster than Western Branch.



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You asked for solutions to combat the effects of shock, surge and vibration. **WE LISTENED!**

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Evergreen Expands Services In Caribbean And Miami

Evergreen Marine Corporation has commenced service from the Port of Miami, connecting shippers to its eastbound and westbound round-the-world routes, and expanding its Caribbean regional container network. The company has also added the Costa Rican Port of Puerto Limon to its global network. Two additional feeder vessels were introduced for this new service, which connects the Caribbean and many ports served by Evergreen in North America, Europe and Asia.

Libra Opens Private Brazilian Container Terminal

The Libra Group, parent company of Nacional Line, has taken the initiative towards easing congestion, improving turnaround times and restructuring activities in the Port of Santos, Brazil, with the opening of a private container terminal — Terminal 37. The facility is reportedly the only private marine terminal of any kind at the Port. Libra was awarded the contract to operate the 500,000-sq.-ft. Terminal 37 for 20 years, with a provision to extend for a second 20-year term. The terminal will be fitted with state-of-the-art equipment and machinery in order to move containers quickly through the Port and beyond. Ultimately, the terminal will have the capacity to handle in excess of 100,000 containers annually.

In an exclusive agreement with the Sao Paulo State Port Authority, Libra, Paulista and Nacional vessels will receive priority berthing to ensure economic and efficient operation. This marks the first phase of the privatization of government-owned port facilities, part of a move that has been legislated by the Brazilian government for the purpose of modernizing its ports.

COMPANY & PEOPLE NEWS

Wallenius Delivers 100,000th Deere Unit At Galveston

Earlier this year, Woodcliff Lake, N.J.-based Wallenius Lines' M/S *Aida* delivered the 100,000th Deere & Company unit at the Port of Galveston. The unit, a special tractor, was driven aboard *Aida* in Antwerp, Belgium, by **Richard Ruf**, general manager of Deere Tractor Works, Mannheim, Germany.

According to **Ernest Connor**, general manager of the Port of Galveston, "Galveston is the Gulf of Mexico operations center for Wallenius Lines, and because of Wallenius, Galveston is the leading Gulf port for mobile machinery."

With the shipment, Wallenius Lines and Deere & Co. marked a milestone in their business relationship. Deere & Co., the Illinois-based manufacturer of agricultural machinery, has been shipping tractors on Wallenius' vessels for three decades. Units manufactured at the Mannheim work factory are transported on the Rhine River to Antwerp, where they are driven aboard RoRos destined for the U.S.

The Port of Galveston is located 30 minutes from the open sea at the mouth of Galveston Bay, and has facilities capable of handling all types of cargo, including containers, import and export dry bulks, breakbulk commodities and a variety of mobile machinery.

ASME Recognizes Aqua-Dyne For Engineering Achievements

Earlier this year, the Petroleum Division of the American Society of Mechanical Engineers (ASME) awarded its Thayer Mechanical Engineering Achievement Award to Houston, Texas-based Aqua-Dyne, Inc., largely due to the company's development of a patented recycle tank cleansing system. The tank cleansing system reportedly removes and separates heavy sludge from tanks without manual entry. Aqua-Dyne has stated that the equipment is capable of breaking down heavy asphalt sludge into oil, water and solid residues which contain less than two percent residual hydrocarbon content.

Aqua-Dyne manufactures pumps and waterjet cleaning units and custom systems, used for removing coatings from ship hulls, concrete and manufacturing equipment, and for removing mineral deposits in heat exchangers and water lines. The company's new waterjet cutting system operates at 35,000 - 20,000 psi, and uses inexpensive copper slag as the abrasive.

For more information on
Aqua-Dyne, Inc.
Circle 69 on Reader Service Card

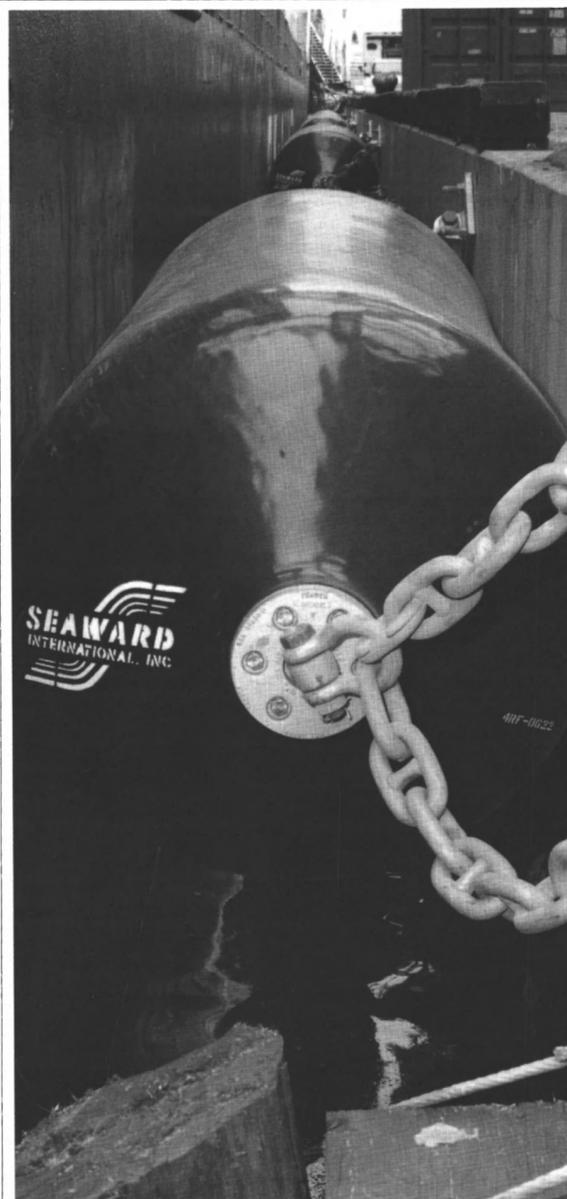
ASNE Day Features Presentation Of 1995 Awards

The American Society of Naval Engineers (ASNE) recognized the society's 1995 award recipients at its annual ASNE Day conference, held in Washington, D.C., in March. Among those recognized

were: Cdr. **Kurt Harris**, UNS; **Carl O. Brady**, General Electric Co.; **Kurt Yankaskas**, Naval Sea Systems Command; **Thomas C. Slotwinski**, Applied Measurement Systems; **Donna S. Walker**, ASNE Tidewater Section; **Laurence R. Dutton**, former chief design engineer, Norfolk Naval shipyard; and **Roger H. Compton**, U.S. Naval Academy. The ASNE Annual Awards

Program recognizes individuals who have made significant contributions to the field of naval engineering through personal involvement, research, scholarly publications, service to the society and lifetime achievement.

What application does the Internet
have in the maritime industry?
Turn to page 92 to find out



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Large or small, floating or fixed, Seaward SEA GUARD® fenders cover you from the tropics to the arctic. Seaward International brings to fender technology the same rigorous quality control and attention to detail we put into all our marine products. From the 2'x4' to the tanker-scaled 12'x24', all our fenders meet the most stringent quality and performance standards.

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**Harland And Wolff
Awarded Bluewater FPSO
Conversion Contract**

Harland and Wolff Shipbuilding and Heavy Industries Ltd., Belfast, Ireland, has been awarded a major contract by Bluewater to convert double-hulled oil tanker *Glas Dour* into a Floating Production, Storage and Offloading (FPSO) vessel. Harland and Wolff will be responsible for marine conversion, including; moonpool fabrication and turret installation; fabrication and installation of an elevated process facilities deck and flare tower; removal of redundant equipment and the installation of additional equipment; upgrading of existing systems and accommodation to U.K. North Sea standards; and installation of offloading equipment to enable the transfer of crude oil from FPSO to shuttle tanker.

Work on the vessel was scheduled to begin immediately and to last approximately 24 weeks.

Following conversion, the 105,000-dwt oil tanker will have an oil storage capacity of approximately 660,000 barrels, and a process plant with a maximum output of 60,000 bhp. The vessel will be leased by Amerada Hess from Bluewater for use in its Durward and Dauntless discoveries in the central North Sea.

"We are delighted to have secured this major conversion contract in the face of strong international competition involving a number of yards worldwide. This contract consolidates the position of Harland and Wolff as an FPSO contractor for both major conversions and newbuildings," said **Per Nielsen**, chief executive of Harland and Wolff.

For more information on
Harland and Wolff

Circle 101 on Reader Service Card

**Walz & Krenzer Awarded
Multiple Cargo Access Door
Contracts**

Walz & Krenzer, Inc., located in Locust Valley, N.Y., has been awarded several contracts for cargo access doors. The company delivered two sideports and a stern door to Todd Pacific Shipyard of Seattle, Wash., for Alaska Highway ferry *M/V Taku*. Halter Marine of Pascagoula, Miss., has also contracted for the design and supply of sideports, hinged deck sections and personnel access sliding doors for an Alaska Highway ocean class RoRo. Currently on the design board are 18 x 12-ft. (5.4 x 3.6-m) multi-panel fire doors and 18- x 18-ft. weathertight doors being supplied to Avondale Shipyard of New Orleans, La., for its new Construction Sealift Program. Hydraulic cargo hatches are also being supplied to the yard for the U.S. Coast Guard Ice-

breaker program.

The Long Island company is also busy in the self-unloading vessel field. A three shipset contract from Seabulk Systems Inc. of Richmond, B.C., has been received for the design and supply of conveyor belt sliding doors and personnel access sliding doors for three ships being built by Jiangnan Shipyard in China. Walz & Krenzer and Seabulk Systems will be working jointly on both the design and sup-

ply of these state-of-the-art conveyor belt doors. In addition, two shipsets of watertight conveyor belt doors are being supplied to the Stephens-Adamson Division of Sveaala Industries Canada, to be installed on vessels operating in the China Sea.

For more information on
Walz & Krenzer, Inc.

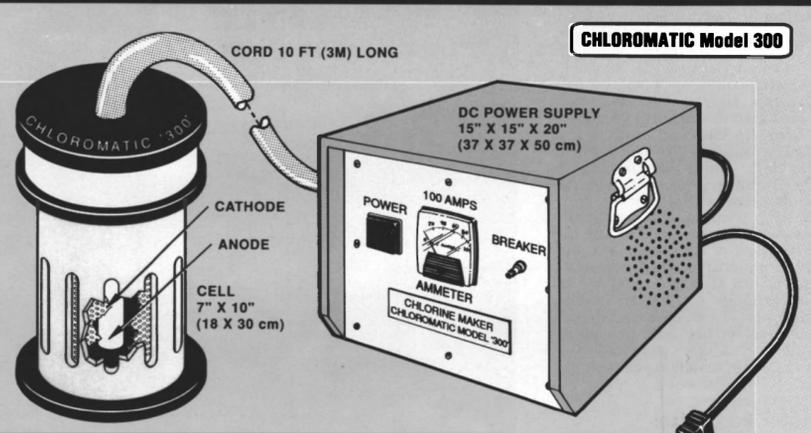
Circle 102 on Reader Service Card

**Court Ruling Victory For
Lykes**

Lykes Bros. Steamship Co. chalked up a victory on May 8 when Chief Judge **Alexander L. Paskay** ruled against a motion filed earlier in the same week by a secured creditor group holding prepetition claims of approximately \$13 million against Lykes. Earlier,

Make Powerful Monatomic Liquid Chlorine Bleach

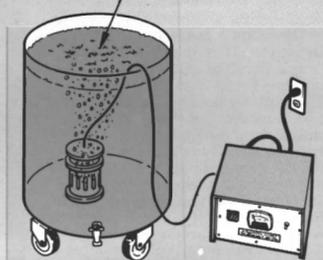
From Water (H₂O) and Salt (NaCl) or Plain Sea Water for 3 Cents per Gallon
FAST * PORTABLE * SAFE * SIMPLE * ECONOMICAL * EASY TO OPERATE



The sole purpose of this equipment is to separate water (H₂O) and salt (NaCl). Due to the nature of our multipatented anodes, powerful oxidants such as ozone and hydroxyl radicals are produced. This is not possible with other chlorine generators. The monatomic chlorine and oxygen produced is much safer than commercially available chlorines, and more effective in bleaching, sterilizing (not just disinfecting) and oxidizing. Model 300 also produces small amounts of caustic soda which acts as a stabilizing agent. To extend its shelf life, additional stabilizing agents may be added. For high purity chlorine, use distilled water and chemically pure NaCl.

INPUT: 220 VAC
OUTPUT: 10 VDC 100 Amps, 1 KWH

SEPARATING SALT WATER
OR SEA WATER TO MAKE
MONATOMIC CHLORINE



HOW TO OPERATE MODEL 300:

Fill the plastic tank with 50 gallons (400 L) of water. Add from 1 to 10% industrial grade salt (NaCl). Immerse the cell into the saline mixture as illustrated. Activate the DC power supply. To increase the monatomic chlorine concentration (measured in ppm or mg/L) increase the amount of salt and the time of operation, until all of the salt has been electrolyzed. Chlorine concentration can be into the thousandths.

MAINTENANCE:

Eventually a white crusty layer of calcium will form upon the perforated electrode. To dissolve the calcium, simply immerse the cell into a 35% concentration of hydrochloric acid (HCl). In most cases, the procedure only takes a few minutes.

Model 300 is our small production model. We manufacture ten other models with capacities up to 50,000 gallons (200 M3) per day.

PLASTIC TANK SHOWN:
50 gallons (200 liters)

March 1995
Manufacturing Electrochemical Equipment in the United States of America Since 1960



BRINECELL, INC.

Mailing Address: P. O. Box 27488, Salt Lake City, Utah 84127 U.S.A.
Offices: 2109 West 2300 South, Salt Lake City, Utah 84119 U.S.A.
Telephone: (801) 973-6400 • Toll Free: (800) 973-4603 • Fax: (801) 973-6463

on April 23, the group had reportedly entered into an agreement with Lykes whereby Lykes would pay the lender group approximately \$3 million between April 23 and August 31. Lykes had reportedly already paid approximately \$750,000 to the secured creditor group during the Chapter 11 case. Shortly after the secured creditor group filed a motion to convert the case to Chapter 7, the bankruptcy court began to hear evidence.

Conversion was opposed by all creditors present, except the secured bank group. Genstar Container Corp., Transamerica Leasing, New Orleans Marine Contractors, Stevedoring Services of America, South Carolina State Ports Authority, the Port of Houston and American President Lines were reportedly among the creditors opposing conversion. Numerous witnesses, including Charles A. Sadoski, chairman of

the Unsecured Creditors' Committee, and Ernst & Young accounting firm partner Mark A. Hopkins, testified that Lykes has the ability to successfully complete its reorganization.

Ruling on the motion, Judge Paskay stated: "There is hardly any doubt that a conversion at this time would not only be premature, based on these factors, but would not be in the interests of the general estate, nor upon serious reflec-

tion, in the interests of the banks."

Offering comment on the ruling, Lykes President Joe B. Freeman stated: "This is not just a victory for Lykes, it's a resounding victory for the legal process that prevents one creditor from seeking to gain any special advantage in a reorganization case. With today's ruling, Lykes' customers, vendors and other business partners can expect continued progress as we work toward completing our reorganization successfully."

Cost Comparison of Commercially Available 5.25% Sodium Hypochlorite (NaOCl) To the Equivalent Free Chlorine (Cl₂) Produced by Brinecell Model 300:

SODIUM HYPOCHLORITE (NaOCl)

By itself, NaOCl is useless. It becomes valuable when put to use. It then decomposes, releasing atomic chlorine (Cl). The molecular weight of NaOCl is 74 as follows: Na = 23, O = 16, Cl = 35. Therefore, the maximum possible atomic chlorine (Cl) in NaOCl is 48%. The concentration of most commercially available NaOCl is 5.25% when freshly made. At that concentration, the maximum available atomic chlorine (Cl) is 25,200 ppm (mg/L). However, the available free chlorine (Cl₂) is only half that, or 12,600 ppm (mg/L).

The cost of 1 gallon (4 L) NaOCl is anywhere from \$0.80 to \$3.00, depending on location.

BRINECELL MODEL 300 (Using proper full-wave DC power supply)

The scientific principle employed to produce free chlorine (Cl₂) is electrolysis. That is the separation of salt (NaCl) and water (H₂O) into their basic elements: sodium, chlorine, hydrogen and oxygen. The Cl₂ comes from the salt (NaCl). Brinecell Model 300 will electrolyze (produce) 50 gallons (200 L) of water seeded with 10% NaCl into at least 4,000 ppm (mg/L) of Cl₂. The total cost in energy, salt and water is less than \$1, or \$0.02 per gallon (4 L) Cl₂.

Thus, the Brinecell Model 300 produces free chlorine (Cl₂) at less than 1/3 the cost of NaOCl.

Due to our multipatented electrodes the Cl₂ produced by Brinecell Model 300 is much safer, and more potent and effective than the equivalent Cl₂ in NaOCl.

Oxidation of Organic Compounds Using the Brinecell Electrolysis System:

We at Brinecell, Inc. have invented and patented an electrode making process in which solid metals are fused as one to produce electrodes with many years of life. They have the ability to carry voltages as high as 250 and power up to 100,000 Watts, operating 24 hours per day. Recirculating capacities range from 15 gpm (60 L) to 2,000 gpm (16 M³).

Some of the most important oxidants which are liberated in aqueous brine solutions with Brinecell electrodes include nascent ozone, nascent chlorine, and their respective hydroxyl radicals. Spontaneously liberated and working synergistically, these powerful oxidants are extremely economical and effective in oxidizing industrial and municipal effluents laden with all types and amounts of oxidizable organic compounds. Oxidation is to carbon dioxide (CO₂) and water (H₂O).

Time of oxidation depends upon the stability and concentration of the compounds, volume of effluent, concentration of NaCl used, pH manipulation, time of recirculation, size and model of Brinecell equipment used, and the voltage applied. The higher the NaCl concentration and voltage, the faster the oxidation rate.

Electrolytically activated sodium chloride solutions, using Brinecell electrodes, are extremely effective for use in the rapid bleaching of paper pulp, as well as cottons and synthetics. Because of the powerful oxidant mixture, bleaching time can be reduced to minutes with the temperature kept at or near 20°C. That way, extremely small amounts of chlorinated organic compounds are formed. Since the electrolyzed solution can destroy such compounds, treatment of the effluent with this solution would reduce the level of chloro-organic compounds even more, rendering it safe for legal discharge. In some cases, the used solution can be recycled—zero discharge.

Besides industrial uses, Brinecell electrodes have been in use since 1960 sterilizing drinking water, swimming pools, water cooling towers, industrial effluents, infectious medical waste, etc. The applications are virtually endless.

March 1995
Manufacturing Electrochemical Equipment in the United States of America Since 1960



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Mailing Address: P. O. Box 27488, Salt Lake City, Utah 84127 U.S.A.
Offices: 2109 West 2300 South, Salt Lake City, Utah 84119 U.S.A.
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Circle 22: on Reader Service Card

Amsterdam Repair Facility Names U.S. Agent



Pictured from left to right are Geometric's John Weldon and Fland Sharp.

Shipdock Amsterdam has announced the appointment of Geometric Marine Services of Neptune Beach, Fla., as its U.S. agent. Shipdock is a repair facility located in Amsterdam Harbor in the Netherlands, offering four drydocks with up to 85,000-dwt capacities and repair berths up to 1,377.9-ft. (420-m) in length. Geometric also reportedly represents Albwardy Marine Engineering in Dubai, Arsenale Venezia in Italy, Braswell Shipyard in Panama, and Cammel Laird in the U.K.

For more information on

Geometric Marine Services

Circle 103 on Reader Service Card

Isotta Fraschini Enters U.S. Commercial Market

Italy's Isotta Fraschini Motori, S.p.A. has been a supplier of diesel engines for the U.S. Navy's minewarfare fleet for more than a decade, and during the past year, has made its debut in the U.S. commercial market. The company is offering its 1300 Series engines, with hp ratings from 500-1,060, and speeds ranging from 2,400-2,700 rpm. This series reportedly offers an excellent weight-to-power ratio, without sacrificing reliability and maintainability.

FDGM, Inc., the fully-owned subsidiary of Isotta Fraschini, located in Chesapeake, Va., has joined forces with Carey's Diesel, Inc. of Dover, Del., to act as the distributor for the new 1300 Series engines. An entire network of dealers along the U.S. eastern seaboard will be made available for the provision of spare parts and service.

For more information

Circle 105 on Reader Service Card

SERVICE STARTS BEFORE YOU SAIL AWAY!



ODYSSEY III



Service Marine Industries is an established leader in the design and construction of vessels for the dinner and passenger vessel industry. Serving cruise industry clientele with discerning tastes and specific requirements for safety, customer service and product support after receiving their vessels, SMI passenger vessels are currently serving satisfied customers in most American ports.

"One Of Two Service Marine Industries Designed And Built Vessels Awarded Passenger Vessel Of The Year By Maritime Reporter."

DESIGN FEATURES:

Length Overall: 240'-0"
Breadth, Hull: 47'-0"
Breadth, Main Deck: 63'-0"
Draft, Full Load: 5'-9"
Air Draft: 16'-6"
Gross Tonnage: Less than 100 GT
Passengers: 600 passengers
Crew: 70 Crew

Propulsion Machinery: Supplied by two Caterpillar 3412 DIT "B" 540 B.H.P. at 1800 RPM diesel engines, air starting, keel cooled. The bow thruster is driven by a CAT 3116 DITA, 300 BHP @ 2800 RPM. Main engines are mounted utilizing LoRez coupling and mounting system.
Main Generators: One CAT 3412 rated @ 500 EKW @ 1800 RPM. One CAT 3408 rated @ 350 EKW @ 1800 RPM.

Air Conditioning: Two Carrier, 100 ton liquid chillers with CU/NI shell and tubes.

Heating: Strip heaters located on duct work.

Tankage (approx.): 8,000 gallons fuel 13,000 gallons fresh water, 11,000 gallons sewage, 100 gallons lube oil.



Service Marine Industries, Inc.

A Full Service Shipyard at Mile 88.5 on the Intracoastal Canal
P. O. Box 3606 • Morgan City, Louisiana 70381
Telephone (504) 631-0511 • Fax (504) 631-0036

Circle 350 on Reader Service Card

Recent Ship Sales

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

Date Reported	Vessel Name	Vessel Type	DWT	Year Built	Sale Price (M)
5/7/96	Couper	Bulker	16,687	71	\$9
5/13/96	Leontus	Bulker	17,016	71	\$1.5
5/7/96	Gova	Bulker	17,726	77	\$3.1
4/29/96	Ocean Garuda	Bulker	17,727	81	\$4.25
5/10/96	Clipper Dream	Bulker	18,300	86	\$8
5/7/96	Rubies	Bulker	18,352	77	\$3.5
4/26/96	Kakushima	Bulker	21,654	85	\$9.1
4/22/96	Polarqueen	Bulker	21,978	84	\$9
4/29/96	Ever Access	Bulker	25,299	70	\$2.5
4/22/96	Tupi Ilha Bela	Bulker	26,223	81	\$4.9
5/10/96	Aspis	Bulker	27,000	75	\$4.1
5/13/96	Sanka Peace	Bulker	27,562	84	\$10.9
4/29/96	Flecha	Bulker	30,909	74	\$4.9
4/22/96	Soldrott	Bulker	34,889	73	\$3
5/10/96	Fortune Bay	Bulker	38,400	74	\$3.8
5/13/96	Chkalovsk	Bulker	39,407	78	\$7
4/29/96	Western Village	Bulker	41,084	85	\$13.5
4/22/96	Bulk Galaxy	Bulker	42,586	85	\$13.5
4/29/96	Toscana	Bulker	50,202	76	\$5
4/26/96	Callisto	Bulker	62,593	73	\$3.4
4/29/96	Infra	Tanker	12,734	85	\$14
5/10/96	Verdi	Tanker	32,214	75	\$4.9
4/22/96	Nissos Therasia	Tanker	90,841	79	\$7.35
4/22/96	Sologne	Tanker	135,500	77	\$7.25

Hyundai Merchant Marine Selects Port Of Tacoma

The Port of Tacoma received notice from Hyundai Merchant Marine that the company intends to move to the Port of Tacoma.

The Port of Tacoma has been talking to Hyundai for more than two years concerning terminal, intermodal facility and expansion opportunities. Hyundai recently expressed intent to occupy the Port's West Blair Terminal, a new 50 to 100-acre container terminal that the Port is developing on the Upper Blair Waterway. The development cost for the new terminal is approximately \$65 million.

The Port's recent dredging, deepening and widening work on the Blair Waterway, along with the removal of the Blair Bridge (planned for early 1997) all help set the stage for additional Port growth on the Upper Blair.

Alliance Newfoundland To Perform Design Study For Terra Nova Field

Alliance Newfoundland, a consortium including Fluor Daniel Inc., was selected by Petro-Canada to perform a design study for the Terra Nova oil field development, located in the Grand Banks area off the east coast of

Newfoundland, Canada. The Terra Nova oil field is estimated to have 400 million barrels of oil reserves. The Fluor Daniel-led team is comprised of four leading companies who have experience in offshore field development under harsh environmental circumstances. The alliance will conduct technical work to identify the optimum floating production system for developing the Terra Nova oil field. Petro-Canada has selected three alliance teams for the competitive design study and will chose the preferred development option and alliance group by early 1997. Members include:

- Fluor Daniel Canada, Inc., the overall project manager, which will provide engineering and construction services to the project;
- Maersk Company Canada Ltd., a leader in the exploration for and production of oil and gas, and shipbuilding, aviation and electronic data process services;
- Bouygues Offshore, one of the world's largest construction conglomerates known for its experience in the design and construction of concrete floaters, both semisubmersibles and monohulls;
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Herberger: Title XI Critical To Continued U.S. Commercial Shipbuilding

To help ensure that the commercial shipbuilding rebound continues in the U.S., Maritime Administrator Radm. Albert Herberger recently testified before the Subcommittee on Commerce, Justice, State and Judiciary of the Committee on Appropriations of the U.S. House of Representatives, to propose the

Maritime Administration's (MarAd) FY '97 budget request. A centerpiece of his presentation was the request for \$44 million to fund and administer the Title XI loan guarantee program.

According to the Maritime Administrator, "The Maritime Administration's fiscal year 1997 budget request reflects the

President's commitment to maintaining the status of the United States as a maritime nation." He further added, "In the absence of timely sealift, the strategic concept of power projection of heavy forces and global reach will be merely hypothetical. The commercial U.S.-flag fleet is a cost-effective source of military sealift."

Military Security Program

According to MarAd, a key element of this year's budget is the Maritime Security Program (MSP). The organization contends the new program will foster a modern, competitive American merchant marine at substantially lower costs than the existing operating-differential subsidy (ODS) program and seeks to ensure the continued operation of merchant ships under the American flag. The program also provides supplemental sealift capacity and an intermodal system which can be made available when needed to support the nation's armed services.

MSP will be financed by budget authority subject to annual appropriations, and MarAd is requesting \$100 million for FY '97 to support this critical program.

The MarAd budget also supports the National Shipbuilding Initiative (NSI) through its funding requests for Title XI and research and development programs. With the enactment of this initiative, MarAd is seeking an unprecedented increase in commercial shipbuilding projects.

Since the enactment of NSI in 1993, MarAd has approved more than \$1.5 billion of Title XI financing for 144 vessels and three shipyard modernization projects as of February 23, 1996. Included among these approvals were 13 double hull tankers. MarAd contends that the funding for the cost-shared, cooperative research and development program will not only help the U.S.' economic trade and national security interests, it is necessary for helping U.S. yards effectively contend with international competitors.

An appropriation of \$44 million is requested for subsidy costs and administrative expenses associated with new loan guarantee commitments for FY '97. Of the total, \$40 million is required to cover subsidy costs and \$4 million is to cover administrative costs. These resources will permit loan guarantees of about \$570 million during FY '97 to strengthen America's shipyards and introduce newer, more efficient ships into the fleet.



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Ptemus Approved To Sell Tanker

Ptemus Brothers Shipping, Inc. received approval to sell 20,020-gt tanker *Sabine* to Amber Sea Navigation, a Maltese corporation. The vessel will be transferred to Belize registry.

Lykes Given OK To Sell Barge

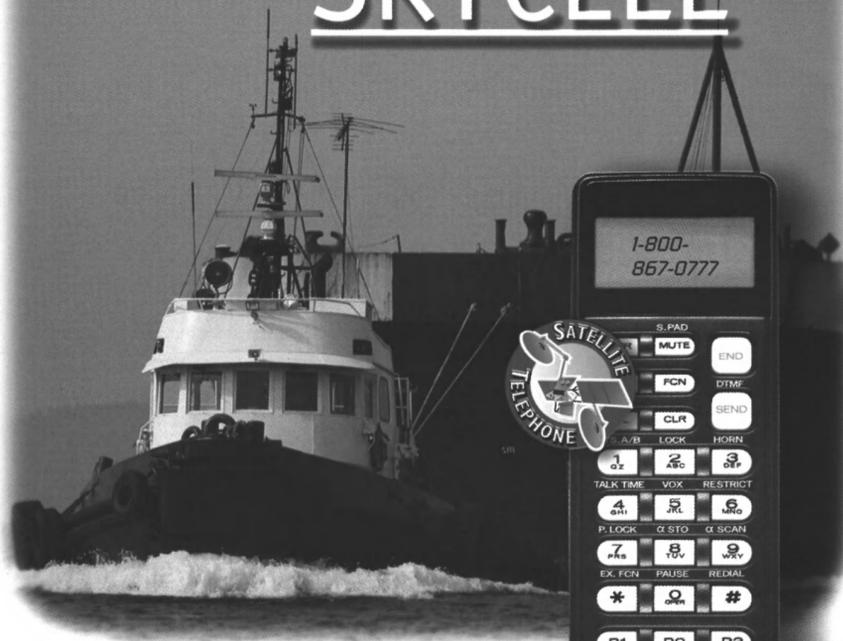
Lykes Bros. Steamship Co. received approval to sell 10,796-gt barge *Lykes Innovator* to Desguaces Metalicos Y Rela-

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minables S.A. de C.V., a Mexican corporation. The vessel, built in 1960 in Pascagoula, Miss., will be scrapped in Mexico.

Deepflex Seeks To Change Registry Of Offshore Unit

Deepflex Production Partners L.P. has asked permission from MarAd to transfer the 9,956-gt

mobile offshore drilling unit *FPS Laffit Pincay* to Bahamian registry. The vessel, built in 1976 in Brownsville, Texas, would be used in mobile offshore drilling.

Weston Asks To Transfer President Harrison To Domestic Trade

MarAd has received an applica-

tion from Weston Shipping Inc. for temporary written consent to transfer the containership *President Harrison* to the domestic trade from June 1 through November 30, 1996. The vessel was built with the aid of construction-differential subsidy (CDS).

According to Weston, the vessel will be Jones Act-eligible on November 30, 1996. In addition, American President Lines' (APL) bareboat charter will end on July

31, 1996. APL has advised Weston that it will not renew its charter. Therefore, Weston notes if the request is granted, it will attempt to immediately employ the vessel in the Puerto Rican trade and terminate the remaining charter with APL.

Fishing Vessel Sale Approved

Fishing Vessel North Wind, Inc. was given approval to sell 469-gt fishing vessel *Egabrag III* to Ilyon Investment, Ltd., a Cyprus corporation. Built in 1964 in New Orleans, the vessel will ultimately be transferred to Russian registry.

Lykes Ok'd To Start Subsidized Voyage

MarAd and the Maritime Subsidy Board have approved a request from Lykes Bros. Steamship Co. to commence its initial subsidized voyage of the Pacific class vessel *President Garfield* (to be renamed *Stella Lykes*) in Fujayrah, United Arab Emirates, upon re-delivery following a bareboat charter to American President Lines (APL).

In addition, APL has been given permission to terminate the vessel's final chartered voyage in the same foreign port.

Currently, the vessel is operating on a foreign-to-foreign feeder service between Kaohsiung, Taiwan and Fujayrah. The board noted that Lykes is required to enroll its Pacific class vessels in the Sealift Readiness Program in order to be eligible for operating-differential subsidy.

Carbrillo Offshore Seeks Sale Of Drilling Barge

The Maritime Administration has received a request from Carbrillo Offshore Ltd., Partnership of San Francisco, to sell drilling barge *Bonitor II*.

The proposed purchaser is EEM Brooklyn Shipping Ltd., of Kingstown, St. Vincent & The Grenadines.

The 4,580-gt barge was built in 1983 in Pascagoula, Miss.

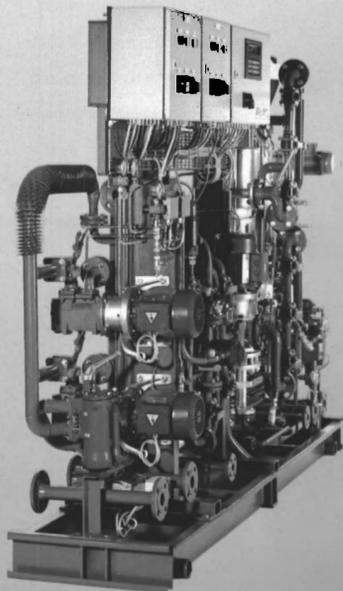
If approved, the barge would be used as a jack-up drilling rig.

Western Overseas Seeks To Sell Container Carrier

MarAd received a request from Western Overseas, Inc. to sell 17,802-dwt container carrier *S-L Shining Star* to Ruby Enterprises Inc. of the British Virgin Islands. The vessel would be resold to Gujarat Ship Trading Corporation of India.

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Shoreside Management Techniques Debut In Maritime Code

by Bridget A. Murphy, associate editor

In an industry consumed by technical standards and engineered solutions, the adoption of the International Safety Management (ISM) Code — a code that relies on management principles focused on human factors — presents a unique, and perhaps foreboding challenge. As stated by **Timothy Leitzell**, president of ABS Marine Services, Inc., "Certification does not imply technical adequacy of the vessel or its procedures ... This is not a technically operating code."

The International Maritime Organization's (IMO's) ISM Code, which is part of the Safety of Life At Sea (SOLAS) Convention, puts forth requirements that some fear hold the industry up to a much higher standard than that which is reasonably attainable by the July 1998 compliance date, if at all.

Embodying principles similar to U.S. Coast Guard Rear Admiral **James Card's** Prevention Through People (PTP) pilot, the Code requires maritime outfits to create and implement safety management plans and procedures capable of withstanding inspections and audits, to be enforced by Port State Control vehicles.

Specifically, ISM mandates that shipowning and operating companies have their own safety manuals on the books.

Companies are assisted by classification societies, which are charged with approving individual safety plans, performing audits to ensure that written plans are put into practice by the operator both at sea and on land, and issuing certifications in the form of two documents — a Document of Compliance (DOC) and a Safety Management Certificate (SMC).

On May 8, the New York Shipping Cooperative Committee put together a roster of speakers who addressed the ramifications of ISM from the perspective of classification societies, the legal profession and protection and indemnity (P&I) clubs.

By session's end it was generally agreed that having a proper safety system in place is the best defense against liability claims and penalty assignments under the Code.

Reservists reach for a water hose to battle flames during firefighting training at the Fleet Training Center at the Norfolk, Va., naval base. Efforts among maritime interests to achieve SOLAS compliance have popularized such drills.



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Preparing For Code Compliance

The ISM Code will become mandatory for all RoRo passenger ferries on July 1, 1997. This will be followed by chemical, gas and bulk carriers; oil tankers; high speed cargo craft over 500-gt; passenger vessels and high-speed passenger craft compliance by July 1, 1998; and conformance to ISM standards by all other cargo ships and mobile offshore drilling units by July 1, 2001.

Lloyd's Register has announced that eighteen ships owned or managed by three Dutch companies — Jo Tankers, Wagenborg Shipping and North Sea Ferries — have become the first vessels to receive ISM Code certificates from the Netherlands Shipping Inspectorate (NIS), the arm of the Directorate-General of Shipping and Maritime Affairs that issues certification after a classification society completes mandated audits.

The American Bureau of Shipping (ABS) has announced that it will offer shipowners and operators free ISM two-day seminars worldwide. The first day of the seminar sessions cover Code requirements, similarities to ISO 9000 and the certification process. The second day offers a workshop in which participants learn to flow-chart processes, write procedures and understand document-control issues; followed by afternoon workshop covering requirements for implementing a management system based on the ISM Code and ISO 9000. For more information on seminar dates and locations, write to ABS at 16855 Northcase Drive, Houston, Texas 77060-6008, or call (713) 873-0700; fax: (713) 874-9551.

Class Societies Rally To The Task

With classification societies tasked with executing three chief functions under the ISM process, the question of conflicting interests within these organizations comes to mind. But according to ABS' Mr. Leitzell, no conflict arises within his organization because employees who assist companies in the implementation of

safety plans are not at all involved in the auditing procedures. In fact, the American Bureau of Shipping maintains separate departments for each process. "Lloyd's and DNV are doing the same thing we're doing ... It's a different form of business, a different form of expertise, and we've all taken appropriate action," he said.

While this lends credibility to the ISM process, the key involvement of classification interests in this process calls attention to the fact that they may soon be competing for business on this level. According to Mr. Leitzell, the implementation of a company's safety system takes approximately three days. ABS issues a report based on initial knowledge of company safety policy. If requested, the society returns and performs a mock audit on shoreside operations and vessels. If the company passes the audit, it proceeds to the certification stage. "We've had some companies use us for this and then go to Lloyd's for certification. It hasn't been a problem," said the ABS rep.

In an effort to promote greater understanding of the Code, Mr. Leitzell offered definitions of safety management (the overall management activities that determine safety policy) and safety management systems (the application and documentation of common sense). He stressed that ISM exists to "establish safeguards against identifiable risks," such as fires, explosions, groundings and collisions, and not to penalize owners for missing difficult technical diagnoses. The ABS rep also stated that the U.S. Coast Guard (USCG) has not planned special ISM boardings, and that in order for the agency to detain vessels for Code violations, there must be clear grounds.

Dodging Liability Loopholes

According to Richard Jarashow, partner in the legal firm of Watson, Farley & Williams, in order to protect against personal liability under ISM, it is necessary to examine your specific job function in order to become aware of your responsibilities under the safety code. He explained that the "company" is the person who has assumed responsibility for shipboard operations, and has agreed to take over duties imposed by the Code — a role that doesn't nec-

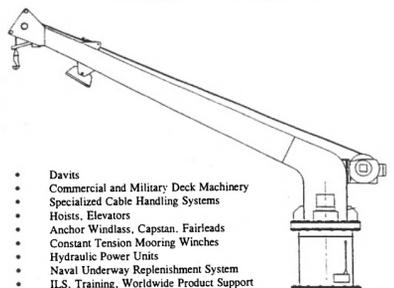


Timothy R. Leitzell, president, ABS Marine Services, Inc., is pictured during a recent discussion of the IMO's new safety code.

essarily coincide with vessel ownership. Mr. Jarashow said that "because of aggressive discovery rules, combined with the broad scope of who is liable," ISM lawsuits will not be dismissed. He added that ISM encourages the creation of a huge, paper-driven organization for even a modest fleet of ships. "You can fairly conclude that ISM will be a huge litigation headache in the United States," said the attorney.

The legal expert espoused several guidelines for "surviving ISM," which included: accepting that the Code is here to stay; recognizing the seriousness of liability designations; using the transitional time to prepare for Code compliance; and mobilizing all resources to fulfill safety mandates. Mr. Jarashow advised those present to "remember that it is an industry changing event," and that performances will be judged against this criteria. He also added that

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owners and operators should take action to terminate the employment of officers with questionable capabilities, and risk possible wrongful dismissal suits "rather than play around with ISM."

Richard Pilley, manager, Thomas Miller P&I Club (U.K. Club), discussed the practical implications of the Code from an insurers' perspective. Since all P&I clubs are self-governing, mutual assistance organizations,

not profit-making organizations, club members are responsible for voting in and changing rules. Mr. **Pilley** stated that as the rules currently stand, if non-compliance with ISM results from an act of the crew, or a shortcoming in the safety management system, then the club carries all liability.

However, if an accident results from any personal fault of the operator, any fine imposed is not covered by the club. He concluded

that if the club rules remain as currently written, a failure to comply with ISM will not indicate a breach with club rules.

Harding Implementation Roadblocks

"Say what you do, do what you say, and verify it," advised Mr. **Leitzell**, responding to the uneasiness associated with creating and implementing fresh safety management plans. He advised that in

most cases large companies should discard outdated manuals and take old regulations off the books, in favor of creating new safety guidelines, which are often as short as three pages.

In regards to the need for all ships to meet the compliance date, Mr. **Leitzell** alluded to comments made by **James D. Bell**, executive secretary of the International Association of Classification Societies (IACS): "By July 1998, are there enough people to audit and certify all the ships in the world? ... I don't believe you'll see one person come to your office and then travel all over the world to do the rest of your 10 ships."

And while IACS has generated a standard for credentials and training for ISM auditors, it is questionable whether maritime auditors or management auditors will prevail over the process which strives to ensure safety and environmental protection at sea through the use of a system that targets company managers rather than ships.

Frank Iarossi, ABS chairman and CEO, addressed this issue at the society's Annual Meeting on April 23: "Our human element efforts to date have largely been associated with the management approach to the safety of ships." He continued, adding: "Nevertheless, there is a growing awareness that human element problems in ship safety are also rooted within the design, construction and maintenance of marine systems — even before their operation."

Seacor To Acquire McCall Enterprises Stock

Seacor Holdings, Inc. announced that it has signed a letter of intent to acquire all the capital stock of McCall Enterprises Inc. and its affiliated companies for 1,215,500 shares of Seacor stock, subject to adjustments reflective of changes in working capital at closing. Based on SEACOR's closing price on April 17, 1996, the transaction has a value of approximately \$48.9 million, and is expected to be closed in the second quarter of 1996.

The McCall Group operates as McCall's Boat Rentals and is based in Cameron, La. The fleet includes five utility boats and 36 crewboats dedicated to serving the oil and gas industry in the U.S. Gulf of Mexico. **Charles Fabrikant**, chairman of SEACOR, said, "The transaction meets our criteria for acquiring businesses which own quality assets and work into Seacor's plans. The majority of McCall's fleet fits into the future of Gulf of Mexico offshore transportation, having flexibility to deal with more sophisticated logistics and the capability to support deepwater production. We are also pleased that **Norman McCall** is staying on to provide leadership and guidance. His understanding of the industry and his vision will make an important contribution to Seacor's future development."

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Fednav Names Seaway Newbuilds During Shanghai Ceremony

The Fednav Group, a Canadian shiping and chartering company, named two 34,000-ton, St. Lawrence Seaway-suitable bulk carriers in a ceremony at the Jiangnan Shipyard in Shanghai

on May 17. The first vessel, due for delivery this month, was named *Federal Calumet* by **Mary Culver**, spouse of **David Culver**, chairman of CAI Capital Corp., Montreal.

The second vessel was named *Federal Saguenay* by **Janet Bumstead**, spouse of **David Bumstead**, executive vice president of Noranda, Inc., Toronto. Both vessels were launched into

the Huang Pu River in an unusual twin ceremony. These two ships are reportedly part of a six-ship package deal, with three vessels scheduled to come into service this year, and three scheduled for service next year.

According to Fednav, these vessels are an indication of its commitment to the future of the Great Lakes/St. Lawrence Seaway System.

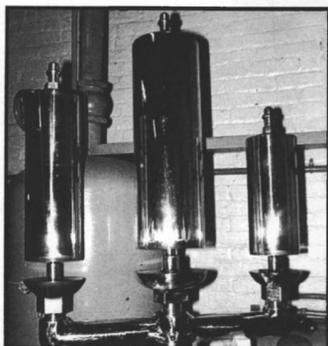
New Ashtech GPS Blends Commercial/Military Applications

On May 22, Ashtech, Inc., a Sunnyvale, Calif.-based company involved in finding precision solutions for global positioning, announced the introduction of its GG24 receiver, reportedly the first single-board receiver to tightly integrate U.S. Global Positioning System (GPS) and Russian GLObal Navigation Satellite System (GLONASS) satellite-based navigation technologies. Ashtech has stated that this product is the first fully integrated receiver designed to take advantage of both disciplines, for commercial and non-military purposes.

The GG24's ability to receive and use signals from not only 24 GPS satellites, but also from the 24 GLOSNASS satellites, ensures its rapid integration into a wide variety of high-precision sea, land and air-based applications on a global scale.

For more information on Ashtech, Inc. Circle 114 on Reader Service Card

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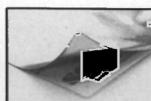
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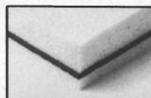
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FBM Marine Wins Order For MOD SWATHs

FBM Marine of Cowes, Isle of Wight, U.K., has been awarded a contract to build two, 75.4-ft. (23-m) passenger transfer craft for the U.K. Ministry of Defence (MOD). The vessels are scheduled to be delivered in July and September 1997, and are the first vessels of a small water-plane area twin hull (SWATH) design ordered by the agency.

The 75-passenger vessels will be used in support of Flag Officer Sea Training (FOST) at Plymouth to transfer staff quickly and comfortably from warships and auxiliaries within the breakwater and in open sea condition. The vessels will be fitted with twin marine diesel engines of approximately 450-kW each, driving conventional propellers to service speeds in excess of 11 knots in sea state 3.

For more information on FBM Marine Ltd. Circle 116 on Reader Service Card

Orkot Names Allied Marine Exclusive U.S. Distributor

Orkot, a manufacturer of fabric reinforced composite materials used in marine applications, has appointed Allied Marine Services (AMS) as its exclusive marine distributor for the U.S. AMS will distribute marine products such as the company's specialized bearing composites, for example, Orkot's rudder and stabilizer fin bearings designed for operation in demanding marine conditions.

AMS has recently undergone an expansion program, opening offices in Connecticut, Washington and Texas. The company's qualified en-

Maritime Reporter/Engineering News

gineers will offer installation assistance, after sales support and spares provision for Orkot's products, which are designed with unique properties, including zero swell in seawater, high and compressive impact strength, low friction enhanced by solid lubricants, the absence of toxic materials and ease of machining and installation.

