Proceedings
of the Marine Safety Council

U.S. Department
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United States
Coast Guard

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"...Be it enacted that the provisions of an act to amend section forty-four hundred and eighty and forty-four hundred and eighty nine of the Revised Statutes of the United States approved March the second eighteen hundred and eighty nine, be and the same are hereby repealed insofar as they relate to the provisions of chapter one hundred and two, section sixty-five of the Act of February the twenty-eighth eighteen hundred and seventy-four..."

Proceedings
of the Marine Safety Council

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When you have finished reading this issue, please pass it on.

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The quotation on the cover is typical of the antiquated language that appears throughout Title 46 of the U.S. Code. For an account of what the Coast Guard is doing to modernize this outdated body of law, see the article beginning on page 85.

Plastic Butane Bottle Hazard

A Navy ship operating in the Mediterranean reported the explosion of a plastic butane lighter refill bottle.

The bottle exploded when it fell from a desk top. These bottles were acquired in Naples, Italy, from both authorized vendors on board ship and from street merchants. The tapered bottom of the bottles, with four plastic dots for feet, makes them unstable when more than half full—also contributing to the hazard.

The red plastic insert tops stick in the open position after use, creating a fire hazard. It was also reported that when these bottles are thrown overboard, a similar explosion will occur on impact with the water.

Tentative Interim Amendment to NFPA 306 Issued

Recently, the Board of Directors of the National Fire Protection Association (NFPA) upheld the decision of the NFPA Standards Council to amend NFPA-306-80, Control of Gas Hazards on Vessels, relating to the duties of a Marine Chemist.

The change, in the form of a Tentative Interim Amendment (TIA), effective December 9, 1981, reads as follows:

2-1. The Marine Chemists Shall Personally Determine Conditions.

A Marine Chemist may issue a certificate setting forth in writing that the prescribed work to a vessel can be undertaken with safety. The Marine Chemist shall physically inspect the conditions and carry out tests within each compartment or space ensuring compliance with the minimum applicable requirements to his satisfaction prior to issuing a Certificate providing for SAFE FOR WORKERS or SAFE FOR HOT WORK.

For further details contact Charles Keller, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269; (617) 328-9290.

INMARSAT Now Operational

On February 1, 1982, INMARSAT (the International Maritime Satellite Organization) began operation of its worldwide satellite communication system. INMARSAT has leased three satellites from MARISAT for operation in the Atlantic, Pacific, and Indian Ocean areas.

INMARSAT is expanding the satellite-based communication system currently operated by MARISAT, a group of U.S. common carriers. That system provides voice, telex, facsimile, and data communications to commercial mariners. INMARSAT is committed to maintaining the level of service while extending the service worldwide. INMARSAT will further expand service by leasing five additional satellites from the European Space Agency and the International Satellite Organization (INTELSAT) in 1982 - 1983.

INMARSAT is developing procedures to ensure the rapid and efficient handling of distress calls and the relaying of these calls to the appropriate rescue authorities. Specifications are also being developed for a satellite system for distributing navigational and meteorological data. Also on the agenda are plans to participate in the testing of satellite EPIRBs (Emergency Position Indicating Radio Beacons) to be conducted by six countries under an international coordinated trials program.

IMCO, the Inter-Governmental Maritime Consultative Organization, is developing requirements for a future distress system to be based on satellite communications and satellite distress alerting by an automatic float-free EPIRB. INMARSAT will provide the satellite communications for that system.

Lloyd's Publishes New Edition of Maritime Atlas

Lloyds of London Press Ltd. recently announced publication of the 13th edition of the Lloyd's Maritime Atlas. Some 10,000 ports and shipping centers are listed in the volume, which is divided into three sections. The first has 28 pages of worldwide maps; the second lists the ports in geographical order and shows latitude and longitude; and the third is an alphabetical index, suitably cross-referenced. Over 600 changes have been made since the last edition was published. The new edition also incorporates many new maps and shows the North Sea gas and oil fields.

Copies of the atlas can be ordered for $32.00 from Lloyd's of London Press Ltd., 205 E. 42nd Street, New York, NY 10017. ⚓

The following items of general interest were published between December 17, 1981, and January 21, 1982:

Final rules: CGD 81-061 Drawbridge Operation Regulations; Amite River, Louisiana, December 17, 1981. CGD 5-81-06R Anchorage Regulations; Norfolk, Virginia, December 17, 1981. CGD 81-055 Drawbridge Operation Regulations; Saint Joseph River, Michigan, December 17, 1981. CGD 2-81-01 Safety Zone: Uper Mississippi River, Mile 633.7 to 636.7, December 28, 1981 (removal). CGD 14-81-01 Drawbridge Operation Regulations; Honolulu Harbor, Hawaii, January 11, 1982. CGD 8-81-01 Safety Zones: Vicinity of Old River Control Structure, Mississippi River, January 11, 1982.

Rule termination: CGD 77-233 Navigation Lights for Small Vessels, January 7, 1982.

Notices: CGD 81-102 New York Vessel Traffic Service, Advisory Committee Meeting, December 28, 1981. CGD 81-105 Qualification of Schlumberger as Citizen, January 7, 1982. CGD 81-106 Port Access Route Study, Notice of Study Results (the areas of Maine, Massachusetts, New Hampshire, and Rhode Island), January 7, 1982. CGD 81-062 Proposed Change to Operating Regulations for Multnomah County Drawbridge across the Willamette River at Portland, Oregon, Notice of Public Hearing, January 21, 1982.

