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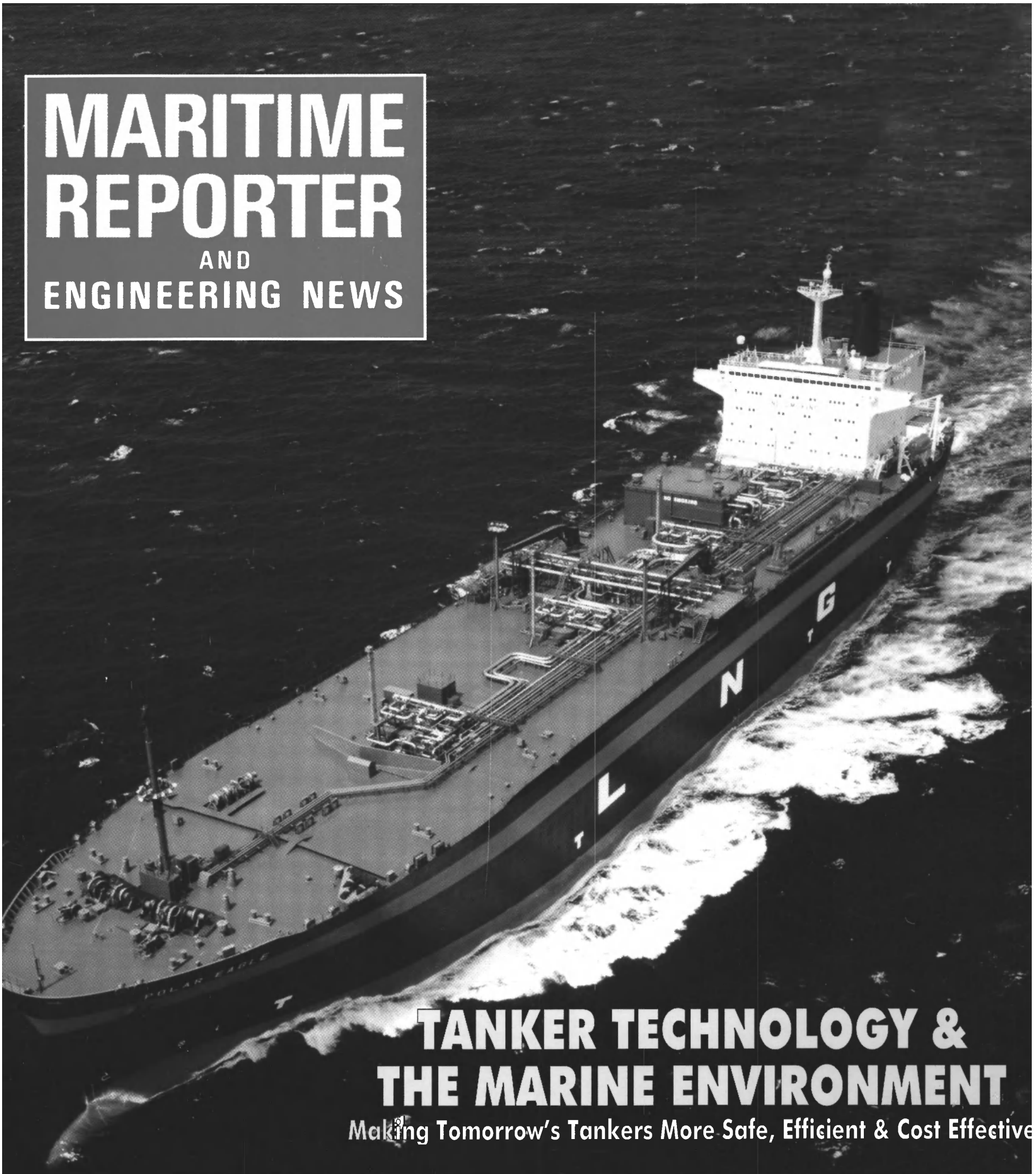

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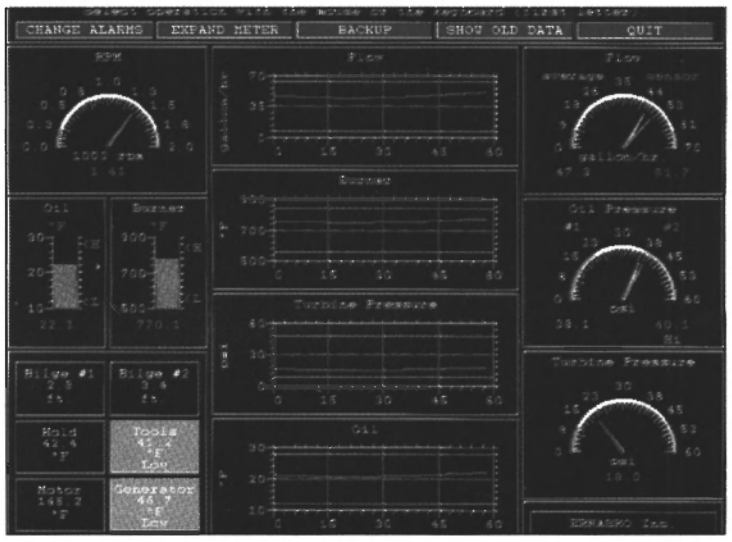
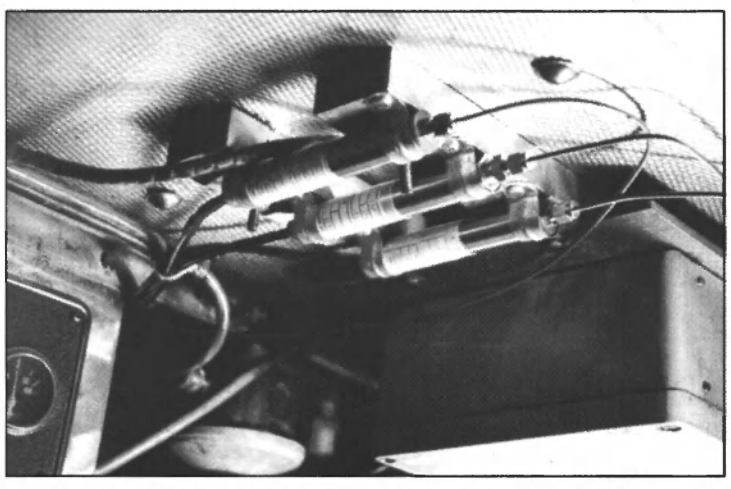
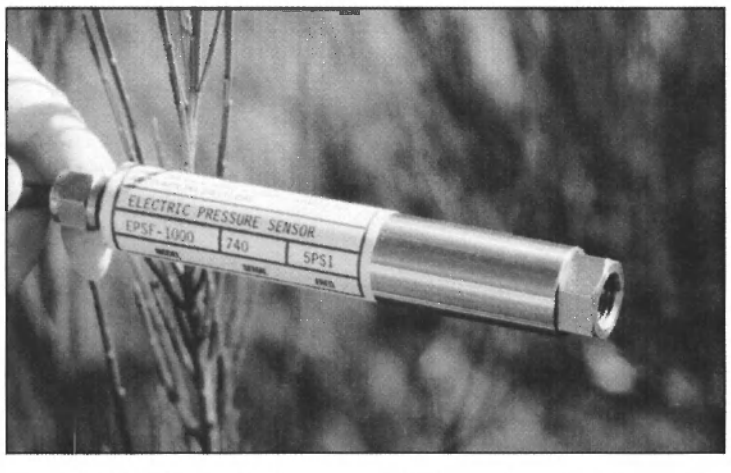


MAIN SCREEN shown in CHANGE ALARM condition allows setting Hi-Lo alarms over full range of any selected function. Besides providing electrical signals for audible/visual signals, alarms are indicated in red on screen.





PRESSURE SENSORS are installed overhead in the engine room of the VICTORIA CLIPPER. Tubing connects the sensors to the monitored locations. Two sensors check raw water (engine coolant) and one reads oil pressure. Individual sensor (above) has a frequency output to eliminate electrical interference.

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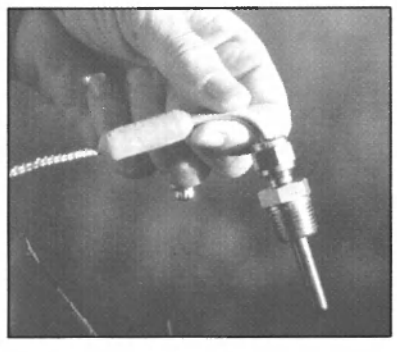
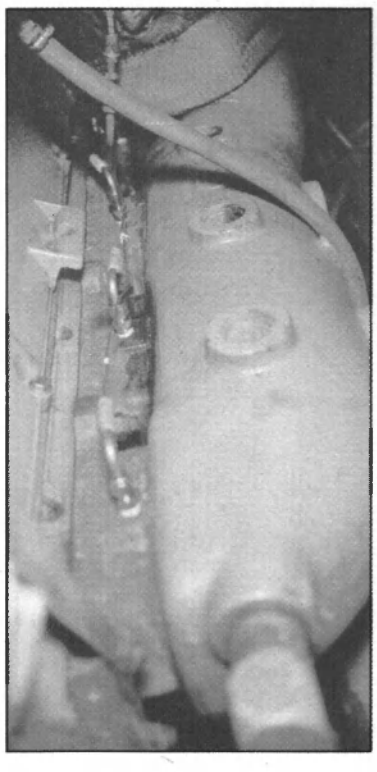


TERMOCOUPLE temperature sensors check exhaust ports on each cylinder of the Detroit Diesel, and two measure raw water and engine coolant. All sensor leads are routed to a junction box, then to the pilot house.



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ON THE COVER

The IHI-built *Polar Eagle* is an LNG carrier with many technologically innovative characteristics. Featured as an Outstanding Oceangoing Ship of 1993 in *MR/EN's* December 1993 edition, the 48,817-dwt vessel measures 784 feet (239 m) long and 131 feet (39.9 m) wide. Classed by ABS, it is the first vessel equipped with IHI's SPB system (Self-supporting Prismatic IMO type B) independent tanks, which are incorporated into the hull, allowing for a flat upper deck. *MR/EN's* "TANKER TECHNOLOGY" coverage starts on page 27.

IN THIS ISSUE:

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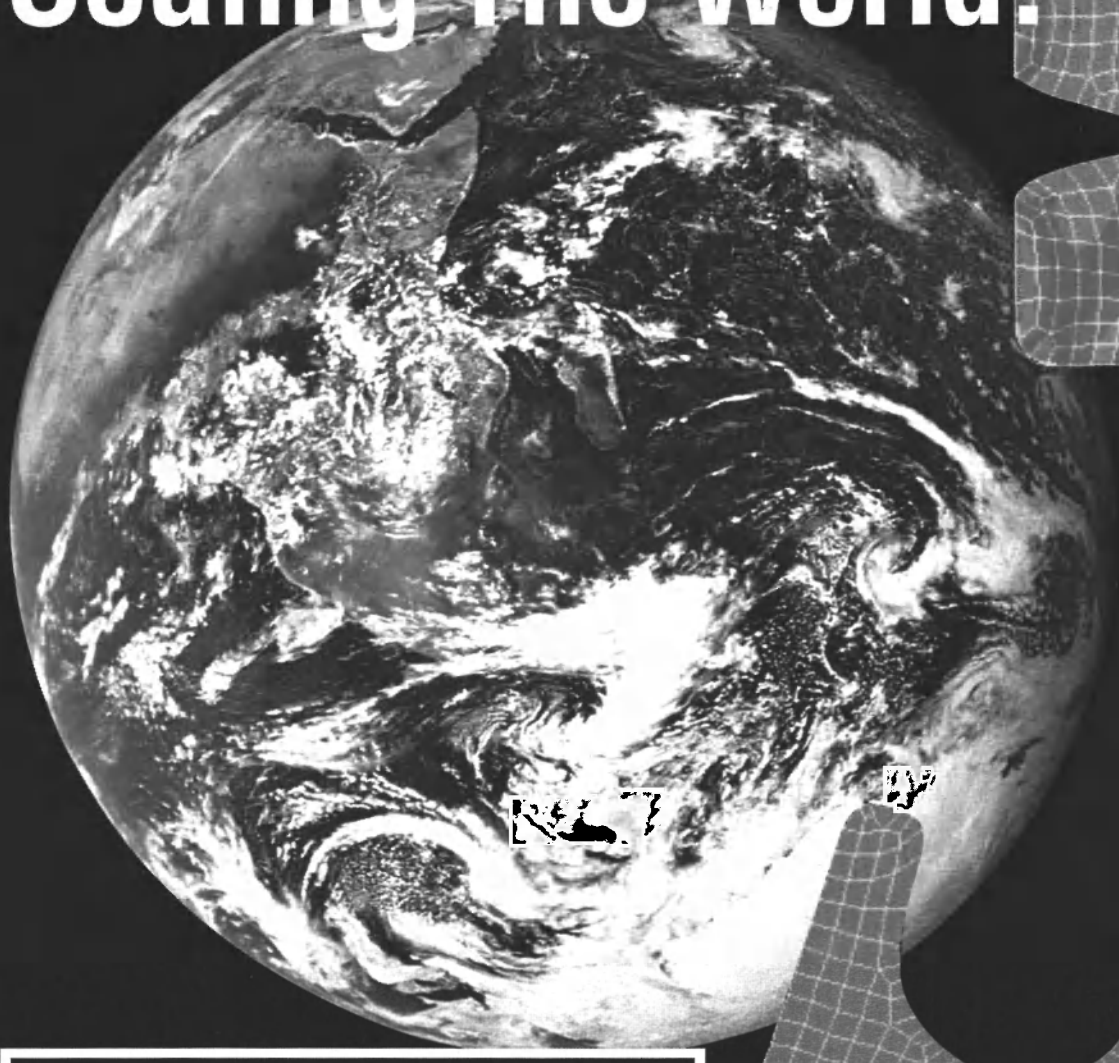

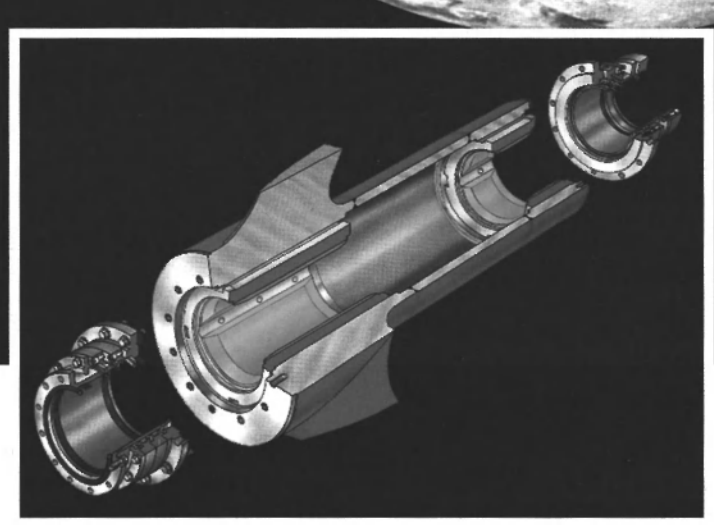

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Kvaerner Unit To Build Fast Ferry

Kvaerner AS unit Kvaerner Kleven Ulsteinvik has won a $66 million contract to build a fast ferry for Ofotens og Versteraalens Dampskibsselskab AS. The ferry is to be delivered early in 1996.

Leevac Chosen To Convert Casino Vessel

Sodak Gaming Inc. selected Leevac Shipyards of Jennings, La. for the conversion of the *Grand Romance* into a casino vessel. Upon completion—anticipated to be Oct. 1, 1994—the 1,200-passenger vessel will have room for more than 900 gaming positions. The vessel is intended to be used in the proposed Port of Marquette, Iowa riverboat project. At press time Sodak had entered into a letter of intent to lease the casino vessel to Gamblers Supply Management Co. For more information on the vessel building capabilities of Leevac,

Circle 149 on Reader Service Card

USCG Proposes Way To Revise Great Lakes Pilotage Rates

The U.S. Coast Guard (USCG) proposed a rulemaking that would revise the method currently used in setting pilotage rates on the Great Lakes. The rulemaking proposes to standardize the methodology to determine those rates in the future; for example, the guidelines for the rates would be more detailed.

The rulemaking affects Great Lakes pilots who are merchant mariners with special knowledge of local waters and responsible for safely directing ships, mostly foreign, through the Great Lakes.

Fednov Signs $100M Contracts For Four Bulk Carriers

The Fednav Group of Companies, reportedly Canada's largest ocean-shipping enterprise, signed contracts for the construction of four new deep-sea bulk carriers at a cost of more than $100 million.

Specially designed to operate in and out of the Great Lakes/St. Lawrence Seaway system, the ships, with a deadweight capacity of 34,000 tons, will be built at Jiangnan Shipyard in Shanghai, China. The yard —reportedly China's oldest—was founded in 1865 and can build a range of vessels up to 75,000 tons deadweight. Under the contracts, the four new ships are due for delivery in 1996 -1997.

Ingalls Ship Named In Honor Of World War II Hero

Ingalls Shipbuilding division of Litton Industries christened its fifth Aegis guided missile destroyer, named *Ramage* (DDG 61).

DDG 61 is named to honor the life and service of World War II hero Vice Admiral **Lawson Paterson Ramage**, USN, (1909-1990). In 1944, while commanding the submarine USS*Parche* (SS 384), Vadm. **Ramage** became the first living submariner to earn the Congressional Medal of Honor.

In addition to its VLS capability, *Ramage* has eight Harpoon antiship missile launchers and two MK 32 triple-barrel torpedo launchers, both mounted on the ship's deck, as well as two MK 15 Phalanx Close-In Weapon Systems and a five-inch, rapid-firing deck gun. DDG 61 also features the LAMPS MK III Control System, with helicopter landing and replenishment facilities.

DDG 61 is the fifth ship in the Arleigh Burke (DDG 51) Class to be christened at Ingalls, of 11 ships contracted to the shipyard. Ingalls' first Aegis destroyer, USS *Barry* (DDG 52) was commissioned in 1992. *Stout* (DDG 55) and *Mitscher* (DDG 57), Ingalls' second and third destroyers, are being prepared for delivery this year.

Aegis ships are designed to provide primary protection for the Navy's battle forces. Aegis destroyers are 504 feet long (154 m), with a beam of 59 feet (18 m).

Four gas turbine engines power the 8,300-ton ships to speeds in excess of 30 knots.

For more information on Ingalls,

Circle 146 on Reader Service Card

The new Aegis destroyer was named *Ramage* in honor of Vice Admiral **Lawson P. Ramage**, USN, (1909-1990), shown here as a Navy Commander receiving the Congressional Medal of Honor from President **Franklin D. Roosevelt** in January 1945. A WWII hero, Vad. **Ramage**, known as "Captain Red," was the first living submariner to earn the Medal of Honor. During the ceremony at Ingalls, **Barbara Ramage**, the widow of Vadm. **Ramage**, sponsored and christened the new ship.

President Clinton Declares Dredging "A National Concern"

Calling ship channel dredging "a national concern" essential to trade and prosperity, President **Clinton** declared, "I am convinced that we can find a way to dredge our nation's ports without compromising environmental protection."

The President's remarks were directed to the American Association of Port Authorities (AAPA), whose Dredging Caucus has pressed the Administration for sweeping reform of U.S. dredging regulations, which the group says unreasonably delay critically needed harbor projects. During a recent Dredging Caucus meeting, AAPA applauded the work to date of the federal Interagency Working Group on the Dredging Process, which U.S. Transportation Secretary **Federico Pena** appointed last fall.

Port of Oakland Executive Director **Charles R. Roberts** and Port of New York/New Jersey Director **Lillian Liburdi** are the Caucus's co-chairs. At the AAPA's Annual Spring Conference, AAPA President **Erik Stromberg** read a letter from President **Clinton** which said: "I am calling on federal agencies to redouble their efforts, and urge the state, local, port, environmental and other interested groups to continue their joint efforts to find solutions to these (dredging) problems. Our nation's ports are a key link in the nation's intermodal transportation chain, and your continued success and support will be crucial to achieving our goals." The President acknowledged the significant economic contribution of ports, stating that, "The public port community will play a pivotal role as we expand export trading opportunities and create a truly global marketplace." In the letter, the President restated his belief, which is shared by U.S. ports, that environmental protection and port operations and development are compatible.

Members of the AAPA are calling on Congress to enact legislation to address the problems ports around the country face keeping their navigation channels open for trade. AAPA seeks to amend the Clean Water Act (CWA) and Water Resources Development Act (WRDA) to reflect more closely the dredging and disposal needs of U.S. ports.

As part of its National Dredging Proposal, the Association seeks adoption of a federal strategy which directs that federal agencies work together to facilitate dredging projects.

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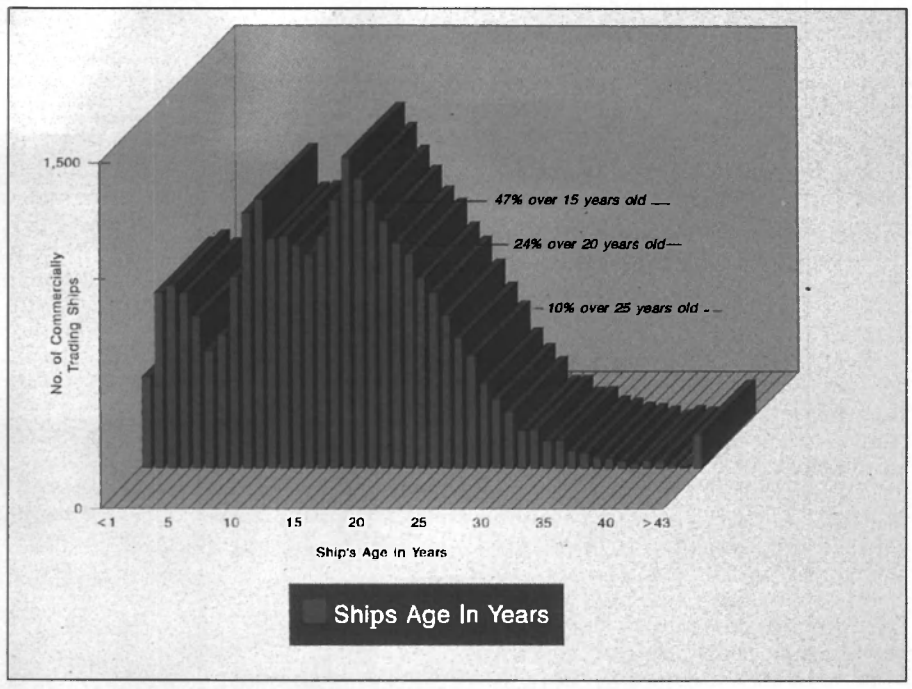
Industry Trends:
The Aging Fleet

by James R. McCaul, president IMA Associates, Inc.

Replacement of aging ships will be the major driver for world ship construction over the next decade, as 47 percent of the commercial fleet is over 15 years of age, and 24 percent is over 20 years.

Source: ***Five Year Outlook for U.S. Shipbuilding*, February, 1994**



Costa Cruise Lines Close To Finalizing Ship Purchase

Costa Cruise Lines is finalizing negotiations with an unidentified shipyard for a 70,000-ton, 1,900-passenger cruise liner for delivery in 1996. The ship is expected to operate in both North American and European waters.

The $300 million project follows the completion of Costa's $1 billion fleet expansion program. In FY'93, Costa reported gross revenue of $392 million and net profit of $23 million. Worldwide, the line carried 224,764 passengers in 1993.

Canadian Pacific Orders Ships From Daewoo

Canadian Pacific Ltd.'s shipping arm Canada Maritime ordered two 33,800-ton vessels from Daewoo Shipbuilding & Heavy Machinery for $120 million.

Delivery of the vessels is for late 1995. The contract has an option for a third vessel.

The two new ships are part of Canadian Pacific's plan to expand its North Atlantic fleet. The ships will replace smaller container ships now used in British and European service.

Singapore Shipbuilding To Build Two Vessels

Singapore Shipbuilding & Engineering (SSE) Ltd. has won a $44 million contract to build two vessels for Regional Container Lines Public Co. Ltd., Thailand.

The contract is for two 950-TEU container vessels, with an option for two more vessels.

This new car ferry—to be built by Chantiers de l'Atlantique—will be powered to a 23.8-knot service speed by four diesel engines.

Chantiers de l'Atlantique Wins Mediterranean Car Ferry Order

Chantiers de l'Atlantique, a GEC Alsthom subsidiary, recently signed a contract with Societe Nationale Maritime Corse-Mediterranee (SNCM) to build a 3,400-dwt passenger/car ferry for delivery in the spring of 1996. Designed to carry 2,400 passengers and 700 cars, the ferry will operate between the French Riviera and Corsica, replacing the *Napoleon*.

Utilizing a four diesel propulsion system, designed to generate a combined 43,092 kW driving a pair of controllable pitch propellers, the vessel will have a service speed of 23.8 knots. The new ferry—which will measure 564 feet (172 m) long with a 99.7-foot (30.4-m) breadth and a 21.6-foot (6.6 m) draft—will be the largest ship in the SNCM fleet.

For more information on Chantiers de l'Atlantique,

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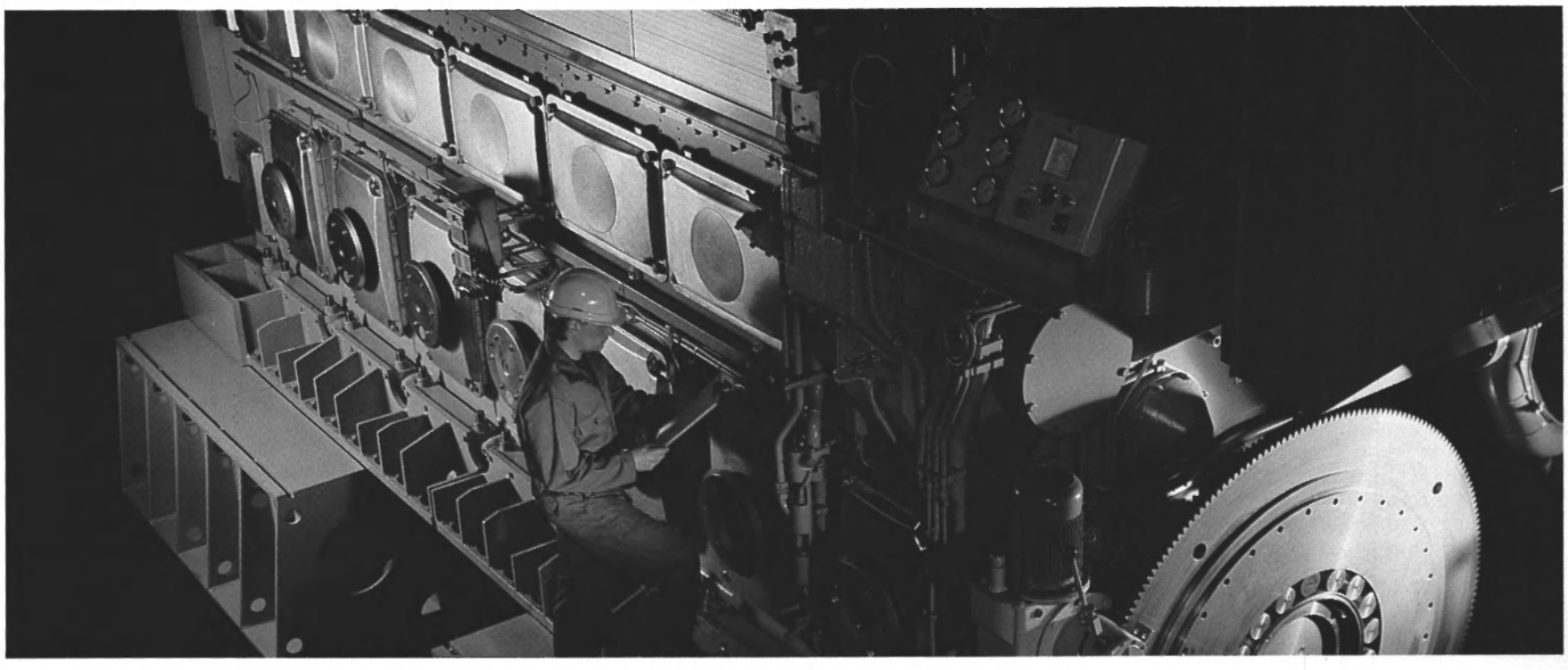

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Trinity Delivers Second Cycloidal Tractor Tug; Launches Casino Boat

Trinity Industries Inc.'s subsidiary Halter Marine has been busy, delivering the *Garth Foss*—the second of two 155-foot (47.3-m), 8,000-hp enhanced tractor tugs equipped with cycloidal propulsion units—and launching the *Flamingo Hilton*, a 245-foot (74.7-m), 1,500-passenger riverboat casino.

Voith-Schneider Powers Tug

The *Garth Foss* was delivered to Foss Maritime of Seattle, and preceded in November by an identical sistership, the *Lindsey Foss*. The tugs, reportedly the world's largest and most powerful, are fitted with Voith-Schneider cycloidal propulsion units. The *Garth Foss* will work for BP Oil Shipping Co. escorting tankers in the Straits of Juan de Fuca and Puget Sound. The *Lindsey Foss* is already working for Arco Marine, performing similar tasks.

The Voith-Schneider cycloidal propulsion system consists of two sets of five vertically oriented blades installed ahead of the tug's center. The system gives the tug 360° maneuverability and great ability to steer and stop tankers in the event of an emergency.

Foss Design Team primarily performed the design work for the two tugs.

Glosten Associates, Inc., a Seattle-based naval architectural firm, provided a contract design and prepared plans and specifications. Detailed design work was conducted by Trinity under Foss supervision, with additional assistance from Glosten.

Foss selected tractor tugs equipped with cycloidal propulsion because of the need to provide high speed (12 knots plus), safe escort, and retardation and steering forces for loaded tankers during rough, open-water conditions.

"Cycloidal propulsion is relatively new to U.S. shipyards, but not to Trinity shipyards," said **John Dane III**, president of the Trinity Marine Group.

Technical details of the vessels were recently presented by **Steve T. Scalzo**, senior vice president of Foss Maritime, at the Royal Institution of Naval Architects in London. He said the nearly double-ended hulls have a pronounced shear to keep the decks dry, and a substantial shear strake to provide a foundation and bearing surface for fendering and bulwarks. The bulwarks were moved inward and canted inward to reduce contact with the vessel being assisted.

The superstructure was also kept well inboard to minimize the possibility of contact with the vessel being assisted, as well as all deck machinery, particularly in an obstruction-free zone at the stern.

The Voith-Schneider unit is driven by a pair of General Motors EMD ME 16-710-G7A diesels rated at 4,000-hp each turning through propulsion unit reduction gears. A turbo coupling between the engine and reduction gear replaces a clutch. The 475-grt vessel has a running speed of 14.5 knots, and carries 83,700 gallons of diesel fuel, 2,400 gallons of lube oil and 4,000 gallons of fresh water.

A 345-sq.-ft. skeg at the stern helps the tug to steer and stop a moving tanker.

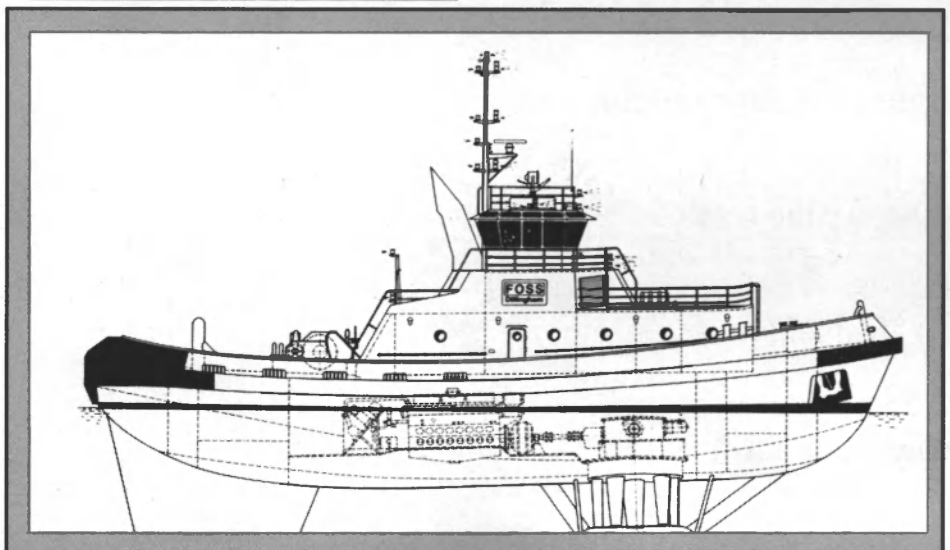
A tractor tug fastened to a ship is operated stern first, and can shear off at an angle using the skeg in combination to produce steering and stopping forces greatly in excess of the tug's static bollard pull.

The tugs feature second generation winches with high braking capacity and fast line recovery.

Built by Trinity's Halter Marine, this new Foss tug features Voith-Schneider cycloidal propulsion.

Garth Foss
Equipment List

Main engines	EMD
Propulsion	Voith Schneider cycloidal propellers
Winch/Anchor windlass	Markey
Towline hold down	Nordic Machine
Radars	Decca
Depth sounders	Ross
VHF radios	SEA
UHF radio	Motorola
SSB	SEA
GPS	Trimble
Weather fax	Furuno
Autopilot	Sperry
Gyro compass	Sperry
Compass	Plath



Pictured is a diagram of a tractor tug with Voith-Schneider cycloidal propulsion. The Voith-Schneider tractor tug configuration entails specific features, including:

- a propulsion and steering system freely arranged underneath the vessel's hull at one end of the vessel,
- a keel plate underneath the freely arranged propulsion and steering device protecting the units against groundings and contacts with other vessels or obstacles in all directions,
- towing gear above the fin, specifically adapted to individual local operation conditions,
- clear pushing direction with fin first and clear pulling direction with propeller forward, and,
- all around visibility from the steering house.

For more information on Voith-Schneider,

Circle 6 on Reader Service Card

Launching Of The *Flamingo Hilton*

Halter Marine Inc. also launched the 245-foot (74.7-m) *Flamingo Hilton*, a 1,500-passenger riverboat casino for the Hilton Hotels Corp., Gaming Division, located in Kansas City, Mo. Delivery of the Cummins-powered vessel is scheduled for May 26. The *Flamingo Hilton* is similar to, but not identical to the *Queen of New Orleans*, a riverboat casino delivered to the Hilton New Orleans Corp. and New Orleans Paddlewheels in February. The *Flamingo Hilton* has increased horsepower (its Cummins KTA-38M diesel engines develop a total of 1,880 hp) and larger shafts and propellers. She also has more hydraulic power and larger rudders moved closer to the stern for increased maneuverability. Electrical power for the ship's hundreds of gaming devices, as well as the air conditioning and heating, is provided by three Onan generators driven by Cummins diesel engines developing 2,145 kW. The paddlewheel is driven by two 200-hp electric motors, for a total of 400 hp, and maneuverability is aided by a 400-hp Schottel bowthruster.

For additional information on the vessel building capabilities of Trinity Marine Group,

Circle 2 on Reader Service Card


The 1,500-passenger *Flamingo Hilton* riverboat casino vessel was recently launched at TMG's Halter Marine

FLAMINGO HILTON
Equipment List

Main engines	Cummins
Bow thruster	Schottel
Generator engines	Cummins
Generator	Stamford
Emergency generator	Cummins
Deck machinery	McElroy
Propellers	Bird-Johnson
Reduction gears	Reintjes
Coatings	Ameron
Couplings	Lo-Rez
VHF radios	Motorola
Radar	Furuno
Air conditioning	Carrier
Engine controls	Mathers
Steering Controls	Custom Hydraulic
Motor starters	Ingersoll-Rand
Shafting	Scott Forge/Trinity Lockport
Pumps	Aurora
Firefighting	Hiller

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Circle 302 on Reader Service Card

Damen Delivers Series Of Tugs

The Stan Tug *Hajah*, which Damen Shipyards delivered to its owner in Yemen.

Damen Shipyards of Gorinchem, The Netherlands, recently delivered several new vessels to a variety of owners.

Damen delivered four mooring boats to Kuwait Oil Company — the *Haqel Dhareef, Haqel Lulu, Haqel Dura* and the *Haqel Murjan* — all of Damen's Stan Tug type 1605. These vessels were specially constructed for operation in the Arabian Gulf area, and are powered by twin Deutz MWM TBD 234 V8 diesels, each developing 325 kW at 2,100 rpm and providing a 10.5-knot speed and 12.7-ton bollard pull. The vessels are 55.9 ft. (17 m) long, with a beam of 18.4 ft. (5.6 m) and a draft of 5.9 ft. (1.8 m) at aft.

For Eastern Construction Co. Ltd. of Taiwan, Damen delivered two vessels recently: the *Eastern 101*, and the *Eastern 501*. The first is a Stan Tug type 1605 with twin Caterpillar 3408B TA/B diesel engines which give the vessel a 9.9-knot speed and a 12.2-ton bollard pull. The *Eastern 101* is 55.4 ft. (16.9 m) long, 17.4 ft. (5.3 m) wide, and 8.2 ft. (2.5 m) deep. The vessel is a modern twin-screw workboat.

The second, the *Eastern 501*, is a multifunctional Multi Cat type 1908. The vessel is 61 ft. (18.6 m) long, with a molded breadth of 25.8 ft. (8.06 m) and molded draft of 5.6 ft. (1.7 m) at the vessel's aft. Twin Caterpillar 3408 TA diesels drive the vessel to a speed of 9.5 knots; the vessel's bollard pull ahead is 11.6 tons. The Multi Cat series of vessels are designed for crane handling, transport of deck cargo, pushing, towing, anchor handling, supply of liquids or general cargo, hose handling, pollution control, salvage and diving support.

Damen also delivered the *Hajah*, a Stan Tug 2207 model, to its owner in Yemen after the vessel completed a successful trial program. Because the vessel type uses a stock hull, it can easily be constructed in five months. The tug will be employed in Hodeidah Ports, Republic of Yemen, for harbor and docking work, berthing/unberthing of tankers and other large vessels, push-pull operations and escorting from or to clear water. The tug can also be used for firefighting, salvage or pollution control duties. Twin Caterpillar 3512B-DI-TA engines each develop 955 kW at 1,600 rpm, driving the vessel to a free sailing speed of 12.5 knots and a bollard pull of 34.8 tons.

For more information on Damen Shipyards,

Circle 11 on Reader Service Card

HAQEL TUGS EQUIPMENT LIST

Main engines	Deutz MWM
Auxiliary engines	Deutz MWM
Generators	Stamford
Gearboxes	ZF
Propellers	Lips
Nozzles	Van der Giessen
AC System	Marine Air

EASTERN 501 EQUIPMENT LIST

Main engines	Caterpillar
Auxiliary engine	Lister Petter
Propellers	Lips
Nozzles	Van der Giessen
Navigation/communication equip.	Radio Holland
Steering gear	Sperry
Exhaust silencers	Mercurex
Life rafts	Viking Life Saving Equipment

HAJAH EQUIPMENT LIST

Main engines	Caterpillar
Radar	Furuno
Echosounder	Furuno
VHF Radio	S.P. Radio
SSB	Furuno
NAVTEX receiver	Furuno
EPIRB	Jotron
Propellers	Lips
Nozzles	Van der Giessen
Reverse/reduction gears	Reintjes
Steering gear	Sperry
Liferafts	Viking Life Saving Equipment

McDermott Enters Russian Shipbuilding Venture

McDermott International Inc. and JSR Amur Shipbuilding Plant of Russia have formed joint ventures for shipbuilding, marine construction and ship component fabrication to take place at the Amur shipyard in the Khabarovsk region of Russia's Far East. Both companies will reportedly own equal shares of the two ventures.

The joint ventures were announced during the Presidential Development Mission to Russia, led by U.S. Secretary of Commerce **Ron Brown**. **Robert E. Howson**, chairman of the board and CEO of McDermott, was among 29 chief executives and presidents on the trip.

One of the ventures to be formed is McAmur Construction Services Co., which will provide fabrication services for marine construction projects offshore Far East Russia, and another venture is McAmur Shipbuilding Co., which will market shipbuilding and ship component fabrication services worldwide.

The Amur yard is in the city of Komsomolsk on the Amur River and is reportedly the largest shipyard in Russia's Far East. The plant has been constructing military vessels since the 1940s, including diesel and nuclear powered submarines.

McDermott International Inc. is a worldwide energy services company which, among other things, provides engineering and construction services for industrial and utility facilities onshore and to the oil and gas industries offshore. McDermott also builds vessels for a variety of other services.

For more information on McDermott,

Circle 69 on Reader Service Card

Carnival Newbuilding Program Tops $3 Billion

Carnival Corporation, which already claims to be the biggest cruise company in the world, is scheduled to introduce six more ships over the next three years.

Carnival Corporation's most recent wave of new ship introductions commenced early in 1993 when subsidiary Holland America's $250 million *Statendam* inaugurated service last January. In November, Carnival Cruise Lines added the $300 million SuperLiner *Sensation* to its fleet, and Holland America finished up the year when *Statendam*'s 1,266-passenger sistership, the *Maasdam*, began service in December. This summer Carnival will introduce the $315 million *Fascination*, followed by Holland America's *Ryndam* in the fall of 1994. *Imagination*, another vessel in Carnival's 2,600-passenger series, is slated for completion in 1995. A trio of new contracts signed in 1993 will add still more to the list: Carnival signed a contract for one of the world's largest cruise ships, a 95,000-ton, 3,300-passenger vessel slated for delivery in 1996. Then Carnival ordered the *Inspiration*, a SuperLiner like the *Sensation*, for delivery in 1996, and Holland America ordered another, *Maasdam*-type ship, the *Veendam*.

Deutz MWM And GE Sign Cooperative Agreement

Deutz MWM, Germany, a unit of Klocker-Humboldt-Deutz AG (KHD), has signed a cooperative agreement with General Electric Transportation Systems (GETS) of Erie, Pa., for the research, development and production of a new series of diesel engines, the 632-series.

Both companies will cooperate in overall design. The agreement involves GETS assembling all the V-engines, including those for Deutz MWM, at a new plant in Grove City, Pa. The new engine series will comprise six-, eight- and nine-cylinder in-line versions as well as 12-, 16- and 18-cylinder V versions, and the diesel version will cover the 1,440 to 6,300 kW range. Noise and exhaust emissions will reportedly be well below all known future U.S. and European statutory levels. Deutz MWM will be making this new 632-series available in diesel and gas versions for marine applications as well as for power generating sets.

Deutz offers a line of engines spanning a power range from 300 to 7,250 kW. In 1993, Deutz MWM achieved total sales of $437.9 million. For more information on Deutz MWM,

Circle 12 on Reader Service Card

Schichau Seebeckwerft Launches Containership

Schichau Seebeckwerft AG of Bremerhaven, Germany, recently launched a modified type BV 1600 containership. The naming ceremony will be performed at the end of June 1994 when the ship is completed. The 536-ft. (163.4 m) ship will be named *Contship Singapore* and delivered on the same day. It has a molded breadth of 90.2 ft. (27.4 m) and a design draft of 31.8 ft. (9.7 m).

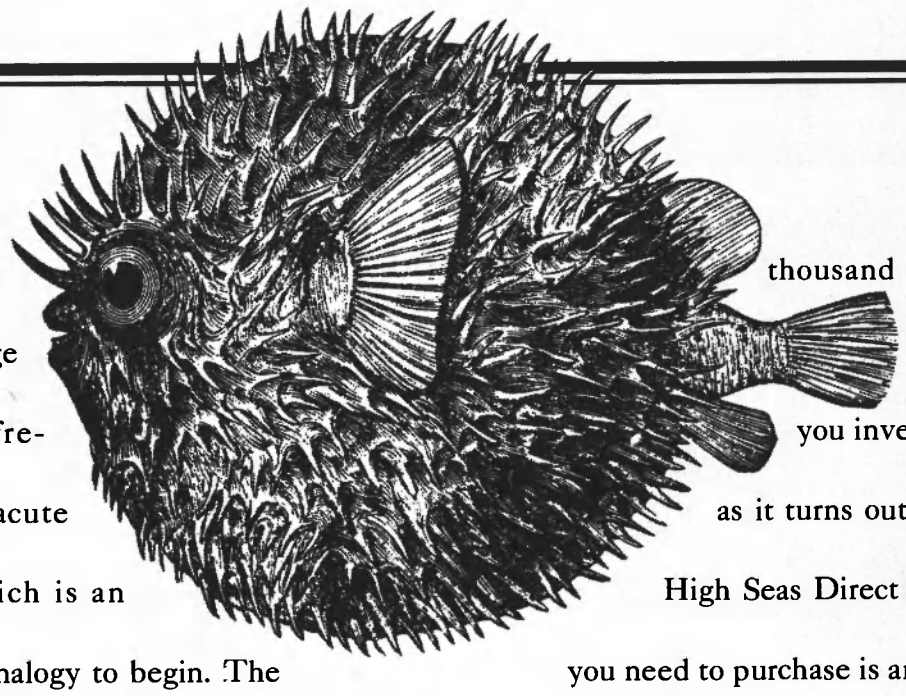
Unlike the original BV 1600 type containership, the *Contship Singapore* will have a container capacity of 1,684 TEUs, versus 1,599 TEUs in the original design, and 152 FEU plugs will be installed, as opposed to the original design's 70 plugs.

The main engine has been increased by one cylinder, so the BV/MAN B&W 7 L 60 MC engine will develop a maximum continuous output of 13,125 kW, and its speed is increased from 18.3 to 19.1 knots.

For more information on Schichau Seebeckwerft,

Circle 66 on Reader Service Card

Finding Your Maritime Satellite Bills A Little Hard To Swallow?



Consider the common porcupine blowfish. To large aquatic predators, it's frequently the cause of an acute case of indigestion. Which is an appropriate place for our analogy to begin. The satellite bill, you see, evokes a similar reaction from those who have grappled with one. At nearly $10 a minute for a satellite call, we can understand why. But we also understand why you can't afford to be without satellite communication at sea. You depend on it to keep your business running full steam ahead. So what's a captain to do? Use satellite only for data transmissions. For voice calls, use AT&T High Seas Direct. You can get through from virtually anywhere for up to 75% less, which would deflate your phone bill substantially. (Hence, figure number two.) By now, of course, you may think our argument is sinking fast. You've already spent 30 or 40 thousand on satellite equipment, and we're suggesting you invest in a new system? Well, as it turns out, the hardware for AT&T High Seas Direct is quite inexpensive. All you need to purchase is an AT&T High Seas Direct handset, which hooks straight into your SSB radio. It sends and receives encoded transmissions—which means your conversations are private—and allows you to dial direct rather than having to go through an operator. (It's the only radiotelephone of its kind on the market in the U.S.) Priced at around $1500, it can pay for itself in less than three and a half hours on the phone. After which time your calls will be taking a significantly smaller bite out of your income. To sign up for AT&T High Seas Direct, to purchase a handset, or for further information, call us at 1 800 392-2067. And you may never blow up over your satellite bill again.

FIGURE 1.
Without AT&T High Seas Direct.

