University-National Oceanographic Laboratory System

Research Vessel Operators Committee

NEWSLETTER

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Editor's Note

I can really appreciate what past editors have gone through putting this newsletter together. It seems that there is no end to the information available that is of interest to the operators. We received many articles and updates on ships and projects that RVOC members are working on.

I can empathize with the over 500 ton operators with regard to ISM. I recently attended the Marine SQE Internal Audit Course given by ABS Group Inc. This is an excellent first step in understanding how ISM will impact your institution. I highly recommend this course to all of you, even if it's not mandatory.

In my other life, which revolves around manned submersible operations, I presented a synopsis of HBOI's submersible safety program and significant operations for the past 30 years at the 5th International Submersible Safety Symposium which was held in Kaliningrad, Russia, on board the 400 foot Research Vessel AKADEMIK MSTISLAU KELDYSH. She is the mother ship for MIRS 1 & 2, which are capable of diving to 20,000 feet. The U.S. was well represented by WHOI ALVIN Ops, Hawaii Undersea Research Labs PISCES, and NOAA-NURP. There was also an historical presentation about the world's deepest dive made by the TRIESTE in 1960 that reached 7 miles deep in the Mariana Trench. A note of interest, the R/V KELDYSH has two saunas and one swimming pool...and you thought we had it tough!

Thanks to all of this issue's contributors.
Tim Askew

From the Chair

My how time flies. The 2000 RVOC meeting is behind us, the minutes are completed and sent to the UNOLS office for distribution, and now it's time to start all over again. But, before we get down to setting an agenda for our meeting in Rhode Island, I'd like to take a minute to fill you in on the UNOLS Council meeting that I attended in Miami in April.

As you all know, UNOLS asked our community to review and comment on the Federal Oceanographic Facilities Committee (FOFC) discussion paper titled "Charting the Future for the National Academic Research Fleet". The report, which defines a federal interagency strategy for the renewal of the national academic research fleet, was generated by an informal

working group of ocean science federal agency staff.

The group concluded that the fleet of large (> 40m) academic vessels should be reduced by 3 ships over the next 20 years. Their findings were based on stable funding for oceanographic research and an increased dependency on data acquisition from non-traditional platforms.

Over 100 groups and individuals responded to the UNOLS Office call for input on the FOFC report. The vast majority felt that the plan, with its associated reduction in the fleet of academic vessels, would not meet the needs of marine science into the next few decades. At the Miami Council meeting, UNOLS agreed to prepare a response to the report that will articulate the consensus view of the community based on the UNOLS poll. UNOLS will also develop their own evaluation of the future of ocean science and attempt to predict how ocean scientists will utilize platforms (of all ilk's) in the future.

This whole exercise, I think, is exciting and will be beneficial to marine science in general and to us as operators of the academic fleet. The sheer volume of the responses demonstrate that a large contingent of ocean scientists are paying attention, and they care enough about their fleet to take the time to comment. In addition, the community's comments (along with an outstanding presentation by John Delaney on the possibility of sub aqueous life on the moons of Jupiter which in all likelihood could resemble deep ocean hydrothermal communities here on earth) have encouraged UNOLS to take a NASA style futuristic look into the next chapter of ocean exploration. If, as the FOFC report predicts, funding for ocean sciences remain apathetical, then this effort will be nothing more than mind games. Of course, we could all be surprised and find ourselves prepared for an exciting future. Either way, I think it's a worthy endeavor and, to me, what UNOLS is all about.

Now back to reality. Plans are progressing for the historic 2001 joint RVTEC/RVOC meeting in Rhode Island. I spoke with Dale Chayes, RVTEC Chair, in Miami and we agreed to a tentative agenda that would include an in depth look at ISM and the quality of service issue. This will be a joint agenda item which I hope will put those with experience and knowledge of these 2 issues in the same room with vessel operators, technicians, and as many scientists as can be mustered, a unique and exciting (I'm a very excitable type personality) opportunity.

We'll need some help putting together a list of topics and speakers. Our first cut includes U.S. big ship operators that are currently working on ISM compliance, operators (NOAA, SACLANT) outside of UNOLS that can fill us in on their experiences, and regulatory groups (ABS) with knowledge and responsibility for ISM. Additionally, if Grabowsky and Roberts are successful in their bid for developing a quality program for UNOLS, I think it would be a good idea to have them in the room during our discussion of ISM.

There you have it. Sounds like an exciting year to me. Steve.

ENDEAVOR 2001 Shipyard

ENDEAVOR entered International Ship Repair and Marine Services, Inc., in Tampa, Florida, a week before Christmas last year. She joined the MAURICE EWING, whose shipyard was already underway. Right after the first of the year the ATLANTIS joined us. This yard was on the second half of our 5-year cycle with ABS and was about 2.5 years after our last yard period in 1998.

Most of the yard items planned were routine, including sea valve servicing, hull painting tail shaft and propeller inspection. Several new services were added for science in the form of a distributed 220 VAC 1• electrical service, additional utilities for vans and additional pass-throughs for temporary cable routing.

A new Ozone generating system from Delta Marine was installed to treat the potable water as well as the air spaces in the gray and black water tanks. We have been having periodic episodes with sewage odors and hopefully this system will help this situation out.

Our biggest surprise was the condition we found our sewage tanks to be in. At the previous yard, they were in reasonable shape and we never anticipated the amount of wastage we found. It took a $50,000 extra to correct the problems. Other major cost additions included machining of the propeller blade palms and extensive repairs to our crane boom cylinder. Bill Hahn

NSF Inspection Program

The RFP has closed. The review panel convened in April and, baring any delays in the review process, inspections should begin mid-summer.

New Vessel Updates

University of Delaware replacement vessel for the R/V CAPE HENLOPEN.

The "Concept" design has been delivered in a preliminary form. The Delaware Research Vessel Committee working groups will review the drawings (profile and all decks) in detail and make recommendations prior to submission to the Fleet Improvement Committee by June of this year. The target date for completing the "Concept" design is September 1, 2001. The "Preliminary" design phase will begin shortly thereafter. Matthew Hawkins

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Portable Van/Container Update

Construction:

The final bids have been received and the contract for construction has been awarded to Thomas International/Sonic Barriers. For those of you not familiar with them, they are a partnership based out of California and Vancouver respectively. They have an excellent reputation for building portable structures used aboard ship.

Based on the final prices and most urgent need, the following vans will be built:

1) Scripps - Electronic (Steel)
2) Univ. of Washington - Isotope (Steel)
3) Oregon State - Isotope (Aluminum)
4) University of Texas - Isotope (Aluminum)

5) LUMCON – Trace Metal Clean (Aluminum)
6) WHOI - Chemical Storage (Steel)

A General Purpose van for myself (Delaware) and Washington's second Isotope van may get added to the contract later in the year if funds become available.

A "kick-off" meeting was held in April. Construction should begin shortly. Dan Schwartz will be helping with the inspection process during construction.

Coast Guard Approval:

The Coast Guard approval for use of the UNOLS specification for INSPECTED vans is also moving forward - though (of course) slower than hoped for. The goal of doing this is to make this standard no longer dependent on the local CG inspection offices. This has been well received by US Coast Guard in Washington.

The original spec had proposed a design pressure of 1.0 psi for the side panels. This was the lowest deckhouse design pressure that our naval architect could find (taken from an NVIC circular for crew boats in the Gulf) and we intentionally started there. Turns out CG doesn't even like their own standard.

They had tentatively proposed (and are willing to accept) increasing this to 1.5 psi. This is an ABS standard for high-speed craft and is the lowest pressure acceptable for "full ocean service". A standard 20-foot container will require only minor stiffening to meet this pressure, according to calculations from our naval architect. A "sheltered location" may have to be agreed upon for the vans to use this pressure as well. CG wants to ensure that vans do not take green water under normal use - if so, MUCH higher design pressures would need to be used.

It appears that the CG may also agree to our fire rating philosophy, which takes into account that ship's structure is always present to help control the spread of fire. Though it may not be obvious, getting CG to agree to these issues is a major step forward. It allows R/V's to not have to build inspected vans to an "A" rating. We have long considered this inappropriate for our service - they are much heavier and more expensive. This also allows the use of aluminum for inspected vans.

Please keep in mind that, technically, the constraints I've given above apply only to INSPECTED vans (i.e. Accommodation, Chemical Storage, and Power Vans on ships over 300 gross tons). Lab vans are not required to meet this. It is my belief that we (UNOLS) should use this standard for vans "normally occupied by personnel" to ensure safety. We are not fully through the CG approval process yet (though very close), so my comments are only preliminary and reflect the information to date.

Matthew Hawkins

Satellite Communications Group Purchase:

Six institutions (Lamont, Duke, Delaware, Washington, Moss Landing and Rhode Island) requested satellite communications equipment as part of their Shipboard Scientific Support Equipment (SSSE) proposals in 2001. The requests involved mostly stand-alone INMARSAT-C and INMARSAT-B units. The National Science Foundation asked that bulk purchase of these units be investigated to help standardize hardware throughout the UNOLS fleet and reduce cost. All of the vessel operators were contacted to discuss the make and model of the units requested. Their input and opinions were considered in the evaluation process, as well as the criteria given below.

1)Functionality and Capability (Standard options, High speed data, etc.)
2)Dependability and Service Record
3)Possible future integration with SeaNet
4)Size (dimensions, number of components, etc.)
5) Cost

Key SeaNet personnel at Lamont-Doherty and Woods Hole Oceanographic Institute were consulted during the process. They will assist with review of the final specification for the hardware purchase to ensure the units can interface properly with SeaNet if requested in the future.

In order to realize the savings associated with group purchase, a single requisition for all of the equipment will need to be made from one vendor. The funds requested for group purchase of communications equipment will be given as part of the CAPE HENLOPEN's SSSE grant and administered by the University of Delaware. The equipment will be shipped directly to the institution that requested it. It will be up to those institutions to make all arrangements for final installation and commissioning of the new systems, including selection of the vendor. The removal of old equipment, and installation of the primary components of the new systems, will be done by the ship operation. A standard Installation/Commissioning "allowance" will be given to each operator through their SSSE grant (not the grant for the group purchase administered by the University of Delaware).
Matthew Hawkins

Medical Services Bid

RFP has been sent out to 5 medical service providers with bids due May 3. Mike Prince and Capt. Eric Buck from Scripps will do site visits with the top one or two providers. Any other volunteers are welcome to help with site visits and evaluation.

Maintenance Program Evaluations

The first two site visits have been done and two additional visits are scheduled for May. The evaluation team (Bill Hahn, Scott Olson, Al Walsh and Dave Powell) will make a recommendation by mid June.

Notes and Clippings

Regulatory

Making ISM Work
Greener, Cleaner and Safer
New Ballast Water Treatment Initiative
Unwanted Lifeforms: Uneasy Fix
International Safety Management
West Coast Emissions Regulations: Environment and the Law
IMO Maritime Safety Committee meets
Watchkeeping and Work-Hour Limitations

Safety
Shock Value
Methods for Motivating Workers to Wear Hearing Protection
Do you coach with feeling?
Norsea Survival Suite Sports a Different Design

New Equipment/Products
High Performance Ropes: New Strength, silent stress

Miscellaneous
Ship Operations Cooperative Program
Adding Fuel to the Fire
Going for GPS and GLONASS
Free Charts on MAPSERVER
Report on the Future Availability and Qualifications of Mariners Through the Year 2020
Keep 'Em If You Got 'Em
Basics about Blocks
Feds Retrieve Anchors from Fishing Grounds
Research vessel from Rozema

Regulatory

March 2001 Vol 106 No 3

Making ISM work

IMO Secretary General William A. O'Neil last month made a plea for effective and conscientious implementation of the International Safety Management (ISM) Code. "We should not allow it to become merely a paper exercise," he said.

O'Neil announced his intention to start an assessment of the impact of ISM since it become mandatory for passenger ships, oil and chemical tankers, gas carriers, and bulk carriers on July 1,1998. It will become mandatory for all other cargo ships of 500 gross tons and above on 1 July 2002.

Nicholas Blenkey
Editor

O'Neil cited an analysis by the Swedish P&I Club indicating that ships complying with the ISM code have made significant claim improvements in comparison with non-ISM code ships. He said he believed such a demonstration of the benefits to be gained by those who have introduced the systems of the code should also give encouragement to those who have to implement the same systems between now and July 1, 2002.

Unfortunately, of course, the ISM Code suffers from one inherent flaw. Essentially, its a QA (Quality Assurance) system. And any QA enthusiast will be swift to point out that successful QA systems can't be imposed on an organization from the outside. They have to be fervently embraced by all involved, especially top management.

That is not to say that ISM will not make a valid contribution to enhancing maritime safety. But it does mean that there's a continuing need to get the message out that successful implementation of ISM brings positive benefits. It also means, unfortunately, that when the carrot doesn't work, the stick will have to be used.

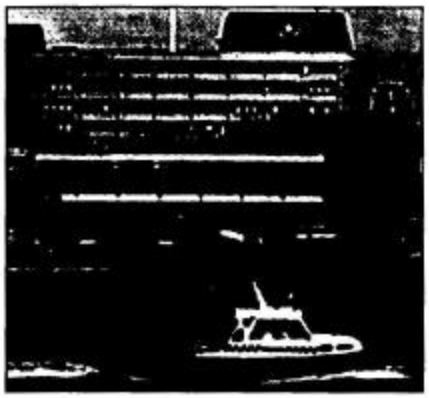
Part of O'Neil's assessment of ISM will involve contacting Port State Control around the world for information about the number of detentions recorded for ISM and non-ISM certificated ships, along with any other action taken by port state authorities in respect of ISM code deficiencies.

Interestingly, owners who seek to make ISM certification no more than a paper chase, may not find it as easy now as it may have been when ISM was new.

A number of *Marine Log* sources are telling us that many owners are going to have a hard time getting recertified. This topic features prominently on the program of our conference, Maritime Operations: The Human Element, being held April 24 and 25 in Washington, D.C.

Nick Blenkey

IMO's London headquarters was the scene of a meeting last month that set the agenda for a panoply of forthcoming regulation intended to make shipping cleaner, greener and safer



GREENER, CLEANER AND SAFER

IMO's last Assembly of the 20th Century sets the international regulatory agenda for 21st Century shipping

Last month's meeting of the IMO Assembly, held at IMO's London headquarters from November 15-26, was the last of the 20th century. However, it played an important role in setting the regulatory agenda for shipping for well into the 21st century.

After freight rates, the biggest worry on most shipowners' minds is how to comply with an ever widening web of international regulations that dictate how they can do business. Already, shipowners are having to get used to the idea that they will no longer be able to apply antifoulants containing TBT to ships hulls. Soon, they will have to deal with the fact that ballast water is something that is going to have to be "managed," so that ships no longer transport "unwanted aquatic nuisance organisms" between eco systems.

Both these issues came significant steps nearer becoming international law at last month's Assembly.

For those who have been residing on Mars, IMO, the International Maritime Organization, is the United Nations agency concerned with maritime safety and the prevention of marine pollution from ships. The regulations developed by IMO are enshrined in various international maritime conventions. Countries that have signed on to those conventions enact national legislation that make the convention requirements law aboard ships flying their flags.

Most of IMO's work is done through its committees, particularly the Maritime Safety Committee and the Marine Environmental Protection Committee. However, the committee's recommendations have to be adopted by the IMO Assembly, which normally meets once every two years. Between sessions of the Assembly the IMO Council performs all the functions of the Assembly, except that of making recommendations to Governments on maritime safety and pollution prevention.

The Council is the executive organ of IMO and is responsible, under the Assembly, for supervising IMO's work. Another significant step taken by last month's Assembly was to elect a new Council. The big surprise was that Liberia failed to win reelection. It's widely believed that this is not unconnected to the fact that Liberia is behind in its dues to IMO.

WORK PROGRAM

The work program submitted to the assembly by IMO Secretary-General, William A. O'Neil, identified IMO's main tasks for the next two years as follows:

- taking measures to more actively implement the proactive policy agreed in the 1990s. The aim apparently is early identification of trends that could affect the safety of ships and those on board, or the environment so that action can be

taken to avoid or mitigate dangers. O'Neil is calling for "Formal Safety Assessment" (still a relatively novel concept) to be used to the extent possible in any rule-making process.

- shifting emphasis onto people;
- ensuring the effective uniform implementation of existing IMO standards and regulations;
- developing a safety culture and environmental conscience;
- avoiding excessive regulation;
- strengthening IMO's technical co-operation programs; and
- promoting the intensification by Governments and industry of efforts to deal with terrorism at sea, piracy and armed robbery against ships, illicit drug trafficking, illegal migration by sea and stowaway cases).

There are few surprises in this list and, as ever, the devil will be in the details. The plea to avoid "excessive regulation" seems a forlorn one. Regulations never seem excessive to those who wish to impose them.

TBT BAN

The Assembly also considered a number of draft resolutions submitted for approval by the Maritime Safety Committee, the Marine Environment Protection Committee and other IMO subsidiary bodies. Among the most contentious of these was the MEPC draft resolution on phasing out TBT from antifoulings. It contains target dates of Jan 1, 2003 for the ending of application of TBT-containing antifoulings to ships and January 1, 2008 for a complete ban on the presence of TBT in antifouling coatings.

IMO Secretary General W.A. O'Neil: His lengthy work program for IMO includes a call for less regulation

The resolution was adopted by the Assembly and the next step will be a diplomatic conference called to create an internationally legally binding instrument to prohibit the use of harmful antifouling systems.

BALLAST WATER

Another contentious issue is ballast water management. While MEPC's Ballast Water Working Group says it has "made significant progress towards a legally binding provision on ballast water management," it is not yet at the stage where it is ready to request a diplomatic conference. Ballast water will, however, remain a high priority of the MEPC. It seems certain that the U.S. will be among those pushing for progress.

This is yet another area where U.S. regulators appear to be pushing ahead of the international tide. The U.S. Non-indigenous Aquatic Nuisances Prevention Control Act of 1990 created the Aquatic Nuisance Species Task Force (ANSTF) and required mandatory exchange of ballast water to protect the Great Lakes. The National Invasive Species Act of 1996 reauthorized that act and extended it by extending ballast water management regulations for the rest of U.S. waters in the form of a regime of voluntary ballast water exchange. In 1993, the U.S. Coast Guard established a mandatory ballast water exchange program to meet the requirements of the 1990 law. In July this year, it implemented voluntary national guidelines to comply with the 1996 law.

The Coast Guard is taking random ballast water samples "to assess the truthfulness [of ships'] reported actions" and it is "exploring promising technologies that offer better long term approaches than ballast water exchange."

However, the Coast Guard concedes that the voluntary nature of its program has come under criticism from a variety of interests. Some environmentalists have asked the U.S. Environmental Protection Agency to regulate ballast water under the Clean Water Act. And the California legislature has passed its own bill on ballast water management that exceeds federal law and requires implementation of ballast water management practices.

By January 1, 2002, the Coast Guard must submit a report to Congress on the level of vessel compliance with the voluntary guidelines and the effectiveness of those guidelines.

Incidentally, ABS recently published a set of advisory notes on "Ballast Water Exchange Procedures" that serves to underline that exchanging ballast water at sea is no light undertaking.

One of its general conclusions is that "the complexity of exchange sequences on certain vessels presents safety concerns, as human error and equipment failures could potentially endanger the vessel. Personnel training will be an essential part of a ballast water training program. System reliability may also be a concern, particularly on older ships."

ALSO ON THE IMO AGENDA

Other agenda items and draft resolutions considered by the IMO Assembly last month included items covering:

- recommendation on training of personnel on mobile offshore units;
- establishment, updating and retrieval of the information contained in the registration databases for the Global Maritime Distress and Safety System (GMDSS);
- pilot transfer arrangements;
- principles of safe manning;
- unlawful practices associated with certificates of competency and endorsements
- self-assessment of flag State performance
- amendments to the Code for the Investigation of Marine Casualties and Incidents (resolution A.849(20));
- amendments to the Procedures for port State control (resolution A.787(19));
- global and uniform implementation of the Harmonized System of Survey and Certification (HSSC);
- procedure for the adoption of, and amendment to, performance standards and technical specifications;
- International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual;
- criteria for the provision of mobile satellite communication systems in the Global Maritime Distress and Safety System (GMDSS);
- implementation of the International Safety Management (ISM) code by 1 July 2002;
- provision and use of port waste reception facilities;
- procedures for the identification of particularly sensitive sea areas and the adoption of associated protective measures;
- amendments to revised specifications for the design, operation and control of crude oil washing systems;
- guidelines on voyage planning.

That's quite some laundry list! In the century ahead, we at *Marine Log* (and marinelog.com) will do the best we can to keep you in the picture as items move from debating topic to imminent requirement! **ML**

MARITIME SOLUTIONS, INC.

PRESS RELEASE

NEW BALLAST WATER TREATMENT INITIATIVE

NEW YORK, NY – September 1, 2000 - Maritime Solutions, Inc. is pleased to announce that funding from grants made by the State of Maryland Port Administration and the National Oceanic and Atmospheric Administration (NOAA) will support the rigorous testing of the Maritime Solutions' patent pending "Ballast Water Treatment System".

The funding, which exceeds $650,000.00, will support a larger public/private sector initiative to test the Maritime Solutions' treatment system. The program will also serve to demonstrate what is seen as a safe, effective, economical, compact, energy efficient, and crew friendly shipboard treatment system that will be of immediate practical use to the maritime industry as an effective alternative to the troubled practice of 'ballast exchange'.

Maritime Solutions, working in cooperation with the University of Maryland, has additionally won the support of the U.S. Maritime Administration (MARAD) that will allow the testing program to take place aboard the "CAPE MAY", a ship of the U.S. Ready Reserve fleet. The former Lykes Lines SEABEE vessel of 39,000 tons dead weight, is berthed in the Port of Baltimore and will provide for realistic shipboard testing of the Maritime Solutions' treatment system utilizing her ballast system while taking water from the Chesapeake Bay.

Management and treatment of ballast water to eliminate undesirable introductions of non-indigenous species is a global problem requiring a global solution. The economic costs associated with unwanted invasive species are now well known. In the Great Lakes alone, it is estimated that the zebra mussel *Dreissena polymorpha* has already caused more than $5 billion in damage to water pipes, boat hulls and other surfaces. In many other parts of the world, notably in Asia and Australia, coastal bivalve fisheries have been devastated by the introduction of dinoflagellate species such as *Alexandrium.*

The Maritime Solutions' Ballast Water Treatment System consists of two stages: a first stage patented 'voraxial' separator manufactured by Enviro Voraxial Technology, Inc. of Deerfield Beach, FL and a second stage treatment of ultraviolet irradiation (UV) manufactured by Aquionics, Inc. located in Erlanger, KY or, alternatively, the chemical biocide 'SEAKLEEN', developed by Garnett, Inc. of Watkinsville, GA.

Maritime Solutions believes that UV irradiation is the secondary treatment of choice for container vessels, passenger ships, and certain other merchant and combatant vessels with ballast flow rate requirements up to 2,000 tons per hour. For larger merchant vessels including tankers, bulk carriers, and OBOs with ballast flow rate requirements between 2,000 and 20,000 tons per hour, Maritime Solutions believes that the biocide 'SEAKLEEN' would offer a more economical and effective treatment. The biocide will

be introduced into the ballast water flow utilizing a chemical dosing unit provided by one of the world's leading marine chemical distributors.

The uniqueness of the Maritime Solutions' ballast water system centers around the inclusion of the EVTN separator as the first stage where more than 95% of the silt, sediment and larger marine organisms are removed and returned to the source water. The 'clean' water is then treated in the secondary stage, where 'residence time' is significantly reduced due to the pre-cleaning of the water, with UV or SEAKLEEN.

UV technology for eradicating unwanted organisms and viruses has been well established, however, in order to ensure an even higher 'kill' rate, Maritime Solutions, working with the University of Maryland and Aquionics, has specified a UV system specifically designed for ballast water treatment. Combining the advantages of the EVTN separator and the specified UV system, a 'kill' rate approaching 99% is envisioned.

The biocide 'SEAKLEEN', patent pending, is a proprietary, natural product specifically formulated for ballast water use and has a half-life of 14 - 17 hours. As a result of the pre-cleaning provided by the EVTN separator, dosage approaching 1 PPM will be sufficient to produce an effective 'kill' rate approaching 99%.

Maritime Solutions, Inc. was established in 1998 to introduce advanced technologies to the international marine and environmental marketplace thereby providing more effective solutions to traditional marine and environmental problems. From its onset, Maritime Solutions targeted select areas of activity that demand the application of improved technology including oil/water separation for waste stream minimization, oil dispersant capability for marine spill response, and fire fighting capability for emergency response. Maritime Solutions' web page can be viewed at: www.maritimesolutionsinc.com.

Once tested and accepted for use by the U.S. Coast Guard as an approved alternative to ballast exchange, Maritime Solutions will begin offering its system to the shipping industry. Application will also be made to the International Maritime Organization (IMO) for approval as an accepted alternative to ballast exchange.

Systems capable of treating from 10 metric tons/hour to 20,000 metric tons per hour will be available after testing and certification is completed. It is anticipated that the potential market for approved ballast water treatment systems will exceed 2 billion US dollars over the next five years.

For further information please contact:

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Unwanted Lifeforms: Uneasy Fix

Ballast Water Exchange can be tough on ships and seafarers as well as on "aquatic nuisance organisms"

With a California law set to take effect June 1, 2000, and the IMO clearly creeping towards action, Ballast Water Management is not so much an issue but a budding reality. The United States passed the Non-indigenous Aquatic Nuisance Prevention Control Act in 1990, requiring mandatory ballast-water exchanges to protect the Great Lakes and establishing the Aquatic Nuisance Species Task Force (ANSTF). In 1996, the National Invasive Species Act (NISA) not only re-authorized the earlier act, but also extended ballast-water management regulations for the rest of U.S. waters and laid out a regime of voluntary ballast water exchange. But like some other environmental solutions, Ballast Water Management, and in particular Ballast Water Exchange, has become one of those solutions easy for legislators to proclaim, but not so easy—and perhaps even dangerous—to implement.

According to recently published American Bureau of Shipping Advisory Notes on Ballast Water Exchange Procedures, there are five methods of managing ballast water to minimize the release of unwanted organisms, all of which have problems.

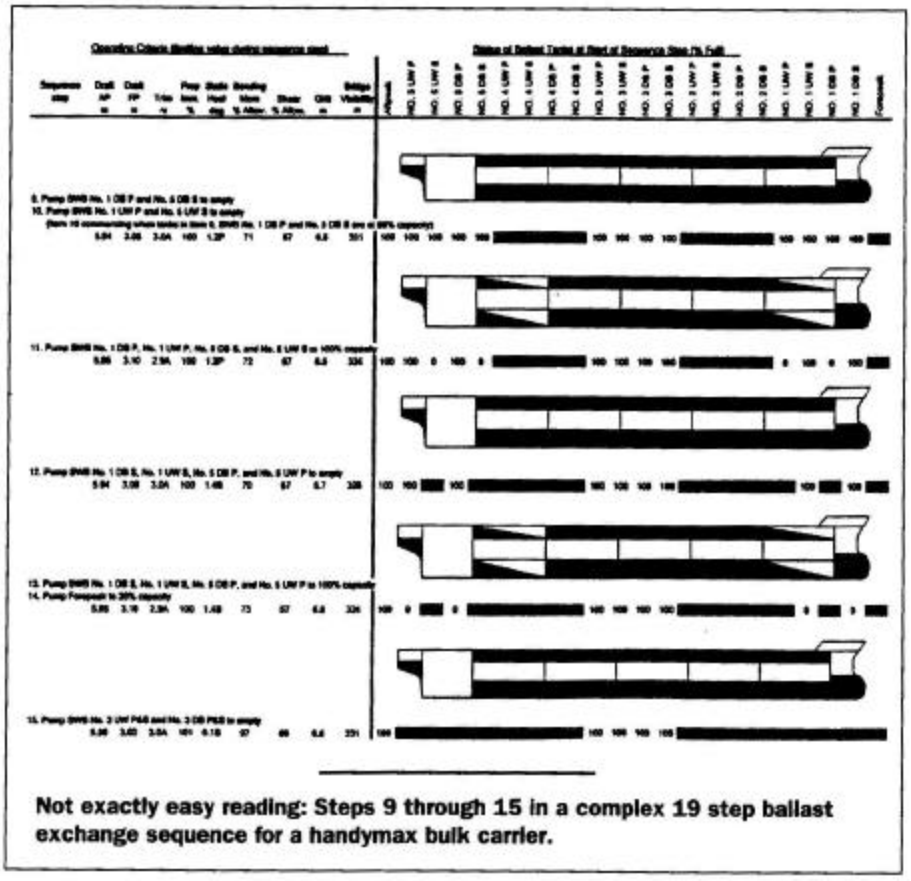
One is the elimination of ballast water discharge all together. This is probably the most reliable in that the dumping of foreign waters is avoided altogether, but not very practical.

A second approach is to reduce organisms taken on board. This is (theoretically) accomplished by limiting the amount of ballast water taken on and minimizing the intake of ballast in shallow waters, stagnant areas, near sewage outflows and dredging operations, and in areas where target organisms or known pathogens are present.

Two other methods involve the treatment of ballast water, either onboard ship or on shore. Onboard ballast water treatments are currently being investigated but no practical or cost effective methods have been found. Besides that, such treatment would likely involve chemicals of some kind, meaning the possibility of other forms of environmental regulation. Onshore treatment, says ABS, in principle has several advantages. But many ships don't have the capability to discharge water ashore and even if they did, few ports have treatment receptacles in place. It isn't likely that ports are going to start constructing ballast water receptacles any time soon considering that many have yet to install mandatory slop receptacles required by MARPOL regulations.

The fifth method is Ballast Water Exchange.

"If [regulators] require Ballast Water Exchange and feel they've solved the problem, they're mistaken," says Joseph J. Cox, president of the Chamber of American Shipping. Cox



Not exactly easy reading: Steps 9 through 15 in a complex 19 step ballast exchange sequence for a handymax bulk carrier.

by Ken Wheaton,
Assistant editor

says that the issue is being taken very seriously and that the industry must strive for technological advances, most likely in onboard or onshore treatment.

"A well intentioned answer to one problem has raised equally serious concerns in another area," says ABS Vice President Stuart Wade, adding that the quick rush to accept ballast water exchange is a bit simplistic. "It's not only not simple, it can be downright dangerous," he warns.

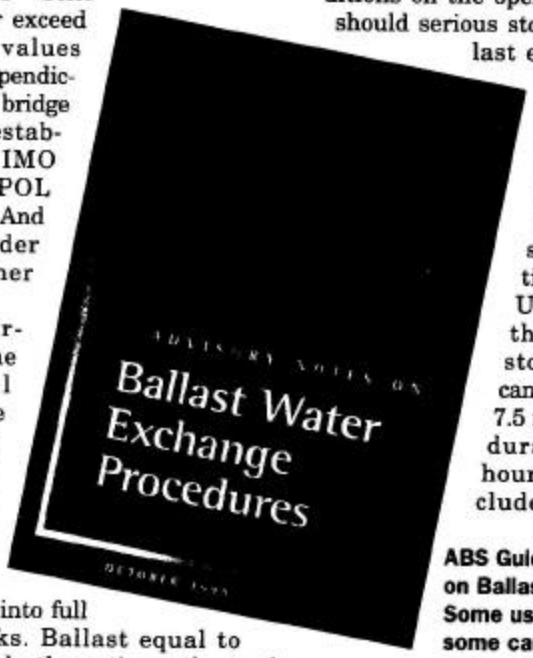
The Advisory Notes from ABS explain that there are two methods of exchanging ballast water at sea: the sequential method and the flow through method. When performed in deep water, away from the coastal shelves and estuaries where the critters lurk, both methods are reportedly 95% effective in eliminating aquatic organisms. But both can entail risks.

The sequential method involves completely emptying ballast tanks and refilling them with open-ocean water. In the ABS study conducted to prepare the Advisory Notes, a number of sequences were developed for tanker and bulk carrier designs. The primary considerations focused on vessel stability, hull girder strength, propeller immersion, bridge visibility, and list angle. The effects of exchange on slamming, sloshing, and damage stability/survivability were considered. Also considered were the number of steps, the number of tanks, the number of ballast movements, and the time to ballast to original draft.

This is far from a one size fits all solution. Ship type must be considered as well. Double hull, single hull, tanker, bulk carrier or containership, not to mention lay out and design of ballast tanks—all of these factors are crucial. ABS is very careful to point out a number of times throughout the advisory notes that their information is vessel specific and that it is based on detailed calculations and precise tank loading scenarios. Containerships, because they rarely operate in ballast only conditions and because they visit many ports on a typical voyage, loading and off-loading at each one, were not considered for the study.

The study found that during the process of sequential exchange forward draft becomes very light, trim can become high and propeller immersion difficult to maintain. Furthermore, bending moments approach 100% allowable during certain sequences and bridge visibility is often not sufficient due to high level of trim aft. "However," points out the Advisory, "it is noted that this occurs in the open sea where risk of collision is less significant."

In order to pose the least risk to ship and crew, a precise sequence of emptying certain ballast tanks while filling others must be achieved. This involves a dizzying physical and mathematical balancing act. In certain single hull tankers, the sequences can be complex, with approximately 50% more steps than there are ballast tanks. For bulk carriers, sequences can require between 12 and 19 independent steps and up to 65 ballast movements. Even when such a sequence is arrived at certain ships still approach or exceed limiting values (trim at perpendiculars, draft, bridge visibility) established by IMO and MARPOL regulations. And this is under ideal weather conditions.



ABS Guidance Notes on Ballast Water Exchange: Some useful advice—with some cautionary notes

The alternative to the sequential method, the flow through method, involves pumping open-ocean water into full ballast tanks. Ballast equal to approximately three times the tank capacity must be pumped through the tank to achieve 95% effectiveness in eliminating aquatic organisms. Applying the flow through method does not alter the stability, stress and ship attitude as does the sequential method.

But there are problems with this method as well. According to ABS, precautions must be taken to avoid overpressurization of tanks. Because it may be necessary to remove manhole covers or Butterworth openings to assure sufficient venting, a number of concerns are raised. The removal and replacement of covers is labor intensive, potential safety risks to personnel accessing the upper deck limit the process to favorable weather conditions only, and the overflow of ballast on deck is prone to icing in cold environments. To add to the problems, venting and overflow arrangements for each tank must be reviewed to insure that flow through is possible. Because forepeak and aftpeak tanks on some ships overflow into enclosed spaces, flow through is not an option.

Because of tank arrangements and other factors, there are, says Wade, "certain ships for which it is practically impossible to exchange ballast water." In some cases, the tanks aren't capable of being overflowed, in others a sequential exchange could conceivably tear the ship apart.

Time is also a major concern. The duration of sequences ranged from half a day to two days for good weather conditions on the open ocean. Of course, should serious storms arise, the ballast exchange sequence may have to be interrupted. The study notes that sequences can be interrupted and continued with some additional time requirements. Using published data that indicates that storms with significant wave heights over 7.5 m have an expected duration of seven hours, the study concludes that ballast exchange procedures would be compromised only on exceptionally short voyages.

"The complexity of exchange sequences on certain vessels," concludes the Advisory Notes, "presents safety concerns, as human error and equipment failures could potentially endanger the vessel. Personnel training will be an essential part of a ballast water management program. System reliability may also be a concern, particularly in older ships."

The study points out that ballast exchange should now be considered during the design process, either making it easier to perform sequential exchanges, or failing that, arranging the overflow system so that flow through can be carried out safely. **ML**

International Safety Management (ISM 2000)

Office of Marine and Aviation Operations, Marine Operations Center

May 1, 2000

Volume 1,Issue 1

What does ISM mean for OMAO?

Office of Marine and Aviation Operations (OMAO) is committed to ISM voluntary compliance, STCW and GMDSS training, and third party audits.

Training will have a higher priority and additional funding is being pursued.

OMAO and Marine Operations Center documentation will receive a higher priority in FY 2000 including revision, consolidation, and controlled distribution both on the Intranet and CD-rom.

The safety, pollution, and health policies of OMAO vessels need to be highlighted and practiced daily.

Internal auditing will begin late in FY 2000 and link ships to the documentation and external auditing efforts.

This will be a culture change for OMAO from a "knowledge based" work force to a "procedure based" environment.

NOAA Ship OREGON II

Our Priorities this year have been:

* Begin STCW training for our personnel including a database and identifying future funds through a Budget Initiative for FY 2002.

* Documentation update including consolidation under the new OMAO & MOC structure. Streamlining, Plain Language and easy dissemination are all ISM elements.

* Prototype internal / ABS audit cycle for OMAO, MOC and the Delaware late this year.

For FY 2000 there will be a new awareness on safety, environmental, and health as key policies.

Introduction

This is the first issue of the ISM Newsletter. The purpose of this newsletter is to bring you up-to-date on STCW and GMDSS training, and ISM implementation.

Inside this first issue you will be introduced to the 13 ISM elements of a Shipboard Safety Manual as well as ISM documentation control and shore and shipboard internal audit procedures.

Inside this issue:

Background Information

American Bureau of Shipping conducted an initial survey of the OMAO approach and ISM plan with positive feedback.

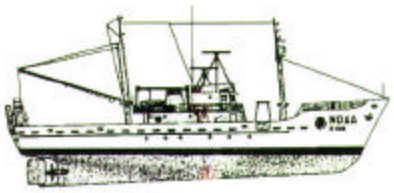
Demonstrations and evaluations for document control and training data base software were conducted and selections made.

STCW training questionnaires were provided to all vessels and replies were used to populate the training data base.

The STCW Working Group drafted training recommendations with cost estimates.

NOAA/OMAO is a member of Ship Operators Cooperative Program (SOCP). The SOCP meets quarterly and is attended by STCW trainers, government organizations, maritime institutes, and shipping companies.

Members of the STCW Working Group traveled to various maritime trainers to evaluate facilities.



NOAA Ship DELAWARE II

STCW/GMDSS Training

NOAA Ship DELAWARE II was selected as the STCW prototype vessel. Various STCW training classes were completed, including Basic Safety, GMDSS, Bridge Resource Management, Advanced Fire Fighting and ARPA. Classes were attended in Newport, Rhode Island; Baltimore, Maryland; New Bedford, Massachusetts; and Norfolk, Virginia. As a result of the training, the vessel is 98% STCW compliant.

NOAA Ships RONALD H. BROWN, DAVID STARR JORDAN, KA'IMIMOANA, McARTHUR, GORDON GUNTER, and OREGON II were given $6,000 each for STCW training. These vessels were selected because they make port calls in foreign countries.

MOC has received a proposal on Computer Based Training for Basic Safety. MGI is the first U.S. Coast Guard approved vendor. The proposal identifies 4 locations where six traveling work stations would be set up for 12 students for 3 days of class. Two additional days would be spent at approved local facilities for practical work in fire fighting and personal survival skills.

Training Database

The STCW Training database is proving to be an essential tool in managing and documenting our training activities to meet voluntary compliance with the ISM and STCW 95 codes.

All ships have forwarded past training certificates and the new training class data has been entered. We now a have individual and summary reports which track previous and FY2000 training hours and cost. Summary transcripts for each ship including each employee on board are available. This will be essential during audits and will assist in identifying training requirements on FY 2001 and later.

The database and scheduling efforts are managed by Wanda Campbell.

Training Achievements in Q2

DAVID STARR JORDAN: 10 employees at MSC San Diego, various STCW courses

RONALD H. BROWN: 22 employees at MSC San Diego, various STCW courses

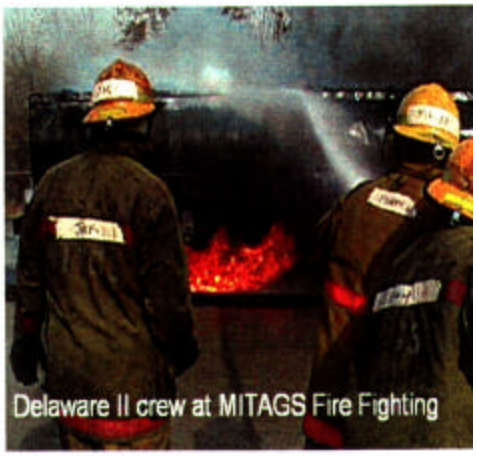
McARTHUR: 9 employees in Seattle, various STCW Courses

GORDON GUNTER: 13 employees in Pascagoula, Personal Survival, Persona-Safety/Social Responsibility

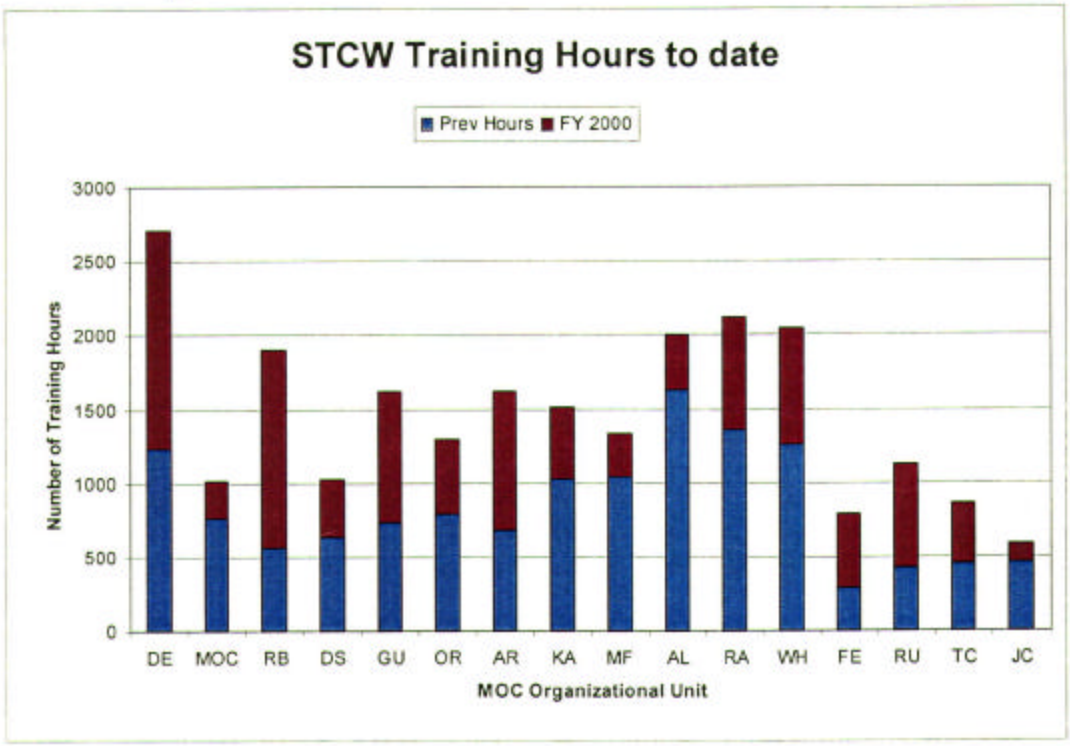
KA`IMIMIANA: 6 employees, Bridge Resource Management

OREGON II: 8 employees in Pascagoula, Basic/Advanced Firefighting, First Aid w/CPR

OREGON II is scheduled for Fast Rescue Boat training to be conducted by Texas A&M University traveling training team for 10 crew members in May. Training will involve class room and underway launch, operation, and recovery work for the complete wardroom and deck departments.



