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AND ENGINEERING NEWS

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- ❑ Navy, Coast Guard, M.S.C. Army Corps of Engineers
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- ❑ Ship surveyor
- ❑ Oceanographer, marine scientist, marine geologist
- ❑ Purchasing manager or agent
- ❑ Superintendent engineer
- ❑ Port captain
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- ❑ Other (please specify) _____

3. Please indicate each type of vessel your company is involved with:
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- ❑ (C)Ferries
- ❑ (D)Tankers
- ❑ (E)Pushboats
- ❑ (F)Dredges
- ❑ (G)Offshore drill rigs
- ❑ (H)Barges
- ❑ (I)Offshore crew/ supply
- ❑ (J)Research
- ❑ (K)Naval
- ❑ (L)Army Corps of Engineers
- ❑ (M)Tugboats
- ❑ (N)Coast Guard
- ❑ (O)Patrol/fire/police
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4. Vessel owners, please indicate primary vessel size:
- ❑ 100' and under
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5. Please check each category that best describes your purchasing influence (more than one if it applies):
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- ❑ (D) Deck equipment
- ❑ (E) Other equipment below deck (Gensets, pumps, valves, piping/fittings, separators, controls, electrical, etc.)
- ❑ (F) Marine lube and fuel products
- ❑ (G) Ship/boat building and repair services (including dry docking)
- ❑ (H) Marine safety equipment
- ❑ (I) Marine insurance and shipping finance
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- ❑ (K)Other (please specify) _____

6. Please check each category describing the area(s) of your marine business or operations (more than one if it applies):
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- ❑(M) Offshore oil/gas
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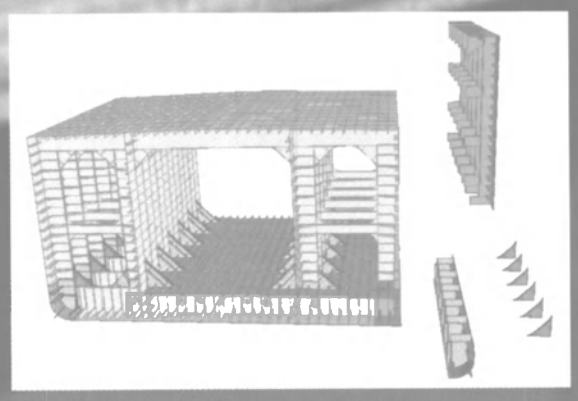
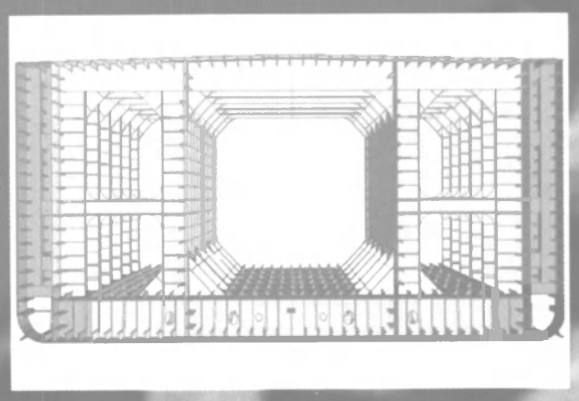


Tanker Technology

The Tanker Transformer

Maritrans, LR deliver innovative DH technique



Ship Repair & Conversion

ISPS Code: Non-Compliance will be Costly

Marine Materials

Aluminum Builders Show their Mettle

The Shipbuilding Report

China Preps for Newbuild Surge

Government Update • Canada • Tech Updates • Monitors & Displays

Announcing MITAGS/PMI's New Port Facility, Company, and Ship Security Officer Training Program.

Since September 11th 2001, the maritime industry has come under increasing pressure to improve security awareness and develop security measures appropriate to the threat level.

International and national regulations and guidance are in place, but your company, ship, or port facility may not be ready to meet these important requirements.

In an effort to help port authorities, facility managers, and shipping companies develop and implement their security plans, MITAGS/PMI now includes the Port Facility, Company, and Ship Security elements in our successful 3-day training program. We tailored this course to provide a practical, comprehensive, and effective approach to solving your maritime security challenges.

2004 Dates – *(log onto our websites at www.mitags.org or www.mates.org for the most current information on dates and times).*

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Feb	23	-	25	PMI	Seattle
Mar	8	-	10	MITAGS	Baltimore
Mar	22	-	24	PMI	Seattle
April	5	-	7	MITAGS	Baltimore
April	12	-	14	PMI	Seattle
May	3	-	5	PMI	Seattle
May	10	-	12	MITAGS	Baltimore
June	7	-	9	MITAGS	Baltimore
June	31	-	July 2	PMI	Seattle
July	5	-	7	MITAGS	Baltimore
July	12	-	16	PMI	Seattle
July	26	-	28	MITAGS	Baltimore

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For more information contact:

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Circle 245 on Reader Service Card

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www.usmma.edu/gmats

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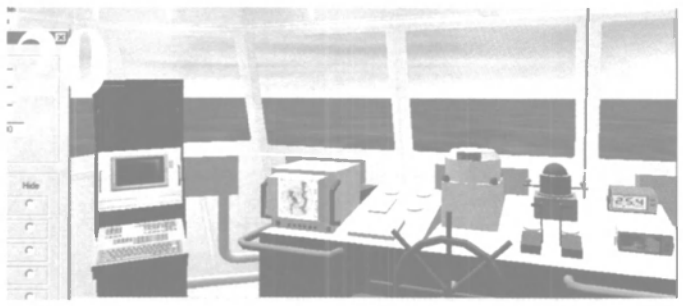

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Northrop Grumman Delivers Aegis Destroyer

Northrop Grumman Corporation's Ship Systems sector commemorated delivery of its 19th U.S. Navy Aegis-guided missile destroyer, Pinckney (DDG 91), during a ceremony onboard the ship at the company's operations along the west bank of the Pascagoula River. In naming Pinckney, the Navy honors Navy Cook Third Class, **William Pinckney**, (1915-1975), recipient of the Navy Cross for his courageous rescue of a fellow crewmember onboard the USS Enterprise (CV 6) during the 1942 Battle of Santa Cruz. "We at Northrop Grumman are as proud of this ship as any we have built," said **Bob Merchent**, vice president, DDG 51 Program. "When this ship takes her place in the fleet, we know we have met the trust placed in us by the Navy and the American people."

Cmdr. **Robert M. Byron**, U.S. Navy, of Asheville, N.C., a 1985 graduate of the United States Naval Academy, will be the new ship's commissioning commanding officer.

"Thousands of shipbuilders dedicated their efforts to produce the absolute best of American industrial capability," said Cmdr. Byron. "Thousands of people worked hard to make this day happen; to give this brilliant technological achievement a pulse."

DDG 91 will be commissioned USS Pinckney on May 29 in Port Hueneme, Calif., and will be homeported in San Diego as a member of the Pacific Fleet's Destroyer Squadron TWENTY THREE. DDG 91 is the 19th of 28 Aegis destroyers under contract to Northrop Grumman Ship Systems.

New Aegis Destroyer Christened Halsey

A new Aegis guided missile destroyer DDG 97 was officially christened "Halsey," honoring Fleet Adm. **William Frederick "Bull" Halsey Jr.**, a World War I and World War II Naval hero. Adm. Halsey was born in October 1892 in Elizabeth, N.J. He earned a Navy Cross for his service in WW I. Early in WW II, Halsey's carrier task force took part in the Doolittle raid on Tokyo. He took command in the South Pacific in October 1942 at a critical stage of the Guadalcanal Campaign. Halsey took command of the Third Fleet in May 1945 and through the end of the Pacific War. Promoted to the rank of Fleet Admiral - becoming the fourth and last officer to hold the rank - in December 1945, Halsey retired from active duty in March 1947, and died in August 1959. Halsey (DDG 97) is the 47TH ship in the DDG 51 Arleigh Burke-class of Aegis guided missile destroyers — the U.S. Navy's most powerful destroyer fleet. Of 28 ships under contract to Northrop Grumman's Ship Systems sector, Halsey is the 22nd Aegis destroyer to be launched and christened.

The Index

How to construct a tradition of quality.

with an almost fanatic commitment to build the best barges on the river. You execute that commitment with a work force that is highly trained and experienced. You use NABRICO fittings so you're sure they will actually fit. You make sure that every barge you build will meet or exceed the latest USCG quality and environmental protection requirements. You pay special attention to each of your client's modifications and you don't stop until they're all installed. You make certain the barge looks as good as it will perform. Then you deliver on time to keep your customer's business moving.

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Circle 259 on Reader Service Card

Editor's Note

As intrusive, costly and arcane as some rules that regulate our industry may seem, I have an entirely different perspective . I love them. To me, new rules and regulations mean an endless array of interesting articles to pursue and publish in our pages.

It is a given that new regulations mean an increased cost of doing business. Trust me in that I do not wish increased cost on our readers and customers. Pick up your favorite business newspaper or magazine, flick on the television or computer, or simply talk with a colleague or friend, and I think that you will agree that intense competition and consolidation have severely challenged companies of all shape and size to build and maintain profitability. The trick, then, becomes the ability to embrace the new reality in the most efficient and cost-effective manner.

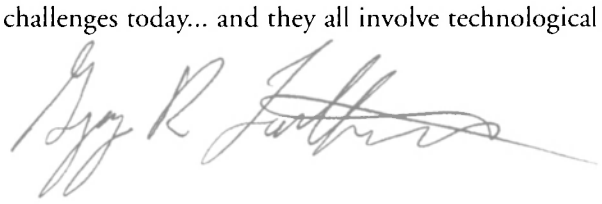
A great example is OPA 90.

Following the Valdez tanker oil spill, OPA 90 was introduced to help reduce the future likelihood of such a mishap. Among a myriad of rules, OPA 90 is most closely associated with the double hulling of tankers trading in U.S. waters. When first introduced, and in fact to this day, the merits of double-hulled ships as a method to eradicate oil spills from tankers are hotly debated. Some of this furor subsided when several successive spills off Europe's coast resulted in new double hull tanker rules from this region.

Starting on page 22 we look at an innovative solution to turn single hull tankers into double hull tankers. Estimated to be a quarter to a third of the cost of a newbuild tanker, the process has been created by Maritrans in cooperation with Lloyd's Register.

Another area of major regulatory concern is the vast realm of Maritime Security, and all that it encompasses. While movement to procure new solutions has been slower than expected, it is foolhardy to believe that this will not be the topic that defines a generation in the maritime industry. From the reinvention of the U.S. Navy, the U.S. Coast Guard, through the sweeping changes that are forever altering the processes and procedures ports and port facilities (including shipyards), on through to the world's largest owner/operators to the smallest small fleets, Maritime Security has and will continue to permeate every pore of the market.

As VADM Terry Cross, USCG Commander of the Pacific Fleet, recently said: "We have many challenges today... and they all involve technological solutions."



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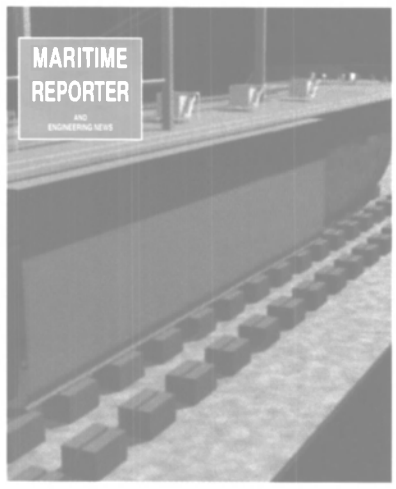

Maritrans and Lloyd's Register are presenting an innovative and cost-efficient way in which to turn single hull tankers into double hull tankers. See story on page 22.

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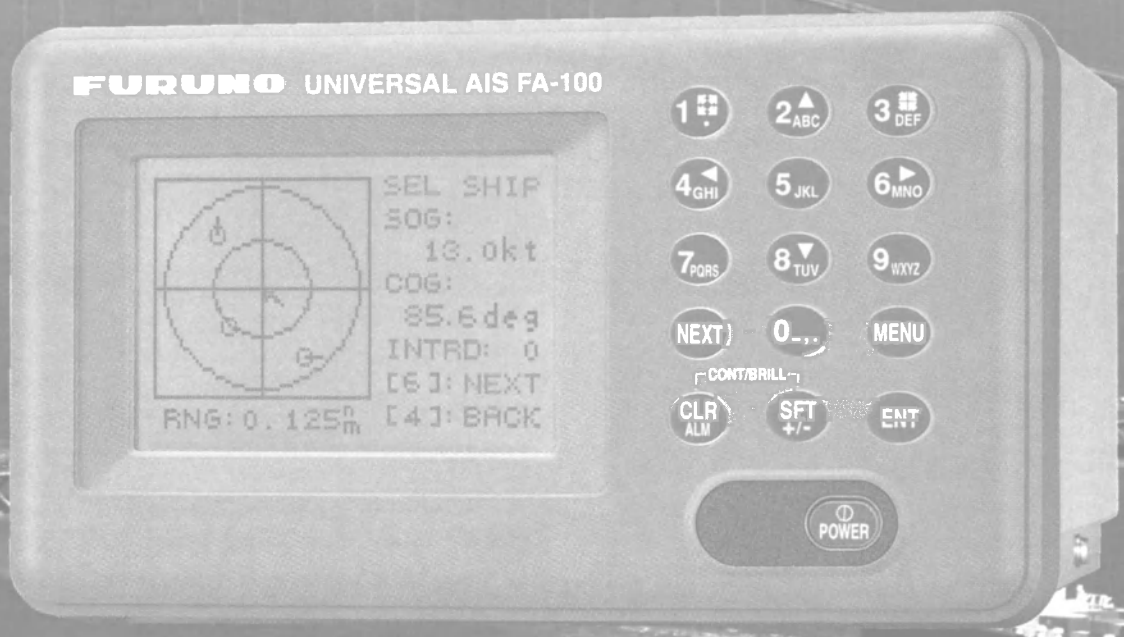

Furuno's FA100 AIS.

Furuno, the largest U.S. supplier of GMDSS equipment, is proud to introduce the new FA100 AIS (Automatic Identification System).

- FCC, USCG & BSH type accepted
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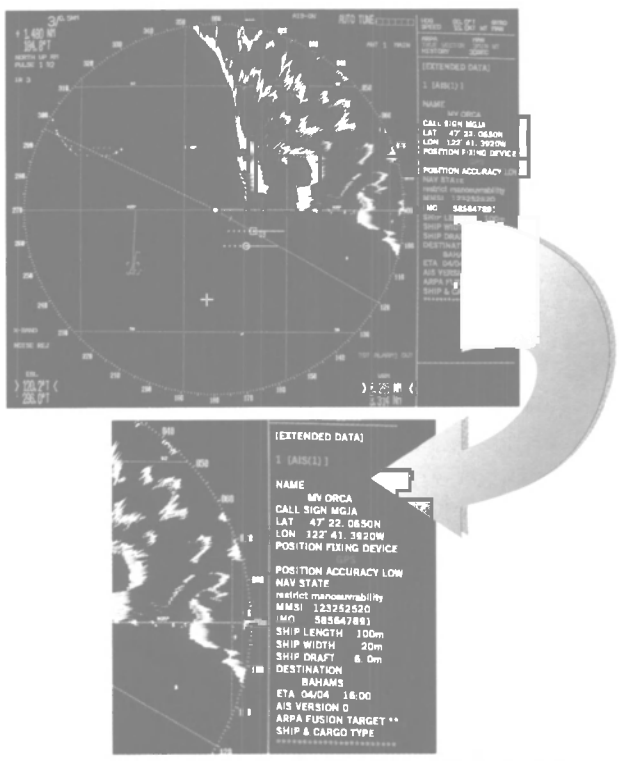

AIS target symbols and detailed information can be overlaid on your Furuno FAR-28x5, FR-21x5 or FR-15x5 series radar with an optional radar plotting module.

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Everything else is a compromise!

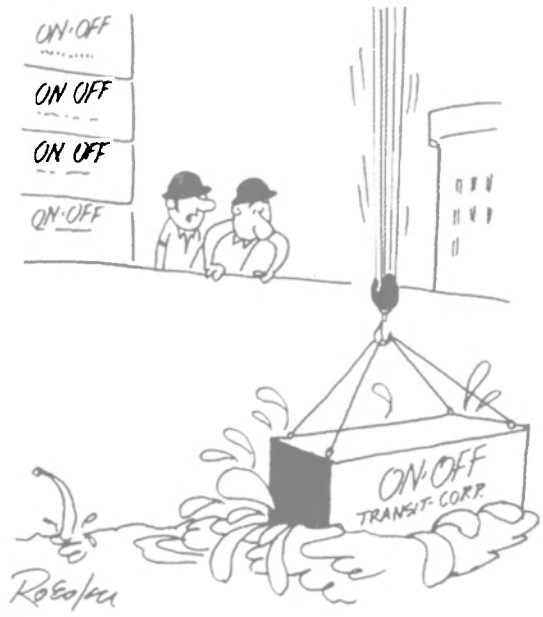
Circle 228 on Reader Service Card

Leading Off

The Liberty Ship ***Michael Moran,*** *honoring the founder of Moran Towing and Transportation was launched in 1944. Pictured (l to r) Mrs.* ***Harry Lee Warren*** *(grand daughter of Moran);* ***Eugene F. Moran*** *(son and then company president);* ***Nancy Moran*** *(great grand daughter) and Commodore* ***Edmond J. Moran***.

Don't Miss Maritime Reporter's 65th Anniversary Celebration edition, coming in AUGUST 2004.

Cartoon



"IT WAS TICKING."

Maritime Meanings

Happy Hour

A brief period of relaxation for the crew of a ship, or for as many as possible, consistent with the need for the ship to remain alert and efficient; said by John Rogers to be a navy term from WWI (presumably Rogers refers to the U.S. Navy; it is inconceivable the the Royal Navy of that period would have permitted frivolity of any kind onboard His Majesty's vessels).

Today, the happy hour is almost religiously celebrated ashore by some groups of people, gathered together in a common cause (such as office workers, school teachers, and so on), who hail the end of the working week and the advent of the weekend by letting down their hair and having a few social drinks with each other.

Source: *An Ocean of Words: A Dictionary of Nautical Words and Phrases, by Peter D. Jeans; Birch Lane Press , 1998*

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for the long run

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Circle on 201 Reader Service Card

Izar Gijon Delivers Two Massive Dredgers

Last December Izar Gijon Shipyard delivered to Jan De Nul the suction dredgers named Taccola and Francesco di Giorgio each of which boasts a 4,400 cu. m. capacity. With a total of eight dredgers delivered in two years, Izar consolidates its position in the construction of these technologically sophisticated ships. Gijon has recently delivered two other dredges for the fFrench company Dragages Ports, of with 5,000 cu. m. and 8,500 cu. m. of capacity.

Over the last two years, Izar has built dredgers of several sizes at its shipyards in Gijon and Sestao. The biggest ones, the Kaishuu and the Juan Sebastian Elcano, with a capacity of 16,000 cu. m. each were built at Sestao Shipyard which also built the Filippo de Brunelleschi, and the Francis Beaufort with a capacity of 11,500 cu. m. Six of the ships were for the Belgian owner Jan de Nul.

These are the main data of the twin Taccola and Francesco di Giorgio.

Hopper capacity	4,400 cu. m.
Length	313 ft. (95.4 m)
Lpp	277.8 ft. (84.7 m)
Width	68.8 ft. (21 m)
Depth	27.8 ft. (8.5 m)
Dredging draft	23.6 ft. (7.2 m)
Deadweight at 6.5 draft	6,955 t
Suction Pipe diameter	900 mm
Dredging Depth	21.0/24.3 m
Speed	12.3 knots
Power Main Generator Diesels	2 x 2,700 kW
Propulsion Power	
2 x 2,150 kW	
Pump power shore discharging	3,000 kW
Jet pump power	1,200 kW
Bowthruster power	550 kW

VT Halter Delivers First-of-Series OSV for Seacor

VT Halter Marine Inc. delivered its first vessel in 2004, the Seacor Pride. The 220- x 46- by 17-ft. Offshore Supply Vessel (OSV) is classed DPS-1 and can carry 5,100 barrels of liquid mud, 6,740 cu. ft. of dry bulk along with fuel oil and fresh water. Constructed at VT Halter Marine's HMP (Halter Moss Point) Operations, Seacor Pride is a high capacity supply vessel with a pair of Caterpillar 3516 main engines and a Caterpillar 3508 driving a 1,000 hp bowthruster.

Two additional Caterpillar engines drive liquid mud pumps on one end and the compressor that powers the bulk mud system on the other end. Offshore Supply Vessels carry goods, supplies, individuals (in addition to the crew) or equipment used to support exploration and offshore production of mineral or energy sources. This state-of-the-art OSV is U.S. flagged, ABS classed and complies with SOLAS (Safety of Life at Sea) requirements for international service. CEO Butch King said, "The Seacor Pride is a reflection of the commitment that we invest in every phase of shipbuilding, from design to delivery."

Main Particulars

Official Number	1140485
Radio Call Sign	WDB5710
Length, o.a.	217 ft. (66 m)
Beam	46 ft. (64 m)
Depth	17 ft. (14 m)
Light draft	6 ft. (2 m)
Loaded draft	14 ft (4 m)
Summer freeboard	3 ft (1 m)
Length BP	211 ft. (5 m)
Lightship	1,075 LT
Main Engines	(2) Caterpillar
Type	3516B
Rated	2,000 bhp @ 1,600 rpm
Auxiliary generators	Cat
Bowthruster	SMI/Brunvoll
Dynamic positioning	Kongsberg Simrad
GPS	Furuno
Gyro	C. Plath Navigation
Radar	Furuno
Radio system	Furuno
VHF	Icom
Internet/E-mail	Globe Wireless
Class ABS	
USCG	Sub Chapter L Offshore
Speed	13 knots
Capacities	
Drillwater	141,799 gal.
Potable water	34,660 gal.
Fuel	152,365 gal.
Liquid mud	5165 bbls

Boeing Connexion Moves to the High Seas

As use of communications at sea expands rapidly, evidence that this trend has entered warp speed was signaled recently as corporate Goliath Boeing announced its plans to roll out is high speed satellite capability to the marine business. Connnexion by Boeing, a business unit of The Boeing Company, announced an expansion of its service offering to include high speed satellite broadband capability for the maritime industry. "We're actively engaged in discussions with several of the leading maritime operators, as well as potential distributors, and have received a tremendously positive response to our service and the speeds at which we can move data," said Connexion by Boeing President **Scott Carson**. "Operators of vessels around the world have the immediate need to stay connected, allowing a more informed and efficient operation, no matter where they are in the world — close to shore or in the shipping lanes across the Pacific and other oceanic regions." The Connexion by Boeing maritime solution is expected to be approximately 10 times faster than the most commonly deployed narrowband maritime communications systems available today, and significantly less expensive to use. Applying the broadband capability of Connexion by Boeing to the maritime communications industry is a natural complement to its commercial airline service. The maritime solution leverages the existing satellite and ground-based network Connexion by Boeing has established and will bring the same capabilities for robust, high-speed connectivity to the maritime industry. Existing networks will provide coverage in the North Atlantic and a solution for Pacific Ocean coverage will be announced in the very near future.

Vessel operators and their passengers can use Connexion by Boeing to access the Internet and firewall-protected corporate intranets, send outgoing emails or open large attachments from incoming emails; get the news, weather or destination information; or view satellite television programming. The service will also enhance ship-to-shore communications for ship captains and crew - providing new opportunities for long-distance learning, improve crew morale, remote monitoring of ships' systems and cargo, improved maintenance, and to make better routing decisions. All of these capabilities are expected to significantly improve the efficiency and safety of operations at sea.

Circle 88 on Reader Service Card

New Ferries for Hawaii?

Hawaii Superferry and Austal USA last month signed an agreement that could result in new passenger-vehicle catamarans for Hawaiian waters to create a commercial high-speed interisland ferry service. Hawaii Superferry plans to use Austal USA-built, high-speed, RoRo vessels to create "Hawaii's Interisland Highway," with catamarans carrying passengers, vehicles and freight between Oahu, Kauai, Maui and the Big Island, beginning in 2006. Under the agreement, Hawaii Superferry plans to purchase two 340-ft. catamaran ferries — able to carry 900 passengers and 280 vehicles, including trucks and buses — for delivery during 2006-2008

"For many years, I have envisioned 'a marine highway' for our islands, so I am pleased with the progress that Hawaii Superferry has made in creating an interisland ferry system that will serve Oahu, Kauai, Maui and the Big Island," said Senator **Daniel K. Inouye**, who has secured more than $25 million in federal funds for the development of ferry infrastructure. Final funding for the project is pending.

Circle 89 on Reader Service Card

NASSCO Gets $578M Option T-AKE's

NASSCO was awarded a $578 million fixed-price-incentive modification under previously awarded contract to exercise options for design and construction of the fifth and sixth ships in the Dry Cargo/Ammunition Ship (T-AKE) Class. Work is expected to be completed by July 2007.

TEN Orders A Series of Ice-Class Product Carriers

Tsakos Energy Navigation Limited (TEN) has ordered two Handysize, double hull, 1A ice-class tankers, with carrying capacity of 37,000 dwt each. The vessels have a contract price of just under $30 million per ship and are scheduled for delivery in September and December of 2006. TEN also holds options for two additional sister ships of the same specifications, which would be delivered in March and June of 2007.

MarAd Approves Deepwater LNG Port

A new deepwater liquid natural gas (LNG) port was approved by the U.S. Maritime Administration. The LNG port, to be built by El Paso Energy Bridge Gulf of Mexico LLC about 116 miles south of New Orleans in the Gulf of Mexico, is a terminal to process and transfer natural gas received from LNG transport ships to a pipeline system, which will carry the natural gas ashore for distribution to U.S. markets.

TOTAL Signs Charters for Stena Tankers

TOTAL has signed a five year charter of the first two Stena P-MAX tankers currently under construction. The new P-MAX (Product-Max) class of tankers are medium-sized, short and wide-bodied with reduced draft. They have an intermediate loading capacity of 65,000 ton, between the standard 45,000 ton vessels and the 70 to 80,000 ton Panamax. These tankers, specially designed for efficient and safe transportation, are under construction in the Croatian shipyard Brodosplit in Split for delivery in 2006.

Damen Delivers First-of-Class ASD Tug

The recently developed Damen ASD Tug 2411 is a real push-pull ASD Tug, designed primarily for working over the bow. This tug is a powerful 4,200 kW vessel that develops a bollard pull of around 70,000 kg; full ahead to full astern in a ship's length, turning around in 10 seconds.

With the introduction of the Damen ASD Tug 2411, Damen Shipyards has put a new type of port tug on the market: very compact, with an enormous bollard pull. The prototype of this boat (yard number 512201) was built at Damen Shipyards Changde in China for stock and as a demonstration model, but before delivery the boat was sold to an Australian shipping company and named Barunga. The delivery to Adsteam Towage Pty Limited in Bondi Junction, New South Wales, took place on January 23, and Barunga is now based in Port Adelaide.

The Design

"What we need is a small ASD Tug but with the power of the ASD Tug 3111; we had a length of around 22 m in mind. Make some suggestions."

This was more or less the question the Damen Sales team put to the Tugs & Workboats Product Group almost three years ago. It was a new product, at least for Damen. Initial sketches showed a wide, short and low, with a very big approach angle to enable it to creep as far under a ship as possible, and with virtually no accommodation and an excellent view all round.

The company had long meetings and made many changes. And the boat grew. That's how it happens with Damen Standard designs. It's always about the customer and what for what use they need a Standard Damen product.

The need for a new type of vessel was the result of developments in the market. Competition for port tug work is usually stiff, which led to an increasing demand for vessels that were lower cost but still packed a considerable bollard pull.

The Damen ASD Tug 2411 design based on this program of requirements has the following main specifications and trial results of yard no. 512201 Barunga:

Length, o.a.	80.4 ft. (24.5 m)
Length, molded	78.7 ft. (24 m)
Length, w.l.	71.5 ft. (21.8 m)
Beam, o.a.	37.7 ft. (11.5 m)
Beam, molded	35.1 ft. (10.7 m)
Depth	15.1 ft. (4.6 m)
Draft hull	11.5 ft. (3.5 m)
Draft aft	17.7 ft. (5.4 m)
Displacement	497 tons
GT	250
Speed ahead	12.8 knots
Speed astern	12.7 knots
Bollard pull ahead	68 tons
Bollard pull astern	63 tons

The beam dimension was chosen to comply with the U.S. Coast Guard requirements for ASD Tug stability (among the most stringent in the market) and this makes the boat relatively wide. The resulting metacentre height is 2.3 m. With full tanks, freeboard is 1.1 m.

Engine Room Design

The hull of the Damen ASD Tug 2411 is divided by four watertight bulkheads into the following compartments:

- Forepeak, dry.
- Forward compartment with the potable water tank below, a cofferdam and two fuel tanks, one on each side of the centreline (port and starboard), that run through into the engine room. Above the tanks are the auxiliary engine room on the starboard side and the cable storage area on the port side; at the front of this compartment there are also the chain lockers and, between them, the laundry unit, a workbench, hydraulic tank unit, main switchboard, boiler and hydrophore. At the rear are two F.O. header tanks for fuel, each of 3.4 m3 capacity.
- Engine room, with the two fuel tanks mentioned above either side of the centreline on the floor, and behind them the liquid foam tank and a dispersant tank (starboard) as well as the sewage tank (port) and then two more fuel tanks (port and starboard); the latter each have a trunk on the centreline leading up to the main deck. There are several other tanks behind the box coolers at the sides of the engine room: on the starboard side the lube oil tank for the main engines and behind it the bilge water tank; on the port side the dirty oil tank and the lube oil tank for the auxiliary engines.

Circle 90 on Reader Service Card

Equipment List

Classification	Lloyds Register of Shipping
Windows	van Wingerden
Window wiper	Exalto
Fenders	Fentek
Paint	International
Active Antifouling	Corrosion and Water Control
Main engines	Caterpillar
Flexible couplings	Vulkan
MCD	Twin Disc
Thrusters	Rolls Royce Aquamaster
Fuel coalester filters	WEKA
Box coolers	NRF
Pumps, Fresh water pressure set	Sterling
Freshwater heater	Gesta
Sewage pump	Libellula
Sewage treatment plant	Hamworthy
E.R. ventilators	Sailor
Air conditioning	Heinen & Hopman
Silencers	Discom
Electrical system	Gebhard
Gen.set engines, Generators	Caterpillar
Automation	Praxis
Capstan, Anchor/towing winch	Kraaijeveld
Life rafts	Viking
Epirb, Sart	Jotron
Control air compressors	Rexroth
Fire fighting engine	Caterpillar
Fire fighting pump	SIHI
Monitor, Central FiFi installation	Ajax de Boer
Floating floors accommodation	Bolidt
Ceilings in wheelhouse and messroom	Dampa
Searchlight	Seematz
Compass	Observator
Gyro compass, Autopilot	Litton
VHF radio telephone	Sailor
VHF Handheld	Jotron
Radar SSB, Navtex, GPS, Echo Sounder	Furuno

Damen ASD Tug 2411 tank capacities (98%):

Fuel	74.8 cu. m.
Lubricating oil	4.8 cu. m.
Dirty oil	2.9 cu. m.
Potable water	7.5 cu. m.
Bilge water	1.9 cu. m.
Sewage	2.9 cu. m.
Foam	5.7 cu. m.
Dispersant	2.9 cu. m.
Water ballast	15.4 cu. m.

VT Halter Marine to Conduct MarAd Study

VT Halter Marine Inc. will partner with the U.S. Department of Transportation — Maritime Administration to conduct a feasibility study for the design and manufacture of a dual-use vessel. A dual-use vessel is one that has both commercial and military applications. The four-part study has an estimated cost of $1,224,680, which VTHM will share on a 50/50 basis with the government. It will take approximately 26 weeks to complete the project.

OMI Pleads Guilty to Illegal Dump, To Pay $4.2M Fine

The U.S. Department of Justice said that OMI Corporation pleaded guilty to preparing false documents in an effort to cover up the illegal dumping of thousands of gallons of waste oil and sludge at sea. OMI also agreed to pay a $4.2 million fine and serve three years probation. A ship captain and chief engineer previously pled guilty in connection with the case. The ship involved in the case, the Motor Tanker Guadalupe, owned and operated by wholly owned subsidiaries of OMI Corporation, made port calls in the U.S., Europe, the Caribbean and Latin America. Ships such as the Guadalupe generate waste oil and sludge in the process of purifying the heavy fuel oil that is used to power the ship. Like other ships, the Guadalupe was equipped with a system for processing this waste oil and sludge. Under this system, the waste oil and sludge is supposed to be burned in an on-board incinerator or off-loaded to shore or barge disposal facilities, Christie said.

In addition, the Guadalupe was equipped with an oily water separator system designed to process oily water that collects in lowermost compartments of the ship.

The clean water is discharged into the sea, but the oily bilge water is supposed to be sent to the system for processing waste oil and sludge. Under U.S. law, ships such as the Guadalupe that enter U.S. waters are required to maintain an Oil Record Book relating to the handling of oil produced in the engine room.

OMI admitted to Judge Hayden that, from around May to September of 2001, a chief engineer authorized ship engineers to bypass the incinerator and oily-water separator system on the Guadalupe, discharging waste oil, sludge and oily-water mixtures directly into the high seas. In an effort to conceal these oil discharges, false and fraudulent entries were made in the Oil Record Book relating to the handling and discharge of the waste oil.

On September 10, 2001, the U.S. Coast Guard and the Environmental Protection Agency boarded the ship in the Port of Carteret to conduct an inspection, and were presented with the false Oil Record Book, OMI admitted. In addition, once he learned that discharges had taken place, the Captain of the ship participated in efforts to cover up what had happened, OMI admitted.

UAE Shipbuilder Wins $500M in Contracts

A United Arab Emirates shipbuilding company has won a $500m contract from the Gulf Arab state's navy to build six warships using French technology. Abu Dhabi Ship Building (ADSB) said that the corvettes, known as the Baynunah Class, will be 70 m long and equipped with combat systems includ-

ing missiles. Two of the vessels under the contract are optional. The ships are designed by French shipbuilder Constructions Mecaniques de Normandie and the first vessel will be built in France, one of the UAE's main arms suppliers.

Teekay Orders Aframax Tankers

Teekay Shipping entered two agreements to construct a total of six 105,000 dwt high specification Aframax tanker newbuildings. Four conventional Aframax tankers and two purpose-built lightering ships have been ordered from Hyundai Heavy Industries and Tsuneishi Corporation, respectively. The aggregate cost of these vessels is approximately $260 million, including construction supervision costs and capitalized interest. IHC Caland Logs $100M New Business

IHC Caland reported that it had won new orders recently worth more than $100 million and would continue to meet its banking covenants. J.P. Morgan had said in October that IHC's high gearing implied the risk of a possible breach of its debt covenants. The group, whose main activity is building and operating floating production and storage platforms (FPSOs) for oil companies, also said on Tuesday that U.S. oil major Exxon Mobil Corp. would keep one of its FPSOs on a long-term lease rather than buying it as initially planned. Meanwhile, a new FPSO has started production for Exxon Mobil offshore Angola. With this new unit, IHC subsidiary SBM now has 13 FPSOs under lease and operating contracts with three new ones under construction, the company said.