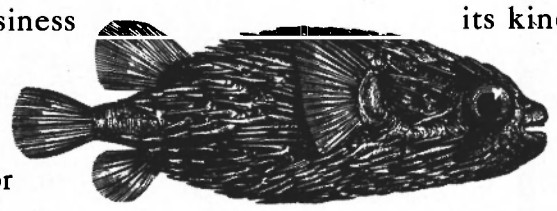


FIGURE 2.
With AT&T High Seas Direct.

AT&T

James P. Colie Refurbishes *Crown Princess* At Norshipco

James P. Colie & Associates, Inc. began various refurbishment work on the *Crown Princess* in late April at Norshipco (Norfolk, Va.).

The majority of the work included remodeling portions of the ship's Dome Casino, Pizzeria, Cafe Cabana, Stage Door Lounge, International Show Lounge, and Beauty Salon, making A.D.A. modifications to cabins and adding wheelchair ramps to outer decks. President and founder **James P. Colie** said a crew of up to 50 worked to complete the two-week project.

James P. Colie & Associates, Inc. is a marine general contracting firm that specializes in cruise ship interiors and renovations. The company has completed more than 700 renovation projects on 38 vessels throughout the world and has reportedly never missed deadline.

For more information on James P. Colie & Associates,

Circle 21 on Reader Service Card

For more information on Norshipco,

Circle 22 on Reader Service Card

Lexus To Import Cars Through Jacksonville Port

Lexus will start importing and processing vehicles through the Port of Jacksonville, Fla. (JAXPORT) beginning in September, a move that could add about 100 jobs to the area, the luxury division of Toyota announced recently. Lexus has contracted with Joyserv Company, Ltd. to handle the unloading and processing of vehicles including cleaning, quality checks, preparation for delivery and installation of some accessories. About 15,000 vehicles will be processed each year.

JAXPORT Managing Director **C. Cliff Mendoza** said the new business would benefit the local economy to the extent of about $2.7 million annually in direct economic impact.

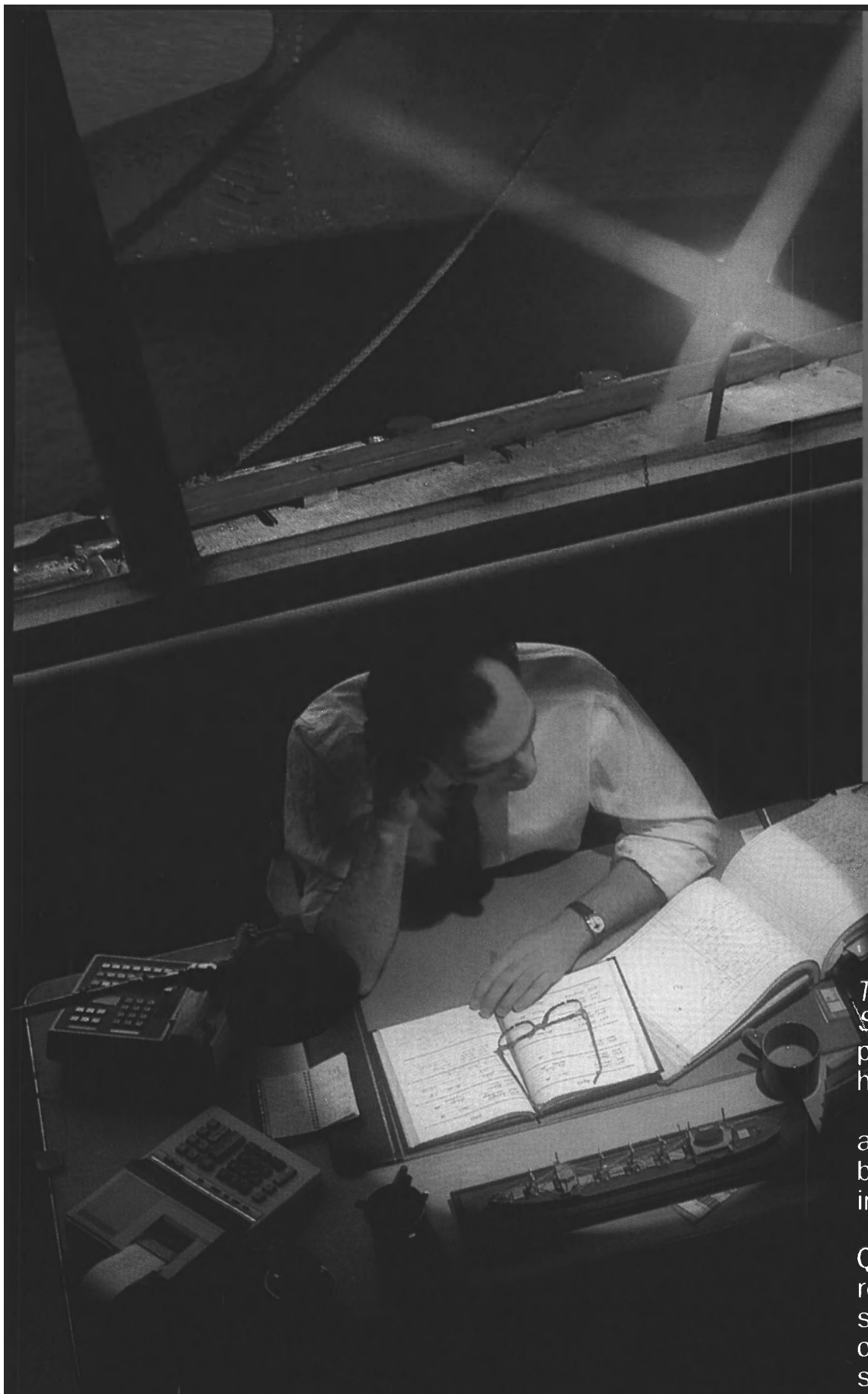
MarAd OKs Israel's Use Of Foreign Flag-Ships For U.S. Grain Shipments

The Maritime Administration (MarAd) has given Israel permission to use foreign-flag ships to carry American grain from U.S. Great Lakes ports to U.S.-flag ships anchored in the Gulf of St. Lawrence. The cargoes will be transferred to the U.S.-flag vessels for shipment to Israel. The permission applies to grain purchased by Israel under a cash transfer program administered by the U.S. Agency for International Development (AID). In a side letter to its cash transfer agreement, Israel has agreed to ship 50 percent of American grain purchases on U.S.-flag vessels. MarAd's approval was given for FY '94 only. It is conditioned on limiting use of foreign-flag vessels on the movement of cargoes from Great Lakes ports to Gulf of St. Lawrence transshipment points. Israel plans to ship 800,000 metric tons (MT) of U.S. grain on U.S.-flag vessels during FY '94. It is reportedly contemplating shipping 180,000 to 240,000 MT through Great Lakes ports under the transshipment arrangement.

MarAd's action permits the U.S. Great Lakes ports to handle the cargoes, even though U.S.-flag vessels are not directly available. It also makes it possible for U.S.-flag ships to handle the cargoes, which cannot transit the Seaway system to carry the cargoes from North America to Israel.

U.N. Extends Claim Period

American President Lines (APL) has advised MarAd of the potential to claim compensation from the U.N. Compensation Commission for losses sustained from the Iraqi invasion of Kuwait — such as the payment of higher insurance premiums during Operations Desert Shield/Storm. The cutoff date for submitting claims was April 1, 1994, but the U.N. has reportedly granted a three-month extension. For more information, contact the Assistant Legal Adviser for International Claims and Investment Disputes at (202) 653-2412.



TEXACO WOULD LIKE TO SHED SOME LIGHT ON YOUR PURCHASING ROUTINE.

The shipping industry is no stranger to *The Ritual Search for New Fuel and Lubricant Suppliers.* This can be a tense time for both purchasing personnel and suppliers...a headache that aspirin can't cure.

The remedy is a worldwide supplier with a fresh outlook–a company with lubricants, bunker fuels and services that are the best in the industry.

That's what Texaco's Partnership in Quality is all about. We're determined to replace *The Ritual* with a long-term relationship. Once you experience our combination of product performance, professional services and competitive pricing, you'll never need a new supplier again. And you'll also understand why we've been able to more than double our international marine lubricant business since 1985.

We'd like to tell you more about how we can serve you better over the long term. In fact, we can even arrange for you to talk to several of our satisfied customers to learn first-hand how our Partnership in Quality Program has helped their businesses.

TEXACO
FUEL AND MARINE MARKETING
WORLDWIDE

PARTNERSHIP IN QUALITY

"Texaco is dedicated to manufacturing and marketing the highest quality products in the industry and to serve all our customers in the most efficient and effective manner possible."

Please contact us at:

Texaco Inc.
Fuel and Marine Marketing Dept.
2000 Westchester Avenue
White Plains, NY 10650
Phone: 914-253-4000
Fax: 914-253-6002

Texaco London
Fuel and Marine Marketing Dept.
1 Westferry Circus
Canary Wharf, London E14 4HA
Phone: 44-71-719-4651
Fax: 44-71-719-5161

Circle 252 on Reader Service Card

Seabulk Offshore Ltd. Modernizes Offshore Supply Vessel Fleet

The supply vessel division of the Hvide Shipping Organization, Seabulk Offshore Ltd. (Lafayette, La.), has acquired 20 offshore supply vessels built between 1983 and 1984. The company completely refurbished and re-classed a series of six 2,500-hp supply vessels to standards which the company claims makes them some of the newest and most highly maintained in the world. It is currently in the process of refurbishing a number of other newly acquired offshore supply vessels.

Four of the rehabilitated vessels were deployed to the Arabian Gulf to support the offshore oil industry in the United Arab Emirates and Saudi Arabia. Two additional vessels were dispatched in the Far East, with the balance of the vessels employed in the U.S. and South America.

To maintain its commitment to safety and environmental safety, Seabulk Offshore has promoted a high level of awareness through its Quality Assurance and Environmental Awareness programs, and the company has a stated commitment to quality and safety.

Seabulk Offshore Ltd. currently has established offshore operations in the U.S., South America, the Middle East and Southeast Asia. Headquartered in the U.S., the company has representation in the U.K., Switzerland, Southern Africa, Saudi Arabia, Abu Dhabi, Dubai and Singapore.

Seabulk Offshore recently entered into a joint venture with the Bin Jabr Group of Abu Dhabi, and is currently in discussion with companies in Saudi Arabia, Qatar and Dubai for similar arrangements.

Seabulk Offshore Ltd. recently modernized a series of six 2,500-hp supply vessels, and is in the process of upgrading several more vessels.

Seabulk 2500 Class Specifications

Length (o a)	180 ft. (54.9 m)
Beam	40 ft. (12.2 m)
Depth	14 ft. (4.3 m)
Speed	12 knots
Class	ABS * A-1, AMS
Tonnage	287 gross/195 net
Flag	U.S.
Home port	Port Everglades, Fla.
Builder	Halter Marine
Year built	1982
Main engines	Caterpillar
Autopilot	Plath Navigate
Fathometer	Skipper
Loran	Furuno
GPS	Sitex
Radars	Furuno
VHF radio	Sailor
SSB radio	Stephens
Fire monitor	Elkhart

APL Orders Six Sperry VMS Integrated Bridge Sets

Sperry Marine won contracts from Howaldtswerke-Deutsche Werft AG (HDW) and Daewoo Shipbuilding & Heavy Machinery to supply a complete "Vision" integrated bridge for six containerships under construction for Oakland, Calif.-based American President Lines (APL). Each ship's integrated bridge will consist of a VMS NT, SeaNET network with workstation, conning information display, dual Sperry Marine 3400M RASCAR II radar/ARPAs, 421/S two-axis speed log, dual configuration ADG-3000 autopilot and other navigation sensors.

According to Sperry Marine's president and CEO, **George A. Sawyer**, key factors leading to the contract were Sperry Marine's ability to supply an advanced, proven, fully integrated bridge design and its worldwide customer support network. "These new APL containerships represent the first of a new generation of post-Panamax ships and will be the largest of their kind in the world. The APL decision to entrust to Sperry Marine the integrated bridge system is most gratifying..." said Mr. **Sawyer**.

Sperry Marine is a major developer and manufacturer of marine electronic, navigation, control and communication systems. For more information on the company,

Circle 35 on Reader Service Card

Texaco Accepts Delivery Of Sea Force[R] RIB From Willard Marine

Willard Marine, Inc. of Anaheim, Calif. has delivered a Sea Force[R] 730 to the Texaco Platform Harvest off Point Conception on the California coast. The 730 rigid inflatable boat (RIB), powered by Johnson outboards, will be used as a fast rescue craft for person overboard work from the platform. Willard Marine builds RIBs and has three models available built to SOLAS requirements. Willard has more than 35 years of experience in the manufacture of fiberglass boats for the U.S. Navy and U.S. Coast Guard, as well as for commercial applications.

For more information on Willard Marine,

Circle 40 on Reader Service Card

Monohull Orders For Austal

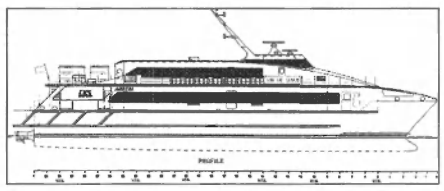
Western Australian aluminum shipbuilder Austal Ships has received an order for two monohull passenger vessels from Yuet Hing Marine Supplies Company of Hong Kong, as well as an order for a 131-foot (40-m) passenger catamaran for the Shanghai Free Flying Transport and Yacht Co. Ltd. for operation in the People's Republic of China (PRC).

Monohull Ferries For Yuet Hing Marine

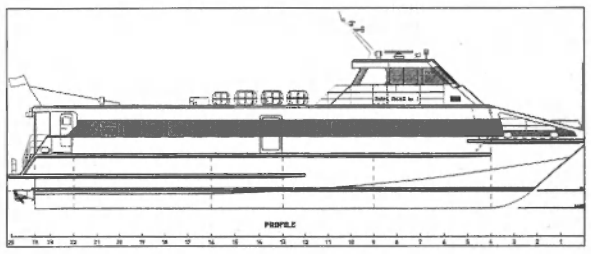
The monohulls are scheduled for an August delivery this year and will operate from Guang Hai to Shang Chung Island, a distance of 13 nautical miles. They are 98 feet (30 m) long, with maximum beam of 23 feet (7 m), molded depth of nine feet (2.8 m) and maximum draft of four feet (1.2 m). The vessels have a passenger capacity of 155, as well as seating for four crew members.

The main propulsion system of each monohull consists of two MTU 8V 396 TE 74L diesel engines developing 832 kW at 1,900 rpm driving two KaMeWa FF Jet 550 waterjets with intake grids through two ZF BU255 marine gearboxes. This propulsion package will drive the fully-laden vessel to 28 knots.

Each will have a tank capacity for 1,057 gallons of fuel and 106 gallons of fresh water. Range at continuous speed will be 200 nautical miles. The vessels will be classified by the China Classification Society and the monohulls will be registered at the port of Guang Hai.



Profile drawing of a 131-foot (40-m) passenger catamaran for operations in the PRC.



Profile drawing of a 98-foot (30-m) monohull passenger vessel, two of which Yuet Hing Marine Supplies Company ordered from Austal Ships.

131-Foot Passenger Vessels

The "Free Flying" 131-foot (40-m) passenger vessel has been outfitted with the stabilizing system and is now commencing sea trials off the coast of Fremantle in Western Australia. The 450-passenger capacity Free Flying catamaran was delivered in April and registered to the port of Shanghai.

Another 131-foot catamaran on order at Austal, yard number 111, will have a passenger capacity of 300 with a fully-laden speed of 33.5 knots. The main propulsion system consists of twin MTU 16V 396 TE 74L diesel engines developing 1,940 kW at 1,940 rpm driving two KaMeWa 71S waterjets through two ZF BU755 gearboxes. The vessel has molded depth of 12 feet (3.8 m) and draft of 4.5 feet (1.4 m). Seating is on two decks, 224 on the main and 76 on the upper deck with VIP seating for nine. The fuel capacity is 2,642 gallons and the freshwater water capacity is 396 gallons. The range at continuous speed will be 300 nautical miles.

Ingalls-Built USS *Ticonderoga* Honored As First Aegis Cruiser

Port Royal Joined Fleet In April As Final In Class

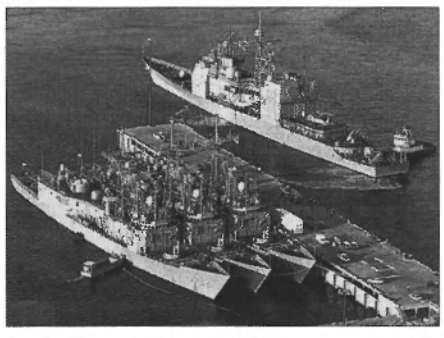
While at the Pascagoula, Miss. Naval Station March 25-27, the USS *Ticonderoga* (CG 47) participated in an Alpha and Omega Celebration honoring CG 47 as the Navy's first Aegis guided missile cruiser, and honoring *Port Royal* (CG 73) as the 27th and final ship of the program.

The *Ticonderoga* was christened at Ingalls in 1981 by then-First Lady **Nancy Reagan**, and joined the fleet in January 1983. *Port Royal* was delivered in April and will be commissioned in July.

The *Ticonderoga* was open for tours at the ceremony. Of the 27 ships in the Aegis cruiser program, Ingalls built 19.

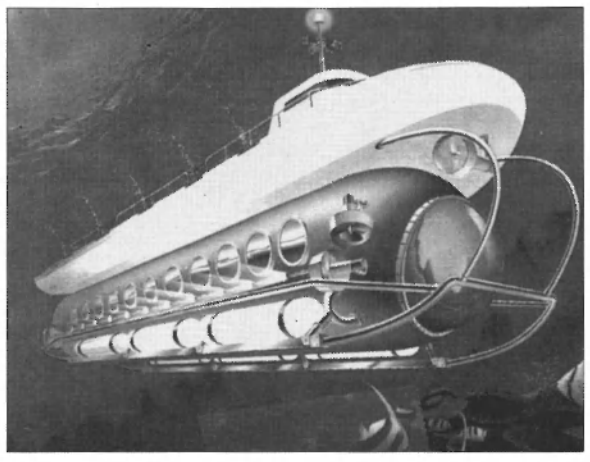
For more information on Ingalls,

Circle 14 on Reader Service Card



CG 47 is berthed alongside three frigates currently assigned to Naval Station Pascagoula, (l.-r.) USS *John L. Hall* (FFG 32), USS *Flatley* (FFG 21) and USS *Jack Williams* (FFG 24).

Daewoo Develops 48-Seat Tourist Submersible



Daewoo Shipbuilding & Heavy Machinery Ltd. has completed development of a 48-seat tourist submersible.The new tourist submersible can go to a depth of 246 feet (75 m) and stay submerged for up to 10 hours at a time. It can also travel at four knots, double the speed of imported tourist submarines currently in operation in Korea. Battery operation of the vessel helps to prevent sea pollution.The company began development of the vessel in August 1992 with a total budget of $3.75 million, and in-house development included a number of special equipment and materials required for the safe operation of the vessel. The company now has plans to develop faster, deeper diving tourist submersibles for the export market. Additionally, the company is paving the way, through technical development in underwater engineering, for the development of other marine leisure facilities.

For more information on Daewoo Shipbuilding & Heavy Machinery,

Circle 43 on Reader Service Card

Etoh Marine Delivers Monohull Ferry

Etoh Marine Corp., Imari City, Japan, delivered the *Fuki 8*, a 235-passenger monohull vessel, earlier this year for operation between Tomishima and Akashi, Japan.

The ferry is 110 feet (33.5 m) long, with a beam of 21 feet (6.5 m) and a draft of three feet (1 m).

The vessel is powered by a pair of Yanmar V-16 model 16LAK-ST1 engines delivering 1,600 bhp each. The engines drive conventional five blade propellers through Niigata MGM 433 reduction gears. It has a top speed of more than 28 knots. Electrical power is provided by a Yanmar 4CHL-N 40 kW generator. Controls and navigation equipment on the flybridge include hydraulic engine controls, Marol hydraulic steering, Furuno GP-1250 GPS, Furuno FCR-1421 radar, Furuno FM-7000 VHS and a Daiko Keiki compass. Etoh Marine Corp. designs and manufactures custom aluminum vessels. For more information on Etoh Marine Corp.,

Circle 41 on Reader Service Card

***Fuki 8* Equipment List**

Main engines	Yanmar
Reduction gears	Niigata
Generator	Yanmar
Hydraulic steering	Marol
GPS	Furuno
Radar	Furuno
VHS radio	Furuno
Compass	Daiko Keiki

Crowley To Build Two Tugs

Crowley Marine Services, Inc. has initiated the construction of two shallow-draft tugs for coastwise and river operation in its Western Alaska services. Total cost of the two new vessels is estimated at $5.2 million. Delivery of the first new tug is tentatively scheduled for early fall of this year. The two boats will have an overall length of 80 ft. (24.4 m) and a molded breadth of 28.5 ft. (8.6 m). The twin-screw tugs will generate a maximum bhp of 1,248. The new tugs will replace two older vessels presently in service in Western Alaska, where an integrated group of Crowley operations provides petroleum terminaling, sales, and direct-delivery barge service to over 1,200 coastal and river villages; dry break bulk; marine freight and lighterage; contract transportation; and common carrier services.

New Firm Wins Ferry Design Contract From Florida DOT

The newly-formed Cunningham & Walker Marine Consultants Inc. of Jacksonville, Fla. has won a contract for the conceptual design of a new 168-ft. (51.2-m) ferry to be built for the Florida Department of Transportation. This new twin-screw ferry will be a double-ended, single pilothouse, 40 car/passenger vessel for the Mayport Ferry Service. It will be a U.S. Coast Guard-inspected Subchapter H vessel. The vessel will have a breadth of 64 ft. (19.5 m) and a draft of 7.75 ft. (2.5 m). **Gary Cunningham** and **Jeffrey Walker**, both formerly of DeJong & Lebet Inc., recently established Cunningham & Walker Marine Consultants Inc. to provide naval architecture and marine engineering services for private and commercial vessels. The firm will be specializing in Subchapter H and T passenger vessels. For more information on Cunningham & Walker Marine Consultants,

Circle 71 on Reader Service Card

Simrad's Acquisition Of Shipmate Finalized

The Norwegian marine electronics group Simrad has finalized its acquisition of Shipmate, the Danish manufacturer of marine navigation and communications equipment. The take-over gives Simrad added momentum in the market for small-ship electronics, a new strategic area for the group.

Simrad is a leader in marine electronics for the commercial markets — the offshore industry, ocean science, fisheries and naval defense. Shipmate is a leading name in satellite-based GPS navigators, plotters and VHF radiotelephones for smaller commercial vessels, yachts and other leisure craft. Last year's acquisition of the U.K.-based Stowe organization, now Simrad Stowe, and of the Norwegian autopilot manufacturer Robertson AS, now Simrad Robertson, were also part of Simrad's strategy to offer a complete range of marine electronics.

For more information on Simrad,

Circle 130 on Reader Service Card

U.S. Cruise Industry Bill Supported By National Cruise Ship Alliance

Members of the National Cruise Ship Alliance testified before the Merchant Marine and Fisheries Subcommittee to support legislation to establish a U.S. cruise ship industry. The legislation (as initially reported in the February 1994 edition of *MR/EN*) is sponsored by Rep. **Joelene Unsoeld** (D-Wash.). Chairman of the National Cruise Ship Alliance **Robert Gogerty**, along with other members of the organization, met with civic leaders, port authorities and officials in 10 major U.S. cities on the Atlantic, Pacific and Gulf Coasts. Mr. **Gogerty** reports those talks convinced him that "the time is right for a U.S. cruise ship industry."

The package sponsored by Rep. **Unsoeld** would allow foreign-built vessels to operate directly between U.S. ports, provided operators begin construction of U.S.-built replacement vessels within three years.

MarAd Expands Electronic Bulletin Board

The Maritime Administration is expanding its computerized public bulletin board, Marlinspike, to include more information for the users and providers of water transportation services. "We hope this communications system will help American shippers get the information they need to make wise transportation decisions," said Maritime Administrator **Albert J. Herberger**. A special section has been added to MarAd's electronic bulletin board for U.S.-flag carriers to publish their vessel sailing schedules, sales and booking telephone numbers and other information. Shippers or the general public can leave messages for shipping lines and send messages to each other. In addition, MarAd is using the bulletin board to make information readily available on such topics as international and domestic trade, national cargo, ports and intermodalism, technology assessment and current legislation. Plans are being made to add information about the U.S. shipbuilding industry, in support of the President's initiatives to make it more competitive internationally.

Marlinspike is available from computers with modems by calling (202) 366-8505 (modem setting: 8 bits, no parity, 1 stop bit [8n1]). It also can be accessed via the Fed World Gateway (#72). For additional information on how to access or use the service, call (202) 366-5508.

Texaco Forms New Company For Russian Venture

Texaco, along with subsidiaries of Exxon, Amoco Corp. and Norsk Hydro, has formed a new limited liability company, Timan Pechora Company L.L.C. (TPC), to explore, appraise and potentially develop oil fields in the Timan Pechora basin of Arctic Russia.

TPC will act as the operating company for the project, located 1,100 miles northeast of Moscow above the Arctic Circle on the Pechora Sea. The contract area in the Timan Pechora basin, covering an area of about 2,847-sq.-miles, contains estimated recoverable resources of more than two billion barrels of oil. More than 130 wells drilled by Arkhangelskgeologia, the administrator of hydrocarbon activities in the region, have shown a success rate of more than 60 percent, resulting in the discovery of 11 oil fields.

"This working partnership is designed to seize upon what appears to be an enormous opportunity," said Texaco Inc. Senior Vice President **Peter I. Bijur**. Texaco's interest in TPC is 30 percent, with Exxon holding 30 percent, Amoco 20 percent and Norsk Hydro 20 percent.

Singapore Co. Wins Crane Contract

Fels Cranes Pte. Ltd., a subsidiary of Keppel Integrated Engineering Ltd., won a $2.8 million contract for three rubber-tired gantry cranes for the Port of Surabaya. Fels Cranes must supply engineering support and equipment packages for the cranes, which will be built in Indonesia.

DOT Requires Certain Pipelines To Accommodate "Smart Pigs"

The Department of Transportation (DOT) is requiring that certain pipelines transporting natural gas, hazardous liquids or carbon dioxide accommodate internal instrument devices known as "smart pigs"—devices that travel inside a pipeline to inspect and record the pipeline's physical condition. The smart pigs can reportedly detect anomalies in the pipe wall. The action is part of a plan to protect the environment developed by the Research and Special Programs Administration, under the direction of Secretary of Transportation **Federico Pena**.

USCG To Test Pollution Ticketing

The U.S. Coast Guard (USCG) has initiated a program to issue tickets for oil spills of less than 100 gallons and for other violations of pollution prevention regulations. The test will be conducted, over a six month period, in the port areas of Charleston, S.C.; Galveston, Texas; and Long Beach, Calif. The ticketing is another step the USCG is taking to enhance the effectiveness of its environmental enforcement policies to preserve and protect the marine environment and improve maritime safety. The violator will be made aware of possible civil penalties associated with the citation. The violator has the option of paying a proposed penalty within 30 days to close the case or may request a hearing. Comments on the ticketing program may be mailed to Executive Secretary, Marine Safety Council (G-LRA), U.S. Coast Guard Headquarters, 2100 Second St., S.W., Washington, D.C. 20593-0001, tel: (202) 267-1477. For more information on the program, call (202) 267-6714.

Stolt Comex Seaway S.A. Reports First Quarter Results

Stolt Comex Seaway S.A. (SCS), subsea contractor to the oil and gas industry worldwide, reported results for the first quarter ended Feb. 28, 1994. The result was a benefit of $4.5 million, or $0.45 per common share, from the cumulative effect of the adoption of a new accounting standard relating to income taxes.

In a regional review, **Guy J. Fleury**, president and CEO of SCS, said of the North Sea area, "SCS has upgraded the DSV *Seaway Condor* by increasing its capabilities to lay flexible pipes, umbilicals and power or telecommunications cables. *Seaway Condor's* advanced features for diverless construction work and its enhanced laying capabilities will be utilized on the Troll, Dunbar and Hudson projects this year. Offshore operations begin this month on the $80 million contract for Norsk Hydro on the Troll Oil development in Norway."

On Brazil, Mr. **Fleury** commented, "In Brazilian waters, at a world record depth of 3,000 feet (914.4 m), SCS participated in the installation of a production Christmas tree employing three ROVs working simultaneously from both a drilling rig and a flexible pipe lay vessel, demonstrating ... our state-of-the-art diverless skills in ever deeper subsea developments around the world."

In the Asia Pacific region, SCS, according to Mr. **Fleury**, "completed a platform and pipeline installation project in Indonesia working with the barge of our Chinese joint venture partner. (Recently) SCS began laying a pipeline and installing umbilicals for Arco Indonesia to tie-in a new subsea gas well north of Bali." SCS has also mobilized some of its ROV fleet from the North Sea to long term contracts on deep water drilling rigs in West Africa.

USCG Wants Cruise Ships To Screen Baggage For Safety

Cruise ships will be required to screen baggage with X-ray devices for weapons and explosives if the U.S. Coast Guard (USCG) gets its wish.

The USCG's proposed rules would also require cruise lines to light ships at night and use ID cards for crew members. Cruise terminals would have to take similar steps as well.

The proposed rules would require cruise lines to comply with security standards set by the International Maritime Organization (IMO) in 1986, prompted by the murder of an American passenger on the *Achille Lauro*. Compliance so far has been voluntary, and the USCG claims many cruise lines have not adhered to the standards.

The USCG predicts about 100 ships and 53 passenger terminals would be affected.

Before deciding whether to adopt the rules, the USCG will accept comment on them until June 23.

EPA Awards Seaward Services $5.6 Million Contract

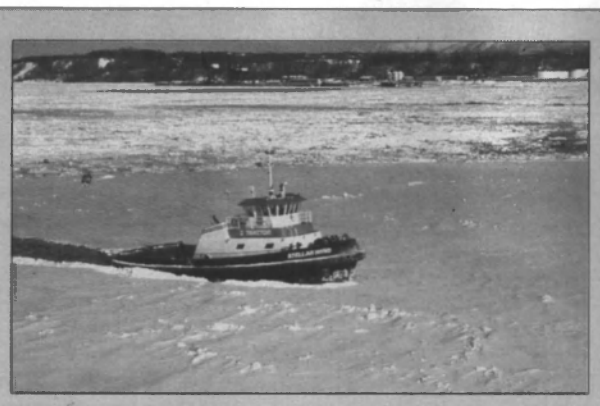
Seaward Services, Inc. (SSI), Port Everglades, Fla. was awarded a four year, $5.6 million federal prime contract by the U.S. Environmental Protection Agency (EPA) for the operation, maintenance and repair of research and monitoring vessels and workboats contained within EPA's Great Lakes fleet.

This contract is a follow-up to a previous four-year contract held by SSI, a contract which has just concluded. EPA's largest research vessel, *Lake Guardian*, is included in the new contract.

Now in its 13th year of operation, Seaward Services additionally provides a wide variety of marine, engineering and technical support services to the Naval Undersea Warfare Center, Newport, R.I. and to the Naval Surface Warfare Center, Ft. Lauderdale, Fla. under other federal prime contracts.

For more information on Seaward Services,

Circle 47 on Reader Service Card



The 85-foot (25.9 m) tug *Stellar Wind* cuts through the ice in Cook Inlet, Alaska on its way to a late-winter ship-assist assignment. The 3,000-hp vessel was designed and built to Ice Class 1-C requirements for Cook Inlet Tug & Barge by Tri-Star Marine of Seattle. The yard is currently building a similar tug, the 85-foot *Tioga*, for Coos Bay Towboat Co. of Ore.

Monarch Casino Awards Contract To R.A. Stearn

R. A. Stearn, a naval architecture and marine engineering firm, won a contract from Monarch Casino and Resort to develop contract plans and specifications for the conversion of the former Washington State ferry — the M/V *Chinook* — to a casino vessel for use on Lake Michigan. The vessel will be designed to carry 2,300 passengers and crew and will have approximately 30,000-sq.-ft. of gaming space on three decks which will provide casino patrons with an estimated 1,400 slot machines and 50 gaming tables. Bow and stern structural modifications plus the addition of a new deckhouse structure will give this conversion the appearance of a modern passenger vessel. Existing propulsion machinery will be refurbished and additional electrical and HVAC services will be provided.

For more information on R.A. Stearn,

Circle 49 on Reader Service Card

Reefco To Supply Navy With Refrigerated Containers

Reefco Manufacturing Corp. has been selected to supply three refrigerated containers to the Honolulu Shipyard under a U.S. Navy procurement program. Reefco's PF-2000 refrigeration system will be installed in the containers, which are selected for summer delivery. Reefco recently unveiled its system, featuring R-22 refrigerant in a dual compressor cascade configuration at the Refrigerated Transpo '94 in San Diego. "This order represents a significant milestone in our drive for market acceptance," noted President **Thomas Escher**. "We will shortly have demonstrator units in the hands of important commercial users, followed by these deliveries to the Navy."

Reefco designs and supplies refrigeration systems to the transportation industry, using components and materials that are reported to be environmentally friendly.

Reefco has also recently filed three patent applications for its methods which it claims provide enhanced cooling capabilities in cargo containers.

For more information on Reefco,

Circle 48 on Reader Service Card

Patent Issued For Launch And Recovery System

Applied Remote Technology, A Raytheon Company, was issued a patent for a method which safely deploys and recovers autonomous underwater vehicles (AUVs). Inventor **Ken Collins** developed the idea to enhance an AUV's inherent weather tolerance while operating subsea with increased indifference to the weather's effect on handling operations. SSTARS combines the advantages of existing systems into a simplified, reportedly cost-effective accessory, which allows AUVs to continue profit-making operation for longer periods of time.

With SSTARS, the AUV is gradually transitioned to/from the water with a gantry crane line lifting only the nose of the vehicle, thus reducing the ship's heave action to non-water-slipping, and non-slack-producing motions along the low drag axis of the vehicle. The SSTARS concept is integrated within a standard-size 40-foot container van, including storage provisions for all AUV support equipment, thus allowing simple transportation and mobilization operations. For more information on the system,

Circle 36 on Reader Service Card

Spanish Yard Gondan Delivers Two Landing Craft To Kenya

The Spanish shipyard Gondan, a member of the private-yard organization Construnaves-CNE, delivered two 197-foot (60-m) bpp landing craft to Galway Ltd. of Kenya.

The craft are self-propelled and equipped to load and unload wheeled cargo vehicles on beaches, ferry ramps, etc. They are fitted with a 13-foot (4-m) wide hydraulic-drive folding ramp forward, designed to support large-trailer traffic and other wheeled loads of up to 70 tons. The deck is adequately reinforced for this traffic and is fitted with the corresponding vehicle fastenings and lashing elements. On the port and starboard forecastles, two cranes are arranged for auxiliary boat maneuvers and cargo handling on deck. The two units have been built under the inspection of Lloyd's Register of Shipping, to class notation +100 A1 Landing Craft LMC.CCS.

Maneuverability & Automation

The builder claims that the vessels have great speed and safety in cargo loading and unloading provided by their vehicle handling facilities, and that the *Galana* and *Tana* are characterized by extraordinary maneuverability and highly automated control systems.

Each craft is propelled by two MTU diesel engines (1,350 BHP at 1,500 rpm) built by Spanish licensee E.N. Bazan. Along with two rudders and a bow thruster, this propulsion plant arrangement provides the craft's great maneuverability, as was demonstrated in sea trials. *Galana* and *Tana* were fitted with a control room within the engine room for monitoring during navigation and maneuvers. Duplicate remote controls of engine ramp and reverse gear are installed both on bridge and in engine room control space. An exhaust gas temperature monitor and centralized alarm and monitoring console, including main-engine, auxiliary-engine, steering-gear, firefighting and other warning signals, are installed in the control room, along with the main electrical switchboard. Grouped-alarm repeaters are fitted on the bridge and in the captain's cabin. Construnaves-CNE says the delivery of these two units is proof that there is export potential from the private Spanish yards and their capacity to meet owner specifications with precision, including in non-conventional buildings, as is the case of the two landing craft *Galana* and *Tana*. For more information on Construnaves-CNE,

Circle 7 on Reader Service Card

***Galana* and *Tana* specifics:**

Length o.a.	208 feet (63.5 m)
Molded breadth	43 feet (13 m)
Depth to main deck	14 feet (4.2 m)
Molded draft	8 feet (2.4 m)
Speed in trials	12.9 knots

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BUYING INTO THE FUTURE

U.S. Industry Is Changing To Compete

by
Greg Trauthwein, managing editor

By act of Congress or by act of will, the U.S. shipbuilding industry is making changes to become commercially competitive on the international market. There are myriad factors involved in the trend, including: funding from the government via Technology Reinvestment Project (TRP) or Maritime Administration Title XI guarantees for yard modernization; partnerships with overseas competitors fostering technology transfers; and introductions of new, commercially viable products. The bottom line: suppliers and shipyards are pulling out all stops to efficiently manufacture quality, cost effective ships. Here's a look at some recent developments.

New Designs, New Partnerships

As announced in the April edition of *Maritime Reporter*, Newport News Shipbuilding (NNS) debuted its design of a product tanker for the commercial market. Dubbed the Double Eagle 333, the ship measures 649 feet (197.8 m) long and 102 feet (31 m) wide, and has a deadweight of approximately 42,000 tons (design draft). According to **Ed Waryas**, director of commercial marketing at NNS, reaction to the new vessel "has been very favorable, we have had a number of serious inquiries domestically and internationally. One design feature that interested potential customers is that the Double Eagle utilizes all mild steel construction." He also said that the shipyard is in the position to sign a contract and start the process now. "We've done a lot of successful, on-time and on-budget ship repairs, and now with the Double Eagle the word is out that we are back in the commercial business," Mr. **Waryas** said.

While NNS—a yard long in history, experience and reputation—was announcing its commercial offerings, more recently a new shipbuilding venture announced its intentions to build ships in the U.S.

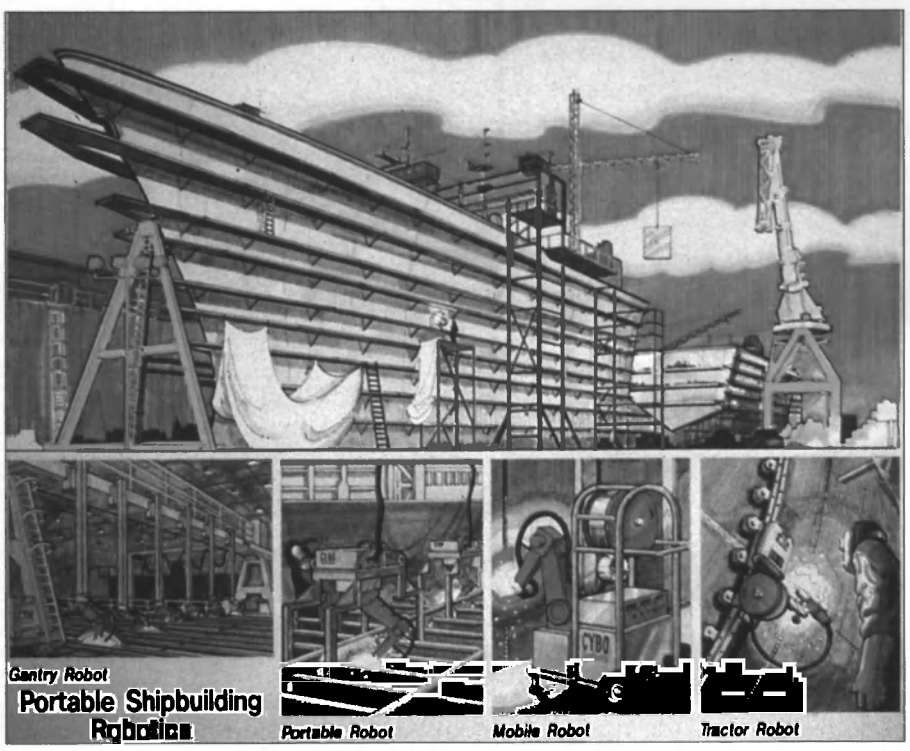
Shipbuilding Ventures, Inc.—formerly U.S. Shipbuilding Consortium, Inc. and a member of the Skaarup Group—made a joint announcement with McDermott Shipbuilding that the new group intends to build product carriers and other ships based on the Skarhar design (please see page 47 of this issue for full details).

Perhaps most interesting is that, along with the venture announcement, it was revealed that the Skaarup Group and SVI have signed a letter of intent with the new company—dubbed U.S. Shipbuilding Corporation (USSC)—to build a 40,000-dwt product carrier, with an option for a second.

Automation: Portable Shipbuilding Robotics

A TRP grant was awarded to CYBO Robots, which seeks to develop a dual-use portable robot welding system to help improve U.S. shipbuilding productivity. The $12.5 million project will attempt to integrate technical advances in personal computers, robot design, offline programming software, three-dimensional vision and weld sensors to provide a system that meets the unique needs of a shipyard.

CYBO Robots helped modernize General Dynamics' Land Systems Div.'s Lima, Ohio plant with robotic welding stations to build the M1A1 Abrams battle tanks more efficiently. The company is currently working—with the help of the government and shipbuilders—to develop portable shipbuilding robotics to help make the U.S. competitive on an international level.



Artist's rendition of CYBO Robots' portable shipbuilding robotics applications.

The keys to these robots will be their mobility and ability to be automatically programmed, offline, for a one-of-a-kind design. Further, the development team, in its proposal for the TRP funds, estimated that the cost of welding robots will be reduced more than 50 percent, enabling U.S. shipbuilders to purchase robots for less than $25,000. If successful, it is estimated that robots will automate up to 75 percent of ship welding.

To ensure that it will create a marketable product, CYBO Robots has assembled a team of partners and consultants to help every step of the way. According to **Ron Reeve**, CYBO Robots' president, the team basically consists of three member types: commercial members, technology members and marketing members. Four shipyards—Bath Iron Works, Ingalls Shipbuilding, National Steel and Shipbuilding Company (NASSCO) and Trinity Marine Group—are in essence the "marketing committee," Mr. **Reeve** explained, as each of their input will be used to define the yard's needs and determine if the product is usable. CYBO Robots is no stranger to helping develop productivity-enhancing robotic solutions, as evidenced by its role several years ago in the modernization of the General Dynamics Land Systems Division Lima, Ohio plant, which builds the M1A1 Abrams tanks.

Similarly, Mr. **Reeve** is no stranger to government-assisted technology programs, and of the ongoing TRP program he said: "I've been in industry a long time, and this is the most exciting government program I have ever seen. Research and development takes a long time, and getting venture capital (to fund R&D) is tough."

But the real benefit, he believes, is the program's focus on commercially viable products. "(With this project) we're not focused on building a product for the government; we are building a product for the commercial market which also fits the government's needs."

WEMD Takes Two TRP Awards

The Westinghouse Electro-Mechanical Division (WEMD) was the first privately owned design and manufacturing facility devoted exclusively to the production of critical components for nuclear reactors. Formed in 1952, the division is fully owned and operated by the Westinghouse Electric Corporation, in Cheswick, Pa. The initial focus of the facility was to provide reactor main coolant pumps with integral motors for the U.S. Naval Nuclear Propulsion Program. WEMD supplied the main coolant pumps for the world's first nuclear-powered submarine, the U.S.S. *Nautilus*.

ARPA received more than 80 proposals addressing shipbuilding and provided five awards. Of these five awards for the shipbuilding industrial infrastructure category, WEMD received two: Development of the Submerged Electric Cargo Pumping System, and Demonstration of the Integral Motor/Propeller Propulsion system for commercial ships. According to WEMD, a submerged electric drive pump would be a major step forward in liquid cargo handling technology for product tankers and liquid chemical carriers. The critical issue of operational safety has been thoroughly addressed in the design. The WEMD concept has received positive feedback from shipyards, ship operators, maritime architects and consultants.

The WEMD Submerged Electric Drive cargo pump would be a direct substitute for either of the currently available technologies: submerged hydraulic pumps or deck-mounted electric deepwell pumps. The design was conceived to provide advantages, including: eliminating the hydraulic power supply and high-pressure deck manifold of the submerged hydraulic system, and eliminating the long shaft and multiple bearings of the deck-mounted electrical system.

Foreign Partnerships: Importing Technology = Exporting Ships

The Maritime Administration has entered into a cooperative agreement with Bath Iron Works (BIW) to develop the capability to construct competitive ships for export. The two-year, $13.9 million project is in essence designed to transfer management and production process technologies to create a globally competitive shipyard. Specifically, technologies to be transferred could include computer-aided design and process simulation, advanced automated fabrication processes, flexible automation/robotics, real time measurement systems for process control, production planning, material control and estimating, and pollution abatement. These process technologies, it is maintained, will help improve both production of commercial vessels and warships for the U.S. Navy.

Of the total $13.9 million cost, the government will provide up to $4.5 million, with Bath Iron Works and its partners contributing $5.7 million in cash and $3.7 million in in-kind services. Partners in the project include Great American Lines, Inc. and American Automar, Inc. Also participating are Kvaerner Masa-Yards and Mitsui Engineering and Shipbuilding.

The TRP award is just one piece of BIW's attempt to modify technology, modernize facilities and develop human resources to become a competitive commercial shipbuilder, according to **Joseph Fortin**, director of commercial shipbuilding. According to him, BIW had a five-year plan to commercialize before TRP. The primary goal of the program was, and is, to save jobs and retain a skilled workforce.

The end goal of the five-year plan is to build RoRo-type ships, said Mr. **Fortin**, a vessel type chosen because of the complexity factor. "BIW's strength is in our ability to outfit complex ships," he said. The goal at Bath is to be in a position by

late 1995 to attract a multi-ship deal. While the final goal is to build commercial vessels, Mr. **Fortin** claims the yard will maintain ties to the Navy. "Commercial work at Bath Iron Works will not replace Navy work, it will supplement our core business, which is and probably always will be, Navy shipbuilding." Yet he maintains a direct benefit will be the capability to build Navy ships even more efficiently. It also means that BIW must integrate processes and systems which work best in a dual use—commercial and military—facility.

Phase one of the technology transfer, already completed, involved sending small, cross-functional groups from BIW to the two participating yards to observe. Phase two will entail taking the acquired knowledge from phase one, and sending back specific people to witness specific process technologies.

In BIW's case, the term "technology transfer" does not specifically equate to the purchasing of a piece of equipment, but rather to the transfer of process improvement techniques, leading to executable shipbuilding plans, from market analysis, to design, to a design and construction plan, to facilities modernization.

NASSCO is another shipyard looking overseas, while making facility enhancements, in an attempt to win commercial business. According to **Fred Hallett**, senior vice president and chief financial officer, the shipyard signed a technology transfer agreement with Kawasaki Heavy Industries Shipbuilding Div. (KHI). The agreement provides for employees from both yards to make visits, in particular looking at layout, accuracy control, equipment and the general processes incorporated to put an orderbook through the facility. He noted that the yards are very similar in many ways, and have been working together informally for the past 10 years, just recently formalizing the relationship with the technology transfer agreement. In essence, NASSCO wants to build "relatively simple, large, ocean-going ships," according to Mr. **Hallett**—such as tankers, container ships and car carriers.

