



University-National Oceanographic Laboratory System

Research Vessel Operators Committee

Volume 19, Number 1

RVOC Newsletter

15 February 1994

It's a little bit late, but Happy New Year to all of you. At this point you should all have received copies of the minutes of the 1993 RVOC meeting. If any of you haven't please let me know. I am still looking for material to include in these newsletters so that I am not just a clipping service. My thanks to those of you who have provided input for this newsletter. If you would like to include a couple of paragraphs on your vessel(s) and the activities for the year please do so. Remember that part of the intent of the newsletter is that it is distributed to people not included in the RVOC.OPERATORS address group on OMNET.

The dates for the 1994 RVOC Meeting have been set. The meeting is scheduled for 25, 26, 27 October in Savannah, Georgia. The meeting is being hosted by Skidaway Institute. We will need your help in developing the agenda for the second day. The plan is to hold multiple workshops in the morning similar to last year and then hold a workshop on Safety Equipment in the afternoon with a guest speaker to address the subject. Please forward any suggestions to Mike concerning the subject matters that should be addressed in the morning workshops and any suggestions on how to structure the afternoon session or who the guest speaker should be. Mike will publish a draft agenda on OMNET in the near future that will be a first step towards arriving at the final agenda. Everyone should participate in refining the agenda so the meeting best serves your purpose.

Best Regards,

Paul Ljunggren

RVOC Ship Updates

OSU- R/V Wecoma

R/V WECOMA entered the shipyard of Maritime Contractors Inc. (MCI) at Bellingham, Washington for Phase I of a mid-life refit and routine maintenance on 11 November 1993. When the initial round of bidding for a mid-life refit produced prices which exceeded available funds (an unhappy circumstance attributed to several interlocking factors among which delayed engineering and limited contractor mobilization and performance time dominated) Oregon State University after consultation with the NSF reduced the scope of the project to those refit items which would comfortably fit within the scheduled out-of-service period and budget. MCI was the low bidder on the second round. The portion of the refit which would have replaced the superstructure (mast, stack and pilothouse) has been deferred to a possible Phase II.

OSU has hired Art Anderson Associates of Bremerton, Washington to replace Rodney E. Lay and Associates as Naval Architects and consulting engineers for all Phases of WECOMA's refit.

The WECOMA project will accomplish all planned refit items of importance to science users and continued vessel reliability. Significant among these are: 7.5' stern extension with new portable A-frame, enlarged wet lab and new electronics lab, new galley, new refrigeration plant, enlarged transducer well, new CTD/Hydro winch, new aft winch and ship control house, new bowthruster power and control system, add MSD, new dual wildcat anchor windlass, factory overhaul of crane, shop overhaul of auxiliary generator electrical ends and bowthruster generator and motor, shop overhaul of watermaker, replace air compressor, add L. O. purifier, new autopilot, new dual axis speed log, numerous up-grades and improvements to laboratories and living spaces as well as other machinery and electronics overhauls and replacements.

At this writing (25 January) WECOMA has been refloated and work is proceeding nearly on schedule and on budget. WECOMA will be re-delivered on 15 March (two weeks later than originally planned, a delay due to some extensive, unplanned electrical work) and return to service on 7 April 1994.

OSU has been extremely pleased with the quality of work by MCI. This contract has been a refreshingly pleasant experience with a high spirit of cooperation prevailing due largely to a "partnering agreement" which underlies the formal contract. "Partnering" has become a beneficial way of life in public works contracts in the Pacific Northwest. This allows OSU to say with confidence "there are no items in dispute."

URI-R/V Endeavor Mid-Life

The R/V Endeavor returned to Rhode island the first week in December after 6 months at Peterson Builders, Inc. in Sturgeon Bay, Wisconsin.

Extensive work was done to the vessel prior to and while at the shipyard. The following list summarizes the major tasks accomplished:

- Overhaul of main engines including modifications to improve economy.
- Removal of the original pilot house, main mast, plenum, and forward stacks with a new aluminum superstructure consisting of a new lab deck, pilot house deck, integrated mainmast-stack.
- Expansion and rearrangement of the transducer well to accept additional transducers and improve accessibility.
- Seven foot stern section.
- Conversion of #10 seawater ballast tanks to storage.
- New reefer and freezer compartments and machinery, and an expanded galley dry stores area.
- Expansion of existing muffler room to provide space for HVAC chillers and additional ship storage.
- Extension of the wet lab including double wide door and equipment handling system.
- New ship's main crane.
- New dual wildcat anchor windlass replacing the single wildcat windlass.
- Rebuild of prime movers and generator sets on the auxiliaries.
- New EDO dual axis speed log.
- New MTI INMARSAT A system.
- New Robertson Autopilot incorporating bow thruster control.

- New, relocated, winch control station.
- Added 40kw emergency generator and switchboard.
- Installation of a Davit International SOLAS approved rescue boat davit.
- New chilled water HVAC system with individual temperature control in berthing spaces.
- New remote control searchlight.
- Additional clean, uninterruptable power in labs and bridge.
- Complete paint job.
- Normal drydocking including shaft renewal, rudder bearing renewal, CPP hub disassembly, sea valves, etc.
- New fuel tank level indicating system.

The ship's structure was in good condition with a few notable exceptions. The deck under the plenum required about 15% replacement. There was significant wastage in sewage and gray water tanks. Several frames were tripped on the starboard side where the ship ties up.

Work is continuing in Rhode Island with completion of the interior painting, rearrangement and overhauls on the ship's winches, and the considerable effort of reinstalling and testing the science outfit.

Scripps- R/V Roger Revelle

Construction of R/V ROGER REVELLE(AGOR 24) is progressing well at the Moss Point, MS yard of Halter Marine. A major event occurred on December 9, 1993, when Dr. Bob Knox officially authenticated the keel in keeping with the shipbuilders' tradition in an appropriate ceremony. Currently, seven of the twenty three modules that will make up the ship have been assembled and a total of fourteen are under construction.

Recent significant events include:

- a. Selection of the SeaBeam 2112 as the multibeam sonar system.
- b. Selection of a Simrad-Robertson DPS system.
- c. Approval of Engineering Change Proposals (ECP's) for:
 1. Additional science staterooms.
 2. A modern traction winch.
 3. Copper nickel main salt water system.
 4. Improvements in the potable water system.
 5. Replacement of the "J" frame with a hydroboom.

Several other items including flush mounting of the multibeam sonar, pilot house arrangement, and improvements in the anchor handling system are under review.

The current schedule calls for launching in April 1995 and delivery to Scripps a year later.

If anyone is in the area and desires to see the ship, please contact the SIO Owner's Representative, Ed Petersen, at 601-475-3080.

Natural Environmental Research Council

Mike Prince recently received a letter from Ken Robertson of the Natural Environmental Research Council(NERC) of England. Ken reported at last year's meeting that the

Research Vessel Services division of NERC would probably have to compete with private industry in a test marketing program for management and operation of the NERC Research Vessels. They have since held this competition and the "in house" Research Vessel Service has won the competition against all commercial competition. Ken hopes to report on the process and the subsequent changes in their operations at next year's meeting or perhaps in a future issue of the newsletter.

Policies-Personal Protective Equipment

As some of you may remember, at the 1993 annual meeting I was tasked with collecting information on Hard Hat, Safety Shoe, and Life Vest policies. I would appreciate if everyone in RVOC could send me copies of policies that they have in place which either require or somehow support and endorse the use of personal protective equipment. Please forward them to my OMNET or Internet address or by mail to:

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RVOC Directory,
Clippings,
Etc.

RVOC Directory
February 15, 1994

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How much authority does the captain have?

By Clark Miller

There's been a murder on board. You suspect your engineer because of longstanding animosity between him and the victim. The suspect proclaims his innocence. The Coast Guard won't reach the grounds for at least six hours. You're in a quandary. You know that out here — beyond the reach of the law — you're the law. You reason that the cops would arrest this man for questioning and that you have the same responsibility. So you order the man to his cabin pending arrival of the Coast Guard. When he refuses to go, you order the crew to seize and chain him to his bunk.

Have you exceeded your legal rights as a captain? Probably not. The weight of the law and maritime tradition is on your side. In fact, the U.S. Code, Annotated, Title 46, Sec. 701, plainly states that for willful disobedience of any lawful command at sea the master can place a seaman in irons until such disobedience may cease. And for continued disobedience, the master can feed the seaman bread and water, with full rations every fifth day until such disobedience may cease.

You should consider another question, however. If your suspect is eventually cleared of suspicion, will you have exposed yourself and the vessel owner to civil action? Here, the situation is less black-and-white; circumstances come into play.

"It's an interesting question," says Hal Vhugan, a Seattle maritime attorney with 30 years' experience. "It's sort of an accepted premise that the captain's authority is supreme. But when I first started practicing, the head of our firm tried a civil suit

for a crew member who had been suspected of a crime and had been chained to the deck and fed bread and water for several days.

"While the captain was exercising due authority, the jury found for the crewman and awarded damages because they felt there was insufficient evidence at the time to warrant the actions. There had been 12 passengers on board, any one of whom might have been the guilty party."

In other words, the captain needs to be lucky, omniscient or very careful. He's the cop out there, Vhugan says. In taking forceful action against a criminal suspect, he's like a policeman who has plenty of authority but can get in trouble for abusing it. He faces the same pressure a cop faces to do the right thing in a tough situation.

The captain's authority to direct and command remains almost inviolate, but when he takes drastic action he needs to have reasonable cause. Otherwise, he may face civil action.

A captain can incarcerate but must be careful how he does it. Seattle attorney Anthony Urie, referring to a standard source, Martin's *The Law of Seamen*, says if there's no brig onboard then confinement can be in any safe place — which does not include the deck. Confinement is to prevent further harm, not to punish.

On the subject of confinement, Vhugan recalls the case of a "ritual ax murder," in which a man was found in his bunk almost decapitated, with his arms crossed and the fire ax on his chest. The captain sent sev-

eral people to their cabins for the duration of the trip, but they were not locked in. Had they refused to comply, he would have had the authority to incarcerate them. There was no subsequent challenge to the captain's actions.

Then there's the case of the *Barnacle Bill* (NF Oct. '90 p. 10), in which the captain of a New Bedford scalloper apparently locked up two crewmen after they stopped working to protest the captain's refusal to return seasick crewmen to shore. While he may have been within his rights to incarcerate them, he risked civil action by also refusing to feed them.

The captain said eight crewmen threatened him with knives and shovels and that he locked himself and two other crewmen in the pilothouse and called the Coast Guard. He declined to press charges of mutiny, which is a federal offense.

In one area, drugs, a captain's power has increased recently. Vhugan says that, two years ago, the Coast Guard issued tough new rules on controlled substances, giving the captain authority to make random searches and tests at any time.

What about less-extreme situations, such as ordering a crewman to perform dangerous tasks? Since working at sea is inherently dangerous, can an injured crewman win in civil court with the claim that he was hurt because his captain placed him in a dangerous situation?

Yes — if the danger stems from unseaworthy conditions on the vessel, rather than

from the sea itself. Vhugan cites *Cantrill v. American Mail Line*, in which the Washington Supreme Court ruled for the seaman. During an ocean storm, he was injured while lashing down loose deck cargo that was supposed to have been left in Seattle. The law assumes that a seaworthy vessel does not sail with loose cargo on deck.

Another case is *Combs v. United States*. Combs had been ordered to climb up on a makeshift platform 20' above the deck; once there, he was ordered to stand on a makeshift rail around the platform in order to straighten a makeshift awning above. When the vessel rolled slightly, he lost his balance and fell, smashing his ankle so badly that his leg was eventually amputated. Since the rail had never been intended as a place to stand, the court ruled against the vessel.

A famous Supreme Court Justice, Learned Hand, addressed the subject of orders at sea in one of his opinions. "You've got to consider the problem of operating at sea," he wrote, "before you understand the real rationale concerning this question of order. You've got to apply common sense."

"It's obviously true that no officer of the sea would be justified in telling a man to jump overboard. . . . But it is also obvious that if the ship were in peril and I'm standing on the bow and one of the officers says, 'Jump over and make this line fast before we sink, that I would have to jump. And if I were killed in the act people would say, 'He was killed in the performance of a proper order.'"

FOR SALE — Examination Books

The Coast Guard publishes a series of books containing questions used in examinations for merchant marine deck and engineer licenses, and merchant mariner's document endorsements. The books contain all questions in the data bank as of the date indicated. Supplemental books provide information on new and revised questions.

Some questions refer to illustrations or other material, which is found in publications listed under "Illustration Books/Reference Material."

The books may be ordered by telephone and charged to a national credit card by calling (202) 783-3238. They may be available at local sales outlets of the Government Printing Office or at commercial book stores handling nautical products. They also may be obtained by writing:

*Superintendent of Documents
Government Printing Office
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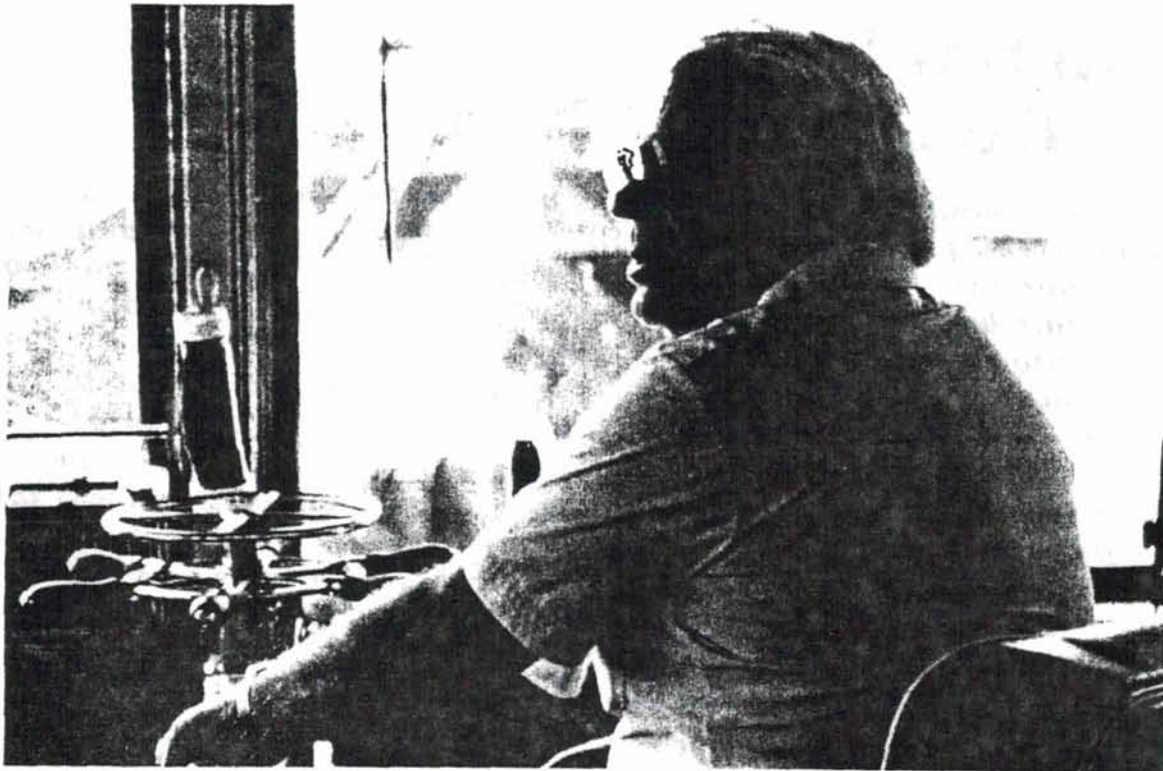
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Tow boat operator has to be tested every five years to renew his license.

ILLUSTRATION BOOKS/REFERENCE MATERIAL

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5" low density	\$13.00 per disk
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3+ inch high density	\$21.00 per disk

Aerospace & Aviation Industries Witness David and Goliath First Hand

* * *

by Noel Armstrong
Contributing to The Aircraft Journal

Up until March of 1993, Goliath stood alone in his kingdom of online aircraft inventory locating for over 11 years. During this entire time he was never truly challenged for his reign, and as a result, was able to do whatever he wanted with his system. The people initially championed the system Goliath had created, but as fate would have it, this would not last forever. One day, a brave young man named David came along to challenge Goliath. David brought promises of a better online system with more features, and newer more flexible technology than that used by Goliath. David delivered as promised and the people rejoiced. But alas, Goliath was not slain, and wound up sharing 20% of the market with David in only 9 short months. David would most definitely bring Goliath toppling to the ground once and for all by continuing to grab up market shares at about 2% per month, with a more diversified product priced at a whopping 70% less than Goliath's. Will Goliath be able to collect himself and prove victorious? We all know how the story goes...but stay tuned anyway, this should prove interesting. Goliath still has 80% of the market, but scores of companies have joined David's team and more join him every day.

Goliath is an arm of **Ryder System, Inc.** called **Inventory Locator Service, Inc.**, of Memphis, Tn. They have been the only major online system for buying and selling aircraft parts for over 11 years, providing an electronic marketplace you can access with your PC and modem.

David is the aggressive and innovative **MaxAir Inc.** of Houston Tx., the brain child of some ingenious engineers who have been tireless pioneers of the Information Highway for over ten years. They too provide an electronic marketplace you can access with your PC and modem. In addition to listing all your inventories and service capabilities for free, you can buy and sell aircraft parts on

their system, as well as receive a wealth of cross reference information related to a specific item, such as: Alternate Part Numbers, Vendor Contacts, National Stock Numbers, CAGE Codes, Procurement Histories, MCRL data, ML/C data, and Manufacturer's List Pricing. And listen to this, with their Remote Research Software, all the data you retrieve from their systems can be automatically stored in dBase style databases to be reused or incorporated into other software packages! You can even access several electronic publications like USA Today Newspaper, and receive them straight to your office computer via modem. The software also allows you to send any kind of business correspondence, like an RFQ, purchase order, or private message, instantly to another company via electronic mail or the built in fax modem manager. Defense contractors can receive up to date information on open government aircraft part contracts to help increase the number of bids they win. The word is, their Research Software can even do part queries and updates on Goliath's system for companies that are transitioning to MaxAir. These guys have a very promising future of bringing the electronic office into reality for every company in the aviation industry, greatly streamlining processes and increasing productivity. They are giving away several months of free access to all companies that want to grab a hold of the future now. They do charge a very nominal setup fee that covers the Research Software and technical support (which I might add, is superior). If you buy, service, or sell aircraft parts, you should call these guys right now. **MaxAir** can have you and your inventory online in less than 24 hours. Contact them at **713-977-6577**, 8am-8pm central standard time and get the complete scoop. You can also send them e-mail on the global Internet to maxpr@maxair.com. Until next time, blue skies!

Noel Armstrong is a globally published freelance advertising writer. Portions of this article have been extracted from other articles and reprinted with permission from the original authors.

You guys
may want
to read
this

Help us make the rules

By Mr. Emmanuel P. Pfersich

You can get involved in formulating regulations and international standards. Interested members of the public, as well as of the transportation industry are welcome to help develop regulations and standards for transporting and handling hazardous materials both domestically and internationally. In fact, your participation is encouraged to ensure that the issues are fully explored from the perspectives of all interested parties, thus arriving at the best solutions.

Regulations

Two administrations in the Department of Transportation share the responsibility for the safe transportation of hazardous materials by water: the Coast Guard, and the Research and Special Programs Administration (RSPA). In particular, the Office of the Associate Administrator for Hazardous Materials Safety.

The Coast Guard is responsible for regulations governing bulk transportation of hazardous liquids, liquefied gases and solids by tankships.

bank barges and bulk carriers. These regulations are found in 46 CFR subchapters N and O.

RSPA develops the regulations covering packaged hazardous materials, which are found in 49 CFR subchapter C. "Packages" include bags, boxes, drums, portable tanks, rail cars and highway vehicles, to name a few.