Delaware II crew at MITAGS Fire Fighting



Progress to Date

Depending on crew size Each of our ships may need more than 300 ma days of training to meet STCW requirements. W are tracking progress each quarter with reports based on the training database. Kee sending copies of your certificates as you complete a class.

Computer Based Training (CBT)

A proposal has been received from the first USCG approved vendor for STCW computer based training.

This course is the 40 hour Basic Safety class (4 modules) including proficency in water surviival and basic firefighting.

The CBT could be installed at either Center, Port Office Facilities, or on a ship for self paced use.

Additionally, MOC, Atlantic, is evaluating two CBT courses under the SOCP program: Fast Rescue Boat Introduction and Vessel Familiarization.

Both were authored in "Power Point" by Cal Maritime and could be easily modified to our use on a NOAA Ship.

SOCP is Ship Operators Cooperative Program which we are charter members. Visit their web site at www.SOCP.org

STCW-95 Update

The following is a summary of STCW-95 required training for deck officers, engineers, and unlicensed personnel.

Deck Officers:

ARPA Course – one time (if fitted)
GMDSS Course – one time (if fitted) [1]
BRM Course – one time
Med-First Course – one time [2]
Advanced Fire Fighting – one time (for individuals designated to control fire-fighting operations)
Basic Safety Training (basic fire fighting, elementary first aid, personal survival, personal safety & social responsibility) - every 5 years
Radar Renewal – every five years

Engineers:

Med-First Course – one time [2]
Advanced Fire Fighting - one time (for individuals designated to control fire-fighting operations)
Basic Safety Training (4 modules) - every 5 years

Unlicensed:

Basic Safety Training (4 modules) - every 5 years

Additional Training:
Fast Rescue Boat – one time for personnel assigned to Fast Rescue Boat crew

[1]FCC license by 2/1/99 for operators sailing on vessels equipped with GMDSS.
[2]Coast Guard has "grandfathered" this requirement for personnel sailing before August 1998.

"OS and AB's starting their careers after August 31, 1998 must be formally assessed before being assigned to a navigational watch. The assessment criteria is still under development by the Coast Guard."

2/3 of all Deck Department personnel must be AB Seaman qualified to meet STCW watch standing requirements. We made significant progress on DELAWARE II in getting fisherman the AB Tickets. We will be working to get all our fisherman positions AB tickets in 2001 & 2002.

Documentation Achievements in Q2

Draft 3 of the OMAO Intranet and CD Rom Table of Contents was distributed for review. This document contains all of the reference material and historical OMAO working documents in one repository. All past documents such as NC Instructions, Marine Center Directives, Guidelines etc. are being revised and reorganized into OMAO or MOC Policies and Procedures. Many documents in the Administrative and Operations areas have been revised by their respective owners and are now being put into the ISO9000 format required by our new "Document Management" software.

Documentation Achievements (Continued)

The key player in this effort has been Hilda Manning, our first TAP employee from AOC.

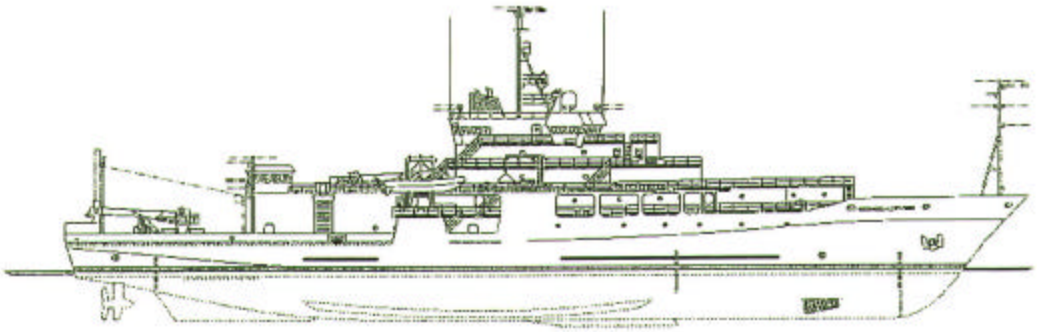
Network software has been recently purchased and we are waiting installation on our new server. In Q3 we look to purchase an "Intranet Publisher" which will be the follow on to the "Document Manager" Software.

Our goal is to provide OMAO Documentation on our Intranet and on CD Rom to the ships by the next Command Seminar.

Each of our Ships will be required to maintain a Safety Management Manual. It will have 13 sections, about a page long each. "All hands" will need to be familiar with the contents, which ABS auditors will probably ask questions on. The manual will enhance our Standing Orders and be a guide to the ISM and STCW code requirements. We are working under the manuals principles in part today, so the transition will not be difficult. Terminology will be important...such as Who is the "Designated Person" in OMAO?

NOAA Ship RONALD H. BROWN Safety Management Manual

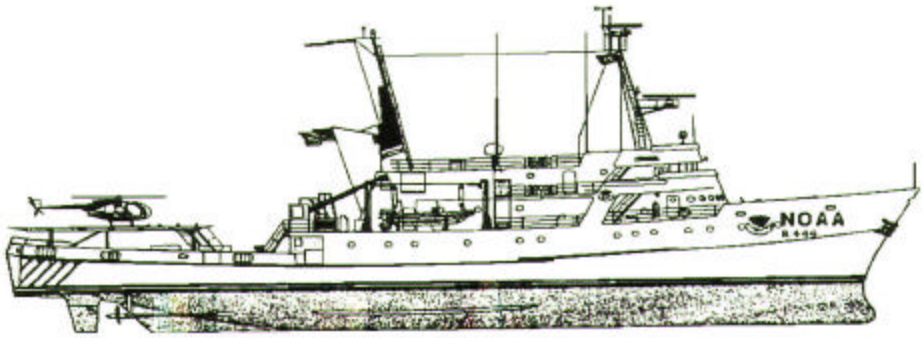
SMM	Table of Contents
SMM	Reference Documents
SMM 1	Purpose, Scope & Compliance
SMM 2	Health, Safety & Pollution Prevention Policy *(Summation of our most important OMAO Policies)*
SMM 3	Responsibility & Authority
SMM 4	Designated Person
SMM 5	CO/ Master Authority
SMM 6	Resources & Personnel
SMM 7	Plans for Ship Operations
SMM 8	Emergency Preparation
SMM 9	Reports & Analysis of Non Conformities, Accidents & Hazardous Occurrences *(A system to mitigate and prevent recurrence of problems and situations, similar to CASREPs)*
SMM 10	Maintenance
SMM 11	Documentation
SMM 12	Verification & Review
SMM 13	Certification & Review



MED Involvement

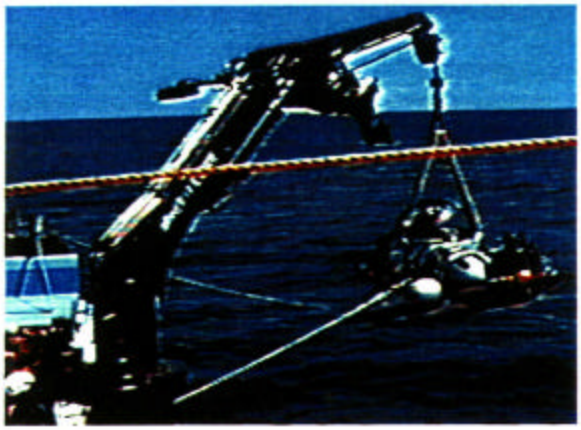
Marine Engineering Division weighs in on Document Review!!

June Feggins is distributing vessel documents to all the MED Port Engineers. We hope to bring them up-to-date shortly and get MED involved in the project. You might not know, but before any ships can be audited, the Marine Operations Center and OMAO must pass the American Bureau of Shipping muster. That means all our documentation has to be up to snuff!



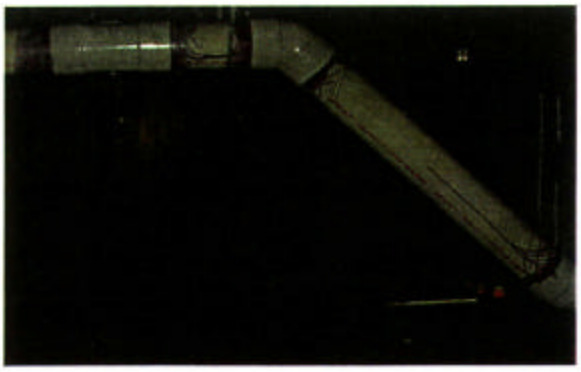
Vessel Configuration

VC1	Ship Designator and Class (formerly 5031)
VC2	Policy on ABS Classing of Ships (formerly 9290C)
VC3	Load Line Assignment (formerly 9292C)
VC4	Vessel Weight & Moment Control (formerly 9096)
VC5	Deck Loading Limits (formerly 9116.1B)
VC6	Color and Identification (formerly 9602A)
VC7	Vessel Alterations (formerly 4720E)
VC8	Rigid Hull Inflatable Rescue/Utility Boats (RHIBs) (formerly 9825)
VC9	Ship Interior Décor (formerly 9190A)
VC10	Launch Painting



Engineering and Maintenance

E/M1	Preventative Maintenance Standards SAMMs (formerly 4700.1)
E/M2	Ship Repair Request Procedures (SRRs) (formerly 1301.00)
	Ship Repair Request (merge) (formerly Adm 26)
E/M3	Prep & Conduct of Ship Repair Contracts (formerly 1302.00)
E/M4	Ship Repair Guidance Specs (formerly 4791)
E/M5	Aluminum Welding Equipment (formerly 9920.1B)
E/M6	Hull Boards (formerly 85-20)
Retired	Standard Work Request Form (formerly 74-15)



National Oceanic and Atmospheric Administration

Office of Marine and Aviation Operations, Marine Operations Center

Marine Operations Center, Atlantic
439 West York Street
Norfolk, Virginia 23510-1114
Attn: Wanda H. Campbell
Phone: 757-441-6800
Fax: 757-441-6495
Email: Wanda.Campbell@noaa.gov

We hope to be on our Intranet Site soon

What are some of the topics in the MOC Policy and Procedure Documentation Library and who are the owners?

Administration: Dale North and Alan Morris;
Operations: CDR Tim Wright and CDR Jon Rix;
Environmental: Jim Schell and Bill Cunningham;
Committees/Mtgs & NOAA Officers: CAPT Clary and CAPT Manzo;
Mission and MIS Support: Mel Asato;
Marine Engineering: Bob Wilmot
Emergency and Safety, Operations Division:
Medical: LCDR Dan Aronson;
Personnel: Dale North and Alan Morris;
STCW Training: Doug Friske and Wanda Campbell

We are refining this breakdown. Table of Contents 4 and a new spreadsheet with links are close to being sent out for the next review cycle.

Planning for FY 2001 STCW Training is on the go. We hope to coordinate with the new FAP process with Beth White. CO's will receive a budget planning sheet this year in Q4. It will come with your budget request from Dale and Alan.

FY 2002 Budget Initiative

- STCW training for NOAA ship complements
- Includes 1-6-8 ship plan with augmentation pools
- Includes 4 additional FRVs
- Includes personnel attrition
- Includes recertification of 7-8 ships in 5 years
- Additional classes for BOTC and REFTRA
- Includes ISM programmatic expenses
- Includes ABS external audits
- Includes ABS technical assistance to fleet inspection program

West Coast Emissions Regulations: Environment and the Law

International, national, state and local bureaucracies all have a certain amount of authority over how shipowners, vessel operators, terminal operators and stevedores are regulated. In this article we will look at some of the newest regulations being developed to minimize diesel particulate emissions and noxious gases—both shoreside and at sea. We will examine various regulatory incentive programs being offered, technological advances at the manufacturing and design level, and we will outline some steps operators can take to minimize their liability, while preparing themselves for prospective regulations which may be applied retroactively.

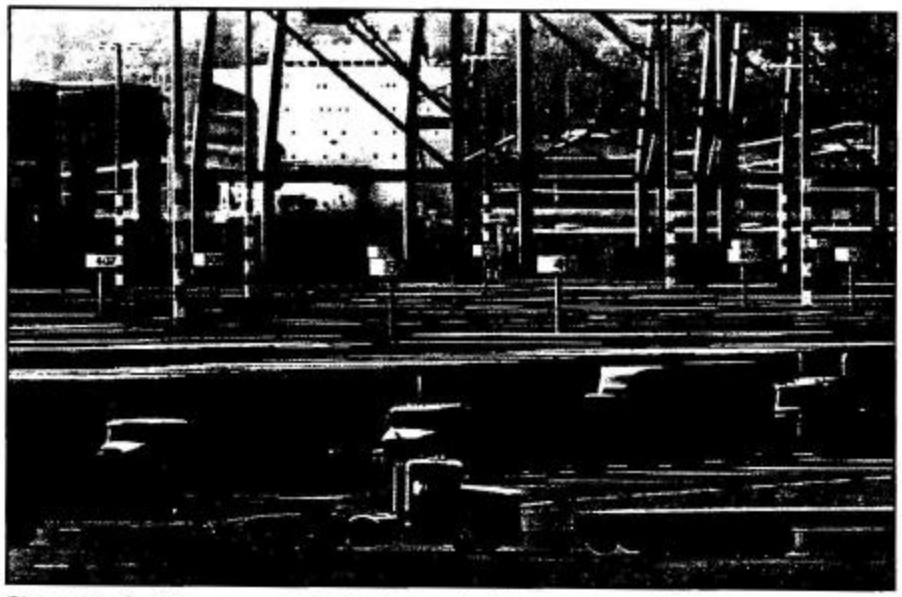
Historic Role of the IMO and MARPOL

The most important and, in many cases, the only marine diesel emissions regulations relevant to international flag vessels are those promulgated by the International Maritime Organization (IMO). The Convention that established the IMO was formed in 1948 by the United Nations Maritime Conference. In 1982 the Maritime Conference became the IMO.

Among the IMO's most important mandates is providing: *" for cooperation among Governments in the field of governmental regulation and practices relating to* technical matters *of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and* control of marine pollution *from ships (emphasis added)".*

Pollution control falls under the auspices of the IMO's Marine Environmental Protection Committee (MEPC) which is responsible for coordinating the IMO's activities in prevention and control of marine pollution.

In 1973 the IMO held a major conference to discuss the overall issue of marine pollution from ships, resulting in the adoption of the first comprehensive anti-pollution convention, the International Convention for the Prevention of Pollution from Ships (MARPOL).



Shoreside facilities are also liable for particulate matter and NOx monitoring and mitigation. Photo by Bill Sutton.

The MARPOL Annex VI

As efforts to minimize waterborne discharges under MARPOL became more successful, the IMO added efforts to minimize airborne pollutants. The MARPOL Annex VI (also referred to as the Protocol of 1997) set limits on the emission of ozone-depleting substances such as nitrogen oxide (NOx), sulfur oxides, volatile organic compounds, shipboard incineration, reception facilities, and fuel oil quality. In terms of air emissions, NOx is the most significant and highly regulated compound.

MARPOL Annex VI applies to any vessel with a marine diesel engine rated at or above 130 kilowatts (175 horsepower) installed after January 1, 2000, or which undergoes a major conversion after that date. Major conversion is defined as replacement or substantial modification of an engine in any way that may increase NOx emissions or where the maximum continuous rating of the engine is increased by more than 10%.

Annex VI will enter into force inter-

By John M. Cowden and Christian A. Hatfield.

nationally one year after it is ratified by at least 15 countries representing 50% of the gross tonnage of the world's merchant shipping—probably 18 to 24 months from now. Annex VI does not apply to vessels in domestic transit.

Certification

Each engine which falls within the Annex VI guidelines requires an Engine International Air Pollution Prevention Certificate (EIAPP). An EIAPP is issued for each applicable engine or engine group after the engine manufacturer has demonstrated that the engine complies with the NOx limits of Annex VI. This certificate is good for the life of the engine or until the engine undergoes a major conversion. Prior to Annex VI taking effect, shipowners can obtain a Statement of Voluntary Compliance issued by the Environmental Protection Agency (EPA), after the manufacturer has demonstrated to the EPA that the engine complies with NOx limits of Annex VI. The statement of voluntary compliance may later be exchanged for an EIAPP.

Annex VI also requires a technical file containing all the details of engine performance parameters that may influence NOx emissions. A Record Book of Engine Parameters—a document for recording changes affecting NOx emissions—should be received by a shipowner when a new engine is purchased or overhauled. These records should be kept on board at all times. For operators who overhaul diesel engines themselves, the EPA will provide information on data required to demonstrate compliance with Annex VI.

Under MARPOL Annex VI, oceangoing vessels built after January 1st, 2000 will be required to certify their engines, monitor NOx emissions and stay below regulated levels. Photo courtesy of Port of Portland.

Surveys and Inspection

MARPOL Annex VI also provides for compliance inspection surveys, typically performed by the Coast Guard in the United States. Surveys will be conducted on a serial basis starting with an initial survey before the vessel is first issued a vessel certificate, with subsequent periodic surveys occurring at least every five years.

After the Annex enters into force, vessels will be required to have an International Air Pollution Prevention Certificate (IAPP) issued by the Coast Guard (or an agency authorized to act on its behalf), certifying that the shipowner has demonstrated compliance with all relevant requirements of Annex VI. The certificate will be valid for fi years.

California Programs

Normally, federal emissions regu tions preempt similar state laws. St environmental agencies act largely enforce federal standards through lo programs. In California, however, t California Air Resources Board (CAR has experimented with, and adopted variety of alternative strategies to duce emissions, including incentive p grams. Foremost among these is t Carl Moyer Memorial Air Quality St dards Attainment Program. The p gram was initially intended to be NOx reduction program, but has sir evolved into a program aimed at t reduction of diesel particulate matter well. The program allows for paym of a portion of the cost of repoweri retrofitting, and purchase of cleaner e gines that meet a specified cost-eff tiveness for NOx reduction.

CARB is also considering other v untary, non-regulatory strategies to duce emissions, including:

- Speed reduction for oceangoi vessels while in California waters;
- A federal incentive program provide funds, beyond those alrea available through the Carl Moyer p gram, for repowering and retrofitti existing engines;
- New federal regulations governi the repower, or rebuild, of existing m rine engines;
- Voluntary application of die particulate filters for commercial m rine vessels.

Alternative propulsion technolog such as smokeless diesel systems usi common rail technology and water injection that could significantly redu diesel emissions are also being cons ered. Wartsila NSD and Carnival C poration are reportedly working on su propulsion systems for Carnival's cru ships.

New Technologies

Switching to non-diesel engines not a practical alternative for most lar vessels, but new diesel technology

fers a number of options for reducing NOx and particulate matter. Among recent innovations is the electronic engine control, changes in fuel injection systems, and air intake improvements and combustion chamber modifications. Exhaust gas re-circulation (EGR) is also expected to be used in most diesel engines to reduce NOx emissions. (EGR reduces NOx by lowering oxygen concentrations in the combustion chamber.) Other technologies feature a variety of catalysts, increasing the rate of chemical reaction to reduce emissions, and diesel particulate traps.

Most of the major diesel engine manufacturers are building engines that are far superior to those available even a decade ago, not only in terms of emissions, but in performance and fuel consumption as well. Caterpillar, Cummins, General Motors, and Wartsila, are all continually updating their diesel technology to produce engines that will be fully compliant with IMO NOx regulations.

For commercial vessel and terminal operators the slew of emerging local, state, federal and international regulations can make it difficult to know precisely what is prohibited, and what will be prohibited in the future. Operators can ensure compliance with EPA and IMO regulations by installing only engines that have full compliance certification.

Primary market responsibility for compliance with existing and future diesel emission regulations will continue to lie with the engine manufacturers, and their technology is advancing at least as rapidly as the regulations. Many of the technological innovations manufacturers are developing have the dual benefit of keeping pollutants to a minimum while resulting in engines that consume far less fuel, are more dependable and more powerful. PMM

John Cowden *is managing director of the Portland, Oregon office of Garvey, Schubert & Barer. He also heads that firm's maritime litigation group.* ***Christian Hatfield*** *is an associate with the firm, practicing in the areas of maritime and casualty response and litigation.*

IMO Maritime Safety Committee meets

In the words of International Maritime Organization (IMO) Secretary-General William O'Neil, the 73rd meeting of the IMO's Maritime Safety Committee was "without parallel" in the IMO's history.

The eight-day meeting produced significant changes on a number of maritime safety issues, including the publication of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers' (STCW) White List, black box carriage requirements, automatic identification system (AIS) carriage requirements, and SOLAS requirements. The committee also addressed safety issues concerning tankers and passenger vessels.

The STCW White List comprises 71 countries deemed by the IMO to be giving "full and complete effect" to the revised STCW Convention (STCW 95) published by the IMO. "The revised STCW Convention and the ISM Code, which takes full effect in 2002, are both aimed squarely at addressing human issues in shipping," O'Neil said. "Although technical matters will retain their importance, improving the standards of seafarers is a vital part of the safety equation. The White List shows that the human element is taking its proper place in the industry's priorities."

The 1995 amendments to STCW, which entered into force on Feb. 1, 1997, revised and updated the original 1978 Convention, setting out clearly defined minimum competency requirements for all seafarers and tak-

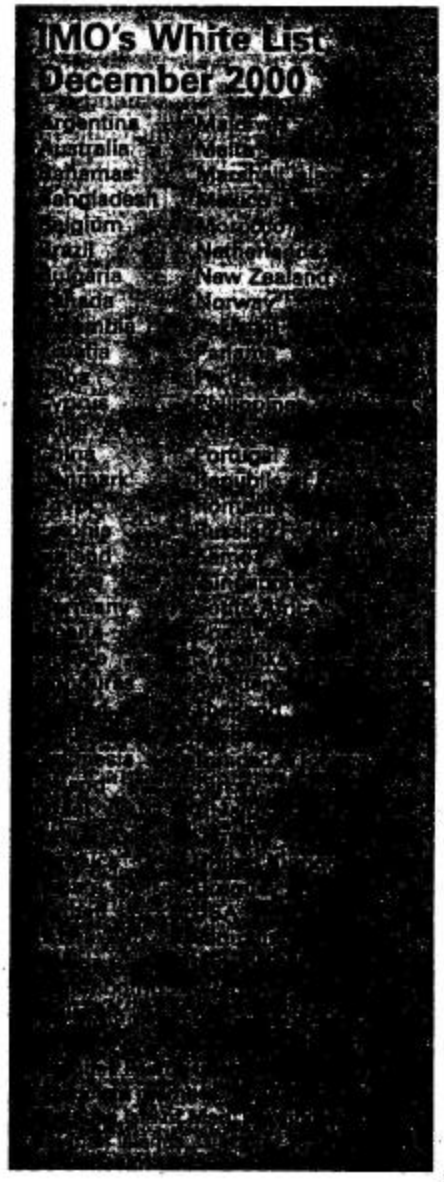
ing into account developments in technology since the 1978 Convention was adopted. A position on the White List entitles "other parties to accept, in principle, that certificates issued by or on behalf of the parties on the list are in compliance with the Convention."

The IMO stressed that, if a country is not listed, it does not invalidate certificates or endorsements issued by that party. According to the IMO, "Nothing in the STCW Convention prevents the employment of any seafarer who holds a valid certificate or endorsement issued by a Party to the Convention. Nevertheless, the White List will become one of several criteria, including the inspection of facilities and procedures, that can be applied in the selection of properly trained and qualified seafarers." If seafarers from a non-listed country are accepted, "they will be required by 1 February 2002 to have an endorsement, issued by the flag state, to show that their certificate is recognized by the flag state. By 1 February 2002, masters and officers should hold STCW 95 certificates or endorsements issued by the flag state."

The IMO does expect that ships flying flags of countries that are not on the White List will be increasingly targeted by Port State Control inspectors. Countries that were not included on the initial White List will be able to continue with the assessment process and be included on a future list once they have met the STCW standards.

The IMO also adopted regulations that will require ships to carry voyage data recorders (VDR), or black boxes.

The VDR for vessels will have the same function as black boxes on aircraft — they will assist with accident investigations. Investigators will be



and instructions in the moments before an incident and help identify its cause.

The IMO published VDR performance standards in 1997 and gave details on data to be recorded and VDR specifications. The VDR should be capable of continuously maintaining sequential records of preselected data items relating to status and output of the ship's equipment and command and control of the ship. The VDR should be installed in a protective capsule that is brightly colored and fitted with an appropriate device to aid location. It should be entirely automatic in normal operation. Under the new regulation, all VDR must undergo an annual performance test.

The following ships will be required to carry a VDR, under regulation 20 of the revised SOLAS Chapter V:

- passenger ships constructed on or after July 1, 2002;
- ro/ro passenger ships constructed before July 1, 2002 not later than the first survey on or after July 1, 2002;
- passenger ships other than ro/ro passenger ships constructed before July 1, 2002 not later than Jan. 1, 2004; and
- ships, other than passenger ships, of 3,000 gross tonnage and upwards, constructed on or after July 1, 2002.

Administrations may exempt ships, other than ro/ro passenger ships, constructed before July 1, 2002, from being fitted with a VDR where it can be demonstrated that interfacing a VDR with the existing equipment on the ship is unreasonable and impracticable.

The IMO also adopted a resolution that called for a feasibility study to assess the need for VDR on existing cargo ships. The study, to be conducted by the Sub-Committee on Safety of Navigation, will take into account such factors as practicability; technical problems relating to the retrofitting of VDR; the adequacy of existing performance standards, including the possible development of simplified standards; experience in the use of VDR on ships already fitted with them, including data that could not have been obtained without VDR; and relevant financial implications, including finalize the study by January 2004. The IMO resolution encouraged shipowners to install VDR on existing cargo ships voluntarily, so that wide experience of their use may be gained.

A requirement to carry AIS transponders was added to Regulation 19 of the new SOLAS Chapter V, carriage requirements for shipborne navigational systems and equipment.

The regulation requires AIS to be fitted and upwards engaged in international voyages, cargo ships of 500 gross tonnage and upwards not engaged on international voyages and passenger ships irrespective of size built on or after July 1, 2002. It also applies to ships engaged on international voyages constructed before July 1, 2002, according to the following timetable:

- passenger ships, not later than July 1, 2003;

• tankers, not later than the first survey for safety equipment on or after July 1, 2003;

• ships, other than passenger ships and tankers, of 50,000 gross tonnage and upwards, not later than July 1, 2004;

• ships, other than passenger ships and tankers, of 10,000 gross tonnage and upwards but less than 50,000 gross tonnage, not later than July 1, 2005;

• ships, other than passenger ships and tankers, of 3,000 gross tonnage and upwards but less than 10,000 gross tonnage, not later than July 1, 2006; and

• ships, other than passenger ships and tankers, of 300 gross tonnage and upwards but less than 3,000 gross tonnage, not later than July 1, 2007.

Ships not engaged on international voyages constructed before July 1, 2002, will have to fit AIS not later than July 1, 2008.

Performance standards for AIS were adopted in 1998. The new regulations require that AIS shall:

• provide information including the ship's identity, type, position, course, speed, navigational status and other safety-related information — automatically to appropriately equipped shore stations, other ships and aircraft;

• receive automatically such information from similarly fitted ships;

• monitor and track ships; and

• exchange data with shore-based facilities.

A flag state may exempt ships from carrying AIS when ships will be taken permanently out of service within two years after the implementation date.

For more information about the IMO and the 73rd meeting of the MSC, visit its web site at www.imo.org.

U.S. Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

2100 Second Street, SW
Washington, DC 20593
Staff Symbol: G-MOC-1
Phone: (202) 267-2978

16711
POLICY LTR 4-00

11 SEPTEMBER 2000

From: Commandant
To: Distribution

Subj: WATCHKEEPING AND WORK-HOUR LIMITATIONS ON TOWING VESSELS, OFFSHORE SUPPLY VESSELS (OSV) & CREW BOATS UTLIZING A TWO WATCH SYSTEM

Ref: (a) Title 46 United States Code (46 USC) Part F – Manning of Vessels
(b) Title 46 Code of Federal Regulations (46 CFR) Part 15 – Manning Requirements
(c) USCG Marine Safety Manual, Volume III, Chapters 20 through 26 – Marine Industry Personnel
(d) Title 46 United States Code (46 USC) §2114 – Protection of Seamen Against Discrimination
(e) Title 46 United States Code (46 USC) §3315 – Disclosure of Defect & Protection of Informants

1. The purpose of this policy letter is to, in one document, summarize and clarify references (a) – (e) as they pertain to work-hour limitations and watchkeeping for mariners on towing vessels, offshore supply vessels and crew boats utilizing a two watch system. Related to this subject is the concern that exceeding work-hour limitations leads to the diminution of crew alertness that could contribute to human factors type accidents. The problems associated with diminution of crew alertness are of particular concern even when operating within the constraints of the law. The Coast Guard is currently conducting research on improving crew alertness by identifying the extent to which various aspects of shipboard life/operations may be contributing to the diminution of crew alertness and subsequent unsafe conditions. This policy will further clarify the responsibilities of mariners, vessel owners, operators, masters and the Coast Guard concerning crew alertness and actions necessary to prevent casualties as a result of fatigue. Finally, this policy summarizes the protections afforded to individuals who report to the Coast Guard on violations of the applicable statutes.

2. Definitions

The following definitions are consistent with previous Coast Guard policies or Coast Guard regulations.

a. *Emergency* is an unforeseen development that imposes an immediate hazard to the safety of the vessel, the passengers, the crew, the cargo, property, or the marine environment, requiring urgent action to remove or mitigate the hazard.

b. *Overriding operational conditions* are circumstances in which essential vessel work cannot be delayed for safety or environmental reasons, or could not reasonably have been anticipated at the commencement of the voyage.

c. *Rest* means a period of time during which the person concerned is off duty, is not performing work, including administrative tasks such as chart corrections or preparation of port entry documents, and is allowed to sleep without being interrupted.

d. *Travel time* to a vessel is considered to be neutral time as it is normally not considered to be "rest," "off-duty," or "work" time, but all relevant circumstances should be considered in evaluating whether a mariner complies with the applicable "rest" required by STCW or "off-duty" requirements specified in 46 U.S.C. §8104(a).

e. *Watch* is activity related to the direct performance of vessel operations, whether deck or engine, where such operations would routinely be controlled and performed in a scheduled and fixed rotation. The performance of maintenance or work necessary to the vessel's safe operation on a daily basis does not in itself constitute the establishment of a watch. However, the latter does count towards the hours of work that can be required by an employer.

f. *Work* is any activity that is performed on behalf of a vessel, its crew, its cargo, or the vessel's owner or operator. This includes standing watches, performing maintenance on the vessel or its appliances, unloading cargo, or performing administrative tasks, whether underway or at the dock.

The definitions above for "overriding operational conditions" and "rest" are used in situations where the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, as amended in 1995, applies.

3. Watchkeeping, Work-hour Limitations and Manning Requirements

a. Watchkeeping requirements, work-hour limitations and manning requirements for mariners on towing vessels, offshore supply vessels and crew boat, as applicable, are comprehensively addressed in references (a) – (c). As a ready reference, enclosure (1) summarizes these requirements.

b. In establishing the safe manning level for an inspected vessel, the Coast Guard Officer in Charge, Marine Inspection (OCMI) must consider many factors in addition to the statutory and regulatory requirements, including reasonable work-hour limits. Owners and operators who establish manning levels on uninspected vessels must consider such limits as well. These factors are specifically outlined in reference (c). In addition, OCMIs may increase the manning of a particular vessel if, through the course of a casualty or other type of investigation, an increase is deemed necessary for the safe operation of the vessel.

c. The law that addresses watchkeeping and working hours on the subject vessels is found in reference (a), specifically 46 U.S.C. §8104. This section of the law includes requirements for officers to have an off-duty period before taking charge of the deck watch prior to departing port, watch rotations on vessels, and specific work-hour provisions for various types of vessels.

d. 46 U.S.C. §8104(d) requires merchant vessels of 100 gross tons and above, when at sea, to be manned for a three-watch system, and mariners shall be kept on duty successively to perform ordinary work incident to the operation and management of the vessel. This section of the law also states that a mariner cannot be required to work for more than 8 hours in one day. There are certain exceptions to the work-hour limitations relevant to the docking/undocking, conducting emergency drills, actual emergency situations or overriding operational conditions that compromise the safety of the vessel and its passengers and crew (See 46 U.S.C. §8104(f)) in which a mariner can be required to work more than 8 hours in a day. Mariners subject to 46 U.S.C. §8104(d) can consent to work in excess of 8 hours in a day.

e. 46 U.S.C. §8104(g) permits licensed individuals and crewmembers of towing vessels, offshore supply vessels, and barges, when engaged on voyages of less than 600 nautical miles, when at sea, to be divided into at least 2 watches. The Coast Guard interprets this section of the law to mean that a mariner can be scheduled to work 12 hours in any consecutive 24-hour period, provided the mariner consents to work more than 8 hours in a day.

f. 46 U.S.C §8104(h) establishes that licensed operators of towing vessels subject to 46 U.S.C. §8904 are not permitted to work in excess of 12 hours in any consecutive 24-hour period, except in an emergency.

4. STCW

In addition to the work-hour limitation requirements outlined above, STCW adds specific rest requirements for vessels operating outside the boundary line (12 miles in the Gulf of Mexico). As a general matter, U.S. regulations impose the STCW requirements on all commercial seagoing vessels (as defined in 46 CFR 15.1101(a)(3)) in international service and to all commercial seagoing vessels of 200 gross register tons and above on domestic and international voyages. The STCW addresses both short-term and long-term rest requirements for watchkeeping personnel.

a. Persons assigned to navigational or engineering watches shall receive a minimum of 10 hours rest in any 24-hour period.

b. The hours of rest may be divided into no more than two periods, of which one must be at least 6 hours in length.

c. Rest periods may be interrupted in case of emergency, drill, or other overriding operational conditions.

d. The minimum 10-hour rest period may be reduced to not less than 6 consecutive hours as long as no reduction extends beyond 2 days and not less than 70 hours of rest are provided in each 7-day period.

e. The minimum period of rest required may not be devoted to watchkeeping or other duties.

f. Watchkeeping personnel remain subject to the work-hour limits and exceptions found in reference (a).

5. Responsibilities

Mariners, owners/operators, and the Coast Guard have separate responsibilities for compliance with, and enforcement of, the work-hour limitation laws. The subparagraphs below provide general guidance regarding the responsibility of each party.

a. Mariners have an individual responsibility to obey the law and are also responsible for reporting suspected watchkeeping and work-hour violations to the Coast Guard. The master of a vessel is ultimately responsible for the safety of the vessel, passengers and crew, cargo, and the environment. To carry out this responsibility the master must ensure that he/she and the crew are properly rested and complying with the law. The master must communicate with the owner/operator to ensure realistic goals are set. If management exerts pressure to exceed the law, the mariner is encouraged to report this situation to the local Coast Guard OCMI. Paragraph 6. below describes protections afforded to mariners when reporting violations to the OCMI.

b. Owners/operators, like mariners, are responsible for obeying the law. Companies should ensure employees are informed of the law and educated regarding safety concerns of not getting adequate rest. They should be aware of operational demands and work hours required to complete expected tasks on board their vessels. 46 U.S.C. §8104(j) states that "the owner, charterer, or managing operator of a vessel on which a violation of subsection (c), (d), (e) or (h) of this section occurs is liable to the government for a civil penalty..." thus pointing out their responsibility to ensure compliance. They should provide unambiguous guidelines to the master regarding expectations to comply with safety requirements and the law when these are in conflict with operational demands.

c. Finally, the Coast Guard is charged with enforcement of the law. The Coast Guard can initiate an investigation based on confidential information provided by mariners during the vessel inspection process, anonymous tips called into a Coast Guard Marine Safety Office, or through the findings of a Coast Guard marine casualty investigation. The latter may also bring consequences for the mariners involved or the vessel's owner/operators. When the Coast Guard determines that a casualty occurred because of a violation of law, an appropriate action, a suspension and revocation proceeding, and/or a civil penalty may be recommended. However, as described below, protections exist for the mariner reporting deficiencies or illegal operations. OCMIs should ensure that all responsible parties within their area of responsibility are aware of the requirements of the law and particularly the importance that rest plays in ensuring safe operations.

It should be noted that the Coast Guard, by 46 CFR 5.71, is prohibited from exercising its authority for the purposes of favoring any party to a maritime labor controversy. However, if a situation is encountered that affects the safety of a vessel or persons on board, the Coast Guard will initiate an investigation and pursue appropriate action when a violation of statute or regulation is discovered.

A particular situation that has generated confusion and concern involves the requirement found in 46 U.S.C. §8104(a), which states that an officer taking charge of the deck watch on a vessel leaving port must have at least 6 hours of off-duty time in the 12 hours immediately before leaving port. While an owner/operator cannot be held accountable for the time a mariner has off, they are

responsible for the time that an individual is on the dock or on the vessel while in port, and can be expected to verify that the individual has had an opportunity for rest regardless of where he/she has been prior to performing the assigned duties. The owner/operator cannot expect a mariner to participate in extensive preparations for getting underway and also be rested enough to take the navigation watch without providing an opportunity for the minimum off-duty time required by 46 U.S.C. §8104(a). Similarly, the mariner is responsible for arriving at the vessel properly rested. If, for example, a mariner spends 8 hours in travel time (i.e., driving) or stays up all night prior to arriving at the vessel, that person is clearly not rested enough to take the navigation watch of a vessel getting underway upon arrival.

6. Protections

The Coast Guard has historically depended on individuals involved with the maritime industry to report violations or unsafe vessel conditions when they occur. In the absence of mariner reporting, the Coast Guard is limited to discovering these types of violations through casualty investigations, or by chance during a scheduled inspection. To prevent retaliation for reporting violations to the Coast Guard, Congress enacted specific protections for mariners that make reports of violations to the Coast Guard. The following cites represent the obligation and protections afforded to mariners for reporting violations of the law or regulations to the Coast Guard.

a. 46 U.S.C. §2114 provides protection to seamen against any form of discrimination, including discharge, for reporting a violation of any law or regulation issued under the authority of Title 46.

b. 46 U.S.C. §3315(a) requires licensed officers to assist the Coast Guard in the inspection of their vessels as well as point out defects and imperfections known to them. This includes any violations of work or watch standing limitations.

c. 46 U.S.C. §3315(b) prohibits any official of the Coast Guard from disclosing the identity of any individual that provides information on vessel defects, imperfections, and overall safety. This includes information on watchkeeping and work hours.