However, Mr. **Hallett** maintains that "defense conversion" is in fact a misnomer for NASSCO, because of the yard's history of involvement in the commercial market. He refers to it more as a return to a strong commercial base, and maintains that the following areas must be addressed to do so:

- Yard Modernization: Must meet the standards to compete on an international level. Ongoing projects include the Ways 2 project, a $5 million project which is the yard's biggest facility upgrade, intended to help perfect its on-block outfitting techniques. The company hopes to use MarAd Title XI funds here.
- Technology Update: NASSCO believes its relationship with KHI can help it "leap frog" up to the technology level it desires.
- Market Access: Simply put, the creation of a level playing field (i.e. subsidy elimination), and in the event that never comes to fruition, teaming with foreign competitors. On the subject of subsidies, Mr. **Hallett** is doubtful that they will ever be eliminated: "If I was a foreign government and you were asking me to give up jobs, why would I do it?"

For skeptics who doubt the ability of U.S. shipbuilders to become competitive on the international level, Mr. **Hallett** suggests that the state of the U.S. steel industry years ago serves as a strong example to the contrary. "Ten to 15 years ago the U.S. steel industry was written off as old and non-competitive. There was a structure put in place to allow them to compete, and today's cost-per-ton is competitive worldwide."

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

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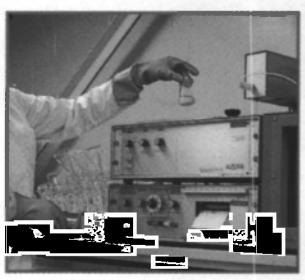
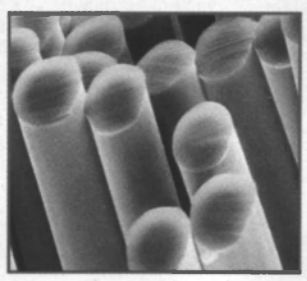
Technically, all polyester (including Dacron polyester) is made from the polymerization of a dicarboxylic acid ester with ethylene glycol, a dihydroxy alcohol.





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When considering any type or brand of polyester, be aware of the engineered properties required for your application. The more important question is: which polyester is the best engineered product for the specific application?

For further information, contact AlliedSignal Fibers, 224 West 35th Street, Suite #1500, New York, NY 10001.

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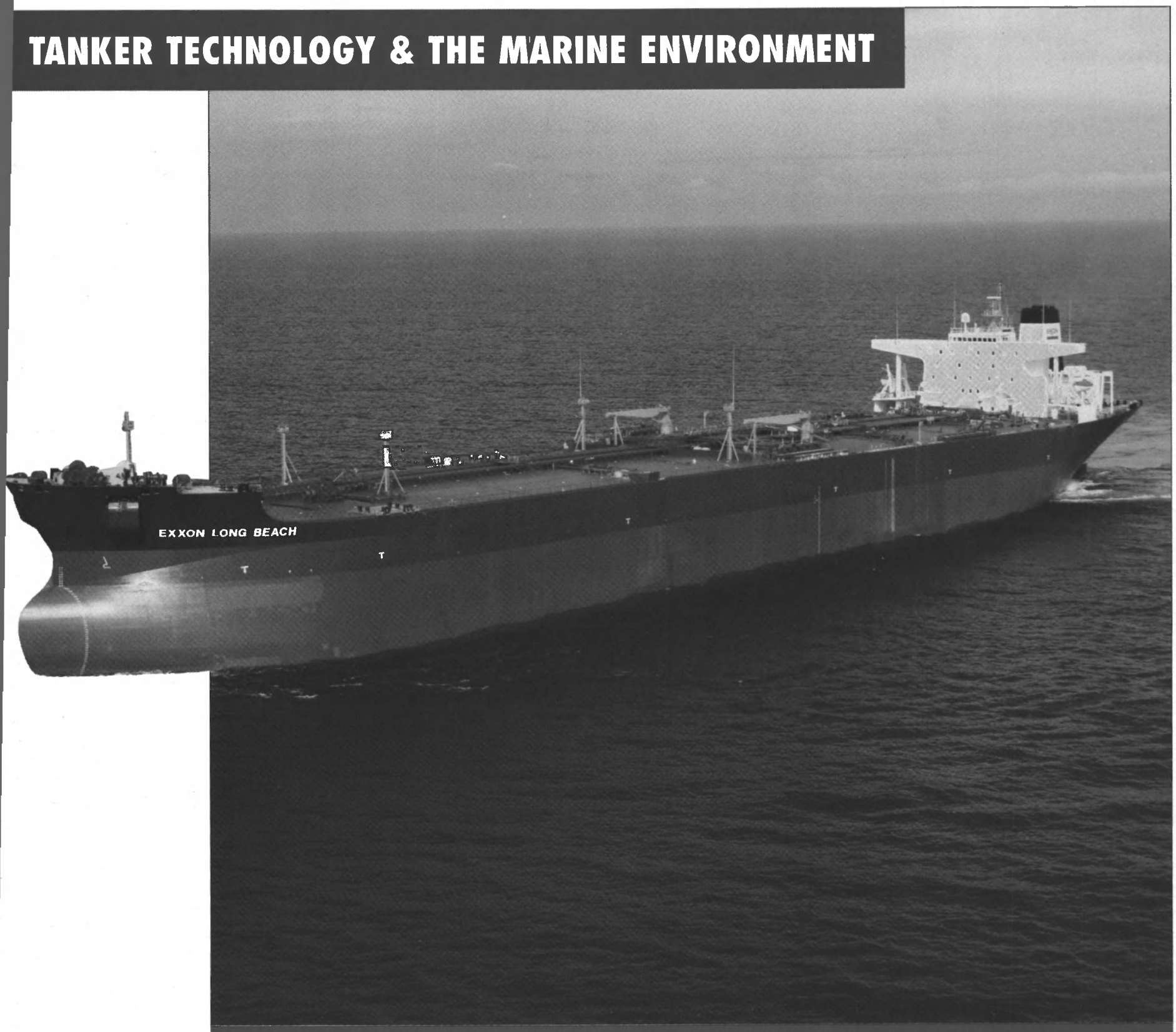
TANKER TECHNOLOGY & THE MARINE ENVIRONMENT



"TANKER TECHNOLOGY" Story Guide

ADVANCES IN TANKER PROPULSION

by
Graeme MacLennan, International Editor

A major VLCC newbuilding program is foreseen by market analysts who estimate that as many as 300 ships of this size must be replaced up to the end of the decade and into the next century. It should be recalled that practically no new VLCCs and ULCCs were built from the mid-1970s until a couple of years ago and that the existing ships are coming up for their fourth and fifth surveys, when extensive renewal of steelwork is likely to be indicated. They will, moreover, have difficulty in meeting the stricter legislation and even more stringent OPA '90 requirements. Charterers are imposing more onerous conditions which may be hard to fulfill and it has been reported that the oil majors have a "black list" of owners/operators and their ships which are unacceptable.

Today's basic requirement for propelling machinery best suited to a VLCC of around two million barrels (280,000 dwt) capacity is for an engine of 20 to 30MW (broadly 27,000 to 40,000bhp) according to the speed and margin required, but at very much lower revolutions than has hitherto been normal; this to take advantage of the higher propulsive efficiency to be gained by a well-designed, very large diameter and slow-running propeller.

The capital cost must be competitive, implying a low number of cylinders, and the fuel consumption curve flat and low over a wide range of speeds, typically 55 to 75 rpm.

The main propelling machinery of tankers, as with that for most other types of ships today, can no longer be considered in isolation and choice must take into account the secondary demands for energy on board: for electric and hydraulic power generation, cargo pumping in port and ballast discharge in port and transfer at sea.

This is among the main reasons why steam remained dominant in the tanker field for so long after it became possible and practical to install single diesel engines of appropriate power.* The main boilers also provided steam for turbo-generators, cargo and ballast pump turbines, cargo tank heating and also flue gases of low oxygen content for ullage volume inerting. Weighed against the steam turbine was a specific fuel consumption inherently inferior to that of the diesel engine; a characteristic aggravated during the 1970s and 1980s when periods of "slow steaming" became necessary while markets were found for the oil they carried.

* For some 25 years after WWII almost the only choice for the large tanker was the geared steam turbine. Single diesel engines of sufficient power were not available, without going to many cylinders, involving higher first cost, maintenance effort and a longer and more expensive ship. There were, of course, exceptions, notable among Scandinavian and Italian owners, who did install high power diesel machinery with up to 12 cylinders in their then-large tankers.

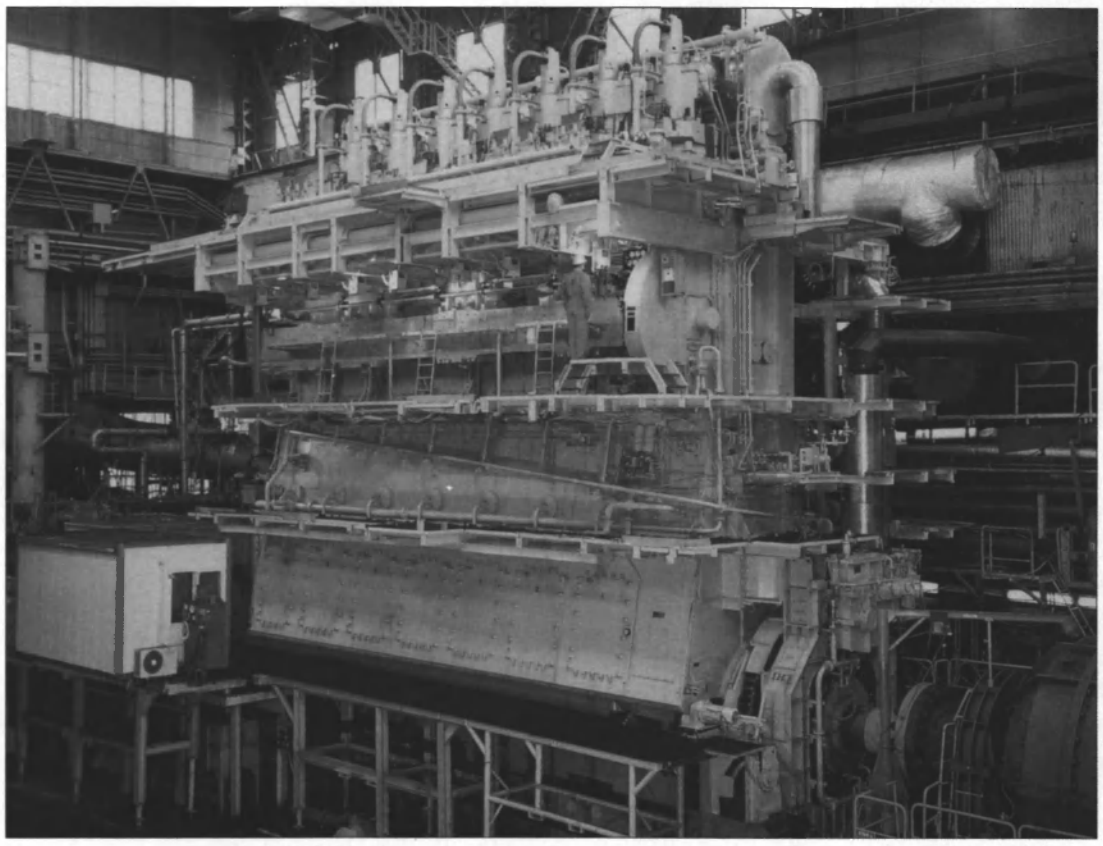


Fig. 1: A Sulzer 7RTA84T engine of 36,960bhp (27,160kW) at 74 rpm. The first of its type, it was built by Diesel United in Japan and is being installed in a 258,000-dwt NYK tanker.

The first fuel crisis of the early 1970s resulted in an immediate and total halt in large tanker newbuilding, and many cancellations. Only a handful, already too far advanced to be stopped, were delivered in 1976-77.

Except for oil/ore and OBO-carriers (which are less frequently ordered today anyway), tankers spend half their sea time sailing in ballast with the machinery developing relatively lower power. The development of modifications to be incorporated as standard has engaged the leading manufacturers in recent years to enable the engines to provide near-optimum economy over a very wide range of powers. Previously only modest advantage could be obtained by fitting "slow steaming" fuel injection nozzles prior to such a passage. Now, the necessary alterations to injection timing can be performed without stopping the engine.

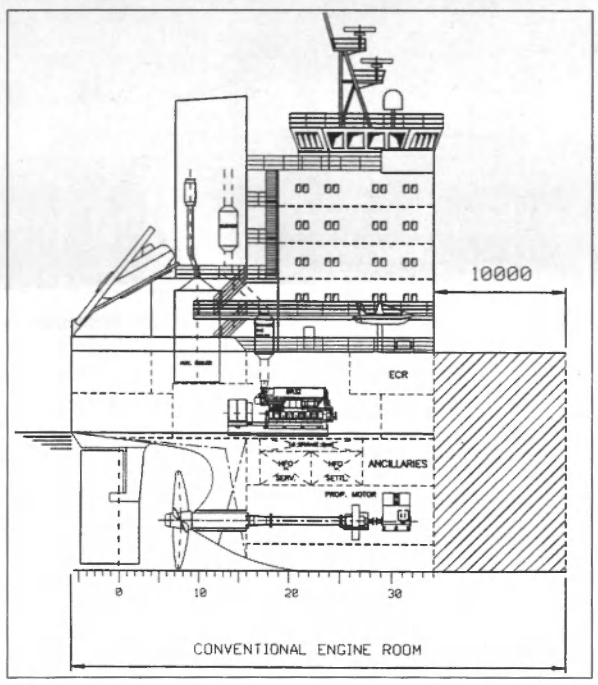


Fig. 2: Savings in engine room length (and gain for cargo space) is made possible by a modern diesel-electric plant.

The successive fuel crises with their dramatic rise in ship-operating costs have had, ironically, a very beneficial effect on the development of the large crosshead diesel engine. For decades during which oil was cheap and a relatively low factor in operating costs, the improvement of fuel consumption had not been a pressing requirement, with only year-by-year minimal reductions.

That the latest models are now burning 25 percent less fuel than they did many years ago, is a measure of the intense and successful effort expended on the problem by designers, metallurgists, turbocharger and lubricant suppliers. Moreover this is a lasting benefit, but the law of diminishing returns makes such progress unlikely to be sustained at such a rate.

This has been achieved by employing much higher working pressures and temperatures, calling, in turn, for close attention to the fuel injection processes, controlled cooling of critical areas, and economical distribution of cylinder lubricant precisely when and where it is required. Long life of wearing parts is a factor closely considered today, as is simplicity and ease of maintenance, important in view of the much-reduced number of skilled and knowledgeable engineering staff carried at sea.

The thermal efficiencies of these latest designs of engine is so high that the heat content of the exhaust gas is insufficient, particularly at reduced powers, to make the capital cost of a waste heat boiler recoverable.

Hull Appendages

The naval architects were not to be outdone in the general move to higher operating efficiency; not an easy task when dealing with the necessarily full-bodied hull form of a large tanker. Attention paid to the afterbody and water flow to and from the propeller led to the introduction of a number of appendages; full or partial ducts forward and aft of the propeller and fins in way of the bossing to correct straighten the flow of the water rising up in vortices on its approach to the propeller disc.

Others were radial fins fitted to the rudder post, and angled to recover wake energy. The free-running Grim Wheel, mounted on the propeller cap or the rudder post immediately aft of it, makes use of the aero engine fan-jet principle for the same purpose.

Some of these are not new, and can be seen in maritime museums as examples of past inventions which, although promising, did not show sufficient return for full-scale application be-

cause fuel was then too cheap to make energy recovery worthwhile.

One of the latest developments is a pair of co-axial contra-rotating propellers (CRP), now at sea on two Japanese VLCCs. The CRPs are reportedly returning a gain of over 14 percent; really worthwhile, but at some considerable extra first cost and mechanical complication. Late in 1992 the 258,000-dwt *Cosmo Delphinus* went to sea from the Mitsubishi Nagasaki shipyard with a 28,000-hp CRP installation driven by a Mitsubishi 7UEC75LSII engine through a Renk Tacke star-simple planetary gear set. The engine drives the after propeller directly and the forward propeller through an outer quill shaft which receives its drive from the toothed annulus of the planetary gear. Last year the *Okonishima Maru*, of the same capacity, came into service with a DU-Sulzer 7RTA84M engine of 27,220bhp and a propeller pair driven by a star-compound gear of IHI's own design and construction.

Ultra-Long Strokes—The "T" Engines

The longer-stroke versions of the engines offered by the three surviving crosshead engine design houses have proved very successful in large tankers, but clear indications that even slower propeller speeds would be beneficial for enhanced propulsive efficiency has led to even longer-stroke versions for running at revolutions down to less than one per second being designed and offered by New Sulzer Diesel and MAN B&W. Mitsubishi has had such an engine, with a successful sales record, in their portfolio for some time.

These engines have been developed fairly rapidly as they are based on well-tried existing models. Interim research and development has led to their incorporating the latest technology, including electronic control of essential operating functions: timing and duration of fuel injection, timing of exhaust valve operation and of lubricant application to the cylinder liners. This development has been aided by the existence of full-size research engines at the licensor's headquarters, on which long-term tests can establish satisfactory new techniques.

The "relaxed" regime of such slow-running engines, all of which are uniflow-scavenged with hydraulically-operated exhaust valves, has enabled the designers to optimize the combustion process to a degree never possible in the past.

New Sulzer Diesel's RTA84T engine, the first example of which, built by Diesel United (DU) of Aioi, their most energetic licensee, will shortly go to sea in a NYK VLCC built in DU's associated major shipyard at Kure, incorporates some of the most significant advances ever incorporated in a diesel engine, large or small (see Fig. 1, page 28). This has not been lost on other operators, and it is a measure of the importance of this step that, at the time of writing, 16 more engines of this type have been ordered for large tankers, building in Korea, Japan and Taiwan; all but one with seven cylinders, and totaling 623,040bhp (457,840 kW).

The brake specific fuel consumption (SFC) of the bare engine (i.e., without a power recovery gas turbine), is 125g/bhp-h (170g/kW-h). Special attention has been paid to the improvement of part-load fuel consumption, for the reasons noted earlier. VLCCs are engaged on very long-haul, fully-loaded voyages, generally followed by a return voyage in ballast at relatively light engine load, and the prudent owner specifies generous continuous service margins.

RTA84T engines are equipped with a combination of variable exhaust valve closing (VEC) and variable fuel injection timing (VIT) which, together, enable SFCs down to 121g/bhp-h (165g/kW-h), and 118g and 160g, respectively, with an exhaust gas recovery turbine, to be achieved at 70 percent engine load. Load-dependent cylinder liner cooling and lubrication can be expected to extend even more the life of these expensive, but eventually consumable items.

Although the piston stroke is some 8.5 percent greater, the engine is no taller, indeed even shorter than the RTA84M, by the use of shorter connecting rods. Engine height, in any case, is seldom a problem in large

tankers.

Three injection valves per cylinder head have shown to be an advantage in engines having S/B ratios approaching 4.0.

A noticeable change in appearance results from raising the camshaft to mid-cylinder height, calling for an extra idler wheel in the gear drive, but with advantages in performance of the fuel injection and exhaust valve actuation events.

MAN B&W's S80MC model has proved a very popular engine for VLCCs with speeds of up to about 15 knots, in which the seven-cylinder version of 34,650bhp (25,480 kW) at 79 rpm MCR is well suited. The *Arosa*, first double-hulled VLCC to be built in Japan, is an example of such an installation. The S90MC-T is being introduced for applications where a higher speed is required. This can be accommodated by a six-cylinder engine, or an economy-rated seven-cylinder model.

Electric Transmission

Electric transmission has returned as a significant medium for powering tankers, specifically those employed on special duties such as relatively short-haul shuttle runs between the loading buoys of offshore oil fields and mainland terminals or transshipment stations. This is not for reasons of expediency, as was the case during WWII when the many hundreds of T2 tankers and troopships built in U.S. yards were fitted with steam turbo-electric machinery because the nation's heavy gear-cutting facilities were totally committed to naval construction.

Electric transmission confers a number of advantages as it can be applied to secondary, but important non-propulsion purposes.

It solves at one step the problem in motor tankers of providing additional sources of power for the vital duties of cargo and ballast pumping, using variable-speed electric motors supplied from the main propulsion generators.

Dynamic positioning and keeping station when loading from an offshore terminal calls for high power being constantly available for applying short bursts of thrust by the main propeller and bow and stern thrusters.

This is technology, on a larger scale, which has been used for some time in research ships and minehunters. It relieves the installation from what has been described as the "tyranny of the shaft-line," enabling a much shorter engine room, as the prime movers and generators can be installed above the propelling motor (see Fig. 2, page 28).

Chevron has had five 40,000-dwt tankers in service for some 18 years with this arrangement of plant, but with GE heavy-duty gas turbines as prime movers.

A number of these ships presently on order have broadly similar machinery: a "power station" consisting of multiple constant-speed diesel-generators which provide energy through a frequency converter to a variable-speed electric motor coupled to the main propeller (which may or may not be of controllable-pitch type).

Current is led from the HT busbars to further frequency converters, the output of which is applied to the variable-speed motors driving the cargo pumps and thrusters, respectively, under control from the cargo management space in harbor, and the wheelhouse through a "joystick" controller or satellite position reference when attending an offshore buoy.

A technically more attractive and potentially less expensive proposition is to use multiple (two or four) smaller propulsion motors geared to the single screw.

This would enable much simpler frequency converters to be used and, moreover, the same ones could be applied to the pumping and thruster supplies.

This system would also be attractive for conventional main haul tankers for which dynamic positioning is not a requirement, but high efficiency maintained down to low powers for longish periods could be an advantage.

ABB Energy of Helsinki, Finland is supplying the electrical transmission plant for all of the North Sea shuttle tankers of the next generation, three to be built in Spain and one in Korea.

Drive For Quality To Afflict Owners, Benefit Builders

Aging Fleet, Enhanced Inspection Programs To Drive Newbuildings, Repair & Maintenance

by
Ian Marriott, Drewry Shipping Consultants

The inherent problem currently undermining the tanker market — oversupply of tonnage in a climate of poor demand for oil — is epitomized by the VLCC sector. In 1992, for instance, the delivery of 22 VLCCs (5.9 million dwt) to the fleet was broadly in line with scrapping.

During 1993, however, deliveries far outweighed sales for demolition, a fact which further distorted a supply-demand balance already firmly weighted against the owner. It is provisionally estimated that 37 VLCCs (10.1 million dwt) entered the world tanker fleet during 1993, while only 25 vessels (6.1 million dwt) were reported sold for demolition.

In a period of such fragility, the accompanying steep increase in operating costs — a direct result of the 1990s' "drive for quality" — has served merely to compound the current problems.

Unfortunately for the tanker owner, it would appear likely that these increases have yet to run their course, a point highlighted in Drewry's recent survey, "Ship Costs in the 1990s: The Economics of Operation and Ownership."

The report, published in February 1994, suggests that the following key operating cost trends are likely to dominate the 1990s:

• A further hardening of the insurance market as underwriters continue to make up for the losses suffered in earlier years. Thus, despite the encouraging reduction in casualties in 1992 and 1993, owners are likely to face further increases in the cost of hull machinery (H&M) insurance, maybe by as much as 20 percent per year to 1995/1996. The position is likely to be further exacerbated by newbuilding and secondhand price developments. If, for instance, newbuilding prices firm again in 1994-1995 and then continue at strong levels on the back of replacement demand, H&M premia should also rise to reflect the higher unit value of the fleet.

• Repair and maintenance (R&M) costs, which increased sharply during the late 1980s and early 1990s, are forecast to rise still further during the remainder of this decade, a response to: (a) the continued aging of the world fleet (older vessels are likely to require more frequent drydocking for main event repairs and more time in drydock for increasingly extensive repair work) and (b) the increasing attention to "quality," the outcome of which is likely to be a further tightening of vessel inspection procedures.

• The combination of a shortage of skilled seafarers and the campaign to improve standards is forecast to result in a rapid rise in crewing costs, particularly for those officers and ratings who will be in real demand.

While this rapid escalation in costs will severely handicap owners, it is likely to be of great benefit to the shipbuilding industry. With nearly 60 percent of the world's tanker fleet over the age of 15 years at the end of June 1993, newbuilding demand will undoubtedly surge in the latter half of the 1990s. While OPA '90 and the March 1992 Amendments to the International Maritime Organization's (IMO) MARPOL 73/78 convention will not compulsorily curtail the lifespan of most tankers, the increasing number and stringency of inspections that a vessel must undergo may force owners to end the trading lives of their vessels earlier than anticipated. The degree to which this occurs will be strongly influenced by developments in three key areas: (1) classification society procedures; (2) port state control strin-

"With nearly 60 percent of the world's tanker fleet over the age of 15 years at the end of June 1993, newbuilding demand will undoubtedly surge in the latter half of the 1990s."

gency; and (3) checks by insurers.

The Enhanced Survey Program (ESP), formulated by members of the International Association of Classification Societies (IACS) in response to MARPOL 73/78's requirement for "an enhanced program of inspection" for tanker and bulk carriers, is likely to have a significant impact on R&M costs in the 1990s. The scale of such cost increases is almost impossible to gauge, given that the system only entered into operation on July 1, 1993, but it is possible nonetheless to comment on the likely areas of impact. One of the chief areas of increase will be in respect of the extended Intermediate Survey. The evidence that many tankers and bulk carriers require structural repairs between special surveys is likely to lead to much greater steel renewal requirements for vessels over 10 years of age.

Such is the spread of new port state control regimes that it is tentatively suggested that there will soon be a system of port state control in every region of the world. In December 1993, for example, 17 Asia Pacific maritime nations signed a new regional port state control agreement in Tokyo. The new system — known as the Tokyo Memorandum of Understanding (MOU) — will take effect from April 1, 1994 and will operate in close conjunction with the Paris MOU and Latin America's Vina del Mar Agreement, the long-term aim being for the 17 nations to inspect 75 percent of the foreign-flagged vessels operating in the region by the end of the decade.

In the same month, there was significant progress in the campaign to establish a port state control regime in the Caribbean, with a provisional agreement to put into place as soon as possible a port state control scheme. Preliminary discussions are also reported to have taken place in South Africa, India, Kenya, Tanzania and some Middle Eastern Gulf States with a view to establishing similar port state control systems.

Complementing these advances, there are signs that those nations with port state control schemes already in operation are noticeably tighter in their control of foreign-flagged vessels, especially those with questionable safety records.

One of the best examples of such a philosophy has been seen in Europe, where it was reported during December 1993 that still further measures are being planned by the European Commission to step up the fight against substandard vessels.

Though precise details have yet to be announced, it is reported that measures may include:

• Focusing inspections on first-time callers to European ports, ships from flags with dubious safety records, ships suspended by classification societies and vulnerable vessels.

• More stringent rules regarding the rectification of faults and provision for banning vessels from EU waters.

In addition, speculation is rife that the European Commission will soon allow only vessels classed by members of IACS to enter European ports.

In Australia, the findings of the "Ships of Shame" inquiry — prompted by the loss of several bulk carriers which had visited Western Australian ports — are likely to lead to tougher port state control checks for foreign-flagged vessels, including tests of crew ability. Senator **Bob Collins**, Transport and Communications minister, stated that the Australian Maritime Safety Authority had inspected 1,720 foreign ships during 1992, and found more than 70 percent to have some kind of problem.

In the U.S. — already stringent checkers of foreign-flagged vessels — the marine safety chief of the U.S. Coast Guard (USCG), RAdm. **Arthur Henn,** pronounced during 1993 that the U.S. plans to "shine a bright light" on poor ship operators by making vessel inspection and boarding files generally available so as to prompt greater compliance with existing international safety conventions.

With regard to checks by insurers, underwriters are increasingly introducing their own vessel inspections as a means of assessing the risk they are taking on themselves.

The U.K. Mutual Steamship Assurance Association was, for example, planning to inspect up to 600 ships in 1993 as part of a campaign to control claims.

This marks a sharp increase on 1992, when around 450 ships were inspected, taking the total to nearly 1,000 vessels since the launch of the scheme in June 1990. In addition, reports suggest that insurers too are becoming more stringent in their checks on vessels. It was reported in August 1993, for example, that more than 20 shipowners were refused renewal terms for the current underwriting year by the Standard Steamship Owners' Protection & Indemnity Association for failing to meet the standards required by the Club.

In its 1993 annual report, the London P&I Club announced that it refused quotes on two-thirds of vessels offered last year.

In addition, it also declined to renew coverage for 36 vessels totaling 436,000 grt. The net is clearly tightening on owners of substandard tonnage, a trend that is likely to be welcomed by the world's shipbuilders.

OPA '90 Implementation

Single-Hull Retrofit Regulations

The OPA '90-mandated retrofit regulations for single-hull vessels were further delayed recently when a report from Herbert Engineering Corp., a San Francisco consultancy, surprisingly called into question basic assumptions behind the Notice of Proposed Rulemaking (NPRM) regarding retrofitting single-hull tankers of more than 5,000 gt with protectively-located non-oil spaces (PL/S). The report on Probabilistic Oil Outflow Analysis concluded that the PL/S would not increase environmental safety but could actually increase oil outflow in the event of a collision, and at significant cost to owners.

The USCG is currently considering a "three-prong approach" to the situation:

- Expediting the implementation of non-controversial elements of the NPRM — requiring emergency lightering equipment and that foreign-flag vessels report their International Maritime Organization (IMO) international number in the Advance Notice of Arrival report.
- New rulemaking to include operational issues after identifying operational measures some owner/operators have implemented that may reduce casualties, as well as expanding regulations to include more tank vessels, and converting some Navigation and Vessel Inspection Circulars into regulations.
- A supplemental NPRM and revised Regulatory Analysis regarding structural measures and hydrostatically balanced loading (HBL).

Vessel Response Plans

On Feb. 4, 1994, the USCG approved the first company vessel oil spill response plan required by OPA '90. The first company approved was Naess Shipping B/V of Holland; the first domestic company approved was Coastal Towing of Houston, Texas. Capt. **Michael J. Donohoe**, branch chief for Headquarters' Marine Environmental Protection Division, said the USCG was presently processing more than 1,700 plans for more than 7,000 vessels, and expected additional approvals in the near future.

The USCG continues to receive five to eight plans per week, and anticipates completing its review of the vessel spill response plans already being processed by the end of August 1994.

National & Area Contingency

Area Contingency Plans must address requirements of the National Contingency Plan (NCP), improvements upon which OPA '90 mandated. Reportedly, all are approved or pending approval.

Committees created to draw up the plans have reportedly identified their areas' sensitivities and structured response priorities based on them. The EPA, the lead agency for the NCP, published the NCP proposed rule on October 22, 1993.

Discharge Removal Equipment

OPA '90's requirement for the carrying of pollution discharge equipment found its way into an Interim Final Rule (IFR) published December 22, 1993, requiring sorbents, containers to hold recovered waste, deck-cleaning emulsifiers, protective clothing, at least one non-sparking portable pump with hoses and scupper plugs.

Double Hulls

An IFR on double-hulling all vessels operating in U.S. waters was published August 12, 1992. OPA '90 requires all vessels carrying oil in bulk cargo to have double hulls by 2015 via a phasing-in process. The IFR provided technical standards for double-hulling vessels that OPA '90 itself did not, enabling the shipping and shipbuilding industries to make the provision a reality. Issues still to be settled are the Environmental Assessment, the definition of oil, and the IMO Marine Environment Protection Committee's recommendations regarding MARPOL amendments dealing with existing vessels.

Studies

Three of five major studies were submitted to Congress for approval

(Continued on page 35)

Chantiers To Start Delivering Tankers

Yard develops a number of automated processes and machines for the construction of LNG tankers

Chantiers de l'Atlantique, a subsidiary of GEC Alsthom, is building five methane carriers for Petronas Marine of Malaysia. The keel for the first of the five tankers was laid in September 1992. This tanker will be delivered in July 1994; delivery of the remaining four ships will be staggered between July 1994 and July 1997. The 130,000-cu.-m. liquefied natural gas (LNG) carriers have been constructed using automated manufacturing and assembly processes. Each LNG carrier has four tanks which are incorporated in the ship's metal structure. Thermal insulation for the liquid methane cargo is provided by a double layer of plywood boxes filled with perlite, an insulating powder made of volcanic materials. Gastightness is ensured by a 0.7-mm-thick membrane made of Invar, a steel and nickel alloy which has an extremely low coefficient of thermal expansion. For safety reasons, a second, identical membrane is placed between the two layers of boxes to ensure tightness in the event of a leak in the first membrane. To minimize the cost of assembly operations aboard the ships, components have been extensively standardized and widespread use has been made of prefabrication techniques. The construction of a carrier requires 50,000 plywood boxes, each measuring 1 m (3.3 ft.) by 1.2 m (3.9 ft.), which are produced in a fully automated, purpose-built workshop on site. In addition, the special Invar parts forming the tank corner structures are made in completely pre-fabricated 10 foot (3 m) long elements.

Special attention has been given to optimizing the supply of the many components installed aboard the ship. Materials are delivered by the erectors themselves using the "just-in-time" method with the aid of a computer system.

One of the first operations to be carried out inside the tanks is to weld metal elements called coupler studs to the ship's double hull, working from data provided by a precision topographical survey. The studs anchor the first layer of boxes. Chantiers de l'Atlantique has developed a special device for this purpose. The Dromadec system comprises a viewing unit, an onboard computer, a stud positioning arm and a welding torch. Using the topographical data provided by a laser and a distance measuring device, the computer places each coupler at the desired position before welding it automatically to the double hull. Dromadec reportedly makes it possible to achieve the precision specifications set for assembling the tank's insulation elements, namely a +/- 0.9 mm positioning accuracy for the studs relative to the topographical data.

Chantiers de l'Atlantique and a number of specialist firms have worked together to develop machines to automate the welding of the membranes and achieve maximum quality. A single ship requires 90,000 m of resistance seam welding and 21,000 m of TIG welding. For more information on Chantiers de l'Atlantique,

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OPA '90 Round-Up

(Continued from page 32)

on January 4, 1993: the IMO Comparative Design Study, the National Academy of Sciences Study, and the Herbert Engineering Study (which resulted in the previously-mentioned delay in single-hull retrofit rules). One of the remaining reports is complete and being cleared. The other, the Tanker Navigation Safety Study, is of such complexity that it has been broken down into 12 sub-studies, and is expected to be completed in several more years.

Tanker Escorts

According to **Bruce Novak** of the USCG's OPA '90 Staff, the two states identified by OPA '90 for tanker escort requirements are Washington and Alaska. He said the USCG has taken some "heavy hits" on the issue from lawmakers who want tankers traversing state waters to have mandatory tug escorts, particularly in Washington, where the major proponents of immediate precautionary measures are Gov. **Mike Lowry** and Congresswoman **Jolene Unsoeld** (D-Wash.). The USCG has reportedly said that safety measures should be created within the boundaries set by international treaties and agreements, and through diplomatic channels between the U.S. and Canada.

The Business Of Crisis Management

OPA '90 has created a private sector determination to prepare for spills, often beyond what's required by law. Oil spill preparedness has become marketable, and companies are offering a host of products and services to tanker owners and others in related fields. The trend has extended to training for crews, training for lawyers, insurance officers and others: organizations such as Environmental Crisis Management, Inc. (ECI) of Stamford, Conn. offer seminars on decision-making in oil spill crisis situations (its most recent was held on May 2). The seminar, called "Spill '94: A Problem-Solving Symposium," is made up of scenarios which introduce a series of problems attendees would encounter in an oil spill situation, and illustrates ways they must work together to resolve those situations optimally.

Environmental videos are being offered to assist owner/operators in preparing themselves for the future as dictated by OPA '90: PCCI of Alexandria. Va. offers owner/operators a video on developing vessel spill response plans. Oil spill response contractors are another outgrowth of the "response fever" which has translated into business opportunity. New technologies are being developed either specifically for, or with definite application in, oil spill response: from GPS-linked oil slick tracking buoys to powerful ECDIS systems to improve navigation and reduce the likelihood of groundings.

The Near Future

More recent developments toward oil spill prevention measures, resulting from more recent experience, include laws reportedly being considered in Puerto Rico to keep tankers five miles offshore until cleared by port officials, and legislation that would allow background checks on owners and the barring from San Juan Bay of any owners with previous violations. As the industry gains more experience in combating spills, new issues will arise and command attention: this makes sense if one views OPA '90 as a commitment to an evolutionary process that will result in reducing the probability of oil spills to a minimum. Mr. **Novak** of the OPA '90 Staff cites two major unresolved issues: existing vessels and escort vessels. But, he said, "We are making a concerted push to finish up the outstanding issues this year." As stated in a recent report by Mr. **Novak**, "It is rare to achieve perfection on the first effort, and there is no doubt that as we live with OPA '90 there will be plenty of suggestions on ways to improve it. This is as it should be. The world changes and our understanding of it changes as well."

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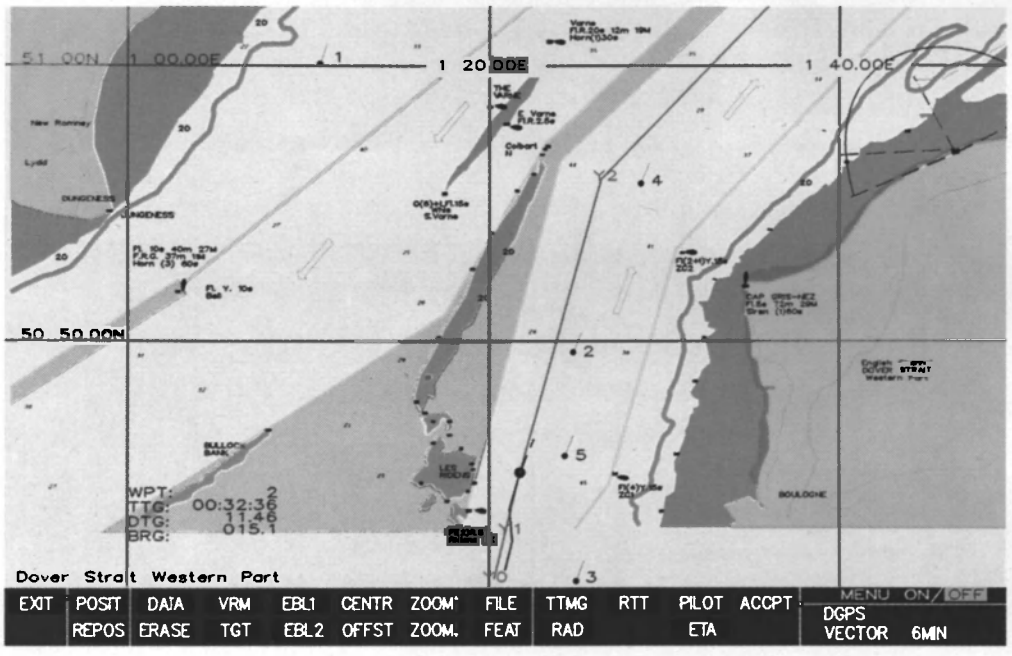

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Eighty percent of vessel groundings can be avoided by improving navigation information, monitoring the vessel's advance and increasing the watch officer's effective conning time. This fact is the driving force behind Sperry Marine's integrated bridge design.

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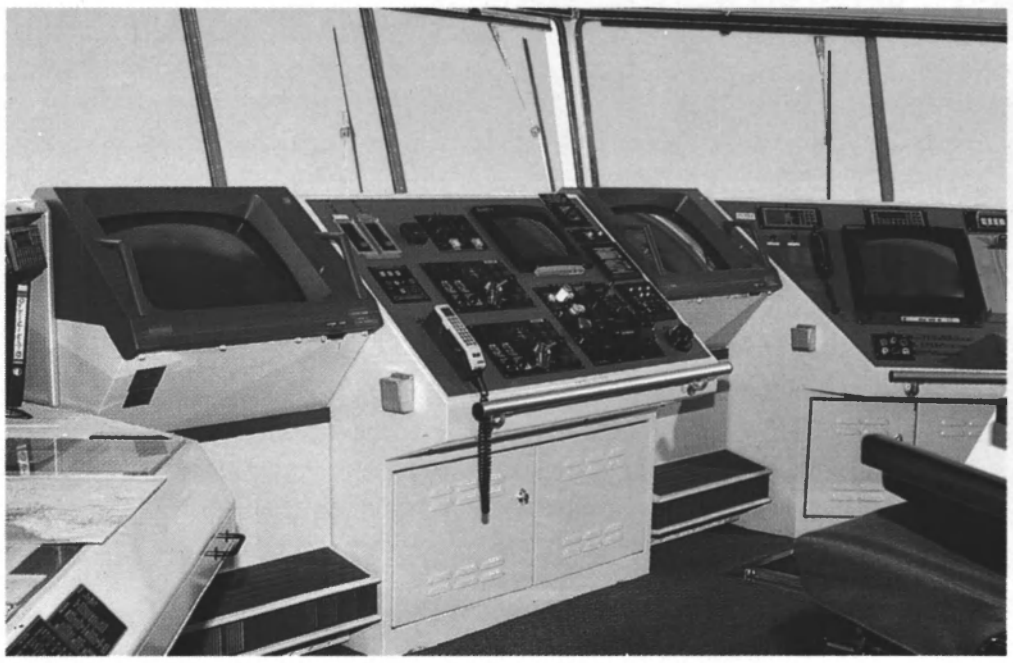

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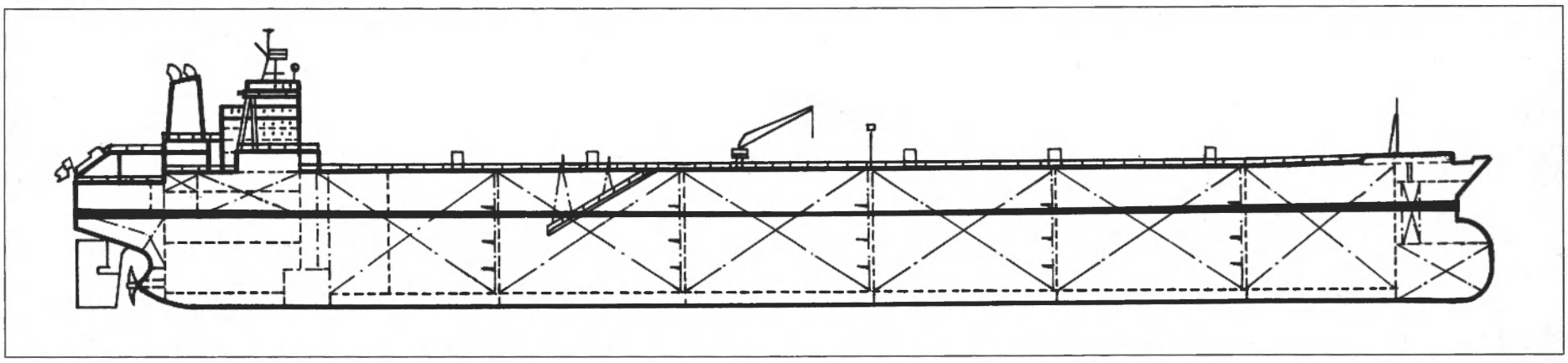

E3 Update:

Astilleros-built VLCC Incorporates Technical Innovation Of Basic E3—And Then Some

The E3 VLCC under construction at Astilleros Espanoles for Naviera Tapias incorporates all of the technical advantages found in the original basic E3 design, as well as some additional features. Under construction at Astilleros' Puerto Real Yard, the $100 million vessel (contract price at ordering time; around $86 million at press time) measures 1,099 feet (335 m) long overall, with a 187-foot (57 m) width, a 103.3-foot (31.5 m) depth, and a 72.8-foot (22.2 m) draft. The 295,300-dwt vessel is scheduled for delivery in June of 1995. The E3 project (which stands for Ecological, Economical and European) was hatched by five leading European shipyards—Howaldtswerke-Deutsche Werft AG (HDW); Bremer Vulkan AG; Chantiers de l'Atlantique; Fincantieri; and Astilleros Espanoles—in order to build a vessel which complied with the latest IMO requirements as well as OPA '90 requirements. The basic E3 design includes many advanced features to meet the project's lofty ecological and economical goals, including:

- The width of the double hull has been increased above IMO requirements, in order to minimize the risk of leakage in the case of collision or grounding,
- A tank arrangement with 24 cargo tanks plus two slop tanks, an arrangement agreed upon following studies into the the behavior of tank arrangement in the case of accidents. The advantage of the chosen arrangement includes no-to low-oil outflow in the event of damage, flexibility in respect of parcel loading and no restrictions for partial tank fillings,
- To enhance the vessel's economy, there were extensive model basin tests and computer calculations performed to optimize the ship's hull lines. Also, wake equalization ducts with fins and a vane wheel are provided in order to reduce the engine power required, and to save fuel oil.

The E3 project is, however, very flexible, a fact proven by the current vessel being built in the Puerto Real Yard, which includes and offers many more technological advances. The main differences with the advanced E3 are that the design incorporates (as options):

- underwater obstacle detection sonar,
- hydraulic submerged cargo pumps in each tank, and omission of cargo pump room,
- take-home drive geared to main propeller shaft or thrusters for emergency propulsion,
- continuous availability of light fuel system for take-home drive, and
- portable hatch mounted telescopic device for internal inspection of cargo tanks.

E3 VLCC Equipment Spec List (**)

Equipment	Spec	Manufacturer
Main engine	7RTA 84M	Sulzer
Auxiliary engines	(3) x 1,710 bhp x 720 rpm	—
Propeller	(1)	—
Generators	(3) x 1,200 kW	—
Emergency generator	(1) x 300 kW	—
Deck machinery	(2) windlasses;	Ulstein-
	(10) mooring winches	Nordwinch
Shafting	(1) intermediate +	—
	(1) tail shaft	—
Bearings	(1) shaft bearing	—
VHF radio	(2) VHF, (3) survival craft VHF	—
Radar	(2) ARPA radars	—
Compass	(2) gyrocompasses	—
GPS	(1)	—
Autopilot	(1)	—
Cargo pumps	(3) x 5,000-sq.-m/hr.	Kvaerner/ Nadrowski
Heat exchangers	Plate type	Reheat
Air conditioning	(2) AC plants	—
Lifeboats	(1) free fall boat +	—
	(1) rescue boat	—
Liferafts	(4) 20 persons rafts;	—
	(1) six person raft	—
Davits	(1) free fall boat davit;	—
	(1) rescue boat davit;	—
	(1) raft davit	—
Waste management	(1) incinerator	Detegasa
Desalination equipment	(2) x 30 ton/day evap.	Gefico
Boilers	(2) x 45 t/h x 22 Kg/cm²	Kawasaki/ San Carlos

**NOTE: At press time, model, quantity and/or manufacturers of some equipment not available.

ECOLOGY

For the reduction of accidental spills in the event of collision or grounding, the E3's double bottom height measures 9.8 feet (3 m), which is 50 percent above IMO requirements; and has extra wide double sides measuring 13.1 feet (4 m), which is 100 percent above IMO requirements. The ship also has an optimized number and location of longitudinal and transverse bulkheads for maximum reduction of oil spills, and side reinforcement with horizontal stringers inside double side tanks to achieve high-level collision class notation. Finally, the fuel oil tanks are fully protected, separated by a cofferdam from the ship's side.