The Coast Guard works closely with RSPA in developing the special regulations for water transport of packaged hazardous materials, and has primary enforcement responsibility.

Domestic involvement

Typically, the publication of a notice of proposed rulemaking and, in some cases, an advance notice of proposed rulemaking in the *Federal Register* notifies all interested parties and gives them the chance to submit comments. In some cases, the Coast Guard conducts public forums on issues. Advance notice of such meetings is given in the *Federal Register*.

Continued on page 34

You are encouraged to get involved in this rulemaking process.

Continued from page 33

Any member of the public may petition or make recommendations to the Coast Guard or RSPA with regard to issuing new regulations, or amending or repealing existing ones. However, it is preferable to be involved up front when you can be heard before a regulation is issued.

International standards

Internationally, there are four primary bodies involved in regulations for the transport of packaged and bulk hazardous materials by water. They are IMO's subcommittees on bulk chemicals, on the carriage of dangerous goods, and on containers and cargoes, plus the United Nations (UN) Committee of Experts on the Transport of Dangerous Goods.

The Subcommittee on Bulk Chemicals is responsible for codes covering the transport of bulk chemicals and liquefied gases. These include the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, and the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk.

The Subcommittee on Carriage of Dangerous Goods is in charge of rules governing the maritime transport of packaged hazardous materials, and develops the International Maritime Dangerous Goods (IMDG) Code.

The Subcommittee on Containers and Cargoes develops the IMO Code of Safe Practice for Solid Bulk Cargoes.

The committee of experts develops the UN Recommendations on the Transport of Dangerous Goods, known as the orange book. This standard forms the basis for the various specific requirements, such as the IMDG Code.

International involvement

The Coast Guard heads United States delegations to the three IMO subcommittees, while RSPA's Office of the Associate Administrator for Hazardous Materials Safety heads United States delegations to the UN committee, upon which there is a Coast Guard advisor.

With some variation, the IMO subcommittees meet once a year, while the UN committee and/or its subcommittee meets twice a year.

Knowledge about the work of these committees and involvement in the formation of United States positions are extremely important. More and more international standards are precursors of domestic regulations.

The principal avenues for public involvement in the preparation of United States positions on the IMO subcommittees are Safety Of Life At Sea (SOLAS) working groups. They operate under the Department of State's Shipping Coordinating Committee. There is a working group supporting the work of the United States in preparation for meetings of each subcommittee. Issues before the respective subcommittees are discussed and proposed United States positions are presented for comment at working group meetings.

Meetings of these groups are announced in the *Federal Register* at least 30 days in advance. They are all open to the public and welcome attendance. In addition, SOLAS working group chairpersons at Coast Guard headquarters maintain mailing lists of members of each group and notify them of meetings.

Similarly, RSPA's Office of the Associate Administrator for Hazardous Materials Safety announces public forums preparing for meetings of the UN Committee of Experts on the Transport of Dangerous Goods in the *Federal Register*. These forums are also posted on the Hazardous Materials Information Exchange, a computerized bulletin board managed by RSPA and the Federal Emergency Management Agency.

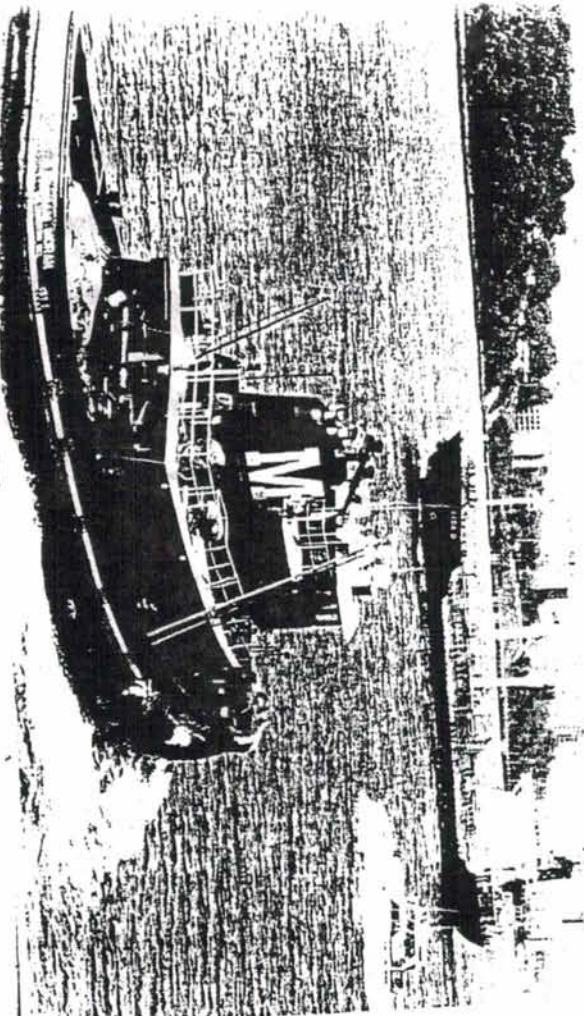
Get involved

Anyone interested in helping to formulate United States regulations and international standards is encouraged to take advantage of these opportunities and get involved. Contact the Hazardous Materials Branch at (202) 267-1577 for further information.

Mr. Emmanuel P. Pfersich is chief of the Packaged Cargo Section of the Hazardous Materials Branch. (202) 267-1577. Telephone: (202) 267-1577.

A tug, pleasure craft and the port tender *Lisa D* are normal New York Harbor traffic.

Photo by LT Tom Butler, USCGR.



Walker & Corsa

NEW YORK, NEW JERSEY, CONNECTICUT, HONG KONG

January 11, 1994

Mr. Paul Ljunggren
Lamont-Doherty Earth Observatory
of Columbia University
Route 9W
Palisades, New York 10964

M/V "MAURICE EWING"

Dear Sirs:

For your information and guidance, please find enclosed a recent Memorandum and Order of the United States District Court for the District of Maryland granting summary judgment against a plaintiff scientist who sued John Hopkins University, Applied Physics Laboratory for personal injuries sustained while on board the R/V AMY CHOUSET (*Mitola v. Johns Hopkins University*). We believe the Memorandum and Order will be of interest to you because the court set forth the standards used to determine (1) whether a scientist on board a research vessel can be classified as a Jones Act seaman; (2) whether such a scientist can be classified as a "seaman" under general maritime law to maintain an unseaworthiness claim; and (3) whether a research vessel scientist is entitled to maintenance and cure. A summary of the Memorandum and Order follows.

John Hopkins University, Applied Physics Laboratory ("JHU/APL") chartered the R/V AMY CHOUSET for the purpose of conducting underwater acoustical research involving the measurement of acoustical wave propagation through the ocean. Plaintiff Mitola, was an employee of JHU/APL for 20 years, and was stationed aboard the research vessel as the supervisor of marine operations during a voyage that began on November 17, 1988. Mitola's responsibilities included the deployment of a towed underwater sensor involved in the acoustical research. On November 24, 1988, the R/V AMY CHOUSET ran into heavy weather several hundred miles off the coast of Bermuda. Mitola was injured when, while out on the vessel's aft deck, he was knocked down by a large wave.

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Of Counsel

*Also admitted in New Jersey
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Mr. Paul Ljunggren
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Mitola sued JHU/APL for alleged negligence under the Jones Act, unseaworthiness of the vessel under general maritime law, and maintenance and cure. JHU/APL filed a motion for summary judgment against plaintiff.

The court granted summary judgment in favor of JHU/APL finding that:

1. Even assuming Mitola was a "seaman" under general maritime law principles, his Jones Act claim was barred by the Oceanographic Research Vessel Act, 46 U.S.C. §§ 441-444.

2. JHU/APL was entitled to summary judgment on Mitola's claim of unseaworthiness because plaintiff admitted that the vessel was seaworthy; and

3. JHU/APL was entitled to summary judgment on Mitola's claim for maintenance and cure because Mitola, if entitled to maintenance and cure benefits at all, had already received the compensation owed.

PLAINTIFF'S JONES ACT CLAIMS

The court found that the Oceanographic Research Vessel Act ("ORVA"), 46 USC §§ 441-444 precludes scientific personnel from recovering under certain statutory provisions, including the Jones Act. Section 441(2) of ORVA defines "scientific personnel" as "persons who are aboard a vessel solely for the purpose of engaging in scientific research, instructing or receiving instruction, in oceanography or limnology." The court stated that the essential inquiry when determining an individual's status is the individual's basic purpose on board the vessel. Performance of seaman's functions or other manual tasks, if incidental to one's primary scientific research duties, will not change an individual's designation from scientific personnel to seaman.

Although the court in *Mitola* found that JHU/APL was entitled to summary judgment on the question of whether Mitola was a seaman covered by the Jones Act, the court stated that "this court is aware that ordinarily, where there is evidence supporting seaman status, the determination of whether an injured employee is a seaman covered by the Jones Act is a question of fact for the jury ..."

In *Mitola*, the court found that the following evidence undisputedly established that Mitola was a member of the scientific research team, not the crew of the vessel:

1. Mitola admitted that the vessel crew was responsible for the transportation and other routine functions of the vessel;

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2. The scientific team, including Mitola, was responsible for the testing operations on the aft deck;
3. Mitola testified that he did not handle the ship's lines and had no role in the navigation of the vessel and his activities were confined to the rear deck and laboratory;
4. Mitola had no discernible role in the every day functioning of the vessel. That was left to the Captain and crew;
5. A test plan distinguished the vessel's crew from the scientific team and classified Mitola as part of the scientific team;
6. Mitola was primarily responsible for the deployment and recovery of the towed underwater sensor used in the acoustical research and for supervising the overall activity of the JHU/APL members of the scientific team;
7. The crew members of the vessel did not, and because of the complex nature of the procedure, were not permitted to participate in the deployment/retrieval process; and
8. Although Mitola operated cranes and winches above the aft deck of the vessel and handled lines, cables and shackles, the court found that the mere performance of such manual duties failed to transform Mitola into a seaman. Mitola performed such tasks only in furtherance of and incidental to his essential duty: the deployment and recovery of the towed underwater sensor used in the scientific research activities.

PLAINTIFF'S UNSEAWORTHINESS CLAIMS

The court stated that although ORVA precludes a scientist from being considered a seaman for purposes of the Jones Act, it does not prevent a scientist from being a "seaman" under general maritime law for other purposes. A plaintiff scientist who can establish his seaman status by showing that his "scientific duties contributed to the function of the vessel or the accomplishment of its mission, like the contribution made by the surgeon crew member of a floating hospital, may still be eligible for the benefits granted seamen by general maritime law. These benefits include the warranty of seaworthiness."

In Mitola, the court found that by Mitola's own admission, there was no unsafe condition of the vessel that caused or contributed to the accident and/or his alleged injury and, therefore, granted summary judgment in favor of JHU/APL.

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Under Mitola, if a "scientist" establishes seaman status under general maritime law, then the scientist is entitled to benefit from the doctrine of seaworthiness.

PLAINTIFF'S MAINTENANCE AND CURE CLAIM

The Maryland court further stated that maintenance and cure are traditional maritime remedies which provide an injured seaman with a daily subsistence allowance and payment of reasonable medical expenses without regard to fault. Thus, if a research vessel "scientist" establishes his status as a seaman under general maritime law and establishes that he is entitled to maintenance and cure, his employer is liable for such obligations.

Kindest regards.
Very truly yours,
WALKER & CORSA

By 
LeRoy S. Corsa

ISC/jf
*Enc.
pljw001.tr
CC: Shipowners Claims Bureau, Inc.
Five Hanover Square
New York, NY 10004
Attn: Mr. Edward S. Jones,
Vice President

Marsh & McLennan Marine & Energy
1166 Avenue of the Americas
New York, NY 10036-2774
Attn: Mr. Stan Schiff,
Marine & Energy Claims Dept.

Mr. Jeffrey Marshall
Columbia University
475 Riverside Drive, Suite 401
New York, NY 10115

Walker & Corsa

Getting high on risk

Shop wisely for crane liability insurance

By James W. Carbin, Esq.

Even the most responsible crane companies are subject to an accident at some time. It has become nearly impossible for crane companies to lease cranes or even bid on jobs without showing proof of insurance. In addition, many sophisticated general contractors and sub-contractors require protection through insurance obtained by the crane lessor.

However despite the necessity for liability insurance, it has become increasingly difficult for crane owners and operators to obtain. A key reason for this is that crane companies are usually labeled as "high-risk" accounts by insurance companies. Much like the rest of the economy, the insurance industry has fallen on harder times since the prosperous 1980s. Many insurers, particularly those that once wrote high-risk policies, can no longer make a profit with high-risk groups, and their capacity to accept new business has been reduced. The few insurance companies still willing to take on high-risk companies are either being more selective or they are asking for substantially higher premiums. For example, recent business reports show that Lloyds of London lost nearly \$6 billion in the last three years alone. The International Union of Marine Underwriters (IUMI) recently disclosed that rates for such liability policies have risen an average of 33 percent in the last two to three years. This directly affects insurance rates for high-risk accounts.

Understanding high-risk

Crane companies are perceived as high-risk for several reasons. First, operation of heavy machinery in confined areas near multiple workers presents a serious risk of accidents both in terms of frequency and severity. In general, injuries sustained from crane-related accidents are substantially more disabling than those in many other areas of coverage. In addition, the typical worker in this field is young, often with a spouse and young

safer conditions. Unfortunately this doesn't allow for the reality that most operators are hesitant to overrule a jobsite supervisor.

Much of this high-risk business has historically been written by foreign insurers in the Surplus Lines market. Surplus Lines insurers are companies that specialize in accepting more difficult to place risks, which conservative insurance companies avoid. Many Surplus Lines insurance companies are located in other countries where

Make sure to choose coverage that is geared to the needs of your business. This sounds obvious, but it is surprising how often companies don't evaluate their real needs until a loss has already occurred and the insurer is asking more questions than the companies can answer.

children to support. This, coupled with the fact that workers are often not qualified for other employment with comparable compensation, means the recoverable damages in such a lawsuit can be daunting.

A second reason crane companies are considered high-risk is because the crane owner is often the target defendant when an accident occurs. In an effort to place blame on someone else, each party involved starts pointing fingers. In reality a crane accident is usually the fault of more than one person. But when the case is put to a jury, the crane becomes the most obvious element to focus attention on. As a practical matter, this high profile often results in the jury assessing some, if not a significant amount, of liability to the crane owner.

Third, crane owners often suffer liability because many states place the ultimate burden of making a safe lift with the crane operator. These laws require operators to refuse to make lifts they feel are unsafe or to wait for

operating costs are lower, making it easier to handle higher risk accounts profitably. This lack of readily available, domestic high-risk insurers often makes finding the coverage crane owners need a frustrating experience. But, knowing what to look for in a broker and understanding the differences among the types of crane owner liability insurance available, can make the task easier.

Obtaining insurance

For a variety of commercial and legal reasons, few insurance underwriters work directly with crane companies when issuing a policy. This means you will probably have to go through a broker to place the insurance. Brokers can be found from several different sources. Check with industry organizations like the Specialized Carriers and Rigging Association (SC&RA) or look through industry publications. Also ask other companies in the industry who they use. Be sure to find out what

James Carbin is senior litigation counsel with Kroll & Tract, a national law firm based in New York, N.Y. He specializes in the defense of crane and other heavy machinery casualties, and he has litigated several hundred such matters throughout the United States.

other crane accounts the broker is servicing. If you are unable to locate a broker that specializes in crane insurance, a general commercial broker can contact a wholesale broker for you. Crane insurance obtained this way will generally be more expensive because both the direct and wholesale brokers earn a commission.

It is the broker's job to locate an insurer that is responsible and financially secure, and to see that the policy is tailored to your operation's particular needs. Be sure to choose a broker that is familiar with the crane business and the different forms of coverage available. In addition, make sure the broker can advise you about the insurance best suited for your company and can recommend any special policy provisions your needs may warrant. For example, if the policy permits certificates of insurance to be issued as proof that insurance is in place, find out who does this and when. If you must wait for the company to issue the certificate you may not be able to bid jobs immediately. Also

Glossary

Additional Named Assured—a contractor named as an extra assured under the crane company's insurance policy; this enables the assured to bid on job contracts.

Broad Form Comprehensive General Liability (CGL)—provides protection beyond that granted under the standard CGL.

Broker—an agent or intermediary who negotiates insurance policies between insurance underwriters and clients.

Comprehensive General Liability (CGL)—provides broad insurance protection for liability arising out of the insureds operation; however it is subject to certain exclusions, such as liability for injuries to your own employees, liability assumed under contract or intentional acts of dishonesty.

Deductible—the amount the policy holder must pay before the insurer will contribute

Duty to Defend—protection for the cost of attorney fees and other costs of litigation like hiring experts to testify on your behalf or court charges

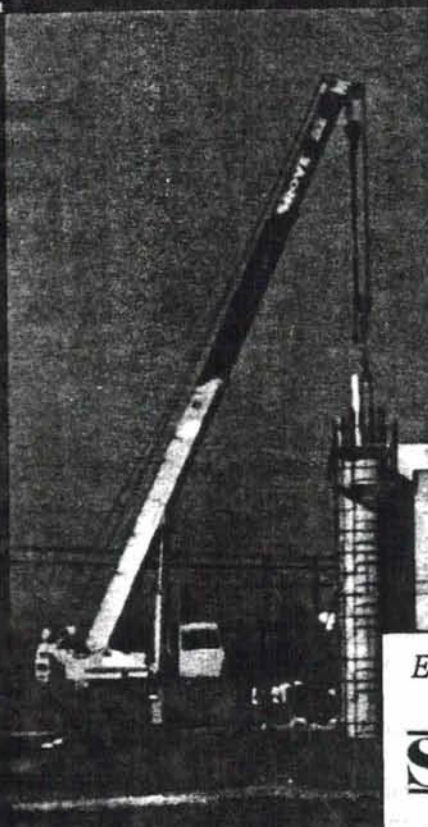
Duty to Indemnify—protection against a claim

Insurance Services Organization (ISO)—an insurance industry association that periodically reviews the wording of liability policies to adapt it to periodic changes in law

Owners Contractor's Policy (OCP)—purchased separately by a sub-contractor or supplier; it benefits the general contractor or property owner by protecting them from liability that may occur during construction performed by the sub-contractors or suppliers.

Worker's Compensation Insurance—required in all states to cover injuries to employees

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learn from the broker what the insurer's general approach is to claims. While some are quick to respond, others are more likely to resist.

While the security of the insurer is something you can expect the broker to ascertain, it is important for you to verify the facts. There are several insurance industry publications that report financial condition and solvency of the major insurers including "Best's Insurance Report" and "Standard & Poor's." Ask your broker for the most recent copy of these reports. Recognize however, that these reports are issued only periodically and the financial profile of the company may have changed by the time you review them. Specifically ask your broker whether there have been any adverse reports of the insurance company's condition since publication.

Choosing the best coverage

Make sure to choose coverage that is geared to the needs of your business. This sounds obvious, but it is surprising how often companies don't evaluate their real needs until a loss

has already occurred and the insurer is asking more questions than they can answer. The type and amount of insurance coverage a company requires depends on its size and operational territory. The more equipment and employees a company has, and the more states it operates in, the higher limits of coverage the company needs. As a general rule, the limit of your policy should approximate the value of the company's assets.

Comprehensive general liability—

The standard type of insurance policy available usually covers both liability for claims and defense costs up to an agreed limit and over the deductible. While this type of policy can have different forms or wording, the typical form policy for construction-related liability insurance is called a comprehensive general liability (CGL) cover. CGL forms provide broad insurance protection for liability arising out of the specific insured operation. However, CGLs are subject to certain exclusions, such as liability for injuries to your own employees, liability assumed under contract or intentional acts of dishonesty. The

CGL form is a product of the Insurance Services Organization (ISO), an insurance industry association that periodically reviews the wording of the policy to adapt it to periodic changes in law. In general, the more recently reviewed forms exclude some of the liabilities protected under the earlier versions. Be sure to check your policy to fully understand the extent of your particular protection.