B. G. Basel

B. G. BASEL
By direction

Distribution: District (m) offices
All MSOs/MSDs/Activities
All RECs
NMC(4c)

TOWING VESSEL WORK-HOUR TABLE

GROSS TONNAGE	ROUTE	LENGTH OF VOYAGE	REFERENCED WORK-HOUR LIMITS	KEY CITE(S)
LESS THAN 100	INLAND	ANY LENGTH	12 HOURS	46 CFR 15.705(d) & 46 USC 8104(b) & (h)
LESS THAN 100	OCEANS	LESS THAN 600 NM	12 HOURS	46 CFR 15.705(d) & 46 USC 8104(b) & (h)
LESS THAN 100	OCEANS	MORE THAN 600 NM	12 HOURS	46 CFR 15.705(d) & 46 USC 8104(b) & (h)
LESS THAN 100	GL	ANY LENGTH	8/12/15 HOURS	46 USC 8104(c)
MORE THAN 100	GL	ANY LENGTH	8/12/15 HOURS	46 USC 8104(c) & (d)
100 - 200	INLAND	ANY LENGTH	12 HOURS	46 CFR 15.705(d) & 46 USC 8104(h)
100 - 200	OCEANS	LESS THAN 600 NM	12 HOURS	46 CFR 15.705(d) & 46 USC 8104(g), (h) & (d)
100 - 200	OCEANS	MORE THAN 600 NM	12 HOURS	46 CFR 15.705(d) & 46 USC 8104(d) & (h)
MORE THAN 200	INLAND	ANY LENGTH	12 HOURS	46 USC 8104(h)
MORE THAN 200	OCEANS	LESS THAN 600 NM	12 HOURS	46 USC 8104(g), (h) & (d)
MORE THAN 200	OCEANS	MORE THAN 600 NM	8 HOURS	46 USC 8104(d) & (h)

Route definitions: Oceans refers to all non-inland routes except GL
GL refers to Great Lakes routes

OSV MANNING AND WATCHKEEPING TABLE

LESS THAN 100	OCEANS	LESS THAN 600 NM	12 HOURS	46 USC 8104(b) & (g)
LESS THAN 100	OCEANS	MORE THAN 600 NM	12 HOURS	46 USC 8104(b)
MORE THAN 100	OCEANS	LESS THAN 600 NM	12 HOURS	46 USC 8104(g) & (d)
MORE THAN 100	OCEANS	MORE THAN 600 NM	8 HOURS	46 USC 8104(d)

CREW BOAT MANNING AND WATCHKEEPING TABLE

LESS THAN 100	OCEANS	ANY LENGTH	12 HOURS	46 USC 8104(b)

Note: 46 USC 8104(h) limits all licensed operators on towing vessels 26 feet or over to working no more than 12 hours a day except in an emergency.
46 USC 8104(c) allows crewmembers on GL towing vessels to work up to 15 hours in 1 day,
but they are limited to working no more than 36 hours in any 72 hour period.
46 USC 8104(d) states that a licensed individual or seamen in the deck or engine department may not be required (but can consent) to work more than 8 hours in one day (on a vessel of more than 100 gross tons when at sea).
46 USC 8104(g) states that voyage of less than 600 miles, the licensed individuals and crewmembers may be divided when at sea, into at least 2 watches.
46 USC 8104(b) states that licensed crewmembers on vessels less than 100 GT on coastwise or oceans voyages are not required to work more than 12 hours in one day.
46 CFR 15.705(d) permits a 2 watch sytem on all tow vessels less than 200 GT regardless of voyage length.

CAUTIONARY NOTICE:

This table should only be used in conjunction with the G-MOC policy letter 4-00

Vessel operators/owners/masters are responsible for ensuring the vessel is adequattely manned and the crew has adequate opportunity for rest.

Mariners can not be required to work more than 8 hours a day while at sea on a vessel of 100 GT or more. The law allows for circumstances that authorize the use of a 2-watch system that allows mariners to consent to working more than 8 hours. Also, the law has other provisions that can limit the hours a mariner can work.

Tim Askew

From: Anatoly Sagalevitch [sagalev@mail.ru]
Sent: Monday, December 18, 2000 5:32 AM
To: Tim Askew
Subject: best wishes

Dear Tim:
I send you the best wishes with coming Christmas and New Year. I wish you happiness and health and new adventures underwater. Please confirm your participation in 5th SSS01/ May be somebody else will come with you. Welcome! It will be great meeting. Not only usual people coming (I mean, who was before), but also somebody from old guardian - Don Walsh, Larry Shumaker, Henri Delauze and others. I expect good discussions and some fun.

Please book air-tickets Copenhagen-Kaliningrad on April 17th and back on April 20th ASAP, because SAS flies only once a day on not so big airplane. It's important.

Please advise.

Best regards,

Dr.Anatoly M.Sagalevitch
P.P.Shirshov Institute of Oceanology RAS
Deep Manned Submersibles Laboratory
117851 Moscow, Nakhimovsky prospect, 36 Russia
Fax: 7 (095) 124 59 83; Phone: 7(095) 124 79 94
E-mail: sagalev@mail.ru

U.S. COAST GUARD

LOCAL LESSONS LEARNED

MSO Puget Sound Lesson Learned 1-00

Crew Rest and Work-Hours in the Towing Industry

The recent investigation of the SR 520 bridge allision pointed to several items of concern for crew endurance in the towing industry. In the 520 bridge case the Coast Guard found that the master had worked more than the allowed 12 hours in a 24 hour period in the days leading up to the accident, a violation of federal work-hour regulations. In addition to the master's actions, the investigation revealed that the marine employer had a policy in place that actually required the master to attend to duties on the bridge during watches other than his own, in effect requiring him to violate the 12 hours in a 24 hour period limitation. The marine employer also did not monitor the work hours of their tugboat crews to ensure compliance with this regulation.

Marine employers should examine their work hour policies for compliance with the federal requirements, and also examine their employees practices for proper execution of company policy and federal regulation.

Recently, Coast Guard Headquarters released a G-MOC Policy Letter 4-00 that should help clarify the requirements pertaining to work-hour limitations and watchkeeping for mariners on towing vessels and other vessels using a two watch system. A copy of the policy letter is available at the following link: www.uscg.mil/hq/g-m/moc/pol0004.pdf

Return to Local Lessons Learned Page

Webmaster: sklinke@pacnorwest.uscg.mil

CG Home District Index

Safety

Shock Value

External defibrillators are safe and easy to use.

By Michael Crowley, Correspondent

Sudden cardiac arrest can happen to anyone, anywhere and at anytime. On land, a 911 call can be made and CPR performed as you wait for paramedics with the necessary equipment to arrive. But when it happens out at sea to you or one of your crew, survival chances are slim. That's because you have less than 10 minutes to react and the necessary survival equipment may be miles away.

Every year in the U.S., 350,000 people die of sudden cardiac arrest. A big reason almost 1,000 people die each day is that there's so little time to revive a sudden cardiac arrest victim. Each minute spent trying to get help or to bring the person back to consciousness, reduces survival chances 10 percent. After 10 minutes, they're brain dead. They're history.

Sure, you can call the paramedics. If you're lucky and tied up to the dock, they might make it to your boat in under 10 minutes and try to "shock" the person back to life with a defibrillator. But if you're at sea, or even moving from one dock to another, the victim's survival chances are bleak. Unless, that is, you are carrying your own on-board defibrillator.

On television you've probably seen a defibrillator in action. A familiar scene on medical dramas like "ER" is when a heart-monitor screen suddenly shows a flat white line. That sets off an alarm, and a doctor runs into the room pushing a bulky piece of equipment. He slaps two paddle-like objects on the patent's chest, yells for everyone to get back, and then zaps the patient with a jolt of electricity that's designed to get the heart working again.

Photos courtesy of Emergency Response Trainers Inc.

Semiautomatic external defibrillators are a good choice for the marine environment. They are easy to use and require only minimal instruction.

SIMPLE SOLUTION

On boats, standard hospital-type defibrillators are not practical. They're too big and would require paramedic training to operate. But now there is a marine-friendly solution: semiautomatic external defibrillators (AED) that only require a minimum amount of instruction to operate.

"We could send one to you right now. You'd unzip it, follow the prompts and save a life," says Jim Casella, marketing head for the Heartstream ForeRunner II, an AED produced by Agilent Technologies, Andover, Mass.

"It's easier to run the AED than it is to do CPR. It's all computerized. It's so foolproof," says Leon Sulerud, who runs Emergency Response Trainers Inc., a safety training company based in Duluth, Minn. Sulerud recently put AEDs on 13 Great Lakes vessels owned by American Steamship Co. An AED was also put on the company's 200' tug *Ocean Venture*, which tows the 800' barge *American Freedom* on long-haul runs out of New Orleans.

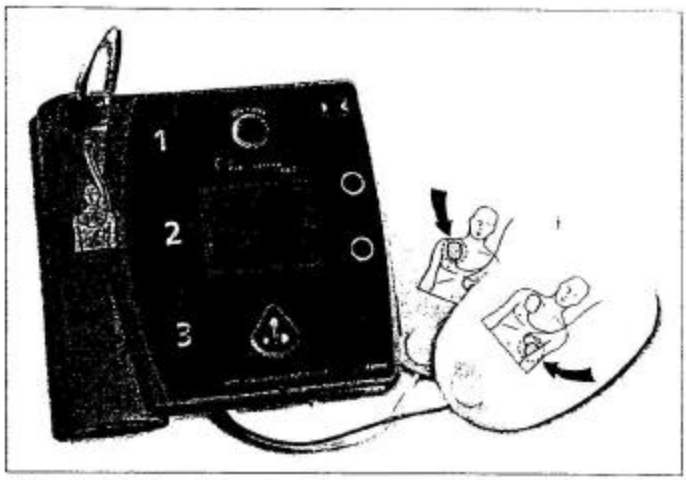
On American Steamship's self-unloading vessels, Sulerud periodically conducts medical and firefighting classes as well as firefighting drills. The defibrillator, compared to other medical gear on a boat, is "the one piece of equipment that can truly save someone's life," Sulerud says. "Everything else is stabilization. Other than getting them into surgery, there's not much that can

be done in the field."

The majority of sudden cardiac arrest patients have abnormal heart rhythms, called arrhythmia. The two forms that are treatable with a defibrillator are ventricular fibrillation, the most common arrhythmia, and tachycardia fibrillation. In ventricular fibrillation, the heart rhythms become chaotic and the heart's pumping action stops. Tachycardia is an extremely fast heart rate that also results in no blood being pumped by the heart.

A defibrillator delivers an electrical shock that momentarily stops the heart and clears away the abnormal electrical activity. Then it's hoped that the heart sends out an electro-chemical reaction across its muscles that causes the heart to contract and expand in normal fashion.

But what about CPR? Yes, CPR is extremely valuable. But it's only a maintenance tool that briefly keeps oxygen going to the heart and brain. CPR might expand the window of time for the use of a defibrillator, but it doesn't replace it.



Diagrams on the unit and pads show where to place them.

Defibrillators can only correct ventricular and tachycardia fibrillation, which is why it's important to know what the heart is doing before you put an electrical shock through someone.

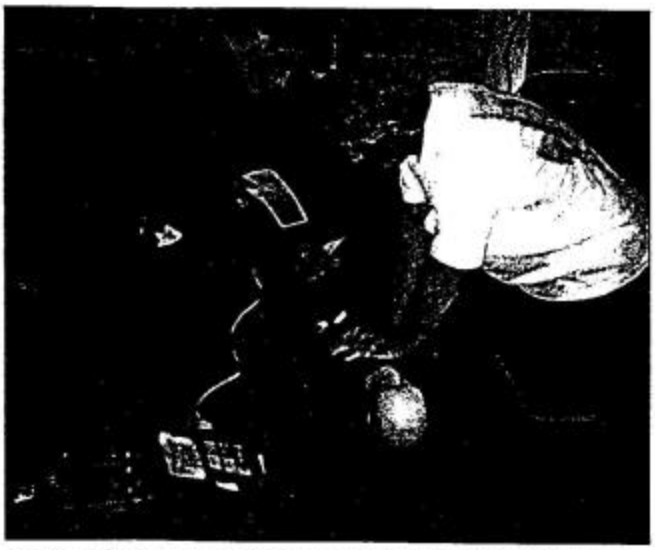
Early defibrillators, the kind you see on TV and still used by some emergency crews, have a screen on the front that shows a patient's heart rhythm. The paramedic or doctor operating the defibrillator reads the rhythm to see if it can be treated with an electrical shock. The newer defibrillators automatically determine if the heart rhythm is treatable and can be shocked, which means the machine can be operated by almost anyone.

DOUBLE SHOCK, LOWER DOSE

There are a couple of other important differences between older defibrillators and newer AED models. Once the defibrillator pads were placed on a patient's chest, the early models sent out a monophasic electrical charge in one direction only, from one pad to another. With the biphasic AEDs, the shock goes from one pad to the second and then back to the first pad. It's a two-stage shock treatment that's more effective.

The new AEDs also have a much lower electrical charge, which is designed to be more efficient and do less damage to the heart. "If the defibrillator converts (brings back to life) the person, they have a better chance of surviving and not have damage done to the heart," says Sulerud.

Older defibrillators were one-size-fits-all and began shocking the patient with 200 joules. If there was no response, the next jolt would be at 300 joules and then 360. The patient received the same dosage, no matter how big he or she was.


Boats with AEDs and personnel with CPR training will boost on-board cardiac arrest victims' survival chances.

An AED like the Heartstream ForeRunner II reads the resistance in the patient's chest and then delivers each shock at 150 joules, plus or minus 15 percent, says Casella.

How the 150 joules is delivered depends on what the resistance is within the chest, which will be different for a 260-lb. individual versus a person

weighing 130 lbs. In each case, the charge is delivered differently, says Casella, both in how much energy goes across in the first and second phase, as well as the length of time the charge is delivered and the peak-current period.

IT'S AUTOMATIC

Some training certainly helps, but the AED is extremely easy to use. The most important technological advance is that the AED interprets the heart rhythm itself, thus the person operating the machine must only perform a minimal number of steps.

Once the Heartstream ForeRunner II is turned on, a voice prompt tells you to put the pads on the patient's chest (corresponding commands also come up on the display screen). There are pictures on the machine, the pad's package and the pads themselves showing where they must be placed.

A connecting wire from the pads is then plugged into the ForeRunner, and it automatically analyzes the heart rhythm, with a "do not touch the patient" voice prompt followed by a "analyzing complete" prompt. Then, if the machine says "stand clear, shock advised," that's the only time you punch the second button, which delivers the shock. (It might also command you NOT to shock.) The machine only has two buttons, and it analyzes and determines the proper course of action. It can't get much simpler.

Once you have revived the patient, bringing in outside medical help is always a good idea. The ForeRunner automatically stores information about the cardiac event in its internal memory. The cardiac record can be reviewed on the screen, or a PC data card can be inserted and the information downloaded to the card. Using Heartstream's optional software, the information on the card can be e-mailed from the boat to a shore-based doctor.

While AED's can be a life saver, there's a safety question regarding a machine that delivers an electrical shock on a metal boat.

"The American Heart Association would say to remove the patient from water or a metal surface," says Casella. "But our scientists have found out that the current takes the path of least resistance, which is always through the patient's chest. So it's safe to do it on metal. Just don't touch the patient. And the device is electronically isolated from the patient."

Sulerud says that transmission of electricity through the deck to a rescuer isn't a problem. "There's so much paint that it's a big insulating factor and biphasic energy is so much lower. And it goes from pad to pad."

The Heartstream ForeRunner II comes with a 5-year battery. Depending on the options, the defibrillator costs between $2,900 and $3,400. WB

By DAVE KOCH,
Senior Technical Specialist,
Dalloz Safety

methods for motivating workers to wear HEARING PROTECTION

There's no shortage of statistics when it comes to noise-induced hearing loss. OSHA estimates that as many as 15 million Americans have a measurable hearing loss, and reports that as many as 30 million workers are exposed to potentially hazardous noise levels on the job.

According to experts, the probability of incurring a hearing loss greater than 25 dB — the baseline for legally defined partial deafness — ranges from 18 percent for exposure to 90 dBA to 70 percent for exposure to 115 dBA over a working lifetime of 40 years.

Yet motivating employees to wear hearing protection devices can be frustrating, despite all the statistics and the fact that hearing loss is cumulative and irreversible.

Part of the reason is that noise is often taken for granted as just another part of the manufacturing process — unlike respiratory hazards that can be easily seen, smelled or tasted. So here are ten steps for getting workers' attention and compliance with your hearing protection efforts:

Know the regulations.

Assure that your company's hearing conservation program is in full compliance with all OSHA and other regulations. Review, if necessary, OSHA's rules governing hearing protection programs found in 29 CFR 1910.95 in the Code of Federal Regulations.

Obtain accurate measurements of the noise levels in your workplace.

Use octave band analysis and NIOSH Method No. 1 to assure the most accurate hearing protector selection to protect employees against your plant's noise levels. Don't rely solely on a device's noise reduction rating. Frequency and the ability to communicate are important considerations. Low-frequency noise is the most dangerous because it doesn't seem as loud as higher frequencies.

Train all employees to properly use hearing protectors.

Hearing protectors must be correctly used to be effective. Training is also a mandatory OSHA requirement and must be documented in writing. Ensure that everyone knows how to properly maintain reusable devices, including cleaning and disinfecting them. This is especially important when devices are shared.

Conduct hearing tests.

Conduct benchmark hearing tests for all employees and then test them at least once a year to provide indisputable data to prove or disprove hearing loss. Documented hearing loss makes a strong case for using protection. Simply telling someone they have some hearing loss in the high frequencies may do little to prove to them that they have a problem; one that can progress.

Did you know...

- **59%** of workers in Swedish studies were exposed to noise for more than five hours a day
- **46%** wore hearing protection for more than five hours a day
- **50%** were not aware of actual noise levels in their workplace
- **41%** adjusted their hearing protectors more than five times a day
- **21%** adjusted protectors more than 10 times daily
- **40%** removed hearing protectors at least five times an hour to communicate with coworkers

Source: Data gathered by Dalloz Safety's Bilsthorpe, Sweden team during new product trials for Bilsom® Natural Sound Technology™ hearing protection devices.

Emphasize education.

Continually educate employees about the need to protect against hearing loss, explaining exactly what noise is and what overexposure can do. Relate it to off-the-job situations, too. Explain that noise damage is a progressive process. Slowly, as we all get older, the workings in the inner ear, the cilia, start to die. This is just a natural occurrence in all of us. Now add workplace noise, and those cilia die before their time.

Avoid a "just wear it" attitude.

Use easy-to-understand videos and pamphlets. Hold informal meetings to address hearing protection. Avoid a "just wear it because you have to" attitude.

Use peer examples. Perhaps there are employees willing to talk about how hearing loss has affected

continued on the next page

Photo courtesy of Dalloz Safety

methods for motivating workers to wear

HEARING PROTECTION

continued from the previous page

them. And recommend simple rules-of-thumb. For example, if you have to shout to talk to a coworker, noise levels probably exceed OSHA's acceptable eight-hour workday level of 85 dBA.

Provide comfortable protection.

Studies show that removing a hearing protector with an NRR of 30 for only 30 minutes during an eight-hour workday can reduce effective protection to less than 50 percent of that NRR 30 rating. Employees also want devices that they don't have to keep removing in order to communicate with workers or to hear warning signals.

Make hearing protection readily available.

Install convenient, wall-mounted dispensers that contain an ample supply of earplugs. Provide a variety of devices as well — earmuffs, earplugs, and canal caps. For repetitive noisy procedures where the need to communicate is less necessary, consider FM stereo earmuffs.

Get help.

Contact agencies such as NIOSH and OSHA, organizations such as the American Industrial Hygiene Association, or manufacturers for their latest motivational ideas. Some manufacturers of hearing protection offer free noise surveys, training, and other support.

Don't give up.

Finally, keep reminding everyone that the best personal protective equipment is PPE that gets worn — and that includes hearing protection. | ESHN

PSYCHOLOGY of safety

Do you coach with feeling?

Put yourself in the other person's steel-toe boots

By Scott Geller

Using conversations to improve safety performance has been the theme of my January and February articles, and this month I'd like to focus on the highest level of conversation that you can have — empathetic coaching.

It's a difficult level to attain, but one that can do wonders to facilitate mutual learning and behavioral improvement. Leaders who demonstrate empathy — sincere understanding and appreciation for other people's circumstances — are more likely to be followed. And their directions, based on an empathic diagnosis of the situation, are more effective.

Conversations at this level are not efficient, but they are effective. They require patience. It takes time to learn, mostly through questioning and listening, what it's like to be in the other person's situation. Then the objective shifts to designing an action plan that fits the circumstances. This requires mutual understanding. Everyone who is taking part in the conversation must have the same feeling for what the circumstances are. Then, if everyone states their commitment to follow through with the plan, you've had a most effective conversation.

This is easier said than done, you might say. You're probably right. But the payoff can be great: When we show more empathy in our conversations, we have more impact in improving attitudes and behaviors. When we show others, through empathic listening, that we really understand their position, we maximize the chance of progress.

When we show more empathy in our conversations, we have more impact in improving attitudes and behaviors.

Coaching requires a sharp eye and careful listening.

Achieving empathy

Here's how to achieve an empathic level of awareness and appreciation:

■ **Take off your blinders.** Minimize the reactive filters that bias conversations. They are barriers to listening intently and proactively to another person.

■ **Ask more questions.** This is how you truly understand the other person's position

EMPATHY — *NOT* SYMPATHY

Empathy is not the same as sympathy. Don't confuse the two, though dictionary definitions are similar. The New Merriam Webster Dictionary (1989) defines sympathy as "the capacity for entering into and sharing the feelings or interests of another;" and empathy as "the capacity for experiencing as one's own the feelings of another."

My American Heritage Dictionary (1991) defines empathy as "identification with and understanding of another's situation, feeling, and motives" — in contrast to sympathy as "a feeling or expression of pity or sorrow for the distress of another person."

We sympathize when we express concern or understanding for another individual's situation, but we empathize when we identify with another person's situation and realize what it's like to be in the other person's shoes.

Last fall I witnessed a most unusual and effective tennis lesson. Later I realized how empathy was at the heart of this success story.

Frank, my longtime tennis opponent, had a strong forehand that had weakened considerably. It got so that I expected to win every set, and he expected the same outcome. Eventually, he lost interest in our regular competition, and I lost a regular tennis opponent.

Then Josh Williams, a friend and associate at Safety Performance Solutions, stepped in to help. Josh played varsity tennis for four years at Kalamazoo College in Michigan, and subsequently taught tennis professionally at John Newcome's Tennis Resort. When Josh arrived at my tennis court, I asked him if he wanted to watch Frank and I rally for a while so he could assess the problem. Numerous tennis instructors use this approach. They observe a student hit a tennis ball numerous times, and then provide direct feedback by verbalizing and demonstrating certain behavioral changes. Then they watch some more and give specific feedback.

But Josh declined my idea. Instead, he took my side of the court and began rallying with Frank. He didn't say anything about any problem, just "Nice shot" a number of times to commend good performance.

At one point, Josh stopped rallying and asked Frank where he thought he was having difficulty. Convinced he knew his problem, Frank discussed the way he grips his racket when shifting from a backhand to forehand stroke. Frank does hold his racket differently than most (using what's referred to as a Western grip instead of the more common Eastern grip).

Josh agreed with Frank's diagnosis and asked him to rally some more balls. This time Josh used the same Western grip as Frank, and mimicked his forehand stroke. In this way, Josh could understand exactly how it felt to be in Frank's tennis shoes. When switching from a backhand to forehand stroke, Josh changed his grip exactly as Frank in order to appreciate the difficulty Frank was experiencing.

Josh truly empathized with Frank's situation, and as a result he provided more relevant advice. And because Josh demonstrated genuine understanding and appreciation of Frank's problem, his advice was readily accepted.

and eventually diagnose the problem.

■ **Listen for more than words.** Not only must we hear every word, but we must also be sensitive to feelings, passion, and commitment. This comes across as much in body language and manner of expression as in words themselves. Listen for more than words when workers give evaluations of their at-risk behavior and offer recommendations for self-improvement. Listen for feelings or emotions that reflect concern for errors and commitment to change.

■ Use your imagination. When you observe another person's work practices, try to view the situation from that individual's perspective. When you listen to someone explain why he or she took a risk or got injured, try to see yourself in the same predicament. Imagine what defense mechanisms you might use to protect your ego or self-esteem.

■ **Weigh alternatives.** When you consider action plans for improvement, try to view various alternatives by putting yourself in the same "steel-toe shoes" of the other person.

We need to approach our safety coaching conversations with an empathic mindset. We want to learn what motivates someone to risk their safety, we want to put ourselves in their place. From that understanding we can derive an action plan that we would be willing to follow. You can do this by bringing empathy to your safety conversations. |

By E. Scott Geller, Ph.D., professor of psychology, Virginia Tech, and senior partner with Safety Performance Solutions. For more information, call (540) 951-7233 (SAFE); e-mail: safety@safetyperformance.com; or visit www.safetyperformance.com

PRODUCT ROUNDUP

Norsea survival suit sports a different design

A top entry point in Guy Cotten's new model enables users to slip it on in about 60 seconds.

BY MICHAEL CROWLEY

Guy Cotten's new Norsea survival suit isn't a new concept, but it is different from any other model U.S. fishermen are used to wearing, and it addresses a couple of potential problem areas in the design of the standard survival suit.

One difference is that there isn't a zipper running down the front that you close once you've pulled the Norsea up over your legs and have your arms in the sleeves. You enter the Norsea through a wide opening at the top, much like you would a sleeping bag. Then after you've pulled on the suit's legs and arms, and you've secured the hood, which is built into the front of the suit, over your head, you take the flap of material that you entered the suit through, zip up the opening and roll it up four times behind your neck.

Next you hook two snaps on the roll to a lifting O-ring (strong enough to pull you aboard a helicopter) on the suit's front. Once the material is rolled and the snaps are hooked, the suit is waterproof.

Fishermen not used to the suit might find that an awkward way to put one on; but Patrick Jaquet, general manager at Guy Cotten, says a well-trained person can put the suit on in 40 seconds. Someone doing it for the first time should be able to do it in 60 to 75 seconds.

The No. 1 problem with survival suits is broken zippers that haven't been properly maintained. Maintenance is done with a lubricant so the slide moves easily up and down. Guy Cotten feels it has found a nylon solution that solves the problem.

"An advantage to the Norsea survival suit," Jaquet says, "is that the zipper does not need to be maintained because it's nylon."

Another weak point to many survival suits is the air bladder. If it doesn't work, you can drown because your head won't float high enough in the water. The danger is that air bladders glued to survival suits will break loose or leak. That's not a problem with the Norsea because the rolled-up material is what keeps your head out of the water — you don't have to rely on a inflating device.

The Norsea survival suit is made out of 5-mm neoprene. Already SOLAS-approved, it was being UL tested for U.S. Coast Guard approval at the end of October. After that, a price will be set. Expect it to cost slightly more than survival suits already on the market. Contact: Guy Cotten, 782 South Water St., New Bedford, MA 02740; tel. (800) 444-6050. Circle Reader Inquiry No. 1.

NO ZIPPER adorns the front of the Norsea survival suit; you enter into it as you would a sleeping bag.

New Equipment

High Performance Ropes:

New strength, silent stress

By Barry Griffin

The marine industry is increasingly discovering the benefits of using High Molecular Weight Poly Ethelene (HMWPE) ropes made from the Spectra and Dynema family of fibers. Work which previously was only possible with wire rope or very large and unwieldy single and doubled polyester lines can now be undertaken with floating, low stretch hawsers, that have initial strength equal to or greater than that of wire rope. This rope technology has allowed the development of very high horsepower tanker escort and vessel assist tugs, and the associated specialized winch and fitting systems that optimize the safety, efficiency and longevity of the crew and equipment.

HMWPE ropes are also finding their way into other marine applications where wire has traditionally been used, including face and push wire for cargo, oil, and construction barges, and mooring lines for container ships, barges, and tankers mooring at piers and offshore buoys.

Choosing a HMWPE rope is not as easy as simply replacing a wire or polyester rope with a HMWPE hawser of equal strength, dressing all the chocks, bitts and fittings against abrasion, and jacketing the rope with a factory or field applied double braid or specialized chafe protection. One can perform miracles of appropriate vessel, winch and fitting design only to discover, down the road, that the rope is failing unpredictably and in circumstances that previously worked well with polyester or wire. This is aggravated by the fact that HMWPE ropes are more expensive than polyester or wire, with no suitable equal or lower cost alternative on the horizon.

Without some elasticity, in the system, "dynamic" loads can very quickly weaken a rope.

Assist and escort tugs in the 3000 to 6000 hp range have experienced rope strength losses ranging from as little as 25% after over 4 years and 4000 jobs for tugs in the 3000 to 6000 hp range to as much as 65% after only 1000 jobs. HMPE hawsers for this service cost on the order of $25,000 to $50,000, depending on size and length.

Not only is the rope more expensive to the tug operator, the raw fiber is also very expensive to the rope manufacturers. Be-

cause of this, the rope often is not tested in a meaningful way on a scale large enough to duplicate the very high static and dynamic loads encountered in the real world. The existing system is essentially best guessing by the customer and rope manufacturer. These guesses are based on past experience and a few calculations, manual logging by the crew of job information and other important rope events, and finally break testing by the customer and rope factory to determine residual strength and retirement policy. Even with this most basic system, an operator is only marginally better informed about the likelihood of an unexpected failure. Why is this and what can be done about it?

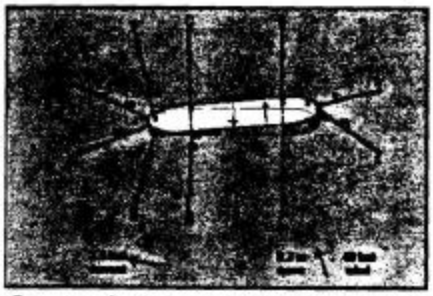
Dynamic Shock Loads

Tug masters rely on subtle senses to gauge the loads they are asked to provide in variable and unusual situations. The advent of tension meters has helped to aid in these decisions, but something significant has changed. When a tug master is shown a high resolution plot of the actual tensions that his tug generated using HMWPE lines, the loads are always much higher than expected and full of "spikes" in which the tension goes very high, very quickly. These "dynamic shock loads" result from momentum, gravity, and buoyancy changes that occur during ship maneuvers, as well as steep hawser angles. When connected to high chocks at angles higher than 30 degrees, the weight of the tug on the working end becomes a significant part of the hawser tension as bollard pull is applied. The forces can become very high at extreme angles.

Less "Feel"

Part of the problem is the way in which humans sense force. Without the benefit of gauges, we know that a force has occurred by either motion or noise. We either hear it or feel it. Wire rope and polyester or nylon hawsers provide both of these cues when loads are high. They rattle, snap, pop, groan and (in the case of polyester and nylon) stretch enough to give us a sense of the load. Wire will naturally develop some elasticity from the gravity of its own weight, and therefore has some give if not wrung up tight. This is not so with HMWPE ropes. There may be noise, but not much, and the ropes stretch only slightly more than wire. HMWPE is virtually weightless compared to wire. Although there is no noise and no motion, the loads are still there. Without some elasticity, or "fuse" in the system, the "dynamic" loads can very quickly weaken a rope.

Even with the difficulty of sensing loads with the new HMWPE ropes, the best rope performance and life is achieved by experienced personnel, especially in tractor work, where some masters have almost 20 years of experience with tractors alone. Data indicates that the maneuverability and "touch" of these masters significantly reduces unwanted high loads and extends rope life. On the other



Some software programs are available to predict loads and make mooring recommendations.

A high angle is just one factor affecting the longevity of ropes.

hand, tugs with relatively high displacement or reduced maneuverability, even in the hands of the best master, will routinely impose greater loads on the rope. In these instances the hawser becomes the tug's "brakes", and absorbs many more of the maneuvering forces, and the rope must be stronger than the horsepower might otherwise dictate.

Using a 4000 hp tug with approximately 100,000 lbs bollard and 500 tons displacement as a baseline for escort and assist work in inland waters, a good starting point is 8" circumference hawser at approximately 600,000 lbs initial breaking strength. This is roughly 6 to 1 over static bollard pull, and allows for a moderate amount of dynamic use. This rope can be expected to last at least 2000 jobs before experiencing a 30% strength loss. 4000 hp tugs with displacements of 700 tons should consider 9" circumference hawser . Tractors and conventional tugs in dynamic service or with new crews should increase this safety factor by at least one, to 7-or-8-to-one over static bollard. These numbers assume that all rope contact surfaces on the tug and winch are the ideal diameter (at least 6 to 8 times the rope diameter), well faired, hard, and smooth.

Some effort has been made to mechanically reduce dynamic loads. One concept is to allow the winch drum to

The Foss pushboat **Clarkston**, *seen here pushing empty grain and container barges upriver to Lewiston, Idaho, with tension meter attached.*

payout when a certain tension is reached. This can be done by allowing the winch brakes to slip at a certain load or by putting the winch into a "constant ten-

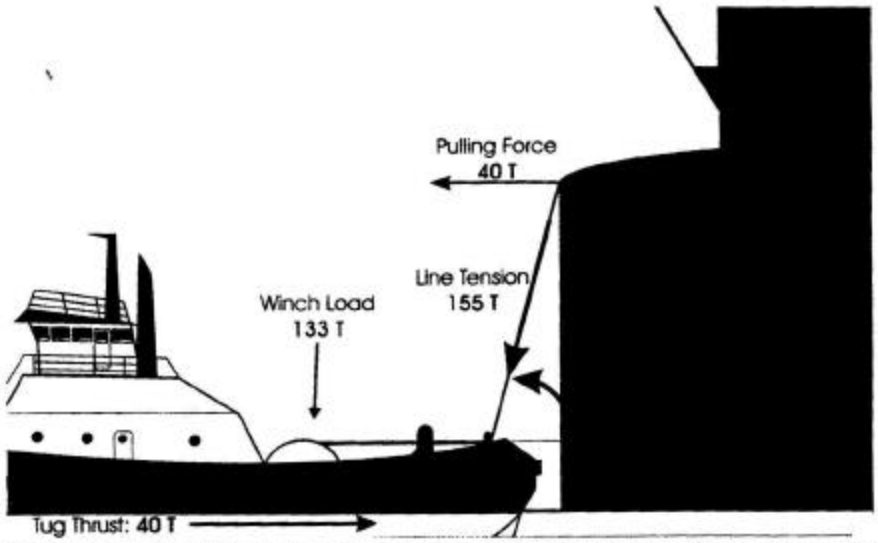
sion" (render-recover) mode. Both of these specialized hawser winches have been developed, and both have their operational limitations. For assist work in most harbors, operators are reluctant to let the hawser slip in the tight quarters that often occur in high lead work. No one wants his tug to suddenly move 10 feet. These and similar brake designs have been proposed as shock limiters for open water work - especially in tanker escort in moderate seas. Both concepts hold promise when combined with the "right" rope and staple design. However, winch brake design is a tricky business. The dynamic or running coefficient of friction of common brake materials is typically lower than the static holding power of the brake. Therefore great care is required to design brakes which can both slip and hold the enormous loads encountered in extreme ship maneuvers.

Strength Without Weight

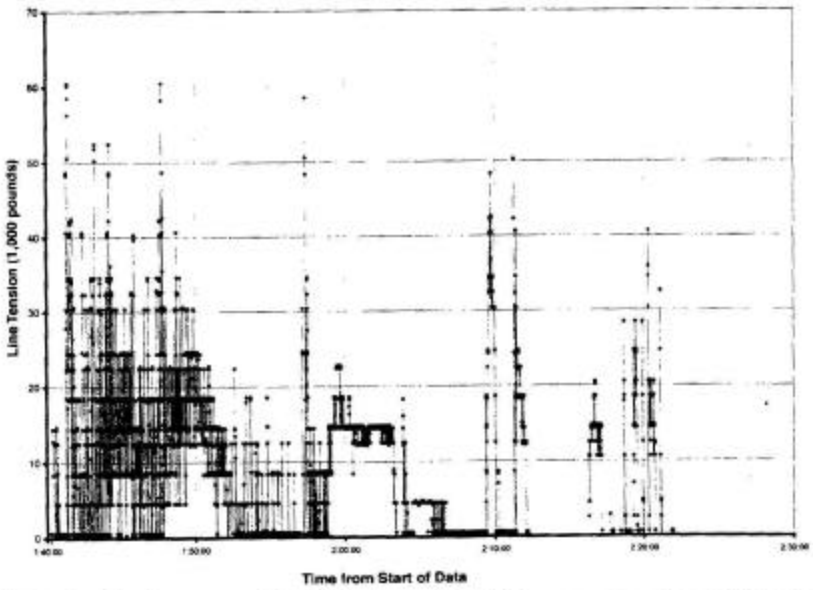
Other elastic elements, or shock absorbers, of various designs, including nylon surge pennants, elastomeric couplings, and ram tensioners, have been used successfully to soften dynamic loads. When the sea state increases beyond what is ordinarily encountered in inland waters, the elastic absorbing capacity of these systems must be extremely high, and therefore approaches the edge of what is practical, supportable, and safe for routine work. A three and one-half inch diameter HMWPE hawser - something that a man can drag around a deck by himself - has the same breaking strength and nearly the same elasticity of a wire rope the same size - a breaking strength of nearly one million pounds. A nylon surge pennant of equal strength would be nearly 10 inch diameter and almost impossible to manhandle on a typical working deck without mechanization and the associated cost and maintenance.

Experience

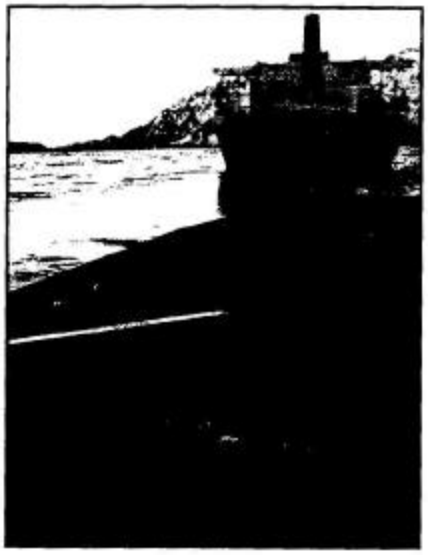
Because of the cost and complexity of designing specialized tug equipment for work with HMWPE ropes and hawsers, the most useful tool developed for use on a day to day basis is the ability to gather real world, high speed tension data from actual tugs in routine service. The information recorded during 20 or 30 ship jobs provides almost all the needed information to determine the proper line size. Many applications can be studied by placing load cells in the



The forces are deceptively strong on a 40-ton tow. Chart B. Griffin/Glosten Associates



Spikes in line tension may not be felt or heard. Assist hawser recording, Hvide Marine



Crowley's **Nanuq**, *tethered to* **Denali** *in Valdez, Alaska. Photo by A. Haig-Brown.*

rigging and recording line tensions.

For ship, barge, and mooring rope applications, specialized mooring analysis software allows nearly complete control and modeling of typical ship mooring situations in varying tides, currents, and winds, with ability to change nearly every aspect of winch and rope arrangement and elasticity.

21st Century Technology

Recently developed tension meters incorporate data logging of actual rope work, regardless of the number of jobs. These meters also keep track of the nature and magnitude of the shock loading. This information, when combined with any tug log events, provides the most accurate and useful data for both customer and rope manufacturer. In essence this information provides a "signature" of the rope service. This information can be downloaded at the vessel, and in the future, inexpensively and directly accessed from other company locations along with other vessel information via satellite using modem technology. Now, more than ever, the information collected can be used to ensure that a tug is outfitted with the most efficient, safe and economical deck equipment.■

Barry Griffin, of B.A. Griffin Associates, Inc., designs and sells high performance wire rope and softline systems for marine applications. Mr. Griffin received a degree from Harvard University in 1971. He has worked in the marine machinery and systems industry since 1975, holding positions as design engineer at Olympic Instruments and Markey Machinery Company, owner of Fathom Corporation, and designer and Plant Engineer at NET Systems of Bainbridge Island, Washington. He is a manufacturer's representative for several marine equipment manufacturers, including Markey Machinery and Puget Sound Rope

Misc.

ompleted SOCP Projects

Crew Member Cross Training
Fitness-for-Duty Evaluation
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Optimum Staffing & Standard Arrangements for Pilothouse Operations
Professional Skills and Knowledge Upgrade
Survey of Shipboard Management Training
Ship Management Training Syllabus
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February 24, 2000

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llows members to share in the results of onboard aluations of new products.

ives members opportunities to purchase shipboard roducts at discounted prices.

Current SOCP Projects

MAINTENANCE AND REPAIR PROJECTS

Ram/Shipnet - The SOCP has developed a network of databases and an analysis methodology, called RAM/SHIPNET, to improve the total life cycle of ships in terms of cost effectiveness, reliability and overall quality and thus increase safety and profits. A video describing the RAM/SHIPNET program is available from the SOCP points of contact.

TRAINING PROJECTS

Distance Training for Shipboard Crews - Remote training, be it on a CD-ROM, computer based or Web based has the potential for reducing costs and providing more flexibility for the mariner. Various alternatives in terms of subjects and media are being investigated, with the focus on Standards of Training, Certification and Watchkeeping (STCW) mandatory training.

Training Resources Database - The database, which is now being populated, provides viewers information on products and services that are commercially available in categories such as videos, courses, computer-based and web-based training.

Training Video Production - Training videos have been produced on STCW 95 topics as well as other areas of interest to the members. They are also available for purchase by the general public, and include the following titles: Personal Survival Techniques (2 parts), Enclosed Space Entry, Shipboard Accident Investigations, Bridge Resource Management, Engine Room Resource Management, ISM Code, Drug and Alcohol Prevention Program and Vessel Lay-up Procedures. Additional videos are currently being developed for Lockout/Tagout, Hot Work, and Rigging Safety.

SHIP OPERATIONS PROJECTS

Streamlined Boiler Automation Inspections -
A video and CD-ROM have been produced to describe a step-by-step procedure to enable a shipowner to obtain Coast Guard approval for using a streamlined (and less costly) procedure for performing inspections for boiler automation systems. The CD-ROM will also include training for the shipboard crew to perform the inspections.

Alternate Watch Schedules - In an effort to reduce the fatigue risk factors inherent in the 4 on/8 off watch system, an alternative method has been tested aboard several vessels for deck officers, with outstanding results. The program is being expanded to other vessels and watchstanders.