The Norwegian company's GX-100 berthing system has a range of up to 200 m, and provides real-time data on approach speed, ship to jetty distance and ship range. This information may be sent to control rooms, to large displays for outdoor sites on the jetty side, or transmitted to remote portable displays for use on the ship or tugs.

For more information on Autronica AS
Circle 118 on Reader Service Card

Sonsub Purchases Perry Triton ROV

Perry Triton, Inc. of Jupiter, Fla., has announced the sale of Triton No. 27 heavy work Remotely Operated Vehicle (ROV) to Sonsub International, Inc. of Houston, Texas. Developed to support Shell Offshore Inc.'s Alliance For Deepwater Remote Inter-

vention Tasks, the 2,500-MSW, 75-hp Triton provides 3,000 kg through frame lift, 300-kg wet payload, a single 75-hp HPU, six channels of simultaneous live video and 12 channels of data transmitted on optical fiber.

Triton 27 will be equipped with two manipulator arms and a full suite of advanced sensors and video equipment. Besides the ROV, the system ordered by Sonsub includes Perry's heavy lift

Racal-Decca Bridge System Chosen For Fincantieri SuperSeaCat

The first of six SuperSeaCat high-speed monohull passenger ferries being built in Italy by Fincantieri at its Riva Trigoso and Muggiano yards for Sea Containers will be equipped with Racal-Decca's MIRANS integrated bridge systems. Two MIRANS systems have been ordered through Telemar, the manufacturers' Italian representative, and are due for delivery in September.

The bridge systems will consist of interswitched X and S-band BridgeMaster 340 ARPA radars connected to high speed antenna turning units.

The installation will also include a ChartMaster CM200R electronic chart module within the bridge array and another ChartMaster as an independent auxiliary workstation. Both ChartMasters will be capable of displaying ARCS raster charts from the U.K. Hydrographic Office and vectorized charts. The MIRANS installations aboard the SuperSeaCat will also include a Live Situation Report module, which brings together all information necessary for safe and efficient vessel operation.

The six aluminum ferries will measure 328 ft. (100 m) long, and represent a \$200 million investment by Sea Containers. The vessels will each be powered by four Ruston 20 RK 270 engines, driving four S112 KaMeWa waterjets capable of carrying up to 800 passengers and 175 cars at speeds up to 38 knots.

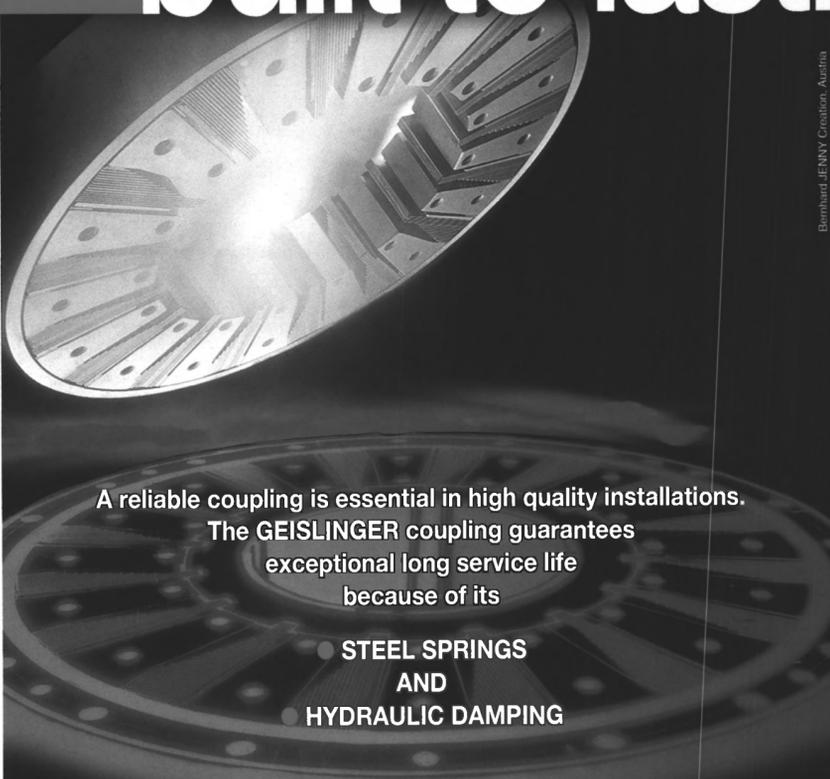
For more information on Racal-Decca
Circle 117 on Reader Service Card

Korean Interest Purchases Autronica Ship Berthing Radar

Autronica AS was awarded a contract by construction company Hanjung to supply three ship berthing radar guidance systems to Korea Electric Power Corporation (KEPCO). The systems are due to be installed on KEPCO's jetties at Samchonpo in September, and will reportedly berth coal supply ships with greater safety and efficiency.

June, 1996

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facture, service and support of both standard and special ROV systems.

For more information on Perry Tritech
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IACS Encourages Close Links With Port State Control

Commitment by leading classifi-

cation societies to increasing dialogue and cooperation with Port State Control (PSC) authorities has been underlined by the International Association of Classification Societies' (IACS) latest involvement in a regional PSC seminar. Improved access to class data and the wide range of assistance available to PSC authorities were main themes in the association's recent presentation to the South Mediterranean in its Memorandum of Understanding (MOU) on Port State Control, staged in Tunis. The latest in a developing series, the presentation was given by **Jim Smith**, IACS' permanent representative to the IMO. Formalized cooperation and assistance with Port State Control and improved access to class and statutory data are two of seven marine safety initiatives introduced by IACS last year, which entered into full force in January.

"Our latest initiatives show that the key contribution being made by Port State Control to improved ship safety is fully recognized by IACS," said Mr. Smith. "IACS members consider it their duty to cooperate fully with Port State Control in effective identification of substandard ships -- and in the process of corrective action for any safety deficiencies within the remit of class," he added.

A wider range of Transfer of Class and Ships in Operation Class Services data has now become more easily accessible to PSC authorities on request.

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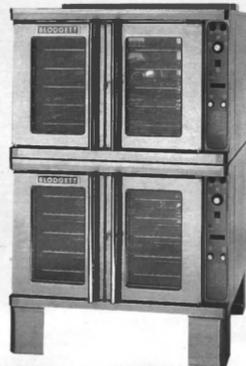
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Circle 175 on Reader Service Card

Information Technology

Strategy & Infrastructure

Grappling With IT Challenges

Marine companies taking clear strategic approaches to maintaining marketshares are characterized by a willingness to invest in infrastructure projects. Information Technology (IT) solutions have infiltrated the industry, and senior management must face the challenge of becoming knowledgeable in the way of these solutions, in order to direct the continued success of companies. Commercial and legislative pressures on shipowners and ship managers have reached the point where effective and economic solutions can no longer be found in conventional systems and methods.

Implementing IT strategies is not a question of accessing huge budgets and vast resources, instead, this process is reliant upon educating those who already possess industry experience and expertise. The days of abdicating to computer technicians have been phased out.

In an effort to provide management with an ever increasing range of applications, companies are eager to incorporate this technology. Powerful market players and small-to-medium-sized businesses alike need strategies for absorbing IT.

Bridging The Info Gap

It is true that, from time to time, IT developments and associated marketing hype can serve to confuse rather than clarify. A classic example of misunderstanding the scope of IT is the association of e-mail with "messages," which underplays the global potential for transmitting fax, telex, data and images within and outside organizations. Many companies have been late to appreciate the significance of e-mail because they claim, "we do not send many messages."

In many situations, the essence of the situation lies in the ability of marine organizations to evaluate the relevance of a given innovation as it relates to accomplishing business objectives.

Communications — A Key Element

U.S. chemical tanker specialist Stolt Parcel Tankers frequently exchanges more than one megabyte of information with its vessels in support of various commercial applications. Without a communications infrastructure to facilitate and optimize this level of exchange, many of the applications would be not be possible.

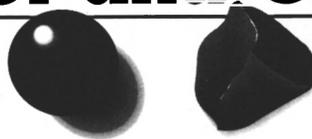
Select companies have invested in end-to-end communications networks linking vessels, headquarters, regional offices and associate organizations. Vessels have become fully integrated floating offices, and few, if any, business plans are beyond reach.

P&O Containers, participating in a recent marine seminar, reported a more than 20 percent increase in telex, data and voice communications.

Jo Tankers, part of Norway's J Odfjell Group, is committed to a network of PCs onboard each vessel, and has designed a ship/shore communications infrastructure to facilitate remote management of onboard networks from the shore, with automatic collection and dissemination of infor-

June, 1996

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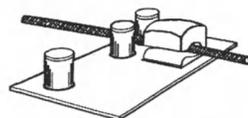
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Grappling With Information Technology Challenges

mation. Such infrastructure projects can also underpin IMO compliance requirements.

Nera Telecommunications, based in Surrey, England, has taken up the infrastructure challenge with a combination of communications products and services that combine

to provide a complete end-to-end network. The international backbone of the network is the SITA airline network, used for the first time for marine applications.

NeraMail is a global e-mail strategy built around industry standard interfaces; and partner Nera

Hypership is a particularly comprehensive ship/shore module, addressing optimization of transmission, connectivity with shore-based systems and network management, and also facilitating client choice of e-mail software. The NeraMail infrastructure is

coupled with the traditional Nera Operations and Network management facilities including Airtime Management.

Another example of a communications enabled application is California-based WNI Ocean-routes' onboard ocean routing system. Using weather and oceanographic data updated daily via ship/shore satellite communications, masters are placed in the best possible positions for charting courses. Orion requires approximately 100,000 characters of data per day to be sent to the vessel, but has a massive payback in crew, vessel and cargo safety, as well as provides the significant cost savings associated with reduced sailing times.

The Satellite Modem Company, Norfolk, U.K., has reportedly, in conjunction with Inmarsat, resolved problems associated with fax communications via Inmarsat M. The SMC M24 pocket modem/software package is the only one to date to pass field and simulator testing. A SMC B96 package for use with Inmarsat B is planned for release later this year.

IT Marches On

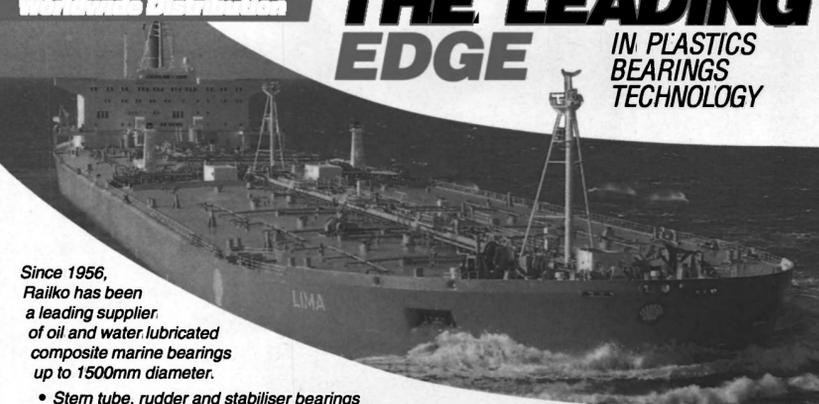
In the views of some, the responsibility for implementing IT strategy and infrastructure rests firmly with senior management. In general, the computer and communications industry provides only the pieces from which individual organizations must build their own strategic pictures. Some IT companies have embraced a more strategic position directly reflective of maritime goals.

A current and crucial legislative case for IT is the ISM Code, which requires shipowners and ship managers to enact infrastructure systems capable of facilitating compliance with safety regulations. This clearly presents a management opportunity for laying the groundwork for IT strategy and infrastructure.

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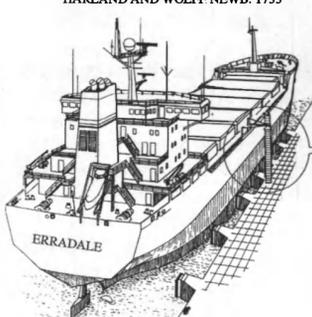
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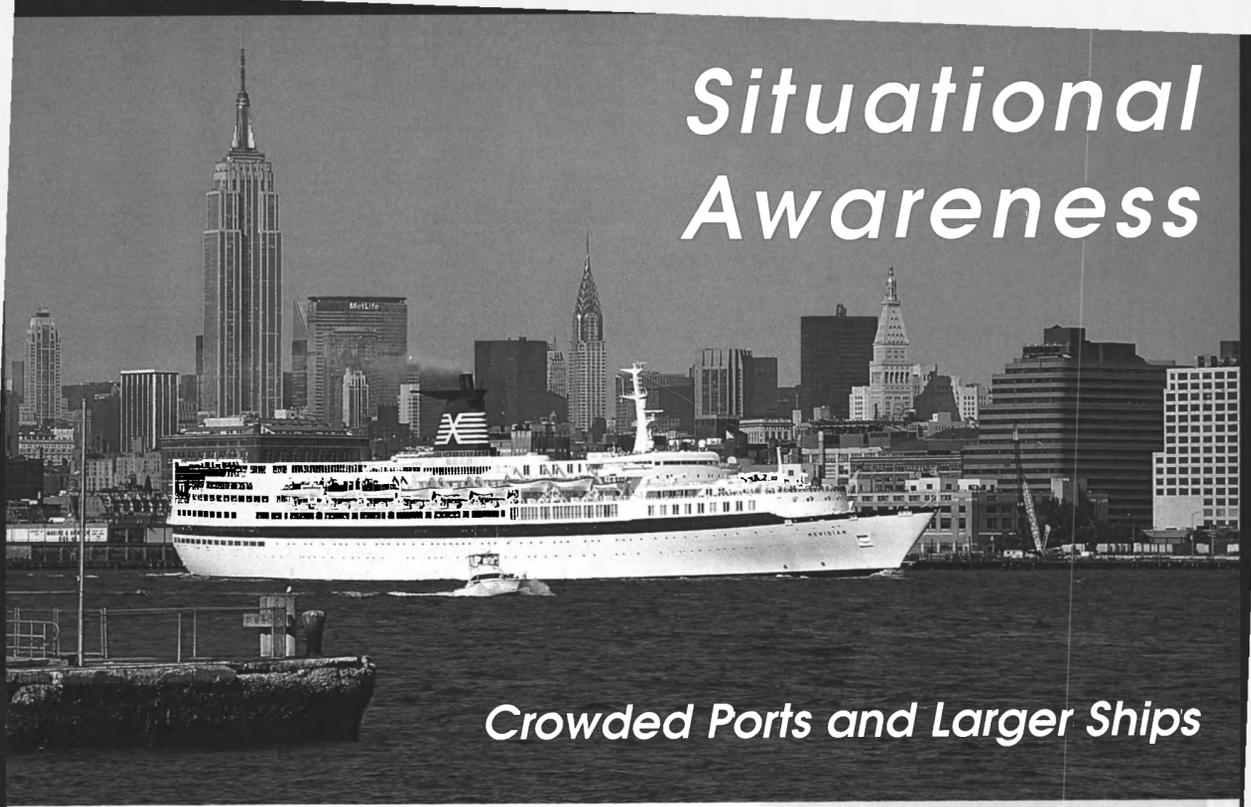


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Omnes Formed To Provide Information Flow Solutions

Company Set To Expand New Messaging Service In Houston

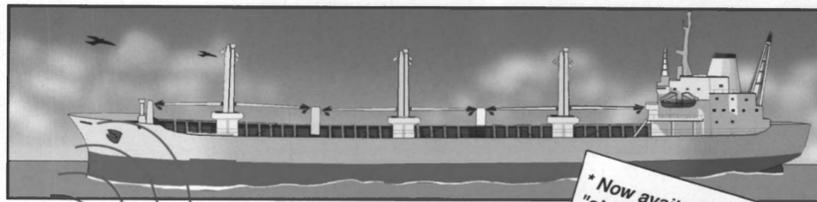
Omnes, which is a joint venture of Schlumberger Ltd. and Cable & Wireless, recently extended its global, customized messaging ser-

vices into the Houston area. The company originally launched Xpo Messaging Service in Aberdeen, Scotland, in February 1996, and

has recently signed up a number of the oil industry's major companies as clients. "The trend among corporations is

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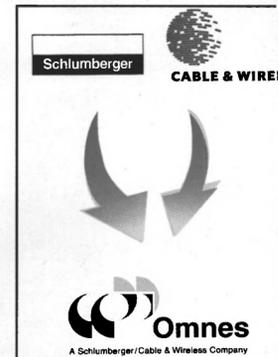
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Windows-based software creates video/data record, allowing remote operator multiple file features, control of site functions, and real-time or prerecorded file image viewing (like of this Columbian freighter docked at an unattended Canadian port.)

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to outsource non-core activities such as communications," said **Jean Chevallier**, president.

Filling a need

In oil and gas exploration and production operations, the movement and management of scientific, logistical and administrative data is high priority. With this in mind, Omnes was formed in January 1995 by Schlumberger and Cable & Wireless. "By combining Schlumberger's understanding of the oil and gas sector with Cable & Wireless' telecommunications expertise, we created a company uniquely qualified to respond to the specific communications needs of global energy companies," said Mr. Chevallier. The infant company's first major contract was for the maintenance, management and future development of the Schlumberger Information Network (SINet), the private Schlumberger communications network linking hundreds of sites in 53 countries. By the end of its first year, the company's prowess in devising and delivering communications solutions was recognized, and customers now reportedly include Shell, British Petroleum and Texaco. In early 1996, Omnes signed an agreement with Control Data Systems to use Mail*Hub e-mail integration software as the base for its new Omnes Xpo Messaging Service. The Mail*Hub software links disparate mail systems in a standards-based network with a common address directory, enabling Omnes customers to establish interactive electronic communications worldwide. Since debuting the Xpo service in Aberdeen, Omnes has signed on 14 customers to the service.

The company

Omnes also provides satellite services to many companies, including Mobil, Phillips Petroleum, Pluspetrol and Bechtel, as well as Local Area Network support services that range from basic support to full network management and integration services. Initial sales efforts of Omnes have been focused on the exploration and production sector of the oil industry, and subsequent customers will include the energy,

utilities, mining and chemical industries. The company currently offers a full array of communications services, including: Internet services; Internet support; Worldwide Web services; messaging services; network services; LAN support services; and satellite services.

For more information on Omnes
Circle 23 on Reader Service Card

About Omnes' president

Jean Chevallier has worked with various Schlumberger companies since starting his career in 1971 with Forex Neptune Schlumberger in Paris as a design and operations engineer. From 1977 to 1983, he worked for Flopetrol Schlumberger, initially in well testing services, then as U.K. district manager, and finally as region manager for South America. From 1983 to 1994, he worked for Sedco Forex Drilling Services. To April 1995, he served as vice president for Schlumberger Telecommunications in Houston.

IT Development Project Attracts Major Players

A new maritime research project which will study the generic requirements and application of Information Technology (IT) and Communication Technology (CT) throughout the maritime sector has been undertaken. According to a key partner in the program, BMT (British Maritime Technology), the program — dubbed "MARVELOUS" (MARitime industry's Virtual Enterprise Linkage Open User Syndicate) — is being mounted within the European Union's new MARIS (Maritime Information Society) project and is managed by Vulcan Schiffbau Verbund.

Other participants in the project include Astilleros Espanoles SA, BIBA, Chantiers de l'Atlantique, Det Norske Veritas, Fincantieri, Germanischer Lloyd, Howaldts-werke Deutsche Werft AG, Lloyd's Register and Odense Steel Shipyard. The program's aim is to identify and harmonize generic requirements for the use of advanced IT and CT in manufacturing and engineering across the maritime industry. The key objectives of the project are to:

- Enhance the productivity of the maritime industry via the efficient and innovative application of IT and CT;
- Shape technological development in cooperation with IT as well as CT vendors;
- Become a platform for technology transfer and cooperation between branches of the maritime industry;
- Develop employment prospects by the development of new and competitive products;

June, 1996

- Increase employment in industries and coastal regions;

- Protect the environment by the use of cleaner manufacturing and the promotion of waterborne transport; and

- Avoid pollution by eliminating substandard management and ships.

BMT's work on the MARVEL-

OUS program is being carried out by the BMT corporate research team established in Teddington in 1986. The team is internationally recognized for its work on IT, particularly in the application of artificial intelligence. This resulted in BMT being involved in a wide range of European research programs including SHIP, an EU-supported project to develop the next generation of hull monitoring systems.

Lindenau Launches Double Hull Tanker

Lindenau GmbH was scheduled to christen and launch 32,250-dwt, double-hulled tanker newbuilding S 240 from the shipyard's Kiel-Friedrichsort site. The vessel, dubbed *Seadevil*, is certified to Ice Class E2 standards. It is reported to be the largest double-hulled tanker to sail under the German flag.

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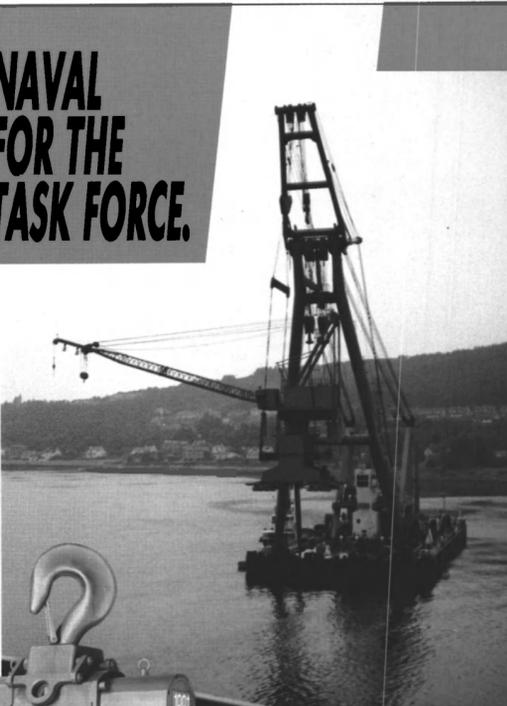
In this case the 100 ton pneumatic hoists were used on site to level these 310 ton cranes. Incredible size and capacity ratio, precision engineering and construction, and their dependability on only 85 PSI compressed air operation made the JDN PROFI the perfect choice for the job.

But this hoist, and the rest of the world famous PROFI series, can operate at the same performance level mounted overhead on trolleys and in low overhead situations. They are unaffected by dampness, moisture, steam or heat, and the pneumatic operation makes them ideal for situations where sparks and electrical problems cannot be tolerated.

The ultra sensitive, pull cord speed regulation, built into every PROFI hoist, was key to this precision Navy operation. The ability of the hoists to be left running indefinitely without damage adds to the exceptional versatility of the PROFI line.

The J.D. Neuhaus Corporation offers a full line with capacities from 500 lbs. to 100 tons, pneumatic hoists, plus a wide variety of trolleys and hoists that operate at 60 PSI or hydraulic power.

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DEPARTMENT OF THE NAVY
COMMUNICATIONS SECTION
FORM 1316-100
100-111111
10 NOVEMBER 1987

From: Commander, Charleston Naval Shipyard
To: J.D. Neuhaus, Baltimore, MD 21207

Subj: DELIVERY OF TWO (2) JDN PROFI 100 TON PNEUMATIC OPERATED CRANE HOISTS ON CONTRACT ORDER #7155

Re: (1) REQUEST FOR QUOTE (RFQ) of two (2) Crane Hoists to help level 310 ton cranes (1 unit)

1. The purpose of this letter is to commend your Mr. Donald F. Flatenberg for his dedicated support and exemplary performance in the handling of these hoists for delivery of the two 100 ton cranes to the shipyard. The quick action and delivery to support our schedule for loading the two 310 ton cranes and support to help level.

2. Enclosure (1) shows the two (100 ton lift) cranes being used to level each of the two 310 ton cranes. Enclosure (2) and (3) are 35 very detailed, 100 ton cranes (100000 lbs). Two 100 ton pneumatic operated hoists are used to level the one partial crane on the other crane. The hoists will level the crane simultaneously. The project was a great success. We are very pleased with the service and the quick use of the equipment.

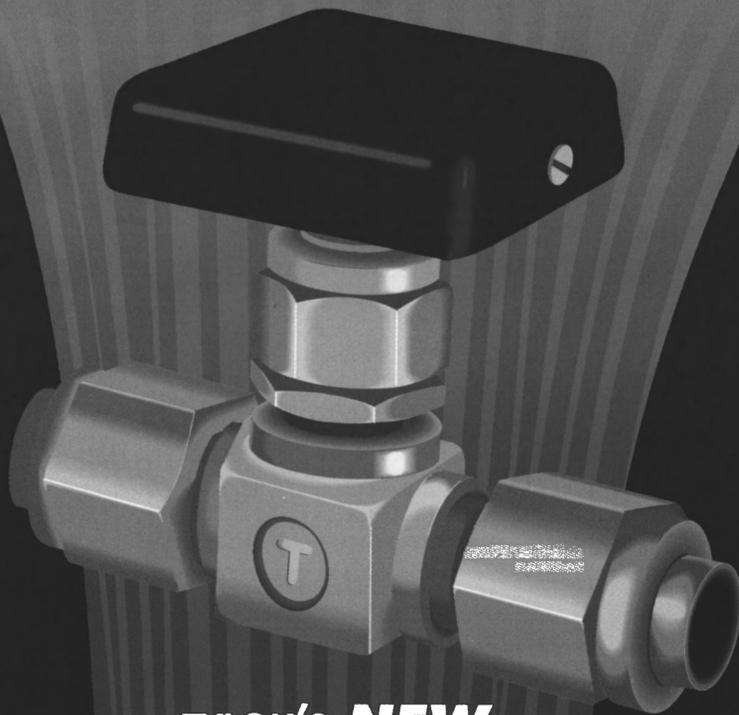
3. Please present one of these photographs to Mr. Flatenberg with our sincere appreciation for a job well done.

A. H. ANDERSON
Acting

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Scana Industrier Acquires Moland Automation

Norwegian ship automation specialist Moland Automation AS has changed its name to Scana Moland AS, following its acquisition by Scana Industrier ASA in December 1995.

Joining the Scana Group, which is listed on the Oslo Stock Exchange, strengthens the company's prospects in new markets. Scana Moland supplies maneuvering/voyage recorders and alarm/monitoring systems.

The company's latest product is the Moland MA 100 alarm, monitoring and control system, which comprises self-contained processing units and operator terminals in a redundant, high-capacity data network.

For more information on Scana Moland
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Halliburton Earnings Up 35 Percent

Halliburton Company announced that 1996 first quarter earnings from continuing operations increased 35 percent. The company reported that revenues of \$1.7 billion were generated for the first quarter, a 30 percent increase over the 1995 first quarter revenues. Halliburton's continuing operations include two business segments: Energy Services and Engineering and Construction Services. Both reported increased 1996 revenues and operating incomes.

Halliburton Energy Services' revenues climbed 17 percent from a year ago to \$663 million for the quarter. At the same time, operating income rose 29 percent to \$67.3 million. Revenue growth was attributable to overall strengthening of the upstream oil and gas market. Strongest growth came from Halliburton's North American, European/African and Latin American regions.

For Brown & Root — Halliburton's engineering and construction business segment — revenues increased 42 percent to \$998 million for the first quarter. Growth was experienced in all major industries served by Brown & Root.

"The strong Halliburton Company first quarter start gives us optimism for significant 1996 full-year progress," said Dick Cheney, the company's chairman of the board and CEO.

Halliburton Company is one of the world's largest diversified energy services, engineering, maintenance and construction companies.

Halliburton Company's Energy Services business segment also announced that it successfully installed a multi-lateral system with full lateral liner connectivity, a hydraulically-isolated lateral junction and full-bore lateral re-entry access. The system, installed

for Norwegian operator Norsk Hydro, is reportedly the world's first to provide full-bore re-entry access to the lateral while maintaining the integrity of the main wellbore. The multi-lateral system was installed in Norsk Hydro's Oseberg field, located approximately 120 km west of Bergen in the Norwegian North Sea.

The Oseberg C platform was installed in 1988 to drain the northern portion of the field. Norsk

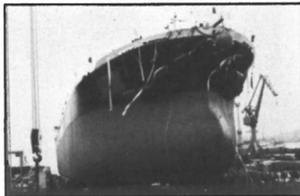
Hydro set a specific goal for increasing recoverable reserves from this field. Multi-lateral technology was identified as a means of helping to achieve the goal.

Halliburton's Multi-Lateral System 3000 was chosen for the application because of its full-bore access which provides flexibility in running downhole tools, and lateral isolation which enhances pressure integrity and increases production control.

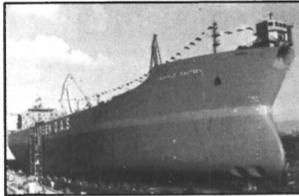
Mikkelsen, assistant director in Hydro's Exploration and Production division said, "This multi-lateral system will allow us to increase recoverable reserves economically. The ability to avoid drilling additional wells while maintaining re-entry access to the lateral is very beneficial."

Norsk Hydro and Halliburton worked closely throughout the planning, development and execution phases of the project. The success-

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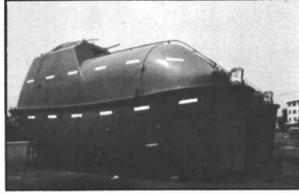
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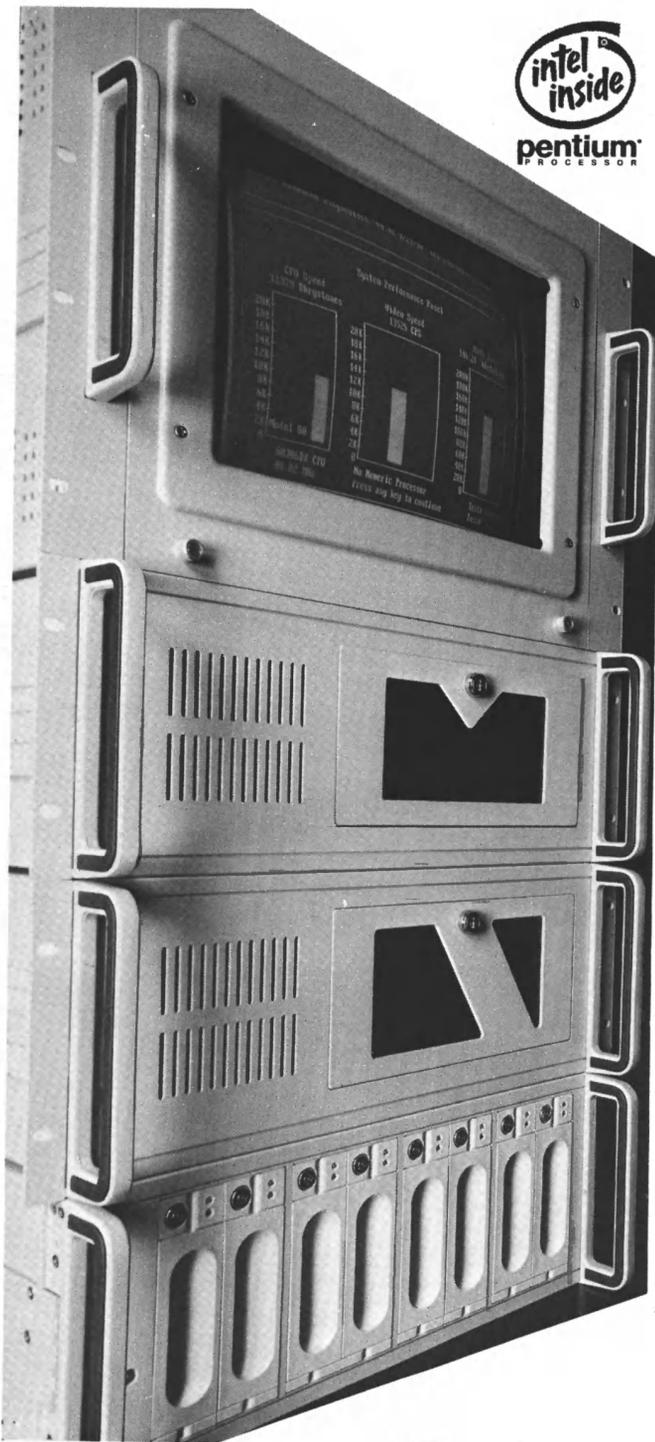
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DOE Report: Oil Consumption To Rise 44%

A new study by the U.S. Department of Energy's (DOE) Energy Information Administration estimates that worldwide oil consumption will continue to rise over the next two decades, increasing by 44 percent and adding 30 million barrels a day to the international oil flow. According to the study, by the year 2015, world oil demand will increase from the present level of about 69 million barrels daily to 99 million barrels.

The study, entitled *International Energy Outlook 1996 With Projections to 2015*, anticipates that world oil supplies will be able to meet the growing demand, although there will be increases in cost and increases in carbon emissions because of the greater use.

A large amount of future oil production will continue to come from Persian Gulf OPEC members, the study says. Persian Gulf OPEC production is expected to represent more than

40 percent and possibly as much as 52 percent of world oil demand, forecasts indicate.

The report says Persian Gulf OPEC production is expected to range from 41 to 52 percent of world oil production, or from 37.8 to as much as 53.5 million barrels daily. Persian Gulf OPEC members now produce about 18 million barrels a day, which amounts to approximately 29 percent of total world oil use. The report notes that worldwide oil reserves, which have been primarily in OPEC nations since the 1980's, may also show marked increases in non-OPEC areas in the next 20 years.

"In the late 1980s," the report says, "more than 350 billion barrels of crude oil reserves were added worldwide. The additions were made predominantly by the OPEC nations, almost 94 percent of the total."

Although OPEC crude oil production has been increasing steadily since the mid-1980's,

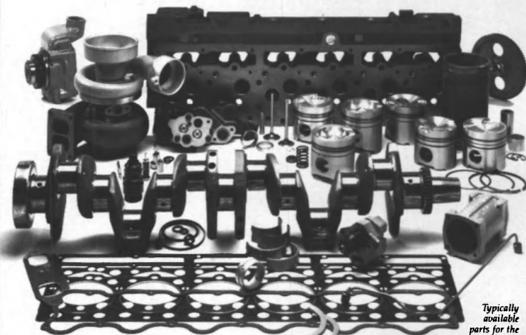
according to the study, "crude oil production from non-OPEC suppliers has shown surprising resilience over the past two decades, increasing by more than two-thirds."

The U.S. Geological Survey estimates that of the more than 450 billion barrels of undiscovered oil that may be recoverable, about two-thirds may come from non-OPEC producers.

"In this context, one may conclude that OPEC could potentially remain at less than a 50 percent share of worldwide production even in the face of strong demand growth for at least the first two decades of the next century," says the DOE study.

The Energy Department data indicates, however, that OPEC countries will continue to have great influence on the world oil market, specifically saying that it assumed that "the OPEC countries with large reserves that can be exploited at relatively low cost will have the

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60 Hz 1800	80 kW	99 kW	
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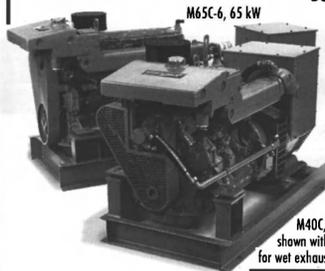
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M65C-6, 65 kW
M40C, 40 kW shown with pump for wet exhaust.



Circle 153 on Reader Service Card
Maritime Reporter/Engineering News

greatest influence on future oil market conditions."

It estimated that OPEC producers may grow at such a "robust" annual rate of 3.5 percent in production to exceed 55 million barrels daily by the year 2015.

"This outlook assumes that Iraq will resume exports in 1997 and will gradually build up its output to almost 3 million barrels per day by the year 2000," the report said. (Note: At press time Iraq, under a new agreement with the United Nations, was expected to resume oil exports this year.)

The report forecasts a continued decline in North American production, including in the U.S., but foresees that U.S. production will recover somewhat and, by 2015, "is expected to return to current production levels."

"Due mainly to the decline in U.S. production," the report says, "North American output will show steady decline into the early years of the next century."

"Canada's output should increase modestly over current levels, declining only slightly by the end of the forecast period. Offshore discoveries in the Gulf of Mexico, incremental Alaskan production from Cook Inlet, and technological advances in extraction methods reverse the downward trend in U.S. production for the remainder of the forecast period. By 2015, U.S. production is expected to return to current production levels."

The study says that, although there have been "serious declines" in oil production in the former Soviet Union in the 1990s, "largely because of the economic problems of the post-Communist era," new data suggest that the downward trend may have ended at a low point of about seven million barrels daily.

"A gradual recovery is expected over the remainder of the decade, but no significant production gains (in the former Soviet Union) are anticipated before the turn of the century," the report notes.

New Underwater Welding Process Approved By LR

Lloyd's Register of Shipping has reportedly given approval to a new process of underwater welding developed by U.K.-based UMC International Plc for permanent repairs to the shell plating of a ship. The technique allows defective areas of shell plating to be cut out and replacement insert plates to be welded into place beneath the waterline while ships are afloat, which is accomplished by the creation of an air-filled void space underwater in was of the defect.

UMC's process overcomes the necessity of welding from both the inside and outside by employing a combination of Tungsten Inert Gas (TIG) and conventional welding, using low hydrogen electrodes to overcome the difficulty.

June, 1996

The repair is then examined using ultrasonic and magnetic particle examinations.

UMC's Managing Director David Jones explained: "Getting a welder who is a diver or putting a ship into drydock for repair are both expensive. This new method uses the specialist skills of diver and welder and effects a permanent repair from inside the ship ... It also overcomes the traditional

reluctance of classification societies to accept any form of underwater welding for permanent repairs to shell plating.

We expect other classification societies to follow Lloyd's in approving this new technique shortly."

For more information on UMS International Plc Circle 115 on Reader Service Card

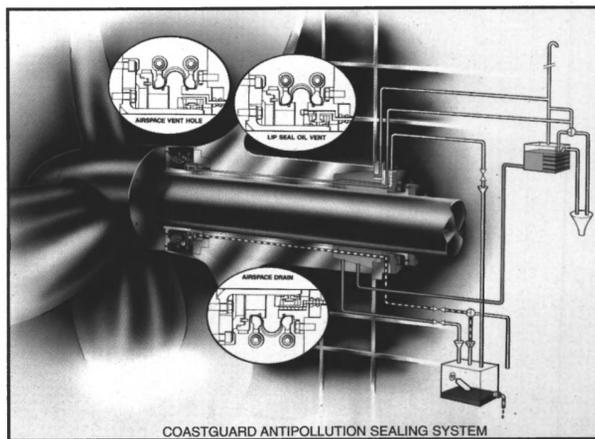
O'Connor Named Lykes Fleet Commodore

Joseph O. O'Connor has been named Commodore of the Lykes Steamship fleet. Capt. O'Connor is master of the M/V *Stella Lykes*, a 2,800-TEU containership newly deployed in service between North Europe, Mexico and the U.S. He has sailed with Lykes for 35 years.



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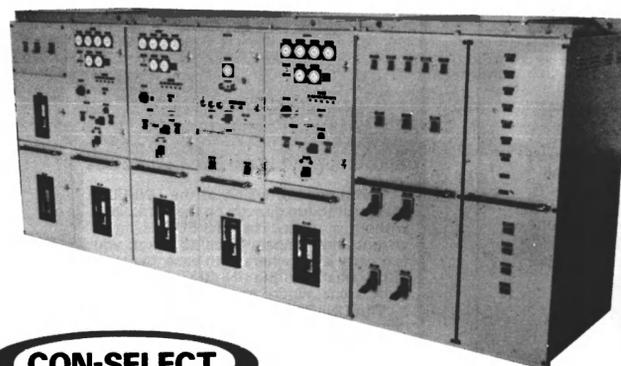
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INDIA

An Emerging Economic And Industrial Power

The pending elections in India may go a long way towards establishing the country as a serious economic, industrial and trading power on the world stage. The process of economic liberalization initiated by the Rao government has been gaining speed since 1991, unleashing notions of privatization previously held in check. The Indian market has appealed to traders and investors for some time. The attractions include a large population (estimated at 901.5 million), an economically competitive workforce and a commitment to democracy. The gradual easing of the state's grip is enabling this appeal to turn into something more tangible, resulting in Indian trade and shipping becoming important factors in the international equation.

Drewry's latest report, *India — The Emerging Economic And Industrial Power: The Potential Impact on World Shipping and Trade*, concludes that whatever the election result, few expect to see the liberalization process reversed. However, Drewry predicts that the economy may take "one step back for every two steps forward." Consequently,

Drewry expects to see Indian exports expand over the next 10 years by approximately 25 to 30 million tons. The major export cargo — iron ore — may show little growth, but gains are expected in the agribulks sector, in alumina traffic and in the steel and manufacturing sectors. By 2005, India's imports — in terms of tonnage — may be close to double current levels and in reaching this conclusion, Drewry's report takes a conservative view on key growth trades such as coal and oil/refined products. The biggest difficulty India faces is matching political will to program funding. Domestic resources are insufficient for meeting the requirements created by infrastructure and other products. External funds — most likely channeled through joint ventures — are vital, given reports that the states and India's financial institutions only have approximately \$7 billion to cover all infrastructural spending. Vast sums are needed for industrial ventures and power generation projects — a sector being closely monitored by coal suppliers.

Also critical is the position of India's ports. Congestion is a serious problem; and there is talk of crisis in the ports. Paradip, Visakhapatnam and Kandla are

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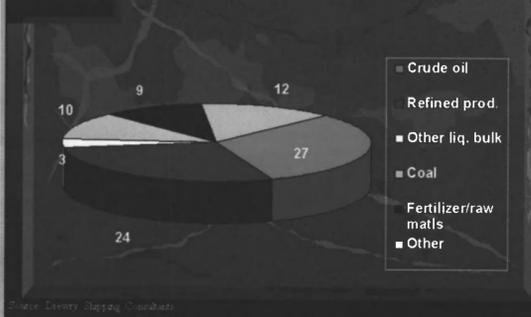
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Estimated Indian Imports, 1995 (in millions of tons)



said to be affected the most. However, this is in response to a claimed increase in total traffic of approximately 10 percent. Drewry concludes that the most cause for concern lies in the least sophisticated sector — general cargoes and minor bulks.

Taking into account the planned increase in capacity with the corresponding residual traffic, a port capacity deficit of approximately one million tons has been projected. If trade

growth — specifically in cargo sectors — keeps pace with overall economic growth trends, this deficit could increase to four or five million tons in the early part of the next century. Much will depend on the ability to attract private capital and management expertise into India's ports, and on the adoption of reforms which will greatly increase cargo handling efficiency. In 1994-95, the Indian shipping fleet reached an all-time high of 6.7 million gt. This positioned the fleet as the world's

17th largest. Moreover, Drewry notes that the Indian-controlled merchant fleet is becoming progressively more diverse as the effects of liberalization surface, and Indian companies new to shipowning and operation enter the market — particularly in the bulk sectors — backed by either domestic resources or overseas/joint venture capital.

For a copy of the report
Circle 1 on Reader Service Card

Newport News Wins Nimitz Planning Contract Extension

On May 10, Newport News Shipbuilding (NNS), a unit of Tenneco, announced that it was awarded an extension to a planning contract for the overhaul and refueling of U.S. Navy aircraft carrier USS *Nimitz* (CVN 68). The award, reportedly valued at approximately \$119 million, will enable the yard to continue planning work in preparation for the ship's scheduled arrival for overhaul in May 1998.

The planning work includes production of more than 2,000 engineering drawings required for upgrades to the vessel's existing systems. The actual overhaul and refueling work is scheduled to take slightly more than two years to complete.

Nimitz, built by Newport News and homeported in Bremerton, Wash., was the second nuclear-powered aircraft carrier to be built for the U.S. Navy, and is the lead ship in its class. NNS is currently building two Nimitz-class aircraft carriers, *Harry S. Truman* (CVN 75), to be delivered in 1998, and *Ronald Reagan* (CVN 76), scheduled for delivery in 2002.

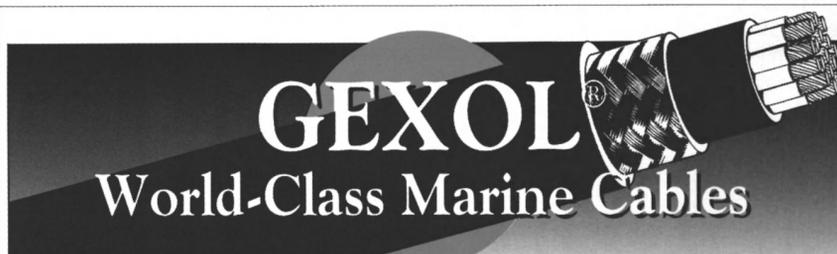
For more information on NNS
Circle 112 on Reader Service Card

Laser Plot Awarded ECS License From U.K. Hydrographic Office

Auburn, Mass.-headquartered Laser Plot Inc. announced that the U.K. Hydrographic Office has granted a license for the company's ARCS electronic chart service (ECS). According to Laser Plot President **Bruce Angus**, "The ability to use several governments' electronic chart products on one system provides the best choices and value for users."

The company has been involved in raster electronic chart technology for more than 10 years. The ARCS Navigator product provides a weekly chart updating service on CD-Rom. The first vessels to be upgraded to ARCS will reportedly be the U.K. Royal National Lifeboat Institute's lifeboats, which are reportedly equipped with more than 50 ChartNav systems.

For more information on Laser Plot Inc.
Circle 113 on Reader Service Card



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MES Delivers Bulk Carrier *Frontier Star*; Tanker *North Star*

Frontier Star, a 46,676-dwt bulk carrier built at the Tamano Works of Mitsui Engineering & Shipbuilding Co., Ltd. (MES), has been completed and delivered to its owner Valpo Shipping SA. *Frontier Star* is a medium-sized (handy-size) bulk carrier with five cargo holds and four cranes.

In addition, MES has also completed and deliv-

ered 148,561-dwt tanker *North Star*, built at its Chiba works. The vessel was delivered to owner Astron Industries SA of Panama, and is the seventh MES-built double hull Suezmax class tanker.