Questions concerning regulatory dockets should be directed to the Marine Safety Council (G-CMC), U.S. Coast Guard, Washington, DC 20593; (202) 426-1477.

* * *

Optional Method of Admeasurement Proposed for Vessels under 79 Feet

Tonnage, known as "admeasurement," is actually a reflection of the volume of a vessel rather than its weight or cargo capacity. Tonnage measurement is used to determine the applicability of domestic laws and regulations. It is also used as a basis for computing limits of liability, as well as tonnage duties, port and pilotage fees, and similar charges. Current law requires on-scene measurement of all spaces within a vessel. The intricate process involved (known as "formal admeasurement") must be carried out in accordance with complex statutory and regulatory requirements and calls for complicated measurements and calculations requiring a knowledge of integral calculus. Admeasurement is therefore a relatively expensive and time-consuming process.

The Tonnage Admeasurement Simplification Act (P.L. 96-594), signed into law on December 24, 1980, gave smaller vessels—vessels under 24 meters (79 feet)—the option of using a simplified method. On January 18, 1982, the Coast Guard published a notice of proposed rulemaking on the subject. The proposed regulations would specify what vessels would be covered by the simplified admeasurement system and set forth what dimensions would be measured and how calculations would be done. They would also provide for assignment of the same tonnages to vessels in the same class. For further information, contact James V. Higgins, U.S. Coast Guard (G-MMT-6), Washington, DC 20593.

Specifications for Pilot Hoists and Ladders Finalized (CGD 74-140)

When a vessel is away from dock, pilots or other personnel are transferred aboard ship by means of a pilot hoist or ladder. In times of emergency, chain ladders can be used for boarding lifeboats and life rafts.

On December 28, 1981, the Coast Guard published a final rule containing new specifications for pilot hoists and revised specifications for pilot ladders and chain ladders. The new specifications remove many unnecessary detail requirements to allow for innovative design. Requirements for pilot ladders are based on Chapter V, Regulation 17 of the Safety of Life at Sea Convention (SOLAS) 1974. The pilot hoist specifications incorporate standards adopted by the Inter-Governmental Maritime Consultative Organization (IMCO) in 1973. The regulations govern the materials, construction, performance, and approval of the equipment and are aimed at ensuring greater safety for those using the equipment to board or leave a ship.

Anyone wishing to comment on these rules may do so by contacting the Marine Safety Council at the address given above before March 28, 1982.

Annexes to Inland Navigation Rules Published (CGD 81-008, 81-006, 81-009)

To coincide with the entry into force of the Inland Navigation Rules, the Coast Guard published Annexes I, II, and III to the Rules in December 1981. These annexes contain the technical information necessary for compliance with the new rules, along with additional signal requirements for fishing vessels.

Annex I concerns the positioning and technical details of lights and shapes. Included in the annex are information regarding horizontal and vertical positioning and spacing of lights, color and intensity specifications for lights, maneuvering lights requirements, and regulations regarding screens for lights and shapes.

Annex II deals with the additional signals for fishing vessels fishing in close proximity. It includes technical details, as well as requirements for trawlers and purse seiners.

Annex III provides technical details for sound signal devices. Included in these regulations are requirements for the frequency, range of audibility, and intensity of sound signals, plus directional and positioning characteristics. Also included in this annex are requirements for bells and gongs, as well as regulations for combined whistle systems and towing vessel whistle systems.

A public hearing was held on January 6, 1982, to discuss Annex IV of the Inland Navigation Rules, which deals with visual distress signals. This annex will be published as a final rule in the future.

For further information concerning these annexes, contact Chris Llana, U.S. Coast Guard (G-NSR-3), Washington, DC 20593; (202) 245-0108.

Regulations Regarding Barge Carriage of Certain Dangerous Bulk Cargoes Revised (CGD 80-001)

When a carrier proposes shipment of a chemical in bulk by water, the Coast Guard reviews the chemical and any hazards which may be associated with it. Should a certain cargo be considered dangerous, the Coast Guard regulates the material to ensure its safe carriage. These regulations are contained in Title 46, Part 151 of the Code of Federal Regulations. Since the original regulations were written, many new cargoes have been accepted for shipment and modifications and changes have been made to existing regulations. In a final rule published December 28, 1981, the Coast Guard incorporated all changes in an updated version of Part 151. The additions and deletions include:

1. Benzene-hydrocarbon mixtures having 10% benzene or more (addition)

2. Methyl-tertiary-butyl ether (deletion)

3. Benzene, toluene, xylene mixtures having 10% benzene or more (addition).

In addition to these and many other additions and deletions, errors which appeared in the previous Part 151 have been corrected.

For further information about this final rule, contact Joseph J. Jakabcin, U.S. Coast Guard (G-MHM-3), Washington, DC 20593; (202) 426-6260.

Puget Sound Navigation Rules Changed (CGD 81-087)

Up until December 24, 1981, vessels navigating from the high seas or Canadian waters into Western Washington passed from an area governed by the 72 COLREGS to one governed by the inland navigation rules. In order to make passage through this area safer and easier, regulations were changed so that the 72 COLREGS now apply in the Strait of Juan de Fuca, Haro Strait, and the Strait of Georgia and Puget Sound and all adjacent waters. This interim final rule, published December 17, 1981, went into effect on December 24, 1981, to coincide with the changeover of inland navigation rules that also took place that day.

Any comments concerning this interim final rule should be mailed to CDR Roger Pike, Chief, Port Safety Branch, Thirteenth Coast Guard District, 915 Second Ave., Seattle, Washington 98174.