OTHER PROJECTS --

SOCP Website - SOCP's website provides information on its mission, projects, member points of contact, its training course database, SOCP training products available for purchase, and links to other maritime sites.

Adding fuel to the fire

The shipping industry is talking about e-commerce these days, and where there is smoke, there must be fire. Bunker fuels are just the latest product to go online. Dolly Robinson investigates

At 11:58 PM Greenwich Mean Time on the 25th of September, 1997, bunkerworld.com went live. The website was the first of its kind, providing information-based services to the bunker industry. In the intervening years, bunkerworld.com has grown from 72 pages to just under 75,000, from no users to nearly 16,500 and it is claimed that the website is visited by at least 70% of the people who make up the bunker industry. The website, which is run and hosted by Telemarine Ltd., is merely the latest phenomenon in the booming internet industry.

The core service of bunkerworld.com was to provide online access to bunker directories containing the details of suppliers and brokers and others involved in bunkering. Today, the directory consists of 1,250 suppliers and nearly 300 brokers; their combined total constitutes 98% of the entire bunker industry. And since its early days, bunkerworld.com has expanded "organically" to provide a daily news service, market commentary, special features similar to those one might find in a magazine, opinion polls and information on bunker prices, insurance, hedging and International Petroleum Exchange fuel contract prices.

In spite of the success bunkerworld.com has achieved as a valuable information tool to those in the bunker industry, Mike Boe, managing director of Telemarine Ltd., emphasises that the purpose of the website is to be just that, and not a replacement for bunker brokers and other intermediaries. He believes that while the internet and e-commerce will never replace brokers in the bunker industry (or in any industry for that matter), it will force them to "reconsider the way that they do business and the value they add to their services. E-trading may eat into their market share, but it will not exclude them from participating."

According to Boe, there are two reasons for a buyer to use the internet: to decrease costs and to increase the efficiency with which he runs his business. He goes on to point out that the same exact values serve the broker, and that the eventual use of e-commerce will be a boon to everybody in the industry by making the whole process of buying and supplying bunker fuels a more efficient one overall. Like other online service providers, such as those highlighted in the realm of shipbroking in the Nov. issue of *Compuship* ("Netshipbroking", p. 36), Boe sees the internet as a facilitator and a business tool rather than a replacement for human commercial endeavour.

Bunkerworld.com will soon be extending itself to include fully fledged e-commerce as well. At the moment, it is possible to send enquiries to various suppliers in order to obtain a price quotation via the website, but it is not yet possible to transact the final deal. The final aim was always to create a virtual marketplace for bunker fuels, but Boe states that he was interested in first gaining the trust of the industry and in making sure that he understood the market thoroughly. To this end, Telemarine Ltd. embarked on "the biggest research project undertaken" in late March of this year in order to determine whether or not the bunker industry would actually utilise e-commerce.

As Boe points out, there is a vast mental distance between buying a book for $15 via amazon.com and purchasing $85,000 worth of bunker fuels with the click of a mouse. However, Boe says that bunkerworld.com receives nearly 1,000 enquiries per month and that $16.7 million worth of bunker fuels are being passed through the enquiry facility per month on a fairly regular basis. The overall response to the survey conducted by Telemarine Ltd. was such that bunkerworld.com is in the process of developing an e-commerce facility through which people will be able to sell and buy bunker fuels online. According to Boe, the purpose of this functionality will be "to let buyers and suppliers do exactly what they do now, but in a controlled environment where efficiency and cost are key issues". The extended service should be up and running by the first half of the year 2000.

The new kid on the block

The newest entrant to the market is eFueloil.com, which went live on November 1st of this year. Strictly speaking, bunkerworld.com and eFueloil.com are not direct competitors. This situation may change when bunkerworld.com introduces its e-commerce capability early next year, but for the time being they are two very different websites, with differing attitudes.

EFueloil.com currently supports a virtual marketplace. The system works on a reverse auction structure, whereby the system picks the winning bid after a 15-minute auction period. According to George Pilloton, CEO of eFueloil.com, the system is designed in a way that allows the shipowner to place his preference for certain suppliers, and the winning bid is chosen on this basis, along with cost considerations. However, eFueloil.com is now introducing an open bid system, which will allow the owner to make the final decision himself.

The company has been in and out of the papers in recent weeks due to its perceived affiliation with ChemOil, a major oil supplier based on the West Coast of the US. Other suppliers have refrained from sponsoring the website based on the belief that their money will somehow end up in their competitor's pockets. EFueloil.com asserts that this premise is patently incorrect and that no commission goes to ChemOil whatsoever.

The issue of independence has been a major sticking point for eFueloil.com, and the company is now doing everything in its power to assert itself as a separate entity. The company is jointly owned by the Japanese trading firm Itochu and the CEO of ChemOil, Bob Chandran. However, many in the industry believe that the mere presence of Chandran presents an inherent conflict of interest.

According to George Pilloton of eFueloil.com, ChemOil did participate in the development of the website, but it does not receive any commission from eFueloil.com and it plays no part in the website itself. Pilloton also says that the company is interested in building an independent marketplace. He emphasises that the ownership of the company will be such that it will not be dominated by any one party. Pilloton is currently looking to get energy trading houses, financial trading houses and energy venture capital players involved in the website, and is "concentrating on developing these partnerships so that people become very clear on the point that [eFueloil.com] is an independent site".

Pilloton claims that the website is getting very strong support from these groups. "One of the things that we've done well is to develop the site quickly and at a reasonable cost, which is why we're attractive to these groups and because we've demonstrated an understanding of the market," explains Pilloton. He is also strongly urging other independent suppliers to participate. "There are daily conversations with people looking to participate, and we're looking to enhance participation through various incentive programmes," he says.

Pilloton hopes that once other suppliers have been persuaded to come onboard, as well as other commercial interests, the website will develop into an internet portal with a focus on fuel oil. He believes that the value associated with e-commerce is "a mix of pricing, information, the transparency of transactions and the ease of transactions." He points out that the most successful B2B (business to business) online marketplaces are adept at both providing information and creating a sense of community, and he will be attempting to steer eFueloil.com in this direction. If the company can shake off the appearance of being affiliated with ChemOil once and for all, it may have a chance to do just this. ❑

Going for GPS and GLONASS

For truly accurate and reliable navigational data, it is best to combine the capabilities of GPS and GLONASS. MAN Technologie has just launched a product which does exactly that. Nigel Kitchen investigates

The Global Positioning System (GPS) became operational in 1993. At the time of its introduction, the system provided a level of positional accuracy that had been previously unimaginable. In 1995, Navstar GPS was declared fully operational by the US Department of Defence (DoD), but this service provided only a single frequency for civilian applications (L1, C/A code), while a more precise code (P code) was reserved for military users.

The current level of C/A code performance is degraded for civil use due to the policy of selective availability (S/A) implemented by the DoD, yielding accuracy in the range of 100m for GPS. According to Jürgen Windl of MAN Technologie, this is sufficient for many applications in the maritime sector, but for more sophisticated applications, such as precise harbour entrance systems or surveying, the system is inadequate.

The only existing alternative is the Russian counterpart to GPS, the Global Navigation Satellite System (GLONASS), which has been in full operation since the beginning of 1996. GPS and GLONASS have similar attributes, says Windl, but in the GLONASS system there is no degradation of accuracy for civilian users. This means that GLONASS satellites provide non-military users with an undistorted single frequency, but with an accuracy of 30m, they are not as precise as GPS satellites.

Combining GPS and GLONASS

According to Jürgen Windl, MAN Technologie developed its new range of combined GPS and GLONASS products because neither GPS nor GLONASS on its own allows the customer to obtain full precision, availability or integrity. He says that by improving all of these parameters, MAN Technologie can offer a number of advantages such as performance improvements, integrity improvements, a reduction of impediments, better satellite coverage with up to 48 available satellites, improved positioning accuracy and a reduction in data acquisition time.

Windl claims that MAN Technologie's new NR-N124 Marine Navigator is the first commercially available combined GPS/GLONASS (GNSS) marine navigation receiver. It is a 24-channel receiver which has been designed with the future in mind as it will also be capable of receiving signals from other navigational systems which are currently in development, including WAAS, EGNOS, MSAS and Galileo.

"GLONASS is becoming increasingly important in forming an inalienable element, together with GPS, in GNSS and in EGNOS," says Windl. "The combined use of GPS and GLONASS offers significant advantages compared with GPS- or GLONASS-only use with respect to improved satellite availability, system integrity and position/velocity accuracy for users worldwide. Fortunately, many impediments can be significantly reduced by the augmentation of GPS and GLONASS."

Enhanced satellite availability

According to Windl, analysis has shown that in combined use constellations (GPS plus GLONASS), at least 11 satellites are visible over a significantly larger area as opposed to five if the constellations

are considered separately. "The combined GPS/GLONASS system has a 98 per cent probability of more than 12 satellites in view in mid-latitudes," says Windl. "Another consequence of satellite availability is that when centimetre accuracy is possible the time required to achieve this decreases as the number of satellites increases. Furthermore, when the receiver cannot assume any information on position or time, the probability of acquiring a satellite increases with the number of satellites in view, thereby reducing acquisition time."

To take advantage of the increased satellite availability and the improved integrity of two independently operated satellite positioning systems, the NR-N124 has 12 channels for GPS and 12 channels for GLONASS, thus providing all-in-view tracking for both constellations. According to Windl, this duality of reception gives the NR-N124 an accuracy of 16m (95 per cent), or six times better than that given by GPS-only devices, which provide an accuracy of 100m.

"This great accuracy permits ships to navigate near shorelines without having to call upon differential stations, even in adverse conditions, such as bad weather, narrow channels and congested harbours or other areas where much of the sky and many of the satellites can be blocked."

Heightened integrity

The NR-N124 also has the ability to provide the user with enhanced system integrity. A navigation system has integrity when it can warn the user that the position fix is in error or even remove the error and provide a correct solution. A GPS receiver must have a line of sight to at least five satellites to be able to detect an integrity problem. To remove the satellite that is causing the problem, a sixth one must be visible.

The ability to detect and isolate a malfunctioning satellite is greatly enhanced by the increased number of satellites in view. Moreover, says Windl, reliance on two independent systems provides an added level of integrity against a system-wide malfunction. GPS alone does not satisfy the requirements of more sophisticated applications, but GPS plus GLONASS will most likely provide a reliable solution.

If one satellite system is switched off or jammed, or if satellites become unhealthy (i.e. they begin generating incorrect data) the NR-N124 will automatically use the satellites which are operating correctly. The NR-N124 also uses the information in the almanacs as well as an implemented RAIM algorithm to determine which satellites are healthy. In the event of signal dropout or signal loss, the receiver has the ability to re-acquire the signal in less than one second.

Increased accuracy

The NR-N124 also provides increased accuracy. Stand-alone GPS has a demonstrated horizontal accuracy of less than 20m for 95 per cent of the time (S/A off). The imperfect predictions of satellite orbits, satellite dock behaviour and atmospheric effects on the signals are the primary causes of error in the basic GPS system. GPS accuracy is, in fact, so good that the DoD decided to deny the full capability of GPS to users who were not specifically authorised this level of accuracy. Windl says that the denial of accuracy is called

Safe navigation

Navigators should not trust their instruments more than they do their own instincts and common sense, says the NEPI

Most navigation officers will go through their entire careers without experiencing a single collision, but when an incident does occur it can be very traumatic for those involved and very expensive for the shipowner. In a recent special edition of its Signals newsletter, the North of England P&I Club (NEPI) considered the question of why accidents keep occurring at sea when the available navigational aids and equipment are getting more and more advanced.

William O'Neil, secretary general of the IMO, was quoted at the opening of the Maritime London Exhibition last year as saying that "the heart of the industry is not the gadgetry but the people involved". While this is true of any aspect of shipping, it is particularly true of safe navigation. The NEPI says that even on the most modern ships, the most sophisticated navigational instrument is still the human being, and one problem could be that those human beings are starting to rely too much on particular pieces of equipment and not enough on their own common sense, experience and training.

A large part of the training and experience of any watchkeeper is the development of knowledge about the International Regulations for Preventing Collisions at Sea 1972 and their application. These regulations play a crucial role in avoiding close quarters situations and collisions. Failure to proceed at a safe speed or keep a proper lookout are probably the fundamental causes of many collisions and yet ships continue to navigate too fast for the prevailing conditions and operate an inadequate lookout, says the NEPI.

Some of the navigation and collision avoidance aids that navigators rely on so heavily may actually contribute to the cause of a collision or incident if they are not treated with respect. The NEPI says that this blind reliance may be especially dangerous in the use of ARPA, GPS and VHF.

The modern ship's bridge is full of equipment, some very sophisticated and some less so. As the equipment gets more sophisticated, the mariner has less of a chance of really understanding the principles of how it works and may tend to forget the errors that might occur and how they should be corrected.

ARPA, for example, which is used on a ship's bridge in pilotage situations and confined waters, is often ground stabilised, because this mode causes fixed targets to remain stationary and allows better use of parallel indexing techniques and ARPA maps. Ship target information in this mode, however, may be misleading in the presence of a current. Therefore, it is advisable to use ARPA in sea stabilised mode for collision avoidance.

The use of GPS requires a similar level of care. For position fixing, GPS does give a high degree of accuracy which is further improved when differential GPS is available, but because charts may be based on a number of different GPS data discrepancies can arise. The same problem occurs if the digital data from the GPS system is input directly to an electronic chart system. On small-scale charts the discrepancies between various GPS data may not be important but on larger scale charts they may be significant to safe navigation. It is therefore essential for the navigator to be aware of which data is being used by both the GPS receiver and the chart and to apply the appropriate corrections; these are usually given in the chart notes.

Using the radio for the purposes of collision avoidance seems like an obvious course of action to those without any navigational watchkeeping experience. It would seem that if one could contact the other vessel and discuss proposed intentions before taking action, all danger would be removed. However, many Flag State administrations actually discourage the use of VHF radio in a potential collision situation because of certain difficulties that can arise through voice contact.

VHF radio, however, may be used as a collision avoidance aid in a similar way to prescribed sound signals. In the USA, for example, the US Coast Guard encourages the use of VHF radio to reach passing agreements in certain circumstances. Rule 34(h) of the US Inland Navigation Rules states that "A vessel that reaches agreement with another vessel in a head-on, crossing or overtaking situation, as for example, by using the radiotelephone as prescribed by the Vessel Bridge-to-Bridge Radiotelephone Act (85 Stat. 164; 33 U. S. C. 1201 et seq.), is not required to sound the whistle signals prescribed by this Rule, but may do so. If arrangement is not reached, then whistle signals shall be exchanged in a timely manner and shall prevail." The overall conclusion is that VHF may be used as a collision avoidance aid on occasion, especially in pilotage waters, but seafarers should clearly understand the risks and the Collision Regulations before deciding what to do.

NAVIGATION

Free Charts On MAPSERVER

Maptech has introduced its MAPSERVER, a free and new way to view, print and email nautical charts and topographi maps online from its web site at *www.maptech.com*. The qua

ity and sheer number of images make it the largest database both NOAA digital charts and USGS topographic maps in th world

#16

REPORT ON THE FUTURE AVAILABILITY AND QUALIFICATIONS OF MARINERS THROUGH THE YEAR 2020

INTRODUCTION

The 1999 Marine Transportation System (MTS) Report to Congress[1] presents statistics showing the overwhelming dependence of the U. S. upon the maritime system to move freight and passengers, and support commercial fishing, cruises and recreational activity. The MTS Task Force, created to "assess the adequacy of the Nation's marine transportation system to operate in a safe, efficient, secure, and environmentally sound manner," states in the report that there is a vital need to attract and retain a qualified MTS workforce. This need is based upon statistics indicating that by 2020, the people and goods moved across waterways will have increased dramatically.

The issue of the future availability and qualifications of mariners through the year 2020 was a recent topic of discussion of a diverse group of maritime industry leaders, government representatives, and academicians (expert group). The group gathered at the request of RADM Robert C. North, U.S. Coast Guard Assistant Commandant for Marine Safety and Environmental Protection to discuss the issue of potential manning sources in the year 2020. The following report summarizes their discussion on the issue.

PURPOSE

The purpose of this report is to relate the comments of an expert group of diverse maritime industry leaders, government representatives, and academicians on the discussion of mariners to the MTS Interagency Committee for Waterways Management. This report focuses on key issues and factors which have influenced the availability of officers and seafarers to serve the strategic and economic sealift interest of the United States and the demands of the international community. Finally, this report details the group's summary of the issues throughout the maritime industry as a whole, and their recommendations for industry.

BACKGROUND OF ISSUE

A 1995 study conducted by the Baltic International Maritime Council and the International Shipping Federation issued an update to their 1990 Manpower report.[2] The study indicated that in 1995, the total number of merchant vessels engaged in deep-sea

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[1] U.S. Department of Transportation. *An Assessment of the U.S. Marine Transportation System: A Report to Congress*. September 1999.

[2] 1995 Baltic International Maritime Council/International Shipping Federation. *The World-wide Demand for and Supply of Seafarers – Manpower Update*. 1995.

trade stood at 43,556. The study projected a moderate growth to 46,923 vessels by the year 2000 and 50,551 vessels by 2005. These figures translated to a 1.5% increase per annum in the world fleet.

The study projected a worldwide shortage of 30,000 merchant marine officers by the year 2000 (7% shortfall) and 42,000 by the year 2005 (10% shortfall). Despite the conservative nature of the study, the clear message is that the officer shortages will escalate unless corrective action is taken.

Although these numbers reflect an international trend, the importance of the worldwide fleet to the economy of the United States cannot be overstated. The 1999 MTS report to Congress presents statistics showing the overwhelming dependence upon the system to move freight and passengers, and support commercial fishing, cruises, and recreational activities. The MTS report forecasts that by 2020, the people and goods moved across the system are expected to grow dramatically. It also highlights the vital role of the maritime industry in mobilizing and maintaining the national security efforts. The following is an excerpt from the 1999 MTS report:

> The United States fulfills its national security or global security missions through a safe and effective marine transportation system. Since the national military strategy has shifted from forward presence to force projection, security planners are placing increasing demands on marine transportation, particularly at strategic ports.

Equally disturbing has been the projection that a further decline in the number of available U.S. merchant mariners will have long-term effect on crewing Ready Reserve Force ships.

DETAILS OF THE DISCUSSION

Before the expert group considered in detail the concerns of having a sufficient number of qualified mariners, it was useful to outline some of the world maritime trends:

1. The total volume of domestic and international marine trade is expected to more than double over the next 20 years.
2. Technological advancements continue to accelerate and change.
3. Ships are being built larger to carry more cargo and passengers and to go faster.
4. There is a much lower tolerance by the public for either loss of life or environmental degradation of any sort.

Given these trends, the discussion was focused on the following aspects:

1. The recruitment of mariners into the industry for careers at sea.
2. The training and qualifications of those mariners, including the proper use of technology.
3. Adequate levels of manning given the level of technology employed and the ability to use it.
4. Ship management that recognizes gaps between technology and operations.

5. International and national standards and regimes to address these aspects.

Within the discussion, several key issues emerged. These issues and factors are discussed below.

- **Recruiting**

1. One aspect of the problem of having enough qualified mariners can be seen in the difficulty filling the lower licensed positions and the entry-level positions. In the United States, of the people between the ages of 18 and 22, a larger percentage than previously are attending college. This results in a smaller pool of high school graduates immediately entering the workforce, a traditional source of offshore, inland and deep-sea entry-level personnel.
2. The maritime industry in general is seen as not actively recruiting graduates from the maritime academies while shore-side industry does.
3. People entering the workforce are choosing not to enter the maritime industry. Pay, quality of life and a higher value on leisure time are possible contributing factors for these choices.
4. Faced with lower at-sea compensation (relatively speaking, as traditional high salaries have been overtaken by inflation) and higher compensation for shore-side jobs, highly educated licensed maritime college graduates are choosing shore-side over sailing career paths.
5. Qualified applicants perceive that the U.S. deep-sea fleet is declining and are reluctant to embark on a maritime career that seems to have an insecure future.
6. Even though technology is being incorporated into the maritime industry, it is not sufficient enough to attract potential mariners. An example was offered that an aviation position is far more glamorous than a maritime position even though both are involved in the movement of people and goods.
7. The pendulum is just starting to swing toward more serious recruiting problems - the need for mariners as a whole is increasing. The maritime industry does not appear to be keeping pace with the recruiting efforts of other industries. If nothing is done, both international and domestic sectors forecast a long-term downward retention trend.

- **Retention**

1. The maritime industry, particularly the ocean-going side, is very different than it was twenty years ago. Vessels spend dramatically less time in port decreasing the amount of time available for mariners to have shore leave. Position descriptions and personal characteristics for all levels from Able Seaman to Master are different. The elimination of the entry ratings in the deep-sea sector has created recruiting and retention difficulties in the higher ratings. One Champion questioned whether the mariner workforce is again starting to "age up."
2. Domestically, the Oil Pollution Act of 1990 (OPA 90), the Standards of Training, Certification and Watchkeeping for Seafarers (STCW), and the International Safety Management Code (ISM) are currently imposing restrictions on mariners.

Internationally, STCW and ISM pose similar, but different manning difficulties. The higher competence demanded by STCW coupled with the need to maintain it pose a personnel challenge to many companies. At the other end of the spectrum, highly trained STCW qualified people, with an incumbent higher level of professionalism, are recruited to positions outside the maritime sector with a net result of mariners lost to the industry. An effective safety management system under the ISM requires crews to be familiar with the company-specific system, requiring additional training. This exacerbates existing difficulties due to retention problems. Internationally, retention problems are forcing companies to pursue non-traditional sources in order to find mariners to fill the workforce. Worldwide changes are considered responsible for the changes in the supply sources available to the international labor market.

3. Retention within the oceangoing side of industry is critical to domestic National Security, due to the reliance placed on the merchant marine to supply much of the needed tonnage to transport American forces and supplies to distant regions of the globe.
4. The effect of dual income families and a greater interest in a higher quality, more stable home-life are significant retention factors. The economics of compensation and the simple fact that maritime employment means long periods of time away from home are major deterrents to retention efforts.
5. Today's society is more fluid and mobile and the effect of employees looking for movement to higher levels makes it more difficult to keep employees from "cradle to grave."
6. Mid-career mariners are abandoning the seafaring life in greater numbers than before.

- **Image**

1. While the public has a somewhat romantic notion of certain aspects of the maritime industry, there is little appreciation for the role that the industry actually has in the United States. The public perception seems more negative than positive. It is considered a no or slow growth industry when in reality, many aspects are high growth. With the decrease in the deep-sea U.S. fleet there is a public perception that the entire industry is in a permanent decline.
2. The industry has done little to improve its image. An inherent problem is that most of the maritime industry does not deal directly with the public. Greater appreciation by the general public could lead to more incentives and improved image. While each segment of the maritime has unique needs to be addressed, much can be accomplished with cooperation among the industry players to promote the maritime industry as a whole.
3. The perception of the mariner has changed. Inland sailors are no longer held in high regard within their communities. Public perception of the ship captain is taking a beating from tankers and freighters to cruise ships.
4. Criminal liability and the publicity fallout are disincentives to joining the industry.
5. The image of the mariner and the industry is out of sync with reality.
6. Today's industry uses the latest in management, safety and technological processes with the individual mariner achieving and maintaining higher standards of

competence, but the public's perception is the opposite. This negative image discourages the general public as well as maritime academy graduates from filling entry and licensed level positions.

SUMMARY

It is necessary to encourage individual companies in the maritime industry to pull their own weight if the industry as a whole wishes to ensure that supply is sufficient to meet demand now and in the future. Some companies use an officer apprentice program in an effort to combat early career losses (though it should be noted that these companies still encounter loss of valuable employees during mid-career). Retention is recognized as a critical issue to U.S. national security requirements placed upon the MTS. Otherwise, both international and domestic sectors forecast a long-term downward retention trend.

In summary:

1. The issues are different between the national and international sectors. There are cultural differences and the solutions may not be the same, due in part to the regulatory differences between domestic and international requirements.
2. The industry is more international in scope in all respects from multinational crews to trade between nations.
3. Training institutions, such as the maritime academies, are a national asset.
4. As the STCW levels the playing field, international opportunities for U.S. mariners increase on foreign flag ships.
5. English speaking officers appear to gain the top jobs.
6. There is a need to successfully show growth in the industry.
7. Solving the national security/defense personnel shortage issue does not help the commercial industry as a whole.

RECOMMENDATIONS FOR INDUSTRY

It is recognized that no simple solution exists for the issue of attracting and retaining a sufficient number of qualified mariners. However, there is much room for development of a number of various, successful implementations. The maritime industry, while segmented into a large number of parts, is often viewed as one entity by the general public. It is this perception that the industry must recognize and work with.

Potential actions to be taken by the maritime industry, as discussed:

1. Improve the image of the industry.
2. Look at other industries and other nations experiencing similar problems and import lessons learned.
3. Provide incentives to prospective mariners.
4. Create mechanisms to predict industry trends (technological advances, fleet growth, etc.)
5. Gather more workforce information.
6. Address national security problem of manning ready reserve and commercial fleets.

7. Make training more flexible so that it applies to more than one segment of the industry.
8. Provide more diverse training platforms.

This report has been created and is presented based upon the recommendation that these findings of the expert group concerning manning shortfalls should be passed to the Federal Interagency Committee for the Marine Transportation System and to the Marine Transportation System Advisory Council which is currently being developed. The expert group agreed that the MTS groups were the logical places for the issue of having a sufficient number of qualified mariners to be further addressed.

Keep 'em if you got 'em

How to retain top quality employees in a tight labor market

By Phillip M. Perry

Losing a talented employee is costly enough in any economic climate. But in today's tight labor market, when trained and motivated people are harder to find than ever before, having a key individual jump ship can cripple the profits of any business.

How can employers avoid losing their best workers? Seven of the nation's top workplace consultants answer that question in this article. Among their pointers are: provide career growth opportunities, talk with people to discover their true needs, and encourage feedback and participation from staff members.

So you've finally trained a crack group of employees. They know your business. They cultivate customers. They develop new ideas. In short, they generate profits.

Now... how do you keep them from quitting for a competing business?

More employers are asking that question in this day of labor shortages. "Talent is hot commodity these days," says Ian Jacobsen, president of Jacobsen Consulting Group, Sunnyvale, Calif. "People have choices as to where they can work. If you don't meet their needs, other employers will. There's simply no reason for them to stick around."

Scary. No wonder retention has become a critical management issue. "When someone jumps ship, what does it really cost you?" poses Jacobsen. "A lot more than just replacement cost. Consider the business you were not able to transact while you find and train a new person, and the delay in your business growth. And then think of what the ex-employee can tell your competition. When people who built your business leave it really sets you back." Add to this the slim pickings that go with a tight labor market and you can find yourself behind the 8-ball fast.

Bottom line: it's much better and easier to retain people than to recruit them.

So how do you keep your staff from jumping ship? The obvious first answer is: raise salaries. Certainly your compensation needs to match or exceed that of the competition. But employers are finding that more pay is not enough. "When you give unhappy employees more money you have wealthier unhappy employees," says Dr. Alan Weiss, president of Summit Consulting, East Greenwich, RI. "So you compound the problem by spending too much." Jacking up salaries, of course, can erode your profits. And you'll find that unhappy employees will depart at the first opportunity when they find an employer who will address their needs, even if the compensation level is lower.

Throwing money at the problem is not the only approach that offers a quick fix at the expense of long term success. "Today there are many 'flavors of the month' that address retention at a superficial level," says Erik J. Van Slyke, senior manager in the human capital advisory services consulting area of Deloitte and Touche, New York. "We're talking everything from some type of deferred compensation, to stock options, to changing the benefit offerings. All of those things are wonderful ways of improving retention in the short term. The downside is that because they are solving symptoms they don't end up really tapping into

What do employees want?

How do you keep your best people? "It's not rocket science," says consultant Ian Jacobsen, president of Jacobsen Consulting Group, Sunnyvale, Calif. "It's a matter of doing the right things right."

To find out what the right things are, Jacobsen's staff interviewed 5,000 people attending job fairs, asking each why they were leaving their current positions. He came up with a list of eight commonly-encountered items on employee wish lists. "In four out of five cases, people were leaving their current positions because one of these factors was not being attended to properly," says Jacobsen. In the fifth case, they were leaving for a perceived better financial windfall from a pre-IPO (Initial Public Offering) Internet company.

1) Treat them as partners. Respect them and involve them. Share information.

2) Provide them with important challenges in their career.

3) Value their contributions.

4) Let them know you appreciate what they do.

5) Use their suggestions and ideas.

6) Demonstrate that you care and are fair. Stand by your employees when something happens such as personal crisis.

7) Hold people accountable for what they commit to. Let them know they are a necessary part of your team.

8) Pay them fairly and appropriately.

Source: *Jacobsen Survey of Employer Attractiveness.* Jacobsen Consulting Group, Sunnyvale, Calif.

our ability to motivate people for the job itself."

The secret, says Van Slyke, is to create a work environment that motivates employees and offers benefits that drive their decision making around employers. Let's see what makes up such an environment.

Provide opportunity for career growth

"The number one reason good people leave a company is because they feel they are no longer growing or expanding what they know," says Dr. William C. Byham, president of Development Dimensions International, Pittsburgh, Pa. "As long as people think they are still growing they will stay with your company." Organizations that are learning ones have a powerful competitive advantage, according to Dr. Byham. "They are communicating the fact that they are able to execute better and follow through on commitments."

If you don't offer opportunities for career growth – even within the same job – then no combination of human resource solutions will help. And be sure to communicate your concerns about individual growth to each employee. "A big problem is that employers don't help people realize they are growing and the organization is helping. So employees don't see things in a context of growth."

Suppose you invite a staff member to sit in on a meeting and you consider this a growth opportunity. Be sure that the individual understands that and sees it in the same context. This goes double for the stars on your staff. "A lot of companies have programs for high flyers but they don't tell the people who are in such programs that they are in it," says Dr. Byham. "So the employers lose the people they most want to keep."

Talk with your people

What really motivates your people? What factors will keep them on board when competing employers offer attractive deals to lure them away?

You'll know the answer if you talk with your staff members. Interview them on a regular basis concerning their life goals, and on what they find attractive about their jobs, and what they do not like. Do this during the quarterly and annual performance reviews, but also in casual off-the-cuff meetings and luncheons.

A one-on-one conversation can be far more valuable than second guessing what your people want. "There are all sorts of research studies about personality types and their career

preferences," says Van Slyke. "The downside is that you don't always hit the mark exactly." Encouraging people to open up can reveal surprising needs. "An employee may want autonomy, or a chance to be creative, or a chance to influence others." Be aware that people often find it difficult to articulate what they want. So watch for clues in their performance on the job. Does Sam seem to come alive when you assign him a specific task that involves marshaling a small team of fellow workers? There's a clue that Sam is looking for more team building opportunities. That's something that Sam might not even think of telling you in your personal conversations.

Finally, be aware that off-the-job activities are becoming more important to individuals, especially high performance ones. Gone are the days when employers could demand the workplace be the number one factor in their staff members' lives. Your best performing staff member may tell you, "The most important thing in my job is that I have time to pursue my love of rock climbing outside of work." This will tell you that the individual may leave if you start demanding too many work hours.

Just as important as limiting the hours of work is allowing the employee to determine the daily schedule. "Flexihours are here to stay," says Don Schackne, president of Personnel Management and Administration Associates, Delaware, Ohio. "They give a feeling of control to individuals. And there is a measure of comfort in knowing that if an emergency arises the individual can adjust the work schedule without being penalized." This factor is becoming more important as more women – with children at home to care for – become more dominant in the workplace. But the employer who extends the benefit to men also gets a lot of mileage. "A flexible hour benefit may seldom be used, but it's comforting to the employee to know it's there," says Schackne. "A person won't take a chance moving to a new employer who may not offer flextime and may not understand the demands of taking care of children."

If all of this sounds as though people are demanding that their personal lives be taken as seriously as their work ones – you are correct. "The new emphasis on life balance is real; it's not some kind of fad," says Weiss. "People are concerned about pursuing their private interests and avoiding burnout. So giving them some control over their time schedule is a tremendous benefit."

Encourage feedback and participation

Are you in the habit of changing policies and implementing plans without input from your staff? Those days are over. "Years ago when the boss said jump everyone asked how high," says Schackne. "It's just the opposite today. People are saying 'if you don't include me in your decision-making process I may be out of here.'"

Today's employees are better educated and understand problem solving techniques. They also believe they have something to contribute, and when they are not asked for input they feel disregarded and ignored. "Give employees an opportunity to let their stories be heard about what they feel should be done," says Weiss. "Sometimes you will hear some good ideas. And the employees get the clear message that you care about their ideas."

A lot of this boils down to respecting employees for everything they have to offer – not just for the one or two talents called for in their job descriptions. "Respect is an extremely important part of attracting and retaining employees," says Fred Martels, president of People Solution Strategies, Chesterfield, MO. "Through

your actions you show that you believe in the self-worth of each of your staff members." Express appreciation, affirm their achievements, and show you care about their work and lives. "Call them by their names and really listen to them: it's a tremendous way to show you respect people."

"People who aren't respected won't tell you there's a leak in the ceiling or someone is stealing from the till," says Martels. "But people who are treated with respect will reciprocate."

Recognize achievement

People develop loyalty to the employer who acknowledges their work. At one level, letters of appreciation – copies of which go into the staff member's personnel file – can work wonders. So can public announcements of praise for those staff members who have reached landmarks in sales or other areas.

Avoid recognizing achievement in a random manner. Your staff may perceive favoritism and unfairness if one person is singled out for praise while another person with equal performance is passed over. "Set up a program in such a way that everyone understands the rules of the game and has a chance of winning," says Jacobsen. "If you play darts you want to know what your target looks like before you start the game. When everyone can see the target and all have darts then it's a fair game."

It helps to involve the people who will be affected in the design and administration of your awards program, according to Jacobsen.

Pay special attention to planning a fair program when individuals are working in teams. "The risk in rewarding top performers is that you recognize one person and you anger the others, especially if it's a team effort and you honor only one person." Joe wouldn't have done that if we hadn't been here to support him." One approach is to reward teams. This has the advantage of creating pressure from within the team for everyone to perform at their best. You can also have team members vote for their most valuable player. But you have to be careful about criteria – articulate that it is not a popularity contest.

As for the actual awards for achievement, everyone appreciates public praise as well as private praise that results in an entry on the personnel records. There is an implication that this event will affect the individual's career. But you may also want to set up a rewards program with tangible benefits. "In terms of incentives, a menu of choices works best," says Jacobsen. "Get some input from staff members on what they would like. A week on Hawaii may not mean anything to one person – but given a choice they may like a week in Paris."

Train your supervisors

Much turnover is due to personality problems with supervisors and managers. "People join companies but they leave supervisors," says Mel Kleiman, president of Humetrics, a Houston-based consultancy. The problems arise when individuals who excel at one type of work are promoted into management positions without adequate preparation. "We go from worker to supervisor without training," says Kleiman. "So we lose our best production person, or our best sales person, and now we have gained a not-okay supervisor."

Whether by formal training program or by mentoring with another successful supervisor, individuals new to the management position must learn the skills involved with giving feedback, helping people grow, coaching, counseling, delegating and assigning

Orient for success

New hires will stay longer if you orient them properly, says Mel Kleiman, president of Humetrics, a Houston-based consultancy. Start by assigning each new employee a "buddy" in the form of a long-time staff member who has a positive attitude toward the business. Then introduce the new employee to the business environment.

"Good orientation isn't a matter of saying, "here are the rules; and here's what you can't do," says Kleiman. "Rather, it's a matter of focusing on what's in the new position for the employee. No one starts a new job saying 'what can I do to screw up today?' They want to do their best and try their best."

Kleiman advises scheduling a series of orientations for the following time milestones:

- First hour: Set up a positive first impression. Ask: "What did you like and dislike about your previous company?" These will provide important clues to making the new hire work out.
- First day: Make sure the day went well. Does the supervisor get along with the employee? Ask: "Were all your questions answered? Any problems? How could we have made the day better for you?"
- Middle of the first week: check back to see how things are going.
- End of the first week: This time the meeting might be done not by the direct supervisor, but by the next one up in the chain. There are two reasons for this. First, you want to make sure the company is living up to expectations. Second, you want to turn the meeting into a recruiting session for others in the new employee's former company. Ask: "Did you have a good week? Did we meet expectations? How did it go?" Then: "Well, when you were at XYZ, and you made a decision to come here – what was the reason you wanted to leave? There are probably some other people at that company who have the same feelings but haven't left, right? Who would you like to see here?"
- First pay check: Now's the time for a mini-review of how things have gone. Sample: "Julie you have really done a great job; you are really fitting in; you have really earned it." Or: "You are moving in the right direction; here are some areas we want to work on."
- First anniversary and each one thereafter. "We know from our polls that people do remember their start dates," says Kleiman. "People consider their first day of work a major career milestone." Source: Humetrics, 8300 Bissonnet, Suite 490, Houston, Texas.

work, interviewing for performance appraisals, and managing priorities. "Everything is team oriented today," says Kleiman. "But who has taught new supervisors to organize teams and play on them?"

Also, make sure your supervisors don't get into a rut in how they perceive what certain people can and cannot do. Encourage managers to stretch their people.

Hire right

One way to reduce turnover is to hire the right people in the first place. That requires some proactive head hunting. "Consider yourself a talent scout, and operate just as professional sports teams look for talent," says Jacobsen. "These days business is like an Olympic competition and you want the people with Olympics potential. Rather than relying on applications coming in and on Internet listings, go out and stalk who are the best people to put on your team."

Hone your interviewing skills to detect the applicants with the right fit for your workplace. "Determine what turns on each job applicant, besides money and the basics," says Dr. Byham. "Some people want notoriety or a chance to work with a lot of interesting people, or want to travel." Determine if your place of business offers what each applicant wants.

Pay special attention to personality and work environment. Says Dr. Byham: "Some people want to work for a fast paced, 'ready fire aim' organization. If yours is a precise, well planned business that person may not be happy."

Plan for success

This article has provided a number of insights from leading consultants on how to keep the best staff members you already have from leaving for supposedly greener pastures. Take action now to identify your best people, determine what will make them satisfied and then provide it.

"Your competition wants your best employees more than they want your best customers," warns Kleiman. "If they get the former, they get the latter." □

BASICS ABOUT BLOCKS

Choosing the right one for the job and maintaining it are crucial on a fishing vessel.

BY MICHAEL CROWLEY

If there's anyone fishermen should be indebted to, it's a nameless individual who — bent, worn and weary from years of hard labor but insightful beyond his years — 4,000 years ago, give or take, took an early example of the wheel, mounted it in a fixed position, and after running a line over it found he could lift what before he had to drag.

Thus the first pulley was born, and it wasn't a big jump from that to a primitive block. Without this development, fishing might have gotten no further than beach seining or handlining with hooks from the side of a rowing boat.

Count the number of blocks on a fishing boat and you realize just how indebted fishermen are to that long-ago genius. Over the thousands of years the block has been around, it really hasn't changed very much. It still consists of a wheel — the sheave — an axle, or center pin and a housing. And the block is still used for the same ends: to change the direction of a line's pull or to develop mechanical advantage.

For a tool that's been around for so long, you'd think it would be pretty foolproof. And the block is, as long as it's strong enough to handle the loads it will be subject to, matched with the wire or synthetic line that will pass through its sheaves, mounted or hung properly, and maintained regularly.

A problem on a lot of fishing vessels is that blocks are too small for the job they are supposed to do. Granted, when rigging is properly designed, high safety factors are built in. Still, if a sheave isn't the right diameter, it won't take as much of the load rating of the wire or line passing over it as it should and will wear out sooner than expected.

Fishermen often ignore the pending disaster, saying, "'This block has been working fine. I'm going to stay with it,'" says Hal Hockema, a naval architect and president of Hal Hockema & Associates of Seattle. "But sometimes that means a catastrophic failure when you least expect it."

