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REPORTER**
AND
ENGINEERING NEWS

GERMAN MARITIME REVIEW

An Industry In Transition

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cost-effective shipbuilding

FINLAND

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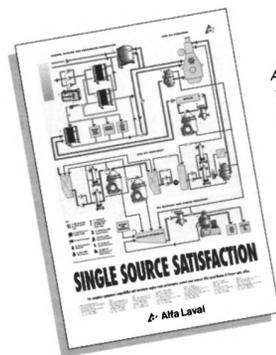
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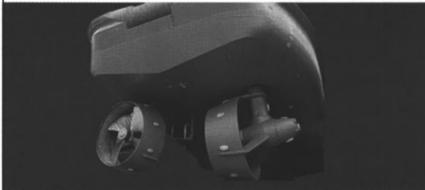
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On The Cover

Pictured on the cover is an innovative open-top containership built by Germany's HDW. Like that of many nations, Germany's maritime industry is in the midst of significant change. In conjunction with the upcoming SMM '96 exhibition, International Editor Alan Thorpe looks at the recent progress and near term prospects for the German industry, starting on page 44.

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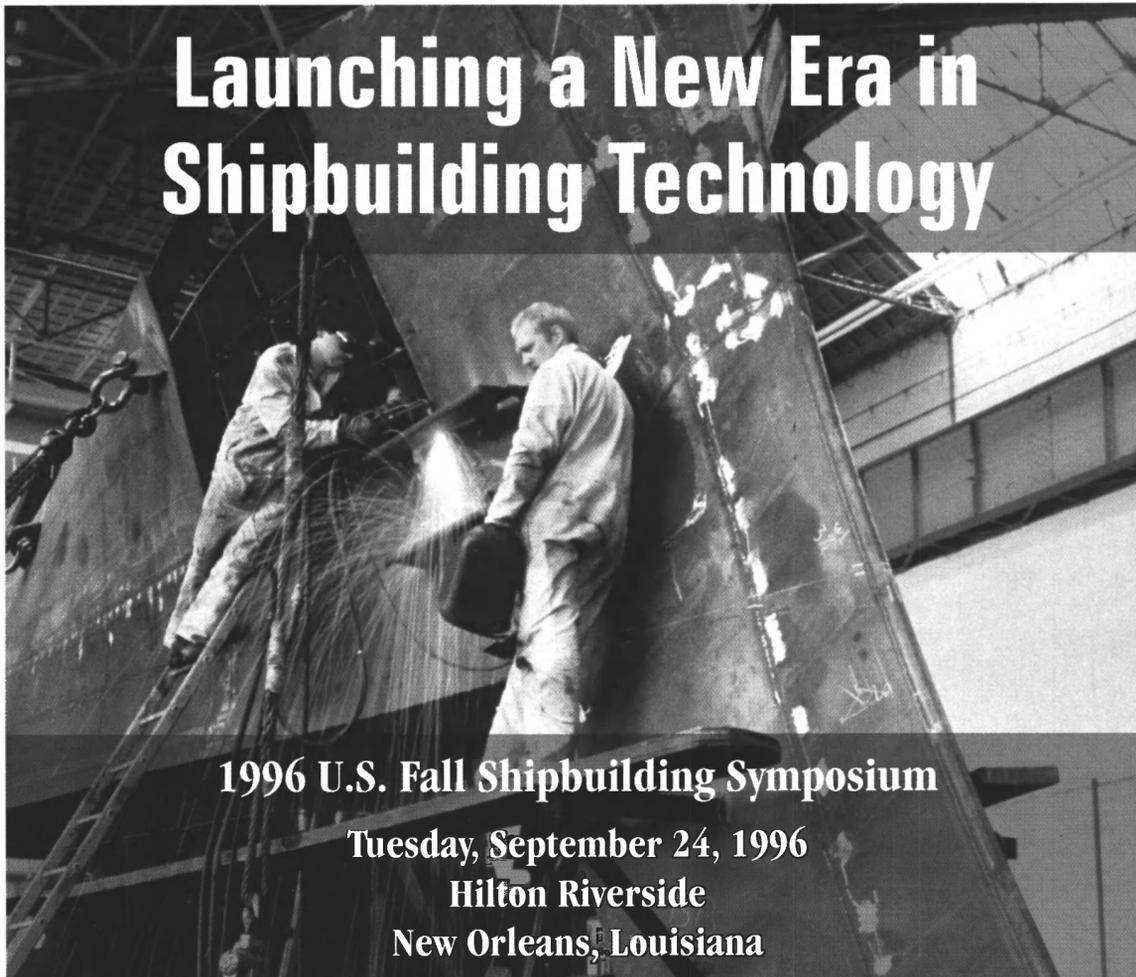
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Suezmax Tanker Market: Undergoing Profound Change

The Suezmax market is undergoing a profound realignment: major independent shipowners, such as Bergesen d.y., C.Y. Tung and Sanko S.S. have exited the Suezmax mar-

ket over the course of the last decade. Many others, including four of the six oil majors (Exxon, Mobil, Shell and Texaco), and independents Worldwide Shipping,

Troodos and Novorossiysk Shipping have reduced their presence substantially. In contrast, only three companies have clearly expanded their market presence —

Chevron, Fred Olsen and OMI Corp. (which has sought ties with chartering interests) — and yet, according to Drewry Shipping Consultants' latest report, entitled *Suezmax Tankers: Myths, Facts and Surprises*, the S&P market registered 120 sales from 1990-95 and a fleet of around 370 ships.

Drewry's analysis found that almost half of these sales were to Greek principals, such as Agency Trust and Thenamaris, mainly targeting tonnage in the 15 to 20-year-old age group. The S&P market has also seen a sharp rise in interest in early 1996, with Dynacom a featured buyer. A closer examination of some acquisitions shows that many of these aging vessels have only just passed special survey, leaving them well placed to take advantage of any improvement in the market.

Although it can be argued that Suezmax tonnage is becoming marginalized in terms of its trading options, this segment cannot be isolated from the fortunes of the tanker market as a whole. In this respect, Drewry forecasts that freight rates for Suezmax tankers will build on the strength of the first six months of 1996, reaching a cyclical peak around the end of the decade with time charter equivalent earnings of \$25,000.

Drewry's detailed forecast freight rates to 2005 show the returns from spot market trading before capital costs may average around 10 percent, but the return on equity from newbuildings and modern tonnage will barely be positive, estimated at one to two percent. This still needs to be placed in context — average freight rates for the period 1991-95 implied returns of minus one percent to plus one percent. All this serves to suggest that once again asset players will win the day, gaining steady returns from trading and selling into market strength.

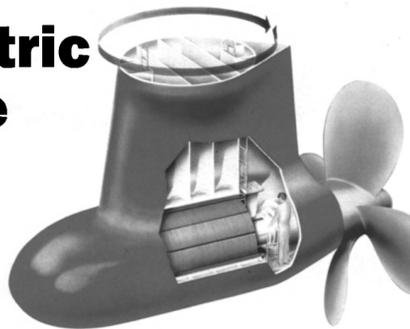
Clearly, the Suezmax tanker has neither the trading flexibility of an Aframax nor the economies of scale of the VLCC, and yet it is subject to compliance with OPA 90 for much of its trade. Triumphed in the 1980s as the largest vessel able to transit the Suez Canal fully laden, the 1990s have seen cargo movements of this type

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NB. 490
River icebreaker Rotheilstein
Owner: Osterreichische Donaukraftwerke AG, Austria
Azipod power: 2 x 560 kW
Delivery: 1995



Conversion 6070
Waterway service vessel Seili
Owner: Finnish Board of Navigation, Finland
Azipod power: 1 x 1.5 MW
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Maritime Reporter/Engineering News

plummet sharply. A dearth of time charter interest in medium or long-term fixtures leaves most owners at the mercy of the spot market. Only a handful of vessels, such as those operated by Chevron, are used to their full potential in dedicated trades.

The spot market itself has become increasingly focused on three main trading arenas: the Atlantic; the Mediterranean; and Asia/Pacific. The first is heavily influenced by the vetting requirements of the key charterers, which is evident in the age of vessels reported fixed. And it is clear that OPA 90 is continually marginalizing more (aging) tonnage in non-U.S. trades; owners of double hulled vessels are clearly favored.

Through the late 1980s, VLCCs increasingly dominated the Middle East trades and many ULCCs shuttled to the Sumed pipeline causing oil movements through Suez to fall. However, the continued growth in oil output from West Africa allowed Suezmax tankers to find a new home. However, the mid-1990s have brought about a new threat for the key West African trades — a renewed influx of VLCCs — partly as a result of weak freight rates, but also as cargo parcels are doubled up. History shows that during the early 1980s, VLCCs were heavily engaged in West African trades.

It may be no coincidence that the fleet of around 370 vessels is at its

lowest point since the mid-1980s. Almost 60 percent of the fleet is more than 15 years old, and about 100 fifth special surveys are due between 1996 and 2000, and almost 40 fourth special surveys are scheduled for 1996. More decline in fleet size seems inevitable.

Drewry's report presents a comprehensive review of the main factors at work in the market today. It profiles in detail seaborne crude oil trades and Suezmax trading patterns, and examines the costs and revenues from operating this type of tonnage. Fleet development of the past decade is exam-

ined, and all Suezmax owners and charterers are reviewed on a statistical basis.

The preceding was excerpted from a report produced by Drewry Shipping Consultants.

For more information on the Drewry report
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Lloyd's Register To Carry Out Type Approval For MSA

Lloyd's Register (LR) has been authorized to carry out type approval of marine equipment on behalf of the Marine Safety Agency (MSA) for British-flagged ships. The approval covers lifesaving, fire fighting and protection, and navigation and marine engineering equipment. The authorization permits LR to issue Statutory Equipment Approval Certificates on behalf of MSA for the following: fire appliances; structural fire protection; lifesaving appliances; marine engineering systems; navigation equipment — Group 1; MARPOL equipment; and crew accommodation. With the implementation of the European Directive on Marine Equipment — which is expected to take effect in 1998 — LR anticipates that its authorization will be extended to cover this directive, making the equipment acceptable for all ships flying flags of EU member states.

September, 1996

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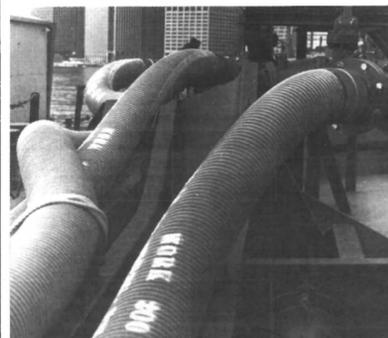
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EDITOR'S NOTE

As much as the recent AISE exhibition was touted as the "coming out party" for U.S. shipbuilders and ship equipment suppliers — marking a re-emergence into the commercial shipbuilding scene — the real party is about to begin in Hamburg, Germany, at the end of this month.

The U.S. is, of course, the official partner country for the SMM '96 exhibition, which is highly regarded as a premiere international maritime event. While the honor associated with this status is considerable, it will be fascinating to note the reception U.S. shipbuilders and equipment suppliers receive, particularly in light of the role the U.S. government has played in prolonging — and many say killing — the OECD initiative on shipbuilding subsidies. Politics aside, customers and competitors who wander into the U.S. Pavilion will find a quality group of companies ready and willing to do whatever it takes to capture commercial shipbuilding business.

This same statement can be universally applied, however, to most any nation's maritime industry. The competition bar continues to rise without an end in sight. Equipment manufacturers and shipbuilders are being pressed to produce more for less, and the companies that will prosper will be those that continue to find the means to produce.

With that said, it's interesting to note that this edition has evolved into a "Country Focus" edition, as three prominent maritime nations — Germany, Norway and Finland — are featured.

All have a strong maritime tradition, and each has also progressively changed and sharpened its focus in lieu of prevailing business trends. The result: every country has become fiercely competitive in one or more niche markets.



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EC Clears BP, Mobil Joint Venture

The European Commission (EC) has approved the formation of a joint venture between BP and Mobil which combines their European activities in the refining and marketing of fuels and lubricants. BP and Mobil will combine their fuels and lubricants businesses throughout Europe by means of partnerships (or their local equivalents) in each national jurisdiction. The equity stakes in the partnerships will be different for fuels and lubricants. For fuels,

BP will hold 70 percent and Mobil will hold 30 percent, while for lubricants Mobil will hold 51 percent and BP 49 percent. The fuels business as a whole will be operated by BP, while the lubricants business will be operated by Mobil.

Both operators will be under the control of a jointly controlled supervisory committee.

The geographic scope of the joint venture will be Western and Eastern Europe (including Western Russia), plus Cyprus and Turkey. The joint venture excludes the companies' international trading, aviation and marine activities as well as their operations in exploration and production, gas marketing and chemicals.

The joint venture will operate on a large number of product markets downstream from the refining of crude oil. This includes the manufacture and sales of base oils, process oils and slack wax; the retail sales of fuels (petrol, diesel and LPG); the non-retail sales of fuels (diesel, fuel oil, LPG, gas oil), bitumen and automotive as well as industrial lubricants.

The joint venture will have an overall market share for retail motor fuels in Europe of about 10 percent, which is expected to put it in third place behind Exxon and Shell.

For lubricants, the joint venture will reportedly represent approximately 18 percent of the total market in Europe.

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Bulk Carrier Market Weakening

Drewry Shipping Consultants has concluded that the market for 100,000-dwt bulk carrier ships is weakening due to increasing incidences of vessel oversupply, and last year's high freight earnings. According to its report, *Capesize Bulk Carriers: Market Trends and Prospects for the Large Bulk Carrier Fleet*, in 1995, the sector orderbook increased from 19 to 30 percent of the available trading fleet, accompanied by a scrapping level expected to register a negligible impact on the market imbalance. However, Drewry points out that a fundamental change is taking place within the Cape class bulk carriers, namely, that the fleet is subdividing into smaller, older Capesizes of 120,000 to 140,000-dwt, and a new generation of ships weighing 160,000 to 170,000 dwt. In other words, replacement is not "like for like."

On the plus side, the consultancy firm projects that trade volumes will not slacken, and that demand for these large-sized vessels will become more dominant in the iron ore trades and will benefit from the burgeoning coal sector. Specifically, Drewry says that the requirement for Capesize + bulk carriers will increase from 491 to 661 million tons of cargo, and correspondingly, from 2,665 to 3,660 billion ton miles.

The gain shown is also expected to highlight the subdivision of the Capesize fleet, with forecast demand in 2005 for 100,000 to 150,000-dwt ships registering at 1,306 billion tons, and demand for 150,000-dwt + ships rising from 1,360 to 2,350 billion ton miles. Assuming that this demand is met by vessels achieving 1995 productivity levels, the requirement for Capesize + vessels will predictably reach 98 million dwt in 2005. As measured by freight rates, Drewry's view is that the peak in 2000 could demonstrate rate gains of 7.5 percent on the 1995 average. Following this, the estimate for 2005 would yield a comparable gain on 1995 of approximately 17 percent. According to the U.K. firm's research, in terms of ownership in this vessel class, Japan holds first rank with 27 percent ownership, South Korea and Greece claim 13 percent and 10.5 percent, respectively, and Hong Kong registers at nearly 10 percent. Significant fleet owners include NYK, with 18 ships totaling nearly three million dwt;

Mitsui OSK with 17 ships; K Line, Navix Line and Ofer Group each with 13 ships; Showa Line with 12 ships; Hyundai MM, Keoyang, and P&O Bulk each with 11 ships; and Hanjin, Korea Line and Overseas Shipholding Group, each with 10

ships. It is also noteworthy that 42 of the identified owners run only one Capesize bulk carrier, while an additional 24 are two-ship contributors, which underpins the two schools of Cape class operation. Drewry concludes that the tradi-

tional tightness of supply in this class sector has provided lucrative opportunities for older ships and "deterred a rush of sales to the breakers."

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1989 Salvage Convention To Enter Into Force

The International Convention on Salvage — which was adopted in April 1989 at a conference convened by the International Maritime Organization (IMO), the

United Nations agency concerned with maritime safety and the prevention of marine pollution from ships — was scheduled to enter into force on July 14. It replaces a

Convention on the Law of Salvage adopted in Brussels in 1910.

The 1910 Convention incorporates the "no cure, no pay" principle, under which a salvor is only

rewarded for his or her services if operations are successful. Although this basic philosophy has worked well in most cases, it does not take pollution into account. A salvor who prevents a major pollution incident but does not manage to save the ship or the cargo receives nothing. There is therefore little incentive for a salvor to undertake an operation which has only a slim chance of success.

The new Convention seeks to remedy this deficiency by making a provision for an enhanced salvage award, taking into account the skill and efforts of salvors in preventing or minimizing damage to the environment. It further introduces a "special compensation" to be paid to salvors who have failed to earn a reward in the normal way.

Damage to the environment is defined as "substantial physical damage to human health or to marine life or resources in coastal or inland waters or areas adjacent thereto, caused by pollution, contamination, fire, explosion or similar major incidents."

The compensation will consist of the salvor's expenses, plus up to 30 percent of these expenses if, due to the efforts of salvor, environmental damage has been minimized or prevented. The salvor's expenses are defined as "out-of-pocket expenses reasonably incurred by the salvor in the salvage operation and a fair rate for equipment and personnel actually reasonably used." The tribunal or arbitrator assessing the reward may increase the amount of compensation to a maximum of 100 percent of the salvor's expenses, "if it deems it fair and just to do so."

On the contrary, if the salvor is negligent and has consequently failed to prevent or minimize environmental damage, special compensation may be denied or reduced. Payment of the reward is to be made by the vessel and other property interests in proportion to their respective salvaged values.

The countries which have accepted the Convention are Canada, China, Denmark, Egypt, Greece, India, Iran, Italy, Jordan, the Marshall Islands, Mexico, Nigeria, Oman, Saudi Arabia, Sweden, Switzerland, United Arab Emirates, the U.K. and the U.S.



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Oceandril Commits Ranger To Multi-Well Offshore Program

Oceandril, Inc. has entered into contracts with two Texas-based offshore exploration companies — Seagull Energy E&P, Inc. of Houston and Aviva America, Inc. of Dallas — committing *Oceandril Ranger* to a three well workover and well completion program offshore Louisiana.

Following completion of work for Seagull at Vermilion Block 75, *Oceandril Ranger* will move to Aviva's Main Pass Block 37 platform for a two well workover and completion program.

Oceandril Ranger is a self-propelled, mat-supported, cantilever jackup rig designed for Gulf of Mexico shallow water well completion and workover service. Oceandril, Inc. is a Texas corporation providing well completion, workover, project management and rig brokerage services to the offshore energy industry.

Intertanko Update

Intertanko Chairman Testifies Before Senate

Richard du Moulin, chairman of Intertanko, testified before the Senate Committee on Environmental and Public Works on June 4, with regards to S. 1730, the Oil Spill Prevention and Response Improvement Act. Having stated Intertanko's support for the concepts embodied in S. 1730, Mr. **du Moulin** drew attention to Intertanko's concern about Section 101's provisions regarding operational and structural measures.

Section 101 would implement two proposed rules if the U.S. Coast Guard (USCG) did not issue final rules within the next months.

The USCG proposed a generic, nation-wide underkeel clearance standard in its operational measures rulemaking. Intertanko reportedly believes that determining minimum underkeel clearance requirements is a local USCG issue, and therefore opposes the USCG proposal and believes S. 1730 offers a better solution to the issue.

Intertanko To Join IACS

Intertanko has been invited to have a seat on the International Association of Classification Societies' (IACS) Advisory Committee, comprising International Maritime Organization (IMO) and key industry bodies. The Committee was formed to

oversee the work of IACS.

Restoration of Funding for USCG VTS 2000 Program

Intertanko is attempting to influence the Senate to restore funding to the VTS 2000 program, eliminated in June by the House Subcommittee on Transportation

Appropriations. VTS 2000 is the USCG's program for the next generation of vessel traffic systems. Intertanko will be assisted in its efforts to restore funding by former Congressman **R. Lawrence Coughlin**, who served for 25 years in the House of Representatives before retiring in 1993.

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CONTRACTS

Navy Extends Intergraph Supply Contract

On July 29, Intergraph Corp., Huntsville, Ala., announced that the U.S. Navy added its suite of DM2 information management software to the \$398-million NAVAIR/SPAWAR CAD-2 contract. This software is designed for implementation throughout an enterprisewide computing environment, and provides a complete information management solution which enables users to manage large and small-format documents, engineering data, and the workflows used to process this information. DM2 software can reportedly manage a mix of information, including raster images, CAD designs, text documents, ASCII files, video clips and audio files.

Intergraph supplies interactive computer graphics systems and technical application software to governments and commercial customers worldwide.

For more information on Intergraph
Circle 5 on Reader Service Card

Walker Engineering Wins IISCG Contract

The U.S. Coast Guard (USCG) has awarded North Hills, Calif.-based Walker Engineering a contract to supply several diesel-powered vessels with its Airsep closed-crankcase breathing system. The USCG vessels to be outfitted with the air-oil separators reportedly include 41-ft. (12.9-m) utility boats and 44-ft. (13.4-m) motorized lifeboats, adding up to about 300 vessel installations. The value of the contract was not disclosed.

The Airsep units are designed to reduce oil consumption, eliminate diesel blowby in the engine room, maintain engine performance, improve engine air filtration and help reduce oil seal leaks.

For more information on
Walker Engineering
Circle 6 on Reader Service Card

Consilium Contracts With Dolphin And Premier

Consilium Marine was awarded a contract from Dolphin Cruise Line

to install its new Salwico C300 fire detection system on three vessels, *Ocean Breeze*, *Sea Breeze* and *Dolphin IV*. Premier Cruise Line has also contracted with Consilium for the installation of new smoke detection systems on three of its vessels. The new CS3000 systems will replace old thermal detection systems. In addition, Premier has also ordered Consilium's VDU and software based presentation system, applicable for display and control of safety measures such as fire screen doors, dampers and low level light.

For more information on
Consilium Marine
Circle 7 on Reader Service Card

SeaVision To Put Systems On Celebrity Vessels

SeaVision, Inc. has contracted with Celebrity Cruises to install and operate interactive television systems on its entire fleet of cruise ships. This agreement was reached early this summer, after SeaVision completed installation of such a system on Celebrity's *Century*. The cruise line decided to extend the system, and dubbed it *Celebrity Network*. Under the terms of the agreement, the network will be installed on *Horizon*, *Meridian*, *Zenith* and *Galaxy* by the end of the year. Newbuild *Mercury*, building at Meyer Werft, will also be equipped with a system in 1997, pre-launch. The *Celebrity Network* reportedly provides guests with a wide range of services, including shore excursion preview and purchasing, state-room service, wine ordering, on-demand movies, shopping and gaming.

For more information on SeaVision, Inc.
Circle 8 on Reader Service Card

BP Shipping Places Kelvin Hughes Nav System Order

Three 150,000-dwt Suezmax tankers under construction at Samsung Shipyard in South Korea will be equipped with Kelvin Hughes' NINAS 9000 integrated navigation system. According to Kelvin Hughes, this order is significant for the shipping company because it represents BP's first

fully integrated bridge system venture. Kelvin Hughes' development of equipment employing ARCS charts and its work with ECDIS were reportedly influential factors in BP's decision to specify NINAS 9000 for the newbuilds. The vessels, Samsung hull numbers 1191/92/93, are being built for North America Tanker Shipping, under the supervision of BP Shipping, to whom the ships will be chartered.

For more information on Kelvin Hughes
Circle 9 on Reader Service Card

Japanese Agency Buys SeaBeam Survey System

The Japan Maritime Safety Agency of Tokyo, Japan, has purchased a multibeam bathymetric survey system from SeaBeam Instruments, Inc., for installation aboard R/V *Shoyo*. The survey sonar, part of the company's 2100 Series, is scheduled to be delivered next year, and can be configured for multiple frequency operation for use in a variety of missions. This contract represents the fifth multibeam survey system the company has sold to the Japanese agency, made possible by Toyo Corp., SeaBeam's representatives in the Far East.

For more information on
SeaBeam Instruments, Inc.
Circle 10 on Reader Service Card

Incat Signs Agreement With Chinese Yard

Incat Managing Director Robert Clifford recently returned to Australia from Asia, after having signed a memorandum of agreement with Afal High Performance Ships Ltd. for the construction of high speed car passenger ferries in Panyu, China. This agreement, struck between Mr. Clifford and Afal Managing Director Vitus Szeto, could pave the way for the construction of at least three Incat K50 ferries in China, worth in excess of \$80 million.

Incat has been searching for quality shipbuilding facilities in which to build its ships, due to the strong global demand for its catamarans. According to company reports, "... the unlevel playing

field created by the Australian government removing the shipbuilding bounty in mid-1997 is seen as one contributing factor in choosing a non-Australian shipbuilding site."

Incat's association with Afal began in 1981 when the latter started building Incat ferries in Hong Kong. The new Afal yard in China has reportedly delivered six aluminum high-speed vessels, with a seventh due for completion in October. During his visit to the new Afal yard, Mr. Clifford remarked that "... the quality of workmanship produced by the shipyard is most satisfactory, the training programs are very good, and the facility more than meets my requirements." Mr. Szeto confirmed that the K50 agreement would fill Afal's orderbook for at least 18 months.

The Incat K50 is designed to travel at 50 knots laden, carrying approximately 450 passengers and 90 cars.

For more information on Incat
Circle 11 on Reader Service Card

IMC Engineering Wins Order

IMC Engineering Inc. has been awarded a contract to supply a digital camera monitoring system for Hamburg-based H.H.L.A. Initially, one gantry crane will be outfitted with the system, and if the system is satisfactory, the monitoring systems will be installed on additional cranes in order to improve safety under the cranes and optimize container damage control. Other IMC customers with similar installations include the Port of Gothenburg AB, the Purfleet Thames Terminal and the Maersk container terminal in Algeciras.

For more information on
IMC Engineering Inc.
Circle 12 on Reader Service Card

Cambridge Applied Systems And Autronica Marine Announce Alliance

Cambridge Applied Systems, Inc. (CAS), a provider of solutions for

("Contracts" continued on page 15)

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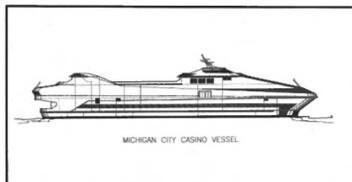
Diesel-electric AC power station helps shuttles loading in harsh North Sea environment

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Guido Perla Designs To Ply Lake Michigan

Two sleek, contemporary casino vessels slated for service on Lake Michigan in Indiana communities next fall are on the drawing boards at Guido Perla & Associates, Inc. (GPA). The naval architecture and marine engineering firm will provide all detail engineering including lofting and numerical plasma cutting codes for

the companies selected to build the vessels. GPA plans to solicit bids from shipyards in late August with construction slated to begin this fall, commencing what is expected to be a year-long project. *Majestic Star* — a 360-ft. (109.7-m), 3,000-passenger vessel — will be built for Barden Development Corporation for operation



Pictured is the Michigan City casino vessel.

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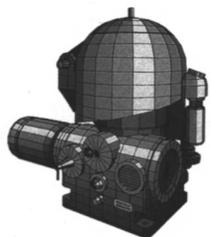


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out of Buffington Harbor, Ind. A 348-ft. (106.1 m), 3,000-passenger boat, yet to be named, will go into service for Indiana Blue Chip, Inc. at Michigan City.

GPA, according to David Pasciuti, vice president of Naval Architecture and Marketing, has also designed a traditional 260-ft. (79.2-m) stern paddlewheel boat for an island nation in the South Pacific. The vessel will be permanently moored, but will have onboard generators for electrical power generation. The paddlewheel will operate for effect. The vessel will offer casino space, a night club, restaurant, stateroom and lounge. The boat is scheduled to be built in the U.S., and then transported to its future location.

Majestic Star will be propelled by two bow and two stern rotatable Z-drives powered by 1,000-hp electric motors. Power will be provided by four CAT 3516 1,825-kW engines. The four-deck vessel will have a 76-ft. (23.2 m) beam, will draw 12 ft. (3.6 m) and provide 40,000-sq.-ft. of casino area.

The Blue Chip vessel will operate on the restricted waters of Trail Creek in Michigan City. The two-deck vessel will be constructed on-site. In addition to detail engineering, GPA will support the project in all facets of production. This will include design of launching ways and cradles, planning of module lifts and transports and on-site engineering support.

The vessel will offer 34,000-sq.-ft. of gaming space, and will have an 80-ft. (24.4-m) beam and a full-load draft of 8 ft. (2.4 m). Each vessel provides for a crew of 500.

Other design work in-house includes a 220-ft. (67-m) supply vessel for deep offshore oil exploration and production. In addition to its fuel, water and mud cargo capacities, the vessel can be equipped for dynamic positioning and fire fighting with a 2,000 gpm fire pump and monitors. Propulsion for this vessel will consist of two engines. The controllable pitch bowthruster will be driven by a dedicated diesel engine.

CONTRACTS

(Contracts continued from page 12)

viscosity measurement and control, has formed a sales and service alliance with Autronica Marine USA, a supplier of engine room automation instrumentation, cargo monitoring and control sensors, and fixed fire detection systems. Through the partnership, CAS and Autronica will supply total Heavy Fuel Oil (HFO) viscometer and temperature monitoring systems to the North American marine industry.

For more information on
Cambridge Applied Systems, Inc.
Circle 15 on Reader Service Card

MAN B&W Engines To Power Four Singapore Newbuilds

Four 650-TEU feeder container-ships to be built by Jurong Shipyard Ltd., in Singapore, will be powered by MAN B&W Diesel 7S42MC low speed engines. According to the engine supplier, this order consolidates the success already achieved by the small bore, low speed MAN B&W engines in Singapore.

Merits of the low speed, MC engine technology and advantages of installing a two-stroke engine include: more cargo space due to a shorter complete propulsion system; and no need for reduction gear. Two of the recently contracted engines are scheduled for delivery in April 1997; and the two others will follow in June of the same year. MAN B&W reported that these orders bring the total of MC engines ordered by Singapore yards in recent years to 19.

For more information on MAN B&W Diesel
Circle 20 on Reader Service Card

Detroit Diesel Acquires Australian Assets

In late July, the Detroit Diesel Corporation announced that a newly-formed affiliate, Detroit Diesel-Allison Australia Pty Ltd., acquired the assets of Rexam plc's Australian Detco operation. Detroit Diesel-Allison Australia is now the Australian distributor for

Detroit Diesel, MTU, Perkins Engines, Electro-Motive Diesel and Allison Transmission products. It distributes and services diesel and natural gas engines, heavy-

duty automatic and hauling transmissions and replacement parts in the marine, on-highway, mining, power generation and agricultural markets. Detroit Diesel-Allison

Australia is reportedly the largest engine and transmission distributor in Australia.

"This acquisition is a strategic step forward in continuing to pro-



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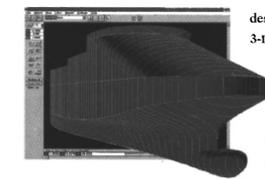
Next, we define all the tanks and compartments in **Autohydro**. Calculating volumes and balancing the ship is easy and quick, so we can spend more time to optimize the layout.

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CONTRACTS

vide first class support to our customers," said **Leo Tutt**, shareholder and chairman of the new compa-

ny. Mr. **Tutt's** family founded Detco's predecessor in 1948.

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new levels of customer support as we introduce new products and focus on a process of continuous

improvement ... Detroit Diesel-Allison Australia will benefit greatly from the joint marketing opportunities of international ownership," said **Roger Penske**, chairman of Detroit Diesel Corporation. "Our customers can look forward to the technological strength and after-market support synonymous with products like Detroit Diesel engines," he added.

Detroit Diesel-Allison Australia is headquartered in Chipping Norton near Sydney, and operates in more than 20 locations in Australia, New Zealand, Central East Asia, Papua New Guinea and the Pacific Islands. Detroit Diesel Corp. recently announced second quarter 1996 revenues of \$491 million.

For more information on Detroit Diesel
Circle 16 on Reader Service Card

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Circle 322 on Reader Service Card

Alfa Laval Announces Contract Awards

Swedish company Alfa Laval, a major supplier of systems and equipment to the marine, power and oilfield industries, has announced a number of new contracts. The company will supply oil treatment systems and central cooling components for Carnival's two latest newbuildings under construction at Kvaerner. Alfa Laval will also reportedly supply Disney's two cruise ships with oil treatment systems, freshwater generators and central cooling systems. Similar supply contracts were signed for a drilling platform conversion and RoRo newbuild at Kvaerner Rosenberg, Norway, and Kvaerner-Govan, Scotland, respectively.

The company also contracted to supply components for two chemical tankers under construction at Union Naval de Levante, a ferry at Astilleros Espanoles' Puerto Real yard, and four container vessels under construction for Sea-Land Service Inc. at Japan's IHL.

For more information on Alfa Laval
Circle 17 on Reader Service Card

Nichols Brothers To Build Dive Catamaran For Operation In Fiji Islands

The third vessel in a series of catamaran dive boats from Nichols Brothers Boat Builders, Inc. has been ordered by Alaska Dive Boat, Inc. for operation by Live/Dive Pacific. The vessel, dubbed *Fiji Aggressor*, to be delivered from Nichols Brothers' Whidbey Island, Wash., yard early next year, will be based at Live/Dive's new Aggressor franchise in the Fiji Islands.

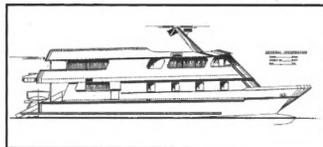
Fiji Aggressor will be a Subchapter T boat under U.S. Coast Guard regulations. It was designed by International Catamarans Pty., Ltd. of Australia (Incat), and will be the 23rd high speed catamaran to be completed by Nichols Brothers.

The vessel — which will accommodate 16 passengers for extended cruises and 49 passengers for day boat operations — will offer a range of facilities for sports divers. Such facilities include a stateroom with individual shower units, crew quarters, a full-service galley, bar and entertainment center, dive platforms, photo lab and onboard air compressors to fill scuba dive tanks.

Anticipated to have a top speed of 25 knots, *Fiji Aggressor* will be driven by waterjets powered by two 1,000-hp diesel engines. Overall length of the Z-form, high efficiency, low wake hulls will be 107 ft. (32.6 m). Onboard equipment will also include two 55-kW generators, fresh watermakers and air conditioning.

Alaska Dive Boat, Inc., headed by **Joe Usabelli**, has previously taken delivery of *Kona Aggressor II* in 1992, and *Palau Aggressor II* in 1994. The Aggressor Fleet, Ltd., headquartered in Morgan City, La., books charters for operations in a number of locations, primarily in the Caribbean and South Pacific areas.

For more information on Nichols Bros.
Circle 37 on Reader Service Card



MarineLine Coating Applied To Chemical Tanker

M/V Rachel B, a 13,749-dwt chemical tanker operated by Hiltviet Associates, Inc. of New York, has had two of its cargo tanks coated with Advanced Polymer Sciences' MarineLine high-technology tank lining. The 1987-built vessel was docked for 26 days at Viktor Lenac Shipyard, Rijeka, Croatia, in April. Among tasks carried out during its stay in the yard was the lining of the vessel's No. 7 port and No. 7 starboard sloptanks with two coats of MarineLine of 250 to 350 microns dry film thickness, covering a total surface area of 1,600-sq.-m.

Previously, these tanks had been coated with epoxy, but as the vessel will be carrying cargoes such as methanol, acetone, sodium hydroxide and other similarly aggressive products in its tanks, it was decked to apply MarineLine as the first phase of estab-

lishing the vessel's capability.

Owned by Suffolk Tankers Ltd., *M/V Rachel B* is an IMO type II and III chemical tanker and has a total of 28 cargo tanks of which 14 are of stainless steel construction. The other 14 tanks, arranged seven on each side of the vessel, are of coated steel. The application to *Rachel B* is reportedly one of many projects carried out or specified, in addition to Latvian Shipping Company's chemical tankers *Indra* and *Dzintari*, both of which had all cargo tanks coated with MarineLine. Another five vessels in the fleet are to be similarly coated with MarineLine.

For more information
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Circle 336 on Reader Service Card

Brazilian Navy Gets Rescue ROV

The Brazilian Navy has completed acceptance trials of Deep Ocean Engineering's 1476.4-ft. (450-m) Phantom Ultimate ROV. The Brazilian system is designed to handle equipment and tool pack-

ages necessary for personnel rescue of downed submarines. The Phantom Ultimate system comes with a handling system and control van. The gyro-guided vehicle carries a Mesotech 971 sonar, Schilling HV6F manipulator, ORE Trackpoint II tracking, DOE video, and Photosea Nighthawk video

and still cameras and strobe, while providing 70 kg of additional payload. The onscreen display depicts depth, heading, time and date, elapsed time, hull integrity status and umbilical turns, as well as soft and armored tether length payed out.



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I.D. Boats Expand NRC Gulf Response Fleet

Graham Marine, an affiliate of Seacor subsidiary National Response Corporation (NRC), has completed the installation of oil spill containment and recovery systems on M/V *Charlie G.*, one of its production support vessels based out of Venice, La. The vessel entered service on July 1, after its crew completed required HAZWOPER and equipment deployment training.

A second Graham vessel is scheduled to be completed by the middle of August. The vessel will be staged near Cameron and Lake Charles, La. NRC has designed both vessels as identified deployment (I.D.) boats. Equipped with high capacity oil skimmers, 500 ft. (152.4 m) of 43-in. oil containment boom and 257-barrel recovered oil storage capacity, the Graham I.D. boats will augment NRC's six dedicated oil spill recovery vessels (OSRV) already staged at major ports in the U.S. Gulf of Mexico.

"The Graham I.D. boat program represents the commitment of NRC, Graham and Seacor to utilize every opportunity to combine resources and capabilities to expand and improve NRC's services," said NRC Vice President **Al Wood**. "We continue to believe that distribution of resources and density of offshore coverage is key to protecting active oil producing and transporting areas across such a broad geographic area."

"There are 188 additional vessels in the Seacor fleet that can support NRC's offshore response operations," said **Charles Fabrikant**, chairman of both Seacor and NRC. "Almost 100 vessels of various types were utilized during the *Mega Borg* spill offshore Galveston. This clearly demonstrates the importance of access to a large marine resource network." M/V *Charlie G.* is chartered jointly to Vastar Resources, Inc. and Marathon Oil Company, and supports production operations in the West Delta area of the U.S. Gulf off the mouth of the Mississippi River.

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OFFSHORE MARKET REPORT

Offshore Sector Giving Boost To World Shipbuilders

by
James R. McCaul, President
International Maritime Associates, Inc

Offshore exploration and well appraisal (E&A) activity is projected to increase almost 10 percent over the second half of this decade. Even more significant, spending for offshore E&A is projected to grow more than 20 percent during this period. Driving interest in the offshore sector are: (1) improved techniques for finding and quantifying new reservoirs and; (2) new techniques for producing deepwater and marginal fields. A result has been a resurgence of demand for offshore rigs and increasing interest in floating production equipment.

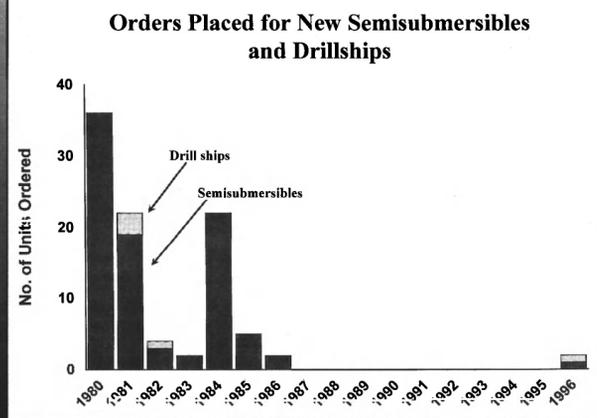
Offshore rig demand

Increased utilization and higher day rates for semisubmersibles and other mobile drilling equipment has resulted from the pick up in offshore development. Mobile drilling equipment has reached the highest utilization level since

January 1985. Semisubmersibles working offshore Europe are realizing a 91 percent utilization level — and mobile drilling rigs offshore West Africa are achieving almost 95 percent utilization. Rates now being achieved by fourth generation semisubmersibles are exceeding \$130,000 per day — compared to \$60,000 to 75,000 per day in mid-1995 and \$50,000 to 55,000 per day in mid-1994. Drillships are getting rates more than 50 percent higher than a year ago.

The increase in day rates for rigs and drill ships has begun to generate demand for new or upgraded equipment. There is no shortage of activity. Here are a few examples of reported rig and drillship construction or upgrading projects.

- Sonat Offshore has announced plans to up-



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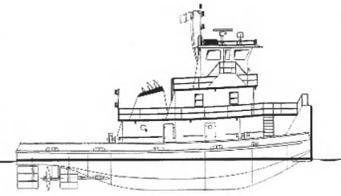
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OFFSHORE MARKET REPORT

grade three rigs and build/upgrade two drillships for deepwater use — and recently signed a contract with Astano for construction of the drillship *Discoverer Enterprise*.

- Global Marine plans to con-

vert/upgrade a flotel for rig use and upgrade one or two additional rigs for deepwater drilling. Global also plans to spend more than \$150 million to convert *Glomar Explorer* to a deepwater drillship.

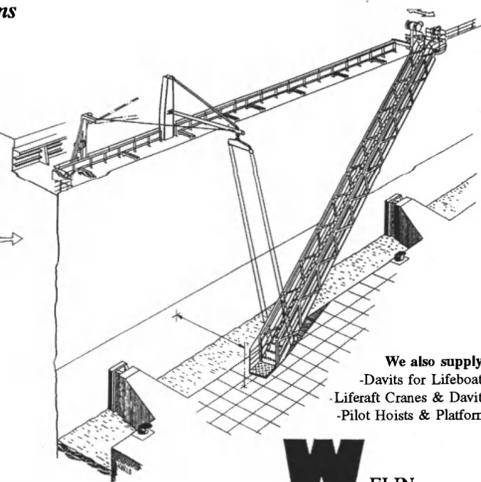
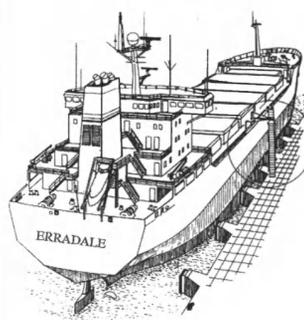
- Falcon Drilling plans to convert a 542-ft., Ukrainian-built hull to a deepwater drillship capable of operating in water depths of 8,000 ft.
- Odfjell plans to build a fifth gen-

eration semisubmersible utilizing the steel pontoons of a rig begun in 1986. Total cost is expected to exceed \$200 million.

- Conoco is understood to be planning to place an order for a deepwater drillship, possibly in joint venture with Reading & Bates.
- Sedco Forex plans to upgrade two rigs for deepwater drilling.
- Saipem will convert the flotel *Scarabeo 7* (ex-*Safe Supporter*) to a deepwater drill rig — and is currently shopping yards in the U.S. and Europe for performing the conversion.
- Japan Drilling is studying the possibility of building two new semisubmersibles.
- PMB/Bechtel has been given a contract by Nobel Drilling to study conversion of a three-column submersible into a semisubmersible drill rig.

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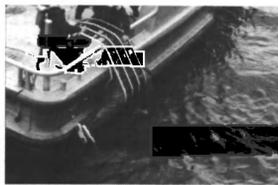
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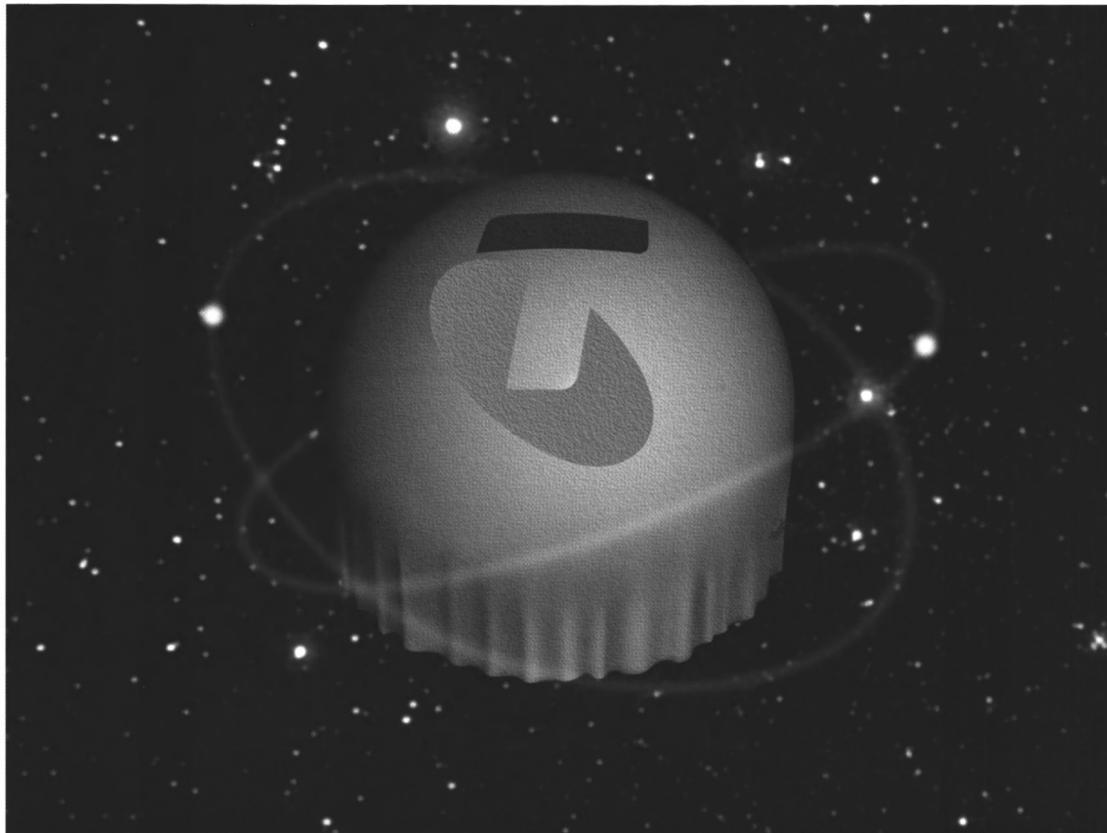
Demand for floating production systems

Construction and conversion of floating production equipment will provide a substantial available market over the next several years. To satisfy requirements for projected installations of floating production systems in the year 2000, capital expenditures exceeding \$10 billion will be made for new floating production equipment over the next three to four years. Almost half of these expenditures will be for construction and conversion of FPSO vessels. Another large portion will be for production semisubmersibles and tension leg platforms.

We expect that demand for floating production systems will continue well into the next decade. However, there will be a shift in demand for various types of equipment — with increasing emphasis on TLPs and other production units able to produce large multi-well fields.

We see demand for floating production systems increasing par-

Maritime Reporter/Engineering News



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OFFSHORE MARKET REPORT

ticularly in the Gulf of Mexico, where E&A activity is rapidly accelerating. Subsea production will accommodate most of the new gas finds in the Gulf, but oil will continue to be difficult to transport long distances at great depths and

floating production systems will need to be positioned over individual fields. Because pipeline infrastructure exists in the Gulf, there will likely be little requirement for FPSO vessels in this area — as onboard storage will not be

required. As a result, demand in deepwater Gulf locations will generate a growing requirement for TLPs and other systems able to economically produce large, multi-well fields. We believe that fabrication of TLPs (and possibly

SPARS) for installation in the Gulf of Mexico will generate the greatest contract value for floating production system suppliers in the next decade.

IMA's study of floating production systems

This article is an excerpt from the first of a series of quarterly reports that IMA will issue over the next year to continually monitor this fast moving business sector. Each of these quarterly reports will be a tight, objective assessment of the current business situation. A special section will be included in each report examining a specific segment of the floating production market.

A subscription to *Floating Production Systems* (four quarterly reports) is available for \$1,200. Contact: IMA Associates, 600 New Hampshire Ave., NW, Washington, DC 20037 USA, tel: (202) 333-8501; fax (202) 333-8504.



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McDermott Awarded Slice Of LNG Project

J. Ray McDermott, S.A. recently announced that Qatar Liquefied Gas Company (Qatargas) has awarded McDermott-ETPM East, Inc. the offshore portion of the third train of its LNG project. The project, valued at approximately \$130 million, includes the design, procurement, construction, installation, hook-up and commissioning of a process platform, a well-head topside and associated bridge, pipeline and submarine cable. Engineering design will be performed by McDermott at its Houston office, and fabrication will be completed at its Jebel Ali facilities in the United Arab Emirates (UAE). The project is due to be completed in late 1998.

McDermott-ETPM East, Inc. of Dubai, UAE, is a joint venture between J. Ray McDermott, S.A. and ETPM S.A. of France. J. Ray McDermott is a worldwide marine construction company. Its services include design, fabrication and transportation; installation of new and refurbished offshore platforms; installation of offshore pipelines; and design and installation of subsea production facilities for the offshore oil and gas industry.

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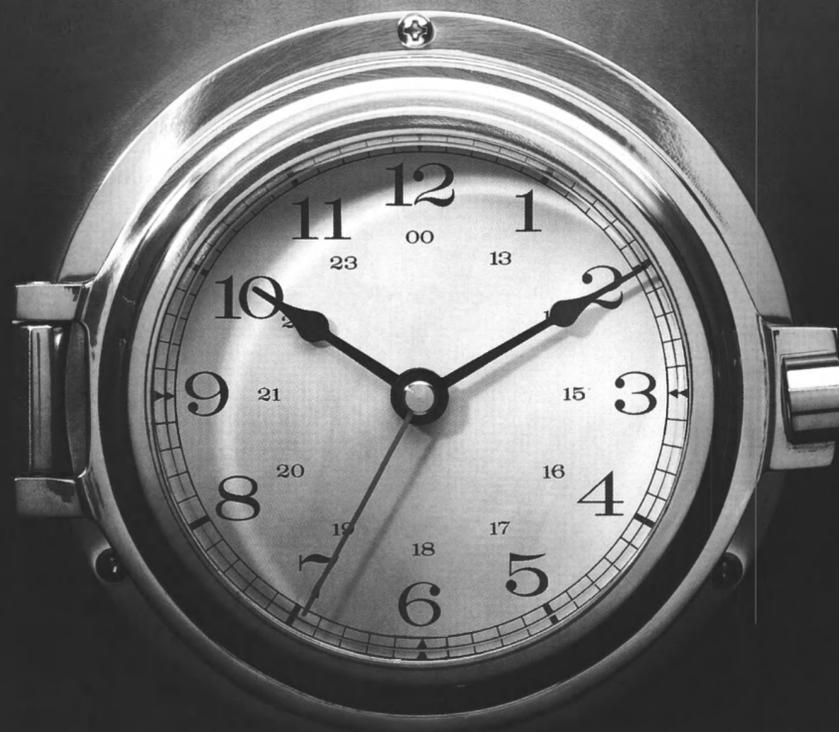
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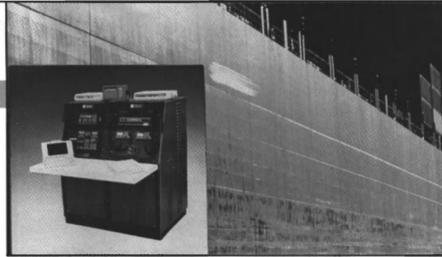
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COMPANY PROFILE

Mackay Communications Helps Companies Embrace Safety and Digital Technology

Communicating in emergency situations has always been a key requirement for shipboard communications equipment. With the implementation of the Global Maritime Distress and

Safety System (GMDSS), equipment reliability during emergencies at sea is still the most critical requirement. However, business applications are surpassing distress



Mackay's MRU-2000 console includes all the requirements to qualify for GMDSS worldwide coverage.



signals as the primary function of vessel communications systems. Advancements in satellite technology and Inmarsat's introduction of low cost digital service are transforming ships into "floating offices." Today, an "emergency communication" is more likely to be an urgent business data exchange.