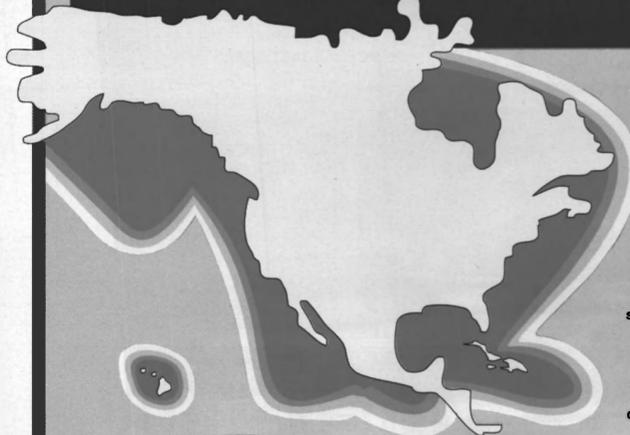
The cargo oil space of *North Star* has a full double hull structure to prevent massive oil spills in the event of collision or stranding, satisfying



North Star

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Circle 176 on Reader Service Card

IMO's MARPOL requirements.

The tank structure also meets the standards of OPA 90. *North Star* has 14 cargo oil tanks and 12 segregated ballast tanks partitioned by three longitudinal and six transverse bulkheads. The cargo oil tanks are equipped with heating coils, and the cargo handling system is designed to permit stowage of three different kinds of oil at the same time.

The segregated ballast tanks in the cargo oil space are equipped with an inerting system to prevent explosion of oil leaks, in addition to devices for detecting any gas in the tanks. They are also equipped with ventilators to let in fresh air during inspection of the tanks. A system to collect ashore oil gas generating from cargo oil tanks during their loading is provided to prevent air pollution. The vessel is equipped with a GMDSS and has reportedly acquired ABS' Safe Hull and OMBO notations.



Frontier Star

Station 12 Debuts New Service

Station 12, a provider of satellite communications, has introduced the Station 12 Call Back service. The new service is intended to make it easier, and in many cases cheaper, to call Inmarsat A, B and M satphones from a fixed telephone connection. Automatic rerouting and abbreviated codes enhance the ease of service; call charges are also, according to Station 12, itemized more clearly. Station 12 says the service will be particularly useful in countries where it is difficult or impossible to call a satphone directly. The Call Back system first establishes the connection between Station 12's earth station and the caller, and then dials the caller. All the caller then has to do is dial the number of the satphone.

For more information on Station 12
Circle 93 on Reader Service Card

Maritime Reporter/Engineering News

ITCLA Publishes Minimum Tank Inspection Criteria

The International Tank Container Lessors Association (ITCLA) has published a tank container inspection manual, entitled Acceptable Container Condition, marking the first initiative to be taken by the new trade association.

The new association was formed to represent the tank container leasing industry to public and governmental bodies, and to address issues of concern to this industry. Founding members include Cronos, Eurotainer, Stolt Tank Containers, Transamerica and Trans Ocean. The new manual describes acceptable and unacceptable conditions for all aspects and components of tank containers, including cleanliness, frame, walkway and ladder assembly, insulation and cladding, manway valves, pressure relief valves, top and bottom valves, pressure vessel, heating and miscellaneous items.

For more information on the manual
Circle 95 on Reader Service Card

MMS Integrates FleetLINK Software With MSAT Service

Marine Management Systems' (MMS) FleetLINK software now provides e-mail and data transmissions between ships and shore offices via MSAT satellite service.

Wilderness Cruises/Special Expeditions, a cruise operator headquartered in Seattle, recently implemented FleetLINK's new MSAT service option. FleetLINK provides low-cost data communications via Inmarsat A, B, C and cellular services, in addition to the recently-added MSAT option.

Wilderness had been using FleetLINK via Inmarsat C, and was interested in using the new MSAT service with the FleetLINK software. Wilderness approached MMS to develop a solution, which they did.

The MSAT service uses a geostationary satellite. FleetLINK's new MSAT communications option transmits a digital signal directly from a computer to a satellite without the use of a modem. Through the MSAT service, FleetLINK can reportedly transmit faster than and without the file size limitations of Inmarsat C.

For more information on MMS
Circle 99 on Reader Service Card

STN Offers New IMO & IALA-Compliant VTS

STN Atlas Elektronik has extended its 9730 range of Vessel Traffic Service (VTS) systems with the introduction of a new, low-cost, stand-alone assembly that reportedly meets IMO and IALA VTS recommendations -- the Atlas 9730-A.

Capable of automatically tracking more than 300 targets at any one time and incorporating electronic sea chart facilities with integral editor functions, the system comprises either an X or S-band remote control Atlas radar with variable antenna sizes, a radar data processor with a high-resolution raw data scan converter, and an operator workstation consisting of a keyboard-controlled, 21-in., color monitor together with support software. A 29-in. monitor is available as an option.

The system is designed for manual and automatic target acquisition, with measurements presented in lat/lon and range/bearing coordinates. Operational parameters provided include collision alerts, fairway supervision,

June, 1996

speed alarms and anchor watch, as well as buoy and navaid drift alerts.

For more information on STN Atlas
Circle 98 on Reader Service Card

Wheeler Becomes U.S. Agent For Romanian Yard

Wheeler Associates has become the exclusive U.S. agent for 2 Mai Mangalia shipyard in Romania. The first American vessel to be repaired in the relatively new shipyard is

62,500-dwt M/V *Themera* of Transglobal Sea Carriers, Inc., New York, with extensive steel renewals scheduled to be performed.

The facility is reportedly the largest in Romania, capable of handling ships weighing up to 200,000 dwt. Three drydocks are available: one 984.2 ft. (300 m) long and 157 ft. (48 m) wide for newbuildings, and one 1,181 ft. (360 m) long and 196.8 ft. (60 m) wide for repairs, both of which have crane capacity for 16, 50 and 120 tons; and the "step" newbuilding dock with two gantry cranes with 480-ton capacities.

For more information on 2 Mai Mangalia
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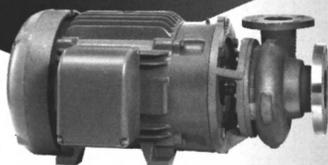
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ILU Reports Higher Casualty Figures In 1stQ '96

There was a disappointing reversal in merchant ship casualty experience in the first quarter of this year. This follows an exceptional year in 1995, which saw some of the lowest loss levels ever recorded, and may signal a return to more normal loss patterns. Statistics compiled by the Institute of London Underwriters (ILU) applying to ships of 500-gt and over show that in the three-month

period, the number of ships confirmed lost was 31, an increase of five (19.2 percent) compared with the same period in 1995, representing 144,237 gt, against 129,339 gt (an increase of 11.5 percent), based on updated confirmations.

"The first quarter's figures will undoubtedly rise as a result of some major casualties, or partial losses, being finally settled as

Constructive Total Losses (CTLs) by underwriters. What is particularly disappointing to insurers is that the quarter's 31 total losses so far confirmed represent a third of all total losses (95) in 1995 as confirmed by the end of that year. Underwriters will be anxious to see how the rest of this year develops," said an ILU spokesperson.

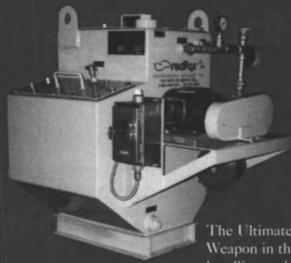
Three of the first quarter's most costly hull and machinery losses were related to the Liberian-flagged containership *Nedlloyd Recife* (16,915 gt built in 1994) --- with an insured value of \$17.5 million and \$952,000 under an Increased Value policy -- which grounded on rocks off Sao Francisco do Sul, Brazil, and broke up; another containership, the Chinese-flagged *Gu Cheng* (9,683 gt, built in 1985), which sank after taking water and listing in rough seas in Taiwan Strait, with 30 crew missing; and the Maltese-flag bulk carrier *Seafair* (36,427 gt, built in 1973), with a cargo of iron ore, which sank in rough seas about 60 miles north of Taiwan -- with 19 of her crew reported missing. A chemical tanker, the Panamanian-flagged *Kira* (4,998 gt, built in 1974), with an insured value of \$11 million, was carrying cargo of phosphoric acid when she sank after listing in heavy weather off southern Greece, with 18 crew missing.

Demonstrating the high values often associated with large fishing vessels and their expensive equipment was the loss of the German-flagged stern-trawling fish factory *Mainz* (3,071 gt, built in 1973) after a severe fire on her factory deck while she was berthed at Cuxhaven; her insured value was just over \$10 million, with another \$4 million under an Increased Value policy.

Among the major casualties in the first quarter was the Liberian-flagged tanker *Sea Empress* (77,356 gt, built in 1993), which has an insured value of \$30 million. The full extent of the damage she sustained is still unknown. Her well-publicized troubles began when she grounded after hitting rocks, en route to a Milford Haven refinery. She was eventually towed to Belfast for drydocking. There were several pollution incidents during the quarter, but *Sea Empress* was the most serious, with major pollution resulting from her ruptured

(Continued on page 82D)

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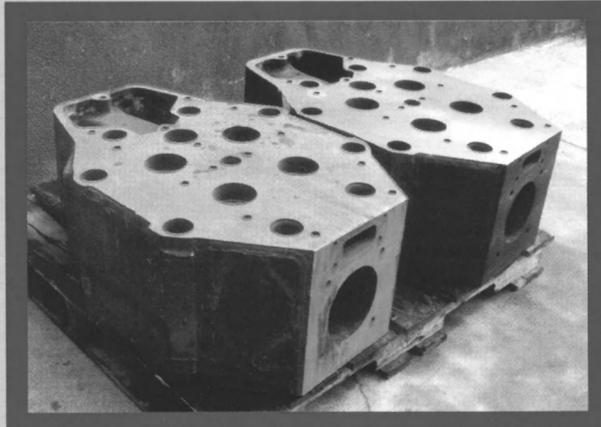
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Types of Ships

By vessel type, the 31 total losses in the first quarter of 1996 are represented:

General cargo (including container carriers)	21
Tankers	5
RoRos	2
Bulk carriers	1
Fishing/trawlers	1
Miscellaneous (dredger)	1

Source: ILU



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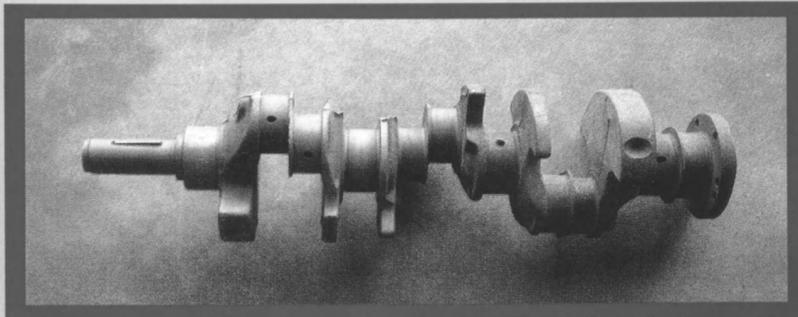
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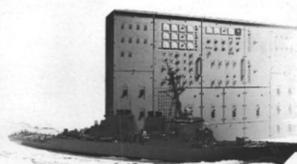
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Leica GPS Receivers Offer Man-Overboard Feature

Leica's marine GPS and DG navigation receivers -- including the MX 100, MX 200, MX 3 and the new MX 400 -- are designed with safety in mind each coming equipped with dedicated MOB (man-overboard) button on the front panel, an optional remote cockpit MO switch and an automatic interface with a lifesaving emergency transmitter.

A new feature is an interface with the Automatic Lifesaving Emergency Radio Transmitter (ALERT), manufactured by Emerald Marine Products Corporation of Seattle.

The ALERT system consists of a small, water-activated radio transmitter which can be fastened to clothing or a lifejacket. It automatically transmits a low-power UHF signal to a receiver/alarm on the boat. When connected to a Leica GPS navigator, the ALERT receiver automatically triggers the unit's MOB function as it sounds the alarm. Instantly, the Leica GPS navigator stores the current position and starts displaying courses and distances back to that location, while graphically showing the user's position relative to the MOB signal on a plotter screen.

For more information on Leica Circle 94 on Reader Service Card

CruisePhone Completes SatPhone Installations

CruisePhone, Inc. has completed installation of the Westinghouse mobile satellite communications equipment aboard *Sea Lion* and *Sea Bird* for Wilderness/Special Expeditions, as well as aboard American Canadian Caribbean Lines' (ACCL) *Mayan Prince* and *Niagara Prince*.

Both ships now use the new MSAT satellite service from American Mobile Satellite Corporation (AMSC) for both voice and data.

"MSAT provides us with a very inexpensive satellite service for our voice and data needs while also providing a very economical service for our passengers," said **Jeff Boyer**, director of Purchasing and Port Operations for Wilderness Cruises.

Nancy Blount, vice president of ACCL, said, "This new MSAT service from CruisePhone gives us coverage we need for our unique itineraries. No matter where we sail, from Panama to the Caribbean, to New England and back, we are in the MSAT footprint. And, for the first time, we have satellite service at prices close to cellular."

Scana Industrier Acquires Moland Automation

Norwegian ship automation specialist Moland Automation AS has changed its name to Scana Moland AS, following its acquisition by Scana Industrier ASA in December 1995.

Joining the Scana Group, which is listed on the Oslo Stock Exchange, strengthens the compa-

ny's prospects in new markets. Scana Moland supplies maneuvering/voyage recorders and alarm/monitoring systems.

The company's latest product is the Moland MA 100 alarm, monitoring and control system, which comprises self-contained processing units and operator terminals in a redundant, high-capacity data network.

For more information on Scana Moland Circle 120 on Reader Service Card

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For more information on the Valve Company Circle 97 on Reader Service Card

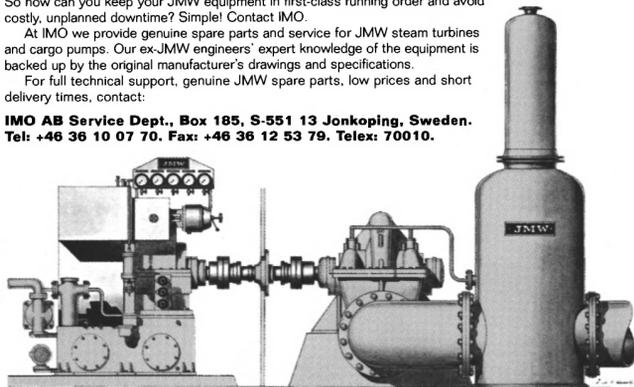
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Circle 173 on Reader Service Card

Alaskan DOT Orders Galley Mock-Up For New Trinity Ferry

Trinity Marine has contracted with Jamestown Metal Marine Sales, Inc. to design, construct and install the accommodation spaces for an Ocean class RoRo passenger vessel the yard is building for the Alaskan Department of Transportation's (DOT) Marine Highway System. Jamestown Metal was responsible for refining an initial design concept during the bidding process, which was ultimately completed by the company's engineering and design staff through the use of CAD technology. The Boca Raton, Fla.-based company focused on creating a vessel that would provide passengers with comfortable accommodations, maximum seating and viewing space, access for disabled passengers and family-oriented public areas. As specified by its design, the RoRo will be equipped with 48 A-Class staterooms, 338 C-Class staterooms, plus 24 roomettes to accommodate 500 passengers and 52 crew in overnight ocean service. In an effort to keep with the Alaskan DOT's desire to maintain open and functional vessel spaces, in order to assure smooth movement of passengers as well as proper equipment operation, Jamestown Metal Marine was tasked with constructing a full-scale mock-up version of all food service work areas for review by the DOT prior to construction. The mock-up, measuring 140 x 50 ft. (42.6 x 15.2 m), was subcontracted to a New Orleans-based builder of custom-designed commercial cabinetry -- Cabinets by Perrier -- which reportedly completed the project using entirely biodegradable materials. Jamestown Metal Marine also planned to construct its own sample of an A-Class stateroom for review, and both units were scheduled to be erected at Trinity Marine's Moss Point facility in late May.

Upon completion and delivery, the DOT ferry will operate out of Bellingham, Wash., and Prince Rupert, British Columbia, terminals.

For more information on Jamestown Circle 111 on Reader Service Card

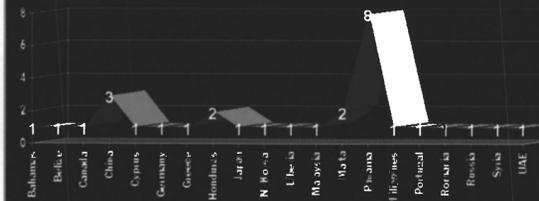
ILU Reports Higher Casualty Figures In 1stQ '96 (cont'd)

Flag Losses

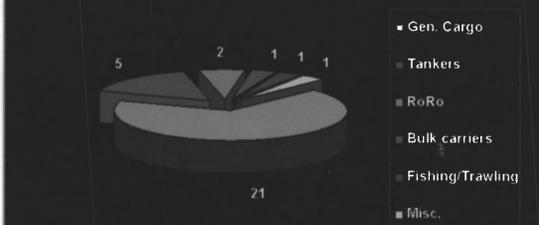
(By flag of registry, the 31 total losses are represented)

Bahamas.....	1
Belize.....	1
Canada.....	1
China.....	3
Cyprus.....	1
Germany.....	1
Greece.....	1
Honduras.....	2
Japan.....	1
Korea (North).....	1
Malaysia.....	1
Liberia.....	1
Malta.....	2
Panama.....	8
Philippines.....	1
Portugal.....	1
Romania.....	1
Russia.....	1
Syria.....	1
UAE.....	1

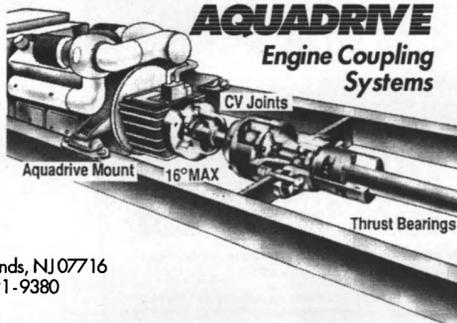
1996 Ship Casualties By Flag



1996 Ship Casualties By Type



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(Continued from page 82)

cargo tanks of crude oil. The ILU's casualty reports indicate that 148 people were either killed or reported missing as a result of total and partial losses in the January-March period. The majority of deaths arose from just five casualties, including the 30 crew missing from *Gu Cheng*. The total of 148 in a quarter compares poorly with the total of 316 lives lost in the whole of 1995.

The ILU's statistics apply only to ships of 500-gt and over, thus excluding many small fishing vessels and other craft such as small ferries.

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Maritime Reporter/Engineering News

TRADE SHOW PREVIEWS

VIET PORTEX '96 Provides U.S. Companies With Access To Vietnam

"U.S. companies will find easy business access to one of the hottest markets in the world today, the transforming 'Dragon' of Vietnam, by exhibiting at VIET PORTEX '96," said **Wolfram Diener**, project manager of the trade show. This rapidly expanding sector of the market is served by a dynamic exhibition/conference that focuses on bringing together the buyers and sellers of port, shipbuilding and waterway construction equipment and related services. The mission of the trade show is to facilitate Vietnam's urgent needs for port expansion, offshore technology acquisition and transportation development. And from all indications, VIET PORTEX '96 will expand substantially in its second year, both in terms of exhibitors and international composition of visitors — especially from Southeast Asia and Japan.

VIET PORTEX '96 will be held in Hanoi at the Culture Palace from November 26-29, with a technical conference scheduled for opening day. Hamburg Messe und Congress GmbH, the event organizer, anticipates more than 150 exhibitors and approximately 8,000 trade and official visitors — mainly maritime executives from Vietnam and neighboring countries interested in purchasing products and services. In conjunction with the trade exhibition, the conference on November 26 will feature international and Vietnamese experts reporting on all facets of Vietnamese port expansion. VIET PORTEX '96 is supported by the Vietnamese Sea Ports Association and Vietnam National Maritime Bureau (VINAMARINE).

To make doing business easier and more productive for U.S. companies, space within a specially priced U.S. Pavilion is reportedly available, and the reservation deadline is August 30, 1996. Right now, as Vietnam aggressively implements its "Doi Moi" economic strategy, there is market demand for U.S. expertise and products related to port development and operations, inland waterways construction, shipbuilding and repairs, and maritime transportation technology, according to **Tom Harrelson**,

director of Marketing for the U.S. Maritime Administration (MarAd).

"In fact, there is approximately \$300 billion worth of funded projects in the planning and implementation stages right now, to prepare Vietnam's port and water transportation infrastructure for an expanded role in the country's economic development," said **Mary Colburn-Green**, U.S. representative for Hamburg Messe. She added that U.S. manufacturers and consultants in areas related to ports, waterways, shipbuilding and offshore technology will find this exhibition a short-cut to doing business in Vietnam. Ms. **Colburn-Green** also emphasized that all the right people and agencies are supporting the show, which means that people who can authorize contracts will be in attendance. The U.S. industry sectors likely to profit from exhibiting include companies involved in: port construction; port, shipbuilding and repair equipment; port facilities; port administration, software and controls; port safety and security; transportation equipment, technology and freight handling containers and related equipment; waterway construction and dredging; engines and propulsion systems; pumps and compressors; cranes and dock



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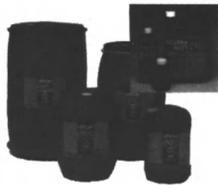
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June, 1996

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equipment; fittings and auxiliary machinery; navigation systems and electronics; and oil drilling and offshore technology. Exhibitors may expect the top government officials and representatives of agencies involved with ports, shipping and waterways to attend the show, since they are anxious to find the products and services they need to fuel this massive expansion. "When you contrast this direct business approach to sales (where all the interested parties come together in a concentrated marketplace), with the slow and often bureaucratic process of pursuing the right channels without contacts, VIET PORTEX makes absolute sense where it counts — at the bottom line. That is why all of the U.S. exhibitors from VIET PORTEX '95 will be back," concluded Ms. Colburn-Green. According to Vince Almerico, senior vice president of Development at Trinity Marine Group, a U.S. exhibitor at VIET PORTEX '95, Trinity plans to exhibit again at the 1996 show. "I

think it is important for Trinity Marine to be there to demonstrate our interest in doing business in Vietnam. We made some good contacts in 1995 with top-ranking Vietnamese officials, and the U.S. Embassy supported our involvement," he said.

Encouraged by early exhibitor renewals and active interest from new U.S. companies, the show organizer predicts a 50 percent increase in exhibitors and visitors. "I'm quite sure the U.S. Pavilion will help American companies stand out and attract positive attention. Our mission in creating this feature is to encourage U.S. companies to try this marketing venue. We're confident that once they come, they'll be back because of

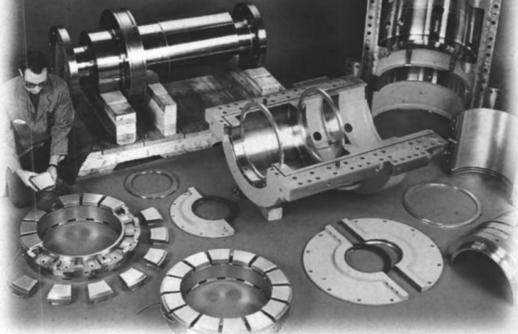
the lucrative return on their investment," said Mr. Diener. VIET PORTEX has the full cooperation of the Chamber of Commerce and Industry of Vietnam. To help U.S. companies participate in the U.S. Pavilion and make their exhibition space, shipping and travel arrangements, Hamburg Messe's U.S. office, located near

Washington, D.C., is organizing the U.S. Pavilion, with space allocated on a first-come basis. U.S. companies are urged to make their arrangements without delay. For more information, contact Mary Colburn-Green, U.S. representative at (304) 263-7342, or fax a request for information to (304) 263-7414.

China Port Expansion Spells Opportunity For U.S. Companies

Approximately 50 U.S. companies eyeing the People's Republic of China as a potential market were given a preview of the phenomenal port expansion taking place as part of the country's overall economic development strategy. The CHINA PORTEX '96 presentation and dinner took place at the Fontainebleau Hotel in conjunction with the Cruise Shipping Show in March at the Miami Beach Convention Center. It was hosted by a joint delegation of top representatives from the China Ports and Harbors Association, Shanghai Port Authority and Shanghai Harbor Bureau, as well as from the Hamburg Messe und Congress, the organizer of the CHINA PORTEX Trade Exposition and Conference. Representatives of the Maritime Administration (MarAd), the Florida Ports Council and International Trade Commission welcomed the delegation. The fifth bi-annual CHINA PORTEX trade show, which will take place from October 30 to November 2, 1996, at the Shanghai Exhibition Center, offers U.S. companies access to the purchasing agents of port and shipping-related equipment and expertise. "This is a particularly productive trade show for exhibitors when one considers that the Shanghai Port alone, which serves 300 million people in the Yangtze River Basin, will triple its capacity by the year 2000," said Wolfram Diener, project director of CHINA PORTEX. This year's trade show is expected to be much larger than the 1994 event, which was attended by 105 exhibitors from 14 nations, who interacted with more than 14,000 trade visitors.

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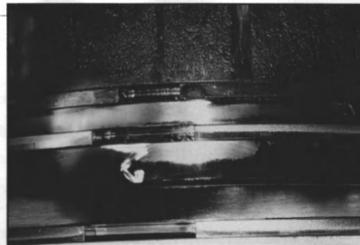
The World at sea drinks

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New Marine Lubricant Combats Effects Of Residual Fuel Contamination

In many types of medium-speed trunk diesel engines, residual fuel often contaminates engine oil. Contamination compromises the oil's ability to perform and can ultimately cause filter plugging, excessive piston deposits and sludge to form in the engine's camshaft and



Before SEATRANS started using Mobilgard 430 in Norway, Supplier's Bergen BRMS diesel engine, deposits and sludge caused problems.

crankcase areas. Widespread availability and use of inexpensive and inferior residual fuels places even greater demands on the engine lubricant.

The challenge for marine lubricant suppliers is to develop novel lubricant formulations that incorporate new, balanced additive systems which protect engines from performance debilitating deposits and sludge build-up.

Mobil's new lubricants are compatible with residual fuel

A research program and extensive field testing helped Mobil Corp. develop new lubricant technology that the company says combats the detrimental effects of residual fuel contamination. According to the oil supplier, Mobilgard 30 and 40 Series oils are specially formulated to be compatible with residual fuel. Because of this compatibility, the oils keep medium-speed diesel engines cleaner and performing more efficiently than lubricants that are not as technically balanced.

Before the oil company began formulating the new marine lubricants, it conducted an extensive research program around the world to study medium-speed engine cleanliness. The research led to Mobil's invention of the patented Residual Fuel Detection (RFD) test, which allows Mobil to quantify the extent and amount of residual fuel contamination in medium-speed engine oils and determine the source of the problem. Technical data from RFD testing was instrumental to the development of Mobilgard 30/40 Series oils.

Product testing at sea yields impressive results

Mobil extensively field tested the new Mobilgard 30/40 Series oils for many thousands of hours aboard vessels owned by several customers, including Royal Caribbean Cruises Ltd. (RCCL), SEATRANS and Cornelis Vrolijk BV. According to reports provided by Mobil, all the field test results confirm that the new oils successfully protected the test vessels' medium-speed diesel engines from piston deposits, sludge build-up and excessive wear.

RCCL switched to Mobilgard 440 after the company's Marine Operations Department reported seeing black sludge in the top deck of M/V *Nordic Empress*' engine. After using the new lubricant for 5,200 hours, the cruise line confirmed a "significant improvement in the cleanliness of the engine's top deck, camshaft and crankcase

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Maritime Reporter/Engineering News

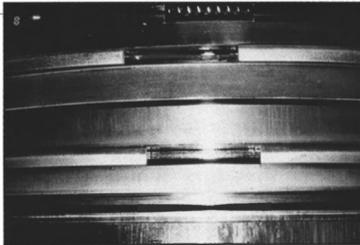
After using Mobil's new oil for 3,294 hours, the diesel engine's piston rings were found clean and free of deposits.

areas."

Before British shipping company SEATRANS started using Mobilgard 430, M/V *Nornews Supplier's* BRM8 diesel engine had problems with deposits and sludge. The cargo vessel's chief engineer said that he found the engine "exceptionally clean after using Mobilgard 430 for 3,294 hours. During a recent inspection, the chief said he found "no piston deposits or sludge in the camshaft or crankcase areas."

An Ulstein-Bergen service engineer involved in the inspection stated that *Nornews Supplier's* diesel engine was among the cleanest he had ever seen after nearly 3,300 hours.

Dutch shipping company Cornelis Vrolijk BV began using Mobilgard 430 after M/V *Frank*



Bonefaas' diesel engine experienced significant piston deposits and sludge. After using the new lubricant for 2,605 hours, Chief Superintendent Engineer G. Zwart said: "The pistons inspected were very clean with minimal piston groove deposits and the cylinder liner wear was excellent." Residual fuel contamination is a common problem for many types of medium-speed diesel engines operating on heavy fuel.

Thanks to an intensive research program and extensive field testing, Mobil has developed new lubricant technology that prevents excessive piston deposits and sludge build-up from forming in medium-speed diesel engines' crankcase and camshaft areas. Based on field test reports, it appears three customers have found that Mobil has developed a solution to the problem of residual fuel contamination.

James Marine Services Names Marketing Exec

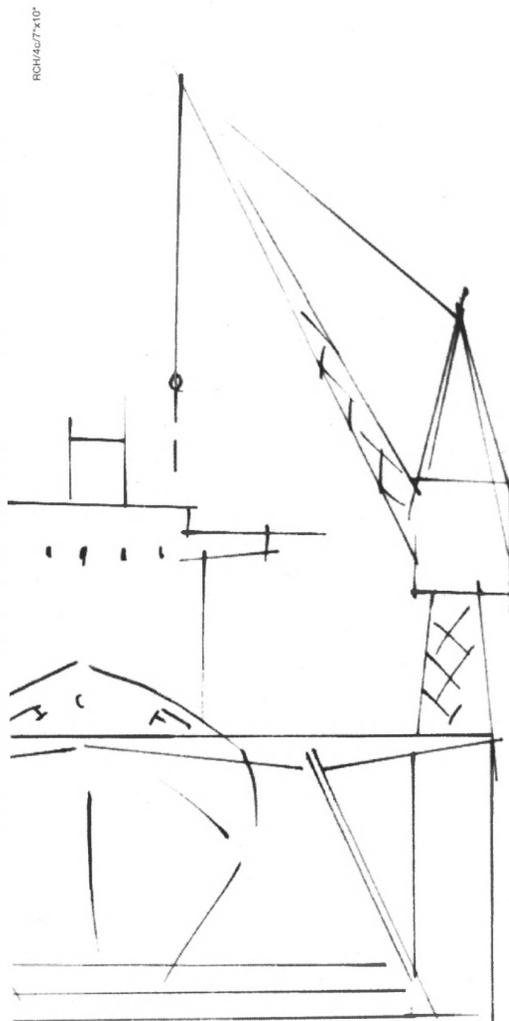
James Marine Services, Ltd. has appointed **Juana Maria Carretero Asensio** as a marketing executive in its Newcastle-upon-Tyne head office. This latest appointment supports the expansion of the company's operations, which reportedly serve a worldwide client base of more than 400 customers in 53 countries, including in Latin America.

Ms. **Asensio** starts her new role immediately with responsibility for marketing in Latin America. This will involve enhancing existing client relationships and promoting James Marine's unique combination of customer services, primarily the supply of marine spare parts and equipment.

PinPoint Installs Nav Systems On 14 Vessels

PinPoint Systems International, a fast growing developer and manufacturer of electronic navigation systems, has completed a 14-vessel installation at the Cameron, La., plant of Zapata Protein, Inc. The Zapata fleet catches menhaden along the Gulf Coast from Florida to Texas. In 1995, Zapata used 43 fishing vessels in conjunction with 34 aircraft to harvest approximately 1.7 billion fish, generating gross revenues in excess of \$90 million.

PinPoint Nautical Navigation is an electronic charting and navigation system that utilizes special electronic nautical charts in conjunction with Loran C or Global Positioning System (GPS) input. For more information on PinPoint Systems Circle 86 on Reader Service Card



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Upturn In Gulf Spurs Acquisition

American Oilfield Divers Inc. (AOD) said that, in anticipation of improved demand in the Gulf of Mexico diving market, it has acquired the operating assets of Gulf Coast Marine Divers Inc., a medium-sized, privately held company, for an undisclosed sum.

AOD also announced that in separate transactions, it acquired two, four-point anchor boats from two separate owners, as well as diving and related equipment from Offshore Diving and Salvage Inc., a diving contractor currently in Chapter 7 liquidation.

"Based on several industry indicators, expectations are high that demand in the Gulf of Mexico diving market will steadily increase during the next several years,"

said George C. Yax, AOD's chairman of the board, CEO and president. "As a result, I believe these are timely acquisitions which will increase our capacity to serve our Gulf of Mexico customer base. We anticipate that the acquisition of Gulf Coast assets will produce a minimum of \$3 to 4 million of revenue for AOD over the next nine months. We expect to employ most of the Gulf Coast's offshore personnel and look forward to working

with them."

Operating assets acquired from Gulf Coast Marine Divers include four-point anchor boat *Four Point IV* (renamed *American Independence*), diving support vessel *Sonya Maria* (renamed *American Scout*), as well as miscellaneous diving and marine construction equipment.

The two four-point anchor boats acquired by AOD were the 220-(67-m) *Seahawk Retrieval* (renamed *American Constitution*) and 170 ft. (52-m) *New Construct* (renamed *American Triumph*). Both vessels will operate in the Gulf of Mexico, replacing two vessels in AOD's Gulf of Mexico fleet which will be positioned overseas for international opportunities particularly in the West African market.

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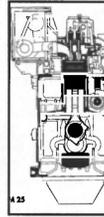
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Krupp MaK's New M 25



Photo of the new Krupp MaK M 25. A more complete technical piece was featured in the May edition of MR/EN (pg. 68), but photos were unavailable for the May edition.



Pictured is a cross section of Krupp MaK diesel engine M 25.

As reported in the May edition of MR/EN, Krupp MaK has introduced the M 25, a member of the company's long-stroke engine generation six, eight and nine-cylinder in-line engines. Following is a list of the engines' specifications:

M25 Technical Specifications

Bore	255 mm
Stroke	400 mm
Cylinder rating	290/300 kW
Speed	720/750 revs/min.
Mean piston speed	9.6/10 m/s
BMEP	23.7/23.5 bar
Pmax	190 bar
Specific fuel oil consumption	185 g/kWh at 100% mo
	184 g/kWh at 85%
Specific lube oil consumption	8 g/kWh
Engine rating (6M 25)	1740/1800 kW
(8M 25)	2320/2400 kW
(9M 25)	2610/2700 kW
Gen rating (6M 25)	2060/2140 kVA
(8M 25)	2750/2850 kVA

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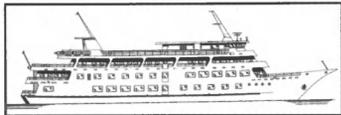


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EBDG Wins Contract To Repower And Modify Spirit of Endeavour



Alaska Sightseeing/Cruise West (AS/CW) of Seattle has awarded a contract to Elliott Bay Design Group (EBDG) for engineering services on the repowering and modification of M/V Spirit of Endeavour. The 207-ft. (63-m), 107-passenger vessel is scheduled to begin Seattle-to-Alaska Inside Passage service in April 1997. AS/CW operates eight small passenger vessels to Alaska and West coast destinations, including Canada's Inside Passage, California wine country, Puget Sound and the San Juan Islands, and the Columbia/Snake Rivers. The contract calls for EBDG to provide contract and detail engineering for major equipment replacements and vessel enhancements required to prepare Spirit of Endeavour for her new role.

The naval architecture and marine engineering firm will also provide stability testing and analysis to comply with SOLAS regulations. Repowering will be done with a pair of 1,500-bhp Caterpillar 3512 DITA diesels, coupled with Reintjes WAF-741 3.039:1 reduction and reversing gears. These will drive 56-in., 4-blade nozzle propellers by Nautican of Vancouver, B.C., along with Nautican's triple rudder system.

Also to be installed are two CAT 3408B DITA diesel gensets with 350-kW generators, a 60-kW emergency genset and a new emergency switchboard. A fog sprinkler system by Novenco-HiPres of Denmark will be fitted throughout the accommodations and public spaces.

Significant hull modifications will be made, with the addition of a bulbous bow and a stern fairing designed for wave reduction and increased fuel efficiency. The modifications are being designed in conjunction with the University of British Columbia, with tank testing for designed optimization conducted at B.C. Research. Work has commenced on the vessel at Seattle's Pacific Fisherman boatyard, and is expected to be completed this fall.

For more information on Elliott Bay Design Group
Circle 49 on Reader Service Card

Krupp Fördertechnik Hands Over Hopper Dredger To Dutch Interest



In mid-April, the Lübeck-based Marine Technology sector of Krupp Fördertechnik GmbH handed over hopper suction dredger Nautilus to Dutch company Baggermaatschappij Holland BV, based in Hardinxveld. The hull of Nautilus was built at the Gdanska Stocznia Remontowa shipyard in Gdansk, Poland, to a design jointly drawn up by the operators, the system manager and engineering partner Krupp Fördertechnik Lübeck and co-fitters Amsterdam-based Vosta BV.

Installation of the digging machinery, dredging trials, commissioning and performance

(Continued on next page)

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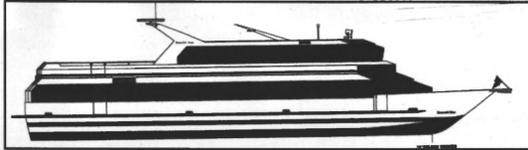
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Emerald Star Added To Waterways Fleet

Waterways Cruises, Inc., a charter and public cruise company located in Washington state, is adding a new \$1.5-million dining and entertainment vessel to its fleet. The addition of *Emerald Star* is expected to increase the company's charter business by 90 percent. *Emerald Star* is a 111-ft (33.5-m), 250-passenger dining/charter vessel that is being transported 2,000 miles overland from Wisconsin to Washington. After a mid-April delivery, the vessel was scheduled to be ready for charters and public cruises throughout Puget Sound and Lake Washington in May. In addition to providing more than 100 charter cruises, Waterways expects to add at least

Emerald Star Equipment	
Main engines	Twin Detroit Diesel 6-71 TI (310 bhp @ 2,100 rpm)
Main generator	75 kW Cummins
Bowthruster	Westmar (hydraulic)
Screws	Michigan Wheel/4-blade bronze/28x22 pitch DynaQuods
Gears	ZF IRM225 (2.45:1)
Engine mounts	Detroit Diesel
Propeller shaft coupler	Vetus
Steering system	Hynotic
VHF/FM	Icom
Depth sounder	Impulse
Radar system	Furuno
Displacement	94 tons
Naval architect	Elliott Bay Design Group
Builder	SkipperLiner Industries, Inc.
Interior design	SkipperLiner Interior Design International



100 dining and entertainment cruises in 1996.

Emerald Star's interior was designed by Interior Design International, Inc. of Seattle, and combines mahogany and cherrywood paneling with brass accents. The main deck features a solarium-style enclosure at the bow of the ship, and seats up to 126 guests for dining.

The vessel is powered by twin turbocharged Detroit Diesel 6V92 engines which deliver 810-hp, and is reportedly capable of cruising at up to 12 knots per hour and servicing destinations as far as Olympia and the San Juan Islands. *Emerald Star* was designed by

Seattle-based Elliott Bay Design Group, and constructed by SkipperLiner Industries, Inc., in La Crosse, Wis.

Emerald Star is one of three vessels owned by Waterways, located in Chandler's Cove at the south end of Lake Union.

For more information on SkipperLiner
Circle 33 on Reader Service Card

For more information on Interior Design Int'l.
Circle 34 on Reader Service Card

Emerald Star Particulars	
Length	111 ft. (33.5 m)
Beam	20 ft. (6.1 m)
Hull depth	5.6 ft. (1.7 m)

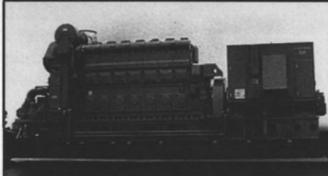
(Continued from previous page)

tests were then carried out in Dutch waters. After a total construction period of 17 months, the dredger was handed over to the customer.

Nautilus is equipped with the new loading and unloading system developed by Krupp Fordertechnik, which reportedly ensures even loading fore and aft of the hopper by splitting the dredged material in two.

For more information on Krupp Fordertechnik
Circle 48 on Reader Service Card

New Holeby Gensets Delivered To Odense Shipyard



MAN B&W Diesel, Holeby, has delivered the Gensets of the L32/40 type to Odense Steel Shipyard Ltd., Denmark, for installation in the third container vessel of a series of mega-container vessels from the shipyard. The Genset is based on the MAN B&W Group's L32/40 medium-speed, 4-stroke engine developed in Augsburg, Germany.

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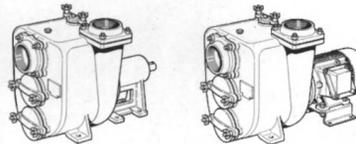
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TBS version includes all aluminum bronze alloy casing with 316 SS shaft and oil lubricated mechanical seal for run dry protection.

Semi open impeller design allows pumps to handle from 3/4" to 3" solids.

JV and JL pumps have large impeller clean out ports for removing debris.

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J Series pumps are available in pedestal mount, close or long coupled to electric motors, electro-clutch pulley and manual clutch pulley versions.

For more information about Gilkes J Series self-priming marine pumps contact your local Gilkes distributor or call (713) 474-7622 for the distributor nearest you.

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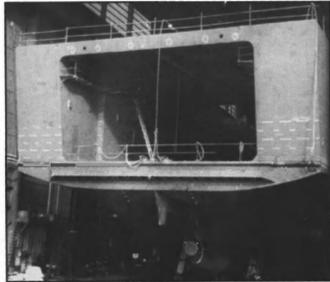
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Circle 393 on Reader Service Card

ScanMarine Celebrates Founding With New Contracts

ScanMarine Group of Sweden AB has recently celebrated its fifth anniversary with the completion of two contracts for SweFerry, located in Helsingborg, Sweden. Work on the car/passenger/train ferry M/S *Aurora* involved updating the ves-



The interior shell of a ScanMarine production dock.

sel's interior areas, including work on the vessel's money exchange area, specifically, the installation of security measures. ScanMarine's contract for the M/F *Trelleborg* — a ferry similar in function to the *Aurora* — involved demolition, rebuilding and installation of new units — including the vessel's reception area, office and archives.

The company has great faith in the refit and newbuild market, according to chairman S.H. Sorensen, and is reportedly involved in the first Swedish civil newbuilding project for a Swedish owner at a Swedish yard since the slowdown experienced in the

Sonardyne Installs SIPS On Second Seismic Vessel

Sonardyne Ltd., U.K., has installed its Seismic Integrated Positioning System (SIPS) of PGS Exploration's *Ramform Challenger*. The vessel was recently completed at Langstein Shipyard, Norway. *Ramform Challenger* is the second of the seismic exploration vessels with a special triangular hull to be built for PGS exploration. The first was the *Ramform Explorer*, which also had a Sonardyne SIPS acoustic positioning system installed.

Ramform Challenger is configured to tow as many as 16 streamers in an array that can be up to half a mile wide. The precise position of the streamers along their lengths of over 3 km must be monitored at all times. PGS called on Sonardyne to further develop SIPS to meet the demanding requirements of this configuration.

SIPS, which won the Queen of England's Award for Technological Achievement in 1994, is already reportedly in service on 80 percent of the world's 3-D seismic fleet.

For more information on Sonardyne
Circle 84 on Reader Service Card

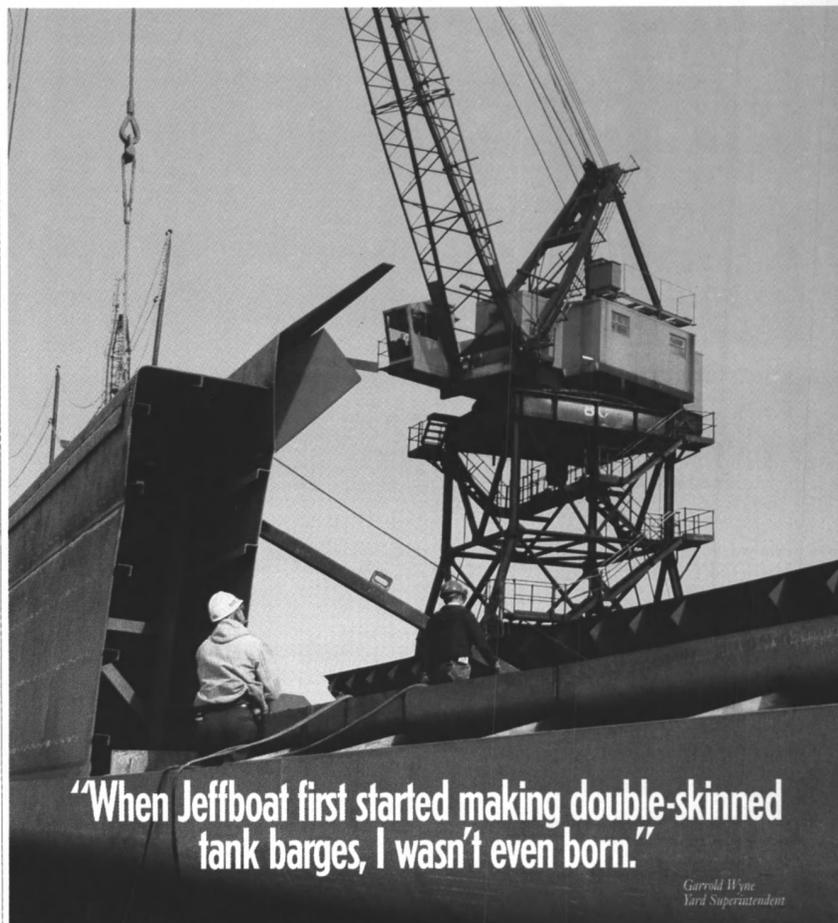
1980s. In 1995, ScanMarine also fulfilled contracts for other prominent maritime interests, including: fire and sound insulation work for a Chinese owner at Mathias Thesen Werft GmbH MTW in Germany; management and supervision work for high-speed megayacht monohull constructed by

Samsung Heavy Industries Co. Ltd. in Korea; and involvement in interior planning, installation and delivery of materials for a Russian research vessel under contract with Oresundsvarvet AB, Celsius Industrier, Sweden.