One of the most important points to consider in a liability policy is whether it provides coverage for lawyers fees and costs of litigation, as well as protects against claims. Generally, protection against a claim is referred to as the Duty to Indemnify; protection for the cost of attorney fees and other costs of litigation, like hiring experts to testify on your behalf or court charges, is referred to as the Duty to Defend. Often Duty to Defend coverage is more important to a company than is the protection against payment of the claim itself, especially in cases where the company is unlikely to be found liable. These situations, when the

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Worker's comp and third party suits

Worker's compensation insurance is required in all states to cover injuries to employees. The trade-off for providing this insurance is that injured employees can't sue their employer. This does not prevent them from bringing action against a third party, such as the general contractor, who may in turn "claim over" against the employer for indemnity for any sum the general contractor must pay the employee. Certain states, such as Texas, are known as absolute bar states, which means even a claim over against a responsible employer is barred.

The failure to provide worker's compensation insurance has different effects in different states. In some, (as in New York) the employer is treated as the compensation insurer. Other states, (like California) allow the employee to bring an action against the employer. And in other states, (like Arizona) the employee can sue the employer, who is barred from asserting many of the usual defenses, including that the employee's own negligence caused the injury. ■

company may only have to pay a nominal sum as a nuisance cost to get rid of the case, is when protection against legal expenses is most needed.

Consider the amount of the deductible in your policy. Virtually all policies require a deductible, which is the amount you must pay before the insurer will contribute. Deductibles serve several purposes. First, it keeps insurers from getting involved in minor claims, representing a significant savings once applied to thousands of policies. Second, by not turning in minor claims, policy holders can negotiate better premium rates because of a better loss experience record.

However, make sure the deductible includes the amount covered for indemnity on claims payments and legal fees. It should include both. Sometimes you will be quoted a better premium for what appears to be the same coverage with the same limits and deductible. But a closer look may reveal that instead of one deductible for both claims and legal fees, there are actually two deductibles built into the policy. This means you will have to pay the deductible twice; first toward the amount of any settlement or liability judgment and then toward the legal fees and expenses.

The standard CGL form policy is partly designed to work in conjunction with the worker's compensation insurance protection policy. The CGL policy expressly excludes any liability arising out of injuries to an employee. This is because the various states have worker's compensation laws that clearly define the terms and limits of insurance to be maintained in order to protect employees injured on the job.

However, a complication arises when an employee of the crane com-

pany is injured and brings action against a third party like a general contractor, who then makes a claim against the employer for the cost of indemnity paid to the employee. (See related sidebar, above.) Often, the third party can make claims under *common law* for indemnity, like when the claim is based on the negligence of the insured's employees or equipment. When this occurs, Part B "Employers Liability of the Worker's Compensation Policy" would respond. However, if the third party's claim is based on an indemnity or "hold harmless" clause in the job contract with the employer, the Worker's Compensation Policy will not afford protection. Likewise it is unlikely the standard CGL policy would apply since that form excludes liability for contractually assumed liabilities such as a hold harmless clause.

Broad Form CGL—For these reasons you may want to obtain a broad form CGL, which provides protection beyond that granted under the standard CGL. One of the most important extensions given under the broad form is that it covers against liabilities occurring as a result of an incidental contract with a third party, like a hold harmless agreement. In addition, it covers against common law indemnity claims. Without a broad form CGL, you may end up facing a claim for indemnity by an uninsured party being sued by an employee. Even if the claim is baseless, you will have to fund the defense costs alone.

Another important feature of the broad form CGL relates to the ability to name an additional named assured. This practice, which is becoming more common, allows contractors to require they be named as an assured under the

crane company's insurance policy. Being named as such enables the assured to bid on job contracts. However, the crane company can be held liable for failure to fulfill the contract if the contract is bid successfully, yet the contractor is not named as required. This liability can be covered under the broad form CGL. Unfortunately additional litigation may be generated in this situation, undermining the protection initially intended, because of complicated questions that arise. For example, is the contractor's CGL policy relieved from responding? And which policy should respond first?

Owners Contractor's Policy—A newer form of coverage called the owners contractor's policy (OCP), is growing in popularity. The OCP is designed to be purchased separately by a sub-contractor or supplier, like a crane owner. Generally it is purchased as a complimentary policy on a contract-by-contract basis, in addition to either the standard or broad form CGL. It protects the general contractor or property owner from liability that may occur during construction performed by sub-contractors or suppliers. Claims are automatically paid under this separate OCP policy and do not affect the assured's loss experience when it is time for renewal of either the standard or broad form CGL. In addition, this special policy precludes many questions arising from the additional named assured practice.

Getting the right crane owner liability insurance is critical to the security of your business. Knowing what to look for in a good broker and knowing about the different types of insurance available makes the process easier. ■

ALDEN ELECTRONICS

December 17, 1993

Mr. Steve Matlager
Radio Holland
500 South 31st Street
Kenilworth, NJ 07033

Dear Mr. Matlager:

In response to our telephone conversation regarding FCC GMDSS type acceptance of Navtex products, the purpose of this letter is to inform you that the Navtex function contained in our Alden MarineFax TR4 Recorder Model 9414 does not comply with the FCC GMDSS requirement.

The reason for this is that part of the GMDSS requirement calls for an audible alarm whenever an A, B, D or L message is delivered to the Navtex system. Our MarineFax TR4 system has a visual alarm that appears in the LCD DISPLAY, but there is no audible alarm.

In all other respects, the Navtex capability contained in the MarineFax TR4 is in compliance.

Therefore, to be complaint with GMDSS requirements, your customer will have to purchase an AE-900 Navtex Stand Alone Receiver which is in complete compliance with the FCC GMBSS requirement and carries a sticker attesting to that fact.

Should you have any further questions, please contact me.

Sincerely,

ALDEN ELECTRONICS, INC.

Armand D. Bouchard
Armand D. Bouchard

ADB/ig

Alden Electronics, Inc., 40 Washington Street, Westborough, Massachusetts 01581-0500
Telephone: 508-366-8851 Telex: 94-8404 FAX: 508-898-2427

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Newsletter

VOLUME 13, NUMBER 1

JANUARY 1994

**U.S. DEFENSE DEPARTMENT ANNOUNCES
INITIAL OPERATIONAL CAPABILITY FOR GPS;
SECRETARIES OF DEFENSE AND TRANSPORTATION APPROVE
TASK FORCE REPORT RECOMMENDING MORE SUBSTANTIVE ROLE FOR
TRANSPORTATION DEPARTMENT IN GPS POLICY AND MANAGEMENT ISSUES**

The U.S. Department of Defense (DOD) has advised the Department of Transportation (DOT) that the Navstar Global Positioning System (GPS) has achieved its Initial Operational Capability (IOC) as defined in the 1992 Federal Radionavigation Plan jointly issued by DOD and DOT.

A signal specification for the SPS, also forwarded to the DOT by DOD, is currently under review by the DOT and other affected civil government agencies. Future DOT announcements will advise the civil community of details regarding status and plans for civil use of GPS.

The Secretaries of DOD and DOT have also approved a report by a Joint DOD/DOT Task Force established to examine the operational, technical and institutional implications of increased civil use of the Global Positioning System, with the objective of developing a consensus regarding the issues and recommendations for using GPS as a national resource to satisfy civil and national security requirements.

The Joint DOD/DOT Task Force Report, titled "The Global Positioning System: Management and Operation Of A Dual Use System", recommends a management structure and technical considerations which will provide for full representation of civilian interests in the policy management of the GPS. Recommendations include establishment of a DOT Pos/Nav Executive Committee and a DOD/DOT GPS Executive Board, future funding by DOD for the basic GPS and by DOT for augmentations to GPS, implementation of DGPS services with integrity information for applications requiring accuracy better than that provided by even the PPS, a study of augmentation alternatives to develop an optimum integrated system to provide GPS augmented services, continuation of current federal development and deployment of GPS accuracy enhancements, and determination of the composition of the federally-provided DGPS service mix which will become a U.S. standard for navigation.

Copies of the Joint DOD/DOT Task Force Report are available to RTCM members on request to the RTCM Office by facsimile to +1-202-347-8540, by telephone to +1-202-639-4006 or by mail to the address listed on this Newsletter. Request Document ALFA VICTOR ALFA.

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**FOR THOSE CONCERNED WITH TYPE APPROVAL OF SHIPBORNE
RADIO EQUIPMENT AND ELECTRONIC NAVIGATIONAL AIDS
REQUIRED BY THE SAFETY OF LIFE AT SEA CONVENTION**

If you are concerned with type approval/type acceptance of maritime radiocommunications and radionavigation equipment you should be aware of ongoing work to revise document IEC-945.

IEC-945 is the only internationally agreed voluntary standard that prescribes test and test procedures for equipment to meet the general shipboard equipment requirements prescribed in IMO performance standards of IMO Resolution A.694(17).

The current revision of IEC-945 is being developed by Working Group 5 (WG5) of Technical Committee 80 (TC80) of the International Electrotechnical Commission (IEC). All concerned with this standard are eligible to participate in the work through auspices of their national IEC committees.

Those concerned with U.S. markets for SOLAS and/or U.S. compulsory ships should note that IEC-945 standards are currently mandated as a requirement for all equipment to be type accepted for use in meeting U.S. flag ship requirements of the Global Maritime Distress and Safety System (GMDSS).

RTCM will make available to members pertinent documents concerning the IEC update work. Mailing list for this purposes is designated as RTCM Special Committee 116. If you desire to be included on this mailing list make request in writing to the RTCM Office by facsimile to 202-347-8540, or by mail to the address listed on this Newsletter. Request addition of your name to mailing list for SC116, IEC 945 Standards Development.

**U.S. COAST GUARD BEGINS TRIAL OPERATION
OF MF/HF DIGITAL SELECTIVE CALLING SERVICES**

The U.S. Coast Guard has begun trial operation of medium and high frequency radiotelephone service utilizing Digital Selective Calling (DSC) from Coast Guard Communications Station Boston (NMF). The DSC service will allow mariners to automatically send a formatted distress alert to NMF as well as other DSC equipped stations worldwide. As an additional service Coast Guard Communication Station Boston (NMF) is also announcing unscheduled marine information broadcasts using DSC.

It should be noted that DSC will also allow mariners to initiate distress, urgency, safety and routine telephone calls to any properly equipped vessel or shore station without the necessity for a continuous aural watch at the receiving station.

The Coast Guard plans to install DSC at each of its high seas communications stations within the next eighteen months, and at each of its coastal radio stations by the end of the decade.

**U.S. FCC ADOPTS CHANGES TO RULES REGARDING
COLLECTION OF FEES FOR SHIP INSPECTIONS**

By Order the U.S. Federal Communications Commission has adopted changes to its rules regarding collection of fees for ship inspections as specified in Title 47, Code of Federal Regulations Section 1.1117.

The FCC notes that prior to this change fees for ship inspections were collected by billing after the inspections were conducted. Since not all licensees were paying their bills however, and significant FCC resources were being diverted to the problem of collecting unpaid fees, it was decided that in the future the FCC will only inspect ships that have paid their fees in advance.

Copies of the FCC Orders are available to RTCM members on request to the RTCM Office by facsimile to +1-202-347-8540, by telephone to +1-202-639-4006 or by mail to the address listed on this Newsletter. Request Document ALFA VICTOR CHARLIE.

**U.S. FCC EXTENDS TERMS OF
SHIP AND AIRCRAFT STATION LICENSES TO TEN YEARS**

By Report and Order (R&O) the U.S. Federal Communications Commission (FCC) has Title 47, Code of Federal Regulations, Section 80.25 to provide that licenses for ship stations in the maritime service will normally be issued for a term of ten years from the date of original issuance, major modification, or renewal. Further, licenses other than ship stations in the maritime services will normally be issued for a term of five years from the date of original issuance, major modification or renewal.

Copies of the R&O are available to RTCM members on request to the RTCM Office by facsimile to +1-202-347-8540, by telephone to +1-202-639-4006 or by mail to the address listed on this Newsletter. Request Document ALFA VICTOR DELTA.

**U.S. DEFENSE MAPPING AGENCY (DMA) REMOVES
DECCA ELECTRONIC LATTICES FROM DMA CHARTS**

The U.S. Defense Mapping Agency (DMA) has announced its intent to begin removing DECCA Electronic Navigation Lattices from new editions of charts commencing January 1, 1994. The action is predicated upon a diminished requirement for DECCA navigation with the advent of the Global Positioning System (GPS).

- o U.S. Coast Guard Headquarters is now connected to Internet electronic mail through a gateway at the U.S. Department of Transportation. Electronic mail correspondence involving RTCM Special Committee 101 on Digital Selective Calling (DSC) or other maritime telecommunications matters can be sent to: j.hersey/g-t07@cgsmt.comdt.uscg.mil.

**DOES YOUR SHIP MEET CURRENT EQUIPMENT CARRIAGE REQUIREMENTS
FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)?**

Those concerned with operation of all ships subject to the Safety of Life at Sea Convention (SOLAS), and with operation of U.S. flag non-SOLAS ships subject to compulsory carriage requirements under the FCC Rules of 47 C.F.R. 80 (compulsory ships) should review requirements related to carriage of Search and Rescue Transponders (SARTs), 406 MHz Satellite EPIRBs and NAVTEX Receivers. In brief summary:

SARTs: Dependent upon the construction date, type and size of ship, and the applicability of SOLAS and/or U.S. Rules, ships may be required to carry one or two SART's beginning February 1, 1992, or February 1, 1995 or February 1, 1999. For detailed information on U.S. flag ship rules see newly published U.S. Coast Guard Navigation and Vessel Inspection Circular (NVIC) 9-93. Copies of the NVIC are available to RTCM members on request to the RTCM Office by facsimile to 202-347-8540, by telephone to 202-639-4006 or by mail to the address listed on this Newsletter. Request Document ALFA TANGO BRAVO.

406 MHz Satellite EPIRBs: Carriage is generally required effective August 1, 1993. (Note that August 1, 1993 is the applicable date for all SOLAS ships; certain U.S. compulsory ships on domestic voyages may be exempt until August 1, 1999 on provisions of 47 CFR 80).

NAVTEX Receivers: August 1, 1993 for all SOLAS and U.S. compulsory ships.

It should be noted that all equipment carried to meet SOLAS requirements must be type approved/accepted for GMDSS use as prescribed by the cognizant national authorities. For U.S. flag ships (including all compulsory ships under U.S. law) specific GMDSS approval labeling is required on each piece of equipment.

**IMO SUBCOMMITTEE APPROVES
ECDIS PERFORMANCE STANDARD**

At it's September session the Safety of Navigation Subcommittee of the International Maritime Organization (IMO) completed its work on revising and updating the IMO Provisional Performance Standards for Electronic Chart Display and Information Systems (ECDIS) based largely upon recommendations submitted by the joint IMO/International Hydrographic Organization (IHO) Harmonization Group on ECDIS (HGE).

The new ECDIS Performance Standard, as approved by the Safety of Navigation Subcommittee, will next be considered by the Maritime Safety Committee (MSC), parent body of the Subcommittee, at its April 1994 meeting. If approved by the MSC it will then be considered by the 1995 IMO Assembly Meeting for approval as an IMO Standard. It is anticipated that the standard will be published as an IMO MSC Circular after MSC approval and prior to Assembly action.

COMMUNICATIONS

GMDSS finds a friend in the House

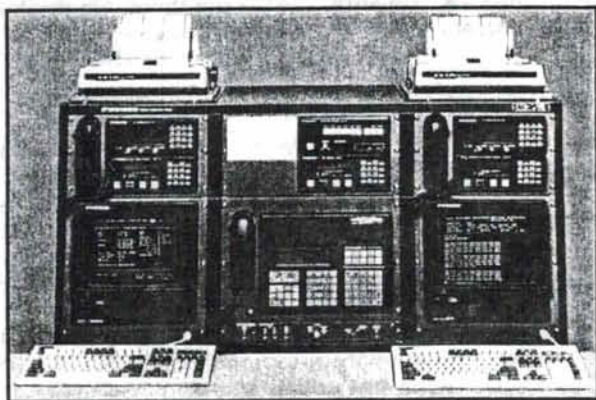
U.S.-flag operators may soon have an incentive to move a lot faster on meeting GMDSS requirements

IF Rep. Jack Kingston (R.-Ga.) is successful in gaining passage of his recently introduced Ship Safety and Competitiveness Act, U.S.-flag operators may soon have very good reason to start looking very seriously at the attractions of fitting GMDSS (Global Marine Distress and Safety System) equipment. That's because his bill would exempt owners of GMDSS-equipped ships from what Rep. Kingston sees as "the arcane" radiotelegraphy and morse code officer requirements of the U.S. Communications Act of 1934. Rep. Kingston sees the act's requirements for radio officers as "featherbedding" in the age of GMDSS. Kingston says the radio officer requirement is costing U.S. operators some \$220,000 per ship. He says that this "burden and disparate treatment is one more example of the many rules affecting only U.S.-flag vessels and operators, making it all but impossible to compete with their foreign-flag counterparts."

As we discussed in our July 1993 issue, (p.16), phased implementation of GMDSS began in February 1992. Essentially, the system uses modern communications technology so that a ship in distress can alert shore-based search and rescue authorities, as well as ships in the immediate vicinity, in order to achieve coordinated assistance and rescue operations. It eliminates the need for morse telegraphy and, rather than relying on the traditional radio officer, makes extensive use of automation. It also has requirements for either redundancy of equipment, or an approved maintenance system.

Because the morse telegraphy requirement has been dumped, GMDSS allows owners to eliminate

the radio officer and instead carry two certified radio officers—who can be any members of the crew who qualify. The U.S. has yet to change its domestic legislation to permit this, a situation that Rep. Kingston intends to



NO MORSE KEYS: Neat GMDSS packages like this Furuno console are becoming more common on board ship as the marine industry moves away from radiotelegraphy and morse code requirements dubbed "arcane" by one U.S. Congressman

change with his bill.

GMDSS equipment requirements vary depending on which of four Sea

Areas a vessel trades in. A number of marine equipment manufacturers, including Furuno and Kelvin Hughes, have published useful guides that explain the options.

GMDSS is being phased in within the framework of the international SOLAS convention. The implementation schedule required that by August 1 last year be fitted with Navtex receivers and 406 MHz EPIRBS. Ships built after February 1, 1995 must comply with all GMDSS requirements. Ships constructed before that date can either comply with GMDSS, or can comply with the Chapter IV SOLAS requirements that were in force prior to February 1, 1992 until February 1, 1999, when they must comply with all GMDSS requirements.

BUILT-IN GPS

Complying with GMDSS provides operators with an opportunity to rethink their communications philosophy. Trimble Navigation is promoting its Galaxy as not only a neat GMDSS package, but a powerful ship management tool.

Saturn incorporates Inmarsat C and a GPS receiver in a single integrated unit.

In an emergency, a push of a button on the Galaxy remote alert panel transmits a message to the selected Rescue Coordination Center that includes the ship's identity, position, speed, course and the time and type of emergency. To help ships keep out of problem areas, Galaxy uses GPS to automatically select the appropriate navigational area for receipt of Inmarsat SafetyNet broadcasts (other areas can be selected manually).

Galaxy's tracking and communications capabilities allow the home

GMDSS opens opportunities for Maritex

Though satcom is certain to get a further boost as GMDSS implementation gains pace, HF radio is also a vital element of the system. That could help the Maritex global radio telex system add to its fleet of 1,200 ships sailing under 40 flags. The HF GMDSS equipment that is now being introduced by producers worldwide generally meets requirements for Maritex, which offers traffic rates that are "highly competitive to Inmarsat charges."

Ships joining the system are assigned a telex number and there are no entrance or annual fees to pay.