Ground Broken on 'World's Largest Shipyard'

A Chinese shipbuilding company has broken ground on what it says will be the world's biggest shipyard, a high-tech facility capable of producing cruise ships and natural gas tankers, sources inside China and wire services reported. The yard, being built on an island at the mouth of the Yangtze river, will reportedly feature seven construction docks along a five-mile stretch of coastline. Due for completion in 2015, the yard will be designed to produce a total of 12 million dwt of ships per year. The new yard is being built by the China State Shipbuilding Corp., which incorporates 25 large- and medium-sized shipyards. The group currently produces tankers and container ships, as well as warships and submarines for China's navy, according to its web site.

Wärtsilä to Discontinue Production in Turku

The second part of Wartsila's business analysis, started last autumn, has now been finalized. In addition to reductions in capacity already decided, the company also plans to discontinue engine manufacture at its Turku factory. The manufacture of large engines will be centered at Trieste, Italy. Under this plan the Turku unit will concentrate on service and maintenance. The Trieste factory, the Group's largest in size, is equipped to manufacture a number of products simultaneously. The factory has already acted as a back-up manufacturing facility for the Wartsila 46 engine and it has experience of producing several different engine types. Engines previously manufactured at Wartsila's factory in the Netherlands were recently added to the Trieste Factory's production program. With respect to gas engines, a central factor in the decision was the direct availability of gas from a gas pipeline in the Trieste factory. Production and R&D activities at Wartsila's Vaasa factory in Finland will continue in their present form.

SHIIPBUILDING

China Preps To Take World Lead

Rapidly rising prices for steel plate in China may be taking the edge off the financial performance at some Chinese shipbuilders. But it will take a lot more than that to undermine shipyards' dramatic expansion plans aimed at ensuring the country's builders produce more ships than any other nation by 2015. In the short run, however, the country's relatively inexperienced builders seem to have failed to read the steel supply signs. They have found themselves caught out by a number of factors driving up ship steel prices. These have risen by almost 60% over the last 30 months or so and now stand close to $400 a ton.

On the one hand, soaring steel demand in other sectors of the Chinese economy has left the country's steel producers with a choice of market outlets — wide steel plate used in the shipbuilding industry is not its product of choice. Meanwhile, shipyard marketing teams were very successful during 2003 in booking large numbers of export contracts at prices significantly below those prevailing in South Korea and Japan. And furthermore, Chinese demand for iron ore and coal is rising so fast that foreign suppliers have negotiated hefty increases in supply contract prices from early this year. Steel prices in China are likely to rise further, some analysts believe.

Despite past criticism for a lack of expertise in more sophisticated ship types, a tendency to cut corners resulting in reduced quality and a liability for delays, Chinese shipbuilders have now won a serious following amongst international shipowners. And the proof of the pudding, as the saying goes, is in the eating. International owners would not return to build ships in China if they were dissatisfied with the product. In exchange for lower prices, many owners are quite prepared, and indeed expect to pay more for their technical personnel to monitor and supervise during the construction process. And, some say, there is more flexibility at production level in Chinese yards than at some other Asian builder. Technical types maintain that negotiating any adjustments to ship specifications is not as difficult in China, and certainly doesn't cost as much as it would in one of the world's principal building yards in South Korea, for example. A quick analysis of the ownership of ships currently under construction at Chinese yards reads like a who's who of world shipping, or at least of German shipping. Amongst other international names are Bernard Schulte, Bockstiegel, A.P. Moller, Torm, Stena Bulk, Bocimar, D'Amato, Egon Oldendorff, Peter Dohle, Rickmers, Schoeller Holdings, Leonhardt & Blumberg, Nordeutsche Vermogen, Everard & Sons, Briese Schiffahrts and Hermann Buss. Norden, Nomikos, Van Ommeren, NYK, MOL, Thenamaris, Wah Kwong and Graig are also on the list. There are now more than 25 shipyards building ocean-going tonnage, and many other smaller facilities engaged in the construction of small specialised craft such as dredgers, cable layers, supply vessels and survey ships.

But Chinese builders are focusing on gearing up to build market share in tankers, bulkers and container vessels. The National Iranian Tanker Company is amongst other owners building VLCCs at Dalian New Shipbuilding whilst China Shipping Group has at least a dozen large container ships contracted at Hudong Zonghua. This Shanghai facility has an orderbook of some 50 ocean-going vessels, the largest being two Aframax tankers for Vancouver-based Valles Steamship. Meanwhile Shanghai Waigaoqiao has 12 Capesize on its books for owners including Bocimar and Cardiff Marine, together with a further seven 105,000 dwt Aframax tankers.

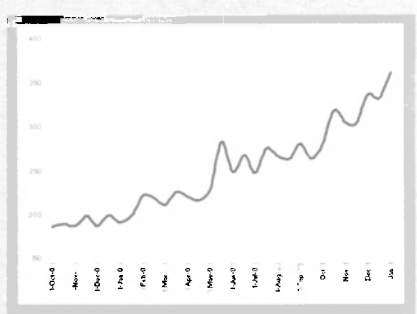
As the Chinese shipbuilding dream becomes a reality in the months ahead, management systems constitute a key challenge. Already some of the leading yards are linking pay rates to efficiency, productivity and quality. But as more ships are completed under the watchful eyes of foreign supervisors, shipyards elsewhere in Asia would do well to keep their eye on the young shipbuilding dragon.

Secondhand Prices

Recent Ship Sales

Vessel	Type	DWT	YB	Price
Cosmar	Bulker	44415	89	5.3
Ocean Rainbow	Bulker	45585	96	18.5
Almavita	Bulker	45798	85	8.2
San Paolo	Bulker	46000	95	18.5
Faviola	Bulker	62343	82	8.6
Frose	Bulker	63212	81	4.7
North King	Bulker	69421	88	12
Moleson	Bulker	73000	98	28
Eleni	Bulker	73000	96	26.5
Andhika Lourdes	Bulker	73000	97	16.7
Bariloche	Bulker	73000	99	29
Samarinda	Bulker	149000	94	32.5
Gladiator	Bulker	150000	83	18
Philippe Ld	Bulker	169000	99	41.4
Alpha Intelligence	Tanker	40000	82	4
Princess Marisol	Tanker	82006	81	5.5
Bornes	Tanker	88950	90	15.8
World Kindred	Tanker	104707	2003	45
World Kronos	Tanker	110000	2003	45
Geres	Tanker	142000	89	20
Poros	Tanker	150000	2002	49.5
Solviken	Tanker	152378	89	18
Kronviken	Tanker	152835	88	18
Nichiryu	Tanker	249037	91	18.5
New Stork	Tanker	264000	87	19.5
Ocean Guardian	Tanker	290927	93	50
World Creation	Tanker	298324	98	75
Sea Forturne	Tanker	298500	2003	72
Maersk Eleo	Tanker	299000	92	47
Maersk Estelle	Tanker	299000	94	49
Poros	Tanker	300000	2002	85
World Crest	Tanker	305795	2002	85

Compiled by Shipping Intelligence (NY), tel: (212) 997-0966, tracks the sale prices of secondhand bulk carriers and tankers.



Secondhand Prices

Tanker Prices Up 35%

Spiraling secondhand tanker prices, a buoyant charter market, and positive sentiment on the tanker market's future fortunes could mean a shortage of potential conversion candidates for FPSO projects in the months ahead. Clarkson's 5-year-old tanker price index showed a 35% rise year on year in December and tanker prices have continued upwards over the first two weeks of this year. With as many as 60 likely FPSO conversions needed over the next five years, this niche sector represents a significant source of business for a number of repair yards, particularly Keppel, Sembawang and Jurong in Singapore. Although there are a significant number of single-hull tankers due to be phased out in the next few years - and there are as yet no requirements for FPSO conversions to be double-hulled - tanker owners are expected to keep their ships in the current market for as long as possible. Tanker demand is rising, shipyards are full and owners are likely to make a healthy return on tanker trading over the next 12-24 months. An added difficulty for those contemplating FPSO conversions is the long lead-time. In order to tender for FPSO projects, offshore contractors are usually expected to submit their bids some 18-24 months before "first oil" is produced. As FPSO conversions do not usually take more than nine months, tonnage has to be identified in advance and effectively committed to a project. Not surprisingly, tanker owners expect to be paid a significant premium for this.

Offshore Service Vessels

Leevac Delivers for Hornbeck

Hornbeck Offshore Services has taken delivery of the HOS Silverstar from Leevac Industries, LLC. Silverstar' measures 240 x 54 x 19-ft., and its the latest of the HOS "New Breed", a design that has been uniquely engineered to offer numerous advantages over existing tonnage. The unique hull form assists in making the HOS Silverstar a very DP-capable and fuel-efficient vessel. It is certified to both USCG Subchapter L (OSV) and I (Freight and Industrial Service) and is fully SOLAS certified for international operation. The American Bureau of Shipping has classed the vessel as +A1, +AMS, +ACC, DPS?2, Offshore Support, Oceans.

Two Caterpillar 3516 B main engines produce 4,000 bhp, which drive two 96-in. CP propellers. The vessel's deadweight of 2,758 long tons can be offloaded with state-of-the-art pumping systems featuring positive displacement pumps.

Wijsmuller Ship Delivery To Continue As Redwise

Wijsmuller Bros. has become an independent company as of January 1, 2004. A management buy-out enables Wijsmuller Bros. to separate from SvitzerWijsmuller of Copenhagen, the holding company of the formerly Dutch Wijsmuller Group. The activities of Wijsmuller Bros. will be continued under the name of Redwise Maritime Services. Redwise' activities were the roots of the renowned Dutch Wijsmuller Group, which in 2001 was acquired by Svitzer of Denmark. The Wijsmuller name is associated world-wide with towage and salvage, but in early years it started with ship delivery.

Ribcraft Signs Contracts with USCG, USAF

Ribcraft recently won contracts to supply boats for the U.S. Guard (USCG) and the U.S. Air Force (USAF). The USAF contract is significant, as it is for the company's new Mitigator 7.8 m boat. The Mitigator will be used in conjunction with the Air Force's Para Rescue activities along the Florida coastline, by the Patrick Air Force Base Para Rescue team, who will use it for near shore rescue and recovery operations for the airfields and occasional space launches. For USCG, Ribcraft will supply several customized Ribcraft 19 ft. (5.85 m) RIBs to the Coast Guard for peacekeeping missions and patrols overseas. Fully equipped with diesel inboard engines, these boats are capable of speeds in excess of 35 miles per hour with a capacity of more than six people. The 19-ft. Ribcraft 5.85 offers increased maneuverability, functionality, and can easily be transported by land, air and sea. Ribcraft offers RIBs ranging in size from 15 to 26 ft.

Circle 19 on Reader Service Card

First ME Engine Built in Japan by Hitachi Zosen

The first ME engine to be built in Japan, a 6S50ME-C, has been completed by Hitachi Zosen Corp. The order was placed by Naikai Zosen for Nissho Shipping. The engine was recently presented to the guests at a ceremony at Hitachi Zosen. This engine is destined as the main propulsion engine for a product carrier. The invited audience of over 200 people, included owners, operators, yard personnel and business partners, noted that the engine was very quiet and produced very few vibrations.

Circle 20 on Reader Service Card

Technical specifications for 6S50ME-C
Output ..... 9,480 kW (12,900 BHP)
Engine speed ..... 127 rpm
Weight approx. ..... 207 tons (dry mass)

Brittany Ferries, Telenor Sign Agreement

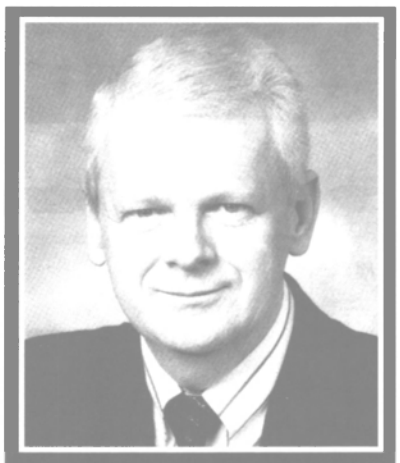
Telenor Satellite Services last month reported that it had signed a three-year agreement with Brittany Ferries to provide high-speed data communications via satellite.

Telenor will provide Ku-Band service for two Brittany vessels, the Val de Loire and Brittany's newest vessel the Pont Aven, with an option to install as many as six additional Sealink systems for the rest of the company's ferry fleet.

Operating at speeds up to 192 kbits per second, Telenor's Sealink service provides high-speed data communications. The system now installed aboard the Val de Loire and early in 2004 aboard the new Pont Aven offers one of the industry's most advanced shipboard satellite communications solutions available today complete with the highest reliability for the maritime community.

Circle 22 on Reader Service Card

Continuous Synopsis Record



Dennis L. Bryant, Senior Maritime Counsel at the law firm of Holland & Knight, Washington, D.C., is a contributing editor of MR/EN.

One of the numerous provisions in the December 2002 amendments to the International Convention on the Safety of Life at Sea (SOLAS Convention) requires ships subject to the Convention to maintain a continuous synopsis record as of July 1, 2004. All is not going smoothly though. Owners and operators should prepare to take individual action prior to the deadline.

The continuous synopsis record is intended to provide an on-board record of the history of the ship. The record is to be issued by the flag administration and is to contain:

a. The name of the nation whose flag the ship is entitled to fly;
b. The date on which the ship was registered with that nation;
c. The ship s identification number;
d. The name of the ship;
e. The port at which the ship is registered;
f. The name(s) of the registered owner(s) and their address(es);
g. The name(s) of the registered bareboat charterer(s) and their address(es), if applicable;
h. The name of the company for purposes of the International Safety Management (ISM) Code, along with its address and the address from which it carries out its safety-management activities;
i. The name of all classification societies with which the ship is classed;
j. The name of the administration, contracting government, or recognized organization that issued, under the ISM Code, the Document of Compliance to the company operating the ship and the name of the body that conducted the audit on which the Document was based;
k. The name of the administration, contracting government, or recognized organization that issued, under the ISM Code, the Safety Management Certificate to the ship and the name of the body that conducted the audit on which the Certificate was based;
l. The name of the administration, contracting government, or recognized security organization that issued, under the International Ship and Port Facility Security (ISPS) Code, the International Ship Security Certificate (ISSC) to the ship and the name of the body that conducted the verification on which the ISSC was based; and
m. The date on which the ship ceased to be registered with that nation.

Any changes relating to entries in the continuous synopsis record are to be made by the flag administration within three months and provided to the ship so that the information remains current. In the interim, until the revisions issued by the flag administration have been received, the company or the master may be authorized and required to amend the continuous synopsis record to reflect the changes. In such cases, the company is to, without delay, inform the flag administration of the amendments.

The continuous synopsis record is to be in English, French, or Spanish, as well as the official language of the flag administration. The record is to be maintained in the format developed by the IMO and maintained in accordance with IMO guidelines. Entries may not be deleted, modified, erased, or defaced. The record is to remain on board the ship when it is transferred to another flag, sold to a new owner (or taken over by a new bareboat charterer), or when another company assumes responsibility for operation of the ship.

When the ship is to be transferred to the flag of another nation, the company is to notify the current flag administration so that it can forward to the new flag administration a copy of the current continuous synopsis record. The new flag administration is to append the old continuous synopsis record to the new one that it issues to the ship.

The continuous synopsis record is to be kept on board the ship and made available for inspection by government officials at all times.

Like the ISPS Code and related maritime security measures, this requirement is a large undertaking and little time is afforded for its implementation. The IMO has yet to officially issue a format in which the record is to be developed, nor has it issued guidelines explaining how the record is to be maintained. Few, if any, flag administrations have yet issued their own guidance, although the Netherlands has developed an application form. Otherwise, flag administrations have not established procedures for collection of information required to be in the continuous synopsis record that is not already routinely collected and maintained.

The U.S. Coast Guard has stated that it will comply with the IMO format once it has been adopted. The agency intends to issue a continuous synopsis record before July 2004. The currency of the information will be based primarily on the information provided by the owner or operator. The Coast Guard goes on to state that sanctions can be imposed for any inaccurate infor-

mation provided by the owner or operator. In other words, the various flag administrations are waiting for the IMO to act — and the IMO has its hands full handling a multitude of maritime security issues as well as responding to demands of various member nations for accelerated phase-out of single hull tankers and its other marine safety work.

Meanwhile, the U.S. Coast Guard has issued guidance to its field offices telling boarding officers, as of July 1, 2004, to review the continuous synopsis records and compare the information with that supplied in the advance notice of arrival. The information is also to be compared with that found on other documents, such as the Passenger Ship Safety Certificate, the Cargo Ship Safety Construction Certificate, and the International Oil Pollution Prevention Certificate (IOPPC).

If the ship arrives off a U.S. port on or after July 1, 2004 without a continuous synopsis record or with one that is clearly inadequate, one should expect the U.S. Coast Guard to deny entry. If the deficiency is not discovered before the ship arrives in port, one should expect to Coast Guard to expel the ship until the record is provided or, at a minimum, isolate the ship and prevent all cargo and passenger operations until the record is provided.

This puts the ship owner and operator in a difficult position. The ship needs a continuous synopsis record in order to operate, but it can only obtain an official continuous synopsis record from the flag administration, which is waiting for further guidance from the IMO.

Rather than continuing to engage in a useless finger-pointing exercise, it is strongly recommended that ship owners and operators develop their own continuous synopsis record for each of their ships. This will serve two important purposes. First, it will consolidate in one location all the information that flag administrations will eventually demand of owners and operators (probably on short notice). Second, it will be available on the ship during the inevitable period between July 1, 2004 and whatever date the official continuous synopsis record is actually received from the flag administration.

The concept behind the continuous synopsis record originated with concerns about substandard shipping and efforts to improve transparency. Following the 2001 terrorist attacks, its value as a security measure was recognized.

The concept of the continuous synopsis record is sound. It includes relevant information that should be consolidated in one location and that should also be available to the flag administration and port state control officials. The execution of the requirement has, to date, been lacking.

The IMO set for itself and for flag administrations a highly ambitious deadline that now looks impossible. Owners and operators should be prepared for some bumps in the road as this measure comes into effect.

Federal Ballast Water Demonstration Project

The U.S. Maritime Administration (MarAd), the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Fish and Wildlife Service (the Service) have announced for the second time since the inception of the program in 2002 a Ballast Water Technology Demonstration Program grants competition for 2004. It was announced in the Federal Register (69 FR 2577, Jan 16, 2004). Like the 2002 competition, NOAA and the Service expect to offer federal assistance grants to successful applicants. MarAd expects to offer the use of several of its vessels as test platforms, subject to availability.

The 2004 competition contains two stages of proposals. It begins with a call for brief preliminary proposals, which must be received on or before February 13, 2004. Full proposals will be due on February 17, 2004. Preliminary proposals will not be subjected to a selection process, but will be used to assist in the preparation for the full proposal competition. Only investigators who submit a preliminary proposal will be eligible to submit a full proposal.

In addition to the requirement for preliminary proposals, the 2004 competition will differ from the 2002 competition in several ways:

- Proposals will be divided into program areas based on the level of technology development;
- Funding limits for individual proposals will be based on these program areas;
- Proposals will be required to include a discussion of the long term development necessary to transition the technology to a viable commercial product; and
- Under certain conditions, proposals to demonstrate technologies that have been submitted to the Coast Guard for approval under 16 U.S.C. 4711(b)(1) for experimental shipboard installation may receive a programmatic preference.

A 3D Virtual Interface to Access Ship Data

By Stephen J. Baum and Ted L. Briggs

Individuals across the shipbuilding enterprise depend on Web access and availability of digital ship data to perform their daily duties. As increasingly larger quantities of ship data become available digitally, the end user often finds it difficult to locate the required data for several reasons. First, it is difficult for the causal user to quickly and easily navigate through volumes of data to find what is of importance. Simple keyword searches based on textual queries are often frustrating and are regularly unsuccessful due to the lack of data standardization.

Second, data tends to be distributed across a number of disparate data systems that typically do not communicate or interoperate and are often "out of sync." The user must then log into each data system individually, retrieve the data, and then manually integrate and validate the data. A 3-D graphical interface can provide a simple, intuitive method to assimilate and access data. This is particularly true for an interface based upon a first-person perspective (FPP), in which the user can virtually navigate throughout a ship and retrieve information about equipment and components from multiple data systems. This type of interface is called a virtual interface. This 3D virtual interface is intuitive and easy to use, especially for a generation of users already familiar with gaming interfaces.

myShipVI

Intergraph has developed a general-purpose, Web-based 3D interactive virtual interface for ship data called myShipVI™, which is based on a FPP and runs on off-the-shelf hardware and software. It is built on a graphic-rendering engine designed to support simulation and gaming. The 3D graphic interface enables a user to tour a virtual ship while providing access to the latest data from a variety of sources.

myShipVI is different than traditional modeling and simulation tools in that it is optimized to execute on a standard desktop or laptop, running well on a minimum of a single 700 MHz processor and 512 MB RAM.

The original concept for a 3D virtual interface was an application that would allow users to be virtually placed in a 3D ship environment where all of the significant equipment is loaded and easily identifiable, just as they are on a physical ship. The display engine needed to offer simple navigation skills and allow the user to interactively touch items to retrieve pertinent related information.

The primary overall objective of the initial 3D virtual interface was to make the shipboard data more accessible, intuitive, functional, and easier to use. Moreover, in addition to the realism, users benefit from a tool that provides familiarization training and aids in the personnel certification process. This application can familiarize users with the vessel before it is built.

Technical Challenges

Performance is vital to the success of a 3D virtual interface. The user must be able to walk smoothly throughout the ship. However, the size of the data associated with a ship, both graphics and static data, cannot be held in memory. Hence, myShipVI adopted a strategy to load/unload models and product tree data as a user moves throughout the ship. The result is minimal waiting time as the interface loads new graphics and product trees.

Other technical challenges myShipVI faced was developing an automated process to extract and validate graphics and attributes from CAD models. Errors are often a result of the translation process, such as equipment with the wrong orientation. However, the translation process also uncovers errors in the original CAD model. Intergraph used three key automation improvements - automatic thinning, surface processing, and automated CAD model updates - to greatly improve translation efficiency.

Also challenging was the difference in the level of detail between CAD files and walkthroughs. Walkthroughs may require greater detail than what is modeled in the CAD file. A piece of equipment may be modeled with minimal detail in the CAD system since the CAD user is concerned primarily with size, shape, and connectivity to electrical, HVAC, and piping systems. Bitmaps can be added to a piece of equipment to add realism and show aspects not included in a CAD model.

Functionality

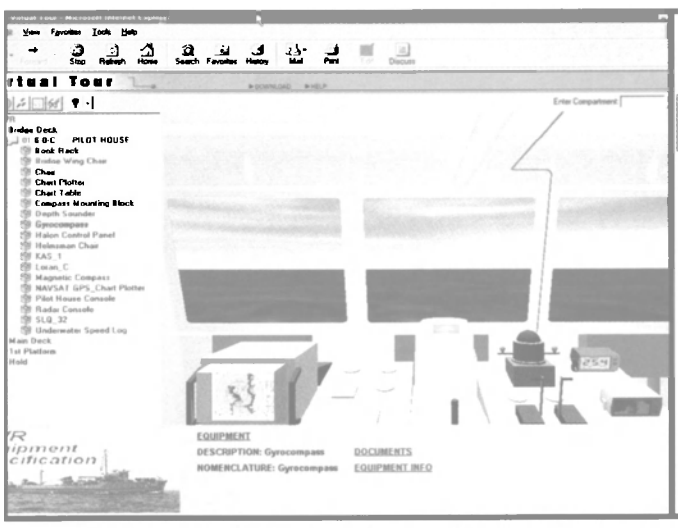
Upon entering myShipVI, users view the ship from a distance. Bitmaps are used for the sky and water to enhance the realism. The 3D virtual ship model is geometrically accurate, having been extracted from the 3D CAD models used to design the ship.

The myShipVI user interface was designed to give the user multiple alternative methods to locate compartments, select a piece of equipment or component, and retrieve data. The user can navigate with a tree view located in the left hand user access area and obtain a logical breakdown of the ship/deck/compartment/part structure. Using the ribbon bar, users can go directly to a specific compartment or graphically navigate using an overlay method to drill down to a specific deck, compartment, system, or component. The Info Pane at the bottom of the interface gives feedback on the user's location and displays data about a selected component. Once in a compartment, all equipment and components are visible as the user walks around. Each functionally significant part is visible and selectable for retrieving pertinent data. Users can selectively hide or make transparent classes of objects, including structure, ship plating, piping, HVAC, wireways, and equipment. This feature allows users to see objects that otherwise are hidden to the user.

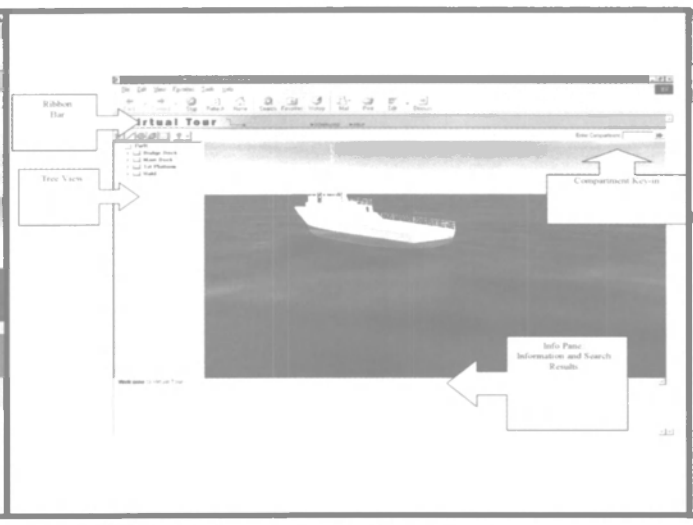
Implementation

Users implement myShipVI using Intergraph core software, Virtual Interface™ (myVI™) and Interoperability Framework™ (myI/F™), which has widespread applicability to many different domains, including ships, buildings, and airframes. myVI is built on a real-time graphic-rendering engine that utilizes texture-mapped polygons for performance. myI/F provides user and application clients, such as myShipVI, a single point of access to integrated data from multiple data and information systems and repositories. It provides a scalable, extensible architecture in which applications interoperate using a common conceptual data schema. It also exposes legacy systems as Web applications and provides an integrated view of data from multiple systems using a Web browser.

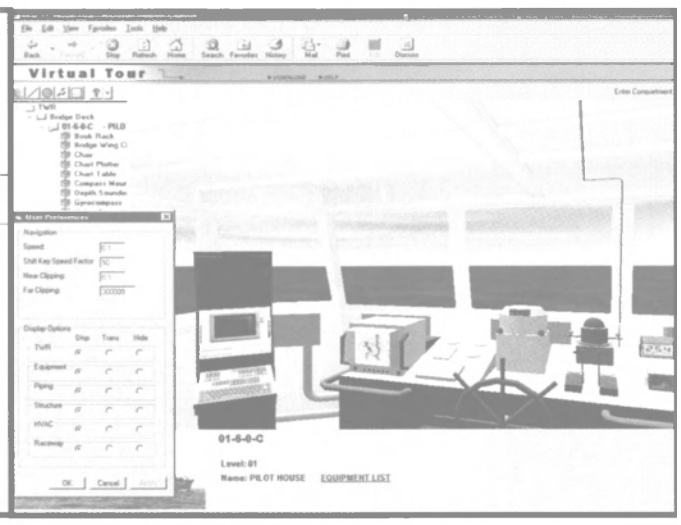
The Intergraph family of 3D virtual interfaces is built on 3DLinXä, a real-time graphic rendering engine and development tool from Global Majic. This rendering engine is designed for use with off-the-shelf PCs running MS Windows. 3DLinX utilizes OpenGL graphics acceleration and supports the importing of several graphics file formats - Wavefront OBJ, OpenFlight, 3D Studio, and Centric DWB.



Intergraph 3D Virtual Interface: myShipVI™



myShipVI initial view and user interface elements



myShipVI display options

MAN B&W Debuts ME-GI Dual Fuel Engine

MAN B&W Diesel A/S launched the ME-GI engine, a range designed for the LNG carrier market. The ME-GI design combines with the developments in the latest electronically controlled ME engines. "The LNG carrier market, like all sectors of the transportation industry, needs to control and, where possible, reduce operational expenses, while securing sound profit. We see many new opportunities in this area for cost-down solutions permitted by the increased flexibility and greater control with the ME-GI engine," Vice President of Two-Stroke Sales, Ole Grøne, said. "Among the many proposals and ideas for LNG carrier propulsion the ME-GI, also installed with reliquefaction technology, where preferred, provides the best solution for the future needs of the LNG transportation market."

Traditionally, LNG carriers have been driven by steam turbines that are fed from boilers fired by the boil off gas, supported by heavy fuel oil. Responding to a market demand for more efficient engines, while retaining the option to burn the boil off gas, MAN B&W is reintroducing its high pressure gas injection low speed diesels - now in electronically controlled execution. Designated ME-GI, this gas burning option is being offered in parallel to the heavy fuel-burning solution with gas reliquefaction.

The combination of the ME-GI engine, installed with a reliquefaction plant, allows the owners and operators the choice to either use the boil off gas in the engine or to reliquefy the gas and use HFO instead.

Out of all the options for the prime mover, the low speed two stroke diesel engine, according to MAN B&W, gives the best thermal efficiency for any conventional propulsion system. This is especially the case for LNG carriers, where the power requirement is around 30 to 40 MW.

Thermal efficiencies of around 50 percent for diesel engines exceed the 30 percent offered by steam turbines and any other combination alternatives. The ME-GI dual fuel enhanced engine control and monitoring systems enable the latest ME technical developments to be applied to the LNG carriers. The precise timing and combustion rate shaping gained through the use of the electronic control of injection and exhaust valves produce greater control at any load.

The ME-GI dual fuel engine builds on the experience gained from the MC-GI dual fuel engine. A 12K80MC-GI-S engine has been in operation in the Chiba power plant (Japan) since the Summer of 1994.

The reliquefaction technology that is proposed as an additional feature to allow the sale of more gas is state-of-the-art technology. It is well known in the process industry and is derived from the numerous reliquefaction units installed on LPG ships. The ME engine range has proved to be very successful since its introduction. The first ME engine was put into service on the 37,500 dwt chemical tanker M/T Bow Cecil (Odfjell, Norway).

Circle 7 on Reader Service Card

Rebuilding Single Hull Tan

We first visited Maritrans' double hull rebuild program in 1998 ("Great Ships of 1998- Maritrans is Making Waves") as the company delivered its first rebuilt double hull barge- the 23,000 DWT "Maritrans 192" (See Figure 1, opposite page).

Since then Maritrans has successfully rebuilt three similar size barges and is currently working on a fifth that includes a 60-ft. lengthening. Maritrans patented barge process was described in detail in our earlier article. As is shown in Figure 2, an inner bottom and double side is built upon the existing single hull structure. (Red is new and blue is existing.) New lower bulkheads are also constructed. The existing deck and upper bulkheads are returned in such a fashion as to create a raised trunk to retain the original cargo volume. Maritrans learned a great deal from its barge rebuild program in terms of pre-measurement, modularization, assembly process, and efficient detailing. Now the company is ready to apply these lessons to an even greater challenge: rebuilding tankers.

Maritrans has completed the contract design for double hull rebuild of its two diesel tankers, M/V Allegiance & M/V Perseverance. There are many similarities to the barge rebuild program, but also some important differences. The new inner bottom structure can be laid directly on top of the existing structure. The tanker internal structure is already high enough to meet the required spacing between hulls. On the barges, it is necessary to build up to get the necessary spacing between the hulls. The double sides are built on the outside (Figures 3 & 4 - See Illustrations on page 24).

For newer single hull MARPOL tankers (which are the most likely to be rebuilt), the cargo volume lost in the new inner bottom ballast tanks is more than offset by the gain in cargo volume by converting the existing segregated ballast tanks back to cargo (Figure 5).

The cost of the tanker rebuild process is a quarter to a third of the price of newbuilding that includes a generous allowance for upgrades

Let's look in more detail at the tanker rebuild process for which a patent is pending:

In Figure 6, brackets and portions of bulkhead are cut free. The brown colored parts will be modified and reused. The red colored parts can be discarded. For this study, access is from the side, but top access is a design option. Next, the new inner bottom plate is laid on top of the existing transverses. The panel stiffening is inside the cargo tank that eases assembly, but still results in far less obstructions in way of cargo than a single hull. In Figure 8, the inner bottom plating is completed, the modified brackets are re-installed, and a new corner piece is placed where the previous turn of the bilge was. Finally, the original turn of the bilge including the stiffening and bilge keel, is installed exactly two meters further outboard from its old position. The double side module is then installed above the relocated turn of the bilge. Figure 9 shows the side module installation and Figure 10 shows the completed newly double hull tanker midship section.

The cost of the tanker rebuild process is a quarter to a third of the price of newbuilding that includes a generous allowance for upgrades. Both OPA-90 and IMO

Let's Double Hull a Tanker, Easy as 1 ... 2 ... 3 ...

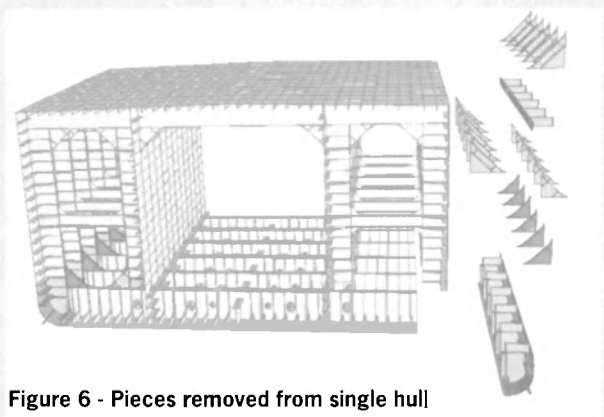


Figure 6 - Pieces removed from single hull

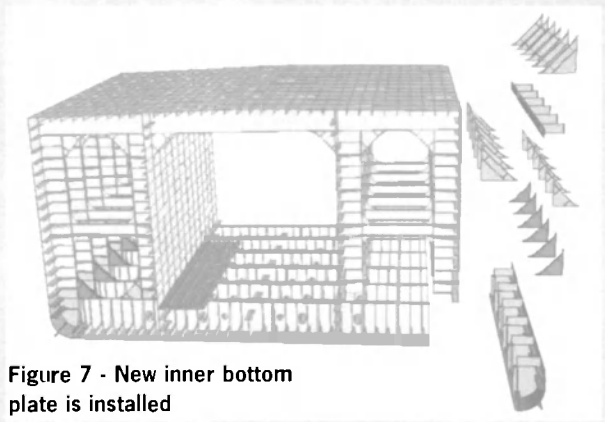


Figure 7 - New inner bottom plate is installed

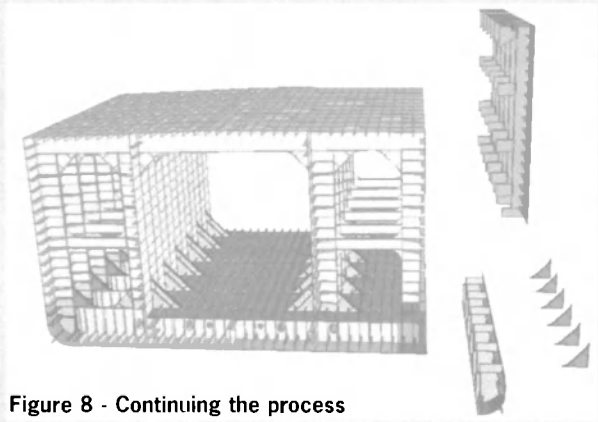


Figure 8 - Continuing the process

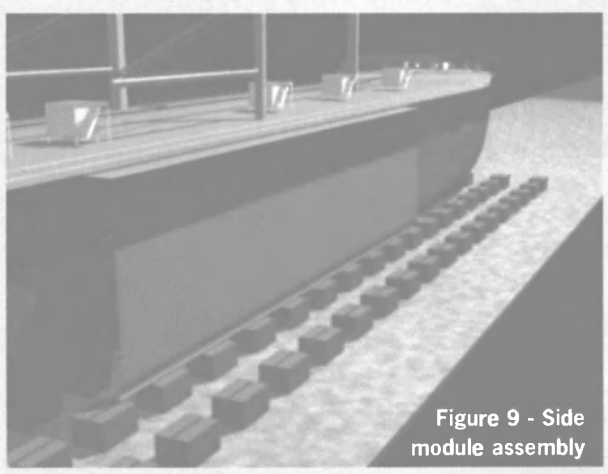


Figure 9 - Side module assembly

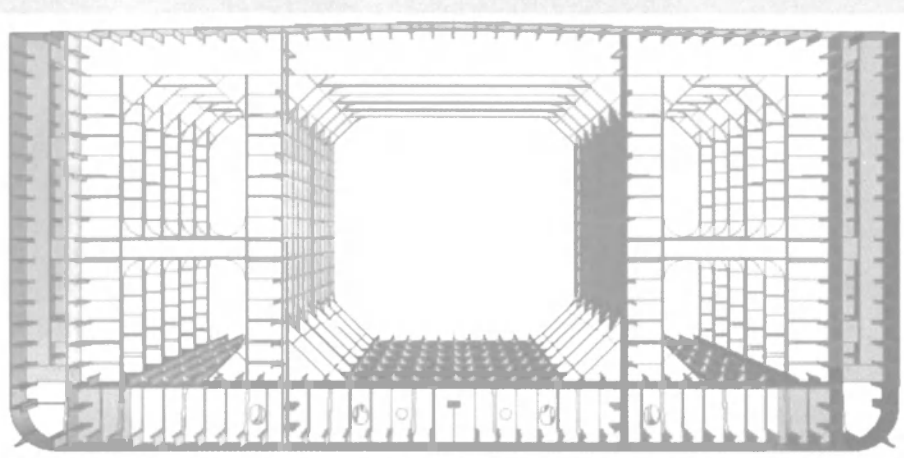


Figure 10 - Rebuild double hull midbody section

ers to Double Hull Tankers

Regulations specifically state that double hull rebuilding is not a major conversion. Therefore the owner's costs are much reduced compared to other conversion processes that increase the cargo volume. Because the added buoyancy exceeds the weight of new steel, the same weight of cargo can be carried at substantially less draft than before rebuild- a clear advantage in draft-limited service.