For more information
Circle 52 on Reader Service Card



Pictured is a side view of ScanMarine yard dock facilities.



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Garrod Wynn
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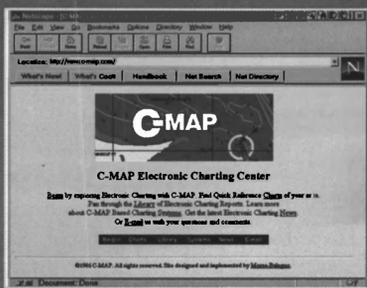
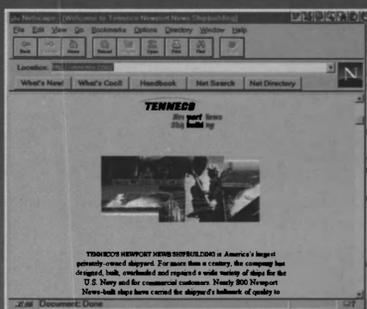
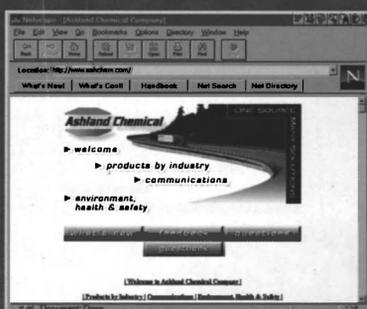
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The Internet: Charting Business Opportunities On An Electronic Sea

by Dan Maniatis,
senior editor/webmaster



Those who might not believe that a land-based network of computers could have anything close to a profound effect on the way companies doing business at sea operate should be advised: the Internet is affecting the way companies in just about all industries do business, and will continue to do so into the foreseeable future.

The Internet's attraction to companies is the ease of accessing information through its pathways. Information Technology (IT) is all about accessing information in a quicker, more complete way, and companies in the maritime industry have long known that better information access means a more efficient and competitive organization.

What Exactly Is The Internet?

The Internet is simply a huge conglomeration of networks, all connected by similar protocols — conventions of information exchange — allowing them to communicate with one another. The computers can be of any type, as long as they are equipped with the software necessary for them to "speak" the correct protocols.

Many corporations today are creating corporate intranets, proprietary networks created with Internet standards but not necessarily connected fully to the Internet, to serve information internally. Why? For one thing, the standardization of hardware and software that the surge in Internet popularity has wrought makes it extremely cost-effective. In some cases, these companies can kill two birds with one stone by implementing an efficient means of granting employees access to the information they need (protected by user authentication, if also connected to the larger Internet), while also establishing an Internet presence with which to serve customers and market their company.

DOD Beginnings

The Internet is now recognized for its huge potential as a commercial tool, but it began as a project funded by the U.S. government for military applications. A company called Bolt, Beranek and Newman (BBN) developed the packet-switching technology upon which the Internet is based in 1969, funded by the Department of Defense's (DOD's) Advanced

Research Projects Agency (ARPA). The technology allowed the reliable transmission of data in subdivisions called packets. BBN is still deeply involved in the Internet (one of its business units, BBN Planet, provides Internet access), as well as other high-technology pursuits, such as Active Sound and Vibration Control (see *MR/EN* May 1996, p. 22).

The network created based on this technology was called ARPAnet, then renamed DARPA-net in 1973, the "D" standing for "Defense." The technology was designed to allow a network to function even if the majority of nodes on the network were destroyed — the idea being to create a means of exchanging information that would survive a nuclear attack.

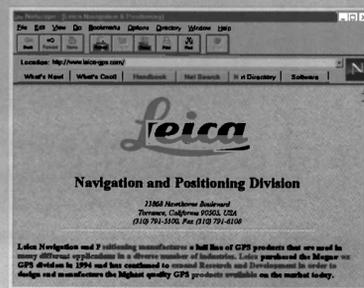
The Most Elaborate Web Ever Spun

The Internet was used by government and educational institutions for years, but did not gain the its current momentum until **Tim Berners-Lee**, then at the European Particle Physics Laboratory (CERN), conceived of the World Wide Web.

The World Wide Web, as is rarely explained in much of the hyped-up articles seen in the popular press, is not a different part of the Internet, exactly. It is not so much a place as a subset of those Internet-connected computers, all of which, in this case, know how to speak the protocol of the Web.

Different protocols allow the transmission of different kinds of information across the Internet. The main protocol "suite" of the Internet is TCP/IP, which contains many sub-protocols to allow for the reliable transmission of a variety of data types. Mr. Berners-Lee developed the hypertext transfer protocol (HTTP), which allows the transmission of hypertext. Hypertext is, simply put, text that can be linked within the body of a page to other pages. Those other pages can be located on the same computer or they can be on the other side of the world. The concept of hypertext had existed before the development of HTTP: a man by the name of **Ted Nelson** had envisioned a grand system, which he called Xanadu, of hypertext linkages rife with contextual references to other related documents, complete with processing capabilities for respecting copyrights, tracking usage and

MARITIME COMPANIES ON THE NET (counter-clockwise from upper left): A collection of "home pages" from some of the companies that have already begun exploring the potential of the Internet's World Wide Web: Wartsila Diesel; Ashland Chemical; Newport News Shipbuilding; C-Map; Norshipco; and Leica.



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paying royalties to the authors of those related documents on a per-access basis. But the World Wide Web was a simpler, leaner and more easily implemented incarnation of a hypertext system — obviously more viable for immediate purposes, as evidenced by the simple fact that it exists, and it is unclear whether Mr. Nelson will ever be successful in creating a system that delivers the promise of

Xanadu. Mr. Berners-Lee also proposed Hypertext Markup Language (HTML), a subdivision of SGML (Structured Generalized Markup Language) that defines the elements of a document based on structure rather than specific formatting. Because different computer platforms have different resources available to them, a structure-based method of creating

documents would allow each client computer to interpret an HTML document in the way most appropriate to its resources. This made HTML largely independent of what display capabilities the user might or might not have.

The Pace Of Change

Just as it is unlikely that anyone who originally developed the ARPAnet knew it would evolve into

something with as much potential as the Internet, it is almost as unlikely that those who worked on the basic HTML language just a few short years ago knew it would be extended to support the kind of functionality it now has.

One of the first extensions of the basic HTML text document was one that allowed the incorporation of images into HTML. This extension was proposed by Marc Andreessen, who was then working at the National Center for Supercomputing Applications (NCSA), which developed the first World Wide Web "browser" software, called Mosaic. When that functionality was added to Mosaic, people began to see the true potential of the Web.

Mr. Andreessen subsequently co-founded Netscape Communications with Jim Clark, formerly of Silicon Graphics. Netscape has been the source of many new extensions to HTML since then — so many that the normal standards development process has been forsaken for HTML, because no standards organization could keep up with the rapid development of the language without acting as a restraining influence on its progress. Netscape Communications' browser, Navigator, while clearly owing a debt to NCSA's Mosaic, has since far surpassed Mosaic as the most popular browser, largely because Netscape has continually innovated to expand the abilities of the software as it has expanded the abilities of the HTML language itself.

Maritime Industry Applications

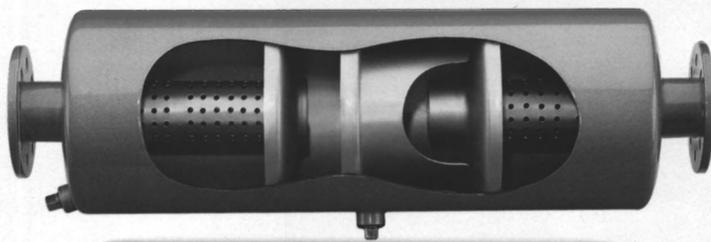
What does all this have to do with the maritime industry? At least as much as it has to do with every other industry.

Web "pages," as the individual HTML documents are called, can embed the functions of file transfer and e-mail directly into the page: a user has only to click on a hypertext link (also called a "hotlink") to access the functions once they are built into the page. With a bit more effort and the help of some custom programming, the pages can even be designed to perform tasks like database searching. Consider the potential in that capability for those companies who want to give customers direct access to what inventory they have in stock: a potential client can simply access the database through the Internet and know immediately whether the part he or she needs is in stock — and if it isn't, possibly order it.

Many companies which have served the maritime industry for years, some for decades, have already realized the potential of the World Wide Web for marketing their products and services. Each company's site tends to offer features that reflect that company's specific business and character. The marine companies that have begun to establish an Internet presence include:

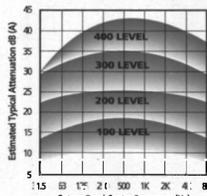
- Wartsila Diesel's Web site

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offers a short presentation of the company, with company news updates and information on the company's research and development activities. It also offers information on its line of products and services, including descriptions of its marine diesel engines, grouped by kW range.

- **Newport News Shipbuilding** (NNS) has a site that offers an overview of NNS, a brief history, as well as information about employment opportunities and a photo gallery of distinctive ships delivered by the yard.

- **Norshipco's** site gives detailed information about its repair facilities, including the geographical distance of those facilities from prime points in the U.S.

- **C-Map's** Web site offers reference charts of certain areas, and has incorporated a library of electronic charting reports for the latest developments in the electronic charting world.

- As is the case with a great many Web sites, **Radio Holland's** was "under construction" at press time; but plans include incorporating product information about its offerings in GMDSS communications, integrated bridges, as well as engine room and cargo control and monitoring equipment.

- Also under construction at press time, **Leica Navigation and Positioning Division's** Web site offers specifications and even pictures of its lines of equipment, broken down by product category and sub-category. For example, under the Marine Navigation menu, users can choose from DGPS systems, hydrographic survey products, commercial marine and pleasure boat products.

This is only a tiny subset of the companies currently taking advantage of the Web's potential for disseminating information. One advantage of electronic publishing over traditional printing is that the cost of revisions and updates is negligible — not at all like the printed product and service information all companies must have, which cannot be revised once printed, and which are worth no more than the paper they are printed on once they become outdated. Also postage, which can be a significant expense, does not apply. Electronic documents are not static like paper, but dynamic. And they can be as dynamic as you need them to be: with a little programming, HTML documents can be created to actually "rewrite" themselves as time goes on. For example, it is now possible to create a document with an ever-changing table reflecting current stock prices for maritime companies, or even with an embedded weather map that reflects the movement of weather systems in a given area. The potential, especially with the developments in

Web-based programming (notable among which is the creation of Sun Microsystems' multi-platform programming language, Java) is growing ever closer to limitless.

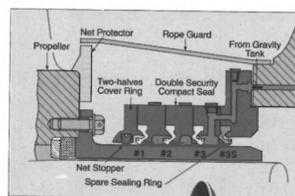
Of course, not all — perhaps not even most — of your prospective customers will have Internet access. That may be true today, but there are definite indications that computers are heading toward becoming the universal appliance

of the near future, combining the uses of television and telephone with the accepted uses of a PC. A reasonable argument can be made that getting your company involved in the Internet may not be a vital part of its strategy today; but an even more reasonable argument can be made that those who ignore the Internet today will be playing catch-up with their competitors tomorrow.

For more information on the Web sites mentioned in this article, visit *Maritime Reporter's* new Web site at <http://www.marinelink.com> and look for the online version of this article in our June 1996 section.

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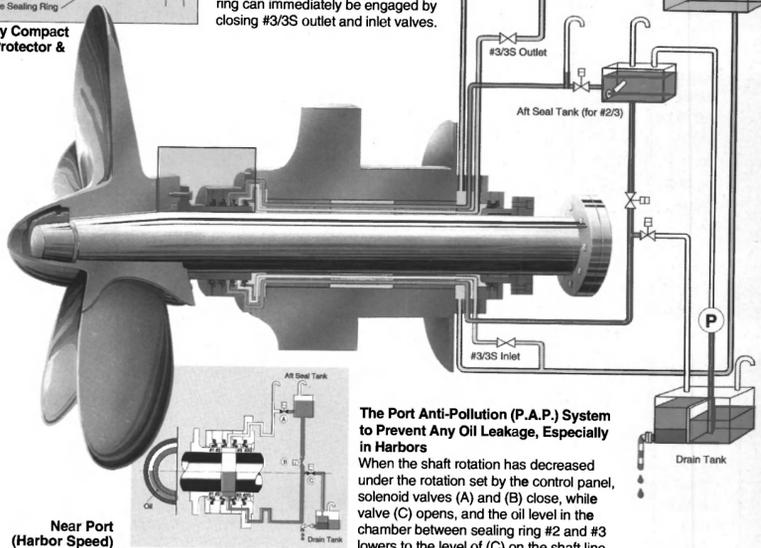
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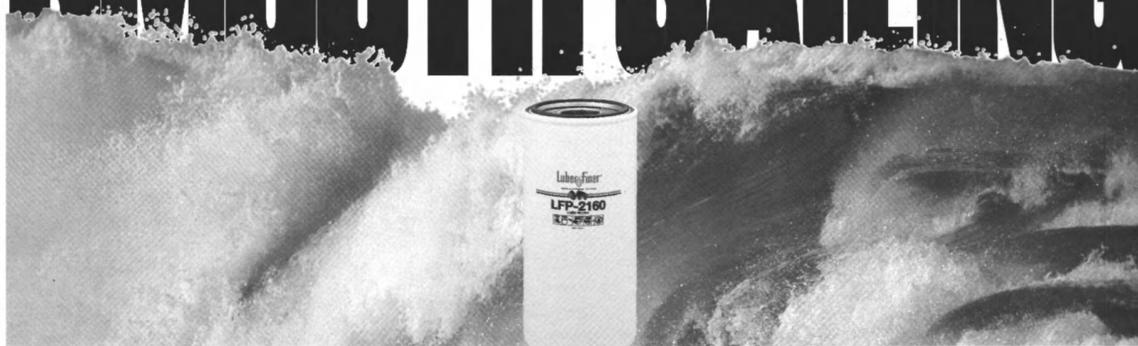
	TOTAL		COMBINATION PASSENGER & CARGO		GENERAL CARGO		CONTAINERSHIP		RoRo		BULK CARRIER		TANKER	
	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT
ALL COUNTRIES	25,493	691,903	390	1,710	11,034	88,248	1,679	41,585	919	8,479	5,440	259,465	6,031	292,416
U.S. (PRIVATELY OWNED)	322	15,259	2	14	35	850	76	2,503	34	648	21	1,018	154	10,226
U.S. (GOVERNMENT OWNED)	190	3,533	11	101	112	1,735	4	71	35	740	-	-	28	886
PANAMA	3,626	102,904	37	153	1,513	12,124	280	7,452	104	862	884	43,946	808	38,367
LIBERIA	1,581	96,729	43	219	269	3,948	142	3,946	21	252	462	28,991	644	59,373
GREECE	963	52,499	23	83	150	1,802	35	771	15	89	467	23,173	273	26,581
CYPRUS	1,456	39,415	15	61	615	6,438	96	1,577	16	119	562	22,851	152	8,369
BAHAMAS	935	36,043	54	260	419	5,822	40	835	37	299	141	7,779	244	21,048
NORWAY(NIS)	648	29,677	12	46	178	2,291	5	84	43	729	123	7,483	287	19,044
MALTA	998	28,125	7	28	394	3,669	23	491	20	100	314	11,576	240	12,261
JAPAN	775	24,210	15	56	160	745	39	1,156	62	413	192	10,495	307	11,345
CHINA, PEOPLES REP	1,448	23,551	30	93	767	6,748	84	1,642	16	140	336	10,973	215	3,955
SINGAPORE	637	19,919	-	-	162	1,935	83	1,837	10	139	110	6,254	272	9,754
HONG KONG	232	14,500	-	-	44	767	37	883	-	-	127	11,576	24	1,274
PHILIPPINES	520	13,540	5	17	200	1,800	13	187	16	116	226	11,177	60	243
RUSSIA	1,553	12,316	8	7	1,214	5,689	33	375	25	245	82	2,783	191	3,217
INDIA	298	11,152	2	5	71	803	6	111	-	-	135	5,429	84	4,804
KOREA (SOUTH)	417	9,710	-	-	149	726	53	1,333	4	92	125	6,670	86	889
TURKEY	445	9,094	5	7	212	1,228	1	12	11	88	150	6,223	66	1,536
TAIWAN	196	9,014	-	-	41	235	85	2,635	1	1	51	4,489	18	1,654
SAINT VINCENT	606	8,618	1	2	373	2,670	17	162	21	110	109	3,736	85	1,938
BRAZIL	200	8,388	1	1	33	228	11	248	9	153	62	3,761	84	3,997
ITALY	391	8,246	17	140	62	281	14	401	40	377	39	2,933	219	4,114
DENMARK(DIS)	337	7,084	-	-	166	624	59	2,034	14	123	13	949	85	3,354
GERMANY	400	6,074	6	35	199	1,147	134	3,834	13	80	10	469	38	509
IRAN	116	5,045	-	-	40	598	1	2	2	5	47	1,700	26	2,740
UKRAINE	437	5,007	8	14	314	2,885	12	131	26	254	44	1,590	33	133
BERMUDA	62	4,718	1	4	11	126	6	121	4	33	9	436	31	3,998
MARSHALL ISLANDS	66	4,612	-	-	21	149	8	386	-	-	27	1,072	10	3,005
NETHERLANDS	400	4,518	6	31	278	1,738	30	960	15	117	7	264	64	1,408
MALAYSIA	247	4,410	-	-	99	648	20	347	7	20	38	1,708	83	1,687
KERGUELEN	63	3,620	-	-	14	47	10	416	7	112	5	682	27	2,363
ROMANIA	221	3,531	-	-	161	1,340	2	16	8	38	40	1,467	10	670
ISLE OF MAN	85	3,471	-	-	20	211	13	267	11	93	11	816	30	2,084
U.K.	147	3,343	20	125	30	111	24	1,090	4	16	7	109	62	1,892
AUSTRALIA	66	3,336	-	-	4	59	4	130	5	51	29	1,683	24	1,413
POLAND	135	3,237	1	2	51	567	-	-	6	37	72	2,446	5	185
KUWAIT	44	3,214	-	-	13	350	3	92	-	-	-	-	28	2,772
INDONESIA	436	2,964	10	16	283	1,400	5	80	7	21	17	321	114	1,126
FRANCE	66	2,320	7	26	11	175	7	202	5	35	2	17	34	1,865
THAILAND	247	2,313	1	1	145	1,313	7	80	-	-	27	620	67	299
VANUTU	113	2,216	-	-	51	380	3	30	4	69	40	1,509	15	228
SWEDEN	181	2,145	4	29	62	461	-	-	43	512	9	61	63	1,082
ANTIGUA & BARBUDA	347	2,082	-	-	254	1,102	57	716	17	59	8	165	11	40
U.A.R.(EGYPT)	119	1,667	1	-	80	520	-	-	7	26	18	794	13	327
BULGARIA	111	1,653	2	-	47	335	5	67	7	61	34	834	16	356
IRAQ	32	1,442	-	-	15	99	-	-	-	-	-	-	17	1,343
UNITED ARAB EMIRATES	49	1,377	-	-	18	187	5	144	1	2	3	82	22	962
PORTUGAL	61	1,371	-	-	33	137	2	14	1	3	5	171	20	1,046
LUXEMBOURG	36	1,273	-	-	9	69	2	77	-	-	9	637	16	490
SAUDI ARABIA	63	1,262	-	-	19	340	5	118	10	253	1	20	28	531

MERCHANT FLEETS OF THE WORLD

OCEANGOING SHIPS OF 1,000 GROSS TONS AND OVER

	TOTAL		COMBINATION PASSENGER & CARGO		GENERAL CARGO		CONTAINERSHIP		RoRo		BULK CARRIER		TANKER	
	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT
MEXICO	47	1,246	-	-	4	56	4	148	-	-	-	-	39	1,042
LIBYA	27	1,199	-	-	10	80	-	-	3	9	-	-	14	1,110
HONDURAS	240	1,100	2	5	196	769	5	10	4	11	11	215	22	90
ALGERIA	72	1,074	1	3	28	261	-	-	11	34	9	289	23	487
KOREA (NORTH)	1	1,021	2	14	77	566	-	-	-	-	10	208	2	233
LATVIA	78	963	-	-	42	250	-	-	7	38	-	-	29	675
VENEZUELA	33	923	-	-	15	113	-	-	2	8	3	187	13	615
QATAR	20	912	-	-	11	206	3	92	-	-	2	270	4	344
SPAIN	111	870	1	3	29	91	16	106	29	111	8	107	28	452
FINLAND	81	845	6	18	29	151	-	-	28	191	5	108	13	377
CHILE	36	820	2	1	9	90	1	22	3	9	12	510	9	188
MYANMAR	41	730	-	-	18	174	1	25	2	20	13	428	7	83
SWITZERLAND	21	718	-	-	1	6	-	-	1	6	14	678	5	28
ISRAEL	27	705	-	-	4	35	21	647	1	5	1	18	-	-
VIETNAM	83	704	-	-	73	476	-	-	-	-	3	36	7	192
NIGERIA	30	634	-	-	16	163	-	-	-	-	-	-	14	471
ARGENTINA	38	580	-	-	19	208	3	75	1	6	3	105	12	186
GIBRALTAR	17	566	1	3	3	34	-	-	-	-	-	-	13	529
PAKISTAN	23	549	-	-	19	299	-	-	-	-	3	160	1	90
CAYMAN ISLANDS	20	500	-	-	8	186	1	2	2	12	4	258	5	42
CANADA	50	499	2	1	13	70	1	2	5	36	6	125	23	265

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MERCHANT FLEETS OF THE WORLD

OCEANGOING SHIPS OF 1,000 GROSS TONS AND OVER

	TOTAL CARGO		COMBINATION PASSENGER & CARGO		GENERAL CARGO		CONTAINERSHIP		RO/RO		BULK CARRIER		TANKER	
	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT
ESTONIA	55	470	-	-	35	161	-	-	11	37	6	260	3	12
LITHUANIA	69	423	2	24	51	206	-	-	2	17	11	165	3	11
BANGLADESH	36	401	-	-	32	368	-	-	-	-	-	-	4	33
SYRIA	86	395	-	-	81	317	-	-	1	2	4	76	-	-
GEORGIA	17	393	-	-	-	-	-	-	-	-	6	158	11	235
MAURITIUS	17	391	1	2	11	170	2	68	-	-	2	67	1	84
BELIZE	83	391	-	-	68	311	3	15	2	5	5	31	5	29
CUBA	46	350	-	-	31	263	-	-	-	-	-	-	15	87
AZERBAIJAN	68	335	-	-	24	83	-	-	2	10	-	-	42	242
SRI LANKA	22	316	-	-	19	133	-	-	-	-	2	181	1	2
NORWAY	88	307	1	3	61	175	-	-	4	10	5	15	17	104
LEBANON	56	301	-	-	47	209	1	1	3	10	4	77	1	4
MOROCCO	39	274	1	2	18	71	3	9	5	23	-	-	12	169
PERU	16	273	-	-	9	74	-	-	-	-	2	50	5	149
CZECH REPUBLIC	11	262	-	-	6	74	-	-	-	-	5	188	-	-
CROATIA	36	255	2	3	24	159	3	52	2	6	3	29	2	6
BARBADOS	23	237	-	-	15	45	-	-	3	23	2	84	3	85
BAHRAIN	7	219	-	-	4	96	-	-	-	-	1	13	2	110
NEW ZEALAND	19	218	2	40	4	22	-	-	5	35	4	36	4	85
SOUTH AFRICA	5	200	-	-	-	-	4	199	-	-	-	-	1	1
EQUADOR	22	182	4	3	3	42	-	-	-	-	-	-	15	137
TUNISIA	19	169	-	-	8	53	-	-	3	7	3	58	5	51
COLOMBIA	19	128	-	-	17	124	-	-	-	-	-	-	2	4
URUGUAY	4	120	-	-	1	2	1	28	-	-	-	-	2	90
IRELAND	26	112	-	-	18	60	2	10	-	-	1	4	5	38
AUSTRIA	23	107	-	-	22	100	-	-	-	-	1	7	-	-



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OCEANGOING SHIPS OF 1,000 GROSS TONS AND OVER

	TOTAL		COMBINATION PASSENGER & CARGO		GENERAL CARGO		CONTAINERSHIP		RoRo		BULK CARRIER		TANKER	
	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT
MALDIVES	20	100	-	-	17	75	-	-	-	-	1	20	2	5
ETHIOPIA	13	99	-	-	8	83	-	-	3	10	-	-	2	6
ANGOLA	10	94	-	-	9	92	-	-	-	-	-	-	1	2
TUVALU	10	80	1	1	4	20	-	-	-	-	-	-	5	59
ALBANIA	11	78	-	-	11	78	-	-	-	-	-	-	-	-
HUNGARY	9	66	-	-	9	66	-	-	-	-	-	-	-	-
DENMARK	19	63	-	-	12	33	-	-	3	13	2	11	2	6
SUDAN	5	59	-	-	5	59	-	-	-	-	-	-	-	-
IVORY COAST	3	40	-	-	2	33	-	-	-	-	-	-	1	7
ICELAND	6	39	-	-	2	12	-	-	2	22	-	-	2	5
GHANA	5	39	-	-	5	39	-	-	-	-	-	-	-	-
GABON	2	38	-	-	-	-	-	-	-	-	2	38	-	-
TANZANIA	5	37	-	-	3	33	-	-	-	-	-	-	2	4

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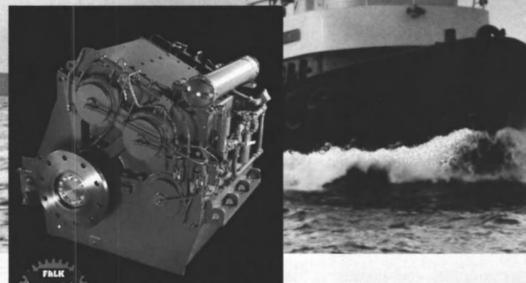
MERCHANT FLEETS OF THE WORLD

OCEANGOING SHIPS OF 1,000 GROSS TONS AND OVER

	TOTAL		COMBINATION PASSENGER & CARGO		GENERAL CARGO		CONTAINERSHIP		RoRo		BULK CARRIER		TANKER	
	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT
PAPUA NEW GUINEA	14	34	-	-	14	34	-	-	-	-	-	-	-	-
JORDAN	2	34	-	-	-	-	-	-	-	-	2	34	-	-
CAMEROON	2	34	-	-	2	34	-	-	-	-	-	-	-	-
MALAGASY	9	30	-	-	5	14	-	-	-	-	-	-	4	16
PARAGUAY	18	27	-	-	14	-	24	-	1	-	1	-	-	3
SLOVAKIA	5	26	-	-	5	26	-	-	-	-	-	-	-	-
YEMEN	3	19	-	-	1	2	-	-	-	-	-	-	2	17
FIJI	4	16	-	-	-	-	-	-	1	5	-	-	3	11
CAPE VERDE	6	13	-	-	5	11	-	-	-	-	-	-	1	2
TONGA	3	12	-	-	1	3	-	-	1	6	-	-	1	3
BELGIUM	5	12	-	-	-	-	-	-	-	-	1	2	4	10
MOZAMBIQUE	4	11	-	-	4	11	-	-	-	-	-	-	-	-

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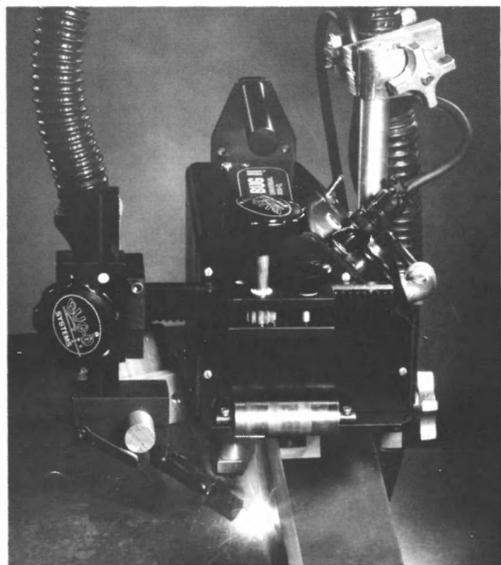
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MERCHANT FLEETS OF THE WORLD

OCEANGOING SHIPS OF 1,000 GROSS TONS AND OVER

	TOTAL		COMBINATION PASSENGER & CARGO		GENERAL CARGO		CONTAINERSHIP		RoRo		BULK CARRIER		TANKER	
	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT
SOMALIA	2	7	-	-	2	7	-	-	-	-	-	-	-	-
W. SAMOA	1	6	-	-	-	-	-	-	1	6	-	-	-	-
TRINIDAD & TOBAGO	2	6	-	-	1	3	-	-	-	-	-	-	1	3
KENYA	1	6	-	-	-	-	-	-	-	-	-	-	1	6
JAMAICA	2	6	-	-	-	-	-	-	1	3	-	-	1	3
SURINAM	3	5	-	-	1	1	1	2	-	-	-	-	1	2
OMAN	1	5	1	5	-	-	-	-	-	-	-	-	-	-
SENEGAL	1	4	-	-	1	4	-	-	-	-	-	-	-	-
LAOS	1	3	-	-	1	3	-	-	-	-	-	-	-	-
KIRIBATI	1	3	-	-	-	-	-	-	-	-	-	-	1	3
GUYANA	1	3	-	-	1	3	-	-	-	-	-	-	-	-
EQUATORIAL GUINEA	1	3	-	-	1	3	-	-	-	-	-	-	-	-
CAMBODIA	1	3	-	-	1	3	-	-	-	-	-	-	-	-



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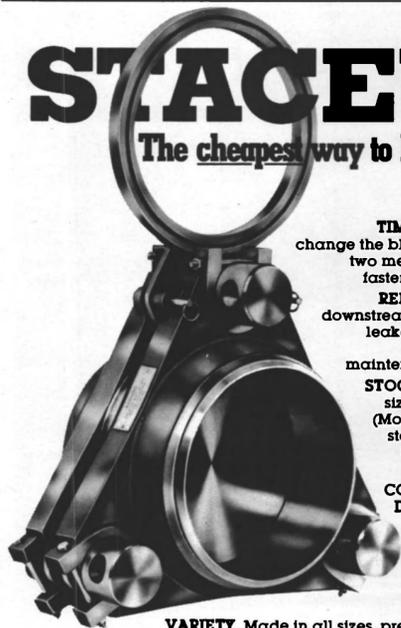
OCEANGOING SHIPS OF 1,000 GROSS TONS AND OVER

	TOTAL		COMBINATION PASSENGER & CARGO		GENERAL CARGO		CONTAINERSHIP		RoRo		BULK CARRIER		TANKER	
	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT	NO.	DWT
TURKMENISTAN	2	2	-	-	2	2	-	-	-	-	-	-	-	-
SIERRA LEONE	1	1	-	-	-	-	-	-	-	-	-	-	1	1
SAO TOME	1	1	-	-	1	1	-	-	-	-	-	-	-	-
MAURITANIA	1	1	-	-	1	1	-	-	-	-	-	-	-	-
KAZAKHSTAN	1	1	-	-	1	1	-	-	-	-	-	-	-	-
GREENLAND	1	1	-	-	1	1	-	-	-	-	-	-	-	-
DOMINICAN REPUBLIC	1	1	-	-	1	1	-	-	-	-	-	-	-	-
UNKNOWN FLAG	52	601	3	3	26	178	2	6	-	-	8	221	13	193

Source: Maritime Administration — Office of Statistical & Economic Analysis

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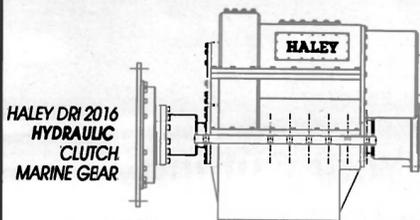
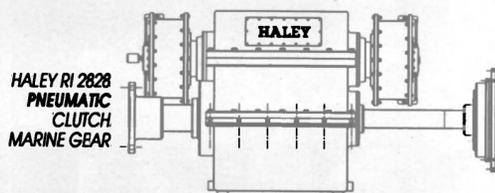
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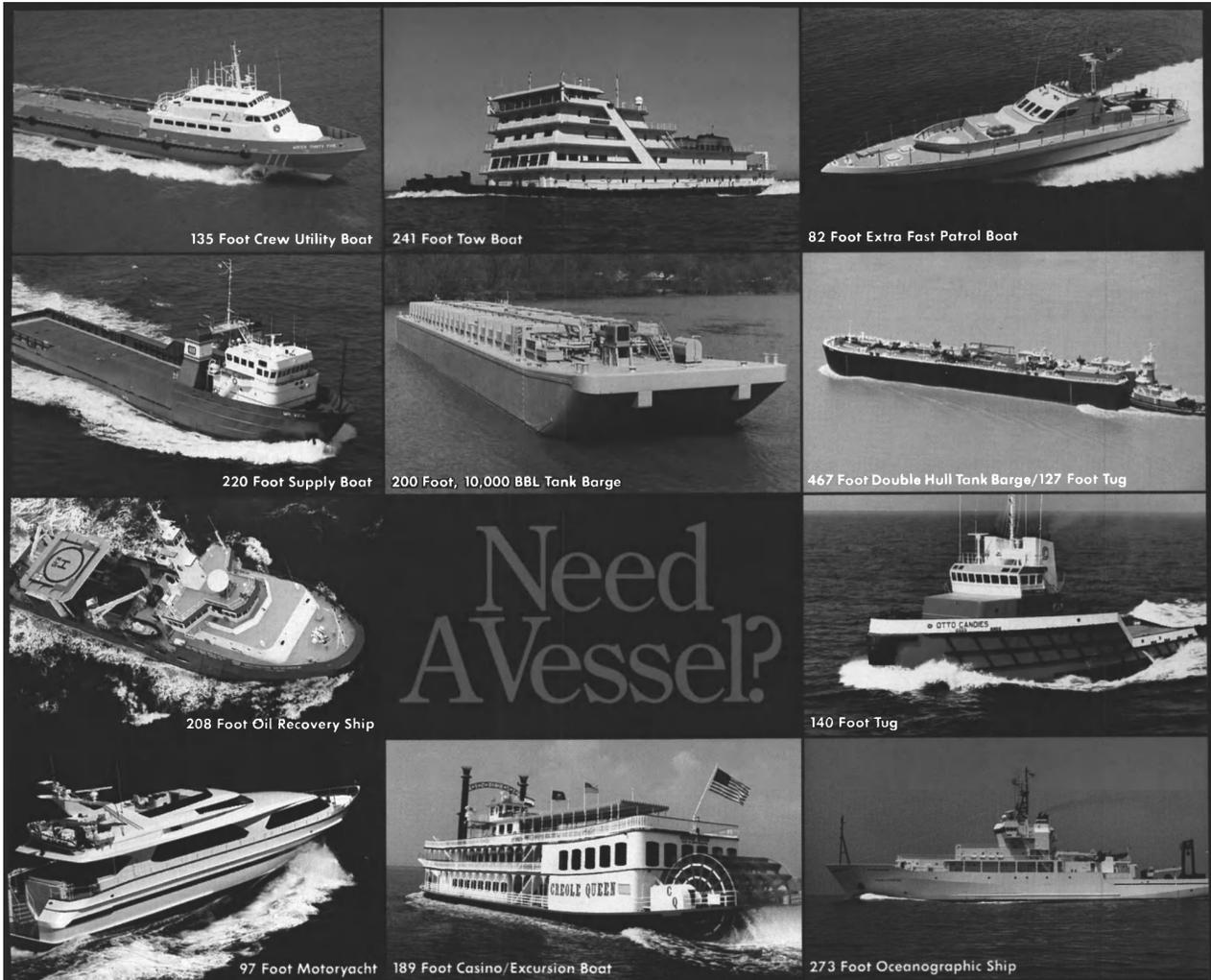
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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000^s)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT	SUBSIDIZED	
									ODS	CDS
1ST LT. ALEX BONNYMAN	RoRo	DEM	1980	MAERSK LINE	T-AXX	37	21			
1ST LT. BALDOMERO LOPEZ	RoRo	U.S.	1985	AMERICAN OVERSEAS MARINE CORP.	T-AXX	45	22	Y		
1ST LT. JACK LUMMUS	RoRo	U.S.	1986	AMERICAN OVERSEAS MARINE CORP.	T-AXX	45	22	Y		
2ND LT. JOHN P. BOBO	RoRo	U.S.	1985	AMERICAN OVERSEAS MARINE CORP.	T-AXX	45	22	Y		
ADABELLE LYKES	CONTAINERSHIP	GFR	1969	LYKES BROS. S.S. CO.	C6-M-F147A	17	15		Y	
ADM. WM. M. CALLAGHAN	RoRo	U.S.	1967	U. S. GOVERNMENT OWNED	PRIVATE	24	14			
ADDONIS	TANKER	GFR	1966	U. S. GOVERNMENT OWNED	FOREIGN CONST	38	81			
ADVANTAGE	FREIGHTER	JPN	1977	RED RIVER SHIPPING CORP.	FOREIGN CONST	12	22			
ADVENTURER	FREIGHTER	U.S.	1960	U. S. GOVERNMENT OWNED	C3-S-38A	8	11			
AGENT	FREIGHTER	U.S.	1961	U. S. GOVERNMENT OWNED	C3-S-38A	8	11			
AIDE	FREIGHTER	U.S.	1961	U. S. GOVERNMENT OWNED	C3-S-38A	8	11			
ALATNA	TANKER	U.S.	1957	U. S. GOVERNMENT OWNED	T1-MET-24A	3	5			
ALBERT E. WAITS	TANKER	U.S.	1941	U. S. GOVERNMENT OWNED	PRIVATE	11	17			
ALLISON LYKES	FREIGHTER	U.S.	1964	U. S. GOVERNMENT OWNED	C4-S-40C	14	13			
AMBASSADOR	FREIGHTER	U.S.	1960	U. S. GOVERNMENT OWNED	C3-S-38A	8	11			
AMBASSADOR	RoRo	GFR	1980	CROWLEY AMERICAN TRANSPORT	FOREIGN CONST	13	9			
AMERICAN BANKER	CONTAINERSHIP	U.S.	1962	U. S. GOVERNMENT OWNED	C6-S-1X	17	20			
AMERICAN CONDOR	RoRo	SWD	1981	CROWLEY AMERICAN TRANSPORT	FOREIGN CONST	16	21			
AMERICAN CORMORANT	FREIGHTER	SWD	1975	OSPREY SHIP MANAGEMENT, INC.	FOREIGN CONST	10	52			
AMERICAN EXPLORER	TANKER	U.S.	1959	U. S. GOVERNMENT OWNED	T5-S-RM2A	15	24			
AMERICAN FALCON	RoRo	SWD	1981	CROWLEY AMERICAN TRANSPORT	FOREIGN CONST	16	21			
AMERICAN MERLIN	RoRo	FRA	1978	OSPREY SHIP MANAGEMENT, INC.	FOREIGN CONST	26	20			
AMERICAN OSPREY	TANKER	U.S.	1958	U. S. GOVERNMENT OWNED	PRIVATE	20	35			
AMERICAN PALMER	FREIGHTER	U.S.	1964	U. S. GOVERNMENT OWNED	C4-S-44A	11	13			
AMERICAN RANGER	FREIGHTER	U.S.	1965	U. S. GOVERNMENT OWNED	C4-S-44A	11	13			
AMERICAN RELIANCE	FREIGHTER	U.S.	1965	U. S. GOVERNMENT OWNED	C4-S-44A	11	13			
AMERICAN VETERAN	CONTAINER/BARGE CARRIER	U.S.	1973	COASTAL BARGE CORP.	C8-S-81B	26	30			
AMERICAN VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	YC2-S-AP2	8	11			
ARCO ALASKA	TANKER	U.S.	1979	ARCO MARINE, INC.	PRIVATE	84	191	Y		
ARCO ANCHORAGE	TANKER	U.S.	1973	ARCO MARINE, INC.	PRIVATE	58	122	Y		
ARCO CALIFORNIA	TANKER	U.S.	1980	ARCO MARINE, INC.	PRIVATE	84	127	Y		
ARCO FAIRBANKS	TANKER	U.S.	1974	ARCO MARINE, INC.	PRIVATE	58	123	Y		
ARCO INDEPENDENCE	TANKER	U.S.	1977	ARCO MARINE, INC.	T10-S-101B	118	267	Y		
ARCO JUNEAU	TANKER	U.S.	1974	ARCO MARINE, INC.	PRIVATE	58	122	Y		
ARCO PRUDHOE BAY	TANKER	U.S.	1971	ARCO MARINE, INC.	PRIVATE	31	72	Y		
ARCO SAG RIVER	TANKER	U.S.	1972	ARCO MARINE, INC.	PRIVATE	36	72	Y		
ARCO SPIRIT	TANKER	U.S.	1977	ARCO MARINE, INC.	T10-S-101B	118	267	Y		
ARCO TEXAS	TANKER	U.S.	1973	ARCO MARINE, INC.	PRIVATE	40	91	Y		
ARCONAUT	CONTAINERSHIP	U.S.	1979	FARRELL LINES	C5-S-70B	18	16		Y	Y
ARZEW	L.N.G. TANKER	U.S.	1978	AGENT MARINE OPERATIONS	LGR-S-94A	69	66			
ATGUN PASS	TANKER	U.S.	1977	KEYSTONE SHIPPING CO.	PRIVATE	74	152	Y		
AUSTRAL RAINBOW	CONTAINER/BARGE CARRIER	U.S.	1972	CENTRAL GULF LINE	C8-S-81B	26	30	Y		
BALTIMORE/BALTIMORE	TUG/BARGE(TANKER)	U.S.	1983	SHERIDAN TRANSPORTATION CO.	PRIVATE	22	48	Y		
BANNER	FREIGHTER	U.S.	1961	U. S. GOVERNMENT OWNED	C3-S-46A	11	13			
BARNARD VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	YC2-S-AP2	8	11			
BAY	FREIGHTER	U.S.	1961	U. S. GOVERNMENT OWNED	C3-S-46A	11	13			
BAYAMON	RoRo	U.S.	1970	U. S. GOVERNMENT OWNED	PRIVATE	15	14			
BEAUJOLAIS	TANKER	U.S.	1954	U. S. GOVERNMENT OWNED	PRIVATE	17	29			
BEAVER STATE	FREIGHTER	U.S.	1965	U. S. GOVERNMENT OWNED	C6-S-60B	14	16			

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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000²)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT	SUBSIDIZED	
									ODS	CDS
BENNO C. SCHMIDT	CHEMICAL TANKER	USA	1992	FREEMONT MCMORAN RESOURCE	PRIVATE	6	8			
BETTY WOOD/THROUGHRED TOPPER	TUG/BARGE(BULK)	U.S.	1973	GULF COAST TRANSIT CO.	PRIVATE	16	24	Y		
BEVERLY ANDERSON/MARY TURNER	TUG/BARGE(BULK)	U.S.	1982	GULF COAST TRANSIT CO.	PRIVATE	14	22	Y		
BLUE RIDGE	TANKER	U.S.	1981	UNOCAL REFINING & MARKETING	PRIVATE	21	42	Y		
BOHNE B	TANKER	U.S.	1956	POLING TRANSPORTATION CORP.	PRIVATE	1	2	Y		
BRIDGETON	TANKER	JPN	1977	GLENAGLE SHIP MANAGEMENT CO., INC.	FOREIGN CONST	199	414			
BRINTON LYKES	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	CS-5-37F	12	15			
BROOKS RANGE	TANKER	U.S.	1978	INTEROCEAN MANAGEMENT CORP.	PRIVATE	74	176	Y		
BUFFALO SOLDIER	RoRo	FRA	1978	RED RIVER SHIPPING CORP.	FOREIGN CONST	26	20			
BUILDER	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	C3-5-46A	11	13			
BUYER	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	C3-5-46A	11	13			
B. T. ALASKA	TANKER	U.S.	1978	MARINE TRANSPORT LINES, INC.	PRIVATE	84	188	Y		
CAPE ALASKA	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	C4-5-58A	11	13			
CAPE ALEXANDER	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	C4-5-58A	11	13			
CAPE ANN	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	C4-5-58A	11	13			
CAPE ARCHWAY	FREIGHTER	U.S.	1963	U. S. GOVERNMENT OWNED	C4-5-58A	11	13			
CAPE ARWIND	FREIGHTER	U.S.	1963	U. S. GOVERNMENT OWNED	C4-5-58A	11	13			
CAPE BIANCO	FREIGHTER	U.S.	1966	U. S. GOVERNMENT OWNED	C4-5-66A	11	15			
CAPE BOW	FREIGHTER	U.S.	1967	U. S. GOVERNMENT OWNED	C4-5-66A	11	15			
CAPE BORDA	FREIGHTER	U.S.	1967	U. S. GOVERNMENT OWNED	C4-5-66A	11	15			
CAPE BOVER	FREIGHTER	U.S.	1967	U. S. GOVERNMENT OWNED	C4-5-66A	11	15			
CAPE BRETON	FREIGHTER	U.S.	1967	U. S. GOVERNMENT OWNED	C4-5-66A	11	15			
CAPE CANAVERAL	FREIGHTER	U.S.	1964	U. S. GOVERNMENT OWNED	C3-5-37C	9	13			