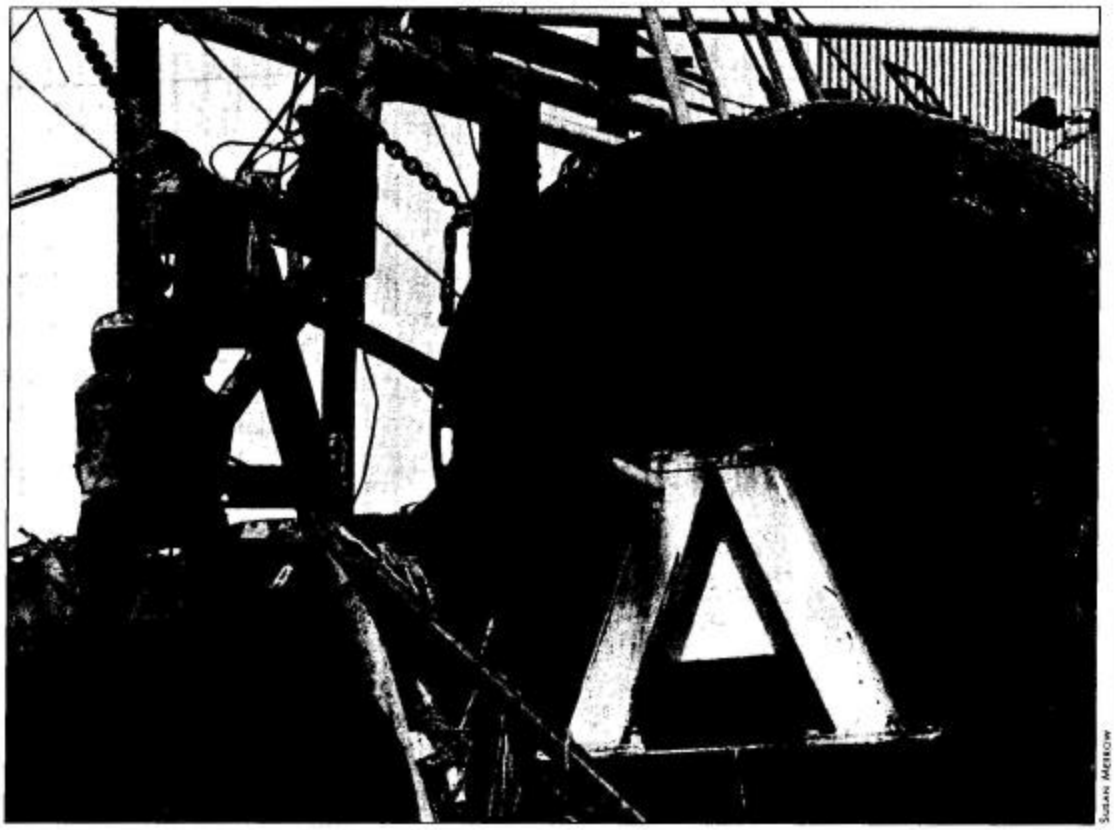
With all the rigging books available, figuring out the load a block will be subject to isn't that hard. But if you don't think it through, you may end up with a block rated at half the load it will ultimately be subjected to.

In rigging parlance, the head load or resultant load is the force that a block has to be able to withstand in order to hold a wire going through it. In the case of a towing block, if you figure the trawl winch has 10,000 pounds of pull, and you size the block for that pull, you're probably close to being halfway there.

That's because there's a pull on the wire from the winch and the net. From the winch there might be 10,000 pounds of tension on the wire, and from the net, there's also a force. "You could have 10,000 pounds of force pulling in two directions," Hockema says.

The load on the towing block — or any other block, for that matter — is increased or decreased depending on the angle of the wire as it leaves the block. If the block serves only as a fairlead, with the wire simply passing over it, there's no force on the block. But the closer the wire gets to a right angle or vertical lift, the greater the load becomes.

That angle and the load on the block can change quickly. Hockema points out that in most cases, the trawl warp leaves the block at a 45- to 30-degree angle from the water. "If you get a hang-up, you may end up pulling the net vertically off the bottom. In that case it could be more than a 90-degree angle," he says. At a 90-degree angle, the forces are doubled on the block. "It's not the normal working situation," Hockema says, "but you have to design the system to handle it."



SUSAN MERROW

KEEPING TOWING WIRE centered on a block's sheave requires that the block (left) be hung so that it can swing freely as the vessel maneuvers.

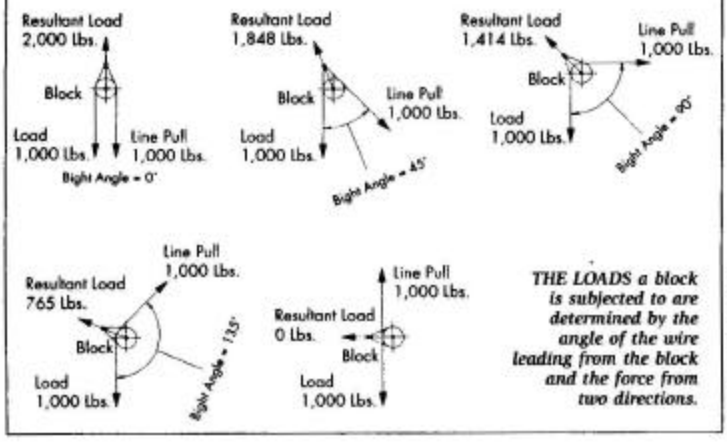
A block should be able to handle any load it is subjected to, but it also must be aligned properly. If it isn't, either it or the wire passing through it will wear out prematurely.

"Alignment is a major factor," says Bruce Washburn, naval architect and vice president at Washburn & Doughty, a boatbuilder in East Boothbay, Maine. "If wire runs so it won't center on the block, it will wear the sheave unevenly. Once you get a sharp edge on the block it can cut into the wire."

Hauling a net straight back is one thing, but when the doors go out and start to spread, the blocks are pulled to the side. If a block can't swing and compensate for the new angle, the wire won't be riding in the middle of the block. As a result, "the sheave wears unevenly, puts a side load on the bearings, and the sheave is pushed against the frame of the block," Washburn says. "The sheave won't spin as well. Everything starts to wear unevenly and more rapidly."

Some sheaves handle abuse better than others. When Skookum, a Hubbard, Ore., manufacturer of blocks for the fishing industry, bought out the BCM line of trawl blocks, the product

BLOCK STRENGTH



THE LOADS a block is subjected to are determined by the angle of the wire leading from the block and the force from two directions.

HAL HOCKEMA & ASSOCIATES

underwent a major redesign, including the sheaves, before it was reintroduced by Skookum.

BCM trawl blocks came to Skookum with cast-steel sheaves. These were replaced with manganese-steel sheaves. "Manganese steel is what we call wear-resistant," says Larry Perotti, Skookum's general manager. "The more a wire runs over a manganese-steel sheave, the harder [the sheave] gets. And it offers less resistance to wire rope."

By contrast, Perotti says, cast steel "is as hard as it gets when it's put into the sheave. Heavy loads can cause line grooves or rope impressions in the sheaves, or sheaves wear to one side."

When that happens, the fisherman can either buy a new sheave or take the old one out and have a welder fill in the wear lines. Either option is expensive.

If synthetic line, such as Spectra, is used, it's important to make sure that the sheaves are always very smooth. Even the inside of the block's frame should be smooth, so there's less chance of the line chafing against the sheave or block.

To handle expensive line like Spectra, Skookum has built blocks with machined stainless steel sheaves. "Even manganese will pit and rust over time," Perotti says, whereas stainless steel stays smoother.

It would be a mistake to have a block built to carry synthetic line being used for wire rope. That's because the sheaves for synthetic line are usually smaller than for wire rope. When a wire rope under a load passes over a sheave that's too small, the top outside of the wire is under tension each time it goes over the sheave.

"Every time it goes over the block, it stretches the outer strands and the strands that are laying on the sheave are compressed," Hockema says. "The wire will wear prematurely and you'll see individual strands that are broken and wires that are smashed down."

Trawl blocks aren't the only blocks where alignment is important. When blocks are mounted from pad eyes and not lined up with a winch, the pad eye is being pulled sideways. Put the block under a load, and it starts trying to bend the pad eye. Pad eyes are usually made of mild steel, and eventually they crack and fail. When that happens, says Hockema, "the block falls down and everything else falls down."

> "Alignment is a major factor. If wire runs so it won't center on the block, it will wear the sheave unevenly."
>
> —*Bruce Washburn,*
>
> MAINE BOATBUILDER

Washburn likes to see the block hung from the rounded part of a shackle -- as opposed to the pin. The trouble with putting the pin through the eye on the block is that the block isn't so well supported hanging from the straight pin, he says. And the pad eye is usually flat, so if the rounded part of the shackle goes through it, it starts wearing unevenly.

When shopping for blocks, it's important to make sure that the block's frame and the sheave are close enough together that if the wire jumps up on the sheave's rim, it can't be wedged between the two.

Sometimes a gap between the sheave and frame is due to poor workmanship or design, and other times the frame of the block can be pulled away from the sheave. With half blocks, where the sheave is covered only down to its pin, that's more apt to happen. It was a problem with the early BCM blocks, Perotti says. The bridles that shrimpers were running through the blocks "had different line sizes, and some of the lines were getting sucked in and cut off." Then Skookum developed a full-sided model that made that "virtually impossible," Perotti says.

Ultimately, a block has to be viewed as part of a rigging system. "There's a whole bunch of individual parts that contribute to the system's integrity and strength. If one part fails and 99 other parts don't, the system still fails. It can be a serious thing," Hockema says.

That's pretty much what happened in Kodiak a little over a year ago. Only in this case, more than one part failed.

On a seiner, a vang wire parted, causing the boom to fall. It hit a crewman on the back of the head and he died shortly after that.

None of the running rigging had been maintained. The wire hadn't been changed end-for-end, nor had it been slushed — lubricated. Thus it was extremely dry and susceptible to wear.

Even more importantly, the sheave in the block was frozen because it, too, had not been lubricated. That created a lot of wear on the wire as it ran across the immobile sheave. Eventually the wire cut through the sheave and parted. NF

For contact information on companies mentioned in this article, see page 101.

Feds retrieve anchors from fishing grounds

By Joel Gallob
Of the News-Times

Three 750-pound anchors left on the seafloor have been retrieved by the National Oceanic and Atmospheric Administration.

Scott McMullen, chairperson of the Oregon Fishermen's Cable Committee, said Friday that the anchors had been used to secure a Navy research platform called FLIP (Floating Instrument Platform), and had been left on the seafloor after the 1995 termination of the program.

"The anchors were left in a very productive fishing area, and the trawl fishing fleet quit using the area due to the risk of damaging or losing nets on the anchors," McMullen said. "The area lost to fishing amounted to about 4 square miles of seabed. Shrimp and groundfish trawlers use the area extensively."

The anchors were located about 12 miles west of Cape Falcon, on the border of Tillamook and Clatsop counties, in 460 feet of water.

The Oregon Fishermen's Cable Committee is made up of trawl fishermen and members of the undersea telecommunications cable industry. It worked with U.S. Senator Gordon Smith's office and Rep. David Wu's office to encourage NOAA to remove the anchors and associated chains, about 14 feet long, and return that area of sea bottom to utilization by the fishing fleet.

Cable committee member Terry Thompson, a commercial fisherman from Newport and candidate for state senate, said, "We appreciate NOAA's efforts to remove the anchors, but we hope the scientific community will work closer with the fishing industry in the future. We have to stop using the ocean as a garbage dump."

The cable committee works with the undersea telecommunications industry to cooperatively share the seabed and maintain the trawl fishing grounds.

The vessel M/V ELAND, owned by Nehalem River Dredging, recovered the anchors over a nine-day period earlier this month.

Oregon State University's new 54' research boat.

Rozema Boatworks

Research vessel from Rozema

Rozema Boatworks, Mount Vernon, Wash., recently delivered a 54'×16'6"×4' aluminum research vessel to Oregon State University. The *Elakha* (the Chinook trading language word for "sea otter") was named in honor of the Northwest's American Indian tradition and will be based at the university's Mark O. Hatfield Marine Science Center in Newport, Ore.

The *Elakha* will support study of Oregon coastal marine systems, including linkages between fish, invertebrates, and algae within marine communities. The researchers will also study near-shore oceanographic conditions. Operations will range along the Oregon coast, including the Columbia River, and offshore to about 35 miles.

"This new vessel will be larger, faster, stabler, safer, and will dramatically enhance ecological and oceanographic research capabilities," says OSU researcher Bruce Menge. "It will open new vistas for OSU, both in research and instruction."

The hard-chine, 18° deadrise, semi-planing hull design comes from Rozema's many years of in-house development of heavy-duty commercial fishing and working vessels. Basic construction features 1/4" plate on the bottom and sides, with 3/16" material on the decks and superstructure. An innovative anti-roll feature was added by tucking in the last 10' of side plate, thus allowing the full-width bottom plate to create a chine extension that tapers to a maximum of 4" at the transom and acts similar to a bilge keel.

The interior layout has crew accommodations directly below the raised pilothouse. Included are a small galley, head with shower, settee, and four berths forward in the bow. An aft cabin on the main deck level contains a 10'×11' laboratory area with benches, cabinets and sinks. A sonar tube extends through the machinery space below. The 19' work deck at the stern has additional lab facilities, plus a hydraulic winch and 2,000-lb. capacity gantry for lifting loads in and out of the water. Electrical power for research and navigational equipment comes from an 8kw Northern Lights genset.

The boat's main propulsion is a 600-hp, 3176 Caterpillar diesel. It spins a 36", 5-bladed propeller in a 12"-deep tunnel through a 5111 Twin Disc gear with a 2.5:1 reduction ratio. Sea trial speeds reached 15 knots at full throttle, while a cruising speed of 10-11 knots should allow a range of about 575 miles.

Although single engined, the boat has two rudders. "It provides more rudder area and helps the boat track and turn in heavy seas," explains Dirk Rozema. "They are located on either side of the tunnel but still in the wash of the propeller. The tunnel was not included to reduce draft—it just makes the hull more efficient, flattens the shaft angle, and puts the engine at a better angle."

The six-month project cost $500,000 and was funded through a grant received by the university. "It was a bid situation where everyone knew they had a fixed amount of money for the boat," says Rozema. "Our proposal gave them the most for their dollar."

— Charles B. Summers

Scientists set up labs aboard a luxury cruise ship

■ The university says setting sail aboard one of Royal Caribbean's newest vessels is actually cheaper than sending their scientists out each week on a private research ship. And the food is better, too.

By JANELLE A. WEBER
Associated Press Writer

MIAMI — Who says the life of a scientist has to be boring?

University of Miami researchers have set up labs aboard a luxury cruise ship, studying global warming and climate change amid hundreds of tourists enjoying fabulous entertainment, activities and ports of call.

The university says setting sail aboard one of Royal Caribbean's newest vessels is actually cheaper than sending their scientists out each week on a private research ship. And the food is better, too.

"I've seen them at the buffet," admitted Jack Williams, president of Royal Caribbean International.

The Explorer of the Seas is the first cruise ship to house two operational laboratories. Royal Caribbean footed most of the $3 million cost and has allowed the university to use the labs free of charge for as long as the ship sails.

Two scientists each week from Miami's Rosensteil School of Marine and Atmospheric Science began cruising on the ship this month to analyze data on climate change, hurricanes and solar radiation.

Because they will be gathering data every week along the same warm water route — the Gulf Stream — they will be able to compare their findings over time. Typically, research vessels embark on brief, isolated trips because daily rental fees can cost tens of thousands of dollars.

"It's a very cost-effective way of getting information that nobody's ever been able to get," said Ellen Prager, assistant dean of the Rosensteil School.

And, of course, there's the fringe benefit of sightseeing when the ship docks in the eastern Caribbean ports of Puerto Rico, the Bahamas and St. Thomas. Broadway-style shows, rock climbing and ice skating are also there to break up the tedious hours of research.

The scientists also mingle with the passengers, offering biweekly lectures and daily tours of one of their labs, which is located on an open deck near a swimming pool and lounging area.

On a recent cruise, nearly 100 swimsuit-clad passengers listened to a scientist dressed in a casual green polo shirt and khaki shorts.

Royal Caribbean also stands to benefit from the partnership. The research could help the cruise company improve its environmental record.

In 1999, Royal Caribbean pleaded guilty to 21 felony counts of dumping oil and hazardous chemicals in U.S. waters. It paid $18 million in fines — the largest amount ever paid by a cruise line.

The company said the labs were not part of its settlement. Williams said he came up with the idea in June 1997 after Rosenstiel School Dean Otis Brown took him on a tour of the university's labs. Brown was the chairman of Royal Caribbean's Ocean Fund, which hands out money for environmental protection and research.

"Would it be any benefit to have a lab like that on the sea all the time?" Williams remembers asking Brown.

Brown jumped at the chance, and Royal Caribbean added the two shiny aqua labs to the Explorer of the Sea's blueprints. The university, the National Science Foundation, and the National Oceanic and Atmospheric Administration also contributed money to the project.

So far, The experiment has received positive feedback.

"Lab coats are so intimidating," Prager said. "We don't want to give the stereotypical scientist impression."

■ On the Net: Royal Caribbean: *(www.royalcaribbean.com)* ; University of Miami Rosenstiel School of Marine and Atmospheric Science: *(www.rsmas.miami.edu/)*

AP

Scientists from the University of Miami Rosenteil School of Marine and Atmospheric Science analyze data on climate change and solar radiation aboard Royal Caribbean's Explorer of the Seas in this undated photo. The Explorer of the Seas is the first cruise ship to house two operational laboratories.

Leonardo: A NATO combined operation

A newbuild NATO research vessel incorporates technology from many NATO nations

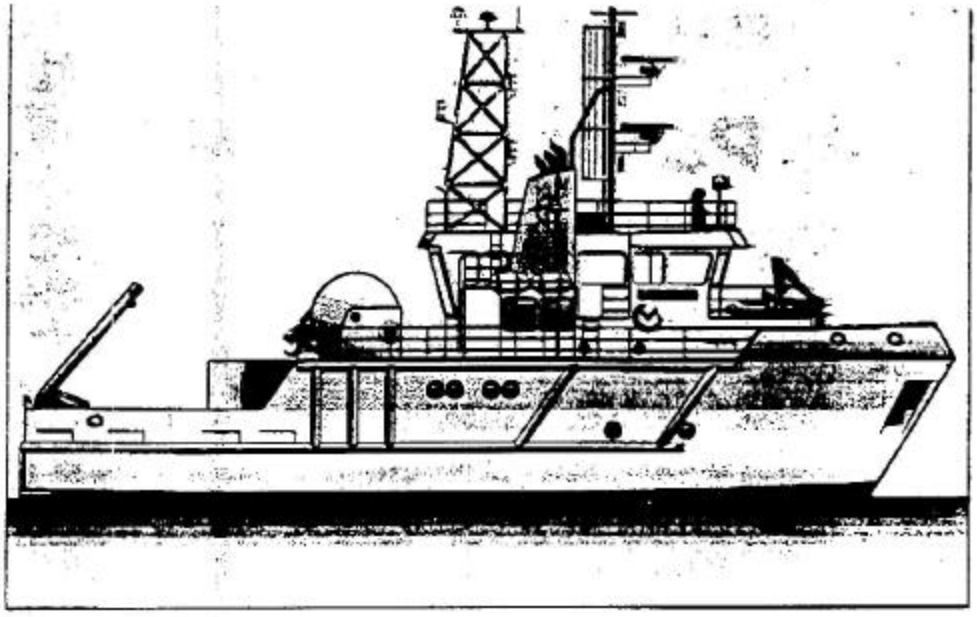
NATO's SACLANT Undersea Research Centre (SACLANTCEN), La Spezia, Italy, conducts research in support of NATO's undersea operational requirements. It operates the only ship jointly owned by all the NATO nations, the purpose built acoustically silent, N.R.V. *Alliance*. It has been in continuous and productive service since its delivery in 1988 by the builders.

Since the end of the cold war, a shift of emphasis into the shallower littoral waters has caused a significant increase in the use of SACLANTCEN's existing leased shallow water research work boat *Manning* in increasingly complex and sophisticated experiments at sea.

In 1998, funding for a new coastal research vessel was approved and following a seven month design phase executed by Burness, Corlett and Partners, U.K., and an international competition, a shipbuilding contract was awarded to McTay Marine Ltd., U.K, on 19 December 2000 to construct a 28 meter Coastal Research Vessel (CRV), scheduled for delivery in April 2002.

The CRV, to be named *Leonardo*, will be the first vessel to operate as an Italian Public Vessel and will be listed on a special register within the Italian Ministry of Defense. It will be classed and certified by ABS.

Leonardo will replace the leased, 20 m workboat *Manning* which is now



47 years old. The new vessel, which will have one very silent low speed condition, will enjoy the benefits of diesel electrical propulsion driving twin azimuthing thrusters and one azimuthing bow thruster controlled by a fully automated dynamic positioning and power management system. Wet and dry laboratories, diving facilities and an impressive suite of deck handling cranes, winches and A-frame, will provide the necessary facilities to undertake all the required shallow seas scientific research operations. Sleeping and messing accommodation for 10 persons will be incorporated.

Leonardo will incorporate systems and hardware from numerous NATO nations. The hull will be built by Remontowa in Poland with superstructure and assembly in U.K.

Main generators will come from Cummins in the U.S.; azimuthing thrusters from Schottel, Germany; electrical distribution and power management will be by Ansaldo, Italy,and cranes will come from Effer, Italy.

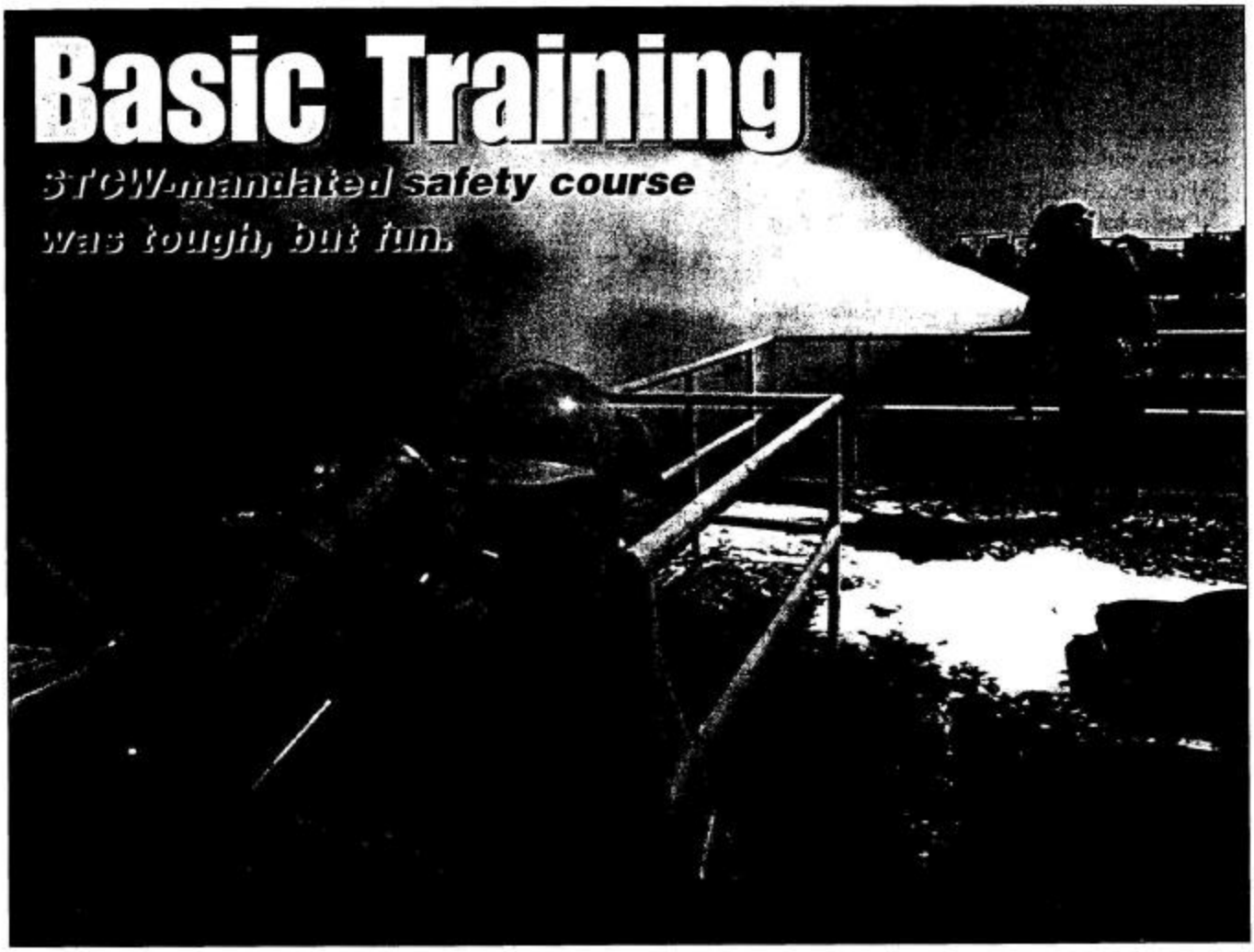
Winches will come fromMarine Project Development, U.K., and watertight doors from Winel/Dollco, Holland.

The vessel, when delivered, will be a technological step change which will significantly enhance NATO's defense related undersea research capabilities and further contribute to military requirements. **ML**

Training

Basic Training

STCW-mandated safety course was tough, but fun.



Donna Young

The STCW course includes fire prevention and firefighting training where trainees don full firefighting gear including self-contained breathing appartus.

By Ken Hocke, Senior Editor

In 1995, the International Maritime Organization revised the Standards of Training, Certification and Watchkeeping (STCW) Regulation VI/1 and Section A-VI/1. Consequently, masters, officers and watch personnel must successfully complete additional safety training by February 2002 in order to obtain or maintain their mariner licenses. In September, Rick Schwab, project manager, maritime and industrial programs community outreach for Delgado Community College Maritime and Industrial Training Center (formerly Delgado's Marine Fire School) in New Orleans, invited me to go through its five-day, 40-hour training course to "see what it's like."

DAY 1

I arrive at Delgado's eastern New Orleans training facility early on a Monday morning. Taking a seat at a picnic table outside, I wait with my classmates—five guys from ENSCO Marine Co., Dallas; two from Sea Mar Management Inc., New Iberia, La.; one from Power Offshore Services Inc., Belle Chasse, La.; and one New Orleans-based merchant mariner. As I sit there listening to the conversation, I feel like I have the word GREENHORN stamped across my forehead. The group goes through a dozen cups of coffee and almost twice as many cigarettes before we walk into a classroom to begin *Basic Fire Prevention and Fire Fighting*.

Our instructor, Andrew Vigueira, a 21-year veteran of the St. Bernard (La.) Fire Department, stresses that boats are small communities unto themselves. Negligence on the part of even one crewmember can put lives in danger. He drives home the importance of maintenance as prevention.

"Fire prevention ought to be our goal," he says. "We're in a little city of our own. Anything anybody does affects us all."

Vigueira is passionate about taking the right steps in case a fire does break out. "First, find the fire. Then inform. Make sure you give the location and what kind of fire—electrical, chemical, whatever," he says. "Keep it controlled, don't let it spread. When it's out, post a fire watch for at least a half hour."

And so it goes for the next few hours, stopping now and then for short breaks. After lunch, we take our first written test. My anxiety grows. Any grade lower than a 70 is a failure. I have to pass if I am to establish any credibility with my fellow trainees. I score an 85, one of the lowest grades in the class.

I make it over the first hurdle. But I lament the fact that I didn't do better. "That's not bad, especially considering you haven't had any of this before," says Capt. Stan Bass, one of my classmates. "We've all had at least some of it." I like Stan.

When we return, Vigueira takes us through *Responding to Shipboard Emergencies and Rescue, Emergency and Non-Emergency Movement of Patients.* Anne, a mannequin whose face and left arm has obviously experienced trauma, is used in demonstrations showing how to logroll onto a spine board and straddle slide onto the board. I come through with a 100 on the written test and feel better about things as the day ends.

DAY 2

They open the steel door just enough for three of us to get inside the black hull. Then the door closes behind. We move to our left, walking slowly through the heavy, black smoke. It's a search-and-rescue mission, but my immediate goal is to keep from walking into a wall, the stairway or an oil pan. I accomplish this by sweeping my flashlight, alternately bouncing the beam off the bottom of the wall and the boots of the guy in front of me.

We're making our way forward dressed in full firefighting gear, including SCBAs (Self-Contained Breathing Apparatus) when I hear the door open again. If daylight is filtering through the smoke, it's not reaching me. The door clangs shut moments later. The second team is in and moving to its right. At least that's what they're supposed to be doing.

The boots in front of me stop. I can hear myself breathing the air from the yellow tank strapped to my back. We move off to the right toward the stairway. The boots stop again and I hear a muffled, "There it is." I aim my flashlight in the direction he's pointing. There sits our rescue victim—a 3-gal. plastic bucket.

Our lead man reaches down, scoops it up, and leads us back the way we came. When we get to the wall, he pounds on it three times. The steel door swings open, and we step out into the fresh air.

We performed this exercise inside Delgado's ship mock-up, an impressive two-tiered structure that's part of the center's firefighting field. Veteran New Orleans firefighters Brian Johnson, Donald Abba and John LeBlanc had already taken us through hose-handling exercises, an electrical-box fire, and a gas-leak fire on a flange, before we donned the SCBAs for the search-and-rescue exercise.

Keeping our SCBAs on, we break into two groups to tackle an engine room fire inside the mock-up. Visibility is better this time around because there is fire, not just smoke. The exercise is a success, and we're finished with the SCBAs before the Louisiana sun provides the real heat of the day.

At lunch, I ask fellow trainee, Capt. Rick Berthelot, who has 29 years on OSVs, if he thinks the training is necessary. "Oh, yeah, I think it's something these guys can use," he says. "I've taken the 51-hour firefighting course here, and I'm still getting some-

thing out of it." Berthelot had open-heart surgery back in February—yet he gets no preferential treatment and asks for none. "No, my doctor cleared me," he says. "I can do anything these other guys can." So far, he's proven it.

After lunch, we tackle a number of other fires using hoses or fire extinguishers, depending on the circumstances. By 4:30 p.m., we've put in eight hours in the field, a long but satisfying day.

"We try to look at this training as giving these guys a firefighting tool box," Johnson says. "We want them to be able to open that box and use those tools."

DAY 3

"You can't beat the value of training. If you don't train, you won't survive." That's how Richard Bordner, a safety consultant

Dann Young

Ken Hocke gets ready to enter the pool.

who spent 22 years in the Navy, greets us on Wednesday morning. Having spent all day yesterday in the field, we will spend today in the classroom, the first half with Bordner as he guides us through *Personal Safety and Social Responsibility*.

What he stresses most is how much better conditions are today compared to years past. He cites improved safety conditions aboard vessels and platforms, employee assistance programs, and protection for employees reporting harassment or unsafe conditions.

I ring up a 96 on the written exam as we reach the halfway point of the course.

We head back to class after lunch to begin *Personal Survival Training*. John McMillan, president, McMillan Offshore Survival Training, Belfast, Maine, is our instructor. His family has been teaching survival training for decades.

We've practiced onboard emergencies, such as fire, but now we move onto a scenario in which the problem is too big for the crew to handle: the vessel or offshore platform is in danger of sinking, and we have to abandon ship.

I've been on enough vessels to know what a station bill looks like but have paid little attention to them. McMillan, and Bordner before him, emphasize the importance of these instructions for emergency procedures, including who is in charge, the type of alarm for each emergency, individual duties, and escape route and lifesaving equipment locations.

McMillan encourages us to stay with the vessel or platform as long as possible. "Man was not meant to be in the water. It's a hostile environment," he says. "Water has and will continue to take lives."

However, once the decision is made to abandon ship, make sure a Mayday distress call is made. McMillan takes us through the 14-step procedure from making sure the radio is turned on to repeating the word "Mayday" three times to saying "over" when finished.

Then we go through the crisis priorities: Protection—This can come from other survivors, extra dry clothing, lifejackets, lifeboats, liferafts or temporary shelter such as floating debris. Detection—The object here is to attract attention by staying together to create a bigger target and/or by using EPIRBs, flares, and items that reflect. Sustenance—Food and water.

"It's not the biggest or meanest who survives," McMillan says, "but the one who applies consistent, sound judgement and common sense."

DAY 4

I swim underwater and come up inside a rectangular aluminum frame with three blue seats that look like salvage from a bowling alley. For all intent and purposes, I'm in a helicopter that's about to go into the water. In reality, I'm in the shallow end (about 4') of a swimming pool at the University of New Orleans. We've been in the water for about two hours at this point.

I strap myself in, leaving my left hand near the belt release. Then I put my right hand on the frame so that I know which way to swim out by following my arm in case I get disoriented. I'm in a single seat, two of my classmates sitting across from me.

Our instructors, Haas McMillan and David Hinyup, are on the outside of the frame. They give us a heads-up, turn the cage upside down, and push it down. As the cage goes over, so does my helmet. When I grab for it, I forget to blow air out of my nose as we rush toward the bottom. Our instructions are to remain in our seats for an eight count before releasing ourselves and swimming to the surface.

When the cage hits the bottom, I've already taken in more water than I can handle. I pop the belt latch, kick out of the cage, and swim to the surface. My classmates are quick to tell me that it's the fastest eight count they've ever witnessed. Humiliated, I swim to the side of the pool. "Don't worry about it," says McMillan. "You'll do better on the next go around. This happens all the time." Somehow I wasn't convinced.

While I wait to redeem myself, I think about the up-and-down day I'm having.

It started with four more hours of survival-training class instruction, including flare-lighting demonstrations. Before lunch, we take the written test. I score an 84—the lowest grade in the class!

Things get better after lunch when we get into the pool. Fully clothed, except for shoes and socks, we strap on our lifejackets and practice entering the water properly, both from the side of the pool and from a 10' platform. Then we pair off and alternate towing one another across the pool.

Our next duty is to enter the water, swim to a circular, 12-man raft, and climb aboard. Although we are only in the raft for about 10

Doug Young

In water, it's important to create a big target for rescuers.

minutes, it's a fairly uncomfortable period. People are laying on others legs, stepping on feet, rocking the boat. McMillan tells us about the importance of having someone in charge so that there is some order aboard. Six to eight hours of this would seem unbearable unless there's a lot of cooperation.

We then get out of the pool and into one-piece, bright orange, neoprene immersion suits used for survival in cold waters. Although mariners that live in colder environments can get these suits on themselves, most of us have to pair off again to get these sausage casings on. Astronauts walking on the moon's surface look like ballet stars compared to us waddling our way toward the pool. Once in the water, McMillan shows us how to stand up in the suits. We look like 11 large orange corks bobbing in the water. Then we get on our backs and lock arms to demonstrate how to create a bigger target for rescuers.

McMillan calls me to the cage again. This time I have my helmet on so tight a gum wrapper couldn't fit between it and my skull. They flip the cage and push it to the bottom. Once there, I count to eight using the one-thousand-one method. Then I pop my belt, swim clear and head for the surface.

DAY 5

This is another eight-hour day of class: four hours of CPR and four hours of first-aid training. There is a written test for each half day. These tests are written by the American Red Cross—80 is the lowest possible passing grade.

Brian Johnson is our morning instructor. Each of us is given a rubber dummy's upper torso for use in practicing our emergency breathing and CPR techniques.

"Once you decide to help someone," Johnson says, "it's very important to stay with it until someone relieves you or you're too worn out to continue."

The morning moves quickly as we work with our dummies, covering casualty assess-

Ken Hockie

Day 5 includes four hours of CPR.

ment, body structures and functions, casualty positioning and the unconscious victim.

We take a test before lunch. I score my first 100 since Monday.

At lunch, my fellow trainees discuss the class and the instructors. "These instructors do a good job," says Capt. Berthelot. "They make sure you get the information you need, but they joke with you too. It keeps it from getting dull."

Rick Heyd, a 25-year veteran of the St. Bernard Fire Department, handles the first-aid course. He tells us that injuries are the No. 1 health problem in the U.S.

"A lot of injuries can be avoided," he says. "And when a family member goes down, your being able to help them is the biggest test."

Heyd covers heart attacks, wounds, shock, burns and scalds, bandage application and first-aid kit use. "Shock cannot be managed effectively alone," he says. "You've got to have help for that one."

Somehow I chalk up another 100 on the afternoon test, relieved to have made it through the course. Outside, Capt. Berthelot says the training is more than just meeting license requirements. "You might save some guy's life out there, too," he says.

We file back into class to get our certificates. Someone points out that the Coast Guard wants mariners to repeat this training every five years. "They just want to make sure your proficiencies are in place," Heyd says.

Class is dismissed, and there's a stampede out to the parking lot. I stay behind to talk to some of the staff and faculty.

"We try to provide a service to mariners, offering companies the flexibility to work around people's schedules," says Schwab. "We work them hard, but we also try to make it as enjoyable an experience as possible."

When I leave about 10 minutes later, some of my classmates are still in the parking lot. They invite me to have a beer with them. Finally, I think, an exercise I can bring a wealth of experience to.

Sr. Ed. Note: Thanks goes out to Kathleen Mix and the Delgado staff for their cooperation. And a special thanks to my fellow trainees—Capt. Stan Bass, Wayne Venison, Capt. Mitch Jackson, Nolan (Lyle) Tanplain, Glenn Abernethy, Capt. Rick Berthelot, Allen Isgitt, Michael Collins, Capt. Chris Cressione, and Shawn Ruiz. Contact Delgado at 877-371-8206. WB

Using Computer Based Training for STCW Basic Training

Houston Marine Training Services has partnered with MGI International Inc., of Vancouver, BC, Canada, to provide Computer Based Training (CBT) delivery of the classroom-theoretical portions of STCW-Basic Safety Training. An impetus for this deal is the urgency for mariners to comply with international regulations of the Standards for Training, Certification and Watchkeeping (STCW), as under current traditional training delivery parameters, it is expected that 60 - 80 percent of companies will be compliant with STCW by February 1, 2002. The availability of this training in a CBT format will increase the training capacity to meet the demands currently facing the maritime industry.

The CBT program is approved by the U.S. Coast Guard and fully meets the STCW requirements for the traditional classroom portion of Basic Safety Training. The courseware is delivered using interactive multimedia that combines CBT with practical training. The modular design allows ongoing student interaction in a proctored, self-paced learning environment. Each student must still be assessed for proficiency in fire fighting, water survival, and first aid. The benefits of this training method delivered in an electronic teaching format are crew flexibility, cost savings, and student data management.

Maintaining crew flexibility is vital to companies competing in a global economy. Training is available around the clock when delivered onboard the vessels. When the student has completed the CBT elements, the student can enroll in the instructor lead practical field/final assessment for fire fighting, water survival, and first aid. Both companies and employees are burdened with the cost of training related expenses. The reduction in training hours, travel costs, and the integration of the training with work schedules will result in substantial cost savings. Each student's progress is captured on a "Student Access Card." Instructor observation capabilities allow electronic monitoring of the student's course progression. The scores and progress sheets are available to the instructor or training coordinator by accessing the administration database.

Circle 30 on Reader Service Card

ICS Launches Video Conferencing Breakthrough

The Institute of Chartered Shipbrokers (ICS) has launched a ground-breaking initiative by using video conferencing to deliver education and training to Europe. Funded in part by the Suffolk Technical and Enterprise Council, the video conference link will enable students overseas to receive tutorials directly from a tutor based at the ICS in London. Using sophisticated software the tutor is not only visible on screen, he/she is also able to use the screen as an overhead projector and a blackboard. Initially launched in Italy, Spain and Portugal on November 30, 2000, the Institute's Understanding Shipping course will be the first course to be delivered in this way. "This is a very good way of investigating what will be a key method of delivery in the future," says **John Barclay**, education consultant to Tutorship, the correspondence college of the ICS. "Through the use of video conferencing, we are meeting demand for the delivery of shipping education overseas in a cost-effective way," he adds.

Computer Based Training Program Wins USCG Approval

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*Other Computer Based Training, STCW 95 courses available on request.

CBT COMPUTER-BASED TRAINING

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Code Red Mariner

Code Red Mariner is the computer-based marine safety training program designed and produced by MGI International Marine Safety Solutions Inc.

Code Red Mariner (CRM) allows MGI International to fulfil its objective of delivering comprehensive and customized marine safety training at a reduced cost:

- CRM replaces time-consuming remote facility training with 24 hour on-site training.
- CRM limits costly drills by using simulations, such as liferaft launching and Marine Evacuation Chute simulations, to expose students to realistic scenarios.

The computer-based training program can be installed into your own system, should the minimum requirements be met, or in custom-built consoles that can be installed onboard or in shore facilities. The console interface includes a flat-panel touch screen, headphones, and a card-swipe unit.

The training program is modular by design and includes ongoing quiz questions and tests at the end of every lesson. The courses contain well-researched material validated by subject-matter experts. Presentation is enhanced through the relevant use of multimedia:

- animation
- 3-D simulation
- graphics
- digital video
- quality audio

The development of course curriculums, installation of the hardware and software if required, and training is managed by MGI International. The program stores student training records in a database accessible to designated personnel. The database can be integrated with existing business management software either onboard or at a remote location.

Courses:

MGI International currently provides the following STCW Basic Safety Training courses that have been approved by the US Coast Guard:

- Basic Medical Emergency
- Personal Survival
- Basic Fire Fighting
- Personal Safety and Social Responsibility

Other STCW courses presently offered are:

- Crowd Management and Human Behaviors
- Crisis Management
- Vessel-Specific Safety Training

Other courses developed by MGI International are:

- The ISM Code
- SOLAS
- STCW Regulations
- Safety Management System
- Non-Conformance Reporting
- Marine Occupational Safety
- WHMIS
- Safety Organization
- Personal Safety in Emergencies
- Shipboard Hazards
- Marine Evacuation Chute (MEC)
- IBA Operator's Course
- Atmospheric Testing
- Gas Monitors
- Permit System

MGI International also offers custom courses to meet the customer's needs. The ISM Code, Safety Management System, vessel-specific, and corporate safety courses are custom-built courses presently operating.

Related Pages:

- Benefits of using CBT
- FAQ
- Spec. Sheet
- Customer Support

U.S. Department of Transportation
United States Coast Guard

Commanding Officer
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16721
NMC Policy Letter 9-99

December 3, 1999

From: Commanding Officer, National Maritime Center
To: Distribution

Subj: Medical Training And Qualifications Set Forth In The International Convention On Standards Of Training, Certification And Watchkeeping For Seafarers, 1978, As Amended (Stcw)

1. This policy letter provides guidance concerning training requirements for certification of mariner competence in the field of medical care.