Jointly owned by the telecommunications companies of Denmark, Finland, Iceland, Norway and Sweden Maritex links land-based equipment in Argenti-

na, Panama, the Philippines and Europe through a central computer system in Sweden to offer a 24 hour, global, ship to shore and shore to ship communications service. Ship to shore services include direct dialing with conversation options, rational store and forward, multiple address telex and semi-fax—a telex-to-fax service that allows non-telex subscribers to be reached. Shore to ship messages can be sent by a variety of means that now include via personal computer and dial-up modem. Maritex says this is an important step towards its efforts to become less dependent on telex and eventually introduce full E-mail services.

For further information circle 150 on Reader Service Card

IDB Mobile offers automatic credit card calling

IDB Mobile Communications, the sixth largest provider of satcom services via the Inmarsat service, has introduced a new credit card service. It allows vessel or rig crew members and visitors (including vendors) to make automatic ship-to-shore credit card calls.

When calling from any standard touch-tone telephone, the caller hears the "bong tone," then enters his credit card information to pay for the call. His credit card is charged and the vessel or rig is not billed.

Ships do not need to register for the service, which allows direct dialing without operator assistance (though operators will assist if digits are entered incorrectly or the caller needs help.)

"This is a simple service to use," says Marc Newman, VP business development, IDB Mobile. "It utilizes advanced technology to allow direct-dial credit card calls from ships at sea, as easily as calls on shore.

According to IDB Mobile's director of European sales, George Mochrie, the service is "the first of its type offered in the Inmarsat arena." He says it will be "very well received on North Sea oil rigs and chartered vessels who often have to handle third party calls."

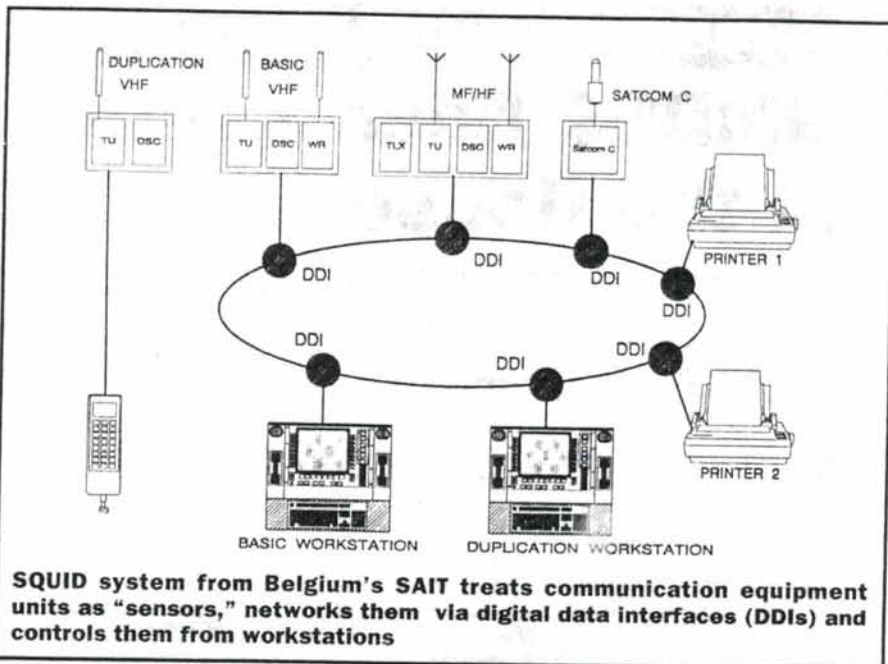
Currently the service accepts Visa, Mastercard, American Express, Diner's Club and Carte Blanche cards.

For further information circle 151 on Reader Service Card

office to transmit up-to-the-minute routing information to specific ships. It can also precisely monitor the movements of every ship in the fleet by making use of Galaxy's ability to include GPS position in messages from the ship.

PACKAGING GMDSS

The major marine electronics manufacturers have attempted to make GMDSS fits less daunting by offering package solutions. Last year, for instance, Furuno introduced its RC 5000/3T GMDSS console. This is a single unit usable by vessels for Sea Area A3 (basically, deep sea areas more than 150 nm from coastal MF stations, but within the coverage of an Inmarsat satellite). It incorporates:



SQUID system from Belgium's SAIT treats communication equipment units as "sensors," networks them via digital data interfaces (DDIs) and controls them from workstations

- Standard-C satcom;
- two VHF's with DSC;
- 400 W SSB with DSC;
- telex terminal;
- watch receivers.

From one central location, the ship's officers can initiate routine or distress communications via a variety of methods and paths. Vessel operators have a complete safety communications system within one single console, offered by one manufacturer.

SQUID

SAIT Marine N.V., Belgium, unveiled its Squid integrated radio communications system at November's Europort show. The basic concept behind this system is to consider all radio communication equipment as "sensors," ignoring their individual control units, and link them via a network to a workstation. It makes use of DDI (digital data interfaces), each of which represents an exclusive link between a sensor or a workstation and the network and ensures compatibility between them.

A Squid installation includes a basic workstation, panel mounted, for fitting in one of the operators' positions of an integrated bridge console, and a duplicate workstation, in its own stand which contains all the electronics that Squid uses to control the communications sensors along with the communications sensors' own electronic units. Presently, the Squid is offered to integrate:

- an MF/HF transceiver with telex, DSC and watch receiver;
- a VHF simplex transceiver with DSC and watch receiver;
- a Standard C satcom including EGC (for reception of MSI).

SAIT says that the configuration of the two Squid workstations and these sensors constitutes a complete GMDSS package with required duplication—except for the second VHF. This, says SAIT, "is generally not integrated as it is used for safety of navigation and is built-in at the conning position."

For further information circle 152 on Reader Service Card

GMDSS VHF

Developed to meet GMDSS requirements for life-saving appliances (regulation 6 of SOLAS Chapter III, Navico hand-held AXIS GMDSS VHF radios are designed for simple operation with one hand. They offer complete protection against water ingress, even when totally submerged to a depth of 1 m. They are also drop resistant from 1 m onto a hard surface.



Navico is an independent British company with subsidiaries in France and Largo, Fla.

For further information circle 153 on Reader Service Card

Electronic charts: Where are we now?

Andy Norris of Kelvin Hughes clarifies the picture on what systems are available now and which are still some time away

IN the next decade the electronic chart will be increasingly recognized by the professional manager as a preferred substitute for the paper chart. In ten to 15 years more ships will be using electronic charts than those using only paper charts. The paper chart can then be expected to rapidly become a back-up facility, perhaps using quite different printing and distribution techniques than those used now. Those are some of the views of Andy Norris, technical director of Kelvin Hughes Ltd. Involved with radar and navigational equipment since 1970, Norris chairs International Electrotechnical Commission panel

that compiles and issues internationally agreed specifications for marine navigational instruments. He's also the technical rapporteur on electronic charts for the Comite International Radio-Maritime (CRM) and represents CRM on HGE—the IMO/IHO (International Maritime Organization/International Hydrographic Organization) harmonized group working on ECDIS specifications. In a recent paper, Norris explained what progress is being made toward the future he foresees.

ECDIS AND ECS

IMO and IHO have split electronic charts into two groups. "The first of

these is known as Electronic Charts Display and Information Systems [ECDIS]. ECDIS equipment and chart data will necessarily follow strict specifications laid down by IMO/IHO and, subsequent to a future IMO resolution, will be accepted as an equivalent complying with the up-to-date charts required by regulation V/20 of the 1974 SOLAS Convention. It is probable that this planned IMO resolution will be approved by the IMO Assembly in 1995."

The second group comprises all other electronic charts that do not comply with the ECDIS specification. "These will not be acceptable by IMO as a paper chart equivalent," warns Norris, "and paper charts will still have to be carried and used by those vessels that have fitted non-ECDIS equipment. These non-ECDIS electronic charts are normally called Electronic Chart Systems [ECS]."

The term ECS is also being used by the United States Radio Technical Commission for Maritime Services [RTCM] to denote an intended minimum standard for non-ECDIS systems to be used within the U.S. An RTCM panel hopes to issue an approved standard this year. It will allow greater flexibility in the data

and display formats than ECDIS and will permit both raster and vector formats. There's some interest in the U.S. in putting this standard forward for international recognition. Other national electronic charts standards are also being formulated. In general, though, the term ECS simply denotes an electronic chart other than one meeting the ECDIS standard.

"It is important to note," says Norris, "that ECDIS is only at the stage of a draft performance standard." That draft standard refers to some IMO and IEC documents that are themselves in a state of revision or that have yet to be issued. "Also," adds Norris, "the carriage requirements for vessels planning to use ECDIS as a substitute for paper charts have not been addressed by IMO, including the consideration for back-up requirements in the case of equipment failure."

Until the relevant IMO resolution is passed, the IEC's Technical Committee 80 cannot issue type approval specifications—though it is already working on these in close consultation with the HGE. "These aspects prevent manufacturers from offering existing fully compliant ECDIS equipment, despite some claims to the contrary," warns Norris.

RASTER & VECTOR FORMATS

Data describing chart information may be stored in raster or vector format. Raster information is stored as picture elements, or pixels. Each is a minute component of the chart image with a defined color and brightness level. Pixels are normally aligned in rows and columns, following standard computer display architecture. The eye sees the total array as a screen "picture" of a chart. Raster scanned images are derived by video or digital scanning techniques that, effectively, "photograph" existing paper chart originals.

Vector data are held as a series of instructions for defining and drawing a particular chart feature. "Thus, for example," explains Norris, "a depth contour can be stored as a defined shape and can have a particular depth assigned to it. Other drawing information could, for instance, include the color and line thickness of the contour. This drawing information is converted into a screen image by the processor within the electronic chart display system. Since the data are stored as a 'table' of chart information, vector systems offer an 'intelligence' that is not inherent within a raster system."

"Vector format systems," continues Norris, "also offer the ability to 'layer' information, i.e. the user can have a certain flexibility as to what informa-

tion should be displayed on the chart. However, considerable effort is required to compile and check the data for a vector chart, whereas a raster chart is comparatively easy to create."

ECDIS is a vector format system. It makes great use of the in-built intelligence in the data. However, "generation of ECDIS chart data is rather more difficult than was once thought," observes Norris, adding "it is likely to be many years before anything like the present coverage of paper charts is equaled."

This is opening the doors for other chart systems—particularly those based on raster data—to be used in parallel with ECDIS. Systems using raster data scanned directly from existing paper charts "have the very real advantage that the displayed chart is entirely familiar to the user..."

Manufacturers can be expected to introducing dual or multistandard systems capable of displaying ECDIS data when available for a particular area and ECS data when ECDIS data are unavailable. "While displaying non-ECDIS data, the equipment ceases to be an ECDIS and hence actual paper charts must be used in parallel as the primary source of chart information. Such equipment must give a clear indication whether ECDIS or ECS data are being displayed."

ELECTRONIC DATA

"In future," predicts Norris, "it can be expected that the supply of ECS display equipment will become divorced from the supply of data" with a "small number of hydrographic offices" offering raster data. [Since Norris presented his paper last September, the world's largest producer of paper charts, the U.K. Hydrographic Office, has, as we reported in our last issue, started to offer fully "official" Admiralty raster charts.]

For ECDIS systems, the draft performance standard calls for data to be "the latest edition of that originated by a Government authorized hydrographic office" and "provided in conformity with IHO standards." Additionally, "ECDIS should be capable of accepting official updates ... in conformity with IHO standards." Thus, notes Norris, "ECDIS is conceived with a firm requirement for the data and its updates to only come from official government sources."

ELECTRONIC CHART UPDATES

"In principle," says Norris, "electronic charts may be updated by a weekly data set, originated by the chart compiler organization, either supplied on disk or via a satellite data link."

"Such semi-automatic updates ... will normally be unnoticeable as cor-

New CDU from Kelvin Hughes

Introduced at November's Europort show, Kelvin Hughes Ltd.'s new Chart Display Unit (CDU) is fully compatible with the U.K. Hydrographic Office Raster Chart Service. It can be used alone or interfaced with the Kelvin Hughes NINAS navigation display.

As a stand alone unit, the high resolution raster scan display with a 1,280 pixel x 1,024 pixel screen is mounted in an ergonomically designed cabinet, compatible with other Kelvin Hughes display cabinets. A window on the right of the displayed chart provides ship's position, course and speed, the range and bearing of the cursor (controlled by track ball) and chart information comprising name, number and projection along with when the chart in use was last corrected and the correction number.

The CDU offers interactive route planning and monitoring along with instantaneous assessment of tracked targets that may be overlaid on the chart from the radar.

For further information Circle 155 on Reader Service Card

rections ... the user will always see a 'clean' but updated version of the chart," he notes, adding that the user should also be given on-screen information on the date of the latest update, while the chart display system should have in-built intelligence to check that all updates before the most recent have been incorporated. "The complete update information should also be able to be reviewed by the operator to aid a manual check of completeness. This invisible type of correction is possible for both raster and vector format charts and is a defined feature of ECDIS."

In addition, and also allowed for in ECDIS, the user should be able to "draw in" updates, e.g. after receiving a Navtex message. These should stand out as being user-provided.

CHART FUNCTIONS

Route planning can be greatly simplified through use of good electronic chart equipment. "Waypoint and route libraries can be easily generated, modified and recalled. Routes may be formed using great circle or rhumb-line legs; controlled radius curves can be generated between consecutive legs. The route can be displayed at various chart scales to visually check on clearances from hazards, etc. Courses and distances can be automatically computed; also automatic or semi-automatic interaction with tidal

stream tables can rapidly lead to leg time estimates..." says Norris, noting that vector format systems can perform automatic checks on the route, "thus any crossing of boundaries of prohibited or special condition areas will be detected ... In particular, vector systems can check whether any planned route would violate own-ship's safety depth contour."

Norris says electronic chart systems are "the ideal display system for positions derived from continuous positioning systems such as GPS, Loran and Decca." But he warns that "clearly the over confidence that can be generated on seeing own-ship's position automatically plotted on a chart must be tempered with a consideration of the system accuracies."

Addressing voyage recording, Norris notes that position plots and other information drawn onto a paper chart provide a valuable voyage record and that there are strict legal requirements for its preservation after an accident.

The draft specification requires ECDIS to store and to be able to reconstruct navigation during the previous eight hours and stipulates that it must not be possible to manipulate or change the recorded information. "It is sensible," says Norris, "for all other electronic chart systems to have a similar form of voyage recording."

RADAR INFORMATION

Incorporation of radar information onto the electronic chart, leading to its use for both navigation and collision avoidance purposes, is still a matter of some controversy, but, in a section of his paper that explores the issues involved in displaying radar on the electronic chart, Norris says: "Display of ARPA tracks on the charts is perhaps now considered as being useful by most mariners and navigation experts who have studied or used such a facility."

OUTLOOK

Norris's conclusions: "The electronic chart is here to stay and it will become increasingly integrated into modern ship operations. The near future will see the introduction of ECDIS, but since it will be many years (20 years plus?) before ECDIS chart coverage is equal to that available on paper charts, it can be expected that other electronic chart systems will have a long life. In the far future, the electronic chart has the potential to become an essential subsystem that will eventually allow the fully automatic pilotage of vessels. This will form a very interesting area of research over a number of years."

ML

Electronic compasses: Getting better all the time

By Burnet Landreth

Having a compass aboard used to be a simple matter. Other than swinging it once in a while to check on accuracy and making sure you didn't set your pipewrench down next to it, a compass was pretty easy to deal with.

Not anymore. Now, you have to select the kind of compass you want according to what you want it to do. Then, if the choice is an electronic compass, there's the issue of where to install the sensor.

Currently, there are three types of compass available to tell you — and all your other equipment, from autopilot and radar to satcom and sonar — which way you're headed.

First is the old standby magnetic compass with the rotating card. Some of today's models can provide heading information to electronics. It's no longer the ideal method, but it works.

One downside to using a magnetic compass for heading information is that the card flops back and forth as the vessel rolls, causing faulty readings. Also, a magnetic compass still works by resting on a bearing which can wear, causing drag and incorrect readings.

Other problems that can cause poor performance when coupled to electronics are bubbles in the housing and extreme susceptibility to stray magnetic fields and vibration. When a magnetic compass experiences too much vibration, it starts "walking," or spinning around endlessly. When you lay something conductive next to it, depending on the strength of the field, the compass will "lock-up" and not spin at all. So, while a simple magnetic compass is still the best for steering with your wheel, it has been surpassed for any electronic interfacing purposes.

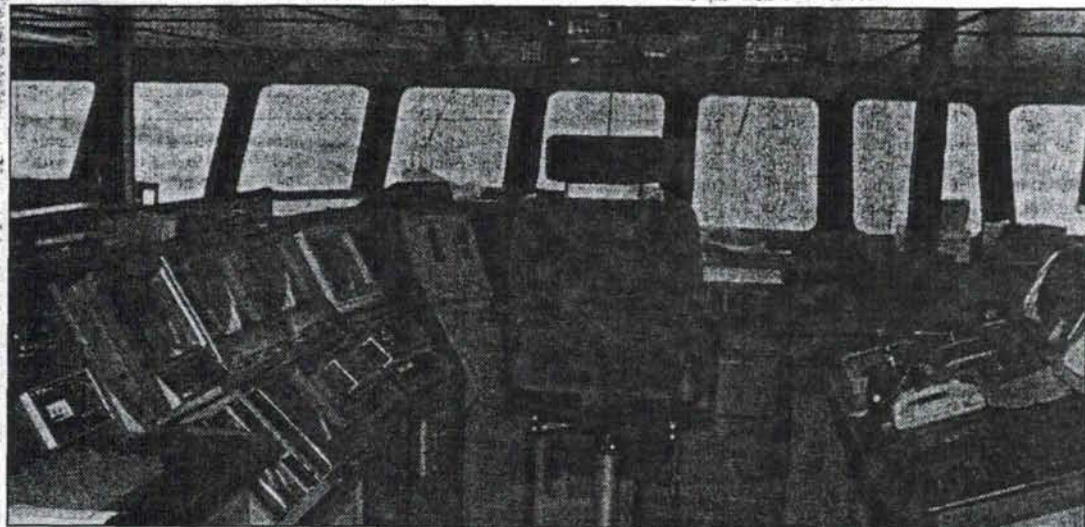
By far the most accurate compass to date is the gyro compass, which is not really a compass at all. A gyro compass actually senses the earth's rotation and points to the spot on the earth with the least rotational speed — the north pole.

This type of compass is excellent for large ships but has definite drawbacks for all others. First, once you turn it on, a gyro compass takes a very long time to settle in and read correctly. Once it took a full day, now, some can settle in in as little as five hours. This can be a problem in our age of instant gratification, especially when some people feel the one-second-update rate of a GPS unit is "just too slow."

In addition, gyros are generally pretty large units, so your bridge needs to be roomy. However, gyros do have an advantage in that they are not affected by stray magnetic fields or rough weather. Their biggest problem is their expense, which is considerable. And unlike other marine electronics, gyros are mechanical units that are never likely to cost less.

Enter the flux gate

The flux gate is the most common elec-



tronic compass. In simplified terms, a flux gate compass is composed of two coils at right angles to each other that are mounted on gimbals, each sensing the earth's magnetic field. As the coils move across the earth, the intensity of the magnetic fields changes, and the software in the flux gate measures those changes. These measurements are compared, and the resulting electronic impulse is presented as a wave form — or in the case of Ritchie's MagTronic unit, as a time/phase shift that looks like a spike. Each degree of the compass is considered a single pulse, and north is two. Once the flux gate has been swung, the compass simply spits out a stream of electronic information about where it is heading.

These electronic compasses can be very accurate, but they come with warnings you must heed.

Many flux gates have had difficulty providing an accurate readout in a turn, although some newer models have miniature yaw gyros or software to lessen the problem. The gimbals supporting the per-

pendicular coils act a bit like a pendulum. When the vessel turns, the sensors of the flux gate begin to read the earth's magnetic field at an angle, spitting out an incorrect reading. Each time it spits out an incorrect reading, all the equipment interfaced with it responds accordingly.