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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000⁵)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT		SUBSIDIZED	
								ACT	ODS	ODS	CDS
CAPE CAISO	FREIGHTER	U.S.	1963	U.S. GOVERNMENT OWNED	C3-S-37C	9	13				
CAPE CARTHAGE	FREIGHTER	U.S.	1963	U.S. GOVERNMENT OWNED	C3-S-37C	9	13				
CAPE CATAWBA	FREIGHTER	U.S.	1961	U.S. GOVERNMENT OWNED	C3-S-32A	9	13				
CAPE CATOCHÉ	FREIGHTER	U.S.	1963	U.S. GOVERNMENT OWNED	C3-S-37C	9	13				
CAPE CHARLES	FREIGHTER	U.S.	1963	U.S. GOVERNMENT OWNED	C3-S-37C	9	11				
CAPE CHARLES	FREIGHTER	U.S.	1963	U.S. GOVERNMENT OWNED	C3-S-37C	9	13				
CAPE CLEAR	FREIGHTER	U.S.	1963	U.S. GOVERNMENT OWNED	C3-S-37C	9	13				
CAPE COD	FREIGHTER	U.S.	1963	U.S. GOVERNMENT OWNED	C3-S-37C	9	13				
CAPE DECISION	RoRo	SWD	1973	U.S. GOVERNMENT OWNED	FOREIGN CONST	13	24				
CAPE DIAMOND	RoRo	FRA	1972	U.S. GOVERNMENT OWNED	FOREIGN CONST	24	24				
CAPE DOMINGO	RoRo	FRA	1973	U.S. GOVERNMENT OWNED	FOREIGN CONST	24	24				
CAPE DOUGLAS	RoRo	SWD	1973	U.S. GOVERNMENT OWNED	FOREIGN CONST	24	24				
CAPE DUGLARD	RoRo	SWD	1972	U.S. GOVERNMENT OWNED	FOREIGN CONST	24	24				
CAPE EDMONT	RoRo	SWD	1971	U.S. GOVERNMENT OWNED	FOREIGN CONST	13	20				
CAPE FARWELL	CONTAINER/BARGE CARRIER	U.S.	1973	U.S. GOVERNMENT OWNED	C8-S-81B	30	41				
CAPE FEAR	CONTAINER/BARGE CARRIER	U.S.	1971	U.S. GOVERNMENT OWNED	C8-S-81B	26	30				
CAPE FLATTERY	CONTAINER/BARGE CARRIER	U.S.	1973	U.S. GOVERNMENT OWNED	C8-S-81B	30	41				
CAPE FLORIDA	CONTAINER/BARGE CARRIER	U.S.	1971	U.S. GOVERNMENT OWNED	C8-S-81B	26	30				
CAPE GIBSON	FREIGHTER	U.S.	1968	U.S. GOVERNMENT OWNED	C5-S-75A	16	23				
CAPE GIRARDEAU	FREIGHTER	U.S.	1968	U.S. GOVERNMENT OWNED	C5-S-75A	16	23				
CAPE HENRY	RoRo	JPN	1979	U.S. GOVERNMENT OWNED	FOREIGN CONST	38	33				
CAPE HORN	RoRo	NOR	1979	U.S. GOVERNMENT OWNED	FOREIGN CONST	38	32				
CAPE HUDSON	RoRo	NOR	1979	U.S. GOVERNMENT OWNED	FOREIGN CONST	38	32				
CAPE INSCRIPTION	RoRo	U.S.	1976	U.S. GOVERNMENT OWNED	C7-S-95A	23	20				
CAPE INTREPID	RoRo	U.S.	1976	U.S. GOVERNMENT OWNED	C7-S-95A	13	19				
CAPE ISABEL	RoRo	U.S.	1976	U.S. GOVERNMENT OWNED	C7-S-95A	23	20				
CAPE ISLAND	RoRo	U.S.	1977	U.S. GOVERNMENT OWNED	C7-S-95A	13	19				
CAPE JACOB	FREIGHTER	U.S.	1962	U.S. GOVERNMENT OWNED	C4-S-11U	13	15				
CAPE JOHN	FREIGHTER	U.S.	1963	U.S. GOVERNMENT OWNED	C4-S-11U	13	15				
CAPE JOHNSON	FREIGHTER	U.S.	1962	U.S. GOVERNMENT OWNED	C4-S-11U	13	15				
CAPE JURY	FREIGHTER	U.S.	1962	U.S. GOVERNMENT OWNED	C4-S-11U	13	15				
CAPE KENNEDY	RoRo	JPN	1979	U.S. GOVERNMENT OWNED	FOREIGN CONST	36	29				
CAPE KNOX	RoRo	JPN	1978	U.S. GOVERNMENT OWNED	FOREIGN CONST	36	29				
CAPE LAMBERT	RoRo	CHL	1973	U.S. GOVERNMENT OWNED	FOREIGN CONST	22	21				
CAPE LOBOS	RoRo	CHL	1972	U.S. GOVERNMENT OWNED	FOREIGN CONST	22	21				

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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000³)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT			SUBSIDIZED	
								ACT	ODS	CDS	ODS	CDS
CAPE MAY	CONTAINER/BARGE CARRIER	U.S.	1972	U. S. GOVERNMENT OWNED	CB-S-82A	22	39					
CAPE MENDOCINO	CONTAINER/BARGE CARRIER	U.S.	1972	U. S. GOVERNMENT OWNED	CB-S-82A	22	39					
CAPE MOHICAN	CONTAINER/BARGE CARRIER	U.S.	1973	U. S. GOVERNMENT OWNED	CB-S-82A	22	39					
CAPE NOME	RoRo	U.S.	1969	U. S. GOVERNMENT OWNED	CS-S-78A	12	16					
CAPE ORLANDO	RoRo	SWD	1981	U. S. GOVERNMENT OWNED	FOREIGN CONST	16	21					
CAPE RACE	RoRo	JPM	1977	U. S. GOVERNMENT OWNED	FOREIGN CONST	13	23					
CAPE RAY	RoRo	JPM	1977	U. S. GOVERNMENT OWNED	FOREIGN CONST	15	23					
CAPE RISE	RoRo	JPM	1977	U. S. GOVERNMENT OWNED	FOREIGN CONST	15	23					
CAPE TAYLOR	RoRo	JPM	1977	U. S. GOVERNMENT OWNED	FOREIGN CONST	13	15					
CAPE TEXAS	RoRo	GFR	1977	U. S. GOVERNMENT OWNED	FOREIGN CONST	12	15					
CAPE TRINITY	RoRo	GFR	1977	U. S. GOVERNMENT OWNED	FOREIGN CONST	14	15					
CAPE VICTORY	RoRo	ITL	1984	U. S. GOVERNMENT OWNED	FOREIGN CONST	22	21					
CAPE VINCENT	RoRo	ITL	1984	U. S. GOVERNMENT OWNED	FOREIGN CONST	22	21					
CAPE WASHINGTON	RoRo	POL	1982	U. S. GOVERNMENT OWNED	FOREIGN CONST	23	33					
CAPE WRATH	RoRo	POL	1981	U. S. GOVERNMENT OWNED	FOREIGN CONST	23	33					
CAROLINA	CONTAINERSHIP	U.S.	1971	NAVIERAS DE PUERTO RICO	C7-S-68E	19	20					Y
CATAWBA VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	VCS-S-8P2	8	11					
CHAMPION	TANKER	U.S.	1969	OMI CORPORATION	PRIVATE	21	38	Y				
CHARLESTON	TANKER	U.S.	1956	APEX MARINE CORP.	PRIVATE	22	39	Y	Y			
CHATAHOOCHEE	TANKER	U.S.	1957	U. S. GOVERNMENT OWNED	T1-MET-24A	3	5					
CHESEA	TANKER	U.S.	1975	KEYSTONE SHIPPING CO.	T6-S-93A	22	40	Y	Y			
CHEMICAL PIONEER	CHEMICAL TANKER	U.S.	1968	MARINE TRANSPORT LINES, INC.	PRIVATE	20	35					
CHERRY VALLEY	TANKER	U.S.	1974	KEYSTONE SHIPPING CO.	T6-S-93A	22	40	Y	Y			
CHESAPEAKE	TANKER	U.S.	1964	U. S. GOVERNMENT OWNED	PRIVATE	22	51					
CHESAPEAKE CITY	TANKER	JPM	1981	GLENAGLE SHIP MANAGEMENT CO., INC.	FOREIGN CONST	44	89					
CHESAPEAKE TRADER	TANKER	U.S.	1982	PENN. ATTRANSO CORP.	PRIVATE	25	51	Y				
CHESTNUT HILL	TANKER	U.S.	1976	KEYSTONE SHIPPING CO.	T8-S-100B	45	93		Y	Y		Y
CHEVRON ARIZONA	TANKER	U.S.	1977	CHEVRON OIL CO.	PRIVATE	17	40	Y				
CHEVRON COLORADO	TANKER	U.S.	1976	CHEVRON OIL CO.	PRIVATE	17	40	Y				
CHEVRON LOUISIANA	TANKER	U.S.	1977	CHEVRON OIL CO.	PRIVATE	17	40	Y				
CHEVRON MISSISSIPPI	TANKER	U.S.	1972	CHEVRON OIL CO.	PRIVATE	36	71	Y				
CHEVRON OREGON	TANKER	U.S.	1975	CHEVRON OIL CO.	PRIVATE	17	40	Y				
CHEVRON WASHINGTON	TANKER	U.S.	1976	CHEVRON OIL CO.	PRIVATE	23	40	Y				
CHILBAR	CHEMICAL TANKER	U.S.	1959	KEYSTONE SHIPPING CO.	T5-S-41A	22	40	Y	Y			

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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000⁵)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT	SUBSIDIZED	
									ODS	CDS
CLEVELAND	FREIGHTER	U.S.	1969	SEALIFT, INC.	CS-5-75A	16	23			
COAST RANGE	TANKER	U.S.	1981	WESTCOAST SHIPPING CO.	PRIVATE	21	41	Y		
COASTAL CORPUS CHRISTI	TANKER	U.S.	1960	COSCOL MARINE CORP.	PRIVATE	23	53	Y		
COASTAL EAGLE POINT	TANKER	U.S.	1960	COSCOL MARINE CORP.	PRIVATE	23	53	Y		
COASTAL MANATEE	TANKER	U.S.	1961	COSCOL MARINE CORP.	PRIVATE	19	31	Y		
COASTAL NEW YORK	TANKER	U.S.	1956	COSCOL MARINE CORP.	PRIVATE	23	39	Y		
COLORADO	TANKER	U.S.	1944	SABINE TOWING & TRANSPORT, INC.	T2-SE-A1	14	10	Y		
COMET	CAR CARRIER	U.S.	1958	U. S. GOVERNMENT OWNED	CS-5-41	14	31			
CONCHO	TANKER	U.S.	1945	SABINE TOWING & TRANSPORT, INC.	T2-SE-A1	19	33	Y		
CONNECTICUT	TANKER	U.S.	1958	U. S. GOVERNMENT OWNED	PRIVATE	23	39			
CONSTITUTION	COMBO PASS & CARGO	U.S.	1951	DELTA QUEEN STEAMBOAT CO.	P3-S2-D12	20	7	Y		
CORNHUSKER STATE	CONTAINERSHIP	U.S.	1969	U. S. GOVERNMENT OWNED	CS-5-MA73C	18	17			
CORNUCOPIA	L.P.G. TANKER	U.S.	1958	WESTCOAST SHIPPING CO.	PRIVATE	22	24	Y		
CORONADO	TANKER	U.S.	1973	KEYSTONE SHIPPING CO.	T6-S-93A	22	40	Y	Y	
CORPUS CHRISTI	FREIGHTER	U.S.	1964	AFRAM LINES LTD.	CS-5-408	14	15			
COURIER	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	CS-5-468	11	13			
COURIER	TANKER	U.S.	1977	VULCAN CARRIERS, LTD.	T6-M-98A	22	36			
COVE ENDEAVOR	TANKER	U.S.	1971	COVE SHIPPING, INC.	PRIVATE	36	72	Y	Y	Y
CPL. LOUIS J. HAUGE, JR.	RoRo	DEN	1979	MAERSK LINE	FAXX	38	21			
CURTISS	RoRo	U.S.	1969	U. S. GOVERNMENT OWNED	CS-5-78A	23	16			
DAMN	FREIGHTER	U.S.	1963	U. S. GOVERNMENT OWNED	CS-5-58A	11	13			
DEL MONTE	FREIGHTER	U.S.	1968	U. S. GOVERNMENT OWNED	CS-5-76A	10	13			
DEL VALLE	FREIGHTER	U.S.	1968	U. S. GOVERNMENT OWNED	CS-5-76A	10	13			
DEL VIENTO	FREIGHTER	U.S.	1968	U. S. GOVERNMENT OWNED	CS-5-76A	10	13			
DELAWARE TRADER	TANKER	U.S.	1982	PENN. ATTRANSCO CORP.	PRIVATE	25	51	Y		
DEHAI	TANKER	U.S.	1978	MARINE TRANSPORT LINES, INC.	PRIVATE	84	191	Y		
DIAMOND STATE	CRANE SHIP/CONTAINER	U.S.	1962	U. S. GOVERNMENT OWNED	CS-5-MA73B	16	20			
DUCHESS	TANKER	U.S.	1971	OCEAN SHIPS	PRIVATE	21	38	Y		
EARLEHAM VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	VC2-S-AP2	8	11			
EASTERN SUN	TANKER	U.S.	1985	SUN TRANSPORT, INC.	PRIVATE	2	4	Y		
EMPIRE STATE	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	CS-5-1U	12	15			
ENERGY ALCANTARA/ENERGY AMMONIA	TUG/BARGE/TANKER	U.S.	1982	ENERGY TRANSPORTATION CORP.	PRIVATE	11	16	Y		
ENERGY INDEPENDENCE	COLLIER	U.S.	1983	KEYSTONE SHIPPING CO.	PRIVATE	25	33	Y		
EQUALITY STATE	CRANE SHIP/CONTAINER	U.S.	1961	U. S. GOVERNMENT OWNED	CS-5-MA73B	17	20			
EXPORT CHALLENGER	FREIGHTER	U.S.	1963	U. S. GOVERNMENT OWNED	CS-5-468	11	13			
EXPORT CHAMPION	FREIGHTER	U.S.	1963	U. S. GOVERNMENT OWNED	CS-5-468	11	13			
EXPORT COMMERCE	FREIGHTER	U.S.	1963	U. S. GOVERNMENT OWNED	CS-5-468	11	13			
EXPORT FREEDOM	CONTAINERSHIP	U.S.	1972	FARRELL LINES	CS-5-738	18	17	Y	Y	
EXPORT PATRIOT	CONTAINERSHIP	U.S.	1973	FARRELL LINES	CS-5-738	18	17	Y	Y	
FALCON CHAMPION	TANKER	U.S.	1984	U. S. GOVERNMENT OWNED	T6-M-136A	18	34			
FALCON LEADER	TANKER	U.S.	1983	U. S. GOVERNMENT OWNED	T6-M-136A	18	34			
FAUST	RoRo	JPN	1985	INTERNATIONAL MARINE CARRIERS, INC.	FOREIGN CONST	52	28			Y
FIDELIO	CAR CARRIER	JPN	1987	INTERNATIONAL MARINE CARRIERS, INC.	FOREIGN CONST	47	16			
FLICKERTAIL STATE	CONTAINERSHIP	U.S.	1969	U. S. GOVERNMENT OWNED	CS-5-MA73C	18	17			
FLORENCE	TANKER	U.S.	1954	U. S. GOVERNMENT OWNED	PRIVATE	17	29			
FRANCES HAMMER/DIXY 4103	TUG/BARGE/TANKER	U.S.	1981	OCEAN SHIPS	186-MT-130A	17	37			Y
FREDERICKSBURG	TANKER	U.S.	1958	KEYSTONE SHIPPING CO.	T5-S-128	22	40	Y	Y	
FURMAN	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	VC2-S-AP3	8	11			
GALVESTON BAY	CONTAINERSHIP	KRS	1984	SEA-LAND SERVICE	CS-M-F141A	57	59			
GALVESTON BAY	FREIGHTER	U.S.	1946	AFRAM LINES LTD.	CS-M-F141A	11	15			
GAMMA	L.H.G. TANKER	U.S.	1979	ALEXANDER STAR & KERSEY	LER-S-94A	69	66			Y
GEN STATE	CRANE SHIP/CONTAINER	U.S.	1966	U. S. GOVERNMENT OWNED	CS-5-MA73D	17	18			
GENERAL EDWIN D. PATRICK	COMBO PASS & CARGO	U.S.	1945	U. S. GOVERNMENT OWNED	P2-S2-R1	16	10			
GENERAL JOHN POPE	COMBO PASS & CARGO	U.S.	1943	U. S. GOVERNMENT OWNED	P2-S2-R2	18	8			

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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000⁵)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT			SUBSIDIZED			
								ACT	ODS	CDS	ACT	ODS	CDS	
GENERAL MAURICE ROSE	COMBO PASS & CARGO	U.S.	1945	U. S. GOVERNMENT OWNED	P2-SE2-R1	16	10							
GEN. ALEXANDER M. PATCH	COMBO PASS & CARGO	U.S.	1944	U. S. GOVERNMENT OWNED	P2-SE2-R1	16	10							
GEN. NELSON M. WALKER	COMBO PASS & CARGO	U.S.	1945	U. S. GOVERNMENT OWNED	P2-SE2-R1	16	11							
GEN. SIMON B. BUCKNER	COMBO PASS & CARGO	U.S.	1945	U. S. GOVERNMENT OWNED	P2-SE2-R1	16	10							
GETTYSBURG	TANKER	U.S.	1957	U. S. GOVERNMENT OWNED	PRIVATE	24	42							
GOLDEN BEAR	COMBO PASS & CARGO	U.S.	1940	U. S. GOVERNMENT OWNED	PASS/CARGO	8	4							
GOLDEN GATE	TANKER	U.S.	1970	KEYSTONE SHIPPING CO.	PRIVATE	28	63			Y				
GOLDEN MONARCH	BULK CARRIER	U.S.	1975	APEX MARINE CORP.	TB-S-100B	45	93				Y		Y	
GOPHER STATE	CONTAINERSHIP	U.S.	1973	U. S. GOVERNMENT OWNED	C3-S-MA73C	18	17							
GRAND CANYON STATE	CRANE SHIP/CONTAINER	U.S.	1965	U. S. GOVERNMENT OWNED	C6-S-MA/QD	17	18							
GREAT LAND	RoRo	U.S.	1975	TOTEM OCEAN TRAILER EXPRESS, INC.	PRIVATE	18	16			Y				
GREEN BAY	RoRo	JPN	1987	CENTRAL GULF LINE	FOREIGN CONST	39	13							
GREEN HARBOR	CONTAINER/BARGE CARRIER	U.S.	1974	CENTRAL GULF LINE	C9-S-81D	28	47						Y	
GREEN ISLAND	CONTAINER/BARGE CARRIER	U.S.	1975	WATERMAN LINE	C9-S-81D	28	47				Y			Y
GREEN LAKE	RoRo	JPN	1987	CENTRAL GULF LINE	FOREIGN CONST	47	14							
GREEN MOUNTAIN STATE	CRANE SHIP/CONTAINER	U.S.	1965	U. S. GOVERNMENT OWNED	C6-S-60B	14	16							
GREEN RIDGE	FREIGHTER	GFR	1979	CENTRAL GULF LINE	FOREIGN CONST	10	12							
GREEN VALLEY	CONTAINER/BARGE CARRIER	U.S.	1974	CENTRAL GULF LINE	C9-S-81D	28	46						Y	
GREEN WAVE	FREIGHTER	GFR	1980	CENTRAL GULF LINE	FOREIGN CONST	10	13							
GROTON/GROTON	TUG/BARGE(TANKER)	U.S.	1982	SHERIDAN TRANSPORTATION CO.	PRIVATE	22	48			Y				
GUADALUPE	TANKER	U.S.	1945	SABINE TOWING & TRANSPORT, INC.	T2-SE-A1	18	30			Y				
GUAYAMA	CONTAINERSHIP	U.S.	1969	NAVIERAS DE PUERTO RICO	C7-S-48E	19	21			Y				
GULF BANKER	FREIGHTER	U.S.	1964	U. S. GOVERNMENT OWNED	C3-S-37D	9	12							
GULF FARMER	FREIGHTER	U.S.	1964	U. S. GOVERNMENT OWNED	C3-S-37D	9	12							
GULF MERCHANT	FREIGHTER	U.S.	1965	U. S. GOVERNMENT OWNED	C3-S-37D	9	12							
GULF SHIPPER	FREIGHTER	U.S.	1964	U. S. GOVERNMENT OWNED	C3-S-37D	9	12							
GULF TRADER	FREIGHTER	U.S.	1964	U. S. GOVERNMENT OWNED	C3-S-37D	9	12							
GUS W. DARNELL	TANKER	U.S.	1985	OCEAN SHIPS	T-5	21	30			Y				
HANNIBAL VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	YC2-S-AP2	8	11							
HATTIESBURG VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	YC2-S-AP2	8	11							
HOWELL LYKES	CONTAINERSHIP	U.S.	1973	LYKES BROS. S.S. CO.	C6-S-85B	21	19				Y		Y	
HUMACAO	CONTAINERSHIP	U.S.	1968	NAVIERAS DE PUERTO RICO	C7-S-48C	19	23			Y				
INDEPENDENCE	COMBO PASS & CARGO	U.S.	1950	DELTA QUEEN STEAMBOAT CO.	P3-S2-DL2	20	7			Y				
IOWA TRADER	BULK CARRIER	U.S.	1981	PENN. ATTRANS CO.	C5-M-129A	24	37						Y	
ITA JAMIE BAXTER/CF-1	TUG/BARGE(BULK)	U.S.	1977	C. E. INDUSTRIES, INC.	PRIVATE	16	24			Y				
JACKSONVILLE/JACKSONVILLE	TUG/BARGE(TANKER)	U.S.	1982	SHERIDAN TRANSPORTATION CO.	PRIVATE	22	48			Y				
JAMES MCHENRY	RoRo	USL	1979	U. S. GOVERNMENT OWNED	C1-MF-123A	3	3						Y	
JEAN LYKES	CONTAINERSHIP	U.S.	1973	LYKES BROS. S.S. CO.	C6-S-85B	21	19				Y		Y	
JEB STUART	CONTAINER/BARGE CARRIER	JPN	1970	WATERMAN LINE	FOREIGN CONST	36	50							
JEREMIAH O'BRIEN	FREIGHTER	U.S.	1943	U. S. GOVERNMENT OWNED	EC2-S-C1	7	11							
JOHN HENRY	RoRo	USL	1978	U. S. GOVERNMENT OWNED	C1-MF-123A	3	3						Y	
JULIUS HAMMER/OXY 4101	TUG/BARGE(TANKER)	U.S.	1981	OCEAN SHIPS	IB6-MF-130A	17	41				Y		Y	
KAINOKU	CONTAINER/RO RO	U.S.	1976	MAISON NAVIGATION CO.	PRIVATE	18	16			Y				
KAINALU	RoRo	U.S.	1974	MAISON NAVIGATION CO.	PRIVATE	18	16			Y				
KANSAS TRADER	BULK CARRIER	U.S.	1981	PENN. ATTRANS CO.	C5-M-129A	24	36						Y	
KAUAI	CONTAINERSHIP	U.S.	1980	MAISON NAVIGATION CO.	PRIVATE	25	26							
KENAI	TANKER	U.S.	1979	KEYSTONE SHIPPING CO.	PRIVATE	60	125			Y				
KEYSTONE CANYON	TANKER	U.S.	1978	KEYSTONE SHIPPING CO.	PRIVATE	82	127			Y				
KEYSTONE GEORGIA	CHEMICAL TANKER	U.S.	1964	TEXACO REFINING & MARKETING	PRIVATE	17	27			Y				
KEYSTONE RHODE ISLAND	TANKER	U.S.	1964	TEXACO REFINING & MARKETING	PRIVATE	17	20			Y				
KEYSTONE STATE	CRANE SHIP/CONTAINER	U.S.	1966	U. S. GOVERNMENT OWNED	C6-S-MA/QD	17	18							
KING	TANKER	U.S.	1957	AMERICAN HEAVY LIFT SHIPPING CO.	PRIVATE	20	35			Y				
KITTANNING	TANKER	U.S.	1977	KEYSTONE SHIPPING CO.	TB-S-100B	45	93				Y		Y	
KNIGHT	TANKER	U.S.	1958	AMERICAN HEAVY LIFT SHIPPING CO.	PRIVATE	20	35			Y				
LAKE	FREIGHTER	U.S.	1961	U. S. GOVERNMENT OWNED	C3-S-33A	9	13							

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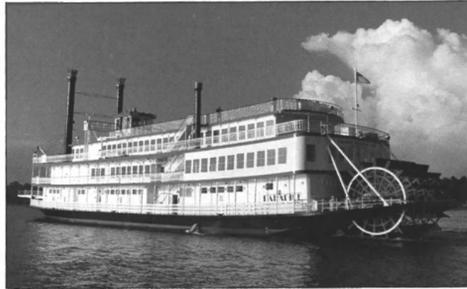
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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000³)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT		SUBSIDIZED	
								ACT	ODS	ODS	CDS
LAKE CHARLES	L.N.G. TANKER	U.S.	1980	AHRENKIEL SHIP MANAGEMENT INC.	LGB-S-102A	94	73			Y	Y
LASH ATLANTICO	CONTAINER/BARGE CARRIER	U.S.	1972	COASTAL BARGE CORP.	CB-S-81H	26	30				Y
LAWRENCE H. GIANELLA	TANKER	U.S.	1986	OCEAN SHIPS	T-S	21	23	Y			
LEADER	TANKER	U.S.	1969	OMI CORPORATION	PRIVATE	17	38	Y			
LEXINGTON	TANKER	U.S.	1958	U. S. GOVERNMENT OWNED	PRIVATE	20	42				
LIBERTY BELLE	TANKER	U.S.	1976	LIBERTY MARITIME CORP.	TB-S-100B	45	84				Y
LIBERTY SEA	BULK CARRIER	KRS	1984	LIBERTY MARITIME CORP.	CB-M-F144A	36	64			Y	
LIBERTY SPIRIT	BULK CARRIER	KRS	1986	LIBERTY MARITIME CORP.	CB-M-F144B	36	64			Y	
LIBERTY STAR	BULK CARRIER	KRS	1986	LIBERTY MARITIME CORP.	CB-M-F144B	36	63			Y	
LIBERTY SUN	BULK CARRIER	KRS	1986	LIBERTY MARITIME CORP.	CB-M-F144B	36	63			Y	
LIBERTY WAVE	BULK CARRIER	KRS	1984	LIBERTY MARITIME CORP.	CB-M-F144A	36	63			Y	
LINCOLN	FREIGHTER	U.S.	1961	U. S. GOVERNMENT OWNED	C4-S-10B	13	14				
LNG AQUARIUS	L.N.G. TANKER	U.S.	1977	ENERGY TRANSPORTATION CORP.	LGB-S-102A	95	73				Y
LNG ARIES	L.N.G. TANKER	U.S.	1977	ENERGY TRANSPORTATION CORP.	LGB-S-102A	95	65	Y			
LNG CAPRICORN	L.N.G. TANKER	U.S.	1978	ENERGY TRANSPORTATION CORP.	LGB-S-102A	95	65			Y	
LNG GEMINI	L.N.G. TANKER	U.S.	1978	ENERGY TRANSPORTATION CORP.	PRIVATE	95	65			Y	
LNG LEO	L.N.G. TANKER	U.S.	1978	ENERGY TRANSPORTATION CORP.	PRIVATE	95	65			Y	
LNG LIBRA	L.N.G. TANKER	U.S.	1979	ENERGY TRANSPORTATION CORP.	PRIVATE	95	65			Y	
LNG TAURUS	L.N.G. TANKER	U.S.	1979	ENERGY TRANSPORTATION CORP.	PRIVATE	95	65			Y	
LNG VIRGO	L.N.G. TANKER	U.S.	1979	ENERGY TRANSPORTATION CORP.	PRIVATE	95	65	Y			
LOUISIANA	L.N.G. TANKER	U.S.	1980	AHRENKIEL SHIP MANAGEMENT INC.	LGB-S-102A	94	73			Y	Y
ITC CALVIN P. TITUS	CONTAINERSHIP	GFR	1975	MAERSK LINE	FOREIGN CONST	41	32				
LURLINE	RoRo	U.S.	1973	MATSON NAVIGATION CO.	PRIVATE	25	22	Y			
LYKES ENTERPRISE	FREIGHTER	U.S.	1960	LYKES BROS. S.S. CO.	CS-S-37E	12	15				
MAERSK CONSTELLATION	RoRo	DEN	1980	MAERSK LINE	FOREIGN CONST	21	21				
MAGALLANES	FREIGHTER	U.S.	1964	U. S. GOVERNMENT OWNED	C4-S-60C	14	15				
MAINE	FREIGHTER	U.S.	1944	U. S. GOVERNMENT OWNED	T2-S-E-A2	8	12				
MAJOR STEPHEN W. PLESS	RoRo	U.S.	1983	WATERMAN LINE	C7-S-133A	45	22				Y
MALLODY LYKES	FREIGHTER	U.S.	1965	U. S. GOVERNMENT OWNED	C4-S-60C	14	15				
MANIKAI	CONTAINERSHIP	U.S.	1970	MATSON NAVIGATION CO.	PRIVATE	24	27	Y			
MANUJANI	CONTAINERSHIP	U.S.	1970	MATSON NAVIGATION CO.	PRIVATE	24	27	Y			
MARINE CHEMIST	CHEMICAL TANKER	U.S.	1970	MARINE TRANSPORT LINES, INC.	PRIVATE	20	37	Y			
MARINE DUVAL	CHEMICAL TANKER	U.S.	1944	MARINE TRANSPORT LINES, INC.	T2-S-E-A1	11	25	Y			
MARINE FIDDLER	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	C4-S-B5	11	14				
MARINE FLORIDIAN	CHEMICAL TANKER	U.S.	1944	MARINE TRANSPORT LINES, INC.	T2-S-E-A1	13	25	Y			
MARINE PRINCESS	BULK CARRIER	GBI	1967	MARINE TRANSPORT LINES, INC.	C6-M-F-139A	26	53	Y			
MARTHA R. INGRAM/105 3301	TUG/BARGE(TANKER)	U.S.	1971	MARITRANS INC	PRIVATE	16	37	Y			
MARYLAND	CHEMICAL TANKER	U.S.	1963	U. S. GOVERNMENT OWNED	PRIVATE	17	27				
MASSACHUSETTS	CHEMICAL TANKER	U.S.	1963	TEXACO REFINING & MARKETING	PRIVATE	17	20	Y			
MATSONIA	RoRo	U.S.	1973	MATSON NAVIGATION CO.	PRIVATE	19	14	Y			
MAUI	CONTAINERSHIP	U.S.	1978	MATSON NAVIGATION CO.	PRIVATE	25	27	Y			

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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000^s)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT	SUBSIDIZED	
									ODS	CDS
MAUMEE	TANKER	U.S.	1956	U.S. GOVERNMENT OWNED	T5-S-12A	15	27			
MAYAGUEZ	CONTAINERSHIP	U.S.	1968	NAVIERAS DE PUERTO RICO	C7-S-48D	19	21	Y		Y
MAYO LYKES	FREIGHTER	U.S.	1945	U.S. GOVERNMENT OWNED	VC2-S-AP2	8	11			
MEACHAM	TANKER	U.S.	1957	U.S. GOVERNMENT OWNED	PRIVATE	19	32			
METEOR	CAR CARRIER	U.S.	1967	U.S. GOVERNMENT OWNED	C4-SF-67A	16	12			
MIRFAK	FREIGHTER	U.S.	1957	U.S. GOVERNMENT OWNED	C1-ME2-123A	2	2			
MISSION BUENAVENTURA	TANKER	U.S.	1968	U.S. GOVERNMENT OWNED	PRIVATE	21	39			
MISSION CAPSTRANO	TANKER	U.S.	1971	U.S. GOVERNMENT OWNED	PRIVATE	21	38			
MISSION SANTA YNEZ	TANKER	U.S.	1944	U.S. GOVERNMENT OWNED	T2-SE-A2	10	17			
MOBILE/MOBILE	TUG/BARGE(TANKER)	U.S.	1983	SHERIDAN TRANSPORTATION CO.	PRIVATE	22	48	Y		
NOKU PAHU/ASTC 1	TUG/BARGE(TANKER)	U.S.	1982	PACIFIC GULF MARINE, INC.	PRIVATE	17	26	Y		
NORMACDAWN	FREIGHTER	U.S.	1965	U.S. GOVERNMENT OWNED	C4-S-64A	11	13			
NORMACLEN	FREIGHTER	U.S.	1961	U.S. GOVERNMENT OWNED	C3-S-33A	9	13			
NORMACMOON	FREIGHTER	U.S.	1965	U.S. GOVERNMENT OWNED	C4-S-64A	11	12			
NORMACKY	TANKER	U.S.	1977	MOORE MCCORMACK BULK TRANSPORT, INC.	T6-S-93A	22	40		Y	Y
NORMACSTAR	TANKER	U.S.	1975	MOORE MCCORMACK BULK TRANSPORT, INC.	T6-S-93A	22	40		Y	Y
NORMACSTAR	TANKER	U.S.	1976	MOORE MCCORMACK BULK TRANSPORT, INC.	T6-S-93A	22	40		Y	Y
NORMACWAVE	FREIGHTER	U.S.	1962	U.S. GOVERNMENT OWNED	C4-S-10	13	15			
MOUNT VERNON	TANKER	U.S.	1961	U.S. GOVERNMENT OWNED	PRIVATE	27	48			
MOUNT WASHINGTON	TANKER	U.S.	1963	U.S. GOVERNMENT OWNED	PRIVATE	28	48			
NAECO	TANKER	U.S.	1957	U.S. GOVERNMENT OWNED	PRIVATE	19	32			
NECHES	TANKER	U.S.	1958	SABINE TOWING & TRANSPORT, INC.	PRIVATE	20	35	Y		
NEELLOYD HOLLAND	CONTAINERSHIP	KRS	1984	SEA-LAND SERVICE	C9-M-F141A	57	59			
NEW YORK SUN	TANKER	U.S.	1980	SUN TRANSPORT, INC.	PRIVATE	19	31	Y		
NEW YORK/NEW YORK	TUG/BARGE(TANKER)	U.S.	1983	SHERIDAN TRANSPORTATION CO.	PRIVATE	22	48	Y		
NEWARK BAY	CONTAINERSHIP	KRS	1985	SEA-LAND SERVICE	C9-M-F141A	57	59			
NOBLE STAR	FREIGHTER	NOR	1977	SEALIFT, INC.	FOREIGN CONST	17	18			
NODAWAY	TANKER	U.S.	1945	U.S. GOVERNMENT OWNED	T1-M-B12	3	4			
NORTHERN LIGHT	FREIGHTER	U.S.	1961	U.S. GOVERNMENT OWNED	C3-S-33A	9	13			
NORTHERN LIGHTS	RoRo	U.S.	1975	INTEROCEAN MANAGEMENT CORP.	PRIVATE	32	16	Y		
NORTHERN SUN	TANKER	U.S.	1981	SUN TRANSPORT, INC.	PRIVATE	2	2	Y		
NOSAC RANGER	RoRo	JPN	1978	PACIFIC GULF MARINE, INC.	FOREIGN CONST	17	17			
NUYO SAN JUAN	CONTAINERSHIP	U.S.	1970	NAVIERAS DE PUERTO RICO	C7-S-48E	19	20			Y
OCCIDENTAL VICTORY	FREIGHTER	U.S.	1945	U.S. GOVERNMENT OWNED	VC2-S-AP2	8	11			
OCEAN CITY	TANKER	JPN	1981	GLENAGLE SHIP MANAGEMENT CO., INC.	FOREIGN CONST	44	89			
OMI COLUMBIA	TANKER	JPN	1974	OMI CORPORATION	FOREIGN CONST	68	125	Y	Y	
OMI DYNACHEM	CHEMICAL TANKER	U.S.	1981	OMI CORPORATION	PRIVATE	32	50	Y		
OMI HUDSON	CHEMICAL TANKER	U.S.	1981	OMI CORPORATION	PRIVATE	32	42	Y		
OMI MISSOURI	BULK CARRIER	JPN	1983	VULCAN CARRIERS, LTD.	C6-M-F-139A	30	50		Y	Y
OMI SACRAMENTO	BULK CARRIER	JPN	1983	VULCAN CARRIERS, LTD.	C6-M-F-139A	30	43		Y	Y
OMI STAR	CHEMICAL TANKER	U.S.	1970	OMI CORPORATION	PRIVATE	19	38	Y		
ODCL INNOVATION	CONTAINERSHIP	KRS	1985	SEA-LAND SERVICE	C9-M-F141A	57	59			
ODCL INSPIRATION	CONTAINERSHIP	KRS	1985	SEA-LAND SERVICE	C9-M-F141A	57	59			
OVERSEAS ALASKA	TANKER	U.S.	1970	MARITIME OVERSEAS CORP.	PRIVATE	28	63	Y		
OVERSEAS ALICE	TANKER	U.S.	1968	MARITIME OVERSEAS CORP.	PRIVATE	21	38	Y		
OVERSEAS ARCTIC	TANKER	JPN	1971	MARITIME OVERSEAS CORP.	PRIVATE	28	63	Y		
OVERSEAS BOSTON	TANKER	JPN	1974	MARITIME OVERSEAS CORP.	FOREIGN CONST	61	124	Y		
OVERSEAS CHICAGO	TANKER	U.S.	1977	MARITIME OVERSEAS CORP.	PRIVATE	45	92	Y		
OVERSEAS HARRIETTE	BULK CARRIER	JPN	1977	MARITIME OVERSEAS CORP.	C6-M-F-139A	14	26			
OVERSEAS JOYCE	RoRo	JPN	1987	MARITIME OVERSEAS CORP.	FOREIGN CONST	48	16			
OVERSEAS JUNEAU	TANKER	U.S.	1973	MARITIME OVERSEAS CORP.	PRIVATE	58	122	Y		
OVERSEAS MARILYN	BULK CARRIER	JPN	1977	MARITIME OVERSEAS CORP.	C6-M-F-139A	14	26			
OVERSEAS NEW ORLEANS	TANKER	U.S.	1983	MARITIME OVERSEAS CORP.	PRIVATE	21	44	Y		
OVERSEAS NEW YORK	TANKER	U.S.	1977	MARITIME OVERSEAS CORP.	PRIVATE	45	92	Y		
OVERSEAS OHIO	TANKER	U.S.	1977	MARITIME OVERSEAS CORP.	PRIVATE	45	92	Y		

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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000²)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT			SUBSIDIZED	
								ACT	ODS	CDS	ODS	CDS
OVERSEAS PHILADELPHIA	TANKER	U.S.	1982	MARITIME OVERSEAS CORP.	PRIVATE	21	44	Y				
OVERSEAS VALDEZ	TANKER	U.S.	1968	MARITIME OVERSEAS CORP.	PRIVATE	21	38	Y				
OVERSEAS WYMAN	TANKER	U.S.	1969	MARITIME OVERSEAS CORP.	PRIVATE	21	38	Y				
OVERSEAS WASHINGTON	TANKER	U.S.	1978	MARITIME OVERSEAS CORP.	PRIVATE	45	92	Y				
PAN AMERICAN VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	VC2-S-AP2	8	11					
PATRIOT	TANKER	U.S.	1976	VULCAN CARRIERS, LTD.	T6-M-98A	22	36			Y		Y
PATRIOT STATE	COMBO PASS & CARGO	U.S.	1964	U. S. GOVERNMENT OWNED	SS-S-M449C	11	9					
PAUL BUCK	TANKER	U.S.	1985	OCEAN SHIPS	T-5	21	30	Y				
PEMBINA	FREIGHTER	USL	1945	SEABORNE LINE, INC.	C1-M-AV1	4	6					
PENNSYLVANIA TRADER	TANKER	U.S.	1962	U. S. GOVERNMENT OWNED	PRIVATE	20	35					
PETERSBURG	TANKER	U.S.	1963	U. S. GOVERNMENT OWNED	PRIVATE	27	51					
PEC. DEWAYNE T. WILLIAMS	RoRo	U.S.	1985	AMERICAN OVERSEAS MARINE CORP.	T-AXX	45	22	Y				
PEC. EUGENE A. OBREGON	RoRo	U.S.	1982	WATERMAN LINE	C7-S-133A	45	25					Y
PEC. JAMES ANDERSON, JR.	RoRo	DEN	1979	MAERSK LINE	T-AXX	37	21					
PEC. WILLIAM B. BAUGH	RoRo	DEN	1979	MAERSK LINE	T-AXX	38	21					
PHILADELPHIA SUN	TANKER	U.S.	1981	SUN TRANSPORT, INC.	PRIVATE	17	34	Y				
PHILADELPHIA/PHILADELPHIA	TUG (BARGE/TANKER)	U.S.	1983	SHERIDAN TRANSPORTATION CO.	PRIVATE	22	48	Y				
PIONEER COMMANDER	FREIGHTER	U.S.	1963	U. S. GOVERNMENT OWNED	C4-S-57A	11	14					
PIONEER CONTRACTOR	FREIGHTER	U.S.	1963	U. S. GOVERNMENT OWNED	C4-S-57A	11	14					
PIONEER CRUSADER	FREIGHTER	U.S.	1963	U. S. GOVERNMENT OWNED	C4-S-57A	11	14					
PLATTE	BULK CARRIER	U.S.	1982	OMI CORPORATION	CS-M-129A	24	37					Y
PONCE	RoRo	U.S.	1968	NAVERAS DE PUERTO RICO	PRIVATE	18	19	Y				
POTOMAC	TANKER	U.S.	1957	U. S. GOVERNMENT OWNED	PRIVATE	16	28					
POTOMAC TRADER	TANKER	U.S.	1983	PENN. ATRANSCO CORP.	PRIVATE	25	51	Y				
PRESIDENT	FREIGHTER	U.S.	1961	U. S. GOVERNMENT OWNED	C4-S-10B	13	14					
PRESIDENT ADAMS	CONTAINERSHIP	GFR	1988	AMERICAN PRESIDENT LINES	C9-M-F150A	62	55				Y	
PRESIDENT ARTHUR	CONTAINERSHIP	JPM	1987	AMERICAN PRESIDENT LINES	C9-M-F151A	39	45				Y	
PRESIDENT BUCHANAN	CONTAINERSHIP	JPM	1987	AMERICAN PRESIDENT LINES	C9-M-F151A	39	45				Y	
PRESIDENT ESKROWER	CONTAINERSHIP	JPM	1980	AMERICAN PRESIDENT LINES	C9-M-F148A	37	48				Y	
PRESIDENT F. D. ROOSEVELT	CONTAINERSHIP	JPM	1980	AMERICAN PRESIDENT LINES	C9-M-F148A	36	48				Y	
PRESIDENT GARFIELD	CONTAINERSHIP	JPM	1987	AMERICAN PRESIDENT LINES	C9-M-F151A	39	45				Y	
PRESIDENT GRANT	CONTAINERSHIP	U.S.	1971	AMERICAN PRESIDENT LINES	CB-S-F81E	27	37				Y	Y
PRESIDENT HARDING	CONTAINERSHIP	JPM	1987	AMERICAN PRESIDENT LINES	C9-M-F151A	39	45				Y	
PRESIDENT HARRISON	CONTAINERSHIP	U.S.	1971	AMERICAN PRESIDENT LINES	CB-S-81E	28	30				Y	Y
PRESIDENT HOOVER	CONTAINERSHIP	U.S.	1971	AMERICAN PRESIDENT LINES	CB-S-F81E	27	39				Y	Y
PRESIDENT JACKSON	CONTAINERSHIP	GFR	1988	AMERICAN PRESIDENT LINES	C9-M-F150A	62	55				Y	
PRESIDENT JEFFERSON	CONTAINERSHIP	U.S.	1973	AMERICAN PRESIDENT LINES	CB-S-85B	21	21				Y	Y
PRESIDENT KENNEDY	CONTAINERSHIP	GFR	1988	AMERICAN PRESIDENT LINES	C9-M-F150A	62	55				Y	
PRESIDENT LINCOLN	CONTAINERSHIP	U.S.	1982	AMERICAN PRESIDENT LINES	C9-S-132A	41	31				Y	Y
PRESIDENT MONROE	CONTAINERSHIP	U.S.	1983	AMERICAN PRESIDENT LINES	C9-S-132A	41	31				Y	Y
PRESIDENT POLK	CONTAINERSHIP	GFR	1988	AMERICAN PRESIDENT LINES	C9-M-F150A	62	55				Y	
PRESIDENT TRUMAN	CONTAINERSHIP	GFR	1988	AMERICAN PRESIDENT LINES	C9-M-F151A	62	55				Y	
PRESIDENT TYLER	CONTAINERSHIP	U.S.	1972	AMERICAN PRESIDENT LINES	CB-S-F81E	27	39				Y	Y
PRESIDENT WASHINGTON	CONTAINERSHIP	U.S.	1983	AMERICAN PRESIDENT LINES	C9-S-132A	41	31				Y	Y
PRIDE	FREIGHTER	U.S.	1960	U. S. GOVERNMENT OWNED	C3-S-33A	9	13					
PRIDE II	TANKER	U.S.	1959	U. S. GOVERNMENT OWNED	PRIVATE	17	31					
PRINCE WILLIAM SOUND	TANKER	U.S.	1975	KEYSTONE SHIPPING CO.	PRIVATE	60	123					
PVT. FRANKLIN J. PHILLIPS	RoRo	DEN	1980	MAERSK LINE	T-AXX	38	23	Y				
QUEENS VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	VC2-S-AP2	8	11					
RAINBOW HOPE	FREIGHTER	U.S.	1980	RAINBOW NAVIGATION, INC.	C1-M-122A	1	2					Y
RANGER	TANKER	U.S.	1976	VULCAN CARRIERS, LTD.	T6-M-98A	22	36			Y		Y
RED OAK VICTORY	FREIGHTER	U.S.	1944	U. S. GOVERNMENT OWNED	VC2-S-AP2	8	11					
RESOLITE	CONTAINERSHIP	U.S.	1980	FARRELL LINES	CS-S-73B	18	16			Y		Y
RICHARD G. MATTHIEN	TANKER	U.S.	1986	OCEAN SHIPS	T-5	21	30	Y				
RIDER VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	VC2-S-AP2	8	11					
ROBERT E. LEE	CONTAINER/BARGE CARRIER	U.S.	1974	WATERMAN LINE	C9-S-81D	29	42				Y	Y