An account of the actions taken by the Marine Safety Council at its January meeting was not ready at the time this issue went to press and will appear in the next issue instead. ⚓

The Open Conference: Grounds for Agreement

by CDR Roger Pike, USCGR
Chief, Port Safety Branch
Thirteenth Coast Guard District

The following success story, related to the Keynote on Puget Sound on the preceding page, reflects an important trend toward increasing consumer participation in rulemaking at an early stage, particularly when an agency has not yet decided on a specific regulatory solution to a problem. We thought it would be of interest to our readers, both those within the Coast Guard and the members of the public affected by Coast Guard regulations.

Public participation is a distinctive and important element in the U.S. system of developing government regulations. Input from the general public, and especially from public-interest and special-interest organizations, helps to ensure that regulations are meaningful, effective, and enforceable. No government agency could hope to have sufficient resident expertise to issue regulations without the benefit of such input.

The principal means of public participation in the rulemaking process have generally been submission of written comments and attendance at public hearings. Both approaches allow the private citizen or interest group to take a position—either pro or con—on the proposed regulations or provide alternative proposals. The general success of these means of gaining public input is evidenced by a national body of regulations which is widely accepted, fairly enforced, and generally effective.

There are situations, however, in which the traditional approaches to providing for public participation do not gain the hoped-for results. This is especially true when the subject matter is highly controversial or when the government agency does not have a draft regulation or position it is attempting to air but is merely seeking general input or proposals for a direction to pursue. In such cases, the result may be hardened or polarized positions or no clear consensus at all.

The Open Conference provides an alternative which is becoming increasingly popular. Because of the wide variety of forms the Open Conference can take, it can be tailored to meet the specific needs of the particular rulemaking effort. It can provide a forum in which people with widely differing interests and perhaps widely divergent positions are brought together to develop a consensus on the direction the sponsoring agency should take in the regulatory process. Such was the case at an Open Conference conducted by the Coast Guard in Seattle last October.

The subject was vessel traffic congestion and user conflicts on Puget Sound and adjacent waters. While Puget Sound clearly does not have the kind of major vessel congestion characteristic of the Houston Ship Channel or the restricted waters of many East Coast ports, it does experience many conflicts between mariners engaged in multiple and often conflicting uses of waterways. Typical of these conflicts are deep-draft vessels navigating in channels where large numbers of commercial fishermen have set their nets and tugs with barges attempting to find a safe course through heavy concentrations of sailboats. All users have an equal right to be on the water, and many do not fully appreciate the special problems posed by their activities for their fellow mariners.

In April 1981 the Coast Guard published a notice in the FEDERAL REGISTER indicating that it would conduct a public hearing in Seattle to solicit public comment concerning ways in which the potential for conflicts could

be reduced. The advance notice of proposed rulemaking did not propose any specific regulatory approach, although it did briefly address a number of possible actions. It also indicated that if the results of the public hearing were not conclusive, an Open Conference might be held.

Although the public hearing which was held in June was well attended, the input the Coast Guard received did not point toward a suitable regulatory remedy to the problem. The comments reflected considerable polarization of opinion and tended to put the interests of one group over those of others. The speakers testifying at this hearing were asked whether they would be willing to participate in a subsequent Open Conference; most said they would.

The Open Conference, which was scheduled for October 13 and 14, was publicized through mailings to interested individuals, organizations, and firms and through extensive press coverage. A public conference center was selected as the meeting site, thus avoiding any "turf" problems. Finally, every effort was made to ensure that a wide variety of possible positions and viewpoints was represented so the conference would be truly representative of the many users of Puget Sound.

The turnout for the conference was gratifying. Among those attending were representatives of deep-draft vessel interests, towboat operators, pilots, commercial fishermen, recreational boaters, and representatives from several State and Federal agencies. From the opening session on, the point was made and emphasized that the purpose of the conference was not to "sell" a Coast Guard position but to solicit recommended courses of action which the conference as a whole could agree to. It was also emphasized that while new or revised regulations could be one possible approach, the conference should not overlook any nonregulatory solutions. For example, it might be possible to address most of the user conflicts through "industry agreements" or other means.

After a brief opening session at which the problems to be looked at were outlined and the conference agenda was discussed, the conference was divided into four working groups. Each working group was made up of members representing a variety of interests and was given one aspect of the user conflict problem to address. Although a senior Coast Guard officer was assigned to each group to serve as facilitator, each group selected its own leader, who moderated the group and later served as its spokesman.

At the end of the first day, a second plenary session was held at which each of the four working groups presented its recommendations to the full conference. Comments were taken from the floor to be used later by the working groups to further refine their recommendations.

On the second day, the working groups reconvened for an additional two hours to rework their recommendations. At the final plenary session, these revised recommendations were presented to the full conference for adoption. In addition, comments and "minority positions" were taken from the floor. Only this final plenary session was recorded verbatim, and this verbatim transcript became the official conference report.

One of the measures receiving the support of the plenary session was a recommendation to disestablish the COLREGS Line of Demarcation between international and inland waters in the Puget Sound area. This, it was hoped, would eliminate possible confusion arising from the use of two different sets of navigation rules. (See the Keynotes section for details on the Coast Guard's interim final rule on this subject).

By almost any measure, this day-and-a-half Open Conference was a success. It provided the Coast Guard with a number of excellent recommendations which had the support of a wide spectrum of the maritime community. Perhaps more important, it provided an opportunity for members of conflicting interest groups to sit down together and work on mutual problems. In fact, one of the recommendations to come out of the conference was frequent meetings of the associations and organizations with primary interest in the multiple uses of Puget Sound.