While a flux gate compass is nowhere near as susceptible to stray magnetic fields as a straight magnetic compass, there is still a degree of susceptibility. You must take great care in where you place a flux gate compass. In fact, "placement of the sensing unit is probably the single most critical aspect of the system," says Lou Rota of Robertson/Simrad.

"The ideal place to install an electronic compass is as close to the waterline and as close to the exact center of the vessel as possible," Rota says. "This spot provides the least amount of motion, and therefore, the probability of the most consistently accurate readings."

Unfortunately, this location is frequently in the engine room! So be careful about

Integrating electronic compasses with various navigational instruments is increasingly common on fishing vessels of all sizes. Soon, there will be two-way "communication" between the compass and other electronics. The compass, for example, will be able to adjust itself based on data supplied by the GPS.

mounting a flux gate too close to engines, compressors, electric motors (any DC current for that matter), pumps or ferrous metal.

"Murphy's Law seems to be in force frequently when we're installing a flux gate," says Ed Adams of Custom Navigation, an electronics company in Westbrook, Conn. "We often find excellent spots for the unit in a dry compartment away from everything harmful and quickly discover there's no way to run wires from the sensor to anywhere else. Finding the right location is the toughest part of the job."

All bets are off if installation is aboard a steel-hulled vessel. Then, the only place for the sensor is atop the mast, away from both the hull and any "soft iron" — other material such as cargo, deck machinery, etc., that might cause deviation. Aluminum hulls don't suffer from this problem and can be treated the same as wood or fiberglass.

KVH of Newport, R.I., has a new unit, the AC 1000, which, according to Jim Dodez, "not only automatically and continuously compensates for magnetic anomalies, when you install it; it tells you on a scale of 0-9, whether the location you've chosen is good or bad. If you get a 9, it's ideal. A reading of 1 means move it or else."

Other cautions

Fishing vessels in the extreme north may experience other problems. There are places on earth where compasses, no matter how good, simply stop working. "No compass — not magnetic, electronic or gyroscope — will work above about 70° north latitude," says Dodez. "And there are places where the



Flux gate compasses are available in a variety of wheelhouse displays, including KVH's combined analog/digital unit packaged in a traditional mount. Others provide information in either analog or digital format.



Inside the flux gate compass are two coils that read variations in the earth's magnetic field as the vessel moves. The system's software measures and compares these differences to provide directional data.

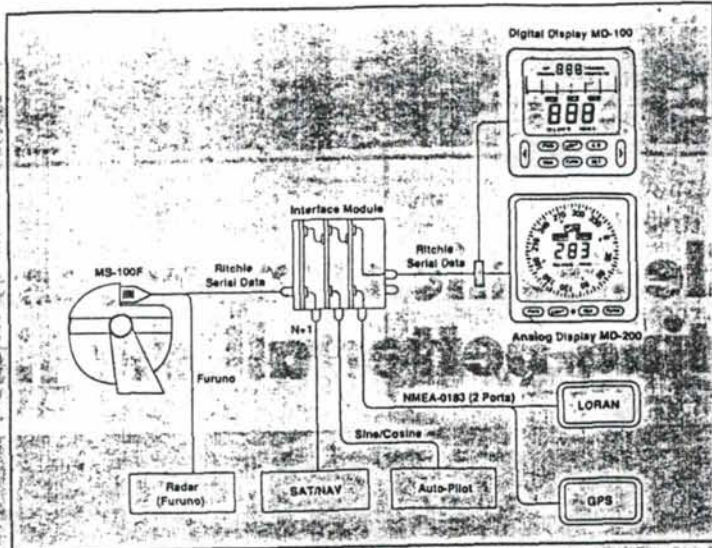
magnetic dip angle [the cause of compass uselessness that far north] extends considerably further south than that.

Another potential problem to be aware of is RFI (radio frequency interference). Newer models are doing a much better job of protecting against this by shielding the units, building the circuit boards better, using more protective housing materials and upgrading cables and connectors. But if your unit is subject to RFI, it can be a serious problem.

The electronic compass provides much of the most basic information to your autopilot and navigation equipment. There is the possibility of an accident if your compass suddenly tells your autopilot that you are 90° off course when you aren't really. When running top heavy or on a vessel with poor stability, that sudden turn could mean a rollover.

Some improvements on the horizon include even easier compensation procedures. At the moment, with the most common interface protocol (NMEA 0183), information can only flow in one direction, from the sensor to the equipment. Soon, under the next generation protocol (NMEA 0193), interfacing will work in both directions. At that point, various pieces of equipment will be able to truly communicate. For example, the GPS — with its incredibly fast updates, which include accurate heading information — will be able to tell the flux gate compass the information it needs to automatically adjust itself.

The biggest problem with flux gates, even today, is one of philosophy. One manufacturer builds equipment to receive a certain type of information from an electronic com-



pass. Another manufacturer's equipment also needs information from an electronic compass but not in the same format. Multiply this problem by all the equipment you have aboard, and you can see there's potential for needing multiple compasses. At this point, electronics manufacturers don't think of a vessel as one large single system; they don't think in terms of universal input.

Of course, you can use one flux gate compass and, with some custom tinkering, feed in multiple displays — but you shouldn't have to. Ultimately, a single accepted stan-

dard ultimately would result in compasses that could be universally interfaced with other electronics. Radio frequency interference, called RFI, can be a serious problem if the electronic compass does not have adequate shielding.

There is a rumor pitching and rolling its way around the industry that an entirely new technology for direction-sensing is about to be introduced to the marine industry. It's called a Ring Laser Gyro and operates on a beam-of-light principle. The system is supposedly light years better than anything available to date.

Evidently, when a boat turns, the beam of light tends to want to remain straight. The sensor then detects this hesitancy, or "drag," and is able to measure it. Currently, the system is very expensive and used only in the military and on some commercial airliners.

Components of an electronic digital compass designed especially for steel hulls include a control module, displays and an antenna-like flux gate sensor. On steel vessels, the sensor is usually located at the top of a mast to minimize deviation,

Components of an electronic digital compass designed especially for steel hulls include a control module, displays and an antenna-like flux gate sensor. On steel vessels, the sensor is usually located at the top of a mast to minimize deviation,



Courtesy of KVH

Electronic compass manufacturers

Cetrek/Teleflex
640 North Lewis Rd.
Limerick, PA 19468
215-495-0671

ComNav
1420 Frances St.
Vancouver, B.C. V5L 1Y9
Canada
604-254-0212

Datamarine International
53 Portside Dr.
Pocasset, MA 02559-1900
508-563-7151

KVH Industries
110 enterprise Center
Newport, RI 02840
401-847-3327

Navico, Inc.
7411 114th Ave N. Suite 210
Largo, FL 34643
813-546-4300

Raytheon
46 River Rd.
Hudson, NH 03051
603-881-5200

E.S. Ritchie & Sons, Inc.
243 Oak St.
Pembroke, MA 02359
617-826-5131

Robertson/Simrad
400 Oser Ave. Suite 2100
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Ownership Shift For Marinette Marine

On Nov. 30, all the outstanding stock of Marinette Marine Corporation was acquired by the MMC Acquisition Company, which is funded by a group of individual investors including Daniel A. Gulling, current president and CEO of Marinette Marine Corporation, and Roger H. Derusha, its current chairman, as major investors. Other investors include individuals from Marinette, Green Bay, Chicago and elsewhere around the country, numbering 16 in total. Selling stockholders include James Derusha, Robert Derusha and Roger Derusha.

Mr. Gulling said he was "glad we were able to accomplish this change in ownership in a way which provides a basis for the company to continue to operate and prosper." He said the company would continue its current plans and complete its U.S. Coast Guard contracts to build two new classes of buoy tending ships. In addition to equity contributions from the investors, some initial financing and additional financing commitments have been made by Michigan Financial Corporation (First National Bank of Merominee) and by Associated Bank Corp.

Bill Would Exempt GMDSS-Equipped Ships From Radio Requirements

A bill was introduced by Congressman Jack Kingston (R-Ga.) to waive certain radio operator and equipment requirements for U.S.-flag ships using the Global Maritime Distress and Safety System (GMDSS).

The bill would exempt U.S.-flag ships from what Mr. Kingston calls "arcane" radiotelegraphy and Morse code requirements of the 1934 Communication Act.

Virtually all competitive foreign ships have adopted GMDSS as their sole method of distress communications at sea, making them, Mr. Kingston says, safer and much more efficient. By 1995, new U.S. ships will be required to have GMDSS systems, but according to present law, they would also have radiotelegraphy equipment that costs \$220,000 per ship per year, and which generates signals the U.S. Coast Guard no longer monitors and the U.S. Navy has ceased to use as well.

Equipping a ship with a GMDSS system is a one-time cost of approximately \$200,000.

New Pilot Boats From Damen Shipyards

Damen Shipyards, based in The Netherlands, launched a new Damen Stan Tender 1550 in a dedicated pilot boat version.

The design of the steel craft has proved to be an immediate success, with a series of 12 pilot boats under construction.

After thorough consideration of the various material options, Damen selected a steel hull and aluminum superstructure.

The design is based on Damen's experience with medium and high speed craft. Model tests were carried out at the Marin Wageningen Model Test Basin comprising not only hull resistance tests but also propulsion tests.

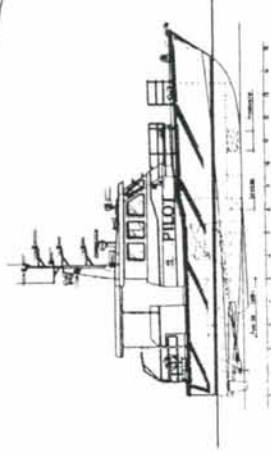
The new Damen Stan Tender 1550 has many interesting options for service in either tropical or Nordic climates. For example, a sun protection roof and sun awning aft are provided for crew's comfort in tropical climates.

The Stan Tender 1550 has been designed to

first pilot craft, which are presently under construction and which shall be classified for operation in the Gulf and Oman Sea.

For more information on Damen Shipyards,

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Why the costs of cooling have owners boiling

Efforts to protect the Earth's ozone layer are driving up the costs of the refrigerant gases used by ships

REFRIGERANT gases are starting to account for a larger percentage of many shipowners' operating budgets. The reason, of course, is that current marine refrigeration systems and air conditioning systems use gases containing chlorofluorocarbons (CFCs). These are believed to be one of major contributors to the destruction of the Earth's protective ozone layer. They are being phased out in accordance with the Montreal Protocol, an international agreement signed by about 120 nations that seeks to control the production and thereby the use of refrigerant gases deemed threats to the ozone.

The most recent amendment to the Montreal Protocol mandates virtual cessation of CFC production by 1 January 1996. The European Community has adopted a stricter schedule, phasing out CFC production by January 1, 1995. In the U.S., the Montreal Protocol has been written into the Clean Air Act of 1990. The world's largest CFC manufacturer, U.S.-based DuPont Corporation, has volunteered to follow the European example and cease CFC production one year earlier than mandated by the Protocol.

Though production of CFCs will virtually cease, their use will not be made illegal—small consolation for owners of existing air-conditioning and refrigeration equipment who will face CFC shortages long before the life of their equipment runs out. Most land-based systems commonly use CFCs R-11 and R-12 (freons). These have proven efficient, stable and dependable refrigerants, which is one reason why almost all U.S. Navy ships were designed to use R-12 systems for air conditioning and refrigeration. Though some commercial ships use R-11 and R-12, however, most use R-22, a hydrochlorofluorocarbon (HCFC) that is also affected by the protocols.

Since there is currently no practi-

cal means of destroying large quantities of chlorine and fluorine gases, the Protocol allows existing CFC systems to operate for as long as the gases are available. In fact, current ozone management strategy assumes that all CFCs will eventually be released into the atmosphere, according to Carrier Transicold engineer and senior project leader Bill Hannett.

"Conservation and recycling will soon be the only way to keep CFC systems supplied with gas"

In some sectors, provisions for continued use in existing systems has encouraged hoarding, driving up the price of R-11 and 12 from about the \$1.00/lb of several years ago to a current high of over \$7.00/lb—a big difference in the budget of an operator of a ship with sizable refrigeration and air conditioning systems that could require 10,000 lb of coolant.

Governments have also added heavy taxes to discourage CFC waste. In the U.S., for example, the excise tax on R-11 and R-12 is nearly 50% of the purchase price. According to Ben Bailey, president of Bailey Refrigeration, Avenel, N.J., this has had dramatic and somewhat successful effects. "In the old days when, say, a condenser leaked and water got into the centrifugal air conditioning system, they would just drop the whole 1,500-lb charge of R-11 into the bilge. Now that 1,500-lb charge is worth \$15,000—they don't drop it into the bilge anymore. So to that extent the restrictions on production and the federal excise taxes have had the desired effect."

In any case, conservation and recycling will soon be the only way to keep CFC systems supplied with gas.

When servicing a system, refrigerant charges aren't blown to the atmosphere anymore. They're sucked out, stored and either cleaned up and put back in (or simply put back in if the refrigerant was clean) or reclaimed for use somewhere else.

In use since the 1940s, the HCFC R-22 has become the refrigerant of choice in maritime applications — estimates put current world totals at about 950 million lb. About 85% of all ships afloat have R-22 systems. The largest maritime refrigerant market isn't, in fact, for the 1,200 reefer ships in the world fleet, but rather the air conditioning and refrigeration needs of the other 40,000 ships afloat.

TARGETED FOR OBLIVION

Like R-11 and R-12, R-22 is also targeted for oblivion, even though as an HCFC it has an ODP (Ozone Depletion Potential) rating of 0.05, or 5% that of R-12. Considering that CFCs account for only 20% of the world's ozone depletion problem, a gas rated at 1/20th their threat should have a negligible effect. R-22, because it is so much more environment friendly than CFCs, is currently subject to no excise tax and has prices hovering about \$5.00/lb, which may indicate one reason for its popularity. Industry suppliers and users contacted for this article did, however, express concern that future amendments to the Protocol may request taxes if an R-22 alternative emerges.

According to the latest version of the Montreal Protocol, beginning January 1, 1996, HCFC production will be regulated to 1989 levels, with a further reduction scheduled for 2005, full cessation by 2010 and availability through 2030.

This alone needn't worry current users, since much of today's world fleet will be out of service in 25 years time. But in the short history of the Protocol the removal date for CFCs has been moved from 2005 to 1995. The same sort of thing *could* happen with target dates for HCFCs.

SHAKEN, NOT JARRED

All this has shaken but not jarred the refrigeration industry. Mark Whitfield, president of Cospolich Refrigerator Company, New Orleans, La., expresses a common sentiment when he says "this period today is both the best and the worst time to be in a refrigeration-related industry, because the constraints that are being placed on us by the government to produce environmentally friendly refrigerants are real. The challenges are the things that make it interesting, because there is an evolutionary

by Joe Evangelista
Technical Editor

process going on right now that doesn't compare to anything that we've seen in the relatively recent past. You know, it's 'pay your money and take the ride.'"

And it seems like quite a ride. There are many possibilities for users looking to update old systems or build new ones. The various refrigerant alternatives compete not just on cooling ability, but on the balance between their virtues and flaws—and the consequences and compromises

resulting from their selection.

Materials compatibility, operating pressures and densities are a few of the characteristics besides cooling capacity that can require anything from a thorough system cleaning to new compressors and lines should an existing system be switched to a new refrigerant.

For example, the accepted replacement gas for R-12 is the hydrofluorocarbon (HFC) R-134A. Though R-134A can operate in systems designed for R-12, it is incompatible with the mineral

oil lubricant of R-12 systems, boils at a higher temperature and operates at higher pressures. Similarly, the HCFC R-123, a replacement for R-11, requires changeover of such system components as gaskets, hermetic motors and compressor impellers.

Refrigerant gas suppliers such as Boonton, New Jersey-based Drew Marine and Oslo, Norway-based Unitor are warily watching refrigerant developments, as they will eventually have to stand behind whatever new products are offered by manufacturers. These are mostly blends of several component gases, say, HCFCs or HFCs. Only three of them, designated R-500, R-502 and R-503 are azeotropes, or blends that combine to act as a single uniform gas.

According to Erik Schau, manager of business development for Unitor's Refrigeration Business Unit, "Many of these blends contain a flammable component such as propane. Since they are not azeotropes, if you get a leak the components escape unevenly. You could be left with just a flammable gas in your system."

Bill Hannett points out another potential problem with these blends—their properties could vary according to varying internal conditions of the refrigeration system, or through a series of partial system rechargings.

Schau's job includes assessing the potential of substitute gases. "I don't see why, when you can use R-22, you would use a blend we know nothing about" he says. "We inform shipowners to take 134 A or 22, depending on application and system age. If, for example, you want -18 °F or -20°F using the same positive compressor you will have problems with 134A. If the temperature of your meat and fish is okay at -15 °F or -17 °F then we can go to 134A, but it's not cheaper than a switch to R-22. We have converted a couple of hundred ships to R-22 and found it a good bridging compound to future refrigerants. It's not a final solution but it actually helps."

In any case, operators of older existing R-12 systems will very likely find the supply of existing gas, combined with conservation and recycling programs, will allow their continued operation throughout their remaining useful lives. In addition, many manufacturers and suppliers recommend preventive maintenance programs. "For example," says Schau, "you can use solder instead of flaring, install numerous leak detectors to inform the crew earlier and so forth. You'll always have some leakage through shaft seals, but these will be minimal."