What about speed loss? Maritrans and Lloyd's Register have completed extensive hull modeling studies using Computational Fluid Dynamics (CFD) backed up by model basin testing. They have carefully designed fairing pieces for Maritrans' two vessels that hold the speed loss to only about one half knot.

As can be seen in Figure 13, Maritrans and Lloyd's Register were able to achieve remarkable correlation for the bow wave between model and CFD prediction. They also made major breakthroughs in resistance prediction, a problem for CFD in the past.

More detailed information on Maritrans/Lloyd's CFD work will be presented at the Royal Institute of Naval Architects forum on double hull design February 25-26, 2004, in London. Maritrans is working with partners overseas to license this tanker rebuild technology for other interested owners.

Circle 9 on Reader Service Card

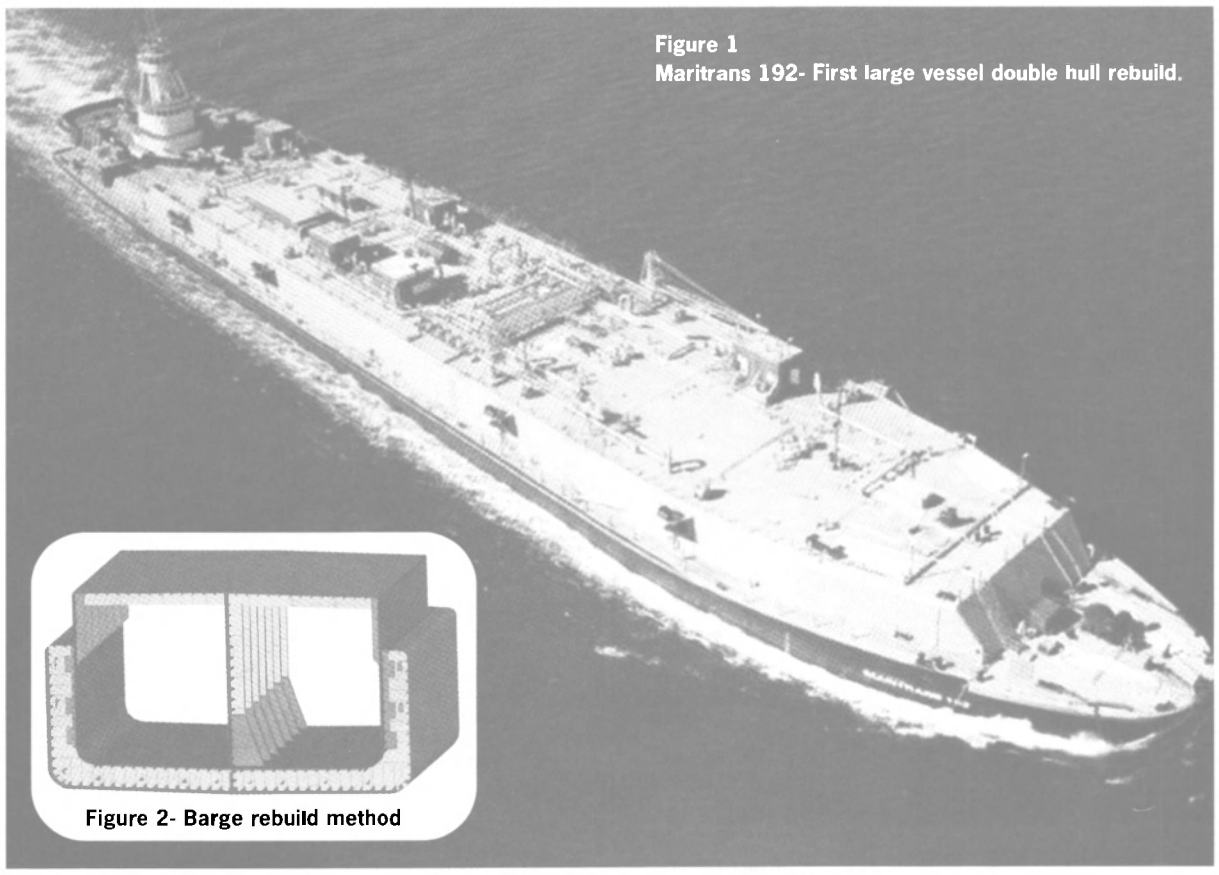


Figure 1
Maritrans 192- First large vessel double hull rebuild.

Figure 2- Barge rebuild method

Figure 3
Tanker before conversion

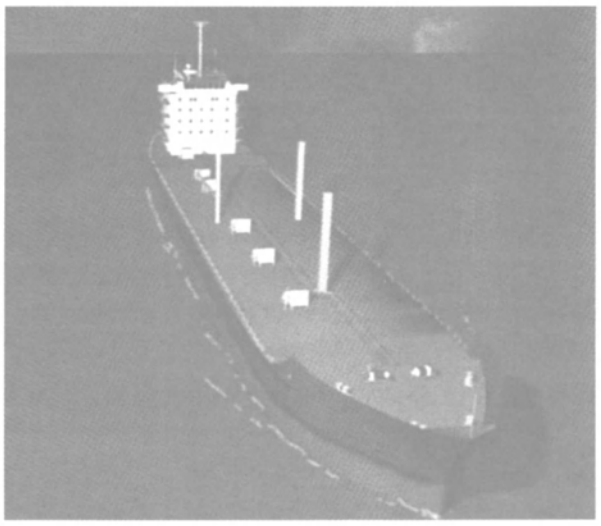


Figure 4
Tanker after conversion

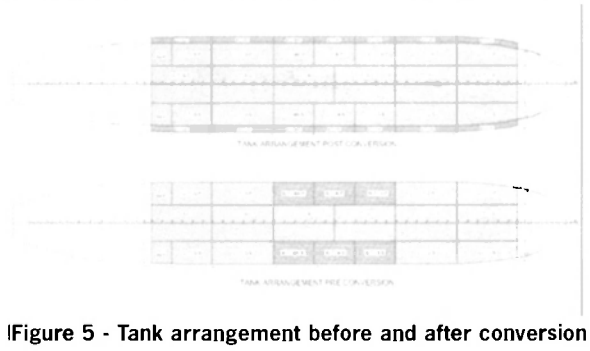


Figure 5 - Tank arrangement before and after conversion

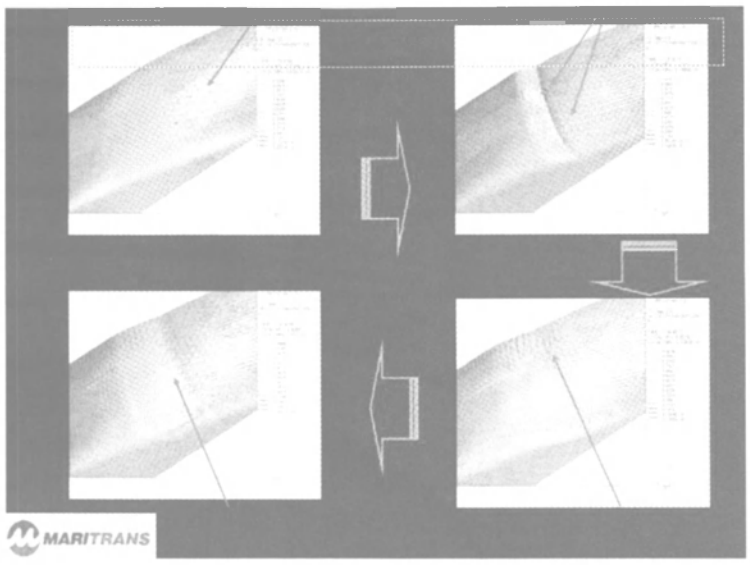


Figure 11 - Hull refinement using CFD flow models

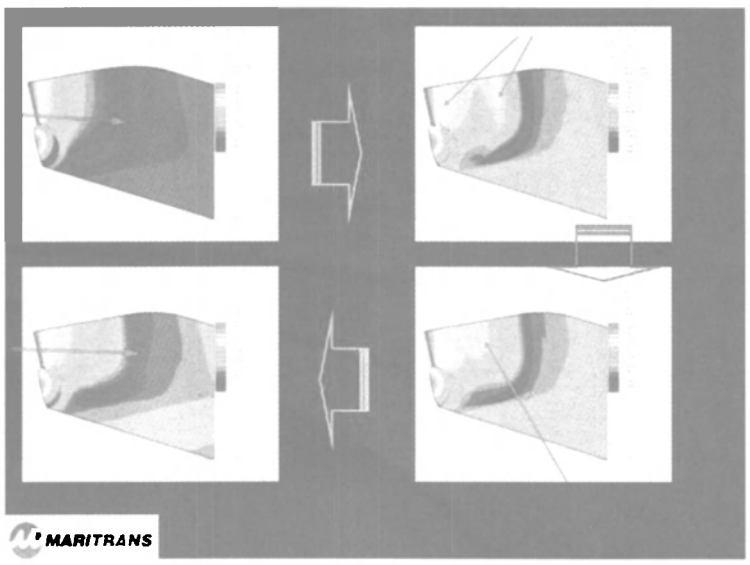


Figure 12 - Hull refinement using CFD pressure models

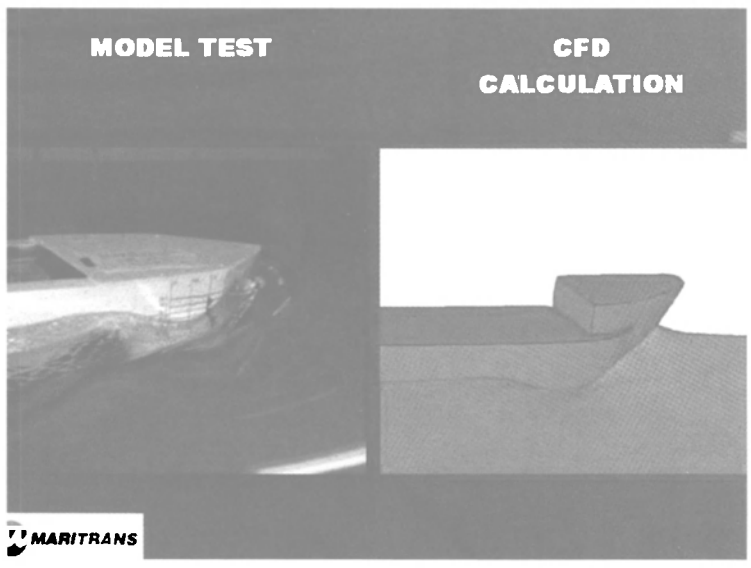


Figure 13 - Model test vs. CFD prediction of the bow wave

Far North Endeavor

Just under two years' hence, shipments of liquefied natural gas are due to start from a new terminal sited within the Arctic Circle in northern Norway. Huge volumes of gas drawn from the Snohvit field deep beneath the Barents Sea will be piped ashore to the Melkoya (Milk Island) liquefaction and export facilities near Hammerfest, for transportation to Spain and the USA by a newbuild series of LNG carriers of up to 147,000-cu. m. capacity. Snohvit is the largest-ever industrial project in Norway's Finnmark county, and the initial shipment contracts have a 20-year timespan.

Despite a location in the high latitudes at more than 70degN, the Melkoya terminal is in ice-free environs due to the benign influence of the Gulf Stream. Accordingly, the dedicated fleet of LNG tankers will not require ice-strengthening, although the robustness of the type is implicit in the design for a 40-year fatigue life in keeping with North Atlantic criteria.

K-Sea Acquires Integrated Tug Barge Unit

K-Sea Transportation Partners L.P. has acquired the 140,000 barrel capacity double-hulled barge S/R New York and the 8,000 h tugboat S/R Everett. This integrated tug barge unit, built in 2000, had been leased by SeaRiver Maritime, Inc., a subsidiary of Exxon Mobil Corporation, from a financial institution. The purchase price of $34 million was financed using available cash and $25 million in borrowings under a new term loan. The new equipment will begin working immediately and is expected to be accretive to K-Sea's distributable cash flow. K-Sea has also signed a new multi-year contract with SeaRiver to utilize the unit in Exxon Mobil's petroleum products transportation in the Northeast United States. The barge has been renamed DBL 140 and the tugboat has been renamed Lincoln Sea. The addition of this integrated tug barge represents a 5.8% increase to the current barrel-carrying capacity of the K-Sea fleet. By the end of 2004, after the phase-out of certain single-hulled vessels required by the Oil Pollution Act of 1990 and the completion of certain retrofitting projects on other existing vessels, K-Sea's fleet will be approximately 74% double-hulled.

Boosting Deepsea RoRo Capacity

A major new stage in the reorientation of the Wilh Wilhelmsen fleet has been implemented with the January 2004 arrival in China of the first of five Mark I deep-sea, combined RoRo container (ConRo) vessels for reconstruction. Five ships of the Tourcoing class, dating from 1978 and 1979, are to be rebuilt with a garage section on the weatherdeck providing capacity for about 1,800 cars. The program has been assigned to Chengxi Shipyard, and follows similar work undertaken on four other ConRos in 2002 and early 2003 by Nantong Ocean Ship Engineering.

The quintet of quarter-ramped vessels to be processed at Chengxi over the January-May period are jointly owned by Oslo-based Wilh Wilhelmsen and Wallenius Lines of Stockholm, and were built to transport heavy cargo and up to 1,800/1,900-TEU containers, with the flexibility also for factory-new cars, trucks and other vehicles and ro-ro freight. The very substantial container capacity on the weatherdeck will be supplanted by garaging encompassing five new car decks and the main deck level. The circa 1,800-car intake of the new area will optimize the vessels around the RoRo concept, and contribute to the further development of Wilh Wilhelmsen's car carrier business. The adaptation of each vessel is scheduled to take 45-50 days and cost $4.6-million.

MTS Rosette:

Jaap van de Guchte Senior stands on the port side half way up the ship's 110-m length. With hand signals, two fingers pointing aft, he directs the helmsman to move the precise two meters for alignment of the tanker's cargo manifolds and those on the BP refinery dock. This will be the first cargo for the new motor tank ship Rosette. It is owned by Jaap Sr. and his two sons. In the elevated wheel house aft one of those sons and the captain for this trip, Jaap Jr., watches as one of his crew stands at the futuristically styled control console, working the jog stick controls of the powerful diesel electric bow thruster he moves the ship aft until Jaap Sr's crossed arms signals, "All stop".

The boat's 2,000 hp Cummins QSK60 main engine has been showing 650 rpm idle on the digital read out. The mate touches the throttle and the digital monitor moves up to 1,150 rpm. The ship stop's almost instantly as her big 1.7-m propeller bites into the waters of Amsterdam's America Haven oil terminal.

Like her sister-ships, being finished at the Verka Shipyard near Dordrecht Holland, the Rosette's hull, with its 11.45-m beam, was built in two parts at the Centromost Shipyard in Poland. After launching, the fore and aft sections were joined to form a hull with 10 holds having a total volume of 3,785 cu. m. capable of holding about 2,900 tons of cargo. The hull, known as a Maxcube type, was then towed to the Verka Shipyards in Holland for completion. The third in a six-vessel series, the

The ship's console.

Photo: Alan Haig-Brown

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Despite a location in the high latitudes at more than 70degN, the Melkoya terminal is in ice-free environs due to the benign influence of the Gulf Stream. Accordingly, the dedicated fleet of LNG tankers will not require ice-strengthening, although the robustness of the type is implicit in the design for a 40-year fatigue life in keeping with North Atlantic criteria.

K-Sea Acquires Integrated Tug Barge Unit

K-Sea Transportation Partners L.P. has acquired the 140,000 barrel capacity double-hulled barge S/R New York and the 8,000 h tugboat S/R Everett. This integrated tug barge unit, built in 2000, had been leased by SeaRiver Maritime, Inc., a subsidiary of Exxon Mobil Corporation, from a financial institution. The purchase price of $34 million was financed using available cash and $25 million in borrowings under a new term loan. The new equipment will begin working immediately and is expected to be accretive to K-Sea's distributable cash flow. K-Sea has also signed a new multi-year contract with SeaRiver to utilize the unit in Exxon Mobil's petroleum products transportation in the Northeast United States. The barge has been renamed DBL 140 and the tugboat has been renamed Lincoln Sea. The addition of this integrated tug barge represents a 5.8% increase to the current barrel-carrying capacity of the K-Sea fleet. By the end of 2004, after the phase-out of certain single-hulled vessels required by the Oil Pollution Act of 1990 and the completion of certain retrofitting projects on other existing vessels, K-Sea's fleet will be approximately 74% double-hulled.

Boosting Deepsea RoRo Capacity

A major new stage in the reorientation of the Wilh Wilhelmsen fleet has been implemented with the January 2004 arrival in China of the first of five Mark I deep-sea, combined RoRo container (ConRo) vessels for reconstruction. Five ships of the Tourcoing class, dating from 1978 and 1979, are to be rebuilt with a garage section on the weatherdeck providing capacity for about 1,800 cars. The program has been assigned to Chengxi Shipyard, and follows similar work undertaken on four other ConRos in 2002 and early 2003 by Nantong Ocean Ship Engineering.

The quintet of quarter-ramped vessels to be processed at Chengxi over the January-May period are jointly owned by Oslo-based Wilh Wilhelmsen and Wallenius Lines of Stockholm, and were built to transport heavy cargo and up to 1,800/1,900-TEU containers, with the flexibility also for factory-new cars, trucks and other vehicles and ro-ro freight. The very substantial container capacity on the weatherdeck will be supplanted by garaging encompassing five new car decks and the main deck level. The circa 1,800-car intake of the new area will optimize the vessels around the RoRo concept, and contribute to the further development of Wilh Wilhelmsen's car carrier business. The adaptation of each vessel is scheduled to take 45-50 days and cost $4.6-million.

MTS Rosette:

Jaap van de Guchte Senior stands on the port side half way up the ship's 110-m length. With hand signals, two fingers pointing aft, he directs the helmsman to move the precise two meters for alignment of the tanker's cargo manifolds and those on the BP refinery dock. This will be the first cargo for the new motor tank ship Rosette. It is owned by Jaap Sr. and his two sons. In the elevated wheel house aft one of those sons and the captain for this trip, Jaap Jr., watches as one of his crew stands at the futuristically styled control console, working the jog stick controls of the powerful diesel electric bow thruster he moves the ship aft until Jaap Sr's crossed arms signals, "All stop".

The boat's 2,000 hp Cummins QSK60 main engine has been showing 650 rpm idle on the digital read out. The mate touches the throttle and the digital monitor moves up to 1,150 rpm. The ship stop's almost instantly as her big 1.7-m propeller bites into the waters of Amsterdam's America Haven oil terminal.

Like her sister-ships, being finished at the Verka Shipyard near Dordrecht Holland, the Rosette's hull, with its 11.45-m beam, was built in two parts at the Centromost Shipyard in Poland. After launching, the fore and aft sections were joined to form a hull with 10 holds having a total volume of 3,785 cu. m. capable of holding about 2,900 tons of cargo. The hull, known as a Maxcube type, was then towed to the Verka Shipyards in Holland for completion. The third in a six-vessel series, the

The ship's console.

Photo: Alan Haig-Brown

tate of the Art Inland Tank Ship

Photo: Alan Haig-Brown

Rosetta is double hulled with the resulting space divided in to 10 ballast tanks. The void between the two hulls is 80 cm. When this amount is deducted from the 5.8 m molded depth, the cargo tanks are five meters deep.

On the de Guchte' s previous single hulled boat, the tanks were four meters deep and could be pumped with deck level pumps. On the Rosette, the greater depth requires submersible pumps that push the oil up. The interiors of the 10 cargo holds are coated for the transport of light chemicals and each is equipped with a Marflex deep-well pump. With each of the 10 pumps capable of moving 100 cu. m./hr. meters per hour and each tank holding 380 cu. m., they expect to be able to discharge a full cargo in under four hours. Jaap estimates that of about 700 tank vessels registered in the Netherlands, about 25 percent are now double hulled. On her regular scheduled rotation, two four-person crews will work the vessel in 14 day turns. She will operate from the harbors of Rotterdam, Antwerp, Amsterdam and on the Rhine River east to Germany, France and Switzerland. Her home port is Hansweert, Netherlands.

The Rosette's Cummins KTA19 powered 463 kW main genset can handle all 10 cargo pumps simultaneously if the shore facility can handle the volume. The ship's secondary generator, also located in the forepeak, is a Cummins 6CT8.3 liter-powered 163 kW set that can, if required, drive up to three of

Owner Jaap van de Guchte (junior) with the QSK60 main engine

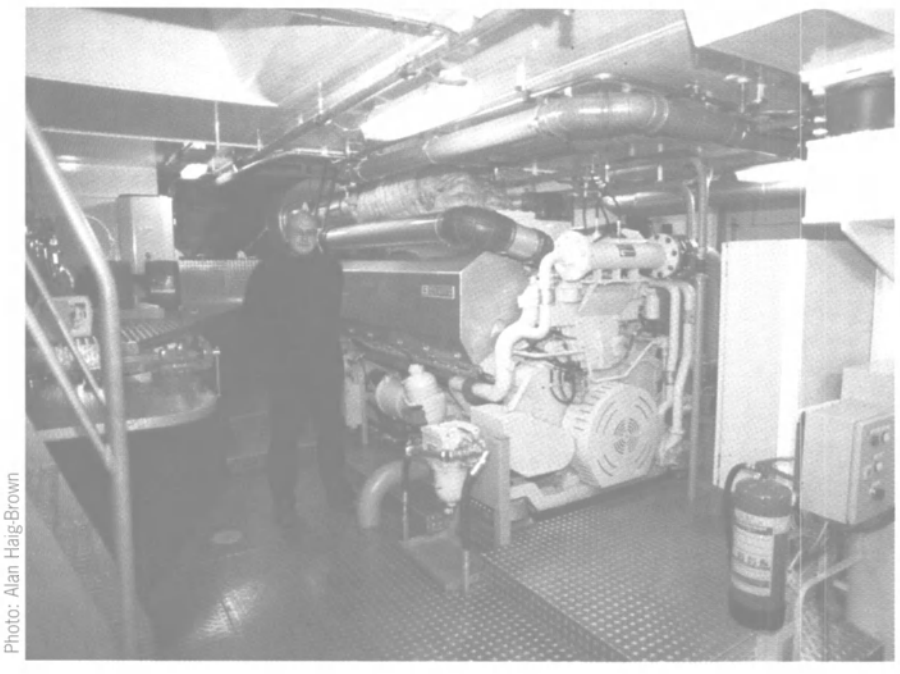


Photo: Alan Haig-Brown

the pumps at a time. This genset also serves functions such as the heated air compressor designed to avoid condensation in the lines when used for degassing the tanks or for the masks worn by the crew when inspecting the tanks. A third Cummins 6BT5.9-liter-powered emergency or hotel services 78 kW generator is located in the main engine room aft.

With most of the electrical needs for the vessel met by the forepeak generators, the main engine room is spacious and bright with ample space for the 2,000 hp Cummins QSK60 main engine sitting well aft. The main engine is coupled, through a Centra flexible coupling, to a ZF W16500 marine gear with a 5.5:1 ratio. The gearbox is equipped with 1:1 PTO shaft, driving a steering pump.

The aluminum covered and insulated exhaust stack exits aft through the transom. The bright finished aluminum diamond checked plating follows the hull contours as they taper aft around the gear and short main shaft. The result is a brilliant setting for the engine that is enhanced by the metallic gray covers on the off white of the engine itself. Not only is this an effi-


Capt. Jaap van de Guchte.

cient engine space, it is a testament to the de Guchte's pride of ownership. Jaap van de Guchte Jr. is particularly pleased with the Cummins Centinal and Eliminator options.

The Cummins Centinel Advanced Engine Oil Management System, virtually eliminates oil changes. Simple in concept, the system uses advanced software to remove a small amount of used oil from the lubrication system and send it to the fuel pump. The used oil blends with the diesel fuel and is burned with the fuel during combustion. Not only does it eliminate the need for oil disposal, it also converts used oil into productive energy. As the Centinel System blends used engine oil into the fuel stream, it simultaneously adds new oil from the vessel's bulk makeup tank into the engine.

The Eliminator Filter system effectively does away with replaceable components in the lube oil system. Taking the place of several conventional filters, the Eliminator Filter unites two proven technologies — a self-cleaning full-flow filter that removes 85-90 percent of particulates over 20 microns and a disc stack centrifugal separator that removes particles down to two microns or less. The result is a better- protected engine and significantly reduced risk of someone inadvertently dropping a bucket of used oil filters overboard when transferring them to the dock.

The Rosette, like most European river vessels, use box coolers for both the auxiliaries and the main engine. Unlike the conventional external hull-mounted keel coolers, these box coolers involve a series of U-shaped tubes in a manifold set into a box inside the hull through which cooling river water circulates. On the Rosette installation, Cummins specified the use of a specialized blue fluid for the cooling known as Fleetguard ES Compleat Extended Life Antifreeze Coolant.

On her sea trials, the Rosette impressed with her low noise levels. In the wheelhouse, which raises itself 1.6-meters on a hydraulic pedestal, engine noise was so limited that the operators were dependent on the tachometer as they couldn't hear the engine revs. The main deck house, which is directly over the engine room has reduced noise levels due to the soft mounting of the whole deck house that stops the transmission of sound through steel. But even in the engine room the decibel levels were well within the regulatory requirements. Sea trials also demonstrated remarkable stopping power of the ship. "I like this engine very much," says Jaap Jr., "Our crash stop was very impressive. The electronic controls allow us to take the throttle from full ahead to full astern in only ten seconds. And the ship comes to a full stop in only 350 meters or 110 seconds."

The boat achieved an average speed of 18.7 km per hour on sea trials with the main engine and an 85 percent cargo load giving her a 3-metre draft. With the bow thruster alone, it was able to move at 6.5 km per hour.

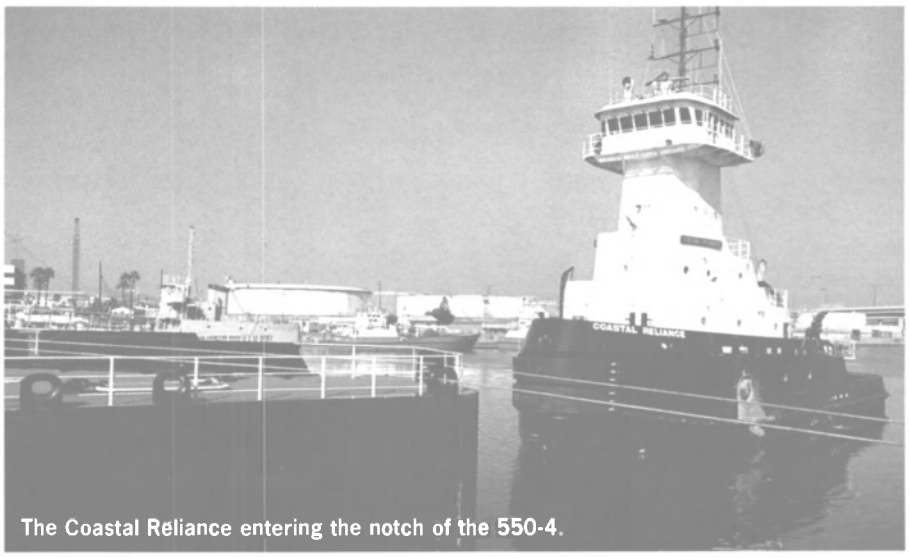
Dutch canal and river barges tend to be owner operated. This is reflected in the extra quality touches in the living accommodations. On the Rosette, the living quarters are all in the stern house which is large enough for five bedrooms, four singles and a double, as well as two shower rooms and two heads. A huge galley, mess and living room lounge area extends down the starboard stern quarter. In his large cabin, Jaap Jr. has set up his computer complete with scanner and other peripherals that allow him to keep track of the vessel's book keeping as well as to produce his extensive collection of boat photos.

After taking on her first cargo at the BP refinery in Amsterdam, the MTS Rosette began the journey south to Antwerp. With 2900 tons of diesel aboard, she was drawing 3.5 meters of water and making a remarkable 21 km per hour. **Jaap van de Guchte** both Senior and Junior are justifiably pleased.

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

Cummins	1
Marflex Pump	2
Verko Shipyard	3
ZF	4

Fourth New ATB Tank Vessel for MTC



The Coastal Reliance entering the notch of the 550-4.

Though some industry insiders predict a slow-down in the ordering of Articulated Tug-Barges for the near term, there is little doubt the innovative unit have left an indelible mark on the U.S. oil product transportation business for a generation.

In the latest delivery, Marine Transport Corporation, a subsidiary of Crowley Maritime Corp., late last year christened its fourth Articulated Tug-Barge (ATB) tank vessel in its new-build program. The 9,280-hp tug Coastal Reliance and 155,000-barrel barge 550-4 were built by Bay Shipbuilding Company in Sturgeon Bay, Wis.

During the ceremony, which took place at Marine Transport's Long Beach office (Pier D, Berth 48), Clorinda Nothstein from Shell Trading U.S. Company (STUSCO) christened both the tug and barge.

The Coastal Reliance/550-4 is the second of two similar units on time charter to STUSCO. Both units currently trade on the U.S. West Coast.

"We are pleased to officially place the fourth new ATB into service," said Steve Collar, Vice President, Business Development for Marine Transport. "We are equally proud of the fact that this ATB will serve STUSCO, one of our most valued and respected customers."

Already in service are the Sea Reliance/550-1, the Sound Reliance/550-2 and the Ocean Reliance/550-3. "All four new ATBs have been integrated into the Marine Transport fleet and are performing very well," Collar said. The essential difference between the newly constructed ATB's and the traditional West Coast tug and barge unit is the method of attachment. The ATB tug is attached to the stern notch of the barge with an Intercon coupler system allowing the tug to push the barge at sea versus the traditional means of towing the barge at sea. The primary benefit of the ATB configuration is greater speed, 12 knots versus seven to nine knots, higher fuel efficiency and greater handling capability. The Intecon coupler system provides a single degree of freedom allowing the tug to pitch about a transverse connection between the tug and barge. All other motions are restrained so that the tug motions match barge motions in roll and heave. The ATB tank vessel incorporates the latest advances in environmental protection and safety while providing increased efficiencies in hose handling, anchoring, mooring, discharge and loading of product. The 550-4 is double hulled and the tug is double sided.

The barge, built, documented and maintained to the requirements of ABS SafeHull, has an inert gas system as well as an enhanced cargo system and a fully redundant ballast system. The Coastal Reliance meets all SOLAS (Safety of Life at Sea) and ABS criteria, and has a foam capable fire monitor; twin fuel efficient, reduced emission electronic diesel engines; a noise reduction package and other upgrades to increase crew comfort. And the communication and navigation equipment is among the most technologically advanced in the industry today.

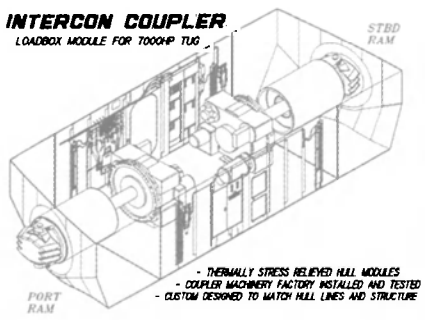
(L to R) **Steve Collar**, Vice President Business Development (MTC), **Clorinda Nothstein** and **Jan Chilelli**, Shell Trading US Company and **Rockwell Smith**, Vice President and General Manager (MTC)

Company Focus: Staying Connected with INTERCON

The Intercon Coupler System is designed to provide a safe and efficient solution to the problems of connecting tugs and barges in ocean and coastwise pushing operations. Principal benefits include the ability to push in the widest range of sea states; the complete elimination of hull contact; fail-safe mechanical connection with redundant controls, and elimination of the expense and hazards of towing lines and related equipment.

In simplest form, the patented Intercon System provides a single degree of freedom allowing the tug to pitch about a transverse connection between the tug and barge. All other motions are restrained so that tug motions match barge motions in roll and heave.

The connection is mechanical — accomplished with two independently mounted ram assemblies, gear driven, and configured for tug installation. The rams stroke transversely, engaging the vertical ladder structures incorporated into both walls of the stern notch. The resulting tug-barge connection is rigid, mechanically locked, and fail-safe.