The Open Conference is a flexible tool which can be used to gather input for a variety of rulemaking efforts. Its format can be adapted to both the subject matter and the composition of the interested public. It provides broad opportunities for public participation, is truly democratic, and encourages agreements rather than polarization. Although the Open Conference described here is only one of many approaches which might be taken, it could certainly serve as a model for any agency considering use of this highly effective forum.

As the issues which must be addressed in the rulemaking process become more complex and as public interest increases in those regulations dealing with health and safety, the Open Conference may prove to be an idea whose time has come. ‡

Seventh Annual
Marine Safety Poster Contest

1st Prize — GOLDEN SAFETY POSTER AWARD - to be presented at the 1982 National Safety Council Congress in Chicago, Illinois.

2nd Prize — SILVER SAFETY POSTER AWARD - to be awarded to employer's representative attending the above Congress for eventual presentation to the 2nd Prize winner.

Sponsor's Award — SPECIAL GOLDEN SAFETY AWARD - to employer of 1st Prize winner to; be awarded to corporate representative attending the above Congress as a thank you to the company for its cooperation and interest in furthering safety in the industry.

RULES

1. The contest is open to any and all employees in the maritime industry who like to draw. All posters must be on a Marine Safety subject. Any maritime operation or situation afloat or ashore may be used.

2. Drawing must be confined to 7½" x 10" on standard 8½" x 11" white paper and should be done in **black** or **red** ink only. Drawings should be designed for **vertical** display. Bold letters and strong art count as well as subject matter. Only one idea should be emphasized.

3. The work must be signed. Submission automatically gives copyrights to the Executive Committee of the Marine Section of the National Safety Council, and the entrant releases all rights thereto.

4. The employer's name and address, as well as the entrant's name, address, and position, must be PRINTED and submitted with each entry.

5. All entries must be postmarked by or before midnight, June 30, 1982. As many entries may be submitted as desired.

6. Winners will be notified via their employers as soon as possible after the closing date.

7. Entries should be mailed to:

Chairman, Audio/Visual Aids and Posters Committee
c/o Ships' Operational Safety, Inc.
284 Main Street
Port Washington Harbor, NY 11050

OFFICIAL JUDGES

Elizabeth V. Stephens, Chairman
Vice President
Ships' Operational Safety, Inc.

John Faulk, Vice Chairman
Safety Director
Strachan Shipping Co.

Captain Robert E. Hart
President
Marine Index Bureau, Inc.

C. Bradford Mitchell
Maritime Consultant

Fourth Annual Marine Safety Photography Contest

Golden Safety Photography Award will be awarded to the person who submits the winning 35mm color slide. The award will be presented at the 1982 National Safety Council Congress in Chicago, Illinois.

Sponsor's Golden Safety Award will be presented to the employer of the winner in the color category in appreciation for its cooperation and interest in furthering marine safety.

Silver Safety Photography Award will be awarded to the person who submits the winning black-and-white photograph. The award will be presented at the above Congress.

Sponsor's Silver Safety Award will be presented to a representative of the employer of the person submitting the winning black-and-white entry in appreciation for its cooperation and interest in furthering marine safety training.

RULES

1. The contest is open to any and all employees in the maritime industry who are photography buffs, either amateur or professional. All entries must be on a Marine Safety subject. Any maritime operation or situation afloat or ashore may be used. A safety topic should be depicted positively or negatively. The entrant should give his picture a safety title or slogan or briefly state the safety topic.

2. Color category: only 35mm slides will be acceptable. Entries will be judged for content, composition, originality, safety applicability, and pertinence.

3. Black-and-white category: glossy or matt prints 8" x 10" or larger will be acceptable. Entries will be judged for contrast, content, composition, originality, safety applicability, and pertinence.

4. Entries must be signed. Photographs and slides will not be returned. Submission automatically gives copyrights to the Executive Committee of the Marine Section of the National Safety Council, and the entrant and sponsor release all rights thereto.

5. The employer's name and address, as well as the entrant's name, address, and position, must be PRINTED and submitted with each entry.

6. All entries must by postmarked by or before midnight, June 30, 1982. As many entries in either the color or black-and-white category may be submitted as desired.

7. Winners will be notified via their employers as soon as possible after closing date. The winners' names and the names of their companies will be published in the NSC, Marine Section Newsletter.

8. Entries should be mailed to:

   Chairman, Audio/Visual Aids and Posters Committee
   c/o Ships' Operational Safety, Inc.
   284 Main Street
   Port Washington Harbor, NY 11050

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Vice President
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John Faulk, Vice Chairman
Safety Director
Strachan Shipping Co.

Allan Litty
President
Flying Camera, Inc.