ECONOMY

To effectively increase the service life of the vessel, the amount of high tensile steel totals no more than 30 percent, and the vessel is designed optimally to resist fatigue. Additionally, most of the surfaces are free of structures, and the tank cleaning arrangement is designed for minimum shadow during crude oil washing. For more information on the E3 tanker project,

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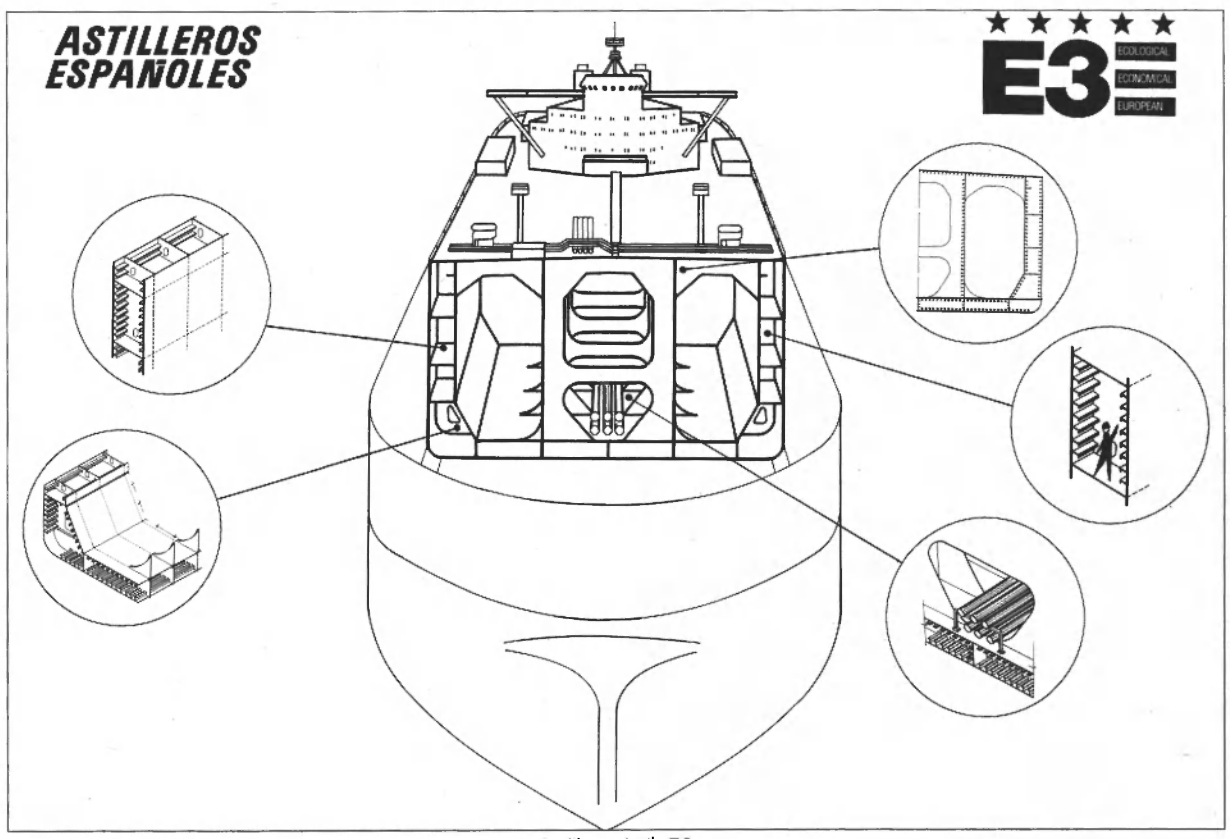
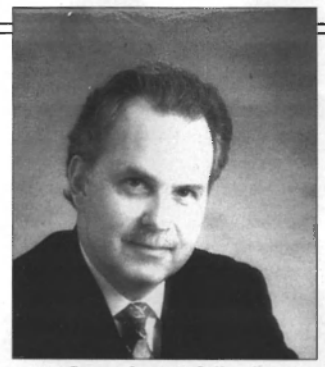


Astilleros-built E3

Pollution Prevention

Assuring the Person in the Chain is not the Weak Link

by
Captain James L. Stilwell, manager, West Coast Regional Office,
International Marine Consultants, Inc.



Capt. James Stilwell

In recent years a myriad of rules and regulations were instituted to prevent, or at least quickly and effectively remedy, oil spills. The Oil Pollution Act of 1990 includes numerous requirements for vessels and personnel involved in the transportation of oil. The scope of these requirements is wide, ranging from work-hour limits of personnel involved in the transfer of petroleum products to detailed oil spill response plans.

While vessels and personnel involved in transporting petroleum products are better prepared today than ever before to quickly respond to an oil spill, the avoidance of such an eventuality is certainly of greater concern to those involved in the trade. A barrel of oil aboard a ship may be worth about $15. That same barrel, when spilled into the water, may cost the spiller many thousands of dollars. Several mechanisms exist for the prevention of spills. These include personnel training, tug escorts for vessels, wind and weather limitation, etc. A less conspicuous mechanism for preventing oil spills, however, comes into play during various transfer scenarios.

A safe and incident free movement of product is the primary concern of all parties involved in the transfer of petroleum products. The introduction of oil spill response plans, and the current availability of equipment and trained personnel to limit the environmental consequences should a spill occur, are all a benefit to today's society. The avoidance of such an incident is without question preferable to remedying a spill after the fact, and the employment of professional lightering masters to coordinate vessel-to-vessel transfers is yet another safety mechanism available to avoid an environmental mishap.

Lightering Masters

Many of the petroleum berths in the U.S. lack sufficient water depth to handle the large tankships which service U.S. ports. Until such time as the government implements a national dredging policy which will result in deep water access to the nation's petroleum terminals, lightering masters are available to ensure pollution free transfers of oil in U.S. waters and beyond.

While crude oil from the Prudhoe Bay fields in Alaska is still transported on U.S.-flag vessels, the majority of imported crude oil is now shipped on foreign registered ships. To ensure a safe vessel-to-vessel transfer where the person in charge of a foreign registered ship may not have complete command of the English language and/or be familiar with the local regulations concerning vessel-to-vessel transfers, the prudent cargo or vessel interest employs qualified lightering masters, experienced in the coordination of transfer operations and supervision of persons in charge of the transfers. The advantages of employing lightering masters are wide ranging. Perhaps the most obvious and most important advantage is

(Continued on page 40)

About little sparks and big soot fires...

Concern grows over increasing rate of soot fires

DnV reports rise in exhaust gasboiler damage

The incomplete combustion of fuel oil leads to the formation of harmful particles in exhaust gases, including unburnt carbon, causing deposits on the blades of turbo chargers. Sulphur also reacts with water creating corrosive sulphuric acid and the fire risk of released sparks during maneuvering.
An increasing number of exhaust gas boilers and turbo chargers are requiring major repairs because of these problems. Not to talk about poor operation or bad maintenance. Claims are just a small part of the problems poor operators have to face after such incidents.

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(Continued from page 38)

the introduction of an individual conversant in both the English language and tanker operations. Among the various communication/coordination requirements prior to a vessel-to-vessel transfer are the following:

- Four-hour notification to the U.S. Coast Guard (USCG) Marine Safety Office and Vessel Traffic Service,
- Notice to the above agencies upon commencement of transfer,
- Arrangement for oil spill response vessels to be in attendance within the anchorage, and
- Notification to oil spill response vessel upon commencement of transfer.

While the outside parties as noted above require information with respect to the transfer, the key communication requirement is between the persons in charge of the respective vessels involved in the transfer.

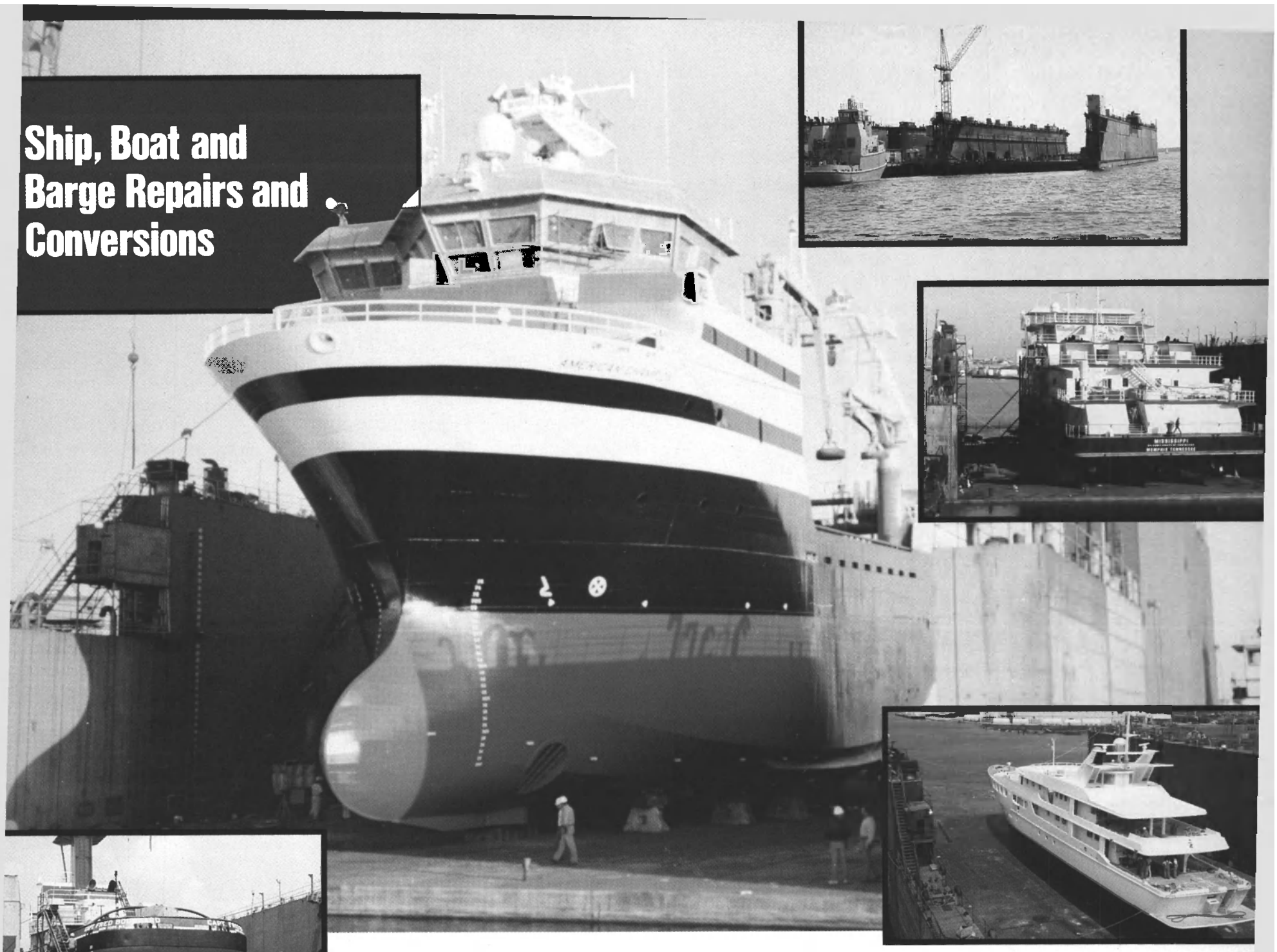
Lightering masters are knowledgeable in all aspects of the cargo transfer operation, including safety concerns, pollution prevention methods and emergency response requirements. Therefore, the required USCG Pre-Transfer Conference between the persons in charge of the vessels is supervised by the lightering master and all questions relating to the transfer are answered prior to commencement of transfer operations. The lightering master can also provide communications equipment to ensure adequate back-up communications.

Prior to transfer operations, the lightering master will monitor the transfer hose connection and visually inspect the vessel to be lightered to assure compliance with all USCG and state regulations. Once cargo transfer has commenced and all requisite notifications have been accomplished, the lightering master will inspect all deck and transfer fittings to confirm the integrity of the system. During the bulk of cargo transfer operations, the lightering master continually monitors vessel-to-vessel rates, discharge pressures and quantities transferred to ensure that all objectives are being met. At the termination of transfer operations, the concerned parties are notified, and draining and disconnecting of the transfer hose is then monitored by the lightering master to facilitate the results. Upon return of the transfer hose to the receiving vessel, the oil spill response vessels are released while the receiving vessel prepares to get underway. In the unlikely event that an oil spill does occur, the lightering master will ensure that the vessels' response plans are immediately implemented.

Cargomasters

Where cargo transfers are conducted alongside a wharf, cargomasters, who function similarly to lightering masters, are employed. The cargomaster is provided by the terminal to supervise operations and coordinate the cargo transfer. The cargomaster conducts a pre-transfer inspection to the vessel, and then coordinates the USCG required Pre-Transfer Conference to assure that all information is passed between the persons in charge of the vessel and at the terminal. During the entire cargo transfer operation, the cargomaster monitors ongoing vessel-to-terminal communications. Should difficulties arise with communications, the cargomaster also plays a critical role in linking communications between two dissimilar vocabularies, that is, the "refinery or terminal" language of the dock person/terminal person in charge and the "nautical or tanker" terminology (most likely as a second language) of the vessel person in charge.

Capt. ***James L. Stilwell*** *is a manager at International Marine Consultants, Inc.'s West Coast Regional Office. IMC is a full-service marine consulting, engineering and technical service organization headquartered in Mineola, N.Y., with regional offices in San Francisco and in Houston. Capt.* ***Stilwell*** *has more than 20 years of maritime-related experience which includes over 12 years as Master aboard various vessels. He holds a U.S. Coast Guard Master of Steam and Motor Vessels of any gross tons upon oceans.*



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ABS' SafeHull was recently made available for existing vessels.

ABS SafeHull:

Maximum Safety For New & Existing Tankers

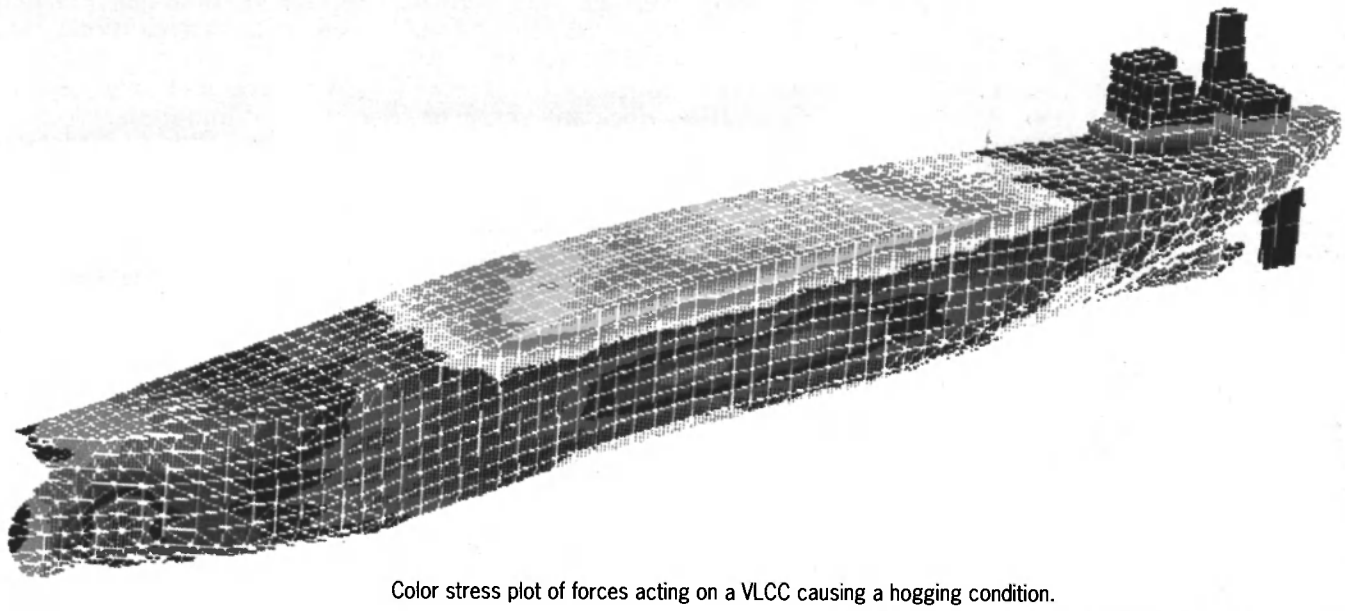
The American Bureau of Shipping (ABS) made technical strides with the introduction of its innovative SafeHull System, a system—three years and $4 million in the making—which has the capability to minimize structural failures due to the effects of yielding, buckling and fatigue. SafeHull, which was first offered to the industry last September for use with new tanker designs, has since been adapted for use with existing tankers.

Recognizing the potential benefits of taking better advantage of modern technology to advance the safety of ship structures, ABS developed SafeHull as a methodology to account for the actual dynamic forces that represent the complex, real-life experience of a ship at sea by incorporating a first-principles approach into the ABS criteria. Using its own technical staff and technical resources, the effort which ensued was the largest exclusive ABS Research &Development effort ever. Following an extensive period of development, testing and validation, the ABS SafeHull System was launched, with the initial application for tanker structures. "We were very excited about the development and launching of the ABS SafeHull System last September," said **Frank Iarossi**, ABS chairman.

"But now, we are even more enthusiastic at being able to offer services for applying SafeHull to existing tankers."

SafeHull For New Tankers

The SafeHull system for new tankers is a complete technical resource comprising two criteria—a Guide for Dynamic-Based Design and Evaluation of Tanker Structures, and a Guide for Fatigue Assessment of Tankers—as well as a comprehensive suite of software applications programs, technical support services and related technical documentation and guidance. SafeHull allows owners, operators, builders and designers the capability to quantify dynamically induced stresses that may exist in a tanker structure. This, in turn, will purportedly lead to more effective distribution of steel in a ship's structure, leading to a reduction in the risk of structural failures due to buckling, yielding and fatigue.



Color stress plot of forces acting on a VLCC causing a hogging condition.

The benefits, according to ABS, are many and include:

- reduced risk of structural failure,
- safer, longer-lived tanker structures,
- lower life cycle maintenance and repair costs,
- more effective use of steel.

The restated criteria in the guides will also include design criteria to assist the designer in the selection of initial design scantlings, which will be checked against the evaluation criteria, and can allow for a more streamlined ABS review process and a more rapid means for exploring innovative designs while maintaining safety and efficiency.

SafeHull: Its Application For Existing Vessels

As originally envisioned, the focus of SafeHull was for new vessels. However, during the product's development ABS clearly recognized its potential value for existing tankers.

This led to, at the beginning of this year, the introduction of the SafeHull System for use with existing tankers.

Called ABS SafeHull Condition Assessment Services, it can apply advanced, dynamic-based structural evaluation criteria to assess corrosion and fatigue on the strength of a tanker structure.

Utilizing this information, critical areas can be identified and solutions regarding structural enhancement can be made.

Administered by the affiliate ABS Services Inc. (ABS MS), the Assessment Service offers two packages.

One package comprises three elements—Condition Assessment Survey, Verification of Gaugings and Structural Evaluation and Recommendations.

The second package focuses on the third element, which is based on SafeHull technology.

In the Condition Assessment Survey, an ABS survey team conducts a survey to assess the condition of the vessel's hull structure, machinery, piping, electrical systems, boilers and accommodations.

The survey also examines the extent of steel wastage, as well as the condition of coating and corrosion systems.

To correctly gauge global and local hull strength, accurate thickness measurements are necessary. Once completed and accepted by ABS, the information is utilized in the SafeHull Structural Evaluation.

Using vessel gauging information, the SafeHull evaluation is conducted based on a comparison of its "as built" condition with up-to-date gaugings utilizing the same state-of-the-art ABS SafeHull criteria as that used for new vessel design. Buckling, strength, ultimate strength and fatigue assessments are included in the evaluation.

Final Report

Upon completion of the survey and analysis work a final report is issued, including: a summary of general findings and facts noted during the condition survey of the vessel's hull, machinery and equipment as defined in the work plan; a detailed list of all structural and mechanical components surveyed with their corresponding rating and related written description in conjunction with photographs; results from the SafeHull Structural Evaluation addressing the current vessel condition of the tanker with regard to strength, fatigue and buckling; identification of critical areas in conjunction with the current condition of the tanker and the projected characteristics of these areas for the period of interest as defined by the client; and recommendations for present and future structural enhancements for consideration by the owner to ensure continued serviceability and the hull structure.

For additional information on the applications of the SafeHull System for both newbuilds and existing vessels, from ABS,

Circle 5 on Reader Service Card

Emphasis is now on life extension. The Chevron-owned *David Packard* was sold to new Greek owners.

Tanker Technology: Its Effect On Shipyards

by

Alan Thorpe, International Editor

The main advance seen recently in the construction of tankers is the use of double hull designs. Yards building such ships have had to change not only the design factors but also, in many cases, the production facilities and methods to enable suitable ships to be built. In the case of the VLCC market there has also been a change of steel utilized in the construction process, to enable longer service life.

The subsequent OPA '90 rulings governing tanker operation has led to many '70s-built ships being able to trade well after their "sell by" dates, thus reducing the expectancy of a major boom in the large tanker building market. In some owners' minds the emphasis has shifted from newbuilding to life extension of existing tonnage.

The large tanker market (above 200,000 dwt) has been an interesting aspect of the shipbuilding industry for the past few years, when many "players" have suddenly realized that new tonnage is still required.

Owners have been reluctant to scrap older tonnage, which still manages to obtain charters despite the posturing of the classification societies and various major oil companies, which claim to fix only high standard vessels.

It is therefore unlikely that a major scrapping boom will develop.

What is more likely is that new tonnage coming onto the market, especially with South Korea continuing its efforts to expand shipyard facilities, will keep freight rates down.

There has been a shift in ownership of the large tanker fleets, the major oil companies making it no secret that they feel shipowning should be for the independents and the oil companies should remain as charterers.

Meanwhile, the Middle East exporting countries, such as Saudi Arabia, Iran and Kuwait, are all involved in the process of building up tanker fleets.

As the current low freight rates continue, the shipyards have to look very closely at construction programs to lower the overall cost of the newbuilding.

One obvious method is by "series" building, a popular method in Japan and South Korea.

The Japanese have been successful in the first session of building such vessels; virtually all yards having single and double skin designs available.

The most popular size of vessel in the '90s has been the 280,000-dwt "USmax" vessel, many of the independent owners and U.S. majors looking to this size of ship. The Middle East owners, such as Saudi Arabia's Vela and Kuwait's KOTC, have looked at other sizes.

The one problem arising in the Japanese shipyards has been one of productivity to meet certain quotas of ship deliveries laid down by the Japanese government.

During various cutbacks in the '80s, Japan's shipbuilding industry was reduced to various specific quotas.

For example, the Kure yard of IHI has a quota of five VLCC deliveries each year, this quota likely to be retained even though double-skinned ships involve another 25% steel content.

The majority of Japanese yards therefore have embarked on various methods by which production can be increased without the banned method of increasing physical capacity.

The main methods chosen have been larger module building procedures, which has led to an increase of cranage and yard transportation units, increased automation and, in some cases, included robotics.

NEW REQUIREMENTS; NEW COATINGS CHALLENGES

One of the main problems facing the yards is that of coating operations in the double hull spaces. The physical limitations of carrying out such work is time consuming and not assisting the yard's battle to reduce construction times.

The necessity to coat the spaces with suitable long-life products is expensive and again, not conducive to the yard's attempts to reduce costs. Many yards therefore look to the cheaper option, which may be a major worry later in the vessels' service life.

Traditionally, coatings for ballast spaces were specified by the shipbuilder with the owner usually having little input.

Often the shipyard had a preferred manufacturer who supplied the coatings, year in and year out. However, the massive increase in ballast tank areas as a result of the double hull designs is now changing traditional attitudes, fast.

The prospect of having to inspect and maintain these areas means that shipowners are now looking for long-life systems, which will reduce maintenance to the minimum. This is leading to the selection of high performance coatings and prepar-

ing surfaces to higher standards.

Traditional coat tar systems are gradually being replaced by light colored schemes, with grit sweeping and even grit blasting becoming the norm.

The classification societies, with increased vessel casualties in mind, are also taking action by carrying out more comprehensive inspections of ballast tanks in service.

In addition to long-term performance expectations of coatings, environmental issues combined with health and safety concerns are also making an impact and must be considered when selecting a ballast tank system.

Reducing solvent emissions is a target for many governments, particularly in Europe and North America.

This has resulted in coating manufacturers developing low-solvent or solvent-free systems. Although the majority of double hulled newbuildings are being constructed in the Far East, where solvent emission legislation is currently minimal, this situation cannot be assumed to continue indefinitely.

Shipowners, therefore, must seriously consider new, "greener" coating systems. According to **David Yule** of International Paint, "With double hulled VLCCs having ballast tanks in excess of 200,000-sq.-m in area, how many potential buyers will be put off if extensive refurbishment of these spaces is required?"

STEEL

The other main change in construction procedures is the limited use of high tensile steel. When there was a mini-boom in VLCC building operations during the early 80s, many ships were built using a high level of high-tensile steel, which has since proved to be costly in terms of corrosion control programs and the reduction of the vessel's life expectancy.

With the current newbuildings in this market, this service life criteria has altered, with owners looking to utilize ships on a longer term basis.

Thus the high-tensile steel content has been reduced. An example of this is the double skin tankers and bulk carriers building at Belfast's Harland & Wolff (H&W), where a 65% level of mild steel is used in each ship.

The South Korean shipbuilding industry has caused a furor with its announced intentions to increase capacity, especially in the building of large tankers.

All four large yards—Hyundai Heavy Industries (HHI), Samsung Heavy Industries (SHI), Daewoo Shipbuilding & Engineering and Halla Engineering—have threatened to increase the size and number of docks available for building such ships, although HHI and Daewoo have since decided against going ahead with their plans. This leaves Halla and SHI.

The problems of over capacity are obvious: with very little scrapping happening on a worldwide basis, the introduction of excessive amounts of new tonnage will only keep the market in an over-capacity situation, which in turn keeps freight rates low.

The South Koreans are banking on the fact that future orders will come their way instead of to Japan, where the shipbuilding industry is suffering from an acute strengthening of the Japanese yen on the international monetary exchange market.

To combat the strangle hold the Far East has over the large tanker market, various yards in Europe got together during the early '90s to form the now-established E3 project, an environmentally-friendly, economical VLCC, which can be built at competitive prices in Europe. The five participating yards were Chantiers de l'Atlantique (France), HDW and Bremer Vulkan (Germany), Fincantieri (Italy) and AESA (Spain).

The only order so far to have materialized is from Spanish shipowner Tapias, which ordered a 280,000-dwt unit (with a yet to be taken option for a further vessel) from AESA's Puerto Real shipyard in southern Spain (see story, page 37). The cost of the ship has been put

at $95 million—the reason behind the lesser cost, apart from the Spanish subsidies in operation, being that the owner decided to take a Sulzer RTA84M main propulsion unit instead of the RTA84T unit.

Many shipyards throughout the world are also looking to smaller crude carriers and the products and chemical carriers for work, all these trades looking as if they will provide work to many shipyards. For the crude carriers the double-hull philosophy is again pertinent, the OPA '90 rules and regulations also applying to smaller crude carriers as well as the large vessels.

In the case of smaller chemical carriers, the steadily increasing carriage of methanol is causing the most technical problems for coating companies.

Estimates of methanol demand vary considerably but there is no doubt whatsoever that it represents a potential area of growth for chemical shippers.

The boom which was forecast a few years ago, however, has still not fully materialized and this has been tied to the uncertainty in oil prices. The forecast laid heavy emphasis on the potential alcohol mixes in lead-free gasoline.

This would prove costly to implement using methanol.

The aggressive nature of methanol can change dramatically with the basic cargo specification. Varying levels of acidity, impurities and even water content in the product making the difference between success or failure of a coating—so much so that strict limits are laid down by coating manufacturers.

Temperature has an even greater effect. A large proportion of methanol production being in warmer climates means that in certain cases it may be loaded at temperatures around 40° C.

Time also has an effect. The longer methanol is in the tank, the greater the penetration of organic coatings. This can lead to underfilm corrosion and osmotic pressure build-up with resultant blistering.

When applying coatings suitable for the carriage of methanol certain criteria can cause problems. Overthickness, perhaps, provides greater potential problems.

All cargoes will be absorbed into paint films. Most will be released with normal ventilation.

With increased film thickness, however, the release is considerably retarded.

Certain cargoes, acrylates in particular, can be held in the film through several cargo sequences only to be "pulled out" when a low molecular weight cargo is loaded. Extremely low levels can put methanol off specification with the resultant down grading of the cargo and subsequent loss of earnings. Overthickness can also lead to paint defects within organic systems. This is particularly evident in the way of "change of section" welds where cracking is almost always the result.

Cargo shock caused by the reaction of a retained cargo with some subsequent product may well result in defects such as blistering.

Underthickness brings its own problems. The major effect is rust rashing.

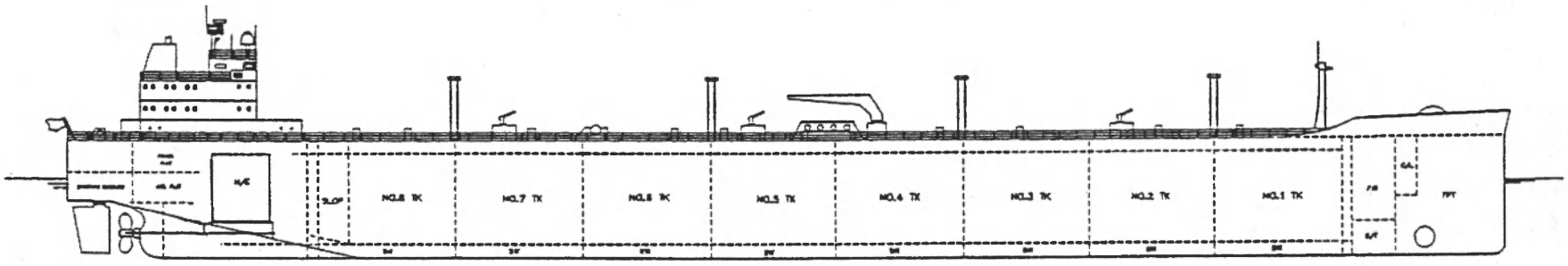
Strict limits are also specified on the amount of impurities allowed on the surface of a coating, prior to its being loaded.

One method is to check by the potassium permanganate wall wash test as outlined by ASTM (American Society for Testing Materials) designate D1363-84.

This indicates whether impurities are present. The process is time related. The longer it takes to produce a reaction with potassium permanganate, the less the contaminant. Of particular importance is contamination by chlorides and hydrocarbons, the level of which are critical where methanol specifications are concerned.

Whenever methanol is to be the major consideration in cargo carriage, zinc silicate is the only suitable coating. For "occasional" carriage of methanol, polyurethanes or phenolics may in only certain instances be acceptable. In both cases, however, the other potential cargoes must be taken into account.

McDermott, Shipbuilding Ventures Inc. Sign Agreement To Build Product Carriers In U.S.



Shipbuilding Ventures, Inc. (SVI), formerly U.S. Shipbuilding Consortium, Inc., and McDermott Shipbuilding, Inc. announced the signing of an agreement forming a new joint venture company to build product carriers and other ships based on the Skarhar design for simplified, longitudinally framed ships.

Along with the joint venture news, it was announced that SVI and the Skaarup Group were ordering a ship from the new venture.

Under the joint venture agreement, Shipbuilding Ventures, Inc., a member of the Skaarup Group, will contribute exclusive rights to the proprietary Skarhar design to the new company, which will be known as U.S. Shipbuilding Corporation (USSC).

The Skaarup Group and SVI will provide design, process, technical and marketing support, while McDermott will provide capital contribution, engineering and technical support. McDermott Marine Construction's Morgan City, La. facility will serve as the principal construction site.

"I am very pleased that our relationship with McDermott has been firmly established, and I am confident this is an important step in our efforts to assist in a revival of commercial shipbuilding in the United States," said **Ole Skaarup**.

Said **Brinson Miles**, general manager, shipbuilding projects at McDermott Shipbuilding, "Our goal is to make shipbuilding an important element of McDermott's business. By entering this joint venture, we take a significant step towards our goal."

THE ORDER

The Skaarup Group and SVI signed a letter of intent with USSC for the construction of a 40,000-dwt product carrier, with an option for a second. SVI and the Skaarup Group plan to pursue innovative financing for the vessel, financing which may include Maritime Administration Title XI export financing assistance. The ship ordered will be built for international service, chartered and operated with the technical assistance of the Skaarup Group.

The ship represents the first in a series of generic ships USSC expects to build at competitive world prices, based on the Skarhar design and using innovative modular construction techniques. Delivery of the first ship is scheduled for the second half of 1996.

McDermott Shipbuilding, Inc. is a unit of McDermott International, Inc., a leading worldwide energy services company. The company

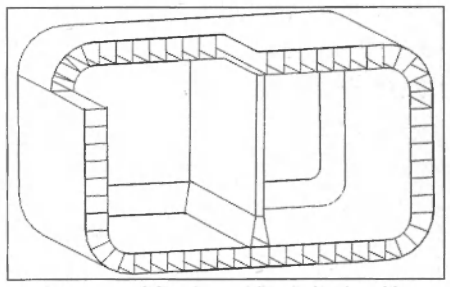


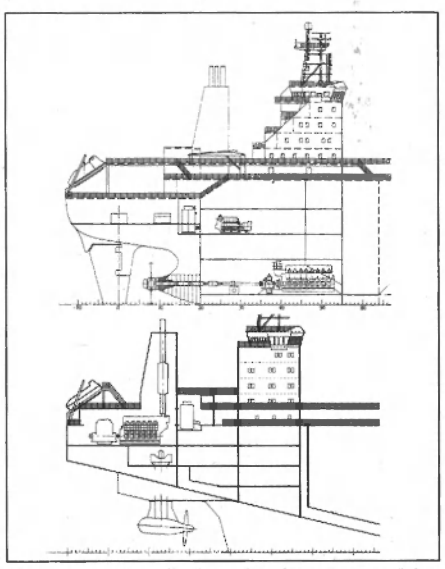
Diagram of Skarhar midbody (tank unit).

and its subsidiaries manufacture steam-generating equipment, environmental equipment, and government and aerospace products. The company also provides engineering and construction services for industrial and utility facilities onshore, and to the oil and gas industry offshore. For additional information on the new joint venture,

Circle 34 on Reader Service Card

Kvaerner Unveils New Double Hull Arctic Tanker

To help unlock the oil and gas reserve potential from the severe environmental conditions in the Arctic continental shelf, Kvaerner Masa-Yards debuted a special tanker vessel designed to operate in both open water and ice conditions.



The new tanker design also has a propulsion arrangement option—incorporating either a pair of diesel engines (top) or an Azipod propulsion unit (bottom).

The arctic tanker design is 120,000-dwt, with an overall length of 915 feet (279 m), a breadth of 141 feet (43 m) and a draft of 56 feet (17 m). According to the shipyard, 120,000 dwt is the maximum practical size for vessels operating in the shallow coastal waters of the Russian Arctic Shelf.

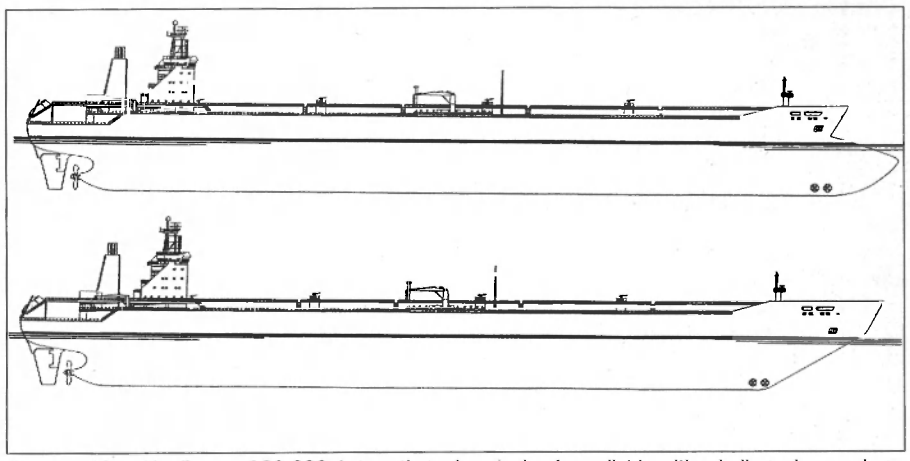
PROPULSION

The vessel is designed for medium speed diesel or Azipod propulsion options. The medium speed diesel alternative consists of a pair of 15,600-kW diesels driving a single controllable-pitch propeller through twin input, single output reduction gear with a built-in thrust bearing.

The Azipod propulsion alternative comprises a new generation AC-AC power plan and two 15 MW Azipod propulsion units. The system, according to the yard, is ideally suited for operation in ice, and the compact arrangement allows more space for cargo tanks, or perhaps a shorter vessel length.

THE HULL

The double hull design fulfills the new requirements of Marpol 73/78



Kvaerner Masa-Yard's new 120,000-dwt arctic tanker design is available with a bulbous bow or in an icebreaking version.

Annex I regulation 13 F. Ice strengthening is in accordance to DNV Ice-10; the tanker's double bottom and sides are ice-strengthened. Two alternative hull forms have been developed by Kvaerner Masa-Yards. Hull A, with its bulbous bow, performs better in open water, whereas Hull B, with its icebreaking stern, performs best in ice. Hull A is capable of operating independently in level ice of up to 2.3 ft. (.7 m); Hull B in ice up to 3.3 ft. (1 m).

CARGO HANDLING

The ship is mainly intended to carry crude oil in seven tanks. It features three cargo segregates and can also transport oil products as return cargo to service distant arctic communities. Each cargo tank is fitted with its own variable-speed electric deep-well pump. The tanks are heated by a thermal oil system to reduce the risk of icing up of the heat exchangers and pipes. The cargo piping on the weather deck is placed under protective cover. The ballast water pumps are also of the deep-well type, so no separate ballast water pump room is needed. The basic vessel design can be altered for shuttle tanker service with relatively minor modifications, the yard reports. For more information from Kvaerner Masa-Yards,

Circle 119 on Reader Service Card

Marine Fuels, Lubricants & Additives

Maritime Reporter & Engineering News' 1994 Marine Fuels, Lubes & Additives review is a limited survey of many top suppliers of product to the maritime industry. Free information—specification sheets and literature—is available from any of the companies reviewed. To obtain free information, circle the appropriate number on the Reader Service Card in this issue.

Photo Credit: Brix Maritime

Brookfield Engineering

Circle 72 on Reader Service Card

Brookfield offers a broad line of viscometers and rheometers. Brookfield has viscosity measuring instruments, systems and accessories for liquids, slurries and pastes. The company also has analog and digital laboratory viscometers for fast and accurate data generation, storage, manipulation and programming along with on-line continuous process control viscometers.

Cartel Products, Inc.

Circle 73 on Reader Service Card

Cartel Products, Inc.'s Diesel Fuel Lubricity Improver & Corrosion Inhibitor protects diesel fuel injection pumps, gaskets and seals; protects against engine corrosion; offers antiwear protection to fuel system components; deep hydrotreating to lower sulfur and aromatics; and is a class-1 Swedish diesel fuel.

Cartel also offers Highly Concentrated Diesel Fuel Treatment which replaces lubricity and prevents equipment/pump failure. The Diesel Fuel Treatment contains water solubilizers, flow improvers, pour point depressants for wax crystal modification, cetane improvers and corrosion inhibitors.

Chevron U.S.A. Products Co.

Circle 74 on Reader Service Card

Chevron U.S.A. Products Company markets a variety of premium lubricants in the U.S. These include:

- Chevron Marine Engine Oils Delo 477 (SAE 30, 40 and 20W-40) - superior high dispersancy, high alkalinity, 17 TBN engine oils. They are for use in diesel engines in towboats, tugs, workboats, dredges and in other marine industrial engine applications requiring a zinc-free oil.
- Chevron Marine Engine Oils Delo 1000, 2000 and 3000 Marine (SAE 30 and 40) - high quality engine oils developed for use in a wide variety of medium-speed trunk piston engines including the latest design high output engines burning marine diesel oils, or residual fuels with low, moderate or high sulfur content.
- Chevron Marine Engine Oil Symbol 9250 - a high quality, high performance engine oil which fully complies with Symbol 9250 of the U.S. Military specification MIL-L-9000H.

Drew Ameroid Marine

Circle 75 on Reader Service Card

Drew Ameroid Marine offers Amerstat[R] 10 Fuel Microbiocide. Amerstat 10 is a low-cost fuel microbiocide. Warm weather brings elevated risks of microbial contamination to vessels bunkering light diesel oil. Malfunctions and energy loss due to blockages and flow restrictions can result from severe fouling and plugging of tanks, fuel lines, filters and injectors; and major cleaning operations that require fuel offloading and demurrage add considerable expense. Amerstat 10 is a broad-spectrum biocide which can be used both for routine and emergency dosing of bunkers.

Elf Lub Marine

Circle 76 on Reader Service Card

Elf Lub Marine redesigned its new range of Elf cylinder lubricants at the end of 1991 to include Talusia HR 70 and an improved Talusia XT 70. Elf Talusia XT 70 has been improved and offers enhanced performance through the application of the most recent quality standards. The new Talusia XT 70 is adapted for the lubrication of all types of old and modern slow-speed engines and is currently used on more than 1,000 vessels. Elf Talusia HR 70 is a new product that was specially-designed to introduce an extra safety margin so as to provide optimum engine performance under the most severe conditions. Talusia HR 70 satisfies very specific demands from shipowners. Talusia HR 70 has more than 60,000 operating hours on different vessels.

Ernasko, Inc.

Circle 77 on Reader Service Card

Ernasko, Inc.'s low-cost integrated Shipboard Monitor System can provide fuel savings, as well as system protection, and can assist in establishing preventive maintenance periods, provide historical records of monitored functions and provide alarms for impending problems. The system operates through a standard 486 computer and includes plug-in board with operating software, cabling, junction box, and sensors. Sensors (pressure, temperature, etc.) have pulsed frequency output, reportedly eliminating electrical interference.

Exxon Company, U.S.A.

Circle 78 on Reader Service Card

Exxon Company, U.S.A.'s zinc-free De-Mar[R] 17P marine crankcase oil offers anti-wear performance without chlorinated components. Because it contains less than 10 ppm total halogens, De-Mar 17P is not subject to EPA tracking and reporting requirements affecting used oils with greater than 1,000 ppm total halogens. The company claims De-Mar 17P also offers improved oxidation control. The 17 TBN high-detergent product is designed to meet the severe service demands of the newer engines.

Exxon Marine

Circle 79 on Reader Service Card

Exxon Marine Synthetic Lubricants offer performance, economic and environmental advantages. On the technical front, equipment manufacturers design their equipment making synthetic oils mandatory for the equipment to run properly.

On the commercial front, longer oil drain intervals can be achieved and make economic sense. On the environmental front, Exxon's biodegradable hydraulic oil offers excellent performance.

Exxon Marine offers synthetic products for various applications: centrifuge gearboxes, refrigeration and air compressors, turbocharger bearings, main propulsion and highly loaded gears, gas compressors, high temperature greases and biodegradable hydraulic oil.

Ferrous Corporation

Circle 80 on Reader Service Card

Ferrous Corporation offers BT-8, a non-metallic and ashless dispersant and fuel stabilizer, which was developed to help reduce the fuel-related problems resulting from high asphaltenes (six percent or more); high carbon residue; incompatibility; and fouled fuel lines, heaters and tanks. BT-8 can also be used to clean up a fouled bunker tank.

BT-8 can reportedly keep fuel more homogenous, eliminating stratification and reducing incompatibility problems.

Florida Horizon Distribution

Circle 81 on Reader Service Card

Florida Horizon Distribution manufactures Pre-Lube 19, a transparent, medium viscosity lubricating polymer providing protective coating against adverse corrosive exposure. The company claims that Pre-Lube 19:

- protects metal surfaces against salt water, acid fumes and other highly corrosive atmospheres,
- penetrates wire rope to provide inner strand lubricity, corrosion protection and prevent core rot,
- protects galvanized steel against white rust,
- is an excellent replacement for synthetic or petroleum coatings,
- will not crack or drip or prevent visual inspection,
- will not harm standard, non-metallic sheaves,
- will not form a sheen on water.

The company also claims Pre-Lube 19 is biodegradable, non-sheening, non-polluting and non-hazardous. Pre-Lube 19 is available in gallon, five-gallon or 55-gallon containers.

The Hammonds Companies

Circle 82 on Reader Service Card

The Hammonds Companies is a

Every 5,000 hours this towboat makes a change for the future.

Changing oil every 5,000 hours instead of every 500 has made a world of difference to Crounse Corporation's single-screw towboat, the M/V *Sue Chappell.* Before the workboat switched to synthetic Mobilgard SHC 120 in its generator engine, it was changing oil every 500 hours and disposing of 112 gallons of waste oil each year.

For the environmentally concerned Crounse Corporation of Paducah, Kentucky, waste oil disposal was a problem that demanded a solution.

The synthetic solution. Crounse Corporation, Detroit Diesel Corporation and Mobil Oil Corporation conducted an 8,000 hour test of Mobilgard SHC 120 in the towboat's generator engine. The synthetic lubricant, with its chlorine level well below the most stringent regulations in effect today, yielded remarkable results.

Mobilgard SHC 120 significantly extended the towboat's oil drain intervals and reduced its annual volume of waste oil 90%. A single oil drain after 5,100 hours of continuous operation of the engine confirmed the oil effectively lubricated the Detroit Diesel 6-71 engine *10 times longer than mineral oil.* Annual waste oil was now just 11 gallons.