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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000⁵)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT			SUBSIDIZED		
								ACT	ODS	CDS	ODS	CDS	
ROVER	TANKER	U.S.	1977	CENTRAL GULF LINE	T6-M-98A	22	36						
R. J. PFEIFFER	CONTAINERSHIP	U.S.	1992	MALSON NAVIGATION CO.	PRIVATE	32	29	Y					
SABINE	TANKER	U.S.	1957	SABINE TOWING & TRANSPORT, INC.	PRIVATE	20	34	Y					
SAGAMORE	TANKER	U.S.	1959	U. S. GOVERNMENT OWNED	PRIVATE	2	3						
SAM HOUSTON	CONTAINER/BARGE CARRIER	U.S.	1974	WATERMAN LINE	C9-S-81D	29	42				Y		
SAMUEL L. COBB	TANKER	U.S.	1985	OCEAN SHIPS	T-5	21	33	Y					
SANTA CRUZ	FREIGHTER	U.S.	1966	U. S. GOVERNMENT OWNED	C4-S-65A	9	13						
SANTA ELENA	FREIGHTER	U.S.	1967	U. S. GOVERNMENT OWNED	C4-S-65A	9	13						
SANTA ISABEL	FREIGHTER	U.S.	1967	U. S. GOVERNMENT OWNED	C4-S-65A	9	13						
SANTA LUCIA	FREIGHTER	U.S.	1966	U. S. GOVERNMENT OWNED	C4-S-65A	9	13						
SAVANNAH	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	P2-M1-MA40A	16	98						
SCAN	FREIGHTER	U.S.	1961	U. S. GOVERNMENT OWNED	C3-S-33A	9	13						
SEA FOX	CONTAINER/RO RO	DEN	1985	CROWLEY AMERICAN TRANSPORT	C6-M-F145A	34	25						
SEA ISLE CITY	TANKER	JPN	1981	GLENAGLE SHIP MANAGEMENT CO., INC.	FOREIGN CONST	45	97						
SEA LION	CONTAINER/RO RO	DEN	1985	CROWLEY AMERICAN TRANSPORT	C6-M-F145A	34	25						
SEA PRINCESS	TANKER	U.S.	1972	SEA PRINCESS TRADING, INC.	PRIVATE	21	37						
SEA VENTURE	CHEMICAL TANKER	GRC	1972	ATLANTIC TANKSHIPS, INC.	FOREIGN CONST	10	19	Y					
SEA WOLF	CONTAINER/RO RO	DEN	1984	CROWLEY AMERICAN TRANSPORT	C6-M-F145A	34	25						
SEABULK AMERICA	CHEMICAL TANKER	JPN	1975	HVIDE SHIPPING, INC.	PRIVATE	22	46	Y					
SEABULK CHALLENGER/STL 3901	TUG/BARGE/TANKER	U.S.	1975	HVIDE SHIPPING, INC.	PRIVATE	21	42	Y					
SEABULK MAGNACHEM/SCC 3902	TUG/BARGE/TANKER	U.S.	1977	HVIDE SHIPPING, INC.	PRIVATE	19	42	Y					
SEADRIFT	PARTIAL CONTAINER	U.S.	1942	ATLANTIC TANKSHIPS, INC.	T2-SE-A1	9	17	Y					
SEA-LAND ANCHORAGE	CONTAINERSHIP	USL	1987	SEA-LAND SERVICE	C7-S-88A	21	21	Y					
SEA-LAND ATLANTIC	CONTAINERSHIP	KRS	1985	SEA-LAND SERVICE	C9-M-F141A	57	59						
SEA-LAND CHALLENGER	CONTAINERSHIP	U.S.	1968	SEA-LAND SERVICE	C7-S-88C	19	22						
SEA-LAND CONSUMER	CONTAINERSHIP	U.S.	1973	SEA-LAND SERVICE	C7-S-88A	24	26						
SEA-LAND CRUSADER	CONTAINERSHIP	U.S.	1969	SEA-LAND SERVICE	C7-S-88D	19	21	Y					
SEA-LAND DEFENDER	CONTAINERSHIP	JPN	1980	SEA-LAND SERVICE	PRIVATE	33	24						
SEA-LAND DEVELOPER	CONTAINERSHIP	JPN	1980	SEA-LAND SERVICE	PRIVATE	33	30						
SEA-LAND DISCOVERY	CONTAINERSHIP	U.S.	1968	SEA-LAND SERVICE	C7-S-88D	19	22						
SEA-LAND ENDURANCE	CONTAINERSHIP	KRS	1980	SEA-LAND SERVICE	PRIVATE	33	23						
SEA-LAND ENTERPRISE	CONTAINERSHIP	U.S.	1980	SEA-LAND SERVICE	C8-S-85D	28	31						Y
SEA-LAND EXPEDITION	PARTIAL CONTAINER	U.S.	1973	SEA-LAND SERVICE	C6-S-85A	22	20						Y

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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000²)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT		SUBSIDIZED	
								ACT	ODS	ODS	CDS
SEA-LAND EXPLORER	CONTAINERSHIP	JPN	1980	SEA-LAND SERVICE	PRIVATE	33	24				
SEA-LAND EXPRESS	CONTAINERSHIP	JPN	1980	SEA-LAND SERVICE	PRIVATE	33	24				
SEA-LAND HAWAII	PARTIAL CONTAINER	U.S.	1973	SEA-LAND SERVICE	C6-S-85A	22	20				Y
SEA-LAND INDEPENDENCE	CONTAINERSHIP	JPN	1980	SEA-LAND SERVICE	PRIVATE	33	23				
SEA-LAND INNOVATOR	CONTAINERSHIP	KRS	1980	SEA-LAND SERVICE	PRIVATE	33	30				
SEA-LAND INTEGRITY	CONTAINERSHIP	KRS	1984	SEA-LAND SERVICE	C9-M-F141A	57	59				
SEA-LAND KODIAK	CONTAINERSHIP	USL	1987	SEA-LAND SERVICE	C7-S-88A	21	21	Y			
SEA-LAND LIBERATOR	CONTAINERSHIP	JPN	1980	SEA-LAND SERVICE	PRIVATE	33	30				
SEA-LAND NAVIGATOR	CONTAINERSHIP	U.S.	1972	SEA-LAND SERVICE	CB-S-85C	28	28				Y
SEA-LAND PACER	CONTAINERSHIP	JPN	1978	SEA-LAND SERVICE	FOREIGN CONST	17	15				
SEA-LAND PACIFIC	CONTAINERSHIP	U.S.	1979	SEA-LAND SERVICE	CB-S-85D	28	31				Y
SEA-LAND PATRIOT	CONTAINERSHIP	JPN	1980	SEA-LAND SERVICE	PRIVATE	33	30				
SEA-LAND PERFORMANCE	CONTAINERSHIP	KRS	1985	SEA-LAND SERVICE	C9-M-F141A	57	59				Y
SEA-LAND PRODUCER	CONTAINERSHIP	U.S.	1974	SEA-LAND SERVICE	C7-S-88A	24	26				Y
SEA-LAND QUALITY	CONTAINERSHIP	KRS	1985	SEA-LAND SERVICE	C9-M-F141A	57	59				Y
SEA-LAND RELIANCE	CONTAINERSHIP	U.S.	1980	SEA-LAND SERVICE	C9-S-81F	30	41				Y
SEA-LAND SPIRIT	CONTAINERSHIP	U.S.	1980	SEA-LAND SERVICE	C9-S-81F	30	22				Y
SEA-LAND TACOMA	CONTAINERSHIP	USL	1987	SEA-LAND SERVICE	C7-S-88A	21	21	Y			
SEA-LAND TRADER	CONTAINERSHIP	U.S.	1973	SEA-LAND SERVICE	CB-S-85C	28	31				Y
SEA-LAND VOYAGER	CONTAINERSHIP	JPN	1980	SEA-LAND SERVICE	PRIVATE	33	23				
SEMINOLE	TANKER	U.S.	1961	MOBIL CORPORATION	PRIVATE	28	50	Y			
SENIATOR	RoRo	GFR	1981	CROWLEY AMERICAN TRANSPORT	FOREIGN CONST	13	9				Y
SGT. MATEJ KOCAK	RoRo	U.S.	1981	WATERMAN LINE	C7-S-133A	45	24				Y
SGT. WILLIAM R. BUTTON	RoRo	U.S.	1986	AMERICAN OVERSEAS MARINE CORP	FAKX	45	27	Y			
SHELDON EYKES	CONTAINERSHIP	GFR	1969	EYKES BROS. S.S. CO.	C6-M-F147A	16	15		Y		
SHINING STAR	CONTAINERSHIP	U.S.	1968	SEA-LAND SERVICE	C6-S-49C	18	18	Y			
SHIRLEY EYKES	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	CS-S-37F	12	15				
SHOSHONE	TANKER	U.S.	1957	U. S. GOVERNMENT OWNED	TS-S-12A	16	27				
SIERRA MADRE	TANKER	U.S.	1981	WESTCOAST SHIPPING CO.	PRIVATE	21	41	Y			
SIOUX FALLS VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	VC2-S-AP2	8	11				
SOLAR	TANKER	U.S.	1959	AMERICAN HILARY LIFT SHIPPING CO.	PRIVATE	18	31	Y			
SOLON TURMAN	FREIGHTER	U.S.	1961	U. S. GOVERNMENT OWNED	CS-S-37E	12	15				
SOUTHERN	L.N.G. TANKER	U.S.	1978	AGENT MARINE OPERATIONS	LG9-S-94A	69	75				Y
SOUTHERN CROSS	FREIGHTER	U.S.	1962	U. S. GOVERNMENT OWNED	C3-S-33A	9	13				

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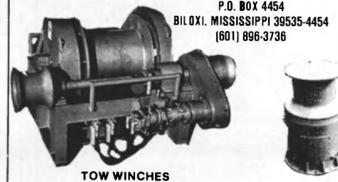
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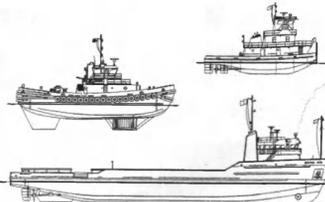
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U.S. FLAG FLEET STATISTICS

1,000 GROSS TONS AND OVER (Tonnage in 1,000²)

Vessel Name	Vessel Type	Where Built	Year Built	Operator	Design Type	GRT	DWT	JONES ACT	SUBSIDIZED	
									ODS	CDS
SPS. ERIC G. GIBSON	CONTAINERSHIP	GFR	1976	MAERSK LINE	FOREIGN CONST	41	32			
SPRAY	TANKER	U.S.	1960	AMERICAN HEAVY LIFT SHIPPING CO.	PRIVATE	18	31	Y		
STATE	COMBO PASS & CARGO	U.S.	1952	U. S. GOVERNMENT OWNED	P2-S1-DN3	13	11			
STATE OF MAINE	COMBO PASS & CARGO	U.S.	1952	U. S. GOVERNMENT OWNED	P2-S1-DN3	13	11			
STONEWALL JACKSON	CONTAINER/BARGE CARRIER	U.S.	1974	WATERMAN LINE	C9-S-81D	29	42		Y	Y
STRONG TEXAN	RoRo	NTH	1976	BENGTSSON WALKER MARINE	FOREIGN CONST	1	3			
STRONG VIRGINIAN	RoRo	GFR	1984	VAN DAMMEKER SHIPPING U.S.A., INC.	FOREIGN CONST	16	22			
STRONG/AMERICAN	TUG/BARGE	U.S.	1985	VAN DAMMEKER SHIPPING U.S.A., INC.	US-M/21A	13	20			Y
SUE LYKES	FREIGHTER	U.S.	1969	LYKES BROS. S.S. CO.	CS-5-75A	16	23	Y		Y
SUGAR ISLANDER	BULK CARRIER	U.S.	1973	PACIFIC GULF MARINE, INC.	PRIVATE	16	30	Y		
SULPHUR ENTERPRISE	CHEMICAL TANKER	U.S.	1994	CENTRAL GULF LINE	PRIVATE	17	22	Y		
SUNMAR SKY	FREIGHTER	NTH	1963	SUNMAR CONTAINER LINES	FOREIGN CONST	2	2			
SUNMAR STAR	FREIGHTER	DNH	1971	SUNMAR CONTAINER LINES	FOREIGN CONST	1	1			
S/R BATON ROUGE	TANKER	U.S.	1970	SEARIVER MARITIME, INC.	PRIVATE	34	77	Y		
S/R BAYTOWN	TANKER	U.S.	1984	SEARIVER MARITIME, INC.	PRIVATE	32	59	Y		
S/R BENICIA	TANKER	U.S.	1979	SEARIVER MARITIME, INC.	T10-S-92A	75	176	Y		
S/R CHARLESTON	TANKER	U.S.	1983	SEARIVER MARITIME, INC.	PRIVATE	31	49	Y		
S/R GALVESTON	TANKER	U.S.	1970	SEARIVER MARITIME, INC.	PRIVATE	13	28	Y		
S/R LONG BEACH	TANKER	U.S.	1987	SEARIVER MARITIME, INC.	T-209	111	215	Y		
S/R MEDITERRANEAN	TANKER	U.S.	1986	SEARIVER MARITIME, INC.	T-209	111	215	Y		
S/R NEW ORLEANS	TANKER	U.S.	1965	SEARIVER MARITIME, INC.	PRIVATE	32	73	Y		
S/R NORTH SLOPE	TANKER	U.S.	1979	SEARIVER MARITIME, INC.	PRIVATE	75	175	Y		
S/R PHILADELPHIA	TANKER	U.S.	1970	SEARIVER MARITIME, INC.	PRIVATE	34	77	Y		
S/R SAN FRANCISCO	TANKER	U.S.	1969	SEARIVER MARITIME, INC.	PRIVATE	34	77	Y		
S/R WILMINGTON	TANKER	U.S.	1984	SEARIVER MARITIME, INC.	PRIVATE	31	49	Y		
TAMPA BAY	FREIGHTER	U.S.	1966	AFRAM LINES LTD.	C4-S-66A	11	15			
TEXAS CLIPPER	COMBO PASS & CARGO	U.S.	1944	U. S. GOVERNMENT OWNED	P1-S1-DRT	10	7			
THOMPSON LYKES	CONTAINERSHIP	U.S.	1974	LYKES BROS. S.S. CO.	C6-S-85B	21	19		Y	Y
THOMPSON PASS	TANKER	U.S.	1978	INTEROCEAN MANAGEMENT CORP.	PRIVATE	74	174	Y		
TILLIE LYKES	CONTAINERSHIP	KRS	1985	NICHOLAS BACHKO CO., INC.	C6-M-F146A	32	36		Y	
TONSINA	TANKER	U.S.	1978	KEYSTONE SHIPPING CO.	PRIVATE	60	125	Y		
TRINITY	CHEMICAL TANKER	U.S.	1966	WATERS MARINE, INC.	PRIVATE	21	38	Y		
TYSON LYKES	CONTAINERSHIP	KRS	1985	NICHOLAS BACHKO CO., INC.	C6-M-F146A	32	36		Y	
ULTRAMAX	ORE/BULK/OIL	U.S.	1973	SEALIFT, INC.	08B-S-90A	40	84	Y		
ULTRASEA	ORE/BULK/OIL	U.S.	1974	SEALIFT, INC.	08B-S-90A	40	83	Y		
VALIANT	CHEMICAL TANKER	NOR	1973	SEALIFT, INC.	FOREIGN CONST	4	8			
WASHINGTON	FREIGHTER	U.S.	1944	U. S. GOVERNMENT OWNED	T2-SE-42	8	12			
WAYNE VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	VC2-S-AP2	8	11			
WESTWARD VENTURE	RoRo	U.S.	1977	TOTEM OCEAN TRAILER EXPRESS, INC.	PRIVATE	18	18	Y		
WILLAMETTE	TANKER	U.S.	1969	OMI CORPORATION	PRIVATE	21	38			
WINTHROP VICTORY	FREIGHTER	U.S.	1945	U. S. GOVERNMENT OWNED	VC2-S-AP2	8	11			
WRIGHT	RoRo	U.S.	1970	U. S. GOVERNMENT OWNED	TAVB-3	23	16			
W. K. MCWILLIAMS JUNIOR	CHEMICAL TANKER	USM	1992	FREEMPORT MCMORAN RESOURCE	PRIVATE	6	8			

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ITL	ITALY
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KRS	KOREA (SOUTH)
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NTH	NETHERLANDS
POL	POLAND
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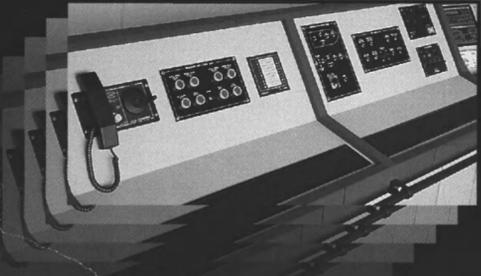
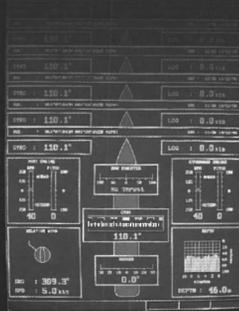


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U.S. PORTS REPORT

VTS

Analyzing Need, Cost & Safety In U.S. Ports

The U.S. Coast Guard's (USCG) planned expansion of the radar-based vessel traffic service (VTS) system — dubbed VTS 2000 — is a project which was recently analyzed by the U.S. General Accounting Office (GAO). The GAO found that support for the VTS 2000 project was not widespread, with objections mainly limited to the cost/benefit ratio of the system to a particular port. Most opposed user fees or other funding approaches that would pass the cost of VTS 2000 from the federal government to those using the system. While the debate will continue, the GAO does report that the port of New Orleans would be a big benefactor of the technology. The estimated net benefit of installing a VTS in this location is \$253.7 million (see Table 1).

Age-Old Battle: Safety vs. Cost

The cost to implement the VTS 2000 project is estimated between \$260 to \$310 million, with about \$42 million in federal funds for operation each year if, as planned, VTS is installed at 17 locations. At present, the USCG plans to pay these costs from its budget, and not pass them on to local ports or users (i.e. shipping companies).

System development is broken down into many areas, including: software development; system design; system testing; contracting; construction of land based support facilities; and system engineering.

The GAO's investigation centered on eight of 17 potential ports which are considered candidates for VTS. It is worthy of mention, however, that development of VTS 2000 has not proceeded to the point where a great deal of site-specific information is available. In fact, the USCG does not plan to determine how many of the 17 ports under consideration should operate VTS 2000 systems until fiscal year 2000, and development plans have not reached the stage where specific components have been selected for any port.

In addition, most of the shipping industry professionals in the ports targeted by the GAO said they had lacked any involvement to date with the VTS 2000 program, although the USCG is expected to work more closely with these stakeholders as more specifics emerge.

However, at the four ports where VTS systems already exist (Houston/Galveston, Los Angeles/

Long Beach, Philadelphia/Delaware Bay and San Francisco), most key stakeholders said that the existing systems were sufficient and were needed. At two of the ports, users were already providing financial support. At the remaining two, stakeholders interviewed seemed willing to fund

some type of VTS operation if necessary to ensure that VTS coverage continues.

Several key issues will have an effect, it seems, on the establishment of privately funded or privately operated VTS systems. The GAO found that these include the private sector's ability to fund the initial start-up costs of such a system, the private sector's exposure to liability, and the USCG's role in planning and overseeing a privately funded system.

VTS

A VTS system is one of several methods for improving navigational safety and protecting the marine environment. A VTS system helps

determine the presence of vessels in and around ports, and provides information to vessels such as: traffic; tides; weather conditions; and port emergencies. Other safety measures include training vessel operators, improving navigational aides (such as buoys and markers), dredging wider, deeper channels and inspecting vessels.

Under authority of the Ports and Waterways Safety Act of 1972, as amended, the USCG operates VTS systems in eight ports in the U.S. Operation and maintenance costs for these systems totaled about \$19 million in 1995, and the costs were borne by the USCG.

To better analyze the need for VTS, a *Port Needs Study* was conducted, and two sets of locations as possible candidates for VTS were ascertained (see Table 1).

Of the 15 ports analyzed, it was shown that 10 would enjoy a net benefit from a new or improved VTS system in 15 years. The

(Continued on page 123)

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U.S. PORTS • TONNAGE ANALYSIS

Tonnage for Selected U.S. Ports in 1994 by Total Tons

Port	Total	Foreign	Imports	Exports	Domestic	Port	Total	Foreign	Imports	Exports	Domestic
South Louisiana, LA, Port	184,855,712	86,506,707	30,085,083	56,421,624	98,349,005	Lorain, OH	14,748,165	69,914	69,914	0	14,678,251
Houston, TX	143,662,625	80,153,848	54,856,552	25,297,296	63,508,777	New Castle, DE	14,738,190	8,648,981	8,633,939	15,042	6,089,209
New York, NY and NJ	126,100,614	49,209,267	41,530,540	7,678,727	76,891,347	Portland, ME	14,245,338	12,659,109	12,555,677	103,432	1,586,229
Baton Rouge, LA	86,245,856	41,599,547	31,353,898	10,245,649	44,646,309	Toledo, OH	13,203,884	5,777,497	1,480,830	4,296,667	7,426,387
Valdez, AK	85,096,176	22,032	1	22,031	85,074,144	Cincinnati, OH	13,192,767	0	0	0	13,192,767
Corpus Christi, TX	78,138,462	53,602,666	47,364,665	6,238,001	24,535,796	Anacortes, WA	12,950,108	2,260,456	796,384	1,464,072	10,689,652
New Orleans, LA	73,332,939	35,627,157	20,494,075	15,133,082	37,705,782	Oakland, CA	12,914,086	10,427,296	4,924,275	5,503,021	2,486,790
Plaquemine LA, Port of	64,758,624	20,775,332	8,915,554	11,859,778	43,983,292	Honolulu, HI	11,672,245	1,757,092	1,455,988	301,104	9,915,153
Long Beach, CA	56,522,167	32,957,732	16,247,256	16,710,476	23,564,435	Charleston, SC	10,829,846	6,924,970	2,748,073	4,176,897	3,904,876
Tampa, FL	51,902,190	20,445,419	6,296,725	14,148,694	31,456,771	Ashtabula, OH	10,368,499	3,064,438	676,986	2,387,452	7,304,061
Pittsburgh, PA	49,056,218	0	0	0	49,056,218	Galveston, TX	10,256,921	5,914,095	3,122,448	2,791,647	4,342,826
Lake Charles, LA	48,331,277	27,699,122	22,643,525	5,055,597	20,632,155	Presque Isle, MI	10,191,125	1,921,093	0	1,921,093	8,270,032
Norfolk Harbor, VA	45,773,648	35,540,864	5,097,656	30,443,208	10,232,784	Taconite, MN	9,510,156	0	0	0	9,510,156
Port Arthur, TX	45,586,136	39,392,184	34,297,737	5,094,447	6,193,952	New Haven, CT	9,470,882	3,037,716	2,843,158	194,558	6,433,166
Mobile, AL	44,996,849	20,515,941	10,657,196	9,858,745	24,480,908	Burn Waterway Harbor, IN	9,343,881	1,985,125	1,912,099	73,026	7,358,756
Texas City, TX	44,350,803	24,562,647	23,734,256	828,391	19,788,156	Louisville, KY	9,320,437	0	0	0	9,320,437
Los Angeles, CA	43,139,632	25,577,574	13,897,659	11,679,915	17,562,058	Two Harbors, MN	9,288,029	0	0	0	9,288,029
Duluth Superior, MN&WI	41,819,417	9,435,062	2,045,208	7,389,854	32,384,355	Mount Vernon, IN	9,287,779	0	0	0	9,287,779
Baltimore, MD	41,450,422	26,275,053	15,348,901	10,926,152	15,175,369	Barbers Point, Oahu, HI	9,022,040	5,053,212	4,254,661	798,551	3,968,828
Philadelphia, PA	40,745,690	26,446,627	25,965,989	480,638	14,299,063	Gary, IN	8,765,065	165,983	165,983	0	8,599,082
Marcus Hook, PA	30,420,459	16,574,510	16,496,857	77,653	13,845,949	Stonport, MI	8,415,775	999,797	0	999,797	7,415,978
Portland, OR	30,164,479	17,429,605	3,373,503	14,056,102	12,734,874	Escanaba, MI	7,774,734	1	1	0	7,774,733
Pascagoula, MS	30,048,859	19,949,849	16,582,650	3,367,199	10,099,010	Wilmington, NC	7,697,282	3,781,942	2,707,674	1,074,268	5,915,340
Chicago, IL	29,421,566	3,924,099	3,687,546	236,553	25,497,467	Calite, MI	7,455,693	1,584,136	0	1,584,136	5,871,557
St. Louis, MO & IL	29,418,967	0	0	0	29,418,967	Metagorda Ship Chan, TX	7,379,628	5,211,218	4,925,456	285,762	2,168,410
Huntington, WV	25,629,485	0	0	0	25,629,485	Providence, RI	6,536,448	2,217,646	1,813,894	403,752	4,318,802
Paulsboro, NJ	24,667,782	13,780,611	13,710,006	70,605	10,887,171	Miami, FL	6,514,924	4,895,387	2,283,175	2,612,212	1,619,537
Richmond, CA	24,093,993	6,088,062	3,237,808	2,850,254	18,005,931	Longview, WA	6,441,798	5,139,163	547,698	4,591,465	3,330,961
Seattle, WA	22,335,514	15,541,768	7,483,433	8,058,335	6,793,746	Vancouver, WA	6,280,927	4,608,954	715,863	3,893,091	1,671,973
Beaumont, TX	21,200,684	7,331,442	5,698,874	1,632,568	13,864,242	Albany, NY	6,106,744	1,502,989	1,218,602	284,387	4,603,755
Jacksonville, FL	18,910,150	8,439,994	6,871,504	1,568,490	10,470,156	St. Clair, MI	5,886,656	38,032	17,203	20,829	5,848,624
Boston, MA	18,869,586	9,798,118	9,152,923	645,195	9,071,468	Camden-Gloucester, NJ	5,668,842	3,091,474	2,319,251	772,223	2,577,368
Detroit, MI	18,718,014	6,014,250	5,494,396	519,854	12,703,764	Conneaut, OH	5,654,746	2,323,785	30,916	2,292,869	3,330,961
Port Everglades, FL	18,135,257	6,668,700	5,399,378	1,269,322	11,466,557	Sandusky, OH	5,421,549	3,248,963	31,195	3,217,768	2,172,586
Tacoma, WA	17,615,819	11,310,327	4,240,597	7,069,730	6,305,492	Kalamazoo, MI	5,351,115	4,313,077	23,130	4,289,947	1,038,038
Freeport, TX	17,450,109	12,533,024	10,809,458	1,723,566	4,917,085	Vicksburg, MS	5,107,967	0	0	0	5,107,967
San Juan, PR	16,299,654	6,108,990	5,376,486	732,504	10,190,664	St. Paul, MN	4,881,224	0	0	0	4,881,224
Indiana Harbor, IN	16,144,862	405,893	399,933	5,960	15,738,969	Port Inland, MI	4,739,728	126,041	0	126,041	4,613,687
Savannah, GA	15,904,910	12,772,183	6,254,094	6,518,089	3,132,727	Victoria, TX	4,566,571	0	0	0	4,566,571
Memphis, TN	15,679,999	0	0	0	15,679,999	Wilmington, DE	4,503,345	3,842,932	3,391,199	451,733	660,413
Newport News, VA	15,671,052	10,676,531	935,963	9,740,568	4,994,521	Silver Bay, MN	4,428,009	0	0	0	4,428,009
Cleveland, OH	15,284,407	3,056,209	2,739,956	316,253	12,228,198	Nikishko, AK	4,326,326	1,278,225	1	1,278,224	3,048,101

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U.S. PORTS • TONNAGE ANALYSIS

Tonnage for Selected U.S. Ports in 1994 by Total Tons

Port	Total	Foreign	Imports	Exports	Domestic	Port	Total	Foreign	Imports	Exports	Domestic
Everett, WA	4,191,656	1,159,641	325,458	834,183	3,032,015	Grays Harbor, WA	1,654,408	1,489,606	2,443	1,487,163	164,802
Fall River, MA	4,178,036	584,668	572,366	12,302	3,593,368	Brunswick, GA	1,626,173	1,423,309	862,165	561,144	202,864
Morehead City, NC	4,144,302	2,367,297	512,572	1,854,725	1,777,005	Stockton, CA	1,608,871	1,444,530	642,939	801,591	164,341
Nashville, TN	3,832,566	0	0	0	3,832,566	Biloxi, MS	1,607,458	0	0	0	1,607,458
Cross Bay, OR	3,743,963	3,532,228	46,531	3,485,697	211,735	Chester, PA	1,555,167	968,437	802,203	166,234	586,730
Port Canaveral, FL	3,623,090	1,324,369	944,683	379,686	2,298,721	Charlevoix, MI	1,549,372	79,383	0	79,383	1,469,989
Marine City, MI	3,572,209	0	0	0	3,572,209	Sacramento, CA	1,544,605	1,207,591	226,700	980,891	337,014
Portsmouth, NH	3,479,010	2,938,743	2,591,063	347,680	540,267	Christiansted, St. Croix, VI	1,543,463	1,346,994	1,286,660	60,334	196,469
Brownsville, TX	3,395,961	2,123,806	2,108,483	15,323	1,272,155	Olympia, WA	1,514,000	82,607	0	82,607	1,431,393
Port Dalmore, MI	3,252,975	337,933	45,406	292,527	2,915,042	Drummond Island, MI	1,473,523	196,604	0	196,604	1,276,919
Bridgeport, CT	3,053,626	497,665	489,683	7,982	2,555,961	Pensacola, FL	1,465,965	320,541	18,769	301,772	1,145,424
Fairport Harbor, OH	2,954,667	233,948	0	233,948	2,720,719	Hilo, HI	1,455,485	93,112	86,340	6,772	1,362,373
Palm Beach, FL	2,882,844	1,026,471	453,473	572,998	1,856,373	Humboldt, CA	1,407,374	712,013	23,035	688,978	695,361
Kansas City, MO	2,815,882	0	0	0	2,815,882	Astoria, OR	1,354,282	1,215,270	99,317	1,115,953	139,012
Marblehead, OH	2,790,392	100,090	0	100,090	2,690,302	Bellingham, WA	1,343,181	716,925	138,561	578,364	626,256
Alpena, MI	2,672,477	119,179	6,089	113,090	2,553,298	Minneapolis, MN	1,239,856	0	0	0	1,239,856
Chattanooga, TN	2,661,025	0	0	0	2,661,025	Bucksport, ME	1,231,946	870,824	870,817	7	361,122
Guntersville, AL	2,652,783	0	0	0	2,652,783	Salem, MA	1,227,099	907,943	907,803	140	319,156
Milwaukee, WI	2,641,109	1,077,077	933,432	143,645	1,564,032	Marysville, MI	1,174,704	205,585	182,133	23,452	969,119
Anchorage, AK	2,559,391	849,818	316,350	533,468	1,709,573	San Diego, CA	1,166,900	904,696	304,663	600,033	262,204
Panama City, FL	2,502,984	588,216	58,036	530,180	1,914,768	Honolulu, HI	1,150,924	111,789	111,789	0	1,139,135
Greenville, MS	2,429,742	0	0	0	2,429,742	Searsport, ME	1,136,068	940,658	827,882	112,776	195,410
Kahului, Maui, HI	2,368,065	28,756	28,214	542	2,339,309	Richmond, VA	1,133,970	562,543	279,706	282,837	571,427
Green Bay, WI	2,288,056	239,617	196,609	43,008	2,048,439	Stamford, CT	1,115,561	0	0	0	1,115,561
Port Jefferson, NY	2,100,897	0	0	0	2,100,897	Buffington, IN	1,097,306	60,876	0	60,876	1,036,430
Monroe, MI	2,034,815	0	0	0	2,034,815	Ludington, MI	1,093,469	41,753	30,661	11,092	1,051,716
Muskegon, MI	2,004,423	207,927	177,671	30,256	1,796,496	Charlotte, FL	1,045,126	0	0	0	1,045,126
Helena, AR	1,989,408	0	0	0	1,989,408	Erie, PA	978,776	132,414	132,155	259	846,362
Tulsa, Port Catoosa, OK	1,895,781	0	0	0	1,895,781	Seward, AK	960,874	892,434	36,806	855,628	68,440
Gulfport, MS	1,842,149	1,674,983	1,140,102	534,881	167,166	Hempstead, NY	916,319	0	0	0	916,319
Ketchikan, AK	1,759,074	641,307	15,628	625,679	1,117,767	Hopewell, VA	916,077	148,014	7,923	140,091	768,063
San Francisco, CA	1,738,572	1,230,742	562,086	668,656	507,830	Grand Haven, MI	878,412	91,351	7,540	83,811	787,061
Port Angeles, WA	1,695,048	778,410	128,488	649,922	916,638						
Buffalo, NY	1,685,139	467,853	408,360	59,493	1,217,286						

Source: Waterborne Commerce Statistics Center

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Maritime Reporter/Engineering News

U.S. PORTS REPORT

study's data indicates that over the first 15 years after a switch to a new system, there may be little marginal net benefit in making the conversion at any of the ports with existing radar-based VTS systems.

The USCG developed an initial proposal in FY '93 to address the *Port Needs Study*. The USCG said that the expanded or enhanced use of VTS systems would reduce the risk of maritime accidents and support other USCG activities, including national defense and law enforcement. Through greater automation of vessel traffic data under VTS 2000, the USCG also expects to be able to more efficiently carry out its waterway management responsibilities.

Procuring The System

The initial development phase will cost \$69 million, and is scheduled for completion in 1999. If all phases are implemented, they are scheduled for completion in FY '04.

The USCG, which is in the early stages of acquisition, plans to select a single systems integration contractor for the project by the first fiscal quarter of FY '97. The contractor will develop computer software, procure hardware (radar, closed circuit television and radios), integrate these components of the system and determine what type of VTS 2000 equipment will be installed at each port. The USCG estimates that the contractor will be needed through the year 2006 if systems are installed in all 17 locations.

Starting in 1998, the USCG plans to install the first system in New Orleans and Los Angeles/Long Beach. Starting in 2000, it plans to install the system

in Port Arthur/Lake Charles, Houston/Galveston and Corpus Christi. (Note: While final decisions on VTS have not been made, these five ports were identified as having the highest priority.)

The key to the ultimate scope and timeline of implementation of the VTS 2000 program hinges on an ongoing study. Last June, several federal agencies — including the USCG, the Advanced Research Projects Administration, the Maritime Administration and the National Oceanic and Atmospheric Association — commissioned a study by the Marine Board of the National Research Council to assess the implementation of advanced information systems for maritime commerce. Among other things, the Marine Board will address the role of the public and private sectors in developing and operating VTS systems, and will examine user fees and trust funds as possible funding sources. The interim report is due out this month, and the USCG plans to use the report in decisions on the VTS 2000 project.

In its conclusion, the GAO admitted that there is an acknowledged need to improve waterway safety. At the same time, it mandates that difficult choices need to be made, and important questions need to be answered, such as: how many ports need the system; how much will it cost; and if there are more cost-effective solutions available. GAO suggests that the USCG immediately open lines of communications with key stakeholders at the ports under consideration for VTS 2000, as a means of both gathering support and/or developing possible alternatives.

TABLE 1

A *Port Needs Study* was recently conducted and printed in conjunction with GAO's investigation into the proposed USCG VTS 2000 system implementation. Partial results are shown in the following table. (Dollars in millions)

Location	Existing VTS/ operator	New benefit of installing	Less net benefit of existing system	Marginal net benefit
Locations Identified For Initial Consideration				
New Orleans ^a	N	\$253.7	\$0	\$253.7
Pt. Arthur, Texas, Lake Charles, La. ^{a, b}	N	\$92.4	\$0	\$92.4
Houston/Galveston, Texas	Y (USCG) ^a	\$61	\$57	\$3
Mobile, Ala./Pascagoula, Miss. ^a	N	\$48.1	\$0	\$48.1
Los Angeles/Long Beach, Calif. ^a	Y (private)	\$42.8	\$45.8	-\$3
Corpus Christi, Texas	Y (private ^c)	\$26.1	\$11	\$15.1
Boston	N	\$15.1	\$0	\$15.1
Other Locations Identified For Consideration				
New York	Y (USCG)	\$9	\$3.7	\$5.3
Tampa, Fla. ^a	N	\$5.2	\$0	\$5.2
Portland, Ore.	N	\$2.2	\$0	\$2.2
Philadelphia/Delaware Bay ^a	Y (private)	\$2.2	\$6.7	-\$4.5
Baltimore	Y (private ^d)	-\$1.7	\$1.4	-\$3.1
Providence, R.I.	N	-\$2	\$0	-\$2
Long Island Sound, N.Y.	N	\$2.3	\$0	\$2.3
Puget Sound, Wash.	Y (USCG)	-\$4	-\$12.2	\$8.2

^a Indicates port visited by GAO.

^b Port Arthur/Lake Charles has a radio-based system, but the system was not considered in the *Port Needs Study* analysis.

^c Corpus Christi has a radio-based harbormaster system that does not use radar.

^d Baltimore has a non-radar, radio-based system operated by the local pilots' association.

Source: GAO

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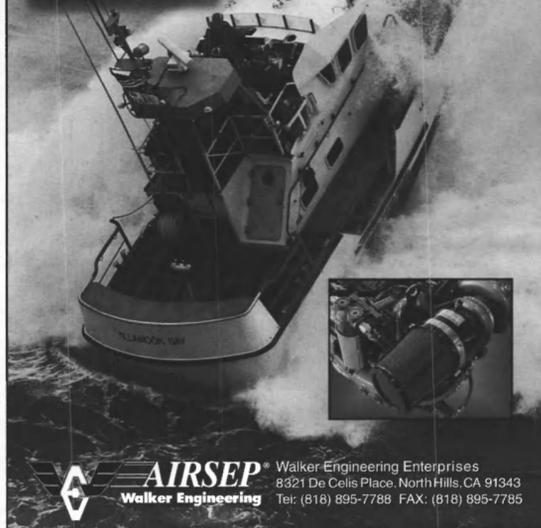
Source: Maritime Reporter & Engineering News

SHIPYARD	SHIP NAME	SHIPOWNER	DIMENSIONS (M)	ENGINE(S)	PRICE (\$)	DELIV.
SHIP TYPE			L x W x D			
Flender Werft AG, Lubeck, Germany						
Container 2000 TEU	—	Claus-Peter Offen	182.2 29.8 15.6	MAN B&W	—	11/96
Container 2000 TEU	—	Claus-Peter Offen	182.2 29.8 15.6	MAN B&W	—	3/97
Container 2000 TEU	—	Claus-Peter Offen	182.2 29.8 15.6	MAN B&W	—	8/97
Container 2000 TEU	—	Claus-Peter Offen	182.2 29.8 15.6	MAN B&W	—	12/97
Freeport Shipbuilding, Freeport, Fla.						
Motor tender	Tennessee	U.S. Army Corps	15.2 5.5 1.6	Caterpillar	—	6/96
Riverboat	—	AMI	72.5 22 1.8	Cummins	—	—
Asphalt barge	WEB 215	Blessy Marine	91.4 16.5 4	Detroit Diesel	—	9/96
Asphalt barge	WEB 216	Blessy Marine	91.4 16.5 4	Detroit Diesel	—	9/96
Gladding-Hearn, Somerset, Mass.						
Rescue/patrol	—	NYC Police Dept.	11 4 1.1	Caterpillar	—	—
Pilot boat	—	VA Pilots Assoc.	15.5 5.2 1.4	DDEC	—	7/96
Ferry	Friendship V	Bar Harbor	34 9.4 1.2	DDEC	—	6/96
Ferry	—	Whale Watch	24.5 6.4 .9	DDEC	—	6/96
Ferry	—	Sayville Ferry Service	28.3 8.5 .9	DDEC	—	1/96
Guangzhou Wanchong Shipyard, Guangzhou, China						
(4) 1200 TEU Containership	—	L&B Shipping GmbH	170 24.8 14.2	MAN B&W	—	6/98
P/O tanker	—	Singapore Fonds	118 17.6 8.4	MAN B&W	—	3/96

SHIPYARD	SHIP NAME	SHIPOWNER	DIMENSIONS (M)	ENGINE(S)	PRICE (\$)	DELIV.
SHIP TYPE			L x W x D			
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HDW, Kiel, Germany						
Containership	—	Zim	253.2 32.2 11.8	Salzer	—	5/96
Containership	—	Zim	253.2 32.2 11.8	Salzer	—	12/96
Containership	—	Zim	253.2 32.2 11.8	Salzer	—	2/97
Containership	—	Zim	253.2 32.2 11.8	Salzer	—	4/97
Containership	—	Zim	253.2 32.2 11.8	Salzer	—	6/97
Containership	—	Zim	253.2 32.2 11.8	Salzer	—	9/97
Containership	—	Zim	253.2 32.2 11.8	Salzer	—	11/97
Cruise ship	Deutschland	P. Deilmann	194.8 23 5.8	MaK	—	5/98
Incat, Hobart Shipyard, Australia						
Wave piercing catamaran	Stena Seolynx III	Dal Bona SA	81.2 26 3	Ruston	—	6/96
Wave piercing catamaran	Hull 041	Dal Bona SA	81.2 26 3	Ruston	—	7/96
Wave piercing catamaran	Hull 042	Condor Pty. Ltd.	86.3 26 3.5	Ruston	—	10/96
Wave piercing catamaran	Hull 043	—	86.3 26 3.5	Ruston	—	12/96
Industrias Verolme-Ishlra SA						
Multi-purpose	Frotasmas	Frota Oceania	158.3 27.8 13.5	MAN B&W	56	6/96
Panamax bulker	Belgrano	Hamburg SUD	215 32.2 18.3	Salzer	32	10/96
Panamax bulker	Babilonga	Hamburg SUD	215 32.2 18.3	Salzer	32	1/97
Panamax bulker	Blumenau	Hamburg SUD	215 32.2 18.3	Salzer	32	4/97

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Maritime Reporter/Engineering News



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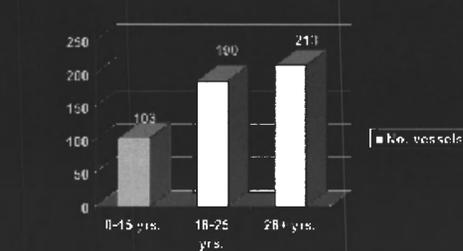
 Member Steel Service Center Institute

Ships On Order

Source: Maritime Reporter & Engineering News

SHIPYARD	SHIP TYPE	SHIP NAME	SHIPOWNER	DIMENSIONS (M) L x W x D	ENGINE(S)	PRICE (\$)	DELIV.
JelfBoat, Jeffersonville, Ind.							
	Towboat	—	Crouse Corp.	36.6 10.3 3.2	EMD	—	7/96
	Towboat	—	Crouse Corp.	36.6 10.3 3.2	EMD	—	9/96
Kvaerner Masa-Yards							
Turku New Shipyard							
	LNG carrier	Yard No. 1331	ADNOC	289 275 48.1	Steam turbine	—	6/96
	LNG carrier	Yard No. 1332	ADNOC	289 275 48.1	Steam turbine	—	1/97
	LNG carrier	Yard No. 1333	ADNOC	289 275 48.1	Steam turbine	—	5/97
	Cruise ship	Yard No. 1337	Deutsche Seereederei	193 27.6 —	Wartsila	—	6/96
	Cable ship	Yard No. 1322	International	131.4 21.8 —	Wartsila	—	1997
	FP50	Yard No. 1339	Norsk Hydro	229 41.5 —	—	—	1997
Helsinki New Shipyard							
	Cruise ship	Yard No. 492	RCLL	279.1 — 32.2	MAN	—	11/96
	Cruise ship	Yard No. 493	RCLL	279.1 — 32.2	MAN	—	9/97
	Cruise ship	Yard No. 491	CCL	260.6 36 31.5	Wartsila	—	1998
	Cruise ship	Yard No. 494	CCL	260.6 36 31.5	Wartsila	—	1998
Kvaerner Kleven, Flere, Norway							
	Oil/product tanker	Yard No. 255	—	129.1 18 10.4	—	—	6/96
	Chemical tanker	Yard No. 263	—	142.2 22.8 13	—	—	9/97
	Hurigruten	Yard No. 266	—	123.3 19.5 4.7	—	—	2/97
	Trawler	Yard No. 268	—	54.2 12.6 5.3	—	—	9/96
Leroux of Lutz, Naval, France							
	Passenger ferry	Andre Colin	Penn An Bed	35 7	Deutz MWM	—	7/96
	Patrol vessel	Rois Charkoui	Moroccan Navy	64 11.4	Wartsila Mahab	—	10/96
	Offshore patrol vessel	—	Moroccan Government	64 11.4	Wartsila Mahab	—	4/97
	Offshore patrol vessel	—	Moroccan Government	64 11.4	Wartsila Mahab	—	10/97
	Fast ferry	NGV Arco No. 2	SMCM	102 15 2.4	MTU	—	7/96
	Cargo Vessel	—	Moroccan Government	69 11.5 4.2	Wartsila	—	10/97
Lindenaу GmbH, Kiel, Germany							
	Oil tanker	—	Butcher Bremen	177.7 28 16.8	MAN	—	9/96
	Chemical tanker	—	Merichem Europe	120 24 12.3	—	—	9/97
Meyer Werh, Papenburg, Germany							
	Cruise ship	Galaxy	Calability Cruises	259.7 32.2 7.7	37,130 kW	—	1996
	Cruise ship	Mercury	Calability Cruises	259.7 32.2 7.7	37,130 kW	—	1997
	Cruise ship	Superstar Leo	Ster Cruises	268 32.3 7.9	50,400 kW	—	1998
	Cruise ship	Superstar Virgo	Ster Cruises	268 32.3 7.9	50,400 kW	—	1998
	Passenger vessel	—	Indonesia	146.5 23.4 5.9	12,800 kW	—	1996
	Passenger vessel	—	Indonesia	146.5 23.4 5.9	12,800 kW	—	1997
	Passenger vessel	—	Indonesia	146.5 23.4 5.9	12,800 kW	—	1998
	Passenger vessel	—	Indonesia	146.5 23.4 5.9	12,800 kW	—	1998
NASSCO, San Diego, Calif.							
	Fast Sealift	USNS Yano	U.S. Govt.	276.4 32.3 27.4	—	—	11/96
	Fast Sealift	USNS Soderman	U.S. Govt.	276.4 32.3 27.4	—	—	9/97
	Fast Combat Spt.	USS Bridge	U.S. Govt.	229.7 32.6 20.3	gas turbine	—	3/98
	Naval Raika Logistics	—	U.S. Govt.	228.6 32.3 27.1	gas turbine	—	9/98
	Naval Raika Logistics	—	U.S. Govt.	228.6 32.3 27.1	gas turbine	—	4/99
	Naval Raika Logistics	—	U.S. Govt.	228.6 32.3 27.1	gas turbine	—	9/99
	Naval Raika Logistics	—	U.S. Govt.	228.6 32.3 27.1	gas turbine	—	3/00
Newport News Shipbuilding, Newport News, Va.							
	Product tanker	Despotico	Elebon	183 32.2 —	Man B&W	—	1997
	Product tanker	Agathonissos	Elebon	183 32.2 —	Man B&W	—	1997
	Product tanker	Makronissos	Elebon	183 32.2 —	Man B&W	—	1997