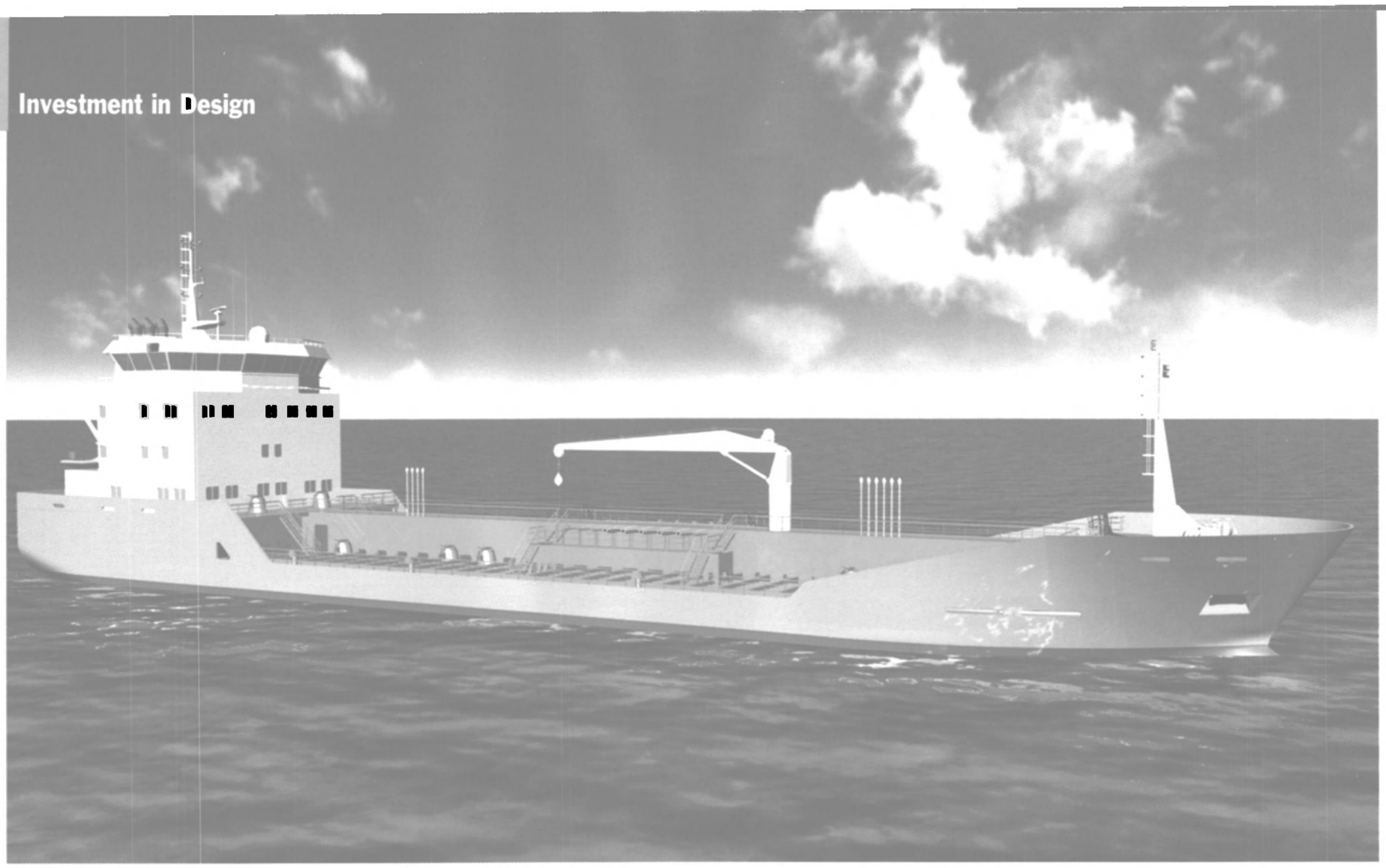


Recent Success

The Intercon reference list is long and distinguished, including the aforementioned Crowley subsidiary installations from Bay Shipbuilding. In addition, Island Tug & Barge Ltd. of Vancouver, BC recently celebrated the commissioning of its barge, Island Trader, in Vancouver. The barge was built in China and returned to Vancouver by tug, Island Monarch. The 3,000-hp tug was retrofitted with an Intercon C-Series Coupler and the barge notch was fitted with Intercon ladder assemblies. The C-Series Coupler is the latest addition to our product line of articulated tug-barge couplers and is sized for ATBs in the 60,000 to 100,000 BBL range. In addition, Penn Maritime of Staten Island, NY, ordered its fifth ATB to be outfitted with an Intercon 50-in. Coupler System.

The 123-ft., 6,000-hp tug and 140,000 BBL barge will be built by Bay Shipbuilding of Sturgeon Bay, Wis.

For free information from Intercon
Circle 11 on Reader Service Card



Innovative Coastal Trader

By David Tinsley, technical editor

An advance in hydrodynamic design has been endorsed by Norwegian energy group Statoil, as the prospective charterer of an innovative newbuild intended for coastwise distribution of oil products. The 4,200-dwt vessel contracted by Bergen Tankers will employ a diesel mechanical propulsion layout based on twin azimuth thrusters incorporating 'pulling' propellers. The project represents the first application of the Norwegian-developed Azipull system in the tanker market, and champions the principle of redundancy, conferred through the use of two, independent propulsion lines.

The engineering and propulsion arrangements selected for the 90m coastal tanker have been shaped by exacting requirements as to maneuverability, design efficiency, safety and transport service dependability. The order signals the commercial breakthrough for the NVC-Design concept developed by Nordvestconsult, part of Rolls-Royce Marine, in response to the evolving needs of products carriers and chemical tankers in the 3,000 to 20,000-dwt range. Ulstein Aquamaster Azipull propulsion units, also emanating from the Rolls-Royce stable, are central to the NVC-Design philosophy.

The seminal class of small, distributive trader booked by Bergen Tankers will combine Norwegian technology with keenly competitive Turkish production, since the newbuild contract has been awarded to RMK Marine, on Tuzla Bay. RMK has a growing reputation in higher quality, specialized areas of the market, including mega-yacht construction. Due for delivery in September 2005, the double-hulled vessel will work along the Norwegian coast out of Statoil refineries, offering a 10-tank compartmentalization for a total 5,200-cu. m. cargo volume. It will be propelled by two AZP085 thrusters, fitted in each case at with a controllable pitch propeller at the forward end, and driven by medium-speed diesels of some 1,400-kW apiece.

The specification calls for a service speed of 13.3-knots, on the basis of 90-percent maximum continuous output and 15-percent sea margin, and additionally looks to a 70-percent full speed capability with just one of the two propulsors and one of the main engines in operation.

The Azipull propulsor is a purely mechanical device, which dispenses with the need for a separate gearbox since gear reduction is built into the unit. In the coastal tanker application, a generator will be interposed on the shaft between each main engine and thruster. The shaft generators will thereby cover the vessel's at-sea electrical power load, supplemented by a 500-kW, electrically-driven bow thruster when maneuvering. The arrangements enable one engine to be shut down in port, and allow the other unit to be declutched from its thruster, driving its shaft generator to power the cargo pumps and meet the vessel's service load.

The system offers full redundancy in both propulsive and electrical power supply, and also permits maintenance of one engine to be conducted while berthed at a terminal, with propulsion still available from the other 'side' of the system should vessel be required to rapidly leave the berth in an emergency.

The Rolls-Royce Nordvestconsult designers claim that the compact nature of the Azipull-based installation has yielded a 5-7% increase in cargo tank volume in relation to other propulsion solutions within the given hull envelope.

In developing the hull form, the Aalesund-based consultancy had to ensure that the ship would have good course-keeping stability. It contends that hulls with length-to-beam ratios desirable for low first cost and high earning capacity have, in the past, demonstrated poor course stability when propelled by azimuth thrusters, needing large steering corrections, resulting in heavier fuel consumption.

Azipull thrusters, with their hydrodynamically-optimized underwater units, provide substantial rudder area, offering improved performance as regards directional stability. Even so, a program of computational design and model testing was undertaken to ensure that the tanker would offer course stability in excess of the IMO zig-zag test requirements.

The deal for the Azipull azimuthing pulling propellers follows the service debut for the system on a double-ended fjord ferry, and subsequent contracts in the offshore support vessel market.

Lost and Not Found

Halifax Shipyard On Hand To Replace Lost Rudder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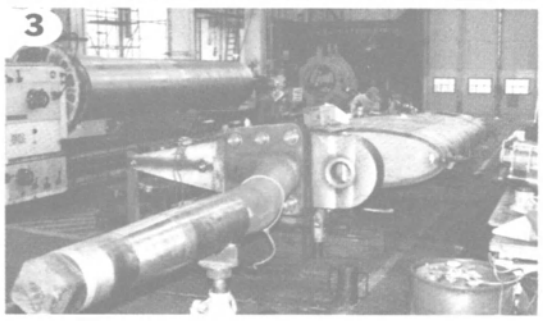
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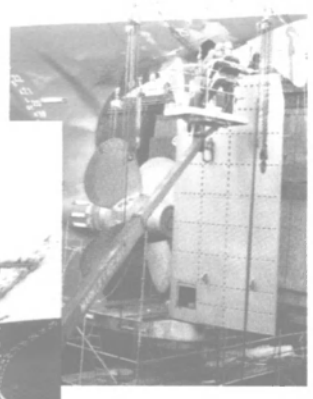
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In November 2003 the Gorthon Lines AB vessel Margit Gorthon lost her rudder in the St. Lawrence River. The RoRo vessel features starboard side ramps and measures 463.9 x 73.1 ft. (141.4 x 22.3 m) and is 14,240 dwt. Halifax Shipyard visited the vessel and found that not only the rudder was gone, but the 343 mm rudder stock broken in three pieces and the steering gear flat bottom shell ripped and twisted. One of the pieces of the rudder stock was embedded in the rotary vane steering gear. All CP propeller blades were damaged beyond repair and had to be replaced. After some number crunching and discussions, Gorthon Lines AB decided to have its incapacitated vessel towed to Halifax Shipyard for repair in late November 2003. The vessel was docked in Halifax Shipyard's in their graving dock that is 567.6 x 77.1 ft. (173 x 23.5 m) with an 26.2 ft. (8 m) draft over the keel blocks.

The work scope included removal of the steering gear, its seat and the damaged deck and shell plates, remove the remainder of the rudder stock and access other peripheral damage, including the propeller blades. A new rudder had to be built; the rudder stock was a forging and difficult to create was dispatched from the Owner with the new propeller blades. The shell requires renewing as well as the aft peak tank top and a new seat manufactured and machined for the steering gear. As well as this a great deal of machining was required on the new rudder and the bottom and top pintles on the remaining stern frame as well as the new steering gear seat. Material was found for the heavy rudder top and bottom plates but stainless steel liners for the pintles could not be obtained in a timely fashion and as a result of this solid stainless steel rounds were used and drilled

1. The ship in Dock A
2. Alignment preparations
3. Rudder stock fitted
4. Hardening the palm bolts
5. Rudder fitted access welding
6. Flooding the dock
7. Vessel leaving


7

out internally to manufacture the needed liners.

The steering gear had to be removed in order to inspect and extract the remaining rudder stock. The stock was stuck fast and had to be drilled out before its removal.

The steering gear was then overhauled and renewed and replacement parts fitted as required.

The rudder itself was fabricated, fitted and welded in 12 days and then sent to the machine shop for milling, drilling and fitting of the mechanical aligned surfaces interfaces. The new rudder stock was machines and fitted to the rudder in the shop.

The Installation

The steering gear new seat was scribed to the deck plates and aligned horizontally before careful sequence welding to prevent distortion. The liners top and bottom were fitted to the stern frame, the rudder stock fitted and then the rudder and hardened down on the palm bolts. The hot work being complete the area was coated, cured and the vessel left on the December 22.

Circle 93 on Reader Service Card

East Isle Shipyard Wins $16M Contract

East Isle Shipyard, Prince Edward Island's largest shipbuilder, recently won a $16 million contract to build a pair of tug boats (hull #82 and hull #83) for Atlantic Towing, Ltd., which already has three tugs on order from the yard. The deal was sealed with an innovative financing plan that is designed to bring business and create jobs in the region.

"In the absence of a Canadian shipbuilding policy, the province has chosen to do our part to develop and encourage the industry in PEI, "said Development and Technology Minister **Mike Currie**. "We believe the financing we provide will help this industry to maintain its important place in our economy. It will give East Isle the ability to maintain its workforce and to continue to bid for contracts both in Canada and abroad."

"This new contract is great news for our Island shipbuilding center of excellence. With each new tug that we produce, the company becomes more competitive and respected in the global marketplace by improving our efficiency and productivity. This new work ensures sustained work through until 2005, preventing significant layoffs and the loss of a skilled workforce." said Jim Shepherd of East Isle Shipyard.

Work on the first of these two new tugs will begin in May 2004. The first vessel will be delivered in January 2005, with the second tug delivered in May 2005.

Circle 94 on Reader Service Card

Transport Canada Takes Lead on Safety

Last month Transport Minister **Tony Valeri** announced a call for tender for contractors to review vessel security assessments and plans for large Canadian flagged vessels that navigate international waters, and the ports that serve them. Transport Canada is implementing International Maritime Organization (IMO) requirements concerning security plans for commercial vessels that operate internationally, as well as for the ports they visit.

The IMO, through its International Ship and Port Facility Security Code (ISPS), imposes a number of security requirements on maritime operators, including a requirement that all vessels of more than 500 grt that operate internationally and their ports of call have security plans in place by July 1, 2004. In addition, Transport Canada is extending these requirements to include any ship weighing more than 100 grt and their ports. The department is requiring that affected vessels and ports submit their plans by January 31, 2004, to allow for a full assessment and approval before the IMO deadline.

"This call for tender is the latest step in Transport Canada's drive to enhance the nation's marine security environment," said Valeri. "It embodies the Government of Canada's firm commitment to meet — or exceed — international marine security requirements while facilitating Canada's international trading abilities."

Transport Canada continues to develop Canadian marine security regulations in order to implement all requirements of the ISPS Code. The tender was posted today on MERX, Canada's official public sector electronic tendering service. To view the call for tender, please visit the MERX website at www.merx.com and enter reference number PW-$$ZG-406-11249.

More Liebherr RTGs for Halifax Terminal

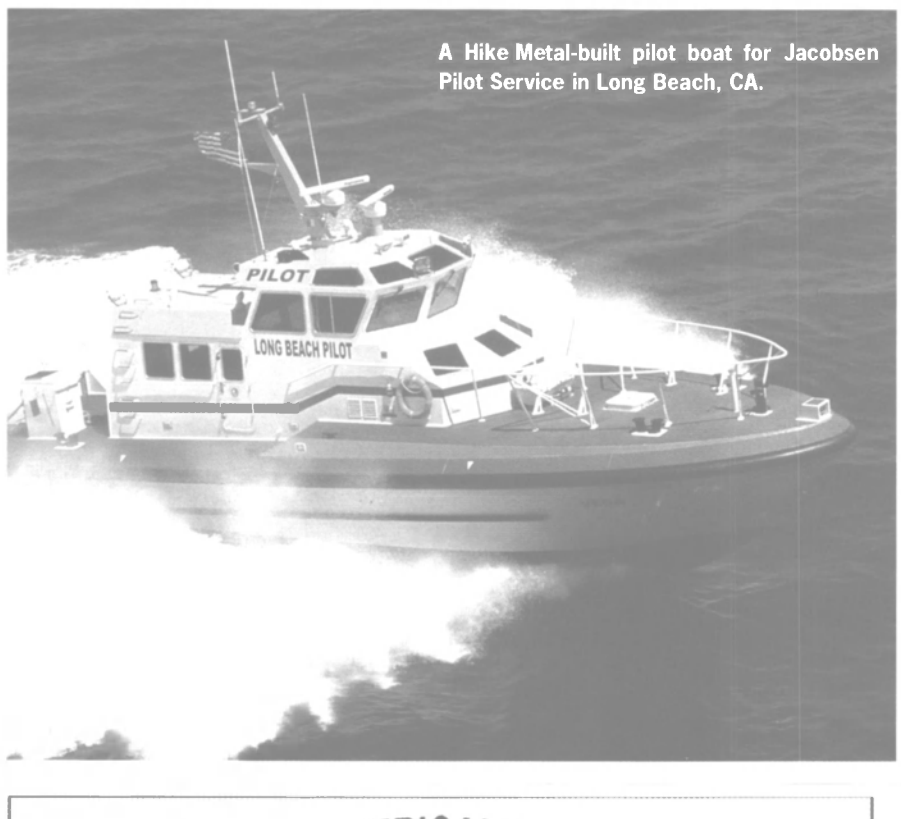
Liebherr Container Cranes Ltd. signed a contract for the supply of four heavy-duty twinlift Rubber Tyre Gantry Cranes to Cerescorp's Halifax Terminal in Canada.

Two similar Liebherr units were delivered to the terminal in 2002. The RTG's are eight-wheel configuration, stack one over five containers high and span six containers plus a truck lane. S.W.L is 50 tons under twinlift telescopic spreader. Hoist speed is 23/50m/min and trolley speed is 70m/min. Crane travel speed is 70/130m/min.

Hike Metal: Steady Progress to Success

Since 1958, Hike Metal of Wheatley, Ontario, has been a steady presence in the Canadian maritime niche, enjoying success and growth built on the local fishing industry. The yard is strategically located on the north shore of Lake Erie, 45 miles east of the Windsor / Detroit border. Central location provides the company good access to both suppliers and market alike.

Hike prides itself on many aspects of its business, starting with the construc-



A Hike Metal-built pilot boat for Jacobsen Pilot Service in Long Beach, CA.

tion of not aluminum vessels, rather strong relationships with customers to establish and define the class and function requirements of the vessel.

On the facilities side, Hike's modern plant facilities and metal working machinery enable us to build both large and small vessels simultaneously. Vessels up to 100 ft. in length can be built completely inside under heated, environmentally controlled conditions, while larger vessels are built in sub-sections and assembled on building berths outside. These facilities are strategically laid out to afford smooth through-put flow of materials and components from delivery, to inspection and stocking, to preparation and incorporation into the vessels allocated. A recent success for Hike was the deliver of a 54-ft. (16.4 m) welded aluminum pilot boat to Jacobsen Pilot Service of Long Beach, Calif. The boat, which was featured on the October 2003 cover of *Maritime Reporter & Engineering News*, was built to suit one of the busiest and demanding port operations in the world.

Circle 95 on Reader Service Card

Car Ferry Saves Fuel with New Engines

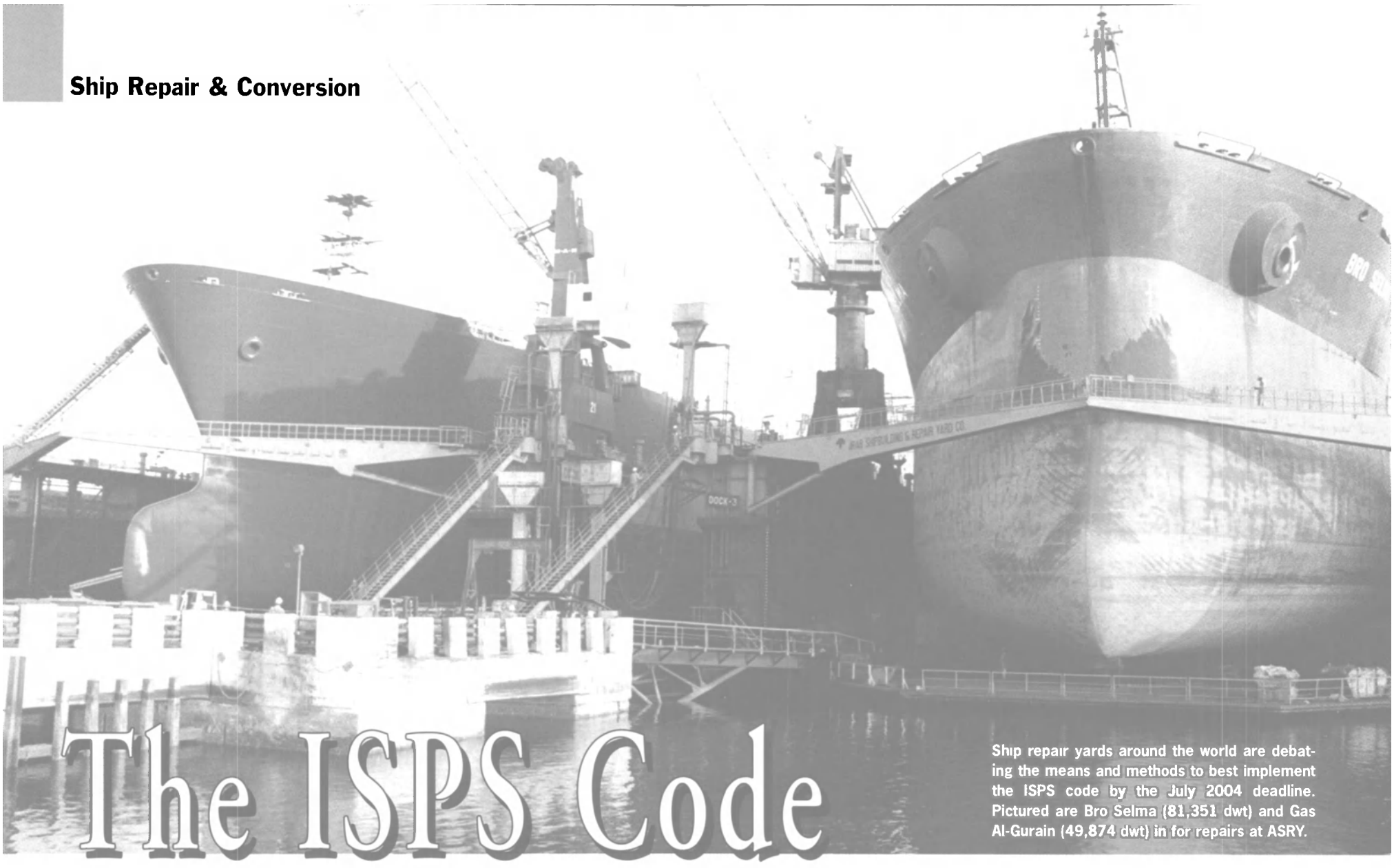
Northern Norway has a large fleet of small and mid-size boats for commercial operations, for example, passenger boats, car ferries and a multitude of fishing boats. These are boats that operate year around and that at regular intervals need to replace their engines.

The high-speed passenger boat MF Sjosprint was equipped at the end of last year with twin Volvo Penta D12s for propulsion, a move which reportedly helped reduce fuel consumption 30 percent compared with the old engine, while at the same time performance has improved.

The MF Flatoy car ferry installed a D12 last May. "Volvo Penta engine has operated problem-free and has a very low noise level, which is comfortable for us working onboard," says Torgier Gamst on the MF Flatoy. "Fuel consumption is also significantly lower. Previously, we consumed 6.3 liters per nautical mile, compared with 4.9 liters today, a decrease of about 25%, or approx. 44,000 liters annually."

The manufacturer claims that many of the operational benefits are due to the engine's advanced electronic control. The fuel system, with single injectors working under very high pressure, is controlled fully electronically. Consequently, in each situation, the exact amount of fuel is injected into each cylinder. Turbo with charge-air cooling and four-valve technology ensures efficient combustion, resulting in low fuel consumption and minimal exhaust emissions.

Circle 28 on Reader Service Card



The ISPS Code

Ship repair yards around the world are debating the means and methods to best implement the ISPS code by the July 2004 deadline. Pictured are Bro Selma (81,351 dwt) and Gas Al-Gurain (49,874 dwt) in for repairs at ASRY.

The cost of complying could be high - but not as high as not complying

John Riding, director of Marico Marine, speaking at Ship Repair & Conversion in London, presents a rosy picture for the future of ship repair by pointing out that freight rates have not been so high for years and some owners, such as bulk carrier operators are enjoying a rare opportunity to seriously invest in maintenance. The busy state of building yards means that "keeping an older vessel in service longer has great commercial attraction," said Riding. He believes that some repair yards have the potential to make a return for the first time in a long time.

However, there is a fly in the ointment in the form of the ISPS Code.

The code as has implementation date of July 2004 and applies to all passenger ships, including HSC, cargo ships 500 grt and upwards and mobile offshore drilling units.

It also applies to all port facilities serving ships engaged in international voyages. Riding explains that "port facilities are nice IMO words used to describe terminals." While a government can decide the application to terminals used mainly by domestic trading vessels, terminals serving internationally trading vessels cannot be excluded, which means repair yards are implicated as port facilities.

Under the code, vessels trading internationally must keep a formal record of security arrangements at the last ten terminals and, it is a SOLAS requirement that this is open to inspection on arrival at the next terminal.

"We know that the requirements of the ISPS Code will effect our operations," — Malcolm McLaren, president of Allied Shipbuilders

This is vital if an owner's next port of call is the U.S. or Australia as both have declared a serious stance on introduction from July 2004.

Riding says: "owners of high profile ships, such as passenger or gas, have a potential commercial need to be selective about which terminals they visit," which may well include limiting selection of repair yards to those able to maintain the security interface to meet the needs of owners.

Riding explains that this is not the end of it as under the ISPS Code the ship also has a right to request a 'Declaration of Security' from the port facility, which is used when the terminal is operating under a lower state of security than the vessel. To sign up for the declaration a yard needs the core components of the code in place from a commercial perspective. "We don't think ship repair terminals can do without the code but in the UK at least, there is as yet no driving force from the regulator to get things moving," says Riding.

To get the ISPS Code in place the yard must have a Trained Facility Security Officer and a vulnerability assessment needs to be completed by a Recognized Security Organization. Once the vulnerability assessment is complete, a security plan needs to be created and approved. This plan covers a number of set areas, including ongoing audit and testing and allows movement through three levels of security - the level of security being applicable to either ship type or the ongoing level or threat assessment. Riding warns, "the plan must have procedures to achieve this."

Riding said that ensuring the identity of flexible contract workers will present a challenge for ship repair yards as will the management of spares and inventory on its way to a vessel from a third party. He also points out that "improving security to know what is happening in way of underwater inlets and other ports of a higher risk vessel could be expensive."

Reactions around the world to the ISPS Code and its effects are mixed.

Some, such as Metalock Brasil, do not believe that it will have a great impact, as it is not a shipyard. **Sean Jansen**, marketing representative for Dorbyl yard in South Africa has a pretty relaxed attitude saying, "the code will be implemented and it certainly has its pros and cons. The security level will reach a new level and the movement of people will be restricted."

However, most yards are taking the implementation of the code very seriously, even if they think it will not have a dramatic impact on their businesses.

"Yes, we know that the requirements of the ISPS Code will effect our operations," says **Malcolm McLaren**, president of Allied Shipbuilders in Canada.

The Canadian Government Authorities, including Transport Canada and The Vancouver Port Authority, are being very helpful to assist the company, which occasionally handles international traffic, to comply with the ISPS Code.

Keith Burgess, chief executive of Dubai Drydocks says "we are hopeful the new ISPS Code will not have much impact on our operations — because we already have a well-developed security system in place and because we are taking the ISPS implementation very seriously." He explains that the yard has already appointed a port facility security officer and several of its employees are attending training courses and Burgess says "we are now working on a procedural manual along the lines of our HSE documentation — we aim to be ready before the due date."

Another that is determined to be ready for the due date is A&P. **Clive Towl** A&P's group business development director told *Maritime Reporter* "we're taking the whole thing onboard — we think it's a very good idea and we will be totally compliant in all our yards."

Towl agrees that one of the largest headaches will be in the repair of cruise ships particularly with the control of the large number of contract workers. However, he explains that "what happens there is you have to have contractors that you know and trust and they obviously have to do their own internal vetting rather like ISO9000 where it's a down-chain up-chain arrangement where you deal with people that have equal quality and equally secure arrangements.

Some yards, such as Todd Pacific Shipyards in the US and Colombo Dockyard claim to have very high security standards in place. **Spiro Risvas**, director of commercial ship repair at Todd Pacific says "Todd, being a Government (US Navy and USCG) approved repair facility for many years already, has very high security standards in place where, in the name of 'Force Protection', provides special measures that satisfy the most stringent level of these requirements. Despite that, Todd is reviewing seriously the parameters of the new ISPS code in an effort to identify possible additional measures to ones existing already. Colombo Dockyard is inside the Port of Colombo, which has been declared a high security zone by the government of Sri Lanka with security provided by the Sri Lanka navy. That is in addition to the security provided by the Sri Lanka Port Authority. **Darshana Chandrasekera**, assistant marketing manager for ship repair at the yard says that "in coming and out going people, goods and vehicles are subjected to very high stranded of scrutiny — security was further improved after September 11 attack and the attack on Colombo international Air Port. It is for this reason that he says the level of security required to be maintained in the yard is minimal. He believes that as an ISO 9001 2000 accredited organisation, the systems and procedures are in place for general security, hence any additional system modifications will not be much of an issue.

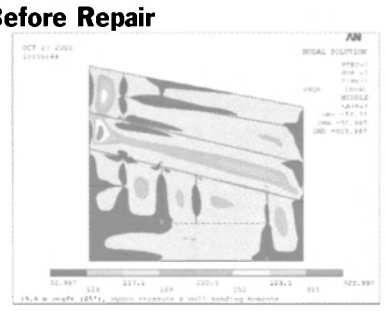
Temporary Hull Repair on FPSO Stands the Test

Alan C. McClure Associates (ACMA) recently completed strength analysis of the tank bottom plating of an FPSO for a large oil company. ACMA's analysis focused primarily on the effectiveness of repairing corroded shell plating with Intelligent Engineering's Sandwich Panel System (SPS).

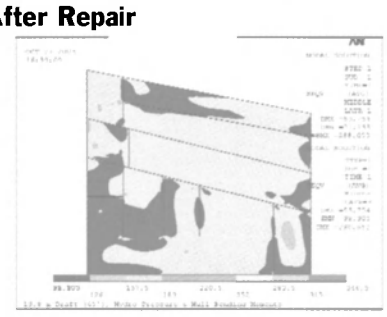
"Utilizing our advanced Finite Element Analysis (FEA) capabilities, we examined the vessel hull to evaluate repair alternatives to the corroded shell plating," said principal structural engineer Peter Marucci. "We loaded the model with hydrostatic and hydrodynamic pressures that the hull would experience from still-water and wave-induced bending moments." Because it's vital to examine all material and environmental variables to predict real-time performance, ACMA evaluated multiple models to determine stresses and loads within the FPSO tank. Similar analyses can also be performed for hull structural members to determine stresses during design and later during repairs for critical and 'hot' areas that are especially important for barges, cargo ships and all marine vessels. The Sandwich Panel System (SPS), developed by Intelligent Engineering, is a technology that permits repairs without hot work inside the tank, allowing the vessel to remain in service. "Based on our modeling of the proposed repair sites, stress was shown to be significantly reduced using the sandwich paneling," Marucci explained. SPS does substantially extend the working time for the vessel and, in this case, appeared to be the best solution available until resources would allow for a more thorough repair and/or restoration.

"There are a number of tankers in service today that are experiencing structural problems in areas where a high level of corrosion has occurred," says ACMA Vice President **Darrel Harvey**. "Our advanced analytical capabilities and extensive shipyard experience gives ACMA a pronounced advantage in providing our clients with unbiased, third-party analysis of these kinds of challenges, as well as the ability to recommend the most cost-effective solutions."

Before Repair



After Repair



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New 12,000-sq.-m. Workshop Pays Dividends

Dubai Drydocks Afloat Repair Division (DDARD) is now ensconced in it's new purpose-built 12,000 sq. m. workshop and offices alongside the actual shipyard, the workshop also having another 500 sq. m. of specialized workshops divided into five disciplines. The workforce has increased to some 87 workers from 70/75, which was the average when the division was operated from Jebel Ali. During 2003, DDAFD answered a total of 712 inquiries, 356 of which were turned into contracts, a further 273 inquiries for hydraulic repair work, 97 of which ended up at contracts, and 33 projects awarded by the yard itself. The largest repair contract involved the Express Alexander, which is managed by Switzerland's Doris Maritime. DDARD carried out a major overhaul of the vessel's main engine, a MAN 16V 52/55, including the replacement of 16 piston rings, and two generators, while the vessel was alongside at Port Raschid. DDAFD is an authorized repairer on MAN B&W diesel engines.

During the recent FPSO conversions at Dubai Drydocks, 256,715 dwt FPSO Xikomba and the 138,930 dwt FPSO Mystras, DDAFD was contracted to carry out all the hydraulic stainless steel pipes for the hydraulic systems. Currently DDAFD is carrying out work on two hydraulic pumps onboard the 200,999 Shinyo Guardian in Dubai Drydocks.

Grand Bahamas Shipyard Filled with Business

Freeport's Grand Bahamas Shipyard (GBS) has a full shipyard — in Floating Dock No.1 the pipelaying barge Lorelay is docked on 3.5 m high blocks (to facilitate thruster repairs), the vessel also undergoing steel renewals in side shell and in the tanks, overhaul of the thrusters, and painting the hull.

In Floating Dock No. 2, Hamburg-Sud's 51,059 dwt containership Cap San Raphael, is being replaced by her sistership Cap San Antonio. This is the second of a series of five vessels to be docked for this owner. This is a routine docking with some minor steel repairs due to cargo damage. The next in the series is the Cap San Augustin.

Meanwhile, alongside is Interorient's 15,375 grt RoRo vessel Caribe Merchant having completed drydocking work is now being carried out on the gearbox overhaul and steel work on the ramp. Also alongside is Dredging International's cutter dredger Amazone. The spud poles of this cutter dredger (100 tons each) have been lifted off and put on a barge.

Series Design in the New Regs Environment

For a half century, GTR Campbell has offered a turnkey ship creation service, applying a unique project-oriented philosophy that turns conflict of interest into mutual interest. New regulations may have changed a design's lifespan but not the series concept.

Today, **Antony Prince** is internationally recognized as the President of GTR Campbell Marine Consultants and successor to the legacy of the company founder, famed naval architect **George Campbell**. But 10 years ago, Prince was just a man with a plan and some mighty big shoes to fill.

Prince had been George Campbell's close friend and associate for over 20 years. In 1990, the aging Campbell turned the company over to his protege, cautioning that, for a consultancy, reputation was not easily transferred from one man to another.

Campbell was a gifted naval architect who put his stamp on the shipping industry by introducing series ship design in a mass-production shipbuilding program based in Japan. Between 1965 and 1989, 338 series built dry cargo ships were constructed to his plans, and under GTRC supervision, at IHI and licensees. Most were built on just two standard designs that became industry benchmarks: 172 copies of the 14,800 dwt Freedom and 80 of the 21,500 dwt Fortune, vessels that today's elder shipowners recall with great fondness.

'Built to a branded, standard design, a ship starts life with a commercial identity," says Prince. "Her characteristics are already known among charterers, potential crew and stevedores, so she starts out as a preferred carrier." But times have changed, he acknowledges and the series production concept must also change. "With the introduction of new bulk carrier requirements every few years, the marketing life of a single design is much shorter today than in the past."

Campbell capitalized on a massive renewal in the Handysize sector, and history may be repeating itself for his successor. Some 45 percent of the 2,200 ships below 35,000 dwt are currently over 20 years old and face replacement or scrapping. With the sector disintegrating at the edges - small cargoes once carried in ships below 20,000 dwt now move mainly in containers, while the largest Handysize parcels are finding more effective carriage in Handymaxes - it is expected that the majority will not be replaced. But even if the sector shrinks by 80 percent, says Prince, it offers designers and builders a golden opportunity. He should know. A Handysize put him back in the game.

In 1994, Prince had yet to overcome the burden of legacy and prove to a skeptical industry that he could pick up where Campbell had left off. That year, he finished development of an advanced double-hull 29,000 dwt bulk carrier design he branded the Fantasy. When the Clipper Group and Dockendale Shipping signed a contract for five of the vessels to be built at China's Dalian Shipyard, the GTR Campbell name leapt back into the spotlight.

Hailed as "a maid of all work for the 21st century," the Fantasy design proved popular, spawning a 12-ship series over three years and refocusing the attention of a

George Campbell at age 79 (right) and Antony Prince, shortly before saying sayonara to Japan in 1989.

new generation of shipowners on the virtues of series-built ships. Since then, GTRC has produced some 45 ships in six series of its own design, five bulk carrier designs - the Fantasy, the 27,000 dwt Festiva and Fortune MkII, the 32,500/34,300 dwt Valiant and the 51,000 dwt Galaxy - and the Fiesta RoPax ferry.