One concern for gas suppliers is that the exotic or proprietary blends

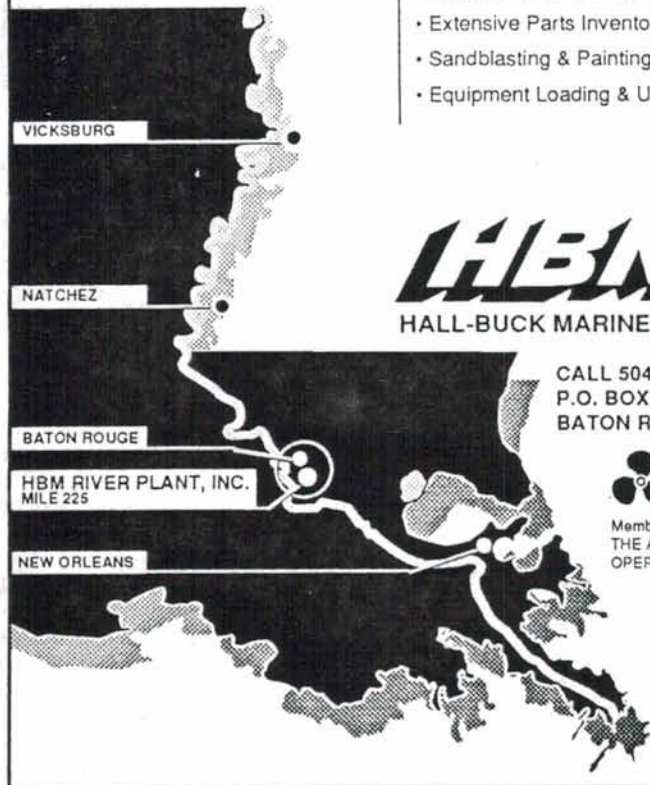
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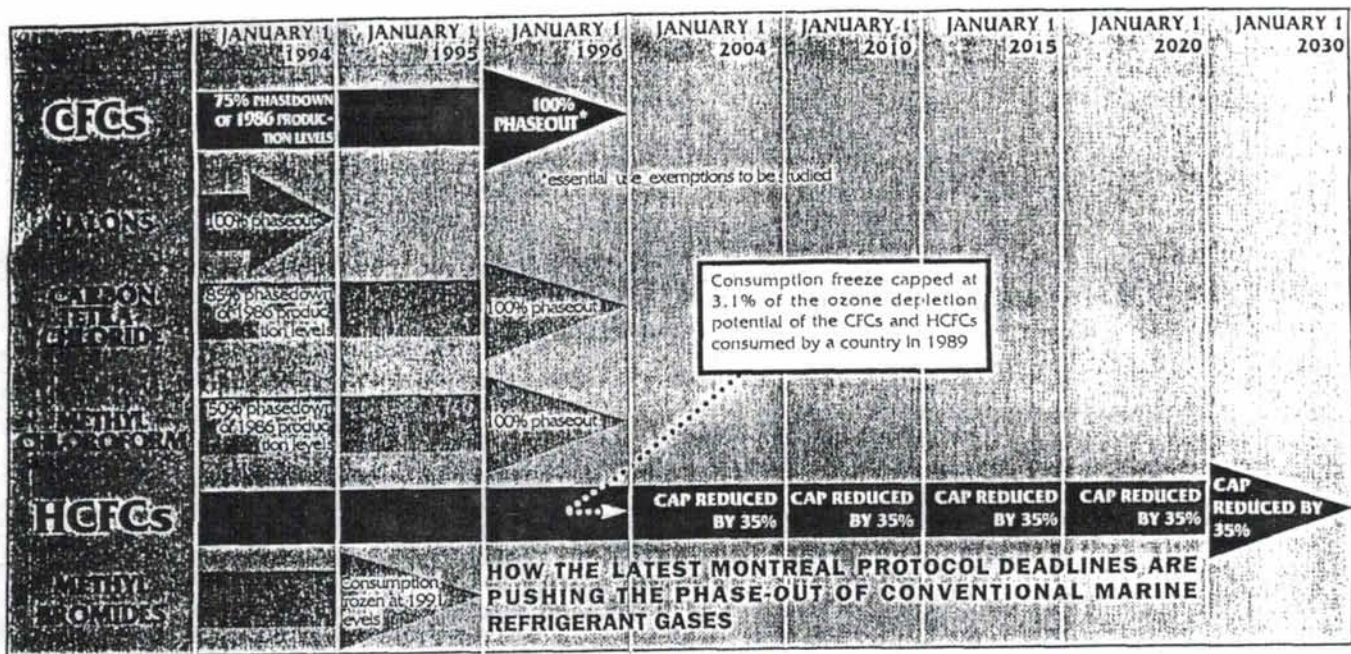
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HOW THE LATEST MONTREAL PROTOCOL DEADLINES ARE PUSHING THE PHASE-OUT OF CONVENTIONAL MARINE REFRIGERANT GASES

planned as CFC and HCFC replacements are not likely to be available in all ports. Inter-company cooperation, on what Hannett call "an unprecedented scale for the industry," could result in some kind of standard product.

Joe Lawrence, marketing manager

of refrigerant products for Drew Ameroid Marine, notes that while exotic blends may not be available everywhere, alternatives such as R-134A are comparatively common, and stocks are high. In fact, prices of newer refrigerants are high only because "manufac-

urers are still trying to get back their R&D costs. R-11 and 12 are the biggest volume movers, and we have customers who still say, 'why buy the more expensive 134A when I can buy 12?' ... resulting in an oversupply right now. We expect to see some fairly intense com-

petition on price between the alternative types in the future."

The majority opinion among suppliers, manufacturers and users contacted for this article favored continued use of R-22 for existing systems. "We see no problems with R-22," says Schau, "but we're not sleeping on it—we don't know the fate of it. It will eventually be gone but there's no panic now."

Users' comfort with R-22 is exemplified by Chiquita Brands' Great White Fleet. Like most non-container reefers, its ships use a main refrigeration plant that chills a secondary coolant which then circulates through the cargo holds. Last year, the Great White Fleet completed a reefer new-building program in which R-22 was the primary coolant and chilled brine was the secondary.

One reason R-22 has been given such a long leash by the Protocol is that there is currently no equitable substitute available. Another is very likely that R-22 is not that serious an ozone threat and regulators know it, though they may feel politically compelled to schedule its elimination.

Ironically, most if not all of the new refrigerants will require more energy in use than the compounds

they replace, due, for example, to more demanding characteristics such as higher operating pressures. The resultant exacerbation of the global warming problem through the burning of fossil fuels may just offset the reduction achieved by eliminating freons. "If we have to compromise on energy efficiencies, then what you're going to do is place additional burden

"Most if not all of the new refrigerants will require more energy than the compounds they replace ..."

on electrical producing plants and not all of those electrical producing plants are environmentally friendly," notes Mark Whitfield. "Some of those burn fossil fuels, which add to the same problem that we're trying to reduce."

Manufacturers are not rushing to produce new basic refrigeration system designs—yet. The basic equipment for most refrigeration and air conditioning needs already exists.

Manufacturers will need to "wait to see what the gas manufacturers are offering before developing new systems," according to Henry Tornquist, manager of Stal Refrigeration's Comfort Cooling division.

REAL REVOLUTION IS IN SERVICE

"The real revolution occurring at the moment," says Tornquist, is in the service side of the industry. "We have to certify our service engineers—you can't just send a guy on board simply because he has 20 years experience any more. Now they have to have certification that they know how to handle these gases, that they won't blow the gas into the atmosphere. Service companies have to retrain even their most experienced service people."

Stal has also seen increasing sales of ancillary service equipment. "We have sold many receivers that can take a whole gas charge aboard ship so that there's no need to blow gas into the atmosphere. Just a couple of years ago there was no need for service compressors and shipboard storage facilities, but now ships have to have them. Our biggest chillers have about 2,000 lb of refrigerant. With

five of them there's about 10,000 lb aboard a cruise ship, and the ship has to have a receiver that can hold it all."

Cospolich is also experiencing the service side revolution. "Because there are so many chemicals out there, the person I really have concerns about is the service technician," says Mark Whitfield. "I think that the learning curve for him is going to exceed that of the manufacturer."

SYSTEM CHANGES

The learning curve is also steep for companies retrofitting refrigerants and making needed systems changes. Although R-134A has been around for about 20 years, only recently is it entering into heavy use. "Everybody is trying to figure out the right things to do and customers are pushing us to give them answers and there's very little practical field experience," says Ben Bailey. "In the marine industry, for example, we use an awful lot of open drive machinery, which is a very small percentage of the total machinery that's produced. Window units, residential units and refrigerators are what's being tested in the labs. So we're hungry for information on the big built-up systems that are in ships.

And there's very little information coming out."

"When you switch to 134A," notes Bailey, "you have to switch to a new synthetic lubricating oil. Everybody thought that oil was going to be polyalkaline glycol (PAG). But then they found something better—polyol ester (POE). And that's only in the past year. Now customers want to know how's POE going to be for the next 20 years in my \$20,000 reciprocating compressor? And what's its long-term machine life? There are an awful lot of unknowns with R-134A."

Generally, though, if an R-12 system is in good shape, it should be able to accept R-134A. The U.S. Navy is switching its existing systems from R-12 to R-134A. But not all systems may be as well-maintained as the Navy's.

Furthermore, explains Bailey, "when you put R-134A in an R-12 system, on a ship stores system, say, you're going to lose probably 5 to 10% capacity from the system." That can create headaches should a system already have only marginally adequate capacity.

"For example," says Bailey, "if the ship stores box was running almost all the time, shutting off for only

short periods of time during a day, and was achieving say 0°F, when you switch to 134A and you lose 10%, then, depending on the boxes, you may only achieve 4°, 5° or 6°F—you won't be able to get down as low in temperature. Some customers have systems that only achieve maybe 8°F when the weather is warm. So if I were to put 134A into the system and they run it non-stop, they may achieve only 12-14°F, and that's just not acceptable. So we have to look at the system and see what has to be done to recover some refrigeration capacity. And sometimes the customer has to think about switching to R-22" rather than R-134A."

AMMONIA

"As far as we can tell at the moment there's no direct replacement for R-22," notes James Templeton of the refrigeration department of Lloyd's Register of Shipping, "Until such a time as somebody comes up with a replacement for R-22, ammonia is the only refrigerant really in the ballpark" for low-temperature applications such as reefer ships, Interest has revived in ammonia,

(Continued on p. 78)

Refrigerants

Continued from p.51

which is one of the oldest gases used to refrigerate cargo.

"We had reefers using ammonia-based refrigerants maybe 40 years ago," notes the Great White Fleet's Bergum, "but bodies such as the British Department of Trade banned it because of its high toxicity. Now classification societies are coming back in with rules and regulations as to how it can be used, but used safely. Currently, ammonia is used on factory fish ships to freeze large volumes of fish very quickly. It's also used extensively ashore in large freezers. So there's lot of expertise in ammonia out there. All we have to do is bring back the old idea with quite a lot of safety checks designed into the ships from scratch."

Lloyd's Register has published Guidance Notes for Marine Ammonia Refrigerating Plants, which include requirements for gas-tight rooms, bulkheads, deckheads and doors. The notes also call for the gas-tight room to be maintained at a negative pressure ven-

tilation so that, should a leak occur, ammonia would not leak out into adjacent spaces. The notes also suggest special scrubbing systems to remove ammonia from any exhaust gas.

Lloyd's Register is classing five new 13,500-gt reefer ships building at Danyard which use ammonia as the refrigerant. According to Templeton, Lloyd's Register only approves ammonia in indirect expansion systems, where the chillers are placed in as small an area as possible and contained in a gas-tight room. "One of the prime requirements," he says, "is to keep the ammonia charge as small as possible, so should there be a leak you're dealing with a smaller amount than otherwise."

Interestingly, Lloyd's Register does not class provision rooms, so its Guidance Notes do not address comfort cooling or ship stores, only refrigerated cargo. "Perhaps our management will be looking at that in future, but there's nothing on about that right now," says Templeton.

The Danyard ships, in fact, use ammonia for the cooling of their provision rooms and air conditioning systems use ammonia as well as cargo spaces. "In the case of the provision rooms, chilled brine is the secondary

coolant, while in the air conditioning it's chilled water," notes Templeton.

An alternative being explored in the reefer trades is further development of controlled-atmosphere (CA) technology. The technique, currently applied to containers, involves removing much of the oxygen from the container and replacing it with a controlled mixture of carbon dioxide and nitrogen. This slows down the respiration of the product and preserves freshness for extended periods of time—longer than under refrigeration alone. Even flowers, the most delicate of products, have arrived after three weeks in a container as fresh as the day they were packed. Chiquita, a modern CA pioneer, has already completed hundreds of banana voyages using CA containers and considers the technology well-proven. In the future, CA technology may allow refrigeration at higher temperatures than currently employed. This in turn would enable a medium-temperature refrigerant like R-134A to be used on reefer ships. But that's still some time away. Meanwhile, the marine industry has to get on with the nitty gritty of making cooling systems work within the ever-tightening constraints imposed by the Montreal Protocol.

ML

RECOMMENDATIONS -

- CHANGE WHEN THE TIME IS RIGHT: SHUTDOWN, THIS WINTER, REPAIR PERIOD, MAJOR BREAKDOWN, ETC. BUT DON'T WAIT TOO LONG.
- R22 IS A GOOD CHOICE
- R134a IS A GOOD CHOICE TOO
- R123 IS NOT A GOOD CHOICE, EXCEPT IN FEW CASES
- THOROUGH LEAK CHECK NOW REGARDLESS WHAT ELSE YOU DO
- LEARN AND FOLLOW NEW RULES
- ABOVE ALL, DON'T VENT

CFC TIMETABLE

* WHEN *	* WHAT *
JULY 1, 1992	ILLEGAL TO VENT
JANUARY 1, 1993	50% CFC PRODUCTION, LIMIT FOR '93
JUNE 14, 1993	MUST FIX LEAKS MUST KEEP RECORDS
JULY 13, 1993	MUST EVACUATE MUST USE EQUIP. TO EVACUATE SAFE DISPOSAL REQUIRED
AUGUST 12, 1993	OWNERS OF REFRIGERANT RECOVERY EQUIPMENT MUST CERTIFY TO EPA RECLAMATION REQUIREMENTS RECLAIMERS MUST CERTIFY
NOVEMBER 15, 1993	TOUGHER EVACUATION STANDARD TOUGHER RECOVERY STANDARDS
JANUARY 1, 1994	MAXIMUM 25% CFC PRODUCTION LIMIT FOR '94
NOVEMBER 14, 1994	TECHNICIAN CERTIFICATION REFRIGERANT SALES RESTRICTIONS
DECEMBER 31, 1994	DUPONT STOPS PRODUCING CFC'S
JANUARY 1, 1995	PROBABLE 12 ½% CFC PRODUCTION
DECEMBER 31, 1995	<i>THE END OF CFC'S</i>
2004	R22 CAP BEGINS
2010	SIGNIFICANT R22 REDUCTION BEGINS
2020	R22 ESSENTIALLY ENDS

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NEWSLETTER



CFC SYNOPSIS - August 1993

IN SHORT -

- R11 AND R12 WILL SOON BE GONE
- LOTS OF NEW REGULATIONS THAT APPLY TO YOU NOW
- THERE WILL BE SHORTAGES
- PRICES ARE GOING UP, UP, UP
- YOU SHOULD BE DOING SOMETHING NOW

THE BACKGROUND -

- U.S. FEDERAL LAW ELIMINATES R11 AND R12 (AND OTHER CFC'S) END OF '95 & LIMITS PRODUCTION TO 25% OF '86 LEVEL IN '94
- DUPONT (AND OTHERS) WILL STOP MAKING THEM END OF '94!
- R22 HAS CAPS THAT TAKE EFFECT 2004 TO 2009
- R134a (REPLACES R12 EXCEPT LOW TEMP) IS COMING ON STRONG
- R123 (SUBS FOR R11) IS A DEAD END - PRODUCES TUMORS
- EPA HAS PUBLISHED (FINALLY!) IT'S RULES (SEE TIMETABLE)

THE CURRENT SITUATION -

RULES:

- A. NO VENTING BY ANYONE - INTENTIONAL = \$25,000 FINE
- B. OWNER MUST HAVE LEAKS REPAIRED
- C. OWNER MUST KEEP RECORDS OF GAS USAGE
- D. SERVICEPERSON MUST RECOVER GAS PRIOR TO SERVICE
- E. SERVICEPERSON MUST USE RECOVERY SYSTEM
- F. REFRIGERATION APPLIANCES MUST BE DISPOSED OF PROPERLY
- G. RECOVERY EQUIPMENT OWNERS MUST REGISTER WITH THE EPA

OTHER:

- R12 TO R22 CONVERSIONS ARE MOST COMMON
 - R12 TO R134a CONVERSIONS ARE STARTING, NEW OIL IS REQUIRED (SYNTHETIC)
 - BLENDS (OF REFRIGERANTS) ARE BEING PUSHED BUT THERE ARE SERIOUS PROBLEMS
 - R12 PRICES HAVE SKYROCKETED
 - R22 PRICES HAVE REMAINED LOW
 - R134a PRICES HAVE COME DOWN
-

Oil Spills: What's your responsibility?

Our discussion regarding a vessel owner's oil-spill liability began last month with a general description of OPA '90, the Oil Pollution Act of 1990.

Your trawler is headed out of Seattle's Elliott Bay on the way to Bering Sea pollock grounds. The engine has just been overhauled, the crew is rested, everything looks good—until a harbor tour boat with a jammed throttle rams your bow.

Next thing you know, there's oil on the water. Some of it, you suspect, comes from your fuel tanks. Who's responsible? You are. Who's going to pay the bill for the booms and battling Coast Guard spill teams are unrolling around your hull? That remains to be seen.

The 13th Coast Guard District uses this scenario as an example of the tricky business of third-party liability. Here's how the case could shake out.

Even if you lose oil due to the negligence of another person or vessel, you are still the "responsible" party, since the oil came from your hull. Therefore, you are required to report the spill and do your best to clean it up yourself or hire contractors to do so. According to a newsletter prepared by the 13th District Marine Safety Division and Vessel Traffic Service: "You are responsible for all removal costs and damages to natural resources, real or personal property, subsistence use of natural resources, revenues, profits and earning capacity due to injury or loss of property or natural resources and costs of providing additional public services."

Ultimately, you may be able to shunt these charges off to the tour boat. According to the Seattle law firm of Mikkelborg, Broz, Wells & Fryer, "A responsible party can avoid liability for removal costs by proving that the spill was caused solely as a result of: 1) an act of God, 2) an act of war, 3) an act or omission of a third party or 4) a combination of the foregoing."

All recovery costs and, in some cases, damages and civil claims may initially be paid by the National Pollution Fund Center. (This federal body is funded, in part, by a tax on imported oil.) Then the agency goes after the responsible party (or the negligent third party) to recoup its costs.

Liability

OPA '90 sets liability limits. For example, the oil-spill liability for a non-tank vessel tops out at \$600 per gross ton or a total of \$500,000, whichever is greater. However, those limits hold only if no applicable federal laws have been broken.

"It is very difficult to spill oil without finding that you have violated some regulation somewhere," says Steve Miller, editor of the Seattle-based Marine Response Bulletin. Worse yet, state laws in Washington and Alaska, which are not preempted by OPA '90, allow unlimited liability claims against a responsible party.

Let's go back to the collision scenario. Say you depend on the tour boat operator to report the spill, and hightail it back to the shipyard to repair your tanks. You have violated federal law by not reporting the spill. Liability limits go out the window and the mounting multi-thousand-dollar charges for skimmers, booms, pumps, vactrucks, etc. have your name on them.

If you report directly to the Coast Guard, whip out your spill-response plan and start calling contractors to clean up the mess, you will probably come out better in the

By **Kris Freeman**
Field Editor

end, although you'll have to put out money up front. Coast Guard publications state that in this case, as a "cooperative responsible party, you are eligible to recover all of your expenses from the Oil Spill Liability Fund. The fund managers go to the third

party for collection." In other words, the Coast Guard will be much more likely to believe "the other guy did it" if you stick around to report the spill and help clean up.

Proof of Financial Responsibility

While states such as Oregon and Wash-

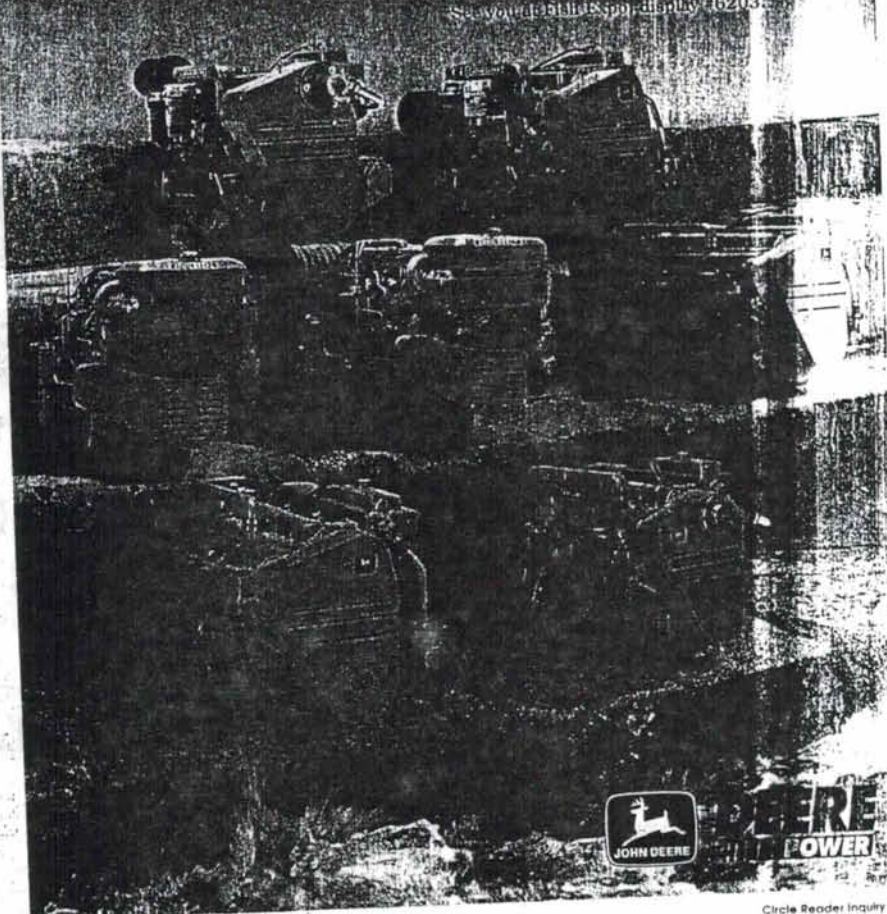
ington require fishing vessels over 5 gross tons to show evidence of the "financial responsibility" necessary to clean up a spill, OPA '90 does not require any fishboat of any size to do so, unless they carry oil as a "secondary cargo" to sell to others, says Miller.