For Mackay Communications, supporting the technology and service demands of the floating office presents the perfect niche — an outsource vendor with a comprehensive worldwide solution including communications systems, navigation equipment, global service capability and satellite air-time services. The company's strategy is to fulfill customer-specific equipment, communications, maintenance and administrative needs. With 80 years of experience in maritime communications, navigational systems and engine room monitoring equipment, Mackay is positioned to meet these needs.

Keeping safety at sea and customer compliance with GMDSS requirements in mind, Mackay offers a broad range of communications products. Included in this offering is the MRU-2000 product family that complies with GMDSS requirements for worldwide coverage. Mackay also provides the necessary government compliance documentation and licensing procurement services for the specific country under which ships are flagged. These services help vessels attain international standards and provide them with proficient communications systems.

Expanding communications demands fostered by the floating office and new digital satellite services have driven the development of new satellite terminals. Mackay, as the exclusive U.S. distributor of Nera satellite equipment, offers what the company claims is the world's most reliable satellite equipment. The offering includes a complete product line of satellite terminals including the only maritime terminal with

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duplex High Speed Data (HSD) capability.

To complete the communications link from ships to home offices, Mackay offers global satellite air-time. The addition of air-time to the company's current offering of traffic accounting services consolidates satellite billing tasks by tracking all satellite transmissions (Inmarsat A,B,M,C and AMSC calls). Shipping companies can facilitate their information more efficiently with Mackay supplying accurate billing information and detailed cost analysis. Offering the complete satellite communications solution enables Mackay to ease customers transitions when upgrading from analog to digital technology.

Mackay President and COO **Francis Neary** is aggressively positioning the company to be at the forefront of marine communications at the start of the 21st century. Mr. Neary's philosophy is simple: "I believe that the successful supplier will know how to mesh all its customers' needs into a turnkey offering that includes hardware, software, air-time, billing and maintenance services available worldwide."

Because the demand for reliable communications and instrumentation equipment has become more important to commercial shipping companies, the need to keep it functioning is vital. In order to sustain equipment in the rugged maritime environment, Mackay backs up its communications and navigation systems by a comprehensive U.S.-based service organization. Several levels of maintenance plans provide customers with a well-trained maintenance and support staff. This service is designed to minimize downtime and maximize safety. In order to reduce the amount of time and cost associated with out-of-service ships, Mackay coordinates its service schedule so that its allocation of time does not delay any scheduled departures.

In its ability to meet customer needs at multiple levels, Mackay delivers global support for floating offices. As the maritime industry seeks providers who can deliver to their outsourcing needs, Mackay will aggressively provide the complete communications and service solutions required to keep these floating offices working efficiently and cost effectively. Mackay has charted its course to support customers who must adapt to remain

competitive in the worldwide shipping market.

The History of Mackay Communications

Mackay Communications' role in the development of maritime communications began with a need to

lower transatlantic cable communication prices. In 1884, **John Mackay** and **James Bennett**, owner of *The New York Herald*, established the Commercial Cable Company and constructed two transatlantic cables with a rate of 50 cents per word compared to the

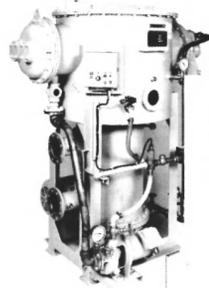
high, current five dollars per word. Mr. Mackay then decided to enter the land-line telegraph business and beginning in 1885 he created the second largest (next to Western Union) telegraph company in the world, Postal Telegraph Company. The experimentation in radio at

Leaders of Desalination Technology

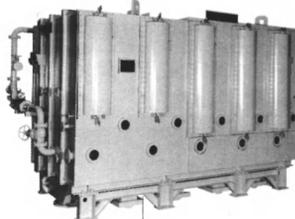
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the turn of the century eventually led to the ability to communicate with ships at sea through coastal base stations. World War I proved radio as a reliable communications device, and it became a less expensive and more accepted form of communicating. **John Mackay's** son **Clarence** realized that radio would flourish and in 1927, he pur-

chased a Long Island station that could communicate with Europe and ships at sea.

By 1928 **Clarence Mackay** had acquired other radio companies and created a holding company called the American Cable and Radio Company. At the same time, **Clarence** sold half of the interests to International Telephone and

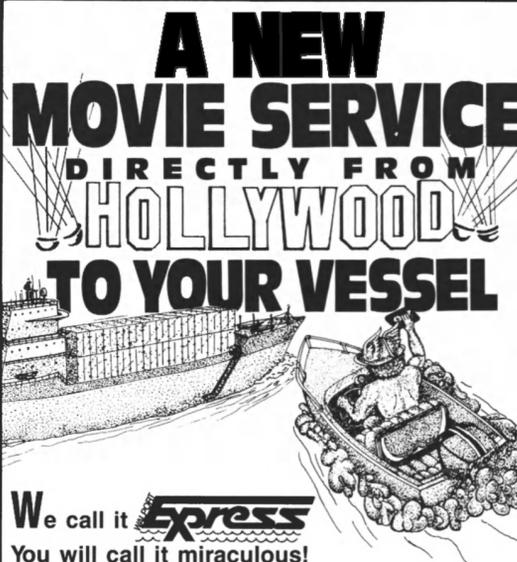
Telegraph Corporation (ITT). ITT acquired the remaining half in 1963, and separated the marine communications operations into a subsidiary called ITT Mackay Marine.

After ITT divested its telecommunications operations in the 1980s, the Mackay operations were sold to a group of private investors

in 1987. Today, Mackay Communications operates from its headquarters in Raleigh, N.C., providing comprehensive communications systems, navigational and engine room equipment, and satellite air-time services to the maritime industry.

For more information on Mackay
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New Contracts At OSL

New contracts at Offshore Systems Ltd. (OSL) include the supply of two additional ECPINS for USS Great Lakes Fleet, Inc., bringing the total of ECPINS being used by its fleet to six. In addition, the Canadian Coast Guard has purchased 12 ECPINS for several

Coast Guard regions, including training institutes. The systems are scheduled for delivery this fall.

OSL has also announced that Union Security & Engineering Corporation, Taiwan, has signed as another dealer to officially represent OSL in this region.

For more information on OSL
Circle 36 on Reader Service Card

Tanker Fleet Grows By 41 Ships In First Half Of '96

The world's tanker fleet grew by 41 vessels and four million DWT during the first half of 1996, according to Jacobs & Partners Limited's *January-June 1996 World Tanker Fleet Review*.

Over the past year, it has risen by 5.5 million DWT to reach 281.6 million DWT. Deliveries of newly built tankers rose sharply to 68 vessels amounting to 7.3 million DWT. However, even if this rate of building is maintained during the second half of the year, it will still remain significantly below the 17.4 million DWT completed in 1993 — the highest figure during the 1990s, and much lower than the peak annual figure of more than 44 million DWT in 1975. With fewer VLCCs on order, the tonnage delivered is set to decline in 1997.

As the VLCC spot market improved to yield an average income of more than \$15,000 per day for a typical older steam powered 260,000-DWT vessel, scrapping was reduced to a disappointing level. Only seven VLCCs reached demolition sites during the first half of 1996. If scrapping continues at this modest level, the last of the mid 1970s-built VLCCs will still be trading in the year 2001.

Products carrier freight rate levels in northwestern Europe, the Mediterranean and the East were generally 20 to 40 worldscale points higher than in the first half of 1995. Shipowners' income was further amplified by a small rise in the 1996 Worldscale Schedule nominal freight rates. Following this improvement, products capable tankers accounted for 47 of the 66 confirmed newbuilding contracts. Interestingly, none of these new orders were placed in Japan or South Korea.

The outstanding orderbook declined both in absolute terms and as a proportion of the existing fleet. If all these ships are built, it would add 6.6 percent to the existing tanker fleet compared to 15 percent five years earlier. Laid-up tonnage was reduced even further to only 1.5 million DWT, most of which is elderly and therefore unlikely to trade again.

No significant price trend emerged for modern tankers with a lack of vessels offered for sale. The improvement in scrap prices by South Asian shipbreakers underpinned the market for older vessels with a consequential rise in the price of pre-1980s tankers sold for trading. A declining tanker orderbook in most categories when set against projections of further growth in oil consumption, particularly in the Pacific Rim, suggests an improvement in the underlying tanker supply and demand.

Maritime Reporter/Engineering News

Ultrasonic Thickness Gauge Available From Cygnus

The Cygnus Model 2, manufactured by Cygnus Instruments Inc., is a versatile, digital, ultrasonic thickness gauge, which converts for underwater inspections with the addition of an umbilical cord.

For underwater inspections, the Cygnus Model 2 can be converted to a topside unit with a long cable for those applications when the user wants to view the measurements as they are being taken, or for when diving in dark waters. A long cable can be ordered in lengths up to 250 ft. (76.2 m).

Cygnus Instruments manufactures what is reportedly the world's first digital multiple echo ultrasonic thickness gauges. Multiple echo gauging means that coatings, such as paint or epoxy, do not have to be removed in order to obtain accurate measurements of metal thicknesses.

For more information on Cygnus
Circle 77 on Reader Service Card

Single Hull Rule Compliance To Cost \$60.5 Million

The U.S. Coast Guard (USCG) announced yesterday that all large, single-hulled tankers sailing in U.S. waters must meet new requirements beginning for some as early as this fall in order to prevent oil spills. The requirements apply to vessels of 5,000 gt or more until 2015, when all tank vessels operating in U.S. waters will be required to have double hulls.

"President Clinton is committed to protecting the environment, and these new requirements for tankers will do that," U.S. Secretary of Transportation **Federico Peña** said. "This action will help prevent accidents that result in oil spills and thus help protect the environment along our coasts and waterways."

Several measures are aimed at reducing human error such as requirements for proper staffing on the bridge, a watch policy tailored to each vessel, and an autopilot alarm or indicator to warn vessel operators that the autopilot is engaged. To promote the flow of information between a tankship's master and the local pilot, the USCG's new rule will require maneuvering performance capability test results, vessel status information and anticipated under-keel clearance calculation information. The rule also is

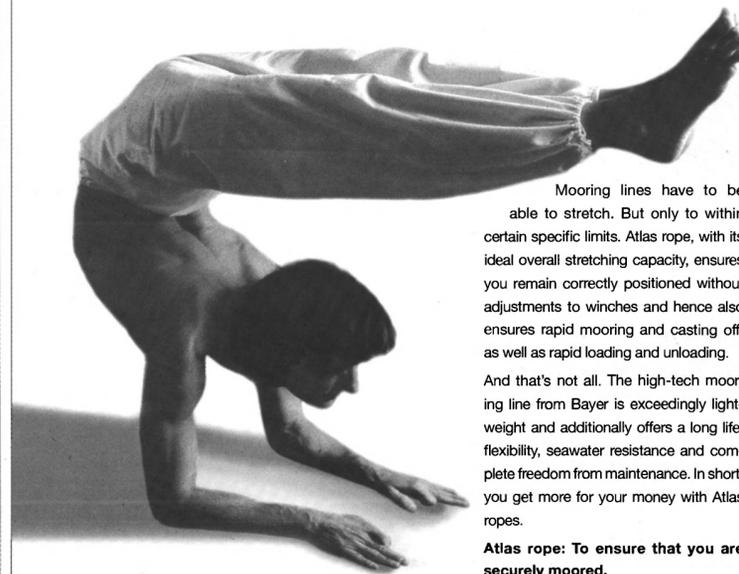
expected to reduce the risk of accidents caused by equipment or structural failures because it requires better hull surveys and surveys of other systems such as piping and safety systems. To reduce the risk of spills involving tank barges, the vessels are required to have emergency steering capability and fendering sys-

tems. These regulations were developed by the USCG under OPA 90 to provide substantial protection to the environment as is economically and technologically feasible. This recent rulemaking was reportedly based on 187 comments from the public. According to USCG estimates, first-year compliance costs for the new require-

ments will be \$60.5 million. Subsequent annual costs will trend downward, leveling out at about \$500,000 during 2012 through 2014.

U.S. tankships and tank barges will account for an estimated one-third of the total costs, and foreign tank vessels and barges will account for the remainder.

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Waterjet Propulsion For Fast Craft

There are many challenges associated with the correct selection of waterjet propulsors for a vessel designed to perform a given mission. When the primary purpose of the proposed new vessel has been defined — in terms of payload, range, speed, endurance, sea state and other environmental factors — the ship design proceeds as an iterative process to define the optimum hull parameters, the optimum propulsor type and size, the internal arrangements, auxiliary equipment and many other features. The

goal: arrive at the ship design which best meets the requirements of the mission with the minimum financial outlay and maximum economic return.

The application of waterjet propulsion to fast commercial craft is still relatively new. The last 15 years have seen a tremendous growth in the waterjet propulsion industry, both in terms of total numbers of units supplied and in the size and power of the units themselves. Consequently, there has been a parallel growth

in the number and displacement of waterjet-propelled vessels, and in the number of hull types to which waterjet propulsion may be applied. Due to the newness of the technology, the tendency has been to fit available waterjet propulsors into a ship design rather than to optimize the ship and propulsor combination. The consequence has been that the true overall economic potential of a waterjet application is often not fully realized.

As with propellers, the waterjet with the highest propulsive efficiency is not usually the best choice for a given ship design. The size and weight of the propulsors have a significant impact on the hull design and on the ultimate vessel displacement. While it may be satisfying to boast of a high propulsive efficiency, the boast is empty if the ship requires more fuel and costs more to build and operate than a slightly smaller ship that performs the same mission with propulsors that operate with a lower propulsive efficiency.

Identifying candidate-optimal designs can be done quickly by using a whole-ship design integration tool, often referred to as a ship design synthesis model. Obviously, the validity of the results will depend on the accuracy of the representation of the elements which comprise the computer model of the ship. Such elements include the hull design and structure, prime movers, propulsors, auxiliary systems, fuel, payload, weapons systems (if any) and many other items.

Growth In Popularity

The reasons for the growth of waterjet propulsion in recent years are many. Initially, the reasons were the advantages of waterjets compared with propellers for certain applications. These advantages included shallow draft, absence of underwater appendages such as rudders, shafts and brackets, relative independence of thrust and torque from variations in ship speed, whereby propellers tend to overload engines, and reduced vibration and noise.

As the database for waterjet-propelled ships increased, it became evident that, for fast craft at least, waterjet propulsion was more efficient than conventional marine screw propulsion, largely because of the absence of appendage drag, and the development of large waterjet propulsors with high mass flow rates and jet velocities suited to ships having speeds in the 30 to 45-knot region, whereas earlier waterjets were more suited to speeds above 50 knots. Examples of such applications include hydrofoil and surface effect ships (SES).

Waterjets enjoy considerable popularity for high-speed car and passenger ferries which operate at speeds up to 45 knots with various hull forms, including SES, catamarans, semi-planing, monohulls, and SWATH. In addition to car and passenger ferries, very large waterjets (30,000 kW and above) are being designed in conjunction with high-speed cargo vessels for trans-oceanic use with speeds up to 50 knots. At present, the largest ships would require four or more of the largest existing waterjets, but this will change as very much larger units,

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which are presently on the drawing board, become available.

Pump Types

Pumps may be of radial flow, mixed flow or axial flow. Early radial flow pumps had centrifugal impellers. Recent radial flow pumps employ impellers similar to those of mixed flow pumps, but with a predominantly radial discharge. Mixed flow pumps which include KaMeWa and MJP products have the highest pump efficiency of currently available propulsors. There are many designs of axial pumps, such as Hamilton, and others in smaller sizes. Some axial designers have a small degree of mixed flow geometry. Inducer pumps are a special case of axial pump design, although inducers have been used followed by a mixed flow stage. Inducers use cavitating blades. At design point, a thin cavity covers the back of the impeller blades. This cavity collapses harmlessly before the flow enters the next stage, usually the stator. Inducers can operate at much higher suction specific speeds than other types of impellers. Because inducer pumps are of axial design, the outside diameter of the pump casing is smaller than that of mixed flow pumps, so the pump is more compact for a given power and thrust, and is easier to install, particularly in SES, catamarans, SWATH and high speed monohulls. The consequent structural weight advantage more than offsets the slightly lower pump efficiency, currently 88 percent versus 91 percent, for mixed flow pumps.

Waterjet Selection

During the design synthesis, a waterjet sizing routine is called. This routine will retain, for the known performance requirements of the ship at the stage where the design synthesis is, an optimum waterjet size. In order to do so, the routine will calculate the performance of a whole range of waterjet sizes, along with a range of nozzle sizes for each waterjet size, for the same required thrust. Jets too small will probably exceed their breakdown limit, or at least the limit for cavitation free operation. Also, the smaller jets will probably have poor performance efficiency as the jet velocity will be very high to provide the required thrust.

On the other hand, waterjets that are too large will offer better

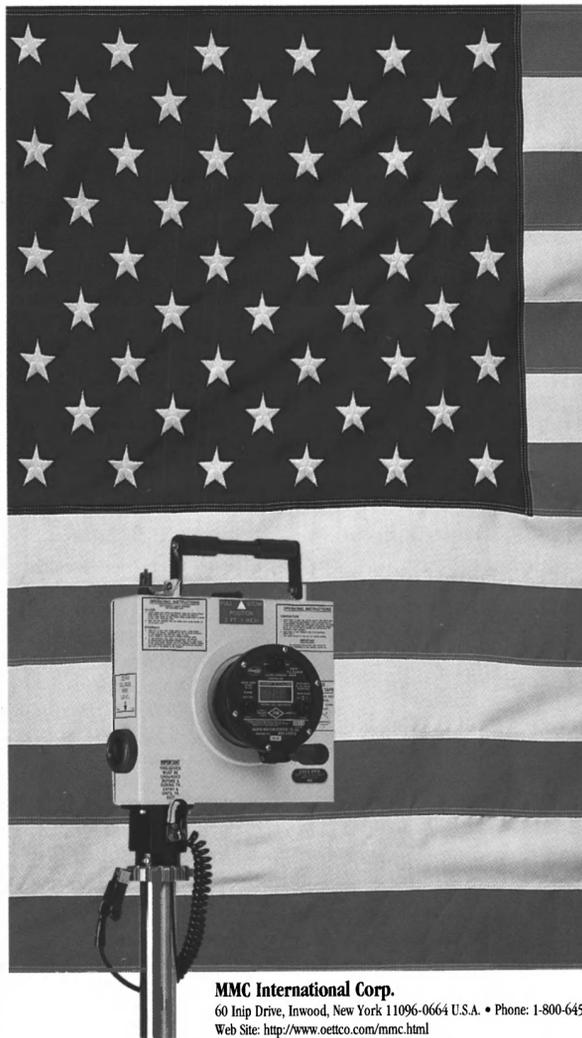
propulsive efficiency and will undoubtedly operate well within the cavitation free zone. However, the ship will be penalized by the heavy weight of the jet and attendant structural weight increase. Also, for certain hullforms, a larger jet will force the hull to be wider

and result in more drag. The larger waterjets rotate at a relatively low speed, and as a result, a higher reduction ratio may be required, adding the weight penalty of a heavier gearbox.

An optimum jet size lies in between the very small and very

large waterjet. In order to determine such an optimum, a criterion that relates to the overall ship impact needs to be established. The criterion that is selected is the product of the power required and the sum of the weights of the propulsion plant and fuel required

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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.

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Heating: Strip heaters located on duct work.

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PROPULSION TECHNOLOGY

arry out the mission. This entire-
therefore, accounts for the fact
t, as the waterjet is larger and
re efficient, it is also heavier
d it impacts the ship weight and
ag to a point where the fuel
quired may be higher than that
th a smaller jet.

The naval architect who knows
ow to estimate the performance
f a waterjet in relation to the ship
esign may be better equipped to
elect the waterjet size than a
waterjet manufacturer whose
nterest may be to maximize the
relative efficiency of the jet
regardless of the overall ship
design optimization.

*The preceding was excerpted from a paper,
"Waterjet Propulsion for Fast Craft -
Optimized Integration of Hull and Propulsion."
The paper was presented at the Fast '95 con-
ference, authored by John L. Allison and
Philippe Boubault, both with Band, Lavis &
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network, provides equipment and
services to the Texas marine, off-
shore and oil and gas industries.

ABB Stal To Provide Gas Turbines For Ferry

ABB STAL AB, Sweden, has
received an order for two GT35 gas
turbines to be used for the propul-
sion of high-speed ferry *Buquebus*
B60. The ferry will be built at
Spanish shipyard E.N. Bazan in
San Fernando. ABB Stal will also
be responsible for supplying the
ferry's automation system, while
ABB Stal and Bazan will share the
delivery of the electrical equip-
ment.

Buquebus B60 is designed for a
cruising speed of 60 knots, which
will reportedly make it the world's
fastest car/passenger ferry in regu-
lar service.

Combined, the two gas turbines
will develop a shaft power of
34,000 kW. The gas turbine sys-
tem has been developed to operate
on IF 30-type intermediate fuel
oils to achieve low operating costs.
Upon completion, the ferry will
enter into regular service on the
route between Buenos Aires,
Argentina, and Motevideo,
Uruguay, at the end of next year.

For more information on ABB Stal AB
Circle 181 on Reader Service Card

September, 1996

Rice Granted Patent Pending Status Of Speed Nozzle

Rice Propellers, located in the
North Pacific coast of Mexico, is a
major supplier of propellers and
nozzles for U.S. shipyards and fish-
ing fleets. The company has
recently developed the Rice Speed

Nozzle design and the Skewed
Kaplan Propeller. Rice has been
granted patent pending status
from the Patent and Trademark
Office of the U.S. Department of
Commerce. The Rice Speed Nozzle
is reportedly a completely new
design. The inside and outside
shells are cambered and rounded.

With these nozzles, users can
reportedly obtain maximum thrust
without losing free running speed.
In 1995, Rice Speed Nozzles were
installed on 140 boats in the U.S.
— mainly in the Gulf of Mexico
and the East Coast. So far, in
1996, the nozzle has been installed
on more than 90 boats.

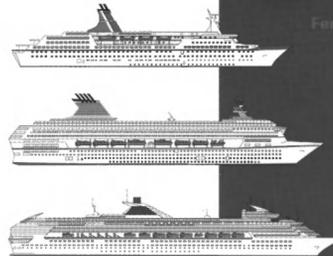
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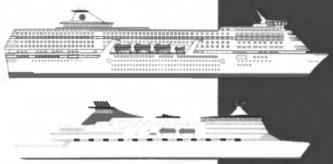
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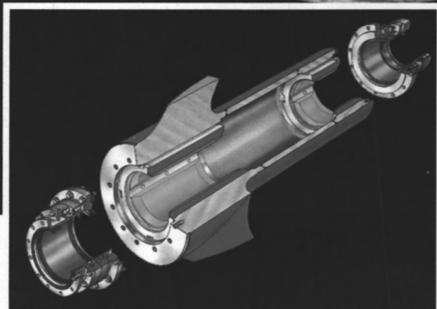
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NNS Names Pelaez Engineering VP

Newport News Shipbuilding (NNS) appointed **Marc Pelaez** as vice president in charge of Engineering. After serving in the U.S. Navy for nearly 30 years, he has retired this year as a rear admiral. **Pelaez's** last position was as Chief of Naval Research, responsible for the Navy's science and technology investments. His responsibilities at the yard will include life cycle engineering and R&D, as well as managing an engineering staff.



Former USCG Commandant Dies

Admiral **Chester R. Bender**, former Commandant of the U.S. Coast Guard (USCG), and the man most remembered by the service for adopting its distinctive "Bender Blues" uniform, died July 20 in Moraga, Calif., following a long illness. Among the most noteworthy of his accomplishments, **Adm. Bender** served as superintendent of the Coast Guard Academy, and as chairman of the U.S. delegation to the Marine Pollution Conference of IMCO in 1973, where he oversaw the management of new statutory responsibilities in the areas of marine safety, environmental protection and law enforcement.

Atlantic Marine Completes Conversion

Atlantic Marine, Inc. has announced the successful conversion of Sargeant Marine's 668 ft. x 84-ft. (203.6 m x 25.6-m) oil tanker *Asphalt Commander* (formerly known as *Falcon Champion*), to an asphalt carrier. Sargeant Marine, Inc., located in Coral Springs, Fla., reportedly manages 56 percent of all marine asphalt tanker capacity.

The U.S. flag vessel underwent installation of a new thermal oil heating system, and structural enclosures for heaters, heating coils, distribution pumps and piping. The main cargo pumps were replaced with positive displacement pumps, and navigation and communications upgrades were performed, as well as routine drydocking repairs and services. Atlantic Marine, Inc. is a wholly-owned subsidiary of Atlantic Holding Co. of Jacksonville, Fla.

For more information on Atlantic Marine, Inc.
Circle 80 on Reader Service Card

RCCL Installs Technomad WeatherTech Loudspeakers

Royal Caribbean Cruises Ltd. (RCCL) has installed Technomad WeatherTech Berlin model loudspeakers on *Sovereign of the Seas*. The Technomad systems have also been acquired for several other RCCL ships, including *Song of America*, *Majesty of the Seas* and *Nordic Empress*. Technomad loudspeakers are reportedly impervious to salt water, sand, condensation, UV light, corrosion, insects and other damage.

For more information on Technomad
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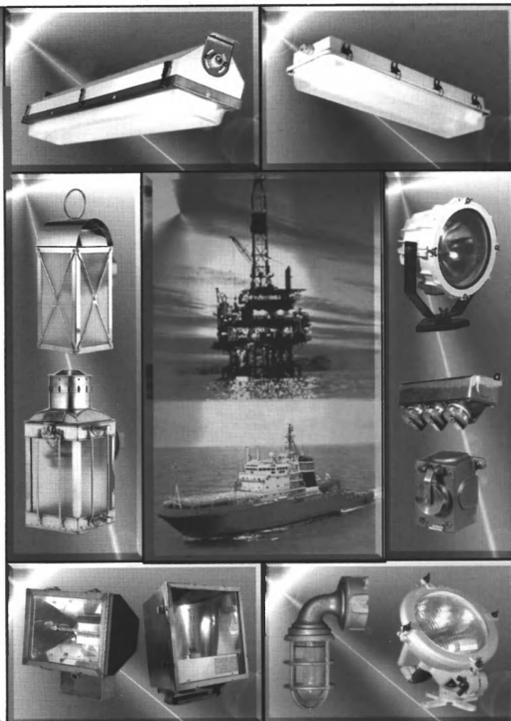
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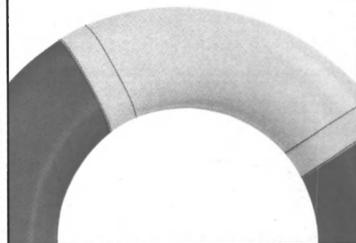
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SEACOR Places Order For Halter-Built AHTS Vessels

SEACOR Holdings, Inc. announced that SEACOR Marine, Inc. has signed a contract with Halter Marine Group, Gulfport, Miss., for the construction of two, 225-ft. (68.5-m) anchor

handling/towing supply (AHTS) vessels.

The value of the project is expected to be approximately \$45 million, and delivery of the vessels is scheduled for the second half of 1997.

The vessels will be flagged in U.S. registry, and will support deepwater drilling operations in

the Gulf of Mexico. Each vessel will be powered by four EMD 16-645-F7B engines driving two CP propellers, developing a bollard pull of approximately 155 metric tons.

Anchor handling equipment will include a Smatco winch with 500 tons of line pull and two drums, each capable of holding 10,000 ft.

of 3.25-in. wire. The vessels will also be equipped with Triplex shark jaws, chain lockers and wire storage reels.

The vessels will have a maximum design draft of 22 ft. (6.7 m), and a weight of 2,800 DWT, with below deck capabilities which include 10,300-cu.-ft. of bulk cement and 3,000 barrels of liquid mud.

SEACOR provides offshore marine transportation primarily in support of oil and gas exploration and development in the Gulf of Mexico, North Sea and West Africa. SEACOR also provides environmental services to the energy and maritime industries through subsidiary National Response Corp. (NRC).

For more information on Trinity
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Singmarine Clinches \$12 M Keppel Smit Contract

Singmarine Industries Ltd. (Singmarine), through its wholly-owned subsidiary Singmarine Dockyard & Engineering Pte. Ltd., has clinched a \$12-million contract to build two harbor tugs for Keppel Smit Towage Pte. Ltd. Each 98.4-ft. (30-m) tug will be powered by two, 2,000 bph diesel engines, with bollard pulls in excess of 50 tons.

Delivery is scheduled for the third quarter of 1997.

The tugboats will be built to ABS classification with a notation of Maltese Cross A1 Circle E. Singmarine Dockyard has supplied Keppel with four previous harbor tugs, which are now in charter in regional waters. Singmarine is also currently building two coastal tankers for U.K.-based FT Everard & Sons, and a supply vessel for United Arab Emirates interest Lammalco Ltd.

For more information on Singmarine
Circle 85 on Reader Service Card

Correction

In the August edition of *MR/EN*, it was mistakenly reported that *Kinsman Condor*, *Kinsman Eagle* and *Kinsman Venture* are owned by Hvide Marine. In fact, the vessels are owned by Bay Transportation Co.

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Recent Ship Sales

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

Date Reported	Vessel Name	Vessel Type	DWT	Year Built	Sale Price (\$M)
8/9/96	Tramarco Trader	Bulker	9,660	75	\$3.2
8/9/96	Ken Sun	Bulker	22,245	80	\$5.6
7/29/96	Ionian Sun	Bulker	22,490	78	\$3.5
8/5/96	Metal Trader	Bulker	25,548	77	\$3.5
7/29/96	Em Xanthos	Bulker	30,050	83	\$10.5
7/29/96	Samjohn Mariner	Bulker	54,272	75	\$5.3
7/29/96	Maritime Grace	Bulker	71,749	90	\$20
8/5/96	Lantau Peak	Bulker	117,612	78	\$6.3
8/5/96	Mineral Osprey	Bulker	148,722	90	\$22.5
7/20/96	Tai Shan	Bulker	149,516	90	\$27
7/22/96	Lowlands Sunrise	Bulker	186,876	88	\$22.5
8/5/96	Comandante Tomas Espora	Tanker	15,170	78	\$3.2
7/22/96	Matsukae	Tanker	17,676	81	\$8
7/30/96	Danila	Tanker	29,751	92	\$18
8/5/96	Energos	Tanker	30,611	75	\$5
8/5/96	Irving Ocean	Tanker	37,740	81	\$9.3
7/22/96	Belamina	Tanker	38,549	79	\$8.5
7/29/96	Emerald River	Tanker	41,502	91	\$28
7/29/96	Rowan	Tanker	44,220	91	\$26
8/9/96	Cabo San Vicente	Tanker	64,896	81	\$14.6
7/29/96	Silver Iris	Tanker	88,348	80	\$13.2
7/22/96	Honam Jade	Tanker	186,497	76	\$7.2
7/29/96	Eredine	Tanker	273,941	76	\$17.3

Jeffboat And Aquamaster Design Z-Drive Propelled River Towboat

Inland shipbuilders Jeffboat and Aquamaster-Rauma, Ltd. have formed a cooperative R&D program to design a state-of-the-art river towboat utilizing Z-drive propulsion. Model testing, conducted during June and July, is the latest phase in a year-long joint design program.

To take advantage of high omnidirectional thrust available from azimuthing propulsion units, potential designs were developed, models were constructed, and quantitative data was gathered which directly compared the performance of the new Jeffboat/Aquamaster towboat hull against conventional type rudder/fixed propeller designs. The resulting towboat design was developed in conjunction with a Finnish naval architect.

The vessel is designed to be powered by three Aquamaster units of equal size, equipped with the company's patented NSMB type nozzle, with a total absorption capability of 8,000 to 12,000 hp.

Tests on the design were conducted by shallow water vessel research experts VBD of Duisburg, Germany. Steering and flanking side forces of the design were reportedly 150 to 210 percent of the conventional vessel.

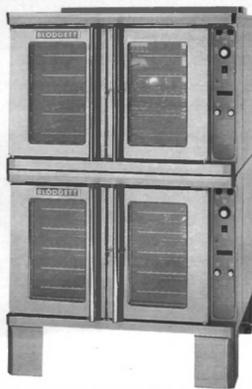
The new vessel also reportedly stopped a simulated tow in one-third the distance normally achieved by a conventional vessel. The strength of this design is the redundancy of propulsion units, which increase safety and "come-home" capability. Model test results enable the Aquamaster azimuth drive units to be specifically matched to the inland river towboat. Measured model hull wake fields and propeller loadings will be used to guide selection of mechanical and hydrodynamic drive details.

For more information on the towboat design
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Kelvin Hughes Secures Evergreen Order

Kelvin Hughes has obtained orders from the Evergreen Group to supply radar and other equipment for a total of 31 vessels. The first vessel to receive the equipment was *M/V Ever Ultra*, the first in a series of 5,364-TEU, post-Panamax containerships to be handed over by Mitsubishi Heavy Industries. The installation included two Nucleus 2, 6000A series S and X-band ARPA radars, fully interswitched with three antennas. Four of *Ever Ultra's* sisterships will receive similar installations. The contract includes equipment installations for ten 1,162-TEU containerships building at Evergreen Heavy Industrial Corp. in Japan, and 15 vessels currently serving in the Evergreen fleet also scheduled for retrofits. The remaining order of equipment will be supplied to the Evergreen chairman's private yacht.

For more information on Kelvin Hughes
Circle 78 on Reader Service Card

Centa GmbH Forms North American Subsidiary

Centa Antriebe Kirshey GmbH of Haan, Germany, has announced the formation of a North American subsidiary, Centa Corporation. The new company's mission is provide technical support and distribution of Centa's ten families of coupling, shafting and clutch systems for marine propulsion. **Jim Halley** has accepted the position of chief operating officer of the new subsidiary. Prior to his appointment, he served with Lovejoy, Inc., Caterpillar, and several other companies involved in the diesel power train business.

For more information on Centa Corp.
Circle 79 on Reader Service Card

Kuo Named Uniglory President

Kuo Chun-hsiung has been named to the presidency of Uniglory Marine Corp., in Taipei. He was formerly chief executive vice president, and in 1984, was one of the company's co-founders.

Mr. **Kuo** has been in shipping for more than 35 years, and has worked for various liner agencies representing companies such as Showa Line, Kyosei Line and Royal Interocean Lines, as well as

has started a private venture in Taiwan — Express Transport Corp.

MaK Reports Engine Sales

MaK Diesel, Inc. has sold six engines — four to Tecmarine Lines Inc. of Miami, Fla., and two to the

Maritime Administration (MarAd).

To Tecmarine, MaK sold four 8M32, 3,520-kW (4,790-hp) engines driving CP propellers for installation on four containerships, with an option for four more. The first two are scheduled for delivery in May 1997; the remaining two will be handed over in October 1997. To MarAd, MaK sold one

6M601, 6,000-kW (8,160-hp) engine and one KWA.C. electric motor driving a CP propeller. These two engines plus the FP propeller and shafting will be removed and replaced by the single MaK 601 engine and a Lips CP propeller.

For more information on MaK
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Integrated Control Systems Maximize Vessel Safety

The Marine Systems Division of Cegelec Projects will be installing the latest in integrated control systems (ICS) on two shuttle tankers in order to centralize control and maximize vessel safety. The con-

tract, awarded by Samsung Heavy Industries, represents a notable breakthrough in the Korean marketplace for Cegelec.

For Cegelec, the scope of the project includes the supply, installation and commissioning of the vessels' ICS and dynamic positioning control systems (DPS). The two shuttle tankers will be used for

operations in the Hibernia fields off the coast of Canada, by the Mobil, Chevron and Uglund consortium.

Cegelec's 900 series ICS will integrate all automation and control systems into a single, comprehensive operator interface. Reliability will be maintained through an industry standards dual redun-

dant network, using factory information protocol (FIP).

An integral part of the ICS system, the DPS 900 will be interfaced to the thrusters, sensors and position measurement equipment to provide full manual or automatic control of the vessel's position.

The systems will be built and pre-commissioned at Cegelec headquarters before going out to Korea. Installation was scheduled for August, and sea trials and commissioning will take place in 1997.

For more information on Cegelec
Circle 182 on Reader Service Card



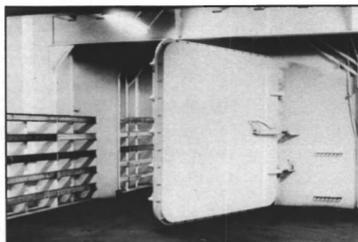
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U.K. Approves Exxon North Sea Project

Exxon Corporation announced that the U.K. government's Department of Trade and Industry approved a \$140-million North Sea project involving the development of two new satellite fields, Gannet E and Gannet F, with combined recoverable oil reserves of some 42 million barrels and a peak production rate of approximately 20,000 barrels per day.

Both fields are located about nine miles from the existing Gannet A platform and are approximately five miles apart. Exxon's U.K. affiliate, Esso Exploration and Production U.K. Ltd., has a 50 percent interest in the Gannet field area. Shell U.K. Exploration and Production has control of the other 50 percent, and operates the field.

The technological development involves the use of an electrical submersible pump in a remote subsea production well in the Gannet E satellite field. Such pumps have been used before, but reportedly have not been installed and controlled so far from the host platform. According to **John Steele**, managing director of Esso Exploration and Production U.K. Ltd., "When proven, the success of this remotely operated pumping system will have major implications for the development of many small fields which, because of the characteristics of the oil or the particular geology, are difficult to produce and are substantial distances from existing infrastructure." The Gannet platform started up in 1992 and processes production from three satellite fields. Production from the two new satellite fields is expected to begin in July 1997.

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Alterations to tug *Tystie* have reportedly enabled the vessel to produce 56 tons ahead, 51 tons astern and a free running speed of 13.5 knots.

Killybegs in Ireland is home to just 3,000 people and around 45 fishing boats, yet its fame in commercial fishing circles has spread far and wide. Fishing and associated services provide employment to half the population, making it one of the most fishing dependent communities in the world. Skippers from the port are regularly "borrowed" by emerging nations as experts on the latest techniques and, for such a small port, Killybegs boasts more than its share of Europe's biggest fishing vessels.

The latest arrival, *Atlantic Challenge* (See picture, page 40), represents a significant benchmark in the development of the so-called super-trawler. Although big by any standards at 230 ft. x 44.5 ft. (70 m x 13.6-m), and a full 16 ft. (5 m) longer than the vessel she replaces — *Atlantic Challenge* has 35 percent less fish hold capacity.

This apparent anomaly is deliberate, as the new vessel has been built for speed and with three times the chilling capacity of the old trawler. With quotas as they are, the profit is in quality not quantity; with premium prices

being paid for the best fish.

Built in Norway at family-run Hellesoy Shipyard to a design by celebrated Norwegian naval architects Vik & Sandvik, the vessel features a hull form which is much narrower in the beam at the waterline. According to its designers, this shape is to ensure that the maximum possible speed is obtained from the Wartsila 16V32E diesel and 3,900-mm Wichmann propeller. On trials the vessel achieved 17 knots, seven knots faster than its predecessor. This level of performance is considered vital by owner Killybegs Fishing Enterprises, for guaranteeing that the catch is delivered to the buyers in prime condition.

The company firmly believes that it makes sense to sacrifice carrying capacity for speed and quality. An increased free running speed will also allow the vessel to seek out grounds further afield.

Ironically, most of the catches are supplied to Norwegian processors, and it was their demands for better quality fish that prompted the vessel, conceived and built in Norway, to be ordered by the Irish company.

The impressive wheelhouse electronic specifi-

cation includes a Racal-Decca Bridgemaster radar, ARCS electronic chart system, Sercel DGPS, a Robertson AP9 MKII autopilot which forms the "brain" of a Robfisk rudder and thruster control arrangement, and Furuno ARPA.

A massive array of fish finding electronics incorporates a Simrad SD 570 omni-sonar for long distance detection, a medium range Kajjo Denki scanning sonar, a Simrad ES381 with split beam for deepwater fish finding and a Furuno color sounder. Few fish are expected to escape.

Atlantic Challenge will mainly work the mid-Atlantic ridge from Iceland to the Azores with a 15-person crew, joining other recently built Killybegs supertrawlers, including the matched pair *Father McKee* and *Brendelen* and the Hellesoy-built giant — 340-ft. (104-m) — pelagic freezer *Veronica*.

In all, some 20 of the vessels at the port are pelagic trawlers. Although drawn from such a small population, it is remarkable that so many skippers have managed to invest millions of dollars without grant assistance.

Similar considerations regarding quality were



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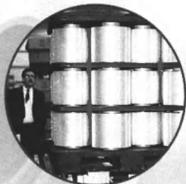


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EUROPEAN UPDATE



Irish supertrawler *Atlantic Challenger* sacrifices fish carrying capacity for superior speed and freezing capability.

inside a nozzle, but once again, the comprehensive battery of fish detection equipment is the most noteworthy. Simrad alone has provided an SR240 omni-sonar, FS900 trawl sonar and three independent color echo sounders, two of which are dual frequency.

Acceptance of Shetland tugs ends speculation

Tystie and *Dunter*, two powerful Voith tractor tugs, have finally been delivered by the Ferguson yard in Scotland and accepted by the customer, Shetland Towage, ending more than six months of speculation. The first of the tugs to be completed (pictured on page 38) was expected to enter service at the beginning of this year, but was rejected by Shetland Towage for failing to achieve the specified astern bollard pull.

Amid much secrecy on the part of the builder, the finished vessel, *Tystie*, returned to drydock for modification, and work on the other tug, nearing the final stages, was halted. Details as to the nature of the alterations were not forthcoming from any source. However, at last the silence was broken with the announcement that new blades, some 10 in. (250-mm) longer, have been fitted to the Voith Schneider cycloidal propellers on both tugs, and the protection plates have been repositioned.

These changes have reportedly enabled the vessels to produce 56 tons ahead, 51 tons astern and a free running speed of 13.5 knots on sea trials. The owner claims that these figures not only exceed the specified requirements, but make the vessels the most powerful tractor tugs in British waters.

Commenting on the news that his company had eventually seen fit to accept the vessels, Shetland's Managing Director Capt. **Eddie Dowswell** said: "We cannot pretend that the difficulties

that we have suffered have been mere teething troubles; we experienced a serious and very worrying technical problem. That has now been resolved in a workmanlike manner, albeit at considerable cost to all concerned. We are now confident that we have two excellent tugs that will acquit themselves very well in all the roles we intend for them. A huge amount of work has gone into their design."

Now that the performance shortfall has been remedied, Shetland seems to have succeeded in realizing its goal of operating two big and potent tugs ideally suited to the harsh environment of the Sullom Voe oil terminal. Measuring 123.4 x 44-ft. (37.60 x 13.40 m) with a maximum draft of 18.7 ft. (5.7 m), *Tystie* and *Dunter* are each powered by a pair of 2,720-hp (2,030-kW) Caterpillar 3606 diesels, the first from this range to be employed in the U.K. towage industry.

Both vessels are classified FiFi 1, being equipped with two foam water monitors with throws of 390 ft. (120 m) and self protection drenching systems. For pollution control duties, the tugs are fitted with spraying equipment and have a total onboard dispersant capacity of 14 tons.

Double-enders take new age propulsors

Danish yard Orskov Staalskibsvaerft AS in Frederikshavn has now finalized the design for two double-ended train/car ferries on order from DSB Rederei AS, Danish State Railways. The ships, which will operate on the 45-min. crossing between Rodby in Denmark and Puttgarden in Germany on the so-called Birdflight route, will reportedly be environmentally conscious as well as attractive in appearance, due to an engineering design philosophy which has taken various criteria into consideration in order to create the desired effect.

Measuring 465.7 x 83.3-ft. (142 x 25.4-m) beam over fender, with a draft of 19 ft. (5.8 m), each vessel has two vehicle decks, with an upper level capacity of 126 cars and a lower capacity of 160 cars. Approximately 900 passengers can be carried in modern, comfortable

involved in another recently delivered Vik & Sandvik design. Built in Holland at the Yssel-Vliet Combinatie (YVC) yard for a Dutch owner's German-based operation, *Helen Mary* is a 383-ft. (116.7-m) pelagic trawler which incorporates a centralized computer system for controlling and monitoring the quality of the catch, including the handling, temperature control, grading, freezing, pumping and packing processes.

Furthermore, the owner and customers on shore can check the state of the catch, including the time taken to freeze, through the monitoring computer via a satellite link. This particular feature is of considerable importance as the vessel will fish over a wide area, from the Barents Sea to the West African coast of Mauritania.

Helen Mary is also thought to be the first vessel of its size to be equipped with an onboard slurry ice system capable of freezing 20 tons of fish from 15 degrees C in only 20 minutes. According to the owner, the vessel will be able to land the best quality frozen fish in the world.

A pair of MaK 9M32 diesels provide 5,300 hp to drive a 4,300-mm stainless steel propeller



Dickensian vessel *Martin Chuzzlewit* is now in service on the lower reaches of the Thames. Its long, slender displacement triple hull form provides a wider deck platform than could be accommodated on a monohull, with additional stability.

EUROPEAN UPDATE

public spaces.

In keeping with other ferries in the DSB fleet, including double-enders, a diesel-electric system was specified early on in the proceedings, but conventional propellers and rudders were abandoned after tests, as power was substantially less than required.

The decision to link four 3,000-kW ABB Sami Megastar diesel-electric power units to four 3,000-kW Contaz propulsors not only ensured adequate power but bucked convention in terms of naval architecture.

Conventional double-ended ferries are normally fitted with one center propeller and a flap rudder at each end of the ship, but the new ferries, with two propulsors fitted at the sides of each end, have made it possible to obtain an optimum hull form and to fit a specially designed bulbous bow at each end. Based on the model test, this concept, together with the high efficiency of contra-rotating propellers, is expected to exceed savings of as much as 20 percent in fuel consumption, as compared with a conventional design. An additional benefit is that the building costs of the ships have been reduced with lower power and noise insulation demand.

The decision to opt for the new generation Contaz propulsor unit is, according manufac-

turers Aquamaster-Rauma in Finland, a milestone in its strategy to make Contaz a well known brand of azimuthing thrusters for ocean-going ships. The incorporated contra-rotating propellers, known for high efficiency, low noise and vibration level, are also streamlined in appearance to provide higher speed than traditional thrusters. The units are also designed for longer life. The DSB order is only the second to be received for Contaz since its introduction, although these units could be the first to see active commercial service if Orskov delivers the lead ship on schedule in May 1997.

The first units were delivered early this year for an RMT 6000 Norwegian platform supply vessel building at Brattvaag Shipyard in Norway, for delivery next summer to DOF Management AS (two smaller units, each producing 2,200 kW have been purchased).

Additional benefits of the propulsion system reportedly include short maneuvering time and all-weather operation on a 24-hour basis. The normal service speed will be 16.5 knots, timing the crossing at 44 minutes, and at maximum service speed of 18.5 knots, a 39-min. schedule could be attained. Twin engine rooms and twin wheelhouses are specified and simultaneous loadings and discharge can be carried out on both deck levels.

Thames taxi design goes commercial

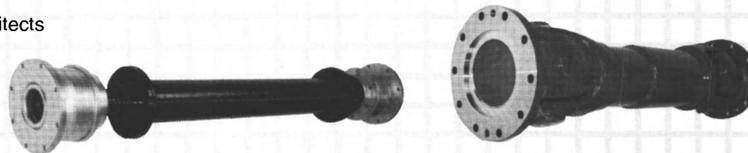
White Horse Ferries, the U.K. company that has been conducting practical assessment tests on river taxi viability on the River Thames, is now preparing to add two new craft to its fleet for operation in the heart of London. The tests, which have involved the design and development of special high speed, low wash vessels, have resulted not only in the creation of an ideal river passenger boat, but also in a design which the ferry operator hopes to market for a wide range of workboat applications.

The R&D program has lasted five years in total, with initial concepts tested on a pre-production, 12-seater reduced scale craft, *Ebenezer Scrooge*. Analysis conducted during its three-year operation led to a honed design concept for the 12/60 trimaran ferry, with build efficiency taken greatly into account in order to facilitate series production. Build efficiency reduces the capital cost per passenger seat and operating costs, bringing total expenditure in line with road operated public transport.

The first of the new 12/60 ferries, *Martin Chuzzlewit*, built by Lay Construction, sister company to White Horse Ferries, is now in service on the lower reaches of the Thames, operating between Gravesend in Kent and Tilbury in Essex. With a long, slender displacement,

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triple hull form, the craft provides a wider deck platform than could be accommodated on a monohull, and with additional stability. The trimaran concept was deemed preferable to a catamaran arrangement, as it allows more flexibility over deck plan arrangements and accommodations. According to the operators, the craft is also considerably more maneuverable than either monohull or catamaran, is more cost-efficient to build and operate, and is considered safer.

The design has also facilitated a unique docking arrangement. In plan form, the craft is wedge shaped forward, enabling the vessel

to dock in a "V" berth, which White Horse has fabricated into its piers at Gravesend and Tilbury. This method stabilizes the vessels for passenger boarding and alighting, and is said to be safer and faster than the traditional means of mooring craft.

The hull, deck and superstructure are all built in glass reinforced plastic (GRP), with a single skin laminate on each hull with keel beam, frame bulkhead and stringer arrangement, providing considerable strength. Foam sandwich construction has been adopted for the deck and superstructure, and fire retardant resins were used in the engine room and

passenger areas.

Measuring 59.11 x 18-ft. (18.26 x 5.5-m), with a loaded draft of 2.95 ft. (0.9 m) and loaded displacement of 16.19 tons, the 12/60s are being fitted with either Sabre Perkins 185 engines, producing 185 hp at 2100 rev/min — as on *Martin Chuzzlewit* — or the new Deutz 1015 V8 water-cooled engine, which offers higher speeds with 473 hp at 2100 rev/min. The latter has been selected for *Wilkins Micauber*, the first of the two craft now in build, scheduled for service in late fall. The sister vessel will also have a Dickensian name.

Both engines power an Ultrajet 375 with an appropriately matched impeller. The waterjet manufacturer, Ultra, has also developed a very comprehensive electro-hydraulic system with full intelligent feedback joystick control of the jets, steering and reversing bucket. A speed of around 20 knots is reportedly attainable.