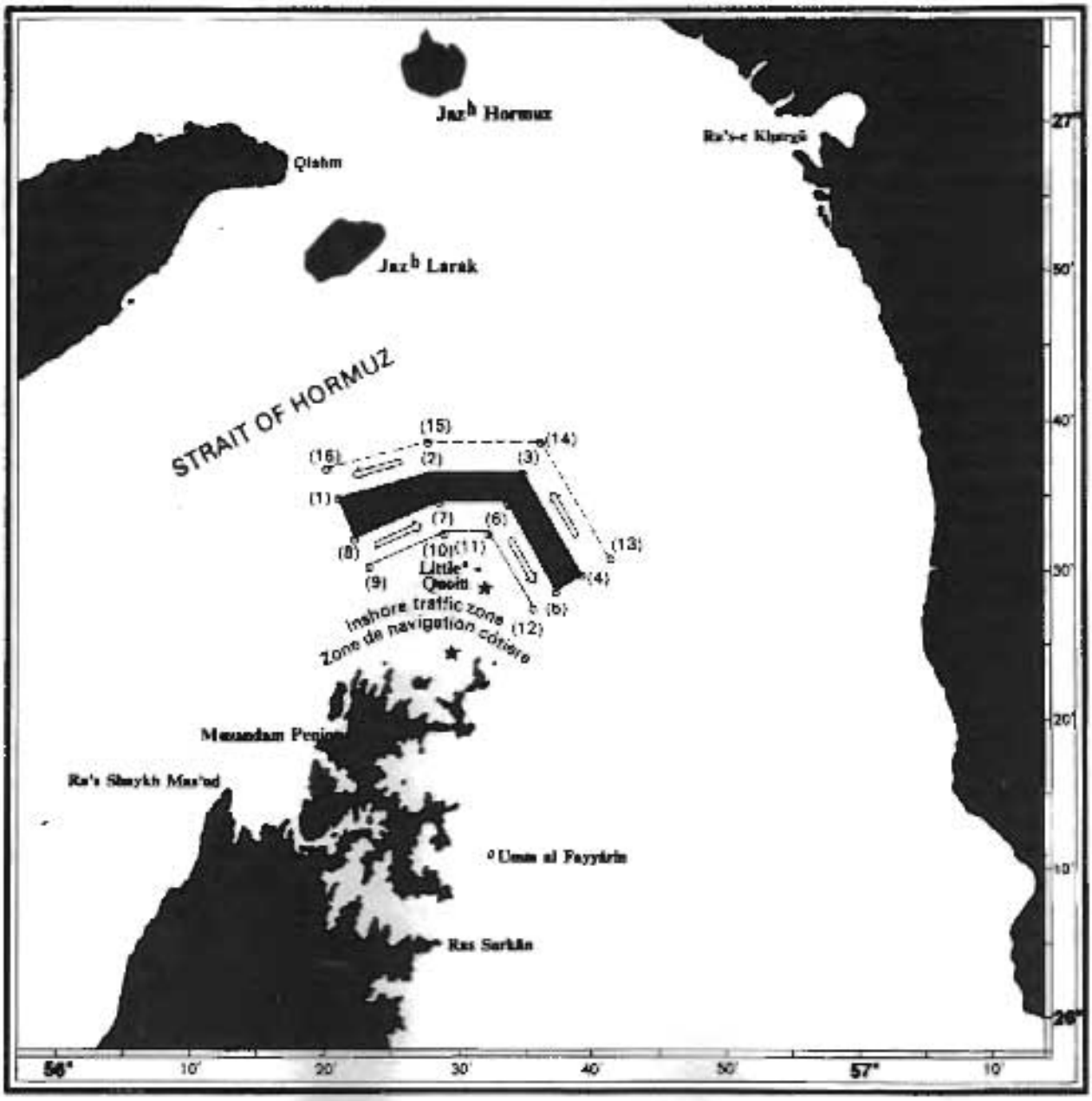
Bob Ahrens
President
Bob Ahrens Productions, Inc.

Non-compliance with Strait of Hormuz Traffic Separation Scheme Reported

The Coast Guard's Office of Merchant Marine Safety has received numerous reports of instances of non-compliance with the Strait of Hormuz Traffic Separation Scheme (TSS). Such non-compliance is in contravention to Rule 10 of the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS), which sets forth navigation requirements for vessels transiting traffic separation schemes. During investigations of these incidents the most often cited reason given for non-compliance with the Strait of Hormuz TSS has been an unawareness of its existence. Apparently, many vessels are transiting the area with outdated charts that do not depict the TSS.

Mariners are advised that charts are available which show the Strait of Hormuz TSS. One such chart is Defense Mapping Agency chart 62392 (4th edition, July 23, 1981). This chart is available from chart and nautical equipment suppliers throughout the United States and in many foreign countries. If this chart cannot be obtained from local sources, it may be ordered from the Defense Mapping Agency at the following address:

DMA Office of Distribution Services
Attn: DDCP
Washington, DC 20315



The Fatigue Factor: the Insidious Enemy of the Mariner

by Captain Duke Diggs

My mate, Walt, arrived on the bridge of our tug just prior to midnight. As I began, somewhat groggily, to brief him on the weather, traffic, and our position, his eyes widened incredulously. "You'd better bring her left, Skipper," he said.

"Left," I thought. "Why, this whippersnapper has just stepped into the wheelhouse to assume the midnight to 0600 watch, and he is telling me what to do before he even relieves me at the helm!" Instinctively I glance at the compass and confirm our heading. 040°. Good.

But Walt, now yelling, shouts "Left, Duke, bring her left. You're heading straight for the bar!" Once more I start to defend myself, but the sincerity in Walt's voice suddenly sets off an alarm familiar to me as a result of my years of experience navigating coastal waters. I step back and relinquish the con to the younger man and watch as he hastily puts the MV SHARALIN's wheel hard left.

As our tug and the 300-foot-long oil barge we are pushing begin to respond to the helm and lazily start their swing to port, I finally see my error. I was actually on a heading of 140° instead of 040°! What happened? I've navigated St. Andrew Sound at night before. I know the course necessary to fetch the entrance buoy, even when its flash is obscured by the haze. I know about the "horseshoe" turn necessary to bring our tow safely around the eastern tip of the large sand bar which separates Jekyl and Cumberland Islands on Georgia's eastern coast. So how did it happen? How could I have made an error that put our tow in such jeopardy?