All vessels of any size that carry oil cargo within the Exclusive Economic Zone must show sufficient contingency clean-

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Circle Reader Inquiry # 11

hulls to operate legally. Fish tenders that carry fuel to re-seal are also required to show financial responsibility. Various types of insurance and bonds will satisfy the requirements.

Some vessels also must prepare a formal oil-spill response plan; small fish boats do not. "However, even if you're not responsible for submitting a plan, you're still responsible for liability for spills," cautions Miller.

Although the most dramatic spills occur when a vessel's hull is punctured, by far the greatest number of spills take place during fuel transfer operations. Most of the 600 or so spills the Coast Guard handles annually in Alaska result from fuel transfers. The average bunkering spill is about 50 to 100 gals.

Here are some suggestions from the Marine Response Bulletin on ways to avoid a bunkering spill:

- Make sure you're ready to receive fuel.
- Make sure all the necessary valves

- are shut.
- Know how much fuel you already have.
- Stop a little short of full, so you'll have room to spare.
- Have someone responsible for the transfer watch it at all times so that if a hose slips or a valve sticks, you can deal with the problem immediately.
- Make sure you let the crew know that proper bunkering is important. □

A three-hour seminar on how OPA '90 and other oil-spill regulations affect fish-boat operators will be presented at Fish Expo on Friday, Oct. 22, starting at 9 a.m.

Although provisions under OPA '90 are aimed primarily at minimizing environmental damage from tanker spills, the law also has implications for fishing vessels. Quick action was credited with containing the spill when two tankers and a freighter collided in Tampa Bay in August (bottom photo). For all boat owners, penalties can be severe for not reporting oil spills from accidents involving collisions, groundings and refuelings.

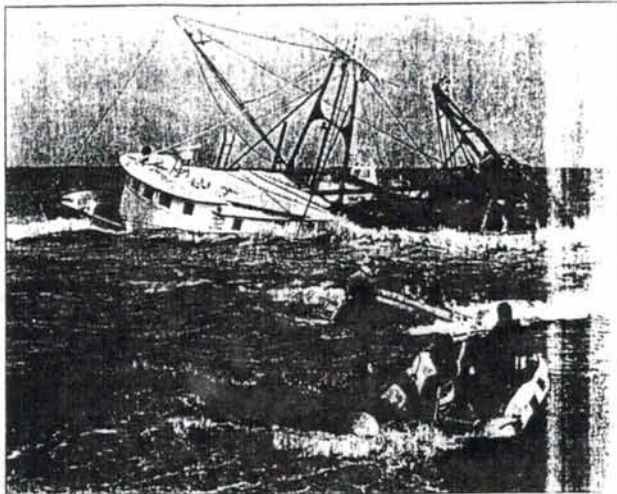


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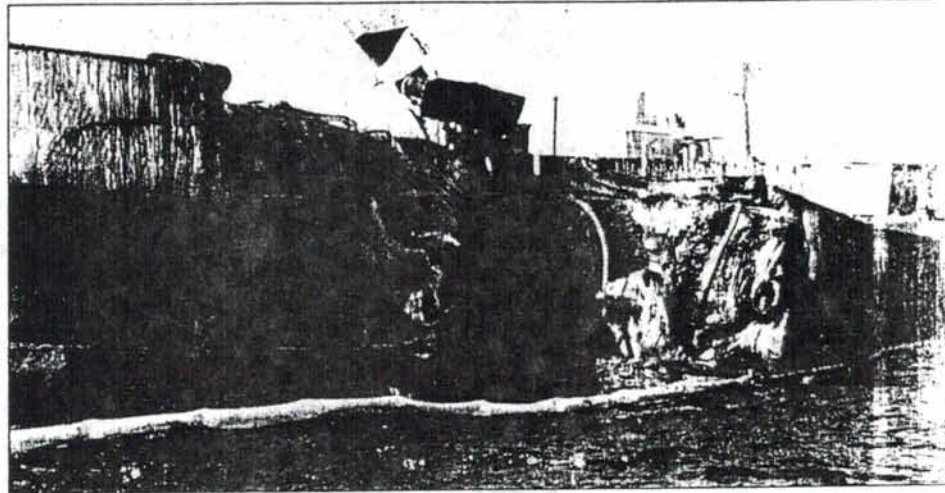


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Circle Reader Inquiry # 198

Keeping clean, green ... and in compliance

Both yards and shipowners are making environmental regulation compliance a number one management priority

TODAY, some of the most pressing problems facing both shipowners and shipyards lie in implementing international protocols, national statutes and regional and local regulations protecting the environment. Ultimately, of course, it is the shipowner who must foot the bill in one way or another, either directly or through increased charges from the shipyard.

Penalties for even inadvertent pollution can be painful and the message has gotten through. "Most of the maritime world is aware that it is easier not to pollute than to pollute," says Jeremy M.S. Smith, general secretary of the Liberian Shipowners Association. But, he adds, "I think that the problems facing conscientious shipowners in observing the letter of MARPOL constraints exist more off their vessels than on them!"

It is, of course the MARPOL convention that most directly governs the avoidance of pollution by ships. Shipowners have long complained that while port states have been swift to penalize shipowners for MARPOL breaches they have been tardy in meeting their own MARPOL obligations to, for example, provide adequate shoreside facilities for the reception and disposal of ship-generated wastes, including oil.

There are currently five MARPOL Annexes, each concerned with a specific type of pollutant: Annex I covers oil; Annex II, chemicals; Annex III, hazardous substances; Annex IV, treated sewage, and Annex V, garbage. By 1996, the International Maritime Organization (IMO) is expected to develop a sixth MARPOL annex covering atmospheric pollution. None of the MARPOL annexes, incidentally, apply to warships.

An annex becomes effective on a vessel when the flag state ratifies it and also in the territorial waters of other nations that have ratified it. For example, since Liberia has thus far endorsed only Annexes I and II, the other annexes are technically optional

on Liberian-flag vessels, except in the territorial waters of countries that have ratified the relevant annexes. However, the Liberian administration, in fact, strongly advises Liberian ships to observe the requirements of all MARPOL annexes.

MARPOL imposes especially strict controls in special areas, these currently include the Baltic Sea and the Mediterranean to which will soon be added the Caribbean. Outside the

*"... nothing is
thrown over the side.
If you do it, you're
fired!"*

special areas, ships have some leeway to discharge some wastes at sea, if the vessel is more than 25 miles offshore.

CRUISE SHIPS

Cruise ships are particularly eager these days not to be branded as polluters ... wherever they may be sailing. A source at at Royal Caribbean Cruise Line, says that the company is making an investment "in the millions" on waste-handling equipment, such as incinerators, shredders and pulpers, for each of two new RCCL vessels under construction. The general rule to employees at Royal Caribbean is that "nothing is thrown over the side. If you do it, you're fired."

Waste that cruise ships can't dispose of on-board must be landed ashore at a future port of call. Lack of waste reception facilities at many Caribbean ports means, effectively, that waste must usually be returned to U.S. facilities.

Increasingly, cruise lines are making waste management a top priority. Recycling, especially of aluminum, is becoming an important part of waste management—the largest cruise ships may generate as many as 20,000 aluminum cans in a week!

INADEQUATE PORT DISPOSAL FACILITIES

The Marine Committee of the International Chamber of Shipping, at a meeting last June, discussed the increasing impatience of many governments, including those of individual American states, toward vessels arriving in their ports after long sea voyages without any evidence to show how wastes generated en route had been disposed of legally. And yet the panel also recognized that relatively few ports have adequate waste disposal systems for vessels that bring their wastes to shore.

Neil Chambers, an ICS marine adviser, noted that "discussions within IMO have focused on tightening the MARPOL regulations and their interpretations to require ships to discharge certain wastes before departure from port, and to require that records of disposal be kept on board for inspection by port states as required." At the same time, says Chambers, "the Marine Committee was nevertheless concerned that ... the lack or prohibitive cost of reception facilities is frequently the cause of ships not being able to dispose of their garbage properly."

Where there are shoreside facilities, many shipowners are overcharged for the disposal services provided. *MARINE LOG* was told that markups of 40% to 60% are said to be common practice. "For many of our owners," says Jeremy Smith of the LSC, "this problem in American ports in particular is the final outrage. It's hard for them to find adequate waste disposal facilities, and they are often charged up the hawse pipe for the honor of removing their garbage."

SURVEY

Shipowners may soon have solid evidence of the inadequacy of shoreside reception facilities. The ICS's Marine Committee has agreed to cooperate with the Baltic and International Maritime Council (BIMCO) on an international survey of facilities. Forms have been prepared by BIMCO for ICS members and other interested parties. [For copies, contact BIMCO, 161 Bagsvaerdvej, DK-2880, Bagsvaerd, Denmark]. BIMCO asks for a frank assessment, using one form for each port, of every reception facility encountered by a vessel. Ship masters are asked to report the amount of "food waste, cargo-associated waste (including oil), maintenance waste, and 'other' wastes (meaning garbage, etc.) accepted by each facility, as well as any amount turned away, taking care to "differentiate between oily wastes and

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garbage." Also, the master is to note such vexations as "undue delay, inconvenient location of facilities, unreasonable charges for use of facilities," whether the use of a facility was not technically feasible, and, "special national regulations" that may affect shoreside disposal.

"That's polite talk for extortion, pure and simple," says one ship manager. "In some Third World countries with one main port, the garbage facilitator can be the prime minister's brother."

BIMCO urges respondents to cite "the cost of discharge, even if the charge had not been considered to be 'unreasonable,' " and to "report on good experiences as well as bad. This will allow comparisons to be made ... or a more complete profile on ports." ICS and BIMCO will together compile the results of this waste disposal study, and present their conclusions to IMO "towards the end of 1994."

FLAG STATE

How does a flag state police its ships to see that applicable MARPOL annexes are being honored? Most open registers rely on certification by a classification society saying that all is in order after a port inspection. The flag state's inspectors will also look at a vessel's oil record book, which in theory shows if a ship arrives in one port with appreciably less oil aboard than was the case upon leaving its previous port. Of course, unscrupulous shipowners can order their masters to enter a false notation upon leaving a port, if a substantial discharge is intended while at sea. And far out on the ocean, in international waters, what is dispersed from a particular tanker or bulk carrier is either done or not done at the discretion of the master.

AIR POLLUTION

Two years ago, IMO adopted a resolution urging governments to prohibit the use aboard ships of chlorofluorocarbons, or CFCs, that have a potential for ozone depletion greater than 5% of that of R-11, a commonly used refrigerant.

MARPOL VI, targeted for completion in 1996, is likely to address:

- fuel oil quality;
- use of ozone-depleting substances;
- emissions of NOx and SOx;
- discharge of volatile organic compounds from cargo areas;
- discharge from ships' incinerators;
- reception facilities.

It could ban the use of existing CFCs, and require a 30% reduction in exhaust emission pollutants such as oxides of nitrogen, carbon, and sulfur, and unburned hydrocarbon particulates. The controls on VOCs from

cargo areas would apply to cargo vapors from oil and chemical tankers.

Effectively, though, MARPOL restrictions on matters such as CFC emissions may be redundant: international agreements such as the Montreal Protocol are simply removing many CFC-emitting products from the market, or substantially increasing their price.

NATIONAL REGULATIONS

Increasing concern for the environment means that ships are all too often subject to domestic as well as international regulations, particularly when in port, or in the shipyard. Though, in the latter case, the responsibility for compliance may be the yard's, the cost will be added in one way or another, to the shipowner's bill.

In the U.S., there is a growing patchwork of basic environmental statutes concerned with protecting rivers, managing solid wastes, purifying drinking water, expunging toxic wastes, and protecting endangered species. All of them are likely to affect vessel owners, shipyards and marine terminals.

SHIPYARDS

Just like any other shoreside industrial plant, shipyards are subject to the whole panoply of national, regional and local environmental protection and occupational safety laws. Today, an incoming ship is greeted by a yard's environmental staffers, waiting on a pier. Their role is not unlike that of a U.S. marshal in an Old West frontier town.

Before the vessel arrives, its owner will have sent the yard a ship repair specification, replying to a standard list of questions. Besides listing needed repairs, the owner must say what kind of paint the vessel is coated with, and declare the type and quantity of any hazardous materials on board.

"It is not in an owner's interest, obviously, to be less than candid in filling out the repair specifications," says T. Michael Chee, environmental supervisor at NASSCO.

"We have to be sure that our crews can work safely," says Kenneth R. Conleton, Supervisor of Health, Safety & the Environment at Newport News Shipbuilding & Drydock Co. "That's our first priority. I don't like finding anything on a ship that we haven't been notified about on the repair specification."

Yard crews sample paint on the ship's exterior as a matter of course before beginning work. Once repairs begin, a shipyard's environmental monitors oversee "anything that goes in the air or is poured on the deck."

(Continued on p.50)



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Any repair job is going to produce waste. Some yards use shrouds to collect the grit from sandblasting. At an increasing number of U.S. yards, shrink wrapping is one means used to contain airborne paint mist (see *MARINE LOG*, August 1993, p. 20). All new coatings must be EPA-approved. If an owner provides paint, it has to meet the yard's environmental standards. One major U.S. repairer recently had to refuse to use the particular paint proffered by one shipowner, who then had no choice but to switch to a more expensive approved paint.

One owner we spoke to complained that some U.S. yards use their environmental clout to increase billing costs, but this was disputed by several others. "The yard doesn't call to tell me good news," said one owner, "but I want to know what they've found, why a job is going to cost more to complete."

Some shipyard environmental specialists feel that an owner often is not told enough about conditions that have been discovered and which may cause future problems with the ship.

"We've been kicking this around, among ourselves," says one West Coast

informant. "If we can see that whatever we're doing is only going to be a temporary solution, or patch on the problem, and that the vessel is soon again going to be environmentally unsound, should we tell the owner now? Most yards just do the work that's been contracted, and let the ship go without a word about troubles that may have been found to be in the offing."

"We've been hesitant to say any-

"If you do it right environmentally, you'll be doing it right financially."

thing," he explains, "because most owners don't want to know. Their attitude is 'sufficient unto today is the evil thereof.' Certainly, the better chief engineers know, but their warnings sometimes take a while to reach the owner. Often, an owner won't believe it until the next inspection by a classification society representative. Then we get told, 'why didn't you take of that problem when the other work was being done?' Our reply usually is, 'you didn't ask us to, and it would have cost X-amount more.'"

If a pollution incident occurs in a U.S. shipyard, the yard has to report it immediately to local, state, and federal authorities—even if the pollutants were swept up, contained, nullified, or eliminated after the incident. The smallest drip has to be reported if a visible sheen can be seen on the water. Ten parts of oil in a million parts of water can be detected by a trained eye. "An untrained person doesn't always see what's going out in the water," says a source at one yard. "You can see the nasties faster in the air."

U.S. yards are by no means alone in taking environmental protection very seriously. Though regulations may vary and some international repair centers are far less stringent than others, the international trend is definitely for the controls on yards to become stricter.

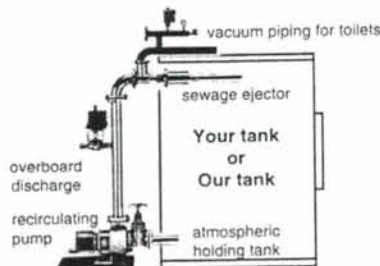
"I think that shipowners who are content to operate environmentally dirty vessels, those who won't bring a fouling ship into a yard until a classification society or the vessel's register puts a gun to their head, should realize that their days are numbered," says a source at NASSCO.

"The world community is here," says NNS's Congleton, "with fewer and fewer places to hide. The word is out that if you do it right environmentally, you'll be doing it right financially." **ML**

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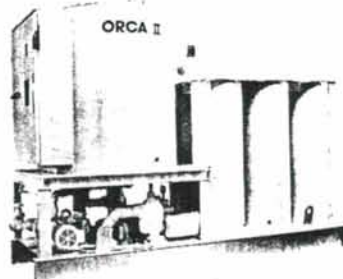
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Halon use limited to

By Mr. Morgan J. Hurley

For years, halons (halogenated hydrocarbons) have been used to extinguish fires on shipboard and on land. They have been popular because of their low toxicity (compared to carbon dioxide), electrical non-conductivity, and non-corrosive qualities. The latter attributes are advantageous around electrical and computer equipment.

Recently, however, it has been determined that halons have a significant detrimental effect on the ozone layer. For this reason, steps have been taken both nationally and internationally to limit their use.

Initiatives

In 1987, representatives of 23 countries including the United States met in Montreal, Canada, to reach an agreement on how to prevent the destruction of the ozone layer by man-made chemicals. They developed the "Montreal Protocol," calling for a 50 percent reduction of ozone-depleting chemical production by 1998.

In November 1992, the Montreal Protocol was revised by the United States and 94 other nations to halt the production of halons by January 1, 1994.

The United States has also taken steps to limit the domestic production of halons and other ozone-depleting chemicals. The Clean Air Act Amendments of 1990 call for stopping the production of halons by the year 2000. In early 1992, President George Bush announced that the United States would phase out the production of many ozone-depleting substances, including halons by December 31, 1995. A proposed rule-making by the Environmental Protection Agency (EPA) would accelerate this deadline to coincide with that of the Montreal Protocol.

The parties to the Montreal Protocol determined that before any new halon systems could be installed, it must be demonstrated that they are essential for adequate fire protection. At the 37th session of the Subcommittee on Fire Protection of the IMO, members could not identify any situations where the use of halon would be essential. Subsequently, the IMO Maritime

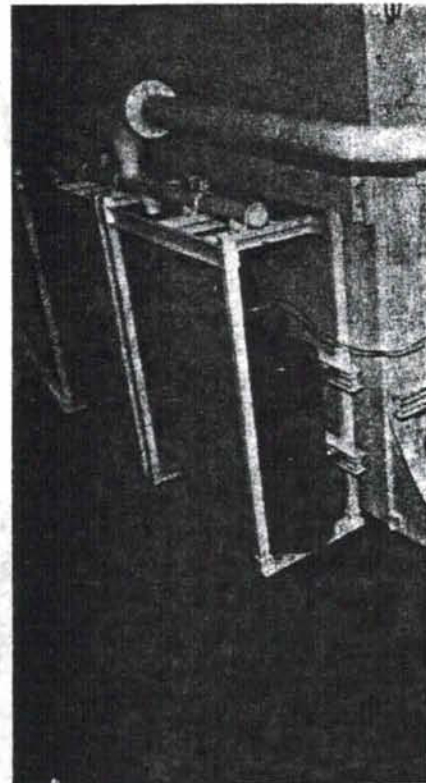
Safety Committee passed an amendment to the International Convention for the Safety of Life at Sea (SOLAS), 1974, stating that new installations of halogenated hydrocarbon systems shall be prohibited on all ships. This amendment will take effect on October 1, 1994.

In the future, the Subcommittee on Fire Protection will consider setting a date for the removal of existing halon extinguishing systems from ships. The group also recognized that commercial conditions would most likely dictate the future of existing systems, because recycled halon from systems that have gone out of service will increase in cost when halon production stops.