Each vessel is designed for single crew operation although, in this instance, a maximum of only 12 passengers can be carried to comply with Marine Safety Agency regulations. Sixty passengers can be carried when operated with two crew so that additional lifesaving equipment can be manned. Passenger accommodation is located amidships with an open aft deck and covered fore deck, astern of the wheelhouse, which is located at the bow. The passenger saloon has seating for 50 passengers and a wheelchair, with the first 12 seats aircraft style. The remainder are of molded GRP with soft upholstery. The outside deck has additional seating for eight passengers and room to stow bicycles. Ample standing room is also available on both decks and in the saloon.

Safety has featured strongly in the design concept and the 12/60s have 12 fully watertight compartments, each with two automatic bilge pumps. In the event of the main hull or one of the sponsons suffers from collision damage, the remaining buoyancy would reportedly be sufficient for keeping the vessel afloat. The vessels are built to Lloyd's approved drawings.

The two trimarans currently in build will be employed to open a half-hour service between Charing Cross and Canary Wharf, initially on a Monday-Friday basis. *Ebenezer Scrooge* will be utilized as a standby vessel on the route.

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Halter Marine Awards Contract To Marine Electronics

Florida-based rep. firm Marine Electronics Solutions, Inc. has been awarded the U.S. Navy MK-V electronics package by Halter Marine New Orleans. The integrated package includes: Transas Marine's NAVI-Sailor 2400 electronic charting systems with radar target extractor; three rugged, waterproof, surface-mounted SVGA visual display units; Furuno FR8051D/4 radar with ARPA; and three Ritchie magnetic compasses — one KVH militarized fluxgate compass and two GPSs. The vessels are the seventh and eighth of a possible twenty.

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Reorganization In Germany

by Alan Thorpe, international editor

The bankruptcy problems facing the Bremer Vulkan Group have dominated the German marine industry for the past few months. The company is said to have debt of \$1.6 billion, with sales of all assets worth only \$.7 billion. Highlighted among the problems faced by the company was the arrest, earlier this year, of company CEO **Greidrich Hennemann**, who has since been released on bail. In the meantime, there is an intense investigation underway by the European Commission (EC) regarding state aid for Bremer Vulkan, and the German shipbuilding industry as a whole. It is likely that, for political reasons, the Bremer Vulkan Group will be saved by the German government in some form, although it is likely that many of the individual divisions will be autonomized, as is the case already with the former East German yards, which Bremer Vulkan took over after reunification.

Meanwhile, Bremer Vulkan has successfully delivered the first of the Costa cruise ships, *Costa Victoria*; although there are now some troubles with the second vessel. Bremer Vulkan is seeking a buyer for the hull of a 78,000-gt cruise vessel currently being completed at its subsidiary Lloyd Werft, Bremerhaven. *Costa Olympia*, owned by a subsidiary of the shipyard, is nearly half completed. The vessel will be delivered to Genoa-based Costa Crociere by the middle of next year. The Italian operator had an option, which ran out on July 2, to buy *Costa Olympia's* hull from the bankrupt group, but had made no decision at that time.

The breakup of the Bremer Vulkan Group has led to the two main, former East German yards — MTW Wismar and Volkswerft Stalsund — to come under the wing of the newly-formed Osee-Beteiligungsgesellschaft, a new base from which both yards will continue to operate.

However, Bremer Vulkan is continuing to take orders, the lat-

est being two 2,700-TEU containerships for Munich-based Conti Group; and two passenger/cargo ferries for Tunisia, although this order is being investigated by the EC concerning the amount of subsidy involved.

Following the successful completion of P&O's *Oriana* during 1995, and Celebrity Cruises' *Century* earlier this year, Papenburg's Meyer Werft is currently busy with the second two Celebrity ships, *Galaxy* due for delivery later this year, and the third during 1997. When the Celebrity ships have been completed, Meyer Werft starts work on two, 2,800 passenger capacity cruise ships under a \$700,000 contract from Star Cruises, which operates out of Singapore. Meanwhile, HDW, Keil, is busy working on a contract for a series of eight 3,500-TEU containerships for Zim Israel, which will busy the yard up to the end of 1997.

Latest orders in the German shipbuilding industry include a series of eight 2,500-TEU containerships, all for German owners from Volkswerft Stralstrand; further orders, again from German owners for the new 700-TEU design available from JJ Seitas, Hamburg; a series of four 2,500-TEU containerships for German owner Peter Dohle from Kvaerner Warnow Werft, the yard already building a series of four similar ships for Cyprus' Interiorient; and an increase from four to six of a series of 2,500-TEU containerships for CP Offen from Flender Werft. Many German owners are expanding fleets in the small range of containerships (up to 2,000 TEU). However, not all German orders are going to German yards, the Polish yard at Szczecin being the largest recipient of this market sector.

Both Germany's large ship repair yards, Hamburg's Blohm + Voss (B+V) and Bremerhaven's Lloyd Werft, are currently undergoing reorganization programs as competition within the

HDW looks to extend influence

Kiel, Germany, based Howaldtswerke-Deutsche Werft AG (HDW) is well-regarded as a premier shipbuilder throughout the world. Known for its ability to change with the market, HDW has recently completed an extensive yard refurbishment program — affecting everything from organization to automation. These changes — with the net affect of increasing production quality and precision while reducing production costs —

are to ensure its viability well beyond the next century, despite negative market conditions such as expanding capacity and disappearing subsidies. According to Dr. **Jürgen Rohweder**, the past 12 months have been good for the yard because all of the types of ships which fit into the yard's main scope of manufacture — including containerships, ferries, cruise vessels and LNG carriers — have been in demand by the market. Dr. **Rohweder** also

attributes the yard's recent success to its innovative technology, its flexibility and its high quality standards, to name a few.

While the immediate term market looks promising, he believes it is paramount to continually advance the yard's technical standards and to drive down production costs — in part by building cooperations with other yards — in order to realize long-term success.

While noting that competi-

tion is increased dramatically all over the world, Dr. **Rohweder** sees room for HDW's expansion of business in Europe, Southeast Asia, the U.S. and China.

By vessel type, HDW expects to see increases in the number of ferries and LNG carriers being built, where in the case of containerships and cruise ships, "a certain saturation may come up."

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STN Atlas Outfits Costa Crociere's New Flagship

Built by Bremer Vulkan, Costa Crociere's new 74,000-ft. (22,555-m) flagship, *Costa Victoria*, began service in the Mediterranean at the end of July. At 853 ft. (260 m) long, the vessel is capable of carrying 2,250 passengers and 800 crew. STN Atlas Elektronik assumed project management

for all electronic and electrical equipment, with responsibility for the design and installation of a proprietary Ship Control Center (SCC) which combines all key automation, communications, navigation, engine control and ship management functions. The navigation sub-unit, an

Atlas NACOS 45-2 system, features automatic track control and route planning functions, in addition to combined radar and ECDIS facilities. STN Atlas Elektronik was also responsible for the ship's



power generation and distribution systems, as well as all cabling requirements in addition to safety and GMDSS equipment. For more information from STN Circle 178 on Reader Service Card

European area heats up, especially from former Eastern European nations. Both yards are, however, experiencing fairly successful times.

In the future, all business activities at Hamburg's B+V will be taken over by two newly formed companies — Blohm + Voss GmbH and Blohm + Voss Industrie GmbH — resulting in a more customer-related effect. Blohm + Voss GmbH will take over all yard activities related to ship repair, conversions, shipbuilding of commercial and naval vessels, marine equipment and consulting. Blohm + Voss Industrie GmbH continues with all activities of general mechanical engineering, energy, environmental and army defense technology, as well as plans and components for marine applications. The detachment of business operations has been effected under the provisions of the German transformation law (Umwandlungsgesetz) and with succession in title from the former Blohm + Voss AG, which has been renamed Blohm + Voss Holding AG, and is now a holding company without operational functions.

Managing Directors at Blohm + Voss GmbH will be **Hervert von Nitzsch**, chairman; **Peter Fuhrmann**; **Udo Hutten**; and **Helmut Nadler**. Managing Directors at Blohm + Voss Industrie GmbH are **Dieter Roschmann**, chairman; **Peter Fuhrmann**; and **Udo Hutten**.

B+V has also announced its plans to shed an additional 800 to 850 jobs in a bid to increase profits and secure the future of the Hamburg-based yard. The cuts will leave the yard with an estimated workforce of 1,900, compared with 3,373 employees at the end of last September.

The company also announced that it will merge the B+V ship repair sector with its subsidiary Barthels & Luders, also based in Hamburg, while at the same time cutting capacity. This alone will cost almost 500 jobs. Boiler production and other small activities will be dropped, while central service activities will be earmarked to individual production units, or will be

subcontracted.

B+V added that the new structure will help the company to achieve sales of \$745.3 million, compared with parent company Blohm + Voss revenues of \$1.1 billion in the 1994/95 business year, and group sales of \$ 1.2 million. It recorded a pre-tax loss of \$31.4 million last year, following a loss of 16.9 million in 1994.

The yard's main reason for last year's loss was due to the ship repair sector, where orders decreased in the wake of weakening prices due to the strong deutschmark, especially against Polish and U.K. currencies. Income this year compared with last was virtually halved.

Despite the uncertainty such a reorganization program has on the market, the yard has recently been fairly busy, especially in the containership market. Ships recently in the yard include P&O Containers' *Tokyo Bay*, Hapag Lloyd's *Bremen Express*, Dresden Express' *DSR-Senator* and *Isla de la Plata* and ABC's bulk carrier *Cornelis Verolme*.

Lloyd Werft, part of the Bremer Vulkan Group, has also won some significant contracts in recent weeks. The yard won the *Stena Felicity* refit from Stena Line, then the refit of *Victoria* from P&O Cruises, and the *Table Bay* refit from P&O Containers. Hamburg's Hamburg-Sud, one of Germany's leading shipowners, has also showed faith in the German shipyard, with a contract to carry out major accommodation modifications onboard the recently purchased 42,221-dwt containership *New York Express*, which was renamed *Cap Roca* after the work was completed.

The largest contract won by Lloyd Werft this year was the \$8-million contract to convert passenger/car ferry *Stena Jutlandica* from a Scandinavian service ship to a cross channel ferry. The contract, which was completed during August, involved the complete refit of the two passenger decks with installation of fast food restaurants and shopping facilities to bring the ship online with other ferries operating on this



Flender Werft Delivers Santa Giovanna

Flender Werft of Lübeck delivered its latest ship, new-building No. 661, *Santa Giovanna*, to Hamburg shipowner Claus-Peter Offen. On the same day, the ship went into a three-year charter contract with an option for three additional years with Messrs. Nedlloyd. Accordingly, the vessel's name was changed to *Nedlloyd Amazonas*.

The 29,700-dwt containership is the first of a series of five ships of the Flender 2000T type. It measures 598 x 97.7 x 51 ft. (182.2 x 29.8 x 15.6 m) with a 37.9-ft. (11.6-m) draft. The shipped was classed by Germanischer Lloyd.

The vessel is powered by a crosshead engine, the longstroke MAN B&W 6S60 MC, which has a rating of 12,240 kW at 105 rpm.

In order to reduce the number of drydocking procedures, the ship has obtained the class notation "IW," meaning that classification inspection of the underwater hull can be carried out on the vessel afloat "in water."

For more information from Flender Werft Circle 174 on Reader Service Card

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service. There was also work to be completed on the vessel's loading and discharging system.

The vessel arrived in Bremerhaven during mid-June and the conversion took approximately six weeks. The vessel has now entered the Dover/Calais service under its new name, *Stena Empoerur*.

Lloyd Werft has also been awarded a contract for the life extension of four containerships owned by Safmarine, a large South African shipping line. The contract, which cost approximately \$28 million, will involve life extension onboard the 3,000-TEU containerships *Waterberg*, *Winterberg*, *Sederberg* and *Helderberg*. Work on the four 50,000-dwt vessels will include the replacement of eight generator sets, removal and extensive repair to 39 hatch covers and the upgrading of the ballast tanks. Safmarine is upgrading the speed of the vessels as well as their ability to carry larger numbers of 40-ft. (12.2-m) containers. Built between 1978 and 1981, the vessels are scheduled to be drydocked between August and next January.

Another yard actively involved in the conversion industry is Meyer Werft, Papenburg, more recognized as a shipbuilder, and winner of the contract to convert vehicle carrier *Ocean Highway*, which was purchased by Kuwait Livestock Transport & Trading Co. (KLLT) for approximately \$4 million, to a specialized sheep carrier for KLLT's Australian/Middle East service. The vessel is to be renamed *Al Mesilah*.

Meyer Werft, which over the years has reportedly converted 25 vessels to this type of livestock carrier, won the contract against competition from Bahrain's ASRY and a number of Southeast Asian and Far Eastern shipyards. The conversion project will take approximately 11 months to complete, with some work being subcontracted to a shipyard in Kleipeda, Lithuania, and Bremerhaven's Motoren werke Bremerhaven (MBW). All final outfitting work will be carried out in the Papenburg shipyard.

MAN B&W continues to enjoy its successful market niche, especially in the low speed market; with one latest contract involving a series of 650-TEU containerships building at Singapore's Jurong Shipyard Ltd. for NOL. Each vessel will have a seven-cylinder S42MC two stroke unit as the main propulsion unit.

MAN B&W lost the recent P&O Containers contract (two

SMM '96 Announces Record Participation

SMM '96, scheduled to take place October 1-5 in Hamburg, Germany, has attracted more than 1,000 exhibitors from 37 countries. It is billed as a record show, as 1994, in comparison, drew 829 exhibitors from 31 countries.

After Germany, Dutch firms form the second-largest contingent at SMM '96, followed by the U.S., Norway, Great Britain and Finland.

The U.S., as has been widely publicized, is the official partner country of SMM '96, and will have its own pavilion featuring 67 firms.

6,600-TEU ships) to Sulzer, although among a long list of containership new-building orders, the German engine company has contract for the 5,200-TEU ships building in Kawasaki Heavy Industries (KHI) for COSCO; the series of nine 6,200-TEU ships building for A.P. Moller at Odense Skibsvaerft, Denmark; the 4,400-TEU ships building for Hapag Lloyd in Mitsui Shipbuilding & Engineering (MSE); some of the 4,000+ TEU ships building in South Korea for Hanjin; and all of the 3,800-TEU ships building in Japan for United Arab Shipping Co. (UASC).

News from the diesel engine manufacturing industry includes the continuing cooperation between Germany's MTU and the U.S.' Detroit Diesel Corp. (DDC). In the U.K., sales and distribution of MTU units will be taken over by Mitchell, the DDC agent, with MTU and DDC as individual offices retaining their responsibilities while striving to set up a joint MTU/DDC office. Meanwhile, in Norway, Bemer Larsen, which is the established DDC office, has been taken over by Bartle O Steen, the existing MTU agent. All reorganizations are expected to be completed by the end of this year. This new cooperation is expected to announce two new designs at the forthcoming SMM exhibition in Hamburg. These will be the 2000 series (200-1,343 kW) and the 4000 series (665-2,720 kW).

U.S. company Caterpillar is also slated to become involved in the German diesel engine manufacturing industry with the takeover of medium speed specialist MaK Maschinenbau, Keil, from ownership of the massive Krupp Group. A letter of intent for the takeover to proceed has already been signed.

Diesel Marine International Group (DMI), supplier and re-conditioner of critical components for two and four-stroke marine diesel engines, has added a new dimension to its marine service with the acquisition of the Drechsler group of companies in Hamburg. Drechsler is a long-established marine service company based in Hamburg, offering a wide range of repair and re-conditioning services both onboard ships and in its workshops. DMI's customers worldwide, with ships trading to Northern Europe, now have access through the DMI marketing operation to a comprehensive range of repair services from DMI (Drechsler) GmbH.

One of the largest orders won this year by diesel engine manufacturer Deutz/MWM involved the supply of CODAD plants

Lindenau Works On Innovative Double Hull Tanker

In May, Lindenau GmbH launched new-building S240, a 32,250-dwt double hull tanker with Ice Class E2 capability. Ordered by Partenreederei, the ship is reportedly the largest ever designed and built at Lindenau, and the largest double hull tanker which will sail under the German flag.

Aside from its double skin, the tanker optimizes safety, as all of its cargo tanks achieved class notation COLL 2. All cargo tanks are coated with Camkote MX. All cargo pipes, cargo pumps, fittings in the cargo tanks and cargo valves are made of stainless steel.

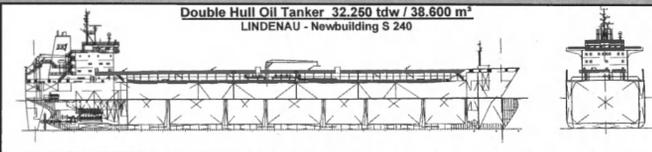
Due for delivery later this month, the ship measures 583 x 92 x 55 ft. (177.8 x

28 x 16.8 m), and has a cargo volume of approximately 38,600-cu.-m. The vessel is designed for unlimited trade according to class requirements, specifically for the transport of crude oil and oil products, limited by the coating resistance list and the scope of supply specified.

The vessel is powered by a MAN 6L

58/64 — which produces 8,340 kW at 428 rpm — driving a variable pitch, Ni-Al-Bronze, four-blade propeller. The vessel achieved a speed — under trial, at design draft and with a main engine output of about 6,600 kW — of about 14.7 knots.

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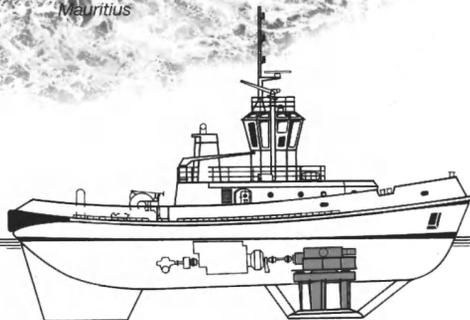
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EU O.K.s Newbuildings At Schichau Seebeckwerft

Schichau Seebeckwerft reported that European Union authorities have given the green light for the construction of two RoRo ferries, and the yard has signed contracts. The ships were ordered by COTUNAV, the national Tunisian carrier, and will be built as hull numbers 1093 and 1094. Both are scheduled for delivery in 1997.

Meanwhile, in July the yard launched what is reported to be the largest combined rail/trailer/passenger ferry under construction for DFO (Deutsche Fahrgesellschaft Ostsee).

The 656-ft. (200-m) ferry is scheduled for delivery in December.

It is powered by four, 6,300-kW diesel engines driving two variable pitch propellers through two twin reduction gears.

Safety and performance is enhanced with an anti-heeling system for loading and unloading, and all safety equipment is to the latest standards.

For more information on Schichau Seebeckwerft
Circle 173 on Reader Service Card

(continued from previous pg.) onboard three patrol boats building for the French Navy at Leroux & Lotz (Nantes). Each main propulsion system comprises two 16-cylinder 620 units and two 12-cylinder 234 units.

Renk To Focus On Products For Fast Speed Ferries

Renk AG will be presenting its product spectrum for marine applications at the upcoming SMM

show, focusing on its products for fast-speed monohull and catamaran ferries. In this sector, Renk has recently been successful by supplying gear systems for almost 20 ferries, including five Aquatrada monohull vessels, four Incat catamarans and three B.C. Ferries. The prime movers are a pair of ABB turbines operating on heavy oil. The Rheine and Hannover Renk works will present some of its curved-tooth and reflex steel disc couplings, designed for offshore duty, and gears for pro-

PELLER shafts with shaft diameters up to 1,100 mm.

For more information from Renk
Circle 177 on Reader Service Card

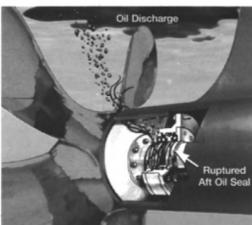
Mecklenburger Metallguss Plans For SMM

Mecklenburger Metallguss (MMG) — a German manufacturer of large copper alloy ship propellers — continues its development of higher efficiency, lower noise and increased service life propellers. To this end, it has expanded its R&D department — including the addition of designers, engineers, software and hardware — and continues to work with shipyards and research establishments to provide solutions for the latest demands in shipbuilding.

For more information on MMG
Circle 180 on Reader Service Card

Deutz MWM Set To Focus On New Engine Series

Deutz MWM will use the SMM '96 exhibition to focus on its new diesel engine series 632. The company will present the in-line engines of that series, which are available in six, eight and nine cylinders. Its standard version



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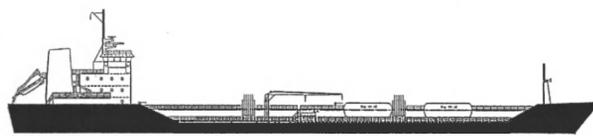
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Maritime Reporter/Engineering News

PBS Velka Bites Focuses On Higher Efficiency Turbochargers

PBS Velka Bites AS, of the Czech Republic, has manufactured turbochargers for diesel engines for more than 40 years. PBS recently finished the first stage of development of its new PTR series, which reportedly has a higher pressure ratio than four, and increased efficiency parameters. The first sets have been tested, with good results on diesel and gas engines reported. The next step of development is to increase the maximum compression ratio, while keeping high reliability in mind.

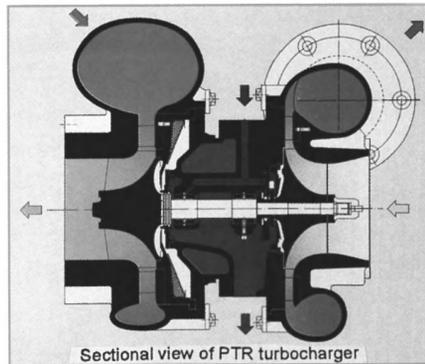
The new PTR turbocharger series report-

edly features considerable improvements, including a radial centrifugal compressor with back-swept blades and a radial-axial turbine.

The turbine and compressor wheels are arranged on overhanging ends of the shaft. Plain bearings located between the wheels have been used.

Turbine and compressor casings are single, one-wall casings. The bearing casing is partially water cooled.

For more information from PBS
Circle 179 on Reader Service Card



covers a power range from 1,440 to 2,565 kW at speeds of 900 to 1,000 rpm.

For more information on the Series 632
Circle 170 on Reader Service Card

Gestra To Introduce New Electronic Temp Control

A wide range of valves and industrial electronic equipment for energy management on ships and in the offshore area is scheduled to be

presented by Gestra AG at SMM.

For temperature measurement and control, when pre-heating heavy fuel oil, for example, Gestra will introduce a new electronic method. The electronic system — TRR 5-1 — is reportedly not only economical, but more reliable



and safer. On the TRR 5-1, the temperature controller and control valve together form a single unit already wired for installation. The TRR 5-1 is programmed by means of the vibration-insensitive programming switches built into the unit.

With this constellation, temperature data can be fed directly to the control room for process monitoring.

For more information from Gestra
Circle 175 on Reader Service Card

ABB Turbochargers To Set Up In Engine Builders Hall

ABB Turbochargers will have its own booth at SMM. Although it is part of the ABB Group and is the largest ABB organization in the marine sector, it is active in different markets, and the company saw it as a logical strategy to move to the engine builders' pavilion.

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Finnish Pride

Finland's maritime industry continues to push the envelope of innovation, offering a plethora of advanced vessels, products and systems to the world.

by Greg Trauthwein, editorial director

The Finnish maritime industry is perhaps best characterized by the specialty vessels, products and services its companies provide. The country's maritime industry is invariably tied closely to the passenger vessel market, and Finnish companies design, build and equip some of the most technically advanced and luxurious cruise ships and ferries in the world. The equipment supply and subcontractor infrastructure is well developed, and is a major factor in helping to keep the country at the forefront of passenger vessel development. The following offers a synopsis of significant activities during the past year.

More Than Cruise ships

While the passenger vessel segment is of obvious importance, it does not fully represent the capabilities of the overall industry.

Finnish yards and suppliers are well-regarded for partaking in the most advanced commercial projects. The main shipyard players are Kvaerner Masa-Yards (KMY) New Helsinki Shipyard and Turku New Shipyard, as well as Finnyards. These companies have established

themselves as building experts of niche, technically advanced ships.

An example of this is *Mubaraz* (pictured above), which was the first of a four LNG carrier, \$1 billion+ order for the Kvaerner Masa-Yards' New Turku Shipyard. *Mubaraz* and its sistership, *Mraweh*, embody a host of proprietary Finnish technologies. Aside from that, *Mubaraz* has the distinction of being the largest ship ever built in Finland.

The second of the four LNG carriers for Abu Dhabi National Oil Co. (newbuilding No. 1331) was delivered in early June. The 135,000-cu.-m. carrier *Mraweh* is one of the largest LNG carriers in the world. The LNG cargo containment system is based on the Kvaerner Moss-type spherical aluminum tank concept, and these LNG carriers are the first 135,000-cu.-m. capacity carriers with only four spherical cargo tanks. The tank manufacturing method was developed at the Turku New Shipyard.

The LNG vessel gets its propulsion power from its own cargo, as boil-off gas is burned in steam boilers.

Much design work for the series was focused

on ship operation costs, including improved fuel economy, seakeeping performance and maneuverability. The ship's slender hull form is of a new low resistance type, and early operation reports from *Mubaraz* and *Mraweh* have proven these goals have been met.

The Turku yard has offers a series of different sized LNG carriers (from 45,000 to 180,000-cu.-m.) to meet diversified customer demands.

Passenger Ship Expertise

Finnyards, meanwhile, has been busy finishing the new series of HSS (high speed service) vessels for Stena. *Stena Explorer* — the first of three HSS 1500 craft, 415.4 x 131.2-ft. (126.6 x 40-m) sisterships from Finnyards in Rauma — is powered by a gas turbine system designed and supplied by Norway's Kvaerner Energy, and utilizes a General Electric (GE) aeroderivative gas turbine. The HSS can reportedly carry 1,500 passengers and 375 cars, and is designed to operate at 40 knots in seas of 16.4 ft. (5 m), due to its gas turbine propulsion system. The vessel is widely considered a quantum leap into the future of ferry travel. Its

The Power to Attract



In 1995, as so many years before, the Wärtsilä Vasa 32 continued to be the most popular medium-speed engine in its class. With a track record totalling millions of operating hours and more than 2,300 units sold, it is an engine that attracts the attention of the entire marine business. Supported by numerous customers and the industry's leading R&D organization, it has led the field for years, with a long list of technical innovations. The latest innovations in the Vasa 32 are gas-diesel technology, the anti-polishing ring and Low NO_x combustion, which demonstrates the best fuel consumption on the market at IMO NO_x standards. No wonder the Vasa 32 is still the most attractive medium-speed engine on the market.

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Circle 385 on Reader Service Card

Finnish Maritime Review

4,000-cu.-m. deck allows for the type of facilities normally available only on larger, more conventional ferries.

On the cruise ship front, Kvaerner Masa-Yards' Turku New

Shipyard delivered the luxury "club" cruise ship *Aida* to Germany's Deutsche Seereederei Touristik earlier this summer. The 1,186-passenger ship will alternate its itinerary between the

Mediterranean and the Caribbean. Significantly, *Aida* is the first cruise ship built by KMY for a German owner. If performance counts, the yard should get follow-up orders, as the vessel was

designed and built in less than 22 months from the signing of the contract. This, the yards claims, is due to efficiencies among all parties, including the owner, suppliers and Germanischer Lloyd, the classification society. The 38,600-gt ship is powered with four MAN 6L48/60 medium speed main engines, with a total power of 21,720 kW, driving two KaMeWa CP propellers via MAAG reduction gears. The electric power is provided by three 3,500 kVA ABB alternators driven by three Wartsila Vasa 8R32 D diesel engines. The ship has two semi-balanced spade rudders, two 1,000-kW KaMeWa bowthrusters, and Blohm + Voss fin stabilizers.

Another pair of cruise ships on order at KMY, Carnival Cruise's *Elation* and *Paradise*, will feature the Azipod propulsion system, a system which received acclaim upon its installation on a pair of tankers operating in the Arctic, *Uikku* and *Lunni*. The Azipod system was chosen for the cruise ships to save fuel and add maneuverability. In addition, the space which is now available — because the propeller motors and shaft lines are now outside of the ship — will be used for freshwater tanks and increased waste treatment capacity. As of the beginning of August, the steel work for the azipods was completed, and production of the units has proceeded according to schedule. *Elation* will have its azipods fitted next spring.

Designs On Safety & Efficiency

Recently, the Refrigeration section of MacGregor's newly formed Passenger Ship Division contracted the modernization and upgrading of the provision stores for Princess Cruises' vessels *Island Princess* and *Pacific Princess*. MacGregor delivered and installed new provision stores (M&F insulation panels) to replace the existing stores which no longer complied with USPH (U.S. Public Health) requirements.

MacGregor's Passenger Ship Division consolidates the activities of the previous Elevator and Refrigeration Divisions of the MacGregor Group in the passenger ship market.

MacGregor's modular prefabricated panel system was specified for the new stores, as it was considered more economical and faster to install within the existing rooms. All drawings, calculations



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Finnish Maritime

and co-ordination were carried out by MacGregor. The work was executed for *Island Princess* in Genoa, Italy, and for *Pacific Princess* in Singapore. The MacGregor Group operates through 30 companies in 25 major shipping and shipbuilding countries and is expanding its local presence worldwide.

Another company which focuses its product development on vessel safety is Valmet Power Transmission. Valmet has delivered to Wartsila a marine propulsion gearbox for a chemical tanker which is equipped with a new PTI drive configuration. The ship, hull No. 1201, is currently under construction at Italy's Apuania shipyard. This solution is designed to increase machinery related safety and enhance operational economy. The concept features a single input/single output gearbox in the horizontal form, three hydraulic multi-disk clutches, which are incorporated in the gearbox, and a PTI drive. The main clutch is for engaging the propeller shaft, while the two others are for the PTO and PTI drive respectively. The PTI drive includes a pony motor.

In the event of engine failure at sea, Valmet's new PTI drive with its unique clutch solution reportedly makes it possible to propel the ship away from hazards. The pony motor, with its shaft integrated in the gearbox, is connected to the PTO shaft to accelerate the shaft alternator. After the alternator has reached its nominal speed, the main and the PTO clutches are disengaged and the propeller shaft is started by engaging the PTI clutch. The propeller is then driven by the shaft alternator, which is functioning as an electric motor and is supplied with power from the generator sets onboard. Besides increasing safety, the unit is designed to make it possible to service the main engine during a call at port, therefore requiring less separate lay days needed for maintenance.

CAD/CAM solutions have also opened up a new forum for increasing design efficiency and safety, and Finnish companies such as Nupas-Cadmatic — a relative newcomer to the market — are making a big impact. The company, which is a joint venture between Holland's Numeriek Centrum Groningen B.V. and Finland's Cadmatic Oy, strives to deliver flexible, easy to use software solutions. To date, shipyards such as J.J. Sietas and Neue Brandt Werft in Germany, Ulstein Verft in

Norway and Chin Fu in Taiwan, have purchased and started using Nupas-Cadmatic shipbuilding software. While most of the product's users are in Europe, the company expects substantial growth in the

Far East and North America.

MacGregor Offers Variety Of RoRo Safety Solutions

The intense attention paid to the

safety of RoRo type vessels is not bound to subside anytime soon. As the *Estonia* and other high-profile disasters have proven, special care and attention must be paid to the

(Continued on page 59)

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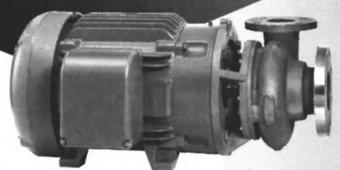


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CAD/CAM Update

KCS Releases Tribon Compartment Module

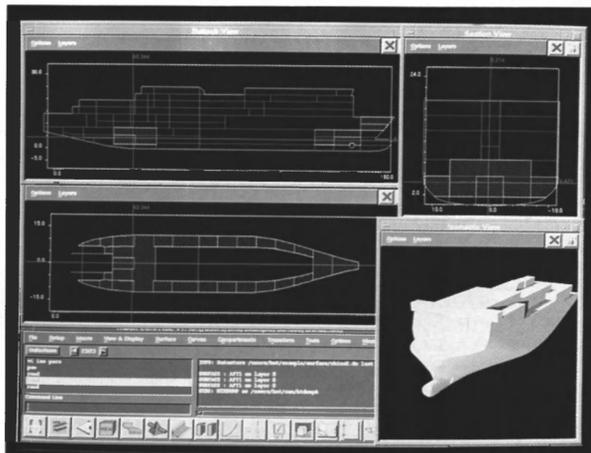
Kockums Computer Systems (KCS) offers the Tribon Compartment module, which focuses on reducing the workhours during the design of the internal arrangement and compartmentation of a ship, providing an advanced facility for the modeling and visualization of designs.

Tribon Compartment has been introduced into the geometric modeling facilities of the Initial Design application of Tribon. Like the advanced Tribon Surface module, Compartment uses the ACIS geometric modeling engine from Spatial Technology Inc. KCS has restructured its special purpose shipbuilding software based on

this advanced, highly interactive modeling tool.

The generation of bulkheads and decks is very general, therefore, Tribon Compartment can be applied to complex structural arrangements and a wide variety of vessels including submarines and SWATHs.

The user of Tribon Compartment can reportedly set a current envelope within which to define internal surfaces and compartments. Transverse and longitudinal bulkheads and decks can be defined using either interactive or numerical positioning, optionally with reference to a frame table.



Pictured is the Tribon Initial Design model of Bang Chui Dao, the passenger ship built by van der Giessen-de Noord in Holland, for Dalian Marine Transport Group in China.

Output from Tribon Compartment will reportedly be used as either a basis for construction of a 3-D product model of the hull structure, or directly by Tribon Calc for

damage stability analysis, tank calibrations and the preparation of stability booklets.

For more information on KCS
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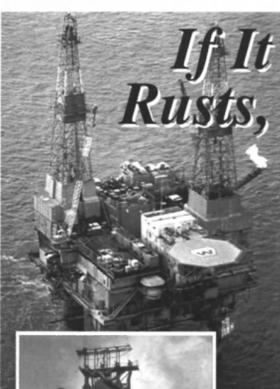
Circle 207 on Reader Service Card

Finnish Maritime Review

Aquamaster-Rauma, ABB Team To Propel Ferries

Danish yard Ørskov Staalskibsvaerft AS has finalized the design for two, 465.7 x 83.3-ft. (142 x 25.4-m), double-ended train/car ferries on order from DSB Rederei AS, Danish

State Railways. The ships — which will operate on the 45-min. crossing between Rodby in Denmark and Puttgarden in Germany — feature an innovative propulsion package consisting of Finnish equipment. The decision was made to link four 3,000-kW ABB Sami Megastar diesel-electric power units to four 3,000-kW Contaz propulsors. The new



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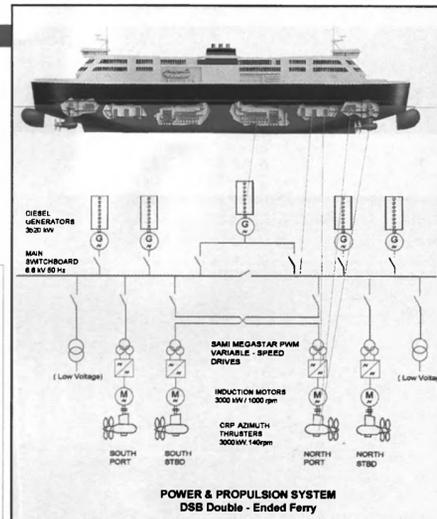
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ferries, with two propulsors fitted at the sides of each end, have made it possible to obtain an optimum hull form and to fit a specially designed bulbous bow at each end.

The decision to opt for the new generation Contaz propulsor unit is, according to Aquamaster-Rauma, a milestone in its strategy to make Contaz a well known brand of azimuthing thrusters for oceangoing ships. The incorporated contra-rotating propellers, known for high efficiency, and low noise and vibration level, are also streamlined in appearance to provide higher speed than traditional thrusters.

The first units were delivered early this year for an RMT 6000 Norwegian platform supply vessel building at Brattvaag Shipyard in Norway, for delivery next summer to DOF Management AS (two smaller units, each producing 2,200 kW have been purchased).

For more information from Aquamaster Rauma
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For more information from ABB
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Wärtsilä 26: Technologically Advanced Power

The new Wärtsilä 26 — using the company's low NOx technology — is designed to optimize space and ease of maintenance, while meeting the most stringent emissions standards of the day. With a maximum power of 310 kW per cylinder and speeds of 900 and 1,000 rpm, the engine is designed for main propulsion applications. It is available in in-line (6, 8 and 9 cylinders) or Vee configurations (12, 16 and 18 cylinders), covering an output range from 1,450 to 5,600 kW. The enginemaker claims that low emissions and low fuel consumption is achieved via high firing pressures, combined with optimum cylinder dimensions and state-of-the-art engine components.

For more information on the Wärtsilä 26
Circle 99 on Reader Service Card

Maritime Reporter/Engineering News

(Continued from page 55)

design, outfitting and construction of these vessels. MacGregor offers a comprehensive technical data sheet on its stern and bow access equipment, to present its technologically advanced solutions.

As MacGregor points out in its brochure, the ramp at either bow or stern may be used to perform a second duty, namely that of a watertight door. About one-third of all ships on unrestricted service which have a roll-on, roll-off capability, incorporate access by the bow as well as by the stern.

For a free copy of MacGregor's technical data sheet
Circle 98 on Reader Service Card

Built To Withstand The Stress

Aquamaster-Rauma has supplied anchoring and mooring systems since 1946. The Rauma windlass program covers chain diameters from 50 mm to 127 mm. The windlasses are either combined with mooring winches or independent, and the power source can be either electric or hydraulic. Standard features on all models are high-grade cast steel cable lifter; precise casting for smooth cable running; and bell mouths.

For more on the line of products
Circle 97 on Reader Service Card

Power Is Money

ABB Marine offers its Cyclo Propulsion concept to the cruise ship market, a propulsion package design which has been incorporated on Carnival Cruise Lines' *Fantasy, Ecstasy, Sensation* and *Fascination*. Each ship, built by Kvaerner Masa-Yards, features a 2 x 14-MW Cyclo propulsion drives, 6.6 kV switchboards, four 10.3 MVA and two 6.8 MVA generators, plus six thruster motors. All were engineered and supplied by ABB Marine, Helsinki. The company also recently won the contract to supply the propulsion system for DSB Ferries, being built at Ørskov Shipyard. One large advantage of the Cyclo concept is the flexibility, increasing the space available for passenger needs, thus increasing earning potential.

For more information from ABB Marine
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Helping East German Yards Modernize

Mock Doors has taken full advantage of the recent wave of shipyard modernization in former East German shipyards. The growing importance of ISO 9001 performance and quality standards has contributed to the increased need for covered production areas. Blast shooting and elevated painting temperatures have also called for closed spaces, due to environmental and energy saving reasons.

Mock Doors manufactures industrial fabric hoisting doors, which are used to close large openings with a technology which provides tight seals, good heat insulation properties and maintenance-free opening in aggressive environments.

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September, 1996

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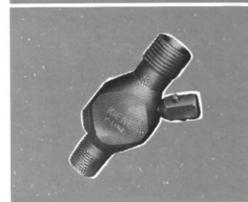
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59

Company Offers Curved, Fireproofed Interior Boards

Huuhka Oy has developed a new product, the Ovalline Interior Board, for the shipbuilding industry. The product was developed with the customer in mind, and the main innovation is the manufac-

turing system which makes it possible to curve and laminate fireproofed boards fast, and with reported high quality. The boards can be curved from 1,550 mm to infinite radius, and lamination with almost any kind of materials is reportedly possible. The company has also developed

a high-quality Space Wall System for ship interior building. The construction is light and steady, and it can be used in several different interior solutions, like free standing display racks, wall coverings and shelving.

For more information from Huuhka Oy
Circle 94 on Reader Service Card

Aker Finishes Its Part On Neptune SPAR

Dockwise N.V., operators of a semi-submersible heavy lift vessel fleet, successfully carried out the transport of the Neptune SPAR from Pori, Finland, to Pascagoula, Miss. Dockwise was awarded the sea transportation of the two sections of the production SPAR from the construction site of Aker Rauma Offshore in Pori to Ingalls Shipyard in Pascagoula, where the two sections are to be assembled. The sections — each 26 meters wide and measuring 119 and 96 meters long — weigh 8,020 tons and 4,650 tons respectively.

For more information on Aker
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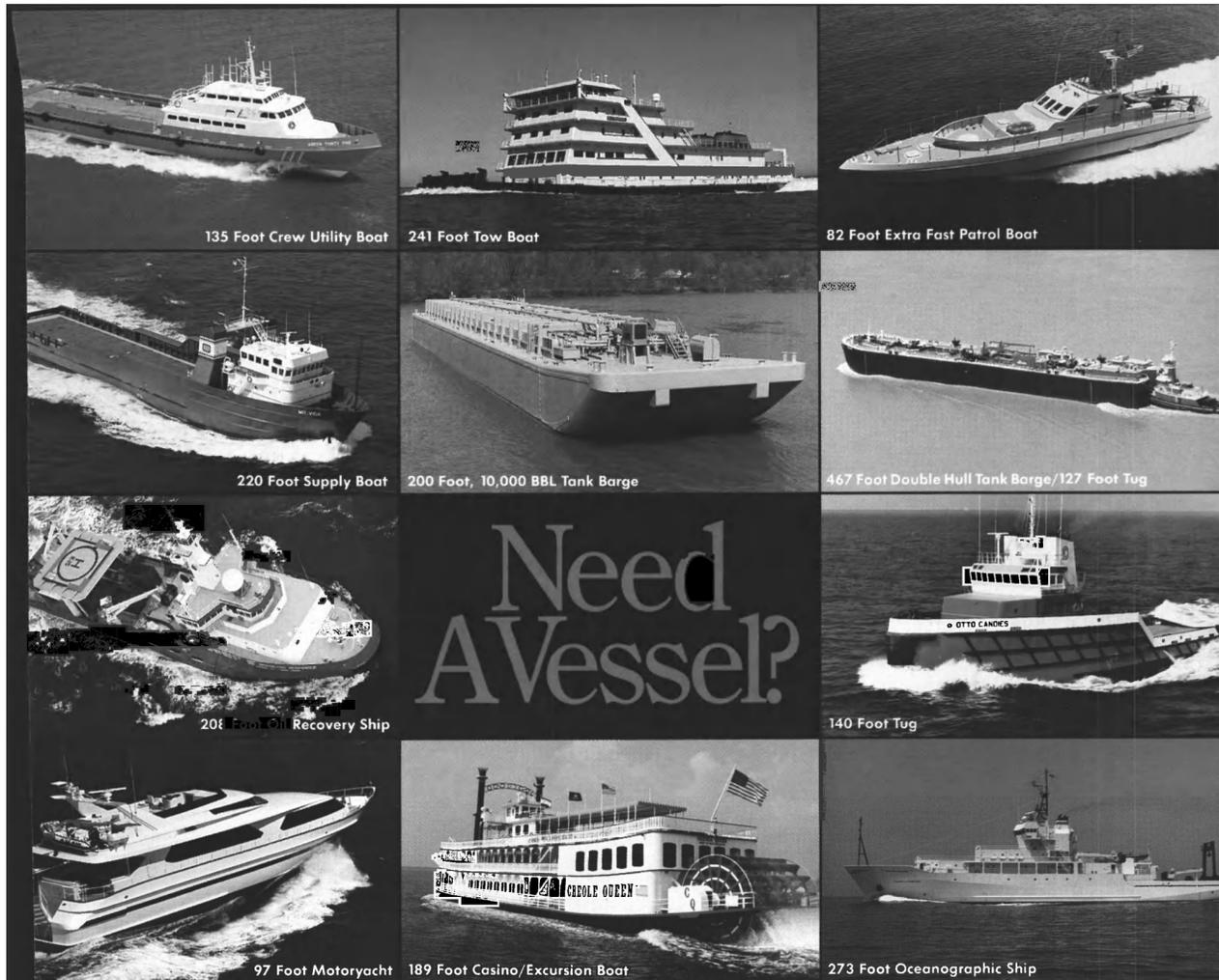
Finnscrew Appoints New Agent In Italy

Finnscrew Finland Ltd. has made an agreement with Italian company Lorenzoni Luciano, a company with a long tradition of working with propellers and other marine equipment such as diesel engines, which makes it Finnscrew's agent in Italy. In expanding its influence further around the globe, Finnscrew Malaysia is now getting up to full speed as well. First Finnscrew Malaysian-made propellers were to be delivered to customers in July. Design of propellers is made by Finnscrew Finland, but casting patterns are made in Malaysia using modern technology developed by the parent company. The factory in Malaysia is capable to cast FP propellers up to 2,000 mm in diameter. Also, CPP components — including blades, hubs and cones — are available up to two tons.

Finnscrew, in business since 1973, has always been an innovator. To maintain its high design level, the company has started a developing project to change and upgrade calculation and analysis programs currently used in propeller construction.

Recent installations of Finnscrew products include:

- Four pairs of ducted FPP propellers installed on tugs for Korea Gas Shipping, built by Kyeong-In Shipyard.
- Propellers for a stern drive tug built by Damen for Gory Towage.
- Contra rotating propellers for Aquamaster CRP units installed on vessels built by Ørskov Staalskibsvaerft for DSB



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Rederi.

• Contra rotating propellers (11 pairs) for Aquamaster CRP units to be installed this year on vessels built by Van der Giessen for Germany's DFO.

For more information from Finnscrew
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ATA Gears Seeks Technological Edge

ATA specializes in the production of spiral bevel gears and in the manufacture of custom-designed gear units and water turbines. Today more than 80 percent of its output is for export.

The company uses a state-of-the-art gas carburizing process for the manufacture of its gear products, as well as the latest in other equipment crucial to the operation.

ATA also designs and manufactures spiral bevel gear units and other special gear units for demanding applications, to a max-

imum power range of 4,000 kW.

For more information on ATA
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Hackman Metos Offers Turnkey Galley Solutions

Hackman Metos' business is to provide solutions, systems and equipment to maximize the productivity and efficiency of ship-board kitchens. Offering turnkey service including layout design, consultation, equipment, installation and project management, the company has supplied equipment and services for a vast number of the top cruise ships in service today, including: Carnival Cruise Lines' *Fantasy*, and NYK's *Crystal Harmony*.

For more information
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Computerized Efficiency Tools Save Time, Money

Onboard-Napa is a tool for loading calculations, damage stability and performance prediction. It is designed for use on car ferries, cruise liners, tankers, cable ships and naval ships. Based on the NAPA — Naval Architectural Package — which is a CAE system covering every modern naval architecture need, the NAPA system is used by many leading European shipyards, ship design consultants, navies and classification societies.

The product is designed with: a user-friendly graphical interface with visual feedback; a real 3-D model of the vessel to allow accurate stability calculations in all draft, trim and list conditions; and stability analysis in damaged or grounded conditions for continuous crew training and decision support in emergency situations.

For more information on Onboard-Napa
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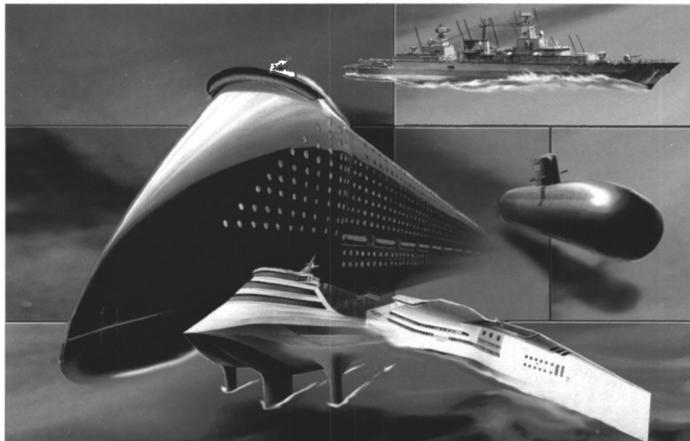
Loipart Offers Ready To Use Galley Solutions

A cornerstone of Loipart's business is the prefabrication of ready-to-install galley modules in its factory in Eura. This patented system enables the customer to inspect the galley before its installation on the ship, and also helps to minimize installation time and cost. Loipart has worked within the industry since 1977, working with shipbuilders on interior installations for newbuildings and refit projects.

For more information from Loipart
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THE HUMAN FACTOR: The Costs of Fatigue at Sea

By Ed Coburn, contributing writer

While the maritime industry has effectively applied technology to reduce operating costs and risks, the human factor is just beginning to receive comparable attention. As a result, further improvements in safety and performance are increasingly dependent on addressing the human factor, and its correlation to maritime accidents.

Assuming that a vessel is well equipped and well maintained, safe operation is dependent on three human factors: individual performance; attentiveness; and alertness. While performance and attentiveness can be largely controlled by maritime operators, alertness is almost entirely the responsibility of crew members. This is where even the best run operations can encounter problems. But this need not be the case. With proper training and policies, maritime crews can enjoy significantly improved levels of alertness.

The Keys to Human Alertness

The first step is to understand

what makes people alert. There are nine factors that control human alertness. These are:

- Mental activity or sense of danger
- Muscular activity
- Time of day on circadian clock (the human sleep-wake cycle)
- Amount of sleep in preceding days
- Ingested food, medicine and other drugs
- Lighting levels
- Temperature
- Sound/noise
- Aroma

When a crew member is sitting on the bridge in the middle of the night, watching a radar screen, with the ever-present hum of the engines in the background, he or she is a prime candidate for succumbing to moments of sleep. There is no interest or sense of danger, little muscular activity, the circadian clock is sending

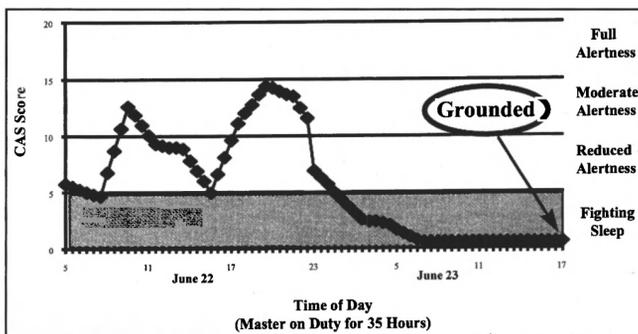
sleep messages, the lighting level is probably low, and the environmental sound is soporific. If that person has been getting too little sleep and the bridge is on the warm side, just about every alertness switch is working against that person. Sleeping conditions are optimum.

The fact is that many of the policies and practices employed in maritime operations are inconsis-

tent with maintaining the highest possible alertness levels. Watch shift rotations tend to be too quick, leaving inadequate time for crew members to get quality, restorative sleep, which results in chronic sleep deprivation. And waking at the wrong time during the sleep cycle causes sleep inertia or grogginess that can impair performance for up to an hour.

An Accident Waiting to Happen

A substantial body of research exists that enables experts to accurately predict individual alertness levels based on circadian time of day, hours of sleep, the previous



CAS Simulation of Master of Tanker (World Prodigy Grounding)
(Source: Circadian Technologies, Inc., Cambridge, Mass.)