U.S. Merchant Fleet Age Profile (Private & Government owned)



Source: U.S. Maritime Administration

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SHIPYARD	SHIP TYPE	SHIP NAME	SHIPOWNER	DIMENSIONS (M)			ENGINE(S)	PRICE (\$)	DELIV.
				L	W	D			
Product tanker		Dhokas	Eleton	183	32.2	—	Man B&W	—	1998
Product tanker		—	Hvide/Van Ommeren	189	32	—	Man B&W	—	1998
Product tanker		—	Hvide/Van Ommeren	189	32	—	Man B&W	—	1998
Product tanker		—	Hvide/Van Ommeren	189	32	—	Man B&W	—	1998
Product tanker		—	Hvide/Van Ommeren	189	32	—	Man B&W	—	1998
Aircraft carrier		Harry S. Truman	U.S. Navy	333	41	33	—	—	1998
Aircraft carrier		Ronald Reagan	U.S. Navy	333	41	33	—	—	2002
Novel Cantieri Apuania, Marina di Carrara, Italy									
Chemical tanker		C. 1201	Finaval	178	29	15	Wartsila	—	3/97
Chemical tanker		C. 1203	Nov. Cab.	126.3	20	10	MaK	—	9/97
Cruise ferry		Excellent	Grandi Trag	176	26.8	9	Wartsila	—	4/98
Chemical tanker		C. 1204	Finaval	178	28	15	Wartsila	—	11/98
North Sea Shipyard Ltd., Ringkøbing, Denmark									
Paper carrier		—	Schiffahrtsge	100.2	15.3	8.5	MaK	—	1996
Car/passenger ferry		—	Andelsfærge	68.5	15.8	—	Alpha	—	1996
MPP Vessel		—	Rederiet Erik	—	—	—	—	—	—
		—	B. Kromann IS	88.4	15	7.5	MaK	—	1996
Orskovs Stalsk, Frederikshavn, Denmark									
LPG container		—	KWID Lansen	74	14	6	MaK	—	10/96
(2) Car/passenger ferry		—	DSB	136	25.4	20.7	MaK	—	5/97
		—	—	—	—	—	—	—	10/97
PT. DOK & Perkapalan Kodja Bahari, Jakarta, Indonesia									
Trailer & passenger vessel		Gotland	Ruderi AB	168	27.7	30	Sulzer	—	—
Chemical oil tanker		—	United Tanker AB	144	23	12.4	MAN B&W	—	—
LPG carrier		—	Tank Reederei	—	—	—	—	—	—
Reefer pallet vessel		—	Ahrenskiel GmbH	116	17.2	9.5	MAN B&W	—	—
		—	Saatrade Groningen	152.7	24	13.4	Sulzer	—	—
Schichau Seebeschwerft AG, Bremerhaven, Germany									
Railway vehicle/passenger ferry		Newbuild No. 1092	Deutsche Fahrgesell	200	28.2	14.4	—	—	12/96
RoRo ferry		Newbuild No. 1093	Osnes	160	25.8	14.2	—	—	7/97
RoRo ferry		Newbuild No. 1094	Tunisia	160	25.8	14.2	—	—	9/97
Service Marine Industries, Morgan City, La.									
Deck barge		—	Global Ind.	91.4	30.4	5.5	—	—	1996
Launch barge		—	Global Ind.	121.9	30.4	7.3	—	—	1997
Casino		—	Indiana Gaming	124.9	32.9	—	Detroit Diesel	—	1997
Deck barge		—	Canal Barge	54.8	16.4	3.6	—	—	1996
Deck barge		—	Canal Barge	54.8	16.4	3.6	—	—	1996
Supply boat		—	UDI	43.3	10.9	3.6	Detroit Diesel	—	1996

SHIPYARD	SHIP TYPE	SHIP NAME	SHIPOWNER	DIMENSIONS (M)			ENGINE(S)	PRICE (\$)	DELIV.
				L	W	D			
Stocznia, Odansk, Poland									
(4) Multi-purpose cargo		Hull Nos. B196-II/1 to B196-II/4	Briese-Schiffahrts	100.6	16.6	8.1	MAN	—	9/96 to 6/97
Multi-purpose cargo		Fortunia	MS Fortunia Schiffahrtsgesell	121.5	18.6	9.2	Sulzer	—	9/96
Thyssen Nordseewerke GmbH, Emden, Germany									
Containership		San Fernando	Claus-Peter Offen	27.4	13.2	9.5	Mitsubishi	—	8/96
Containership		San Felipe	Claus-Peter Offen	27.4	13.2	9.5	Mitsubishi	—	12/96
Containership		Fresena	Maritime	27.4	13.5	9.9	Mitsubishi	—	3/97
Containership		Faducia	Maritime	27.4	13.5	9.9	Mitsubishi	—	3/97
Containership		Pembroke Senator	Reverel F. Loiez	29.8	16.5	11.5	Mitsubishi	—	12/97
3. MAJ, Rijeka, Croatia									
Containership		Jadruglov Pride	Scorpio Maritime	201.4	32.24	18.7	Sulzer	37	8/96
Product tanker		Timashevsk	Novoship	173.8	32	17	Sulzer	30.6	9/96
Product tanker		Tula	Novoship	173.8	32	17	Sulzer	30.6	12/96
Multi-purpose vessel		—	Chipabrook	169.8	27.5	13.8	Sulzer	27	6/97
Multi-purpose vessel		—	Chipabrook	169.8	27.5	13.8	Sulzer	27	12/97
Multi-purpose vessel		—	Chipabrook	169.8	27.5	13.8	Sulzer	27	3/98
Shipyard Trogir, Trogir, Croatia									
—		Tver	Novorossiysk	—	—	—	—	—	10/96
—		Hull No. 220	Novorossiysk	—	—	—	—	—	3/97
—		Hull No. 229	Valley Shipping Co.	—	—	—	—	—	1/98
—		Hull No. 230	Vardo Shipping Co.	—	—	—	—	—	8/98
—		Hull No. 232	Vardo Shipping Co.	—	—	—	—	—	4/98
—		Hull No. 233	Voldo Shipping Co.	—	—	—	—	—	1/98
—		Hull No. 234	Vygo Shipping Co.	—	—	—	—	—	6/98
Varna Shipyard, Varna, Bulgaria									
Multi-purpose		Hull No. 283	Blumarine	113.8	20.9	10.4	MAN B&W	—	10/96
Multi-purpose		Hull No. 284	Gemarin SA	113.8	20.9	10.4	MAN B&W	—	12/96
Bulker		Hull No. 505	Achtundzwanzigste	177	30	16.2	MAN B&W	—	7/96
Bulker		Hull No. 506	Dreisigste	177	30	16.2	MAN B&W	—	11/96
Bulker		Hull No. 507	Polish Steamship Co.	177	30	16.2	MAN B&W	—	6/97
Bulker		Hull No. 508	Polish Steamship Co.	177	30	16.2	MAN B&W	—	1/98
Bulker		Hull No. 711	Kom Maritime Ltd.	133	22.2	11.1	MAN B&W	—	3/97
Bulker		Hull No. 712	Bogdan Maritime	133	22.2	11.1	MAN B&W	—	6/97
Bulker		Hull No. 713	Perik Maritime	133	22.2	11.1	MAN B&W	—	9/97
Bulker		Hull No. 714	Persek Maritime	133	22.2	11.1	MAN B&W	—	11/97
Bulker		Hull No. 455	Tzarevets Maritime	159	25	11.5	MAN B&W	—	12/97
Bulker		Hull No. 456	Trapezitsa Maritime	159	25	11.5	MAN B&W	—	3/98
Wavemaster Int'l., Henderson, W.A., Australia									
(2) Catamaran car ferry		Yard No. 134, 135	Vallaj 8	44	12	—	MTU	7.5	12/96
Pax-catamaran ferry		Yard No. 140	Follers Group	41	12	—	MWM	5.8	11/96
(4) Pax-monohull ferry		Yard No. 141-144	Seafly Ferry Svc.	28.5	6.2	—	MTU	3	10/96
		—	—	—	—	—	—	—	8, 1/97
Pax-catamaran ferry		Yard No. 139	Ezaki Kisen	24	7.8	2.5	MTU	2.5	11/96
Atlantic Marine, Jacksonville, Fla.									
Casino vessel		—	Showboat Marino Casino	118	23	3.5	Caterpillar	—	11/96

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SNAME/SSC To Hold Ninth Symposium

On November 18-20, 1996, the Society of Naval Architects and Marine Engineers (SNAME) and interagency Ship Structure Committee (SSC) will co-sponsor a joint symposium called *Human and Organizational Error in Marine Structures: A Quest for*

Quality in Design, Construction and Maintenance. The symposium is scheduled to be held at the Sheraton National Hotel in Arlington, Va.

As in the past, the symposium is intended to provide a wide sampling of recent research in the field of ship structures, much of which has been sponsored by SSC and SNAME. Topics of the papers to be presented include safety and risk

management, inspection and operations, quality and reliability, and case studies on errors in marine structures. These papers will reportedly provide the field with readily usable tools for improving productivity and safety.

This is the ninth such symposium cooperatively sponsored by the Hull Structure Committee of SNAME and SSC. The SSC member agencies include the American

Bureau of Shipping, Defence Research Establishment Atlantic (Canadian National Defence), the Maritime Administration, the Military Sealift Command, Naval Sea Systems Command, Transport Canada and the U.S. Coast Guard.

For registration materials
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Enviro Response Introduces Fuel Mag To U.S. Market

De-Bug USA, a division of Enviro Response Products, Inc., which manufactures and markets Magnetic Fuel Conditioners (MFCs), has signed a distribution agreement with Fuel Mag International of New Zealand to be the exclusive North and South American distributor for the Fuel Mag line of fuel decontamination devices. The new products represent the next generation of MFCs, and will reportedly enhance the company's existing line of fuel decontamination units currently marketed to commercial, military and recreational marine markets, as well as trucking and transportation markets to eliminate the problem of microbial contamination in diesel fuel in storage tanks and engine applications. The initial unit in the series is the LG-X400, designed for installation in engines of up to 400 hp with fuel line sizes of 1/4, 3/8 and 1/2, and fuel flow rates of up to 90 gallons per hour.

For more information
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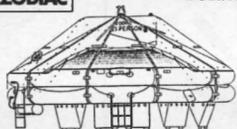
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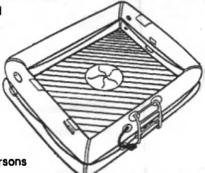
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ERL Offers Equipment Guide

ERL Marine Products, New Albany, Ind., manufacturer of liquid level gauges, sight glasses, P-V valves and related vapor equipment for tank barges, is offering a 160-page tank barge equipment guide. The ERL catalog includes excerpts from the Code of Federal Regulations, as well as vessel equipment installation diagrams and photographs. Also included is information on liquid cargo grades, conversion factors, a comprehensive glossary and a pictorial index.

For a copy of the ERL catalog
Circle 75 on Reader Service Card

William Drury Introduces Damage Control Kit

The William Drury Company, located in Tacoma, Wash., has introduced a damage control kit for commercial vessels. The unit provides readily available and easily transportable equipment for assisting repair crews in emergency situations. When a valve blows, a pipe springs a leak or something breaks, this kit can reportedly assist in making temporary repairs and possibly save vessels from total disaster.

For more information
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Maritime Reporter/Engineering News



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Buried Treasure



Motorized Pulleys "Pull Weight" In Round-The-Clock Ocean Mining Operation

Company finds design causes less downtime & maintenance

"In the mining business, profitability is directly related to the ability to maintain peak production without interruptions and delays attributed to inefficient operating equipment and problematic downtime," said **Butch Ochs**, Purchasing and Materials manager for Marcona Ocean Industries Ltd., Longwood, Fla. He said that at the company's Ocean Cay site, profitability was improved by using self-contained, motorized pulleys that are virtually maintenance-free.

"The changeover to motorized pulley conveyor drives, on two bulk material handling conveyors on one of our hopper barges, is just the first step in what we hope to be a complete revamping and modernization of most, if not all, of our material handling belt conveyor drives."

Mr. Ochs discussed the switch to a motorized pulley conveyor drive system on one of three dredge barges used in the mining of aragonite from the ocean floor.

Two JOKI motorized pulleys, supplied by Interroll Corporation, replaced the conventional drive systems on belt conveyors used to offload the mineral during round-the-clock mining.

"The motorized pulleys, applied along with new style, self-contained, tail pulley take-ups, completely eliminate high-maintenance drive

motors, speed reducers, hydraulic take-up systems, couplings and external bearings -- plus all safety guards and other associated components. Our maintenance people love them, now that time-consuming belt tension adjustments and expensive drive maintenance are virtually eliminated," said Mr. Ochs.

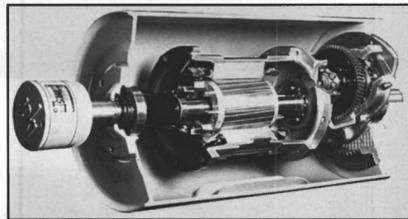
Mining The Marine Desert

Marcona Ocean Industries is a service and bulk transportation company with terminals in Fort Pierce, Fla.; Savannah, Ga.; and Perth Amboy, N.J.; and shipping services at Fort Pierce, Savannah and Ocean Cay. The Ocean Cay mine site is 50 miles off the U.S. mainland at Ft. Lauderdale, situated directly on the Gulf Stream.

An artificial island, Ocean Cay covers approximately 90 acres and houses a workforce of approximately 100, mostly Bahamian workers. With the exception of food and fresh water, the island is, for the most part, self-sufficient. The aragonite mining scheme basically consists of dredging with a cutterhead suction dredge, screening, stockpiling and recovery. At Ocean Cay, oceangoing vessels are loaded at rates of up to 4,000 tons per hour.

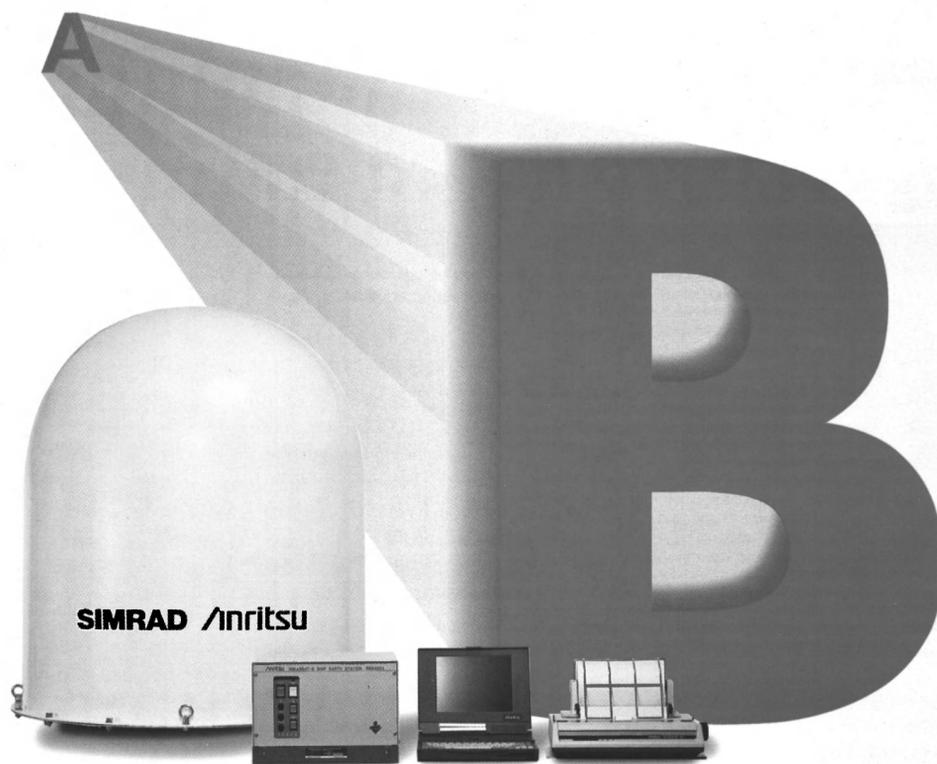
The Big Payoff

Aragonite, dubbed the white gold of the Bahamas, is a naturally occurring mineral, precipitated from ocean water when the saturation of calcium carbonate in cold water interacts with the warm waters of the Gulf Stream. This Bahamian deposit of calcium carbonate has been roughly quantified as totaling 100 billion tons.



The model TM633 JOKI motorized pulley at Marcona's site is 25-in. in diameter, with a 45-in. face width and 60-hp output, operating at 600-ft. per minute belt speeds. The self-contained unit reportedly has many advantages in terms of reliability and maintenance.

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Calcium carbonate is a vital resource for many industries. Aragonite is used in the manufacture of Portland cement, lime, steel and glass, as well as in animal feeds, construction aggregate, and in numerous agricultural applications.

The annual worldwide consumption is approximately two billion tons, with the U.S. accounting for nearly one-third of that total.

Nearly 100 percent pure, with only a small trace of other minerals present, aragonite grains are oolitic (egg-shaped), smooth, and near white in color. The substance is tasteless, odorless, non-polluting, dustless, non-toxic and easy to handle.

Its chemical purity, size consistency, and small grain structure provide numerous benefits to industrial users. It is also ASTM-

approved as a fine aggregate.

Hopper Barge Details

The motorized pulley conveyor drive hopper barge is one of three barges that shuttle between the Ocean Cay base and the ocean dredging site. Each barge can carry up to 1,500 tons of aragonite; on-loading and offloading takes approximately one hour. Powerful tugboats provide the motive power.

The 60-hp pulleys drive 42-in. wide, 450-ft. (137.2 m) long conveyor belts at speeds of up to 600 ft. (182.9 m) per minute. Mr. Ochs explains, "The conveyor equipment is always wet; often the pulleys are completely submerged."

The salt water environment is one of the most challenging in the mining industry. That's why we continually search for equipment that will eliminate components susceptible to rust and corrosion.

"One minor bearing or gear failure may shut down production for an extended period of time. All replacement components and parts must be located on the mainland, then flown in, to be installed by our maintenance people."

Now that the new motorized pulleys and the completely sealed take-ups have eliminated many exposed bearings and all exposed gears, life is a lot easier for maintenance crews."

Motorized Pulley Details

The electric motor and the gear drive are enclosed within the outer shell of the JOKI motorized conveyor pulley.

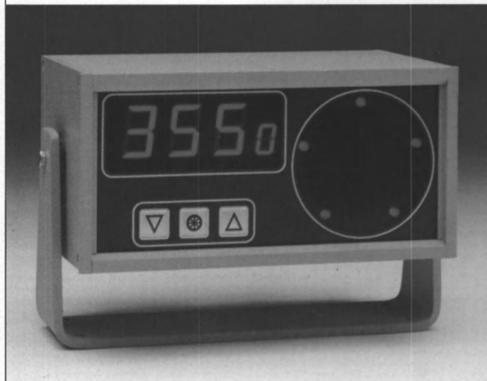
The motor shaft does not rotate. Power is transmitted to the outer shell through a geared ring which is fixed to the rotating member.

Since there are no external motors, gear reducers, sprockets or chains, OSHA chain guards are not required, hence operator safety is improved. All moving parts are enclosed within the pulley, which eliminates the need for continual adjustment and yearly maintenance.

The motor and gears run in a heretical sealed oil bath, which ensures that all moving parts are properly lubricated and cooled. Since synthetic oil is used, one oil change is recommended every 40,000 hours of operation, and this is accomplished without removing the JOKI motorized pulley from the conveyor. The JOKI pulley is available in a wide range of sizes, standard ratings and speeds -- with diameters from 8.5 to 31.5 in., and face widths from 10 to 94 in. Non-standard widths are also available. Drive motors are rated from 0.15-hp to 180-hp. Belt speeds range from 14 ft. (4.2 m) to 1,080 ft. (329.1 m) per minute.

For more information from Interroll
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Digital Gyro Repeaters



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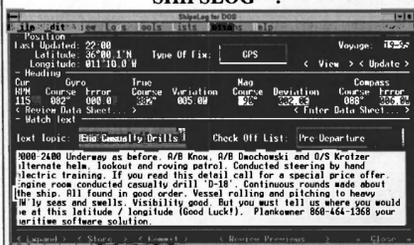
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Tracor Wins Navy Contract For Communications Systems Design

Tracor Applied Sciences, Inc., an Austin, Texas-based division of

Maritime Reporter/Engineering News

Tracor, Inc., has won a seven-year contract with a total potential value of \$38.7 million to provide engineering services for the design and installation of the radio communications system (RCS) for a new construction Nimitz class aircraft carrier, USS *Ronald Reagan* (CVN-76). The contract includes an option for retrofit of the same system onboard the *USS Nimitz* (CVN-68). Under the contract,

Tracor will perform total system design, integration and tests of CVN-76 RCS using a "design budget" approach developed by the U.S. Navy for the Arleigh Burke (DDG-51) class destroyers.

The latest Navy-approved equipment, fully integrated and tested in a test bed simulating the radio room of the aircraft carrier, will be delivered to the Navy for installation aboard the CVN.

According to **K. Bruce Hamilton**, president of Tracor Applied Sciences, "This contract is a major extension of our core business in communications system integration into a new class of surface combatants. The CVN is the fourth class of ship for which Tracor will deliver production communication suites."

Since 1978, the company has reportedly delivered RCS for 27

Aegis cruisers, 21 Aegis destroyers and six Taiwanese frigates.

Tracor is reportedly one of the 15 largest defense electronics firms in the U.S., and released sales figures totaling \$886.9 million for 1995.

For more information on Tracor Applied Sciences, Inc. Circle 104 on Reader Service Card

Stolt Comox And Azerbaijan State Oil Form Joint Venture

Stolt Comox Seaway S.A., a subsea contractor to the oil and gas industry based in Aberdeen, Scotland, has signed an agreement with the State Oil Company of Azerbaijan (SOCAR), a major oil and gas producer in the Caspian Sea, to form a joint venture company to provide subsea services to oil companies operating in the Azer and Caspian offshore areas.

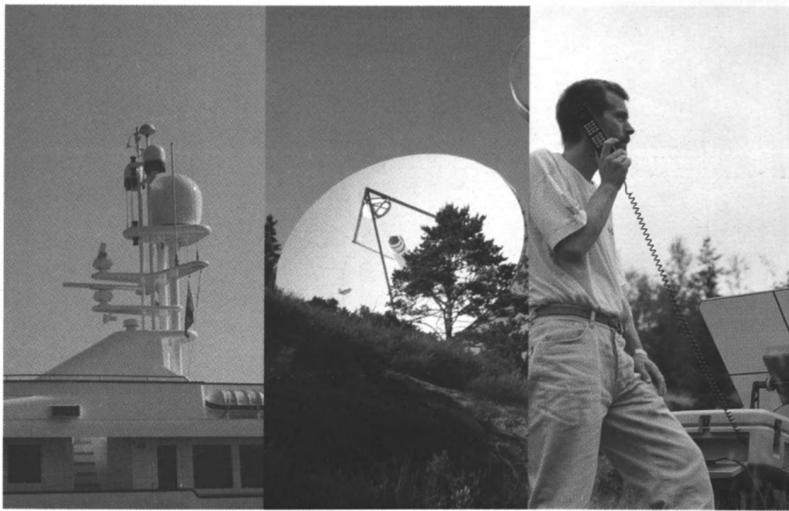
The joint venture company will reportedly be located in Baku, and will provide a number of services, specifically: assistance to drilling operations; subsea construction services related to pipeline installation and offshore field development; subsea inspection, maintenance and repair of offshore structures and pipelines; survey and positioning related to construction activities; small diameter flowline installation; and integrated subsea field development and subsea engineering.

Operations in Baku were scheduled to begin immediately, with the establishment of a training center for offshore personnel while the company promoted its services to local customers. Initially, the company will focus on the provision of services for the forthcoming drilling program in the Kaspomorneft, and offshore construction work related to the Bag 1 Early Oil project for the IOC consortium — a consortium of 11 oil companies led by British Petroleum and Amoco for exploration and development fields in the Azerbaijan sector of the Caspian Sea.

Other contract news, Sonsub also recently awarded a \$14-million job by Elf Angola for the installation and commissioning of 6 km of pipelines as part of development of a series of gas fields off the coast of Angola. The pipelines, which will reportedly serve the Buffalo, Palanca, Impala and Cobo fields, are scheduled for installation this year.

1996

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NERA
TELECOMMUNICATIONS
Circle 320 on Reader Service Card

Calendar of Events

JUNE

Posidonia '96: June 3-7, Port of Piraeus Authority Exhibition Centre, Piraeus, Greece.

Contact: **Maria Keramida** or **Fofi Katsibra**, Posidonia Exhibitions S.A., 4-6 Eplias St., 185 37 Piraeus, Greece, tel: +30 (1) 4283608; fax: +30 (1) 4283610.

Equiport '96: June 4-7, Marseille, France. Contact: **Edit Expo International** 12, rue Vauvenargues 75018, Paris, France, tel: +33 (1) 42 23 13 56; fax: +33 (1) 42 23 13 07.

CHEMarine 2000: June 6-7, Shangri-La Hotel, Singapore. Contact: **Lily Gon**, administrator, Centre for

Management Technology, 80 Marine Parade Rd. #08-08, Parkway Parade, Singapore 449269, tel: +345 7322; fax: +345 5928.

FISCH '96 & Seafood Europe: June 7-10, Bremen, Germany.

Contact: **Karin Hartmann**, MGH Bremen GmbH, Bischofsnadel 1-2, D-28195

Bremen, Germany, tel: +49 421 363 0564; fax: +49 421 321 485.

ASME Turbo Expo '96: June 10-13, Birmingham, U.K.

Contact: **Marina Stenos**, Public Information, The American Society of Mechanical Engineers, 345 East 47th St., New York, N.Y. 10017, tel: 212-705-7738.

Goteborg Shipping Week: June 11-13, Swedish Exhibition & Congress Centre, Goteborg, Sweden.

Contact: **Dan Agren**, project manager, The Swedish Exhibition & Congress Centre, Box 5222, S-402 24 Goteborg, Sweden, tel: +46 31 708 80 70; fax: +46 31 16 03 30.

Seventh International Conference on Marine Engineering Systems (ICMEC): Safe and Efficient Ships: June 13-14, Trondheim, Norway.

Contact: **Kathleen Ford**, conference organizer, The Institute of Marine Engineers, 76 Mark Lane, London EC3R 7JN, U.K., tel: +44 171 481 8493; fax: +44 171 488 1854.

11th International Harbour Congress: June 17-21, Antwerpen, Belgium.

Contact: **Rita Peys**, conference secretariat, Desguinlei 214, B - 2018 Antwerpen Belgium, tel: +32 3 216 09 96; fax: +32 3 216 06 89.

European Workboat Exhibition '96: June 18-20, Pt. Solent, U.K.

Contact: In U.S. and Canada, **Jerr Martin**, Box 360, Gurnee, Ill. 60031, fax (847) 336-7126, or National Boat Show Ltd., Meadlake Pl., Thorpe Lea Rd., Egham Surrey TW20 8HE, U.K., tel: +44 (0) 178 473377; fax: +44 (0) 1784 439678.

MARI-TECH '96: June 19-21, Quebec Hilton Hotel, Canada.

Contact: **Steve Kack**, Canadian Institute Marine Engineering- St. Lawrence Branch 22 George D. Davie St., Levis, Quebec G6V 6N7, Canada, tel: (418) 837-584 ext. 2264; fax: (418) 838-0184.

ASNE Flagship Section Conference Modeling, Simulation and Virth Prototyping: June 24-26, Hyatt Regent Hotel, Crystal City, Va.

Contact: **Whitney Emerson**, American Society of Naval Engineers (ASNE), 14 Duke St., Alexandria, Va. 22314-34 tel: (703) 836-6727; fax: (703) 8 7491.

USMSA 7th Annual Safety Seminar: June 24-26, Kodiak Island, Alaska.

Contact: **Shannon K. Coghlan**, Marine Safety Association Manager Office, 1900 Arch St., Philadelphia, 19103-1498; tel: (215) 564-3484; (215) 963-9785.

JULY

China Offshore Expo '96: July Tianjin, People's Republic of China.

Contact: **Nancy Lawson Smith**, C International, P.O. Box 2 Germantown, Md. 20875, tel: (301) 0012; fax: (301) 515-0016; e: ingrid@glah.com.

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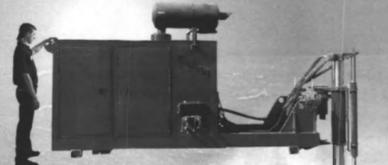
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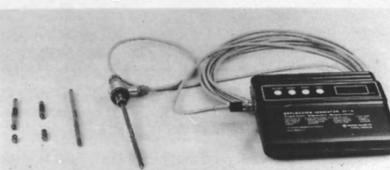
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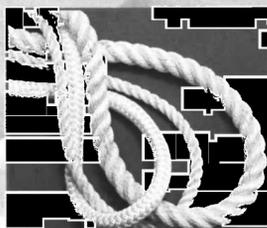


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For further information, contact:

AlliedSignal Fibers, 224 West 35th Street, Suite 1500
New York, NY 10001, email: canonsbea@aol.com



Circle 204 on Reader Service Card

Calendar Of Events

Port, Shipbuilding & Marine Technology Expo '96: July 2-5, Tianjin, People's Republic of China.
 Contact: **Nancy Lawson Smith**, Glahe International, P.O. Box 2460, Germantown, Md. 20875, tel: (301) 515-0012; fax: (301) 515-0016; e-mail: glahe@glahe.com.

AUGUST

Coastal Environment '96: August 7-9, Federal University of Rio de Janeiro, Brazil.
 Contact: **Sue Owen**, conference secretariat, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO40 7AA, U.K., tel: +44 1703 293 223; fax: +44

1703 292 853.

Nor-Fishing '96: August 14-17, Trondheim, Norway.
 Contact: **Liv Sagen**, senior project coordinator, The Nor-Fishing Foundation, Nidarhallene, N-7030 Trondheim, Norway, tel: +47 73 92 93 40; fax: +47 73 51 61 35.

Offshore Northern Seas '96: August 27-30, Stavanger, Norway
 Contact: Hamburg Messe und Congress GmbH, Postfach 30 24 80, 203308 Hamburg/Jungiusstraße 13, Germany; tel: +49 040 3569 2190; fax: +40 040 3569 2187.

SEPTEMBER

8th International Maritime Exhibition BaltExpo '96: September 3-6, Gdansk, Poland.
 Contact: Agpol Promotion Ltd., 00-654 Warszawa, ul.Sniadeckich 17, Poland.

1996 Naval Warfare Exposition & Symposium: September 4-5, Virginia Beach Convention Center, Virginia Beach, Va.
 Contact: **J. Spargo & Associates, Inc.**, 4400 Fair Lakes Ct., Fairfax, Va. 22033, tel: (800) 336-4583, ext. 6200; fax: (703) 631-6200; e-mail: jspargo@aol.com.

The International Marine Simulator Forum (IMSF): September 8, Sheraton Hotel, Copenhagen, Denmark.
 Contact: **Harry J. Crooks**, IMSF chairman, RTM STAR Center, One Maritime Plaza, Toledo, Ohio 43604, tel: (800) 221-9395; fax: (419) 255-8833.

ITS '96 (The International Towing and Salvage Convention and Exhibition): September 9-13, Seattle, Wash.
 Contact: Thomas Reed Publications, 19 Bridge Rd., Hampton Court, East Molesey, Surrey DT8 9EU, U.K., tel: +44 0181 941 7878; fax: +44 0181 941 8787.

Marsim '96: International Conference on Marine Simulation and Ship Maneuverability: September 8-13, Copenhagen Sheraton Hotel, Copenhagen, Denmark.
 Contact: Conference Secretariat, DIS Congress Service Copenhagen, Herlev Righvej 2 c, DK-2730 Herlev, tel: +45 44 92 44 92; fax: +45 44 92 50 50.

MotionExpo: The Motion Control Applications and Technology Show: September 10-12, Bally's, Las Vegas, Nev.
 Contact: **Carrie Cassidy**, Advanstar Communications, Inc., 7500 Old Oak Blvd., Cleveland, Ohio 44130; tel: (216) 891-3160; fax: (216) 826-2801.

Superyacht Northwest '96: September 11-14, Pier 66, Seattle, Wash.
 Contact: **Sharry Stabbert** or **Kristie Ferguson**, Superyacht Northwest/Workboat Northwest, 135 Lake St. South, Ste. 115, Kirkland, Wash. 98033, tel: (206) 827-3200; fax: (206) 827-7455; e-mail: superboats@aol.com.

Workboat Northwest '96: September 11-14, Pier 66, Seattle, Wash.
 Contact: **Sharry Stabbert** or **Kristie Ferguson**, Superyacht Northwest/Workboat Northwest, 135 Lake St. South, Ste. 115, Kirkland, Wash. 98033, tel: (206) 827-3200; fax: (206) 827-7455; e-mail: superboats@aol.com.

5th International High Speed Marine Craft: September 11-13, Bergen, Norway.
 Contact: **Lise Olausen**, Norwegian

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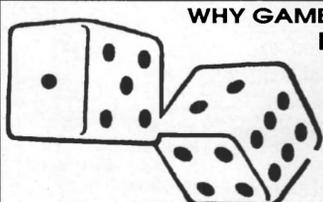
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Society of Chartered Engineers, P.O. Box 2312 Solli, N-0201 Oslo, Norway, fax: +47 22 94 75 02.

AWO Fall Convention: September 12-13, Mark Hopkins Hotel, San Francisco, Calif. Contact: American Waterway Operators, 1600 Wilson Blvd., Suite 1000, Arlington, Va. 22209, tel: (703) 841-9300; fax: (703) 841-0389.

American Association of Port Authorities (AAPA) Annual Convention: September 16-20, Hyatt Regency, Vancouver, British Columbia, Canada. Contact: AAPA, 1010 Duke St., Alexandria, Va. 22314, tel: (703) 684-5700; fax: (703) 684-6321.

Heger Dry Dock Dockmaster's Training Seminar: September 17-20, Norfolk, Va. Contact: Heger Dry Dock Engineers, Inc., P.O. Box 6605, Holliston, Mass. 01746, tel: (508) 429-1800; fax: (508) 429-1811.

Seatrade Mediterranean Cruise and Ferry Convention: September 17-20, Port of Genoa, Italy. Contact: Michael Kazakoff, Princeton Forrestal Village, 125 Village Boulevard, Ste. 220, Princeton, N.J. 08540-5703, tel: (609) 452-9414; fax: (609) 452-9374, or contact Tony Nash, 42 North Station Rd, Colchester, CO1 1RB, U.K., tel: +44 1206 45121; fax: +44 1206 45190.

Icelandic Fisheries Exhibition 1996: September 18-21, Reykjavik, Iceland. Contact: Patricia Foster or Marianne Rasmussen, Nexus Media Limited, Top Floor, 84 Kew Rd., Richmond, Surrey TW9 2PQ, U.K., tel: +44 181 332 9273; fax: +44 181 332 9335.

Expo Shipping '96 Incorporating Air Transportation: September 19-22, Putra World Trade Center, Kuala Lumpur. Contact: Richard Lim, managing director, Global Expositions, Rm. 57138, Xi Yuan Hotel, Beijing 100046, People's Republic of China, tel: 01-8334723; fax: 01-8342310.

International Marine Transit Association 21st Annual Conference: September 22-25, Pan-Pacific Hotel, Vancouver. Contact: Martha A. Reardon, secretary-treasurer, IMTA, 34 Otis Hill Rd., Hingham, Mass. 02043-4510; tel/fax: (617) 749-0078.

Oceans '96 MTS/IEEE Conference and Exhibition: September 23-26, Fort Lauderdale, Fla. Contact: Computer Science Department, MS 3122, Texas A&M University, College Station, Texas 77843, e-mail: oceans96@cs.tamu.edu; fax: (409) 847-9284, or Dan G. White, publicity chair, Oceans '96, Harbor Branch Oceanographic Institution, Inc., tel: (407) 465-2400; fax: (407) 484-9094.

Offshore Southeast Asia '96: September 24-27, Singapore. Contact: Hamburg Messe und Congress GmbH, Postfach 30 24 80, 203308 Hamburg/Jungiusstraße 13, Germany; tel: +49 040 3569 2190; fax: +40 040 3569 2187.

National Waterways Conference Annual Meeting: September 25-27, Regal Riverfront, St. Louis, Mo. Contact: Mary Maloof, NWC, 1130 17th St. N.W., Washington, D.C. 20036, tel: (203) 622-4014; fax: (203) 622-1929.

Fish Expo Seattle: September 26-28,

Washington State Convention & Trade Center, Seattle, Wash. Contact: Diversified Expositions, P.O. Box 7437, Portland, Maine 04112-7437, tel: (207) 842-5508; fax: (207) 842-5509.

Seamen's Church Institute Fourth Annual Port Community Event: Date TBA, International Seafarers' Center, Port

Newark, N.J. Contact: Patricia Carlson, SCI, 241 Water St., N.Y., N.Y. 10038, tel: (212) 589-5828; fax: (212) 349-8342.

OCTOBER
International Perspectives On Maritime Security: October, date unannounced, fall meeting of Maritime Security Council,

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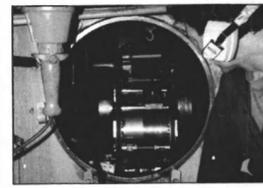
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Calendar Of Events

Washington, D.C.
 Contact: Commander D. Michael Smith,
 U.S. Department of Transportation (S-60),
 Attn: International Perspectives, 400
 Seventh St., SW, Room 10401,
 Washington, D.C. 20590.

World Gaming Congress & Expo '96:
 October 1-3, Las Vegas Convention

Center, Las Vegas, Nev.
 Contact: International Gaming &
 Wagering Business, 7 Penn Plaza, N.Y.,
 N.Y. 10001, tel: (212) 594-4120; fax:
 (212) 714-0514.

**Ship Machinery & Marine Technology
 Exposition (SMM) '96:** October 1-5,
 Hamburg, Germany.

Contact: Hamburg Messe und Congress
 GmbH, Postfach 30 24 80, 203308
 Hamburg/Jungiusstraße 13, Germany; tel:
 +49 040 3569 2146; fax: +40 040 3569
 2149.

ELBE 2000: October 1-5, Hamburg,
 Germany.
 Contact: Hamburg Messe und Congress

GmbH, Postfach 30 24 80, 203308
 Hamburg/Jungiusstraße 13, Germany; tel:
 +49 040 3569 2146; fax: +40 040 3569
 2149.

**SNAME 15th Annual International
 Maritime Exposition:** October 2-4,
 Marriott Marquis, New York City.
 Contact: Society of Naval Architects and
 Marine Engineers, 601 Pavonia Ave.,
 Jersey City, N.J. 07306, tel: (201) 798-
 4800; fax: (201) 798-4975.

Marichem Asia '96: October 2-4, World
 Trade Centre, Singapore.
 Contact: Peter Taylor, Gateway
 Exhibitions, P.O. Box 1343, Springfield,
 Va. 22151, tel: (703) 914-0608; fax:
 (703) 914-1608.

**Valdez Symposium On Oil Spill
 Prevention and Readiness:** October 8-11,
 Valdez Convention and Civic Center,
 Alaska.
 Contact: Scott Thompson, Prince William
 Sound Community College, P.O. Box 97,
 Valdez, Alaska 99686, tel: (907) 835-
 2943; fax: (907) 835-2369.

**MARE FORUM '96: Market Mechanisms
 For Safer Shipping And Cleaner Oceans:**
 October 10-12, Rotterdam, the
 Netherlands.
 Contact: Mirjam de Leeuw, conference
 manager, P.O. Box 1738, 3000 DR
 Rotterdam, the Netherlands, tel: +31 10
 408 29 28; fax: +31 10 453 07 84.

**70th Annual Convention And American
 Merchant Marine & Maritime Industry
 Conference:** October 14-18, Sheraton
 Inner Harbor Hotel, Baltimore, Md.
 Contact: 70th Annual Propeller Club
 National Convention, 3927 Lee Highway,
 #101A, Fairfax, Va. 22030

**Fitrans '96: International Transport and
 Logistic Fair:** October 15-18, Bilbao,
 Spain.
 Contact: Feria Internacional De Bilbao, Pl.
 Pedro M. Basterrechea, 2, 48013 Bilbao,
 Spain, tel: +34 9 4427 72 00; fax: +34 9
 3 405 22 58.

**Odessa '96 (2nd International Shipping
 and Shipbuilding Exposition with Ukraine
 and Black Sea Region):** October 15-18,
 Port of Odessa.
 Contact: European Administration Office,
 East West Exhibition Management Ltd.,
 Moore Stephens Services s.a.m., L'Estoril,
 Avenue Princesse Grace, Monte Carlo,
 Monaco, tel: +33 93 104 121; fax: +33
 93 256 270.

Fish Expo Boston: October 17-19, World
 Trade Center, Boston, Mass.
 Contact: Diversified Expositions, P.O. Box
 7437, Portland, Maine 04112-7437, tel:
 (207) 842-5508; fax: (207) 842-5509.

IMAS '96: Shipping and the Environment:
 October 22-24, London, U.K.
 Contact: Fleur Heapy, The Institute of
 Marine Engineers, The Memorial Building,
 76 Mark Lane, London EC3R 7JN, U.K.,
 tel: +44 171 481 8493; fax: +44 171 488
 1854.

**South America Cruise Seminar '96 (SACS
 '96):** October 22-24, Bahia Convention
 Center, Salvador, Bahia.
 Contact: Feiras e Conferencias

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ASNE Flagship Section Symposium: 3rd week of October, Washington, D.C.
Contact: **Whitney Emerson**, American Society of Naval Engineers, 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

Seatrade Tanker Industry Convention: October 29-30, Royal Lancaster Hotel, London, U.K.
Contact: **Michael Kazakoff**, Princeton Forrestal Village, 125 Village Blvd., Suite 220, Princeton, N.J. 08540-5703, tel: (609) 452-9414; fax: (609) 452-9374.

China Portex '96: October 30-November 2, Shanghai, China.
Contact: Hamburg Messe und Congress GmbH, Postfach 30 24 80, 203308 Hamburg/Jungiusstraße 13, Germany; tel: +49 040 3569 2190; fax: +40 040 3569 2187.

NOVEMBER

Ausmarine '96: November 4-7, Fremantle, Australia.
Contact: Baird Publications, 10 Oxford St., South Yarra 3141, VIC, Australia, tel: +61 39 826 8741; fax: +61 39 827 0704, or in the U.K. at 4A Carmelite St., London, EC4Y 0BN, tel: +44 171 353 1085; fax: +44 171 353 1084.

Ship Repair & Conversion '96: November 5-6, Olympia 2 Conference and Exhibition Centre, London, U.K.
Contact: **John Gwynn-Jones**, BML Business Meetings Ltd., 2 Station Rd., Rickmansworth, Hertfordshire WD3 1QP, U.K., tel: +44 923 776 363; fax: +44 923 777 206.

ASME Turbo Asia '96: November 5-7, Jakarta, Indonesia.
Contact: **Tonia Miller**, IGIT Expositions, tel: (404) 847-0072; fax: (404) 847-0151.

SSC/SNAME Symposium: Quality and Human/Organizational Error in Ship Structures: November 18-20, Sheraton National Hotel, Arlington, Va.
Contact: **Alex Landsburg**, tel: (202) 366-1923; fax: (202) 366-2288.

Viet Portex '96: November 26-29, Hanoi, Vietnam. Contact: Hamburg Messe und Congress GmbH, Postfach 30 24 80, 203308 Hamburg/Jungiusstraße 13, Germany; tel: +49 040 3569 2190; fax: +40 040 3569 2187.

DECEMBER

AWO Winter Conference: December 4-5, Ritz Carlton, Washington, D.C.
Contact: American Waterway Operators, 1600 Wilson Blvd., Ste. 1000, Arlington, Va. 22209, tel: (703) 841-9300; fax: (703) 841-0389.

Asia Pacific Cruise Convention: December 4-7, World Trade Centre, Singapore.
Contact: **Chris Cotton**, Miller

Freeman/Seatrade, 4401 China Resources Building, 26 Harbour Rd., Hong Kong, tel: +852 2827 9128; fax: +852 2827 7831.

International Workboat Show: December 5-7, Ernest N. Morial Convention Center, New Orleans, La.
Contact: Diversified Expositions, P.O. Box 7437, Portland, Maine 04112-7437; tel: (207) 842-5508; fax: (207) 842-5509.

ASNE Channel Islands/Inland Empire Sections Combat Systems Symposium: December 10, NSWC Port Hueneme, Calif.
Contact: **Annette C. Verna**, American Society of Naval Engineers (ASNE), 1452 Duke St., Alexandria, Va. 22314-3458; tel: (703) 836-6727; fax: (703) 836-7491.