Initiative effects

As of now, any ship with a SOLAS certificate may not install a new halon system after October 1, 1994. Existing halon installations on SOLAS vessels are not affected by present regulations. However, these installations may have to be removed at a future date.

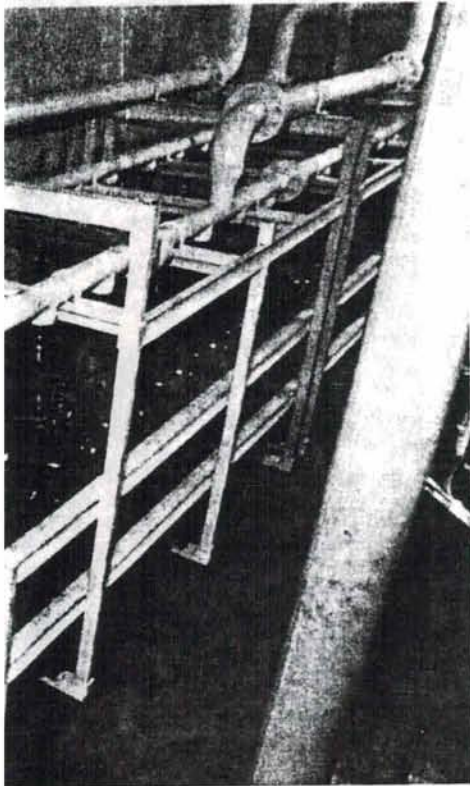
Vessels without SOLAS certificates are not prohibited from installing new halon systems, and are not required to remove existing systems. The Coast Guard, however, is considering initiatives to limit or prohibit new systems from being installed aboard United States flag vessels.



protect ozone layer

Alternative systems

Carbon dioxide; high, medium and low expansion foam; and fixed-water spray extinguishing systems are all approved for use aboard ships. They all



*A typical
halon
installation*

share some of the benefits of halon, but also have disadvantages. For example, carbon dioxide is noncorrosive, but lethal in extinguishing concentrations.

Emerging technologies which are not yet approved for use aboard United States flag ships include water mist systems, inert gas total flooding systems and halon-like substitutes. Water mist systems inject a fine spray of water into a protected space. Inert gas systems operate on the same principle as carbon dioxide, displacing oxygen from protected spaces, thus decreasing its concentration in the air to below combustion levels. Halon-like substitutes inhibit combustion, but do not deplete the ozone layer.

Halon disposition

After halon production ends, the cost of purchasing recycled products will rise, and they also will be taxed in the United States. Also, recycled halon may be difficult to obtain due to limited availability and high demand, particularly by the airlines and the military.

Therefore, two halon banking agencies endorsed by the EPA have started brokering the transfer of halons between former users whose systems are removed and who have excesses, and those in demand of the product. They are the Defense Logistics Agency under the Department of Defense and the Halon Recycling Corporation, a non-profit organization. The latter functions as a clearing house, brokering the sales of halon between buyers and sellers.

Summary

Ever since it was recognized that halons threaten the ozone layer, domestic and international regulatory action has rapidly taken place. The internationally-agreed on date for stopping the production of Halon has moved closer. Also those wishing to maintain existing Halon systems are trying to guarantee a supply after production ceases.

For information on buying or selling recycled halon, contact the EPA's ozone hotline at (800) 296-1996.

*Mr. Morgan J. Hurley is an engineer with the
Fire Protection Section of the Ship Design Branch.
Telephone: (202) 267-2997.*

Not all foam systems are created equal

By LT Hung M. Nguyen

Ocean-going tankships are often prevented from carrying particular cargoes because of their fire-fighting foam systems. A system may be of good quality, but if its ability to extinguish a fire of a certain cargo has not been tested, the vessel would not be authorized to carry that cargo.

Fires

A fire is a self-sustained flaming combustion with four essential components: heat, fuel, oxygen and chemical reaction. When any one of these components is missing, a fire cannot burn.

There are four distinct types of fire:

- (1) **class A** (ordinary cellulose materials),
- (2) **class B** (flammable or combustible liquids),
 - (a) hydrocarbons and
 - (b) polar solvents,
- (3) **class C** (materials occurring in or originating from live electrical circuits), and
- (4) **class D** (certain metals with unique chemical properties).

Fire-fighting foam

A fire extinguisher is effective if it can separate one component from the others. Foam extinguishes flammable or combustible liquid fires by:

- (1) **smothering** the fire, preventing air from mixing with flammable vapors;
- (2) **suppressing** flammable vapors, preventing their release;
- (3) **separating** flames from the fuel surface; and
- (4) **cooling** the fuel and adjacent surfaces.

The quality of foam is measured in terms of its drainage time, expansion, fire performance and burn back resistance.

The first fire-fighting foam was known as "chemical foam," and was used to combat coal oil fires. Formed from a chemical reaction, these foams are now obsolete. They were replaced by "air" or "mechanical" foams.

Air foam is made by mechanically mixing air with a foam solution (foam concentrate mixed with water). Surfactants (as in detergents) are the primary components of foam concentrate. A surfactant molecule has an unsymmetrical structure with a hydrophobic (water-fearing) and a hydrophilic (water-loving) part. This unique feature is responsible for the foam's stability and resistance. If a flammable liquid can displace or

extract the stabilizing surfactant molecules, the foam will be destroyed.

There is a variety of air foams available: regular (protein), fluoroprotein, aqueous film-forming (AFFF), high expansion and alcohol. They vary in their effectiveness. Regular, fluoroprotein and AFFF (non-polar-solvent) foams are effective on hydrocarbon (non-water-mixing) fuels only. Alcohol (polar-solvent) foams are generally used against fires involving polar (water-mixing) solvents, such as alcohols and ketones.

While polar solvent foams are usually effective on hydrocarbon fires, non-polar solvent foams are generally not effective on polar solvents. This is because polar solvents have a high affinity for water and may render non-polar solvent foam ineffective by draining water from it. This should not discourage anyone from testing the effectiveness of non-polar-solvent foams against polar solvents. (The Coast Guard recently approved a non-polar solvent foam for use against a polar solvent: Chubb National Foam XL-3 for methyl tertbutyl ether.)

Regulations

The requirements of a fire-fighting foam system for self-propelled tankships and manned non-self-propelled tankships are outlined in 46 CFR parts 34.20 and 153.460, the IMO's International Codes for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code chapter 11 and BCH Code chapter III.E), and regulation 61 of the IMO's International Convention for the Safety of Life at Sea (SOLAS). Further guidance on foam systems for polar solvents is in Navigation and Vessel Inspection Circular (NVIC) 11-82.

Plan review and approval

Fire protection requirements for various flammable or combustible liquids can be found in table 1 of 46 CFR part 153, IMO's IBC Code chapter 17 and IMO's BCH Code chapter VI.

A requester should first check with the system manufacturer to see if it has been approved by the Coast Guard for the cargo in question. If not, the requester should work with the foam manufacturer to obtain approval from the Survival Systems Branch, Merchant Vessel Inspection and Documentation Division.

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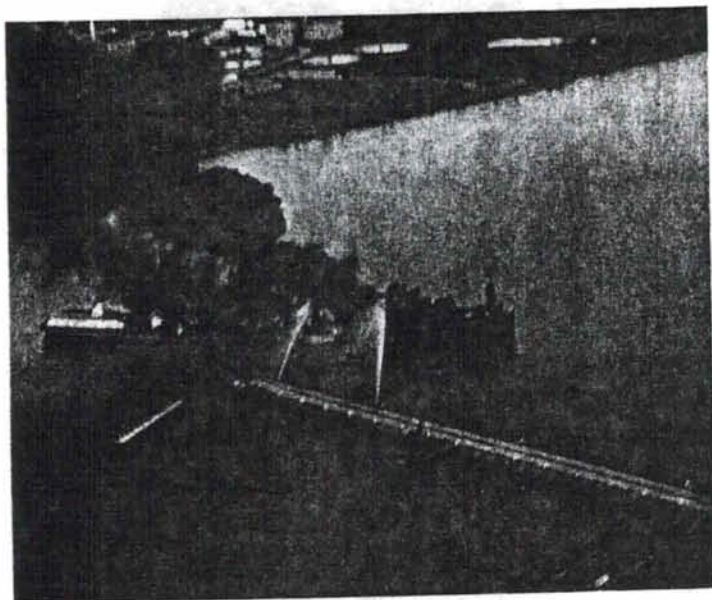
Telephone: (202) 366-6441.

The A B C's

of effective fire control

By Mr. Christopher E. Krusa

On September 16, 1990, the 635-foot bulk carrier Buffalo passed the 392-foot tankship Jupiter on the Saginaw River off Bay City, Michigan. The Jupiter, which was discharging its cargo of unleaded gasoline at the pier, broke away from its berth and its stern swung out into the river, rupturing the discharge hose.



The Jupiter fire.

Gasoline spilled on the pier and onto the deck of the Jupiter. The electrical cables to two motor-operated valves that closed off the pipelines at the end of the pier were torn apart, causing sparks. Fire spread to the deck of the tankship and soon flames engulfed the entire midships area.

The third mate and another seaman ran to the bow telephone to report the fire when an explosion occurred, followed by a loud roar of fire from the burning gasoline. "Let's get out of here," exclaimed the third mate. Without taking time to don lifejackets stowed forward or even to grab a ring buoy hanging in the forward bulwarks, both men jumped overboard.

Tragically, the other seaman drowned, but not without heroic efforts by the third mate to keep him afloat. He was the only fatality of the entire disaster.

Of all the threats to life and property, fire is probably the most dreaded. Unlike some natural phenomena, the ultimate outcome of a fire, particularly aboard ship, is often determined by the crew's reaction immediately after discovery. If appropriate precautions are taken beforehand and the right control methods are used, a fire can often be extinguished with little or no property damage and without any casualties. If not, the situation can become drastic.

To ensure that the response to a shipboard fire is appropriate, a well-rounded training program is required. There is a universal consensus that the primary elements in an effective marine fire-protection program should be:

- 1) awareness of the causes of fire in ships and preventive measures to take;
- 2) substantive knowledge of operating and maintenance procedures of the fire-fighting equipment and breathing apparatus aboard ship;
- 3) experience with live fire situations in a controlled environment; and
- 4) sufficient skill in the use of fixed and stationary fire-fighting equipment, breathing apparatus, and rescue and first aid equipment.

Shore vs shipboard

Shipboard fire fighting presents unique problems not typically encountered with shore-based fires. First and foremost is the fact that steel is used throughout ships for bulkheads, decks, superstructure, berthing spaces etc. Sizable fires in steel structures are usually very hot, smoky and stubborn, requiring fire-fighting teams to rotate frequently.

Many types of combustibles are found in ship's interior spaces and in most cargoes.

Fire fighting is not the day-to-day work of ship crews. It is an auxiliary duty, which is not pursued with anywhere near the intensity required of shore-based volunteer fire fighters. And a marine fire presents a serious challenge to the most seasoned professional fire fighters.

Ventilation

Another important issue to consider during a fire-fighting operation is ventilation. Limiting the supply of oxygen through ventilation controls the fire, avoiding its spread. The concern is to absolutely avoid a "backdraft" situation. This can occur when temperatures in a compartment reach the superheated stage (1500 to 1800 degrees Fahrenheit), and unburned combustion products cannot be exhausted. If a door is opened for attack, fresh, cool, oxygenated air will enter. Instantaneous combustion may result in an explosion.

The supply of air to the affected compartment should be cut off to reduce oxygen to smother the fire. It may also be appropriate to turn on the exhaust ventilation, thus removing the super-heated gases to the outside via exhaust ducting. However, exhausting the



Fire-fighting students participate in all purpose nozzle team training.

Priorities

When a shipboard fire is discovered, it is imperative that an evaluation be made on scene immediately by responsible crew members. Merchant marine officers and vessel operators must be aware of the fact that controlling and extinguishing live fire involves leadership in more difficult areas than simply mustering the crew and making hose assignments.

A typical protocol for fire management follows these priorities:

- 1- locate the fire,
- 2- determine exposures from all sides,
- 3- direct the first fire team attack,
- 4- control the fire parties,
- 5- confine the fire,
- 6- extinguish the fire, and
- 7- overhaul the fire.

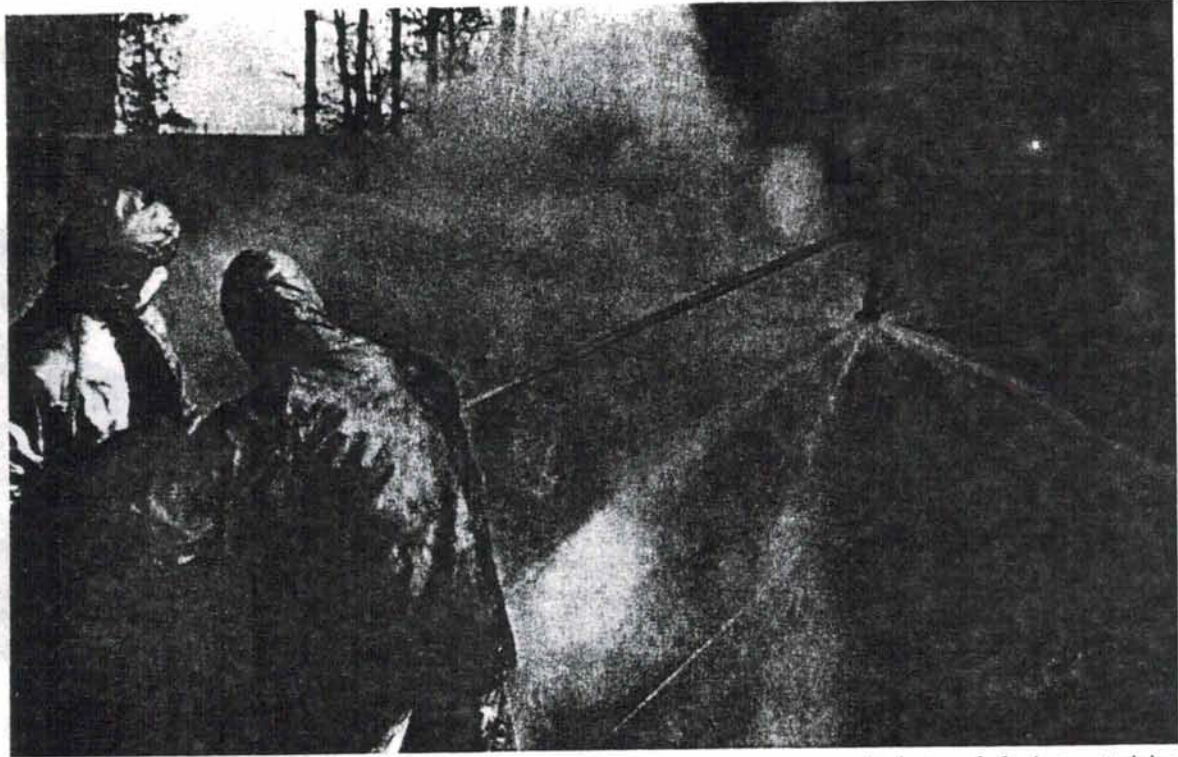
hot gases may extend the fire to other locations in the vessel, depending on the routing of the exhaust ventilation duct and the ability to control associated exposures. On the other hand, assuming the fire will smother without exhausting the hot gases away, the fire team may be lulled into a false sense of security and be tempted to enter the compartment prematurely.

The decision to turn on exhaust ventilation must be made intelligently. The key to a correct decision is flexibility and preplanning ship-specific techniques for all areas incorporating the location and routing of exhaust ducting.

Fat fryer fires

Fires in deep fat fryers are common, and can be extremely difficult to put out, even for experienced fire fighters. When fog water is applied to a container of deep fat at an ignition temperature of 510 degrees

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Students apply fog in team training.

Continued from page 47

Fahrenheit, a small explosion is likely to occur, splashing the fat around the galley, thus spreading the fire.

A good technique is to put out the fire with a dry chemical extinguishing agent such as PKP. When the fire is out, a four-foot applicator can be activated and held up high so that light water fog can drift slowly over the container, cooling the fat to below ignition temperature.

Fire severity

The size, intensity, location and type of fire dictates the type of attack. For example, a fire fueled by spilled flammable liquid igniting in a machinery space requires significantly different tactics than a moderate fire in a berthing compartment. In the first instance, AFFF foam should be applied immediately. However, if the fire gets out of control, personnel must evacuate the spaces and the vessel's fixed fire system should be activated at once.

On the other hand, a moderate fire in a berthing compartment could be tackled by a fire party with a hose charged with water, but with the nozzle in the OFF position until the fire is reached. Then the hose is turned on and the fire extinguished. This allows the team to enter the affected space without disturbing the thermal layers of heat and smoke. Visibility is improved, and the risk of injury to fire-team members is minimized. For an inexperienced fire team, the safest approach is a must.

Practical steps

There are many things for a fire fighter to recall when confronted with a shipboard fire. The following list of practical action items should be memorized, practiced and followed:

- 1. locate, size-up and determine all exposures;**
- 2. establish communications with the fire team and master/operator;**
- 3. fix a staging area and obtain gear including breathing apparatus and fire suits;**
- 4. team leader and a backup should keep track of fire team personnel entering and leaving the scene;**
- 5. cut off fire energy sources, such as electricity and flammable liquids;**
- 6. consider carrying hoses uncharged to save energy;**
- 7. do not open a compartment door to a fire until an assessment has been conducted; and**
- 8. keep low to allow heat and gases to pass over head.**

Fire prevention

History has proven time and time again that the best fire-fighting technique is a well executed prevention program. To be successful, a fire-prevention program must be carefully planned and structured. The details should be tailored to the ship for which the program has been developed. All crew members must accept and internalize fire prevention as a critical part of shipboard life. And it is important that the master/operator and chief engineer set the example.

All shipboard fire-prevention programs should include:

1. formal and informal training, and drills;
2. frequent full-ship inspections;
3. preventive maintenance and repair;
4. recognition of individual and team efforts; and
5. pre-fire planning.

Training

The *Esso Brussels/Sea Witch* disaster in New York Harbor in June 1973 spurred federal funding for marine fire-fighting training. A formal curriculum, text and hands-on training facilities were funded in the late 1970s. Effective in late 1990, virtually all applicants for merchant marine licenses now must present certificates of completion from a Coast Guard-approved fire-fighting course of instruction. All courses must meet requirements based on the International Maritime Organization's (IMO) resolution A.437 (XI) "Training of Crews in Fire Fighting." This provides a good foundation, but it is not enough.

Fire-fighting skills begin to get rusty after the initial training. Just because the Coast Guard requires only this training, it doesn't mean it should stop there. The best way to maintain fire-fighting skills is to take a full refresher course at an approved hands-on school at least once every five years. This must be backed up with frequent drills and material review while aboard ship. In addition, all seafaring professionals should promote an attitude of fire safety to help nip fire hazards in the bud as they are discovered.

A list of basic and advanced Coast Guard-approved training courses begins on page 56. The



Students check for reflash.

Maritime Administration (MARAD) sponsors basic and advanced marine fire-fighting training at its school near Toledo, Ohio, a joint MARAD/Navy fire school at Earle, New Jersey and a Navy fire school at Treasure Island, San Francisco, California. MARAD instructors are available to provide information and guidance from the school in Earle at (908) 938-5190 and the one in Toledo at (419) 259-6362.

A MARAD text entitled, "*Marine Prevention, Fire Fighting and Fire Safety*," can be purchased through the Government Printing Office for \$18. The GPO stock number is #003-007-00099-5.

Conclusion

The effectiveness of marine fire control is primarily dependent on the individuals who operate ships.

Ship's crews must seriously practice and apply their fire knowledge and skill to reduce this risk to such a point that the vessel is fire safe.

The human element continues to be important in limiting and controlling shipboard fires and explosions.

The training photographs accompanying this article were taken by Mr. Michael Romstadt and Mr. Steven Parsons, MARAD fire instructors, Toledo, Ohio.

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