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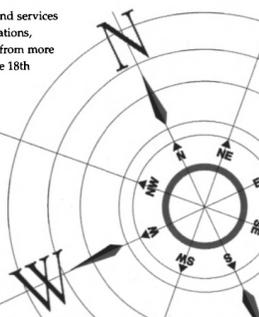
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SAFETY UPDATE

sleep period, preceding days of sleep deprivation, and a number of other factors. Circadian Technologies, Inc. (CTI), a Cambridge, Mass.-based management consulting firm, has developed a computer program that does circadian alertness simulation (CAS).

Using the CAS software, CTI researchers modeled a number of maritime incidents, including the grounding of oil tanker *World Prodigy*. *World Prodigy's* master was severely impaired by fatigue and loss of sleep as a consequence of his work schedule leading up to the time of the accident. The accident occurred at 16:39 in clear visibility and calm seas. In this incident, the master was on duty for 35 hours without relief.

Based on all of the available data, the CAS simulation shows that the master would have been fighting sleep for almost 18 hours. In that condition, response time is slow, ability to fully comprehend events is impaired, and microsleeps (bursts of sleep of several seconds' duration) almost unavoidable.

As the data shows, the master was at an extremely low level of alertness when he came on duty, and though his alertness improved in the next 18 hours, he never reached a state of complete alertness.

Cutting the Costs of Fatigue

Fatigue causes accidents and health problems increases turnover, damages labor relations, and results in increased operating costs, overhead capital costs, legal liability and reduced customer service - ultimately, leading to lower corporate profits.

Often fatigue is passed off as a disciplinary issue and the result of individual irresponsibility. In fact, fatigue is the result of many factors that can be addressed through a systematic alertness assurance process.

Lifestyle training can greatly improve the situation. Just as crew members receive training to do their jobs, lifestyle training is equally necessary. Helping crew members to understand the importance of proper sleep, diet, and exercise can pay big dividends to both the individuals and the company. Alcohol, caffeine, medications and other drugs can all interfere with their ability to get the quality of sleep needed.

At the same time, maritime operators should revise their policies and practices to take into account the current state of knowledge about human alertness. There are many simple and inexpensive steps (fatigue countermeasures) that can significantly reduce the risks and costs of fatigue. Other steps, while more expensive, can in many cases result in dramatic reductions in fatigue costs.

Designed properly and well implemented, these fatigue countermeasures provide benefits to both employer and employee. In addition, by reducing accidents, the need for additional regulatory and legislative efforts to address fatigue is minimized.

Ed Coburn is the publisher of ShiftWork Alert, a newsletter for managers of round-the-clock operations, and Working Nights, a lifestyle training newsletter for people working non-traditional hours. He can be reached at tel: (800) 878-0071 or e-mail: ec@shiftwork.com.

Maritime Reporter/Engineering News

COMPANY & PEOPLE NEWS

Offshore Energy Society Names Chairman

Andre Jackson, Baker Energy manager with more than 25 years of experience in all phases of international energy project management, has been named chairman of the Offshore Energy Center Society (OES). Announcement of Mr. Jackson's appointment was made by **Les Mallory**, vice chairman of the Offshore Energy Center, which is now being developed on the *Ocean Star* jackup rig at Galveston's Pier 19, near the Strand.

Newpark Shipbuilding Forms Enviro Division

Houston, Texas-based Newpark Shipbuilding & Repair, Inc. has consolidated all gas free operations and outside non-marine environmental services under a newly formed First Wave Environmental Services Division.

AESA Appoints Pérez To Commercial Directorship

New Astilleros Espanoles Group (AESA) Chairman **Antonio Mendoza** has named **Juan Carlos Pérez** to the position of commercial director. Previous to accepting this position, Mr. Pérez served as the commercial manager of the Offshore division, contributing to AESA's reputation as a leader in offshore unit construction.

Firm Relocates

Technical project management and marketing development firm Maritime Consulting International has relocated its offices. Its new contact information is: 3003 NE 149th Ave., Portland, Ore. 97230-4355, tel: (503) 256-5535; fax: (503) 256-4535.

Interforce Expands Underwater Repair Services

Interforce Inc. of Fort Lauderdale, Fla., has expanded its underwater repair and ship husbandry services to include full

scale project management for major and minor repairs, and for overhauls, salvage and towing, spill response contingency plan development, and complete inspection and maintenance services.

Aqua Signal Names South American Rep

Aqua Signal Corp., an Illinois-based marine lighting and accessory manufacturer, has named

Miami-based E & P Marine to represent its products. **Larry Correa**, Sales manager at E & P, says his company will represent the products in Mexico, Central and South America and the Caribbean.



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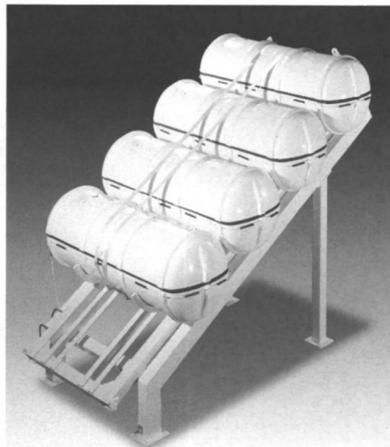
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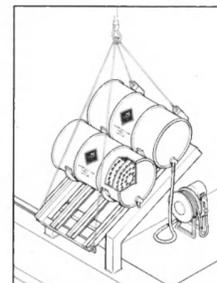
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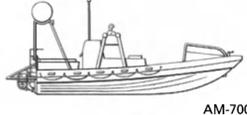
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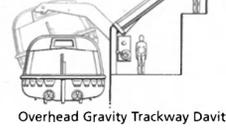
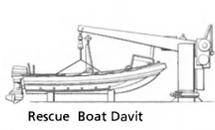
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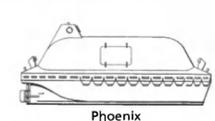
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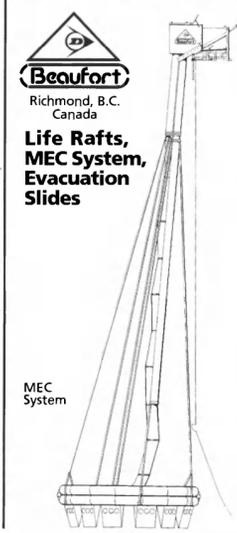
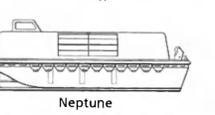
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COMPANY & PEOPLE NEWS

Joins ACBL

American Commercial Barge Co. (ACBL) of Jeffersonville, Ind., announced that **James M. Fox** has been named vice president of Operations for ACBL de Venezuela. Mr. Fox has more than 20 years of experience in vessel operations, including the areas of personnel assignment, training, safety, vessel maintenance and fleet operations. He was formerly employed as vice president of Distribution/Gulf Operations, where he was responsible for movement of all company barges in the Gulf/East Canal area. Mr. Fox will report to **Oscar Curth**.

Nedlloyd Expands Service

Nedlloyd Lines (U.S.A.) Corp. has expanded its Mediterranean service to include two weekly calls to Charleston and one weekly call to Houston from its Mediterranean/North Atlantic service (MEDNAS) and new Mediterranean/South Atlantic service (MEDSAS). The new rotation includes the cities of Genoa, Valencia, Algeciras, Charleston, Port Everglades, Miami and Houston. This Atlanta-headquartered shipper operates 38 fixed liner services to more than 190 ports in 80 countries.

Ritchie Joins Lydall

Lydall, Inc. is a Connecticut manufacturer of technically advanced engineered materials for specialty applications in air and liquid filtration, thermal barriers and shields, electrical insulation and materials handling. The company has appointed **C. Stokes Ritchie** as vice president of Sales and Marketing for its Lydall Westex division.

Hondo Marine Expands U.S. Network

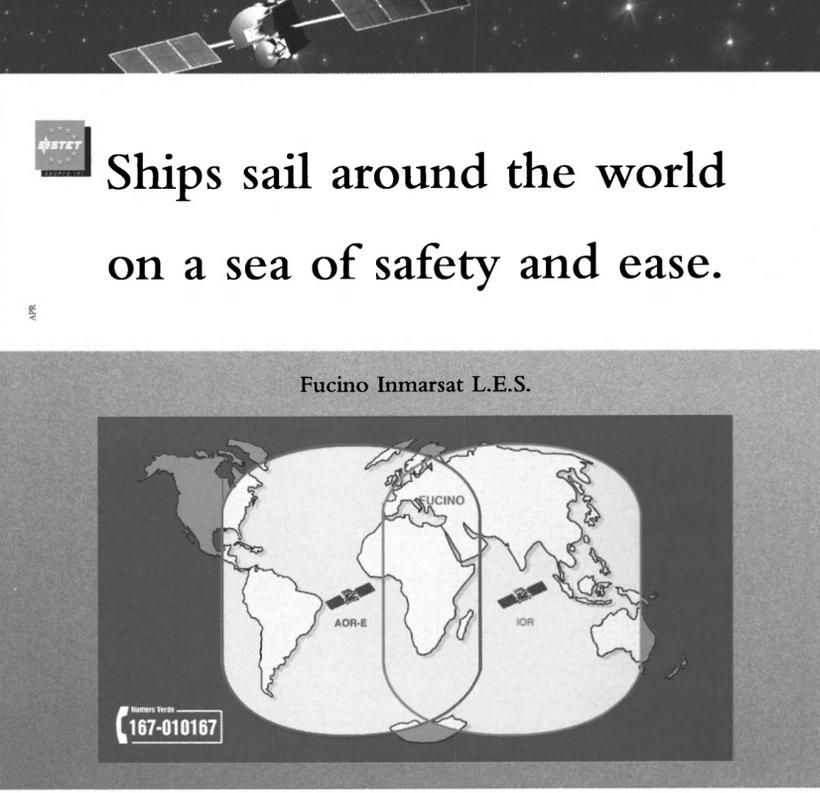
Honda Marine, a manufacturer of four-stroke outboards headquartered in Duluth, Ga., has expanded its U.S. dealer network. New additions to its network include locations in New York, California, Georgia, Alabama, Mississippi, Louisiana, North Carolina, South Carolina, Wisconsin and Indiana. The company offers models producing from two to 90 hp.

Servowatch Opens Southern U.S. Office

Servowatch Systems, a company involved in the marine electronics

and controls business, has opened an office in Fort Lauderdale, Fla., to provide sales and technical support to its U.S. customers. Supplying comprehensive control and monitoring systems for yachts

and commercial craft, Servowatch also provides a consultancy service for computer systems, audio and video, and integration with navigational and communications equipment.



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COMPANY & PEOPLE NEWS

Lloyd's Certifies Hong Kong Shipowner Under ISM, Appoints Directors

Hong Kong Shipowner Wah

Kwong Shipping Agency has recently become the first company in Hong Kong to gain International Safety Management (ISM) Code approval through Lloyd's Register Certification Scheme for Ship Operators.

"It has been hard work for us to prepare our safety management system, but I believe that we are already seeing benefits to the way we work. Companies which have not yet begun to tackle the matter will find it hard to achieve certifi-

cation by the mandatory implementation date," said Wah Kwong's ISM Manager Captain **Peter Yuk**.

Lloyd's Register has also appointed **Akira Miyazaki**, corporate advisor for Mitsubishi Heavy Industries in Japan, and **Robert Woods**, main board director of P&O and managing director of P&O Containers Ltd., as non-executive directors of the classification society.

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SeaVision Relocates Corporate Headquarters

On July 1, SeaVision, Inc., a company involved in interactive television for cruise ships and leisure industry applications, announced that it will relocate its headquarters from Lisbon, Ohio, to Miami, Fla. The new office will be headed by **Brian Blair**, chief operating officer, who said that two key factors supported the company's decision to move to Florida. "First, Miami is the cruise capital of the world, and we recognized the need to be close to our clients. Second, as a rapidly-growing, high technology company, we are looking for a large pool of talented people, all the better if they have cruise industry experience," remarked Mr. Blair.

Reson Renames U.K. Division

Danish underwater acoustics firm Reson AS, known for its sonars, transducers, hydrophones and transducer calibration equipment, has announced that its U.K. division, formerly known as Reson U.K., has been renamed Reson Offshore Limited. Reson AS also has a U.S. subsidiary, Reson Inc., which manufactures the company's SeaBat line of multibeam echosounders.

APS Expands Agency Network

The worldwide network of agencies for Advanced Polymer Sciences, Inc., (APS) of Avon, Ohio, has been further extended with the announcement of two new appointments in Europe. APS manufactures MarineLine, a polymer-based, aerospace technology lining for the cargo tanks of chemical and product tankers. The two new

COMPANY & PEOPLE NEWS

nts are FH Lorentzen & Son AS Oslo, Norway, and Femar Mare l., located in Genoa, Italy.

Oronite Announces New Appointments

Linda S. Grant has been named purchasing contract administrator for Chevron Chemical's Oronite Additives Division. She procures raw materials, commodities and specialty chemicals for the manufacture of Oronite products, and before this appointment, most recently served as transportation/responsible care specialist for the Oronite Division.



Linda S. Grant



Steve J. Best

Steve J. Best has been appointed original equipment manufacturers' (OEM) technical liaison for the same Chevron division. He is the communications link for Oronite's Specialty Products with the OEMs in such product lines as tractor hydraulic fluid additives and two-stroke engine oil additives. He has been employed as an Oronite processing engineer, and as a customer technical service representative for Oronite's Specialty Additives.

Leica Employee Honored By Institute Of Navigation

Thomas A. Stansell, Jr., of the Leica GPS division, has been awarded the Weems Award by the Institute of Navigation (ION) in Alexandria, Va. The award is given out annually in recognition of continuing contributions to the art and science of navigation. As director of Advanced Programs with Leica GPS, Mr. **Stansell** is the team leader of the computer-aided earth moving program (CAEM), in which Leica is collaborating with Caterpillar and Spectra-Physics under the President's Technology Reinvestment Program (TRP).

Prior to Leica's purchase of the company's commercial GPS business group in 1994, Mr. **Stansell** spent 25 years with Magnavox, and reportedly was responsible for starting the offshore oil survey integrated navigation and systems

business, and for developing a long series of successful Transit and Omega navigation and survey instruments. He also headed the teams which developed Magnavox's all-digital GPS receiver technology.

Based in Torrance, Calif., Leica's GPS group designs, manufactures and markets professional products using GPS for marine and land-based applications.

Vikoma Int'l Names Managing Director

Vikoma International Ltd. of Cowes, Isle of Wight, designs and

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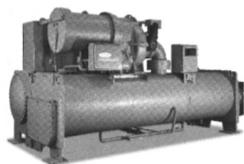
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COMPANY & PEOPLE NEWS



Albert Brown.

manufactures emergency oil spill response equipment and systems for the continuous recovery of hydrocarbons

from industrial wastewater. **Albert Brown**, who has occupied the interim managing director slot since November 1995, has stepped in as the company's managing director, after the resignation of

Graham Norman due to poor health.

During his career, Mr. **Brown** served as managing director of Salvesen Oilfield Technology Ltd., during which time the company

was awarded the Scottish Off-Achievement award in recognition of its performance in the Euro oil and gas sector. In the last years, he reportedly played a part in the development of a corporate consultancy group in Aberdeen which counts major oil companies among its clients.

THE ART OF RECONDITIONING



Established in 1956, Brigantine Services Limited has specialised in the reconditioning of diesel engine parts. All reconditioning procedures are carried out to the exacting specifications of the engine manufacturers and the appropriate classification society.

Brigantine's experience is only matched by the quality of its workmanship. The company operates from its new 4,200 square metre modern workshop located in Hong Kong, and employs more than 100 technicians authorised to carry out repair and maintenance services by MAN B&W Diesel, New Sulzer Diesel, Mitsubishi Heavy Industries, Ulster Hydraulic Brattvaag, Lyngso-VALMET Marine and the Hong Kong Government.

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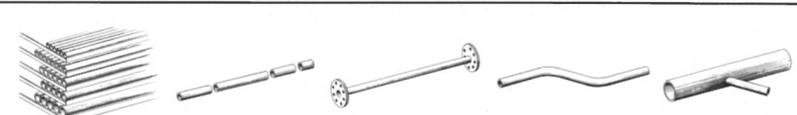
- Diesel engine reconditioning of such components as:
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Shay Named Gulf & Atlantic Project Manager

Robert J. Shay has been appointed to the position of project manager for Gulf & Atlantic Maritime Service, Inc., a full-service ship agency with headquarters in Iselin, N.J., and branch offices in port and inland locations throughout the U.S. Prior to accepting his new position, Mr. Shay accrued more than 25 years of experience in the field of project cargoes and chartering, and was employed by Lykes Bros Steamship Co., Industrial Maritime Carriers and Colonial/Gulfship Marine.

XTRA Names Chief Information Officer

San Francisco, Calif.-based XTRA International, the marine container leasing division of XTRA Corp., has appointed **Paul K. Bulba** to the position of vice president and chief information officer. He assumes responsibility for XTRA International's worldwide information systems at the company's headquarters and at its worldwide locations. New technology development, fleet administration, customer invoicing and maintaining information platforms are part of his new portfolio.



Paul K. Bulba

"K" Line Makes Liner Department Appointments

"K" Line, a fully integrated intermodal transportation company linking the Pacific Rim with North America, has recently made new appointments in its liner departments. **Tina Masington** and **Christopher Luebbers** were

COMPANY & PEOPLE NEWS

ed managers in the Logistics department, r joining the company in 1994 as planning ysts. **Alan Silber** has been promoted to gen- manager, Liner Budget, responsible for liner geting including West Coast terminals, as l as control and reporting of monthly expendi- es and variances.

Support News Names Little Human Resources VP

On July 22, Newport News Shipbuilding (NNS), division of Tenneco, announced the appointment of **Alfred Little, Jr.** as vice president of Human Resources, effective immediately. Prior to accepting this position, he was employed in the same capacity for Sun Company, Inc. in Philadelphia, and has also worked for Inmont Corp. and Jones & Laughlin Steel Co. Mr. Little's responsibilities at the yard will include employee relations, compensation, benefits, employment, labor relations, environmental health and safety, security and training, and development.

Peterson Builders Elects New Chief Executives

Peterson Builders, Inc. (PBI) of Sturgeon Bay, Wis., recently announced the election of two executives to senior level positions. **James M. Stawicki**, vice president and chief operations officer since 1995, was named president of the company. **Ellsworth L. Peterson**, who occupied the presidency for 31 years, was elected chairman of the board.

In June 1995, the company announced its decision to sell its shipbuilding division at Sturgeon Bay, due to U.S. defense spending cutbacks and changing marketplace conditions. PBI has completed an auction of its personal property and equipment related to shipbuilding, and the real estate will be developed for purposes other than shipbuilding.

PBI's remaining operations include a ship repair operation in Ingleside, Texas; a spare parts procurement and logistics business in Sturgeon Bay and Virginia Beach, Va.; and a calibration lab, marina and corporate support group — handling the licensing and support of vessel designs and management of the company's real estate — in Sturgeon Bay.

Women's Maritime Group Seeks To Establish U.S. Chapter

The Women's International Shipping and Trading Association (WISTA), an international organization for women in maritime industry and

September, 1996



Ellsworth L. Peterson



James M. Stawicki

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COMPANY & PEOPLE NEWS

law, is attempting to establish an active U.S. chapter. The organization began in the U.K. in 1974 as informal gatherings of female brokers, and has expanded to include members from across the world in

all areas of shipping and trading, including operations, finance, brokering, chartering, freight forwarding, consulting, management, law and insurance. WISTA organizes annual conferences which

include workshops, lectures, specialized courses, port and terminal tours, company visits, professional discussions and gala events, as well as provides an invaluable industry network. For more infor-

mation on WISTA, contact **An Lufkin** at Reefer Cargo Ser Agency, 12 Fish Island, P.O. 2088, New Bedford, Mass. 02 tel: (508) 994-4411; fax: (508) 6267.

The New York Women's Association (NYWBA), an organization open to lawyers from jurisdiction, is currently in midst of creating a Women Maritime Law Committee. For more information, call the association at tel: (212) 889-7873.

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Interstate Diesel Names New Canadian Distributor

Interstate Diesel/McBee Supply of Cleveland, Ohio, has announced the addition of Allied Holme Power Products of Vancouver British Columbia, as its distributor for remanufactured Detroit Diesel and Cummins injectors. Interstate/McBee has been manufacturing diesel replacement parts for Cummins, Detroit Diesel and Caterpillar engines since 1947, and reportedly serves customers in more than 75 countries.

Watercom Announces Appointments

Waterway Communications System, Inc. (Watercom), a Jeffersonville, Ind.-based company providing telecommunications for vessel and shore-based applications, has announced three new appointments. **Pamela Hansford** has been named AR/credit analyst. **Jennifer Wood** has been promoted from the Customer Services department to senior Marketing Services specialist. **Katrina Pritchard** has been named Marketing Services specialist.



Jennifer Wood



Katrina Pritchard

Newport News Names Anderson CFO

On July 23, Newport News

COMPANY & PEOPLE NEWS

Shipbuilding (NNS) announced the appointment of **David J. Anderson** to the position of senior vice president and chief financial officer (CFO). Since 1991, he has served as executive vice president and CFO of R.J. Reynolds Tobacco Co. in Winston-Salem, N.C. At the shipyard, Mr. Anderson's responsibilities will include finance, accounting, payroll, cost management and cost engineering. He will reportedly head up the new investor relations function when NNS is spun off from parent company Tenneco later this year.



David J. Anderson

Newport News builds naval and commercial ships, and in its 110-year history, has reportedly produced close to 800 newbuilds.

RINA Names New President

The Royal Institute of Naval Architects (RINA) announced that **T. John Parker** succeeded **Peter J. Usher** as president of the institution on July 1. Dr. Parker has served as chairman and CEO of Harland & Wolff and as executive group chairman for Babcock International Group plc. He also chairs Lloyd's Register of Shipping's Technical Committee and is a member of Bureau Veritas' International Committee.

Gordon To Head Lykes' Washington Office

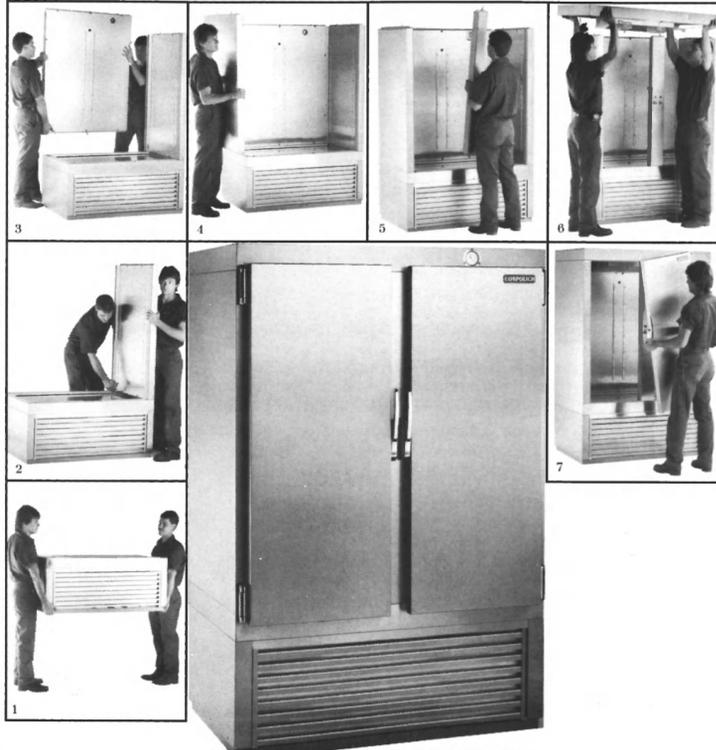
Michael J. Gordon has joined Lykes Bros. Steamship Co. as director, Government Affairs, in Washington, D.C. The appointment was announced by Capt. **John W. Murray**, Lykes senior vice president, Operations. Mr. Gordon will be responsible for strengthening the company's relationship with departments and agencies of the U.S. government, including enhancing Lykes' position in the carriage of preference cargoes. He will also work with representatives of foreign governments and the Washington-area freight forwarding community to expand Lykes' commercial service offerings. Before accepting this latest appointment, Mr. Gordon served as manager of Government Services and Affairs for another U.S. flag carrier.



Michael J. Gordon

Aker Appoints New U.S. Operations Leader

Aker Oil & Gas Technology, Inc. (AOGT) has announced the appointment of **Jan Moksnes** as president of the Aker central business unit in the U.S., effective August 1. Mr. Moksnes, former resident of Aker subsidiary Norwegian Contractors, succeeds **Olav K. Christiansen**, head of U.S. operations since 1992. During Mr. Moksnes' tenure as president of Norwegian



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COMPANY & PEOPLE NEWS

Contractors, the company delivered concrete gravity based structures for numerous projects, including the concrete hull for the Heidrun TLP (tension leg platform).

Dickinson Named Kelvin Hughes Singapore GM

Effective August 15, **Martyn Dickinson** will assume responsi-

bility as general manager of Kelvin Hughes (Singapore) Pte. Ltd. Previous to his appointment, he served as a regional sales manager for the company, covering duties in a number of countries including

Australia and New Zealand. Mr. **Dickinson** has also been involved in the development of radar and integrated navigation systems, with particular emphasis on specialized navigational equipment for high speed craft.

Kelvin Hughes plans to upgrade its Singapore office's current capabilities with an expansion of operations, which will reportedly include increasing staff levels and spare parts inventories.

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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.

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National Marine Names New Managers

New Orleans based river transportation company National Marine, Inc. has named two new managers.

Ralph Vineyard has joined the company as assistant manager of Barge Repair and Maintenance.

David Ott was named to the position of Risk manager. Operating a diversified fleet of 55 towboats and more than 700 barges, National Marine is reportedly one of the U.S.' largest inland river carriers.



Ralph Vineyard



David Ott

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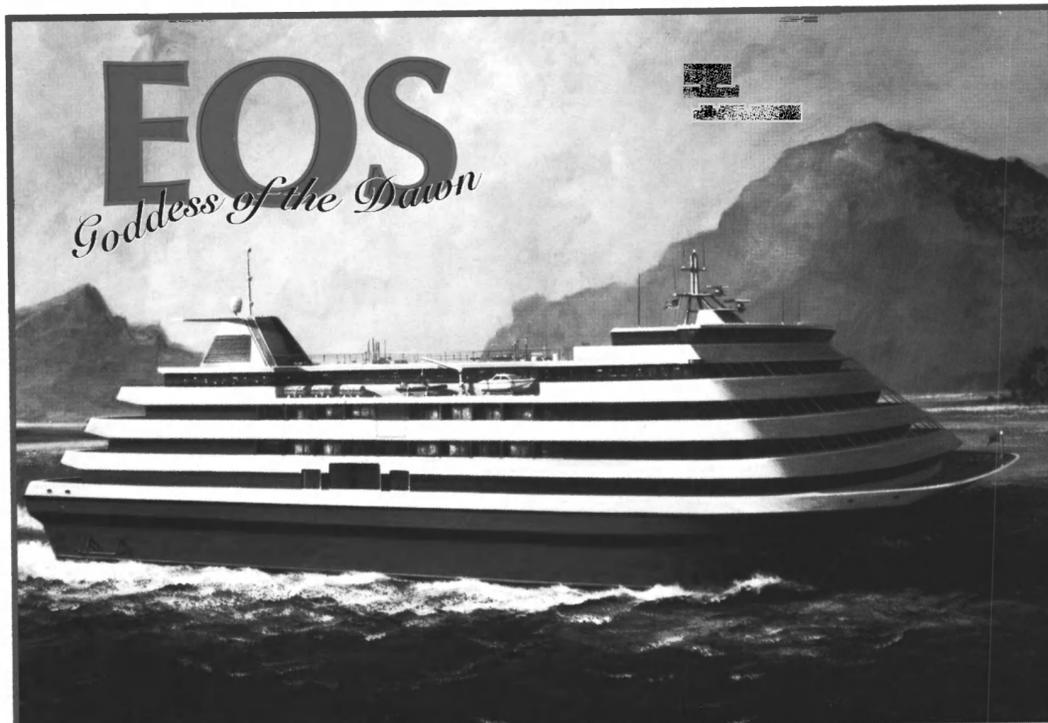
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Hastings Instruments Hires GM

Al Pichelli has been named general manager of Teledyne Brown Engineering Hastings Instruments. This Virginia-based business unit designs and manufactures instrumentation for precise measurement and control of vacuum pressures and gaseous flows. Previous to this appointment, Mr. Pichelli served as senior vice president at Teledyne Laars in Moorpark Calif.



Al Pichelli



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Mobil's Raven Undergoes Sea Trials

Double-hulled VLCC *Raven* underwent sea trials prior to its delivery in June to Mobil Shipping and Transportation Company. The 280,000-dwt supertanker was built by Sumitomo Heavy Industries, Ltd.'s Oppama shipyard in Oppama, Japan. *Raven* will be Mobil's second double-hulled VLCC. The first, *Eagle*, was commissioned in 1993.

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MMS To Distribute CargoMax

Herbert Engineering Corporation (HEC) and Marine Management Systems, Inc. (MMS) have agreed that MMS will be HEC's global distributor of CargoMax for Windows HEC's cargo loading, trim, stability and strength software application.

CargoMax reportedly provides the tools necessary to maximize vessel utilization by accurately and quickly evaluating stability and strength margins for any given load. Features include integrated damage and stability analysis, level gauging system interface and the latest IMO and IACS requirements for tankers and bulk carriers.

In addition, compatibility with the HECSALV salvage response software provides an added dimension for contingency planning and ensures rapid response capability. CargoMax is capable of being configured for all types and is approved by classification societies such as ABS, DNV and LR.

MMS offers CargoMax as part of its FleetWATCH operations and administrative systems product lines. In addition to CargoMax, FleetWATCH also offers software applications for vessel reporting and personnel/payroll management. These software applications can be purchased together as an integrated package, or separately on a modular basis.

Headquartered in San Francisco, Calif., Herbert Engineering Corporation is a naval architectural consulting firm with more than 30 years of ship design and software development experience.

Marine Management Systems of Stamford, Conn., provides software applications worldwide for more than 500 ship and shore sites.

Port of Le Havre Reports Rise In Traffic

As of June 30, the Port of Le Havre Authority reported a rise in traffic for the first half of 1996, as compared with statistics from the first six months of 1995. A 6.6 percent rise in volume over last year was recorded.

This increase is due to the rise in crude oil traffic and to the increase in other fuel products, including exports of refined products as well as a strong rise of coal imports which have nearly doubled, reaching approximately one million tons for the first six months of this year.

IIW Begins Fabrication On Aegis Flight IIA Destroyers

Bath Iron Works Corporation (BIW) has begun fabrication on the first Aegis Flight IIA variant of the Arleigh Burke-class guided missile destroyers. This ship, named *Oscar Austin* (DDG 79) after a marine who received the Congressional Medal of Honor for giving his life in Vietnam, is the 29th of 57 ships in this class currently planned by the Navy. As lead yard for design and construction of the Burke destroyers, BIW has received contracts for 19 destroyers and has delivered nine of these ships. *Oscar Austin* is the shipyard's 16th DDG to begin fabrication. Construction of this ship will continue over the next two years, with launch scheduled for September 1998, and delivery for February 2000.

The most significant difference between the Flight IIA variant and other destroyers being is the addition of twin helicopter capability. This change requires dual helicopter hangars above the main deck, additional accommodations for air crew, aircraft handling systems and ammunition storage facilities to allow embarked helicopters to be deployed with the ship.

Internal changes in the Flight IIA ship have also been incorporated. Approximately 30 percent of the ship has been redesigned to upgrade many of the structural, piping, electrical and ventilation systems and components. In addition, many traditional MILSPEC components have been replaced with commercial off-the-shelf (COTS) components to reduce costs.

Another significant change involves the Flight IIA ship design process. For what is reportedly the first time ever, a U.S. Navy surface combatant design has been developed almost exclusively using 3-D computer aided design (CAD). This technology reportedly allows BIW designers to visualize the product on the computer screen, using live "walk-throughs" and demonstrations

In the way of general cargo trade, the Port is suffering from the slow-down of the economics in continental Europe. The imports of containerized products increased by only .6 percent, whereas exports increased by 5.1 percent. The forecasts for the second half are expected to be more favorable, as all the containerized shipowners serving the Far East have opted to use the Port of Le Havre.

to determine optimal solutions for human engineering and interference-free design.

For more information on Bath Iron Works Circle 3 on Reader Service Card



USS OSCAR AUSTIN DDG 79

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TRIBON is an Expert system

Shipbuilding knowledge accumulated over 25 years is implemented in TRIBON. This means that the system allows designers to be extremely productive creating designs. In addition TRIBON has customisable standards which allow a customer to build in the rules that are used in production at his own site so that designs are tailored to use the available production facilities in the most economical way.

All information stored in one common Product Information Model

The core of the TRIBON system is the Product Information Model which is used to integrate all stages and disciplines of design and build strategy work and make them concurrently available to all designers and planners. This shortens the overall process by allowing different types of designers and planners to work in parallel.

Automatic Production Information

TRIBON will automatically generate production information for a design in accordance with the build strategy and the customisable shipbuilding expertise built into the system.

The types of machinery supported by TRIBON are constantly expanding with improvements in shipyard facilities and robot technology. KCS is heavily involved in a series of yard modernisation projects in Europe, Korea, and Japan where the use of TRIBON is critical to control new equipment being installed and gaining cost savings in production.



KCS operates worldwide. We place a high importance on continuing support of our customers, so to complement the support services of our head office in Sweden, KCS local offices have been established in China, Germany, Japan, Russia, South Korea, Singapore, UK and USA.

More than a third of world building orderbook

Design and information systems from KCS are in service at more than 230 shipbuilders and design engineers offices all over the world. Today these companies carry out the design and production for more than a third of all ships in the complete world shipbuilding orderbook. This large base of customers are continually creating new ideas and projects to improve the TRIBON system.

The KCS Family Concept

The TRIBON system is developed in close cooperation with our customers in what we call the KCS Family Concept. The Family Concept is a framework for communicating and working together with our customers. Ideas and plans are exchanged regularly in a number different forum such as Partner Meetings, Reference Groups, Workshops, and Users Meetings. For example, Users Meetings

are organised once a year to give customers from all over the world the chance to get together and discuss system development and improvement. At the 1995 meeting there were 205 customers from 26 countries.

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**Hollywood Casino
Announces License Renewal
in Illinois**

Hollywood Casino Corporation has announced that the Illinois Gaming Board has voted to renew the company's license of Hollywood Casino-Aurora, Inc., its wholly-owned subsidiary. The owner's license permits Hollywood Casinos-Aurora to operate two riverboats on the Fox River in Aurora, Ill. Hollywood Casino opened for business in June 1993. Under Illinois law, the owner's license was originally issued for a three-year period and is renewable for successive one-year periods. Hollywood Casino Corporation owns and operates Hollywood-named casino entertainment facilities under the service mark Hollywood Casino in Aurora, Ill.; and Tunica, Miss.; and through its 30.1 percent ownership of Pratt Hotel Corporation.

**Coastal Corporation
Announces Increase In
Earnings**

The Coastal Corporation recently reported that earnings increased 16 percent in the second quarter to \$66.1 million, or 58 cents per share, compared to \$57.2 million, or 50 cents per share, during the same quarter a year earlier. It also showed a 31 percent increase in earnings per share, climbing to \$148.6 million, or \$1.32 per share, compared to \$114.8 million, or \$1.01 per share for the same period a year earlier.

"Coastal is on track toward reaching its goal of increasing earnings per share by more than 15 percent this year," said **David A. Arledge**, Coastal's CEO. "I am especially pleased with the performance of our Exploration and Production group, where lower costs and production volume increases coupled with stronger prices, have resulted in dramatically improved profitability," Mr. Arledge added.

**Cascade Adopts New Labor
Agreement**

A new labor contract has been ratified between Portland Shipyard's prime contractor, Cascade General, Inc., and the 1,500 shipyard workers represented by the Metal Trades

Council of Portland. Cascade General President and CEO **Frank Foti** said the contract includes several radically different approaches to wage and jurisdiction issues he anticipates will enable Cascade to compete more effectively for foreign and domestic ship repair business. "The contract will change the way we work to assure the survival and success

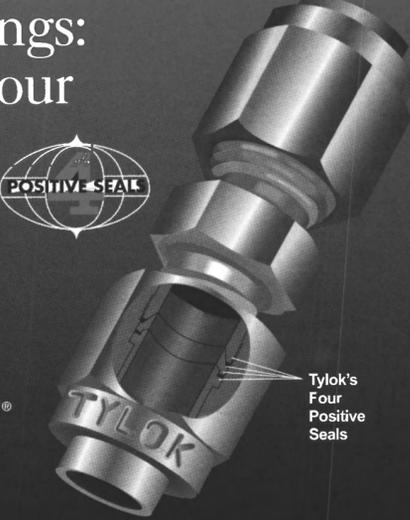
of the ship repair industry in Portland," Mr. Foti predicted.

The four-year contract, effective July 1, 1996, through June 30, 2000, allows a worker from any Metal Trades union to perform any craftwork at the shipyard he or she can do safely and efficiently. It also provides an hourly wage based on skill, ability and performance. The Metal Trades Council

of Portland is a bargaining unit comprised of shipyard craft locals, including boilmakers, teamsters, carpenters, painters, electrical workers, machinists, pipefitters, sheet metal workers, asbestos workers, operating engineers and laborers.

For more information
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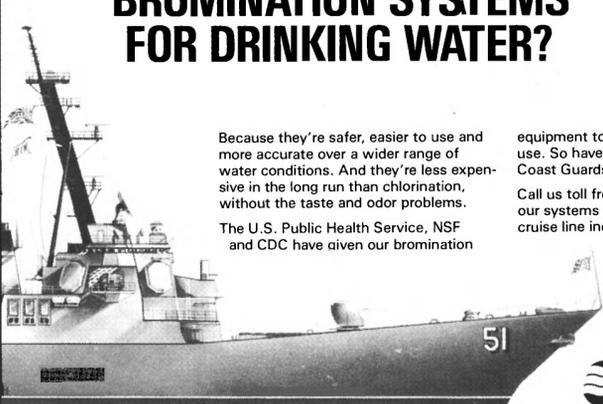
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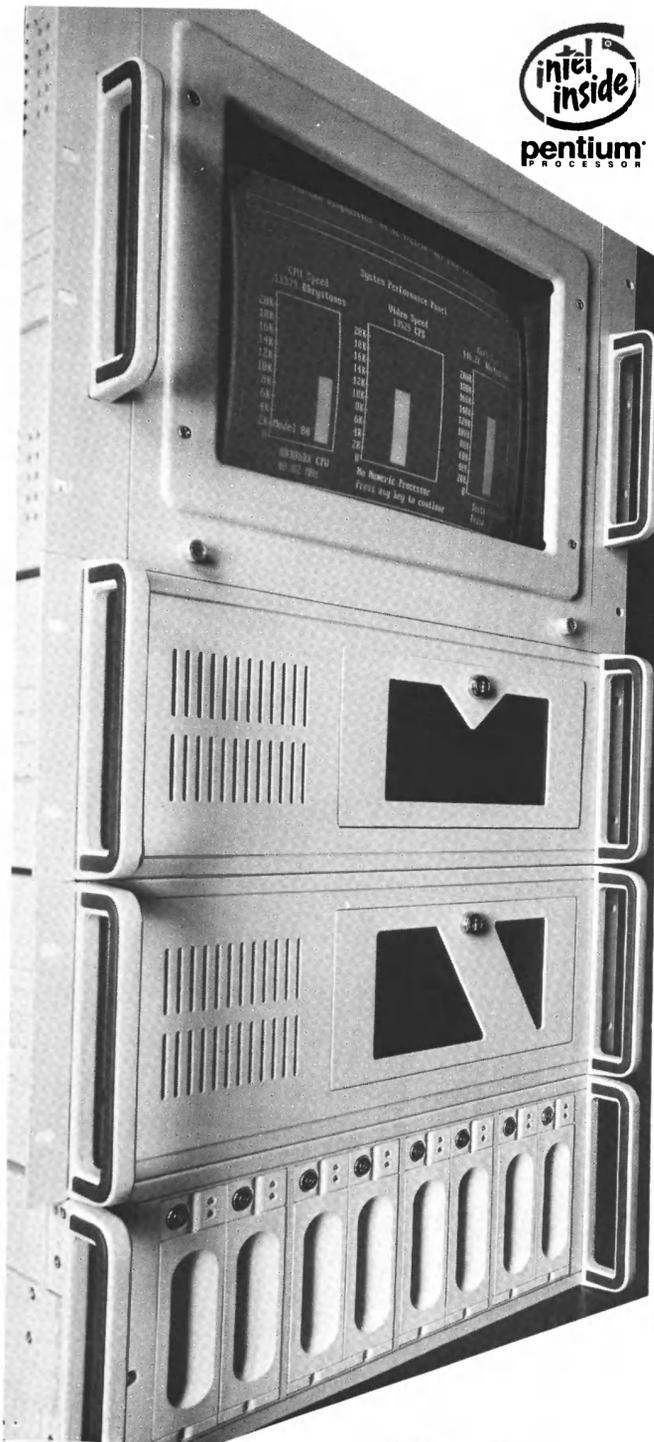
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Toward Environmentally Sound Warships

NATO wants its ships to be good environmental neighbors while they keep the peace

Substantial refit business to be had between now and 2005

By Jonathan M. Ross, P.E.
Director of Engineering, Proteus
Engineering

At first glance, one may question the usefulness of making warships into good environmental neighbors. After all, given that the business of warships is to fight, environmental concerns would seem a distant priority.

The North Atlantic Treaty Organization (NATO) thought otherwise. NATO reasoned that to have their navies' ships the objects of environmental tussles would not advance their role of keeping peace through united action. And NATO's ships are quite visible, whether in homeport, visiting other nations' ports or transiting waterways placed under ever-tightening environmental restrictions.

So NATO commissioned an industrial advisory group to determine the feasibility of technology and conservation to meet the environmental laws expected to be on the books by the year 2005. The group, NIAG SWG/50, was composed of representatives of 20 companies from seven NATO nations.

This article reviews present-day and projected environmental regulations; types of naval waste generated; and waste treatment technologies.

Environmental Regulations
The NIAG group reviewed present-day and projected national and international environmental regulations that may affect ships of the NATO navies. Regulations were classed as to the type of waste they addressed, namely: solid, liquid or gaseous.

Present and projected solid waste environmental regulations may be summarized as follows:

Plastics- No discharge presently permitted; some discharge may be permitted in the future as biodegradable plastics are developed.

Paper- Discharge permitted at

distances beyond 12 nm from shore; this is projected to be the case in 2005 as well.

Food and (biodegradable) trash- Present and projected requirement follows that direct discharge is permitted beyond 12 nm from shore; no discharge permitted closer to shore.

Metal and glass- Presently discharge is permitted beyond 12 nm; no discharge may be permitted in the future.

Hazardous and infectious medicinal substances- No discharge allowed.

Chlorine- Presently there is no restriction; by the year 2005, discharge may be prohibited.

Present and projected liquid waste environmental regulations may be summarized as follows:

Black water- Presently, restricted

types of discharge are permitted beyond four nm and direct discharge beyond 12 nm. Projected future practice envisions no discharge within 12 nm, and restricted types of discharge beyond 12 nm.

Grey water- Direct discharge is presently permitted except for certain areas (e.g., Canada). Future requirements may permit restricted types of dis-

charge.

Oily water- No discharge is now permitted in port and restrictions apply at sea. Future requirements are projected to be more stringent.

Liquid organics- Direct discharge permitted (except hazardous organics). Future requirements projected at zero

(Continued on page 86)

Key

As in any field, the environmental sciences have their own acronyms, a few of which are listed here:

CFC	.....	Chlorofluorocarbons
CO	.....	Carbon Monoxide
CO ₂	.....	Carbon Dioxide
HC	.....	Unburned Hydrocarbons
NO _x	.....	Nitrogen Oxides
ODS	Ozone depleting substance
SO _x	Sulfur Oxides
VOC	Volatile Organic Compounds

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Floating Crane *Titan* Delivered To Panama



The 1941 German-built floating crane *Titan* (also known as *Herman the German*), a landmark in Long Beach, Calif., since 1948, has been sold to the Panama Canal in preparation for the closing down of the Long Beach Naval Shipyard. The crane will be used for maintenance work on the canal and its lock doors. Before the crane was moved to Panama, it was completely refurbished, which took close to one year to complete. Due to the limited crane capacity available in Panama, it was necessary to deliver the crane while fully erect, as reassembly upon arrival was not an option. A wet tow of the fully erect crane was considered too risky (a sister crane capsized

and sank during a wet tow across the English Channel) and the dry transport option, using a self-propelled heavy-lift ship was pursued.

In order to confirm transport feasibility, a detailed structural analysis of the crane structure was performed by Argonautics Marine Engineering of Sausalito, Calif. A complete survey was done to measure the dimensions of all beams of the crane structure. A model containing more than 1,500 beam elements was built to analyze the behavior of the structure when subjected to dynamic loading during the transport. The analysis showed that internal seafastings, some strengthening and a boom sup-

port were required to ensure acceptable stress levels in all relevant members of the crane structure. All calculations and procedures were reviewed by Matthews-Daniel Company of Houston, who also acted as marine surveyor on behalf of the underwriters. The transportation contract was awarded to SeaTeam Heavy Lift of Oslo, Norway, and on May 19, *Titan* was loaded on *Sea Swan* by means of the float-on method. Upon completion of the seafastening operation and receipt of the surveyor's certificate of approval, the heavy-lift ship departed Long Beach on May 22. The ship arrived in Panama on May 31, where *Titan* was safely offloaded and delivered.

AmClyde Announces Two Crane Orders For Japanese Market

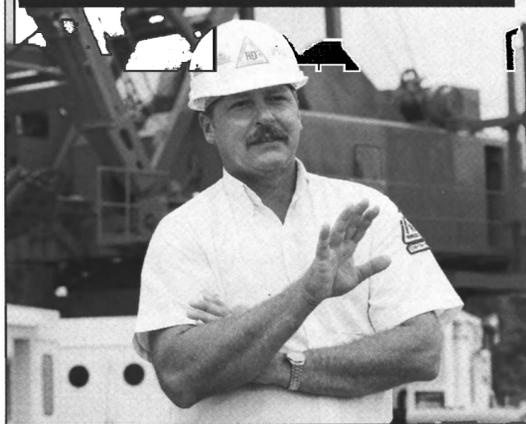
AmClyde Engineered Products, Inc. completed its contract to build a 700-metric-ton marine crane and celebrated the completion with a commissioning ceremony in Tokyo Bay, Japan. The order, valued at more than \$13 million, includes the barge-mounted crane, pile-driving equipment and barge anchor winches.

This project represents the first time a Japanese construction company has purchased large, custom-engineered crane equipment from an American manufac-



Pictured is the AmClyde 700-ton marine crane which was recently delivered to Japanese contractor Murazumi in Tokyo, Japan.

JOHN DEERE ENGINES ARE COMIN' ON STRONG



IN CRANE BARGES.

"Very little maintenance."

Joel Smith, of R&D Maintenance Service operates a new 54' x 160' crane barge with two Deere gen-set engines. He also uses two Deere powered compressors elsewhere in the project. "To my knowledge we haven't had to do anything but routine service on any of them."

"Seven years old and the engines run with no problems."

Smith likes the way even older Deere engines keep delivering the performance he needs. "The compressor engines have been in service for 7 years now, and they still work like the new ones. They just keep running. They give us the dependability we need on projects like ours."



John Deere engines from 70-300 hp (52-224 kW) are being used on more workboats of all kinds every day. Talk to the people who use them and find out why.

turer to be fully designed and built in the U.S. and shipped to Japan for use in the Japanese home market. The crane is now in use by Murazumi Construction Company, performing pile driving and heavy lift work for port, bridge building and other construction work.

AmClyde designed the crane and mooring equipment at its corporate headquarters in Saint Paul, Minn., and performed the manufacturing in Duluth, Minn., and in the New Orleans, La., area.

AmClyde has also been awarded a similar contract by Mitsubishi Heavy Industries for a 1,600-metric-ton crane which is intended for Japanese marine contractor Fukada. This order, valued at more than \$26 million, will be delivered on a turnkey basis later this year. Fukada will reportedly use the crane for Japanese infrastructure work, including port and bridge building, as well as offshore marine salvage work.

For more information on AmClyde
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Toward Environmentally Sound Warships

percent VOC reduction for total vessel, elimination of CFC usage.

Chlorine- Direct discharge permitted; discharge projected to be prohibited in the future.

Hull coatings- Presently, coatings are metal-based; non-metal based coatings are envisioned as the future requirement.

Gaseous waste regulations deal with ship exhaust emissions as well as halons, CFCs and VOCs.

Regarding halons and CFCs, which deplete the ozone layer, international negotiations appear to be leading to a high level of restriction.

In practical terms, this points to a phasing out and replacement with other materials that are recog-

nized as environmentally sound. Regarding VOCs, again the general trend is toward reduction and higher level of regulation.

WASTE GENERATION

Waste generation data was gathered from several NATO navies and found generally consistent, and developed into a "NATO average." For solid and liquid waste generation, a consistent correlation was discovered between 'quantity of waste generated' and 'number of personnel aboard a ship.' Using this correlation, solid and liquid waste quantities were projected based on a ship's complement.

The study showed that it is feasible to develop an environmentally sound ship that will conform to the regulations projected for the year 2005.

Regarding existing ships, it was concluded that most will have to be retrofitted to comply with emerging regulations.

Solid Waste Generation Profiles

The following types of solid waste were considered in the study:

- Plastics
- Paper
- Food
- Metal
- Glass
- Trash
- Hazardous
- Medical

Food waste dominated on a weight basis and plastics dominated on a volume basis. In both cases, paper was second.

Liquid Waste Generation Profiles

The following types of liquid waste were considered:

- Black water
- Grey water
- Oily waste water
- Waste oil

Liquid waste generation data was

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Toward Environmentally Sound Warships

collected and averaged for NATO navies in a manner similar to that for solids. Only volume data was developed, because volume management is the important issue with liquid waste. Grey water dominated, followed by oily water,

waste oil and black water.

Gaseous Waste Generation Profiles

For gaseous waste, the correlation between quantity of waste generat-

ed and number of personnel was not strong; rather, a correlation was found between a 'ship's installed power' and 'quantity of waste generated.'

Gaseous waste was divided into two categories: engine and boiler

exhaust.

Other sources were comprised of VOCs discharged during fuel loading or transfer; halons from extinguishing systems; and charge of ODSs, such as CFCs and HCFCs during maintenance operations, and vapors from the use of solvents, varnish and cleaners.

Looking toward projected waste generation rates by the year 2001, several trends were noted. The dominant trend regarding change in waste generation is a gradual decrease in the number of ship personnel on each vessel through increased automation and efficiency. Other trends include projected improvements in waste treatment technology, packaging enhancements and changes in handling.