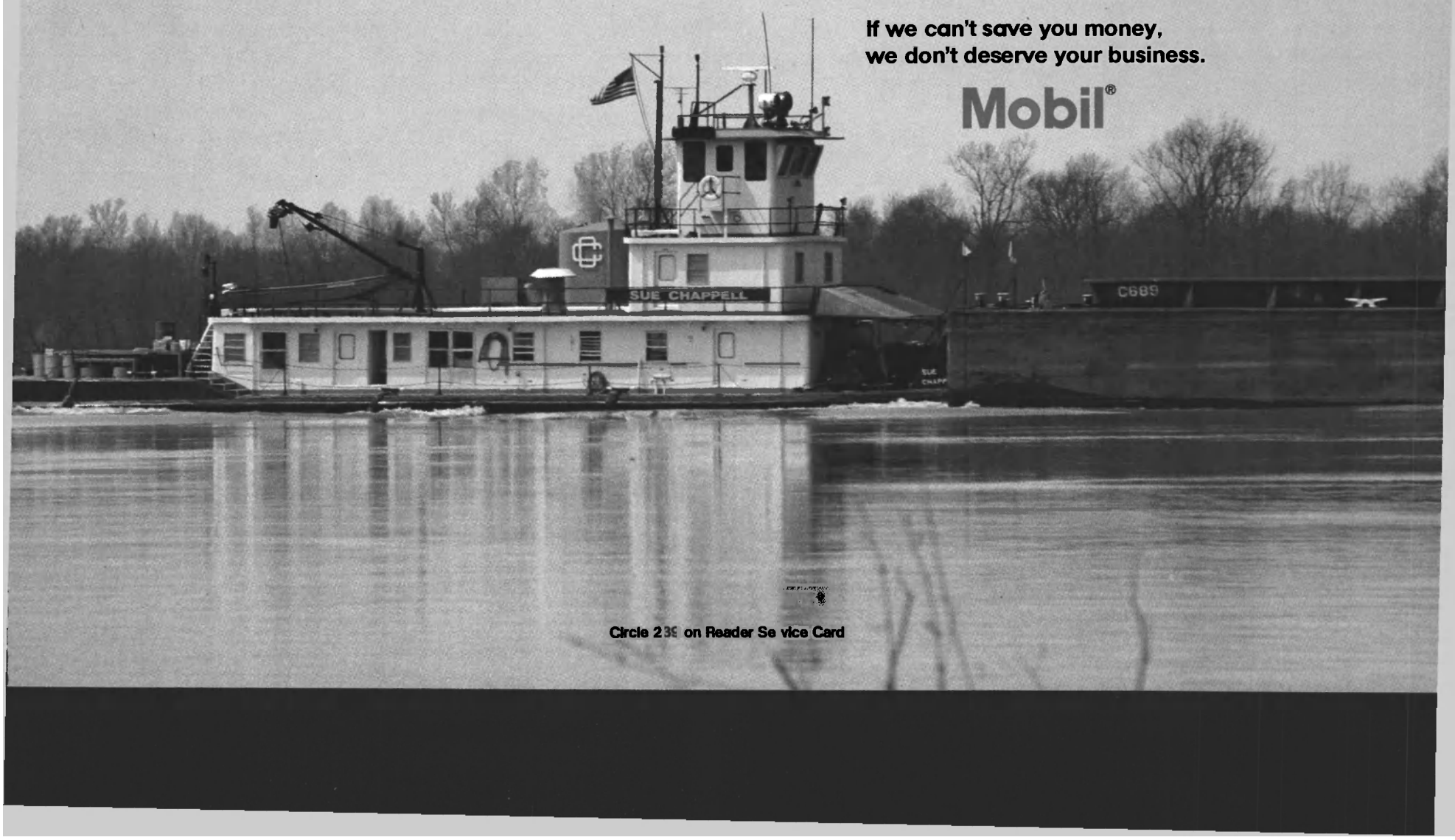
Mobilgard SHC 120 cut the engine's oil consumption by nearly 75%. The generator consistently used *only one quart* daily. Quite a difference from the one gallon of mineral oil it typically consumed.

Mobilgard SHC 120 reduced overall engine wear by almost 50%. When the towboat was overhauled, engineers found that the engine's piston rings and cylinder liners had only about half the normal wear rates. Time between overhauls is now projected to extend from 40,000 hours to 60,000 hours.

So take a good look at the synthetic lubricant that helped this towboat make a difference in the world. And a change for the future.

If we can't save you money, we don't deserve your business.

Mobil®



manufacturer of diesel fuel additives, including:

• Biobor[R] JF, a concentrated liquid fuel additive, used to eliminate Hydrocarbon Utilizing Microorganisms (HUM) or HUM-Bugs, in all hydrocarbon fuels such as aviation jet fuels, kerosene, No. 1 and No. 2 diesel fuels, home heating oil, marine diesel and bunker "C" fuels. Hammonds also offers the HUM-Bug Detector[R] Kit, designed to provide early detection of HUM-Bugs.

• LubriBor[R] Hi-Tech Lubricity Agent is designed to improve fuel lubricity characteristics and reduce fuel system wear. Compatible with other fuel additives and approved for U.S. and British military use, LubriBor contains a component that provides corrosion protection in low-sulfur diesel.

• Select3[R] Diesel Fuel Conditioner is a low-dosage stabilizer and corrosion inhibitor for cracked and straight run distillate fuels. Its chemistry allows for top fuel efficiency, as well as upper cylinder performance. Hammonds claims this diesel fuel additive has antioxidant properties that provide maximum sludge control and good color stability, while reducing or eliminating the peroxide formation that can also occur in the low-sulfur diesel fuel processing.

• ColdFlo[R] Improver is a non-alcoholic de-icing agent that permits fuel to flow at even the lowest temperatures. Specifically, ColdFlo diesel fuel additive was designed to improve the negative effects of the diesel industry's refining process, which reduces the sulfur content in on-road diesel fuel.

Mobil Oil

Circle 83 on Reader Service Card

Mobil Oil, with its EAL Arctic Series, is addressing the needs of the rapidly changing refrigeration industry where there is critical demand for lubricants that are compatible with CFC, HCFC and HFC refrigerants.

Mobil's EAL Arctic Series is reportedly the first synthetic lubricant commercially available for HFC-134A refrigerant.

Mobil brings 50 years' experience with synthetic lubricants to the EAL Arctic Series. The products are formulated, developed, manufactured, packaged and distributed through Mobil's fully integrated operation.

Petro-Morine Company

Circle 84 on Reader Service Card

Petro-Marine Company, Inc. has developed a new, portable, closed sampling system for the petroleum and marine industries. This system makes it possible to obtain samples through vapor control valves under inert gas pressure.

The PetroView™ closed sampling system addresses the concern of the new environmental laws, which restrict or prohibit emissions of hydro-carbon vapors into the atmosphere while sampling tanks. It is designed to be used aboard marine vessels or shore tanks that are fitted with MMC or hermetic vapor control valves for restricted gauging.

With this system it is now possible to take samples through vapor control valves as recommended by the American Petroleum Institute. It can obtain running samples, all level samples, spot samples, zone samples, water bottom samples, and, in the future, RVP samples.

Shell Oil Company

Circle 87 on Reader Service Card

Alert to the special requirements of marine customers, Shell Oil Company constantly evaluates new products against the needs of mariners and the tests and specifications of marine equipment builders.

Shell Caprinus[R] UE Multigrade 20W-40 is a multigrade oil for medium speed diesels designed to improve fuel and oil economy while reducing engine wear - important characteristics to consider when trying to improve the economical operation of a vessel.

TF Purifiner, Inc.

Circle 85 on Reader Service Card

TF Purifiner, Inc. offers the TF Purifiner oil filtration and evaporation system that attaches to any internal combustion engine or hydraulic system and keeps the oil as good as replacement oil. The oil passes through the long-strand unbleached cotton filter at a low flow rate.

This removes particles down to one micron in size and absorbs acid and sulfur.

Then the heated refining chamber drives off all harmful fuels, water and antifreeze.

Proper viscosity is maintained and additives remain intact.

The TF Purifiner has a 10-year warranty.

Fluoramics

Circle 86 on Reader Service Card

Tufoil[R] is a patented marine engine treatment utilizing micro-particles of PTFE (polytetrafluoroethylene) and MOLY (soluble molybdenum disulfide), used because of their friction-reducing properties, to provide reportedly smoother, cooler-running marine engines and improved component life.

Texaco

Circle 155 on Reader Service Card

Texaco Fuel and Marine Marketing department (TFAMM) markets Texaco's bunker fuel and marine lubricants, offering a Used Oil Analysis Program, Management Information systems, technical literature and engineering services.

Texaco's worldwide line of marine lubricants start with Taro Special, a SAE 50 high alkaline reserve (70 BN) premium quality cylinder oil for large, slow-speed diesel engines burning residual fuels. According to Texaco, Taro Special offers excellent wear protection for cylinder liners and piston rings. Doro AR 30 is a SAE 30 moderate alkaline reserve (6 BN) premium crankcase lubricant for these engines, also meeting the anti-wear requirements of engines equipped with a PTO unit.

Texaco offers Taro XD SAE 30 and 40 oils with a BN of 15, used in medium-speed engines burning fuels with a maximum sulfur content of up to 1.8 percent. For higher sulfur levels, Taro DP SAE 30 and 40 with 32 BN levels, along with Taro XL SAE 40 with a 40 BN, are available.

In addition to its marine engine oils, Texaco provides a complete lubricant product line comprising synthetics, specialty oils, and greases which are available for all other lubricant needs.

Biodiesel-Powered *Sunrider* Prepares For Home Stretch

The *Sunrider*, a 24-foot (7.3-m) rigid inflatable Zodiac Hurricane, is powered by a 180-hp MerCruiser diesel stern drive and fueled with 100 percent biodiesel made from soybean oil. The *Sunrider*, led by Captain **Bryan Peterson**, is on a mission to increase global awareness of ecology and alternative energy.

The biodiesel-powered *Sunrider* arrived at Saint Helena Island in the South Atlantic, where the expedition prepared for the final leg of its round-the-world voyage.

The expedition is funded through the National SoyDiesel Development Board (NSDB). The NSDB researches and promotes soy-based biodiesel with national soybean checkoff funds through the United Soybean Board.

Capt. **Peterson** plans a final stop at Ascension Island before embarking on his Atlantic crossing, which will bring him to the port city of Recife, Brazil. From there, the expedition eventually will travel back to San Francisco.

Officials from several countries have reportedly expressed interest in the renewable biodiesel fuel, which is being tested extensively among bus transit authorities and other diesel engine users in the U.S.

For more information from the National SoyDiesel Development Board,

Circle 44 on Reader Service Card

Singapore Telecom Invests $7.7M In Inmarsat-M Service

Singapore Telecom has introduced Inmarsat-M, a mobile satellite communications service which supports telephone and facsimile transmissions via the Inmarsat satellite over the Pacific Ocean. Data transmissions will also be possible by the end of the year.

Singapore Telecom says that because Inmarsat-M uses digital technology, the mobile terminal is more portable than terminals for analog services. The Inmarsat-M terminal is no larger than a briefcase and weighs as little as 19.8 lb. The use of digital technology also reportedly makes lower terminal costs and charges possible. An Inmarsat-M mobile terminal can cost about $25,000—30 percent less than analog terminals, according to Singapore Telecom. The company also says that the average traffic charge for analog services is about $8.75 per minute, while the traffic charge for Inmarsat-M is $5.50 per minute. Singapore Telecom has invested about $7.7 million for a new Inmarsat M/B access control and signaling equipment to provide the Inmarsat-M service. For more information on Singapore Telecom,

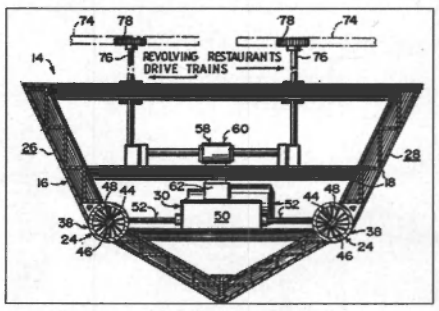
Circle 128 on Reader Service Card

NEW TECHNOLOGY

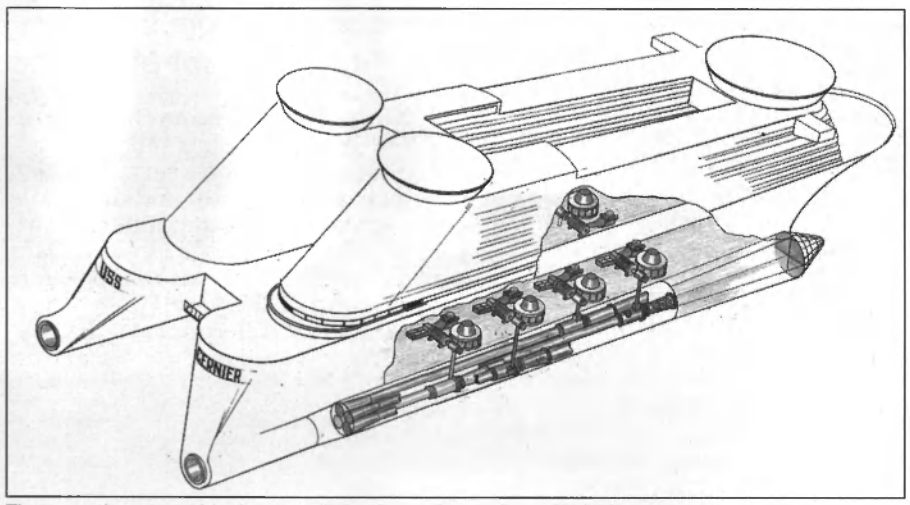
Hydro-Propelled Ship Concept Receives Patent

The inventor of a patented hydro-propelled ship is currently seeking a manufacturer to fabricate the vessel on a national and international basis.

The vessel, devised by **Edward Cernier**, is designed to incorporate a pair of propulsion turbines affixed to a double hull of the ship in a catamaran configuration to drive the vessel. Each of the turbines are designed to be placed inside an elongated tubular housing, which includes a water intake port and a water exit port. A shaft runs through the center of the housing, and is operated by a power-generating mechanism. A plurality of rotors are attached to the shaft, and when the shaft is rotated, the rotors will squeeze, compress and force water from the intake through the water exit port, effectively creating water jet propulsion. A power plant housed within the hull is designed to not only operate the propulsion turbines, but also to drive a pair of revolving restaurants placed atop the hull.



Cutaway of the hydro-propelled ship.



The recently patented hydro-propelled ship would require a 25,000-hp powerplant. The inventor is currently seeking a builder for the vessel.

The concept of the propulsion turbines calls for the use of a 25,000-hp engine for the propulsion system to function properly. The designer claims the vessel is designed to travel up to 50 knots or more.

The vessel is designed as a multi-activity passenger ship, featuring a wide beam to accommodate a full range of facilities. For full details on the hydro-powered ship,

Circle 18 on Reader Service Card

MTU Friedrichshafen Receives DIN ISO 9001 Certification

The quality assurance system of MTU Friedrichshafen was awarded approval in accordance with DIN ISO 9001. A NACCB (National Accreditation Council of Certification Bodies) certificate for the British market was issued at the same time. Det Norske Veritas (DNV) District Manager **Reidar Nyrerod** presented the document to MTU Vice President Dr. **Gerd-Michael Wolters**, and the company deems the certification important for its image on the international market.

MTU Debuts New Magnetic Ranging Facility

Eberhard Sohn, MTU Friedrichshafen's general manager of technical services, recently handed over a new magnetic ranging facility on the north side of the Friedrichshafen airstrip to **Klaus Schedl**, head of electronics. MTU needs the plant for engines destined for minehunter vessels. The individual ferro-magnetic parts are treated to produce the smallest possible permanent magnetic signature.

The ranging track, in order to simulate the earth's magnetic field for any given location, is equipped with a number of coils which generate the required magnetic field when subjected to corresponding current. The resulting values are used by the customer to design their system. Saying that there are only two such facilities in Germany, MTU also carries out service contracts for other customers, investigating the properties of all components of a minehunter's propulsion train.

For more information on MTU,

Circle 38 on Reader Service Card

Weight-Saving Plastic Composite Shafts Offered By Swedish Company


Applied Composits created a plastic composite shaft to help save weight.

Applied Composits of Linkoping, Sweden launched a line of shafts made of plastic composites, targeting the high-speed vessel market where weight reduction is crucial.

According to tests, the company claims the shafts not only offer a weight reduction of 70 percent, but are also stronger than steel, allowing approximately 10 times more torque weight to be transmitted.

Composite shafts have been in operation for several years in the Swedish Navy's test vessel SMYGE, reportedly without showing fatigue signs. For additional information on the composite shafts,

Circle 23 on Reader Service Card

ABB Nera Saturn Mm Is Inmarsat Type Approved

Mackay Communications announced that the ABB Nera Saturn Mm marine digital satcom has been Inmarsat Type Approved. The unit provides global telephone, fax and data for boats as small as 35 feet (10.7 m) through the Inmarsat-M digital satellite service. For more information from Mackay,

Circle 120 on Reader Service Card

Marine Systems Expands Hydraulic Retrofit Kit

Hydrohelm, the hydraulic retrofit kit for shift and throttle controls, has expanded its product line to include a single lever, dual function hydraulic. This division of Marine Systems had previously made "Soft-Touch" hydraulics available, utilizing cables as "snap in" retrofit. For Hydrohelm kit pricing and additional information,

Circle 24 on Reader Service Card

Metritape Finds Far East Market Encouraging

Metritape Inc. has supplied tank gauging systems for two vessels built at Hanjin Heavy Industries, Inc. in Korea, vessels which were recently delivered to Shipping Corporation of India. Both product carriers feature Metritape cargo and temperature gauging systems consisting of continuous level sensors and associated microprocessor-based instrumentation. Metritape and its Korean agent, World Ocean Engineering, have also negotiated to supply gauging on three new vessels for Hanjin Shipping Corporation Co., Ltd. These vessels include an LNG carrier and two 4,000-TEU container ships on which Metritape will supply gauging for ballast and service tanks, plus four draft points. In addition, Hyundai Heavy Industries, Ulsan, is taking advantage of Metritape's new Sentry I system for two VLCCs. Sentry I is Metritape's latest product offering; a high-performance solution for all on-board gauging requirements.

The backbone of Metritape's gauging system is the resistance-tape continuous level sensor; a non-mechanical level gauge which is reportedly unaffected by foam, vapors, surface waves or tank structure. For more information on Metritape gauging products,

Circle 25 on Reader Service Card

Northeast Technical Debuts New Tanker Cargo Tank Inspection Device

Northeast Technical Services, in conjunction with BP Oil Co. (USA) Marine Technical Group, has designed, tested and manufactured a new cargo tank inspection device called Maricam. Maricam, suitable for use on all types of tankers, permits a detailed inspection of areas which are traditionally difficult, if not impossible, to inspect.

The product reportedly easily inspects areas which were only accessible by staging, rafting or "tank walking"—without entering the tank. Maricam incorporates some of the latest technology in live action, low light computer chip video cameras, a custom-designed 400mm, 20x zoom lens and an adjustable, high-intensity halogen light source.

The Maricam is reportedly capable of seeing, with detail, cracks, fractures and broken welds, from as far away as 50 feet (15.2 m). The Maricam is deployed through any standard Butterworth tank cleaning hole. The tank must be gas free, and the system requires two trained personnel to operate. An average ship with 70 to 80 Butterworth holes can reportedly be surveyed in three to four days. For more information on the Maricam,

Circle 30 on Reader Service Card

ACS Obtains Galvalum License

American Corrosion Services (ACS) was granted a license to manufacture, market and sell Galvalum anodes.

"The Galvalum license allows us to supply a broader market and penetrate new markets, particularly in international areas," said ACS President **Chris Landry**. Galvalum I, II and III constitute the three aluminum-based alloys that comprise the Galvalum anode group. They are designed to protect structures in saline mud, sea water or hot brine environments. The primary application of these alloys, specifically Galvalum III, is corrosion protection of offshore oil and gas structures and pipelines. For more information from ACS,

Circle 28 on Reader Service Card

Circle 267 on Reader Service Card

Circle 278 on Reader Service Card

Circle 279 on Reader Service Card

Product Review

Deck Machinery & Cargo Handling Equipment

Photo courtesy of: Manitowoc Engineering

Appleton Marine, Inc.

Circle 88 on Reader Service Card

Appleton supplies marine deck machinery: cranes, single point davits, mooring winches, anchor windlasses and capstans. In addition to the vertical shaft anchor windlasses (3.6-inch chain) and mooring and warping capstans for the entire AOE-6 vessel program, Appleton Marine is supplying the complete package of underway replenishment equipment for the AOE-10 program. Dual constant tension, single point RHIB handling davits with manual launch capability, cross deck winches, anchor windlasses and capstans are being provided for the U.S. Coast Guard WLB buoy tender. A buoy handling crane for the WLM coastal buoy tender is also on order. A complete deck machinery package — stores cranes, constant tension mooring winches, and combination mooring winch/anchor windlasses — is being designed and manufactured for the Military Sealift Command Sealift Conversion program at Newport News Shipbuilding; stores cranes are also being provided for the Sealift Conversion program at NASSCO.

Clarke Chapman

Circle 89 on Reader Service Card

Clarke Chapman Marine's product range includes special purpose winches such as sonar array and balloon winches; replenishment-at-sea systems; and deck cranes for buoy handling and helicopter recovery, where special wave compensation features are required for operation in high sea states.

Clarke Chapman's equipment has been installed on British and foreign naval vessels including fleet tankers, supply vessels, frigates, destroyers and aircraft carriers, as well as many commercial ships, including lighthouse tender vessels and Antarctic research vessels.

Cross Equipment

Circle 90 on Reader Service Card

Cross Equipment, Ltd. of Houma, La., serves the equipment needs of the oil and gas industry. Cross has one of the largest inventories of new surplus, and used remanufactured marine deck machinery in the world — complete mooring systems, winches, windlasses, capstans and other types of deck machinery, as well as cranes, bulk tank systems and other marine equipment.

A sister company to SMATCO Industries, Cross utilizes SMATCO's engineering expertise along with its 51,000-sq.-ft. facility for repair and remanufacturing work. Cross' recent projects include delivering a four-point mooring system for Offshore Divers, a 35-ton telescoping crane and mooring system to Mexssub, Inc. and a SMATCO Model 62-DAD-170 side-by-side towing winch for an East Coast customer. Cross is renting two 500,000-lb. Lucker units with take-up reels, power units and six-ft.-diameter double sheave assembly to Hyundai Heavy Industries for the SBHT Project, which will consist of pulling a pipeline and river crossing ashore.

Del Gavio Marine Hydraulics

Circle 91 on Reader Service Card

During 1993, a number of deck machinery hydraulic pump failures were experienced by Sea-Land Service Atlantic class vessels. Del Gavio Marine Hydraulics traced the cause of the problem to contaminated oil. Since these systems have large capacities for oil, significant savings to the shipowner were reportedly realized by accomplishing a series of system oil regeneration through the use of high-volume filters, installed and used during normal turnaround.

Pump damage was remedied by removal and overhaul during the same turnaround. Total pump failure requiring renewal was stopped and the systems reportedly restored to reliable working condition without delays or changes to the sailing schedules.

The firm prides itself on professional, timely repairs and is especially experienced with older Western Gear and Hyde systems as well as more modern systems such as Brattvaag, Fukushima, Skagit and Denison. Other company services include assistance in the design of new systems or modification of existing systems. Del Gavio Marine Hydraulics offers service on a worldwide, around-the-clock basis and responds to emergency or routine repair calls from its facilities at Carlstadt, N.J. and Alameda, Calif.

Elevating Boats Inc. (EBI)

Circle 92 on Reader Service Card

Elevating Boats, Inc. (EBI) has recently incorporated innovations into its cranes. One is an efficient anti-two blocking system actuated by cables, reportedly eliminating the need for hoses running the length of the boom. EBI has also developed a wear pad system for telescoping cranes using readily replaceable nyloil wear pads, for a very smooth operation using an EBI rack and pinion telescopic mechanism. EBI has recently built a new computerized warehouse and packing system to better service its customers. EBI's exclusive representative in the U.S. is Techcrane International.

Hawboldt Industries

Circle 93 on Reader Service Card

Hawboldt Industries, Inc., located in Chester, Nova Scotia, Canada, has been serving the marine markets since 1906. Hawboldt offers an extensive range of anchor windlasses, capstans and towing, fishing, mooring and oceanographic winches. Much of Hawboldt's equipment is custom designed to meet specific application requirements. The company is currently delivering the first of 12 shipsets (windlass, capstan and power unit) for the Canadian Navy's Maritime Coastal Defense Vessel Program. Hawboldt recently expanded its U.S. representative network to include Menge Marine and Fowler Resources of New Orleans, and Manufacturers Agency of Houston.

Intercon

Circle 94 on Reader Service Card

Intercon offers a full range of heavy deck machinery for the military and commercial markets. Current Navy backlog includes crane fabrication for eight new Strategic Sealift Ships (T-AKRs). Included are 130-ft. (39.6 m) boom assemblies and slewing platform structures of the MacGregor-Hagglunds design. Ongoing Navy programs include main propulsion gear casings for DDG-51 class destroyers, and USN Deep Ocean Salvage Winch Systems. In commercial marine markets, Morania Oil Tanker of New York has ordered Intercon's Tug/Barge Coupler System for two new 7,200-hp ATBs. This unique linkage technology reportedly provides unmatched safety and economic advantages to the tug/barge industry. Three additional coupler shipsets were added to the Maritrans fleet in 1993. Current winch deliveries include stern and bow winches for St. Philip Towing's 6,000-hp tug.

Jeamar Winches

Circle 95 on Reader Service Card

Jeamar Winches has extended its line of capstan winches to eight models ranging in size from 2,000 lb. line pull up to 20,000 lb. line pull.

All sizes are standard and normally in stock.

The latest addition is a 20,000-lb. winch, which is ideal for either deck or dock mounting. The capstan is locked in position when it is not powered, ensuring maximum holding capabilities.

A corrosion resistance option is available for when the capstan is to be constantly exposed to sea air/water conditions.

All sizes are direct drive and compact, hence requiring minimum space and reducing maintenance costs.

Krupp Fordertechnik GmbH

Circle 117 on Reader Service Card

The Krupp Fordertechnik group of companies includes PWH Anlagen + Systeme GmbH, which in late 1993 received an order for what the company claims will be the biggest continuous ship unloader ever built, with a handling rate of 2,300 tons/hour and the ability to unload ocean-going vessels of up to 100,000 dwt, for ENDESA Empresa Nacional de Electridad SA, Madrid. Krupp Fordertechnik was responsible for engineering and supplying state-of-the-art dredging equipment for the *Bali II*, a 5,000-sq.-m. hopper suction dredger, as well as fitting out the 1,800-sq.-m. hopper suction dredger M/S *Seekies*, which is intended to extract raw gravel from the Baltic and ensure coastal protection by reclamation work.

Lake Shore

Circle 96 on Reader Service Card

Lake Shore says it developed and patented the constant tension technology that made U.S. Navy Underway Replenishment a world leader, and is now applying that technology to military and commercial machineries. Boat handling, launching and recovery in rough seas has become safer and more reliable with Lake Shore davits, claims the company. Lake Shore has developed and advanced the art of tension control winches. This new technology is in use in minehunting, minesweeping, submarine communications and underwater mining, where delicate reliable remote control of sub-surface machinery is important. Lake Shore continues to develop its line of military and commercial winches, davits, windlasses, elevators and cranes for both the domestic and international markets. For more than 100 years Lake Shore says its marine products have been known for quality and reliability. Lake Shore remains in the deck machinery business through advancement in controls, materials and special-purpose designs.

Liebherr-Werk Nenzing GmbH

Circle 97 on Reader Service Card

Liebherr-Werk Nenzing GmbH (LWN) is one of 47 enterprises within the Liebherr Group of companies. LWN was officially founded in 1976, but the Liebherr enterprise's roots in building cranes go back to 1949. LWN was established for the purpose of designing, manufacturing, providing sales and after sales service of cranes working in the maritime environment. The current production program includes mobile harbor cranes, ship cranes, offshore cranes and cable excavators. Today LWN employs about 750 people, and 1991's turnover was about $150 million. All cranes are completely designed, manufactured and assembled in LWN's workshops. Extensive inspection and control facilities reportedly ensure that all process conditions are accurately observed.

The MacGregor Group

Circle 98 on Reader Service Card

One of the world's leading organizations in the supply and service of shipboard cargo handling equipment is the MacGregor Group. The group comprises seven product divisions, namely: cranes, hatch covers, RoRo, lashings, elevators, reefer engineering and liquid cargo handling, and a worldwide service organization.

MacGregor has recently received numerous orders for equipment and services for all of its divisions from shipyards and shipowners worldwide.

The P&H Superstacker FCH77 from PPM Cranes.

Mannesmann Demag Gottwald

Circle 99 on Reader Service Card

The present manufacturing program of Mannesmann Demag Gottwald includes 13 different heavy duty mobile harbor cranes with capacities of six to 120 t SWL and radii of 26 ft. (8 m.) to 164 ft. (50 m) for handling general cargo, heavy loads, containers and bulk material in ports. Maximum mobility and versatility enable operation at any accessible point in a port. The company's latest development is its Automated Transport System for horizontal transport of any cargo. The first practical realization of this new idea is the fully automated container transport in a container terminal between the quay cranes and the stockyard by driverless AGVs (Automated Guided Vehicles). According to the company, integrated computer intelligence, autonomous navigation, high accuracy positioning and 24-hour operation help to guarantee performance.

Manitowoc Engineering

Circle 100 on Reader Service Card

Manitowoc Engineering Co., Manitowoc, Wis., designs, manufactures, markets and supports a full line of lattice-boom cranes well-suited for handling containerized, bulk, and breakbulk cargo. Liftcrane capacities range from 54.4 metric tons (MT) to 1,300 MT; clamshell capacities range from 6.8 MT to 45.4 MT. Mountings include crawler, truck, pedestal and RINGER®. Specialized container handling attachments have been developed for the 4100W Series-2, 4600 Series-3, 4600 Series-5 and M-250 Series-2.

Marine Equipment Inc.

Circle 101 on Reader Service Card

Marine Equipment, Inc. and its Louisiana representative, Menge Marine Equipment, recently delivered what is reportedly the first SOLAS 1983 U.S. Coast Guard-approved Freefall Lifeboat to be installed in a U.S.-flag ship, under construction in Amelia, La.

The Fassmer Freefall is fully equipped for fire protection and immediate evacuation of up to 34 passengers. The Freefall Lifeboat will be installed on the stern of the vessel on a Davit International Model D-FH-70 hydraulic/gravity Freefall Davit complete with hydraulic winch and self-contained power pack.

Marit/Davaine Chain

Circle 102 on Reader Service Card

Marit, located in Saint-Amand-Lee-Eaux, France, is reportedly the primary producer of chains (especially manufactured for marine use) in France.

Marit is represented in North America by Davaine Chain U.S.A. of Saugus, Mass.

Stud link anchor chain and components are manufactured in grades U2, U3 and ORQ in diameters of 14 mm (.55-in.) and 102 mm (4-in.). Classification society certification is available and quality is of primary importance.

Open link chains are also available for buoy mooring lines and for special applications such as: marine railway hauling chain and other sprocket wheel applications.

Marit manufactures chafe chain and components for single point mooring systems (SPM) and has provided various grades of chains according to the latest 1993 OCIMF Recommendations, for major oil company installations located in the Far East, Arabian Gulf, Venezuela and Nigeria.

Markey Machinery

Circle 103 on Reader Service Card

For almost 90 years, Markey Machinery Co., Inc. has built marine deck machinery including capstans, windlasses, mooring winches, towing, research and tractor tug hawser winches. Last year, Markey supplied the Foss tugs *Lindsey Foss* and *Garth Foss* with type CYP-80 stern capstan, WYWD-20 bow winch/windlass, DUSS-56 hawser winch, and complete controls/drive units for each machine.

The DUSS-56 was built for high-line speeds and includes two large automatic drum brakes with 500,000-lb. braking capacity at full drum. Continuing a tradition of quality, a TDSD-32 double drum diesel tow winch was built for the Bouchard Transportation Company tug *Robert J. Bouchard*. For Otto Candies, Inc., a TYS-32 hydraulic single drum tow winch and two hydraulic clinching hooks were provided for the new *Sidney Candies*.

Markey Machinery also offers refurbishment services to help extend the life of existing equipment.

McElroy Machine & Mfg. Co.

Circle 104 on Reader Service Card

McElroy Machine & Mfg. Company, Inc. of Gulfport, Miss., specializes in the manufacturing of custom winches and other deck machinery for marine applications. McElroy's engineering and design capabilities allow the company to offer a diverse range of equipment to meet its customers' specific requirements. Two newly-introduced products include paddlewheel drive systems designed and furnished for riverboats for the cruise and gaming markets and oil containment boom storage reels. McElroy is currently working on paddlewheel drive systems for three new gaming vessels being built, five anchor winches for a U.S. towing company and several mooring capstans, windlasses and deck machinery items for various customers.

Morgan Marine

Circle 105 on Reader Service Card

Morgan Marine, a leader in marine knucklebooms, now offers Hiab-Effer and Morgan Marine cranes, the smallest crane having 11 ft. (3.3 m) of reach and 500 lb. of capacity and the largest marine knuckleboom having a capacity of 39,380 lb. at a radius of 25 ft. (7.6 m). Morgan has a broad product range. Morgan recently built and delivered eight marine knucklebooms for use on a U.S. Navy LCAC, and is reportedly a popular choice among oceanographers and navies around the world — providing excellent products, value and service.

New England Trawler Equipment Company

Circle 106 on Reader Service Card

New England Trawler Equipment Company (NETEC), a manufacturer of deck machinery since 1926, specializes in custom engineered deck machinery for the marine, government and oceanographic communities. Current projects include hydraulic constant tension mooring winches; hydraulic anchor windlasses for 2.5-inch (63.5 mm) chain; diesel-powered, double-drum waterfall hauling winches for Corps of Engineers crane barges; and a variety of mooring winches, windlasses, capstans and electro-hydraulic power units for tugs and double-hulled tank barges. NETEC recently introduced a line of electric mini-capstans with 50,000-lb. bollard pulls — NETEC says, the highest in the industry — and is introducing an economical, rugged line of supply boat windlasses for chain sizes of one to 1.5 inches (38 mm) and anchors up to 6,000 lb.

NETEC and Seattle Crane & Equipment Company have signed an agreement: NETEC is now the exclusive dealer for Seattle cranes on the East Coast and Seattle Crane is the exclusive dealer for NETEC deck machinery in the Northwest and Alaska.

Palfinger Hebetechnik

Circle 107 on Reader Service Card

Palfinger is a manufacturer of hydraulic, articulated boom cranes. Based in Salzburg, Austria, Palfinger serves markets in more than 50 countries from its highly-automated production and assembly plants. Palfinger claims its success is based on its commitment to meeting the needs of its customers around the world through technological innovation. Palfinger's PK cranes are built with 2.4 up to 70 ton-meter lifting moment; its PKM cranes have between 20 and 120 ton-meter lifting moment; and Palfinger's PSM cranes, designed in accordance with DIN 15018, have lifting moments of between 33 and 170 ton-meters. Palfinger's North American subsidiary is located in Niagara Falls, Ontario, Canada.

Skookum RopeMaster

Circle 108 on Reader Service Card

Skookum/RopeMaster, recognizing the increasing popularity and use of the newer high-strength and synthetic ropes and the need for tackle blocks and fairleads compatible with these ropes, offers the marine industry blocks and fairleads with Working Load Ratings up to 50,000 lb. Other products currently include special engineered blocks and fairleads featuring large-diameter, high-strength poly/nylon sheaves designed to accept electro-mechanical cable used by the geophysical and ocean surveying industries.

SMATCO Industries

Circle 109 on Reader Service Card

Southern Marine and Tool Company (SMATCO). offers a line of winches ranging from models with 10,000-lb. line pull to one million-lb. SMATCO offers mooring systems, towing, anchor handling, and general construction winches. The Houma, La.-based company has expanded its winch product line to include windlasses, capstans, tuggers, fairleaders and deck sheaves. SMATCO can design and build specialty winches to suit a customer's specific application. SMATCO also designs and manufactures pipe-handling equipment.

Continuous ship unloader by PWH Anlagen, a company of Krupp Fordertechnik.

Some of SMATCO's most recent contracts are for the manufacture of an ROV deployment winch with levelwind for Oceaneering International; a constant production run of SMATCO deck fairleaders and deck sheaves; and a SMATCO model 40-DAS-75 towing winch for a towing

company on the West Coast. SMATCO was also recently awarded a contract to supply a Korean company with a complete pipe-laying system. SMATCO offers 24-hour service and spare parts, seven days a week for domestic and overseas customers. SMATCO has a crew of service technicians and parts specialists ready to maintain and service marine-related equipment.

Smith Berger Marine

Circle 110 on Reader Service Card

Smith Berger Marine, Inc. can custom design products for special applications. Recent projects include a 48-inch (121.9 cm) diameter roller delivered to the Navy used to deploy hydrophonic arrays.

The roller featured rubber coating on the barrel and UHMW coating on the tapered flanges. Another project involved the supply of flag blocks and guide sheaves for installation on two USCG buoy tenders.

With overall weight being critical, Smith Berger furnished the hardware with Nylatron sheaves which provided a lightweight solution. Eight model MC-2616-SR double sheave fairleads will soon be furnished for the U.S. Army Corps of Engineers' Red River Crane Barge. The fairleads feature 16-inch (406mm) sheaves grooved for 1.125-inch (28.6mm)wire, and special vertical side rollers.

Superior-Lidgerwood-Mundy

Circle 111 on Reader Service Card

Superior-Lidgerwood-Mundy has more than 120 years of experience manufacturing all types of hoists, winches and capstans. During the last year it implemented a 3-D, parametric driven, solid modeling CAD system which gives the company state-of-the-art design capabilities. As a result, S-L-M claims it is prepared to meet the deck machinery and cargo handling challenges of the 90s while maintaining a commitment to providing the highest quality products at the lowest achievable cost. S-L-M attributes its strong sales in the first quarter of '94 to its current focus on developing and expanding its engineering expertise to meet the quality, delivery and pricing needs of its commercial customers.

Techcrane International

Circle 112 on Reader Service Card

Techcrane International is the exclusive representative for EBI (Elevating Boats Inc.) marine cranes in the U.S and abroad. Techcrane International is also the exclusive importing agent for Hella marine articulating (knuckle boom) cranes in the U.S. EBI and Hella marine cranes together provide a source for a wide range of marine cranes from 7,000 ft.-lb. to 10,000,000 ft.-lb. capacity for fixed length boom cranes, telescoping boom cranes, and knuckle boom (articulating) cranes.

Techcrane says the trouble free rack and pinion telescopic mechanism, with more than ten years of service in the marine environment, has proven to be the best innovation in telescopic crane manufacturing in recent years.

A rack and pinion telescoping mechanism is available on all EBI model TC cranes.

EBI Cranes has recently been awarded contracts to manufacture EBI TC10-24-40 cranes by Marine Builders (Utica, Ind.) and Rodriguez Boat Builders (Bayou La Batre, La.), on behalf of the U.S. Army Corps of Engineers. The cranes are to be delivered to their respective shipyards within seven weeks. EBI Cranes has recently designed and fabricated the first Quick Transport Crane for use aboard ships and docks and barges. This crane is comprised of an EBI TC10 or TC20 crane, with skid, outriggers, hydraulic power unit and counterweights. The complete unit can be loaded, and through corner castings can lock on the truck bed within minutes. Once on location, the crane, without a need to tie down, can reportedly be operational in minutes.

Washington Chain & Supply

Circle 113 on Reader Service Card

Washington Chain & Supply of Seattle has experienced increased demand for its line of release hooks in the export market. Recent shipments of multiple-unit orders have gone to Ecuador, Taiwan, and Trinidad. The hooks come in conventional and rotary models rated from 25 to 200 tons, and are available with integral capstans, remote releases, and load monitor/recorders. A variety of single- and multiple-hook models are used for vessel mooring and towing by port authorities, shipping lines, petroleum companies, and others.

Western Machine Works

Circle 115 on Reader Service Card

Western Machine Works has served the marine industry for nearly 100 years and has been manufacturing hydraulic tow pins with optional stern rollers and hold-downs for over 30 years. In addition to standard eight- and 12-inch (203 and 304.8mm) diameter pins, Western Machine Works has designed a compact two-pin unit with optional hold-down to meet the demands of smaller tugs.

These units are built to Western's usual high standards and with the same materials that are in its larger units. Western Machine Works also provides assistance to customers in developing or adapting special designs to suit individual requirements.

PPM Cranes, Inc.

Circle 124 on Reader Service Card

PPM Cranes, Inc. of Conway, S.C. — a unit of Legris Lifting Groupe, based in Rennes, France — recently introduced the 77,000-lb. second row capacity P&H Superstacker FCH77, its largest and newest reach stacker. The unit offers a 22T (20t) lifting capacity for third row containers; 38.5T (34.5t) for second tow containers; and 49.5T (45t) for first row. The Superstacker FCH77 can reportedly maneuver easily in 55-ft. aisles, even carrying 40-ft. containers, and has an end-on capacity of 23 tons (21t) for 40-ft. containers and 46 tons (42t) for 20-ft. containers. It is powered by a Cummins LT120 C250 water-cooled diesel engine. The Superstacker line also includes the P&H Superstacker FCH55, a 55,000-lb. second row capacity reach stacker, and an empty container handler, the P&H Superstacker ECH, designed for fast, efficient organization or reconfiguration of port or rail yards.

Westmont Industries

Circle 142 on Reader Service Card

Westmont Industries, Inc., a manufacturer of heavy material handling equipment, is nearing completion of a Navy contract for eight 100-ton barge cranes. The cranes, which rest on barges measuring 175 feet (53.3 m) by 80 feet (24.4 m), can lift loads of 100 long tons at an 80-foot (24.4 m) radius and have a boom length in excess of 200 feet (60.9 m).

Westmont, of Santa Fe Springs, Calif., has been designing, manufacturing and installing heavy material handling equipment since 1951. Westmont has completed projects up to $50 million in size for both government and private concerns. Westmont's other products include bridge crane and monorail systems, portal cranes, high capacity turntables, jet engines maintenance systems, moving walkways and specialized material handling systems. The current backlog includes 60-ton portal and 20-ton wing wall cranes for the Navy. In addition, Westmont is currently under contract to produce a 38-ton portal crane and other equipment for the Corps of Engineers.

BoatLIFE Sandable Sealant Resists Diesel, Gas

BoatLIFE, serving the marine industry for more than 30 years, offers a one-part sealant especially formulated for teak deck seam applications.

BoatLIFE Sandable Silicone Sealant requires no mixing or priming, and is tack-free in just 30 minutes. When fully cured (24 hours average), the sandable sealant resists teak oils and cleaners, as well as gasoline and diesel fuel. BoatLIFE Sandable Silicone Sealant is available in white or black in 10.6 fl. oz. cartridges.

For more information on BoatLIFE's products,

Circle 116 on Reader Service Card

Senate Committee Holds Hearing On Hathaway And Scroggins Nominations

The Senate Committee on Commerce, Science, and Transportation held a hearing on the nominations of **William D. Hathaway** and **Joe Scroggins, Jr.** to the Federal Maritime Commission (FMC). Sen. **John Breaux**, chairman of the Merchant Marine Subcommittee, presided at the hearing.

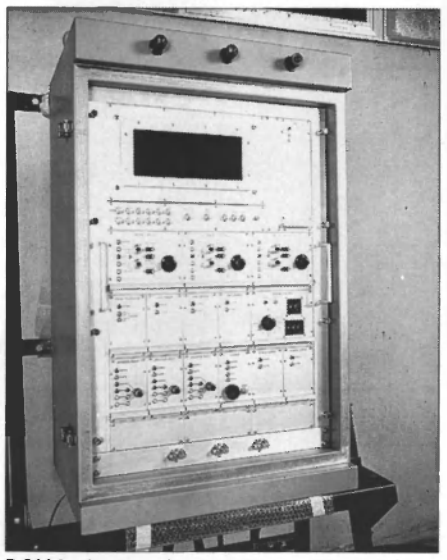
Mr. **Hathaway** is a graduate of Harvard College and Harvard Law School. He has been renominated to the FMC and will continue to serve as chairman, the position he has held since April 1993. Mr. **Hathaway** served as a U.S. senator from 1973 to 1979, and in the House of Representatives from 1965 to 1973, where he was a member of the Merchant Marine and Fisheries Committee. Mr. **Scroggins** is a graduate of the Merchant Marine Academy and Harvard Business School, and has been the senior deputy port director for the Tampa Port Authority since 1990. He was previously director of facilities and director of planning for the Port of Houston Authority (1981-1990), and before that he was a senior transportation analyst at John J. McMullen Associates, Inc. and an economist with Conoco, Inc.

Manson Construction Aidod By Mobil In Coastal Pipolino Project

Extending San Diego's Point Loma outfall pipeline—part of San Diego's Clean Water Program—was both a challenge and an opportunity to help ensure the integrity of California's coastline for Manson Construction & Engineering Company. With help from Mobil Oil, Manson Construction and joint construction partner Morrison Knudsen Corp., completed the 18-month Point Loma Outfall Project without experiencing a single hydraulic fluid-related delay or incurring one environmental spill fine. Today, the pipeline extends 12,500 feet (3,810 m) to a point on the ocean bottom nearly 4.5 miles (7.25 km) offshore and 325 feet (99 m) below the surface. The Point Loma Outfall pipeline, which carries treated effluent from the Point Loma Wastewater Treatment Plant, needed emergency repairs and a large extension to help protect California's delicate coastal marine habitat. To complete the job, Manson and Morrison Knudsen constructed two major pieces of hydraulically-operated underwater equipment: a "screed," which laid the gravel roadbed for the 12,500-foot pipe, and a "horse," which jointed two 73-ton pipe sections and carried them to the ocean bottom. All of the hydraulic systems involved in the construction of the outfall pipeline were lubricated with Mobil EAL 224H, a new biodegradable and virtually nontoxic hydraulic fluid.

"With so much of our work done either in or close to sensitive coastal waters, we aggressively pursue methods to eliminate both the potential for and the damage done by hydraulic fluid leaks and spills. Two of these methods involve increasing our preventive maintenance program and the converting of all of our hydraulic systems to Mobil EAL 224H," said **Pat McGarry**, Manson Construction's vice president of Operations. Mobil EAL 224H's vegetable base biodegradability is good news for the environment, as is EAL 224H's low toxicity. Mobil's environmentally-friendly hydraulic fluid passes the commonly accepted toxicity "Trout Test" at levels beyond the current standard of acceptability. Throughout the project, the U.S. Coast Guard closely monitored Manson Construction's Point Loma Outfall Project activities. The construction company reports that no environmental damage was caused by Mobil EAL 224H, nor were there any spill fines levied at any point. For more information on Mobil,

Circle 114 on Reader Service Card



DGM4 degaussing system was used on Intermarine's *Osprey* minehunter to achieve an extremely low magnetic signature.

Intermarine's MHC 51 Minehunter Completes Magnetic Signature Trials

In January, the USS *Osprey* (MHC 51) conducted magnetic signature measurements at the naval base in Charleston where she continues trials, and builder Intermarine USA announced that the stringent U.S. Navy contract requirements had been met.

Mines are continually developed to greater levels of sensitivity, and many anti-ship mines use a ship's magnetic signature as a primary sensing device. Detection of a ship's signature can lead to detonation and the destruction of the ship.

Intermarine USA's extensive use of non-magnetic materials in the *Osprey* is complemented by the DGM4 degaussing system designed and manufactured by Impianti Forniture Elettriche Navali (IFEN) of La Spezia, Italy. IFEN equipment was installed on the Italian Lerici, Malaysian Mahamiru and Nigerian Ohue class mine countermeasure vessels (MCMVs) also built by Intermarine at its shipyard in Italy. IFEN has since developed the multi-control, multi-channel DGM4.

The system was required to undergo full First Article Testing in accordance with U.S. military specifications before installation onboard MHC 51, including high-impact shock, vibration and EMI/EMC. In addition to operational and environmental exposure testing, accelerated life testing was conducted to confirm reliability.

Intermarine says the DGM4 features modularity, interchangeability, reliability and maintainability. The system has magnetometer automatic control and computer generation in case of magnetometer failure of the degaussing current-driving signals. The DGM4 is a class standard on the MHC 51 ships, and is also installed on the eight Intermarine Gaeta class MCMVs nearing completion for the Italian Navy, as well as the Norwegian Oskoy class Surface Effect Minehunter/Sweepers.

For more information on Intermarine USA,

Circle 8 on Reader Service Card

Foss Environmental Announces "Sea Slug" Distributorship

A 12,500 gallon "sea slug" under tow at five knots.

Foss Environmental Services Co. completed a stocking distributorship agreement with Canflex (USA), Inc. Canflex manufactures temporary, floating, towable fluid containment bags called "sea slugs."

Canflex also manufactures other styles of temporary liquid containment devices that can be used ashore or for other applications, as well as underwater lift bags for vessel salvage and a crane testing bag.