True, they are not the huge production runs once known as series ship construction. But to Prince, 12 seems to be the right number for a ship series these days. "I couldn't build a Fantasy class ship today if I wanted to," he says. "They are fine, competitive vessels accepted as preferred carriers, and the owners love them, but so many regulations have changed since 1998 as to render the design obsolete."

With this in mind, he modified the series concept to fit shorter production runs. As always, each ship within a series is exactly like the others. Beyond that, the series, where possible, shares consistencies in such areas as layout and equipment selection, bringing a family identity to the whole clan.

"The benefit of series ships comes from the fact that most people prefer dealing with known quantities," says Prince. "When you build to a standard design without variation, you develop it into a trade name that imparts to each ship a clear identity, which is a very powerful business tool.

One of the most recent GTRC designs is the 20,000 dwt D S Regent, delivered January 2003.

"We once heard from a charterer who had hired his first Fantasy," he explains. "He put three days in the charter for discharging cargo, because he had never chartered a 29,000 tonner that did it in less. The Fantasy finished in a day and a half. Now, one and a half days of stevedoring represents a huge savings in time and money, so he went down to the ship to see what was up. When he found the ship was so designed as to make this the normal turnaround time in port, he had one reaction: 'Next time I'll charter a Fantasy.'

The Product is a Process

GTRC produces its vessels through a highly idiosyncratic process that starts not with what the owners want, but with what the world needs. The principal players in the drama are Algoship Designers Ltd. and GTR Campbell Marine Consultants.

Algoship begins by identifying general commercial needs through market research and economic analyses. In an exhaustive study, factors such as national economies, regional development and manufacturing, and trends in the sizes and types of bulk cargo movements are distilled into projections of marine transportation needs, from which a concept ship emerges. That concept is then handed over to GTRC, which, in cooperation with an independent design studio, develops it into an initial design.

Next, Algoship finds a shipyard to build the vessel, and together they come up with an ideal sale price. Algoship's goal, to offer a price that is both attractive to owners and profitable to the yard, requires a great deal of trust from the builder, because it means unreserved discussion of labor and material costs. As GTRC prides itself on producing high specification ships, robustly built to ABS SafeHull requirements, competitive costing calls for a very fine pencil.

Once that barrier is crossed and a price set, Algoship acts as broker, notifying prospective clients that such a ship is available, at what price, and at which yard. GTRC then takes over as project supervisor, setting and policing the construction schedule with the yard planners. Tight project supervision, says Prince, is what makes it work.

The apparent conflict of interest is that Prince runs both organizations - Algoship being a one-man shop - and seems to end up changing sides, from owner to yard, at various points of the shipbuilding process.

"GTRC has operated under this philosophy for some 50 years," says Prince. "It has worked out well so far, but can only thrive in an atmosphere of utmost trust. We must be totally transparent, completely trusted by both parties. This is a very personal business, in which one individual builds strong relationships with shipowners, shipyards and classification."

Relationships aside, the process can only work if the shipyard is convinced it can build the vessel at a profit. The key to that conviction is precise costing, which can only be done on a finished design. So, before any agreement is signed, GTRC bears up front the costs of detailed analyses and design development, performing full trim and stability calculations, running SafeHull

Phase B on the midship section, and refining the design through the work of model basins, design studios and other specialists.

With design complete, GTRC sits in on plan approval. "Presently, our design team is in Korea working out a new design branded the Trader, a 30,000 dwt ship to be built to ABS class on a 4+4 contract for Clipper," he says. "Later, our project managers will sit with ABS during plan approval, in order to respond promptly to comments. This can shorten the plan approval process considerably."

With the design prepared, there is no room for owner extras, options or alterations - another key page from the Campbell playbook. "I listen to all comments, and apply the same filters as for all design considerations: 'Does it enhance the safety of the ship, or address a safety issue we have not considered? Does it increase the earning capacity of the vessel? Does it reduce the operating cost of the vessel?' I rarely encounter a comment to a finished design that passes all three criteria," he says.

"The product we sell is a ship based on George Campbell's philosophy," he adds. "Part of that philosophy is to eliminate delays and cost overruns. So, while we don't discourage the owner from doing his own supervision, we do point out that our shipyard supervision, which has brought us such respect in China, is as important as our design work to meeting all the goals of the project."

Tight process control and adherence to plan make it work, he says. "In effect, we create a team that is part shipowner, part shipyard, part GTRC and part ABS. We go for robust construction, which is why we work with ABS class," says Prince, "and why we have used SafeHull on all our designs since the Fantasy in 1994. The relationship between ABS and GTRC dates back to Mr. Campbell, who used to say he found ABS to be the most modern-thinking of all the class societies."

On the dock before the IVS Victory: D.P. Samantroy, GTRC Site Supervisor at Xingang Shipyard, Tianjin, China, with Captain Haakestad of IVS Victory and ABS Surveyor S.S. Hwang.

Still Flying the Flag

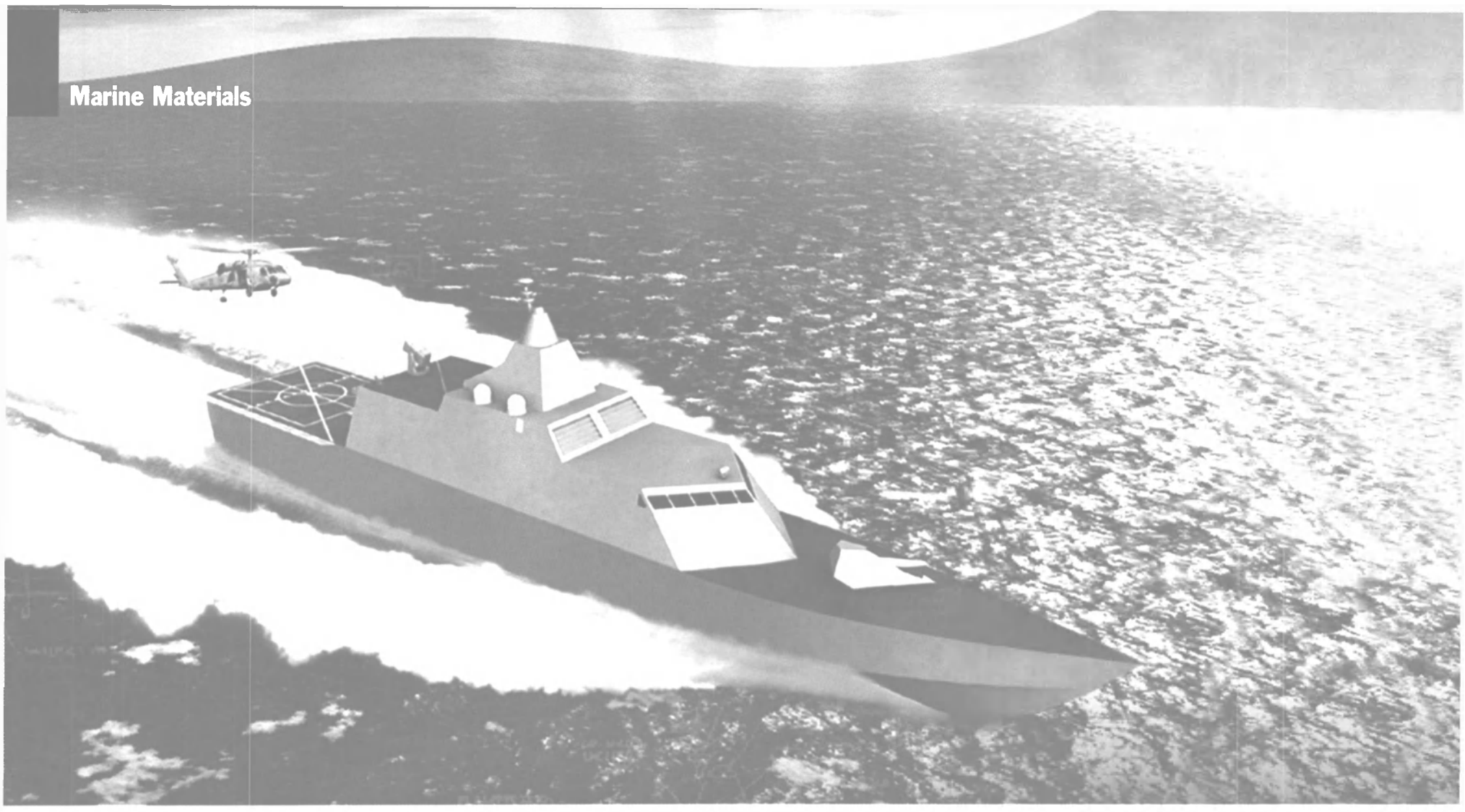
While holding true to his mentor's philosophy, Prince is not his copy. While no less tough in negotiation, Prince is seen in a more genial light than his famously gruff predecessor. He is also not as averse to publicity as Campbell, whose avoidance of attention has resulted in his near disappearance from the public record.

The size of the company has also changed with time. Campbell's organization once reached over a hundred employees in half a dozen countries, with 50 in his Montreal design office alone. Today's GTRC is leaner, with a worldwide staff of 40 run from three main offices. Prince says this is the company's natural size. As he prefers independence, he has no expansion plans in mind.

But he is expanding its design range. Campbell concentrated his efforts in the Handysize arena, in his day a market of huge potential. Today that potential is more diffuse, and Prince has left his comfort zone to pursue larger ship classes. GTRC now has a Handymax on the market, the 51,000-dwt Galaxy series, and is currently developing Panamax and Capesize concepts.

This article was written by Joe Evangelista for the Fall 2003 edition of the American Bureau of Shipping's (ABS) Surveyor Magazine. It is reprinted with permission.

ABS-classed 17,000 dwt Amfitriti, one of 30 Freedom MkII vessels launched between 1978 and 1982.



The use of aluminum in marine construction has certainly come of age, particularly for fast ferry and now military purposes. Pictured above is one of three contestants for the U.S. Navy's Littoral Combat Ship Program. The Lockheed Martin Design Team includes many members with aluminum expertise, including Bollinger Shipyards and Fincantieri.

Aluminum Boats Prove Their Mettle

Aluminum Popularity Growing Fast Among Diverse Group of Boat Builders

By John Simpson, Editor, Aluminum Now
and
Michael Skillingberg, VP, Technology, The Aluminum Association, Inc.

Aluminum has been used in the marine industry for more than 100 years because of its light weight and ease of fabrication combined with good corrosion and fatigue resistance. However, for much of the past 30 years, fiberglass has been the material of choice of North American boatbuilders, particularly for higher-volume production lines. Competitively priced compared with boats made from most other materials, fiberglass boats can also be made from standardized molds that reduce their construction time and labor.

Aluminum alloys, which are specified for marine use, offer many benefits, though, too. Their high level of performance along with recent advances in aluminum cutting and welding is helping to reduce fiberglass' boats cost advantage, and the metal's utility for a wide range of boatbuilding applications is poised for reappraisal.

Changing Image of Aluminum Boats

"Aluminum boat technology is relatively new," says **Steve Daigle**, president of Daigle Welding & Marine Ltd., in Campbell River, British Columbia, noting that welded aluminum boats first came on the market en masse as recently as the late 1960s. Prior to that, riveting was the standard technique for joining aluminum sheets on boat hulls-a technique still used for many smaller boats that use thinner-gauge aluminum.

The image of a leaky, riveted runabout with ungainly lines persists for some people when picturing an aluminum boat. In fact, since the dawn of the welding age for aluminum boats, they have grown in stature to the point where they are the top choice in a number of categories of boats, including small recreational craft, small to medium-sized commercial fishing boats in the northwestern U.S., crew boats in the Gulf of Mexico, and fine yachts-both sail and motorized. Daigle himself notes that in just his 16 years in the boat business, the number of welded aluminum boat manufacturers in British Columbia has jumped from 6 to 24. But whether aluminum can make inroads into the large market for mid-sized recreational boats remains to be seen.

Corrosion-Resistant Alloys

Central to aluminum's suitability for use in boat construction is the high resistance to corrosion of its alloys for marine applications when used in the specified corrosion resistant tempers. The traditional marine alloys-5083, 5086, and 5456 as well as the more recently developed 5383 and 5059-resist corrosion in fresh water and saltwater. A new specification ASTM B 928 "High Magnesium Aluminum-Alloy Sheet and Plate for Marine Service" has been developed to help in the selection of the appropriate alloy-temper products.

Except for cosmetic reasons, 5xxx-series alloys don't even have to be painted above the waterline: the unpainted metal reacts with air (as would any other aluminum alloy) to form aluminum oxide-a hard, protective coating that protects the underlying aluminum. For most conditions the bottom of an aluminum hull needs only compatible antifouling paint to prevent the growth of performance-robbing barnacles and weeds and zinc anodes to prevent galvanic corrosion associated with non-aluminum metallic propulsion equipment and other attachments. Contrary to a common myth, with careful preparation and the application of proper primers and undercoats, aluminum holds paint very well. Aluminum alloys used for hull construction-commonly 5086 and 5083-are also easy to weld. Hull plating of 3/16 of an inch and above easily accommodates MIG (metal inert gas) welding for much of the basic construction, with TIG (tungsten inert gas) welding appropriate for the more detailed work, such as attachments. What's more, advancements in welding equipment have also made this less of a chore than it used to be by using less heat, thus dis-

torting the metal less when it is being joined. This results in welds that can be made more easily and more precisely.

"We've replaced all our welding equipment and now use nothing but Pulse MIGs," says **Jack Winninghoff**, president and owner of Winninghoff Boats, Inc., in Rowley, Mass. Pulse MIGs, which use a computer to create a controllable square wave pulse, are capable of providing smoother welds with greater penetration into the metal for a more pleasing appearance. Winninghoff describes the Pulse MIGs of the past four to five years as "a heckuva lot better-the welder has better control and can work faster," cutting an estimated 15 percent of the labor time.

Unlike fiberglass, which cannot be welded, aluminum is quick and relatively easy to weld under most conditions. Highly shapeable, the metal lends itself to sculptured detailing with soft shapes and edges-allowing for the more attractive lines of today's aluminum craft. More easily machined than steel, aluminum can even be cut with common carpentry tools-a router and saber, circular, and band saws-rather than a torch. In addition, hull fittings such as bait tank pumps and depth finders can be installed by simply drilling and tapping into the hull with a stainless steel fastener.

Here again, however, computers are starting to revolutionize this aspect of the aluminum boatbuilding business, with cost-saving results. Both custom and production boatbuilders can now create hull designs with three-dimensional CAD (computer-aided design) software that can be fed directly to a computer-controlled cutting table, making for uniform, more quickly cut, pieces. Ease of cutting and welding is a factor not only during the construction process, but also for repairs and remodeling. Since aluminum boats are not built from molds, changes in design, altering the location of bulkheads, resizing cabins, etc., are all accomplished more easily than on fiberglass boats. Equipment can also be relocated more easily on an aluminum boat-by cutting and welding or drilling and bolting-than on fiberglass. As for durability and reparability: aluminum comes out ahead of both steel and fiberglass. Compared with a steel hull, a "strength-equivalent" aluminum hull (i.e., built to the same stiffness) boasts about 29 percent greater dent resistance and 12.5 percent greater resistance to rupture, according to Michael Kasten, of Kasten Marine Design, Inc., of Port Townsend, Wash.

With regard to flammability, aluminum does not burn and requires a temperature of over 1,000° F to melt. Further, aluminum boats can be easily fitted to provide "structural fire protection," i.e., containment of fire in a particular compartment by the craft's structure without help from firefighting systems.

Lightness + Strength = Versatility

An aluminum boat of a strength equal to a comparably designed steel or fiberglass boat will weigh less by approximately 20 percent or more. In fact, weight savings of 35% to 45% in hulls, and 55% to 65% in superstructures, can be achieved with aluminum compared to steel. Put another way, pound for pound aluminum is stronger than either material. Aluminum's weight advantage means that an aluminum craft of comparable design and equal strength will generally move more quickly if sail driven, use less fuel if motor-driven, be able to accommodate a heavier cargo, and be more easily trailerable than its steel and fiberglass counterparts. Higher vessel speeds and load capacities, enabled by use of aluminum, attract extra traffic volume and profit for the ferry operator. The use of aluminum can also improve seaworthiness, safety, and reliability, and lower maintenance costs.

For information on aluminum products for the marine market visit:

Alcan Inc.
http://www.rolledproducts.alcan.com/index.html ?menuID=2&segmentID=10&action=segment

Alcoa Inc.
http://www.alcoa.com/global/en/about_alcoa/businesses/alcoa_mill_prod.asp

Corns Aluminium Rolled Products
http://www.corusgroup-koblenz.com/english/products/shipbuilding/index.htm

Kaiser Aluminum & Chemical Corp.
http://www.kaiseral.com/kaiser/kaisermain.nsf

Pechiney Rolled Products
http://www.sheet-coil.pechiney.com/is-bin/INTERSHOP.enfinity/eTS/Store/-/-/-/Marine_Storefront-Start?Activite=Marine

Many aluminum products for marine applications are also available through the distribution network. The Metal Service Center Institute web site (http://www.msci.org/sitemap.adp) can help find a distributor.

Marine Materials Directory

The Marine Materials Guidebook is the result of an e-mail survey conducted in January 2004. Please send any additions, deletions or corrections to mren@marinelink.com. Publisher is not responsible for errors or omissions.

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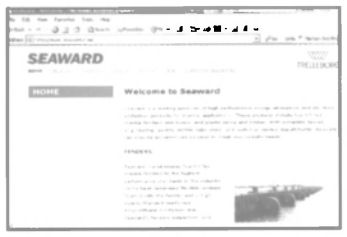

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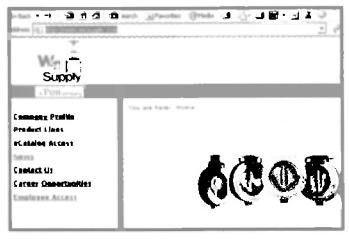

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Accord International, Inc.
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Houston, Tx 77087
Products: composite, rubber, metal, hydraulic, and fire hose assemblies, couplings, gaskets, packing, expansion joints, custom fabrication
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Apex Steel Corp
50 East Palisade Ave.- Suite 404
Englewood, NJ 07631
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ARCON Welding, mfr of The Workhorse Welder
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Salisbury, MD 21801
Products: DC Inverter Stick, MIG, TIG and Stud Welders that offer proven reliability, rugged construction and great welding characteristics.
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Oram`s Marine Village
Auckland, New Zealand
Products: Full service architectural design, interior decor and exterior styling concepts. Experienced designs comply with Coastguard Authority regulations, SOLAS and Lloyd`s Register.
Circle 40 on Reader Service Card

Benjamin R. Vickers & Sons Ltd
Airedale Mills, 6 Clarence Road
Leeds, LS10 1ND England
Products: Hydrox 550, Hydrox Bio 68, Hydrox 21, Hydrox Bio 220, Hydrox 8EP
Circle 41 on Reader Service Card

Brookdale - A DuPont Canada Company
#1 - 8755 Ash Street
Vancouver, BC V6P 6T3 Canada
Products: EVAC-U8™, EVAC+™ Emergency Escape Smoke Hood; EVACpro™ for Scott
Circle 42 on Reader Service Card

Cannon Muskegon Corporation
2875 Lincoln Street
Muskegon, MI 49443
Products: Stainless steel, nickel base alloys for castings
Circle 43 on Reader Service Card

Climax Portable Machine Tools, Inc.
2712 E. Second Street, PO Box 1210
Newberg, OR 97132
Products: Boring bar systems, Bore Welding Machines, Valve Repair Machines, Flange Facers, Milling Machines, Lathes.
Circle 44 on Reader Service Card

CMP Coatings Inc. (Chugoku Marine Paints Ltd.)
1610 Engineers Road
Belle Chase, Louisianna 70037
Products: Antifouling, Primer, Epoxy, Finish coat, Topcoat, Tank coatings.
Circle 45 on Reader Service Card

CORROSEAL/Geiger Enterprises, Inc.
P.O.Box 788
Coupeville, WA 98239
Products: Corroseal® Rust Converting Primer & Crystal Lok® Concrete Waterproofer
Circle 46 on Reader Service Card

Corrosion Correctors LLC
PO Box 2265
Poulsbo, WA 98370
Products: Ship-2-Shore Fluid Thin Film Corrosion / Rust Inhibitor Coating
Circle 47 on Reader Service Card

Custom Ship Interiors, Inc
PO Box 882
Solomons, MD 20688
Products: Interior construction - turnkey for all phases
Circle 48 on Reader Service Card

Cygnus Instruments, Inc.
PO Box 6417
Annapolis, MD 21401
Products: Ultrasonic metal thickness gauges - Ultrasonic Leak Dectector - Pit Gauges - Coating Thickness Gauges
Circle 49 on Reader Service Card

DeFelsko Corporation
802 Proctor Ave.
Ogdensburg, NY 13669
Products: Coating thickness gages and inspection instruments
Circle 50 on Reader Service Card

DLBA Robotics, Ltd.
1320 Yacht Drive, Suite 703
Chesapeake, VA 23320
Products: Manufacturers of Composite Tooling, Plugs, Patterns, and Limited Production Molds
Circle 51 on Reader Service Card

DMC Clad Metal Div. Dynamic Materials
5405 Spine Road
Boulder, CO 77379
Products: Bi-metallic, weld transition joints: aluminum to steel, etc.
Circle 52 on Reader Service Card

Duramax Marine LLC
17990 Great Lakes Parkway
Hiram, Oh 44234
Products: Johnson Cutless Sleeve and Flange Bearings, DuraCooler keel cooling, Duramax BoxCoolers, Johnson Fender and Dock Bumper, Commercial Stuffing boxes, Duramax Shaft Seal Systems
Circle 53 on Reader Service Card

Garibaldi Glass Industries, Inc.
7344 Winston Street
Burnaby, BC V5A 2G9 Canada
Products: Marine Window Manufacturer
Circle 54 on Reader Service Card

GE Sealants & Adhesives
16325 Northcross Drive
Huntersville, NC 28078
Products: Marine Silicone for Consumer and OEM Applications
Circle 55 on Reader Service Card

George G. Sharp Inc.
100 Church Street
New York, NY 10007
Products: Marine Systems, Analysis and Design
Circle 56 on Reader Service Card

Gibbs & Cox, Inc.
2101 Executive Drive
Hampton, VA 23666
Products: Marine Corrosion Consulting
Circle 57 on Reader Service Card

Goodrich Corporation
6061 Goodrich Blvd

Marine Materials Directory

Jacksonville, FL 32226
Products: design, analysis, and production of Marine Composite structures and Fireproof Composite Solutions Management Products, TDI Air Starters, Dynalco Controls
Circle 58 on Reader Service Card

Gullco International Ltd.
1175 Nicholson Road
Newmarket, ON L3Y 7V1 Canada
Products: Weld Automation Systems
Circle 59 on Reader Service Card

Hoyt Alloys
Garth Road, Morden, SM4 4LT U.K.
Products: Babbitt Metal Hoyt 11R for Diesels & Turbines Hoyt No.14 for Stern Tubes
Circle 60 on Reader Service Card

J. Calman Industries
176 West King Tut Road
Lynden, WA 98264
Products: polyurethane foam insulation [spray & pour] & specialty coatings
Circle 61 on Reader Service Card

Jamestown Metal Marine Sales, Inc.
4710 NW Boca Raton Blvd, Suite 400
Boca Raton, FL 33431
Products: Joiner bulkheads, linings, ceilings, galley equipment, refrigerated spaces, furniture and furnishings, joiner doors, insulation, HVAC sysyems and equipment, deck covering
Circle 62 on Reader Service Card

Joseph Farcus Architect, P.A.
5285 Pine Tree Drive
Miami Beach, FL 33140
Products: Architectural & Interior Design service
Circle 63 on Reader Service Card

Jotun Paints USA
9203 Highway 23
Belle Chasse, LA 70037
Products: Quality manufacturer of marine, offshore, and protective coatings including tank coatings.
Circle 64 on Reader Service Card

LeTourneau, Inc.
P.O. Box 2307
Longview, TX 75607
Products: ABS Certified High Strength Steel Plate 420-690(N/mm2) 45-100ksi Yield Strength, ABS EQ and FQ 690 Rack Material, 95/8 - 16" OD tubulars 500-620(N/mm2) 50-90ksi Yield Strength
Circle 65 on Reader Service Card

MTG Moltec
5-2320 Bristol Circle
Oakville, Ont. L6H 5S3 Canada
Products: PMA Nonmetallic Flexable Conduit System & EMI Protection up to "IP 69K"
Circle 66 on Reader Service Card

Nefora Oy
Iso-Heikkilantie 8
Turku, NA 20200 Finland
Products: Interior contractor, Turn-Key deliveries
Circle 67 on Reader Service Card

New Funnels (S) Pte Ltd
176 Gul Circle
Singapore, 629627
Products: Container Lashing Materials ; Marine Engineering; Marine Hardware
Circle 68 on Reader Service Card

Offshore Rubber Fenders, Inc.
1616 S. Voss Rd. Suite 890
Houston, Tx. 77057
Products: Marine Offshore Rubber Fenders
Circle 69 on Reader Service Card

Seaclear Industries
30 Research Lane
Las Vegas, NV 89101
Products: electricially heated glass, windows, replacement glass
Circle 70 on Reader Service Card

Seasafe, Inc.
209 Glaser Drive
Lafayette, LA 70508
Products: Fiberglass: Grating, Handrail, Ladders, Louvers, Platforms, Cable Tray, Strut
Circle 71 on Reader Service Card

Seaward

3470 Martinsburg Pike
Clear Brook, VA 22624
www.seaward.com
Robert Taylor
tel: 540-667-5191
fax: 540-667-7987
email:sales@seaward.com

Descr: Seaward is a design and manufacturing company with over 25 years of experience providing fender and buoy systems to the maritime industry worldwide.
Products: Foam filled fenders and buoy systems, recycled plastic piling and timbers, and urethane coatings.

Circle 72 on Reader Service Card

Specialty Metals Corp
8300 South 206th Street
Kent, WA 98032
Products: Distributor of Stainless Steel, Aluminum, Steel, and Alloys In House Processing including Waterjet Cutting, Flame Cutting, Shearing, Forming, Punching Same Day Service
Circle 73 on Reader Service Card

Steel America
400 E. Indian River Road
Norfolk, VA 23523
Products: Steel Fabrication, Machine Shop, In-place Machining, Heat Treating, Welding, Shafts
Circle 74 on Reader Service Card

TEXAS METAL CASTING COMPANY, Inc.
5400 Lotus Lane, P O Box 3259,
Lufkin, TX 75903
Products: Custom Alloy Castings of Aluminum, Bronze,Copper, and Stainles Steel.
Circle 75 on Reader Service Card

The Claremont Corporation
35 Winsome Drive
Durham, CT 06422
Products: Insulation Products and Solutions; Thermal, Acoustical, and Fire
Circle 76 on Reader Service Card

The Oceanscience Group
105 Copperwood Way, Suite J
Oceanside, CA 92054
Products: ADCP Deployment Tools; Surface, seafloor, mooring, boats, buoys and floats: Surface and subsurface Solar-powered LED marine lanterns, Wave gauges.
Circle 77 on Reader Service Card

Thermal Ceramics
2102 Old Savannah Road
Augusta, GA 30906
www.thermalceramics.com
Vicki Floyd
tel: 706-796-4482
fax: 706-560-4056
email:vfloyd@thermalceramics.com
Products: FireMaster marine structural fire protection systems offer lightweight, easy to install solutions in aluminum and steel bulkhead and deck applications.
Circle 78 on Reader Service Card

UFP Technologies
172 East Main Street
Georgetown, MA 01833
Descr: UFP Technologies is an innovative designer and custom converter of foam, plastics and natural fiber products
Products: Dow BluCell Sound Absorbing Foam

Circle 79 on Reader Service Card

Unitor Ship Service
9400 New Century Dr.
Pasadena, TX 77507
Descr: Unitor is the world's leading vessel equipment and service provider to the international merchant fleet and shipbuilding industry. The company's key competitive advantage is its international service and distribution network,
Products: Fire-Rescue-Safety, Refrigeration, Repair and Maintenance, Chemicals
Circle 80 on Reader Service Card

Uponor Unipipe
831 East Windsor Ave., Unit 9
Elkhart, IN 46514
Products: Multi Layer Composite pipe, Tin Plated Brass Fittings
Circle 81 on Reader Service Card

Viking Metals & Marine Supplies
6 Orquel Court
Dartmouth, NS B2W 4Z3 Canada
Descr: Products: Marine Valves, Copper Nickel Pipe & Fittings
Circle 82 on Reader Service Card

worldpanel.com
1750 Australian Ave #1
Riviera Beach, FL 33403
Products: Okoume,ocoume,marineplywood,marineply,BS1088,Cabin-Sole,Starboard,Seaboard,Diamonite,Brookline,Braewood,Brookline,Veneers,Teak,Cabin-Sole,Teak&Holly,TeakHolly,Teak Floorin
Circle 83 on Reader Service Card

W&O Supply

3485 Evergreen Ave.
Jacksonville, FL 32206
www.wosupply.com
tel: 800-962-9696; fax: 904-354-5321
info@wosupply.com

W&O Supply is a dedicated team of professionals committed to being the premier provider of total piping solutions to the marine industry. W&O Supply offers a wide variety of both commodity and engineered products and solutions for the maritime industry.
Circle 84 on Reader Service Card

Wortelboer G.J. jr B.V.
Quarantaineweg 5
Rotterdam, 3089KP
The Netherlands
Descr: Products: Anchors & Chain cable
Circle 85 on Reader Service Card

Boatracs Joins Port Security Test

Boatracs recently participated in a maritime security exercise co-sponsored by the Transportation Security Administration (TSA), Regional Maritime Security Coalition (RMSC), Oregon Emergency Management (OEM), and the states of Washington, Oregon, and Idaho. The security exercise was designed to test maritime communication systems and track cargo movement along the Columbia and Snake River systems as a means of preventing potential security threats to US transportation networks.

Circle 16 on Reader Service Card

Rolls-Royce Marine Expands U.S. Presence

Last month Rolls-Royce Naval Marine Inc. broke ground for the expansion of its foundry in Pascagoula, Miss., signaling the importance of the U.S. market in the company's future. The 18,000 sq. ft. facility is designed to enhance manufacturing capabilities and improve production efficiency across a range of propellers and submarine propulsors.

"The expansion of this facility demonstrates our commitment to our customers," said **Patrick J. Marolda**, President, Rolls-Royce Naval Marine Inc. "We wanted to provide better products faster - to be better able to compete - and upgrading and streamlining our manufacturing in this facility allows us to do just that." "Rolls-Royce Naval Marine is a long-time friend of Mississippi and of Pascagoula, and we're delighted to be increasing our presence here," said Marolda.

The facility offers 15,000 sq. ft. of manufacturing space and will house a 10 m gantry milling machine able to machine propellers up to eight meters in diameter. Together, this machine and this space will dramatically accelerate the machining process -- three times faster than the current rate.

"Growing this facility also underscores our commitment to the US," added James M. Guyette, President and CEO, Rolls-Royce North America.

Circle 13 on Reader Service Card

Cranesmart Systems Finds Success in GOM

Cranesmart Systems has found lucrative crane safety equipment business for offshore drilling rigs in the Gulf of Mexico.

Its wireless design, marine duty components, and intrinsically safe options are designed to make the units reliable and efficient. Letourneau Inc., a division of Rowan Companies, uses Cranesmart Systems on Gorilla VIII, as well as its Tarzan Class rigs.

The Cranesmart System displays load on the hook, maximum rated capacity, load moment, radius, boom angle and anti-two-block function, without the need for cable reels, hydraulic hoses, or moving parts.

Cranesmart Systems are shipped precalibrated, and are designed for self-calibration, eliminating the need for test weights or complicated re-calibration procedures. Systems install normally within a couple of hours.

Circle 18 on Reader Service Card

Eletson Chooses Seagull

Eletson selected Seagull to provide Computer Based Training for their vessels, which it will implement library fleetwide.

Circle 17 on Reader Service Card

EMMF Strengthens Global Bunkering Team
Exxonmobil Marine Fuels (EMMF), a leading supplier of marine fuels, made moves recently designed to strengthen its bunkering team. **Dan Bryce** is to leave his post as EMMF Americas General Manager to become Adviser, LNG/PGS Business Planning and Support, ExxonMobil Gas and Power Marketing, based in Houston. **Joe Rud**, currently EMMF Manager for Marketing and Supply, is relocating from Leatherhead (UK) to Fairfax (USA), to become General Manager Americas, EMMF Fuels Marketing Division. **Iain White**, currently Business Development Manager, Marine Fuels, Leatherhead, is to become Marine Sales Manager UK/Ireland/Israel, Marine Lubricants, Marine & Aviation Lubricant Sales. **Yeo Ek-Thoe**, currently EMMF General Manager Asia Pacific, is to become Manager Marketing and Supply, EMMF Asia Pacific Pte Ltd, based in Singapore. The new EMMF Asia Pacific General Manager will be **Kim Macmillan**. **Sowmi (Krish) Krishnamurthy** remains as EMMF general manager Europe, Africa and Middle-East, and **Patrick Billy** continues as EMMF manager business planning and analysis. ExxonMobil Marine Fuels (EMMF) is relocating its International Sales for Europe, Africa and Middle East to Antwerp, effective February 2, 2004.

Circle 15 on Reader Service Card

Kennemann New Chairman for SMM Committee
Jiirgen Kennemann, the Chairman of the management board of the shipyards Aker Werften MTW, has been selected as the new chairman of the Consultative Committee of SMM 2004, scheduled to take place in Hamburg, Germany from September 28 to October 2.

Aker Finnyards Names New President
Jyrki Heinimaa (38) was appointed the new President of the Finnish shipbuilding company Aker Finnyards Oy as of February 16, 2004. He has been employed by the company since 1996. **Erik Skogstrom** (39), M.Sc. (Nav.Arch), Shipbuilding, the Senior Vice President, Production, of the company has been appointed as Deputy to the President and Executive Vice President.

A&B Names New Execs
Christopher J. Benjamin was promoted to vice president and CFO. **Thomas A. Wellman** was promoted to vice president, controller and treasurer. **Charles W. Loomis** will be promoted to associate general counsel, and will retain his position of vice president with A&B Properties, Inc.

Flood New GM of Continental Marine
Dan Flood has been promoted to general manager of Continental Maritime, a subsidiary of its Northrop Grumman's Newport News sector. He replaces **Dave McQueary**, who is retiring.

CAE USA Names New Tech Director
CAE USA marine systems has named Capt. **William H. Luebke** to the newly created position of director of technology. He will help set, monitor and evaluate technical standards, as well as develop new engineering approaches to bring the best marine control solutions.

Three Executive Appointments at Newport News
Northrop Grumman Corporation announced three appointments in its Newport News sector: **Becky Stewart,** currently vice president, Surface Ship and Submarine Fleet Maintenance Program has been named head of the Submarine Program; **Irwin F. Edenzon**, currently vice president, Business and Technology Development, has been named vice president, Technology Development and Fleet Support; and **John J. Mazach**, currently executive director, Business Development, has been promoted to vice president, Business Development.

Adm. Johnson Elected to Wartsila-Lips Board
Admiral **Jerry Johnson** has been elected to the Board of Directors of Wartsila-Lips, Inc. as the Vice President, Business Development, and member of the Government Security Committee.

Larson Appointed General Counsel of FMC
Amy W. Larson was appointed as the General Counsel of the Federal Maritime Commission (FMC).