Technologies

A wide range of technologies exist for waste treatment, some not yet demonstrated for naval use. The technologies considered in this study included the following:

- Sterilization
- Coalescence
- Membrane separation
- Evaporation
- Vapor compression distillation
- Electrocoagulation
- Shredding / compaction + heat
- Shredding / compaction
- Water maceration
- Shredding
- Supercritical water oxidation
- Biological treatment
- Plasma combustion
- Incineration (advanced)
- Electrochemical oxidation
- Wet oxidation
- Catalytic oxidation
- Catalytic reduction
- Scrubbing

Shipboard installations are projected to comprise several approaches rather than a single approach. These approaches will be formed into systems that will address waste separation, treatment, disposal and storage.

Based on an assessment of typical operational profiles and crew sizes, assessments were developed for small ships (e.g., corvettes), medium ships (e.g., frigates) and large ships (e.g., aircraft carriers). From the assessments, example designs were developed to illustrate how environmental technologies could be combined onboard ships to successfully meet the requirements of environmental regulations.

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dy showed that it is feasible elop an environmentally ship that will conform to the ions projected for the year Regarding existing ships, it mcluded that most will have retrofitted to comply with ng regulations. is also concluded that waste egement aboard naval vessels require integrated systems, use no single technology will fy all environmental require- ts. The integrated system st achieve a balance of waste imization, treatment, holding l a capability for discharge.

Acknowledgements

re author wishes to acknowledge ie efforts of the entire NIAG roup, of which he was a member, s well as the support from Special Working Group 12, and in particu- ar its chairman, **Lawrence Koss**.

Reference

NATO Industrial Advisory Group Prefeasibility Study on a NATO Environmentally Sound Ship of the 21st Century, Document NIAG - D(96), NATO Unclassified, February 1996.

Jonathan M. Ross, P.E., is director of Engineering at Proteus Engineering, a Maryland-based organization that provides the international maritime community with software and consultancy solutions in naval architecture and marine engineering. Tel: 410-643-7496; Fax: 410-643-7535; e-mail: jross@cc.atinc.com.

International Law Governs American Admiralty Bureau Text

The American Admiralty Bureau announced the publication of its *Guide to the Enduring Principles of International Maritime Law (ISBN 1-879778-28-9)*. The text provides a brief introduction to the basic and practical aspects of maritime international law pertaining to naval and Coast Guard officers and senior petty officers, merchant marine officers, shipping and insurance managers, lawyers and paralegals involved in international shipping. This 77-page guide is the latest edition to the Bureau's continuing legal education text series and is available through all marine education

September, 1996

textbook retailers.

For more information
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Nichols Announces Public Offering Of Common Stock

Chris H. Horgen, chief executive officer, Nichols Research Corporation, announced the filing

of a registration statement with the Securities and Exchange Commission relating to a public offering of one million shares of common stock. In addition, the company has granted the underwriters, comprised of The Robinson-Humphrey Company, Inc., Oppenheimer & Co., Inc., and Ferris, Baker Watts, Incorporated, an over-allotment option with

respect to 150,000 additional shares. The proceeds from the offering will be used to repay a portion of the company's outstanding borrowings under its revolving credit facility, for potential acquisitions, and for general corporate purposes.

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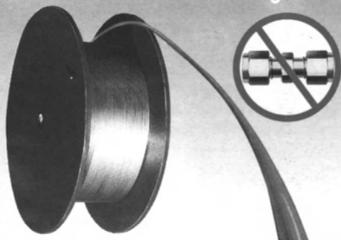
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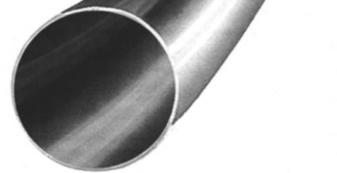
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COMPANY PROFILE

J.D. Neuhaus: 250 Years And Still Going Strong

Last year J.D. Neuhaus celebrated its 250th anniversary. The company, a leading Germany manufacturer of pneumatically operated hoists, was founded in 1745 and currently supplies customers in more than 60 industries in more than 90 countries.

The company currently employs more than 100 people. The production program comprises pneumatic hoists with a load capacity of 100 to 100,000 kg. In addition, the company produces hydraulic and mechanical hoists, trolleys, lifting gear and crane equipment.

The company has adopted a solid plan of investing in new equipment to assure its mar-



An aerial view of J.D. Neuhaus, which has been in business more than 250 years.



ket leadership. An example of this is the fully-automatic computer-controlled high rack storage.

For more information on J.D. Neuhaus
Circle 168 on Reader Service Card

The JDN synchronous hoist and turn gear.

Prüftechnik AG Offers Technologically Advanced Solutions

At SMM, Germany's Prüftechnik AG will feature many of its advanced products, including: Rotalign, a robust laser-optical shaft alignment system; System 2 Centralign, a complete workstation for precise alignment of steam glands, diaphragms, bearing journals and outer shells; Vibrotip with Vibecode, a predictive maintenance system with automatic recognition of measurement locations; and Vibronet, a network system for online condition monitoring.

For more information on Prüftechnik
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Schiffko Offers Wide Variety Of Expertise

Established in 1955 by Professor **Ing Kurt Wendel**, Schiffko is a reputed international consultancy with maritime activities around the globe.

Schiffko services include planning and complete design of ships of any type, as well as partial design, calculation and production information work to assist shipyards.

It has designed more than 2,000 ships for customers from more than 60 countries.

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Maritime Reporter/Engineering News

New Reporting Editor For Autoship Programs

Autoship Systems Corporation, a developer of ship design software, has announced the release of a new reporting engine for its naval architecture programs Autoship, Autohydro, Autopower, Autobuild and Autoload.

The Autoship System Report edits reports online within Autoship System products; cuts and pastes between other programs; saves reports to MS Excel format; edits reports offline either using Autoship Report Editor or MS Excel; and resizes and repositions graphics within the report. All Autoship Systems' products have the same report format, reportedly simplifying the merging of reports between programs.

For more information on Autoship Systems Corporation
Circle 62 on Reader Service Card

Henschel Wins Newport News Contract

Henschel, a subsidiary of SPD Technologies, Inc., has been awarded a contract by Newport News Shipbuilding to support the redesign of the entire interior communications system for CVN-76, the U.S. Navy's next aircraft carrier. The new system, Integrated Communications and Advanced Networks (ICAN), is being developed to integrate communications, ship control, navigation and machinery control across a fiber optic network.

Henschel's role in the CVN-76 program over the next several years will be to assist in the engineering of the overall voice system; design the worker-machine interfaces for voice, ship control, and navigation functions; and design computerized machinery control systems for many of the ship's machinery systems.

The ICAN program already has produced new technologies developed by Henschel, including an Integrated Voice User Terminal (IVUT), which allows various shipboard communications to be handled through one terminal, and a JP-5 automation system, which is a graphic user interface that allows control and monitoring of shipboard fueling from a computer screen.

Henschel is a designer, developer and manufacturer of shipboard automation systems, control con-

soles, interior communications and indicating and monitoring equipment.

For more information on Henschel
Circle 59 on Reader Service Card

LR Realizes Record Enrollment In Service

The post-Panamax container-

ship *Bunga Pelangi Dua*, owned by Malaysia International Shipping Corporation Berhad (MISC), has become the one-thousandth ship to join the Ship Emergency Response Service (SERS) developed by Lloyd's Register (LR).

To mark the occasion, **Khalid Dahlan**, MISC's deputy managing director, was presented with a

SERS certificate and an inscribed silver dish at a ceremony held on July 17, at MISC headquarters in Kuala Lumpur.

"The registration of our vessels under ship emergency response services such as LR's SERS is a precautionary step to ensure that the corporation is equipped with fundamental technical support should an emergency situation



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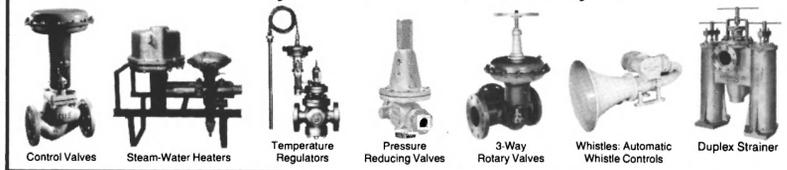
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arise onboard the corporation's vessel," said Mr. Dahlan.

Bunga Pelangi Dua is MISC's twenty-ninth vessel, of a 60-vessel fleet, to be entered in SERS.

MISC has also developed an emergency response structure which is designed to provide rapid and effective assistance to any of its vessels in need of assistance.

For more information on
Lloyd's Register
Circle 60 on Reader Service Card

Omnes Achieves ISO 9002 Certification

Omnes, a joint venture of Schlumberger Limited and Cable

& Wireless plc, announced that its Service Management Center (SMC) in Houston, Texas, has achieved ISO 9002 certification. The SMC provides global telecommunications customer support, including HelpDesk, Network Management and Fault Management services. Certification was granted by

Lloyd's Register Quality Assurance (LRQA).

Omnes maintains a range of communications facilities worldwide, and the quality management system developed during the certification process will reportedly have immediate impact in Omnes operations across the globe.

For more information on Omnes
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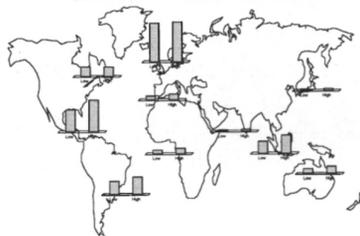
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HSV Seminar Plays Host To Maritime Speakers

The second High Speed Vessel (HSV) seminar was reportedly another big success for the Vancouver Island Branch of the Canadian Institute of Marine Engineering, attracting more than 160 persons to the event. The seminar was held June 7-8, at Laurel Point Inn on Victoria's Inner Harbor.

Speakers from Germany, Sweden, Norway, England, Ottawa and Washington, D.C., as well as the Pacific Northwest came to deliver eight papers on a range of topics pertaining to the building, powering and operation of high speed vessels. Among the speakers was **Bo Svenson** of the Swedish firm ABB Stal, who delivered a presentation on Swedish industrial gas turbines for marine use, and **Volker Yost** of the German firm MTU.

The Stolcraft, presented by **Jet Kellman** of Art Anderson Associates of Seattle, and the SWATH vessel, recently constructed by Nichols Shipbuilding, presented by **Dick Holcomb** reportedly gathered much attention and emphasized the role these vessels in the future.

Coming in October...

The October 1996 edition of *Maritime Reporter & Engineering News* will offer a comprehensive look at **The Environment**, and ways in which industry and government can work together to achieve compliance.

Featured in this edition will be equipment and systems designed to keep waters clean.

Disney Powers Ahead In Cruise Venture Development

On July 31, Disney Cruise Line (DCL) announced that it will soon launch an innovative campaign targeted at familiarizing travel agents with its signature product. Commenting on this news, DCL Marketing Vice President **Ken Potrock** said, "While we intend to fully utilize the synergistic marketing power of The Walt Disney Company, we want to first educate agents who will be an important part of our distribution system, and provide them with the materials and support they need to create new vacation sales opportunities when reservations open in late September." Following this campaign, which will for the first time define the image of the company's cruise product, DCL will begin travel trade advertising in October.

Development of Disney's private, 1,000-acre Bahamian isle, newly named Castaway Cay, is also currently underway, including preliminary work on the private dock which will allow for easy access to and from the ships.

The cruise line has also appointed its second master, Capt. **Hans Mateboer**, former master of Holland America's *Ryndam*, *Rotterdam*, *Statendam* and *Maasdam*. He joins Capt. **Tom Forberg**, who is the master for *Disney Magic*. Both will be instrumental in the launch of the first ship in early 1998, and following its inaugural season, Capt. **Mateboer** will assume responsibility for *Disney Magic*, as Capt. **Forberg** turns his focus to the second ship's launching. Capt. **Mateboer** has joined DCL's new-building team at Fincantieri's yards in Marghera and Ancona, Italy, to oversee the construction of the cruise ships.

For more information on
Disney Cruise Line
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Coming in October...

Canadian Maritime Industry
Review

September, 1996

In-flight view of private Disney cruise isle.



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93



The Norwegian Way

by Greg Trauthwein, editorial director.

There are few nations which can boast stronger ties to the maritime industry than Norway. From the outset, when the Norwegian vessel construction and equipment supply base were created to serve the nation's vital fishing fleet, Norwegian companies have been leaders in product innovation and technology.

While Norway's vessel construction repertoire no longer includes large ships — rather the focus is on specialty and smaller vessels today — there is a strong, ever-present bond and cooperation among vessel owners, vessel builders and equipment suppliers which ensures all parties

maintain a high competency level to stay competitive on the international level. As the international maritime industry has rapidly evolved, Norwegian equipment suppliers — with the leadership of Norwegian Trade Council — have been aggressive in pursuing business opportunities across the globe. Trade missions — such as the one to U.S. in the spring of 1995 — have brought a unified message of partnership and solution to the yards visited.

The following offers a briefing on significant events and contracts involving Norwegian companies in the recent past.

Maritime Reporter/Engineering News-Record

NORWEGIAN MARITIME REVIEW

People Movers

Norway's history and geography make its relationship to the passenger vessel market tight. Its industry has contributed invaluable advances to creating safe and efficient passenger vessels, including oceangoing cruise ships and ferries, both conventional and fast types. Projections for business in all passenger vessel segments — despite saturation concerns in the cruise ship market — are positive. Norway has been a world leader in stiffening legislation to ensure the highest degree of safety and performance, particularly on RoRo type vessels, and this, coupled with increasing acceptance of "fast ferries," will drive the refit and new-build side for years to come.

Jets Vacuum espouses this dedication to the passenger vessel industry. Involved in more than 100 ship projects per year — including Royal Caribbean Cruises Ltd.'s (RCCL)

Vision ships at Chantiers de l'Atlantique, the maritime industry accounts for 90 percent of the company's income, and it has enjoyed a healthy 15 percent annual growth in recent years. According to its managing direc-

tor, future growth will be in the passenger and cruise ship segments.

To ensure the country gets its fair share of this business, several companies have joined to form the Fast Ferry Forum in order to pre-

sent a unified message of quality and performance to the owners, designers and builders of fast ferries. The group of Norwegian companies offers a wide array of products and services to this niche. The group includes Servogear

Nor-Shipping '97 Looking Strong

With its record success in 1995 a fresh memory, Nor-Shipping has reportedly increased its pace of exhibitor registration for the next event, to be staged June 10-13, 1997, in Oslo.

To date, approximately two-thirds the 12,000-sq.-m. available at Sjølyst Exhibition Center has reportedly been booked or reserved. Last year's Nor-Shipping enjoyed a 34 percent increase in direct exhibitors, as compared to the previous event in 1993, as well as a 21 percent expansion in stand space.

Important attendance was also up in 1993, and the proportion of professional visitors coming from the rest of Norway rose from 20 to 30 percent.

For further information on exhibiting or attending Nor-Shipping contact: Norges Varemesse, P.O. Box 154 Postboks 130 - 01, 0212 Oslo, Norway, Attn: **W. Thomas**, head of project; tel: +47 22 43 91 00; fax: +47 22 43 89 87.

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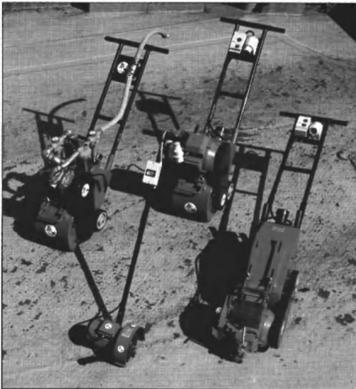
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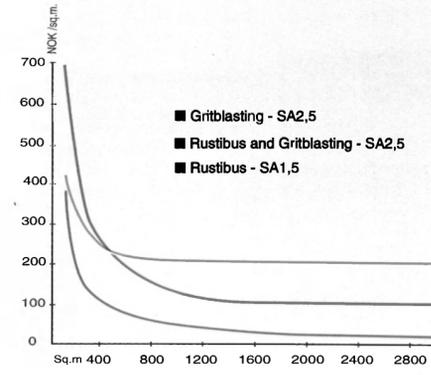
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Sq.m	Gritblasting - SA2,5	Rustibus and Gritblasting - SA2,5	Rustibus - SA1,5
400	~650	~400	~350
800	~250	~200	~150
1200	~200	~180	~120
1600	~200	~180	~110
2000	~200	~180	~100
2400	~200	~180	~100
2800	~200	~180	~100

Circle 398 on Reader Service Card

Polarlys: A Norwegian Affair

The *Polarlys* — which maintains the Hurtigruten combined passenger and freight service — was built by Ulstein and is a spectacular successor to the two previous vessels to carry the name.

The \$75-million contract to build *Polarlys* was signed in May 1994 by Ulstein Verft from owner Troms

Fylkes Dampskibsselskap (TFDS). At 404 ft. (123 m) long and 64 ft. (19.5 m) wide, it is the largest ship ever to be built by Ulstein. The yard'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 require-

ments was safety, specifically 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. 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 it was 85 percent complete, with all cabins, piping and principal machinery items in place.

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.

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.

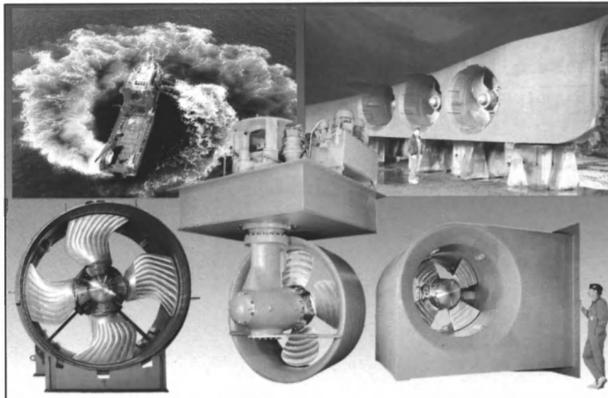
Maneuvering is assisted by high-lift rudders, twin 790-kW tunnel bowthrusters and an aft thruster. The aft thruster is an Ulstein 830-kW azimuthing unit mounted at the extreme stern, aft of the rudders. It may be swung up into a recess in the hull when not being used.

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 in grating navigation system.

Stability requirements for passenger vessels are changing as a result of several serious accidents worldwide, and *Polarlys* has been designed to meet all existing 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 stability level of two-compartment damage stability, while the vessel design includes a special flexible bulkhead section to reduce the length of flexible spaces. The vessel comes with strict new fire safety rules well.

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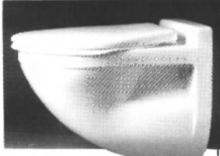
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Maritime Reporter/Engineering

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(propellers), Mar-El (remote systems), Moland (alarm, monitoring and control systems), Vingtor (information systems), Norcontrol (navigation systems), Tranberg (navigation and signal lighting), Hydro Aluminium Vik Verk's (lightweight aluminum systems), Colt Industrier (window systems), Glamox (lighting), Jets Vacuum (sewage systems), Marintek (ship model testing and hull design), and Eksportfinans (financial).

Another Norwegian high-tech company, TTS Technology, recently teamed with Thornycroft, Giles & Co. (TGC) — developers of the FastShip — to jointly develop the world's fastest container handling technologies. Under the agreement, TTS will invest up to \$2.5 million to become an equity partner in TGC and complete the development of the Aicon terminal handling and ship loading/unloading system, designed to provide a cost-effective interface between marine and land-based logistics systems. "...We sought to form a strategic partnership with a firm that has internationally recognized expertise in the design and manufacture of sophisticated equipment and reliable material handling systems that must function in a tough environment," said **Ronald Jørnelison**, president and CEO of TGC. "We believe TTS to be the ideal partner for this task." The Aicon system combines an orderly receipt/distribution and marshaling of incoming and outgoing containers in ports with the extremely fast loading and unloading of the FastShip vessels. Use of the system designed to expedite ship turnaround time to about six hours for a 1,448-TEU vessel.

riding the wave

The cyclical volatility of the marine market meant good news for some companies, not so good news for others.

The first half of 1996 included reports from Norwegian shipbuilder and engineering group Kvaerner at its first-half profits dropped 60 percent, mainly from poor results in oil and gas and pulping business.

Meanwhile, its acquisition of Aalgar House continues to be utilized as to how it will affect the company in the long term.

While the overall numbers were down, shipbuilding activity reportedly remained strong, with a strong tax profit. Expectations are for shipbuilding units to deliver

Ulstein To Highlight Offshore Abilities At SMM '96

Ulstein will be highlighting its unrivalled range of UT700 offshore vessel designs at the SMM exhibition in Hamburg, as well as the latest developments from the group's equipment companies.

The mainstay of the Ulstein Group's shipbuilding division, Ulstein Verft, remains securely in offshore tonnage, and a healthy orderbook emphasizes the company's dominance of this market sector.

Of the 18 offshore support vessels on order at North European yards in July, nine were being built to an Ulstein UT700 design, and six of these were placed at Ulstein Verft itself.

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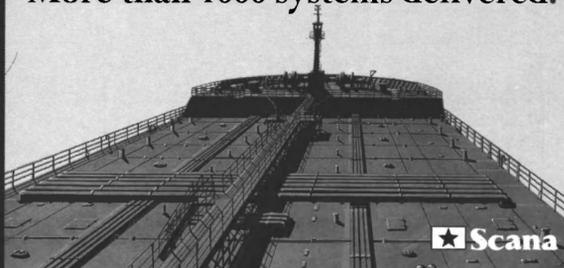
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profits for the balance of the year, although below last year's results. Also, company executives were reportedly upbeat for the long-term, and indicated that the company's potential will become strong financial results in the future.

On the other hand, Unitor Group reported pre-tax profits of NOK 56 million, compared with NOK 30 million for the same period in 1995. This result included a gain from the sale of the Industry & Offshore division. While the com-

pany noted a growth in the demand for maintenance products which also took place throughout 1995, it also found that consumption per ship is stagnating, as growth is mainly tied to the increase in the number of ships

opening in the international merchant fleet. Factors indicating a stronger year include a strengthening U.S. dollar and an increasing demand for seaborne transport in major segments.

Hitec was another Norwegian company reporting strong 1995 results. The Hitec Group achieved its most profitable year in history, boasting an income before taxes of NOK 56.1, as compared to NOK 17.4 in 1994, representing an increase of 223 percent. The Group also continued its growth in total revenues, with an increase in operating revenues of 134 percent. Hitec is a technology group providing systems for automation and



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	1000	(746)	@ 1800			
KTA38-M2	1200	(895)	@ 1800	1300	(970)	@ 1800
	1050	(783)	@ 1600			
KTA50-M2	1400	(1044)	@ 1600	1700	(1268)	@ 1800
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"Shoemaker, stick to your sole!"

It is this Norwegian saying which indicates how Ulstein Forsynings-tjeneste AS (UFAS) intends to service and maintain its traditional markets — offshore, cruise liners and fishing fleets — as it seeks to expand into new markets, according to Capt. Arnt Skjenes, sales manager. Founded in 1978, UFAS is a major manufacturer of rescue, patrol and pilot craft. In all, the company has a reference list including more than 445 craft, ranging in size from 18 to 65 ft. (5.5 to 20 m). Major customers are in the offshore industry, where the company's Seabear 23 is synonymous with the Man Overboard Boat (MOB). The Alusafe 600 and 700 series fill the same role or cruise liners, and UFAS counts Royal Caribbean Cruises Ltd. as one of its best customers. UFAS wide product range fits most customers' needs, but the company will entertain tailor-made projects. Recent orders include a contract from Schlumberger Geco-Prkla i Houston for a newly developed UFAS boat for shallow water seismic survey. Other significant contracts include those with the Swedish and Norwegian navies.

For more information
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NORWEGIAN MARITIME REVIEW

remote control, and it applies its technology to drilling, production units, subsea and environment. Significant contracts in 1995 included participation in the upgrade of *Maersk Giant* for use on the Yme field in the North Sea. The Hitec board also decided to enter the ROV market in 1995, based on the Group's competence in remote control, automation and hydraulics. At the beginning of this year, Hitec completed the takeover of UDS AS, a company engaged in the engineering of remotely controlled subsea operations.

Innovation Offshore

The offshore market is, naturally, a prime market for many Norwegian maritime firms. The general upward trend of offshore technology driving worldwide production has been a boon for many firms, including Ulstein Propeller, which secured its largest single installation for Ulstein thrusters.

The contract is worth more than NOK 50 million, and includes an order for eight TCNP 120 azimuthing units from Sedco Forex International, part of the multinational Schlumberger Group. The units are for installation on the semi-submersible rig *Sedco 707*. Each thruster features a CP, 3.3-m. diameter propeller, and has an output of 3,000 bhp (2,200 kW). The units are electrically driven by AC motors, and Ulstein Propeller is also supplying an electronic remote control system for interfacing to the rig's new dynamic positioning system. When complete, the rig will keep station using only the DP-controlled thrusters, with the use of anchors.

The quick-growth FPSO market has also attracted Norwegian firms, namely Rapp Bomek and Autronica.

Fire doors for FPSOs are a growing market for Rapp Bomek, according to the company, and it is "definitely an area we focus on," said **Tore Torrisen**, sales manager. Rapp sees world oil producers investing more into FPSO oil retrieval, and projections estimate up to 60 new units will be built by 2000. To date, Rapp Bomek has supplied exterior fire doors for six vessels. On the more traditional platform side, Rapp Bomek recently signed a five-year agreement with Statoil concerning maintenance for the Heidrun platform. The contract includes all doors on the platform, including 366 Bomek fire doors, as well as doors from other manufacturers.

Autronica recently was tasked to provide a networked, intrinsically safe fire and gas detection system to protect 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 Silvertch, a U.K. based supplier. Autronica's system incorporates approximately 300 intrinsically safe detectors, monitored by two BS-100 control panels. Each analog smoke and heat sensor is individually monitored.

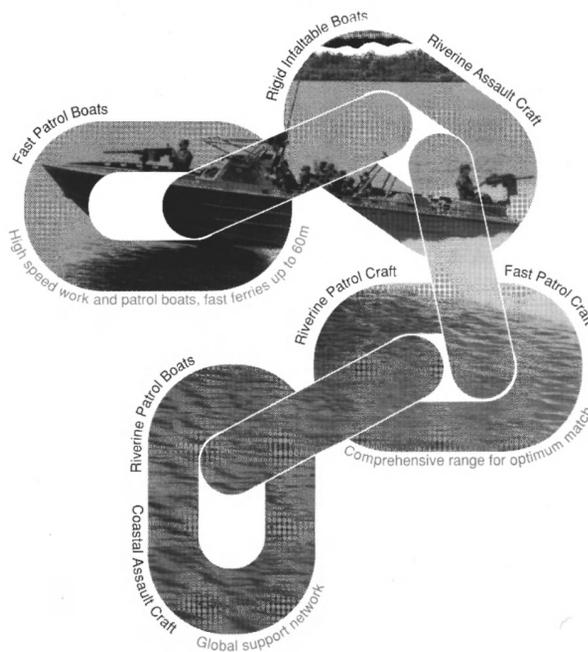
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applications. Brunvoll conventional tunnel thrusters are available from 33 to 2,700 kW, with controllable or fixed-pitch propellers. Tunnel thrusters may be fitted with noise suppressors as well.

Brunvoll's azimuth thrusters provide main or auxiliary, inboard or outboard propulsion and 360 degree maneuverability. The company also offers complete drive and control systems, tailored to individual vessels.

For more information on Brunvoll
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Westad Valve Solutions For Many Applications

Westad Industri AS develops, manufactures and markets high performance valves for a wide range of marine and offshore applications. Its butterfly valves have built a solid reputation aboard crude oil tankers, product/chemical carriers, LPG/ethylene/LNG carriers, and offshore applications. In addition, the company produces ball valves in stainless steel for chemical carriers, LPG carriers and for the petrochemical industry. The company takes research and development seriously, and continually conducts research into areas of flow control.

For more information on Westad
Circle 69 on Reader Service Card

On The Lookout

Hernis Scan Systems A/S specializes in closed circuit television (CCTV) security surveillance systems and energy and environmental management systems.

The company is involved in the research, design, development, engineering and production of CCTV systems for every kind of application, and the company has a strong client list

on ships — particularly passenger ships — and the offshore market.

For more information on Hernis
Circle 101 on Reader Service Card

Finding The Way

Scandinavian Micro Systems manufactures digital heading repeaters for commercial and naval vessels as well as passenger information systems used on cruise ships, ferries and large pleasure craft. The company's ScanRepeater LR40/LR60 models have a large, bright digital heading display with an analog turning indicator which is designed to allow for instant estimation of the vessel's heading and turning rate.

For more information on Scandinavian Micro Systems
Circle 102 on Reader Service Card

Seatex Expands MRU Line

Seatex now offers a broader range of motion sensors for the survey market. Last year the company launched the high performance Seapath, an integrated MRU/GPS (Motion Reference Unit) product for high precision heading, attitude and position sensing. The company has recently debuted three low cost models of the well-proven MRU sensors, MRU-H, 2 and 1. MRU-H is designed as the ideal sensor for heave compensation of echo sounders in small vessels; MRU-2 was specially designed for roll and pitch measurements; while MRU-1 is best suited for accurate measurements of vertical and transverse monitoring.

For more information from Seatex
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Maritime Reporter/Engineering News

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monitoring and information systems, has added a new dimension to business as it is making select instruments and sensors available as standalone units. The first products available are: SeaProfiler, with applications for CT, PT and CTP and SW (speed and direction); Smart-10, a DGPS based wave height, direction and period measuring buoy; and Geni, an advanced compact real-time data collection and processing unit with low power consumption.

For more information from Oceanor
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Aanderaa Instruments Passes Milestone

Aanderaa Instruments is celebrating its 30th year in business this year. The company has its roots in a NATO funded research project focused on the development of new instruments for recording ocean currents.

The end of the project gave rise to the company and its first product, the Recording Current Meter RCM 4, in 1966. The company is introducing a new instrument, the RCM 9, this year. It measures several ocean parameters and uses the Doppler shift principle for the measurement of ocean currents.

For more information from Aanderaa
Circle 105 on Reader Service Card

Norsk Hydro Delivers Cruise Ship Waste Management Solutions

Questions of how to design and operate the waste treatment systems on new cruise ships have caused more than a few headaches among shipowners and operators. Norsk Hydro Waste Treatment of Norway offers solutions. One of the world's leading manufacturers of complete waste treatment systems for passenger ships, Norsk Hydro systems are fully automated and can handle burnable and non-burnable waste, as well as sludge oil in ways that fulfill IMO regulations. The company's incinerators and waste handling products have been installed on more than 50 cruise ships.

For more information from Norsk Hydro
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Glamox: Lighting The Way

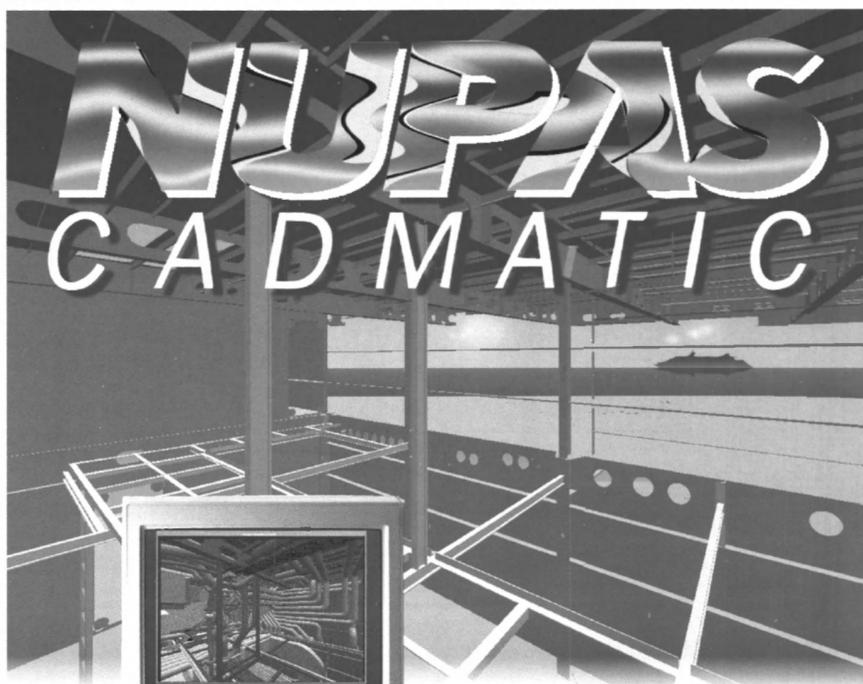
Glamox, a leading manufacturer of lighting products for many industries, offers its extensive lighting products to shipyards and

shipowners. Glamox eventually entered the burgeoning offshore market, helping to develop equipment for the extreme conditions of the North Sea.

For more information on Glamox
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Autronica Takes Fire Detection To The Next Level

Autronica's new fire detection system — developed to fill the tremendous anticipated need created by new regulations — uses a



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NORWEGIAN MARITIME REVIEW

color screen to give immediate information about the development and spread of smoke, escape routes, etc. The screen also allows the user to find any cabin fire door, corridor, stairs or lifeboat onboard. The new AutoMaster 5000 is designed to monitor the most complex network of detectors. When the alarm is triggered, the location instantly pops up on the screen automatically. Color codes are used to provide exact information on the location of fire and smoke. The system even allows the user to gauge smoke density. It allows allow for the quick and easy planning of escape routes. The Autronica system is based on the UNIX operating system.

For free information on the AutoMaster 5000
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Keeping It Cool

Teknotherm produces a wide range of marine refrigeration products, and in its 60 years has

designed, contracted and manufactured thousands of systems. Its line of products for the merchant marine includes reefers, chemical tankers, air conditioning, provision storage and inert gas drying. For the fishing fleet, products include RSW cooling, plate freezing, IQF freezing, air-blast freezing, low temperature plants (to -55/-60 Celsius), and refrigerant R-22, ammonia or environmentally friendly alternative. Most components in its products are manufactured in-house.

For more information on Teknotherm
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DNV Advances Ship Safety

Det Norske Veritas' (DNV) Nauticus product is a digital product model which is used to register, store and retrieve all data relevant to the maintenance of class throughout a vessel's life cycle. The core of Nauticus is a three-dimensional graphical model of the vessel. This is established dur-

ing the design phase, with possible changes during construction. By entering into a joint development with KCS, DNV has ensured an integration between Nauticus and the Tribon system, which is a total shipbuilding system which can be used from initial design through classification approval. DNV has also initiated a cooperation with SpecTec to integrate Nauticus and the planned maintenance system

Amos.

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Hi-Fog Snuffs Out Fire

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Ulstein Offers New Generation Gearbox

Ulstein Propeller's 3000-series high reduction marine gear is the first of a new generation of transmissions, following extensive investment by the company in the latest CAD/CAM technology for production. The 3000-series supersedes the 2400 and 2500 design gears, and with a power transmission of around 5,000 kW, it fills the gap in the production range between the smaller 1500 designer and the larger capacity 6000-series. All cast iron castings for the main housing and other details are produced by the Ulstein Group's foundry in Bergen.

For more information on the 3000-series gear unit
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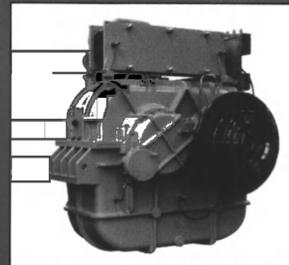
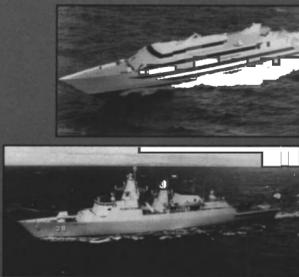


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NORWEGIAN MARITIME REVIEW

es and small amounts of fresh er. The system works by proling very small droplets of water h high momentum into hot flue es, to reach the combustion rce even in large, hidden fires. e Hi-fog system is designed to sorb a fire's energy and cool the rrounding air.

Aside from its safety benefits, the -fog system helps a shipowner ve weight, as the system uses all bore, stainless steel tubing hich is designed for new construc on and retrofits.

A typical Hi-fog system has a total eight of 15 tons.

For more information on Hi-fog
Circle 112 on Reader Service Card

Ring Marine Helps Outfit Stena Explorer

Stena Explorer, the first of the new HSS (High Speed Service) catamarans, has a Ring Marine Communication telephone system installed.

Based on the marine-adapted Digicom/ASA 101 exchange, the system is connected to a GPS-controlled cellular system with 10 lines for external communications.

The system comprises 30 digital telephones and 10 rugged intercom stations.

For more information from Ring Marine
Circle 113 on Reader Service Card

Jotun Helps Ships Stay Covered And Owners Under Budget

Jotun Protective Coatings offers a wide variety of products and services, including painting systems for cruise ships and ferries.

For above the waterline, the company offers a range of products, including Jotamastic 87, a two-pack, rust-preventing modified epoxy paint for use on boot tops, topsides, decks and holds.

It may be applied directly to poorly prepared surfaces, and can be applied over old conventional coatings to upgrade the coatings system where higher protection performance is required.

A similar array of products is offered for coatings below the waterline, including Seamate HB66, the top of the range self-polishing antifouling for vessels sailing at between eight and 16 knots. In selecting Jotun's self-polishing antifoulings, the Voyage

Factor Concept gives the owner the possibility to consider the estimated number of sailing days during the year.

Fewer sailing days can consequently help reduce paint costs.

For more information from Jotun
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DPS For Crucial Situations

Simrad's ADP 703 is a dynamic positioning system (DPS) which uses three control computers to provide a high degree of operational reliability. The ADP 703 is designed to be used in the most

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- ◆ The flexible cable with high-visibility handle is a unique All Set design that has proved its reliability during seven years of operation.
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- ◆ 700,000 CSAM-DF's are now in use worldwide. The latest addition to the list of users is Maersk Line.
- ◆ Major ports prefer the CSAM-DF for its safety and productivity.

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NORWEGIAN MARITIME REVIEW

critical applications. Integration with other Simrad Albatross systems, AVM (Albatross Vessel Management) and ATC (Albatross Thruster Control) is achieved by a dual communications network.

For more information from Simrad
Circle 115 on Reader Service Card

Maintenance Management Made Simple

SpecTec's AMOS for Windows maintenance management product offers many advantages. It is a highly visual system, with fea-

tures for inventory control and purchasing administration. AMOS for Windows focuses on the functions and processes which make up an individual installation, allowing the user to prioritize work schedules and resources. Through its Work Flow Function

feature, AMOS for Windows allows the user to configure the path where electronic documents are to travel within an organization, as well as incorporate quality assurance procedures and rules into the system. In addition, AMOS for Windows can "speak" in more than a dozen national languages.

For more information on
AMOS for Windows
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Unitor Offers Shipboard Polymer Repair System

Unitor introduced a new polymer repair system which offers vessel operators the ability to undertake emergency repairs as well as permanent repairs to pipes, and all types of mechanical equipment and machinery components, including non-weldable materials. The various products that make up the system have been carefully selected. A key component is the 76-page marine maintenance manual, which covers, in detail, each product and the type of repair. Clear drawings help explain the repair procedure.

The kit contains eight products, which cover the majority of emergency and permanent repairs onboard, and use the latest polymer resin technology. The products are reportedly compatible with all ferrous and non-ferrous metals, have excellent chemical resistance, and are suitable for permanent immersion in many environments. Some of the repairs possible include: leak-stop repairs; metalgrade repairs; ceramigrade repairs; and rubbergrade repairs.

For more information on the
Polymer Repair System
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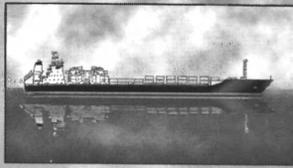
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Rapp Hydema Gets Trawler Order

Rapp Hydema won a significant, \$2.3-million contract to supply deck machinery and steering systems for six new Russian trawlers. The trawlers belong to the Murmansk trawler fleet, and are being built in Wolgast, Germany. It is a breakthrough for Rapp in Russia, as the contract was worked on for three

Maritime Reporter/Engineering News

Ulstein Deck Machinery has secured the first orders for new generation compact modular winch portfolio

Contracts to supply new generation winches to ships building in Japan, South Korea, Spain, Turkey and Sweden are providing valuable references for Ulstein Deck Machinery's latest winch technology. Ulstein Deck Machinery's anchor winch is a completely new

design, whereas its mooring winch is a refined version incorporating substantial improvements.

The new winches are the result of the combined design and engineering expertise of both Brattvaag and Norwinch in the creation of a new range of mooring and anchor-

handling deck machinery. Compared with earlier concepts they are more compact and easier to install, benefiting from a new foundation design which improves and simplifies transfer of external forces to the ship structure.

Through the application of the

latest design techniques, including stringent stress and dimension analysis, the new design retains the proven robust and functional qualities of Ulstein Deck Machinery's earlier equipment ranges from both Brattvaag and Norwinch, but the number of components has been rationalized. Greater emphasis has been placed on ease of manufacture and refinement of material content. Less steel is now used to create stronger but lighter and more compact overall design. The driving force behind this program was to ensure an attractive and a price competitive product through to the end of the century.

According to Eirik Naess, Ulstein Deck Machinery's development manager at the Norwinch Division, the compact dimensions of the new design have a number of advantages when applied to restricted foredecks such as on containerships. Minimal deck space on such vessels very often limited the possibilities of getting a good arrangement with the earlier design winches and windlasses. With more compact dimensions, the new design offers significant layout benefits.

For more information on Ulstein Deck Machinery
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Working in the world's most ecologically sensitive environment, the Antarctic icebreaker and research vessel, Nathaniel B. Palmer relies on 640 mm (25") Thor-Lube stern tube bearings for pollution free reliability. The ship is also equipped with Thordon rudder and thruster bearing systems.

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Thor-Lube bearings can be as easily integrated into conversion projects as new build.

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New Line Of Fiberglass Fans Available From Delta "T"

Delta "T" Systems, Inc. has introduced a new line of fiberglass-housed marine ventilation fans. The first in a series of six models to be introduced is a 12-in. diameter axial fan. Key features of this line include: molded fiberglass housing with a white gloss gel coat finish; high-efficiency, continuous-duty, direct drive fan motors; structural composite construction using fire-retardant resins; corrosion-proof, adjustable-pitch polypropylene fan blades; and all stainless steel and corrosion-resistant hardware.

The Delta "T" product line includes airmist eliminators, combustion and cooling air fans, fire/smoke dampers and electronic fan speed control systems.

For more information
Circle 22 on Reader Service Card

COMPANY PROFILE

Coatings Solutions Take Center Stage

Euronavy's new Euro-basic ES301 offers economical advantages

Recent disasters involving large tankers have resulted in ecological and economic catastrophe.

These losses not only affect companies — both the cargo shipper and cargo owner — but also governments and local authorities, the latter charged with cleaning the damage and trying to restore the environment to its previous natural equilibrium as best possible.

An added consequence for all shippers and shipowners is the proliferation of mandates and legislation from both national and international organizations, such as the U.S. Coast Guard and International Maritime Organization. These organizations have been active in providing recommendations, and helping to create and implement measures targeted at avoiding such situations in the future. Many of these measures are related to the construction of new vessels, designed to increase safety and minimize environmental disaster.

Regulations for existing vessels — particularly tankers and bulk carriers — have focused on enhanced inspection programs, paying special attention to corrosion. One reason for vessel failure is premature corrosion in areas such as wing tanks, ballast tanks, bulk tanks, chain lockers, void spaces and double bottoms.

A good corrosion protection process must be used in the tank areas. A coatings system, however, must be more multi-functional than corrosion protection, as it must also be: chemically resistant to cargo; mechanically and thermally resistant; and safe from contaminating sensitive cargoes such as food.

While many coatings adequately cover one or more performance and application requirements, shipowners seeking total solutions must seek all-encompassing coatings solutions ensure long life and safety.

Euronavy International believes has devised just such a solution.

Euronavy, which is ISO 9002 certified, has produced paints for the marine and offshore business for more than 13 years. Its latest offering, Euro-basic ES301, is considered a major breakthrough.

ES301, is a two pack, solvent free (100 percent solids) epoxy coating, which incorporates the latest dicing

technology, reportedly overcoming many drawbacks associated with traditional tank coatings.

ES301 — which complies with

VOC regulations — can be applied on wet, rusty surfaces, and in 100 percent humidity. The epoxy coating has a unique reaction with

water molecules, meaning that it can remove water from the surface. Some water is used in the curing process, and the water that

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There is one aspect in particular that distinguishes Unitor from other marine supply companies and that is our unique international network.

Every hour of the day, Unitor supplies products and service to the international merchant fleet from bases in 983 ports in 74 countries all over the World.

The Unitor product and service portfolio includes over 6,500 standard products for onboard repair and maintenance, fire, safety & rescue equipment and service, refrigerants and refrigeration system spare parts and service, as well as a complete line of marine chemicals.

UNIVERSAL

Unitor began working with projects to new buildings in the early eighties and offers all main types of fire detection and fire fighting systems, nitrogen generators, heating, ventilation and air conditioning (HVAC) systems for commercial vessels and tank insulation systems for liquid gas carrier ships.

Unitor offers an important competitive advantage to owners due to the fact that it offers technical service and supplies over the entire World through its own organisation.

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COMPANY PROFILE

is not consumed is leaved to the outside of the coating.

Normally, there are two main mechanisms that contribute to the adhesion of a paint film in a given substrate; mechanical and chemical interaction. Euronavy claims

that in the case of Euro-basic ES301, there is strong interaction, or even reaction, between coating and substrate.

With Euro-basic ES301 there are no dew point restrictions, as a result of being wet compatible.

This means that surface preparation can be done by water blasting, particularly with high pressure water blasting, which offers environmental benefits over other methods. By using water blasting, no chemicals or abrasives are used,

and the impact energy of the water on the metal surface is enough to remove rust deposits, coatings and crystallized salts. In addition, helps remove any salts present on the steel surface.

These factors help to support Euronavy's claim that the new coating can help get a ship in and out of drydock faster. In addition, because there are no special application requirements, the product can be applied by riding crews as well — with work done while the ship is in service.

For more information from Euronavy
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Telstra To Achieve Global Coverage For Satcom Services

Expected in the third quarter this year, Telstra will receive global coverage which will provide access to Telstra Satcom A and services in all four ocean regions the world (excluding the Arctic and Antarctic circles).

International and land-based Satcom A and C users will reportedly enjoy the same level of service and prices from the Atlantic Ocean East (AOR-E) and Atlantic Ocean West (AOR-W) as they have previously in the Indian Ocean Region (IOR) and Pacific Ocean Region (POR) when using the Perth LE (land earth station).

Marketing Manager for Telstra Mobile Satellite & Radio Service **Phil McKenzie** said, "The benefit for customers is that those operating in the Atlantic Ocean Region can now use a satellite service provider that they are familiar with and even standardize the billing procedures on an international scale. Pricing structures for international customers will be competitive, regardless of the ocean region they are operating in and using one service provider means you only receive one bill."

For more information on Telstra
Circle 33 on Reader Service Card

Unitor Announces Key Management Appointment

Norwegian international supply specialist Unitor has

Maritime Reporter/Engineering News

announced four key management appointments. **David J. Tandy** has been appointed vice president, Sales Marketing, responsible for the company's worldwide sales and marketing activities. Mr. Tandy has 24 years of experience in senior market positions, mainly in the marine industry. **Gunnar Baerheim** has been appointed vice president, Marine Systems. Based in Oslo, Mr. Baerheim is responsible for the development and marketing of the company's fixed systems for newbuilds and retrofits. Mr. Baerheim has more than 20 years of experience in senior positions, specializing in marine insulation. **Bernd Bauer** has been appointed Unitor's general manager in Germany, responsible for the company's activities in Germany, Poland and the interlands. Mr. Bauer is based at Unitor's area office in Sittensen, Germany. **John Devine** has been appointed U.K. area sales manager, responsible for sales activities within the British Isles. Mr. Devine has more than 15 years of experience in the marine industry. He joined Unitor in 1991, and is now based at Unitor's London office.

Mid-Coast Marine To Build Jensen-Designed Freezer Longliner

Jensen Maritime Consultants, Inc. (JMC) has completed the design for a new generation 59 x 24-ft. (18 x 7.3 m) freezer longliner. The Seattle-based naval architecture firm has designed the new vessel for **Jim and Rhonda Hubbard** of Seward, Alaska. Mid-Coast Marine Oregon will build the vessel at the company's Coos Bay, Ore., shipyard. Construction began in June, and delivery is scheduled for January 1997.

The design of the new freezer longliner continues Jensen's trend of maximizing capacity, technical content and comfort of new and converted fishing vessel designs based on length limits imposed by various fishing regulations.

The vessel design is reportedly suited for small boat fishing operations interested in producing value added products, such as those with individual fishing quotas in the Alaskan halibut and sablefish fisheries.

The vessel will initially be equipped to longline for halibut, sablefish, cod and turbot. Future

outfits would enable crabbing and tendering. Fish will be preserved in two fiberglass lined cargo holds either by ice, refrigerated seawater or freezing. A processing room located on the main deck is equipped with heading and gutting stations, a wash tank and two plate freezers.

The hull and foremast are steel, and the pilothouse and aft mast

are aluminum. The full-bodied hull is complimented with a bulbous bow to enhance hull resistance and seakeeping. The hull has also been designed so that a midbody can be added amidships. The vessel also has a removable aluminum shelter deck to facilitate crabbing and tendering operations.

Argonaut Marine of Seattle, has

been retained by Mid-Coast Marine to perform the numerical control (NC) lofting in support of fabrication of the steel and aluminum structure. Farwest Steel of Eugene, Ore., will provide structural materials and plate cutting.

For more information
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SEAPILE is made from Duralin® plastic, a matrix of 100% recycled resin that bonds with the pile's fiberglass reinforcing elements. Impervious to marine borers, SEAPILE is also resistant to ultraviolet light, chipping and spalling. It is currently available in 10", 13" and 16" diameter, with pile lengths of up to 90 feet. The SEAPILE drives like a wood pile with the same machinery.

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Leica Introduces Dual Channel DGPS Beacon Receiver

Leica has introduced the MX 52R, a new dual channel DGPS beacon receiver which reportedly provides accuracy levels of 16.4 ft. (5 m) or better when connected to a

Leica DGPS navigator. The MX 52R reportedly provides automatic selection of the best available DGPS beacon signal by using two independent channels. One channel tracks the best available beacon signal and sends the demodulated DGPS error correction data to the GPS receiver, while the second channel scans for other DGPS beacon signals and maintains a

DGPS directory.

The MX 52R uses GPS error corrections transmitted from marine radio beacons in the 283.5 to 325 kHz band to achieve positioning accuracy of 16.4 ft. or better in realtime. It is compatible with the public broadcast DGPS service operated by the U.S. Coast Guard and other services meeting the International Association of

Lighthouse Authorities (IALA) standard.

The MX 52 R is supplied with H-field ferrite loop antenna which reportedly requires no external grounding, making it ideal for use on small vessels, vehicles, aircraft or portable applications. The loop antenna significantly reduces effects of atmospheric noise, such as P-static caused by thunderstorms.

An optional combined GPS/beacon antenna uses a single antenna cable for both signals, simplifying installation and maintenance. When connected to any Leica GPS receiver, the MX 52R is controlled by the navigator. The signal strength and SNR are continuously displayed by the GPS navigator.