For more information on Foss Environmental Services Co.,

Circle 144 on Reader Service Card

Harland & Wolff Orders Jumbo Bulb Flats From Inexa Profil

Harland & Wolff, Belfast, Northern Ireland, has ordered 1,600 tons of Jumbo Bulb Flats from Inexa Profil for delivery during 1994 for two Suezmax tankers.

"We can now build ships with all of the advantages of the bulb flat compared to welded T and L sections in the ship's side.. .Shotblasting, painting and maintenance are simplified, which is an advantage for both the yard and the shipowner," said **Kjell Arvin**, technical director at Harland & Wolff.

For more information on Harland & Wolff,

Circle 148 on Reader Service Card

American Oilfield Divers Expands Fleet

American Oilfield Divers announced it acquired two vessels and two saturation diving systems and related equipment from Martech USA, Inc. for an undisclosed amount of cash.

The *Arctic Carolyn* is a 185-foot, four-point anchor diving support vessel equipped to support towing, ROV and diving operations. The *Golden Bear* is a 65-ft. crew boat equipped with ROV support facilities and emergency spill response capabilities. The two saturation diving systems are designed for diving to 1,000-ft. water depths.

For more information on American Oilfield Divers,

Circle 152 on Reader Service Card

Sperry Marine Announces Executive Appointments

Charlottesville, Va.-based Sperry Marine, Inc. made several executive appointments recently.

J. Nolasco DaCunha was appointed to vice president sales and service, responsible for the management of Sperry's worldwide sales and service operations. A 20-year veteran of Sperry Marine, Mr. **DaCunha** has held numerous engineering and sales positions.

Hans E. Rasmussen was appointed to the position of managing director, Europe. Based in Copenhagen, Denmark, he will be responsible for the management of Sperry Marine's European sales and service operations. Most recently, Mr. **Rasmussen**, a 12-year veteran of Sperry Marine, managed sales and service operations in Scandinavia.

George L. Toma was appointed as the new worldwide customer service manager, responsible for the management of Sperry Marine's worldwide customer support operations. He joins the company after a successful career at Radio Holland.


J. Nolasco DaCunha


Hans E. Rasmussen


George L. Toma

Kockums Purchases BMT Icons Ltd.

Kockums Computer Systems (KCS), a Swedish maritime software company, has acquired BMT Icons Ltd., Newcastle, U.K., from British Maritime Technology Ltd. (BMT). Under the sale agreement, KCS will assume ownership of all computer software programs developed by BMT Icons. In a statement, KCS said, "By integrating the products and skills of the two organizations within the Tribon Shipbuilding system, KCS will be able to offer the industry a complete service—from basic design to production." KCS intends to maintain the BMT Icons office in Newcastle. For more information from Kockums Computer Systems,

Circle 143 on Reader Service Card

Players Intl. Selected As Riverboat Applicant In Indiana

The City of Evansville, Ind. informed Players International, Inc. that it is one of three applicants selected by the City to continue negotiations for a riverboat casino in Evansville.

Tank Sentries For Diesel, Water Or Waste

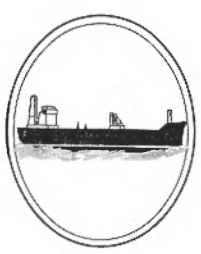
Headhunter tank sentries measure the level of waste tanks, diesel tanks, and water tanks. Ten LEDs indicate the percentage of fluid in the tank. Reportedly, tanks as small as seven inches high to as large as seven ft. high are handled with extreme accuracy. All models have audible and visual alarms and come with easy-to-set slide switches that permit the user to set alarms to sound at any desired level. A mute switch permits the alarm to be silenced when desired. No moving parts in the tank eliminates the fouling of such parts, and all units work on any DC voltage from 12 to 36 volts. Headhunter also offers custom panels, controls and monitors for all fluid systems. For more information on Headhunter's tank sentries,

Circle 122 on Reader Service Card

SETCOR: Offering A Myriad Of Marine Products

SETCOR's new brochure details a variety of products for the marine industry from a number of well-known marine industry companies: Standard Radio Marine's GMDSS-approved radio stations; Maritime Education's shipboard or office training via interactive CDs in GMDSS Certification, Tanker Safety, Fire Fighting, First Aid/Medical and more; Consilium Marine's Salwico Fire Alarm System, Sal Speed & Docking Logs and the Salwico Gas Detection System; and SF-Control's microprocessor-based electropneumatic level gauges. These products and services join those of Saab TankRadar, Gunclean, OMICRON High Level Alarms and FGI Inert Gas Systems under the SETCOR banner. For more information on SETCOR,

SETCOR
Equipment for the Long Haul



Circle 123 on Reader Service Card

Westinghouse To Provide Diesel Engines For USCG Icebreaker

Westinghouse Electric Corp.'s Marine Division has begun work on a $14.5 million contract from Avondale Industries to provide diesel engines for the U.S. Coast Guard's (USCG) newest polar icebreaker, the USCG *Michael A. Healy*.

Under the purchase order from Avondale, Westinghouse will provide four 12-cylinder, 10,600-hp ZA40S medium-speed engines.

The company is working closely with Fincantieri's diesel engine division in Trieste, Italy, which will physically build the engines. The engines will be delivered in January 1996. The current contract includes four sub-bases that will serve as mounts for the medium-speed diesels. Generators for the icebreaker's electric drive propulsion system are being designed and manufactured by the Westinghouse Motor Company in Round Rock, Texas, under a separate contract. The diesel-generator units will power two 15,000-hp electric motors.

These motors will drive two fixed-pitch propellers. In addition to providing power for the electric-drive system, the Westinghouse medium-speed diesels will also supply energy for the ship's electrical service.

The *Healy* will be able to clear channels in icepacks up to 4.5 feet (1.4 m) thick continuously at speeds up to three knots, or up to eight feet (2.4 m) thick by backing and ramming the ice.

For more information on Westinghouse,

Circle 17 on Reader Service Card

USCG Schedules Hearings On Proposed Small Passenger Vessel Regs

The U.S. Coast Guard (USCG) has scheduled public hearings on a proposed rulemaking to completely update the existing construction and equipment standards for small passenger vessels. The standards would apply to more than 52,000 vessels including ferries, sight-seeing, excursion and dinner cruise boats, charter and party fishing boats, dive boats and offshore oil industry crew boats. The proposed changes would simplify the small passenger vessel requirements and update them.

The proposal would cover certain lifesaving equipment; promote increased use of fire retardant materials; and establish new upper thresholds for vessel length and passenger capacity above which certain construction and equipment requirements would apply. To register, write to the Executive Secretary, Marine Safety Council (G-LRA-2), U.S. Coast Guard Headquarters, 2100 Second St., S.W., Washington, D.C. 20593-0001, tel: (202) 267-1477.

For more information or copies of the rulemaking, contact Lcmdr. **Marc C. Cruder**, project manager, Merchant Vessel Inspection and Documentation Division (G-MVI), tel: (202) 267-1181.

CACI Wins $4.8 Million Contract

CACI International has won a $4.8 million contract from the Navy, with options up to $7 million, to support the Department of Defense Integrated Undersea Surveillance System Computer-Aided and Acquisition and Logistics Support Program. For more information on CACI,

Circle 51 on Reader Service Card

Comptek Wins $6.2 Million Contract

Comptek Research, Inc.'s subsidiary Comptek Federal Systems has won a $6.2 million U.S. Navy contract—a five-year cost-plus-fixed-fee contract awarded in April 1990 by the Naval Sea Systems Command (NAVSEA). The contract is for Comptek to supply engineering support to NAVSEA for its reliability, maintainability and quality assessment program. Comptek has reportedly provided these types of services to NAVSEA for more than 20 years. For more information on Comptek Research,

Circle 52 on Reader Service Card

PK Marine To Provide Engineering For Combi-Tug Conversion

Design to be ready for bidding by mid-summer

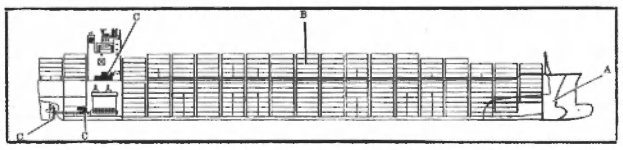
PK Marine, Camarillo, Calif. will provide design engineering and shipyard coordination services to Wilmington Transportation Company of San Pedro, Calif. for the conversion of the tug *San Pedro* to a combi-tug configuration. This conversion will include the installation of an Aquamaster Rauma azimuthing thruster. Existing focsle accommodations will be down-scaled to accommodate the installation of a Detroit Diesel 8V-149 DDEC engine to drive the thruster. Additional bollard pull will be achieved through the installation of a propeller nozzle and Nautican triple rudder system to replace the existing open propeller and single rudder. Other improvements will include enhanced stern fendering, hydraulic stern towing pins, and a quick release towing hook.

Paul A. Gow of PK Marine considers the combi-tug conversion to be a cost effective method to bring under-utilized, single screw tugs back into fully productive service. The addition of the thruster achieves enhances the maneuverability, plus increases the available bollard thrust by the addition of more horsepower. Mr. **Gow** claims not all single screw tugs are candidates for such extensive modification. This modification dictates that the boat meet current stability requirements for towline pull. Many single screw tugs have neither the initial stability nor the righting energy to meet the stability requirements. The addition of the thruster compounds this challenge. PK Marine has performed ongoing stability analyses, throughout the preliminary design stages of this project. The design package is expected to be ready for bidding, by West Coast shipyards, by mid summer.

For more information on PK Marine,

Circle 157 on Reader Service Card

Blohm + Voss Wins Rebuild Contract From Sea-Land



ACV conversion to SL31. Work includes forebody modification (A), midbody removal (B) and shaft motor & generator (C).

The Repair Division of Blohm + Voss has won a rebuilding contract from U.S. shipping line Sea-Land for rebuilding work on the ships *Galveston Bay*, *Sea-Land* and *Raleigh Bay*.

The three container ships are of the Atlantic Class Vessel (ACV) type, and have a volumetric capacity of 3,652-TEUs. Each is being shortened by three midship sections (three container lengths)—from 950 feet (289.5 m) to 856 feet (261 m). The three ships are also each being given a new bow structure with greatly improved streamlining. The Hamburg Shipbuilding Research Institute (HSVA) has been involved in the hydrodynamic calculations and in the planning of the experimental work. The aim of the rebuilding is to make the ships three knots faster, raising the speed from 18 to 21 knots. The increase in speed will also be achieved by applying additional power—about 4,000 kW—to the propeller shaft, produced by a diesel generator and supplied to the drive train via an electric motor and a gear coupled to the propeller shaft. The diesel generator can produce 4,860 kW. When entering and leaving harbor, 1,800 kW of power can therefore be supplied at the same time to operate a bow thruster. For more information on Blohm + Voss,

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Twelve Marine Pilots Complete MSI Workshop

Twelve marine pilots from three different pilot organizations recently completed a workshop designed to help achieve greater safety for ships and the environment. The program, entitled "Bridge Resource Management for Marine Pilots," was conducted by MarineSafety International (MSI), an industry leader specializing in proficiency training for merchant mariners. MSI operates computer-based shiphandling simulator complexes in Kings Point, N.Y.; Newport, R.I.; San Diego, Calif.; and Rotterdam, The Netherlands. The concepts of Bridge Resource Management (BRM) have evolved from analyses of aircraft and ship accidents and human factors studies conducted by the National Transportation Safety Board (NSTB) and the U.S. Coast Guard. MSI is the maritime subsidiary of FlightSafety International (FSI).

Throughout the year, Pilot BRM workshops will be conducted at FSI centers in Seattle; Long Beach; Houston; St. Louis; Philadelphia; and Montreal; as well as at MSI centers in New York, Newport and San Diego. For additional information on the workshops from MSI,

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Separation System Removes Emulsified And Dissolved Oil

Enviro-Crest Services, Inc. introduced an oil/water separation system which can remove both emulsified and dissolved oil, as well as free oil from a waste water stream. The system reportedly removes most surfactants as well, which pass through their coalescing filters at levels which keep the operator from incurring state and federal fines. The ECS Separator is available in five-, 10-, 15-, 25- and 50-gpm units. For more information from Enviro-Crest Services,

Circle 27 on Reader Service Card

Spurs Helps Prevent Oil Seal Damage

Spurs Line & Net Cutter is helping to prevent oil seal damage, and subsequent leakage, from line and net intrusion into the seal and bearing area. Whether long line, drift netting, floating tow lines or dock lines, Spurs' prop-mounted large and medium vessel line and net cutter is designed to cut away lines, nets, etc. before entanglement begins. This can help to minimize costly charges and idle drydock time. As line is grabbed by the propeller, it is wound toward the propeller hub and picked up by the rotating cutter blade where it is instantly cut, forward or reverse, and washed away, clearing the propeller with each revolution. For free information on the Spurs Line & Net Cutter,

Circle 29 on Reader Service Card

Compact Rack System Supports Variety Of Tools

The Compact Rack System from Bug-O Systems is a rigid system which can be used to hold a variety of cutting torches, welding guns and other hand-held tools. The system consists of Teflon hard-coated 7/8-inch (22.2mm) diameter aluminum rods, with 32-pitch steel racks keyed into them. These rods with racks are available in standard lengths of 7.5-inches (190mm) and 15-inches (380mm). For more information on the Compact Rack System,

Circle 37 on Reader Service Card

Beier Named Agent For Scana Skarpenord

Scana Skarpenord has appointed Frank L. Beier Radio as its exclusive service agent for the U.S. East and Gulf Coasts. Beier technicians have completed an extensive training certification program and are authorized to respond to all service inquiries. Beier Radio also has in stock an extensive spare parts inventory to support all the Skarpenord products. Service can be obtained by calling Beier Radio's central dispatch at 1-800-256-1395.

Wesmar HD600E Sonars In Sea Trials Around The World

The results are in for 12 months of evaluation of the Wesmar HD600E high powered searchlight sonar.

The Wesmar HD600E series was studied in three diverse fisheries: Chile, Sweden and Canada. In all three areas, the Wesmar sonars met with success.

Fisheries Patrol Boat the *Tanu* uses Wesmar HD600E sonar for locating and assessing herring stocks in the waters off British Columbia, Canada.

The Wesmar HD670E color scanning sonar was used for long range mackerel detection in Chile, and the Chilean fishing company Pesquero El Golfo reported excellent results using the product. The results were reportedly so successful that a similar HD670E-8 sonar was purchased for a second boat in the company, the *Patria*. The news of El Golfo's success with these two sonars reached the port of San Antonia, where a second Chilean fishing company, Tripesca, subsequently purchased and installed HD670E-8 Wesmars (these with hydraulic hoists) on three vessels.

The Wesmar HD600E sonar was used by the Canadian Department of Fisheries and Oceans for locating and assessing herring stocks in water off British Columbia in western Canada, from the Washington border to Queen Charlotte.

The Fisheries department purchased 18 new Wesmar HD600E sonars.

A 60kHz Wesmar HD600E was also installed aboard the 65-foot (20-m) *Slaeddoe*, near the port city of Lyseki, between Gothenburg, Sweden and Oslo, Norway. The scanner is being used for shallow water "pair" purse seining. The HD600E's key advantage reportedly is its ability to distinguish the size of schools of fish.

For more information on Wesmar,

Circle 64 on Reader Service Card

Keppel Joint Venture Signs Lease For Australian Yard

The signing of an agreement to lease between the Port of Brisbane Authority and Keppel Cairncross Drydock Australia Ltd. signaled the commencement of a $16 million project to bring the 85,000-dwt Cairncross Drydock at Bulimba in Brisbane back into commission by the third quarter of 1994.

Keppel Cairncross Drydock Australia Ltd. is a joint venture company formed by Singapore-based public company Keppel Corporation Ltd., a conglomorate with core businesses in shiprepair and shipbuilding, rigbuilding, property, banking and financial services, engineering and shipping. Australian shareholders include shareholders of the Brisbane-based Maritime Engineering Group. Keppel Corp. Ltd. owns a 60 percent share in the new joint venture, while Australian shareholders hold the balance.

On completion of the work, Cairncross Drydock would be a 24-hour integrated marine shiprepair and refurbishment facility, providing a "Panamax" width drydock specifically targeted at the international commercial shipping industry.

For more information on Keppel,

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Schichau Seebeckwerft Delivers Container Vessel To Conti Reederei

Schichau Seebeckwerft AG, Bremerhaven, delivered newbuilding no. 1082 to Conti Reederei, Unterfohring, near Munich.

Karin Ehlermann was the sponsor and named the ship *Contship New Zealand*. The new ship was handed over to Conti Zweite Corso Schiffahrtsgesselschaft GmbH & Co. *Contship New Zealand* will be managed by NSB - Niederelbe Schiffahrtsgesellschaft GmbH & Co. and enter a long-term charter with Contship Container Lines, Ipswich, U.K. The new ship has a container capacity of 1,684 TEU, 618 TEU below deck and 1,066 TEU on deck. Instead of 70 plugs for refrigerated containers the ship is now equipped with 152 plugs. As a consequence of the higher number of refrigerated containers a third diesel generator was installed.

Contship New Zealand has three deck cranes with a lifting capacity of 40 tons each. The main engine, a Bremer Vulkan/MAN-Burmeister & Wain type 7 l 60 MC developing 13,125 kW, was increased from six to seven cylinders. The speed of the ship increased from 18.3 to 19.1 knots. For more information on Schichau Seebeckwerft,

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Marco Receives Oil Skimmer Order From Australia

Marco Pollution Control and its Australian agent Holaust Pty. Ltd. received an order from the Australian Maritime Safety Authority for three 28-foot fast response oil recovery vessels. The Marco-designed Harbor 28 vessels, complete with Marco's Filterbelt oil and debris recovery systems, will be built in Australia. The three vessels are scheduled for delivery this summer.

The all-aluminum Marco Harbor 28 (formerly Class I-C) oil recovery vessel is 28.8 feet long (8.75 m), with a beam of eight feet (2.4 m) and a depth of three feet (.9 m). Powered by twin 70 hp OMC outboard engines, it can respond at speeds of up to 15 knots. The Harbor 28 features a one-foot Filterbelt oil and debris recovery system with a Marco U040 submersible oil transfer pump. The Marco Filterbelt is reportedly very efficient for removing oil mixed with debris from open water. It removes the oil directly without requiring further separation. For more information on Marco,

Circle 9 on Reader Service Card

Fonte Named Boston Whaler President

Doug Fonte has been appointed president of Boston Whaler. Previously, Mr. **Fonte** had been president of Penn Racquet Sports for nine years, and had spent two years as Sports Tactics International's president.

Mr. **Fonte** has 20 years of experience in the automotive, textile and sporting goods industries.

Babin Named Avondale's Sales & Marketing Manager

Ronald E. Babin has been named manager of sales and marketing for Avondale Boat Division.

Mr. **Babin** brings to the position 18 years of experience and involvement in the commercial marine industry. Along with Vice President and General Manager **Barry Heaps** and Assistant Vice President **Wiley Thornton**, Mr. **Babin** will market Avondale Boat Division's capabilities to build steel vessels up to 400 ft. (122 m).

Atlantic Marine Holding Elects Sverdrup To Directors Board

Atlantic Marine Holding Company has elected **Cato F. Sverdrup** of Copenhagen, Denmark to its board of directors, a step the company hopes will assist its move into the international shipbuilding arena.

Mr. **Sverdrup** is president, Burmeister & Wain Holding A/S, and he brings to Atlantic's board a wealth of international shipbuilding industry experience. Mr. **Sverdrup** has been involved in all aspects of shipbuilding for over 30 years.

He was technical director and later president of Burmeister & Wain Shipyard (B&W) and is currently chairman of B&W Shipyard, B&W Shipholdings, B&W Ship Design and B&W Finance.

He serves as a member of the general committee of Lloyd's Register and is a member of the board of Det Norske Veritas.

Raytheon To Relocate North American Headquarters

Raytheon Marine Company will move its company headquarters during the fourth quarter of this year, as a result of the consolidation of the parent company, Raytheon Company, and its defense-related business.

To improve the competitive position of its defense-related business units and the productivity of its commercial business, Raytheon Company of Lexington, Mass. will consolidate missile manufacturing into one Massachusetts location, freeing up the company owned property in Manchester, N.H., which will become the new headquarters for Raytheon Marine Company's North American operations.

Raytheon Marine/Europe ha also consolidated all sales, servic and manufacturing into one Ports mouth, U.K. facility.

For more information o Raytheon,

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Tranter Acquires Heat Transfer Technologies, SA

Tranter Inc., a wholly-owned subsidiary of Dover Corporation, has purchased HTT Heat Transfer Technologies SA of Fribourg, Switzerland, which operates under the trade name SWEP throughout the world.

Tranter President **Ken Kaltz** announced the acquisition, noting that it is part of Tranter's ongoing program to expand its heat transfer product line.

"SWEP designers and engineers are the thermal experts in brazed heat exchanger technology," said Mr. **Kaltz**.

"(The acquisition) expands Tranter's own high standards of heat transfer technology beyond our plate and frame, prime surface and all-welded plate heat exchangers." Mr. **Kaltz** also said SWEP's space-saving designs and high heat transfer capabilities were part of a new generation of OEM systems that are less expensive to install, maintain and operate.

SWEP recently introduced what Tranter reports is the smallest fully-functional PHE unit in the world, which can fit in a human palm.

Tranter, Inc. is located in Augusta, Ga. and has manufacturing facilities in Wichita Falls, Texas and Edgefield, S.C.

For more information on SWEP or Tranter,

Circle 121 on Reader Service Card

Christian Becomes Acting Manager Of Portland Port's Marine Division

Keith Christian has been appointed acting manager of the Port of Seattle's marine division.

Mr. **Christian** has served as director of marine planning and development for three years, overseeing the Port's long-range planning and facility development to meet the needs of the steamship lines which transport more than $27 billion in goods through this gateway each year.

Mr. **Christian** will serve in the senior management post until a new managing director is selected.

Mr. **Christian**'s service to the Port of Seattle spans more than 20 years. He fills a post left vacant by **Don Fleming**, who resigned in March.

Sovereign Submarines Builds Tourist Sub For Operation In Hawaii

Sovereign Submarines launched a 72.5-foot (22-m), 48-passenger tourist submarine, *Voyager I*, to be transported to Hawaii by SeaPath, Inc., the Washington-based firm that is promoting the Finnish-designed vessel.

The *Voyager I* is the first of two submarines that will be completed by Sovereign Submarines for operation by Submarines Hawaii off Oahu.

SeaPath was formed to foster construction of tourist submarines based on designs by Sub Marine Designs International, Oy/Ltd. of Finland. Submarines designed by this group are now in service in the Caribbean, Far East and Northern Europe. The Hawaiian submarines, *Voyager I* and *Voyager II*, are "second generation steel and acrylic vessels," according to SeaPath President **Robert Martin**. Sovereign Submarines' engineers participated in adapting original design drawings to meet U.S. Coast Guard (USCG) and American Bureau of Shipping (ABS) standards, as well as fabricating fiberglass shrouds and fairings and installing and testing all external and internal fittings and gear. Sovereign President **Bruce Reagan** explained that detailed vessel design drawings and calculations were reviewed by the USCG and ABS. The submarine designs were adapted to meet ABS "Rules for Building and Classing Underwater Systems and Vehicles." The *Voyager I* is powered by an electro-hydraulic system and can achieve speeds of up to seven knots. While certified by the USCG for operation down to 150 feet (45.7 m), the vessel is classified by the ABS for a depth of 328 feet (100 m). For more information on SeaPath Inc.,

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For more information on Sovereign Submarines,

Circle 55 on Reader Service Card

Sun State Marine Completes Construction Of Towboat

Sun State Marine, Inc. completed construction of a new towboat which was christened *Sun River City*. The *Sun River City* was christened at the Sun State Marine shipyard and began service on the St. John's River. The new towboat is 70 feet (21 m) long, with a beam of 25 feet (8 m) and a draft of 8 feet (2 m). The vessel will normally carry a crew of four and will operate in barge towing service in the Florida and South Georgia area. The 1,000 hp towboat is powered by two Caterpillar 3412DITA engines driving MG 521 reduction gears at 4:1 ratio and 66-inch (167.6-cm) by 48-inch (121.9-cm) stainless steel propellers. The main engines were provided by Ring Power Corp. of Jacksonville, Fla. Main and auxiliary electrical power is furnished by two Perkins 40 kW generators. Steering systems include two main and four flanking rudders powered by an engine-driven hydraulic pump backed up by two auxiliary electro/hydraulic systems. Sun State Marine, in business for more than 55 years, owns and operates nine towboats and six tank barges in the Florida/Georgia area. Services the yard provides include drydocking, repairs, preservation and long-term wet berth storage. For more information on Sun State Marine,

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Newport News President Inducted Into Maritime Hall Of Fame

W.R. (Pat) Phillips

Albert J. Herberger, Maritime Administrator, presented Newport News Shipbuilding (NNS) President **W.R. (Pat) Phillips** with one of five International Maritime Hall of Fame Awards.

Mr. **Phillips** was inducted into the Hall of Fame along with other prominent leaders in the shipping industry.

The International Maritime Hall of Fame Awards, established by the Maritime Association of the Port of New York/New Jersey, also acted as the culminating event for the week-long commemoration of the 50th Anniversary of the Normandy invasion. The festivities included the arrival to New York Harbor of the last surviving Liberty ships before they embarked to Normandy on May 5, 1994 for the historic *Last Convoy*.

During the first week in May, the premier event was the International Maritime Hall of Fame Awards, which took place at the Statue of Liberty in New York Harbor.

The event consisted of a dinner/dance and an awards ceremony, with representatives of the shipping community from throughout the world and dignitaries from World War II.

Other inductees into the Hall of Fame included **Lane Kirkland**, president of the AFL-CIO; **John Olsen**, chairman and president of Cunard Line; Capt. **Ken Fullwood**, vice president of Mobil Shipping & Transportation Company, and **John Griffith**, chairman of Norton Lilly International.

Moore Appointed Marine Systems Division Head At University of Michigan

Richard C. Moore has been appointed research scientist and head of the Marine Systems Division of the Transportation Research Institute (UMTRI) and as an adjunct faculty member of Naval Architecture and Marine Engineering in the College of Engineering. At UMTRI, he will lead a research team focused on projects to enhance the competitiveness of the U.S. shipbuilding industry and of marine transportation. He will begin teaching ship production courses in September.

Mr. **Moore** was previously manager of Engineering Computer Services for Jonathan Corporation of Norfolk, Va. and program manager for that company's joint effort with Intergraph on the NAVSEA CAD-2 contract. He held line management positions in production and engineering at Newport News Shipbuilding from 1967 to 1989, and led numerous projects for increased productivity.

Alfa Laval Sets Up New Persian Gulf Service Center

Alfa Laval Middle East Ltd. recently relocated from Cyprus to Dubai. The new Marine Service Center offers total support for Alfa Laval customers in the Persian Gulf.

In the past, Alfa Laval says its customers had to settle for emergency repairs in the Gulf, waiting until they reached European or Far Eastern ports with an Alfa Laval service center before carrying out more demanding jobs. **Ake Rudestad**, president of Alfa Laval Middle East, says the new service center provides full support for spare parts, service and technical advice. "The Center has qualified engineers capable of servicing and repairing all Alfa Laval engine room components and systems, including fuel and lube oil separation systems, thermal equipment and freshwater generators." The intention is to create a service center of the same caliber of other Alfa Laval service centers. For more information,

Circle 33 on Reader Service Card

Red Funnel Orders Two Voith-Schneider Ferries From Ferguson Shipbuilders, Port Glasgow

Red Falcon, the first of two new passenger/vehicle ferries for Red Funnel, has just been commissioned on the Southampton to Isle of Wight route. The vessel is reportedly larger than the existing ferries operating this service with almost double the carrying capacity.

Extensive ship model tank tests were conducted and the results were encouraging for a vessel of this size. As the small harbor at Cowes is congested, leaving little space to maneuver, machinery and propulsion systems chosen had to be reliable and well-proven. The system also had to be quick to respond and easy to control in order to provide safe operation of the ferry inside the harbor, especially during the winter months. The *Red Falcon* is a symmetrical double-ended Voith-Schneider propelled ferry built by Ferguson Shipbuilders, Port Glasgow. Propulsion is by one Voith-Schneider propeller (size 26GII/165) at each end on the centerline, each driven by a Stork Wartsila 8FHD240 engine developing 1,000 kW at 750 rpm through a Voith Turbo coupling, type 1150 DT-L. The propeller pitch is controlled by a power-assisted hydraulic system from any one of four positions in the wheelhouse. The second identical ferry, also being built at Ferguson's shipyard, is due to be delivered to Red Funnel later this year. There will then be 10 vehicle ferries operating on three routes to the Isle of Wight, nine of which will be propelled by Voith-Schneider propellers. For more information on Voith-Schneider,

Circle 53 on Reader Service Card

***Red Falcon* specifics:**

Length waterline	263 ft. (80 m)
Breadth Mid	57 ft. (17.5 m)
Draft max	9 ft. (2.75 m)
Cars	140
Passengers	890
Carrying capacity	560 tons
Speed	14+ knots

API 1994 Tanker Conference

"Image - A Global Maritime Mission"

June 19-22, Pebble Beach, Calif.

The American Petroleum Institute (API) 1994 Tanker Conference provides an opportunity for professionals and executives from major oil companies and independent shipping fleets, charterers, shipyards, ship brokers, financial institutions and international maritime agencies to keep up-to-date on new legislation and regulations and how they will affect maritime interests.

C.J. Krambuhl, manufacturing, distribution and marketing director for the 1994 Tanker Conference, said of the show, "Our maritime world is changing rapidly. Keeping up-to-date on industry trends, governmental regulations and the changing perception of our business among the public at large is essential to success - both today and tomorrow.

"Designed specifically to meet the needs of maritime executives, this conference presents valuable information on where our industry is today and perspectives on issues geared toward tomorrow's maritime leaders. In addition to its unparalleled educational sessions, the conference offers the opportunity...to make new acquaintances, renew previous ones and to enjoy the amenities at this year's stunning Pebble Beach, California site."

Speakers at the sessions come from various industry sources such as Arco Marine, Inc., BP America, the Canadian Coast Guard, the U.S. Coast Guard and Chevron Shipping Company. Topics to be discussed include:

- *"The Current View from Washington,"* a review of the legislative agenda for the year highlighting key issues affecting maritime industry;
- *"Port State Control: Is It Worth the Efforts?"*, a view from the Canadian Coast Guard;
- *"Preventing Air Pollution From Ships - An International Update"*;
- *"Tanker Inspection - The Oil Companies International Marine Forum (OCIMF) Sire Program,"* an outline of OCIMF's Ship Inspection Report Program and its impact on tanker fleet quality and improved vessel safety; and,
- *"The Tanker Industry - Saint or Sinner,"* a session on overcoming and changing negative public perception of the tanker industry.

The API 1994 Tanker Conference also boasts an impressive social calendar, designed to give attendees and spouses the opportunity to experience the natural beauty of California's Monterey Peninsula, experience the area's outstanding resorts, unequaled golf facilities, and more.

For more information on the API 1994 Tanker Conference, contact API, Department 5160, Washington, D.C. 20061-5160, fax: (202) 682-8222 / 8051.

API 1994 Tanker Conference Schedule

Sunday, June 19:

7:00 p.m. - 9:00 p.m.:
Opening Reception

Monday, June 20:

8:30 a.m. - 9:45 a.m.:
Opening Session

10:00 a.m. - noon:
Session I - Commercial Reality

6:30 p.m. - 8:00 p.m.:
Evening Reception

Tuesday, June 21:

8:30 a.m. - 10:15 a.m.:
Session II - Environmental Tightrope

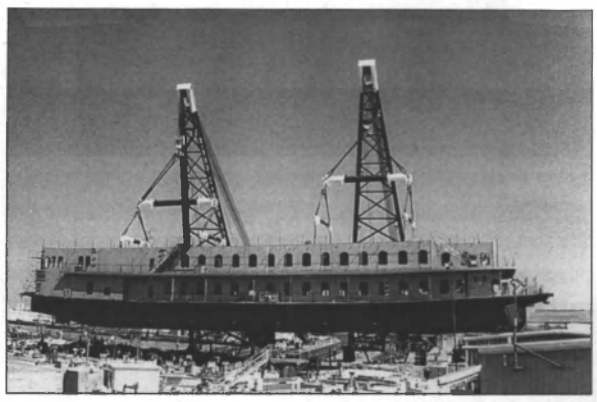
10:30 a.m. - noon:
Session III - Technical Session

6:30 p.m. - 8:00 p.m.:
Evening Reception

Wednesday, June 22:

8:30 a.m. - 10:15 a.m.:
Session IV - The People Equation

Bisso Marine Derrick Barges Set Record



Bisso Marine Co., Inc. of New Orleans, La. has reportedly set a new heavy lift record for Harvey Canal.

Bisso Marine's heavy lift derrick barges *Cappy Bisso* and *Lili Bisso* launched a 1,235-ton, 228-foot (69-m) by 74-foot (22.5-m) gaming vessel for Houma Industries of Harvey, La. The vessel is owned by Kehl Riverboats.

Two additional gaming vessels are currently under construction at Houma Fabricators of Houma, La. Versabar, Inc. of Harvey supplied all the rigging for the lift project. For more information on Bisso Marine,

Circle 20 on Reader Service Card

Baltimore USCG Yard Renovates Cutter *Steadfast*

The U.S. Coast Guard (USCG) recommissioned the 210-ft. (64-m) USCG cutter *Steadfast* in February 1994 after its completion of Major Maintenance Availability (MMA) at the Coast Guard Yard in Baltimore, Md. The MMA is an essential project intended to overhaul and upgrade selected systems and equipment on cutters with approximately 30 years of service. Under MMA, the USCG decommissions the vessel, reassigns the crew, and performs an extensive overhaul. The work adds another 15 years of operation to the cutter. When recommissioned, the vessels are, with the exception of the hull, essentially new. *Steadfast* is the third "B" class 210-ft. cutter to complete MMA at the Coast Guard Yard. The $21.5 million-per-vessel project includes structural repairs, a new design feature of exhaust stacks aft of the pilot house, an enlarged superstructure to support the stack, increased fire fighting capabilities, and a smaller flight deck. Coast Guard Yard tradesmen overhauled engines and reduction gears, improved berthing and messing spaces, installed new refrigeration and air conditioning units, a new marine sanitation system, and new ship's service generators. The American Shipbuilding Corp. Yard in Lorain, Ohio launched *Steadfast* on June 24, 1967. During its life on Florida's east coast, *Steadfast* logged more than 200,000 miles, participated in more than 200 search and rescues, spent more than 17,000 hours on surface law enforcement and conducted more than 2,000 helicopter landings and takeoffs.

Advanced Multi-Hull Designs Catamaran *Wuzhou*

Advanced Multi-Hull Designs designed a 79-ft. (24-m) catamaran, *Wuzhou*, which was delivered for service in China. Built by Hong Kong yard A. Fai Engineers and Shiprepairers, the vessel is servicing a 230 nautical mile route in Guangdong Province with the Wuzhou Guangxi Navigation Co. The vessel is the second high speed catamaran to enter service with this company. *Wuzhou* is built of marine grade aluminum and designed to DNV High Speed and Light Craft rules. The vessel is classed by the Chinese Classification Society.

Construction of the vessel commenced at A. Fai's yard in Kowloon where the hull and superstructure were fabricated separately. In the construction period, A. Fai relocated to a new yard and the hull was floated to this yard for installation of the superstructure and final outfitting. The AMD170 can carry 24-dwt including 2,113 gallons (8,000 L) of fuel and 396 gallons (1,500 L) of fresh water. Propulsion is provided by two Isotta Fraschini ID 36SS 12V high speed diesel engines driving five bladed fixed pitch propellers through ZF BW 460 reduction gearboxes. Utilizing 90 percent of the 1,020 kW available from each main engine, a full load service speed of 27 knots and a maximum speed of 29 knots is achieved. For more information,

Circle 67 on Reader Service Card

Kvichak Receives Multiple Orders For Longliners

The 32-foot *Aleutian Pribilof No. 1*, the first of Kvichak Marine's CDQ longliners for Alaska, speeds across Lake Washington during trials.

Kvichak Marine Industries is constructing eight 32-foot (9.75-m) Bering Sea longliners, with the potential for several more. "What's driving the interest in this boat is the CDQ (Community Development Quota) program in Alaska," said **Keith Whittemore**, Kvichak vice president. One of the longliners was built for the Aleutian Pribilof Island Community Development Association (APICDA), one of the CDQ organizations representing communities in the Bering Sea/Aleutian Islands region. APICDA was seeking efficient, reliable boats to harvest halibut, which they found in the Kvichak design.

Kvichak is building two more of the vessels for APICDA, and also has six boats underway for Yukon Delta Fisheries Development Association, a CDQ group for Yupik Eskimo Native Americans. The Yukon Delta order includes five complete boats and one "kit" version

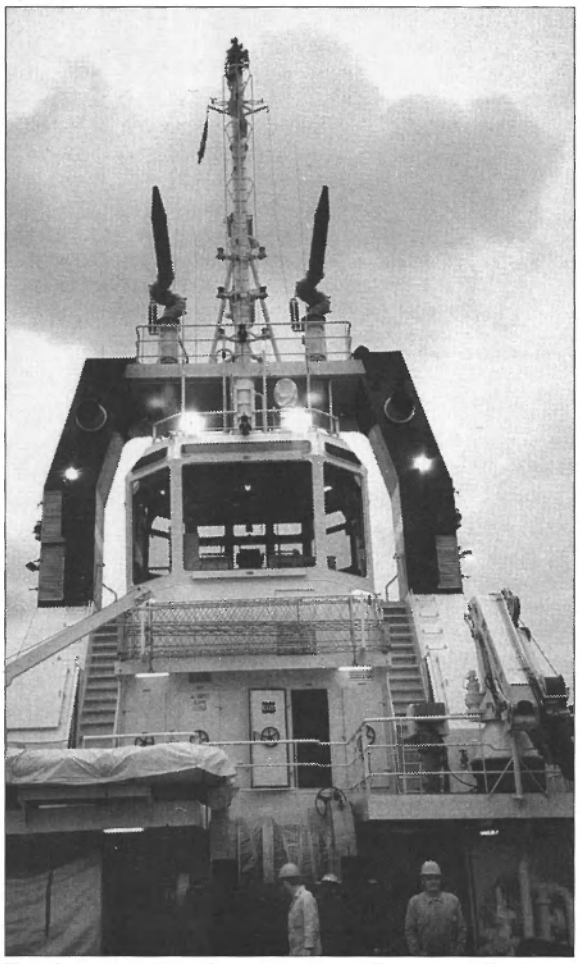
The Kvichak longliner is 32 ft. (10 m) long, with a beam of 12 ft. (4 m) and a draft of four ft. (1.2 m). Construction is of marine-grade aluminum throughout, with 3/16-inch (4.76mm) side shells and 1/4-inch (6.35mm) bottom plate.

The APICDA boat is powered by a 300-hp Caterpillar 3116 marine diesel engine, driving a four-blade, 24-inch (609.6mm) SST propeller through a Twin Disc 5050 gearbox. The Yukon Delta boat is powered by a 350-hp Lugger 6108 engine with a Twin Disc 5061 gearbox. Standard features on both versions include electrical and hydraulic systems, Hynautic two-station engine and steering controls and a washdown pump.

For more information on Kvichak,

Circle 57 on Reader Service Card

Astilleros Balenciaga Delivers First Of Two-Tug Series For BP Exploration



The *Cramond*, first of two escort tug/Emergency Response Vessels being built by Astilleros Balenciaga for BP Exploration. The second tug will be the *Dalmeny*.

Astilleros Balenciaga, member of the Spanish private yard group Construnaves, delivered the *Cramond*, the first of two twin escort tugs/Emergency Response Vessels (ERVs) the yard is building for BP Exploration. Two azimuthal variable-pitch propellers, driven by two diesel engines generating a total power of 2 x 2,400 hp, and a 170-hp bowthruster, enable the *Cramond* to handle VLCCs of up to 300,000-dwt and achieve a free-running speed of 14 knots. With the forthcoming delivery of the *Dalmeny*, the second of the series, the contract, which was won a year ago, will be complete. Currently, the yards in the Construnaves Group are filling orders for a dozen high-seas tugs for national customers as well as owners from France, Great Britain, Greece and Yemen.

For more information on Astilleros Balenciaga,

Circle 56 on Reader Service Card

Bremer Vulkan Delivers Containership

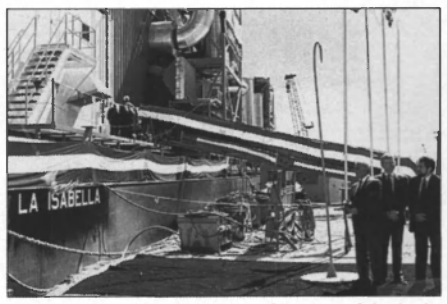
At Bremer Vulkan the second of a series of four containerships for China was named the *Yuanhe* and delivered to China Ocean Shipping Company (Cosco) of Peking on April 8, 1994. The 3,764-TEU ship incorporates easy conversion of certain holds from 20- to 40-ft. containers, the transport of 45-ft. containers at certain positions on the hatch covers and the conveyance of "high-cube" containers. The main engine—a BV/Sulzer 9RTA 84C diesel developing 34,380 kW at 100 rpm and 90 percent MCR, built by Bremer Vulkan Werft und Maschinenfabrik GmbH—drives a fixed-pitch propeller, giving the vessel a service speed of 24 knots. Three 1,380 kW diesel-generator sets provide electrical power. In view of the high installed engine power, a 7/8 engine room layout proved to be the optimum solution.

For more information on Bremer Vulkan,

Circle 126 on Reader Service Card

Wartsila Power Barge Launched At McDermott

Wartsila's newest barge-mounted power plant, *La Isabella,* was launched from McDermott Shipyards in Morgan City, La. in March. It was christened by **Marco A. Subero Sajium**, administrator general of Corporacion Dominicana de Electricidad (CDE), in a ceremony attended by industry and company representatives. The power barge is now on its way to Puerto Plata in the Dominican Republic,



Present at the launching in Morgan City, La. of the *La Isabella* floating power plant were (l. to r.)**Marco A. Subero Sajium**, administrator general of Corporacion Dominicana de Electricidad; **Torsten Astrom**, vice president - Power Plants of Wartsila Diesel, Inc.; and **Rolando Gonzalez Bunster**, president of Compania Electricidad de Puerto Plata.

where it will be used to triple the capacity of an existing power plant.

La Isabella is 256.5 feet (78.2 m) long, with a beam of 76 feet (23.2 m), depth of 14 feet (4.3 m) and draft of seven feet (2.1 m).

The barge delivery marks a major benchmark in an agreement between Compania Electricidad de Puerto Plata, S.A. and CDE, the Dominican Republic's electrical utility, to expand an existing 19.2 MW power plant by 50 MW. Towards the end of 1993, CEPP placed an order with Wartsila Diesel for the engineering, construction, start-up and delivery of a barge-mounted power plant. The $40 million barge-plant will be located alongside the existing facility, and will include nine Wartsila Diesel 18V32 engines (5.7 MW each). Installation completion was planned for early May of 1994. The current facility is comprised of three Wartsila Diesel 18V32 engines (5.5 MW each).

La *Isabella* Equipment List

Main engines	Wartsila Vasa
Alternators	ABB
Electrical switchgear & control system	Vaasa Engineering
HFO separator systems	Alpha Laval
Lube oil separators	Alpha Laval
HFP booster units	Aura Marin
HFO feeder units	Aura Marin
Boilers	Vaporphase
Water makers	Alpha Laval
Air compressors	Sperre
Plate heat exchangers	APV
Ventilation system	L.C. Eldridge

Wartsila Vasa 6R20 Engines To Japan

Kawasaki Heavy Industries in Kobe, Japan has ordered auxiliary engines of the Wartsila Vasa 20 design. The order is for Wartsila Vasa 6R20 engines for two 38,000-cu.-m. LPG-tankers to be built for Belgian ship owner Exmar.

Each of the two ships will be equipped with three Wartsila Vasa 6R20 generating sets. The engines will be operated on HFO up to 600 cSt/ 50° C from start to stop. The engines will be delivered from the Wartsila Diesel Vasa factory during 1994; the two vessels will be delivered during 1995.

For more information on Wartsila Diesel,

Circle 10 on Reader Service Card

N.Y. Awards FCS Contract To Supply Oil/Water Separators For Fire Boats

FCS, Inc. received a contract from the City of New York to furnish three oil/water separators for the City's fire boats. The equipment to be supplied are Bilge Boy™ units manufactured by Nelson Industries. (FCS is an authorized distributor of Nelson products.) The City of New York Fire Department's concern for clean water prompted the department to outfit its fire boats with oil/water separators. New York City wanted equipment that met the following requirements: approval by the U.S. Coast Guard (USCG); low cost; compact; easy to install; and capable of being operated manually or set up for automatic operation. The Bilge Boy units meet these requirements and will be installed on active fire boats operated by the City of New York. The oil/water separators are reportedly efficient in removing oil from the bilge water, and are approved by both the USCG and the IMO. These units, which are available in two capacity ranges (2.5 and 7.5 gpm), have also been approved by the Canadian Coast Guard. For more information on FCS,

Circle 19 on Reader Service Card

Recirculators Make For Fume-Free Engine Rooms

In an effort to rid engine rooms of potentially harmful crankcase fumes, Nelson Division, of Stoughton, Wis. developed the crankcase emission absorber, now called the EcoVent™ Recirculator.

The operating principle of the EcoVent Recirculator is to pass blow-by gases through highly absorbent media. The entrained oil droplets then deposit or coalesce on the media. Eventually, the droplets saturate the media and drain harmlessly into the bottom of the EcoVent, ready for collection or return to the oil sump.

The crankcase fumes leaving the EcoVent are commonly piped to the air inlet of the engine. By piping to the inlet side of the air cleaner, a 0.0-0.3 inches of water crankcase pressure is established. This pressure level is achieved by varying the distance of the outlet piping from the air cleaner. The closer the outlet is to the air cleaner, the greater the suction across the EcoVent product, according to the manufacturer.

EcoVent Recirculators are available in four standard models designed for marine and industrial diesel or natural gas engines. Models can also be custom designed for larger gas turbine and slow- to medium-speed diesels. The units are sized to handle flow rate changes from new engine to overhaul conditions.

EcoVent Recirculators have, according to the company, proven effective on hundreds of workboats, transportation research and pleasure crafts, as well as U.S. Navy and Coast Guard vessels around the world.

For more information from Nelson Division,

Circle 1 on Reader Service Card

The MacGregor Group

Under The Aegis Of Incentive, A Cargo-Handling Equipment Supplier Of Formidable Size

The MacGregor Group was created last year following the acquisition of MacGregor-Navire by the Incentive Group, forming what the group claims is the largest supplier of shipboard cargo handling equipment in the world.