Durfee Joins Senesco Marine
Senesco Marine hired **William K. Durfee** as its new Senior Vice President of Procurement and Planning. He will oversee and streamline several of the company's procedures, including the front end of contracts and the scheduling of construction personnel and projects.

Irby Joins Bollinger
Danny R. Irby has joined Bollinger as executive vice-president, new construction responsible for all aspects of construction of new boats, barges and other specialized vessels and equipment, commercial and government.

Casjens to Leave Hapag-Lloyd Board
Günther Casjens, a member of the executive board of Hapag-Lloyd AG, is leaving the company at his own request with effect from March 1, 2004.

Towers Joins EBDG
Elliott Bay Design Group (EBDG) said that **Jim Towers**, P.E. has been promoted to Chief Engineer.

Sulzer Engines Selected for German Containerships

Eight 1,574 TEU container ships contracted by the German owner Peter Döhle Schiffahrtsgesellschaft at the Jiangsu Yangzijiang shipyard in the People's Republic of China are to be propelled by Sulzer RT-flex common-rail engines. Each ship will be equipped with a single 7-cylinder Sulzer RT-flex60C low-speed engine with a maximum continuous power output of 16,520 kW (22,470 bhp) at 114 rpm. The ships are due for delivery in 2005 and 2006.

Circle 14 on Reader Service Card

Success Aboard QM2

Datamodul´s daughter-company, CONRAC GmbH was awarded by Kelvin Hughes for the delivery of Type Approved TFT Displays in their new and future IBS Programs. Next to the superior performance and quality aspects, one of the main reasons for this decision was, the high level of own development integrated in the concerned TFT monitors. The result can be recognized in the Queen Mary 2 bridge. All TFT displays are delivered in an OEM Chassis-Only version, ready for integration in the special design of the bridge.

The QM2

During the late 1990's Kelvin Hughes realized that the availability of cathode ray tubes (CRTs) for use in bridge navigation displays, such as Radar and ECDIS, was becoming limited. The introduction of flat panel screens into the leisure/home market and commercial industry was also seen to be growing.

Kelvin Hughes was making good inroads into the Integrated Bridge market with its Ninas 9000 system based on the Nucleus range of Radar and ECDIS displays.

International Design Consultants (IDC) was brought in to work with Kelvin Hughes in the past on Concept and Nucleus Radar. IDC was now tasked with looking at commercial shipping, speaking to navigators and ship's bridge operators to see how they operated and what they wanted from the bridge of the future: in essence how it would look and operate. At the same time the designers at Kelvin Hughes sought flat panels to meet the rigorous demands of the marine environment and the requirements of the type approval authorities. While numerous panels were commercially available, their lack of ability to completely dim to black was just one of the problems encountered. At the same time the systems department of Kelvin Hughes were looking at multi-switching processors and displays to provide a more versatile future bridge.

Kelvin Hughes and IDC came up with a futuristic "Concept" design for a small five panel integrated bridge which would incorporate commercially available flat panels, engine controllers, autopilots, communication systems, steering control and other gauges and indicators. This bridge design became known as the Manta system because of its shape from above resembling that of a Manta Ray.

The "Concept" Manta Bridge was never intended as a saleable product, it was intended to show the market in which direction Kelvin Hughes was heading, in its design and engineering. The company had continued to sell the traditional CRT based Ninas 9000 bridge to world-wide markets including the cruise ship industry with the 'Mistral' built at yard of Chantiers De L'Atlantique.

In 2000 Chantiers De L'Atlantique won the contract for the new Cunard cruise ship the QM2 and contracts went out for the equipment to be fitted in her. Kelvin Hughes won the contract to supply the complete navigation bridge against stiff competition. At this stage no one was quite sure what the final layout would be or how it would look. One dilemma was that although the company had won the contract in 2000, the supply of the equipment would not take place until 2003. Kelvin Hughes knew that by then although CRTs would still be available it would be difficult to offer full life replacements. By now TFTs had improved, they were available, type approved and fully met the marine requirements. Kelvin Hughes now had TFT flat panels suitable for bridge installations and looked to IDC to produce a workable design which would accentuate the benefits of this new technology. What was needed was a design that showed that TFTs were more compact than CRTs, lighter in weight and could be incorporated into an ergonomically pleasing unit. It was also required that these units could be incorporated into simple styled consoles to form anything from a small fast ferry bridge to a complex unit such as that required by Cunard for the QM2.

After much discussion and passing of various designs back and forth, the shape and form of the Manta Display was finally agreed. All that had to be done now was to convince Cunard that what Kelvin Hughes intended to supply their prestigious ship would match its image and take it well into the 21st century.

One of the radical aspects of the new bridge layout was to move the center console away from the displays. This console, which traditionally protrudes out from the bridge, normally contains the engine controls, autopilots, communication handsets and other essential controls. Because of the amount of equipment that the console has to accommodate and the restrictions on its size to conform to class approval it can give problems in the design of bridge layouts. The decision to move it away from the displays now allows more equipment to be put in it, while allowing the bridge operators free access to all the displays. As this design concept had not been used before, Kelvin Hughes has taken out a patent on this layout.

At a meeting at the headquarters of Kelvin Hughes in Hainault, expected by the representatives of Cunard and Chantiers De L'Atlantique to last an hour or so, the new design was launched to them showing all the benefits and features that would enhance the new ship. Thankfully everyone was more than enthusiastic and embraced the new look. They immediately set about replanning the bridge to incorporate all the new ideas and designs in a meeting that now took up most of the day.

For more information
Circle 31 on Reader Service Card

LCD's Turning Black

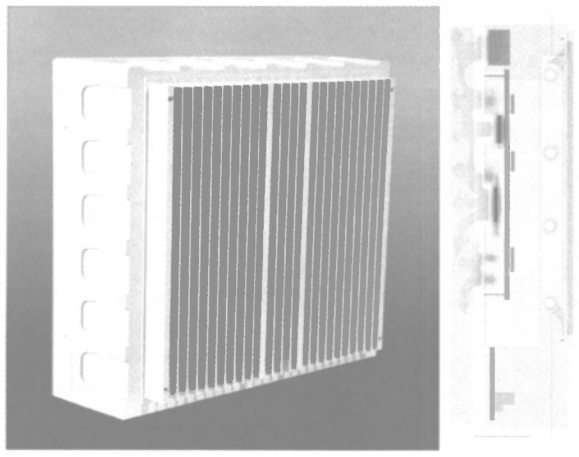
Considerations in the Design of an IP67 Rated Computer or Display for Outdoor Marine Applications

An outdoor designed product is required to be totally sealed to eliminate uncontrolled system contamination through external fans and openings. To increase system reliability, it is advised to eliminate active cooling devices such as heat exchangers. Before applying passive cooling it is necessary to measure the amount of energy that will be introduced into the box and know how much thermal load the enclosure can remove.

For outdoor use, aluminum (when treated with the right chemical processes) is a good alternative to stainless steel. An aluminum enclosure with integrated heat sinks (usually a cast assembly) with good thermal conductivity characteristics is recommended. Integrated heat sinks not only offer the lowest thermal resistance for the heat to move out of the system, but also utilizes natural convection cooling through the heat sink fins.

In addition, low power components in the design help reduce overall power consumption, hence the internal temperature rise resulting in heat transfer efficiency and a lower internal temperature rise by thermally bonding high power components such as power supply, processors and LCD backlight. "Hot spots" are avoided inside the enclosure by circulating the air evenly towards the heat sinks. All of these features result in a minimum internal ambient temperature rise minimizing the temperature on the LCD from inside the box.

There are two major sources of power on the LCD (a) solar (b) backlight. The solar power is about 1KW/M^2 and the backlight power varies on type and size of the LCD. For example, on a 15-in. ACTFT LCD, the solar power amounts to approximately 60W on the LCD and high bright backlight power is about 30W. The LCD assembly in this case acts like a glass house with energy sources on both sides. This excessive power increases the temperature of the liquid crystal to a point where it stops polarizing and turns the LCD "black". The loss of polarization is marginally recoverable and typically follows a consistent pattern. Initially, a black dot expands in the center, growing larger until it fills the entire screen. Also, LCD's left for a long period of time in a 'black screen' mode can cause damage beyond repair.



Images showing fins on the back of the enclosure for convection cooling and passive heat dissipation through direct contact of heat sources with the enclosure.

To eliminate the LCD turning black, verification of the design is needed. For instance on certain 15-in. LCD's, temperatures of 85°C or higher will cause the LCD to turn black. The LCD ambient temperature must equal an external ambient temperature of 55°C, plus an internal temperature rise of best case 10°C, to 65°C. Typically, 1000W/M^2 solar gain should equal 60W of power on the surface of the LCD (60W of power is equivalent to a 60°C temperature rise) and the total minimum temperature rise on the surface of the LCD is equivalent to 125°C. For the LCD not to turn black, an additional 40W of energy must be removed.

Removing the additional 40W of energy is done by applying special solar filters. These filters reflect major portions of the solar energy, blocking it from the LCD glass. In addition, circulating air between the enclosure glass and the LCD will complete the cooling required to eliminate the LCD from turning black.

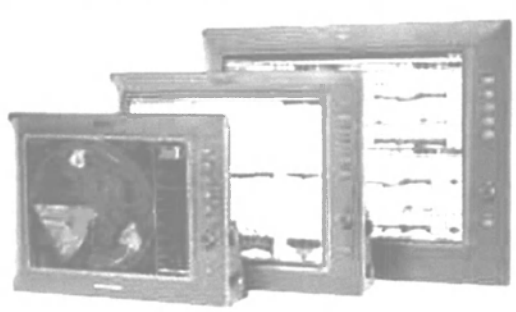
Azonix Corporation was founded in 1981 as a design and manufacturing engineering firm specializing in rugged, high-precision measurement, control and display products.

Originally designed for the demanding standards of the offshore oil industry, this core technology is now integrated into the ProPanel Mariner, used in the commercial and military marine industry.

Circle 29 on Reader Service Card

New TFT Monitors from Simrad

Simrad's recently launched a range of LCD monitors based on high quality TFT MVA Premium technology and available in 15, 17, 19 and 23-in. versions, with a 10-in. version due soon. Dubbed the CF range all the displays offer improved input options, meaning that each model includes DVI-D input, RGB standard input and Video input. A Picture In Picture (PIP) function enables a secondary input to be displayed, this could be a deck camera or video feed. CF displays can be viewed almost anywhere on a vessel, making them easy to position for effective working conditions.

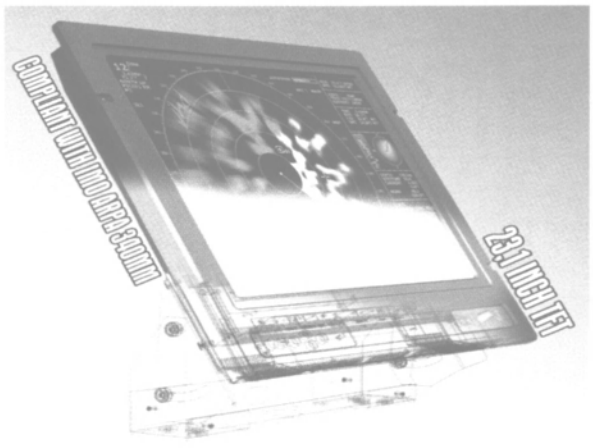


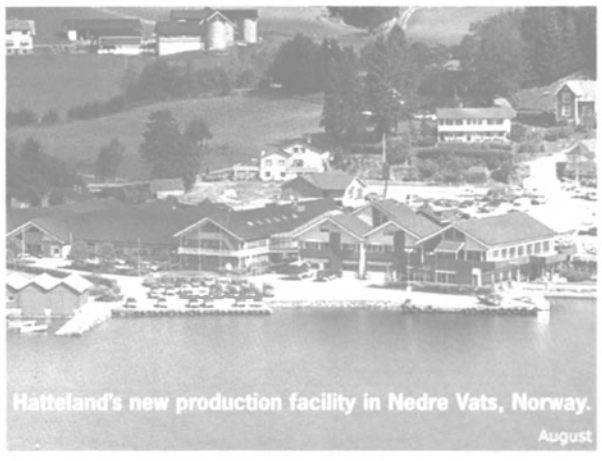
Circle 30 on Reader Service Card

The Needs of Maritime Electronic Equipment

The rigorous standard of the International Electrotechnical Commision IEC60945 for the maritime market is mandatory for reliable and safe Electronic components. Following the CRT-tubes new technologies like LCD has emerged. In opposite to the analogue CRTs the LCD Screens are digitally driven and therefore this aspect must be considered. The link between Displays and Computers is more important and this combination must be understood and handled in a proper way. For example the calibration of ECDIS Displays requests deep know-how because Display and Computers graphic card both influences the result. Beside the technological understanding it is self explanatory that such high sophisticated equipment cannot be compared with consumer products. Hence the availability, serviceability and form-fit-and-function must be secured through many years. The right choice of industrial key-components is essential. Focused on the Martitime Market the Jakob Hatteland Display Group is dedicated to offer and fullfill these requirements.

Jakob Hatteland Display, Norway with its recent daughter company Jakob Hatteland Technology started in 1987 and has been involved in the maritime market since then. Today the Group develops and manufactures a complete range of high quality and type approved Displays, Panel-Computers, Stand-alone and Rack-Computers for maritime and industrial applications and was worldwide the first company to offer a fully approved 23" LCD Radar-Display, back in 2001.




Hatteland's new production facility in Nedre Vats, Norway.
August

The Products

Based on high quality and state-of-the-art components with the highest specifications Hatteland's products meet the requirements for harsh applications. Integration into systems are made easy due to standardized products and features. The Displays (MMD) and the Panel-Computers (MMC) are suitable for a variety of applications with manyfold available accessories, like remote control, brackets, touch screens, sunvisors, etc. ECDIS&ARPA compliant units and MIL tested units for Naval use are obtainable. All products are fully dimmable for night vision use.

The Computers (MSC) are powerful and compact and can be placed virtually everywhere. An ideal and robust unit for maritime environments, available either with AC- or DC-PSU and many more options.

The 19-in.-Rack computers are ideal for use in environments where performance is important, different versions in 2U and 4U heights are available. Equipped with Intel Pentium 4 Processors, respectively with (dual) Intel Xeon Processor these computers are the choice for demanding applications.

Opened in September 2003 with a notably opening ceremony with guests from worldwide, Hattelands plant #1 in Nedre Vats, Norway is equipped with modern installations with Heat-up chambers, 3 ECDIS calibration chambers and a closed dust-free zone for final assembly. A dedicated production area for Computers and for prototype production is running in the same building. The capacity here is more then 20.000 units per year and offers expansion possibilites for future needs.

Testing and Approvals

The Standard IEC945 (EN60945) test is mandantory for all of the products. ECDIS products are approved by BSH in accordance to the IEC61174 standard. For MIL applications the MIL-STD 461D (1993), MIL-STD 462D (1993) and extended environmental tests are done. All products are/will be approved by world's leading classification societies.

For more information on Hatteland
Circle 5 on Reader Service Card

Fusion 980 Display Wall

The high-performance Fusion 980 display wall controller processor, by Jupiter Systems utilizes Jupiter's revolutionary new switched-fabric architecture, Intel's new dual-core Xeon processor and ATI's Radeon Mobility 7500 graphics chip. These enable the Fusion 980 to drive as many as 60 displays at 1600 ? 1200 resolution and to display up to 32 video sources, 32 RGB computer sources and virtually unlimited network and local applications.

Circle 32 on Reader Service Card

Advantage of Marine Guard™ Foam Filled Marine Fenders

Urethane Products Corporation's Marine Guard™ Foam Filled Marine Fender offers many significant advantages over Hard Rubber and other types of fenders. Foam filled marine fenders are fabricated from a closed-cell resilient foam that absorbs significant quantities of energy when compressed. The foam is protected by thick, filament-reinforced outer elastomer skin. This construction offers a number of important features and advantages.

High Energy Absorption With Low Reaction Force

Marine Guard™ Foam Filled Fenders have both high-energy absorption and low reaction force. Reaction forces at rated compressions are lower than most other fenders at comparable energy levels. The low reaction force of the foam filled fender is an important consideration in the design of piers and quay walls, where significant economies are produced by eliminating the need for load-spreading panels, which are required for most large hard rubber fenders. Foam filled fenders dissipate a significant portion of energy internally and do not cause the vessel to rebound from the berth as readily as pneumatic or hard rubber fenders.

Tough Outer Skin

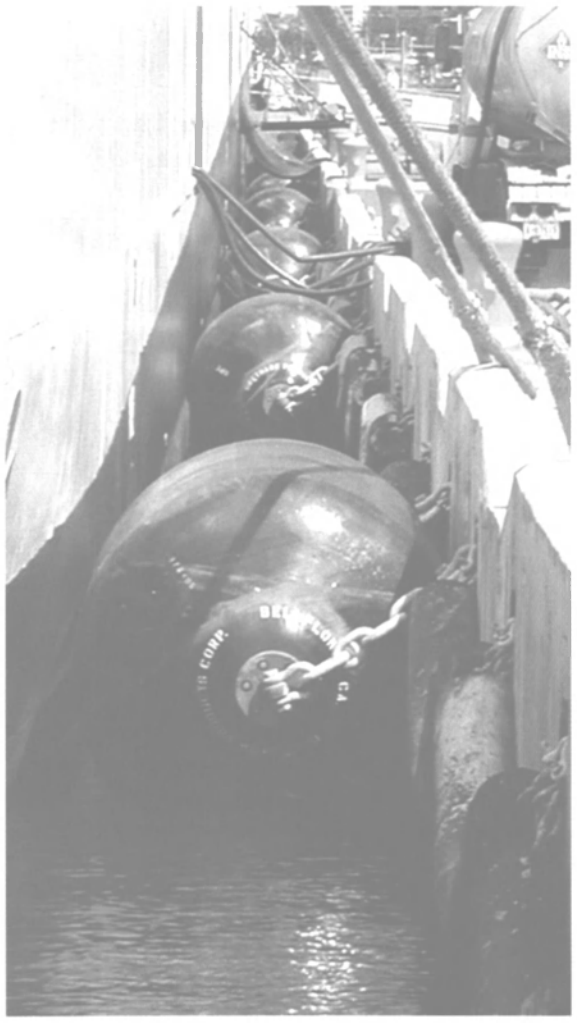
Foam filled fenders have a rugged polyurethane elastomer outer skin, with nothing o snag hull protrusions or dock fittings. To provide added strength, the thick skin is reinforced with nylon filaments. Independent tests have shown that this gives the outer skin of the fender a rear strength improvement of 4 to 6 times than that of an equivalent thickness of unreinforced skin. Other types of fenders with a layered construction are subject to delamination between the layers of fabric reinforcing and rubber membrane. The urethane elastomer skin is far more resistant to the degrading effects of oil, chemicals, ozone and UV radiation than is the vulcanized rubber used in other types of fenders. Urethane is also very abrasion resistant. Formulated specifically for marine fenders, the outer fender skin undergoes strict quality control at the manufacturing plant.

Custom Size and Colors

In addition to traditional fender sizes, foam fender manufacturing processes allows the fenders to be designed and supplied in custom sizes, capacities, configurations and colors.

Laboratory and Field Tests

Marine Guard™ Foam Filled Fenders have been extensively tested to verify their performance, ruggedness and durability. Compression tests are conducted in a certified laboratory using one of the world's largest compression testing machines. These fenders consistently excel in all other required tests, including energy absorption; capacity and reaction forces; ultimate compression; cyclic compression (dynamic and sustained loading); transverse pull tests;



and longitudinal pull tests. Years of field operation with foam filled fenders have confirmed the ability of these fenders to take the rugged service for which they are designed.

Quality

Materials testing, verification and inspection are in accordance with the standards and practices of:

- ASTM (American Society for Testing and Materials)
- ISO (International Organization for Standardization)
- AWS (American Welding Society)
- AISC (American Institute of Steel Construction)
- SSPC (Steel Structures Painting Council)

Statistical quality techniques include statistical process control and sampling plans. Quality systems have been audited and approved by the many organizations, including:

- ABS (American Bureau of Shipping) - system and type approvals
- DCMC (Defense Contract Management Command)
- DGSC (Defense General Supply Center)
- ISO (International Organization for Standardization)

Simple Installation

Installation of Marine Guard™ Foam Filled Fenders is simple compared to hard rubber fenders, which require specialized mounting fixtures. The fenders use standard chain pendants attached at each end of the fender. Load-spreading panels between the ship and the fender are not required. Fender transportation using standard rigging methods is easily accomplished.

Total Buoyancy

The natural buoyancy of foam filled fenders also allows them to be installed in a floating position between a ship and dock or another vessel. This is particularly beneficial in areas with large tidal or seasonal water level fluctuations since, unlike fixed fendering, the floating fender can rise and fall with changing water levels. The floating fender remains at the water line of the vessel for optimum fendering.

Burst Resistance

When a Marine Guard™ Foam Filled Fender is compressed, the compression force is resisted by the pressurization of many small, completely closed foam cells and by the buckling of the cell walls, the resistance to cell bursting is very high. The fender skin is not a pressure containment boundary; therefore, there is no need for pressure relief valves or inflation valves on the outer cover.

Safety

Because of the foam filled fender's unique design, it will not explode or sink. It retains its energy absorbing and standoff capabilities even if the skin is damaged. This extra margin of safety can be vitally important in docking, marine salvage, offshore construction or ship-to-ship transfer operations.

Low Maintenance

The foam filled fender has been designed to resist environmental conditions. The exterior is highly resistant to ozone, hydrocarbons, ultraviolet radiation, sweater and other environmental factors, and the skin color is integrated into the elastomer.

Reliable Performance

All of the above factors combine to eliminate many of the post purchase maintenance and potential replacement costs of other fenders. Years of successful performance in the field have established the foam filled fender as the standard fendering solution for the industry.

Tel: (562) 630-4982
Fax: (562) 630-6974
www.urethaneproducts.com
e-mail: jthermos@urethaneproducts.com
Circle 260 on Reader Service Card

BUYER'S DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER. 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 assumes no responsibility for errors. If you are interested in having your company listed in this Buyer's Directory Section, contact Mike Lowe at Lowe@marinelink.com

ACCOMMODATION LADDERS & GANGWAYS

Rampmaster, Inc., 6600 NW 32nd Avenue, Miami, FL 33147, 800-327-8917, 305-694-8270, sales@rampsonline.com, Contact: Al Davis, www.rampsonline.com

AIR CONDITIONING & REFRIGERATION

Adrick Marine Corp. , P.O. Box 1549 , N.Massapequa, NY 11758, 631-491-9475, 631-491-9478, adrick1976@aol.com

Bailey Refrigeration, 4986-1 Euclid Road, Virginia Beach, VA 23462

Cospolich Refrigeration, 14695 Highway 61, Norco, LA 70079

Flagship Marine, Inc, 2427 SE Dixie Hwy , Stuart, FL 34996, 800-316-6426, 772-283-4611, sales@flagshipmarine.com, Contact: Tom Martland, www.flagshipmarine.com

Port-A-Cool, PO Box 2108, Center , TX 75935

Stork Bronswerk Inc . 3755 C Boul. Matte, Brossard, Quebec J4Y 2P4, Canada

Taylor Made Environmental, P.O. Box 15299, Richmond, VA 23227

AIRHORNS/SIGNALING EQUIPMENT

Airchime Manufacturing Co.. 5478 267th St., Gloucester Industrial Estate,, Langley, BC V4W 3S8, Canada

Kahlenberg Brothers Co.. P.O. Box 358, Two Rivers, WI 54241

ALARMS, FACTORY-MUTUAL APPROVED

NREC Power Systems, 5222 Hwy 311, Houma, LA 70360

Selco USA Inc.. 2508 Lakebrook Ct, Atlanta, GA 30360-1715

ALUMINUM BOATS

Island Boats, 6806 Highway 90 East, New Iberia, LA 70560

Metal Craft Marine Inc . 347 Wellington St . Kingston, Ontario K7K 6N7, Canada

Sea Ark Marine, P.O. Box 210, Monticello, AR 71655-0210

William E. Munson Co., 18130 Sunset Way, Edmonds, WA 98026

ALUMINUM SUPPLIER

Aluminum & Stainless Inc, 101 Thru-Way Park, Broussard, LA 70518, 800-252-9074, 337-837-5439, sales@aluminumandstainless.com

ANCHORS & CHAINS

CS Controls Inc, 101 Dickon Road, Houma, LA 70363, 985-876-6040, 985-876-0751, info@cscontrols.com, Contact: Paul Srigley, www.cscontrols.com

GJ Wortelboer Jr. B.V., P.O. Box 5003 , 3008 AA Rotterdam, Netherlands

Washington Chain & Supply, P.O. Box 3645, Seattle, WA 98124

ANTIFOULING

Flexdel Corp. /Aquagard, 1969 Rutgers University Blvd., Lakewood, NJ 08701, 888-353-9335, 732-901-6504, flexabar@sprintmail.com, Contact: Joe, Andy, or Rick, www.aquagard-boatpaint.com

Jotun Paints USA, 9203 Highway 23, Belle Chasse, LA 70037

AUTOPILOT SYSTEMS

AG Marine Inc., 5009 Pacific Highway East 11, Tacoma, WA 98424

Beier Radio, 1990 Industrial Ave, Harvey, LA 70058

ComNav Marine Ltd.. 13511 Crestwood Pl.. Ste 15 15, Richmond, BC V6V 2G1, Canada

Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-1851

BALLAST

Ballast Technologies, 4620 S. Coach Dr., Tuscan , AZ 85714

Redland Genstar Inc., Executive Plaza IV, Hunt Valley, MD 10912-1031

BATTERY CHARGERS

La Marche, 106 Bradrock Drive, Des Plaines, IL 60018, 847-299-1188, 847-299-3061, sales@lamarchemfg.com, Contact: John Pawula, www.lamarchemfg.com

BEARING- RUBBER, METALLIC, NON-METALLIC

Cooper Bearing, 5795 Thurston Ave., Virginia Beach, VA 23455

Craft Bearing, 5000 Chestnut Ave., Newport News, VA 23605

Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234

Orkot Composites, 2535 Prairie Rd, Unit D., Eugene, OR 97402, 541-688-5529, 541-688-2079, mscott@polymersealing.com, Contact: Mike Scott, www.orkotmarine.us

Thordon Bearings Inc., 3225 Mainway, Burlington, Ontario L7M 1A6, Canada

BILGE SYSTEMS

Fast Systems, 14040 Santa Fe Drive, Lenexa, KS 66215-1284

Westfalia Separator, Inc., 100 Fairway Court, Northvale, NJ 07647, (201) 767-3900, (201) 784-4399, brown.courtney@wsus.com, Contact: Courtney Brown

BLOCKS & RIGGING

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

BOATBUILDER

Sea Ark Marine, P.O. Box 210, Monticello, AR 71655-0210

Washburn Doughty, P.O. Box 296, E. Boothbay, ME 04544

BOLLARDS

Maritime International, 100 E. Vermilion St. #212, Lafayette, LA 70501

BRIDGE SUNSCREENS

Martek Marine Blinds, Unit 46, Century Business Centre, Maversway, Rotherham, South Yorkshire S63 5DA, UK

BROKERS

Marcon International, P.O. Box 1170, Coupeville, WA 98239

BULKHEAD SEALS/PANELS

CSD North America, 880 Candia Rd , Unit 10, Manchester, NH 03109

Thermax, 3115 Range Rd, Temple, TX 76501

BUOYS

Datrex, P.O. Box 1150, Kinder, LA 70648

CAD/CAM SYSTEMS

Albacore Research, 4196 Kashtan Place, Victoria, BC V8X 4L7, Canada

Autoship Systems Corp., Suite 312-611 Alexander Street, Vancouver, BC V6A 1E1, Canada

Cadmatic , Ostra Strandgatan 72 (Vita Huset), FI-20810 Turku, Finland

Creative Systems Inc.. P.O. Box 1910, Port Townsend, WA 98368

CAPSTANS

Coastal Marine Equipment Inc., BLDG. 9114 MISAAP Industrial Complex, Stennis Space CTR., MS 39529, 228-813-1700, 228-813-1709, sales@coastalmarineequipment.com, Contact: Ralph Waguespack, www.coastalmarineequipment.com

CS Controls Inc, 101 Dickon Road, Houma, LA 70363, 985-876-6040, 985-876-0751, info@cscontrols.com, Contact: Paul Srigley, www.cscontrols.com

Superior Lidgerwood Mundy, 1101 John Ave., Superior , WI 54880

CARGO MONITORING & CONTROL SYSTEM

Hermatic Inc., 4522 Center St., Deerpark, TX 77536

CAST IRON REPAIR

In-Place Machining, 1929 N . Buffum St, Milwaukee, WI 53212

CHAINS

Crandall Drydock Engineers, PO Box 505804, Chelsea, MA 02150

G.J. Wortelboer, Postbus 5003, 3008 AA Rotterdam, Netherlands

Washington Chain & Supply, P.O. Box 3645, Seattle, WA 98124

CHEMICALS/ CHEMICAL CLEANERS

Uniservice Americas, 57174 Hardin Rd., Slidell, LA 70461

CLASSIFICATION SOCIETY

American Bureau of Shipping, 16855 N. Chase Drive, Houston, TX 77060

CLOSED CIRCUIT TELEVISION

Hernis Scan Systems A/S, Postboks 619, NO 4809 Arendal, Norway

CNC PLATE CUTTING

Advanced Fabricating Inc. PO Box 3721, Galveston, TX 77552

COATINGS/ CORROSION CONTROL/ PAINT

Chugoku Marine Paints, P.O. Box 73, , 4793 , Netherlands

DeFelsko Corp. 802 Proctor Ave., P.O. Box 676, Ogdensburg, NY 13669

Ferro Corp., 1301 North Flora St., Plymouth, IN 46563

Flow International Corp., 23500 64th Ave., South Kent, WA 98059

Hempel Coatings , 10-3511 Viking Way, Richmond, BC V6V 1W1, Canada

Jotun Paints USA, 9203 Highway 23, Belle Chasse, LA 70037

MK Production Resources Inc., 1610 Reynolds Street, Brunswick, GA 31520

Nace International, 140 South Creek Dr., Houston, TX 77084

NAPASCO Inc., 213 Main Project Road, Shriever, LA 70395, 985-449-0730, 985-449-0740, napasco@napasco.com, Contact: Pam Bartell, www.napasco.com

Resto Motive Laboratories, P.O. Box 1335, Morristown, NJ 07962-1235

Sherwin Williams, 101 Prospect Ave., Cleveland, OH 44115

Sigma USA, P.O. Box 816, Harvey, LA 70059

COMMUNICATIONS

Inmarsat Ltd. 99 City Rd., London EUY 1AX, UK

L-3 Communications, 6000 Fruitville Road, Sarasota, FL 34232

Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-1851

Seawave, 76 Hammarlund Way, Middletown, RI 02842

World-Link Communications, 74 Main St., Framingham, MA 01701

COMMUNICATIONS SERVICE

Mantel Marine Communications, 16 E. 41st Street, NY, NY 10017

COMPOSITE SHAFTS

Centa Corp., 815 Black Hawk Drive, Westmont, IL 60559

COMPOUNDS

Philadelphia Resins, P.O. Box 309 , Montgomeryville, PA 18936

COMPUTER SOFTWARE MONITORING SYSTEMS

Azonix Corp., 900 Middlesex Turnpike, Bldg 6, Billerica, MA 01821, (978) 670-670-6300, (978) 670-8855, ProPanel-Mariner@azonix.com

COMPUTER/ COMPUTER SOFTWARE

Autoship Systems Corp., Suite 312-611 Alexander Street, Vancouver, BC V6A 1E1, Canada

Creative Systems Inc., P.O. Box 1910, Port Townsend, WA 98368

Spec Tec , Professor Koth's Vey, 1366 Lysaker, Norway

CONSOLE- GMDSS

Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-1851

CONSULTANTS

Captain R.J. Underhill & Associates, P.O. Box 1030, Groves, TX 77619

Elliot Bay Design Group, 5301 Shishole Ave. NW, Ste. 200, Seattle, WA 98107

Hornblower Marine Services, P.O. Box 112476, Campbell, CA 95011-2476

CONTROL SYSTEM-MONITORING/STEERING

Beier Radio, 1990 Industrial Ave, Harvey, LA 70058

Electronic Marine Systems, 800 Ferndale Pl , Rahway, NJ 07065

Electrowave U.S.A., 6125 W. Sam Houston Pkwy., Ste 406, Houston, TX 77041

G.R. Bowler, 2261 Lake Rd., Ontario, NY 14519

Kobelt Manufacturing Co., Ltd., 8238-129 Street, Surrey, BC V3W0A6, Canada

L-3 Communications Westwood Corp;Tano Div., 5700 Citrus Blvd, Ste E, New Orleans, LA 70123, 504-733-4777/ 1-800-229-TANO, 504-734-2127, guy.hardwick@l-3com.com

MMC International, 60 Inip Dr, Inwood, NY 11096

Prime Mover Controls, 3600 Gilmore Way, Burnaby, BC V5G 4R8, Canada

Tano Corp., 57017 Citrus Blvd., Ste. E, New Orleans, LA 70123

CORROSION CONTROL

Furuno USA Inc., 4400 NW Pacific Rim Blvd, Camas, WA 98607

Gardner Denver Water Jetting Systems, 8807 Emmett Rd., Ste 100, Houston, TX 77040

Ultra Strip, 3515 SE Lionel Terrace , Stuart, FL 34996

COUPLERS- TUG & BARGE

Intercontinental Engineering , PO Box 9055 , Kansas City, MO 64168

COUPLINGS

American Vulkan, 2525 Dundee Rd, Winter Haven, FL 33884

Centa Corp., 815 Black Hawk Drive, Westmont, IL 60559

Geislinger Corporation, 200 Geislinger Drive, Battle Creek, MI 49015

Interexpo Ltd Couplings In Stock, Plateia Theatrou 4, Athens 105 52, Greece, +30 210 3245666, +30 210 3248666, +30 210 3249666, interexpo@interexpoltd.gr, Contact: Marie Helene Charon, www.coupling.gr

Mapeco Products, 91 Willenbrock Rd., Unit B, Oxford, CT 06478

MMC International, 60 Inip Dr, Inwood, NY 11096

CRANE - HOIST - DERRICK - WHIRLEYS

Bisso Marine Co., P.O. Box 4113, New Orleans, LA 70178

CS Controls Inc, 101 Dickon Road, Houma, LA 70363, 985-876-6040, 985-876-0751, info@cscontrols.com, Contact: Paul Srigley, www.cscontrols.com

E. Crane, 241 Executive Dr , #3, Marion, OH 43302

Holly Hoist Corp, P.O. Box 86, St. Clair Shores, MI 48080

Liebherr Werk Nenzing GMBH, P.O. Box 10, A-6710, Nenzing, Austria

CRANKSHAFT REPAIR

In-Place Machining, 1929 N . Buffum St, Milwaukee, WI 53212

Waltz & Krezner, 91 Willenbrock Rd., Oxford, CT 06478

CUTTING & WELDING MACHINES

Bug-O-Systems, 3001 W. Carson St., Pittsburgh, PA 15204

ESAB Cutting Systems, 411 South Ebenezer Road, Florence, SC 29501

DECK MACHINERY- CARGO HANDLING EQUIPMENT

Coastal Marine Equipment, Bldg 9114 MISAAP Ind. Complex, Stennis Space Center, MS 39529

Coastal Marine Equipment Inc., BLDG. 9114 MISAAP Industrial Complex, Stennis Space CTR., MS 39529, 228-813-1700, 228-813-1709, sales@coastalmarineequipment.com, Contact: Ralph Waguespack, www.coastalmarineequipment.com