Leica's GPS Division specializes in advanced satellite navigation technology. Based in Torrance, Calif., the GPS group designs, manufactures and markets professional products using GPS for marine and land-based applications.

For more information on Leica
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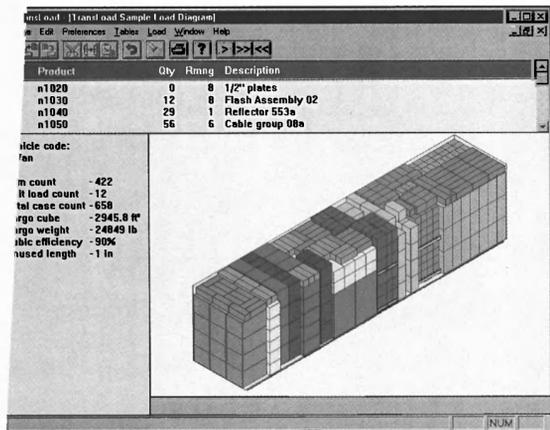
Magnavox Introduces Data Option For Satellite Terminals

The new 2.4 kbps data option, offered by Magnavox Electronic Systems Co. for the Magnavox's MX 3030 and MX 3400 Inmarsat-M terminals, now allows both the transmission and reception of data, supplying the terminals with the full range of voice, fax and data devices being provided by Inmarsat-M.

Magnavox's data option is type approved by Inmarsat for the MX 3400 marine terminal and the MX 3030 portable briefcase satphone, and it provides real-time digital data transfer anywhere in the world through the Inmarsat-M satellite system. The MX 3400 MAGNAPhone M is a marine satellite terminal designed for use on boats as small as 40 ft. (10 m). Magnavox Electronic Systems Co. is a subsidiary of Hughes Aircraft Company.

For more information on
Magnavox Electronic Systems Co.
Circle 54 on Reader Service Card

FORMATION TECHNOLOGY



TransLoad software displays 3-D, color coded diagrams that show exactly how cargo should be loaded in a trailer, container or rail car for optimal efficiency.

TransLoad Software Designed To Optimize Freight Loading Efficiency

TransPack Software Systems, Inc., of Fort Washington, Pa., has announced the availability of its TransLoad software, which is designed to help optimize the efficiency of freight loading. The software works by arranging mixed-size products in trailers, containers and railcars. Shippers can therefore determine, in advance, if all the cargo in a shipment will fit in the planning vehicle, how much space to allot, and how many vehicles will be required for the shipment. This information can be used to select equipment, manage shipping costs and increase customer satisfaction due to accurate planning.

In calculating load plans, TransLoad takes into account user-specified stacking and height restrictions, case orientation, inbound/outbound stop ordering and palletizing requirements. The software produces 3-D, color coded diagrams that demonstrate how cargo should be loaded for optimum results.

TransLoad can reportedly be used as a standalone unit or in conjunction with existing routing or order entry systems. It runs under Windows, Win95 or Windows NT on individual or networked PC workstations. According to **Ken Stevenson**, president of TransPack, "We developed TransLoad in response to a market September, 1996

need. Private and common carriers alike are looking for an easy-to-use load planning system that integrates package specifications, palletizing and load planning."

For more information on TransPack Software Systems, Inc.
Circle 67 on Reader Service Card

Container Service Corp. Installs Wireless LAN Solution

Trans Pacific Container Service Corp. (TraPac), a U.S. marine terminal company, has installed an AS/400 Wireless LAN solution at its Port of Seattle terminal in order to increase the speed of cargo loading and unloading. With the IBM solution, TraPac personnel can load and discharge ships' containers, tracking the movement of inventory to the yard with use of the Yard Processing Package, which runs on laptop computers aboard mobile vans.

The vans move to the location of container loading, so that drivers can capture up-to-the-second information regarding what cargo is being stored where. This data is entered into the Yard Processing Package, transmitted wirelessly to one of eight stationary access points in the yard, and forwarded to the

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INFORMATION TECHNOLOGY

company's AS/400 Advanced System, providing continuous database updates. In turn, TraPac's customers and their trucking companies receive updated reports on container locations approxi-

TraPac's wireless LAN solution at work.

mately every 15 minutes through an Electronic Data Interchange (EDI) application running on the AS/400 Advanced System. The company also send data via EDI to the Tokyo headquarters of parent company Mitsui O.S.K. Lines.

According to TraPac Information Systems Manager **Lisa Norton**, "The system increases our wireless coverage in the yard a hundred fold, due to better systems availability and improved response times. We accelerated data transmission speeds from a very slow 9,600 baud to virtually real-time, so that we can get immediate answers on any container's location."

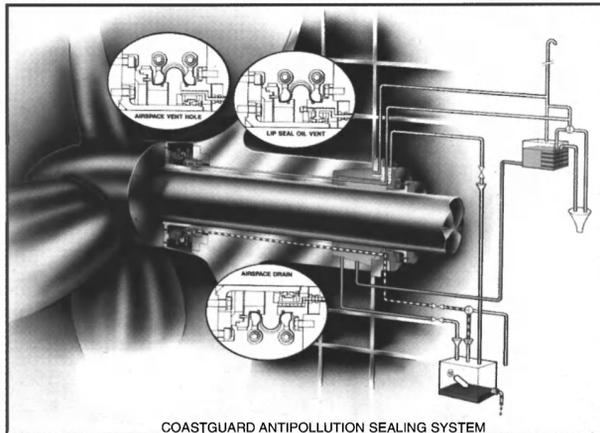
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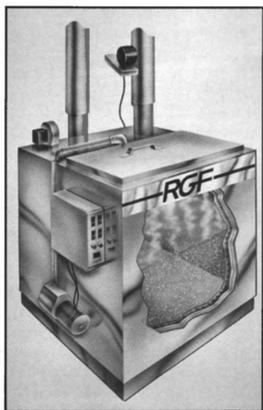
Worldwide Shipping-Logistics Application Takes Shape

On June 28, Microsoft Corp. and Net Logistics Inc. announced the launch of an innovative shipping-logistics application and a web site — dubbed WWSHIPment and WWSHIPnet, respectively — offering a number of industry-specific applications, accessories and tools to help both shippers and shipping service providers conduct trade and freight transportation business across the Internet in real time. WWSHIPnet offers an easy-to-use gateway to transportation industry tools offering business services such as information and references for viewing shipping schedules, rates, regulations and support aids; and directories listing contact information of transportation industry companies. As part of WWSHIPment, services such as broker-to-broker interface, equipment relocation and cargo tracking are available. This particular application also delivers an open-systems electronic data interchange (EDI) communications channel, based on intranet to Internet to intranet links. Net Logistics will provide access to WWSHIPment by distributing, at no charge, a software package comprising customized copies of the Microsoft Internet Explorer browser and Microsoft Internet Information Server to all shipping service providers. In addition, with Microsoft's upcoming products, both shipping service providers and their manufacturing and retail customers can effectively exchange data between their legacy systems. Microsoft tools and middleware will permit customers at both ends to use specific Microsoft server applications to migrate data to all divisions of each corporation that needs to share it. WWSHIPment helps solve incompatibility by providing a bridge between the various systems.

For more information on Microsoft Corp.
Circle 65 on Reader Service Card

PRODUCTS

RGF Introduces New Waste Water Treatment System



Pictured is the RGF Steam Draygon Evaporator which can reportedly evaporate up to 99 percent of contaminated waste water.

RGF Marine Environmental Technologies, Inc., a member of RGF Environmental Group, has unveiled its newest waste water treatment and recycling system, the RGF Steam Draygon Evaporator. The unit reportedly evaporates up to 99 percent of contaminated waste water, leaving only minimal residual waste for disposal.

The RGF Steam Draygon Evaporator can reportedly process 250 to 400 gallons of waste water per day, operates automatically or by manual batch process, and incorporates a self priming centrifugal processing pump. A solid state temperature control provides accurate temperature settings while a PLC six probe sensor makes necessary adjustments for automatic operation. The RGF Steam Draygon operates on kerosene, diesel fuel, natural gas or liquid petroleum gas, and can also use waste oil to fuel the burner, safely disposing of one waste while evaporating a waste stream.

RGF's water treatment system also incorporates a high flow exhaust fan and a serpentine heat exchanger designed to increase the evaporation rate, prevent unnecessary loss of BTUs and reduce fuel cost. The Steam Draygon features complete 304 and 316L stainless steel construction, a stainless automatic oil skimming belt and an UL approved process pump.

For more information on the Steam Draygon
Circle 42 on Reader Service Card

Hamworthy Pump Range Targets Shorter Lead Time

Hamworthy Marine of Poole, U.K., has introduced a new production system for a range of its fast moving Dolphin centrifugal pumps. The production methods have been designed and the pump components specified to ensure reduced delivery lead times.



The range features 15 models of the Dolphin centrifugal pumps, which address 75 percent of ship-board pumping duties. They include main engine cooling, auxiliary cooling water circuits, bilge systems, ballast systems and general service.

These units reportedly meet Lloyd's, DNV, BV, GL, ABS and RINA classification requirements for unrestricted service.

Models in the range have capacities up to 550-cu-m/hr with heads of five to 38 m. Standard specifications of all pumps in the range include: mechanical seal; pump shaft in stainless steel (316S); 50mm suction and delivery gauges; bronze casing (LG2); coupling guard; mounting feet; and aluminium bronze impeller (ABI).

For more information on Hamworthy Marine
Circle 48 on Reader Service Card

Hamworthy Marine of Poole, U.K., has introduced a new production system for a range of its fast moving Dolphin centrifugal pumps.

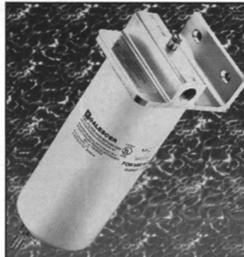
Helac Introduces Enclosed Hydraulic Valve Actuators

Helac's PVS Series hydraulic rotary valve actuators are now completely enclosed and sealed to meet IP66 specifications for prevention of dust and water ingress and contact with moving parts. The PVS Series combines Helac's patented, high torque design with fail-safe, spring return in an ultra-compact configuration. The large diameter center shaft features a hollow bore that permits coupling to the valve stem internally, facilitating direct mounting of the actuator to the valve bonnet without brackets or couplings. All of PVS' internal components and adjustment hardware are enclosed and sealed from the environment. Standard cylinder seals are used throughout its steel construct to ensure leak-free operation without drift. Options on the PVS series include limit and proximity switches, completely submersible designs, position feedback, manual override and metric mounting. Fail-safe valve open or closed positions are available, along with double-acting models.



Pictured is Helac's PVS Series Hydraulic Valve Actuator designed to be completely enclosed and sealed from operating environments.

For more information on Helac's PVS Series
Circle 44 on Reader Service Card



Nelson Adds New Line Of Koalescers

Nelson Division has added a new line of UL marine listed koalescers to its line of standard spin-on koalescers. The UL listing makes it applicable to all marine engines using either diesel or gasoline fuels, and the UL versions can be used for both suction and pressure side applications. The Nelson koalescer reportedly removes 99 percent of the free and emulsified water in fuel, which can rob engines of power, destroy fuel injectors and pumps, corrode metal, generate rust and oxidize fuel into varnish. The removal of water from fuel protects the engine, allowing it to burn pure fuel and provide more power. Nelson Division, a division of Nelson Industries, Inc., is involved in the design and manufacture of exhaust and filtration systems.

For more information on Nelson
Circle 45 on Reader Service Card

Fire Tube Cleaners Introduced For One-Person Operation

The Fire Tube Cleaner (FTC), from Thomas C. Wilson, Inc., is an efficient tube cleaning system for two through four-in. tubes. The FTC is made up of an electrically driven motor and a heavy duty, flexible shaft assembly that allows for the cleaning of tubes in condensers, boilers and heat exchangers in an one-person operation. The FTC collects soot and scale, both wet and dry, as it cleans with a simultaneous vacuum feature, leaving boiler and maintenance personnel clean. This 1-hp unit can also be used to clean chiller and absorption units by using different shafts and casings and brushes.

For more information
Circle 46 on Reader Service Card



The Fire Tube Cleaner (FTC) is a single unit that cleans boilers, condensers and heat exchangers.

Fisher Offers Proton 3 Magnetometer

Fishers Mfg. Inc. offers its Proton 3 marine magnetometer with a built-in printer and RS232 computer interface. The Proton 3 is a third generation magnetometer used to locate and steel targets. The built-in printer prints out the magnetic readings with the Loran or GPS positions of the target. The information can then be used by the computer for magnetic anomaly mapping or for logging information.

Fishers specializes in the development and manufacture of high-tech underwater search equipment.

For more information on Proton 3, contact J.W. Fishers Mfg. Inc. Circle 38 on Reader Service Card

RTM STAR Center Adds USCG-Approved OPA 90 Tanker Courses

RTM STAR Center's simulation, training and research center in Fort Lauderdale, Fla., has expanded its simulation training courses with the addition of three U.S. Coast Guard JSCG-approved Tankerman PIC courses. The courses address the new federal mandates concerning the safe transfer and transport of dangerous liquids by multi-product carriers, as well as by crude oil tankers.

According to Brian Long, director of the Florida STAR Center, the addition of the Tankerman PIC courses gives the maritime training facility the most extensive offering of USCG-approved courses available in the maritime industry. The three courses are as follows: OPA 90 Tankerman PIC Simulator Course (two weeks); OPA 90 Tankerman PIC Simulator Course (one week); and OPA 90 Tankerman PIC Classroom Course (one week).

For additional course information, schedules and costs, contact RTM STAR Center, 2 West Dixie Highway, Dania, Fla. 33004, tel: 1-800-45-4522; fax: (954) 920-4268; e-mail: STARCTR@aol.com.

KE-Burgmann Wins New Orders

KE-Burgmann's, Expansion Joints Division in Denmark has obtained orders for expansion joints to be supplied for projects involving Mitsubishi Heavy Industries Ltd.

(MHI) and Hyundai Heavy Industries Co. Ltd. (HHI).

MHI has awarded KE-Burgmann the contracts for 19 expansion joint units, model Combine-X. The expansion joints are to be installed at the gas turbine single and combined cycle plants of *Una* in Holland, *Aweer* in Dubai, *Wang Noi II* in

Thailand, and *Quillota* in Chile.

An additional contract for 31 non-metallic expansion joints, FluaChem, for the flue gas desulfurization plant of *Detmarovice* in the Czech Republic was also awarded to KE-Burgmann by MHI. From HHI, KE-Burgmann has been awarded the contract for 150 sets of FluaChem expansion

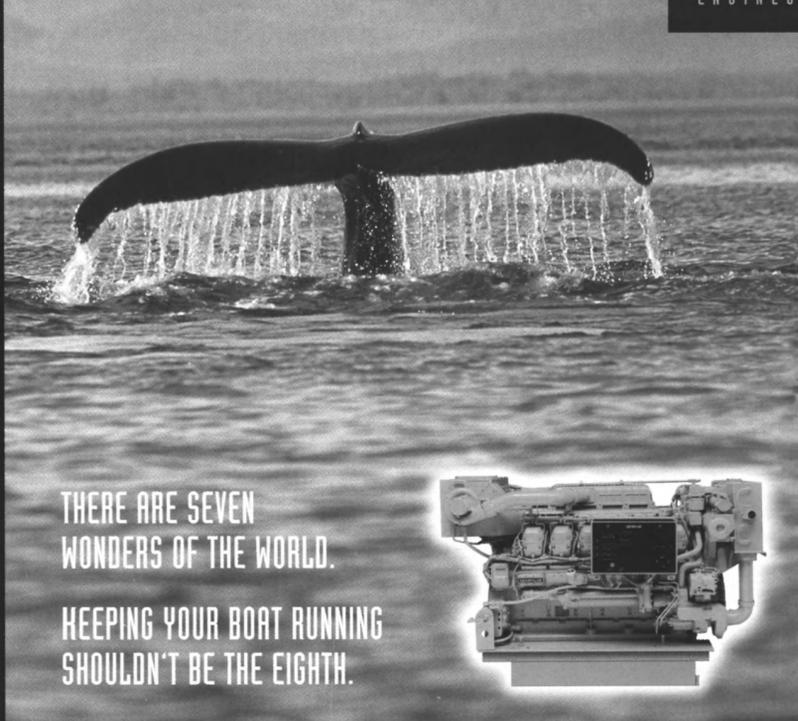
joints, inclusive of steel components to KE-Burgmann and its Korean partner, Se-Won Industries Co. Ltd.

These joints are to be installed at the Kepco flue gas desulfurization plants of *Hadong* and *Taeon* in Korea.

For more information on KE-Burgmann expansion joints, contact KE-Burgmann Circle 39 on Reader Service Card

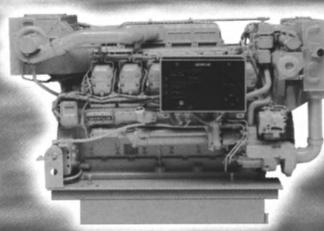
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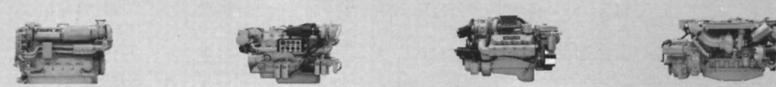
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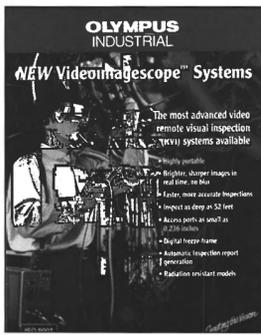
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PRODUCTS

Olympus Introduces New Optic Probing Device

Olympus America Inc.'s Industrial Products Group has recently released a new brochure that details the latest developments in its Videomagescope systems for remote visual inspection of internal machinery, tanks, valves, heat exchangers, turbines, and other hard-to-see places. The 6-mm-diameter Videomagescope Model IV6C5, which is described in the brochure, has a flexible probe that contains a small CCD (Charged Coupled Device) image sensor. The probe reportedly needs an access hole to the interior of equipment of less than 1/4 inch and is available in probe lengths ranging from 6.6 ft. to 52.5 ft. (2 m to 16 m). The instrument provides high-resolution, true-color images in real time, without motion blur or "rain-bow" effect.



Pictured is Olympus America Inc.'s Videomagescope system for remote visual inspection of equipment.

For more information on Olympus America Inc.
Circle 47 on Reader Service Card

Electro-Shield Blocks Shock

Electro-Shield insulated rubber shielding, manufactured by Aldan Industries' Safety Product Division is engineered to protect personnel, equipment and work areas from electrical hazards up to 1,000 volts. The shield conforms to both O.S.H.A. 1910.335 Safety Related Work Practices and ASTM D-178 Specifications for Type II Matting.

Electro-Shield reportedly maintains its flexibility even in extremely cold temperatures, will not melt, is self extinguishing, highly tear and puncture resistant and oil and ozone resistant. The shielding is lightweight and can be cut to any size, and it comes in "safety yellow," cautioning workers of possible danger. Electro-Shield is available in three-ft. x 25-ft. rolls.

For more information on Electro-Shield
Circle 43 on Reader Service Card



Electro-Shield insulated rubber shielding conforms to both O.S.H.A. 1910.335 Safety Related Work Practices and ASTM-D-178 Specifications for Type II Matting.

Coppus Offers New Air Mover

Coppus Portable Ventilation Division, Tuthill Corp., has introduced its latest product, a power tool and air mover for boaters. The Coppus Power Plus is report-

edly capable of moving 300-cu-ft. of air per minute up to 30 ft. (9.14 m) away, and can be used for cooling, drying or refreshing cabin air. The Power Plus comes equipped with a 20-ft. (6.1 m), 14-gauge, three-wire grounded cord, allowing the tool to be positioned anywhere it is

needed. Other product features include two built-in, 15-amp grounded receptacles for easy power tool attachment; adjustable air direction to blow away heat, fumes, odors and dust; a built-in carrying handle; no-scratch rubber contact pads; and a three x one-in. stain-

less steel plate for engraving names. The Power Plus 115-volt model weighs 8 lbs., stands 11 1/2 in. high and is 8 3/4 in. wide.

For more information
Circle 41 on Reader Service Card

The Coppus Power Plus, a new power tool/air mover, cools hot areas, dries wet surfaces and refreshes cabin air.



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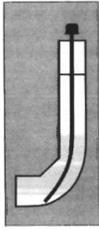
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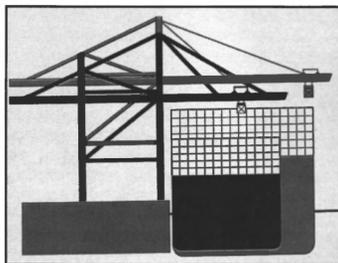
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Circle 317 on Reader Service Card

Port of Göteborg Invests in Post-Panamax Capacity To Sustain Deep-Sea Role

The board of the Port of Göteborg AB, Sweden, has decided to adapt the Port's container facility, the



This illustration shows a comparison between a container crane/container vessel of standard dimensions (in black) and crane/vessel of post-panamax dimensions.

Skandia Harbor, to the demands of post-panamax vessels. The Port is demonstrating its determination to keep and develop its role as the direct deepsea port for Scandinavian trade and industry.

The adaptation, which will cost approximately \$23 million, includes the purchase of two new post-panamax cranes, dredging, an erosion protection wall along a 1,312.3-ft. (400-m) stretch of quay, and two new straddle carriers, in addition to the 21 already in use at the terminal.

Deepsea container vessels

are now increasingly being built larger than the Panama Canal locks can handle — so-called post-panamax vessels.

Approximately 80 such vessels now either exist or are in order-books. Maersk Line, one of the deepsea shipping lines making direct calls at Göteborg, already calls at the port with its post-panamax vessels.

The investments at Skandia Harbor will include two new container cranes with 159.1-ft. (48.5-m) outreach, with crane arms to be set higher to be able to handle a post-panamax vessel with a full deck load.

The Göteborg investment in post-

panamax capacity will be financed from the Port's own funds.

No national, regional or local government subsidies will be granted. The entire investment package is expected to be operational by 1998.

Wesmar Offers Hydraulic Package

A revolutionary closed proportional hydraulic system that runs both a roll fin stabilizer and bowthruster has been introduced by Wesmar Marine Electronics. The advantages of the single hydraulic system include extended operating capacity and cost effectiveness. A yacht owner can reportedly save thousands of dollars on bowthruster and stabilizer packages by relying on a single operational system rather than using two separate hydraulic packages — one for the thruster, one for the stabilizer. Wesmar's first 750-psi hydraulic system, designed for both the thruster and stabilizer, was recently installed by Mark Hermann, owner of Channel Coast Yacht Services, on a 48-ft. (14.6-m) Krogen.

For more information on Wesmar
Circle 49 on Reader Service Card

New Helium Leak Detector Offers Rapid Answers

Connecticut Analytical Corp., a manufacturer and distributor of gas detection equipment and products, has announced the newest addition to its line of products, a helium leak detector. The Varian HeliTest helium leak detector offers laboratory leak detector mass spectrometer accuracy in a hand-held package, with one button, user-friendly interface. The HeliTest's ability to locate a variety of leaks easily and rapidly is attributed to its microprocessor control, which allows it to detect gas permeation and leakage in pipelines, fuel systems, hydraulic systems and storage tanks. The HeliTest also allows gas tight ship-board seals, water tight bulkheads, oil tanks and hull welds to be checked for seepage and/or porosity.

For more information
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Crane Barge BOS 400, Capetown, South Africa



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Circle 263 on Reader Service Card

Astilleros Gondán Delivers Stern Trawler Amaltal Mariner

Astilleros Gondán, a member of Spanish private shipyard group onstrunaves located on Spain's northwest coast, has delivered *Amaltal Mariner*, a 121.4-ft. (37-m) stern trawler fitted out for all types of bottom mid-water trawling. As of September, this ship will fish hoki and ther species in New Zealand grounds.

Richard Tregidga, skipper of *Almatal Columbia*, said, "The *Mariner* will be the most modern wet fish trawler in New Zealand." Mr. **Tregidga** will be the vessel's captain for the 42-day delivery trip from Asturias, Spain, to its homeport of Nelson, New Zealand.

Amaltal Mariner is a modern steel hulled vessel with an aluminum wheelhouse, and is equipped to fish in waters as deep as 4,921 ft. (1,500 m), with bottom trawl for orange roughy. Mid-water gear will be used for toki, alphonsino and blue nose fishing.

The ship is powered by a MAN B&W Alpha 6L 28/32 diesel engine developing 2,000 hp at 775 rpm, a reduction gear fitted with a 600 kVA PTO, and is equipped with an alphatronic remote control and monitoring system. Through the reduction gear PTO, the main engine drives a 600 kVA, 380 V, 50 Hz alternator. A 400 kVA at 1,500 rpm genset is also installed.

The fishing machinery is hydraulically powered and was supplied by Rapp Hydema. The major elements are: two main trawl winches; four Gilson winches; one codend winch; two outhaul winches; and one net drum.

This trawler is fitted with a highly comprehensive array of electronic communications, navigation aids and fishfinding equipment supplied principally by Furuno, Roverton, Sailor and Simrad.

Over its history, Astilleros Gondan has built more than 160 ships. These include merchant ships, tugs, yachts and landing craft. A great part of the production of this yard is focusing on building fishing ships of all types (trawlers, purse seiners, longliners and shrimp ships).

For more information on Astilleros Gondan
Circle 4 on Reader Service Card

Amaltal Mariner main particulars

Length o.a.	121.4 ft. (37 m)
Breadth b.p.	31.5 ft. (9.6 m)
Depth main deck	14.4 ft. (4.4 m)
Depth trawl deck	22 ft. (6.7 m)
Propulsion	2,000 bhp
Speed	11 knots



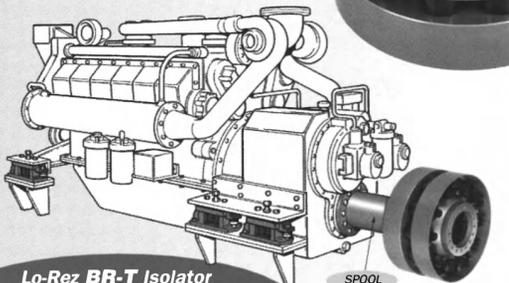
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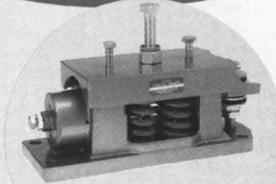
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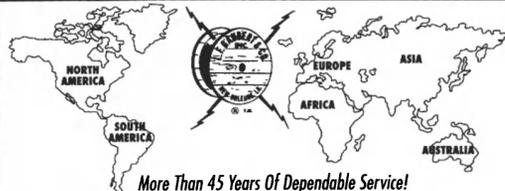
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An Industry In Flux

Spain's maritime industry, like that of many countries, continues to endure a great deal of change. The following report details activities of Spanish shipowners, ports and agent authorities, as well as the Spanish fishing sector.
— by **Ferliship**

Spain's marine industry is going through a great deal of change, although there are some indications that the situation may be stabilizing.

According to the Spanish Shipowner's Association, there has been a significant adjustment in the supply of maritime services, with a general weakening of companies and their fleets, since joining the EU.

To date, the situation is still not very positive and many companies are struggling to survive, in large part due to the tremendous addition of regulations that companies have had to incorporate. The cost of meeting the EU's regulatory regime has been compounded by shipowners being forced to pay the true cost for their operations. Previously, ships were regarded as protected resources in Spain, meaning that the cost of ships, repairs, crewing and insurance were all subsidized. The sudden burden of additional costs on the Spanish shipowners has led, in large part, to fleet reductions.

One immediate solution implemented by many shipowners is flagging out tonnage to

reduce costs. Spain's shipowners have been forced to employ alternative registries for ships, rather than fly the high-cost domestic flag. This problem remains, despite the introduction of the Canary Island's second registry a few years ago.

Statistics from Anave, the Spanish Shipowners' Association, clearly illustrate an exodus from the national flag registry. Anave records show that for 16 consecutive years there has been a continuous decline, in terms of tonnage, of Spanish-flagged ships.

At the end of 1995, a total of 230 ships were under Spanish flag. In comparison, at the end of 1994 there were 234 ships, and at the end of 1993 there were 250 ships.

The larger proportion of Spanish flag vessels are those employed in Spain's cabotage services, which operate under a protective umbrella and are obliged to use the national flag. These will soon be open to competition from other EU member states. Companies such as the ferry operator Trasmediterranea, S.A., which operates a fleet of 24 ferries and RoRos, may feel the pinch unless a more economical solution can be found and implemented before 1999, when their market will be open to outsiders.

The coastal/medium haul tanker company, Compañía Logística de Hidrocarburos (CLH), has a more immediate problem. As of January

1997, its market will be liberalized under I rules.

Another Spanish owner, Naviera Elcano, part of the state-owned holding Teneo, has its fleet under foreign registry.

The Spanish government has apparently recognized the problem and is taking steps in the right direction to address the situation. However, it claims that it will still take at least three to five years to achieve a registry similar to Denmark's international ship registry (DI) or the Madeira registry.

There are two major hurdles for Spain to overcome. The first is to win the support of the two major seafaring trade unions: Unio General de Trabajadores (UGT) and Sindicat Libre de la Marina Mercante. The second is political, and entails granting domestic shipowners special dispensation to reduce costs.

Despite disappointments with the hoped-for European registry, the Spanish Administration is pressing ahead with liberalization plans for cabotage and strategic cargoes.

Ports & Agent Authorities

Puertos del Estado, the state owned port holding company, assumes responsibility for dredging, navigation equipment maintenance and general policy rules of the 48 state ports. There are 26 port authorities which control port com-

Spanish Coast Home To Innovative Krupp Ship Unloader

In the Port of Ferrol on the northwestern tip of the Spanish coast, a continuous ship unloader, equipped with a number of innovative features, has been in operation since January 1995. The facility has reportedly unloaded more than three million tons to date. PWH Anlagen + Systeme GmbH, based in St. Ingbert-Rohrbach, was commissioned to supply the continuous unloader in December 1992. The company has since become the bulk handling technology subsidiary of Krupp Fodertechnik GmbH. The client and operating company is Madrid-based Endesa (Empresa Nacional de Electricidad SA). The company imports coal from the U.S. and Indonesia for its power station in As Pontes. For the Port, the new equipment means coal can be unloaded efficiently and cost-effectively, without producing dust and noise in the surrounding residential areas.

The ship unloader was not assembled on site, but several kilometers away, in close proximity to the factory where the steel components were made. After this work was completed, the 1,246-ton unloader, mounted on sliding blocks, was maneuvered over Teflon plates by hydraulic presses, moved approximately 492.1 ft. (150 m) from the assembly area to the docks of the shipyard, and shifted onto a pontoon. After a one-hour journey on the pontoon from the shipyard via bay to the pier, the unloader was moved from the pontoon to its final position and placed on rails in

(Continued on page 122)

Pictured is the Krupp ship unloader which, since January 1995, has unloaded three million tons of coal in the northwest Spanish Port of Ferrol.



SPANISH MARITIME INDUSTRY

... and planning. Spain's maritime activity can be divided into three regions: Algeciras in the south, Barcelona in the Mediterranean, and Valencia on the northern coast. Bilbao and Gijón are on the Atlantic. Algeciras has been considered the predominant container port in the Mediterranean, since breaking the one million TEU barrier in 1994. Maersk Line generates a major portion of the Port's container traffic.

Growth has been steady for the Maersk Line, accounting for 92,000 of the Port's container moves in 1993 and 356,000 in 1994, with more than 450,000 expected for 1995. To encourage upward trend, Algeciras has opened a new terminal dedicated to the Danish giant.

Meanwhile, Barcelona has applied phase one of its new container terminal, which will increase its capacity from 700,000 TEU to 1.2 million TEU. Additional plans entail the development of its logistics center, Zona de Actividades Logísticas.

Vehicle traffic is another area in which the Port is booming. Barcelona invested in storage at its car terminal with the construction of a multi-story parking garage. Also, there has been a significant increase in cruise passenger service in the last three years — 298 cruise ships and 174,008 cruise ship passengers used the Port of Barcelona in 1994, representing an approximate 15 percent increase over 1993 figures. First quarter figures for 1995 showed a 7.6 percent increase.

The Port of Valencia traffic reportedly grew by 24.7 percent in 1994, reaching 10,640,000 tons in throughput. APV, Valencia's port authority, controls the Ports of Sagunto and Gandía as well. The total traffic in the three ports increased by 30.8 percent in the first quarter of 1995 with respect to 1994 figures.

The Port of Bilbao is presently immersed in expansion of a new terminal, with a total investment of approximately \$287 million.

Fishing Sector

There are three fleets operating from Northwest Spain which fish outside Spanish waters. The Grand Sol ships (224 total) work around Ireland and the western approaches to the British Isles; the

cod fleet (22 total) fish off Canada; and the hake and groundfish freezing fleet fish (112 total) in the South Atlantic.

Spain also has shrimpers and a fleet of tuna and swordfish ships

that work the Southern Atlantic, and a tuna fleet in the Indian Ocean. The Spanish cephalopod fleet, based in Southern Spain, works mainly in Moroccan waters. There has recently been a conflict

with Morocco, during which approximately 650 Spanish vessels were fishing off its coast. The Kingdom of Morocco broke with a prior agreement and demanded renegotiation. As a result, EU

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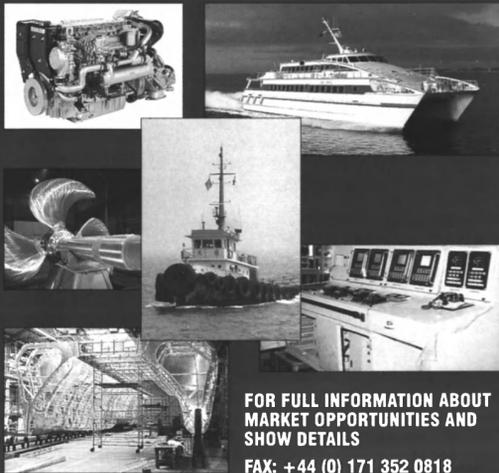
A few facts - China's 109,000km of navigable waterways and extensive coastline are main arteries of communication utilising every sort of ferry, workboat and commercial craft.



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97
中国国际船艇及船用技术设备展览会

SPANISH MARITIME INDUSTRY

Fisheries Commissioner **Emma Bonino** entered a deal which will reduce the number of ships operating in Moroccan waters to less than 500 by the end of the millennium. The four-year agreement will cost approximately \$162 million.

Further strife involves the Canadian government and a dispute in international waters. The fishing industry is concerned that Canada will continue to lower the 10,000-ton total allowable catch agree-

ment (1996) to zero. Spain slowly begun to scrap parts of its deepwater black halibut freezer fleet.

As a result of these conflicts the Islamic Republic of Iran has offered Spain new grounds — waters between 262.5 656.2 ft. (80 to 200 m) deep to compensate for its loss. The leasing of Iranian ships, which have licenses to operate in several African countries, including Angola, has also been proposed.

Spanish Coast Home To Innovative Krupp Ship Unloader

(Continued from page 120)

an operation lasting five hours. The entire operation was conducted and supervised by Krupp.

With this order and its successful commissioning, Krupp has added new sizes of machinery for the environmentally-friendly unloading of bulk material to its range. The continuous unloader has a peak throughput of approximately 2,300 tons per hour, and handles 30,000 tons per day.

The material is unloaded via an L-shaped chain bucket elevator approximately 118 ft. (36 m) in height. The buckets are filled in the horizontal section of the bucket elevator and then moved in a vertical direction. At the bucket elevator head, the material is discharged into a spiral chute and fed to the boom belt conveyor. From here, the material is passed through the central chute to the portal conveyor and then to the stacker situated on the land-side which automatically piles the material to heights of up to 52.5 ft. (16 m). In each case, the stacker seeks the optimum discharge position, i.e. minimum dropping height, by lifting, lowering and slewing in order to reduce the formation of dust and to completely fill the available storage space.

The unloader is intended for ships of up to 100,000 dwt, and can reportedly reach all areas of the ship's holds by moving along the pier, turning the upper part of the machine, lifting and lowering the boom and turning the elevator bucket, thus allowing bulk material that does not flow easily to be completely unloaded.

All the main movements of the ship unloader are produced by hydraulic motors or cylinders which are fed by three de-centrally situated stations. The unloader is operated from the cabin by only one person, and during the unloading process is operated by radio-control from alongside the hatchway of the ship. The freely programmable control system assists the operator in unloading, as the movements of the unloading bucket elevator in the hold are automated and may be switched on or off. All of the unloader's movements are reportedly designed to be protected against collision.

For more information on Krupp Fodertechnik GmbH
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Maritime Reporter/Engineering News



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PROPULSION TECHNOLOGY — High Speed & Gas Turbine Engines

Speeding Along

by
Graeme MacLennan, international editor

The speed with which the very large, lightweight, super fast monohull, catamaran or semi-SWATH ferry has become an established ship type in its own right has surprised many. The success

of the first commercial craft, carrying large numbers of passengers, cars and in many cases heavy commercial vehicles, has forced most competitors to rethink operations. Several have purchased or chartered one or more to test the water alongside conventional ships.

As a result, almost every aspect has been turned on its head. As with aircraft, maximum utilization must be obtained from a very costly asset. The dramatic reduction in the crossing time makes rapid turnaround and exchange of passengers, vehicles and catering stores much more significant. There is no need to provide overnight accommodation and cabin staff, and catering can be on a much simpler scale. Set against these positive factors is the greater cost of the crafts, the quantity of quality fuel needed to maintain speeds of 40 knots and more, a somewhat more complex shoreside infrastructure, and uncertainties about the life of light alloy construction driven by an immense concentration of power. The last two factors are important for preserving speed and carrying capacity due to the weight sensitivity of such crafts.

Suitable machinery is available from only the very few suppliers willing to undertake the costly development for what appeared to be an unlikely market. The demand is for slim, lightweight, and hence fast-running engines which can be installed within the submerged hulls of catamaran-type ships. This is not as important for monohull configurations.

MTU was first on the scene. It already had a versions of its 20V 1163TB models -- a well-proven solution -- serving for a number of years as the cruise, or "D" mode engines in the CODAG frigates of many navies, and as the sole propulsion unit in others. It is considered by many to be the leader in this field, and its Friedrichshafen plant is turning out large numbers of engines, as most fast ferries are fitted with four of these 10,000-bhp+ engines.

Ruston of the U.K. and Caterpillar of the U.S. (also made by Bazan in Spain) have recently extended the cylinder numbers in their respective ranges and are now catching up.

Four 16-cylinder Ruston RK270 engines were fitted in the first Australian-built, wave-piercing Sea Cats, and four 20RK270s

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PRELIMINARY CONFERENCE PROGRAMME

Established as the industry's international meeting place, the ShipRepair & Conversion Conference and Exhibition will be held at Olympia 2, London on November 5th and 6th. The full conference programme for the event is currently being finalised by Alan Thorpe, the Conference Coordinator. Further speakers and papers are being confirmed for the main programme and will be added to those shown below, including more Technical Workshop Sessions

Opening Address
Eric Mackie, Executive Chairman, Swansea Drydocks, UK

A Practical and Legal Guide to enforcement under Shiprepair Contracts
Mike Lax, Partner, Lawrence Graham, UK

Information management for ship maintenance and repair
Jim W Templeton and David W Robinson, American Bureau of Shipping

Checking the quality of surveys onboard an aging fleet of ULCCs
John Dunne, Managing Director, Papachristidis, Greece

Planning for special surveys
Gilberto Chaves, Director of Ships in Service, Bureau Veritas, France

Paper Title to be advised
Salvage Association, London

Options of monitoring the quality of sub-contractors and suppliers within an ISO 9000 system
RSP Bell, Senior Surveyor, Marine Quality Services, Lloyd's Register, UK

The need to have ISO 9002 accreditation in all departments of a shiprepair yard, and how this is achieved
Dr A C Antoniou, Technical & Quality Assurance Manager, ASRY, Bahrain

The need for more sophisticated technology for the shiprepair yard to move into more complicated repairs and conversions
Chris Millman, Technical Engineer, Dubai Drydocks

The future of Hong Kong's repair industry after 1997
Chris Pooley, Managing Director, Hongkong United Dockyard, HK

Developing more technical skills in addition to steel repairs
Marek Sokolowski, Commercial Manager, Gdansk Shiprepair Yard, Poland

Is the European conversion industry competitive against the Far East?
Peter Felten, Special Projects Director, A&P Group

Conversion of the FPSO "Glas Dowr"
Robert Bos, Engineering Manager, Bluewater Engineering BV, Holland

The conversion of the VLCC "Cairu" into a FPSO for the Marlim Field (Bacia de Campos)
Justo Izquierdo, Project Manager, ASEA, Spain

Owners and equipment suppliers can cooperate better, more businesslike and in a win-win situation - but how?
Sigurd Guide, Vice President, Kvaerner Ships' Equipment, Sweden

Controlling hull fouling without damaging the environment
Davy Jones, Managing Director, UMC, UK

The application of the latest developments in UHP hydroblasting equipment for deck and ballast tank maintenance
John Willsler, Woma (UK)

Seals for water-lubricated stern tube systems, replacing traditional packed glands
Valeriy Komlev, Cederval & Soner, St Petersburg

Oil mist detection in the atmosphere of an engine-room
Quality Monitoring Instruments, UK

Pollution-free stern tube seals
Dr Yamajo, Kobelco Marine Engineering Co, Japan

Safe use of gas onboard
Geir Haug, Unitor, Oslo

The "Open Dock"
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| Arna Dunkerque | Matelec |
| Asmar Shipbuilding & Docking | Megatec |
| Astilleros Espanoles | Metalock Industrial Services |
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PROPULSION TECHNOLOGY — High Speed & Gas Turbine Engines

[developing 7,080 kW (9,630 bhp) at 1,030 rpm] are now installed in the 282.1-ft. (86-m) Incat for Condor. Similar powerplants are specified for six 328-ft. (100-m) MDV 1200 Pegasus monohulls being built at Fincantieri for Sea Containers' SuperSeaCats.

Caterpillar has achieved considerable success in this field, with many references for its 3616 model, which now delivers 5,650 kW (7,690 bhp) at 1,000 rpm from a lightened version.

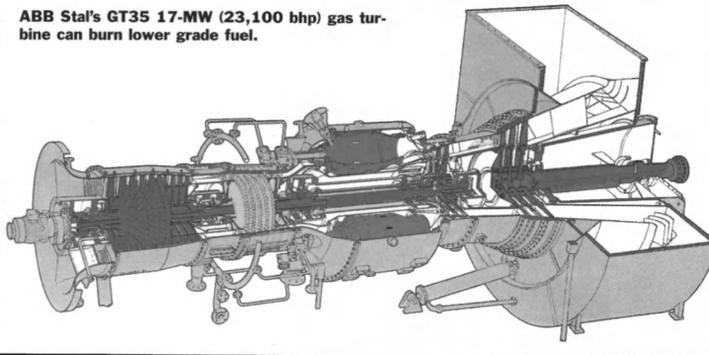
This has resulted from parallel development by Empresa Nacional Bazan, at San Fernando, near Cadiz, where the 413.3-ft. (126-m) monohull *Alhambra* has just been launched, scheduled for completion in October. This fast ferry (designed to carry 1,250 passengers and 244 cars) has six of these uprated engines. Four of its engines drive KaMeWa size 112SII waterjets in the wings. Two of the engines are twin-geared, and drive an 140BII in the center transmission. This is done through Geislinger composite material couplings and Reintjes lightweight reduction gears.

Alhambra is for a good Bazan customer, Buquebus of Buenos Aires, who recently ordered two 252.6-ft. (77-m) fast ferries, the first of which will have two ABB STAL GT35 gas turbines. The second will be equipped with

the first four 18-cylinder Caterpillar 3600 Series engines, reportedly developing 7,000 kW.

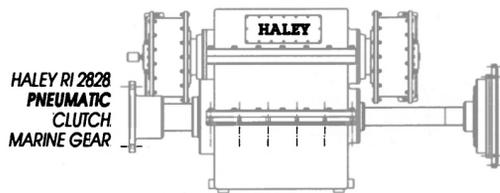
Two years ago MTU and the Detroit Diesel Corporation announced a cooperation agreement for the joint development and manufac-

ABB Stal's GT35 17-MW (23,100 bhp) gas turbine can burn lower grade fuel.

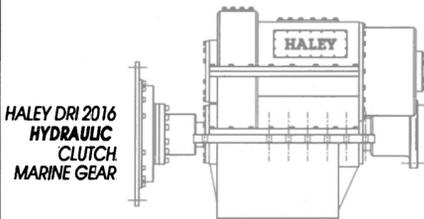


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Maritime Reporter/Engineering News

PROPULSION TECHNOLOGY

ture of two new engines. The smaller 2000 Series - for up to 1,343 kW (1,827 bhp) -- is derived from the Mercedes-Benz Series 500 truck engine. The 4000 Series is an entirely new design -- with two-liter cylinder capacity -- and will be marketed, for the present, in parallel with the popular MTU 396, which itself was derived from the Mercedes engine for the Leopard tank.

It will feature a reversion to the almost-forgotten common rail fuel injection system, but under control of sophisticated electronic management and monitoring systems to achieve strikingly-reduced fuel consumption over a wide power range. Examples of both will be on display at the SMM exhibition in Hamburg, early in October. The first orders for the 4000 Series engines have been received; four engines with 2,300-kW each were ordered for four fast ferries to serve the Italian offshore islands.

Gas turbines

Where much higher powers are required, the lightweight gas turbine is the only alternative to multiple diesel engines. Two of the three remarkable HSS (High Speed Service) catamarans ordered by Stena Line from Finnyards are now in service across the Irish Sea. These ferries illustrate the production potential of such ships.

In high season, the 415.3 x 131.2-ft. (126.6 x 40-m) *Stena Explorer*, with space for 1,500 passengers and the equivalent of 375 cars, makes five return crossings between Holyhead and Dunlaoghaire (ferry port for Dublin). Each crossing taking only 99 minutes, versus the three and a half hours it takes for the conventional RoPax ferry, which can carry 1,700 passengers and 270 cars. The submerged bulbous part of each hull contains two General Electric gas turbines, arranged co-axially fore and aft of a MAAG HPG 185/C combining and splitter gear, having two output shafts leading to KaMeWa size 160 steering and reversible waterjets.

An LM2500 turbine of 22.8 MW (31,000 hp) is forward of the gear and an LM1600 of 13.3 MW (18,100 hp) is aft, both arranged to drive the same primary pinion through MAAG synchronous clutches which enable on-load changes of mode.

This provides permutation for maximum economy at various speeds. One LM1600 in each hull gives about 25 knots; one LM2500 in each gives 32 knots, and altogether, the package delivers more than 40 knots. The maximum power which can be applied to propulsion is reportedly second only among the world's merchant ships to the 88-MW power of *QE2*. The service and economic performance of these revolutionary craft will be watched closely in coming months, particularly during the winter.

For its next pair of smaller HSS 900 catamarans, Stena has specified an ABB STAL GT35 gas turbine of 17MW in each hull, again driving two waterjets. The GT 35 is based in an aero turbine which never flew, but was developed as an industrial machine without the constraints of the aircraft environment. It is able to burn relatively low quality fuel and, due to its lower cycle temperature, the exhaust has a much lower NOx content. Two GT35s have also been ordered for a 77-m Bazan monohull, similar to the one with the four new MTU 4000 diesels. The first of the Danyard

September, 1996

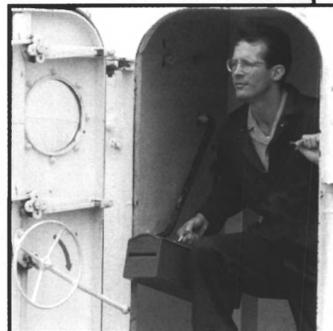
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PROPULSION TECHNOLOGY — High Speed & Gas Turbine Engines

Seajet 250s, *Mai-Mols*, has just gone into domestic service in Denmark. This 40-knot, \$31-million craft, carrying 450 passengers and 120 cars, has two GE LM500 turbines driving four waterjets

through MAAG gears.

Japan reports continued promise from the two prototype Techno-Super-Liners -- very fast, turbine-powered, half-scale freight carriers.

Waterjets are now the only possible means of applying high propulsive power to fast, shallow-draft craft of this type. The lightweight construction would be unsuitable for supporting conven-

tional shafting and propellers for such powers. Some fast ferries in service have spun reinforced fiber shafting for weight savings.

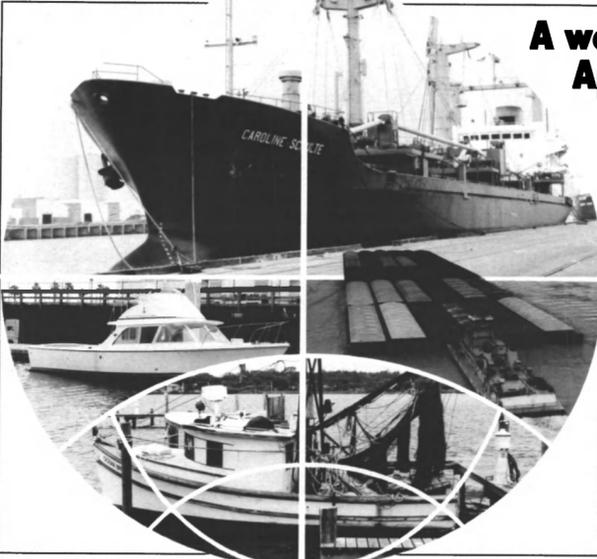
ELECTRIC TRANSMISSION

There is only one large cruise ship (more than 50,000 gt and 1,200 passengers) on order which will not employ diesel-electric propulsion, a clear indication that the principle has come to stay -- possibly employing advanced gas turbine prime movers in the future.

All of these ships employ the so-called power station system with several diesel generator sets providing energy for all purposes onboard. The systems are supplied by only three long-established European manufacturers: ABB (Stromberg); Cegelec (BTH, Metrovick, GEC and Alstom); and STN (AEG). They have since been joined by Siemens, whose initial success is a major one, an 84-MVA plant powered by six Sulzer 16ZA40S engines supplying two double-wound, 21-MW propulsion motors in Princess Cruises' future flagship, the 104,000-gt *Grand Princess*. Major American electrical engineers have been slow to return to this market in which they were very prominent during earlier brief spells of popularity. General Electric will supply the five-generator 2 x 25,000-shp machinery for the two 85,000-gt, 2,400-passenger Disney Cruise ships to come from the Fincantieri yards in 1998.