Seatrade Asia Pacific Cruise Convention: no announced days, Singapore.
Contact: **Michael Kazakoff**, Princeton Forrestal Village, 125 Village Blvd., Ste. 220, Princeton, N.J. 08540-5703; tel: (609) 452-9414; fax: (609) 452-9374.

1997

FEBRUARY 1997

Underwater Intervention 1997: February 17-19, Adams Mark Hotel, Houston, Texas.
Contact: Underwater Intervention Committee, 2611 FM 1960 West, Ste. F-204, Houston, Texas 77068, tel: (800) 316-2188; fax: (713) 893-5118.

MARCH 1997

ASNE Day 1997: March 17-19, Sheraton Washington Hotel, Washington, D.C.
Contact: ASNE, 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

Remote Sensing for Marine and Coastal Environments: Technology and Applications: March 17-19, Clarion Plaza Hotel, Orlando, Fla.
Contact: **Wendy Raeder**, conference coordinator, ERIM, P.O. Box 134001, Ann Arbor, Mich. 48113-4001; tel: (313) 994-5123; fax: (313) 994-5123; e-mail: raeder@erim.org.

International Gaming Business Expo '97: March 18-20, 1997, the Sands, Las Vegas, Nev.
Contact: Ullo International, Inc., 200 Connecticut Ave., Norwalk, Conn. 06856-4990, tel: (203) 852-0500; fax: (203) 838-3710.

APRIL 1997

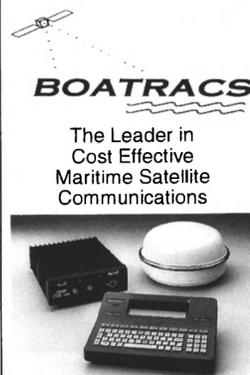
1997 International Oil Spill Conference: April 7-10, 1997, Fort Lauderdale Convention Center, Fort Lauderdale, Fla.
Contact: Conference Manager, 1997 Int'l Oil Spill Conference, 655 15th St., NW, #300, Washington, D.C. 20005, tel: (202) 639-4202; fax: (202) 347-6109.

MAY 1997

Offshore Technology Conference '97: May 5-8, AstroDome U.S.A. Complex Houston. Contact: Offshore Technology Conference, P.O. Box 833868, Richardson, Texas 75083-3868, tel: (214) 952-9494; fax: (214) 952-9435.

JUNE 1997

Nor-Shipping '97: June 10-13, 1997. Contact: Norwegian Trade Fair, Sjølystsenteret - Sjølyst Exhibition Center, P.O. Box 130 Skøyen, N-0212 Oslo, Norway, tel: +47224391 00; fax: +47 22431914



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Principal Contracts Recorded, April 1996

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	COUNTRY (Owner)	SHIPYARD	COUNTRY (Builder)	TYPE	No.	DWT	DELIV. Date	PRICE (\$Million)
UNKNOWN	—	SOUTHERN OCEAN	SINGAPORE	ASPHALT CARRIER	1	4,000	1996	—
ITOCHU CORP.	JAPAN	KANASASHI CO.	JAPAN	BULK CARRIER	1	27,700	3/98	—
BERTLING	—	BOHAI SHIPYARD	CHINA	BULK CARRIER	2	29,000	1997	—
POLISH STEAMSHIP COMPANY	POLAND	VARNA SHIPYARD	BULGARIA	BULK CARRIER	2	41,450	97/98	—
CLA (CHILENA DE NAV. INTEROCEAN. CCNI)	CHILE	STOCZKA	POLAND	BULK CARRIER	4	45,000	1999	—
MITSUI O.S.K. LINES	JAPAN	HITACHI ZOSEN	JAPAN	BULK CARRIER	1	71,000	1997	—
MITSUI O.S.K. LINES	JAPAN	TSINEISHI	JAPAN	BULK CARRIER	1	73,000	1998	—
FAR EASTERN SILO	TAIWAN	JIANGNAN	CHINA	BULK CARRIER	1	72,000	9/97	—
C F AHRENKIEL	CYPRUS	VIANA DO CASTELO	PORTUGAL	CHEMICAL	1	5,700	9/96	20
STEWARTSON	ITALY	SEA SHIPYARD	DENMARK	CHEMICAL	2	3,500	1997	34
STEWARTSON	NORWAY	KUI XIN SHIPYARD	CHINA	CHEMICAL	1	8,000	1998	20
ISIAHAR	CYPRUS	HYUNDAI	KOREA	CONTAINER	1	—	9/97	—
GERMAN INTERESTS	GERMANY	SHANGHAI EDWARD	CHINA	CONTAINER	1	10,000	1997	—
GERMAN OWNERS	GERMANY	SIETAS	GERMANY	CONTAINER	1	—	—	—
KLAUS BRAACK	GERMANY	SHANGHAI EDWARD	CHINA	CONTAINER	1	10,000	1997	—
GERMAN OWNERS	GERMANY	SIETAS	GERMANY	CONTAINER	2	—	—	—
HANSA TREUHAND	GERMANY	HANJIN	KOREA	CONTAINER	2	—	97/98	60
VARNIMA	GREECE	KHERSON SHIP.	UKRAINE	CONTAINER	2	16,368	1998	—
HEUNG-A	KOREA	HANJIN	KOREA	CONTAINER	2	—	1997	—
VIASOV GROUP	MONACO	KHERSON SHIP	UKRAINE	CONTAINER	2	—	—	—
COMPAGNIE MAROCAINE DE NAVIGATION	MOROCCO	UNION NAVAL DE LEVANTE	SPAIN	CONTAINER	2	6,000	1997	—
STEAMERS MARITIME HOLDINGS	SINGAPORE	WUHU SHIPYARD	CHINA	CONTAINER	2	—	6/97	20
NAM TAI LINE	TAIWAN	KYOKIYO ZOSEN	JAPAN	CONTAINER	2	—	1997	—
ROLF ROHWEDDER	GERMANY	SHANGHAI EDWARD	CHINA	CONTAINER	3	10,000	1998	—
TECMARINE	U.S.	J PATTIE	NETHERLANDS	CONTAINER	1	—	97/98	—
TECMARINE	U.S.	J PATTIE	NETHERLANDS	CONTAINER	3	—	97/98	—
GERMAN SHIPOWNERS	GERMANY	PEENE-WERFT	GERMANY	CONTAINER/RoRo	4	—	—	—
FUKADA SALVAGE & MARINE WORKS	JAPAN	MITSUBISHI H.I.	JAPAN	CRANE SHIP	1	—	11/96	51
P&O	U.K.	FINCANTIERI	ITALY	CRUISE	1	—	—	300
RENAISSANCE CRUISES	U.S.	CHANTIERS DE L'ATLANTIQUE	FRANCE	CRUISE	2	—	6/98 & 6/99	—
HAM	NETHERLANDS	IHC	NETHERLANDS	DREDGER	1	4,200	1997	—
WUJINE & BARENDIS	NEW ZEALAND	NIESTERN SANDER	NETHERLANDS	DRY CARGO	1	4,250	11/97	10.3
CHONGQING SHIPPING	CHINA	VOLKSWERFT STRALSUND	GERMANY	DRY CARGO	2	9,350	1997	—
SCOTLINE	U.K.	YORKSHIRE	U.K.	DRY CARGO	1	3,360	1997	10.6
STEAMERS MARITIME	SINGAPORE	JINLING	CHINA	FEEDER SHIP	6	—	97/98	85
THOMAS FYLKES DAMP	NORWAY	ULSTEIN	NORWAY	FERRY	1	11,200	1998	88.5
ALLIAURO	ITALY	BREVIG MARINE	NORWAY	FERRY	2	—	1997	—
FERROVIE DELLO STATO	ITALY	RODRIQUEZ	ITALY	FERRY	3	5,000	97/98	95.5
HONG KONG INTERESTS	HONG KONG	KVAERNER SINGAPORE	SINGAPORE	FERRY	2	—	1996	12
PESQUERA SACRAMENTO	PERU	SERVICIO INDUSTRIAL DE LA MARINA	PERU	FISHING	2	—	1998	—
INDEPENDENT FISHERIES	NEW ZEALAND	MOEN SLIP A/S	NORWAY	FISHING	1	—	2/97	—
QUANTUS FISHING COMPANY	SCOTLAND	FLEKKEFJORD SLIP & MASK	NORWAY	FISHING	—	—	12/96	—
BP SHIPPING	U.K.	HARLAND & WOLFF	U.K.	FPSO	1	150,000	1997	610.5
FPSO ALLIANCE	U.K.	HARLAND & WOLFF	U.K.	FPSO	1	150,000	6/98	600
CHONG QING	CHINA	VOLKSWERFT STRALSUND	GERMANY	GENERAL CARGO	2	10,000	5/97	—
SNAM	ITALY	SESTRI CANTIERE NAVALI	ITALY	LNG	1	—	—	—
SNAM	ITALY	SESTRI CANTIERE NAVALI	ITALY	LPG	1	—	1998	57
WESTAL-LARSEN	NORWAY	MITSUI ZOSEN	JAPAN	LPG	3	—	98/99	138
HSS HOLLAND SHIP SERVICE	HOLLAND	SEDEF GEMI	TURKEY	MULTI-PURPOSE	1	13,500	6/98	—
GERHARD WESSELS	—	SAVA	YUGOSLAVIA	MULTI-PURPOSE	2	4,450	1997	—
AUGUST BOLTEN	GERMANY	DALIAN SHIPYARD	CHINA	MULTI-PURPOSE	—	—	1998	—
KRUPP	GERMANY	DAEWOO HEAVY INDUSTRIES	KOREA	ORE CARRIER	2	317,700	—	140
STENA LINE	SWEDEN	AESA	SPAIN	PASSENGER	2	—	1998	130
CENARGO	U.K.	AESA (SEVILLA)	SPAIN	PASSENGER	2	6,300	1998	150
SEAFLYTE FERRY SERVICES	INDONESIA	WAVEMASTER	AUSTRALIA	PASSENGER	4	—	—	16
FAR EAST HYDROFOIL	HONG KONG	QUICKING	CHINA	PASSENGER / CARGO	1	—	1996	—
OCEAN TOKYO	JAPAN	ONOMICHI	JAPAN	PASSENGER/RoRo	2	—	1997	—
BRITISH COLUMBIA FERRY CORP.	CANADA	VANCOUVER SHIPYARDS	CANADA	PASSENGER/RoRo	3	—	7/97	154.1
CALEDONIAN MACBRATNE	U.K.	BUCARIE SHIPYARD	U.K.	PASSENGER/RoRo	1	—	7/97	—
TOR LINE	SWEDEN	FINCANTIERI	ITALY	RoRo	2	—	1999	100
TOR LINE	SWEDEN	SAMSUNG	KOREA	TANKER	2	12,000	—	127
KLAUS OLDENDORFF	CYPRUS	HALLA	JAPAN	TANKER	1	105,000	8/98	44.5
STATOIL	NORWAY	SAMSUNG	JAPAN	TANKER	1	100,000	—	100
TSAKOS GROUP	GREECE	ASTILLEROS RIO SANTIAGO	ARGENTINA	TANKER	2	62,000	1998	64
D/S NORDEN/EAC SHIPPING	DENMARK	KHERSON SHIP	UKRAINE	TANKER	1	30,000	96/97	—
EAC SHIPPING	DENMARK	KHERSON SHIP	UKRAINE	TANKER	1	30,000	96/97	—
COLUMBIA SHIPMANAGEMENT	CYPRUS	ADMIRALTESKI	RUSSIA	TANKER	2	28,400	1997	25
FIURETANK	SWEDEN	BRATTVAAG SKIPSVERFT	NORWAY	TANKER	2	11,500	1997	56
MARINAVI	ITALY	CANTIERE NAVALE FRATELLI	ITALY	TANKER	2	12,000	97/98	—
CERES HELLENIC SHIPPING ENTREPRISES	GREECE	SAMSUNG HEAVY INDUSTRIES	KOREA	TANKER	1	150,000	6/98	—
PORT AUTHORITY OF JAMAICA	JAMAICA	DAMEN SHIPYARDS	NETHERLANDS	TUG	1	—	—	59
HAWAIIAN TUG AND BARGE CORP.	HAWAII	TRINITY-HAITER MARINE	U.S.	TUG	1	—	—	—
TUGZ INTERNATIONAL	U.S.	HAITER MARINE INC.	U.S.	TUG	2	—	—	—
UNKNOWN	—	UNKNOWN	—	TWEEN DECKERS	1	4,250	11/97	—

U.S. Military Newbuilding

Although spending on new U.S. Navy ships is nowhere near the levels of a decade ago, the market still warrants the attention of many vessel builders and suppliers — companies which are still forging their way into the International commercial markets. A decision on the procurement of the LPD-17 class — the only new naval surface ship construction program to be introduced for the remainder of the century — is expected soon. The following two pages of charts and statistics provide a brief overview of the short and mid-term prospects for Navy work.

Navy: New Construction = \$10 Billion For Yards Through 2000

The U.S. Navy shipbuilding plan through the end of the century includes the construction of 32 new ships, eight ship conversions, one service life extension and one carrier refueling. More than \$30 billion is proposed for this plan, and shipyard newbuild contract value accounts for about one-third of this amount.

The remainder of the costs is attributed to government-furnished equipment placed aboard the vessels and to other government program costs.

The Navy's proposed FY 1996-2000 shipbuilding program follows the continuing trend of naval reductions. At an average of less than seven new ships per year, the program exhibits a 66 percent reduction in the quantity of ships to be procured, compared with the 19 ship per year average of the 1980s.

U.S. Navy Shipbuilding Plan

Class	1996	1997	1998	1999	2000	Total
New Attack Sub	—	—	1	—	1	2
SSN	1*	—	—	—	—	1
DDG-51	2	3	2	3	3	13
LHD	1	—	—	—	—	1
LPD	1	—	1	—	2	4
T-AGOS	—	—	—	1	—	1
TAGS/AGOR	—	—	—	1	—	1
T-ANKR (Military Sealift)	2	2	2	2	—	8
ADCX	—	—	—	—	1	1
CVN (Refuel)	—	—	1	—	—	1
AOE SLEP	—	—	—	1	—	1
AE (Conversion)	2	2	2	—	—	6
AFS (Conversion)	2	—	—	—	—	2
Total	11	7	9	8	7	42

*This ship was only partially funded. It may slip to FY 97.
Source: U.S. Maritime Administration.
(See related chart on the top of next page)

June, 1996

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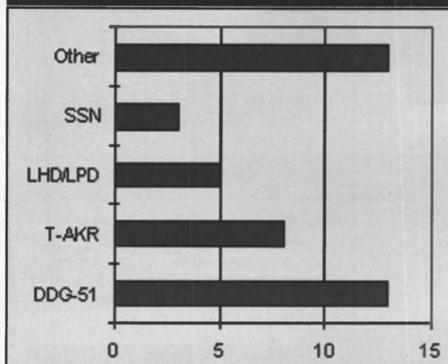
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U.S. Military Newbuilding

The U.S. Navy's shipbuilding plan through the year 2000 calls for the construction of 42 new ships, including 13 DDG-51's, eight military sealift ships (T-AKR) and five LHD/LPD ships.



T-Ship Program Boosts Newbuild Activity

The U.S. Navy's T-Ship Program continues to be an important segment of ship construction and conversion activity for U.S. shipyards. T-ships are auxiliary vessels funded by the Navy budget, but designed to be civilian-crewed and under the control of the Military Sealift Command. Since mid-1979, 16 U.S. private shipyards have been awarded contracts for the construction of 63 new ships and the conversion of 36 existing vessels. The initial contract value for these vessels totaled approximately \$8.5 billion. During 1995, there was one new T-ship contract placed with a U.S. shipyard. Avondale Industries received an order with an initial contract value of \$206.4 million to build one military sealift ship (T-AKR). Additionally, one contract, for the completion of the T-AGOS 23, a small waterplane area twin hull ocean

surveillance ship (SWATH), was assigned to Halter Marine Inc. The contract value was \$60 million. As of December 31, 1995, 11 T-ships were under construction or on order at three shipyards, with an orderbook value of approximately \$1.8 billion.

Yard	Class or #	Name	Del.	Price (\$M) (Approx.)
Halter Marine	T-AGS 62	Bowditch	7/96	\$42.9
Halter Marine	T-AGS 63	Henson	2/98	\$47.2
Halter Marine	T-AGOS 23	Impeccable	12/98	\$60
Avondale	T-AKR 300	Bob Hope	10/97	\$265.2
Avondale	T-AKR 301	n/a	3/98	\$210
Avondale	T-AKR 302	n/a	9/98	\$210
Avondale	T-AKR 303	n/a	1999	\$206.4
NASSCO	T-AKR 310	n/a	3/98	\$269.1
NASSCO	T-AKR 311	n/a	10/98	\$218
NASSCO	T-AKR 312	n/a	4/99	\$218
Avondale	T-AO 203	Laramie	4/96	\$106.3

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Now U.S. Navy Ships In Service In 1995

During 1995, 17 new naval vessels measuring 1,000 ldt and larger were delivered. The 17 totaled approximately 221,000 ldt and had an initial contract value of approximately \$5.3 billion. In comparison, in 1994, just 15 vessels valued at \$3.5 billion were delivered.

Yard	Class or #	Contract (\$M)
Newport News	SSN 769	\$306
Bath Iron Works	DDG 60	\$256
Ingalls	DDG 59	\$204.7
Ingalls	DDG 61	\$204.7
NASSCO	AOE 8	\$197.6
Halter Marine	T-AGS 61	\$42.9
General Dynamics, Electric Boat	SSBN 741	\$617.4
Avondale	T-AO 201	\$106.3
Newport News	SSN 770	\$306
Ingalls	DDG 63	\$204.7
Bath Iron Works	DDG 62	\$256
Avondale	LSD 50 (CV)	\$127.8
General Dynamics, Electric Boat	SSN 771	\$400
Avondale	T-AO 204	\$97.5
Newport News	CVN 74	\$1,475
Ingalls	DDG 65	\$254.9
Bath Iron Works	DDG 64	\$256.5

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Circle 336 on Reader Service Card

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.

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Adick Marine, 1410 Central Ave., Farmingdale, NY 11735
Bill Brown Enterprises, Inc., 4995 Ocean Pines, Berlin, MD 21811
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Novenco Hi-Press AS, P.O. Box 310, Røpkelevej 55A, DK-2630 Taastup, DENMARK
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Kunson Mfg., 780 Pearl St. Jensen Way, La Comer WA 98257
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RGF Marine, 3875 Fiscal Court, West Palm Beach, FL 33404
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Litor Ship Service Inc., 2375 West Estler Street, Long Beach, CA 90813
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Hamilton Jet, P.O. Box 709, Christchurch, New Zealand
- INERT GAS SYSTEMS**
Milar Systems, 3710 Lakeside Court, Mobile AL 36693
- INFORMATION TECHNOLOGIES**
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Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123
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Marine Services Corp., 3457 Gulphard Dr., Hood River, OR 97031
TODCO, Inc., P.O. Box 1087, Marion, OH 43052
- JOINER - Waterlight Door-Panelling-Ceiling System-Decking**
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Branlon Ind., 1101 Edwards Ave., Jefferson, LA 70181
CustomShip Interiors, Inc., P.O. Box 237, Lusby, MD 20657
Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123
Jamestown Metal Marine Sales, 4710 Northwest Second Ave., Boca Raton, FL 33431
Slido Systems, Inc., 220 Carpenter St., Greenvort, NY 11944
Wolz & Krenzer, Inc., 90 Forest Ave., Locust Valley, NY 11560
- KEEL COOLERS**
R.W. Fennham & Co., 1716 Elverth Ave., Manassas, VA 20108
Kaltenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
The Water Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307
- LIFEBOATS/RAPTS**
American Eagle Mfg., Inc., 780 Pearl St. Jensen Way, LaComer WA 98257
Norsafe AS, P.O. Box 115, N-4618 Faerrik, 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

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

HITTING SYSTEMS/EQUIPMENT—Lamps, Fixtures, Searchlights
ACR Electronics, Inc., 5757 Ramenwood Rd., Ft. Lauderdale, FL 33310-5247
Archway Marine, 4501 Swan Ave., St. Louis, MO 63110
Datex, Inc., P.O. Box 1150, Kender, LA 70068
Golden Marine, 180 Van Buren St., Brooklyn, NY 11231
Kokum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
L.C. Doane, P.O. Box 975, Essex, CT 06428
Pauluhn Electric Mfg. Co., Inc., 1616 N. Main, P.O. Box 53, Pearland, TX 77581
Francis Searchlights/Star Supply Co., 4415 6th N.W., Seattle, WA 98107

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

LIQUID LEVEL INDICATORS
Island Mfg. Corp., 2733 Gross Point Rd., Skokie, IL 60076-0226

LIQUID OVERFILL PROTECTION SYSTEMS
E.R.L. Marine Products, P.O. Box 1026, New Albany, IN 47151-0226
Merrifield, Inc., 58 Potter Pl., Littleton, CO 80120
Midland Mfg. Corp., 7733 Gross Point Rd., Skokie, IL 60076-0226

LOGISTICS
Newport News Shipbuilding, Logistics & Technical Services, 12129 Jefferson Ave., Newport News, VA 23603
V.L. Logistics Consultants, Inc., 3420 Benville Blvd., Ocean Springs, MS 39664

LUBRICANTS
Exxon Co. USA, 800 Bell St., Houston, TX 77002
Royal Lubricants, P.O. Box 518, East Hanover, NJ 07936

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
Del Gavo, 619 Industrial Rd., Carlstadt, NJ 07072
Hopman Brothers, 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
Walton Coast Machinery, 1920 S. Highway Rd., Glenview, IL 60025

MARINE ACCOMMODATIONS
Hopman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Jamestown Metal Marine Sales, Inc., 4710 Northwest Second Ave. Boca Raton, FL 33431
Maritime Services Corp., 3457 Guigard Dr., Hood River, OR 97031

MARINE CEILING
Hydro-Aluminum, Via Verk, N-5880 VK I SOGN, Norway
Insulations, Inc., 12360 Leisure Road, Baton Rouge, LA 70807

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

MARINE DOCKING
Tribal Industries, 1705 First Rd., Downsview, Ontario CANADA

MARINE DRILLING & BLASTING
Marine Drilling & Blasting, P.O. Box 10455, Jacksonville, FL 32247-0455

MARINE ELECTRONICS
Frank L. Beier Radio, 2001 Ridgegate Drive, Metairie, LA 70001
Kokum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Marine Electronics Solutions, Inc., 1522 Crabapple Cove, Jacksonville, FL 32225
Saab Marine Electronics AB, Box 19345, 402 51 Godingborg, SWEDEN
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

MARINE ELEVATORS
Kobuco Machinery, 1101 Laramie Rd., Biloxi, MI 39535-4454

MARINE EQUIPMENT
Bohmet & Associates, 1150 Rule Rochelle, Sidel, VA 70458
McClary Machine, P.O. Box 4454, Biloxi, MS 39535-4454

MARINE FINANCING
Salco Credit Co., Inc., 4909 158th Ave. NE, Redmond, WA 98052

MARINE FIRE PROTECTION
Hiller Systems, 3710 Lakeside Court, Mobile, AL 36693
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Linton Ship Services, Inc., 2275 West Esther St., Long Beach, CA 90813

MARINE FURNITURE
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Jamestown Metal Marine Sales, Inc., 4710 Northwest Second Ave. Boca Raton, FL 33431
Maritime Services Corp., 3457 Guigard Dr., Hood River, OR 97031

MARINE GEARS
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
The Falk Corp., P.O. Box 492, Milwaukee, WI 53201-0492
Haley Marine Gears, Inc., P.O. Box 689, Greenville, SC 29615
Marine Gears, P.O. Box 669, Greenville, SC 29615

MARINE HYDRAULICS
Del Canto Marine, 1101 Industrial Rd., Carlstadt, NJ 07072

MARINE INSURANCE
John G. Aigen, 1300 SE 77th St., Fort Lauderdale, FL 33316

MARINE INTERIORS
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Jamestown Metal Marine Sales, Inc., 4710 Northwest Second Ave. Boca Raton, FL 33431
Johnson Construction Specialties, Inc., 2402 Ruler O. Box 1880 Houston Texas 77251

MARINE PLUMBING
Bill Brown Enterprises, 3457 Guigard Drive, Hood River, OR 97031

MARINE PUMPS
Gilkes Inc., P.O. Box 628, Seabrook, TX 77686

MARINE SUPPLIES SALES
Defence Specialization & Warehousing Service, 2163 Airways Blvd., Memphis, TN 38114

MARINE TRAINING
Center for Marine Training, 8701 Teichman, Galveston, TX 77554

MARITIME ARTWORK
Santa Art Studio, 6 Ridge Drive, Old Saybrook, CT 06475

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Donald L. Blount, 2550 Elmwood Ave., Ste. K, Norfolk, VA 23513
C. Baxter & Associates, P.O. Box 8026, Mobile, AL 36603
CMI Marine Co., 4040 Woodcock Dr., Suite 200, Jacksonville, FL 32207
Childs Engineering Corp., Box 333, Medford, MA 02052
Crandall Dry Dock Engrs., Inc., P.O. Box 505904, Chelsea, MA 02150
Crane Consultants, 15301 First Ave. S., Seattle WA 98148
C.R. Cuthing, 18 Vesey St., New York, NY 10007
CT Marine, 65 Crooked Trail, Rowayton, CT 06863
Cunningham & Walker, 1762 Providence Hollow Lane, Jacksonville, FL 32223
Arthur D. Darden, 3000 Ridgegate Dr., Suite 403, Metairie, LA 70002
DeLong & Leibel, Inc., 1724 Emerson Street, Jacksonville, FL 32207
Design Associates, Inc., 14380 Chef Menteur Highway, New Orleans, LA 70129
Designs & Planners, 2120 Washington Blvd., Suite 200, Arlington, VA 22204
Eliot Bay Design Group 5201 Shattuck Ave. N.W., Ste. 200, Seattle, WA 98107
Enron Mgmt & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
GHIL Inc. (Int. Measurement Consultants), P.O. Box 1838, Newport News, VA 23601
Gibbs & Cox, Inc., 50 West 23rd St., New York, NY 10010
John W. Gilbert & Assoc., Inc., 66 Long Wharf, Boston, MA 02110
The Glendon Assoc., Inc., 600 Mutual Life Bldg., 405 First Ave., Seattle, WA 98104
Guido Perla & Assoc., 720 3rd Ave., Ste. 1200, Seattle, WA 98104
Morris Guarinich Associates, Inc., 130 Sutter St., Ste. 400, San Francisco, CA 94104
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
Hydrocomp, Inc., 202 C Packlets Court, Williamsburg, VA 23185
MCA 20 Ridgely Ave., Annapolis, MD 21401
JHJ 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., 2860 Alway Ave., #A-103, Costa Mesa, CA 92626
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McClary Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
John J. McMillan Associates, Inc., 1 World Trade Ctr., Ste. 2000, N. Y.N.Y. 10048
Fendall Marbury, P.O. Box 2321, Annapolis, MD 21401
Marine Design & Operations, Inc., 225 E. 1st Ave., Roselle, NJ 07068
Marine Management Systems, Inc., 102 Hamilton Ave., Stamford CT 06902
Marine Power Associates, 1010 Turquoise St., Ste 217, San Diego, CA 92109
Maritech, Seacraft, Bay Road, Newmarket, NH 03857
Maritime Design, Inc., 3620 Harley 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
Ocean Motion Co., P.O. Box 130, 49 Shore Drive, Barrington, IL 60010-1300

Olean Marine Surveys Co., P.O. Box 283, Port Jefferson, NY 11777
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 520 Fulton St., Ste. 301, San Francisco, CA 94107
Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112
Scientific Marine Service, 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 06428, 17 Battery Pl., New York, NY 10004, P.O. Box 975, Barnegat Light, NJ 08008, 2 Seavine Pl., 5203 Leesburg Pike, Suite 700, Falls Church, VA 22041
50 Vahell Way, Orlinda, CA 94953
George S. Sharp, Inc., 100 Church St., New York, NY 10007
R.A. Stearn, Inc., 233 N. 1st Ave., Sturgeon Bay, WI 54235
A.K. Suda & Ass., 3024 19th St., Metairie, LA 70002-4989
TIMSCO, P.O. Box 91380, Mobile AL 36691

NAVIGATION & COMMUNICATIONS EQUIPMENT
Funaro U.S.A., 271 Hutton Way, S. San Francisco, CA 94080
ICS Electronics Ltd., Unit W, Rudolf Industrial Estate, Ford, Andover, West Essex, UK
KVH Industries, Inc., 110 Enterprise Center, Middletown, RI 02842-5068
Massey Communications, 300 Columbus Circle, Edison, NJ 08837
Negron Marine Consultants, 840 Bond Street, Elizabeth, NJ 07201
Offshore Systems Ltd., 107-920 West 1st St., North Vancouver, B.C. V7P 3N4 CANADA
Rafael Survey USA, 3824 Westchase, Houston, TX 77042
Raytheon Marine Co., 676 Island Pond Rd., Manchester, NH 03109-5420
Scandinavian Micro Systems P.O. Box 155, N-1411, Kobbolton, NORWAY
Scientific Atlanta, Inc., 1650 International Court, Norcross, GA 30093
Sea, Inc., 7030 220th S.W., Mountlake Terrace, WA 98043
Simrad, 19210 33rd Avenue West, Lynnwood, WA 98036
Simrad Robertson, 10291 Hammett, Suite 100, Houston, TX 77043-1923
Sperry Marine Inc., 1070 Semprile Trail, Charlottesville VA 22901
Standard Marine Electronics, P.O. Box 98151, Los Angeles, CA 90009
Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94086
Wayway Communications System, Inc. 453 E. Park Pl., Jeffersonville, IN 47130

NOZZLE SYSTEMS
Custom Nozzle Fabrication, P.O. Box 547, Pascagoula, MS 39568
Reef Propellers, Av. Rio Espinoza 488, Mazatlan, MEXICO 82180

OIL—Marine—Additives—Testing
Labriport Laboratories, Inc., 1650 Airline Hwy., Kenner, LA 70062
Mobil Oil Corporation, 2525 Galveston Road, Fairfax, VA 22037-0001
Tetco International, 2003 Westchester Avenue, White Plains NY 10650

OILWATER SEPARATORS
Alfa-Laval Separation, Inc., 355 Adams Rd., Warrington, PA 18974-0556
Blom & Voss Industrie GmbH, P.O. Box 10 07 20, D-20457 Hamburg 1, GERMANY
U.S.A. Reps Simplex-Turner Inc., P.O. Box 168, Little Neck, NY 11363-0168
Fast Systems, 2040 North Broadway, St. Louis, MO 63147
Harwin Marine Inc., 1129 Hospital Dr. Ste. 3C, Stockbridge, GA 30281
MMC International, 60 Inp Dr., Inwood NY 11696
National Fluid Separators, 527 Westchester Avenue, White Plains NY 10650
Nelson Industries, Highway 51 West, Sloughton, WI 53589
RFG Marine Environmental Technologies, Inc., 2875 Fiscal Court, West Palm Beach, FL 33404

PAINT—Painting—Corrosion Control
Ashland Chemical Co. Drew Marine Co., One Drew Plaza, Bonton, NJ 07005
Comsol, Inc., 1045 12th Ave. NW-FSA, Itaska, WA 56027
Dover Coatings, 1000 North Broadway, St. Louis, MO 63147
Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
Fenn Corp., 1301 North Flora St., Plymouth, IN 46505
Jamestown Paint, 25 N. Washington Ave., P.O. Box 348, Jamestown, RI 02835
Hempel Coatings, 6901 Cavalcade St., Houston, TX 77028
Hemphill, Inc., Marine Div., 432 E. Hill Rd., P.O. Box 1460, Willis, CA 95490
Permastop Rust, 264 South Main St., Wallingford, CT 06492
Product Research Service, Inc. 229 Hwy 23, PO Box 159, Belle Chasse, LA 70037
Royal Chemical, 2705 Concorde Road, Belle Chasse, LA 70037
Sigma Coatings, 8973 Market St., Houston, TX 77028, 330 Rover Rd., Harvey, LA 70059, 1100 Adams St., Hooker, NJ 07030
In-Place Marine, Inc., 2715 North Woodlawn Ave., Long Beach, CA 90813

PIPE FITTINGS/CLOSURES/CONNECTING SYSTEMS
George Fischer Pipe Tools, 407 Haldley St., Box 40, Holly, MI 48442
Lokring Corp., 395 Hialeah Drive, Hialeah, FL 33040

PLASTICS
American Industrial Plastics, 724 Fantess Blvd., Daytona Beach, FL 32114

POLLUTION CONTROL PRODUCTS/MARINE SERVICES
Marco Pollution, 2300 West Commodore Way, Seattle, WA 98119
OH Inc., 221 Rue De Jean, Lafayette, LA 70508

PORTLIGHTS
Correl Carr, P.O. Box 253, Monroe, CT 06468
Predict/DLI, 253 Winslow Way West, Branbridge Island, WA 98110

PROPELLERS
Associated Marine Technologies, 4016 Seaboard St., Portsmouth, VA 23701
Holland Roe Propeller, 2273 Barataria Blvd., New Orleans, LA 70072
Rice Propellers, Av. Rio Espinoza 488, Mazatlan, MEXICO 82180
Rola SP Propellers, Via Sile St., P.O. Box 251, 6828 Bellera - SWITZERLAND
Rola SP Propellers USA, Inc., 4030 Mustang Road, Melbourne, FL 32934 USA
Saur Propellers, 1502 Fairview Avenue E., Seattle, WA 98102

PUMP—Repair—Drives
—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
Avestra Industries, 10010 S. 1st Ave., Suite 116, Harvey, LA 70058
American Air Filter, P.O. Box 5990, Louisville, KY 40342
ABB Drives Inc., P.O. Box 372, Milwaukee, WI 53201-0372, USA
ABB Industry Co., P.O. Box 30281, Milwaukee, WI 53230
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. 102, Metairie, LA 70001
Bird Johnson Company, P.O. Box 1528, Pascagoula, MS 39567
Brunell AS, P.O. Box 370, N-4041, Molde, Norway
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
The Falk Corp., P.O. Box 492, Milwaukee, WI 53201-0492
GEC ALSTHOM Diesels, Inc., 10801 Kempswood St., Houston, TX 77043-1412
Gleason Marine Company, 160 VanBuren St., Brooklyn, NY 11231
Hohel Engineering, Inc., 1320 Kemper Meadow, Ste. 300, Cincinnati, OH 45240
In-Place Machine Co., Inc., 1929 North Butlam Street, Milwaukee, WI 53212-3793
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp Makr., 7555 Danboro Crescent, Mississauga, Ontario, CANADA L5N 6P9
LIPS E.V., P.O. Box 6, 5151 9P Duren, The Netherlands
Lohmann & Stolterhoff, P.O. Box 1860, D-58408 Witten, Germany
Lo-Rez Vibration Control, 186 West 8th Ave., Vancouver, BC CANADA V5Y 1N2
Mapco Products, Inc., 96 Forest Ave., Loosd Valley, N.Y., 11550
Marschner Werk, P.O. Box 1442, D-5884 Halver GERMANY
MAN B&W Diesel, 17 State St., New York, NY 10004
MAN B&W Diesel AS, Omega Diesel, Nels Jule Vei 15, DK-9900 Frederikshavn, DENMARK
MAN B&W Diesel GmbH, Stadthaberstrasse 1, D-86153 Augsburg 1 GERMANY
Omni-Strut, Inc., 3615 Sorenson Ave., Santa Fe Springs, CA 90670
Oren Corp., 1111 Cedar Creek Rd., Griffin, WI 53024
Rola SP Propellers USA, Via Sile S. P.O. Box 251, 6828 Bellera SWITZERLAND
Rola SP Propellers USA, 4030 Mustang Road, Melbourne, FL 32934, USA
S & S Propeller Co., 2718 College Point Blvd., Flushing, NY 11354
Karl Senner, Inc., 25 W Third, Kenner, LA 70062
Schottel-Werke, Manizer Strasse 99, D-58322 Spay-Rein, GERMANY
Schottel North America, Inc., 1505 Corbin Ave., Hammond, LA 70403
Ships Machinery International, Inc., 6375 N.W. 56 Street, Miami, FL 33166
Siemens Electric Ltd., 1180 Couthampton 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 AS, P.O. Box 924, N-5602, Bergen, NORWAY
GERMANY U.S. Rep. Volth Schneider America, Inc., 121 Susquehanna Ave., Great Neck, NY 11021
Oy Warsta Ab, Vasa and Abo Divisions, P.O. Box 244, SF65100 Vasa, FINLAND

PUMP—Repair—Drives
Amoco Pumps, 4000 West Burnham St., Milwaukee, WI 53215
Del Gavo, 619 Industrial Rd., Carlstadt, NJ 07072
Gilkes, Inc., PO Box 628, Seabrook, TX 77588
Harwin Marine, Inc., 1129 Hospital Dr. Ste. 3C, Stockbridge, GA 30281
Irm B. Leach Co., Box 71, 847 State Rd., Cheraw, SC 29527
Via Motivator, 568 Parker St., Newark, NJ 07104

RADAR
World Trade Network, Ltd., 1622 28th Ave. N., Minneapolis, MN 55447

REFRIGERATION EQUIPMENT/SERVICES
Adco Marine, 1410, Central Ave., Farmingdale, NY 11735
Ashland Chemical Co., One Drew Plaza, Bonton, NJ 07005
RTF Mfg., RD #1 Route 66, Hudson, NY 12534
Unico Ship Service Inc., 2275 West Esther Street, Long Beach, CA 90813

REMOTE VALVE OPERATORS
American United Marine Corp., 5 Broadway, Rt. 1, Staugus, MA 01906
Elcor Manufacturing, P.O. Box 773, Binghamton, NY 13902

RIGID INFLATABLE BOATS
American Eagle, 780 E. Peabody Jensen Way, LaComer, WA 98257
Wilard Marine, Inc., 1520 H. Grove St., Anaheim, CA 92806
Zodiac of N. America Thompson Creek, P.O. Box 400, Stevensville, MD 21666

ROPE—Marine—Nylon—Hawes—Fibers
Allied Signal Inc., Fibers Division, 101 Columbia Rd, Morristown, NJ 07962
American Mfg. Co., 200 Southpark Rd., Lafayette, LA 70506-9609

RUBBER BUSHES
Vesco Plastics, P.O. Box 40647, Cleveland 2022, South Africa

SAFETY LIGHTING
Danco, Inc., P.O. Box 1150, Kinder, LA 70648-1150

SALVAGE/SPILL RESPONSE
Donjon Marine, 1250 Liberty Ave., Hillsdale, NJ 07025
Byrne, Rice & Turner, Inc., 1172 Camp Street, New Orleans, LA 70130
Eloch International Corp., 1110 Industrial Blvd., Sugarland, TX 77478
Envirovac, Inc., 1290 Tunnel Dr., Rockford, IL 61111
Fast Systems, 3240 North Broadway, St. Louis, MO 63147
ITT Labco, 1485 Dale Way, Costa Mesa, CA 92626
Research Products Blanketech, 2639 Andon Dallas, TX 75220

SATELLITE COMMUNICATIONS
American Mobile Satellite Corp., 1602 Parkridge Blvd., Reston, VA 22091
CP Comm. Intl., 2100 Park Central North, Ste. 900, Pompano Beach, FL 33064
IDB Mobile Comm., 6903 Rockledge Dr., Ste. 500, West Bethesda, MD 20817
Maskey Communications, 2721 Woodway Drive, Raleigh, N.C. 27604-1851
Maritime Cellular Network, 560 Village Blvd., W. Palm Beach, FL 33409
Norwegian Telecom, Postboks 6701 St. Olavs Plass, N-0130, Oslo, Norway
PTT Telecom, Station 12, P.O. Box 30150-2500, D The Hague, NETHERLANDS
Scientific Atlanta, Inc., 1650 International Court, Norcross, GA 30093
Singapore Telecom, 15 Hill Street, Telephone House, 2nd Storey, Singapore 0817
Teleco International, 2003 Westchester Avenue, White Plains NY 10650

SCALE MODELS
Marwell, P.O. Box 225, Oconomowoc, WI 53066
Scale Reproductions, 1646 County Road 13, Fairhope, AL 36532
Surgeon Bay Model Shop, 187 N Ninth Ave., Surgeon Bay WI 54235

SEALS
Blom & Voss Industrie GmbH, P.O. Box 10 07 20, D-20457 Hamburg, GERMANY
U.S.A. Reps Simplex-Turner Inc., P.O. Box 168, Little Neck, NY 11363-0168
Kobuco Marine Engineering Co., 6F Tatsunuma Bldg., 3-19, Yasu 1-Chome, Chuo-ku, Tokyo, 105 JAPAN
U.S.A. Rep. Roland Marine Inc., 90 Broad Street, New York, NY 10004
Vesco Plastics, 1536 Barclay Blvd., Buffalo, NY 14209

SEALANTS
Draffels, Inc., Div. of Life Ind., 205 Sweet Hollow Rd., Old Bethpage, NY 11804

SEATING
H.O. Boatrom Co., 818 Progress Ave., Waukegan, WI 53186
Slid Systems, Inc., 220 Carpenter St., Greenvale, NY 11944
Turner Marine, Inc., 2618 154th St. NE, Marysville, WA 98271

SELF UNLOADING SYSTEM REPAIR
Kierma Rubber Engineering, GERMANY
U.S. Rep. Simplex-Turner Inc., P.O. Box 168, Little Neck, NY 11363-0168

SHAEVES
American Industrial Plastics, 724 Fantess Blvd., Daytona Beach, FL 32114

SHIP CERTIFICATION
American Bureau of Shipping, 2 World Trade Center, 106th Fl., New York, NY 10048

SHIP EQUIPMENT
Jered Brown Brothers Inc., 1608 Newcastle St., Brunswick, GA 31521-0904
Metc. Systems Corp., 645 Anchors St., Ft. Walton Beach, FL 32548

SHIP REPAIR
Curacao Drydock Co., P.O. Box 3012, Curacao, Netherlands Antilles
Golena Marine Company, 160 Van Brunt St., Brooklyn, NY 11231
Carr, E. B. Geary, P.O. Box 1246, Fajardo, Puerto Rico 00738

SHIPBUILDING EQUIPMENT
NEI Synchronit, Inc., 8970 S.W. 87th Ct., Miami FL 33176
Vialtova, Via Duca d'Acosta 12, 34074 Montebelluna, Gorizia ITALY

SHIPBUILDING—Repairs, Maintenance, Drydocking
American Eagle Mfg., 780 Peabody Jensen Way, LaComer WA 98257
Amelis, Inc., P.O. Box 3107, Brownsville, TX 78523
Asisteno Espanoles, S.A., C/O Andros, 1912023 El Planio SPAIN
Atlantic Marine, Inc., P.O. Box 3802, Mobile, AL 36652
Atlantic Marine, Inc., 6500 Hechacher Dr., Jacksonville, FL 32226
Avondale Industries, Inc., P.O. Box 50269, New Orleans LA 70150
Bender Shipbuilding & Repair, P.O. Box 42, Mobile AL 36601
Bisco Marine Co., P.O. Box 4113, New Orleans, LA 70178
Golems Marine Company, 160 Van Brunt St., Brooklyn, NY 11231
Gull Coast Fabrication, Inc., P.O. Box 538, Lakeshire, MS 39558
Caroco, P.O. Box 1147 Port Of Spain, Trinidad, W.I.
Chris-Marine AB, P.O. Box 9208-2009, Malmo, SWEDEN
Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381
Fincentieri SPA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
Golems Marine Company, 160 Van Brunt St., Brooklyn, NY 11231
Gull Coast Fabrication, Inc., P.O. Box 538, Lakeshire, MS 39558
HDW, Kiel, Germany USA Rep.: Roland Marine Inc., 90 Broad St., NY, NY 10004
Hilch Zwerge, Hilch Shipbuilding & Engineering Co., 1-11 Habauchi Chiyoda-ku Tokyo 100 Japan
Intermarine (USA), Inc., 301 N. Lathrop Ave., Savannah, GA 31402
In-Place Machine Co., Inc., 929 North Butlam Street, Milwaukee, WI 53212-3793
Jacksonville Shipyard, 750 E. Bay St., Jacksonville, FL 32202
Jeffcoat, Inc., P.O. Box 610, Jeffersonville IN 47130
Kvaerner Masa-Yards Oy, Box 132, SF-00151, Helsinki, FINLAND
Levaco Shipyards, P.O. Box 1180, HWY 90 East, Jennings, LA 70648
Lindens Indus., Sagsvasteruter 10, Postboks 9093-2202, Kari, Fredrikshavn GERMANY
Motor-Service AB, Box 215, 144 04 Rominge, SWEDEN
Munson Hammerhead, 780 Peabody Jensen Way, LaComer WA 98257
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607
Peterson Builders, Inc., 101 Pennsylvania Ave., Sturgeon Bay, WI 54235-0650
Thomas Marine, 37 Bransford Street, Patchogue, NY 11772
Samsung Heavy Ind., 25, 1-Ha, Bongdang-ro, Chungku, Seoul, Korea
SeaArk, P.O. Box 210, Monticello AR 71655
Seafab, P.O. Box 1651, 4111 Cedar St., Pascagoula, MS 39567
Scientific Marine, Inc., P.O. Box 742, Bayou la Batre, AL 36509
Sippeliner Shipyards, 821 Park Plaza Dr., Dept 21, LaCrosse WI 54601
Stainer Shipyard, Inc., P.O. Box 742, Bayou la Batre, AL 36509
Swath Ocean, 979 G Street, Chula Vista, CA 92011
Trinity Marine Group, Box 3029, Gulfport, MS 39505-3029
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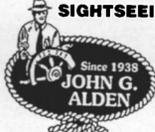
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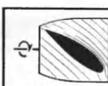
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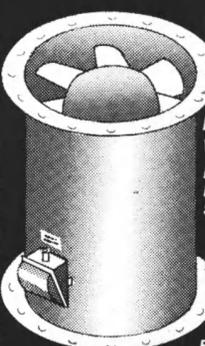
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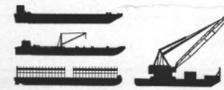
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