A manufacturer of shipboard cargo handling equipment, MacGregor's inventory still lacked conventional shipboard deck cranes. Incentive had previously acquired Hagglunds Marine & Offshore, a leader in shipboard deck cranes. It was a logical step for the two Incentive subsidiaries to merge to offer the market a comprehensive range of shipboard cargo handling equipment from a single supplier. This range includes shipboard cranes, hatch covers, RoRo equipment, cargo lashing equipment, passenger and cargo elevators, refrigerated cargo systems and insulation services, and liquid cargo and ballast valve remote control systems. Even before the merger, MacGregor-Navire and Hagglunds were working together on a number of projects, including providing Class Standard Equipment (CSE) to the U.S. Navy's Strategic Sealift Fleet, both retrofit and newbuildings. MacGregor has also obtained contracts from the various shipyards involved to supply other products to a number of the ships. The MacGregor Group now comprises some 30 companies located in major shipping and shipbuilding countries. MacGregor-Hagglunds, the Group's crane division, offers a range of electro-hydraulic deck cranes suitable for improving cargo-handling efficiency — such as power swivels for rotating the load, line steadying systems and swing preventing units, together with ancillary items such as grabs, log handling equipment and container spreaders. Some recent developments from the MacGregor Group include:

- The Omega Seal, designed for use on the cross joints of pontoon (liftaway) hatch covers on containerships, enabling the covers to be removed and replaced in any order.
- MacGregor-Conver, the group's lashing division, developed a semi-automatic twistlock, the CV-14. This unit reportedly provides a solution to the U.S. authorities' proposed regulations banning personnel from working on top of container stacks. The semi-automatic unit enables the twistlocks to be fitted to and removed from containers at dock level, obviating the need for stevedores to climb onto container tiers.
- In response to the IMO requirement to improve the damaged stability of passenger RoRo ferries, MacGregor's RoRo Division has developed Flood Control Doors which close across vehicle decks, providing a barrier to any flood water.
- The Group's Reefer Engineering Division has been working closely with the service organization in converting conventional reefer ships into pallet-friendly vessels to improve overall cargo-handling efficiency. The division also introduced an aluminum cladding system for the insulation of reefer ship holds, which reportedly offers considerable savings in installation costs.
- The Liquid Cargo Handling Division introduced a remote controlled valve system designed for the cargo control on tankers, but suited to a variety of other applications. The system reportedly utilizes the actuators' hydraulic operating circuits to provide positive and accurate indication of the status of each valve, eliminating the need for any electrical cabling and electronics either on deck or in the tank.
- The Elevator Division developed a plug-in passenger elevator system. The complete elevator is fabricated, assembled and tested ashore and delivered to the shipyard as a unit ready to be lowered into place in apertures out into the various deck levels. This plug-in philosophy has been extended to cargo elevators and side-loading systems.

For more information on the MacGregor Group,

Circle 31 on Reader Service Card

Scana Skarpenord To Supply Tanker Level Gauges

Scana Skarpenord, Norway, recently closed contracts for tank monitoring on the first E3 tanker which is being built by Astilleros Espanoles (AESA) of Spain.

The Cargomaster[R] BM 70/50 level radar was designed to deal with traditionally difficult level gauging situations like extreme trim and list, light and foam-covered cargoes. Based on the frequency modulated continuous wave principle, the BM 70/50's advantage is that its beam is not focused, so more of the signal can be lost and the minimum signal is still received.

The unit is flame-proof and completely housed in stainless steel. The antenna is cleaned as part of the regular tank-cleaning process, and the higher effect reportedly means the unit is much less sensitive to waste sticking to the antenna. For more information on Scana Skarpenord,

Circle 132 on Reader Service Card

Kvichak Wins Passenger Vessel Contract

Kvichak Marine Industries of Seattle has been awarded a contract to design and build a 57.5-ft. (17.5-m) passenger vessel for Decatur Northwest, a community association of Decatur Island in the San Juan Islands of Puget Sound. The 49-passenger vessel will operate on year-round scheduled service between the island and the city of Anacortes, Wash.

The vessel will replace the *Captain Ritchie*, a wooden-hulled boat now in service. Elliott Bay Design Group was retained to represent the owner through completion of the as-yet-unnamed vessel. Kvichak President **Brian Thomas** said the vessel was scheduled for delivery in August 1994. The all-welded aluminum vessel will be powered by two 300-hp Lugger marine diesels, which will provide a service speed of about 12 knots. For more information on Kvichak Marine Industries,

Circle 145 on Reader Service Card

From Tanker To Grain Carrier: Hyundai Converts The *Golden Monarch*

The *Golden Monarch*, a U.S.-flag San Clemente class tanker built at NASSCO in 1975, is being converted to a grain bulk carrier at Hyundai's Mipo Dockyard, South Korea.

The vessel was identified for possible conversion by ABS Marine Services, in conjunction with Apex Marine Corporation, in October 1992. The purpose of the proposed conversion was to alter the vessel's cargo configuration, modernize access and transfer systems, and overall create a bulk carrier that could lower rates for the Cargo Preference trade.

In August 1993, C.G. International Naval Architects of Scotch Plains, N.J. was contracted for revision and final working drawings. By February 1994, the vessel was delivered to Hyundai so work could begin.

The vessel's longitudinal bulkheads were removed to facilitate the creation of new cargo space. Lower trim plates and extension of the double bottoms were fabricated using new steel blocks. Standard hatch coamings were installed at the main deck. The result is a six-hold configuration serviced by a two-panel set of MacGregor hatches at each hold. Cargo spaces, ballast space, main deck, accommodation house and engine casing were all recoated with International Paint high-performance epoxy coatings.

The conversion entailed major refurbishing of the propulsion plant and machinery spaces to return the vessel's steam plant to its original sea trial criteria and fuel curve. The vessel's main boilers, condenser and steam turbines were cleaned and retubed extensively, and the vessel's combustion control and fuel oil delivery system were modified by Introl Corporation of Westminster, Md. — adapting new shoreside power plant technologies to marine uses. The vessel was fitted with a Volmar Moletron Static generator utilizing type 6.0 ultrasonic waves to treat fuel oil before combustion in a new Todd TCD burner system, which reportedly reduces fuel consumption and NO_x and SO_x stack gases.

MacGregor-Navire was contracted to supply a hydraulically-operated hatch cover system, specially designed for this type of conversion. Seacoast Electronics supplied new Raytheon 3cm and 10cm radars with integral IMO-compliant Automatic Radar Plotting Aid. A Global Positioning System, a Medium Frequency Whip Antenna and a complete integrated bridge were included in the installation.

For more information on companies involved in this project, circle the appropriate number on the Reader Service Card bound in this issue.

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C.G. International Naval Architects	136
Hyundai	137
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Seacoast Electronics	141

Posidonia '94:

Home Port For The International Maritime Industry

Posidonia '94, scheduled from June 6 to June 10, 1994 in the Piraeus, Greece Port Authority's waterfront exhibition center, will feature more than 850 firms from 44 countries (confirmed space at press time).

"The exhibition plays a big part in keeping members of the maritime world up to date with key developments influencing all factors of this most international of industries," said **Nana Michael**, Posidonia's managing director.

Ms. **Michael** said one of the most interesting aspects of the exhibition was its attraction for newcomers. "We have many first-time participants, both from the international and local markets," she said. Countries like India, Australia and Spain all have a considerable presence at the exhibition this year. The U.S., in conjunction with the Council of American Shipbuilders, will have its largest pavilion ever. Thirteen national pavilions were confirmed by press time, with several others still under negotiation. Largest of the international exhibits is the United Kingdom's, which under the banner of the British Marine Equipment Council is mounting one of the most impressive overseas displays of its marine capability ever. Italy, Germany, Japan, France The Netherlands, Brazil, Singapore and South Korea are other countries with large areas. China is another country keen to underline its maritime capabilities, while several countries of the emerging Eastern Europe will be there, with Ukraine at the fore. The Greek presence is building up, with a larger-than-usual number of exhibiting companies representing ships gear and services developed in Greece. Some exhibitors intend to present new products at Posidonia, further bolstering the array of proven items and services that will be on display. A glance at the early exhibitors' list reveals that every facet of the marine industry is covered, from standard ship equipment to the most high-tech vessel management and other equipment.

The shipbuilding and repair industries will be especially well-represented. Other sectors with a strong presence include operators, classification societies, inspection services, finance institutions, ship registries, service firms, shipbrokers, insurance organizations, publications, ship suppliers, environmental agencies, port authorities and more.

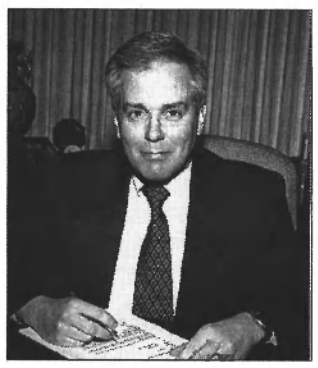
For more information on the Posidonia '94 exhibition, contact **Kaki Dessipri** at Posidonia Exhibitions, +30 1 4283 608/609.

MTU Friedrichshafen Names Hanssen New President/CEO

Dr. Rolf A. Hanssen

The supervisory board of MTU Motoren-und-Turbinen-Union Friedrichshafen GmbH appointed Dr. **Rolf A. Hanssen** president and CEO. Dr. **Hanssen**, currently director at Daimler-Benz responsible for corporate planning and controlling, will assume his duties on July 1, 1994. Dr. **Hanssen** will succeed **Hubert Dunkler**, who will retire in the second half of the year. Dr. **Hanssen** joined Daimler-Benz in 1976.

Philadelphia Gear Appoints Cox Sales & Marketing VP



Robert J. Cox

Philadelphia Gear Corporation has appointed **Robert J. Cox** to the position of vice president, sales and marketing. Mr. **Cox** will be responsible for worldwide marketing and sales of Philadelphia Gear products.

Before joining Philadelphia Gear, Mr. **Cox** held the position of vice president, sales and marketing for A-C Compressor Corporation of Elm Grove, Wis.

McMahon To Chair Washington State Maritime Commission

State of Washington Governor **Mike Lowry** has appointed **Gerald P. McMahon** chairman of the Washington State Maritime Commission. Mr. **McMahon** is vice president, Pacific Region, for the American Waterways Operators (AWO), the national association of the domestic inland and coastal barge and towing industry. The Washington State Maritime Commission is a state corporation with responsibility to provide access to an approved contingency plan, communications network, and oil spill response contractor for vessels operating in Washington State waters which have not satisfied state oil spill contingency plan requirements.

Witherspoon Becomes Mississippi River Commission President

Brigadier General **Eugene S. Witherspoon**, U.S. Army Corps of Engineers, was sworn in recently as president of the Mississippi River Commission (MRC). The oath of office was administered by Mayor **Joseph L. Loviza** of Vicksburg, Miss. Gen. **Witherspoon** is the 31st president of the Commission, which was created by an Act of Congress in 1879. The MRC consists of three officers from the U.S. Army Corps of Engineers — one designated as president — a representative from the National Oceanic and Atmospheric Administration, and three civilians, two of whom are civil engineers. Gen. **Witherspoon** has been serving as commander and division engineer of the Corps' Lower Mississippi Valley Division since December 1992. As MRC president he is also responsible for the Mississippi River and Tributaries Project — the vast, comprehensive flood control and navigation system for the alluvial valley from Cape Girardeau, Mo. to the Gulf of Mexico.

Flow Intl. Introduces Ultrahigh-Pressure Waterjet Cleaning System

Flow International Corp. introduced the Husky, a direct-drive ultrahigh-pressure pump reportedly offering great efficiency in industrial waterjet cutting and cleaning applications. Driven by a Caterpillar diesel engine, the Husky delivers continuous operating pressure of 40,000 psi at flow rates up to 6.5 gpm. Equipped with three high pressure water outlets, the Husky is ideal for simultaneous operation of one, two or three hand tools, according to the manufacturer. It is also suitable for field abrasive waterjet cutting requirements, as well as high-flow single-tool robotic applications. The Husky incorporates a closed-loop cooling system, which cools the pump and ancillary equipment without the need for additional cooling water.

Flow Intl.also introduced the A-3000 Ultralight, a lightweight handheld ultrahigh-pressure cleaning tool. At 11 pounds, the A-3000 Ultralight weighs one-third less than Flow's other hand-tools. Possible applications for the unit include: removing paint, rust and corrosion from offshore oil platforms; stripping materials from the inside of storage tanks; and numerous other applications which require coating removal or surface preparation. For additional information on this and other waterjet cleaning tools from Flow International,

Circle 154 on Reader Service Card

Comsat Unit Offers In-Orbit Tests Services, Inks AMSC As First Customer

Comsat Technology Services (CTS) will offer an independent satellite communications system In-Orbit Test (IOT) from its Clarksburg satellite control center, beginning in the fall, and American Mobile Satellite Corp. has contracted to use the facility after the launch of its first satellite later this year.

This service will allow satellite users, owners and the insurance industry to perform an IOT on a satellite to verify performance. For additional information on the service from Comsat,

Circle 153 on Reader Service Card

Wooster Products Supplies Variety Of Safety Surfaces

Wooster Products offers a host of safety treads and surfaces for anti-slip protection, complying with OSHA and other safety surface specifications. For 73 years Wooster has supplied a range of anti-slip products that now includes instant, self-adhesive anti-slip Flex-Tred surfaces, available in standard roll sizes or custom die cut shapes. Wooster's line also includes other surfaces for a variety of anti-slip needs: the Spectra line of safety treads for safety combined with aesthetic value or the Supergrit line for countering heavy pedestrian traffic. The company also offers a variety of other products, including abrasive anti-slip epoxies, paints, fasteners and more. For more information on Wooster Products,

Circle 125 on Reader Service Card

Retired Senior Texaco VP Elected To MSRC Board

Willis B. Reals, retired senior vice president of Texaco, Inc. and former chairman of Texaco Chemical Company, has been elected to the board of directors of the Marine Spill Response Corporation (MSRC), the not-for-profit organization charged with responding to major oil spills in U.S. coastal waters. The board of MSRC is independent and self-perpetuating. Mr. **Reals** replaces **Edwin C. Holmer** on the MSRC Board. Mr. **Holmer**, former president of the Exxon Chemical company, is retiring following a three-year tenure on the MSRC board. Mr. **Reals** joins MSRC after a 41-year career with Texaco. He holds both bachelor's and master's degrees in Chemical Engineering from MIT.

BUYERS DIRECTORY

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

ABRASIVES
Chesapeake Specially Products, 5055 Northpoint Blvd., Baltimore, MD 21219
Ervin Industries, Inc., 3893 Research Park Drive,Ann Arbor, MI 48106-1668
San Pedro Mining, La Pradera, Hwy 82, P.O. Box 986, Sonoita, AZ 85637
Stan-Blast Abrasives, 3300 River Rd., P.O. Box 968, Harvey, LA 70059

ABSORBENT PRODUCTS
Haz-Maz Response Technologies, 5841 Box Canyon Rd., La Jolla, CA 92307
Sorbent Products, 645 Howard Ave., Somerset, N.J. 08873

ACOUSTICAL INSULATION
The Claremont Co., Inc., 174 State St., Meriden, CT 06450

ADHESIVES
Life Industries, Corp., 205 Sweet Hollow Rd., Old Bethpage, NY 11804

AIR CONDITIONING AND REFRIGERATION—Repair & Installation
ABB Flakt Marine, Box 1043, 436 21 ASKIM, SWEDEN
Adrick Marine, 141D Central Ave., Farmingdale, NY 11735
Bailey Group, 2323 Randolph Ave., Avenel, NJ 07001
Carrier Transicold, P.O. Box 4805, Syracuse, NY 132211
Johnston Brothers, 180 Enterprises Avenue, Patterson, LA 70392
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031

ANODES/CATHODIC PROTECTION
American Corrosion Services, 218 Rue Beaugerd, Ste. B., Lafayette, LA 70508

ANTENNAS–Rate of Turn Indicator
Rivertronics, 2624 East Broadway, Alton, IL 62002

AUCTIONEER
Forke Bros., 3901 Faulkner Drive, Lincoln, NE 68516

BALLAST
Chesapeake Specialty Products, 5055 Northpoint Blvd., Baltimore, MD 21219
Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031
Mineral Research & Recovery Inc.,4565 S. Palo Verde, Ste. 203 Tucson, AZ 85714
San Pedro Mining, La Pradera, Hwy 82, P.O. Box 986, Sonoita, AZ 85637

BARGE BUILDING
Conrad Industries, P.O. Box 790, Morgan City LA 70381

BASKET STRAINERS
Beaird Industries, P.O. Box 31115, Shreveport, LA 71130

BEARING—Rubber, Metallic, Non-Metallic
B.F. Goodrich, Engineered Polymer Products, 150 Division Dr., Wilmington,NC 28401
Blohm & Voss AG,P.O. Box 100720, D-2000 Hamburg 1, GERMANY;
U.S.A. Reps: Simplex- Turmar Inc., P.O. Box 168, Little Neck, NY 11363-0168
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Orkot Engineering, 2535 Prairie Road-Unit D, Eugene, OR 97402
Tenmat Inc., 511 Interchange Blvd, Newark, DE 19711
Thordon Bearings Inc.., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6

BERYLCO SAFETY TOOLS
NGK Metals Corporation, P.O. Box 13367, Reading, PA 19612

BILGE OIL/FUEL ABSORBER
The Bilge Rat, P.O. Box 4244, Fort Walton, FL 32549

BOILER CONTROL SYSTEMS
G.R. Bowler Co., 2701 Culver Rd., Ste. 200, Rochester, NY 14622

BOILER—Manufacturers
Aalborg Ciserv (Miami) Inc., 2449 Northeast 13th Avenue, Ft. Lauderdale, FL 33305

BROKERS
151 Maritime Services, 34062 El Encanto/B, Dana Pt. CA 92629
Bayou Rentals, 9356 Highway 1, Lockport, LA 70374
Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale, FL 33335
Emerald Yacht & Ship Brokers, 759 N. Milwaukee St.,# 552, Milwaukee, WI 53202
Jack Faulkner, 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960

BULKHEAD SEALS
Blohm & Voss AG, P.O. Box 100720, D-2000 Hamburg 1, GERMANY
U.S.A. Reps: Simplex-Turmar Inc., P.O. Box 168, Little Neck, NY 11363-0168
John Crane Marine USA,1536 Barclay Blvd., Buffalo Grove, IL 60089

BUNKERING
Crowley Maritime, 155 Grand Ave., Oakland, CA 94612

CABINETRY
Fenco, 1901 Route 130, Burlington, NJ 08016

CELLULAR TELEPHONE SERVICE
Cellnet Corp., 400 Main St., Ste. 800, Stamford, CT 06901-3004

CHAINS
Crandall Dry Dock Engineers Inc./Marit Chain, 21 Pottery Lane, Dedham MA 02026
Milligan Marine Supply, 5832 Harvey Wilson, Houston, TX 77020
Washington Chain & Supply Inc., Box 3645, Seattle, WA 98124
Waterman Supply Co., P.O. Box 596, Wilmington, CA 90748

CHAIRS
Gasser Chair Co., 4136 Loganway, Youngstown, OH 44505
Infanti Chair Mfg. Corp., 3075 Richmond Terrace, Staten Island, NY 10303
Shelby Williams Industries, Inc. 150 Shelby Williams Dr., Morristown, TN 37813
Turnbull, Inc., 3818 134th St. N.E., Marysville, WA 98271

CHEMICALS
Drew Ameroid Marine, One Drew Plaza, Boonton, NJ 07005
Vecom USA, Inc., 236 St. George Avenue, Jefferson, LA 70121

CHIPPING/SCALING
Robert C. Collins & Co., 6772 N.E. 4th Ave., Miami, FL 33138

CLAMPING—Pipe, Tubes, Hose
ZSI, 12749 Richfield Ct., Livonia, MI 48150

CLASSIFICATION SOCIETY
American Bureau of Shipping, 2 World Trade Center, 106th Fl, New York, NY 10048

COMPACTORS
A/S Vesta, Skudehavsvej 27, DK-2100 Copenhagen, DENMARK;
Sales Agents: American United Marine Corp., 5 Broadway, Rt 1, Saugus, MA 01906,
International Compactor, 1088 Lighthouse Ln., Hilton Head Island, SC 29928

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

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

COMPUTERIZED INFORMATION SYSTEMS
Autoship Systems Corp., #403, 611 Alexander St., Vancouver, BC, Canada V6A1E
Creative Systems, Inc., P.O. Box 1910, Port Townsend, WA 98368
Intergraph Corporation, 2051 Mercator Drive, Reston, VA 22091-3413
Kockums Computer Systems AB, PO Box 50555, s-202 15 Malmo, SWEDEN
Kocum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
TIMSCO, P. O. Box 91360, Mobile AL 36691

CONDENSERS/SEPARATORS
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130

CONTROL SYSTEM--Monitoring
Autronica Marine A/S, Drammensveien 126, N-0277 Olso 2, NORWAY
Electronic Design Inc., 3020 20th St., Metairie, LA 70002
IMO Industries, Gems Sensors Division, One Cowles Rd., Plainville CT 06062
Kobelt Manufacturing Co., Ltd., 11720 Horseshoe Way, Richmond, BC, Canada
MMC International, 60 Inip Dr, Inwood NY 11696
Marine Electric RPD, Inc., 50 Carol St., P.O. Box 1135, Clifton, NJ 07014-1135
Robertson Marine Systems, 3000 Kingman St., Suite 207, Metairie, LA 70006
Teleflex Naval technologies, 205 Church Rd., North Wales, PA 19454

CONTROL SYSTEM–Steering
KGW Schweriner, Wismarsche Strasse 380, 19055 Schwerin, GERMANY
Kobelt Manufacturing, 11720 Horseshoe Way, Richmond, BC, CANADA, V74 4V5
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068

CONVERSIONS & REPAIRS
Gulf Coast Fabrication, Inc., P.O. Box 539, Lakeshore, MS 39558
Vancouver Shipyards, 50 Pemberton Ave., N. Vancouver, B.C. CANADA V7P 2R2

CONVEYOR BELT REPAIR
Klehma Rubber Engineering, GERMANY
U.S. Rep: Simplex-Tunnar Inc., P.O. Box 168, Little Neck, NY 11363-0168

CORROSION CONSULTANTS
S.G. Pinney & Assoc., P.O. Box 9220, Port St. Lucie, FL 34985

COUPLINGS
American Vulkan, P.O. Drawer 673, Winter Haven, FL 33882
Aquadrive Systems, Inc., 55 Olin St., Ocean Grove, NJ 07756
Lo-Rez Vibration Control Ltd., 156 West 8th Avenue, Vancouver, BC CANADA,V5Y1N2
Mapeco Products, 90 Forest Avenue, P.O. Box 382, Locust Valley, NY 11580

CRANE–HOIST–DERRICK—WHIRLEYS
Bisso Marine Co. P.O. Box 4113, New Orleans, LA 70178
The Crosby Group, Inc., P.O. Box 3128, Tulsa OK 74101
Del Gavio Marine Hydraulics Inc., 619 Industrial Rd., Carlstadt, NJ 07072
Hagglunds Inc, Marine Div. Headq., 50 Chestnut Ridge Rd, Montvale, NJ 07645
Liebherr-Werk Nenzing GES.mbh, P.O. Box 10, A-6710 Nenzing, AUSTRIA
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
J.D. Neuhaus Hebezeugue GmbH, D-5810 Witten, GERMANY
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454
NEI Clarke Chapman Canada, 1075 N. Service Rd. W., Unit 4, Oakville, Ontario, CANADA L6M 2G2
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883
Smatco Industries, P.O. Box 4036, Houma, LA 70361

CRANES
Morgan Marine, 1300 Nomandy Place, Santa Ana, CA 92705
Palfinger Inc., 8040 Dorcester Rd., Niagara Falls, Ontario, CANADA L2E 6V6
Tech Crane Int'l., Inc., 61130 Timberbend Dr., Lacombe, LA 70445

DECK CAULKING/REPAIR
Life Industries, Corp., 205 Sweet Hollow Rd., Old Bethpage, NY 11804

DECK MACHINERY — Cargo Handling Equipment
MacGregor-Navire Group, 34 Bedford Rd., Clapham North, London SW4 7HH
Markey Machinery Co., Inc., P.O. Box 24788, Seattle, WA 98124-0788
McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Skookum/Rope Master, P.O. Box 280,Hubbard, OR 97032
Smatco Industries, P.O Box 4036, Houma, LA 70361
Smith Berger Marine Inc., 516 South Chicago Street, Seattle, WA 98108
Willem Pot b.v., P. O. Box 29102, 3001 GC Rotterdam, The Netherlands

DECK MACHINERY
Loeffler Corp., US #1 & Robbins Ave., Penndel, PA 10947
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454
NEI Clarke Chapman Canada, 1075 N. Service Rd. W., Unit 4, Oakville, Ontario, CANADA L6M 2G2
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Pusnes, PO Box 102, N-4818, Faervik, NORWAY
Skookum/Rope Master, P.O. Box 280, Hubbard, OR 97032
Smatco Industries, P.O.Box 4036, Houma, LA 70361
Smith Berger Marine Inc., 516 South Chicago St., Seattle, WA 98108
Waterman Supply Co., P.O. Box 596, Wilmington, CA 90748

DESALINATION - REVERSE OSMOSIS
NEI Clarke Chapman Canada, 1075 N. Service Rd. W., Unit 4, Oakville, Ontario, CANADA L6M 2G2
Rochem Separation Systems, Inc., 3904 Del Amo Blvd.,Ste. 801, Torrance, CA 90503
Rochem Separation Systems, P.O. Box 156, 54 Rue Agasse, 1211 Geneve 17, SWITZERLAND

DEPTH SOUNDING EQUIPMENT
Innerspace Technology, Inc., 36 Industrial Dr., Waldwick, NJ 07463

DIESEL ACCESSORIES
Coltec Industries Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
General Thermodynamics Corp., 210 South Meadow Rd., P.O. Box 1105, Plymouth, MA 02360
Kiene Diesel Accessories, 325 S. Fairbanks St., P.O. Box 386, Addison, IL 60101

DIESEL ENGINE — Spare Parts & Repair
Aalborg Ciserv (Miami) Inc., 2449 Northeast 13th Avenue., Ft. Lauderdale, 33305
Alaska Diesel,4420 14th Ave.,NW,Seattle,WA 98107
Atlantic Yacht Sales, P.O. Box 4010, Middletown, NJ 07748
Caterpillar, Inc., Engine Div., P.O. Box 610, Mossville, IL 61552-0610
Coltec Industries, Parts & Service Div., 701 Lawton Ave., Beloit, WI 53511
Cummins Engine Co., 4500 Leeds Ave., Ste. 301, Charleston, SC 29405-8521
Cummins Mid-South, Inc., 110 E. Airline Highway, Kenner, LA 70062
John Deere, John Deere Rd., Moline, IL 61265
Diesel Engine & Parts Co., 8123 Hillsboro Ave., Houston, TX 77029
Geiger Truck Parts, P.O. Box 365, Watseka, IL 60970
Giro Engineering Ltd, Talisman, Duncan Road, Park Gate, South Hampton, S03 7BX ENGLAND
Golten Marine Company Inc., 160 Van Brunt St., Brooklyn, NY 11231
Hall-Toledo, Inc., 525 West Sophia St., Maumee, OH 43437
In-Place Machining, 1929 N. Buffum Street, Milwaukee, WI 53212
Klattenberg Marine, 17 Grandview Ave., W. Orange, NJ 07052
MAN B&W Diesel AG, Stadtbachstrasse 1, D-86153 Augsburg 1, GERMANY
MAN B&W Diesel A/S, Center Syd, Stamholmen 161, DK-2650 Hvidovre, DENMARK
MAN B&W Diesel, 17 State St., New York, NY 10004
MTU of North America, 10450 Corporate Dr., Houston, TX 77478
Markisches Werk GmbH, P.O. Box 1442, D-5884 Halver 1, GERMANY
Motor-Service AB, Box 2115, S-144 04 Ronninge, SWEDEN
New Sulzer Diesel, Inc, 200 Park Ave, New York, NY 10166
Paxman Diesels, P.O. Box 8, Paxman Works, Colchester, Essex, CO1 2HW, ENGLAND
Paxman Diesels USA, (A Div. of Ruston Gas Turbines, Inc.), 15950 Park Row, Houston, TX 77084
Posi-Clean Corp., 3301 Chapline St., Wheeling, WV 26003
Textron Lycoming, 550 Main St., Stratford, CT 06497
Ulstein Bergen AS, PO Box 924, N5002 Bergen, NORWAY
Wartsila Diesel, 201 Defense Highway, Annapolis, MD 21401

DIVING & SALVAGE
Bisso Marine Co. P.O. Box 4113, New Orleans, LA 70178
H.J. Merrihue, P.O. Box 23123, New Orleans LA 70183
Muldoon Marine Services, Inc., P.O. Box 3221, Terminal Island, CA 90731

DOORS - MARINE & INDUSTRIAL
Mapeco Walz & Krenzer, Inc., 90 Forest Ave., Locust Valley, NY 11560
Trenomat GmbH & KG,5600 Wuppertal 11, Domap, GERMANY

DRILLING & BLASTING
Marine Drilling & Blasting, PO Box 10455, Jacksonville, FL 32247-0455

DRY DOCKS-Design
Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381
Curacao Drydock (USA), PO Box 3012, Curacao, Netherlands Antilles
North Florida Shipyards, P.O. Box 3255, Jacksonville, FL 32206

ELECTRICAL EQUIPMENT
Bender Inc, 400 Gordon Dr, Bldg 501, Exton, PA 19341
L. F. Gaubert & Co., Inc., P. O. Box 50500, New Orleans LA 70150
MMC International, 60 Inip Dr, Inwood NY 11696
SPD Technologies, 13500 Roosevelt Blvd., Philadelphia PA 19116

ELECTRONIC CONTROLS
MCR Engineering, 206 Dedham St., Norfolk, MA 02056

ELECTRONIC DISPLAY
High Seas Technology, Inc., 2965 West State Rd., Fort Lauderdale, FL 33312
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolboton, NORWAY

ELECTRONIC INFORMATION SUPPORT
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolboton, NORWAY

ELECTRONIC RACKS
A & J Manufacturing Co., 14131 Franklin Ave., Tustin, CA 92680

ELECTRONIC SALES & SERVICE
Fishermans Wholesale Marine Supply Co., Inc., 4540 B. Downman Road New Orleans, LA 70126
GMT Electronics, Inc. 171 Main St., South River, NJ 08882

EMERGENCY MEDICAL ASSISTANCE
International SOS Assistance, 8 Neshaminy Interplex, Ste., 207, Trevose, PA 19053

EMISSION CONTROLS
ABB Flakt Marine, Box 1043, 436 21 ASKIM, SWEDEN
Haldor Topsoe Nymollevel 55, DK-2800, Lyngby, Denmark

ENGINEERING SERVICES
MCR Engineering Co., Inc. 206 Dedham St., Norfolk, MA 02056

ENGINE CONTROLS - SHIFT AND THROTTLE
Marine Systems, Inc., 1000 NW First Avenue, Bldg. 20, Boca Raton, FL 33432

ENGINE ROOM LIGHTING
Pauluhn Electric Mfg. Co., Inc. 1616 N. Main, P.O. Box 53, Pearland, TX 77581

ENGINE TEST EQUIPMENT
General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Rd., Plymouth, MA 02360
Instruments, Computers, & Controls, Inc., 6942 Haven Creek Dr., Katy, TX 77449

ENVIRONMENTAL SYSTEMS
NWR, Inc.,-Environmental Systems Division, Box 58626, Salt Lake City, UT 84158

EPIRBS
ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247, Ft. Lauderdale FL 33310-5247
Alden Electronics, 40 Washington St., Westborough, MA 01581
Litton Special Devices, 750 W. Sprout Road, Springfield, PA 19064

EQUIPMENT - Marine
Bohnet & Associates, 1150 Rue Rochelle, Slidell, VA 70458
Fisherman's Wholesale Marine Supply Co., 4540 B Downman Rd., New Orleans, LA 70126
Ocean Technical Services, Inc., 634 Peters Road, Harvey, LA 70058

EVAPORATORS
Alfa-Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974
Beaird Industries Inc., P.O. Box 31115, Shreveport, LA 71130
NEI Clarke Chapman Canada, 1075 N. Service Rd. W., Unit 4, Oakville, Ontario, CANADA L6M 2G2

EXPANSION JOINTS (RUBBER,METALLIC)
Archon Industries, 200 Williams Street, Portchester, NY 10573

FANS - VENTILATORS - BLOWERS
Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402

FASTENERS
Ferry Industrial Fastener Co., 1470 St. Charles Ave., Lakewood, Ohio 44107
Hardware Specialities, 48-75 36th St., L.I.C., NY 11101
Jamestown Distributors, 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02835
Okabe Co., Inc. 645 Forest Edge Drive, Vernon Hills IL 60061

FENDERING SYSTEMS/BUOYS - Dock & Vessel
B.F. Goodrich, 150 Division Drive, Wilmington, NC 28401
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Milligan Marine Supply, 5832 Harvey Wilson, Houston, TX 77020
Schuyler Mfg. Co., Inc., 16901 Woodinville-Redmond Rd., Woodinville, WA 98072
Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook, VA 22624
Ultra Poly Inc., 2926 South Steele, Tacoma, WA 98409
Viking Fender Co., 50 Church Street, Sea Bright, NJ 07760

FIBERGLASS PIPE & FITTINGS
Ameron Fiberglass & Pipe, 61 Executive Ave., Edison, NJ 08817

FIBER OPTIC SYSTEMS
AT & T, Cables System/Fiber Optic Div., 111 Madison Ave., Morristown, NJ 07962

FIN STABILIZERS
Blohm & Voss AG, P.O. Box 10 07 20, D-2000 Hamburg 1, GERMANY;
U.S.A. Reps: Simplex-Turmar Inc., P.O. Box 168, Little Neck, NY 11363-0168

FIRE AND SMOKE CONTROL
ABB Flakt Marine, Box 1043, 436 21 ASKIM, SWEDEN

FIRE DETECTION SYSTEMS
ABB Flakt Marine, Box 1043, 436 21 ASKIM, SWEDEN
Autronica Marine A/S, Drammensveien 126, N-0277 Olso 2, NORWAY

FIRE STOP PRODUCTS
NMP, 12437 E. 60th St., Tulsa, OK 74153

FLAME CUTTING MACHINE
Bug-O-Systems, 3003 West Carson St., Pittsburg, PA 15204

GALLEY EQUIPMENT
Cospolich Refrigerator Co., 949 Industry Rd., Kenner LA 70062
Lang Manufacturing, P.O. Box 905, Redmond, WA 98073
Maritime Services Corp., 3457 Guignard Dr., Hood River, OR 97031

GANGWAYS, LADDERS
Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

GENERATORS
Belyea Co. 45 Howell St., Jersey City, NJ 07306

GMDSS COMMUNICATION
Ross Engineering, 12505 E. Starkey Rd., Largo, FL 34543

GROUND FAULT PROTECTION & LOCATION EQUIPMENT
Bender, inc., 400 Gordon Drive, Bldg. 501, Exton PA 19341

HATCH COVER SEAL RENOVATION
KIBI Corporation, U.S. Reps: Simplex-Turmar Inc., P.O. Box 168, Little Neck, NY 11363-0168

HATCHES
L.S. Baier, 7527 NE 33rd Dr., Portland, OR 97211

HEAT EXCHANGERS
Alfa-Laval Separation Inc., 955 Mearns Rd., Warminster, PA 18974
A/S Vesta, P.O. Box 548, DK-9100, Aalborg, DENMARK US Agent: Aalborg Ciserv Houston,, Inc., P.O. Box 906, Angleton, TX 77515
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130
Tranter Inc, Old Burk Road, Wichita Falls, TX 76307

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

HYDRAULIC FLUSHING SYSTEM
Consolidated Fluid Power, Ste. 22 Glendale Dr., LR, Jacksville, Nova Scotia, Canada B4C 3MI

HYDRAULICS
Bailey Sales Corp., 6431 Baum Dr., P.O. Box 19805, Knoxville, TN 37939
Del Gavio Marine Hydraulics Inc., 619 Industrial Rd., Carlstadt, NJ 07072
Hagglunds Denison, 14249 Industrial Parkway, Marysville, OH 43040
Hamilton Jet, P.O. Box 709, Christchurch, New Zealand

HYDRO JETTING PUMP UNIT
Harben, Inc., PO Box 2250, Cumming, GA 30130

INCINERATORS
American United Marine Corp., 5 Broadway,Rt. 1, Saugus, MA 01906
A/S Vesta, P.O. Box 548, DK-9100 Aalborg, DENMARK. U.S. Agent: Aalborg Ciserv

Houston, Inc., P.O. Box 906, AngletonTX 77515

INSULATION
The Claremont Co., Inc., 174 State St., Meriden, CT 06450
Maritime Services Corp., 3457 Guignard Dr.,Hood River,OR 97301

INTERIOR DESIGN
Directions in Design, 633 Emerson Suite 100, St. Louis, MO 63141
Interior Design Int'l, 701 Dexter Ave. N., Ste. 307, Seattle, WA 98109

INTERIORS
Hopeman Brothers, 435 Essex Ave., Waynesboro, VA 22980
Maritime Services Corp., 3457 Guignard Dr.,Hood River, OR 97031

JOINER—Watertight Door—Paneling—Ceiling System—Decking
Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123
Jamestown Metal Marine Sales, Inc., 4710 NW Second Ave., Boca Raton, FL 33431
Marine Accommodations Inc., 8535-3 Baymeadows Rd., Se 140, Jacksonville, FL 32256
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031
Walz & Krenzer, Inc., 90 Forest Ave. Locust Valley N.Y. 11560

KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LIFEBOATS/RAFTS
Boston Whaler, Inc. Commercial Products Div., 1149 Hingham St., Rockland,MA 02370
Caley Ocean Systems, Mayor Avenue, East Kilbride, Scotland, G74 4PU
Fr. Fassmer GMBH & Co., D-2876 Berne 2, Wese, GERMANY
Norsafe AS, P.O. Box 115, N-4818 Faervik, Norway
Willard Marine Co., Inc., 1250 N. Grove St., Anaheim, CA 92806
Zodiac of North America, P.O. Box 400, Stevensville, MD 21666

LIFESAVING EQUIPMENT
Steams Manufacturing, P.O. Box 1498, St. Cloud, MN 56302

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247, Ft. Lauderdale, FL 33310-5247
Fishermans Wholesale Marine Supply Co., Inc. 4540 B Downman Road New Orleans, LA 70126
Golten Marine, 160 Van Brunt St., Brooklyn, NY 11231
The L.C. Doane Co., P.O. Box 975, Essex, CT 06426
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Julian A. McDermott,1639 Stephen St., Ridgewood, NY 11385
Pauluhn Electric Mfg. Co., Inc. 1616 N. Main, P.O. Box 53, Pearland, TX 77581
Phoenix Products, 6161 N 64th St., Milwaukee WI 53218
Francis Searchlights/Stam Supply Co., 4415 6th N.W., Seattle, WA 98107

LINE BLINDS
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474

LIQUID LEVEL INDICATORS
Metritape, P.O. Box 2366, Littleton, MA 01460
Setcor, 2 Dean St., Tenafly, NJ 07670

LIQUID OVERFILL PROTECTION SYSTEMS
E.R.L. Marine Products, P.O.Box 1026, New Albany, IN 47151-1026
Metritape, P.O. Box 2366, Littleton, MA 01460
Setcor, 2 Dean St., Tenafly, NJ 07670

LOCK SETS
HMS Marine Hardware, 333 W. Merrick Road, Valley Stream, NY 11580

LOGISTICS
Chand Corporation, 157 Hwy 654, Mathews, LA 70375
QED, 4646 N. Witchduck Road, Virginia Beach, VA 23455
VL Logistics Consultants, Inc., 3420 Bienville Blvd., Ocean Springs, MS 39564

LUBRICANTS
Jet-Lube, Inc., 4849 HomesteadRoad, Houston, TX 77226
B P Marine Americas, 200 Westlake Park Blvd., Houston, TX 77079-2682

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
Del Gavio, 619 Industrial Rd., Carlstadt, NJ 07072
Golten Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150

MACHINERY MONITOR AND CONTROL SYSTEMS
Electronic Marine Ssytems, 800 Ferndale Pl., Eahway, NJ 07065

MARINE ACCOMMODATIONS
Directions in Design Inc, 633 Emerson, Suite 100, St Louis, MO 63141
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
Jamestown Metal Marine Sales, Inc., 4710 Northwest Second Ave;,Boca Raton, FL 33431
Marine Accommodations Inc., 8535-3 Baymeadows Rd, Ste 140, Jacksonville, FL 32256
Maritime Services Corp., 3457 Guignard Dr., Hood River, OR 97031

MARINE BATTERIES
Rae Storage Battery Mfg. Co. Inc., 51 Deming Rd., Berlin, CT 06037

MARINE BOILERS
NEI Clarke Chapman Canada, 1075 N. Service Rd. W., Unit 4, Oakville, Ontario, CANADA L6M 2G2

MARINE CEILINGS
The Gage Corp., 803 S. Black River St., Sparta, WI 54656
Hydro-Alumunium, Vik Verk, N-5880 VIK I SOGN, Norway

MARINE ELECTRONICS
High Seas Technology, Inc., 2965 West State Rd., Fort Lauderdale, FL 33312
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Saab Marine Electronics AB, Box 13045, 402 51 Goteborg, SWEDEN

MARINE FIRE PROTECTION
Hiller Systems, 3710 Lakeside Court, Mobile, AL 36693

MARINE FURNITURE
Directions In Design, 633 Emerson, Ste. 100, St. Louis MO 63141
Engineered Data Products, P.O. Box 565, Woodbury, NJ 08906-7565
Jamestown Metal Marine Sales, Inc., 4710 NW Second Ave,Boca Raton, FL 33431
Marine Accommodations Inc., 8535-3 Baymeadows Rd, Ste 140, Jacksonville, FL 32256
Maritime Services Corp., 3457 Guignard Dr., Hood River, OR 97031

MARINE GEARS
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227

MARINE HARDWARE
HMS Hardware, 333 W. Merrick Rd., Valley Stream, NY 11580

MARINE RADAR COMPONENTS
EEV, Inc., 4 Westchester Plaza, Elmsford, NY 10523

MARINE SHIP MANAGEMENT
BarbaArkhon, 1810 Chapel Ave. West, Cherry Hill, NJ 08002

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

METAL PRODUCTS
Engineered Data Products, P.O. Box 565, Woodbury, NJ 08906-7565
Jamestown Metal Marine Sales, Inc., 4710 N.W. Second Ave., Boca Raton,FL

MONITOR CONTROL ALARM
Tracor Marcon, 800 Ferndale Pl., Rahway, NJ 07065

MULTI-CABLE PENETRATION DEVICE
NMP, 12437 E. 60th St., Tulsa,OK 74153

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
CDI Marine Co., 4040 Woodcock Dr., Suite 200, Jacksonville, FL 32207
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Ln., Dedham, MA 02026
Crane Consultants, 15301 First Ave S., Seattle WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Arthur D. Darden, 3200 Ridgelake Dr., Suite 403, Metairie LA 70002
DeJong & Lebet, Inc., 1734 Emerson Street, Jacksonville, FL 32207
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Diversified Technologies, 812 Live Oak Dr., Chesapeake VA 23320
Encon Mgmt.& Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
GHM Inc. (Ind. Measurement Consultants), P.O. Box 1836, Newport News, VA 23601
Gibbs & Cox, Inc., 50 West 23rd St., New York, NY 10010
John W. Gilbert & Assoc., Inc., 66 Long Wharf. Boston, MA 02110
The Glosten Assoc. Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
Guido Peria & Assoc., 4039 21st Ave., Ste. 300, Seattle, WA 98199
Morris Guralnick Associates, Inc., 130 Sutter St., Ste. 400, SanFrancisco, CA 94104
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
Hydrocomp, Inc., 45 James Farm-Lee, P.O. Box 865, Durham, NH 03824
JJH Inc., No. 4 Executive Campus, Culbert Blvd. & Route 70, P.O. Box 5031, Cherry Hill, NJ 08034
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
James S. Krogen, 1515 NW 7th St., Ste. 124, Miami FL 33125
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
MCA Engineers, Inc., 2960 Airway Ave., #A-103, Costa Mesa, CA 92626
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
John J. McMullen Associates, Inc., 1 World Trade Ctr, Ste 3000, N Y,NY 10048
Fendall Marbury, P.O. Box 2321, Annapolis, MD 21401
Marine Design & Operations, Inc., 226 Chestnut St., Roselle Park, NJ 07204
Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06902
Marine Power Associates, 1010 Turquois St., Ste 217, San Diego, CA 92109
Maritech, Seacliff, Bay Road, Newmarket, NH 03857
Maritime Design, Inc., 3020 Hartley Rd., Jacksonville, FL 32257
R.J. Mellusi & Co., 71 Hudson St, New York, NY 10013
Nautical Designs, Inc. 2101 S. Andrews Ave,Suite 202, Ft Lauderdale FL 33316
Olsen Marine Surveyors Co., P.O. Box 283, Port Jefferson, NY 11777
QED Systems Inc., 4646 Witchduck Rd., Virginia Beach, VA 23455
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 620 Fulsom St., Ste. 301, San Francisco, CA 94107
Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112
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 08006; 2 Skyline Pl., 5203 Leesburg Pike, Suite 700, Falls Church, VA 22041;
50 Vashell Way, Orinda, CA 94563
George G. Sharp, Inc., 100 Church St., New York, NY 10007
R.A. Steam, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
TIMSCO, P. O. Box 91360, Mobile AL 36691

NAVAL BOAT BUILDERS
Atlantic Boat Group, Inc., 1850 Lake Park Dr., Ste. 216 Smyrna,GA 30080

NAVIGATION & COMMUNICATIONS EQUIPMENT
AT&T, High Seas Dept., 412 Kemble Ave., Room C380, Morristown, NJ 07960
Autronica Marine A/S, Drammensveien 126, N-0277 Oslo 2, NORWAY
CAST, Inc., 5450 Katella Ave., Los Alamitos, CA 90720
Cellnet Corp, 400 Main St, Stamford, CT 06901-3004
Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024
C. Plath, 222 Severn Ave., Annapolis, MD 21403
Cruisephone, Inc. 2100 Park Central N., Pompano Beach, FL 33064
Electronic Marine Systems, 800 Ferndale PL., Rahway, NJ 07065
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Hose-McCann, 1241 W. Newport Center Dr., Deerfield Beach, FL 33442
IDB Mobile Communications, 1828 L Street NW, Suite 660, Washington, D.C. 20036
Mackay Communications, 300 Columbus Circle, Edison, NJ 08837
Marine Electric RPD, Inc., 50 Carol St., P.O. Box 1135, Clifton, NJ 07014-1135
Megapulse, Inc., 8 Preston Court, Bedford MA 01730-2380
Norwegian Telecom, P.O. Box 6701, Oslo 1, NORWAY
Offshore Systems Int'l., 19015 36th Ave., W., Ste. BC, Bldg. F, Lynwood, WA 98036
Pauluhn Electric Mfg. Co., Inc. 1616 N. Main, P.O. Box 53, Pearland, TX 77581
Portland Ship Repair Yard, 5555 N. Channel Ave., Bldg. 50, Portland, OR 97217
RD Instruments, 9855 Businesspark Ave., San Diego, CA 92131
Raytheon Marine Co, 46 River Road, Hudson, NH 03051
Robertson Marine Systems, 3000 Kingman Street, Suite, 207, Metairie, LA 70006
SPD Technologies, 13500 Roosevelt Blvd., Philadelphia, PA 19116
Scandinavian Micro Systems P.O. Box 155, N-1411, Kolboton, NORWAY
Simrad, 19210 33rd Avenue West, Lynwood, WA 98036
Sound Propeller, 1608 Fairview Ave. E., Seattle, WA 98102
Sperry Marine Inc., 1070 Seminole Trail, Charlottesville VA 22901
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Summer Equipment Ltd., 24 West 4th Ave., Vancouver V5Y 1G3, CANADA
Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94086
Waterway Communications System, Inc. 453 E. Park Pl., Jeffersonville, IN 47130

OIL—Marine—Additives
Mobil Oil Corporation, 3225 Gallows Road, Fairfax, VA 22037-0001
Texaco, International, 2000 Westchester Avenue, White Plains NY 10650

OIL/WATER SEPARATORS
Alfa-Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974-0556
Blohm & Voss AG, P.O. Box 10 07 20, D-2000 Hamburg 1, GERMANY;
U.S.A. Reps:Simplex-Turmar Inc., P.O. Box 168, Little Neck, NY 11363-0168
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale NJ 07647
Fast Systems, 3240 North Broadway, St. Louis, MO 63147
MMC International, 60 Inip Dr, Inwood NY 11696
National Fluid Separators, 827 Hanley Industrial Ct., St. Louis, MO 63144
Nelson Industries, Highway 51 West, Stoughton, WI 53589

PAINT—COATING—CORROSION CONTROL
Allied Signal, Inc., A-C Performance Additives, P.O. Box 1039, Morristown, NJ 07962
Amclean Coating Removal, 12920 S.W. 99 N. Ave., Miami, FL 33176
The Amessen Corp., Corrosion Dynamics Div., 1100 Walmut St., Rosell,NJ 07203
Corroseal, Inc., 1045 12th Ave. NW-F5A, Issaquah, WA 98027
Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
Jamestown Distrib., 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02835
Hempel Coatings, Foot of Curie Avenue, Wallington, NJ 07057
International Paint, 6001 Antoine, Houston, TX 77292
Microphor, Inc., Marine Div., 452 E. Hill Rd., P.O. Box 1460, Willits, CA 95490
Royal Chemical, 2705 Concord Road, Belle Chasse, LA 70037
Sigma Coatings, 8979 Market St., Houston, TX 77029, 330 Rover Rd., Harvey, LA 70059, 1100 Adams St., Hoboken, NJ 07030
UT Technologies Ltd., Box 31114, Robie St. RPO, Halifax Nova Scotia Canada B3K5T9
Vecom USA, 236 St. George Avenue, Jefferson, LA 70121

PAINT REMOVAL
Robert C. Collins & Co., 6772 N.E. 4th Ave., Miami. FL 33138
LTC Americas, 101 G. Executive Dr., Sterling, VA 22170
White Metals, Inc.