The decision by Carnival Cruise Lines to adopt the Kvaerner-ABB Azipod system for the seventh and eighth Fantasy class cruise ships is a step which will also be watched with some interest. The Azipod is a streamlined pod, suspended below the stern of a ship, containing a long, small-diameter electric motor and thrust bearing connected directly to a propeller. It is capable of being rotated unrestrictedly through 360 degrees, dispensing with the need for a rudder, and capable of applying full power ahead, astern and side thrust to any angle on the beam. *Elation* and *Galaxy*, both scheduled for delivery in 1998, will have the same power as the others of the class, but applied by two 14-MW Azipods with tractor propellers. The advantages are many, namely: control is readily incorporated in

(Continued on page 132)



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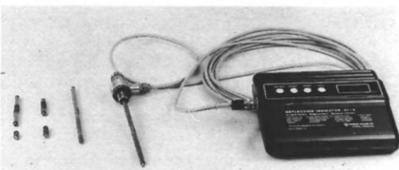


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PROPULSION TECHNOLOGY — High Speed & Gas Turbine Engines

(Continued from page 128)

any joystick maneuvering system; the space occupied by inboard motors is freed for other purposes; tractor propellers work in undisturbed water leading to low vibration; and the heading can be maintained under emergency full astern conditions. The source of power has also been changed for these two ships.

Six of Wartsila's new 12W38 engines will replace the four 12-cylinder and two 8-cylinder Sulzer ZA40S engines. Carnival has not adopted this system blindly, as it noted the consistent and excellent performance returned with a bouy tender and with two 11.4-MW conversions of ice-going product tankers. The system was reportedly offered to Royal Caribbean Cruises

Ltd. for its latest orders. Integrated electric propulsion and auxiliary systems are an ideal solution for chemical tankers which may have a large number of tanks, each requiring a segregated pumping system.

Stolt Parcel Tankers have specified such power on a dozen such ships, of advanced design, ordered in Denmark, France and Spain. With this setup, cargo space is gained because the machinery space is very short, as the generator sets are installed above the 10-MW motor, which is a relatively small, 1,200-rpm machine, geared to a six-bladed propeller. Large passenger and vehicle ferries are another type of ship for which electric transmission

was once popular. It was lauded for providing easy maneuverability, and was an option before powerful medium-speed engines and CP propellers became generally available. The German and Swedish TT ferries, operating in the environmentally-sensitive Baltic Sea, burn a very light grade of fuel.

Clever design by Deltamarin of Finland utilizes the advantage of the freedom from shaft-line constraints by installation of two 6,500-kW AEG propulsion motors as far aft as possible, and the generator sets in compartments within the double skin outboard of the B/5 bulkheads in the much longer lower trailer deck thus made possible.

(For additional propulsion technology insight from Graeme MacLennan, please see the copy of Marine Technology International, page 12, which was included with this edition.)

MIT Research Shows Decreased Bycatch With Alternative Fishing Method

Research by the Massachusetts Institute of Technology (MIT) Sea Grant Center for Fisheries Engineering Research indicates that midwater pair trawling may be the most effective, resource-sparing and marine mammal-friendly approach to landing big-eye, yellowfin and albacore tuna. Data from the two-year study, which was authorized by the National Marine Fisheries Service

(NMFS), is now being examined by the agency as it considers making pair trawling an approved method for catching tuna.

Since 1993, NMFS has permitted only long-lining and grill netting for commercial tuna fishers on the U.S. East Coast. While little data exists regarding the exact bycatch (the catch of untargeted species) with these techniques, both involve levels that concern

fishers and environmentalists alike.

In the MIT Sea Grant study, a small group of fishers spent two seasons midwater pair trawling for tuna in the Northwest Atlantic. With this method, two vessels work together, with each boat pulling on one side of a net. Accompanied by NMFS observers, the fishers documented the performance of their fishing gear for each haul and recorded all catches.

Results from both seasons show a small number of encounters with sea turtles and marine mammals, due in large to the fact that the

nets are quickly lowered to depths where tuna, and not the protected species, congregate. The large mesh-size of the pair trawl nets also allows smaller fish to escape.

The documentation of the fishery, in which close to 95 percent of the fishing trips were made with NMFS observers, offers the agency the opportunity for utilizing scientific data in its decision-making. "This experimental fishery represents a new way of getting things done," said Cliff Goudey, director of the MIT Sea Grant Center for Fisheries Engineering Research, and coordinator of the experiment.



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Owner/ Operator	Country (Owner)	Shipyard	Country (Shipyard)	Ship Type	No.	Delivery Date	Price \$M
KLAUS OLDENDORFF	CYPRUS	MANGALIA	ROMANIA	BULK CARRIER	3	1997	—
ARGO REEDEREI	GERMANY	SPLIT	CROATIA	BULK CARRIER	1	1997	—
GREAT CIRCLE SHIPPING AGENCY	INDIA	CHEUNG KU MARINE IND.	KOREA	BULK CARRIER	2	98/99	—
MO SHIP MANAGEMENT	JAPAN	MINAMI NIPPON	JAPAN	BULK CARRIER	2	1997	—
NISSEN KAIUN	JAPAN	SHIKOKU DOCKYARD	JAPAN	BULK CARRIER	1	1997	—
NISSHO IWAI	JAPAN	ITSUI ENG. & SHIPBUILDING	JAPAN	BULK CARRIER	1	1998	22.7
SHIKISHIMA KISEN	JAPAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	1	1996	—
UNKNOWN	JAPAN	ITSUI ZOESEN	JAPAN	BULK CARRIER	1	1998	—
UNKNOWN	JAPAN	TSUNEISHI	JAPAN	BULK CARRIER	2	1997	—
KOREA LINE	KOREA	HAKODATE DOCK	JAPAN	BULK CARRIER	2	—	38
OLYMPIC SHPG. & MGMT.	MONACO	SHIKOKU DOCKYARD	JAPAN	BULK CARRIER	1	1997	—
BELSTOVE MANAGEMENT	NORWAY	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	4	1999	—
POLSKA ZEGUGA MORSKA	POLAND	STOCZNIA	POEAND	BULK CARRIER	3	1998	48
PRECIOUS SHIPPING	THAILAND	CHEUNG KU MARINE IND.	KOREA	BULK CARRIER	2	98/99	32
UNKNOWN	UNKNOWN	ITSUI ZOESEN	JAPAN	BULK CARRIER	1	1998	—
UNKNOWN	UNKNOWN	SAIKI	JAPAN	BULK CARRIER	2	1997	—
UNKNOWN	UNKNOWN	SHIKOKU DOCKYARD	JAPAN	BULK CARRIER	1	1997	—
WESTERN BULK SHIPPING	NORWAY	SUMITOMO HEAVY INDUSTRIES	JAPAN	BULK CARRIER	4	98/99	—
POLISH STEAMSHIP CO. (PZM)	POEAND	STOCZNIA	POEAND	BULK CARRIER	3	—	—
DOCEHAVE	BRAZIL	EISA	BRAZIL	BULK CARRIER	2	—	68.4
U-MING MARINE TRANSPORT CORP.	TAIWAN	HITACHI	JAPAN	BULK CARRIER	1	2/98	28
WESTERN BULK SHIPPING / SUMIMOTO CORP.	NORWAY/JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	4	98/99	101
UNKNOWN	UNKNOWN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	1	1996	—
BUQUEBUS	ARGENTINA	BAZAN	SPAIN	CATAMARAN	2	—	—
GOLD BRIDGE SHIPPING	INDONESIA	USUKI	JAPAN	CHEMICAL	1	1997	—
MEDITERRANEA DI NAVIGAZIONE	ITALY	CANTIERI NAV. DE POLI	ITALY	CHEMICAL	1	1997	32.5
MEDITERRANEA DI NAVIGAZIONE	ITALY	CANTIERI NAV. DE POLI	ITALY	CHEMICAL	1	—	—
UNICOM MANAGEMENT SERVICES	LIBERIA	BRODOSPLIT	CROATIA	CHEMICAL	2	—	—
UNICOM MANAGEMENT SERVICES	LIBERIA	BRODOTROGIR	CROATIA	CHEMICAL	2	—	—
UNICOM MANAGEMENT SERVICES	LIBERIA	ULJANIK SHIPYARD	CROATIA	CHEMICAL	2	—	—
MISC	MALAYSIA	AESA	SPAIN	CHEMICAL	4	1998	200
AR CO IN SRL	—	CANTIERI NAV. DE POLI	ITALY	CHEMICAL	2	1997	—
EMILIANA MARITIMA	—	LINDENAU	GERMANY	CHEMICAL	1	97	—
SRL MARNALI	ITALY	NAVAL GIJON	SPAIN	CHEMICAL	2	1998	93.8
DAITOH TRADING CO.	JAPAN	ASAKAWA SHIPBUILDING	JAPAN	CHEMICAL	2	1998	34.7
DAITOH TRADING CO.	JAPAN	FUKUOKA SHIPBUILDING	JAPAN	CHEMICAL	1	1998	19.2
N.T. MARINE/MIWA KAIUN	JAPAN	SHIN KURUSHIMA	JAPAN	CHEMICAL	2	1997	60
NIPPON YUSEN KAISA (NYK)	JAPAN	HITACHI	JAPAN	BULK CARRIER	1	6/98	30
ITSUI O.S.K. LINES (MOL)	JAPAN	ITSUI ZOESEN	JAPAN	BULK CARRIER	2	8/98	54.7
CSAV	CHILE	SZCZECIN SHIPYARD	POLAND	CONTAINER	2	1998	62
FRIEDRICH A. DETJEN	GERMANY	HALLA	KOREA	CONTAINER	5	—	—
H.R. SCHEPERS	GERMANY	VOLKSWERFT STRALSUND	GERMANY	CONTAINER	8	97/98	—
LEONHARDT & BLUMBERG	GERMANY	GUANGZHOU	CHINA	CONTAINER	2	1998	48
UNKNOWN	GERMANY	SIETAS	GERMANY	CONTAINER	1	1997	—
SHREYAS SHIPPING	INDIA	ABG SHIPYARD	INDIA	CONTAINER	1	1998	15.3
SHREYAS SHIPPING	INDIA	ABG SHIPYARD	INDIA	CONTAINER	1	—	15.7
HANJIN SHIPPING CO.	KOREA	HANJIN H.I.	KOREA	CONTAINER	2	97/98	30
HYUNDAI MERCHANT MARINE (HMM)	KOREA	HYUNDAI	KOREA	CONTAINER	5	8/97	—
PAVIAN	RUSSIA	SZCZECIN SHIPYARD	POLAND	CONTAINER	1	1998	31
DJAKARTA LLOYD	SINGAPORE	PT PAL	INDONESIA	CONTAINER	1	1998	—
DJAKARTA LLOYD	SINGAPORE	PT PAL	INDONESIA	CONTAINER	2	1998	60
PACIFIC INT. LINES	SINGAPORE	KANASASHI CO.	JAPAN	CONTAINER	2	1997	—
KIEN HUNG SHIPPING	TAIWAN	SHIN KURUSHIMA	JAPAN	CONTAINER	2	1998	52

Principal Contracts Recorded, July 1996

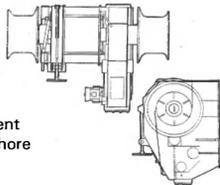
Owner/ Operator	Country (Owner)	Shipyard	Country (Shipyard)	Ship Type	No.	Delivery Date	Price \$M
KIEN HUNG SHIPPING	TAIWAN	SHIN KURUSHIMA	JAPAN	CONTAINER	2	1998	52
CARNIVAL CORP.	U.S.	FINCANTIERI	ITALY	CRUISE	2	1999	600
SOUTH COAST SHIPPING	U.K.	MERWEDE SHIPYARD	NETHERLANDS	DREDGER	1	1998	—
MISC	MALAYSIA	MALAYSIA SHIPYARD	MALAYSIA	FEEDERSHIP	2	97/98	40
ATTICA ENTERPRISES	GREECE	KVAERNER MASA	FINLAND	FERRY	2	1998	200
SIREMAR/CAREMAR/TOREMAR	ITALY	RODRIGUEZ	ITALY	FERRY	4	1998	65.8
COBRECAF	FRANCE	BREHERET	—	FISHING	1	1997	22.5
E. SIMPSON	U.K.	FLEKKEFJORD SLIP & MASK	NORWAY	FISHING	1	4/97	—
SONAT OFFSHORE DRILLING	U.S.	AESA-ASTANO	SPAIN	FLOATING DRILLING	1	2/98	250
ANTAI MARINE SHIPPING	CHINA	NEUE BRAND WERFT	GERMANY	GENERAL CARGO	2	—	—
JINIVAN SHIP MGMT.	HONG KONG	SHIN KOCHI JUKO	JAPAN	GENERAL CARGO	2	1997	—
UJI KAIUN	JAPAN	MURAKAMI HIDE	JAPAN	GENERAL CARGO	1	1996	—
UKUEI KAIUN YK	JAPAN	HAMAMOTO	JAPAN	GENERAL CARGO	1	1996	—
COYO KAIUN KK	JAPAN	YOSHIDA ZOSEN	JAPAN	GENERAL CARGO	1	1997	—
YOKUYO KAIUN	JAPAN	HAMAMOTO	JAPAN	GENERAL CARGO	1	1997	—
JUMIKIN BUTSURYU	JAPAN	YOSHIDA ZOSEN	JAPAN	GENERAL CARGO	1	1996	—
AIYO KAIUN	JAPAN	TAIYO ZOSEN	JAPAN	GENERAL CARGO	1	1996	—
OWA KAIUN	JAPAN	SANUKI ZOSEN	JAPAN	GENERAL CARGO	1	1996	—
IONG BANG FORWARDING	KOREA	BANG EO JIN	KOREA	GENERAL CARGO	1	1996	—
EBSENS SHIP MGMT.	NORWAY	SLOVENSKE	SLOVAKIA	GENERAL CARGO	7	1997	—
UNKNOWN	PORTUGAL	VIANA DO CASTELO	PORTUGAL	GENERAL CARGO	6	1998	—
OSCO	CHINA	KAWASAKI H.I.	JAPAN	HEAVY-LIFT CARGO	4	1998	160
ESTFAL-JARSEN SHIPPING	NORWAY	MITSUI ENG.&SHIPBUILDING	JAPAN	LPG	3	98/99	138
OMAYA	SINGAPORE	SHIN KOCHI JUKO	JAPAN	LPG	1	1997	—
ANTAI MARINE SHIPPING	CHINA	BRAND WERFT	GERMANY	MULTI-PURPOSE	2	1997	—
LIPPER DENMARK	DENMARK	ZHONGHUA SHIPYARD	CHINA	MULTI-PURPOSE	4	1998	60
ET SONDENFJELDS-NORSKE DAMPSKIB.	NORWAY	FINNISH MARITIME DIRECTORATE	FINLAND	OFFSHORE	1	4/98	—
AERSK SUPPLY SERVICE	DENMARK	SIMEK	NORWAY	OFFSHORE	2	5/98	—
LYAN REDERI	—	VAAGLAND BAAT	—	PALLET VESSEL	1	1998	—
UNKNOWN	JAPAN	SANUKI ZOSEN	JAPAN	PASSENGER	1	1997	—
EMBAWANG MARITIME	SINGAPORE	MARINTEKNIK SING.	SINGAPORE	PASSENGER	2	2/97	5.7

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Principal Contracts Recorded, July 1996

Owner/Operator	Country (Owner)	Shipyards	Country (Shipyards)	Ship Type	No.	Delivery Date	Price \$M
ISTAMBUL DENIZ OTOBUSLERI (IDO)	TURKEY	AUSTAL SHIP	AUSTRALIA	PASSENGER	2	11/96	—
U.K. MINISTER OF DEFENCE	U.K.	FBM MARINE	U.K.	PASSENGER	2	9/97	—
GHATZ PATIL TRANSPORTS	—	SEMO	—	PASSENGER/FERRY	1	1997	—
ISTAMBUL DENIZ OTOBUSLERI (IDO)	TURKEY	AUSTAL SHIP	AUSTRALIA	PASSENGER/VEHICLE	2	1997	—
SIREMAR	ITALY	CANTIERI NAV. DE POLI	ITALY	FERRY	1	1998	25.7
UNKNOWN	UNKNOWN	OCEANFAST FERRIES	AUSTRALIA	FERRY	1	7/97	—
YASUDA SANGYO	—	HITACHI	JAPAN	FERRY	1	1997	—
UNKNOWN	UNKNOWN	INCAT AUSTRALIA	AUSTRALIA	FERRY	1	1997	—
MITSUBI O.S.K. LINES (MOL)	JAPAN	KANASASHI CO.	JAPAN	PCC	2	1998	—
MITSUBI O.S.K. LINES (MOL)	JAPAN	MINAMI NIPPON	JAPAN	PCC	3	97/98	—
UNIQUE SHIPPING	HONG KONG	SHIKOKU DOCKYARD	JAPAN	REEFER	2	97/98	—
SHINSEI KAIUN	JAPAN	FUKUOKA SHIPBUILDING	JAPAN	REEFER	1	1997	—
DFDS A/S	DENMARK	FINCANTIERI	ITALY	RoRo	2	1998	—
IZUMI KISEN	JAPAN	IMABARI SHIPBUILDING	JAPAN	RoRo	1	1997	—
MIYAZAKI SANGYO	JAPAN	IMABARI SHIPBUILDING	JAPAN	RoRo	1	1997	—
NIPPON YUSEN KAISA (NYK)	JAPAN	SAMSUNG	JAPAN	TANKER	2	1998	84
EASTERN MED MAR	U.K.	FUKUOKA SHIPBUILDING	JAPAN	TANKER	1	1997	—
MOBIL CORP.	U.S.	I.H.I.	JAPAN	TANKER	1	5/98	85
REEDEREI NORD KLAUS E. OLDENDORFF	CYPRUS	HALLA	KOREA	TANKER	1	10/98	—
PRIMORSK SHIPPING CORPORATION	RUSSIA	CHEUNG KU MARINE IND.	KORLA	TANKER	3	97/98	—
UNKNOWN	CHINA	WUHU	CHINA	TANKER	1	1998	—
NIPPON YUSEN KAISA (NYK)	JAPAN	SAMSUNG	JAPAN	TANKER	1	1999	45
HANJIN SHIPPING CO.	KOREA	HANJIN H.I.	KORLA	TANKER	2	1998	48
MURMANSK SHIPPING	RUSSIA	ADMIRALTEYSKI	RUSSIA	TANKER	5	1999	140
FORMOSA PLASTICS	TAIWAN	SASEBO	JAPAN	TANKER	3	97/98	88.5
CAMPBELL MARITIME	U.K.	APPLEDORE	U.K.	TANKER	3	1998	49.4
PRITCHARD-GORDON TANKERS	U.K.	APPLEDORE	U.K.	TANKER	3	1998	—
UNKNOWN	UNKNOWN	ULJANIK	CROATIA	TANKER	1	1998	—
POLISH STEAMSHIP	POLAND	SZCZECIN SHIPYARD	POLAND	TANKER	2	98/99	40
POLISH STEAMSHIP CO. (PZM)	POLAND	STOCZNIA	POLAND	TANKER	2	1999	40
FUJAIHAI PORT AUTHORITY	—	DAMEN SHIPYARDS	NETHERLANDS	TUG	1	1997	—
BUKSER OG BJERGNING	NORWAY	MOEN SLIP	NORWAY	TUG	1	1997	—
SIMON MOKSTER SHIPPING	NORWAY	AUKRA INDUSTRIER	NORWAY	TUG	1	4/97	—
SEACOR MARINE	U.S.	TRINITY-HALTER MARINE	U.S.	TUG	1	—	—
CORY TOWAGE	U.K.	DAMEN SHIPYARDS	NETHERLANDS	TUG	2	1997	—
SOLSTAD SHIPPING	NORWAY	ULSTEIN	NORWAY	TUG/SUPPLY	1	1997	33.7



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USCG 47MB - 13 Stidd Seats aboard. photo by Don Murray

USCGC 47MB 506 - 22 Stidd Seats aboard. photo courtesy Trinity Marine Group

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Damen Delivers Tug To Singapore



In mid-spring, Damen Shipyards delivered a tug to Tanker Mooring Services in Singapore, after the vessel successfully completed sea trials. The tug, *TMS Star II*, is the second vessel the Netherlands-based yard has delivered to the owner through its local agent Intraco Ltd., and will be utilized as a workboat at a local SBM terminal for assisting in the berthing and unberthing of tankers.

TMS Star II reportedly achieves a bollard pull of 11.7 tons and a free sailing speed of 10.5 knots with a continuous output of 804 bhp. The 55.4 ft. x 17.3-ft. (16.8 x 5.2-m) tug has a 7.5-ft. (2.3-m) draft, and is classed by Lloyd's Register. Main propulsion is provided by two Caterpillar 3408B TA V8 engines, each developing 300 kW at 1,800 rpm. Each engine drives a Promarin, 1,300-mm diameter fixed

propeller through a Twin Disc reverse/reduction gearbox type M 516. One generator set, consisting of a Lister-Petter CRK 3 engine driving a Stamford BCM 184G generator produces an output of 22.5 kVA, 50 Hz at 1,500 rpm.

TMS Star II's single chine hull was reportedly designed to withstand heavy impact forces, with shell and bottom plating of 10-mm thickness and a 20-mm thick integrated sheer strake. The hull is also equipped with a push bow, and D-shape rubber fenders are located at the stern for protection of transom corners. In the wheelhouse, the vessel has a magnetic Kelvin Hughes Kotter compass and a Motorola MC-2100 VHF radio telephone.

For more information on Damen Shipyards Circle 25 on Reader Service Card

TMS Star II was constructed to be extremely stable and maneuverable, for use as a towing, mooring and general assistance operations vessel in a Singapore terminal.

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Conference & Exhibition Preview

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The 1996 SNAME International Maritime Exposition is scheduled to take place at the New York Marriott Marquis in New York City, N.Y., from October 2-5. SNAME will play host to more than 120 exhibitors offering marine products and services such as: ship repair and conversion; plumbing equipment; fire detection, alarm and suppression equipment; purification systems for fuel oil, lube oil, sludge concentration, and oil water treatment; anti-corrosion coatings; ultrasonic inspection instruments for leak detection and mechanical inspection; marine safety equipment; software for PC-based fleet management; satellite equipment for marine and mobile applications; marine diesel engines; marine design computer software; and marine lubricants.

SNAME's three-day program will address the theme *New Initiatives for Maritime Success* by combining traditional papers with panel discussions and special reports as part of mini-symposia sessions. Wednesday, October 2 will be devoted to two technical and research (T&R) symposia.

The first symposium will begin with a panel of experts discussing the elements of the National Shipbuilding Initiative (NSI), and the second will include presentations by the T&R panels.

The presentation of traditional technical papers will accompany panel discussions and exhibits. Papers to be presented include:

- *Analysis of Oil Production Ships Considering Load Combination, Ultimate Strength and Structural Reliability*, which will investigate the combination of still-water and wave loads on oil production ships;

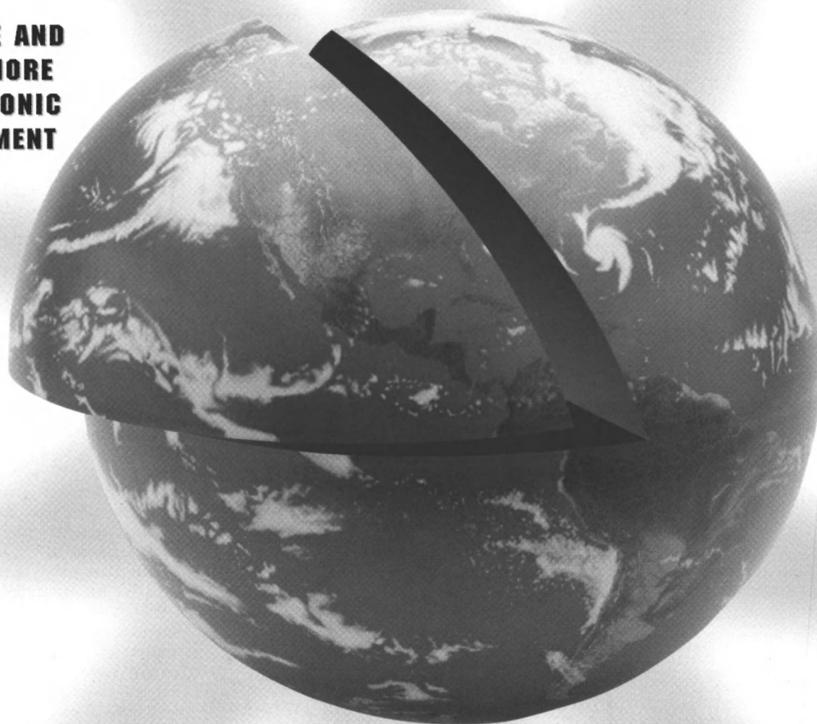
- *Thermal Stress and Hull Stress Monitoring*, which will describe temperature and hull stress signals recorded from a containership and bulk carrier.

The SNAME Exposition also includes a luncheon which will be addressed by SNAME President W.R. Phillips.

For more information on the 1996 SNAME Exposition, contact Kristin Cagliari, marketing coordinator, 601 Pavonia Ave., Jersey City, N.J. 07306, tel: (201) 798-4975; fax: (201) 798-4975.

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Circle 304 on Reader Service Card

TS Tanksystem Awarded U.S. Newbuilding Contracts

TS Tanksystem SA's hermetic gas tight portable gauging and sampling equipment has been chosen by three U.S. shipyards. Avondale Industries has chosen the equipment for an American Heavy Lift project, entailing four

product tankers; Alabama Shipyard will use the equipment for its Dannebrog project which includes building two 16,000-dwt chemical tankers plus an option for one more; and Newport News Shipbuilding will use the equipment for its Van Ommeren/Hvide project incorporating five product/chemical tankers. Tanksystem's hermetic line is

ISO 9000 certified and reportedly approved by all major classification societies. The hermetic line is represented in the U.S. and Canada by its agent American United Marine Corp., with offices in Boston and New York. Hermetic Inc. is Tanksystem's fully-owned company.

For more information on TS Tanksystem Circle 23 on Reader Service Card

Crane Heatex Appoints Klattenberg As Rep

Crane Heatex, an English subsidiary of the Crane Corporation, Stanford, Conn., has appointed Klattenberg Marine Agencies, West Orange, N.J., as its representative in the U.S. and Canada. Crane Heatex is a manufacturer and repairer of charged air cooler and shell and tube heat exchangers for marine applications. Services range from straightforward replacement tubestacks to complex thermal and mechanical designs.

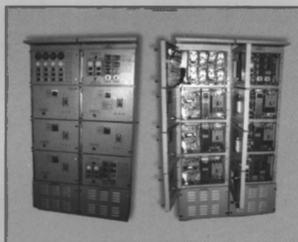
For more information on Crane Heatex Circle 24 on Reader Service Card

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Alabama Shipyard, W&O Supply Enter Agreement

W&O Supply, Inc. of Jacksonville, Fla., has entered into a partnering agreement with Alabama Shipyard, Inc. to supply various valves and spares for the Dannebrog Rederi chemical tanker project. Construction of these vessels is reportedly underway at the Mobile, Ala., yard. The agreement covers the ships' major piping systems and includes products manufactured and supplied by Econosto International B.V., World Valve Losser, Henry Vogt Machine Co. and Pres-Vac Engineering.

W&O Supply is a marine industry supplier of valves, pipes, fittings and metals, with stocking distribution warehouses in 15 U.S. ports, Vancouver, Antwerp and Singapore.

For more information on W&O Supply Circle 86 on Reader Service Card

NNS Christens Aircraft Carrier Harry S. Truman

At press time, christening ceremonies for aircraft carrier *Harry S. Truman* were scheduled to take place at Newport News Shipbuilding on September 7. The ship is the eighth Nimitz class aircraft carrier to be built by the yard, and it is scheduled for delivery in 1998.

Invited speakers for the ceremonial proceedings included Senators **John Warner** and **Charles Robb** of Virginia and Congressman **Ike Skelton** of Mississippi. **Drucie S. Horton** was named Matron of Honor to Truman's sponsor, **Margaret Truman Daniel**, daughter of President Truman.

Maritime Reporter/Engineering News

International Maritime Exposition Exhibitor Profiles

ABB Turbocharger Co. SNAME Booth #407

ABB Turbocharger Co. provides application engineering and a complete line of ABB exhaust gas turbochargers for engines above 500 kW. ABB also offers new and reconditioned spares, 24-hour field and shop service including: turbine blade reconditioning; shaft metallizing; computerized rotor balancing and reconditioned bearings and lube pumps. ABB service centers are located in New York, Miami, Houston, Los Angeles and Seattle.

Allied Systems Co. SNAME Booth #101

Allied Systems Co., a designer and manufacturer of marine duty hydraulic cranes and boat davits since 1978, has recently supplied equipment for the U.S. Coast Guard (USCG) WLB and WLM buoy tenders, Canadian navy frigates, ROK navy vessels, and the U.S. Navy and U.S. Army. Allied has also supplied more than 100 of its recently developed constant tension winch systems for use on RIB handling davits, and is currently manufacturing five deck cranes for USCG's polar ice-breaker *Healy*.

American Bureau of Shipping SNAME Booth #218

The American Bureau of Shipping will exhibit SafeNet, a life cycle ship management and information network designed to assist owners in managing vessels safely and efficiently, and SafeHull 96, a method for designing and evaluating tankers, bulk carriers and containerships in order to enhance structural safety.

Anchor Marine & Industrial Supply, Inc. SNAME Booth #613

Anchor Marine & Industrial Supply, Inc. is a manufacturer of anchors, anchor chains, marine hardware, fenders, deck and dock equipment. Additional products include watertight doors and hatches, wire rope and related fittings, and fiber and synthetic rope.

Apollo International Corp. SNAME Booth #125

Apollo International has facilities in New York and Houston that supply hoses for oils, chemicals and solvents

for ships, barges and terminals. Apollo also supplies all types of general purpose hoses in rubber, metal and composite, as well as tank cleaning equipment, mechanical packings and gaskets, and rubber and metal expansion joints.

Appleton Marine, Inc. SNAME Booth #517

Appleton Marine manufactures a full-line of marine cranes, marine winches,

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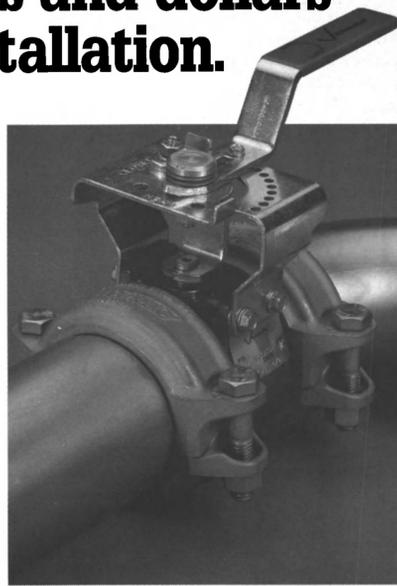
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International Maritime Exposition Exhibitor Profiles

anchor windlasses and capstans. Additional Appleton Marine product lines include RHIB handling davits, FPSO chain tensioning winches, astern refueling reels and underway replenishment winches.

Atlantic Marine, Inc. & Alabama Shipyard, SNAME Booth #418

Mobile, Ala.-based Atlantic Marine, Inc. and Alabama Shipyard, Inc., offer full service ship repair and conversion and newbuilding services to the international marine industry.

Beird Industries, Inc. SNAME Booth #400

Beird Industries, Inc. will exhibit

MAXIM heat recovery evaporators, including desalinators, distillers and watermakers, with particular emphasis on its design and manufacture of custom equipment, and its experience with multi-effect and multi-stage flash evaporators. Beird will also provide information on its in-house fabrication and machining capabilities.

Belzona Repair Technology SNAME Booth #102

Belzona Repair Technology will display its polymer technology for repairing, rebuilding and protecting machinery and equipment. Belzona products are reportedly ISO 9000 certified; have ABS type approval; and are

approved by the U.S. Navy, Bureau Veritas, Det Norsk Veritas, Lloyd's Register of Shipping, Germanischer Lloyd and the U.K. Ministry of Defence.

B.W. Elliott SNAME Booth #615

B.W. Elliott Mfg. Co., Inc. will exhibit its ROG (Remote Operating Gear) lines, flex shaft, rigid rod, RMVA System Uniflex, along with vapor tight operators. Elliott has been an original equipment manufacturer (OEM) of remote mechanical valve actuators for more than 20 years.

Caterpillar Engine SNAME Booth #116

Caterpillar Engine Division is a manu-

facturer of diesel engines and generator sets that range from 80 to 7,000 hp.

Cegelec

Cegelec manufactures diesel electric propulsion engines.

Chevron Products Company SNAME Booth #122

Chevron will present its marine lubricants line of products and services, including trunk piston engine oils Chevron Delo 1000, 2000, 3000 and 3400. These new formulations reportedly provide engine cleanliness with very low levels of wear, and are designed to combat the effects of black sludge.

Creative Systems SNAME Booth #403

Creative Systems, Inc. will be demonstrating its General HydroStatics (GHS) software for naval architects and marine engineers. GHS is a software package designed for the calculation of trim, stability and longitudinal strength, and is reportedly economical enough even for small offices.

Cybo Robots SNAME Booth #628-630

Cybo, along with a consortium of 12 organizations, has developed low cost, flexible, automatically programmed, adaptive welding systems for production of commercial and Navy ship structures. The project integrates existing advanced American technologies in robotics, sensors, software and adaptive welding on an open-structure, PC-based environment that conforms to emerging standards.

Del Gavio Marine Hydraulics SNAME Booth #610

Del Gavio Marine and Del Gavio Ship Repair will have sales representatives present for assistance with any questions about the marine and industrial services the companies provide. As

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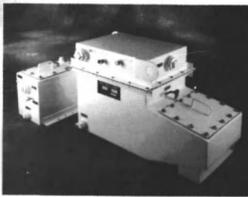
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International Maritime Exposition Exhibitor Profiles

an authorized Denison distributor, Del Gavio will have a complete line of Denison pumps, valves and motors on display.

Dunlop-Beaufort Canada Ltd.

Dunlop-Beaufort will present technical information on its complete range of SOLAS approved liferafts, IBAs (reversible platforms), MECs and minislides.

Envirovac, Inc.

SNAME Booth #500

Envirovac offers consumers two new products: EVAC, a vacuum collection holding and transfer system (VCHT);

and ORCA, a Type II marine sanitation device (MSD) certified by OSLG/IMO.

Exxon Company

SNAME Booth #513

Sales and technical representatives will be available to discuss EXXMAR, Exxon's marine lubricants developed for cross head and trunk piston diesel engines.

A representative of Exxon, USA, will also discuss applications of Exxon lubricants in the tug and inland waterways trade.

FAST Systems

SNAME Booth #104

FAST Systems will exhibit its line of

sewage treatment systems.

Frank Mohn Houston, Inc.

SNAME Booth #209

Frank Mohn Houston, Inc. will provide information concerning environmentally safe submerged cargo pumps for chemicals, products and oil vessels; oil spill recovery equipment; and emergency offloading equipment, all of which are for offshore production, firepump systems and waterlift pumps.

Furuno USA, Inc.

SNAME Booth #404-406

Furuno USA will be exhibiting its new, ultra-compact GMDSS console, along

with several models of user-friendly, commercial grade, IMO compliant ARPA radars.

GasTOPS Ltd.

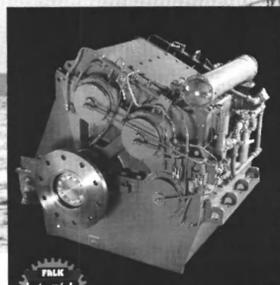
SNAME Booth #124

GasTOPS' exhibit will feature Mermaid, a powerful interactive propulsion and control system design tool that incorporates sophisticated models of propulsion machinery and control functions to permit designers to "sail a ship before it's built".

Mermaid provides the capability to support propulsion machinery system design and development activities, including machinery concept evaluation, control law development, test and trials, training and troubleshooting.

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Falk has built a reputation in the marine drive industry. A reputation for dependability that has stood up as well as our equipment. Since 1916, Falk has been manufacturing straight reduction and reverse-reduction drives for virtually every type of marine vessel in operation. Our standard MRH and MR Series drives, as well as our custom-designed drives, all share important features: state-of-the-art engineering, durable materials, and quality assurance that starts in design and lasts through years and years of continuous, efficient operation.

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For more information about our marine drives, as well as other Falk equipment, call your local Falk distributor or call 1-800-545-5215, ext. 851.

FALK

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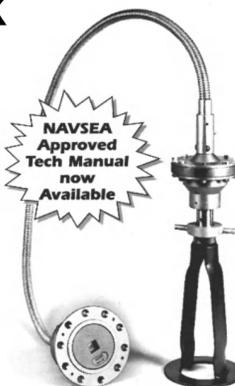
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International Maritime Exposition Exhibitor Profile

Gems Sensors

SNAME Booth #211

Gems Sensors will be exhibiting its continuous level indicators and sensors.

Gerard Technology Associates

SNAME Booth #217

GTA will present the following products at the SNAME exhibition: Golar marine incinerators; Golar eductors; Golar A-60 safety windows; marine aluminum helidecks; marine aluminum ship windows; accommodation ladders; custom compactors; Wagner steering gear; Hernis closed circuit TV systems; and Vianova automated shipyard production equipment.

Goltens-New York

SNAME Booth #601

Goltens is involved in repair and reconditioning of diesel main propulsion, auxiliary systems and fuel injection systems; as well as full service marine/industrial/powerplant repair and re-engineering. Goltens offers complete pipe fabrication and welding facilities and in situ grinding and in-place machining -- including in-house reconditioning of crankshafts and centrifugal bearing re-babbiting. Experienced riding crews are available from the worldwide Goltens Group.

Headhunter, Inc.

SNAME Booth #625

Headhunter, Inc. is a manufacturer

and supplier of plumbing equipment for a variety of vessels. Headhunter products include: Royal Flush, a marine toilet with a five-year warranty; Royal Fox, a USCG approved sewage treatment system; JetpaQ, a complete water pumping system with built-in pressure and damage control mechanisms; and Tank Sentry, a fluid level monitor with alarms and pump controls.

Hiller Systems, Inc.

SNAME Booth #121

Hiller Systems, Inc. provides a complete line of products and services pertaining to fire detection, alarm and suppression. Hiller Systems also provides materials and installation of

marine decking and insulation.

HydroComp, Inc.

SNAME Booth #403

HydroComp, Inc. (HCI) provides software products and consultancy services for the performance analysis and design of marine vehicles for industrial and governmental clients. HCI has a broad range of experience in applied hydrodynamics and software development, offering consumers products such as NavCad, PropCad, PropExpert and SmartEngine.

Ian Conrad Bergan,

SNAME Booth #515

Ian Conrad Bergan is a manufacturer of high level alarms, hydrostatic tank

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What is new at Buck Kreihs, is a renewed commitment to excellence—a promise to our customer that your project, large or small, will receive the same care and attention to detail that has been the cornerstone of our 37 years of success.



The new management team at Buck Kreihs stands ready to assist you. Left to right: Michael Tonguls, Controller; Keith Sierra, Vice President; William J. Baraldi, President; Jacqueline Kreihs Tonguls, Chairman of the Board; Randolph Nunez, Vice President; John LaBoutillier, Vice President.



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The built-in carrying handle allows for easy mounting and removal at any point along the workpiece. The machine will travel at speeds of 4-75 ipm (100 to 1905

mm/min) with a 50 lb. (22.7 kg) load capacity. For more information on the new UNI-BUG II, call: 1-800-245-3186, ext. 55.



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Quality Assurance

CERTIFICATE OF APPROVAL

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Norfolk Shipbuilding & Drydock Corporation
Norfolk, Virginia, USA

has been approved by Lloyd's Register Quality Assurance
Limited to the following Quality Management System Standards:

ISO 9002:1994, EN ISO 9002:1994, ANSI/ASQC Q9002-1994

The Quality Management System is applicable to:

**Drydocking, Overhaul and Repair of
Marine Vessels On and Off Site**

Approval
Certificate No: 103270

Original Approval: June 26, 1995

Current Certificate: June 26, 1995

Certificate Expiry: June 30, 1998



R. Armstrong
on behalf of LRQA

The approval is subject to the company maintaining its system to the required standards, which will be monitored by LRQA

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"NORSHIPCO aims for customer satisfaction by providing on time delivery of error free products and services.

Throughout our businesses, it is our endeavor to operate in a safe and environmentally responsible manner and to meet the customer's requirements.

The key to our quality system is the commitment of management and employees towards achieving our goals."

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Chief Executive Officer

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International Maritime Exposition Exhibitor Profiles

level gauging, cargo radar microwave tank level gauging, and closed loading systems for tankships and tank barges.

In-Place Machining SNAME Booth #511

In-Place Machining will feature a number of its products and services, including: crankshaft crankpin and main journal refurbishing in engines; line boring main bearing pockets; metalstitch repair; onboard machining repairs and/or modifications to main

and auxiliary engines and machinery; and Pielstick, Mitsubishi, Daihatsu, Warsila, Caterpillar, MAN and other engine machining and welding modifications. The company is also the U.S. rep for Metalock International.

Index Sensors & Controls, Inc. SNAME Booth #413

Index Sensors & Controls Inc. manufactures temperature, pressure switches and controls designed to withstand hostile environments. Applications range from overtemp warnings to low pressure warnings, alarms or shutdown switches. Index products are engine mountable, factory preset and insensitive to vibration. Custom designs are also available.

International Marine Software Associates SNAME Booth #403

International Marine Software Associates (IMSA) is an association of select developers of marine design computer software. From concept to completion, IMSA reportedly gives a advantage in hull design, lofting/marufacturing/NC burning, hydrostatic stability/strength, power and propulsion, finite element analysis and structural optimization. IMSA integrates software for each specialized discipline of the marine industry into a comprehensive suite dedicated to productivity and cost effectiveness.

Inventory Locator Service, Inc. SNAME Booth #408

Inventory Locator Service brings marine buyers and sellers together electronically in seconds. Its new marine software for Windows is designed to facilitate buying and selling of spare parts, whole components, complete engines and vessels. The software also contains a fast, economical and efficient integrated e-mail system.

ITW Philadelphia Resins SNAME Booth #319

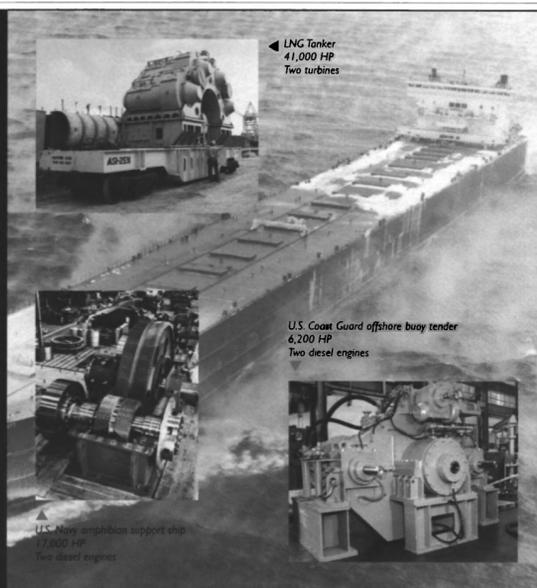
ITW Philadelphia Resins will provide information regarding its line of chocking compounds, including Chockfast Orange and Gray for engines, stern bearings and equipment. ITW will also introduce non-skid and marine coatings, including

Maritime Reporter/Engineering News

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International Maritime Exposition Exhibitor Profiles

Model 200, 300 and 500, along with adhesives, fairing and repair compounds.

Clattenberg Marine Agency

SNAME Booth #118

Clattenberg Marine Agency offers the repair services of several shipyards located in the Caribbean, Europe and the East, and also provides replacement parts for diesel engines, turbochargers, heat exchangers and separators, and repair services for companies operating under ISO certification.

Krupp MaK Diesel, Inc.

SNAME Booth #505

Krupp MaK Diesel, Inc. will reveal its newest line of marine diesel engines, ship service gensets, and complete marine propulsion systems.

Kvaerner Masa Marine Inc.

Kvaerner offers a full range of naval architecture and marine engineering services, including design, innovative product development, feasibility studies, construction supervision and project management.

Leistritz Corporation

This company supplies screw pumps for various shipboard services, including cargo handling, lube oil and fuel oil systems, and hydraulic supply for steering gear and deck machinery.

Lloyd's Register of Shipping

SNAME Booth #128

Lloyd's Register is a ship classification society and leading technical inspection and advisory organization that will be present to discuss the challenge of improving standards of safety, quality and reliability in the maritime industry.

Mackay Marine

SNAME Booth #502, 504, 506
Mackay Marine carries a complete product line of Inmarsat approved

satellite equipment including A, B, C and M for marine and mobile applications. The A and B systems are upgradeable to provide full Inmarsat high speed data service and are ideally suited for sending bulk data and

video conferencing. The expanded product line will include the new Inmarsat Mini-M satellite telephone and the new vehicle mounted Inmarsat M satellite telephone. Other products include a GMDSS console designed to

meet international regulations and a complete line of radar equipment.

Marin

SNAME Booth #620

Marin offers model testing, consulting,

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International Maritime Exposition Exhibitor Profiles

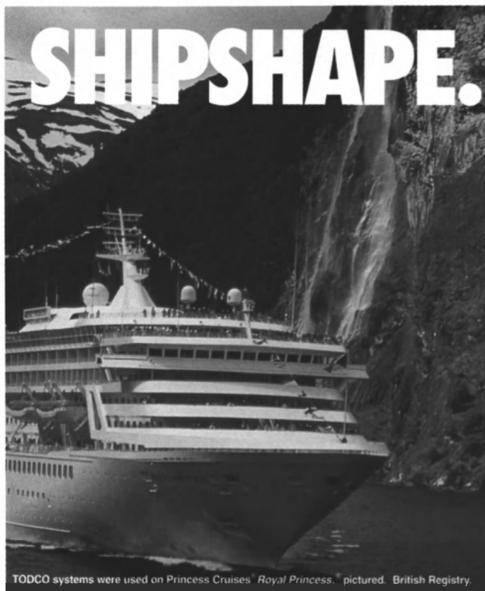
software and onboard measurements for the maritime industry. Hydrodynamic consultancy service is accomplished with the use of Computational Fluid Dynamic (CFD) computer codes for hull form optimization developed in-house. These CFD-

codes, along with other software that predict the propulsion, maneuvering and seakeeping performance of ships, are also available for ship designers. Sea trials and full scale monitoring campaigns are conducted by Marin for contractual purposes and for R&D feedback.

Marine Management Systems, Inc.

SNAME Booth #412
Marine Management Systems, Inc., a

software development system provider for more than 25 years offers Fleet Manager, a complete integrated software solution for 1 based fleet management. MM clients reportedly include: Algor Central Marine; ARCO Marine; Maritrans; and Mitsubishi Heavy Industries. According to MMS reports more than 1,400 of its systems are supported worldwide on all types of vessels, from tugs to tankers.



TODCO systems were used on Princess Cruises' Royal Princess, pictured. British Registry

SHIPSHAPE.

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For more information, call (716) 257-3475.



Cattaraugus, New York U.S.A.
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MEBA Engineering School

SNAME Booth #603

The MEBA Engineering School was established in 1966 to provide the contracted companies of District No. 1 Marine Engineers' Beneficial Association with qualified marine engineers. Today, the school provides both deck and engineering officers of the U.S. Merchant Marine with a continuing education that includes courses such as Ship's Management, Tankship Safety, LNG Tankship, Deck and Engine License Upgrading, Diesel Engineering, Machine Shop, Welding, Ship's Medicine, Analog Electronics, Digital Electronics, Electrical Trouble Shooting, and Computer Technology.

Metritape, Inc.

SNAME Booth #107

Metritape, Inc. will be exhibiting the Sentry II centralized tank level gauging system, which features resistance-tape level sensor technology. Resistance-tape sensors are used for measuring liquid level and temperature in a variety of applications, including cargo, ballast, fuel, oil and water tanks aboard tankers, barges, container-ships, military vessels and cruise ships. The sensors are flexible and are available in three to 100-ft. lengths, facilitating easy installation in any tank, including difficult J-shaped ballast tanks. Resistance-tape sensors are reportedly unaffected by internal tank structure or surface waves, due to the fact that they are without moving parts.

MGI International Marine Safety

SNAME Booth #607

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Measures ullage, innage, oil-water interface and temperature

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International Maritime Exposition Exhibitor Profiles

GI International Marine Safety Solutions, Inc. manufactures and installs marine safety equipment, and provides professional services, including supervision of equipment and crew training. MGI represents companies such as Welin Lambie Ltd., Fibre Reinforce Product Ltd., and Ambar Marine, Inc., for the distribution of davits, lifeboats and rescue boats, respectively. It is also a manufacturer of the Life Rack System (LRS), Fuel Rack System (FRS) and Evacuation Bridge, and has produced concept designs in AutoCAD.

MMC International Corp. SNAME Booth #201

MMC International Corp. is a producer of portable, electronic, gas-tight gauging, sampling and sounding equipment, vapor control valves, high/overflow alarm systems, C-L covers and couplings, and clarifiers/coalescers.

Nautical Technology Corporation SNAME Booth #605

Nautical Technology Corporation (NTC), a leading provider of integrated software solutions for ship operations management, will present its Windows NTC Ship Manager, which includes key features such as: purchasing, inventory control, maintenance, crew management/payroll, budgeting and cost analysis. NTC will also introduce its enhanced communications package, NTC Replication Manager, which offers various data distribution options including e-mail and all Inmarsat equipment.

Newport News Shipbuilding

NNS will emphasize the diversity of its capabilities, including: the Double Eagle tanker; its new, robotic, automated steel handling and processing facility; its extensive repair capabilities;

its design and construction capabilities for Navy aircraft carriers and submarines; and its family of surface ship combatants.

Northrop Grumman Marine Systems SNAME Booth #103-105

Northrop Grumman Marine Systems, a leader in the production and service of marine propulsion machinery, will feature the fuel-efficient, ICR inter-cooled, recuperated gas turbine engine; diesel propulsion for the LPD-17 class amphibious assault ships; steam propulsion and power generation for the new SSN power and control systems for surface ships and submarines; electric drive propulsion systems and marine logistics support.

Ocean Power & Equipment Co., Inc. SNAME Booth #508-510

Ocean Power represents Davit International, a manufacturer of

davits, winches and cranes for launch and recovery of freefall lifeboats, enclosed lifeboats, rescue boats and liferafts. The company also represents World Water Systems, Inc., manufacturer of Heli-Sep oily water separators and 15PPM bilge alarms; Daros Piston Rings AB, a supplier of piston rings for two-stroke, large bore New Sulzer and MAN B&W engines; Cape Industries, Ltd., manufacturer of cylinder liners and cylinder covers; and Sperre Industri A/S, manufacturer of air compressors with up to 482-cu-m/hr capacity and 30-bar pressure. Ocean Power will also exhibit products from Fr. Fassmer & Company, Eltech International Corp. and Spinner II Products Division.

Permastoprust (America), Inc. SNAME Booth

Permastoprust (America), Inc. is a manufacturer of rust/corrosion preventatives and treatments.