2. This policy letter supersedes and cancels NMC Policy Letter 21-98, *Acceptance of Training for Qualification as a Person in Charge of Medical Care Onboard Ship.*

3. Strictly speaking, the scheme for medical care competency required of a seafarer laid out in the STCW provides four levels of competency and affects every mariner on a seagoing vessel. Each level of competency is defined and briefly discussed below, and in separate enclosures which may be reproduced locally as information fliers.

a. The first level of medical competency, elementary first aid, is the training included as one of the four elements of basic safety training (BST) described in the STCW Code, Section A-VI/1.2.1 and Table A-VI/1-3. This training is discussed in enclosure (1).

b. The second level of medical competency is for mariners designated to provide medical first aid onboard a ship and is set forth in the STCW Code, Section A-VI/4.1 to .3 and Table A-VI/4-1. Under the STCW, each applicant for a license as an officer in charge of either a navigational watch or an engineering watch must meet the requirements of STCW Table A-VI/4-1 (required by STCW Code, Table A-II/1 for deck officers and Table A-III/1 for engineering officers). In addition to these mandatory requirements, other mariners may qualify in this competency and be issued the appropriate documentation. The requirements to qualify as a Medical First Aid Provider are discussed in enclosure (2).

c. The third level of medical training is required for a mariner who is designated to take charge of medical care onboard ship and is set forth in the STCW Code, Section A-VI/4.4 to .6 and Table A-VI/4-2. Issues relating to the training and certification for Person in Charge of Medical Care (PIC Medical Care) are discussed in enclosure (3).

d. The fourth level applies to officers qualified at the management level for service on vessels of 500 gross tons (ITC tonnage) or more. Applicants for licenses as master and chief mate must demonstrate the medical competencies identified in STCW Code, Table

Subj: MEDICAL TRAINING AND QUALIFICATIONS SET FORTH IN THE STCW

A-II/2. Applicants may elect to demonstrate these competencies by completion of approved or accepted training as discussed in enclosure (4).

4. In addition to the competencies discussed in the enclosures, the STCW Code, Section A-VI/1.6 requires that all crew members receive sufficient information and instruction to take immediate action upon encountering an accident or other medical emergency before seeking further medical assistance onboard. Crewmembers who have completed the elementary first aid element of basic safety training meet this requirement, as discussed in enclosure (1).

5. The training that leads to competency in levels one, two, and three is modular. While many of the topics are similar, each course stands alone. To qualify for a competency at levels two or three, a mariner must already be qualified at the lower level(s). Elementary First Aid is a prerequisite for competency as Medical First Aid Provider. Elementary First Aid and Medical First Aid Provider are prerequisites for competency as PIC Medical Care.

6. The approval of courses to meet STCW standards is discussed in the enclosures. A training provider who wishes to have a course approved should contact the National Maritime Center (NMC) in accordance with the guidance in NMC Policy Letter 7-98, *Submission of Applications for Course Approval.*

7. Each of the enclosures may be reproduced locally to serve as an information flier about the medical competencies.

M. S. BOOTHE

Encl: (1) Competency in Elementary First Aid
(2) Competency as Medical First Aid Provider
(3) Competency as a Person in Charge of Medical Care
(4) Competency at the Management Level

Dist: All District Commanders (m)
Commandant (G-MSO-1)
All COs MSOs
All Activity Commanders
All RECs

COMPETENCY IN ELEMENTARY FIRST AID

OVERVIEW

1. Elementary first aid training is designed to provide a mariner with the knowledge, understanding, and proficiency to take immediate action upon encountering an accident or other medical emergency.

2. The STCW Code, Section A-VI/1 requires seafarers employed or engaged on a seagoing ship on the business of that ship as part of the ship's complement with designated safety or pollution prevention duties in the operation of the ship to receive appropriate BST. Elementary First Aid is one element of BST. For this element, each crewmember described above must provide evidence of having achieved the required standard of competence to undertake the tasks, duties, and responsibilities listed in column 1 of STCW Code, Table A-VI/1-3. Once initial competence is achieved, the mariner must be reassessed in this competency at least every five years.

3. The requirement for completion of this element of BST became effective 1 February 1997. All mariners who are required to meet the Elementary First Aid requirements must carry acceptable proof of competency as required by 46 CFR 15.1105(c), even if they have a Medical First Aid Provider or Person in Charge of Medical Care endorsement. To accommodate the large number of mariners who needed this training immediately, several alternative schemes were devised to enable mariners to rapidly meet the required standards. These interim schemes and the acceptable proofs of competency are summarized in NMC Policy Letter 5-99 available on the World Wide Web at http://www.uscg.mil/hq/g-m/marpers/pag/policy.htm.

4. Mariners who have completed a course approved or accepted by the Coast Guard as a course in Elementary First Aid meet the requirement for first aid training in the familiarization training required by STCW Code, Section A-VI/1.6 and 46 CFR 15.1105(a)(2)(vi). The course must have been completed on or after August 1, 1993.

5. The following personnel have been determined to meet the STCW's standards of training and assessment in Elementary First Aid:

   a. A staff officer holding a certificate of registry as a medical doctor, professional nurse, marine physician's assistant, or hospital corpsmen; or

   b. A mariner holding a valid qualification as an emergency medical technician (EMT) (non-ambulance), EMT (ambulance) or as a paramedic.

Personnel meeting the Elementary First Aid requirements in this manner should carry the appropriate credential as the proof of meeting these requirements required by 46 CFR 15.1105(c).

TRAINING AND COURSE APPROVAL

1. The Coast Guard will approve Elementary First Aid courses that cover the learning objectives of Table A-VI/1-3 of the STCW Code. International Maritime Organization (IMO) Model Course No. 1.13, *Medical Emergency - Basic Training*, contains the recommended course content with a length of 12 hours. The Coast Guard has determined that a one day course of eight hours in length

would meet the STCW requirements. Training providers may further refine the IMO Model Course and submit to the NMC for approval, but should ensure that all STCW competencies are taught and assessed.

2. The Elementary First Aid course may be taught separately or included as a part of the required BST course or program.

3. The Coast Guard has not yet determined whether courses approved to meet the requirements of 46 CFR 10.205(h) also meet STCW training requirements. We are working with the American National Red Cross to resolve this issue. In the interim, such courses are not considered equivalent to STCW-compliant courses. To be accepted as meeting the requirements for initial or reassessment of skills in Elementary First Aid, course completion certificates must specifically state that the course is Coast Guard approved as meeting the STCW Code, Section A-VI/1.2.1.3. Some Red Cross Chapters have asked for and received STCW approval; these courses are on the approved course list maintained by the NMC.

4. Once trained, mariners must maintain the minimum standard of competency in elementary first aid, as well as the other required elements of BST. Mariners can demonstrate that they have maintained these skills by assessment of a practical demonstration of their skills and abilities by a Coast Guard approved designated examiner, or completion of a Coast Guard approved or accepted refresher course.

COMPETENCY AS MEDICAL FIRST AID PROVIDER

OVERVIEW

1. Training as a medical first aid provider is the second level of medical training required by the STCW. Medical first aid providers must have the knowledge and skill to conduct a primary and secondary survey of a sick or injured crewmember, immobilize the patient, and begin immediate treatment to preserve life. These are all skills which typically must be performed before obtaining radio medical advice. The STCW Code, Table A-VI/4-1 is a complete list of the required competencies.

2. The STCW Code, Table A-II/1 requires an applicant for certification as an officer in charge of a navigational watch on seagoing vessels 500 gross tons (GT) as measured under the International Tonnage Convention (and equivalent to 200 gross register tons using the domestic tonnage scheme) or more to meet the standards in Section A-VI/4.1 to .3. Similar provisions in the STCW Code, Table A-III/1, apply to an applicant for certification as an officer in charge of an engineering watch or a designated duty engineer on a vessel with main propulsion machinery of 750 Kw (1,000 HP) or more. Officers licensed as a mate of vessels of 500 gross register tons or more or as an assistant engineer on vessels of 1,000 or more HP must meet this requirement to receive an STCW form if:

a. They began the service or training after 1 August 1998; or

b. They are issued their licenses on or after 1 February 2002.

The requirement for this training does not apply to currently licensed officers or to candidates for licenses who began training or service before 1 August 1998 and who receive their licenses before 1 February 2002.

These requirements are summarized in the following table.

ISSUANCE DATE OF LICENSE	AND THE TRAINING OR SERVICE BEGAN	THEN THE MARINER MUST COMPLETE AN APPROVED COURSE MEETING
Before 1 February 2002	Before 1 August 1998	46 CFR 10.205(h)
Before 1 February 2002	On or after 1 August 1998	The STCW's standards in STCW Code, Table A-VI/4-1*
On or after 1 February 2002	Anytime	The STCW's standards in STCW Code, Table A-VI/4-1*

* The course's approval letter must specifically state that completion of the course meets these STCW standards.

Enclosure (2)

3. Licensed mariners described in paragraph two and licensed officers at the management level will not have the Medical First Aid Provider endorsement placed on their license, MMD, or STCW form because it is an inherent qualification of the license. A mariner who is not required to complete Coast Guard approved or accepted training as Medical First Aid Provider may still elect to do so and will have his or her STCW form endorsed as Medical First Aid Provider in accordance with 46 CFR 12.13. If no other STCW qualifications require the issuance of an STCW form, the endorsement will be placed on his or her merchant mariner's document (MMD). If the mariner does not hold an MMD, the endorsement will be placed on his or her license.

4. The following personnel have been determined to meet the STCW's standards of training and assessment for Medical First Aid Provider:

a. A staff officer holding a certificate of registry as a medical doctor, professional nurse, marine physician's assistant, or hospital corpsmen; or

b. A mariner holding a valid qualification as an emergency medical technician (EMT) (non-ambulance), EMT (ambulance) or as a paramedic.

Personnel qualifying as Medical First Aid Provider in this manner will be issued an endorsement, if appropriate, in accordance with paragraph 3 above.

Personnel qualifying as Medical First Aid Provider in this manner also meet the Elementary First Aid training requirements and should carry the appropriate credential as the proof of meeting these requirements required by 46 CFR 15.1105(c).

5. Other mariners may qualify for this endorsement based upon completion of Coast Guard approved or accepted training, or other training equivalent to the STCW's standards. Applicants using the latter alternative should forward the following information to the National Maritime Center for evaluation:

a. A resume of his or her training and skills in this area, including information on course's content, provider and instructor(s);

b. Proof of completion;

c. Proof of any professional rating (i.e., EMT, etc.); and

d. If the training was completed over five years ago, information about maintenance of the skills in this area.

TRAINING AND COURSE APPROVAL

1. The Coast Guard will refer to this second level training course as the Medical First Aid Provider Course.

2. The Coast Guard will approve a course that leads to the endorsement of Medical First Aid Provider if the course covers the learning objectives of Table A-VI/4-1 of the STCW Code. IMO Model Course 1.14, *Medical Emergency - First Aid*, is a useful guide to achieving the learning

objectives. The IMO Model Course recommends a course length of 21 hours. The Coast Guard agrees that a course of 21 hours in length would satisfactorily meet the STCW requirements. Training providers may further refine the IMO Model Course and submit to the NMC for approval, but should ensure that all STCW competencies are taught and assessed.

3. To be accepted as meeting the requirements for assessment of skills as Medical First Aid Provider, course completion certificates must specifically state that the course is Coast Guard approved as meeting the STCW Code, Table A-VI/4-1.

4. Completion of a course approved as meeting the STCW Code, Table A-VI/4-1 will also meet the requirements of 46 CFR 10.205(h).

5. A prerequisite for starting this course is to have achieved competency in Elementary First Aid.

COMPETENCY AS A PERSON IN CHARGE OF MEDICAL CARE

OVERVIEW

1. Training as a Person in Charge of Medical Care (PIC Medical Care) is the third level of medical training provided under the STCW. This competency provides for a specified crew member or crew members to effectively participate in coordinated schemes for medical assistance on seagoing ships and to provide the sick or injured with a satisfactory standard of medical care while they remain onboard. Among other competencies, skill must be demonstrated at: using various splints, braces, dressings and bandages; using a resuscitator; using a stretcher; suturing; nursing care; and administration of medications. The average ship's crew member, including senior officers, is typically unfamiliar with such skills.

2. A mariner who meets the requirements for this competency will have his or her STCW form endorsed as PIC Medical Care. If no other STCW qualifications require the issuance of an STCW form, the endorsement will be placed on his or her merchant mariner's document (MMD). If the mariner does not hold an MMD, the endorsement will be placed on his or her license.

3. Because Medical First Aid Provider is a prerequisite of PIC Medical Care, and neither endorsement has a requirement for refresher or other recurring training, endorsement as both is not necessary. The PIC Medical Care endorsement replaces the Medical First Aid Provider endorsement on the mariner's credential.

4. The STCW is not a manning document; it establishes standards for a mariner's professional qualification. The manning laws and regulations of the United States do not require a vessel to have someone specifically designated as a person responsible to take charge of medical care. If by practice, company policy, or to meet STCW requirements, someone aboard a seagoing ship is designated to take charge of medical care, that individual must meet the standards of competency set forth in STCW Code, Section A-VI/4-2, and be able to produce evidence of having met those standards. Having a mariner onboard with this certification may eliminate potential port-state control problems which could otherwise result.

5. Staff officers holding a certificate of registry as a medical doctor, professional nurse, marine physician's assistant, or hospital corpsman have been determined to meet the STCW's standards of training and assessment for PIC Medical Care. Personnel obtaining the PIC Medical Care endorsement in this manner will be issued an endorsement in accordance with paragraph 2 above. Personnel qualifying as PIC Medical Care in this manner also meet the Elementary First Aid training requirements and should carry the appropriate credential as the proof of meeting these requirements required by 46 CFR 15.1105(c).

6. NMC Policy Letter 21-98, *Acceptance of Training for Qualification as a Person in Charge of Medical Care Onboard Ship*, which is cancelled by this policy (NMC Policy Letter 9-99), erroneously allowed a mariner holding a valid qualification as an emergency medical technician (EMT) (non-ambulance) to receive an endorsement as PIC Medical Care. A more in-depth comparison of EMT training and assessment procedures with Table A-IV/4-2 of the STCW Code

has shown that the Code requires training and assessment in topics not usually covered in EMT courses, such as: suturing; wound healing; nursing care; diseases and disease prevention; dental care; etc. EMTs should no longer be given the PIC Medical Care endorsement.

TRAINING AND COURSE APPROVAL

1. The Coast Guard will approve courses leading to qualification as PIC Medical Care if the course covers the learning objectives of Table A-VI/4-2 of the STCW Code. IMO Model Course No. 1.15, *Medical Care,* is a useful guide to achieving the learning objectives. The IMO Model Course recommends a course length of 40 hours. The Coast Guard agrees that a course of 40 hours in length would satisfactorily meet the STCW requirements. Training providers may further refine the IMO Model Course and submit to the NMC for approval, but should ensure that all STCW competencies are taught and assessed.

2. To be accepted as meeting the requirements for assessment of skills as PIC Medical Care, course completion certificates must specifically state that the course is Coast Guard approved as meeting the STCW Code, Table A-VI/4-2.

3. The prerequisites for starting a course leading to a PIC Medical Care endorsement are to have achieved competency in Elementary First Aid and as a Medical First Aid Provider.

COMPETENCY AT THE MANAGEMENT LEVEL

OVERVIEW

1. Training at the management level is the fourth level of medical training required by the STCW. The fourth level applies to applicants for licenses as Master and Chief Mate for service on vessels of 500 gross tons (ITC tonnage) or more. Such applicants must demonstrate the medical competencies surrounding organizing and managing the provision of medical care onboard ship. These are identified in Table A-II/2 of the STCW Code.

2. For all practical purposes, the medical care competencies in Table A-II/2 of the STCW Code are a subset of the competencies required for PIC Medical Care.

TRAINING AND COURSE APPROVAL

1. The Coast Guard will approve courses to assess medical care competencies leading to qualification as Master and Chief Mate for service on vessels of 500 gross tons (ITC tonnage) or more. Such courses must cover only the medical care learning objectives of organizing and managing the provision of medical care onboard ship in Table A-II/2 of the STCW Code. These competencies must be covered in the same manner and same level of detail as generally accepted to satisfy the training requirements for PIC Medical Care as shown in IMO Model Course 1.15, *Medical Care*.

2. No such courses have been approved by the NMC to date. Training providers may submit courses satisfying this requirement to the NMC (NMC-4B).

3. A mariner who completes a Coast Guard approved or accepted PIC Medical Care Course also meets the requirements for proving competence in medical care at the management level.

4. To be accepted as meeting the requirements for assessment of skills at the management level, a course must be Coast Guard approved as meeting Table A-II/2 of the STCW Code, unless it has been approved as meeting the requirements for PIC Medical Care.

Rigging for Safety

Rigging training should emphasize technical skill and safe practices

By Bill Davis

Because accidents injure or kill riggers every day, rigging is not an activity that people should be allowed to learn from their mistakes. Most accidents, in fact, can be avoided if riggers are properly trained.

The number of accidents can be reduced significantly at your facility by providing training that enables your personnel to recognize and avoid potential hazards. Effective training should include information that has proven to contribute to safe rigging practices. Elements of effective rigging training include the following:

- making mathematical calculations,
- inspecting and using rigging equipment,
- understanding safe rigging practices, and
- applying the techniques learned in the classroom.

These elements are discussed below, as well as general guidelines for customized training and government and industry regulations.

Making mathematical calculations

Riggers must have a grasp of how much they are actually lifting. And they can know this with any degree of certainty only by having the ability to calculate safe load limits, the balance point of loads, or proper sling angles for lifting loads. Moreover, riggers must be able to calculate volumes and recognize that equal volumes don't always have equal weights. This can be a factor in selecting the right lifting equipment and employing the best lifting techniques.

As an old farmer-turned-educator and rigging instructor, I try to make this point vivid to students by using practical examples, such as lifting bales of hay or straw. Hay bales are very dense and heavy, while straw is loose and light, yet both have the same volume. When the rope breaks because it is overloaded, and the crew has to pick up 15-20 bales of heavy hay while you try to splice the rope, a lot of time is lost. It's not likely that farmers will use calculators. For riggers, however, calculators make it possible to perform calculations with ease and confidence.

Bill Davis is an instructor at Hane Training, Inc., in Terre Haute, Ind. He became an instructor in 1992, after 32 years as a high school agricultural mechanics teacher. He received his B.S. degree from Purdue University in 1955 and his M.S. degree from Indiana University in 1965. Hane Training, a member of the Association of Crane & Rigging Professionals (ACRP), has been providing industrial maintenance training since 1978. For more information about ACRP, write to P.O. Box 61589, Vancouver, WA 98666, or call 800-690-3921.

Inspecting and using rigging equipment

Rigging equipment includes wire rope, hooks, chains, nylon slings, chain slings, wire rope slings, hoist chain, metal mesh, shackles, fiber rope, eyebolts, and metal mesh slings. A discussion of wire rope, for example, should include breaking strength and a rule of thumb for estimating safe working loads. Although all lifting devices should have a tag with the pertinent facts on it, all too often they don't.

A rule of thumb gives riggers a reference with which to estimate safe working loads. Another example is the inspection and use of nylon and poly-enclosed fiber slings. As with wire rope, breaking strengths, center of gravity, safe working loads, and a quick rule of thumb should be discussed. Also, the indicators of stretch and wear of these devices should be pointed out in training. The instructor should urge students to read the tags or labels; if these identifiers are missing, the maxim is, "If you can't read it, you don't need it." Each rigging tool can be treated in a similar fashion.

Safe rigging practices

Training should include a consideration of the basic safety equipment usually found in the workplace: hardhats, gloves, belts, harnesses, shoes, and so forth. These can vary greatly due to the different types of industries the students represent or the types of work the students perform. Regardless of the variations, the following rigging principles apply: center of gravity for lifting; angle of sling; safety design considerations; the weight of the objects to be moved; and the common sense required for the job.

Although safety should be a prime consideration in a basic rigging course, care must be taken in using the word "safety" itself. Don't try to use the word as a scare tactic; it can backfire on you. Studies have shown that trying to frighten people into compliance by showing them gory accidents doesn't work because students simply shut the media off. Moreover, a repetitive use of the term tends to make it too commonplace for significant meaning. My experience has shown that the best approach is to demonstrate safe practices throughout the training. Safe rigging practices are best learned by explaining the reason why, rather than by telling or soliciting horrifying stories of accidents. Try to keep discussions of safe rigging practices on a positive note.

Applying rigging techniques

People learn best and retain more from experience. In order to reinforce the learning that has taken place in the classroom, students should spend at least 50 percent of the course in hands-on laboratory experiments. Furthermore, discussion portions of the training should be highly interactive. While the instructor demonstrates topics, for example, students can take measurements and make calculations in their workbooks, which make useful job aids when completed.

Effective rigging training employs lab trainers (or stations) to closely simulate conditions found on the plant floor or at the construction site. An optional situation is to have two students per station. Students can measure the stress developed by each degree of angle on this trainer, and they can perform center-of-gravity experiments. Moreover, the stress angle factors associated with rigging activities can be calculated. Other experiments can include calculating the wear allowance for chain and wire rope.

Customization and jobsite training

The classroom and lab portions of the training can be customized to satisfy your rigging needs. To make it more realistic, some facilities like to take training one step further and move from the classroom and lab to the jobsite. Although this can be arranged with company approval, this practice has drawbacks. When considering the additional costs, space requirements, safety factors, liability, and number of people involved, the classroom and lab experiments prove to be the optimal alternative.

My experience has been that training at the jobsite leaves too many people standing around while only a few can participate. Moreover, few students care to participate. The principal objective of the basic course is to teach students why certain practices are essential and to help students recognize and avoid potential hazards. This can be accomplished with the practical use of actual equipment.

Government and industry regulations

Unless the course is advertised as one dealing with government and industry regulations, it is best to avoid referring to OSHA or other regulations as much as possible during the training because it "turns off" the students. The course should, of course, reflect all of the latest pertinent rules and regulations.

The training discussed in this article assumes that all students are at the entry level of rigging practices. It includes those who make the connections, estimate the loads, choose the equipment, and stand the greatest risk of injury or death due to faulty equipment or inappropriate or inadequate methods. Effective rigging training will teach riggers to calculate safe load limits; to properly inspect and operate rigging equipment; and to practice safe rigging techniques. This training, in turn, will greatly reduce or eliminate accidents at your facility. ▮

Rigging training "In a Flash"

Training & Inspection Resource Center (TIRC), Woodland, Wash., introduces the *In a Flash! Field Reference Guide*. *In a Flash* is designed to be used as a reference tool for inspecting rigging gear. It provides visual examples of damage, making it easy to determine if equipment should be removed from service. The flip book features a collection of 110 color photos depicting the most common types of rigging gear damage outlined by OSHA, ANSI, and ASME rules.

The guide can also be used as a self-guided training tool or as an instructor-led one- to three-hour training session. Each color photo includes a corresponding answer key, which includes black-and-white photos and notes about the problems found.

In a Flash! has been designed to fit easily into a shirt or hip pocket, which makes it readily available during inspections.

Quick Facts

What: In a Flash! Field Reference Guide
Who: Training & Inspection Resource Center (IRC), Woodland, Wash.
Cost: $19.95
How to order: Call 360-225-5666 or e-mail tirc@aol.com

Forklift safety refresher

Although forklift compliance rules have changed, basic safety tips remain sound advice. Safety Short Production, Inc., La Porte, Texas, has gathered some of these tips into a quick *Forklift Safety* video. The company field-tested 900 customers who used brief training videos weekly over the course of a year. Sixty percent indicated a reduction in accidents, while 4 percent noted no significant improvement.

The 5-minute forklift video demonstrates proper operating techniques on a real job site. To reinforce the importance of forklift training, actors kick off the viewing with a staged forklift accident.

Quick Facts

What: Forklift Safety Video
Running Time: 5 minutes
Who: Safety Short Production, Inc., La Porte, Texas
Cost: $79.95
How to order: Call 800-458-2236 or visit www.safetyshorts.com

Some of the recommended pre-operating safety tips include daily forklift inspections, checking the route, estimating load capacities, analyzing the load for tie-down needs, and wearing a seat belt. Operators are advised to turn off the engine before adjusting the forks, travel with the load low to the ground, avoid sharp cornering, and drive slowly without sudden stops or fast acceleration.

Basic procedures covered include loading pallets from above and transporting a load over a ramp. The company reminds viewers never to transport people on a forklift and to lower the forks when leaving the vehicle unattended. According to Safety Short Production, trainers are not to use the video as a stand-alone resource but rather as a supplement to a more extensive program or as a quick review of a few basics. Safety Shorts also offers the "Safety Shorts Training System," a series of videos for developing a weekly safety training program. ▮

Lowering the Boom

Proper operation of marine cranes takes training.

By Bruce Buls, Technical Editor

In college, when working on railroad steel gangs in Montana, the top-dog machine operator was the guy who ran the crane. Not only was his machine the biggest, it was the most vital. It also took the most skill to operate. College greenhorns could only dream of running the crane. Our machines looked a lot more like shovels.

In the Navy, crane operators are specially trained and certified. In the commercial fishing industry, crane operators can be deckhands who happen to be closest to the controls when a job needs to be done.

So while for many people crane operation is a career, for others it's an occasional job done with little training or experience. The closer any operator is to the latter, the more dangerous he or she is. With tremendous power and mobility, heavy loads swinging from the hook, and an inherently dangerous environment, marine crane operation can quickly threaten life, limb and property.

Recognizing the hazards and the need for training, the North Pacific Fishing Vessel Owners Association (NPFVOA) Vessel Safety Program in Seattle included "Crane Operations and Maintenance" in its Industrial Safety Program, which was developed about 10 years ago. During a one-day class, students are walked through the basics of safe and efficient crane operations. The in-class training is supported by a workbook and a video produced specifically for this training.

Jon Kjaerulff, president of Fremont Maritime, Seattle, wrote the original workbook. "The whole theme of the book," he says, "was to try to create a mindset in which the crane operator would be seen as being in charge of his area of operations, like the skipper or engineer would be in charge of a lot of other vessel operations. We wanted to cultivate some respect for the job."

Human factors that are important in operating a crane safely include training, experience, alertness and concentration.

Charles Summers

The material he and others developed define area of operations as the "crane environment," which is comprised of physical, human and weather factors.

Physical factors include the area encompassed by the maximum radius of the boom, both vertically and horizontally. Within that area, obstructions often prevent the crane operator from seeing the load, requiring him to depend on

than making them fast, is to make them comfortable. For example, we put in specially designed, reclining seats made by Sterling Upholstery in New Iberia (La.). We didn't think the ready-made airline seats were comfortable enough."

Part of the boat's homey atmosphere comes from the extensive use of wood in the interior. There is very little exposed metal or plastic in the accommodations, and the use of dark woods with contrasting wooden trim provides a sense of luxury.

There's seating in the main passenger area for 52, and the two aft main cabin lounges provide additional seating for 11.

The spacious wheelhouse has forward and aft steering stations with wheel and toggle steering. Communications equipment includes a JRC GMDSS system and a Globe Wireless high-frequency radio connection to the Internet, allowing the crew to send data directly to computers in Seacor's Houston headquarters. This allows Seacor management to access cargo manifests, personnel data, engine hours, and vessel position, which is automatically reported to headquarters on every transmission.

Although the *Victor O. McCall* is not presently SOLAS-equipped, it can easily be retrofitted to comply with international regulations.

"Supplying a boat in Nigeria can be a problem," says Seacor's vice-president for African Operations, Keith Gregory. "The boat has to be reliable enough to work without excessive repair and supply, and big enough to carry the parts and supplies that she will need. And since the Nigerian offshore oilfield is moving farther offshore, she has to have the speed and endurance necessary for long trips."

The boat is named, in part, after Seacor's retiring head of Nigerian operations, Chief Victor Obilor, who likes the boat's design. "This design will do well in the heavy seas off the African coast, and can operate out of primitive ports like Warri (Nigeria) without continual resupply worries," he says.

FULL-SERVICE YARD

Although Neuville is a small yard, modern technology and techniques allow it to provide complete design and manufacturing services. "We do everything except the carpentry," says Neuville. "We build our boats upside-down, frame by frame, and roll them over for equipment installation and finishing."

Bordelon says that the results of the vessel's sea trials were so encouraging that the company plans to model upcoming crew-supply boat designs after the *Victor O. McCall*'s basic hull form. "Seacor's Norman McCall said that she's the best-riding boat in their fleet," he reports, "so we feel like we've gotten the formula right."

Neuville has two crew-supply boats under construction now, including a sister ship for Iberia Crewboats & Marine Services. Seacor has also taken slots for several more *Victor O. McCall*-class vessels to be constructed in the near future. WB

direction from another person.

Human factors relevant to safe crane operations include training, experience, alertness and concentration.

Weather factors range from wind, rain, and snow, to sea conditions and darkness.

LOAD CAPACITY

One of the most fundamental factors affecting safe and efficient crane operation is the load. Every crane has a Safe Working Load, which is the maximum weight the crane can lift when the boom is fully extended (if it telescopes) and horizontal. The SWL is posted on the crane, generally on the base.

With marine cranes that swivel up from the horizontal, heavier loads can be handled as the boom angle increases (above horizontal) and when the boom is retracted. To determine safe loads at various angles and radii, the operator must consult the load capacity chart, which should also be posted on the crane, somewhere near the operator.

However, while an angle indicator on the boom may reveal the angle of incline, determining the radius can be difficult.

LeRoy LaMar, president of Arxcis Inc. and NPFVOA's crane-class instructor, says, "Operators can determine radius if the boom is either fully retracted or fully extended, but in between you don't really know what the radius is. I joke with people in class and tell them to put a measuring tape on the hook and you'll always know what the radius is, but obviously that's not going to happen."

One solution, says LaMar, is to never exceed the SWL, even if the crane will handle more—sometimes considerably more—at a shorter radius and greater angle.

But what if you don't know the weight of the load?

One method, according to the NPFVOA workbook, is to spot the safety hook over the center of gravity of the load and take up all slack in the wire rope using the winch controls. Then try lifting the load with the boom control only. Because the hydraulics controls are designed to a lower capacity than the boom's structural members, if the boom control is able to lift the load, the load should be safe, but only at the distance tested. If the load is lifted and moved outward, either by lowering the boom or extending the boom, the SWL may be exceeded.

Crane operators must also keep in mind the Safe Working Load of the wire rope and never exceed that.

There's a third SWL that must also be considered: the load's rigging.

LaMar, whose company is one of five nationally that is authorized to officially

inspect and certify marine cranes, says that while dangerously overweight loads are a concern, "We don't see many catastrophic failures. We do see some pretty beat up machines come back, but where you have failures is below the hook—in the rigging, that's where people get hurt. If the crane fails it's because something happened, maybe a lot of negligence, but those are infrequent. But rigging failure, people dropping loads, not knowing how to rig the loads, that's where the accidents are."

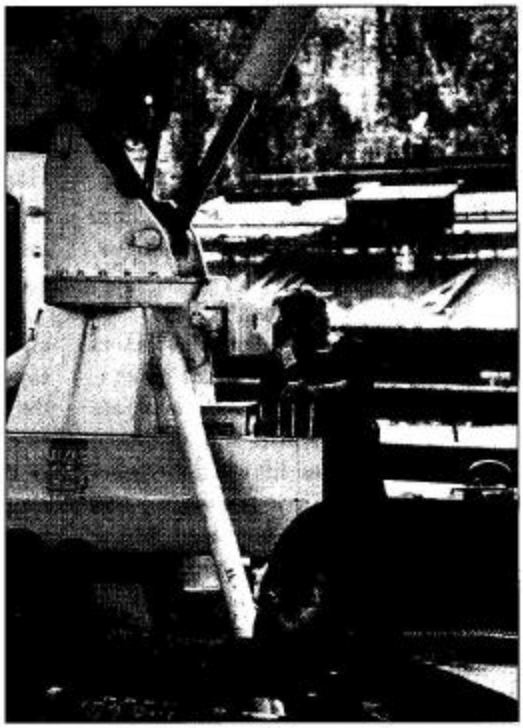
RIG IT RIGHT

Some tips on proper rigging from the NPFVOA workbook include: examine all parts of the sling for damage or wear, don't overload the sling, know how much strain you're putting on the sling, and rig tag lines.

Another practice that all safety experts would agree on is the use of proper hand signals for communication between the crane operator and the helpers. Standardized hand signals are available from the Occupational Safety and Health Administration.

LaMar says that in his experience, which is mostly with commercial fishermen, only about 10 percent use proper hand signals. "All kinds of hand signals are being used out there," he says. "And when you have two or three guys working a load, you'll have two or three guys giving hand signals. The operator needs to designate one person and use the standard hand signals. We really encourage that. Particularly when you're working with crews from different backgrounds. A lot will use verbal commands. But you can't always hear them and you can't always understand them."

LaMar believes the use of casual or impromptu hand signals comes from a mistaken macho attitude. "If a guy gives a real proper hand signal, he's a weenie. If he does kind of the sloppy ones, he's seen as more of a salt. The guy that does it the way he's supposed to is probably a greenie. We talk about this in the class, and they all kind of admit that you don't want to look like a goofball. We've developed this culture that says when you play it by the book, there's something wrong with you."



C. Summers

Obstructions often prevent a crane operator from seeing the load. This requires relying on others for direction.

But beyond that, according to LaMar, is the attitude of management. "It has to come from the top down. It means encouraging people to do things right and a certain lack of tolerance for doing things improperly. We sometimes see management saying this or that is important, yet when push comes to shove they'll take the low road to get the job done. So the real focus is not only on training the employee to be safe but also having the employers walking the walk as well as talking the talk. It's important. In the long run, it does save them money. Those who do the things for the right reasons are typically more successful."

For many marine operations, cranes are critical to the success of the vessel's mission. It pays in many ways to keep them well maintained and properly operated. **WB**

Elements of Effective Training

Important guidelines for developing a training program

By Charles Mize

The Occupational Safety and Health Administration (OSHA) has mandated that you train all your employees in the safety and health aspects of their jobs. This applies especially to crane operation and rigging applications in industry and construction because they are complex and dangerous occupations. Every year, accidents in the plant or on the construction site cost lives, serious injury, property damage, lost time, and legal fees.

According to a report by *Online Crane Accident Magazine* (www.craneaccidents.com), an OSHA study found that crane accidents in the United States claim 50 lives every year, with more than 500 U.S. construction workers killed in crane accidents between 1984 and 1994. In 1999, the online publication received reports of more than 100 crane accidents, which resulted in 50 deaths. The publication also acknowledges that it is reasonable to believe that not all accidents were reported. We don't know how much of this terrible loss of life was due to ineffective training, or no training at all, but the loss of one human life is too much.

OSHA and training

Although not a crane or rigging incident, the following story illustrates the fact that government regulatory authorities are going after companies that don't provide safety training for their employees. An OSHA regional news release issued last year read, in part, "A former De Land, Florida, subcontractor has been sentenced to three years probation after pleading guilty to a criminal misdemeanor for contributing to a worker's death in Orange Park two years ago."

Charles L. Mize is the director of training at Hane Training, Inc., in Terre Haute, Ind. In his position, he supervises the rigorous three-month instructor-training program; evaluates instructor deliveries; reviews and improves instruction and training; and supervises the design and development of new training. Hane Training, a member of the Association of Crane & Rigging Professionals (ACRP), has provided industrial maintenance training since 1978. For more information about ACRP, write to P.O. Box 61589, Vancouver, WA 98666, or call 800-690-3921.

The subcontractor was the second of two contractors sentenced in the case, which grew out of an OSHA investigation. Both contractors pled guilty to a misdemeanor for "willful disregard of OSHA's confined space requirements and for allowing a worker to enter the tank *without proper training* (italics added for emphasis) and safety equipment." Moreover, the second contractor pled guilty to a felony for falsifying records submitted to OSHA in an attempt to cover up the cause of the worker's death.

Training goals

Your principal goals as a manager are safety and productivity. Effective training can contribute to achieving these goals. All too often, management neglects training for new-hires while they undergo probation, or managers have the mistaken notion that experienced employees don't need training. These practices can lead to disaster.

Effective training will teach your employees to recognize and avoid hazards, consequently reducing or eliminating fatalities and injuries as well as equipment and property damage, thus improving overall safety records and increasing productivity. For those of you who realize that training is an investment rather than an expense (effective training can be a profit center), this article provides guidelines with which to design, deliver, evaluate, and improve an effective crane and rigging training program.

Elements of an effective program

Several educationally-sound guidelines describe effective training. The Standard of Excellence in Training of the Association of Crane & Rigging Professionals (ACRP) has an excellent list of requirements for training (see the accompanying sidebar). ACRP's Standard closely parallels the guidelines established by the International Association of Continuing Education and Training (IACET), the creator and caretaker of the continuing education unit (CEU). OSHA also has published voluntary guidelines with which to design and develop training.

The OSHA guidelines found in "Training Requirements in OSHA Construction Industry Standards and Training

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Guidelines" illustrate how to establish and maintain an effective training program. The OSHA guidelines are as follows:

- Determine if training is needed
- Identify training needs
- Identify goals and objectives
- Develop learning activities
- Conduct the training
- Evaluate program effectiveness
- Improve the program

These guidelines, discussed below, apply to all training, whether for overhead or mobile cranes, or for industrial or construction applications:

• **Determine if training is needed:** You train because employees need to know certain activities to perform their jobs correctly or safely. If they can't, you will have problems, and problems trigger the *possible* need for training—possible because not all problems can be solved with training. The first step in the training process is to determine whether the problem has a training or a non-training solution.

A clear instance of a needed training solution for safety issues is cited in the introduction of OSHA's Training Requirements in OSHA Construction Industry Standards and Training Guidelines. It states: "Many researchers conclude that those who are new on the job have a higher rate of accidents and injuries than more experienced workers. If ignorance of specific job hazards and of proper work practices is even partly to blame for this higher injury rate, then training will help to provide a solution." On the other hand, if safety problems are due to faulty equipment, environmental conditions, or other factors, training will not solve the problem.

Training should be designed to reduce or eliminate deficiencies and to increase job performance. It should be considered for employees who are unfamiliar with equipment, lack knowledge of a work process, or have been performing tasks incorrectly. If you determine that performance can be improved with a training solution, then the next step is to identify what kind of training is needed.

• **Identify training needs:** If the problem proves to require a training solution, conduct a needs assessment to define the course content (in other words, the subjects that need to be covered in the training). Keep in mind that the training content should include information that will help workers reduce or eliminate deficiencies and to increase job performance. Information for possible course content might be obtained from industry or government standards, job analysis, job hazard analysis, or an examination of the content of other training providers.

Content for rigging training might include such topics as rigging failures and their causes; rigging hardware; sling applications, methods, and inspections; weight calculations and planning; and using load charts.

Among the topics that might be included in crane training are machine components; machine inspections; crane setup; power line awareness; OSHA rules; hand signals; and crane load charts.

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Elements of Effective Training,
from page 18

• **Identify goals and objectives:** The next step is to develop learning outcomes. These outcomes describe knowledge and tasks that participants must know or perform to reduce or eliminate the deficiencies. When formulating learning outcomes, be sure to put them in concrete behavioral-objective terms that are observable and/or measurable.

Behavioral objectives are statements that require the participants to demonstrate the skills they have learned in the classroom or the lab. They are written using action words. For example, in a rigging course, an objective written in behavioral objective terms might say, "Students will learn in this course to inspect [action word] the following: hooks, chains, wire rope, etc."

In a crane course, an objective written in behavioral terms might be, "The student will learn in this course to read and perform [action words] hand signals."

• **Develop learning activities:** From the learning objectives, the course developers design learning activities and course materials to fulfill them. Course materials should be formatted to ensure that learning occurs. This is accomplished by carefully considering the learning process while developing your training materials. This includes the development of workbooks, job aids, hand-out materials, the design and building of trainers, and any other materials required to deliver the course.

The delivery techniques that can be designed for the training are described in the section below. The course developers can be members of your own staff or qualified persons with whom you contract. Either alternative requires that they have the prerequisite technical and methodological skills.

• **Conduct the training:** The instructors chosen to deliver the training must be qualified in technical content and training methodology attained by education and experience. Your instructors should not be chosen only for their industry experience and expertise; they should be chosen for their ability to communicate with your personnel as well. Whether you use your own staff or employ training providers, the instructors should have undergone a formal training and certification program in course content and training methodology.

During the training program, instructor candidates should learn how to properly draw students into full participation in the workshop. The instructor can actively engage participants in the training by employing a Socratic instructional technique by which he or she uses skillfully formulated questions to lead students to draw their own conclusions. This ability will result in deeper and longer lasting learning.

Furthermore, the instructor can use periodic review to reinforce the training that has already been presented in the course. An appropriate use of repetition has proven time and again to facilitate learning. And, if used properly, it allows the materials being presented to be referenced and tied in with previously covered materials. It also ensures that the materials are thoroughly understood.

Moreover, use all the senses in your training—auditory, visual, and kinesthetic—with a liberal use of audio-visual aids. Above all, include a lot of hands-on experience because people learn more and retain it better by doing. Also design activities that closely simulate conditions found on the plant floor or on the construction site. At least 50 percent of the time in your workshops should be devoted to hands-on experiences.

To be sure that the students have achieved the course objectives, they should be tested verbally and given a written test. Also, when feasible, performance testing on the job should be administered to ensure the transfer of learning from the classroom to the jobsite.