PIPE FITTINGS/CONNECTING SYSTEMS
Lokring Corp., 396 Hatch Drive, Foster City, CA 94404
Stanley G. Flagg Co., 1020 W. High St., Stowe, PA 19464

POLLUTION PACKER COMPACTORS
TFC Corporation, 77415 Cahill Rd., Minneapolis, MN 55439

PORT SERVICES
Port of Portland, 5555 N. Channel Ave., Portland, OR 97217

PROJECT TRACKING, PLANNING & MANAGEMENT
Tracking Systems of America, 8789 San Jose Blvd., Jacksonville, FL 32217

PROPELLER POLISHING SYSTEMS
Robert C. Collins & Co., 6772 N.E. 4th Ave., Miami, FL 33138

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
Avondale Industries, Harvey Quick Repair, P.O. Box 116, Harvey, LA 70058
American Air Filter, P.O. Box 35690, Louisville, KY 40432
ABB Drives Inc., P.O. Box 372, Milwaukee, WI 53201-0372, USA
ABB Industry Oy, P.O. Box 185, 00381 Helsinki, FINLAND
ABB TURBOCHARGER, INC.,1460 Livingston Avenue, N. Brunswick, NJ 08902
Aquamaster-Rauma Ltd., Box 220, SF-26101, Rauma, FINLAND
Bird Johnson Company, P.O. Box 1528, Pascagoula, MS 39567
Brunvoll A/S, P.O. Box 370, N-6401, Molde, Norway
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320
Coltec Industries (Fairbanks Morse Engine Div.), 701 Lawton Ave, Beloit, WI 53511
Fincantieri, Diesel Engines Div—GMT, Bagnoli della Rosandra 334, Trieste, ITALY
GE Naval & Drive Turbine Systems, 166 Boulder Dr., Fitchburg MA 01420
Harbormaster Marine, Inc., 31777 Industrail Road, Livonia, MI 48150
Holset Engineering, Inc., 1320 Kemper Meadow, Ste. 500, Cincinnati, OH 45240
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp MaK, 7555 Danbro Crescent, Mississauga, Ontario, CANADA L5N 6P9
Kobelt Manufacturing, 11720 Horseshoe Way, Richmond, BC Canada V7A 4V5
Lohmann & Stolterfoht, P.O. Box 1860, D-58408 Witten, Germany
Mapeco Products Inc., 90 Forest Ave., Locust Valley, N..Y. 11560
Markisches Werk, P.O. Box 1442, D-5884 Halver GERMANY
MAN B&W Diesel, 17 State St., New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Holeby, DENMARK
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15. DK-9900 Frederikshavn,DENMARK
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-86153 Augsburg 1 GERMANY
Mathers Controls, 675 Pease Rd., Burlington, WA 98107
Mitsubishi Heavy Industries America, Inc., 630 Fifth Ave., Ste. 3450, NY, NY10011
MTU of N.A., 10450 Corporate Dr., Sugar Land, TX 77478
New Sulzer Diesel, Ltd., CH-8401, Winterthur, SWITZERLAND
Omnithruster Inc., 9515 Sorensen Ave., P.O. Box 2144, Santa Fe Springs, CA 90670
Rolla SP Propellers SA, Via Silva 5, P.O. Box 251, 6828 Balerna SWITZERLAND
Rolla SP Propellers USA, 4030 Mustang Road, Melbourne, FL 32934, USA
Karl Senner Inc., 25 W Third, Kenner LA 70062
Schottel-Werft, D-5401 Spay, GERMANY
Shipwrights, Inc., 855 Worcester Rd., Farmingham, MA 01701
Siemens Energy & Automation, Inc., Systems Div., Marine Systems no. America (A23N), 100 Technology Dr., Alpharetta, GA 30202
Stewart & Stevenson, 1400 Destrehan, P.O. Box 8, Harvey LA 70059-0008
Textron Lycoming, 550 Main St., Stratford, CT 06497
Thrustmaster of Texas, 12227-K FM 529, Houston, TX 77041
Ulstein Bergen Diesel A/S, P.O. Box 924, N-5002, Bergen, NORWAY
J. M. Voith GmbH, Marine Division, Postfach 1940, D-7920, Heidenheim/Brenz, GERMANY U.S. Rep: Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021
Oy Wartsila Ab, Vasa and Abo Divisions, P.O. Box 244, SF65100 Vasa, FINLAND

PROTECTION MATERIALS
Megafilm, Bone Lane Industrial Estate, Newbury, Berkshire RG14 5SH ENGLAND

PROTECTIVE WRAPS
FANA (Film Applicators of North America), 1260 E Woodland Ave., Springfield PA 19064

PUMP—Repair—Drives
Coffin Turbo Pump, Inc., 326 S. Dean Street, Englewood, NJ 07631
Del Gavio, 619 Industrial Rd., Carlstadt, NJ 07072
Frank Mohn Houston, Inc., P.O. Box 1586, La Porte, TX 77572-1586
Gilkes, Inc., PO Box 628, Seabrook, TX 77586
Jim's Pump Repair, 48-55 36th St., Long Island City NY 11101
Leistritz Corporation, 165 Chestnut Street, Allendale, NJ 07401
Vita Motivator, 99 W Hawthorne Ave., Suite 622, Valley Stream NY 11580

REMOTE VALVE OPERATORS
ELLIOTT MANUFACTURING, P.O. BOX 773, BINGHAMTON, NY 13902

RESISTANCE TAPE
Metritape, P.O. Box 2366, Littleton, MA 01460

REFRIGERATION EQUIPMENT/SERVICES
Adrick Marine, 141D, Central Ave., Farmingdale, NY 11735
Bailey Refrigeration Co., 2323 Randolph Ave., Avenel, NJ 07001

REMOTE VALVE OPERATORS
American United Marine Corp., 5 Broadway, Rt 1, Saugus, MA 01906
Teleflex, Inc., 771 First Ave., King of Prussia, PA 19406

ROPE—Manila—Nylon—Hawsers—Fibers
Allied Signal Inc., Fibers Division, 1411 Broadway, New York, NY 10018
Dupont, Montgomery 403, 1011 Centre Road, Wilmington, DE 19805

RUDDER STOCK SEALS
Blohm & Voss AG, P.O. Box 100720, D-2000 Hamburg 1, GERMANY
U.S.A. Reps: Simplex Turmar Inc., P.O. Box 168, Little Neck, NY 11363-0168
John Crane Marine USA,1536 Barclay Blvd., Buffalo Grove, IL 60089

RUST REMOVAL
Robert C. Collins & Co., 6772 N.E. 4th Ave., Miami, FL 33138

SAFETY LIGHTING
Datrex, Inc., P.O. Box 1150, Kinder, LA 70648-1150
Loctite Luminescent Corp., Etna Road, Lebanon, NH 03766

SAFETY TOOLS
NGK Metals Corp., P.O. Box 13367, Reading, PA 1961

SANITATION DEVICE—Pollution Control
Eltech International Corp, 12850 Bournewood Dr, Sugarland TX 77478
Jered Brown Brothers, 56 South Squirrel Rd., Auburn Hills, MI 48326
Byrne, Rice & Turner, Inc., 1172 Camp Street, New Orleans, LA 70130
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
Fast Systems, 3240 North Broadway, St. Louis, MO 63147
Microphor, Inc., 452 E. Hill Rd., P.O. Box 1460, Willits, CA 95490

SATELLITE COMMUNICATIONS
IDB Mobile, 10525 W. Washington Blvd., Culver City, CA 90232

SCALE MODELS
Markitect, PO Box 225,Oconomowoc, WI 53066
Scale Reproductions, 16346 County Road 13, Fairhope, AL 36532
Sturgeon Bay Model Shop, 187 N Ninth Ave., Sturgeon Bay WI 54235

SCUTTLES/MANHOLES
L.S. Baier & Assoc., 7527 NE 33rd Dr., Portland, OR 97211

SEALANTS
Boatlife, Inc., Div. of Life Ind., 205 Sweet Hollow Rd., Old Bethpage, NY 11804

SELF UNLOADING SYSTEM REPAIR
Klehma Rubber Engineering, GERMANY
U.S. Rep: Simplex-Turmar Inc., P.O. Box 168, Little Neck, NY 11363-0168

SHIPBOARD COMMUNICATIONS
Hose-McCann, 1241 West New Newport Center, Deerfield Beach, FIL 33442

SHIPBUILDING EQUIPMENT
NEI Syncrolift, Inc., 8970 S W 87th Ct., Miami FL 33176

SHIPBUILDING—Repairs, Maintenance, Drydocking
Astilleros Espanoles S.A., Padilla 17, 28006 Madrid, SPAIN
Atlantic Marine, Inc.,P.O. Box 3202, Mobile, AL 36652
Atlantic Marine, Inc., 8500 Heckscher Dr., Jacksonville, FL 32226
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150
Bender Shipbuilding & Repair, P.O. Box 42, Mobile AL 36601
Bender Inc., 400 Gordon Drive, Bldg. 501,Exton, PA 19341
BethShip, Sparrows Point Yard, Sparrows Point MD 21219
Bisso Marine Co., P.O.Box 4113, New Orleans, LA 70178
Bollinger Lockport & Larose, P.O. Box 250, Lockport, LA 70374-0250
Boston Whaler, Inc.,Commercial Products Div.,1149 Hingham St.,Rockland,MA02370
Chris-Marine AB, P.O. Box 9025, S-2000 39, Malmo, SWEDEN
Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381
Curacao Drydock Inc., P.O. Box 3012, Curacao, Netherlands Antilles
European Ship Repair, 120 NE 20th St., Miami, FL 33137
Fincantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
G.M.D. Shipyard, PO Box 050221,Brooklyn, NY 11205
Gold Coast Yachts, Inc., Box 1980 Kingshill, St. Croix, U.S.V.I. 00851
Gulf Coast Fabrication, Inc., P.O. Box 539, Lakeshore, MS 39558
HDW, Kiel, Germany,USA Rep.; Roland Marine Inc., 90 Broad St., NY, NY 10004
Hall Buck Marine, P.O. Box 35, Baton Rouge, LA 70816
Hitachi Zosen, Hitachi Shipbuilding & Engineering Co., 1-1-1 Hitotsubashi Chiyoda-Ku Tokyo 100 Japan
Hike Metal Products & Shipbuilding, Box 698, Wheatly, Ont., Canada N0P 2P0
Hyundai Heavy Ind., 1 Cheonha-dong, Dong Ku, Ulsan, Korea
IHI, Tokyo Chuo Bldg., 6-2, Chiyoda Tokyo 100 Japan
Intermarine (USA), Inc., 301 N. Lathrop Ave., Savannah, GA 31402
Jacksonville, Shipyards, 750 E. Bay St., Jacksonville, FL 32202
Jeffboat, Inc., P.O. Box 610, Jeffersonville IN 47130
Kamag Transporttechnik GmBH, Daimlerstrasse 14, D-89079 U1M, Germany
Kvaerner Masa-Yards Oy, Box 132, SF-00151, Helsinki, FINLAND
Kvichak Marine, 615 N 34th St, Seattle, WA 98103
Leevac Shipyards, P.O.Box 1190, HWY 90 East, Jennings, LA 70546
Lisnave, Apartado 2138, 1103 Lisbon, Codex PORTUGAL
Marco, Inc., 2300 W Commodore Way, Seattle, WA 98199
Motor-Service AB, Box 2115, 144 04 Ronninge, SWEDEN
Munson Manufacturing, 150 West Dayton, Edmonds WA 98020
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607
Nichols Brothers Boat Builders, 5400 South Cameron Rd., Freeland, WA 98249
Norconsult Engineering Co., Inc., P.O. Box 529, 5785 Plantation Rd., Theodore,AL 36582
North Florida Shipyard, Inc., P.O. Box 3255, Jacksonville, FL 32206
Peterson Builders. Inc., 101 Pennsylvania Ave., Sturgeon Bay, WI 54235-0650
Thomas Marine, 37 Bransford Street, Patchogue, NY 11772
Samsung Heavy Ind., 25, 1-ka, Bongrae-dong, Chung-ku, Seoul, Korea
SeaArk, P.O. Box 210, Monticello AR 71655
SeaFab, P.O. Box 1651, 4111 Cedar St. Pascagoula, MS 39567
Service Marine Industries, P.O. Box 3606, Morgan City LA 70381
Skipperliner Shipyards, 621 Park Plaza Dr, Dept 21, LaCrosse WI 54601
Steiner Shipyard, Inc., P.O. Box 742, Bayou la Batre, AL 36509
Swath Ocean, 979 G Street, Chula Vista, CA 92011
Textron Marine Systems, 6600 Plaza Drive, New Orleans, LA 70127-2584
Trinity Marine Group, Box 3029, Gulfport, MS 39505-3029
Triplex Marine., 6200 Procter St., Port Arthur, TX 77642
WillardMarine, inc., 1250 N. Grove St., Anaheim, CA 92806
Zidell Marine Corp., 3121 S.W. Moody Street, Portland, OR 97201
Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400, Stevensville, MD21666

SHIPYARD CABLES
Amercable, 350 Bailey Road, El Dorado, AR

SIGHTGLASSES
Archon Industries, 200 Williams Street, Portchester, NY 10573

SIMULATOR TRAINING
Marine Safety International, Caorf Building, Kingspoint, N.Y. 11024
Ship Analytics, P.O. Box 410, North Stonington, CT 06359

SILENCERS
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130

SKILLED LABOR
Craft America, 1302 Ingleside Rd., Norfolk, VA 23502

SPILL RESPONSE/ENGINE ROOM MAINTENANCE
Haz-Mat Response Technologies, 5841 Box Canyon Rd., La Jolla, CA 92037

STAIRMASTER SAFETY TREADS
Wooster Products, Inc., P.O. Box 896, Wooster, OH 44691

Buyer's Directory Continues on page 81

STERN TUBE SEALS
Blohm & Voss AG, P.O. Box 10 07 20, D-2000, Hamburg 1 Germany
U.S.A. Reps: Simplex-Turmar Inc., P.O. Box 168, Little Neck, NY 11363-0168
John Crane Marine USA, 1536 Barclay Cove, Buffalo Grove, IL 60089
Kobelco Marine Engineering Co., LTD., Tokyo, Japan
USA Reps: Roland Marine Inc., 90 Broad St., New York, NY 10004
STIFFNER WELDER
Bug - O - Systems, Inc., 3003 W. Carson St., Pittsburgh, PA 15204
STUFFING BOXES
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
SURVIVAL EQUIPMENT
Schat Watercraft, P.O. Box 7008, Newark, DE 19714
Viking Life Saving Equipment, 1625 N Miami Ave., Miami FL 33136
TANK CLEANING EQUIPMENT
Setcor, 2 Dean St., Tenafly, NJ 07670
TANK LEVELING INDICATORS
American United Marine Corp., 5 Broadway, Rt. 1, Saugus, MA 01906
Autronica Marine A/S, Drammensveien 126, N-0277 Oslo 2, NORWAY
Bergan Tank, 3409 Gulf Breeze Pkwy, Gulfbreeze, FL 32561
ERL Marine Products div, PO Box 1026, New Albany, IN 47151-1026
Ian-Conrad Bergan, 3409 Gulf Breeze Parkway, Gulf Breeze, FL 32561
IMO Industries, Gems Sensors Division, One Cowles Rd, Plainville CT 06062
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Metritape, PO Box 2366, Littleton, MA 01460-2366
MMC International, 60 Inip Dr, Inwood NY 11696
Saab Marine Electronics AB, P.O. Box 13045, S-402 51 Goteborg SWEDEN
TANK LIQUID LEVEL GAUGES
Archon Industries, 200 Williams Street, Portchester, NY 1073
TELECOMMUNICATIONS
Mitel, 11911 Freedom Dr., Suite 700, Reston, VA 22090
TEMPORARY FLOOR & WALL PROTECTION SYSTEMS
Megafilm, Bone Lane Industrial Estate, Newbury, Berkshire RG14 5SH ENGLAND
TEMPORARY/PERMANENT SHELTERS
Universal Shelters, U.S. Hwy. 19 S., Pelham, GA 31779
TESTING SERVICES
Wyle Laboratories, 7800 Govern's Dr. S.W., Huntsville, AL 35807
THERMAL INSULATION
The Claremont Co., Inc., 174 State St., Meriden, CT 06450
Vapor Corporation, 6420 West Howard, Niles, IL 60714
THICKNESS TESTING
Cygnus Instruments, P.O. Box 3127, Annapolis, MD 21403
M.A.C.E., 5910 N.E. 15th Ave., Fort Lauderdale, FL 33331
TOOLS
Tri Tool Inc., 3806 Security Park Drive, Rancho Cordova, CA 95742-6990
TORSIONAL VIBRATION SPECIALISTS
M.A.C.E., 5910 N.E. 15th Ave., Fort Lauderdale, FL 33331
T.W. Spaetgens, 156 W. 8th Ave., Vancouver, BC, CANADA, V5Y 1N2
Vibranalysis Engineering Corp., 9300 Gamebird, Houston, TX 77034
TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Jack Faulkner, 2419 Caddy Lane, Flossmoor IL 60422
TURBOCHARGERS
ABB Turbocharger Co., 1460 Livingston Ave., North Brunswick, NJ 08902
ULTRASONIC TESTING
M.A.C.E., 5910 N.E. 15th Ave., Fort Lauderdale, FL 33331
VACUUM TOILET SYSTEM
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
Fast Systems, Inc., 3240 N. Broadway, St. Louis, MO 63147
Jered Brown Bros., 56 S. Squirrel Rd., Auburn Hills, MI 48326
Jets Vacuum Sewage System, P.O. Box 14, N-6060 Hareid, NORWAY.
VALVES AND FITTINGS
Cla-Val Co., P.O. Box 1325, Newport Beach, CA 92663
Derbyshire Machine & Tool, 5100 Belfield Ave., Philadelphia, PA 19144-1788
ERL Marine Products Div., PO Box 1026, New Albany, IN 47151-1026
Hydra-Search Co Inc, 120 Admiral Cochrane Dr, Annapolis, MD 21401-7399
Leslie Controls, 1250 Telecom Dr., Tampa, FL 33637
Loeffler Machine, US #1 & Robbins Ave., Penndel PA 19047
MMC International, 60 Inip Dr, Inwood NY 11696
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474
Stanley G. Flagg Co., 1020 West High St., Stowe, PA 19464
Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201
VAPOR RECOVERY CONTROLS
E.R.L. Marine Products, P.O. Box 1026, New Albany, IN 47151-1026
VIBRATION ANALYSIS
DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
T. W. Spaetgens, 156 W 8th Ave., Vancouver BC CANADA V5Y 1N2
Vibranalysis Engineering Corp., 9300 Gamebird, Houston, TX 77034
VIDEO—Training
DNV Petroleum Services, Inc., 111 Galway Pl., Teaneck, NJ 07666
WASTE SERVICES
Browning-Ferris Industry, (Medical Waste Systems) 757 N. Eldridge, Houston, TX 77079
WASTE WATER TREATMENT
Envirovac, 1260 Turret Drive, Rockford, IL 61111
Exstar International Corp., 6502 Windmill Way, Wilmington, NC 28405
WATER PURIFIERS
Alfa-Laval, Desalt A/S, Stamholmen 93, DK-2650 Hvidovre, Copenhagen,DENMARK
Alfa-Laval Separation Inc., 955 Mearns Rd., Warminster, PA 18974
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Exstar International, 6502 Windmill Way, Wilmington, NC 28405
Lifestream Water Purification Equip., P. O. Box 634, Huntington Beach, CA 92648
NEI Clarke Chapman Canada, 1975 N. Service Rd. W., Unit 4, Oakville, Ontario, CANADA L6M 2G2
Sea Recovery Corp., P.O. Box 2560, Gardena, CA 90247-0560
WEATHER CHART RECORDERS
Alden Electronics, 40 Washington St., Westborough, MA 01581
WEATHER INSTRUMENTS
Aanderaa Instruments, Fanaveien 13B, 5050 Nesttun, Bergen, Norway
Belfort Instruments, 727 S. Wolfe St., Baltimore, MD 21231
WELDING
Aftek Corp., 1023 Pineville Road, Chattanooga, TN 37405
Bug-O-Systems, 3003 W. Carson St., Pittsburg, PA 15204
Miller Electric Manufacturing, P. O. Box 1079, Appleton, WI 54912
Welding Consultants USA, 10399 Paradise Blvd. #101, St. Petersburg, FL 33706
WELDING AND REFRIGERANT PRODUCTS
Drew Ameroid Marine, One Drew Plaza, Boonton, NJ 07005
WINCHES AND FAIRLEADS
Jeamar Winches Ltd., 53 Maple Ave., Richmond Hill, Ontario L4C 6P3, CANADA
MMC International, 60 Inip Dr, Inwood NY 11696
Markey Machinery Co., 79 South Horton St., Seattle, WA 98134
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
NEI Clarke Chapman Canada, 1075 N. Service Rd. W., Unit 4, Oakville, Ontario, CANADA L6M 2G2
NIM Group Ltd., Hockley Way, Alfreton Trading Estate, Alfreton, Derbyshire DE55 7FA, ENGLAND
Skookum/RopeMaster, P.O. Box 280, Hubbard, OR 97032
Smatco Industries, P.O. Box 4036, Houma, LA 70361
Smith Berger Marine Inc., 516 S. Chicago St., Seattle, WA 98108
WORD MONITORING SYSTEMS
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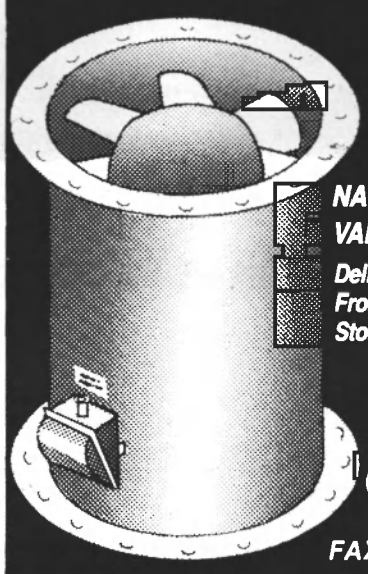

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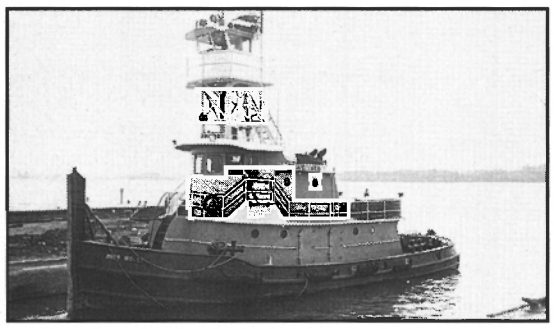

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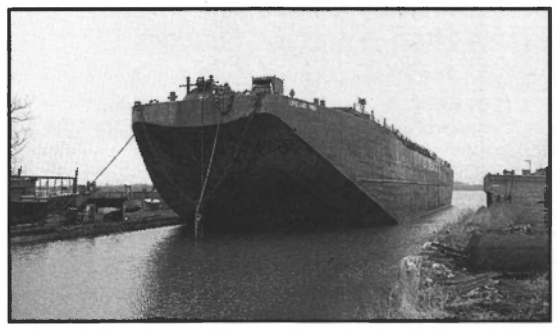

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LOCATION: The S.C. Loveland Co., Inc. pier facility, 1501 N. Beach St. (Piers 66-69N), just off Berks Street and Delaware Ave. and the Port Richmand Pier Site. The majority of the equipment is at the Pier 66-69N sale site just off of I-95, (North Girard Ave. Exit or South - Girard Ave./Lehigh Ave. Exit).

TERMS: High Bidders will be notified by Thursday, June 16th, 12:00 noon EST. If awarded, high bidder must wire transfer five percent of total items awarded, or complete payment by Friday, June 17th, 2:00 p.m. EST with balance due by Thursday, June 23rd at 2:00 p.m. EST. Payment should be made to Sealed Bid Services, Inc.

INSPECTION: Items may be inspected Monday thru Friday, June 6th thru 10th, 8 a.m. to 4:00 p.m., Monday, June 13th, 8:00 a.m. to 4:00 p.m., and Tuesday, June 14th, from 8:00 a.m. to 11:30 a.m. or by special appointment from May 1st. Please call Jerry Fleming for scheduling (215) 542-7787.

BID PACKAGES/CATALOG: Bid packages and a full descriptive catalog will be available June 1, 1994 by mail or at the sale site during the inspection period. A full descriptive picture brochure will be available May 1st. Please call Sealed Bid Services, Inc. if not on the mailing list for a brochure.

SPECIAL NOTE: A few of the larger barges and tugs are completing charters. If you are interested in these, please call the sale site (215) 423-0770 and ask for Paul Selneck to make sure your interest in available for inspection.

SALE SITE PHONE: (215) 423-0770 Paul Selnek **SEALED BID SERVICES INC.** (215) 542-7787 Jerry Fleming

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GENERAL LEE 110'X34' Tugboat #648920, (1982) Builder Modern Marine Power, Houma, Louisiana, powered by (2) CAT D-339 SCAC (Separate Circuit Aftercooled) 1125 hp 1225 rpm marine engines, reintjes WAV-1460 (5:984-1) gears, all steel construction, 4'3" depth, 11'7 3/8 load line, gross tonnage 98.81, net 67.0, displacement 413 l.t. 688 l.t. on load line, capacity of 84,400-gal. fuel oil, 1, 140-gal. lube oil, 333-gal. hyd. oil, 13,769-gal. potable, ABS Certificate L.W.T. displacement 433.104 short tons, 386.70 long tons. With Markey Machinery Type TYSD-32 hyd. double-drum towing winch, Capstan X-1804 windless, generators powered by GMC 6V-71 dsl., boom, (2) Loran Furuno LC-90s, Raytheon D-250 Fathometer, SAT NAV Furuno FSN50, Decca Marine 801SAT NAV, (3) Furuno FR1211, standard horizon 6HX2205, Perico solar ray searchlight. Starboard engine overhauled - 8/92, port engine overhauled - 5/93. This vessels in very good condition and presently operating.
MISS HOLLY 65'X23' TUGBOAT #517791, Builder Breaux's Bay Craft, Inc. Loreauville, Louisiana, powered by (2) CAT D-353-E air start turbo charged & aftercooled engines, equipped for Keel cooling & twin disc MG521 gears, 4.09: ratio, all steel construction, depth 9', draft 7'6", capacity of 16,000-gal. fuel oil, 540-gal. lube oil, 4,000-gal. fresh water. With (2) Parker Bros. 250 hyd. winches, silent hoist, 7-1/2 hp pacemaker electric barge mover, (4) Blackburn roller buttons, (2) Gardner Denver 5 hp. air comprs, (2) GMC 6V-71 dsl. engines powering Delco 1-5304 30KW 1200 rpm 3-ph. 60-cycle 120/208V commercial Delco generator, equipped for keel cooling. Sleeping conditions for 5 people, Kelvin Hughes 17/6 radar w/magnifier, (2) Furuno radars, Konel KR-150 AM radio telephone, Konel KR-33VB VHF-FM radio telephone, Ross Laboratories 100/25 combination flasher/recorder paper chart type depth recorder, Pierce Simpson Guardian 23 CB Radio, Bogan 9 station intercom. This vessel is in very good condition and presently operating.
MOVE TUG I 26' Tugboat/Workboat, Builder Thomas Marine, alum. hull, powered by GMC 671 dsl. engine w/Walter V drive.
MOVE TUG III 25' Tugboat/Workboat, Fiberglass uniflite hull, powered by GMC 653 dsl. engine, with 1-1/2 to 1 reduction hyd. transmission.
MOVE TUG IV 34' Tugboat/Workboat, Steel Hull, incomplete reconstruction in progress (will be offer in its unfinished state) GMC 671 dsl. engine and transmission will be sold separate.

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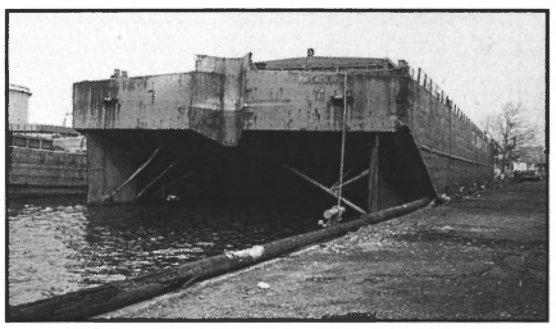
140'x62' 6"x25' 4" Covered Hopper Barge #290771, Built in Orange, Texas. With engine room, dsl. powered generator and pump, net reg. tons 3,747, cap. 9,400 tons. Ocean Service, ABS Drydock.
100'x43' 6"x23' Covered Hopper Barge #588661, Builder Tidewater Equipment & Construction, Chesapeake, Virginia. With engine room, dsl. powered generator and pump, net reg. tons 2,612, cap. 5,490 tons. Ocean service.
136'x50'x16'x10" Covered Hopper Barge #507168, Builder Gretna Machine & Iron Works, Haruay, Louisiana. Net reg. tons 1,887, cap. 3,600 tons.
195'x35'x16' Covered Hopper Barge #531931, Builder Jeffboat, Jeffersonville, Indiana. Net reg. tons 1,244, cap. 2,080 tons. Ocean service.
195'x35'x16' Covered Hopper Barge #531933, Builder Jeffboat, Jeffersonville, Indiana. Net reg. tons 1,244, cap. 2,080 tons. Ex-Ocean service.
195'x35'x12'6" Covered Hopper Barge #524083, Built in Neville Island, Pennsylvania. Net reg. tons 1,068, cap. 1,700 tons.
195'x35'x12' Covered Hopper Barge #503722, Builder Jeffboat, Jeffersonville, Indiana. Net reg. tons 876, cap. 1,500 tons.



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176'x55'x15'4" Flat Deck Barge #631397, Builder Tidewater Equipment & Construction, Norfolk, Virginia. 3/4" steel deck, net reg. tons 2,041, cap. 4,100 tons.
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104'x43'6"x12'9" Flat Deck Barge #571730, Builder Tidewater Equipment & Construction, Norfolk, Virginia. 3/4" steel deck, net reg. tons 948, cap. 2,000 tons.
172'6"x43'6"x10'9" Flat Deck Barge #580238, Builder Tidewater Equipment & Construction, Norfolk, Virginia. 3/4" steel deck, net reg. tons 661, cap. 1,350 tons.
172'6"x43'6"x10'9" Flat Deck Barge #568188, Builder Tidewater Equipment & Construction, Norfolk, Virginia. 3/4" steel deck, net reg. tons 661, cap. 1,350 tons.
172'6"x43'6"x10'9" Flat Deck Barge #565357, Builder Tidewater Equipment & Construction, Norfolk, Virginia. 3/4" steel deck, net reg. tons 661, cap. 1,350 tons.
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100'x39'x8'8" Flat Deck Barge #519874, Builder Bethlehem Steel, Beaumont, Texas. Net reg. tons 427, cap. 750 tons. Ex-Ocean.
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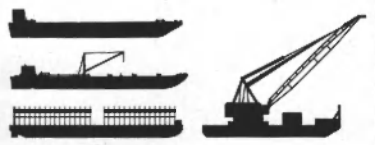

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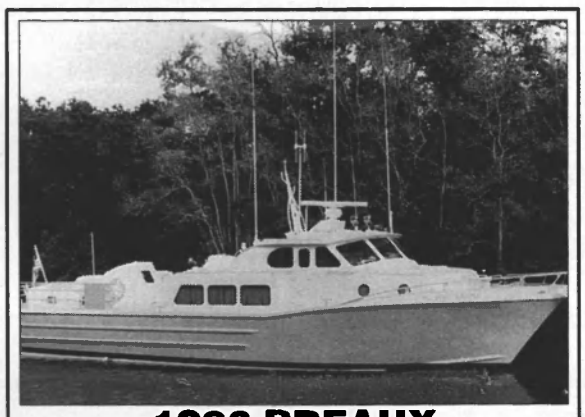

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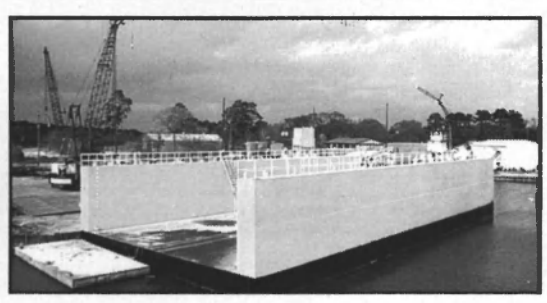

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Atlantic Drydock Corp., also located in Jacksonville, is looking for a Ship Repair Coordinator who is a recent maritime academy graduate.

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A small, fast growing midwest marine engineering firm is seeking a marine engineer with mechanical and electrical design experience. Minimum five years marine design experience required. Degree preferred, but not required. Manual or CAD drafting skills required.

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LEGAL NOTICE

Invitation for Bids
The City of New York
Department of Environmental Protection
Bureau of Clean Water

Contract documents for a New York City Department of Environmental Protection project listed below will be available sometime in June - July 1994. Bids will be publicly opened approximately 7 weeks thereafter.

Contract No.: 919-MV

The title for this project is: Marine Vessels Maintenance and Repair Work.

NYCDEP, Office of Contract Management, 17th floor, 59-17 Junction Blvd., Corona, N.Y. 11368. A pre-bid conference will be held approximately 2 weeks prior to the bid opening at the **Marine Services Bldg., Wards Island Sewage Treatment Plant, Wards Island, N.Y. 10035.**

For dates and times regarding availability, bid openings and the pre-bid conference, and for any technical questions, contact **Sven Van Batavia, (212) 860-8250.** Questions regarding bid documents should be directed to **Joseph Lopez, (718) 595-3235.**

MAN B&W Crosshead A Contender In The Medium-Speed Market

MAN B&W held a conference in Frederikshavn on April 12 for the presentation and test run of the first MC engine type S35. International Editor ***Graeme MacLennan*** *reports from Denmark.*

MAN B&W has added another model to its portfolio of crosshead engines. The S35MC is a longer-stroke version of the L35MC, which has proved to be among the best-selling engines of its power range in the Far East.

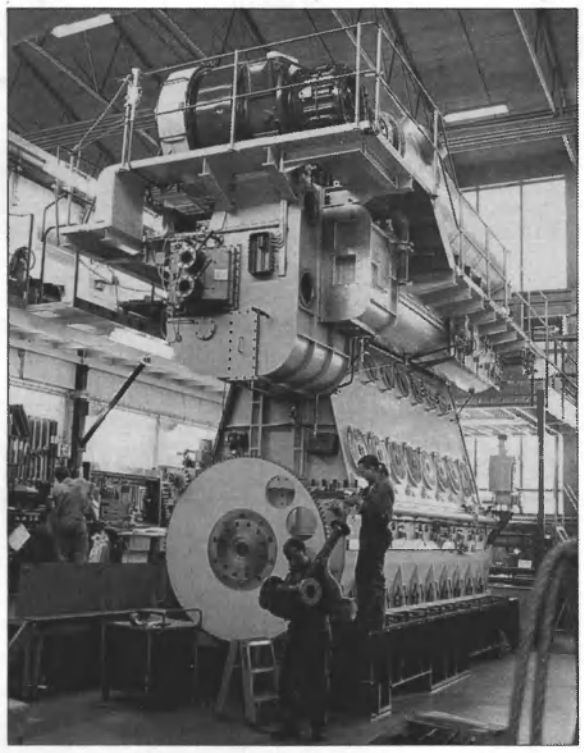
In contrast, the S35MC is aimed at the world market, and MAN B&W foresees these engines as powerful competitors in the range of outputs where the geared medium-speed four-stroke, trunk-piston engines presently reigns supreme. The 170 rpm running speed is a much better match for the slower-running propellers which are demanded today and which, with suitable reduction gearing, the medium-speed engine can so readily satisfy.

The taller crosshead engine is not, of course, suited to all those applications, for instance where a through main deck at a relatively low level is essential, as in RoRo trailer and car ferries, but it can offer many advantages for container feeder ships where the short length of the engine and absence of a gearbox may enable perhaps another 20-ft. box to be accommodated within a finite ship length. Coastal and chemical tankers, particularly ships and research vessels, are applications in which particular advantages can apply; indeed the first order is for a 17,500-dwt product tanker under construction in Singapore.

The model has many components in common with the L35MC, is the same length, about 35.5 inches (900mm) higher and slightly heavier. The bedplate, framebox, cylinder liner, piston and connecting rods are altered to accommodate the longer piston stroke and crankthrow, but otherwise the configuration is the same as before.

Constant- or variable-speed generators, according to whether controllable or fixed-pitch propellers are specified, can be attached forward or aft of the engine. As with the other models from the Frederikshavn factory, the engine can be supplied as part of an Alpha Diesel propulsion package, complete with shafting, propeller, generator PTO drive and Alphatronic controls.

Lubricating oil consumption is lower since the quantities applied to the cylinder liners are controlled, and the periods between scheduled overhauls are longer. The running gear is more accessible and maintenance can be undertaken by less skilled operators. Noise and No_x levels are lower than faster-running, highly-rated engines. The S35MC is offered with from four to 12 cylinders, covering a range of powers from 2,800 kW (3,800 bhp) to 8,400 kW (11,400 bhp) at the maximum 170 rpm L. rating and a specific fuel consumption of 175g/kW-h (129g/bhp-h), falling to the 475 kW/cylinder L. rating at 145 rpm when the SFC is 170g/kW-h. For more information on the engine from MAN B&W,



Assembly of the first 8S35MC engine.

Circle 156 on Reader Service Card

Boston Whaler's New Impact Design Reported A Success

Since its introduction last fall, Boston Whaler Inc.'s 21-foot (6.4-m) Impact has met with success, capturing sales ranging from international, federal, state and city agencies to commercial and recreational applications.

The Impact resembles a rigid inflatable boat, but Boston Whaler claims the Impact will never deflate, is virtually unsinkable, and comes with a 10-year limited warranty The Impact features a foam collar which facilitates the boarding of vessels even while underway. The collaring system cushions the shock associated with making contact with other boats or structures without marring the other surface. "The State of Florida has four Impacts on order and the State of Utah has already accepted delivery with another unit on order," said **Doug Nettles,** of Boston Whaler. The fendering system also reportedly attracted the attention of mega-yacht owners, and the Impact can be customized to match the decor of any vessel.

For more information on Boston Whaler,

Circle 42 on Reader Service Card

CALENDAR

JUNE

Large Marine Sealed Bid Sale:
S.C. Loveland Co., Inc.; Bid Deadline: Tuesday, June 14th, noon. Contact: Sealed Bid Services, Inc., 1044 Bethlehem Pike, Montgomeryville, Pa. 18936; tel: (215) 542-7787.

AUGUST

NorFishing '94 Exhibition and Seminars: August 9-13, Trondheim, Norway
Contact: The NorFishing Foundation, Nidarohallene, N-7030 Trondheim, Norway, tel: +47 73 92 93 40; fax: +47 73 51 61 35.

Offshore Northern Seas (ONS) '94: August 23-26, Stavanger, Norway
Contact: ONS, P.O. Box 410, N-4001 Stavanger, Norway, tel: +47 51 55 81 00; fax: +47 51 55 10 15.

SEPTEMBER

AWO Fall Convention: September 8-9, Fairmont Hotel, San Francisco, Calif.
Contact: The American Waterways Operators, 1600 Wilson Boulevard, Arlington, Va. 22209, tel: (703) 841-9300; fax: (703) 841-0389.

World Gaming Congress & Expo: September 26-28, Las Vegas Convention Center, Las Vegas, Nevada
Contact: World Gaming Congress & Expo, Gaming & Wagering Business, Seven Penn Plaza, New York, N.Y. 10001-3900, tel: (212) 594-4120 or 1-800-223-9638; fax: (212) 714-0514.

Shipbuilding Machinery & Marine Technology Exhibition & Conference: Sept. 27-Oct. 1, Hamburg, Germany
Contact: tel: +49 40 3569 2146; fax: +49 40 35 69 2149

OCTOBER

Fish Expo '94: October 13-15, World Trade Center, 164 Northern Ave., Boston, Mass.
Contact: Diversified Expositions, 5 Milk Street, Portland, Me. 04112, tel: (207) 772-3005; fax: (207) 772-5059.

International Tug, Towage & Salvage Convention & Exhibition (ITS '94): October 17-21, Grand Harbour Hotel, Southampton, U.K.
Contact: **Allan Brunton-Reed**, managing director, The ABR Company Limited, Dunelm, Church Road, Claygate, Esher, Surrey KT10OJP, U.K., tel: +44 372 468 387; fax: +44 372 468 388.

NOVEMBER

The International WorkBoat Show: November 3-5, Ernest N. Morial Convention Center, New Orleans, La.
Contact: Diversified Expositions, 5 Milk Street, Portland, Me. 04112, tel: (207) 772-3005; fax: (207) 772-5059.

Ship Repair & Conversion '94: November 8-9, Olympia 2, London
Contact: **John Gwynn-Jones** or **Jon Chaplin**, tel: +44 923 776363; fax: +44 923 777206.

SNAME 1994 Annual Meeting and International Maritime Exposition: November 16-19, New Orleans, La.
Contact: Tel: (201) 798-4800.

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Livingstone's Last Journeys Expedition - Charles Haskell (left), expedition leader, with the IDB MOBILE satcom in the Bangweulu Swamp in Zambia, Africa.

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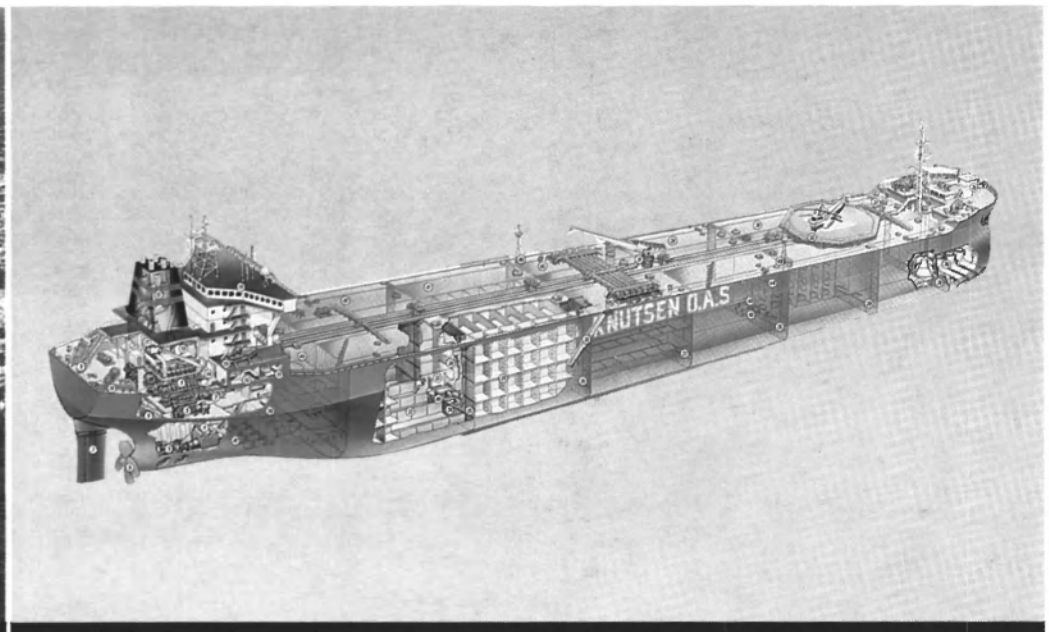

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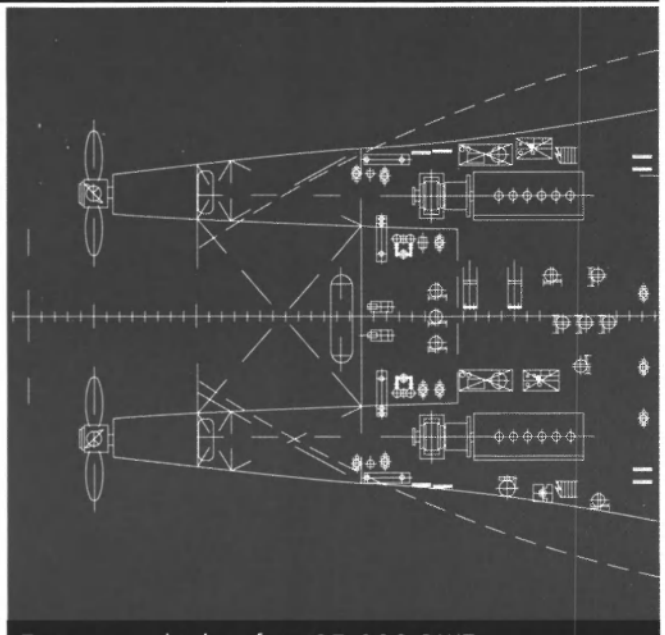

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