The incident above happened several years ago. But the questions it raised in my mind haunted me, and my subsequent search for their answers led me to the fascinating subject of fatigue. Because of a schedule change, I had neither slept nor eaten properly on the day prior to the near accident I've just described, and I was now determined to find out all I could about the effect of these physiological factors on the mariner.

Little Was Known

My inquiry revealed that at that time very little had been done in the marine industry in the way of research into the human factor of fatigue. I then turned to another industry in which I had experience, an industry which I consider to be the mariner's "next of kin": aviation. Navigation in the two fields is essentially the same, from the rudimentary compass to the highly sophisticated Loran C. And those using our nation's skyways must deal with the same elements—winds, weather, drift correction, and so on,—as those plying the waters off our coasts. The two fields have one other common meeting ground: command decisions.

The Captain has total authority—and total responsibility.

Initially, then, it was from the Federal Aviation Administration and aviation trade publications that I gathered my information. Later, however, I was able to obtain a report specifically addressing fatigue in the marine environment. "Watchkeeping and Safety," a very informative paper prepared by W. P. Colquhoun of the Medical Research Council Perceptive and Cognitive Performance Unit at the University of Sussex in Brighton, England, offered valuable data for my project.

I compiled the data available from many diverse sources, including areas not closely allied to the maritime industry but with common features. Manufacturing, for instance, has had experience with rotating shifts. This gave me the raw material that was later to provide meaningful insight into the effects of fatigue on the human body. I had already learned, in my own close call that June night aboard the SHARALIN so long ago, that these effects could be of great consequence. What I didn't know was that fatigue was also a factor—though unrecognized until very recently—in too many of the accident reports filed each year.

That "Tired" Feeling May Be More Than a Lack of Sleep

My studies indicated that adequate rest was essential for personnel standing watch aboard ship. Most medical authorities state that, although individuals vary in their personal sleep needs, the average need is eight hours and the sleep should be unbroken if at all possible. (More on sleep later.) As my investigation proceeded, I found that sleep was only one factor in the well-being of a mariner. I found that fatigue is often caused, or compounded, by medical factors.

Marine personnel who suffer from diabetes, hyper- or hypotension (high or low blood pressure), petit mal (a mild form of epilepsy), migraine headaches, asthma, or any of the many other common organic illnesses, are apt to be very much aware of their own limitations and prepared to cope with them.

This is not true, however, of the "healthy" mariner who is suffering from the equally common, but less well-known, hypoglycemia. Hypoglycemia is just one of a number of unconsciously self-induced maladies that can interfere with the mariner's level of alertness while he is on duty. These insidious conditions can cause almost any problem, from erroneous radar plotting to passing out cold at the helm.

What is hypoglycemia? Literally translated, it means "low blood sugar." But what exactly does this mean to you as a professional mariner?

Let me illustrate, with a hypothetical case, what can cause hypoglycemia in the typical mariner, how it relates to fatigue, and what effects it has on you. I will also discuss how you can prevent it from interfering with your work.

Let's take "Harry," for example. Harry's typical watch might begin something like this. He arises at 0700, showers, shaves, dresses, and heads for the galley. Harry never feels too much like eating a decent breakfast. He does need that coffee, though, and he is fond of Danish pastries. He has several cups of steaming coffee with a couple of teaspoons of sugar in each, and, as he chats with his shipmates, he has a large piece of pastry with icing and a sweet filling. Harry feels much better now, and he climbs the stairs and bounces into the bridge wheelhouse with vigor. He feels well and is ready to go on watch and assume responsibility for the ship from 0800 to 1200 hours.

But what is going on inside Harry's body? A lot. Harry's pancreas is now working overtime. All of that sugar he ingested this morning has suddenly been absorbed into his bloodstream, reached his brain, and sent a signal from his hypothalamus to his pancreas that he is now hyperglycemic (his blood sugar level is too high). "Please give me some insulin right away," says Harry's body. And old Harry's pancreas does just that. It begins to pour insulin into his system to compensate for the extremely high blood sugar level.

What happens? The insulin does its job, all right. If you think back to Harry's breakfast, however, you'll remember that it consisted of coffee and a Danish pastry. Harry's body lacks the proteins and fats needed to accompany the high carbohydrate intake if the sugar is to be uniformly absorbed into his bloodstream and his body is to get a steady supply of fuel. So, when his blood sugar level falls in reponse to the insulin, he may begin to feel a little "lightheaded." Depending on his general condition, our friend Harry, the mate who has the con and is responsible for the safe navigation of his ship, just might pass out cold!

While passing out is an extreme reaction, it can happen. At the very least, an individual working with the food base just described is not going to be as alert as he might be otherwise, with some ham and eggs or other protein in his

NTSB Deems Fatigue Contributing Factor in Tug/Barge Accident

While Captain Diggs was ultimately able to avoid an accident in the incident described at the beginning of his article, the crew of the tug CAROLYN was not so lucky. The CAROLYN and its tow, the barge WEEKS NO. 254, were proceeding north in the Atlantic Ocean on September 20, 1972, when, because of heavy weather, they headed south to seek refuge in the Chesapeake Bay. The weather continued to deteriorate. The Coast Guard Cutter MADRONA and a commercial tug, the WARRENGAS, stood by, ready to assist the tug and barge.