CS Controls Inc, 101 Dickon Road, Houma, LA 70363, 985-876-6040, 985-876-0751, info@cscontrols.com, Contact: Paul Srigley, www.cscontrols.com

Intercontinental Engineering , PO Box 9055 , Kansas City, MO 64168

Markey Machinery, P.O. Box 24788, Seattle, WA 98124

McElroy/Catchot Winch Company, Inc., P.O. Box 4632, Biloxi, MS 39535-4632

Rapp Hydema, 4433 27th Ave. West, Seattle, WA 98199

Smith Berger Marine, 7915 10th Ave. S., Seattle, WA 98108

Superior Lidgerwood Mundy, 1101 John Ave., Superior , WI 54880

W.W. Patterson , 3 Riversea Road, Pittsburgh, PA 15223

DEHUMIDIFIERS

EBAC Industrial Products, 704 Middle Ground Blvd, Newport News, VA 23606, 800-433-9011, 757-873-3632, sales@ebacusa.com, Contact: Gray Coughlan, www.ebacusa.com

DESALINATION - REVERSE OSMOSIS

G.E.T. Inc., 3135 Golden Ave., Long Beach, CA 90806

Reverse Osmosis of South Florida, Inc., 150 S.E. 29th St., Fort Lauderdale, FL 33316

DIESEL CYLINDER INDICATORS

Kiene Diesel, 325 S. Fairbanks St., Addison, IL 60101

DIESEL ENGINE OVERHAUL

Detroit Diesel Corporation, 13400 Outer Drive West, Detroit, MI 48329-4001

Motor-Services Hugo Stamp, 3101 S.W. 3rd Ave., Ft. Lauderdale, FL 33315

DIESEL ENGINE- SPARE PARTS & REPAIR

Aquamarine Engineering, P.O. BOX 83495, San Diego, CA 92138

Caterpillar, Inc., P.O. Box 610, Mossville, IL 61552-0610

Chns MArine AB, Box 9025, 200 39 Malmo, Sweden

Cummins Marine, 4500 Leeds Ave., Ste 301, Charleston, SC 29405

GE Marine Engines, 1 Neuman Way, Cincinatti, OH 45215

Giro Engineering Limited, Talisman, Duncan Road, Park Gate, Southampton, Hants SO31 7GA, UK

Man B&W Diesel, 17 State St , NY, NY 10004

Man B&W Diesel A/S, Teglholmsgade 41, Copenhagen SV DK-2450, Denmark

Man B&W Diesel AG, Stadtbachstrasse 1, Augsberg D-86153, Germany

Marine Exhaust Systems of Alabama, P.O. Box 698, 757 Nichols Ave., Fairhope, AL 36533

Marine Turbo & Diesel Inc., 1090 7th St , Richmond, CA 94801

Mariso USA, Inc , 100 Davidson Ave., Somerset, NJ 08873

Motor-Services AB, Box 2115 , Ronninge S- 144 04, Sweden

Motor-Services Hugo Stamp, 3101 S.W. 3rd Ave., Ft. Lauderdale, FL 33315

NREC Power Systems, 5222 Hwy 311, Houma, LA 70360, 985-872-5480, 985-872-0611

Reagan Equipment, 2550 BelleChase Hwy, Gretna, LA 70054

Scardana Americas Bkg., 502 Empire St. , Greenfield Park J4V 1V7, Canada

Wartsila Diesel, 201 Defense Hwy, Annapolis , MD 21401

DIESEL FUEL DECONTAMINATION

Algae X International, P.O. Box 4011, Fort Myers Beach, FL 33932

DIGITAL TORQUE METER SYSTEMS

Instruments, Computers & Controls, 78 Londonderry Tpke, Hookset, NH 03106

DISPLAY TECHNOLOGY

Kent Modular Electronics Ltd., 611 Maidstone Road, Rochester, Kent, UK

DIVING & SALVAGE

Bisso Marine Co., P.O. Box 4113, New Orleans, LA 70178

DOCK FENDERING SYSTEMS

Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376

DOCUMENTATION/DATABASES

Zaetric Business Solutions, LLC, 24800 I-45 North, Suite 324, Houston, TX 77386, 713-824-1654, 713-621-4885, inquiries@zaetric.com, Contact: David Woody, www.zaetric.com

DOOR LOCKS

The Brass Works Inc., P.O. BOX 566, DeLand, FL 32721, 386-943-8857, 386-943-8810, info@marinedoorandcabinethardware.com

DOORS- MARINE & INDUSTRIAL

Deansteel Mfg., 111 Merchant St., San Antonio, TX 78204

Joiner Systems, 1925 52nd Avenue, Lacine, Quebec H8T 3C3, Canada

Juniper Industries Inc, 72-15 Metropolitan Avenue, Middle Village, NY 1379, 718-326-2546, 718-326-3786, marinesales@juniperindustries.com, Contact: Sales, www.juniperindustries.com

Juniper International, 72-15 Metropolitan Ave., Middle Village, NY 11379

Manly Marine, P.O. Box 86788, N. Vancouver, BC V7L 4L3, Canada

Mapeco Products, 91 Willenbrock Rd., Unit B, Oxford, CT 06478

USA Sliding Doors, Inc., 801 Hosmer Road, Churchville, NY 14428, 585-538-4160, 585-538-2806, info@usaslidingdoors.com, Contact: Mr. Robert Weiland, www.usaslidingdoors.com

Waltz & Krezner, 91 Willenbrock Rd., Oxford, CT 06478

DRIVES

Allied Systems, 2300 Oregon St., Sherwood, OR

DRIVESHAFTS

The Cline Company, 600 Buncombe St., Greenville, SC 29602

DRUG TEST KITS

Sun State Specialty K-9s, 1500 Beville Road, Daytona Beach, FL 32114

DRY DOCKS- DESIGN

Crandall Drydock Engineers, PO Box 505804, Chelsea, MA 02150

ELASTOMER PIPING PRODUCTS

Elasto Valve Rubber, 1691 Pioneer Road, Sudbury,ON PG3 1R2, Canada

ELECTRIC & CONTROL SYSTEMS

Geniro Systems Inc., 1885 Boul Dagenais West, Laval, QC H7L 5A3, Canada, 450-622-7575, 450-622-8484, stefan@genirosys.com

ELECTRICAL EQUIPMENT

MMC International, 60 Inip Dr, Inwood, NY 11096

Olsun Electrics Corporation, 10901 Commercial Street, Richmond, IL 60071-0001

ELECTRONIC CHARTS

C- Map Commercial, 133 Falmouth Rd, Mashpee, MA 02649

Navionics, 6 Thatcher Lane, Wareham, MA 02571, 800-848-5896/508-291-6000, 508-291-6006, sales@navionics.com

EMERGENCY DISTRESS SIGNAL

Greatland Laser, LLC., 4001 West International Airport RD, Anchorage, AK 99502, 907-245-4475, 907-245-4599, laser@alaska.net, Contact: Jim O' Meara, www.greatlandlaser.com

EMPLOYMENT

All American Marine, P.O. Box 191237, Tillman's Corner, AL 33619

ENGINE ROOM LIGHTING/ MONITORING & CONTROL

GMT Electronics, 171 Main St., South River, NJ 08882

ENGINES

BTMC, 5810 Columbus Pike, Lewis Center, OH 43035, 740-548-4282, 740-548-5756, davemiller@btmccorp.com, Contact: Dave Miller, www.btmccorp.com

Fairbanks Morse, 701 White Avenue, Beloit, WI 53111

GE Marine Engines, 1 Neuman Way, Cincinatti, OH 45215

Pri Products-Power Research Inc.s-, 6970 Portwest Drive, #180, Houston, TX 77063

EVAPORATORS

Alfa -Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974

Beaird Industries, 601 Benton Kelly St. , Shreveport, LA 71106

Sasakura Engineering , 7-32 Takeshima, 4-Chome, Nishiyodogoaw KY Osaka555, Japan

EXHAUST

Marine Exhaust Systems of Alabama, P.O. Box 698, 757 Nichols Ave., Fairhope, AL 36533

EXPANSION JOINTS

Elasto Valve Rubber, 1691 Pioneer Road, Sudbury,ON PG3 1R2 Canada

Silex Inc., 6659 Ordan Dr., Mississauga, ON L5T 1K6, Canada

EXTRUDED RUBBER PRODUCTS

Clean Seal Inc., PO Box 2919, South Bend, IN 46880

FASTNERS

Superbolt, PO Box 683, Carnegie, PA 15106

FENDERING SYSTEMS/ BUOYS - DOCK & VESSEL

Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234

Fender Care Americas Inc C/-OBC Shipping Inc... 7611 Lake Road South Mobile, Mobile, Middle Bay Port Building 305,, AL 36605, +44 78029 65765, wendy.stephan@fendercare.com, Contact: Wendy Stephan, www.fendercare.com

Maritime International, 100 E. Vermilion St. #212, Lafayette, LA 70501

Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376

Poly-Hi-Solidur, 2710 American Way, Ft. Wayne, IN 46899

Schuyler Rubber Co., 16901 Woodred Rd., Woodinville, WA 98072

Seaward International, P.O. Box 98, Clearbrook, VA 22624

Urethane Products, 9076 Rosecrans Ave, Bellflower, CA 90706

Viking Fender Co., 1160 State St , Perth Amboy, NJ 08861

FILTER INSERTS

CC Jensen Inc, 1557 NW Ballard Way, Seattle, WA 98107, 206-789-1710, 206-789-1747, ccjensen@ccjensen.com, Contact: Sales, www.ccjensen.com

FILTERS/FILTER SYSTEMS

AAF International, 10300 Ormsby Park Pl. STE 600, Louisville, KY 40223, 888-388-0529, 888-398-0529, mbragg@aafintl.com, Contact: Myles Bragg, www.aafintl.com

Algae X International, P.O. Box 4011, Fort Myers Beach, FL 33932

Boll Filter, 9822 General Drive, Ste. 180, Plymouth, MI 48170

G.E.T. Inc., 3135 Golden Ave., Long Beach, CA 90806

Hellan Strainer, 3249 East 80th St., Cleveland, OH 44104

US Filter , 2 Milltown Ct., Union , NJ 07083

FIRE & SAFETY PRODUCTS

Brookdale International, 1--8755 Ash St., Vancouver, BC V6P 6T3, Canada

DBC Marine Safety Systems, 101-3760 Jacombs Rd., Richmond, BC V6V 6T3, Canada

IFSTA/Fire Services Program, 9030 N. Willis, Stillwater , OK 74078-8045

IMSSCO Corporation, 2040 Harbor Island Drive, Ste. 201 A, San Diego, CA 92101

Pt. Canaveral Marine Fire Fighter Academy, P.O. Box 267, Cape Canaveral, FL 32920

FLANGES

Jesse Engineering, 5225 7th St., E. Tacoma, WA 98424

FLOW CONTROLS
Hoffer Flow Controls, 107 Kitty Hawk Lane, Elizabeth City, NJ 27906

FLUID SEALING & PACKING
The Delmar Company, Highway 60 Rte 4, Dillwyn, VA 23426

FUEL ADDITIVES
Pri Products-Power Research Inc.s-, 6970 Portwest Drive, #180, Houston, TX 77063

GALLEY EQUIPMENT
AR Larsen Co., 15040 NE 95th St., Redmond, WA 98052
Cospolich Refrigeration, 14695 Highway 61, Norco, LA 70079
Jamestown Metal Marine Sales, Inc., 4710 Northwest 2nd Ave. , Boca Raton, FL 33431

GALLEYS
Deansteel Mfg., 111 Merchant St., San Antonio, TX 78204

GANGING & SAMPLING
Hermatic Inc . 4522 Center St., Deerpark, TX 77536

GAS GENERATION SYSTEMS
Air Products AS, Box 8100, Vagsbygd, NO-4675 Kristiansand S, Norway

GAS TURBINES
GE Marine Engines, 1 Neuman Way, Cincinatti, OH 45215

GEARS & GEAR REPAIR
Karl Senner Inc., 25 W Third, Kenner, LA 70062

GENERATOR CONTROLS
Detroit Diesel Corporation, 13400 Outer Drive West, Detroit, MI 48329-4001

GMDSS- GEAR BOXES & BEARINGS
Beier Radio, 1990 Industrial Ave, Harvey, LA 70058

GOVERNORS
Governor Control Systems, 3101 SW 3rd Avenue, Ft. Lauderdale, FL 33315

GPS
Leica Navigation, 23868 Hawthorne Blvd, Torrance, CA 90505-5908
Standard Horizon, 10900 Walker St., Cypress, CA 90630

GROUNDINGS
Sohre Turbomachinery, 132 Gilbertville Rd., P.O. Box 889, Ware, MA 01082-0889

HATCHES & DOORS
Juniper International, 72-15 Metropolitan Ave., Middle Village, NY 11379
Manly Marine, P.O. Box 86788, N. Vancouver, BC V7L 4L3, Canada

HEAT EXCHANGERS
Alfa -Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974
Aquamarine Engineering, P.O. BOX 83495, San Diego, CA 92138
Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234
Tranter, Inc., P.O. Box 2289, Witchita Falls, TX 76307, 940-723-7125, 940-723-1131, www.tranterphe.com

HEAVY FUEL TREATMENT
Algae X International, P.O. Box 4011, Fort Myers Beach, FL 33932

HIGH SPEED FERRY BUILDERS
Incat Australia Pty. Ltd, 18 Bender Marine, Hobart 7009, Australia

HMI CONTROLS DISPLAY
Azonix-Dynalco, 3690 NW 53rd St., Ft. Lauderdale, FL 33309

HOISTS
Coastal Marine Equipment, Bldg 9114 MISAAP Ind. Complex, Stennis Space Center, MS 39529

HORNS/WHISTLES
Airchime Manufacturing Co., 5478 267th St., Gloucester Industrial Estate., Langley, BC V4W 3S8, Canada
Kahlenberg Brothers Co., P.O. Box 358, Two Rivers, WI 54241
Kockum Sonics LLC, 933 Industry Road, Suite 105, Kenner, LA 70062

HOSES/HOSE FITTINGS
JGB Enterprises, Inc., 115 Metropolitan Dr., Liverpool , NY 13088

HYDRAULIC SYSTEMS
Allied Systems, 2300 Oregon St., Sherwood, OR
Anchor Lamina, 38565 Country Club Drive, Farmington Hills, MI 48331

INCINERATORS
Therm-Tec Inc., P.O. Box 1105, Tualatin, OR 97062

INFRARED IMAGING EQUIPMENT
Flir Systems, 16505 SW 72ND AVE, Portland, OR 97224

INSPECTION EQUIPMENT
Staveley Instrument, 421 N. Quay St., Kennewick, WA 99336

INSTRUMENTATION
Hoffer Flow Controls, 107 Kitty Hawk Lane, Elizabeth City, NJ 27906
Thermo Electron, 6801 Cochran Rd , Solon, OH 44139

INSULATION
M & A Supply LLC, 150 North Plains Industrial Rd., Wallingford, CT 06492, 203-294-9431, 203-294-1697, sales@ma-supply.com, Contact: Jeff Blake, www.ma-supply.com
Mascoat Products, 10890 Alcott, Unit 12, Houston, TX 77043
Pacor, Inc . P.O. Box 107, Westville, NJ 08093
Superior Energies Inc., 3115 Main Ave., Groves, TX 77619

INSURANCE SERVICES
WQIS, 80 Broad St., 21st Floor, New York, NY 10004

INTERIOR DESIGN
Global Interior Group , 2426 Dennis Street, Jacksonville, FL 32204

INTERIORS
Custom Ship Interiors, Inc., P.O. Box 882, Solomons, MD 20688
Directions In Design, Inc., 1849 Craig Road, St. Louis, MO 63146, 314 205-2010, 314 205-0889, May-Zinsers@didinc.com, Contact: Sharon May-Zinser, www.didinc.com
Global Interior Group , 2426 Dennis Street, Jacksonville, FL 32204
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
Jamestown Metal Marine Sales, Inc. 4710 Northwest 2nd Ave. , Boca Raton, FL 33431
Lit Industries, 516 Costner School Rd., Bessemer City, NC 28016-9801
Panel Specialists Inc./Thermax N.A., 3115 Range Road, Temple, TX 76504-1240, 254-774-9800, 254-774-7222, thermax@erols.com, Contact: John Hutchison, www.panelspec.com

JOINER- WATERTIGHT DOOR-PANELING-CEILING SYSTEM
Custom Ship Interiors, Inc., P.O. Box 882, Solomons, MD 20688
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
Joiner Systems, 1925 52nd Avenue, Lacine, Quebec H8T 3C3, Canada
Waltz & Krezner, 91 Willenbrock Rd., Oxford, CT 06478

K-9 DETECTION
Sun State Specialty K-9s, 1500 Beville Road, Daytona Beach, FL 32114

KEEL COOLERS
Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234

LASER ALIGNMENT
Ludeca, Inc., 1425 NW 88th Ave, Miami, FL 33172

LAUNDRY EQUIPMENT
Richard Galley Supply, PO Box 4035, Houma, LA 70361

LEAK REPAIR
Indumar Products Inc., 2500 Tanglewilde, Suite 260, Houston, TX 77063

LIFEBOAT TESTING
Water Weights, Inc., 5139 Brook St., Suite E, Mont Clare, CA 91763

LIFEBOATS/RAFTS
DBC Marine Safety Systems, 101-3760 Jacombs Rd., Richmond BC V6V 6T3, Canada
Survival Systems International, P.O. Box 1567, 931 Industry Rd., Kenner, LA 70062, 504-469-4545, 504-466-1884, service@ssinola.com
Viking Life Saving Equipment, 1625 N. Miami Ave., Miami, FL 33136
Willard Marine Inc., 1250 N. Grove St., Anaheim, CA 92806
Wolong International, 151 Chin Swee Road #03-14, Manhattan House, 169876, Singapore

LIFESAVING EQUIPMENT
C.M. Hammar AB, August Barks Gatan 15, 421 32 Vastra Frolunda, Sweden
Viking Life Saving Equipment, 1625 N. Miami Ave., Miami, FL 33136

LIFT EQUIPMENT
Mi-Jack Products, 3111 West 167th St., Hazel Crest , IL 60429

LIFT EQUIPMENT TESTING
Water Weights, Inc., 5139 Brook St., Suite E, Mont Clare, CA 91763

LIGHTING SYSTEMS/ EQUIPMENT
ACR Electronics Inc., 5757 Ravenswood Rd., Ft. Lauderdale , FL 33310-5247
Archway Marine Lighting, 4501 Swan Ave., St. Louis , MO 63110
L.C. Doane, P.O. Box 975, Essex, CT 06426
Maritime Associates, P.O. BOX 1788, Crystal Bay, NV 89402, 775-832-2422, 775-832-2424, maritimeas@charter.net, Contact: unknown, www.marinesigns.com

LINE & NET CUTTERS
Spurs Manne, 201 S.W. 33rd St., Ft. Lauderdale, FL 33315

LUBRICANTS
Exxon Mobil Marine Lubricants, 3225 Gallows Road, Fairfax, VA 22037, 1+609-409-2741, 1+609-409-5699, unknown, Contact: unknown, www.exxonmobil.com
Pri Products-Power Research Inc.s-, 6970 Portwest Drive, #180, Houston, TX 77063

LUBRICANTS/LUBRICATION SYSTEMS
Benjamin R. Vickers & Sons Ltd., Airedale Mills, 6 Clarence Road, Leeds, W. Yorkshire LS10 IND, UK
Companion Products, Inc., 2040 Johnson Ct . Unit A, Kingston, IL 60145-0009

MACHINERY MAINTENANCE, REPAIR & TESTING
Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-1851

MANEUVERING EQUIPMENT
Van der Velden Marine Systems, Birkenweg 11, D-21465, Reinbek, Germany

MARINE & OFFSHORE SIGNAGE
Maritime Associates, P.O. BOX 1788, Crystal Bay, NV 89402, 775-832-2422, 775-832-2424, maritimeas@charter.net, Contact: unknown, www.marinesigns.com

MARINE CONSTRUCTION/REPAIR
Sundial Marine, 5605 N.E. Sundial Road, Trautdale, OR 97060

MARINE CONSULTANTS
Hall Associates of Washington , P.O. Box 1554 , Mukilteo, WA 98275

MARINE DECKING & FLOORING
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
SlipNOT Metal Safety Floorings (Div. of W.S. Molnar Company), 2545 Beaufait St., Detroit, MI 48207

MARINE DIESEL ENGINES
MAN Engines & Componets Inc., 591 SW 13th Terrace, Pompano Beach, FL 33069, 800-MAN-2842, 954-946-9098, www.man-mec.com

MARINE ELECTRONICS
ACR Electronics Inc., 5757 Ravenswood Rd , Ft. Lauderdale , FL 33310-5247
Beier Radio, 1990 Industrial Ave, Harvey, LA 70058
Comark Marine, 93 West Street, Medfield, MA 02052
GMT Electronics, 171 Main St., South River, NJ 08882
Hatteland Display, Bogstadveien, 19. . N-0355 Oslo, Norway
Jotron Electronics, Box 85 , NO-328OT Jodalyng Norge, Norway
Leica Navigation, 23868 Hawthorne Blvd, Torrance, CA 90505-5908
Marine Electronic Solutions, 1522 Crabapple Cove, Jacksonville, FL 32225
Saab Marine Electronics, Box 13045, 402 5Goteborg, Sweden
Standard Horizon, 10900 Walker St., Cypress, CA 90630

MARINE ENGINEERING
Elliot Bay Design Group, 5301 Shishole Ave, NW, Ste, 200, Seattle, WA 98107

MARINE EQUIPMENT
Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376
Scardana Americas Bkg., 502 Empire St. , Greenfield Park J4V 1V7, Canada
Waterman Supply, P.O. Box 596, Wilmington, CA 90748

MARINE FURNITURE
Deansteel Mfg., 111 Merchant St., San Antonio, TX 78204

MARINE GLASS
ProCurve, 3535 Davisville Rd., Hatboro, PA 19040

MARINE HARDWARE
HMS Manne Hardware, 333 W. Merrick Road, Valley Stream, NY 11580-5219

MARINE LIGHTING & ELECTRICAL SUPPLIES
Manning Electric Inc., 154 27th Street, Brooklyn, NY 11232, 718-832-2488, 718-832-2493, info@manning-electric.com, Contact: Anthony Menditto, www.manning-electric.com

MARINE MANAGEMENT
Hornblower Marine Services, P.O. Box 112476, Campbell, CA 95011-2476

MARINE POWER PLANT SYSTEMS
Auramarine Ltd., Box 849 , FI-20101 Turku, Finland

MARINE RADIOS
Standard Horizon, 10900 Walker St., Cypress, CA 90630

MARINE SENSORS
Airmar Technology Corp., 35 Meadowbrook Drive, Milford, NH 03055, 603-673-9570, 603-673-4624, sales@airmar.com, Contact: Peter Braffitt, www.airmar.com

MARINE SERVICES
Conam Inspection, 192 International Blvd., Glendale Heights, IL 60139

MARINE THERMAL IMAGING
Anon International, 720 Glen Eagle Drive #100, Winter Springs, FL 32708

MARITIME TRAINING & SCHOOLS
Marine Safety International, Marine Terminal , Laguardia Airport, NY 11371

METALIZING
International Metalizing & Coatings , PO Box 201, Cherry Hill, NJ 08003

METERS
Selco USA, Inc. , 2508 Lakebrook Court, Atlanta, GA 30360-1715, 1-877 selcous (1-877-735-2687) 770-455-9110, 770-455-3754, info@selcousa.com

MONITORING ALARM/CONTROL
Marine Electric Systems, Inc., 33 Route 17 South, East Rutherford, NJ 07073, 201 531-8600 Ext 231, 201 531-8606, info@marineelectricsystems.com, Contact: Gary Mandell, www.Marineelectricsystems.com

MONITORING SYSTEMS
G.R. Bowler, Inc. Marine Controls, 2261 Lake Rd , Ontario, NY 14519, 800-524-9570, 315-524-8753, gary@grbowler.com, Contact: Gary R Bowler, www.grbowler.com
Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-1851
Prime Mover Controls, 3600 Gilmore Way, Burnaby, BC V5G 4R8, Canada

MOORAGE FACILITY
Sea Ark Marine, P.O. Box 210, Monticello, AR 71655-0210

MOTOR PROTECTION
Marine Safe Electonics, 261 Milway Ave. #12, Concord, Ontario L4K 4K9, Canada

NAV/COMM EQUIPMENT
Beier Radio, 1990 Industrial Ave, Harvey, LA 70058
C- Map Commercial, 133 Falmouth Rd, Mashpee, MA 02649
Chartco, New North Road, Hainault, Ilford Esex 166 2UR, UK
Electronic Marine Systems, 800 Ferndale Pl., Rahway, NJ 07065
Furuno USA Inc., 4400 NW Pacific Rim Blvd, Camas, WA 98607
Hose-McCann Telephone Company, 1241 W. Newport Center Drive, Deerfield Beach, FL 33442, 954-429-1110, 954-429-1130, mchip@hosemccann.com
Mackay Communications, 2721 Discovery Dr., Raleigh, NC 27616-1851
Transas Marine USA, 19105 36th Ave. W., Ste. 101, Lynwood, WA 98036-5760

NAVAL ARCHITECTS, MARINE ENGINEERS
A.K. Suda, Inc., 3004 19th St., Metairie, LA 70002-4989
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
Arthur D. Dargen, Inc, 3200 Ridgelake Dr., Suite 403, Metairie, LA 70002
Band, Lavis, & Associates, Inc., 900 Ritchie Hwy, Suite 203, Severna park, MD 21146
Bay Engineering, 253 N. First Ave., Sturgeon Bay, WI 54235
C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609
CDI Marine Co., 9550 Regency Square Blvd, Ste 400, Jacksonville FL 32222
Computer Sciences Corporation-Advance Marine Center, 1201 M St. SE., Washington , DC 20003
CT Marine, 56 Crooked Trail, Rowayton, CT 06853
Cunningham & Walker, 1762 Providence Hollow Lane, Jacksonville, FL 32223
Dejong & Lebet, Inc., 1734 Emerson St., Jacksonville, FL 32207
Elliot Bay Design Group, 5301 Shishole Ave. NW, Ste. 200, Seattle, WA 98107
George G. Sharp, 100 Church St , New York, NY 10007
GTR Campbell Marine, 24 Lambton Street, Ormstown, Quebec JOS 1AO, Canada
Guido Perla & Associates, 4300 King St., Ste 1200, Seattle, WA 98104
Jamestown Marine Service, 1084 Shennecossett Rd., Groton, CT 06340
John J. McMullen Associates, 4300 King St., Suite 400, Alexander, VA 22302
John W. Gilbert & Assoc., 199 State St., Boston, MA 02109
Kvaerner Masa Marine Inc., 201 Defense Highway, Ste 202, Annapolis, MD 21401
M. Rosenblatt & Son, Inc., an AMSEC LLC Operation, 1201 M Street, S.E., Suite 020, Washington, DC 20003
Mantech, Seacliff, Bay Road, Newmarket, NH 03857
MCA Engineers, Inc., 2960 Airway Ave , #A-103 , Costa Mesa, CA 92626
McElroy Machine & Mfg Co., Inc., P.O. Box 4454 , Biloxi, MS 39535-4454
MIL Systems, 200-1150 Morrison Drive, Ottawa, Ontario K2H 8S9, Canada
Nautical Designs, Inc., 2101 S. Andrews Ave., Ste 202, Fort Lauderdale, FL 33316
R.J. Mellusi & Co., 71 Hudson St., New York, NY 10013
Sargent & Herkes, 225 Baronne St., STe 1405, New Orleans, LA 70112
Scientific Marine Services, Inc., 101 State Pl., Ste F., Escondido, CA 92029
Sea School, 10812 Gandy Blvd, St. Petersburg, FL 33702
Seaworthy Systems Inc., PO Box 965, Essex, CT 06426
The Glosten Associates Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
VUYK Engineering, P.O. Box 204, , 9700 AE Groningen, Netherlands
Washburn Doughty, P.O. Box 296, E. Boothbay, ME 04544

NAVIGATION
ComNav Marine Ltd., 13511 Crestwood Pl., Ste 15 15, Richmond, BC V6V 2G1, Canada
D & B Technologies, 1458 OCEAN SHORE BLVD #132, ORMOND BEACH, FL 32176-3613
Klein Navigation, 11 Klein Drive, Salem, NH 03079, 603 890-1304, 603 890-9796, mail@kleinnavigation.com, Contact: Deborah Durgin, www.kleinnavigation.com
Nauticast AG, Mariahilfer Strasse 50/211, A-1070 Vienna, Austria
Transas Marine USA, 19105 36th Ave. W., Ste. 101, Lynwood, WA 98036-5760

NOZZLES/ NOZZLE SYSTEMS
Harrington Marine , 6720 124th Ave., Fennville, MI 49408
Nautican, 115 Kelvin Grove Way P.O. Box 428, Lions Bay, BC VON 2E0, Canada, 604-921-1920, 604-921-1925, josip@nautican.com, Contact: Josip Gruzling, www.nautican.com

OIL/WATER SEPARATORS
Alfa -Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974
MMC International, 60 Inip Dr, Inwood, NY 11096
Westfalia Separator, Inc., 100 Fairway Court, Northvale, NJ 07647, (201) 767-3900, (201) 784-4399, brown.courtney@wsus.com, Contact: Courtney Brown

PAINTS AND ANTI FOULANTS
E Paint Company, 25 Research Road, E. Falmouth, MA 02536, 800-258-5998, 508-495-3210, epaint@epaint.net, Contact: Kimberly Fontaine, www.epaint.net
New Coat Technology, LLC, P.O. Box 130 228, Houston, TX 77219, 713-223-4370, 713-523-4606, sales@newcoattech.com

PARTS LOCATOR SERVICE
Inventory Locator Service, 3965 Mendenhall Rd., Memphis, TN 38115

PIPE FITTINGS/CUTTINGS/CONNECTING/ SYSTEMS
GS-Hydro U.S., 1395 Bluehills Ave., Bloomfield, CT 06002
Jesse Engineering, 5225 7th St., E. Tacoma, WA 98424, 253-922-7433, 253-922-2536, tmorgan@jesse-wallace.com
Neptune Research, 1685 Latham Rd., West Palm Beach, FL 33409
RAMCO Manufacturing Co., 365 Carnegie Ave., Kenilworth, NJ 07033

PIPE LEAK REPAIR
CSD North America, 880 Candia Rd., Unit 10, Manchester, NH 03109

PNEUMATIC LINE THROWERS
Restech Norway A/S, Box 624, NO-8001 BODO, Norway

PORT DEVELOPMENT
RTM Star Center, 2 W. Dixie Hwy., Dania, FL 33004
Sasakura Engineering , 7-32 Takeshima, 4-Chome, Nishiyodogoaw KY Osaka555, Japan

PORT SECURITY
Foss Environmental, P.O. Box 3535, Seattle, WA 98124

PORTABLE FOAM APPLICATORS
IMSSCO Corporation, 2040 Harbor Island Drive, Ste. 201 A, San Diego, CA 92101

PORTABLE VENTILATORS
Americ Corp, 1910 E. Devon Ave., Elk Grove Village, IL 60007

PRECISION FLAME CUTTING/SAWING
Ronson Technical , 2146 B Flintstone Dr., Tucker, GA 30085

PREVENTATIVE MAINTENANCE
Marine Safe Electonics, 261 Milway Ave. #12, Concord, Ontario L4K 4K9, Canada

PROPULSION EQUIPMENT
ABB Turbocharger, Inc., 1460 Livingston Ave., North Brunswick, NJ 08902
Alstom Power Conversion, 3 Ave. Des Trois Chenes, 90018 Belfort Cedex, France
Brunvoll A/S, P.O. Box 370, N-6401 Molde, Norway
Caterpillar, Inc., P.O. Box 610, Mossville, IL 61552-0610
Cummins Marine, 4500 Leeds Ave., Ste 301, Charleston, SC 29405
CWF Hamilton Co., P.O. Box 709 , Christchurch, New Zealand
Fincanteri, Diesel Engine Div., GMT, Bagnoli della, Rosandra 3334 Trieste, Italy
Harbormaster Marine, Inc., 31777 Industrial Rd., Livonia, MI 48150
Karl Senner Inc., 25 W Third, Kenner, LA 70062
Kawasaki Heavy Indust., World Trade Center Bldg., 4-1 Hamamastu-cho, 2-chome, Minato-ku Tokyo 105-6116, Japan
LA.ME Srl. Marine Division, Via della Fornace 4, Opera (MI), Italy
Man B&W Diesel, 17 State St., NY, NY 10004
Man B&W Diesel A/S, Telgtholmsgade 41, Copenhagen SV DK-2450, Denmark
Man B&W Diesel AG, Stadtbachstrasse 1, Augsberg D-86153, Germany
Mapeco Products, 91 Willenbrock Rd., Unit B, Oxford, CT 06478
Napier Turbochargers, P.O. Box 1, Waterside , South Lincoln LN5 7FD, UK
Nya Berg Propulsion AB, Box 1005, 430 90 Ockero, Sweden
Propulsion Systems Inc, 601 NE 26th Court, Pompano Beach, FL 33064
Rolls-Royce Commercial Marine, 10255 Richmond Ave., Ste 101, Houston, TX 77042
Schottel Gmbh & Co., KG-Mainzer Strasse , 99-D-56322-Spay, Germany
Schottel Inc., 675 Industrial Blvd., Sugar Land, TX 77478
Voith Schiffstechnik GMBH & Co., P.O. Box 2011, 89510 Heidenheim, Germany
Wartsila Corporation, Box 244, FI-65101 Vasa, Finland

Wartsila Lips, 3617 Koppens Way, Chesapeake, VA 23323
ZF Marine, 3131 S.W. 42nd St., Ft. Lauderdale, FL 33312, 954-581-4040, 954-581-4078, www.zf.com, Contact: A.J. Halavacs, www.zf-marine.com
ZF Marine Group , Ehlerst. 50, 88046 Friedrichshafen, Germany

PROPULSION MONITORING
Azonix-Dynalco, 3690 NW 53rd St., Ft. Lauderdale, FL 33309

PUBLICATIONS
Maritime Reporter, 118 East 25th street, New York, NY 10010, 212 477 6700, 212 254 6271, jomalley@marinelink.com, Contact: John O'Malley, www.marinelink.com

PUMP-REPAIR-DRIVES
Fybroc-Div.of Met-Pro, P.O. Box 144, Harleysville, PA 19438
Reagan Equipment, 2550 BelleChase Hwy, Gretna, LA 70054
Scardana Americas Bkg., 502 Empire St. , Greenfield Park J4V 1V7, Canada

RADARS-ARPAS
Ampco Pumps Co., 4424 West Mitchell St, Milwaukee, WI 53214
Beier Radio, 1990 Industrial Ave, Harvey, LA 70058
Furuno USA Inc., 4400 NW Pacific Rim Blvd, Camas, WA 98607

RADIATION DETECTION
Thermo Electron, 6801 Cochran Rd., Solon, OH 44139

REMOTELY OPERATED VEHICLES
VideoRay LLC, 415 Engleview Blvd., Exton, PA 19341

REVERSE OSMOSIS
G.E.T. Inc., 3135 Golden Ave., Long Beach, CA 90806

RIGID INFLATABLE BOATS
Willard Marine Inc., 1250 N. Grove St., Anaheim, CA 92806
Wing Inflatables, P.O. Box 279, 1132 Samoa Blvd., Arcata, CA 99521

ROPE-MANILA-NYLON-HAWSERS-FIBERS
Marlow Ropes, South Road, Halisham, East Sussex BN27 3JS, UK
Puget Sound Rope, 1012 Second Ave., Anacortes, WA 98221