• **Evaluate program effectiveness:** Did the training achieve the course objectives and solve the training need? Student evaluations and course audits are among the ways to measure the effectiveness of your training. Another evaluation method is field audits.

"Standard of Excellence in Training"

Requirements of the Association of Crane & Rigging Professionals

1. A **"needs assessment"** shall have been performed to define the course needs.
2. The **skill and knowledge** needs that were defined by the assessment shall be utilized in the development of the course materials.
3. The **structure** of the course materials shall be logical and sequenced so that they utilize terminal and enabling objectives, as appropriate.
4. The **presentation format** of the course materials in a classroom, "hands-on," or other material presentation approach shall be structured and applied in a fashion that most effectively imparts the materials and also meets the defined objective.
5. The **instructors** that present course materials shall be knowledgeable and experienced in the topical area for which they are providing instruction, and they shall have sufficient instructional skills to effectively provide the instruction.
6. The **duration** of the sessions of training for the course shall be sufficient to address the course topics in a manner that allows the students adequate time to master the defined objectives.
7. The course material presented at a session of training shall be **summarized** at the end of each session to verify that the objectives defined for the session were addressed.
8. The **evaluation methods** used to verify the student's mastery of the defined objective shall consist of written, verbal, and performance-based techniques.
9. **Feedback** shall be obtained at the completion of each session of training.
10. A **review** shall be performed to verify the appropriateness of the program materials and presentation approach. Modifications to the program shall be based on feedback, refined needs assessment, or new technology.

Certification Gains Momentum

Employer recognition is boosting the pace of CCO crane operator certification

By Graham Brent

Just four and a half years after its formation, the National Commission for the Certification of Crane Operators (CCO) has tested more than 13,000 crane operators. CCO has conducted some 450 separate test administrations in 45 states since it began operations in April 1996. Although CCO offers no training itself, crane operator training and education programs available from companies within the industry are primary factors in developing and maintaining qualified crane operators, who can then go on to pass the CCO certification examinations.

"This volume of testing is a clear indication of the growing adoption of the CCO certification program by contractors, owners, and other employers," says Davis J. Lauve, CCO president.

Lauve, who is president of Nichols Construction Corp. in Baton Rouge, La., cites a Pennsylvania Department of Transportation (PennDOT) project where CCO certification is being required as typical of the kind of employer buy-in now being seen across the country. All crane operators on the $350 million extension of Interstate 99 between Bald Eagle and State College, Pa., need to be CCO-certified. One construction project is already under way, with seven more to be bid by the end of this summer.

"It's imperative that only qualified and certified personnel operate cranes or hoisting equipment," says James D. Ritzman, PennDOT construction project manager for the I-99 corridor. "By requiring our contractors to use only CCO-certified operators, we can be confident they have the knowledge and skills necessary for the safe operation of their cranes. Plus, with CCO certification, we know exactly what we are getting."

CCO certification is not the only first for PennDOT on this project, however. This is also the first time it has opted for an owner-controlled insurance program (OCIP). Gus Leysens, vice president of safety management with the risk management firm Willis Corroon, says: "Willis initiated the CCO requirement as part of the overall insurance 'wrap-up' program. CCO was a natural fit into the construction safety guidelines of the project."

Crane operator training and education programs offered by firms such as AmQuip Corp. in Bensalem, Pa., are important in developing and maintaining qualified crane operators, who can go on to pass the CCO certification examinations.

"In fact, CCO certification helps the contractors as much as it does us or PennDOT or anyone else associated with this project," Leysens says. "No one wants a crane accident. And

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Graham Brent is the executive director of the National Commission for the Certification of Crane Operators (CCO), Fairfax, Va. For more information, visit the CCO website at www.nccco.org.

An article in *CraneWorks* titled, "How Effective is Your Training?" (January-February 2000), advocates field audits of mobile cranes under actual working conditions to evaluate the effectiveness of training. Return-on-investment, staff retention, higher productivity, and, above all, a safer work environment are other means with which to determine the effectiveness of your training.

We can't improve on the advice of the ACRP with respect to the guideline, which says, "A review shall be performed to verify the appropriateness of the program materials and presentation approach. Modifications to the program shall be based on feedback, refined needs assessment, or new technology."

• **Improve the program:** The conditions and technology on which your courses are based is ever changing; consequently, you must continually strive to update them to account for these changes. We encourage you to develop processes to assure that your courses continue to satisfy your crane and rigging training needs. You can continuously improve your processes by measuring their performance. Moreover, we advise you to operate an ongoing training program to continuously upgrade the knowledge and skills of your instructors in course content and training methodology.

Documentation and certification

It is recommended that a careful record be kept of the training provided for employees. You should document the training in case of accidents for insurance and, most important, for OSHA. In this regard, "Training Requirements in OSHA Construction Industry Standards and Training Guidelines" states: "[I]t is usually a good idea for the employer to keep a record of all safety and health training. Records can provide evidence of the employer's good faith and compliance with OSHA standards. Documentation can also supply an answer to one of the first questions an accident investigator will ask: 'Was the injured employee trained to do the job?' "

Furthermore, keep records of continuing education units (CEUs) that you might award for training. Benefits of CEUs for your employees are to supply an employer with information on education and training experiences pertinent to an occupational competence; and to provide documentation to registration boards, certification bodies, and occupational societies. Moreover, after training your crane operators and riggers, consider having them certified for insurance purposes and for government regulatory agencies. Several qualified crane and rigging certifying agencies can test and certify your employees.

The payoff

Effective crane and rigging training can help you decrease operational and maintenance costs; increase quality and productivity; and, above all, protect the lives and health of your employees. Should you accomplish these, you will be more competitive and profitable. You can use the guidelines discussed in this article to establish and maintain your own effective program or to evaluate the effectiveness of the training of other training providers you employ. ▮

Certification Gains Momentum, from page 22

requiring qualified personnel that have been tested to the national CCO standard is a major step toward ensuring we don't have one."

Recertification time

This year will see the first wave of crane operators applying for CCO recertification. Operators certified at the start of the program are nearing the end of their five-year certification period and need to pass a written recertification exam in order to remain certified.

At two hours for the core exam and all four specialties, the recertification exam is shorter than the exam that candidates take for their initial certification. However, the recertification exam covers the same content areas as the original exam, while reflecting any changes to standards that may have occurred during the five-year certification period. Any recent technical developments to cranes also are covered.

Candidates who fail their recertification exam will have to take and pass the full written exam in order to be certified. Leon "Skip" Johnson, chairman of the Written Exam Management Committee, says that operators could take their recertification exams up to one year prior to the expiration of their certification.

The new five-year certification period would take effect from the end of the candidate's initial certification period, however. Thus, a candidate whose certification expires in January 2002 could take the recertification exam as early as January 2001. The new expiration date, providing the candidate was successful, would be January 2007.

Operators certifying in the first three years of the program did not have to take a practical examination; instead, they had to show evidence of 2,000 hours of crane-related experience in the four years prior to applying. But recertifying candidates have to pass the practical examination unless they have done so since it was introduced in 1999, Lauve adds.

Once CCO-certified operators pass the practical exam, they do not need to take it again on recertification if they provide evidence of 1,000 hours of crane-related experience during the five-year certification period. Of course, all CCO-certified operators must meet CCO medical requirements and maintain compliance with those requirements in order for their certification to be valid.

Growth factors

Contributory factors in the growth of the CCO program include official recognition by federal OSHA and participation by industry groups such as the Associated Builders and Contractors, the Associated General Contractors, and the Houston Business Roundtable (HBR), which represents the interests of petrochemical, construction, and industrial users in Texas and the Gulf Coast.

"It stands to reason that employers that adopt the CCO program can expect to reduce risk for all their employees, and their facilities in general," says Mike Rudnicki, HBR executive director. ▮

Unsafe at Any Speed

The "hurry up" approach to rigging sometimes results in injuries

By Mike Parnell

When it comes to rigging loads and moving materials, safety must always be the first consideration. The possibility of injury is always present—even in situations that seem simple. For this reason, it is critical that proper rigging procedures are followed. It's also important to recognize how hazardous even a simple load move can be to life and limb. Unfortunately, this was not done in the job described below.

This particular job involved removing bundles of extruded aluminum from a flatbed truck and placing the bundles inside a building's receiving area. The company was an anodizing facility that provides special coating treatment for metal products. The truck bay was sunken to allow a truck bed to be equal in height to the warehouse floor.

Three individuals were involved: a driver, a shop helper, and a warehouse foreman. Tom, the truck driver, had 25 years of experience delivering produce for a large grocery store chain. For the past two years, he had picked up and delivered steel and aluminum for an anodizing company. Hanson, 18, was the shop helper who was on-site as a member of a temporary labor pool. His most recent job experience was as a food handler for a restaurant chain. Wayne, the warehouse foreman, had worked for three years as a helper then as a foreman of in-house product transfers.

The load to be moved consisted of extruded aluminum stacked and banded into compact bundles between 1,500-1,800 pounds each. Bundles were 2 feet wide, 1 foot high, and 15 feet long. They were stacked side-by-side and on top of one another, with 2"x4" boards between packages. The synthetic sling being used was an eye-and-eye type consisting of 1 ply and measuring 4 inches wide by 10 feet long, with a vertical rated capacity of 6,400 pounds. The overhead monorail hoist being used had a 1-ton capacity and was capable of traveling the length of the truck bay and storage building.

The possibility of injury is always present — even in situations that seem simple.

The scenario

Tom, who arrived at the facility at 7:30 a.m., had numerous stops to make during a 12-hour workday, including a final destination that would not be completed until three hours after his last local delivery. Upon arrival, he started to offload the bundles of aluminum until Hanson arrived shortly after 8 a.m. Together, they rigged the sling in a basket hitch at the midpoint of two stacked aluminum bundles. Using the overhead hoist, Tom and Hanson lifted the double stack until the top of the load was chest high, making it easier to push toward the back of the warehouse.

Both men were holding onto each end of the bundles of aluminum. Hanson was backing through the warehouse with Tom walking forward. When they reached the stacking area, both were hesitant to let go of the load, which was necessary in order to grab the electric pendant control used to hoist and lower the load. Wayne, the foreman, was in the stacking area checking inventory and saw their predicament. Unfortunately, he could not get around the ends of the load because of clearance problems and couldn't grab the pendant control by reaching over the load. To reach the pendant control, he had to kneel down and pass under the suspended load.

As Wayne stood up after reaching the other side of the load, he heard a crash. Looking at Tom, who was standing at one end of the load, Wayne turned around quickly and saw Hanson lying on the floor with both legs under the load. As a result of the accident, Hanson lost the use of 40 percent of his right leg and 80 percent of his left leg.

Upon inspection, it was discovered that the sling had four plastic-like friction burns, one of which was completely severed at the exact location of a lower load corner bearing point. The other friction damage points matched the remaining three load corners. The sling, which had just been put into service that morning, showed no other damage.

Witness accounts indicate that the load began to tip up on Hanson's end and down on Tom's end. It appears to have slid toward Tom, with the aluminum-to-sling corner contact points creating enough heat to melt through the sling. While it tipped, Hanson held onto the load in an attempt to keep it from upsetting. As it went above his head, the sling parted, the bundle of aluminum struck the floor at the other end, and the tumbling aluminum fell onto Hanson's lower body.

Reasons for the accident

This accident raises several important questions. What elements or practices were outside the realm of

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good rigging? Did any poor practices lead to the accident? Which practices demonstrate the general attitudes toward conducting safe work at this employer's facility?

What is readily apparent is that Tom, the truck driver, was in a hurry because he had a long workday and extensive travel ahead of him. Perhaps to quicken the job, he opted to move more than one bundle at a time, even though the extra bundle knowingly overloaded the hoist. Then, Tom placed Hanson in immediate hazard by having him hold onto the load rather than use a tag line. Thus began a series of events that ultimately resulted in Hanson's accident:

- The load should have been lifted only a few inches regardless of rigging technique because the truck bed and warehouse floor were the same elevation. The load was high in the air, only for Tom's convenience, which created a very dangerous condition.
- The single sling in a basket hitch created a very unstable load. The center of gravity continually teetered over the sling bearing point, especially when pushing the load, creating a pendulum action.
- No wear pads or softeners were used between the sling and the load to minimize cutting or friction damage.
- The foreman intentionally passed under a live load. This load was visibly unstable since neither Tom nor Hanson felt comfortable enough to release his end to grab the crane's pendant control and lower the load.
- Hanson was not given any immediate instruction about what to do in case the load started to upset.
- The employer did not provide a new-hire with safety orientation or training sufficient to create awareness to hazardous situations in the facility.

Final analysis

It's not known whether Tom had received any training related to material handling. If he did receive training, however, he did not implement even the most basic elements of good rigging practices. Likewise, the foreman had likely not received any training in material handling. Again, if he did have some level of training, he failed to demonstrate any caution for an extremely hazardous situation. During the same morning, for example, the foreman did not stop the movement of previous loads that had used the same single basket hitch rigging technique.

Overall, it was simply a matter of time before a loss of load occurred in this facility using these techniques. The lack of good practices can be attributed—at least in part—to a lack of training, experience, hurried work, and general appreciation for true hazards. Unfortunately, this actual job resulted in a young man being wheelchair bound for the rest of his life.

We can all take a step back and say that we would never violate any of these simple items mentioned above. In performing a job, however, it is often too easy to slip into "hurry-up" mode and bypass important rigging procedures. ▮

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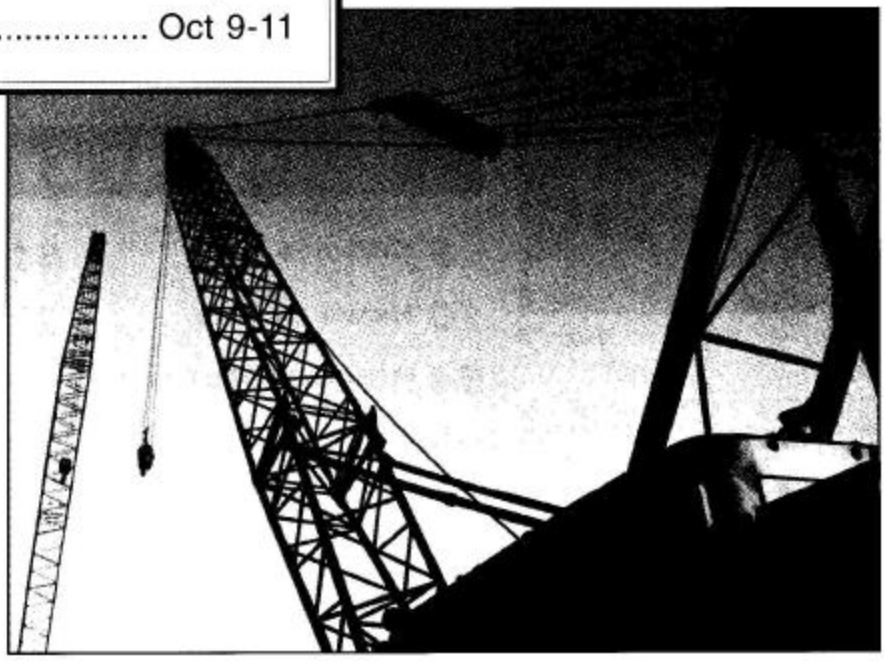

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The Need for Crane Operator Training

Training improves professionalism, productivity, and safety

By Dave Ritchie

Why should companies provide crane operator training? And what benefits does training provide crane operators? By providing training, a company may increase profits through better safety and increased productivity. For operators, training is equally beneficial because it helps increase their earnings while improving professional credentials. Ultimately, both companies and operators need training because it may prevent an injury or death.

A crane can injure people, damage property, and even destroy itself in a matter of seconds. Quite often, a crane is the most critical piece of equipment on a construction site. Yet many crane operators have little, if any, formal training and are not required to demonstrate any special knowledge about their profession.

Reap the benefits of training

Over the last 25 years, cranes have become much more sophisticated; however, the training most crane operators receive has decreased, mostly through elimination of trainee positions (oilers). Combining sophisticated machines with untrained operators is a road to disaster. Information that points this out is available in trade publications, local news sources, and on the Internet, including the website www.craneaccidents.com.

Many safety professionals agree that at least 98 percent of accidents are preventable. Just think of the potential dollar savings as well as the lives that can be saved when a good training program is in place. Plus, fewer accidents and losses mean extra money for better equipment and higher wages. Companies without good training are taking a dangerous gamble that will never pay off in the end.

OSHA standards and regulations

Current OSHA standards require little training for crane operators. When OSHA (29CFR 1926 Subpart N) became effective in 1972, it only included five points on crane operator qualifications or required training, which are included in B30.5 1968 (ANSI). That document is part of the OSHA standard by reference. Four of those points address the health and physical condition of crane operators. The fifth point allows employers to designate a qualified operator.

A seldom-recognized point in construction OSHA [29CFR 1926.20(b)(4)] reads, "The employer shall permit only those employees qualified by training or experience to operate equipment and machinery." While these regulations were appropriate in 1972, they don't meet the needs of today's crane industry.

Most cranes in 1972 had oilers, who performed an important job while learning the trade from the "old timers." With this position mostly eliminated and with the advances in technology, today's average crane operator is far behind operators of the past. Luckily, new OSHA forklift operator regulations signal future changes in crane operator regulations.

The Advisory Committee on Construction Safety and Health (ACCSH), an arm of OSHA, is considering changes to 29CFR 1926 Subpart N that will most likely require crane operator training. In February 1999, OSHA formally recognized crane operator certifications issued by the National Commission for the Certification of Crane Operators (CCO) as having demonstrated the qualifications required by the latest ANSI standard (ASME B30.5 1994). New training requirements will likely follow that standard.

Dave Ritchie, CSP, CHST, CCO, is a crane and rigging training specialist with St. Paul Fire and Marine Insurance Co. in St. Paul, Minn. He has seven years' experience as an estimator and project manager, 16 years' experience as a crane operator, and eight years' experience as a safety professional. He received his B.S. degree in construction management from Colorado State University. He is also a member of the Association of Crane & Rigging Professionals (ACRP) and the author of Professional Crane Operator, *a 40-hour training course developed jointly by The St. Paul and the AGC of America. For more information about ACRP, write to P.O. Box 61589, Vancouver, WA 98666, or call 800-690-3921.*

Significant 1994 ANSI operator qualification additions include the following:

1. Successfully pass four tests
   - Written exam appropriate to crane type
   - Combination written and verbal exam on load charts
   - Practical, in the seat exam
   - Physical with drug test every three years
2. Demonstrate specific knowledge
   - Reading and comprehension
   - Writing
   - Arithmetic necessary for load charts
   - Knowledge of ANSI, OSHA, and local crane safety regulations

Many crane load charts now require the user to follow the latest ANSI standard even though many operators have never seen or heard of an ANSI standard. In addition, because the manufacturer's instructions carry the full force of law [29 CFR 1926.550(a)(1)], these qualifications are required on many new cranes.

Training today

Companies today usually view crane training in one of two lights: compliance or investment. Those that are only concerned about complying with the law and simply want names on a training class signature list don't see the benefit of a comprehensive training program. Others view training as an investment in a company's most valuable asset—the employees.

Training for compliance only is of little value to anyone. For example, the estimated cost of the "Big Blue" accident in Milwaukee exceeds $100 million. The proposed OSHA fines are only $540,000. In this scenario, compliance training would only pertain to 0.5 percent of the accident cost. Training as an investment in employees might have saved three lives and $100 million. The objective of training is not to sit through a class but to learn skills that will make the workplace safer and more productive. To determine which category the training fits, the results must be measured. The best way to measure results is through an independent third party. When selecting a third party, look for an organization that is itself accredited to do the job. In other words, find a certifier that is certified. One such organization is CCO.

Training is what today's crane operator needs to make the jump from lever puller to professional. The industry needs it today, and it will most likely be required soon. Before selecting a trainer, be sure to check references and compare price and quality. Membership and participation in a professional organization like the Association of Crane & Rigging Professionals (ACRP) is a plus. Remember that there is no substitute for a long-term training program with crane operators who are serious about learning and companies that are serious about safety. Training saves money and, most important, lives. ▮

Objectives of Crane Operator Training

A person with hands-on crane experience as well as a high degree of crane expertise should present all training courses. In addition, the training should be interactive (i.e., require participation by the student) or have some form of accountability built in to demonstrate that learning has taken place. The overriding goal should be to have the professional crane operator come away with the following skills:

1. Load Charts—The ability to determine how much weight can be placed on the hook in any given situation.

2. Site and Set-up—The ability to investigate a site and then properly configure and set up a crane.

3. Ideal Conditions—An understanding of the ideal conditions assumed by a crane load chart and the ability to make appropriate reductions in capacity when conditions are less than ideal.

4. Rules and Regulations—The knowledge and understanding necessary to follow crane safety rules and regulations.

5. Basic Rigging—The ability to recognize poor rigging and give appropriate advise.

6. Operations—The knowledge and understanding of the safety aspects of crane operation.

7. Maintenance and Inspection—The knowledge, understanding, and ability to follow proper maintenance and inspection procedures.

8. Crane Types—An understanding of the various safety and operational variables associated with crane types, such as crawler, lattice-boom carrier mount, and telescopic boom cranes.

VIDEO REALISM HELPS CREWS WITH FIRST-AID PROCEDURES

There's nothing like hands-on training. But other forms of instruction, especially video, can also be effective.

In "One Hand for the Ship," part of a video series called Medical Maritime Emergencies, a crewman's hand is accidentally cut off. It was staged, of course, but with plenty of fake blood and enough realism to make almost anyone squirm.

John Sabella, one of the video's producers, says the captain of an oil tanker told him that his crew had been playing the amputation scenario over and over again just to watch the blood spurt.

More importantly, the captain also told Sabella that the hand-amputation scenario demonstrated the proper way of preserving an appendage for possible reattachment, including protecting the part with gauze wrapping and a plastic bag before inserting it into a water-and-ice bath. "The captain told me," says Sabella, " 'We would have put the hand right into the water and ice. We didn't know you should protect it first. That was valuable information.' "

The series of 10 videos (which covers heart attacks, contaminated eyes, severe trauma, angina, burns, head injury, seizure, choking, sea sickness and amputation) are used both as instructional mechanisms during training and as refreshers. All were filmed aboard working vessels and portray accident scenarios drawn from the case files of Maritime Health Services, a Seattle-based company that provides medical consultation to vessel personnel.

While the 10 videos—and others currently in production—all offer plenty of information in compelling situations, Sabella says he and his partners are also developing a series of first-aid videos that will include a testing component. The content will stop, he says, and the narrator will ask viewers what to do next.

"The test versions of the cassettes are going to provide an examiner or employer a means of measuring retention. Remember that, under the ISM code, ships will be audited and crews must be able to demonstrate proficiency. You can't just say someone went to school. Test versions can be used to help ensure a passing grade on the audit.

"Vessel owners want me to produce a video that works like a birth control pill—all they have to do is administer it once a month and that's it. But that's not how the world works, especially under the new rules. You will be tested."

— Bruce Buls

Communication

Getting 'IT'

Wireless data transfer improves ship-to-shore information flow.

By Bruce Buls, Technical Editor

A few years ago, at a Coast Guard-sponsored Y2K conference, I encountered a new term: IT (eye tee). Speaker after speaker kept referring to "IT" as in "Y2K isn't just an IT problem."

My problem was that I didn't know what IT was. I didn't get IT.

Finally, I whispered to the person sitting next to me, "This is probably a stupid question, but what is IT?"

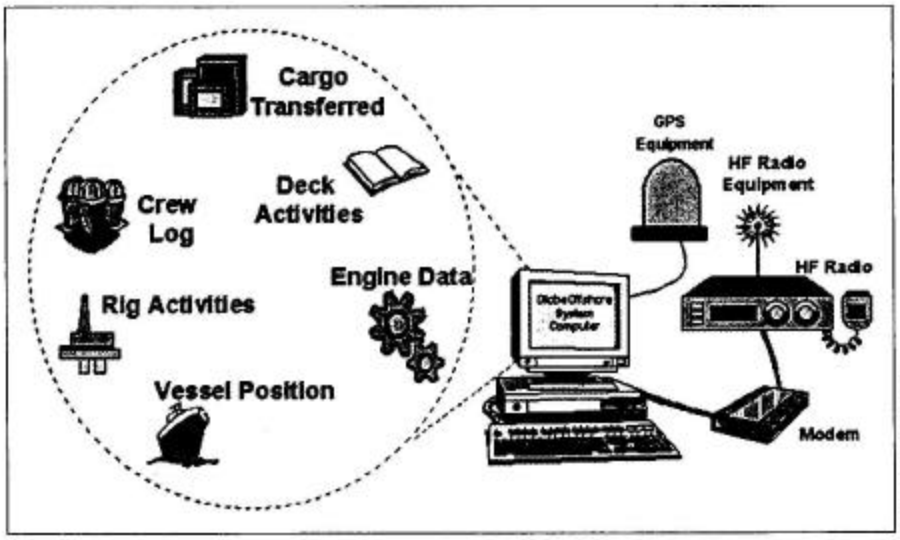
Her answer—and she was very gracious about it—was "information technology."

You can wrap up a lot in a term as large and vague as information technology, but essentially it's all about data and computers. When the bar codes on your groceries are scanned at the supermarket and the connected computer in the back office monitors how much of what is being sold, that's IT. When you get a computer-generated earnings statement from your employer with updated totals for pay, taxes, 401(k) and vacation time, that too is IT in action.

In the world of workboats, the IT metamorphosis means more computers in the wheelhouse that are wirelessly networked with the home office. What was once handwritten into logs, reports or requisitions by the captain, mate or engineer and then hand delivered, transcribed by voice or faxed is increasingly being input directly into an onboard PC. Once inside the computer, the data is automatically transmitted back to the home office where the information is incorporated directly into databases, spreadsheets or other forms.

As Chuck Drobny Jr., chief operating officer of Boatracs, puts it, "We see the boat as being another office down the hall." Vessels are being wired, wirelessly.

Drobny's San Diego-based company, which offers both communications and information management software systems, doesn't usually refer to its products as "IT." (They and competitor Globe Wireless both insist on calling them "solutions.") Even so, the services and software of both are another part of the information technology explosion that is changing the way business is done everywhere.



All images Globe Wireless

Fleet information management systems can transmit data on everything from crew changes to fuel and lube oil consumption to information about vessel location.

NEW SYSTEM FOR SEABULK

Boatracs recently announced an agreement to develop a new integrated information management system for Seabulk Offshore Ltd.'s Gulf of Mexico workboat fleet. The system will allow a boat's crew to enter data directly into a PC-based database on the vessel, which will be transmitted via satellite once a day—or as needed—to Seabulk's shoreside office computers in Lafayette, La. Data will include daily master's logs, crew changes, fuel and lube oil consumption, and accident reports. Information about the vessel's location at selected intervals will also be included.

By adding the new software, Ken Helms, Seabulk's operations manager in the Gulf, says, "Our company is now migrating from basic communication and positioning into a seamless information system between our vessels and our offices."

You may be at sea, but your data is back at the home office. Or it better be.

Seabulk's system, when ready, will be tailored especially for them. "It's a new application," says Drobny, "but one for which we rely heavily on our corporate experience in building applications that did similar kinds of things for other companies in the industry.

"I'm inclined not to think that there's a piece of software where one size fits all," he says. "I know that everybody puts crew on boats and takes them off. Everybody has safety reports. Everybody has fuel they account for and everybody has vessel logs they construct. But I've never seen two companies that do those things in exactly the same way."

Boatracs communications—whether e-mail messages or complete vessel activity reports—are transmitted via satellite. In the U.S., Boatracs utilizes Qualcomm's OmniTRACS® satellite system, which includes two geosynchronous satellites that relay messages and other information and provide location tracking. The OmniTRACS system is used on over 200,000 commercial trucks in the U.S. as well as vessels with Boatracs systems.

Outside the U.S. and beyond the reach of OmniTRACS, Boatracs switches to Inmarsat Mini-M satellite service.

Though satellites are usually regarded as more expensive than other methods of communication, Drobny says that isn't necessarily so. "For one thing, we only send the minimal amount of information that needs to be sent to convey changes. For example, we only report who gets on and who gets off the boat. We don't turn around and report who's on every day. To report that you're on the boat every day for 30 days is redundant. And sending content costs you money.

"People ask me if our program will help cut their communications costs, but I tell customers that simply reducing their phone costs is not a reason to embark on this kind of system. The best way to reduce voice traffic is to stop talking so much."

Savings come in other ways.

"We're not talking about a $250 off-the-shelf product," says Drobny. "A lot of these efforts costs tens of thousands of dollars and are a substantial investment for the company. But they've also resulted in some substantial savings and opportunities. Take for example the Coast Guard's streamlined inspection program. That's designed to give the company the opportunity not to have to take the boat out of the water so many times. It may result in the boat being available three to four days more than it would with the old system. We automate that system for them and make it even more efficient and then maybe they can have an extra day per year at work and for a boat that's getting $10,000 a day, that's an extra $10,000 in revenue.

"On-charter and off-charter fuel reconciliations are another opportunity to save substantial amounts of money," adds Drobny. "We all know that companies have paid a lot of money to reconcile those fuel bills. Does that mean somebody stole that fuel? Probably not. What it means is that the accounting wasn't kept up because it was too difficult. These are the kinds of things you try to automate with these kinds of systems so that the numbers are all accounted for, and they don't have to do things like eat $50,000 worth of fuel."

NEW SYSTEM FOR SEACOR

Boatracs' primary competitor in the field of workboat fleet communications and information management is Globe Wireless, a communications company based in Foster City, Calif.

Unlike Boatracs, Globe Wireless uses both satellites and its own network of high-frequency (HF) radio stations around the world—18 of them at last count. Called the Marine Radio Network, the stations are all linked to a central

operations center in California. Vessels can send to and receive from any of the 18 radio stations. "Each of those radio stations gives overlapping coverage," says Barry Neary of Globe Wireless, "and each of those radio stations has multiple channels on which a ship can connect and receive and transmit data. No matter where they are in the world, there are at least two or three radio stations which have a strong enough signal to be heard."

In addition to the HF radio, Globe Wireless has recently added satellite communications to its program. "Up to about a year ago," says Neary, "we had digital HF only, which is fine, but there are limitations, such as not being suitable for very large files."

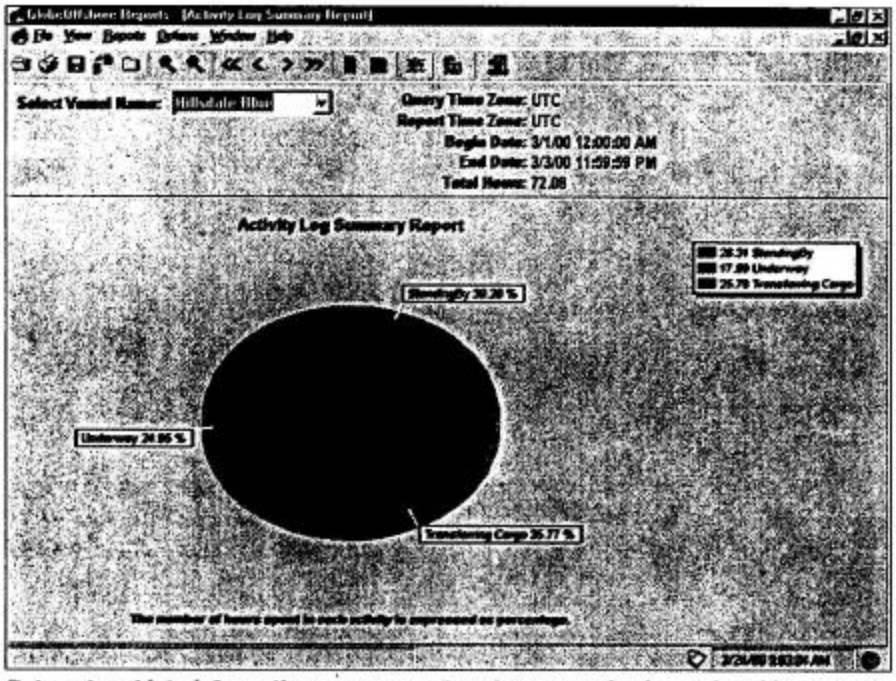
Digital HF is produced by a computer connected to a proprietary modem and high-frequency radio. "With both HF radio and satellite," says Neary, "our software can make decisions about which method of transmission you should use, whether satellite or digital HF, based on how large the file is, how urgent the file is, things like that. There's a lot of flexibility in having both solutions in one package."

Globe Offshore is Globe Wireless' information management software created specifically for the workboat fleet. Neary, product manager for Globe Offshore, says the program "uses our transmission network to capture vital log information on board a workboat—the kind of typical information that's handwritten into logs by the captain, things like deck log information, engine log information, crew log, cargo—all that the captain enters into Globe Offshore, which is an electronic log that runs on the PC. The data, which includes GPS positioning information, gets sent to shore automatically through our network. Back on shore, we have our shoreside component, where we would go in and put the software into the owner's office or the charterer's office. And using that software, they can automatically download the information over the Internet that's coming in from their fleet of vessels and then analyze and run reports on the information to see how efficiently their vessels are running."

One of the companies turning to Globe Offshore for fleet information management is Houston-based Seacor Smit Inc., which operates workboats all over the world. "We've got it on about 77 boats and are headed for 300," says Pat Davitt, Seacor's manager of vessel information systems. "It's going to be on all our boats, worldwide, which is the reason that Globe was so attractive. A system that doesn't have worldwide coverage is useless to us."

Davitt says that his PC logs into Globe's server every 15 minutes and retrieves all the vessel data.

"It's amazing how much data you get," says Davitt. "I've got 8 or 9 million position records on vessels, which is very useful and sometimes indispensable. We found that a lot of times where there's



Data entered into information management systems can also be analyzed by computers on board and back at the home office.

been some dispute over what a vessel was doing, I can go in and reconstruct the track of the vessel's speed, heading, and everything. You don't use it every day, but when you do use it, it's sure nice to have."

With the current crop of information management software, much of the data is keyed directly into the computer by officers on board, but this is changing, too. Bar code readers can input both crew and cargo information and onboard vessel systems—like GPS—can be wired directly into the information management/communications computer.

As more and more ship-to-shore communications becomes complex data transfers, will talking become unnecessary? Boatrac's Drobny doesn't think so.

"I used to be an engineering manager for an inland fleet and there were times when I wanted to hear the tone of someone's voice on the boat, and then there were times when I wanted him to hear the tone in my voice. So voice still has its place, but voice is a very inefficient way of communicating a lot of the operating data that passes between the boat and the shore on a daily basis."

For that, you need to get IT. WB

Coming soon... ICO

Offering substantially cheaper communications costs and cheaper equipment, ICO promises to severely shake up the market for ship-shore satellite communications

The ICO satellite constellation should be in service by mid 2001, offering voice and data communication at substantially lower prices than those currently available. Pricing will be simplified and standardised internationally, thereby removing the tedious task of finding the cheapest land earth station operator (LESO) which Inmarsat users currently face. The terminals, designed specifically for maritime use, could well prove to be more reliable than those currently on the market since they contain no moving parts.

Getting this far has not been easy for ICO. Last year's poor investment climate for satellite systems forced it to enter Chapter 11, a US court protection status granted to companies whilst they restructure their finances. Now with $1.2 billion additional funding underwritten by Craig McCaw and Subhash Chandra, ICO is set to exit Chapter 11 in the second quarter of 2000 and is well on the way to establishing a service.

"I'm seeing that the shipping industry is very keen for alternatives," comments Victor Barendse, general manager, maritime services with ICO. "Just talking to manufacturers, we had very good feedback. We've already got a reasonable following from the market."

Victor Barendse, manager maritime services

Mr. Barendse is responsible for bringing ICO to the shipping industry. He is taking a cautious approach, aiming, as he puts it, to "underpromise and overdeliver" in promoting ICO to shipping. Nevertheless, he makes no bones about his expectations. "Our technology is the best," he says. "It is well suited to maritime. The industry should enjoy working with ICO."

ICO has three target market sectors within the shipping industry: shipmanagers (and owners), individual crew members and safety authorities. While it does not plan to apply for GMDSS accreditation, it plans to include a safety alerting button on the marine terminals, which the maritime safety authorities can use as they wish. It is possible that safety schemes involving ICO equipment could be developed on national, rather than international scales.

"We have a threefold advantage over Inmarsat for safety systems," says Victor Barendse. "Firstly, our equipment will be less expensive. Secondly, you can have voice as well as data on the same equipment; the authority can telephone the vessel to make sure there is a distress situation. Thirdly, we can combine day to day and emergency communications in the same unit."

Before his current position, Mr. Barendse was involved in market forecasts and financial planning for Inmarsat, including the initial commercial work for ICO when it was within Inmarsat. As part of this work, he performed a close evaluation of the technology of the various existing and future mobile satellite services.

Company history

ICO was originally established in 1994 as a project within Inmarsat in 1990, dubbed Project 21, to establish an "Inmarsat-P" service. Inmarsat took the decision to spin off ICO as a separate company to attract more outside investment; about 30 Inmarsat employees, including Victor Barendse and the (then) Inmarsat director general Olof Lundberg moved to ICO. Inmarsat also supplied $150m in cash investment, with a further $75m "in kind," the estimated value of the expertise and knowledge which Inmarsat supplied. At the time, this investment amounted to just over 10.5 per cent of ICO.

Following this spin-off, ICO was unsuccessful last year in securing sufficient financing from its original investors, including Inmarsat, to complete the system. The relationship between Inmarsat and ICO is now less than clear, following recent additional investment by Craig McCaw and Subhash Chandra (see below). Largely, the two companies are now going their separate ways and will probably address similar maritime markets.

In late 1999, Olof Lundberg left his position as CEO of ICO. "I think he felt he'd taken the industry as far as he could," comments Robert Taylor of ICO. "He'd done what he wanted to do, he felt that others had the talent to continue the work."

What ICO offers

ICO's airtime costs, it says, will be lower than those on offer in the industry today. The datarates will initially be 9.6 kbps, and in the long term it intends to develop internet (IP) based data services of up to 64 kbps for fixed users with an enhanced range of data services for mobile users. The call quality will be comparable with GSM (cellular) networks; call set up times are expected to be similar to other satellite systems. The system will have a very high penetration capability, designed to deliver a call-attempted alert when the user of a handheld phone is inside a building

Shipping is one of five market segment ICO is targeting: the others are remote fixe (users on land which have no land line connec tion); remote handheld (people who need per sonal mobile communications in areas nc served by cellular telephone networks); lan transport including vehicle tracking and flee management; and government, including mili tary and relief applications.

The satellites will be launched fron February 2000, with initial service expected i the second quarter of 2001. ICO will begin b offering voice and short message services quickly followed by messaging, data and highe data rate services.

The commercial head office of ICO is i London, with offices already established i Singapore, Mumbai, Dubai, Istanbul, Moscow Pretoria, Miami, Washington, Beijing and India The satellites will be controlled from a centr near London, with a backup control centre i Japan; the ground network will be managed fron a centre in Tokyo, with a backup near London.

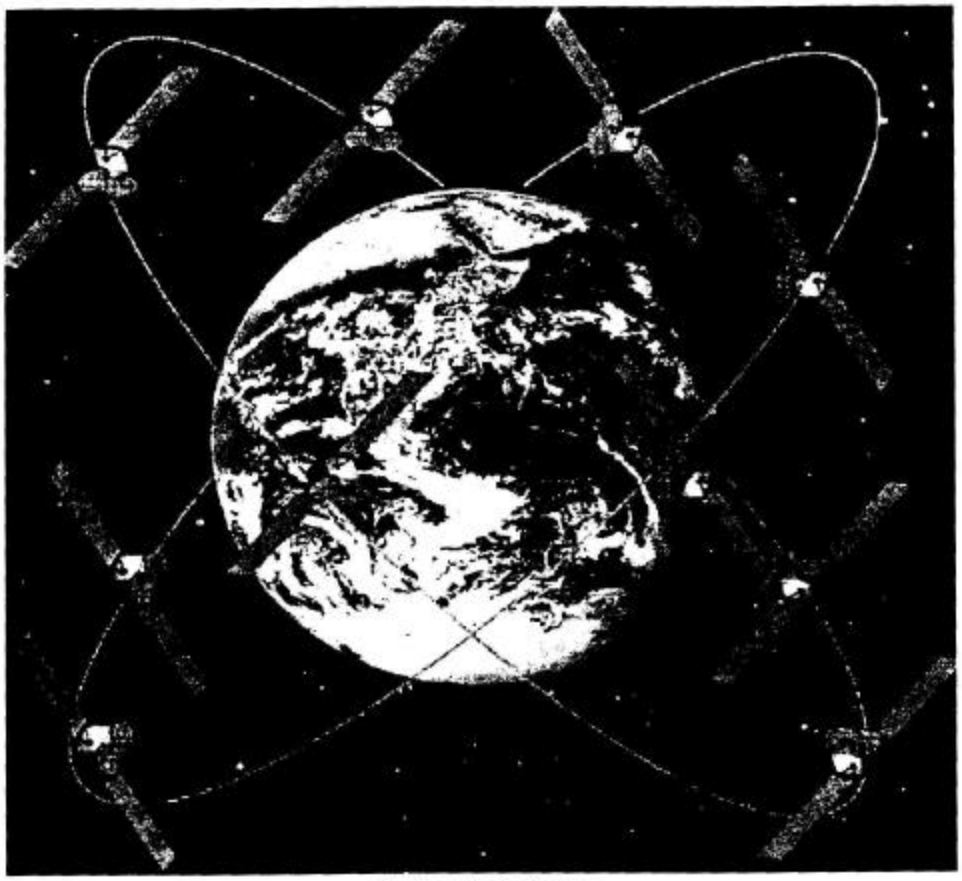
Closing the book on Chapter 11

ICO was reluctantly forced into Chapter 1 protection status in August 1999 because i could not secure enough funding to kee afloat. Under US law, Chapter 11 provides company with a final opportunity to restruc ture its business plan and win more investmen before being declared bankrupt.