Use the best technology
to build better ships

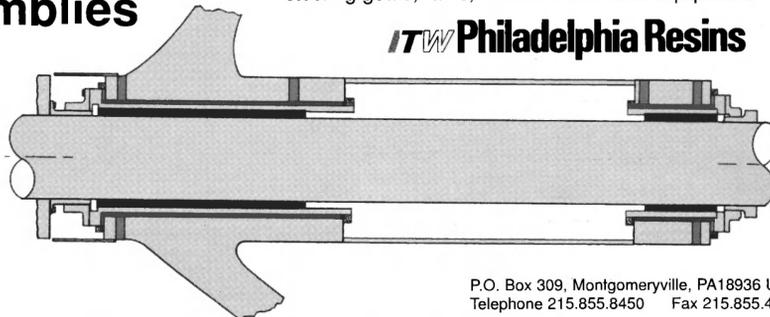
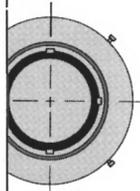
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- cast-in-place assembly system maintains permanent alignment
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- reduces installation costs of bearings and sterntube assemblies
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Chockfast ORANGE is widely used to assure precise, permanent alignment of main propulsion systems, sterntubes, strut and line-shaft bearings, pumps, motors, rudder and pintle bearings, generators and auxiliary equipment, crane and elevator rails, Z-drives, steering gears, rams, thrusters and other equipment.

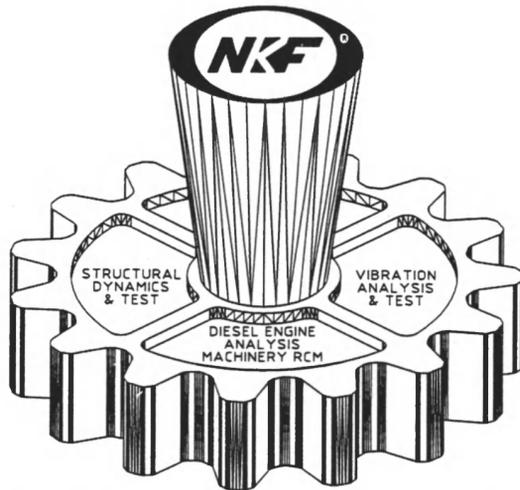
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146

**SEMCO
MARINE INC.**

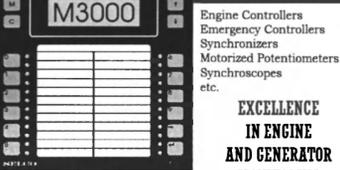
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Rosenblatt (M.) & Son, Inc.

SNAME Booth #200

M. Rosenblatt & Son, Inc. (MR&S) is a full-service na architecture and marine engineering company and tra portation consultancy experienced in all phases of co mercial and naval ship design, construction, operatic and fleet support. MR&S offers quality manageme computer-based design, engineering, research, constru tion supervision, and technical services for a wide varie of ship types and marine systems for both U.S. and fc eign shipowners and operators, governments, shipyar and private clients.

Seaworthy Systems, Inc.

SNAME Booth #215

At the exhibition, Seaworthy Systems, Inc. will present the Seaworthy-designed convertible container carrier anc *Tricat*, a 50 knot + passenger vessel being built by the Pequot River Shipworks, Inc. of New London, Conn.

Sector, Inc.

SNAME Booth #100

Sector will exhibit its line of safety and anti-pollution equipment for ships and tankers, representing companies such as Consilium Marine, Omicron, Saab Marine Electronics and Smit Sinus Gas Systems. The equipment included in Sector's exhibit will cover tank cleaning, fire detection, speed logs, overflow protection, radar level gauging and inert gas systems.

**Selby Marine Products-Harris
Specialty Chemicals, Inc.**

SNAME Booth #621

Selby will be exhibiting its line of underlayments; water-proof membranes; deck and reefer box insulation; seam-less interior, exterior and non-skid coatings; anti-corro-sion primers; and ammo deck insulation. Selby products are reportedly approved by various Department of Defense military specifications and the U.S. Coast Guard, as well as reportedly hold type approval certificates from international regulatory agencies worldwide.

Sigma Coatings

Sigma manufactures and distributes marine paints and coatings for new construction and maintenance of marine vessels.

Sperry Marine Inc.

Sperry will exhibit its Voyage Management System, which includes its universal electronic chart manager, automatic navigation and track-keeping system (ANTS), voyage optimization and safety sytem (VOSS), and Autocad abilities.

Thordon Bearings, Inc.

SNAME Booth #617

Thordon Bearings will place much of its emphasis at the

Maritime Reporter/Engineering News

International Maritime Exposition Exhibitor Profiles

AME Exhibition on the Thor-Lube stern tube bearing system. The Thor-Lube system offers shipowners a simple, reliable, non-polluting option to conventional oil lubricated systems. Comprised of proven Thordon XL bearings lubricated with Thor-Lube — water soluble, inherently biodegradable, polymer-based lubricant — in a sealed stern tube system, the Thor-Lube system reportedly eliminates concerns over stern tube oil leakage and disposal of seawater contaminated oil.

Tranter, Inc. SNAME Booth #623

Tranter, Inc. will feature its Superchanger plate and frame heat exchanger; its Maxchanger all-welded plate heat exchanger; its Swept CBE compact brazed heat exchanger; and Platecoil, a prime surface heat exchanger.

Trinity Marine Group

Trinity Marine Group, Inc. is a builder of small to medium-sized marine crafts, both military and commercial, including high-grade combatants, fast patrol craft and research ships.

TS Tanksystems SA SNAME Booth #604

UE Systems, Inc. SNAME Booth #619

UE Systems constructs ultrasonic inspection instruments for leak detection and mechanical inspection. These ultrasonic inspection devices are designed to locate leaks in hatches, vapor recovery systems, pneumatics, LNG and LPG pressure and vacuum systems, condensers, heat exchangers, steam traps and valves.

Uniservice Americas SNAME Booth #114

Uniservice offers a range of chemicals for tank and deck cleaning, anti-corrosion coatings, water treatments, fuel additives, bacteria treatments and pollution control products in 762 ports worldwide. Uniservice also offers con-

sumers gases, fire fighting equipment, dosing equipment, and UNIMAC, a computerized automated water treatment monitoring and control system.

Unitor Ship Service Inc.

Unitor supplies marine equipment and services, specializing in fire fighting systems, marine refrigeration, medical equipment, and a complete line of marine chemicals.

Victaulic Co. Of America

Victaulic offers the complete line of mechanically grooved and plain end piping products from 3/4" through 48", including pipe couplings, fittings, valves, accessories and tools for pressures up to 1,000 psi, in carbon steel, stainless steel, copper, copper/nickel and other materials.

Viking Life-Saving Equipment SNAME Booth #632

Viking is a provider and servicer marine safety products, including inflatable liferafts of four to 100-person capacity, inflatable buoyant apparatus, marine evacuation systems, water-activated lights for PFDs, survival suits and emergency rations.

Walport USA SNAME Booth #616

Walport USA, a supplier of video entertainment, will introduce its newest service, Walport Express, which delivers the latest and best video movies directly to vessels. Walport will also preview its latest safety and training videos, and a new GMDSS console and ECDIS navigation equipment.

Wartsila Diesel SNAME Booth #402

Wartsila is a leading supplier of medium speed diesels from 500 to 25,000

hp. The company has transferred its state-of-the-art technology from Europe and is currently carrying out manufacturing and testing at its Mount Vernon, Ind., plant.

W.B. Arnold Co., Inc. SNAME Booth #614

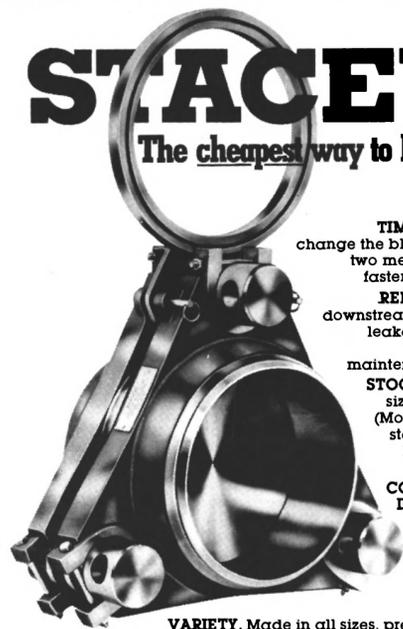
W.B. Arnold is a manufacturer of marine equipment and spares including: automatic filters; boilers; compressors; deck machinery; desalination units; diesel engine spares; fiberglass pipes; fire detection units; diesel engine spares; fire detection systems; gangways and accommodations system; hot oil heaters; marine fenders; marine loading arms; pumps; sewage

plants; tank cleaning equipment; vapor recovery; and tank gauging systems.

Westfalia Separator SNAME Booth #405

Westfalia Separator, Inc., now ISO 9001 certified, offers complete, modularized centrifugal purification systems for fuel oil, lube oil, sludge concentration and oil water treatment. Westfalia's newest line of WSC type separators is reportedly guaranteed to discharge purified water, with less than 15 ppm of free oil for overboard discharge.

In keeping with its Westfalia Separator AG (Germany) roots, the Centrico, Inc. name was changed to Westfalia Separator, Inc. as of July.



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Exxon Affiliate Signs Production Sharing Contract For Offshore Congo Project

Exxon Corp. announced that an affiliate, Esso Exploration and Production Congo, Ltd., has signed a production sharing contract to explore the Mer Profonde Nord block, which lies 50 to 75 miles offshore Congo. The Mer Profonde Nord block covers an area of approximately one million acres in water depths ranging from 660 to 6,600 ft. (200 to 2,000 m).

In addition to Mer Profonde Nord, Exxon affiliate interests in the Congo also include a 15 percent interest in the approximately 270,000-acre Marine IX permit and a 30 percent interest in the 950,000 acre Mer Profonde Sud license, which was acquired in July of this year.

Exxon's addition of the Mer Profonde Nord permit to its West African portfolio is further evidence of the company's commitment to the high potential resource area of offshore West Africa. **Kenneth R. Evans**, president, Esso Exploration and Production Congo, Ltd., and vice president, Africa-Middle East Business Unit, Exxon Exploration Company, commented, "Exxon is pleased to have the opportunity to operate the Mer Profonde Nord block. The award announced today reinforces Exxon's progress in expanding our long-term presence in the Congo and West Africa and further exhibits the cooperation that exists between Exxon and the government of the Republic of the Congo."

In recent years, Exxon has established a major position in the deepwater off Angola, Nigeria, and the Congo, holding interests in

13 blocks, totaling nine million acres, including this award. Exxon is the operator of three offshore blocks, one each in the Congo, Angola and Nigeria.

Ameron To Acquire Devco Marine Coatings Business

On August 8, Ameron International Corp. announced that it had signed an agreement to acquire the worldwide Devco marine coatings business of Imperial Chemical Industries plc. The business to be acquired by Ameron reportedly generated sales of approximately \$50 million

in 1995.

"This acquisition will make Ameron the largest supplier of high performance marine and shore coatings in the United States, and it also greatly expand our sales and service work and global presence in these markets," said **James S. Marlen**, Ameron chairman, president and CEO.

Ameron will manufacture and market a number of well-known product lines under Devco trade names such as Bar-Rus advanced technology epoxy, ABC marine antifouling, Catha-C zinc-rich primer, Devchem tank linings, Devco non-skid epoxy, Devthane acrylic urethane and Pre-prime primer.

In addition, Ameron will manufacture and s

NWC Preps For Annual Meeting

The National Waterways Conference's annual meeting is scheduled to take place at the Regal Riverfront Hotel in St. Louis, Mo., from September 25-27. The meeting will examine shifts in national policies affecting inland waterways, and explore steps to reverse the current downward trend in federal civil works funding. Among those scheduled to address convention delegates is Major General **Stanley G. Genega**, director of Civil Works for the Army Corps of Engineers.

The program's theme, *Are Shrinking Federal Budgets Sinking the Navigation System?*, prompted Conference Chairman **Robert W. Portiss** to comment: "The civil works program is already targeted for substantial reductions in funding, and this will happen if we don't convince policymakers that navigation and flood control should have a higher national priority." These are the concerns organizers intend to address.

The National Waterways Conference's annual meeting will include 30 speakers, panelists and moderators, and 400 business, civic and waterways leaders are expected to attend. Topics to be discussed include: efforts to trim the cost of navigation operation and maintenance (O&M) programs; changes in federal policies governing waterways programs; the impact of lower budget ceilings on civil works programs; and the modernization of the upper Mississippi and Illinois waterways. Also, the convention has scheduled an awards ceremony to honor the latest recipient of the National Rivers Hall of Fame Achievement Award, and winners of the National Waterways Conference's first annual waterways literature and promotional materials competition.

For registration information, contact NWC, 1130 17th Street, N.W., Washington, D.C. 20036, tel: (202) 296-4415.

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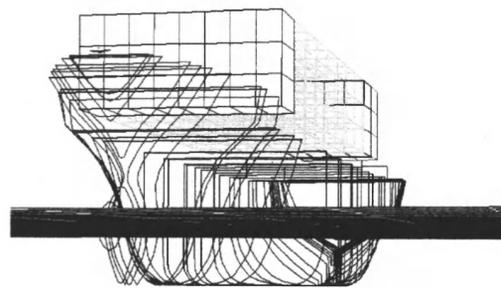
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ts of Africa. Ameron will also manufac-
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fr. **Marlen** noted that the acquisition will
ng together the technologies of two pio-
ering companies in the coatings industry.
eron is known for developing and intro-
cing inorganic zinc silicate coatings and,
ore recently, for its patented engineered
lysiloxane chemistry and products. Devoe
involved in marine technology, specifically
oxy resin chemistry and coatings. "The
evoe product line will be an excellent com-
lement to Ameron's technology and mar-
ets," Mr. **Marlen** said.

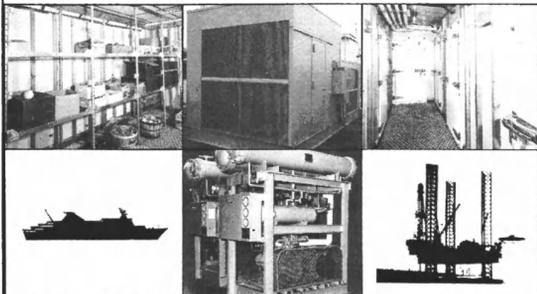
"We continue to seek strategically attrac-
ive acquisitions, marketing alliances and
icensing partnerships in all our businesses,"
re added. In the first quarter of this year,
Ameron acquired Centron International, a
Texas-based manufacturer of fiberglass pipe
for oilfield applications.

Gastech '96

Gastech '96 is scheduled to take place at the
Austria Center in Vienna, Austria, from
December 3-6. Gastech '96 is the 17th meeting
in the Gastech series devoted to natural gas,
LNG and LPG issues, and is reportedly the
largest exhibition for the natural gas and lique-
fied gas industry. The program will explore the
vital issues confronting the consumption and
production of gas, and other challenges facing
the gas industry. Topics to be discussed include:
world natural gas supply and demand, which
will concentrate on Japanese perspectives, nat-
ural gas developments in Latin America, and
global gas strategies; trends and forecasts in
world LPG supply; natural gas as an alterna-
tive fuel for vehicles, with particular attention to
the world outlook for natural gas vehicles, key
success factors for building natural gas refuel-
ing stations, and initiation and implementation
of an alternative fuels program; and safety and
developments in liquefied gas facilities.

The exhibition also features keynote speeches
by members of the industry. Speakers sched-
uled to be present at Gastech '96 include: **Peter
G. Schaedel**, Energy Transportation
Corporation, and **Yasemin Aksoy**, Tulane
University, who will be focusing on the impact
of ISO 9002 certification on corporate quality;
Martin S.P. de Groot, Shell International Gas
Ltd, U.K., who will focus on advances in LNG
risk assessment; **David Haug**, Enron
Development Corp, who will speak of project
finance; and **Stephen H. Del Regno**, Energy
Asset Management LLC, who will concentrate
on market-based, two-part pricing for LNG.
Robert J. Lakey, conference director, will ini-
tiate the opening ceremonies on December 3.
For more information on Gastech '96, contact
the Gastech Secretariat, London RAI, Glen
House, 200/208 Tottenham Court Road, London
W1P 9LA, England, tel: +44 171 436 9774; fax:
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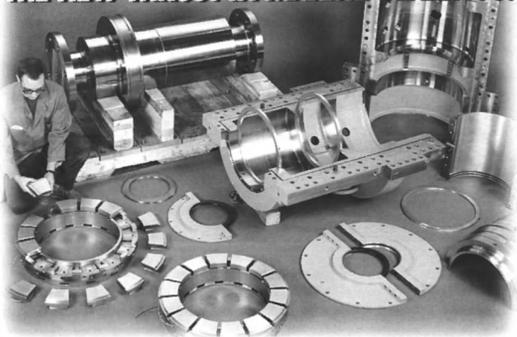
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CALENDAR OF EVENTS

SEPTEMBER

American Association of Port Authorities (AAPA) Annual Convention: September 16-20, Fairmont Regency, Vancouver, British Columbia, Canada.
Contact: AAPA, 1010 Duke St., Alexandria, VA 22314, tel: (703) 684-5700; fax: (703) 684-632

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) 429-1811; fax: (508) 429-1811.

Seatrade Mediterranean Cruise and Ferries Convention: September 17-20, Port of Genoa, Italy.
Contact: Michael Kazakoff, Princeton Forrest 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 Static Rd, Colchester, CO1 1RB, U.K., tel: +44 1206 45121; fax: +44 1206 45190.

Greater New Orleans Barge Fleeting Association 15th Annual River And Marine Industry Seminar: September 18-20, Hotel Inter-Continental, New Orleans, La.
Contact: Alan Savoie, Greater New Orleans Barge Fleeting Assoc., P.O. Box 355, Destrehan, La. 70047, tel: (504) 783-1468; fax: (504) 783-1468.

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.

Voyage & Time Charterparties: September 19-20, London.
Contact: International Business Communications Ltd., Gilmoora House, 57-61 Mortimer St., London W1N 8JX, tel: +44 (0) 171 637 4383; fax: +44 (0) 171 631 3214.

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.

(Continued on page 57)

Maritime Reporter/Engineering News

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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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GEC ALSTHOM Diesels Inc., 10801 Kempwood Drive, Suite 1, Houston, TX 77043-1412
Ian-Conrad Bergen, 3409 Gulf Breeze Pkwy, Gulf Breeze, FL 32561
MCO Industries, Gens Sensors Division, One Cowles Rd., Plainville CT 06062
MMC International, 60 Inp Dr., Inwood NY 11696
Robinson Marine Systems, 3000 Kingman St., Suite 207, Metairie, LA 70006
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

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Engine Monitor, Inc., 179 Hickory Avenue Harahan, LA 70123
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068

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Golsen Worldwide, 160 Van Brunt St., Brooklyn, NY 11231
In-Place Machining Co., Inc., 1929 North Buffalo Street, Milwaukee, WI 53212-3733

DECK CAULKING/REPAIR
Life Industries, Corp., 2081 Bridge View Dr., N. Charleston, SC 29405

DECK MACHINERY - Cargo Handling Equipment
Lakeshore, Inc., P.O. Box 809, Iron Mountain, MI 49801
Marley Machine & Mfg Co., Inc., P.O. Box 24789, Seattle, WA 98104-0788
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Smith Berger Marine Inc., 516 South Chicago Street, Seattle, WA 98108

DECK MACHINERY
Clarke Chapman Canada, 1075 North Service Rd. West, Oakville, ONTARIO CANADA
Intercontinental Engineering, P.O. Box 9525, Kansas City, MO 64160
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Pulsars, PO Box 102, N-4818, Faenik, NORWAY
Smith Berger Marine Inc., 516 South Chicago St., Seattle, WA 98108
T.C.W., 1607 Port Barnmouth Pl., Newport Beach, CA 92660
Timberland Equipment, P.O. Box 490, Woodstock, Ontario N4S 7Z2 CANADA
Waterman Supply Co., P.O. Box 596, Wilmington, CA 90748

DESALINATION - REVERSE OSMOSIS
Ulstream Water Systems, Inc., P.O. Box 654, Huntington Beach, CA 92647
Lifesource Industries, 326 S. 11th Ave., Fort Lauderdale, FL 33315

DIESEL ACCESSORIES
General Thermodynamics Corp., 201 South Meadow Rd., P.O. Box 1105, Plymouth, CT 02960
Kiene Diesel Accessories, 325 S. Fairbanks, Addison, IL 60101

DIESEL ENGINE ANALYZER
FCS, Inc., 22 Main Street, Centerville, CT 06049

DIESEL ENGINE - Spare Parts & Repair
Alaska Diesel, 4420 14th Ave. NW, Seattle, WA 98107
Caterpillar, Inc., Engine Div., P.O. Box 610, Mossville, IL 61552-0610
Cummins Inc., 4500 Leeds Ave., Ste. 301, Northbrook, SC 29405-6521
Cummins Mid-South, Inc., 110 E. Airline Highway, Kenner, LA 70062
John Deere, John Deere Rd., Moline, IL 61205
DMI Northpoco Co., P.O. Box 2100, Norfolk, VA 23501-2100
GE Transportation Systems, 2901 East Lake Rd., Erie, PA 16531-0001
GEC ALSTHOM Diesels Inc., 10801 Kempwood Drive, Suite 1, Houston TX 77043-1412
Golsen Worldwide, 160 Van Brunt St., Brooklyn, NY 11231
GTC Chemical Services, Inc., 8920 Landerdale Suite A, Houston, TX 77012
In-Place Machining Co., Inc., 1929 North Buffalo Street, Milwaukee, WI 53212-3733
Kiene Diesel, 325 S. Fairbanks, Addison, IL 60101
Kriegerberg Marine, 17 Grandview Ave., W. Orange, NJ 07062
MAN BAW Diesel AG, Staubachstrasse 1, D-48153 Augsburg 1, GERMANY
MAN BAW Diesel A/S, Tegelhømsgade 41, DK-2450 Copenhagen SV, DENMARK
MAN BAW Diesel, 17 State St., New York, NY 10004
Motor-Service AB, Box 2115, S-144 04 Haninge, SWEDEN
Motor Service-Hugo Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
Paxman Diesels, P.O. Box 8, Paxman Works, Colchester, Essex, CO1 2HW, ENGLAND
Ulsatec Bergen AS, PO Box 924, 8502 Bergen, NORWAY
Wartilla Diesel, 201 Defense Highway, Annapolis, MD 21401

DISPUTES ANALYSIS
Resolution Management, 11 Eves Drive S140, Marlton, NJ 08053

DIVING & SALVAGE
Beard Industries Inc., P.O. Box 4113, New Orleans, LA 70178
H.J. Merrhue, P.O. Box 23123, New Orleans LA 70183
J.W. Fishers, 65 Anthony St., Berkeley, MA 02279
Mudson Marine Services, Inc., P.O. Box 3221, Terminal Island, CA 90781

DOORS - MARINE & INDUSTRIAL
Branton Int'l, 1101 Edwards Ave., Jefferson, LA 70181
Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123
Mapeco Water & Wrecker, Inc., 90 Forest Ave., Locust Valley, NY 11560

DRIVE SHAFTS
Alphadine Systems, 17 Ave. D, Atlantic Highlands, NJ 07716

DRY DOCKS-Decks
Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381
Crandall Dry Dock, 2 Williams St., Chelsea, MA 02150

EDUCTORS
Vita Motorator, 566 Parker St., Newark, NJ 07104

ELECTRICAL EQUIPMENT
Askew Hardware Products, Inc., 2920 Supply Ave., Commerce, CA 90040
L.F. Gaubert & Co., Inc., P.O. Box 50550, New Orleans LA 70150
MMC International, 60 Inp Dr., Inwood NY 11696
Senco Marine Inc., 321 SW 47th Ave., Ste 309, Ft. Lauderdale, FL 33314

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

ELECTRONIC INFORMATION SUPPORT
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY

ELEVATOR SERVICE
Alimak Elevator Co., 1100 Boston Ave., Bridgeport, CT 06610
Miller Elevator Service, 840 South Military Trail, Deerfield Beach, FL 33442

EMISSION CONTROLS
ABB Flakt Marine, Box 1043, S-436 21 ASKIM SWEDEN
Haidor Topsoe Nymolvel 55, DK-2800, Lyngby, Denmark

EMPLOYMENT
Boat Crews, 1 Seine Court, Suite 309, New Orleans, LA 70114
Marine Jobs, Inc., 800 Downtown Blvd. Ste. 111, Mobile, AL 36609

ENGINEERING SERVICES / MARINE ENGINEERS
Kwamer Massa Marine Inc., 201 Defense Highway, Suite 202, Annapolis, MD 21401
NK Engineering, Inc., 4200 Wilson Blvd., Arlington, VA 22203
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

ENGINE - EFFICIENCY TEST EQUIPMENT
General Thermodynamics Corp., P.O. Box 1105, Plymouth, MA 02360

ENGINE ROOM LIGHTING/MONITORING & CONTROL SYSTEMS
Radio Electric Mfg Co., Inc., 1616 N. Main, P.O. Box 533, Pearland, TX 77581
Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017

EPRBS
ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247, Ft. Lauderdale FL 33310-5247

EVAPORATORS
KSA-Laird Separation, Inc., 955 Mearns Rd., Warrminster, PA 18874
Beard Industries Inc., P.O. Box 31115, Shreveport, LA 71130

EXPANSION JOINTS
Apollo International, 78 Degraw St., Brooklyn, NY 11231

FANS - VENTILATORS - BLOWERS
ABB Flakt Marine, Box 1043, S-436 21 ASKIM SWEDEN
L.L. Liss Associates, Inc., 4111 Bovi Ave., San Mateo, CA 94402

FASTENERS
Askew Hardware Products, Inc., 2920 Supply Ave., Commerce, CA 90040
Jameson Distributors, 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02835
Otake Co., Inc., 645 Forest Edge Drive, Vernon Hills, IL 60061-3106

FENDERING SYSTEMS/BOYS - Dock & Vessel
S.F. Goodrich, 150 Division Drive, Wilmington, NC 28401
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Schuyler Mfg Co., Inc., 16901 Woodville-Redmond Rd., Woodville, WA 98072
Seawall International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook, VA 22624
Ultra Poly Inc., 2926 South Steale, Tacoma, WA 98409
Fender Co., 1160 State St., Perth Amboy, NJ 08861

FIBERS
Allied Signal, Meyer I Box, 101 Columbia Rd., Morristown, NJ 07962

FILTER SYSTEMS
Everpure Inc., 680 N. Blackhawk Dr., Westmont, IL 60559
Luber-Finer, Inc., 5050 Quorum Drive, Dallas, TX 75240

FIN STABILIZERS
Blom & Voss Industrie GmbH, P.O. Box 10 07 20, D-2000 Hamburg 1, GERMANY
U.S.A. Resp. Simplex-Turner Inc., P.O. Box 168, Little Neck, NY 11560p.

FIRE RESISTANT PANELS
Thermex N.A., 13115 Dulany Valley Rd., Glen Arm, Baltimore, MD 21057

FIRE SUPPRESSION AGENT
American Pacific Corp., 3770 Howard Hughes Pkwy., Las Vegas, NV 89109

FLAME CUTTING MACHINE
Bug-O-Systems, 3003 West Carson St., Pittsburgh, PA 15204

FLEXIBLE COUPLINGS
Waterman Supply Co., P.O. Box 596, Wilmington, CA 90748

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

FUEL DECONTAMINATION
Enviro Response Prod., P.O. Box 4011, Ft. Meyers, FL 33932

GALLEY EQUIPMENT
GTC Chemical Services, Inc., 8920 Landerdale Suite A, Kenner, LA 70062
Jamestown Metal Marine Sales, 4710 Northwest Second Ave., Boca Raton, FL 33431
Lang Manufacturing, Inc., P.O. Box 905, Redmond, WA 98073

GANGWAYS, LADDERS
Wooster Products Inc., 1000 Spruce St., P.O. Box 886, Wooster, OH 44691

GEAR REPAIR
Haley Marine Gears International, Inc., 2600 N. Concord Belle Chasse, LA 70037

GENERATOR
Alaska Diesel, 4420 14th Ave. NW, Seattle, WA 98107
Saskiab Engineers, 7-32, Takayama, Aomori, Nishiyodogawa-ku, Osaka, JAPAN

HATCH COVER SEAL RENOVATION
Barwood Inc., 3641 Soundway, Bellingham, WA 98226
KBS Corporation, U.S. Resp: Simplex-Turner Inc., P.O. Box 168, Little Neck, NY 11560p.

HEAT EXCHANGERS
J.D. Neuhuss Corp., 2603 Rolling Rd., Gwynn Oak, MD 21207

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

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

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

HYDRAULICS
Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken, NJ 07030
Del Gaudio Marine Hydraulics Inc., 819 Industrial Rd., Coltsville, NJ 07072
Engine Monitor, Inc., 179 Hickory Ave., Harahan, LA 70123
Hamilton Jet, P.O. Box 709, Christchurch, New Zealand

INDUSTRIAL & MARINE CLEANING SERVICES
GTC Chemical Services, Inc., 8920 Landerdale Suite A, Kenner, LA 70062

INERT GAS SYSTEMS
Nier Systems, 3710 Lakeside Court, Mobile AL 36683

INFORMATION TECHNOLOGIES
Marine Management Systems, 102 Hamilton Ave., Stamford, CT 06902

INSULATION
Blom & Voss Light Insulation, Barrels & Ladders GmbH, Norddeutsche Strasse 15, 20457 Hamburg GERMANY
Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123

INTERIORS
Custom Ship Interiors, Inc., P.O. Box 237, Lusby, MD 20657
Hopeman Brothers, 425 Essex Ave., Waynesboro, VA 22980
Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123
Jamestown Metal Marine Sales, 4710 Northwest Second Ave., Boca Raton, FL 33431
Marine Services Corp., 3427 Guigard Dr., Hood River, OR 97031
TODCO, Inc., P.O. Box 1087, Marion, OH 43302

JOINER - Watertight Door-Paneling-Ceiling Systems-Decking
All Alpha Int'l, Inc., P.O. Box 49895, Cincinnati, OH 45249
Branton Int'l, 1101 Edwards Ave., Jefferson, LA 70181
CustomShip Interiors, Inc., P.O. Box 237, Lusby, MD 20657
Hopeman Brothers, Inc., P.O. Box 850, Waynesboro, VA 22980
Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123

Jamestown Metal Marine Sales, 4710 Northwest Second Ave., Boca Raton, FL 33431
Stidd Systems, Inc., 220 Carpenter St., Greerport, NY 11944
Walt & Krenner, Inc., 90 Forest Ave., Locust Valley N.Y., 11560

KEEL COOLERS
R.W. Fernstrom & Co., 1716 Eleventh Ave., Menominee, MI 49858
Kahlerberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
The Water Machine Co., Inc., 84-88 Cambridge Avenue, Jersey City, NJ 07307

LIFERAFTS/RAPTS
American Eagle Mfg., Inc., 780 Penke Jensen Way, LaConner, WA 98257
Dunlop Beaufort, 12351 Bridgeport Rd., Richmond, B.C. CANADA V6V1J4
Norsale AS, P.O. Box 115, N-4818 Fraevik, Norway
Viking Life Saving Equipment, 1825 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

LIFESAVING EQUIPMENT
MGI International, 119-225 West 1st St., North Vancouver, B.C. CANADA
Systems Manufacturing, P.O. Box 1458, St. Cloud, MN 56302

LIGHTING SYSTEMS / EQUIPMENT—Lamps, Fixtures, Searchlights
ACR Electronics, Inc., 5757 Ravenswood Rd., Ft. Lauderdale, FL 33310-5247
Ditrex, Inc., P.O. Box 1150, Kinder, LA 70646
Gollen Marine, 160 Van Bunt St., Brooklyn, NY 11231
Kocum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70058
Paluhm 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
Key Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106

LIQUID LEVEL INDICATORS
Midland Mfg. Corp., 7722 29th Street, Baton Rouge, LA 70806-0226

LIQUID OVERFILL PROTECTION SYSTEMS
E.R.L. Marine Products, P.O. Box 1026, New Albany, IN 47151-1026
Mektique, Inc., 59 Front St., Littleton, CO 80140
Midland Mfg. Corp., 7723 Gross Point Rd., Skokie, IL 60076-0226

LOGISTICS
Newport News Shipbuilding, 12129 Jefferson Ave., Newport News, VA 23603
V. Logistics Consultants, Inc., 3420 Bienville Blvd., Ocean Springs, MS 39564

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 Gavio, 619 Industrial Rd., Carlstadt, NJ 07077
Golfen Marine Company Inc., 160 Van Bunt Street, Brooklyn, NY 11231
Maritime Power, 200 Henderson St., Jersey City, NJ 07302
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Wallace Coast Machinery, 1620 Wauegan Rd., Glenview, IL 60025

MARINE ACCOMMODATIONS
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
Installations, 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 Guignard Dr., Hood River, OR 97031

MARINE CEILING
Hydro-Kammar, Via Verk, N-5880 VIK I SOGN, Norway
Installations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807

MARINE DESIGN
E.H. Orrell Co., Inc., 1405 Chippendale Road, Lutherville, MD 21093
Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Installations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Seiby, P.O. Box 1000, Sapulpa, OK 74067

MARINE DOCKING
Tribor Industries, 1705 Hurl Rd., Downsview, Ontario CANADA

MARINE DRILLING & BLASTING
Marine Drilling & Blasting, Inc., P.O. Box 10455, Jacksonville, FL 32247-0455

MARINE ELECTRONICS
Frank L. Beter Radio, 2001 Ridgegate Drive, Metairie, LA 70001
Kocum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70058
Suez Marine Electronics AB, Box 12045, 402 S1 Goleborg, SWEDEN
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

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

MARINE EQUIPMENT
Botnet & Associates, 1150 Rulo Rochelle, Stiel, VA 70458
McEroy Machine, P.O. Box 4454, Biloxi, MS 39535-4454

MARINE FINANCING
Salton Credit Co., Inc., 809 156th Ave. NE, Redmond, WA 98052

MARINE FIRE PROTECTION
Hiller Systems, 3710 Lakeside Court, Mobile, AL 36685
Installations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Unitor Ship Service Inc., 2375 West Esther Street, Long Beach, CA 90813

MARINE FURNITURE
Installations, 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 Guignard Dr., Hood River, OR 97031

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

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

MARINE INTERIORS
Installations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Jamestown Metal Marine Sales, 4710 Northwest Second Ave., Boca Raton, FL 33431
Johnson Construction Specialists, Inc., 3420 Rusk P.O. Box 1360 Houston
- Texas - 77251
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031

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

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

MARITIME ARTWORK
Saba Art Studio, 8 Ridge Drive, Old Saybrook, CT 06475

MOTOR PROTECTION EQUIPMENT
Marine Sale Electronics, 37 Slaffern Dr., Concord, Ontario L4K 2X2

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Donald L. Blount, 2550 Ellmore Ave., Ste. K, Norfolk, VA 23513
C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609
CPI Marine Co., 4940 Woodcock Dr., Suite 200, Jacksonville, FL 32207
Chiks Engineering Corp., Box 333, Medfield, MA 02052
Cranial Dry Dock Engrs., Inc., P.O. Box 355804, Chatswa, MA 02150
Crane Consultants, 15301 First Ave. S., Seattle, WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
CT Marine, 56 Cooled Trail, Rowayton, CT 06853
Cunningham & Walker, 1782 Providence Hollow Lane, Jacksonville, FL 32223
Arthur D. Darden, 3200 Ridgegate Dr., Suite 403, Metairie, LA 70002
DeLong & Label, Inc., 1734 Emerson Street, Jacksonville, FL 32207
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, 2120 Washington Blvd., Suite 200, Arlington, VA 22204
Eliot Bay Design Group 5301, Shiloh Ave. N.W., Ste. 200, Seattle, WA 98107
Econ Mgmt & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
GHM Inc. (Inc. Measurement Consultants), P.O. Box 1536, Newport News, VA 23601
Giles & Co., Inc., 50 West 23rd St., New York, NY 10010
John W. Gilbert & Assoc., Inc., 189 State St., Boston, MA 02109
The Gleason Assoc., Inc., 800 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
Guido Perla & Assoc., 720 3rd Ave., Ste. 1200, Seattle, WA 98104
Morris Quarantick Associates, Inc., 130 Sutter St., Ste. 400, San Francisco, CA 94104
C. Raymond Hunt Associates, 59 Long Wharf, Boston MA 02110
Hydrocomp, Inc., 202 C Packets Court, Williamsburg, VA 23185
MSA 20 Ridgely Ave., Annapolis, MD 21401
L.H. Inc., 3412 Progress Dr., Bensenville, 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, 789 Brockwell Plaza Ste. 701, Miami, FL 33131
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
MCA Engineers, Inc., 2980 Arroyo Ave., #4-103, Costa Mesa, CA 92626
Alan C. McCure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McEroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
John J. McMillen Associates, Inc., 1 World Trade Ctr., Ste. 3000, N.Y.N.Y. 10048
Fendall Martbury, P.O. Box 2321, Annapolis, MD 21401
Marine Design & Operations, Inc., 225 E. 1st Ave., Roselle, NJ 07023

Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06802
Maine Power Associates, 1010 Turquoise St., Ste 217, San Diego, CA 92109
Marltech, Seabrook, Bay Road, Newmarket, NH 03857
Marine Design, Inc., 3200 Hensley Rd., Jacksonville, FL 32257
R.J. Meluzi & Co., 71 Hudson St., New York, NY 10013
Nautical Designs, Inc., 2101 S. Andrews Ave. Suite 202, Ft. Lauderdale, FL 33316
Ocean Motors Co., P.O. Box 130, 49 Shore Drive, Barrington, RI 02866-0130
Olson Marine Surveyors Co., P.O. Box 283, Fort Jefferson, NY 11777
M. Rosenblatt & Sons, Inc., 350 Broadway, New York, NY 10013 and 620 Fulton St., Ste. 301, San Francisco, CA 94107
Sanger & Herkes, 225 Baronne St., Suite 1405, New Orleans, LA 70112
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
Sea School, 10812 Gandy Boulevard, St. Petersburg, FL 33702
Seaworthy Systems Inc., P.O. Box 965, Essex, CT 06426, 17 Battery Pl., New York, NY 10004; P.O. Box 975, Barnegat Light, NJ 08009, 2001 N. Beauregard Street, Alexandria, VA 22311; 50 Vashell Way, Orlando, CA 34565
George G. Sharp, Inc., 100 Church St., New York, NY 10007
R.A. Sisson, 253 N. 1st Ave., Surgeon Bay, WI 54205
A.K. Suda & Ass., 3004 19th St., Metairie, LA 70002-4989
TAMSCO, P.O. Box 91360, Mobile AL 36691

NAVIGATION & COMMUNICATIONS EQUIPMENT
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
ICS Electronics Ltd., Unit V, Rudford Industrial Estate, Ford, Avon, West Essex, UK
KVH Industries, Inc., 111 Enterprise Center, Medford, NJ 08042-9268
Mackay Communications, 300 Columbus Circle, Edison, NJ 08837
Nogon Marine Consultants, 840 Bond Street, Elizabeth, NJ 07201
Othson Systems Ltd., 107-630 West 1st St., North Vancouver, B.C. V7P 3N4 CANADA
Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017
Scandinavian Mono Systems P.O. Box 155, N-1411, Kolbotn, NORWAY
Sea, Inc., 7030 220th St., Mountlake Terrace, WA 98043
Simrad, 19210 38th Avenue West, Lynnwood, WA 98036
Standard Robertson, 10805 Jannett Road, Houston, TX 77043-1923
Sperry Marine Inc., 1070 Semole Trail, Charlottesville, VA 22901
Standard Communications, P.O. Box 82151, Los Angeles, CA 90009
Tombie Navigation, 585 North Bayview Avenue, P.O. Box 9642, Sunnyvale, CA 94088
Waterway Communications System, Inc., 435 E. Park Pl., Jeffersonville, IN 47130

NOISE CONTROL
Lundquist One Bart Drive, Deer Park, NY 11729

NOZZLE SYSTEM
Calden Nozzle Fabrication, P.O. Box 547, Pascagoula, MS 39368
Rice Propellers, Av. Rios Esnoz #88, Mazatlan, MEXICO 82180

OIL—Marine—Additives—Testing
Mach Oil Corporation, 1000 Road, Fairfax, VA 22037-0001

OIL/WATER SEPARATORS
Alfa Laval Separation, Inc., 955 Meams Rd., Warrminster, PA 18974-0556
U.S.A. Reps-Sirhan-Turner Inc., P.O. Box 168, Little Neck, NY 11363-0168
Fast Systems, 3240 North Broadway, St. Louis, MO 63147
Harmonworthy Marine Inc., 1129 Hospital Dr., Ste. 3C, Stockbridge, GA 30281
MUC International, 60 Imp Dr., Inwood, NY 11096
National Fluid Separators, 877 Harbor Industrial Ct., St. Louis, MO 63144
Nelson Industries, Highway 51 West, Slough, Wiltshire, UK W3599

PAINT—COATING—CORROSION CONTROL
Ashland Chemical Co./Drew Marine Co./One Drew Plaza, Boonton, NJ 07005
Carnacel, Inc., 1045 12th Ave. NW/FS, Issaquah, WA 98027
Devco Coatings 4000 Dupont Circle, Louisville, KY 40207
Egard, Inc., P.O. Drawer 2988, Lafayette, LA 70502
Firth Corp., 1301 North Plaza St., Plymouth, MI 48150
Jamestown Distrib., 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02835
Hempel Coatings, 6901 Cavalcade St., Houston, TX 77028
Menzel, Inc., Marine Div., 422 E. 9th Rd., P.O. Box 1460, Willets, CA 95490
Perrastrop Rust, 264 South Main St., Wallingford, CT 06492
Product Research Service, Inc. 229 Hwy 23, PO Box 159, Belle Chasse, LA 70007
MUC International, 60 Imp Dr., Inwood, NY 11096
Sigma Coatings, 8979 Market St., Houston, TX 77029, 330 Rover Rd., Harvey, LA 70059, 1100 Adams St., Hoboken, NJ 07030
Firth Corp., 1301 North Plaza St., Plymouth, MI 48150
PIPE FITTING/CUTTING/CONNECTING SYSTEMS
George Fischer Pipe Tools, 407 Hadley St., Box 40, Holly, MI 48442
Lodge, 356 14th Drive, Foster, CA 94404

PLASTICS
Advanced Industrial Plastics, 724 Ferness Blvd., Daytona Beach, FL 32114

POLLUTION CONTROL/PRODUCTS/MARINE SERVICES
Marco Pollution, 2300 West Commodore Way, Seattle, WA 98199
MUC International, 60 Imp Dr., Inwood, NY 11096

PREDICTIVE MAINTENANCE
PredictUL 253 Winslow Way West, Bainbridge Island, WA 98110

PROPELLERS
Associated Marine Technologies, 4016 Seaboard St., Portsmouth, VA 23701
Rice Propellers, Av. Rios Esnoz #88, Mazatlan, MEXICO 82180
Sisco Marine, Inc., 221 1st Ave., Seattle, WA 98105

PROPULSION EQUIPMENT
-Bismuthers, Diesel Engines, Gears, Propellers, Shafts, Turbines
-Andrus Industries, Harvey Dunes Road, P.O. Box 116, Harvey, LA 70058
American Air Filter, P.O. Box 35600, Louisville, KY 40332
ABR Diesel Inc., P.O. Box 237, Milwaukee, WI 53202-0237, USA
ABB Industry Oy, P.O. Box 185, 00381 Helsinki, FINLAND
ABB TURBOCHARGER, INC., 1460 Livingston Avenue, N. Brunswick, NJ 08902
Aquamaster-Rauma, Inc., 2315 North Woodlawn Ave., Ste. 103, Metairie, LA 70001
Brd Johnson Company, P.O. Box 1528, Pascagoula, MS 39367
MORAN AS P.O. Box 204, 20401, Muko, Finland
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2920
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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.

Ships Agency: September 24-25, London.
Contact: International Business Communications Ltd., Gilmoora House, 57-61 Mortimer St., London W1N 8JX, tel: +44 (0) 171 637 4383; fax: +44 (0) 171 631 3214.

Third International Petroleum Environmental Conference: September 24-27, Albuquerque Hilton, Albuquerque, N.M.
Contact: **Barbara Derby**, The University of Tulsa, Continuing Engineering Education, 600 S. College Ave., Tulsa, Okla. 74104-3189, tel: (918) 631-3088; fax: (918) 631-2154; e-mail: conted-cee@utulsa.edu.

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: NWC, 1130 17th St. N.W., Washington, D.C. 20036, tel: (202) 296-4415; fax: (202) 835-3861.

Bunkering in the Americas: September 25-28, Miami, Fla.
Contact: **Carleen L. Kluss**, International Marketing Strategies, 28 Southfield Ave., Stamford, CT 06902, tel: (203) 406-0106; fax: (203) 406-0110.

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.

September, 1996

Training 2000 Conference: September 30-October 2, Linthicum, Md.
Contact: **Larry O'Toole** (ext. 320) or **Lennie Martin** (ext. 317) at MEBA Engineering School, 27050 St. Michaels Rd., Easton, Md. 21601-7550, tel: (410) 822-9600; fax: (410) 822-7220.

Economics and Operations of Bunkering and Marine Lubrication: September 30-October 4, London.
Contact: The Institute of Marine Engineers Conferences Dept., 76 Mark Lane, London EC3R 7JN, tel: +44 (0) 171 481 8493; fax: +44 (0) 171 488 1854.

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, 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.

Water Environment Federation's 69th Annual Conference & Exposition: October 5-9, Dallas Convention Center, Dallas, Texas.
Contact: **Nancy L. Blatt**, director, Public Information, WEF, 601 Wythe St., Alexandria, Va. 22314-1994, tel: (703) 684-2400; fax: (703) 684-2492.

Ports & Customs Equipment, China '96: October 6-9, Shenzhen, China.
Contact: Recruitment Agent, Ronlex International Ltd., Unit 1, 25/F, Honour Industrial Centre, 6 Sun Yip St., Chaiwan, Hong Kong, tel: + 852 2528 2462; fax: + 852 2528 5784.

Society of Petroleum Engineers' Annual Technical Conference and Exhibition: October 6-9, Colorado Convention Center, Denver, Colo.
Contact: **Brenda Wright**, Meetings/Exhibit Unit, Society of Petroleum Engineers, P.O. Box 833836, Richardson, Texas 75083-3836, tel: (214) 952-9310; fax: (214) 952-9492.

The 1996 Tanker Conference and Prevention Through People Seminar II: October 7-8, ANA Hotel, Washington, D.C. Contact: American Petroleum Institute, 1220 L Street NW, Washington, D.C. 20005, tel: (202) 682-8229.

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.
The Maritime Industry In Transition: Competitive Strategies For The 21st Century: October 9-11, Seattle, Wash. Contact: Office of the U.S. Section, PIANC, 7701 Telegraph Rd., Alexandria, Va. 22315-3868, tel: (703) 428-6286; fax: (703) 428-8171.

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.

7th Annual Abu Dhabi International Petroleum Exhibition & Conference: October 13-16, United Arab Emirates.
Contact: International Exhibitions, Inc., 1635 W. Alabama, Houston, TX 77006, tel: (713) 529-1616; fax: (713) 529-0936.

Rio Oil & Gas Expo: October 13-17, Rio de Janeiro, Brazil.
Contact: International Exhibitions, Inc., 1635 W. Alabama, Houston, TX 77006, tel: (713) 529-1616; fax: (713) 529-0936.

Achieving Safety at Sea: ISM Code: October 14-15, London.
Contact: International Business Communications Ltd., Gilmoora House, 57-61 Mortimer St., London W1N 8JX, tel: +44 (0) 171 637 4383; fax: +44 (0) 171 631 3214.

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

Achieving Safety At Sea: October 14-15, Bloomsbury Crest Hotel, London, U.K. Contact: **Ruth Hogg**, International Business Communications Ltd., Gilmoora House, 57-61 Mortimer St., London W1N 8JX, U.K., tel: +44 171 453 2709; fax: +44171 631 3214.

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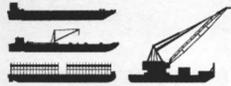
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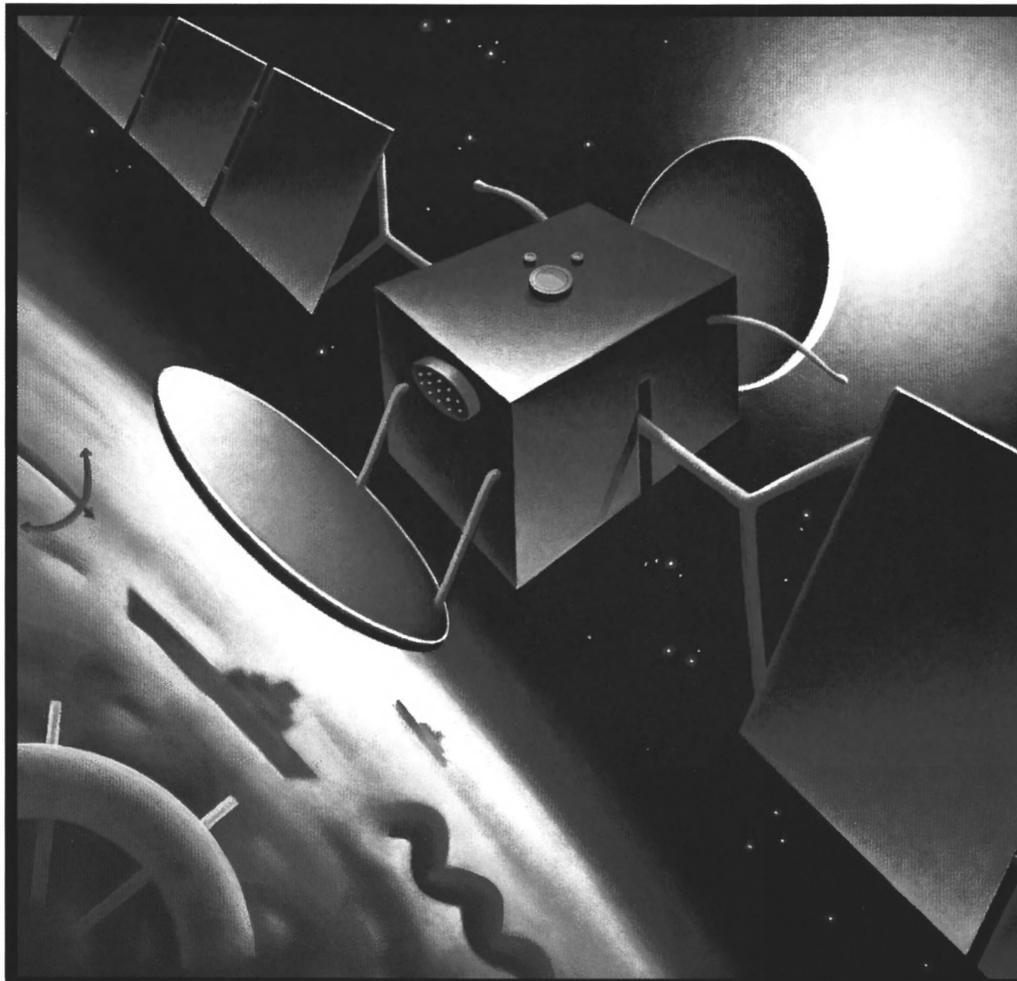
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