After the CAROLYN and its tow passed over the Chesapeake Bay Bridge and Tunnel (CBBT), the CAROLYN began to list excessively to port. In order to facilitate the transfer of fuel from the port to the starboard tanks, the crew headed the CAROLYN into the wind. During this maneuver, a portion of the towing hawser coiled on deck washed overboard from the tug and fouled first the port, then the starboard, propeller. The fouling of the propellers caused a total loss of propulsion. At 0140 on September 21, after the crew of the CAROLYN had been evacuated by the MADRONA and after the MADRONA had made several unsuccessful attempts to take the WEEKS No. 254 in tow, the tug and barge struck a trestle on the western side of the CBBT. After the initial impact, the tug and barge drifted south and struck the CBBT in various locations. The CAROLYN then passed under the bridge, and the towing hawser parted. The CAROLYN drifted south and grounded on Chesapeake Beach; the WEEKS No. 254, buffeted by heavy winds, remained on the west side of the CBBT and pounded the structure for several hours. This pounding extensively damaged bridge pilings, bridge spans, and a portion of the roadway. No deaths or injuries occurred.

The National Transportation Safety Board (NTSB) determined that the probable cause of the casualty was: 1) the failure of the master of the CAROLYN to inform the MADRONA or the WARRENGAS of the existence of a quick-release anchor on the barge and 2) the incorrect decision made by the commanding officer of the MADRONA not to take the CAROLYN in tow as a last resort. Contributing to the failure was the fatigued state of the master of the CAROLYN; contributing to the incorrect decision was a statement by the master of the CAROLYN to the commanding officer of the MADRONA that the tug was sinking.

The master of the CAROLYN was an experienced operator, but he obviously had not planned sufficiently for the contingencies that might occur along his route. While his decision to seek shelter from the high winds and rough seas was appropriate, for example, there were no charts of the Chesapeake Bay on board. Entry into the bay had to be made in the dark without the use of charts or the radar, which had failed. That stress, plus his lack of familiarity with the CAROLYN's limitations in heavy weather, resulted in his being unable to respond adequately to the changing situation. The effect of the stress was heightened by the fact that the master had had no rest since before 0600 on September 20. These conditions may have led the master to take certain actions not compatible with those which he might have reasonably been expected to take. The master's three major inappropriate actions were:

1. Not securing the hawser when he prepared for bad weather,
2. Incorrectly assessing the degree of hazard associated with the additional list caused by excessive fuel in the port tanks, and
3. Forgetting to deploy the barge anchor or to alert the Coast Guard of its existence.

While it is impossible to determine how great a role fatigue played in this casualty, it is easy to see that, in his position, the master needed to be in maximum control of his faculties.

The Marine Casualty Report on this accident, Report No. USCG/NTSB-MAR-74-2, is available to the public from the National Technical Information Service, Springfield, Virginia 22161.

stomach, for instance.

Eat Well, Sleep Well, Feel Well . . .

A good diet is therefore just as necessary as sufficient sleep if we are to avoid fatigue. Let me illustrate with an organ that is both familiar—and essential—to the deck officer: the eye. The human eye is one of the first organs to feel and show the effects of fatigue. Whether we are suffering from too little sleep or overly long hours—perhaps we have been asked to "double-through" on a couple of watches—, our eyes are one of the first organs to be affected. Our field of vision narrows, peripheral vision deteriorates, and we could, just could, miss a crucial blip on the radar or an important course change. An adequate blood sugar level is absolutely necessary if our eyes are to function properly. Add low blood sugar to a shortage of sleep, and we can see the potential for disaster.

Sleep

We mentioned earlier that medical authorities generally agree that rest periods should not be interrupted. This is due in part to the discovery that our sleep is divided into two very distinct phases. These consist of, namely, REM (which stands for rapid eye movement) and non-REM sleep. In the non-REM phase, the eyes, if the lids are lifted, are found to be rolled back in their sockets, and the body is almost completely relaxed. In the REM phase, if the lids are lifted, the eyes will be seen to be moving very rapidly. It is during the REM phase that dreams occur. Although the exact nature of sleep is not known, it is believed that sufficient amounts of both REM and non-REM sleep are necessary for the proper functioning of the body.

Here is the kicker. We also know that an individual alternates between REM and non-REM sleep phases. It is possible, with some types of shift work, to upset this pattern. Experiments have shown that waking a person and depriving him of one or the other sleep modes produces undesirable side effects, such as nervousness, irritability, and difficulty concentrating. If we are to have the vitality needed for the demanding jobs on today's ships, we must therefore plan our rest periods to provide for an adequate number of cycles through each sleep mode.

We have now seen that "fatigue" is a syndrome with a much broader base than a simple lack of sleep. The importance of unbroken sleep periods and a balanced diet is clear. There is another physiological factor that contributes to a mariner's state of alertness, however, a factor that goes virtually unrecognized by both company management and the individual mariner. I am talking about "circadian rhythm."

The Internal Clock

The succession of REM and non-REM sleep phases is not the only cycle that influences a mariner's well-being. The body's biological rhythm—its circadian rhythm—also has a profound effect on his performance.

As before, the aviation industry was the first to recognize and study circadian rhythm (the so-called jet-lag concept became popular in the press a few years ago). Briefly put, circadian rhythm is a term applied to the series of temperature changes the body undergoes in the course of a day. These changes are indicative of one's adaptation to a certain sleep-wake cycle. Some folks are "day people," doing their best work during the day and sleeping at night. Others may be "night people," i.e., individuals who through adaptation for one reason or another sleep well during the day and feel comfortable and alert working through the night hours.