ROTATING EQUIPMENT
FCS, Inc., 22 Main Street, Centerbrook, CT 06409

RUDDER BEARINGS & BUSHES
Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234
Orkot Composites, 2535 Prairie Rd, Unit D., Eugene, OR 97402

SAFETY MANAGMENT CONSULTANTS
Modern Maritime, 67 Bow St., Ste. 3, Portsmouth, NH 03801

SAFETY PRODUCTS
Brookdale International, 1--8755 Ash St., Vancouver, BC V6P 6T3, Canada
D & B Technologies, 1458 OCEAN SHORE BLVD #132, ORMOND BEACH, FL 32176-3613, 407-647-7500, 407-647-7505, HOTEYE@HOTEYENOW.COM
DBC Marine Safety Systems, 101-3760 Jacombs Rd., Richmond, BC V6V 6T3, Canada
FabEn Co., Inc., 2012 Karbach, Houston, TX 77092
Lalizas SA, 21 Haidariou St., 545 Piraeus, Greece
SlipNOT Metal Safety Floorings (Div. of W.S. Molnar Company), 2545 Beaufait St., Detroit, MI 48207
Stearns Mfg. Co., PO Box 1498, St. Cloud, GA 56302-1498
Thordon Bearings Inc., 3225 Mainway, Burlington, Ontario L7M 1A6, Canada
Viking Life Saving Equipment, 1625 N. Miami Ave., Miami, FL 33136
Walport USA , 39-5A Dover Rd South, Toms River, NJ 08757

SALVAGE
Titan Maritime Industries Inc., P.O. Box 350485, Ft. Lauderdale, FL 33004

SANITATION DEVICE- POLLUTION CONTROL
Envirovac Inc, 1260 Turret Dr., Rockford , IL 61111
EVAC Environmental Solutions, 1260 Turret Dr., Rockford , IL 61111
FAST®Systems, 8229 Brentwood Industrial Drive, Brentwood, MO 63144, 314-645-6540, 314-645-6131, solutions@marinefast.com, Contact: Alan Fleischer, www.marinefast.com
Headhunter Inc., 3380 SW 11th Ave., Ft. Lauderdale, FL 33315
Hydroxl Systems, 9800 McDonald Park Rd, Sidney, BC V8L 3S8, Canada
Microphor, 452 E. Hill Rd., Willits, CA 95490
Research Products-INCINOLET, 2639 Andjon Drive, Dallas, TX 75220, 800-527-5551, 214-350-7919, sales@incinolet.com
Sanitary For All, Inc., 3909 Witmer Rd., PMB 472, Niagra Falls, NY 14305

SATELLITE COMMUNICATIONS
Beier Radio, 1990 Industrial Ave, Harvey, LA 70058
Eurocom Industries AB, Box 7071, DK-9200 Aalborg SV, Denmark
Furuno USA Inc., 4400 NW Pacific Rim Blvd, Camas, WA 98607
KVH Industries Inc., 50 Enterprise Center, Middletown , RI 02842
Land Sea Systems, 509 Viking Drive, Suites K,L,M, Virginia Beach, VA 23452
Nera Satcom AS, Box 91, NO-1375 Billingstad, Norway
Stratos , 1501 Metcalfe St. Ste 1900, Ottawa, Ontario K2P 1P1 Canada
Thrane & Thrane A/S, Lundtoftegardsvej 93D, DK-2800 Lyngby, Denmark

SCARIFIERS
Desmond-Stephan, P.O. Box 30, Urbana, OH 43078

SEALS
Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234
Kobelco Marine, Inc., 366 Fifth Avenue, Suite 312, NY, NY 10001, 212-967-5575, 212-967-6966, hawkins@kobelcomarine.com
Orkot Composites, 2535 Prairie Rd, Unit D., Eugene, OR 97402

SEATING
H.O. Bostrom, 818 Progress Ave., Wankesha, WI 53186

SECURITY BARRIERS
Seaward International, P.O. Box 98, Clearbrook, VA 22624

SECURITY CONSULTANTS
Solutions Group, 9663 Santa Monica Blvd. Ste 175, Beverly Hills, CA 90210, 877-844-8744, 877-844-8744, sginternational.net, Contact: Michael Duffy, www.solutionsgroupinternational.com

SENSORS
Electronic Marine Systems, 800 Ferndale Pl., Rahway, NJ 07065

SHAFT SEALS
Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234

SHAFT/BORE ALIGNMENT TOOLS
Ludeca, Inc., 1425 NW 88th Ave, Miami, FL 33172

SHAFTS
Geislinger Corporation, 200 Geislinger Drive, Battle Creek, MI 49015

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

SHIP DISPLAYS
Data Modul, 1767-46 Vets Memorial Highway, Islandia, NY 11749

SHIP LIFTS
Synchrolift Inc., Two Datran Center, 9130 S. Dadeland Blvd., Miami, FL 33156-7850

SHIP MANAGEMENT
Eurasia Group , 22A Floor Chinachem Exchange Sq., . 1 Hoi Wan St., Quarry Bay, Hong Kong

SHIP REPAIR
Dubai Drydocks, P.O. Box 8988, Dubai, United Arab Emirates
GMD Shipyard, 360 Front St., Staten Island, NY 10304
GS-Hydro U.S., 1395 Bluehills Ave., Bloomfield, CT 06002
United Marine Enterprises Inc., P.O. Box 22077, Beaumont, TX 77720

SHIP SIMULATORS
Kongsberg Maritime Ship Systems AS, PO Box 1009, 3194 Horten, Norway

SHIPBUILDING-REPAIRS, MAINTENANCE, DRYDOCKING
Allen Marine, P.O. Box 1049 , Sitka, AK 99835
Atlantic Marine, Inc., P.O. Box 3202 , mobile, AL 36652
Atlas Metal Sales, 1401 Umatilla St., Denver, CO 80204
Austal USA, 100 Dunlap Dr., Mobile, AL 36633
Blount Marine, 461 Water St., Warren, RI 02885
Bollinger Lockport & Larose, P.O. Box 250, Lockport, LA 70374
Curacao Drydock Co., Box 3012 , Wilmestad, Curacao, Netherlands Antilles
Damen Shipyards, P.O. Box 1 Gorincherr, 4200AA Holland, Netherlands
Detyens Shipyards Inc., 1670 Drydock Ave., Bldg 236, North Charleston, SC 29450
Eastern Shipbuilding Group, 2200 Nelson St., Panama City , FL 32402
Fincantieri Canterieri Navali Italiani Spa, Merchant Shipbuilding Div., 34123 Trieste, Italy
Gladding Hearn, 1 Riverside Ave., Somerset , MA 02725
GTR Campbell Marine, 24 Lambton Street, Ormstown, Quebec JOS 1AO, Canada
Horizon Shipbuilding Inc., 13980 Shell Belt Rd., Bayou La Batre, AL 36509
In-Place Machining, 1929 N . Buffum St, Milwaukee, WI 53212
Leevac Industries, LLC, P.O. Box 1190, Jennings, LA 70546
Mariso USA, Inc., 100 Davidson Ave., Somerset, NJ 08873
Motor-Services AB, Box 2115 , Ronninge S- 144 04, Sweden
Newport News Shipbuilding, 4101 Washington Ave., Newport News , VA 23607
United Defense, 1525 Wilson Blvd., Ste 700, Arlington, VA 22209-2444
United Marine Enterprises Inc., P.O. Box 22077, Beaumont, TX 77720
VT Halter, PO Box 3029, Gulfport, MS 39505
Washburn Doughty, P.O. Box 296, E. Boothbay, ME 04544
Willard Marine Inc., 1250 N. Grove St., Anaheim, CA 92806

SHIPYARDS
Alabama Shipyard, P.O. Box 3202, Mobile, AL 36652
Allen Marine, P.O. Box 1049 , Sitka, AK 99835
Atlantic Marine, Inc., P.O. Box 3202 , mobile, AL 36652
Bollinger Shipyards, 8365 Hwy 308 South, Lockport, LA 70374, 985 532-2554, 985 532-7225, RobertS@bollingershipyards.com, Contact: Robert A. Socha, www.bollingershipyards.com
Derecktor Shipyard, 311 E. Boston Post Rd., Mamaroneck, NY 10543
Detyens Shipyards Inc., 1670 Drydock Ave., Bldg 236, North Charleston, SC 29450
GMD Shipyard, 360 Front St., Staten Island, NY 10304
Leevac Industries, LLC, P.O. Box 1190, Jennings, LA 70546
Offshore Inland, 3521 Brookdale Dr. S., Mobile, AL 36618
United Defense, 1525 Wilson Blvd., Ste 700, Arlington, VA 22209-2444

SILENCERS
EM Products, 5380 Cottonwood Lane, Prior Lake, MN 55372, (952) 440-9200, (952) 440-3400, sales@zerostart.com
Silex Inc., 6659 Ordan Dr., Mississauga, ON L5T 1K6, Canada

SIMULATION TRAINING
Marine Safety International, Marine Terminal , Laguardia Airport, NY 11371
Maritime Institute of Technology, 5700 Hammonds Ferry Rd. Linthicum Heights, MD 21090
Poseidon Simulation AS, Box 89, NO-8370 Leknes, Norway
Transas Marine Overseas Ltd., 12 Obukhovskoy, Oboroni, St. Petersburg 193019, Russian Federation

SKILLED LABORERS
Ameri-Force Inc., 3266 Talleyrand Ave., Jacksonville, FL 32206
MK Production Resources Inc., 1610 Reynolds Street, Brunswick, GA 31520

SLIDING DOORS
Waltz & Krezner, 91 Willenbrock Rd., Oxford, CT 06478

SOFTWARE
Autoship Systems Corp., Suite 312-611 Alexander Street, Vancouver, BC V6A 1E1, Canada, 604-254-4171, 604-254-5171, sales@autoship.com, Contact: Brigden Henry, www.autoship.com
Creative Systems Inc., P.O. Box 1910, Port Townsend, WA 98368
Loadmaster International , St. Varvsgarten 11B SE. 211 19 Malme, Sweden
Resergence Software Inc. ., 2021 Lakeshore Dr., Ste 21D, New Orleans, LA 70122

STEERING GEARS/ STEERING SYSTEMS
A. Van der Velden B.V., Dorpsstraat 67a, PO Box 2061, 2930 AB Krimpen a/d Lek, Netherlands
CS Controls Inc, 101 Dickon Road, Houma, LA 70363, 985-876-6040, 985-876-0751, info@cscontrols.com, Contact: Paul Srigley, www.cscontrols.com
Kobelt Manufacturing Co., Ltd., 8238-129 Street, Surrey, BC V3W0A6, Canada
Offshore Inland, 3521 Brookdale Dr. S., Mobile, AL 36618

STERN TUBE BEARINGS/ BUSHES
Duramax Marine LLC, 17990 Great Lakes Parkway, Hiram, OH 44234
Orkot Composites, 2535 Prairie Rd, Unit D., Eugene, OR 97402
Thordon Bearings Inc., 3225 Mainway, Burlington, Ontario L7M 1A6, Canada

STERN TUBE SEALS
Superbolt, PO Box 683, Carnegie, PA 15106

STRAINERS
Hellan Strainer, 3249 East 80th St., Cleveland, OH 44104

SUN PROTECTION SYSTEMS
Solar Solve Marine, 7 St. Hilda Industrial Estate, South Shields NE33 1RA, UK, +44 191 454 8595, +44 191 454 8692, info@solasolv.com, Contact: Paul Hopkins, www.solasolv.com

SURFACE PREP TOOLS
Aurand Mfg., 1210 Ellis St., Cincinnati, OH 45223
Flow International Corp., 23500 64th Ave., South Kent, WA 98059, 800-446-3569, 253-813-9377, mbest@flowcorp.com
Flow International Corp., 23500 64th Ave., South Kent, WA 98059
NLB Corp., 29830 Beck Road, Wixom, MI 48383, 248-624-5555, 248-624-0908, nlbmktg@nlbusa.com, Contact: Jenna Eads, www.nlbcorp.com
Schmidt, PO Box 37, Fresno, TX 77545
Ultrastrip Systems Inc., 3515 SE Lionel Terrace, Stuart, FL 34997, 772-287-4846, 772-781-4778, sales@ultrastrip.com, Contact: John Odwazny, www.ultrastrip.com

SURVIVAL EQUIPMENT
Brookdale International, 1--8755 Ash St., Vancouver, BC V6P 6T3, Canada

TANK LEVELING INDICATORS
Ian Conrad Bergan, 3119 North Davis Highway, Pensacola, FL 32503, 850-434-1286, 850-434-1246, sales@icbergan.com, Contact: Ron Monell, www.icbergan.com
King Engineering Co, PO Box 1228, Ann Arbor, MI 48106
Kockum Sonics LLC, 933 Industry Road, Suite 105, Kenner, LA 70062
Saab Marine Electronics, Box 13045, 402 5Goteborg, Sweden
Technical Marine Services, 6040 North Cutter Circle, Portland, OR 97217

TEAK DECK SEALANT
Boatlife Industries, 2081 Bridgeview Drive, N. Charleston, SC 29415, 800-382-9706, 843-566-1275, Contact: Louise Schmidt

TESTING SERVICES
Wyle Laboratories, 7800 Govern's Dr. S.W., Huntsville , AL 35807

THRUSTER SYSTEMS
Thrustmaster of Texas, Inc., 12227 FM-529, Houston, TX 77041, 713 937-6295, 713 937-7962, info@thrustmastertexas.com, Contact: Bert Ault, www.thrustmastertexas.com

TRAINING
International Maritime Training, 910 SE 17th St., Ste 200, Fort Lauderdale, FL 33316
USMMA- Global Maritime and Transportation School, 300 Steamboat Rd., Kings Point, NY 11024

TRANSMISSIONS
Karl Senner Inc., 25 W Third, Kenner, LA 70062

TRAVEL SERVICES
Travel Services Unlimited, 200 Golden Oak Court, Suite 120, Virginia Beach, VA 23452

TURBOCHARGERS
ABB Turbo Systems AG, CH 5401, Baden, Switzerland

TURBOCHARGERS- REPAIRS
Motor-Services Hugo Stamp, 3101 S.W. 3rd Ave., Ft. Lauderdale, FL 33315
Napier Turbochargers, P.O. Box 1, Waterside , South Lincoln LN5 7FD, UK

ULTRA HIGH MOLECULAR WEIGHT MARINE FENDERING
Ultra Poly, Inc., 2926 So.Steele Street, Tacoma, WA 98409

ULTRASONIC TESTING
M.A.C.E, 5910 NE 15th Ave., Fort Lauderdale, FL 33331

ULTRATHIN (UHMW) NON-SKID DECKING
Ultra Poly, Inc., 2926 So.Steele Street, Tacoma, WA 98409

UNDERWATER SURVEILLANCE SONAR
C-Tech LTD, P.O.Box 1960, Cornwall Ontario K6H6N7, Canada

VACUUM EQUIPMENT
Industrial Vacuum Equipment Corporation, N8091 Maple Street, Ixonia, WI 53036, 800-331-4832, 920-261-7117, randy@industrialvacuum.com

VACUUM TOILET SYSTEM
Envirovac Inc, 1260 Turret Dr., Rockford , IL 61111
Jets Vacum Sewage System, P.O. Box 14, N-6060 Hareid, Norway

VALVES
Norriseal, P.O. Box 40525, Houston, TX 77240, 713-466-3552, 713-896-7386, sales@norriseal.com, Contact: Gordon Dorr, www.norriseal.com

VALVES & FITTINGS
Leslie Controls, 12501 Telecom Dr., Tampa, FL 33637

VENTILATION SYSTEMS / PRODUCTS
Delta T Systems, PO Boxj9159, Jupiter, FL 33468
Dry Air Technology, 313 North Oak St., Burlington, VA 88233
Jon M. Liss Associates, PO Box 5005-73, Rancho Santa Fe, CA 92067

VIBRATION ANALYSIS
Ludeca, Inc., 1425 NW 88th Ave, Miami, FL 33172
Maritech, LLC, 100 Powermill Rd., Acton, MA 01725

VIBRATION CONTROL PRODUCTS
Lo-Rez Vibration, 186 W. 8th Ave. , Vancouver, BC V5Y 1N2, Canada, 604-879-2974, 604-879-6588, lo-rez@lo-rez.com, Contact: Ted Spaetgens, www.lo-rez.com

VISCOMETERS
Cambridge Applied System, 196 Boston Ave. , Medford, MA 02155

VOYAGE DATA RECORDERS
Rutter Technologies, P.O. Box 23150, Churchill Park Postal Outlet, St. John's, NL A1B 4J9, Canada

WASTE WATER TREATMENT
Airvac, 4217 N. Old U.S. 31, Rochester, IN 46975
EVAC Environmental Solutions, 1260 Turret Dr., Rockford , IL 61111, 815-654-8300, 815-654-8306, sfredrick@evac.com
FAST®Systems, 8229 Brentwood Industrial Drive, Brentwood, MO 63144, 314-645-6540, 314-645-6131, solutions@marinefast.com, Contact: Alan Fleischer, www.marinefast.com
RWO , Leerkampe 3, D- 28259 Bremen, Germany
ZNC International Incorporated, 200 William Street , Port Chester, NY 10573, 800-552-4403 / 914-690-0650, 914-690-0653, Chris@znclink.com, Contact: Chris Zimmerman, www.znclink.com

WATER JET CLEANING
Flow International Corp., 23500 64th Ave., South Kent, WA 98059
Gardner Denver Water Jetting Systems, 8807 Emmett Rd., Ste 100, Houston, TX 77040
NLB Corp., 29830 Beck Road, Wixom, MI 48383

WATER PURIFIERS
Alfa -Laval Separation, Inc , 955 Mearns Rd., Warminster, PA 18974
Gardner Denver Water Jetting Systems, 8807 Emmett Rd., Ste 100, Houston, TX 77040
Pentair Water Treatment, 502 Indiana Avenue, SheBoygan, WI 53081, 866-873-7506, 866-203-7361, customerservice@plymouthwater.com
Reverse Osmosis of South Florida, Inc., 150 S.E. 29th St., Fort Lauderdale, FL 33316, 954-462-4114, 954-467-6080, sales@desalinator.com

WATERTIGHT CLOSURES
Waltz & Krezner, 91 Willenbrock Rd., Oxford, CT 06478

WELDING PRODUCTS & POWER EQUIPMENT
ESAB Welding and Cutting Products, 411 S. Ebenezer Rd, PO Box 100545, Florence, SC 29501, 843-664-4411, 843-664-4258, dterry@esab.com, Contact: Donna Terry, www.esabna.com
Integro, 290 Pratt Street, Meriden, CT 06450

WINCHES & FAIRLEADS
Coastal Marine Equipment, Bldg 9114 MISAAP Ind. Complex, Stennis Space Center, MS 39529
Coastal Marine Equipment Inc., BLDG. 9114 MISAAP Industrial Complex, Stennis Space CTR., MS 39529, 228-813-1700, 228-813-1709, sales@coastalmarineequipment.com, Contact: Ralph Waguespack, www.coastalmarineequipment.com
CS Controls Inc, 101 Dickon Road, Houma, LA 70363, 985-876-6040, 985-876-0751, info@cscontrols.com, Contact: Paul Srigley, www.cscontrols.com
Intercontinental Engineering , PO Box 9055 , Kansas City, MO 64168
Jeamar Winches, 1051 Clinton St., Buffalo, NY 14206
Markey Machinery, P.O. Box 24788, Seattle, WA 98124
McElroy/Catchot Winch Company, Inc., P.O. Box 4632, Biloxi, MS 39535-4632
MMC International, 60 Inip Dr, Inwood, NY 11096
Patterson Company, 3 Riversea Roads, Pittsburgh, PA 15233, 800-322-2018, 412-322-2785, info@wwpatterson.com
Smith Berger Marine, 7915 10th Ave. S., Seattle, WA 98108
Superior Lidgerwood Mundy, 1101 John Ave., Superior , WI 54880
Timberland Equipment Ltd & Almon Johnson, 459 Industrial Ave., Woodstock, ON N4S 7Z2, Canada

WINDLASSES (ANCHORS)
Coastal Marine Equipment, Bldg 9114 MISAAP Ind. Complex, Stennis Space Center, MS 39529
Coastal Marine Equipment Inc., BLDG. 9114 MISAAP Industrial Complex, Stennis Space CTR., MS 39529, 228-813-1700, 228-813-1709, sales@coastalmarineequipment.com, Contact: Ralph Waguespack, www.coastalmarineequipment.com
CS Controls Inc, 101 Dickon Road, Houma, LA 70363, 985-876-6040, 985-876-0751, info@cscontrols.com, Contact: Paul Srigley, www.cscontrols.com
Jered Industries, 1608 Newcastle St., Brunswick, GA 31520

WINDOWS
Deansteel Mfg., 111 Merchant St., San Antonio, TX 78204

WINDSCREEN & WINDOW WIPERS
Bae Systems, 550 South Fulton St., Mt. Vernon, NJ 10550
Hepworth Marine International , Hepworth House, Brook St., Redditch, Worcestershire B98 8NF, UK
Wynn Marine, Ltd., Wynn House, Lansdown Estate,Cheltenham, Gloucestershire, UK

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Products

Azonix

Azonix HMI Product Solutions are totally-sealed ruggedized industrial systems ranging from data acquisition and control systems to stand-alone computers, smart terminals and remote displays. Originally designed for the standards of the offshore oil industry, this core technology is now integrated into the ProPanel Mariner for use in the commercial and military marine industry.

Circle 101

Brookfield

Brookfield Engineering Laboratories has released their new 84 page, full-color 2004 catalog. This year's catalog features the complete line of laboratory and process viscometers and rheometers. The the catalog also includes Broofield's new line of Texture Analyzers. Introductory pages for each section answer basic questions.

Circle 102

Columbus Mckinnon

Columbus McKinnon has introduced its new hand chain hoist, the Hurricane, which combines high quality and ruggedness in an economically priced hand chain hoist. It is developed by a cross-functional global team from CM's engineering, marketing and manufacturing groups, the Hurricane line carries a five year warranty.

Circle 103

Consilium

Consilium Navigation AB has launched the new SAL T3 speed log, combining a longitudinal and transversal true speed measurement with echo sounding. The SAL T3 is the first type approved combination of speed log and echo sounder in one housing, using only one combined transducer.

Circle 104

DMX

DMX has low coefficient of friction at both breakaway throughout the full operating range of shaft speeds. Lower friction means engines can operate more efficiently and conserve fuel. The DMX Locking Stave System does not require a bearing shell. Instead DMX staves equal in length to the housing are alternated with rubber staves that are axially longer than the bearing housing.

Circle No. 105

Great Lakes

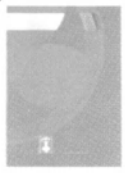
Manufactured by Great Lakes Chemical Corporation, FM-200 was originally developed to replace ozone-depleting fire suppressants. FM-200 , which doesn't depelete strospheric ozone, has been proven safe for people through extensive pharmacoligical testing rivaled by other fire suppressants. It deploys quickly and cleanly, without leaving any residue or causing collateral damage.

Circle 106

Jakob Hatteland Display

Today the company develops and manufactures a complete range of high and type approved quality displays, panel-computers and stand-alone computers.

Circle 107



HRP

HRP thruster systems are in operation world-wide in both inland navigation and on board all kinds of sea going vessels. At HRP they have thrusters that can be driven by diesel engines, electric- or hydraulic drive systems. All HRP products are designed, engineered and produced at Krimpen aan de Lek, Holland facilities.

Circle 108

KMM

From its offices in Vancouver, BC and Houston, TX, Kvaerner Masa Marine Inc. (KMM) offers quality naval architecture and marine consulting services including: feasibility studies, ship design, marine engineering, advanced analysis, construction supervision, ship production technology, project management, and research investigations.

Circle 109

Kroy

Kroy has introduced the new K4100 desktop label printer which features auto sizing, quick response and fast print speeds, scaleable and downloadable fonts, enhanced memory and a print resolution of 300 dpi. The K4100 can be connected to a PC for customized label, wire wrap and shrink tube applications.

Circle 110

Maxsurf

Formation Design Systems offers the Maxsurf v.9.5. The upgrade is part of their continuing research and development program to deliver the state of the art in naval architecture software. Formation's development team has also delivered a customizable approach to all kinds of stability criteria. With Hydromax, users can create their own custom sets of criteria by selecting from a wide range of standar criteria types.

Circle 111

Midwest

Mid-West Instrument has introduced its new, Model 123 Differential Pressure Gauge. This new gauge uses the same sensing and output method as the Model 120. The Model 123 extends the upper differential pressure range from 100 PSID to 400 PSID.

Circle 112

Ocean Safety

Ocean Safety has added the AQ180 SOLAS/ Shipswheel Approved Lifebuoy Light to its range of AquaSpec life-saving light products. The AQ180 combines a compact casing with an innovative extra-large dome that projects the light over a wide area, which enhances visibility.

Circle 113

Pinpoint

Pinpoint Laser Systems has introduced a new and improved flatness measuring and alignment kit. Machine beds, rollers, web assemblies, X-Y stages and mechanical slides can be precisely checked to .0005 in. for flatness and adjusted with this new Pinpoint product.

Circle 114

Premet

Premet Indicators are designed and manufactured for use on diesel and gas engine applications for the marine market and mobile and stationary power stations. The equipment is notaffected or restricted by heavy fuel oil. Its main applications include: combustion engines, compressors, hydraulic-equipments, steam piston engines and integral motors.

Circle 115

SDT

The Sherlog TA, as required by the IACS Unified Rule Z.17, and Russian Register, has been formally Type Approved by Lloyd's Register, ABS, DNV and Hellenic Register. It offers a software routine, dedicated to hatch cover ultrasonic tightness testing to memorize, log and download to PC all measured survey data and allow detailed and accurate reporting.

Circle 116

Southco

Southco Marine is a new oraganization that combines two brands of marine hardware: the Mobella brand of marine locks, latches and accessory hardware with the solutions of Southco. The Southco Marine portfolio provides a range of solutions for access hardware challenges in cabin, cockpit and entry door applications.

Circle 117

Coastal Marine

Coastal Marine Equipment's Anchor Windlasses are supplied with catheads, lever operated jaw clutches and hand wheel operated band brakes. All Anchor Windlasses are available in electric or hydraulic drive and can be supplied constant speed, multi-speed and variable speed. Hydraulic drives operate off central hydraulic system or dedicated system supplied with unit.

Circle 118

Techcrane

Techcrane Global provides worldwide sales and service for marine cranes. Techcrane is the largest distributor of EBI Cranes- capacities 2.5 - 200 tons. Telescoping cranes feature a unique Rack & Pinion telescoping mechanism. Techcrane.net proudly offers a full arsenal of marine crane CAD drawings and technical data specifications for all visitors.

Circle 119

Leslie Controls

Leslie Controls has released their new Steam & Thermal Fluid Controls brochure. The new brochure includes photos and descriptions for every product in Leslie's extensive line, suitable for Industrial/Commercial, Power, Process and Maritime applications.

Circle 120

Ward Leonard

Ward Leonard, in partnership with other technology leaders, is in the process of developing a line of permanent magnet motors for numerous Navy applications. These newly designed motors will include an extensive array of features and benefits relevant both to the Navy and to various specialized industrial applications. They will be smaller in size and show a major improvement in torque.

Circle 121

Graco

Graco has introduced a data recording kit designed to record critical application information on its Reactor proportioning system. The kit records the volume of material sprayed, target and actual A and B pressures, primary temperatures of the A and B components as well as hose temperature.

Circle 122

Hammar

C.M.Hammar AB has launched a new electronic remote release system (ERRS) for life rafts, evacuation systems or other lifesaving appliances. The new electrical ERRS is designed for quick and efficient evacuation of passengers. It is operated via an electronic control panel that activates one or several electric Hammar H20 Remote Release Units.

Circle 123

Wynn

Traditional wiper control systems run on an analogue basis but the digital nature of the Series 3000 Network Control system makes it a far more powerful utility. Among the many features, the Series 3000 has a LCD console mount control panel, modular systems that offer full flexibility and full wiper control including integral wash and air purge.

Circle 124

Sonardyne

Sonardyne has introduced Fusion, a concept of flexible and integrated navigation solutions coupled with the coordinated development of software and hardware. It has developed into a family of acoustic hardware and software products that can be configured to offer accuracy subsea navigation, adaptable for all offshore survey, construction and drilling applications.

Circle 125

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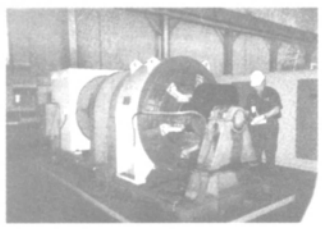

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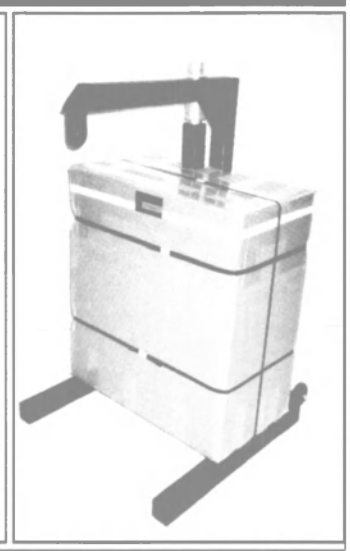

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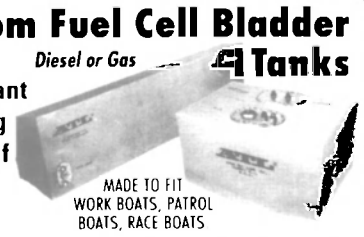

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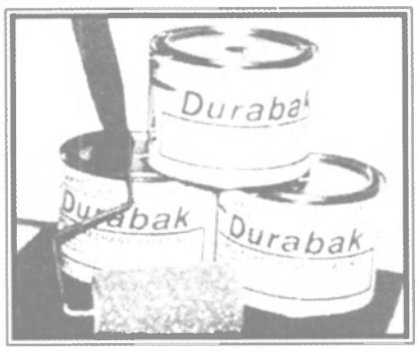

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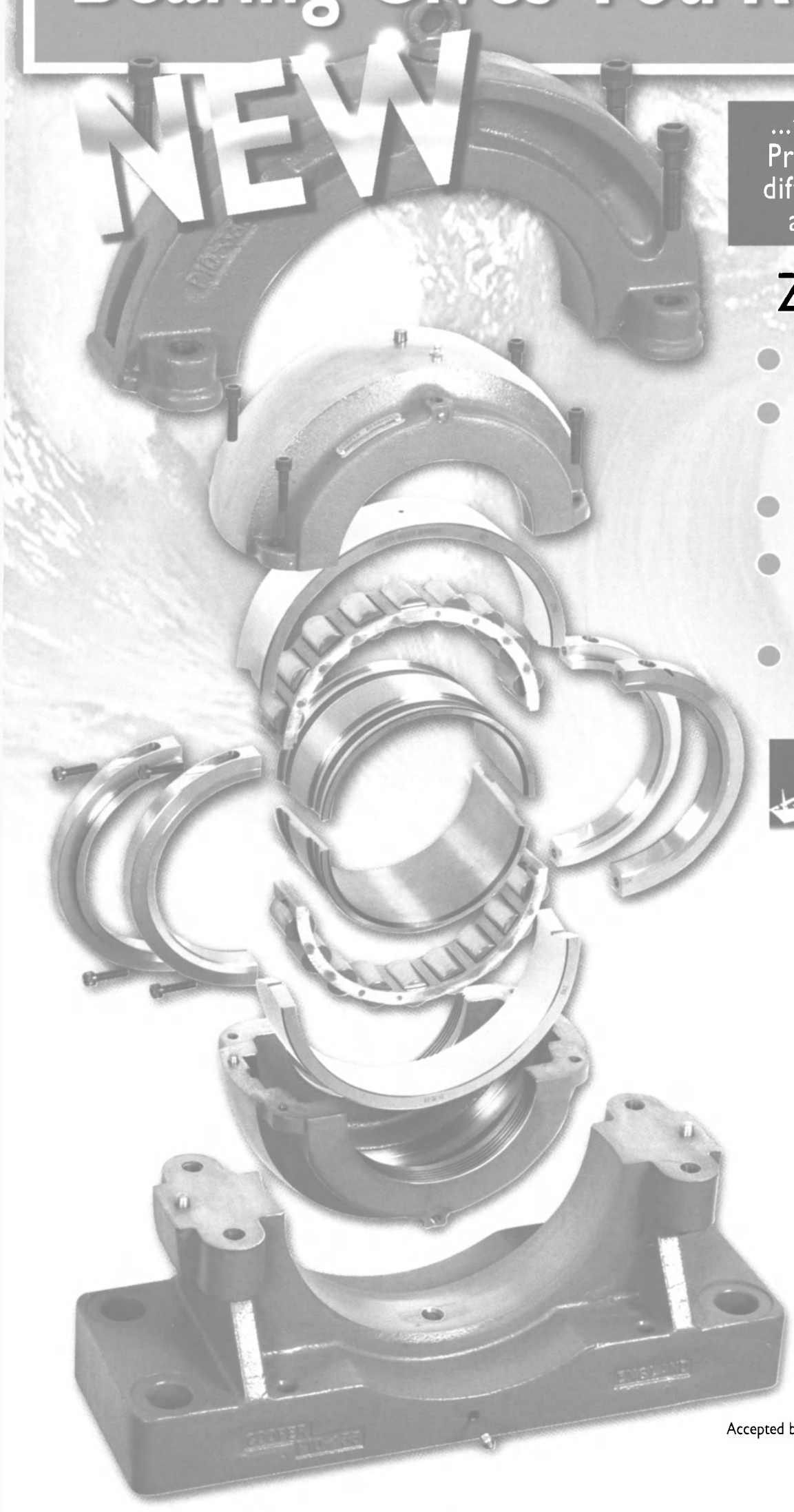

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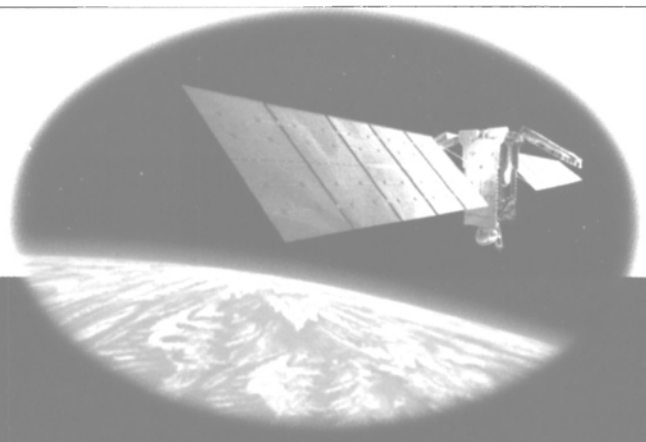

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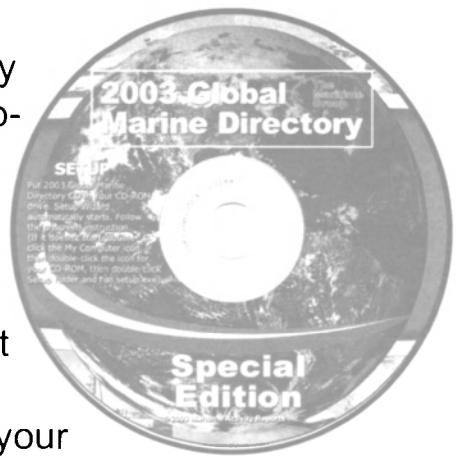

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