ICO blames its forced entry on Chapter 1 firmly on the impact of Iridium's poor marke performance on the investment community. I August 1999, Iridium's satellite constellatio was already in service, but the company wa receiving a great deal of bad publicity becaus sales were much lower than expected.

ICO asserts that Iridium's poor perfor mance in the market was entirely due to th way it had set up the business, not due to th market itself being poor. Nevertheless, convinc ing potential investors of this proved very diffi cult. "The people funding Iridium were th same people we were talking to; they didn know if Iridium's problems were due to ther not being a market for these services or due t Iridium itself," says Mr. Barendse.

He points out that there are elementary dif ferences between Iridium and ICO from a investment point of view. "We are spending $2. billion, covering both the satellites and th launch," he says. "We don't expect our system t go wrong for 12 years." By contrast, Iridiun spent an estimated $3.4 bn to set up the constel lation, followed by another $2.4 bn to replenis the satellites, which last an estimated five years



ICO's constellation in action

For the $2.3bn price, ICO expects to have two to three times the usage capacity of Iridium.

The movement into Chapter 11 protection status has given an ICO an opportunity to seriously restructure its business plan and to look for serious, revenue generating business applications rather than expecting the bulk of its market to be handheld personal telephones. As part of this restructuring, the decision was made to increase emphasis on the maritime industry.

The investment capital of $1.2 billion has been underwritten by two major investors, Craig McCaw, underwriting 62 per cent, and Subhash Chandra, underwriting 38 per cent. Craig McCaw is well known as a pioneer in the telecommunications industry and a lead figure and investor behind Teledesic, a project to launch an "internet in the sky" in 2004 with 288 low earth orbiting satellites and datarates of up to 64,000 kbps. Subhash Chandra is chair of the Afro-Asia Satellite Corporation (ASC) and a major Indian satellite and television entrepreneur.

Victor Barendse says he is particularly pleased that the company has secured both investors rather than just one. He says that both Mr. McCaw and Mr. Chandra were keen to provide all of the funding, but ICO was keen to have both investors on board so it could gain access to the expertise of both of them.

Given the poor economic climate for satellite systems, this investment is a strong endorsement in ICO's technology, particularly since both investors know the industry very well. It puts ICO in the enviable position of being able to operate a satellite constellation with full equity funding and no borrowings, a position which, it says, it does not share with any of the other mobile satellite companies.

ICO's system

ICO will be launching 12 satellites, each of which will orbit the earth at a height of 10,390 km, which classifies them as medium earth orbit satellites (MEOs). The system design and orbital height were carefully chosen, ICO says, to provide the best mix of service quality, technical risk, speed of implementation and ease of constellation management. It fits midway between the 700 - 1100 km orbital height of Orbcomm, Iridium and Globalstar, classified as low earth orbit satellites (LEOs), and the 36,000 km height of Inmarsat satellites which orbit the earth at the same speed as it turns, known as geostationary earth orbit satellites (GEOs).

The location of all ICO phones, which have current accounts and which are turned on, is continuously monitored. If a call is made from a fixed line to an ICO telephone on a ship, it is automatically routed through landlines to the most appropriate ground station. From there, the call is sent up to the satellite and bounced down to the vessel. There is no need for the user to dial a different ocean region code, depending on where the ship is; a single access number will reach the ship anywhere.

The height of the satellites above the earth determines how much of the earth's surface the satellite covers (known as the footprint), and hence the number of ground stations required for continuous coverage. Orbiting at 10,39(km, each ICO satellite can see about 25 pe cent of the earth's surface at any time, whils each point on the earth's surface can see up t four satellites at any time.

ICO calculates that it only needs 7 land stations to provide continuous coverage. It is actually installing 12, for backup purposes. All o these will be owned and fully controlled by ICO. ICO believes that this gives the company a major edge over its competitors. Low earth orbiting satellites have a smaller footprint on the globe, and hence more land stations are required to make sure every satellite can communicate with at least one land station at any time. The operators of these constellations are forced to look for ways around this; Iridium for example has a complex (and, it has been said, highly expensive) system of bouncing calls from one satellite to another until it reaches a satellite which can send the call down to a land station.

The Inmarsat constellation, with four geostationary satellites with overlapping footprints on the earth's surface, theoretically only requires two ground stations (known as land earth stations) for continuous global coverage. However it has many more, all owned by Land Earth Station Operators (LESOs), not controlled by Inmarsat and taking a large cut of its revenues. Many commentators believe that this set-up is a major source of inefficiency for Inmarsat.

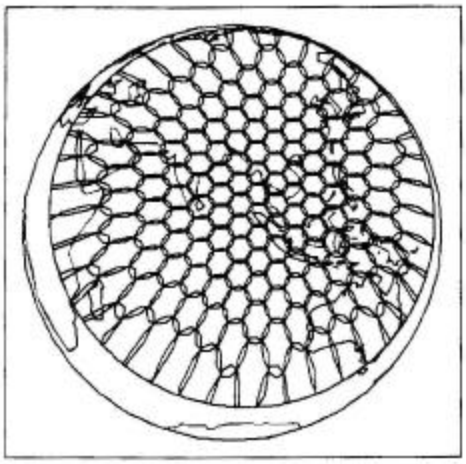
The height of the satellite above the earth also determines the number of satellites required; the 12 satellites in the ICO constellation fits between the 40-70 satellites required for a low earth orbit constellation (such as Iridium) and the four required for a geostationary constellation (such as Inmarsat). However, the cost of building and launching a satellite increases with the orbiting height: ICO estimates that the cost of building and launching its 12 satellites is comparable with the cost of Globalstar's 48.

The economics turn much more strongly in ICO's favour, it says, when the satellite lifetime is factored into the cost. Due to their more substantial construction and higher orbit, ICO expects its satellites to last for 12 years, whilst Iridium satellites are expected to last for six.

The higher the orbit of the satellite, the less revolutions of the earth it makes in the same amount of time. This means that the satellite moves across a single point on the earth, such as a vessel, more slowly. For this reason, managing satellite calls is easier to handle with ICO than with Iridium or Globalstar, it claims; there are less handoffs from one satellite to another in the same amount of time.

Another advantage of a higher orbit, ICO says, is that the average elevation from the ground to the nearest satellite is higher than with LEOs. This means there is lower probability of signals being blocked by buildings or terrain.

Another factor is the time delay: because ICO's satellites are three times nearer the earth than the Inmarsat satellites, the signals take a third of the time to transmit. The time delay with Inmarsat satellites has been significant,



The footprint of one ICO satellite, with 163 spot beams

particularly when sending faxes and data to and from a ship; it has reportedly caused problems with the two machines at each end setting up a connection.

Spot beams

A feature of the ICO satellites is their spot beams, which allows ICO to carefully preserve satellite power and radio frequency, the two limiting factors of satellite operation. Each ICO satellite has 163 spot beams.

The spot beams enable ICO to broadcast a radio signal to a specific area of the ocean, rather than the entire coverage area of the satellite; the smaller the transmission area for the spotbeam, the less power required for the radio signal.

It is actually possible to re-use radio frequencies with spot beams. Whilst it is not possible for two adjacent spot beams to use the same frequency, a spot beam can use the same frequency as the spot beam one displaced from it. With frequency re-use, ICO claims that each satellite can handle 4,500 simultaneous telephone conversations.

The satellite control centre is located in Uxbridge, UK. At the centre, the movements of the satellites are tracked, the orbits are adjusted, the condition of the satellites is monitored (power levels, temperature, stability). If there is a malfunction, the constellation can be aligned. The centre can optimise how much transmitter power is allocated to communicating with the mobile phones and the ground stations on each satellite.

Ground setup

ICO is building land stations, or "satellite access nodes", similar to Inmarsat land earth stations (LES), around the globe. It currently expects to have six SANs operational by April 2001, another five by July 2001 and a twelfth by April 2002; ICO has calculated that it only requires 7 SANs for full global coverage, so the additional five will serve as spares, or to carry excess data traffic, or to improve connection to different parts of the globe.

So far, plans are in place to build SANs in Germany, USA, Mexico, Brazil, Australia, South Korea, China, Indonesia, India, South Africa and Dubai.

The SAN will track the satellites within its sight, directing communications traffic to the satellite best suited to offer a robust link, handing calls from one satellite to another as they move around the world. The SAN's are built by NEC and Ericsson, in Japan and Sweden.

ICO is connecting its SANs to each other and to other networks. Together with the SANs, this is called the ICONET. The ICONET will divert telephone calls to the most appropriate SAN, as well as interfacing with cellular (mobile telephone) networks and terrestrial networks.

The ICONET is managed by the Network Management Centre in Tokyo. It is being implemented by NEC of Japan, with subcontractors Hughes Network Systems (USA) and Ericsson Telecommunications Ltd (UK). The work to build ICONET began in September 1997 and is scheduled for completion in August 2000.

Equipment

ICO handheld telephones are being developed by several major manufacturers with broad experience of today's mobile communications markets. Most telephones are likely to be handheld and pocket size, capable of satellite and cellular operation, with optional data ports and messaging functions.

The telephones are designed to comply with international safety standards for radio frequency radiation, with average transmitted power of 0.25 W (compared to 0.25 W to 0.6 W for typical cellular telephones). Handsets are expected to be as light as 250g with a target retail price of $1,000.

Because of the large number of ICO phones which are expected to be manufactured, for all the markets in which ICO is involved, it expects to be able to achieve vast economies of scale which will be reflected in the price of the maritime telephone. The maritime telephone contains many components that are also present in telephones designed for other applications.

Nera, Furuno and JRC have already agreed to develop ICO phones for the maritime industry and Nera has already produced a prototype. Whilst the maritime equipment might be fixed to the bridge in normal operation, the crew will be able to remove it and carry it around onshore. The antennae are omnidirectional with no moving parts.

The telephones and service will be distributed through various distribution partners, many of whom are investors in ICO. ICO will also distribute services through cellular network service providers and other value-added resellers. Over 80 preliminary agreements have been signed including one with China Mobile Communications Corporation, the world's largest cellular telephone operator.

Regulatory approval

ICO has submitted applications to regulatory authorities around the world seeking permission to offer services, as well as to launch satellites and obtain radio frequencies and operating permits.

ICO expects to benefit greatly from the ITU (International Telecommunications Union) GMPCS-MoU (Global Mobile Personal Communications by Satellite Memorandum of Understanding). These arrangements are intended to facilitate worldwide deployment and trans-border use of fixed and mobile satellite terminals. ❑

The NERA ICO maritime telephone

Insurance

Preventing problems up front

Simple risk management and loss control hints save you money

The insurance market is hardening. According to the Commercial Insurance Market Index compiled by the Council of Insurance Agents and Brokers, for the first time in more than 13 years, prices are on the rise. Seventy percent of insurance providers that responded to the survey said prices for medium-sized accounts are higher today then one year ago. Insurance providers are looking at loss margins and profit margins. By getting stricter with their policies, insurance companies are no longer going to let losses slide.

What does this mean for rental fleet owners and operators? It means a fundamental shift is under way, and insurance coverage is moving from a buyers' to a sellers' market. It's time rental companies take a hard look at how they address loss control and risk management. If they're not careful, these companies may find themselves with fewer insurance options. Plus, they'll be looking at price increases between 5-15 percent.

Implementing a few simple steps will help ensure that your rental company is a good risk.

Consult with your insurance agency

Most insurance agencies and brokers offer services designed to help clients. Ask about them. They may have training materials or courses. Use them.

Also talk to them about paperwork. Make sure you understand what paperwork needs to be filled out and how it should be done. This will make filing claims faster and easier. Knowing what needs to be done up front helps eliminate plenty of headaches when there is an incident.

Examine equipment transportation

The biggest losses seen by many companies are related to transportation of equipment. This segment is even larger than liability claims. A couple of things can be done to help reduce your company's risks.

First, get a motor vehicle record (MVR) on all drivers responsible for transporting equipment. It's a relatively easy thing to do and ensures that your drivers have good, safe records. Why risk your investment with a bad driver?

Have your drivers attend a safe-driving course. If having all of your drivers go to a course isn't feasible, then have one driver attend a train-the-trainer course. Empower that employee to train the others in defensive driving techniques.

It is also important to have a regular maintenance schedule in place for all trucks and trailers. Develop a worksheet or checklist that stays with each unit.

Also make sure each truck has an end-of-shift checklist. If any problems are noted, get them fixed before sending the truck back out on the road.

Have weekly toolbox meetings

Knowledge leads to safety. Having a short, weekly safety meeting helps emphasize the fact that your company is serious about safety. It keeps employees abreast of safety concerns and reminds them of the safety basics.

Don't make these meetings too long. Keep them to about 15 minutes, and only cover one to two topics.

Information for these meetings can come from a variety of sources including trade associations, trade magazines, and your insurance company.

Make attendance mandatory, and document who attends.

Develop a comprehensive rental agreement

Make sure an attorney reviews your rental agreement. It must have a "hold harmless indemnification clause." This clause says your company will not be brought into lawsuits against the equipment user.

A rental contract should also say customers are responsible for equipment when in their care, custody, and control. Without this in your contract, your company could be held responsible if equipment is stolen or vandalized, which negatively affects your loss ratio.

Lastly, make sure you have a contract for everyone. Family, friends, and employees must all read, understand, and adhere to the rental contract. There can be no exception.

Explore theft prevention

The last decade has seen a real increase in the amount of theft from rental yards. Take measures to deter this kind of loss. Your yard should have adequate fencing and lighting. It is often a wise investment to get a security system or hire a security firm.

Also available are on-board systems for your equipment that can be used to track the location of equipment via satellite. Those systems help with fleet management as well as loss prevention.

Information for this article provided by Allied Insurance Brokers, Pittsburgh, Pa.

Spending a little money to safeguard your equipment is cheaper than increased insurance costs related to high amounts of theft.

Don't delay in reporting claims

A number of studies have shown a direct material impact associated with the timeliness of reporting a claim. Payout increases are substantially more when filing a claim one day after the incident when compared to filing just three days later. Make sure your customers also know to report claims immediately. You always hear that when investigating a crime, police have better chances of solving it the sooner they can gather evidence. The longer they wait, the trail cools, and it gets harder to do their job. The same is true for insurance brokers and agents.

A loss prevention and risk management program allows you to focus on the things that maximize the profitability of your company and help grow your business.

Make sure equipment involved in an accident is removed from service immediately. If use of the equipment continues, there is no way to ensure it will stay in the same state as when the incident occurred. To get full payout on a claim, insurance companies must know the status of the equipment at the time of loss.

Implementation

Putting these kinds of practices into place can really help your company's insurance costs. Let employees and customers know their responsibilities. Having a solid loss prevention and risk management program in place results in several things. You'll have better informed employees. Losses will be kept at a minimum. Insurance companies will see you as a more favorable risk. Lastly, you won't be spending your time dealing with bad claims.

The ultimate benefit of developing a comprehensive loss prevention and risk management program is that you will be preventing problems up front. This allows you to focus on things that maximize the profitability of your company and help grow your business. ▮

Legal

Don't get sued for workplace violence

By Phillip M. Perry

***Atlanta**: an employee kills nine co-workers in a murderous rampage. **Honolulu**: a worker shoots seven fellow staff members to death. **New York City**: an employee on a shooting spree hospitalizes a fellow worker and traumatizes dozens of others.*

These are just three of the terrifying incidents that flashed across the nation's headlines over the past year. The human cost from murder in the workplace is a national tragedy. Employers, who must somehow live with the agony of the loss of life in their companies, must also defend themselves against the inevitable lawsuits filed by survivors of the victims. No wonder workplace violence has become a top-of-mind issue for business owners everywhere.

How can employers take steps to protect their workers and lessen the risk of legal repercussions from violence? Five attorneys who specialize in employment law address that question in this article.

It's every employer's worst nightmare... and it's happening to you. The worker you fired yesterday calls from home. He's bending your ear about how his co-workers "always had it in for me." Then he says something that makes your blood run cold: "I have a gun. I ought to bring it to work and take care of my problems."

How do you respond? When your heart beats fast, your mind reels and you're dizzy with fear it's not easy to know what to do. You do know that making the wrong decision risks the lives of your employees. You've seen the recent headlines about disgruntled individuals killing co-workers in cities as far-flung as Atlanta and Honolulu.

The scene just described is not just a story: It actually occurred to an employer in Michigan. Later in this article, the attorney whose client received the call offers advice on what to do. See how his suggestions compare with your response.

If you're like most employers, workplace violence has become a top-of-mind issue – and not only for the human cost when disgruntled individuals shoot guns to "even scores." Survivors of victims often target employers with costly lawsuits. The legal system is not friendly to employers who should have seen signs of pending violence but failed to act.

"Courts are treating these lawsuits more seriously because of the increase in the number of incidents," cautions Timothy Bland, an attorney at the Memphis, Tenn., law firm of Ford & Harrison, and a specialist in employment law and workplace violence. "In a recent North Carolina case, for example, a court awarded a $7.9 million judgment against an employer when a worker killed two fellow employees." You can be sued on any of a number of common grounds. (See the sidebar: "Fending off lawsuits.")

You can take steps to keep your employees out of harm's way and your business out of bankruptcy court. Here's some help. In this article, attorneys who specialize in defending employers against workplace violence lawsuits offer guidance on how to reduce the risk of assaults by responding adequately to early signs of trouble. Let's see what they say.

Establish a "zero tolerance policy"

Most employment law attorneys suggest employers institute a "zero tolerance policy" which mandates immediate termination for an act of violence, or threat of same.

Whether it's a slug to a supervisor's mug, or a fistfight between workers, physical aggression cannot be tolerated. "You need to discharge individuals who commit assault," says Louis C. Rabaut, an employment law specialist at Warner Norcross & Judd, Grand Rapids, Mich. "If you fail to do so, and they later do something worse which causes a lawsuit, the court will deem you to have had notice of violent tendencies." Juries often say things like: "They knew this guy was going to go off because of his behavior. No one did anything about it."

Rabaut recalls a Wisconsin case where a dispute arose between two employees. "All through the day they were yelling at each other," he says. "Finally one employee threw a rag at the other, who responded with a slap." The employer fired both workers. The employees' resulting lawsuit for wrongful termination failed, says Rabaut, because of the changing climate of the courts. "There is much more acceptance by judges and juries that employers have to be a lot less tolerant about violence."

Threats to commit violence – whether against a co-worker or a supervisor – must also cause termination under a zero tolerance policy. One example of such a threat is: "I'm going to beat you up after work" when said to a co-worker or supervisor. Here are some others: "Employees who kill their supervisors have the right idea"; "I'm afraid I'm going to lose control and I have guns"; "I am going to come in and

have a Twinkie day." (The last refers to the "Twinkie Defense" in which an accused murderer claimed he was mentally unbalanced after eating some food with high sugar content.)

Words have power. There's no longer a defense that "it was only talk." Says Rabaut: "Let employees know that 'if you say it, it's as bad as if you did it.' If you say 'I'm going to go home and get a gun' or 'I ought to settle this with my AK 7' you get treated as if you actually did what you said."

Respond to early signs of trouble

So how about events that are less extreme but may foreshadow trouble down the road? We ran this question by Teresa L. Butler, a partner at the Atlanta law firm of Littler Mendelson, the nation's largest employment law firm. "A zero tolerance policy does not mean you fire every person for starting down the path," she says. "It means you will act appropriately." While violence or direct threats spark immediate discharge, any number of lesser acts can trigger a system of progressive discipline that may include administrative leave and mandatory psychological evaluation and counseling.

Some activities may appear to border on violence. For example, an employee may toss a pile of papers onto the floor, stomp around and scream "This place stinks!" Says Butler: "In such a situation you would approach the person and inquire as to what can be done. It's not so much workplace violence as a disruptive activity."

On a more serious level, an employee who damages property may or may not be seen as committing an act of violence. "It's a close call," says Bland. "Look at the context of why the employee did what he did. Maybe he got some terrible news and knocked a computer off desk. But if it's a senseless act then it could call for immediate termination."

An act which might trigger counseling is a feud that develops between two workers. While no threats are made and no fight breaks out, you want to reduce tensions before they escalate into a fight that requires discharge. "You want to resolve what differences there are with a mediation session or even refer them to an outside counselor," says Marc Ragovin, a partner in the employment group at New York City-based Gibney, Anthony & Flaherty. "Airing their grievances may diffuse the volatile situation."

Employees who commit such acts may be required to make an appointment with a professional counselor. If you do not have an Employee Assistance Program (EAP) look for a suitable alternative. Many communities have psychiatric hospitals with outpatient clinics and staff counselors trained in workplace issues. Your local police department may also offer referrals.

When referring to a counselor, avoid saying anything that would spark a lawsuit for discrimination under the Americans With Disabilities Act or state laws. "Employers have to be careful to not attribute someone's violence to a condition that may be viewed as a disability or a mental impairment," says Ragovin. "You may get into an area where you are perceiving a person is disabled." Pin the reason for the referral on the behavior of the employee rather than a characteristic of the individual. Avoid saying "You need the help of a psychiatrist," or "You have a mental problem." Instead, use words such as: "Because of your recent actions [...describe them in detail...] you are required to make an appointment with [...]"

The prudent employer tries to diffuse stressful situations by setting

Fending off lawsuits

For employers who want to reduce their risk of workplace assaults and resulting lawsuits, times are getting tougher.

"Traditionally, many employers thought they could safely ignore the need for a security program," says Norman D. Bates, a Sudbury, Mass.-based attorney who counsels businesses nationwide on reducing liability for workplace violence. The rise in incidents of serious assaults has changed the world dramatically. "The old attitude expressed by 'that's why we have insurance,' doesn't cut it anymore," says Bates. "Today's employees want to know you have a security plan to protect them. And insurance policies are not only getting more expensive, but many exclude injuries from assault and battery. Now businesses are required to purchase separate policies for such perils as stabbing, shooting and rape."

Employers can be sued on numerous grounds such as negligent hiring (failure to screen out risky job candidates), negligent supervision (failure to keep personnel from engaging in practices dangerous to others) and negligent retention (failure to terminate individuals who pose a danger to co-workers.) They need to design security programs that include good personnel policies such as adequate pre-employment screening, good training and supervision of people, and enlightened policies and procedures.

With the greater risks inherent in the world of work, it's no wonder violence has become a top-of-mind issue for employers. Says Bates: "We have found over the past 20 years that the single greatest motivator for employers to upgrade security has been the fear of a lawsuit."

up a dialog. "Keep an open line of communication," says Ragovin. "A serious incident might not occur if a troubled employee has a way to talk and lets his feelings be known rather than taking them out on someone else."

"I call the combination of a zero tolerance policy and progressive discipline the 'iron fist and velvet glove approach,'" says Rabaut. Together, these two magic missiles of the disciplinary arsenal carry a safety payload: they seek out and cool down workplace hot spots before wildfires break out. "People who engage in this type behavior typically don't just snap," explains Butler. "In many cases there were signs that – if noticed and managed properly – could have minimized the risk of what happened."

Tread carefully on the grey areas

Suppose an employee tells you: "You'd better not treat me like this."

Threat? Or a harmless escape valve for workplace pressure?

If you think this comes down to a judgment call, you're right. But words are only part of communication. Consider other factors such as tone of voice and how the individual presented himself when speaking the words.

"An employee can mutter something in a non-threatening way, or he can move close to you and scream it while jabbing a finger in your face," says Butler. "You have to add these human and subjective interpretations to conduct." Even if the behavior was somewhat aggressive, Butler feels it may be appropriate to limit your response to mandated counseling if no direct threat was made. "But if the

situation escalates, you may need to fire the individual both for being threatening and also for being insubordinate and not interacting in a productive manner with his supervisor."

What about humor that includes a violent threat? Ignore it? Or yank the joker from the workplace deck? While some attorneys counsel discharge, others hedge their bets. "It's almost impossible to give a bright line rule," says Bland. "A lot of times threats are made in jest or as part of normal conversation. Those can be dealt with through progressive discipline. But if someone makes a specific threat and there is no evidence they are not serious, they should be discharged."

Grey areas may also arise when local culture, often in an industrial setting, allows for a certain level of violence. "In an ideal world we would like to see people terminated as soon as they exhibit violent behavior," says Butler. "But sometimes a decision hinges on culture and history. You may have an employer who has lots of that type of problem and as a practical matter terminations might be impossible."

Attorneys advise trusting your own instincts when doubt casts a shadow across the workplace landscape. Says Butler: "If you feel afraid, something is amiss. You are in management because you have some level of good judgment. So trust your gut; don't overanalyze." And judgment calls are, indeed, often required. "These are very fact-specific situations. It's tough to draw bright lines."

One final point: Having a policy is not enough. You must tell employees the rules of the game. Failing to do so can be dangerous and costly. Consider that firing an individual for making a threat is risky enough, since the termination may itself be a trip wire for violence. But your risk is increased many times over if the terminated individual feels as though you are picking on him, because you never informed him of your policies.

When terror calls

Now let's return to the scene which opened this article. How would you handle the individual who called and threatened to use a gun to solve his problems? For an answer we turned to Louis C. Rabaut, who was the attorney for the Michigan employer who actually received the call. In the real-world event that inspired our anecdote, the employer called Rabaut, who in turn called the former employee.

"In a situation like this, you want to keep the individual where he is, talking on the phone as long as you can," says Rabaut. He suggests using open-ended queries such as "Tell me why you are upset," and "Are you sure there's nothing we can do to get you help?"

While Rabaut kept the individual talking, he had a colleague call police, who sent cruisers to the business

Get more information

Major Developments in Premises Security. by Norman D. Bates. A statistical report and analysis on inadequate security liability for employers, and the development of case law. Liability Consultants, Inc., 39 Union Ave., Sudbury, Mass. 01776. 1-888-872-5222. (1999.) $35.00

Preventing Violence in the Workplace. by Dr. Charles E. Labig. What causes violence in the workplace and how to stop a crisis before it occurs. AMACOM, 1601 Broadway, New York, NY 10019. 1-212-903-8315. (1995.) $24.95.

location as well as to the former employee's home to make an arrest. Rabaut suggests a similar course of action if you find yourself in such a situation. "Let the police know you have a former employee on the line threatening to kill people, and give them his location."

Whether the police will arrest an individual solely on the basis of a threat depends on policies in your region. At the very least, however, they will send officers to your place of business.

In Rabaut's situation the arrest was made. "Getting the man into custody let him see his threats were being met with force," says Rabaut. "We then filed for a temporary restraining order to keep him away from the business premises." A sheriff went to the man's home and served him with the order, which also mandated a court appearance. During his hearing, the judge reinforced the terms of the restraining order.

Intimidated by early action by the police and firm instructions from the legal system, the threatening individual caused no further harm. "Being hauled into court before a judge often has a sobering effect on people," says Rabaut.

While this story had a happy ending, in the best of all worlds you will identify and defuse anger before it escalates into a situation as frightening as this one. But whether you are dealing with a threat or an actual act of violence, you can't hide and pretend nothing is amiss. "Once something happens you have to act quickly and do whatever you must in terms of discipline," says Ragovin. "It can only lead to more trouble if you don't." □

USCG Licensing

USCG 12-Hour Clause Policy Letter Issued

The clarification raises almost as many issues as it resolves

By Charley Havnen

The USCG recently published a letter concerning watchkeeping policy and workhour limitations on towing vessels, offshore supply vessels (OSVs) and crewboats using a two watch system. This letter is labeled G-MOC POLICY LETTER 4-00 and is dated Sept. 1, 2000. The letter is too long to publish here but may be found online at the USCG web site (www.uscg.mil/hq/g-m/gmhome.htm and using the "Search" button look for "G-MOC Policy 4-00"). It is unfortunate that the letter must be read with several other references handy. They include Title 46 USCA and at least part of the Code of Federal Regulations. The letter goes into a good bit of detail concerning interpretation of the law and regulations concerning hours of work on vessels authorized to use a two watch system. The letter also goes into the Standards of Training Certificating and Watchkeeping (STCW) although these standards clearly do not apply to all vessels that use a two watch system.

The policy letter provides us with the USCG view of the famous (or infamous) "12-hour clause." It is remarkable that the "Policy Letter" was published at all, since it seems by and large to be a restatement of the law without a great deal of interpretation added. In all fairness to the USCG the letter does collect in one place most of the issues affecting work hours within a two watch system.

According to the Policy Letter, mariners are responsible to obey the law and for reporting suspected watchkeeping and work hour violations to the USCG, although reporting violations does not exonerate the mariner from any potential violation or prevent the USCG from proceeding against their license and/or Merchant Mariners Document (MMD).

The USCG indicates that operating companies should ensure that employees are informed of the law and educated regarding the safety concerns of not getting adequate rest. The USCG states that operating companies should provide unambiguous guidelines to the master regarding expectations to comply with safety requirements and the law even when these are in conflict with operational demands.

It is most curious that the USCG indicates that the operating company has a duty to train the master and other employees as to the content of the law. The Master is considered by the courts to be

part of company management. The Master is generally told in writing by the company to comply with the law. Historically, the USCG has chosen to suspend or revoke the Master's license for violations of law rather than proceed against the company. The policy letter assumes that the company knows more about the law than does Master. In today's world, the Master generally knows more about the requirements of law than do many Operations Department supervisors.

The policy letter goes on to describe how the USCG can initiate an investigation into possible violations based upon confidential information provided by a mariner, anonymous tips or through the findings of a USCG casualty investigation.

The USCG is charged by Congress to investigate casualties and personnel actions. The USCG has subpoena authority in these actions, as well as a responsibility to prepare reports and maintain statistics. While the USCG has authority to initiate an investigation based upon a complaint, their powers are limited. they have no subpoena powers in this action, no report of investigation is made to superiors and we believe no statistical records of such complaints are either authorized or indeed allowed to be kept by the USCG unless they are investigating the conduct of a licensed or documented individual.

Records of hours worked are often not maintained as company records nor are they required by the USCG to be maintained. These rules are basically unenforceable in all but extremely obvious violation cases.

Mariners should be aware that it is generally the USCG policy to take action against a licensed individual's right to employment rather than to issue a citation against the company for violation of law.

This is all well and good but what does the letter mean to mariners and companies.

The Coast Guard is attempting to reassure mariners that they (the mariners) can report apparent violations of the manning and watchkeeping standards to the Coast Guard without fear of retribution on the part of the company. What the letter does not go into (nor can it) is that while the law protects mariners from employer retribution against "whistle blowers", it does not protect mariners against self-incrimination. As seen by of the USCG a mariner will most probably lose his right to employment for manning or watchstanding violations without regard to whether it was done with or without shoreside supervisory direction. In other words, any violation that a crewman can complain about to the USCG, he (the crewman) has been a participant. The crewman may therefore be placing his license or MMD in jeopardy.

On the other side of the coin, the Coast Guard is attempting to convince operating companies that they have a duty to train mariners about the law. We do not believe that such a duty exists in law or regulation. The company does need to tell the master (in writing) to comply with all laws and regulations. Beyond that, its up to the master to train himself.

One issue worthy of note: "Work" is any activity clearly counted against the 12 hour (or other) day. It includes watches, performing maintenance, unloading cargo and performing administrative tasks. In most cases only watches can be used to track Mariner's workhours. Only the mariner knows when the maintenance, cargo handling and administrative duties exceed the hourly limits unless they are specifically logged. In many cases, doing anything beyond standing watches exceed the limits. Who knows? How can it be tracked? It sounds like we are on the "honor system" for workhour limitations. It is all very confusing.

One last issue concerns the legal requirements that the licensed deck officers be properly rested before taking the deck watch of a vessel departing port. The USCG letter indicates that the mariner is responsible for arriving at the vessel properly rested. Who is to judge whether he has the proper 6 hours of off time before departing port? What if he drives the carryall from Houston to Fourchon for a crew change? What if he is not the driver but cannot "rest" in a moving vehicle. Who decides? It sounds like only a fired or otherwise disgruntled seaman would say that he was not rested, and further if he was not properly rested, he should not have taken the vessel out of port.

Does anyone remember "Catch 22"? This all sounds like a "Catch 22" for both mariners and employers.

Charley Havnen *is a Commander USCG Ret. His organization can help you with your vessel construction project, regulatory problems, vessel manning issues, procedure manuals, accident analysis or expert witness. His organization can do what you can't or don't want to do. He can be reached by contacting the Havnen Group (800) 493-3883 or (504) 394-8933, fax: (504) 394-8869.*

Potential Improper Issuance of Merchant Mariner Licenses/Documents

Good morning/afternoon;

This information is being forwarded to you to let you know about a problem at one of our Licensing offices and to ask you to possibly give us a hand in re-validating some of the licenses and documents in question.

The Coast Guard has determined that an uncertain number of Merchant Mariner licenses and documents issued by its Regional Examination Center monitoring unit in San Juan, Puerto Rico, may have been issued improperly. The Coast Guard requests assistance from the marine industry, maritime unions and individual mariners in helping to locate these potentially invalid licenses and documents.

Merchant Mariner Licenses

The licenses in question contain serial numbers in the following ranges:

765001 – 765100;
864001 – 864100;
865401 – 865500;
878001 – 878100;
878601 – 878700;
919901 - 920000.

The license certificates themselves may be representative of a variety of license transactions including original issues, renewals, duplicates, and upgrades. The issuing port may be represented as San Juan, PR, however, it may appear as another location.

We're requesting that you (your company/union/organization) carefully scrutinize the licenses of your personnel to determine if any have licenses with these serial numbers. Some of the licenses issued with these serial numbers may be valid licenses. However, employers and maritime unions need to be aware that some persons operating under licenses containing these serial numbers may not be properly qualified to hold the position for which they were hired. If an employer or maritime union finds one of these licenses or questions the validity of a license or mariner document, they should contact the Regional Examination Center in Miami, Florida at 1-(800) 982-9374 or (305) 536-6549 to verify the validity of the license or document. To prevent further discrepancies, those mariners that have license numbers listed above that are confirmed to be valid, will have their licenses reissued by the Regional Examination Center at no cost to the mariner.

Merchant Mariner Documents

Because Merchant Mariner's Documents have no assigned serial numbers, the Coast Guard is looking to the marine employer and maritime unions for assistance in identifying anyone that does not appear to possess the qualifications needed for the position being filled. Any mariner who has been recently hired and has no long term employment or affiliation with a company or maritime union should have their Merchant Mariner's Document verified by the Coast Guard.

We are asking marine employers, maritime unions and individual mariners to contact their local Coast Guard Marine Safety Office if they have any questions or information that may help the Coast Guard identify improperly issued licenses and documents. The Coast Guard is working diligently to mitigate this situation and we regret any inconvenience that this may cause.

Again, thank you for your help. There will be a public announcement about this on Friday 29 December in Miami.

Just For Fun

ORDER
of the Captain of the R/V " the Akademik Mstislav Keldysh "
of June 28, 1998

FIRE SAFETY REGULATIONS.

SMOKING ON A VESSEL IS AUTHORISED IN THE FOLLOWING PLACES:
In cabins, when ashtrays are available and the room mate agrees.
On the boat deck and 7 th floor deck, where deck chairs are located.
At the entrance to the top deck sauna, on the main deck close to the main-ladder and on the afterdeck near the entrance to the corridor of the main deck.

SMOKING IS FORBIDDEN:
In bed or on sofas, in laboratories, while walking in corridors and it is forbidden on decks near the fuel and ventilation ports, on open parts of the decks, in public places, inside of cargo holds on decks near opened holds, in store-rooms and in auxiliary premises.

IT IS STRICTLY FORBIDDEN to throw matches, cigarettes and other object out of the portholes.

IT IS FORBIDDEN:
To make a fire without the written permission of the captain; and to store explosive, inflammable and dangerous poisonous substances in the cabins.

To bring to the ship all the above - mentioned dangerous object without notice of the chief mate.

To leave electrical equipment and lighting devices on while unattended (with the exception of computers).

To use any electrical heating devices (clothes-irons, water-boilers, cookers, except for proper kettles) in cabins and laboratories.

Wipe furniture, deck, cabins and laboratory equipment with inflammable liquids such as petrol (gasoline), acetone, solvent etc.. To wrap lamps with either paper, curtains or another combustible material. To use flammable containers for rubish - bin (trash cans). It is categorically forbidden to leave portholes open when leaving cabins and laboratories.

THE RESPONSIBILITY for maintaining the vessel in fire - safe manner lies on the ship fireman.

Anybody breaking the fire safety rules will be severely fined.
All members of the expedition must be informed of these fire regulations.

ORDER

of the Captain of the R/V " the Akademik Mstislav Keldysh "

GENERAL RULES
UNDER THE SAFETY PRECAUTIONS

Below listed rules that should be known and carried out by each member of expedition.

YOU MUST:

1. At descent or rise on a gangway keep hands on rails for protection.
2. To have sefe footwear.
3. To be cautious on a wet deck (vessel swings).
4. To fix reliably all equipment and electrodevices in laboratories and pantries.
5. To open and to close doors, holding both hands before complete closing (otherwise the door can knock on a hand or leg).
6. Using a ladder keep hands on the ropes (it is impossible to keep for rods).
7. Before using a toilet read the instruction above it.

IT IS FORBIDDEN:

1. At mooring operations of a vessel to be in region of these works.
2. At realization ship and repair jobs to be in region of their realization (Keep safe distance).
3. To be on the top deck over the bridge (it is very dangerous, because of high-frequency radiating radioaerials).
4. To rise on mast's, roofs of hangars and other platforms that do not, have a barrier.
5. To sit on the protection barrier because of the danger of falling overboard.
6. In stormy weather to be on open sites of a deck without the sanction of a captain's watch mate.
7. At descent or rise of apparatus "MIR" or boat and rubber boat to be in region of these work.
8. At descent or rise of hangars of apparatus "MIR" is to be under them.
9. To jump in pool from a barrier or higher places.
10. To be in sweating-room of sauna, alone.
11. To be under the cargo.
12. To work on deck without a helmet and gloves.
13. To work at height more than 1,5 meters and overboard, not having a safety belt.
14. To carry on gangways a heavy subjects more than 50 kgs, alone.
15. In dark time of day to make any work at bad illumination for one person on external decks.
16. To leave the electrotool and electroequipment under a pressure voltage without supervision (put it on a dry and visible place).
17. To connect in the ship electric system of high capacity electric equipment, without the sanction of a chife electromechanic.(ph. **640** or **777**)
18. To lower on board any equipment, cables or ropes without the sanction of a captain's watch mate. (ph. **666**)
19. To enter machine branch or shaft of machine branch without the sanction of the watch mechanic (ph. **777**).
20. To open, close, turn, twist without the ship experts any handles, gates, covers, hatches.

If you see a fire, ring up **666** on the phone (name a specific place) or break glass and press the button of a hand-operated push-button fire bell (small red box in corridors).

If you require the emergency medical help, ring up **666** on the phone (Name particular place where the doctor should arrive).

If you require the help of any ship expert, ring up **666** on the phone.

R/V " the Akademik Mstislav Keldysh "

Правила удаления мусора в море

Категория мусора	Тип мусора	За пределами особых районов	В особых районах
1	Пластмассы, включая синтетические тросы, рыболовные сети, пластмассовые мешки для мусора.	Сброс запрещен	Сброс запрещен
2	Обладающие плавучестью сепарационные, обшивочные и упаковочные материалы.	> 25 миль от берега	Сброс запрещен
3	Измельченные изделия из бумаги, ветоши, стекла, металла, бутылки, черепки и т.д.*	> 3миль от берега	Сброс запрещен
4	Изделия из бумаги, ветошь, стекло, металл, бутылки, черепки и т.д.	> 12 миль от берега	Сброс запрещен
5	Пищевые отходы:		
	а) Неизмельченные пищевые отходы	> 12 миль от берега	> 12 миль от берега
	б) Измельченные пищевые отходы*	> 3миль от берега	> 12 миль от берега
6	Зола из инсинераторов	> 12 миль от берега	Сброс запрещен

* – Измельченный мусор должен проходить через грохот с отверстиями не более 25 мм.

Regulations of garbage disposal at sea

Garbage Categories	Garbage Type	Outside special areas	In special areas
1	Plastics includes synthetic ropes and fishing nets and plastic garbage bags	Disposal prohibited	Disposal prohibited
2	Floating dunnage, lining, or packing material	> 25 miles offshore	Disposal prohibited
3	Ground paper products, rags, glass, metal, bottles, crockey, etc.*	> 3miles offshore	Disposal prohibited
4	Paper products, rags, glass, metal, bottles, crockey, etc.	> 12 miles offshore	Disposal prohibited
5	Food waste:		
	a) Not ground food waste	> 12 miles offshore	> 12 miles offshore
	б) Ground food waste*	> 3miles offshore	Disposal prohibited
6	Incinerator ash	> 12 miles offshore	Disposal prohibited

* – Ground grabage must be able to pass through a screen with mesh size no larger than 25 mm