Any interruption or change in the sleep-wake pattern of an individual scheduled to stand an essential watch will result in a compromise in the operational safety of his vessel. Approximately ten full days are required for the recovery of the mariner who has had his "internal clock" desynchronized. This desynchronization can be caused by either a rapid crossing of time zones or an abrupt change in the sleep-wake cycle of a particular mariner. Thus, it can readily be seen that the mariner who works the typical rapidly rotating shift (the "swing" shift) common for so many inland boatmen is never working at his peak efficiency. The importance of circadian rhythm should not be overlooked by either the prudent mariner or the management of any marine company, if for no other reason than that corporate profits are tied directly to the safety and efficiency of a company's ships and the personnel who man them.

A Challenge to the "Time-honored" Four-on, Eight-off and Six-and-Six Traditions

Since company profits are directly related

to safety and efficiency, a change to a steady, fixed-watch system could mean money in the bank. Some of the benefits, for instance, that have accrued to companies experimenting with fixed watches include better employee morale and fewer accidents. Both of these benefits, in turn, translate into such indirect savings as lower insurance rates and less vessel down-time.

Studies made both ashore and aboard ship have repeatedly shown that optimum performance of personnel occurs during fixed eight-hour shifts. An example of this arrangement might be three successive shifts running from 0800 to 1600, 1600 to 2400, and 2400 to 0800. The most efficient system would allow an unbroken rest period of 16 hours for each sailor following each eight-hour watch.

Provision can then also be made for personnel who are by nature "night people" to allow them to volunteer for the night duty.

On vessels presently employing a three-watch system (four hours on, eight hours off), a change to three eight-hour shifts would not result in any additional personnel costs. However, many tugs and other vessels in the merchant marine fleet, such as fishing and charter vessels, follow a two-watch, six hours on, six hours off, schedule. For them, implementation of the improved fixed-shift system would mean either the addition of an extra crew or a change to two twelve-hour shifts. Twelve hours is a long trick, even when stood aboard vessels equipped with good automatic pilots and modern, automatic navigation equipment, and I do not advocate this solution. I have met crew members, however, who say that the better rest during the resulting continuous twelve-hour rest period compensates for the long watch. This is especially true at sea, when an AB is allowed to take the con and let the watch rest his eyes for a short time. Hot meals during this type of watch are a must.

Two six-hour rests, on the other hand, usually result in only four or so hours of actual sleep at a time. Naturally, eating, bathing, shaving, and an adequate "wind-down" period after coming off watch must be subtracted from a given rest period.

While the alternative to the long twelve-hour watch—namely, the addition of an extra crew—may seem, at first, blush, to be unpalatable because of the cost involved, individual companies might wish to investigate the savings to be achieved from some of the side benefits I have mentioned. The cost of an additional crew would seem small compared to the bad publicity and clean-up costs resulting from an oil spill following a fatigue-induced accident.

While no clear-cut solution presents itself for the disruption caused by time zone changes, mariners and management should be alerted to potential problems. Adequate diet and rest are particularly important if the watchstanders are to maintain their ability to concentrate.

Know Thyself . . .

Since individuals vary greatly in both their need for sleep and their dietary requirements, we cannot draw generalizations. It is important, therefore, that each mariner know his own particular needs. Tune in to your body. Learn your average sleep time when you are not working. Get free literature from your local health department on nutrition. Try to eat well-balanced meals. Don't do this just to keep from becoming a "Harry," either. Eat properly, and you will look better, feel better, and do a better and safer job for your company.

Adequate Rest and Diet are Important to All Concerned

In summary, adequate crew rest and a proper diet are paramount to marine safety. They are important to everyone, from the crew members who do not want to risk "life or limb," to the deck officer who wishes to remain accident-free to protect his reputation and license, to the marine superintendent of a towing concern who would like to improve his company's profits, to the Coast Guard, where safety is the name of the game.

About the Author

Captain Duke Diggs is a practicing consultant for the maritime and aviation industries. His area of specialization is management and safety, and he has done research on fatigue and biomedical factors in both government and the private sector. Captain Diggs has extensive experience in the marine field and in the past has served as a master, relief captain, docking pilot, and tug skipper, as well as operations manager of a marine towing company. He can be reached at P.O. Box 145, Surry, Virginia 23883; (804) 229-9259.

UNITED STATES GOVERNMENT

Memorandum

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

DATE: 4 January 1982

SUBJECT: Article on the Coast Guard Strike Teams, request for

FROM: Daniel L. Dewell, Public Information Assistance Team, Pollution Response Branch

TO: Editor, Proceedings of the Marine Safety Council

1. I received your request for an article about the strike teams of the National Strike Force (NSF) some time ago. When you asked for the piece, you said you didn't want the usual rundown on the teams, but something that explained what the duty is like, who the people are, and how they operate. It's not a bad idea, but after a couple of shots at it, I realized that this project wasn't going to be easy. Even though I've worked with the teams on a lot of cases and exercises, there is more to their duty than that.

2. There are 85 or 90 Coast Guardsmen assigned to the NSF. I'll bet if you asked them all what duty is like on a strike team, you'd wind up with 85 or 90 different answers. To be sure, it is unusual duty. NSF members find themselves traveling more than most of us, and, because groundings, collisons, oil-well blowouts, and the like cause some of the spills they work on, they have lots of good sea stories to tell. But if you write an article about spectacular cases, that really isn't a balanced view of what the teams do. They have their share of boring jobs that would be hard enough to write about, let alone expect someone else to read!

3. It's pretty hard to pin down the essence of life on a strike team. I suppose if you had to compare the job to something that everyone could relate to, you could use a fire station. Yeah, that's not bad. They have their own equipment, trucks, trailers, pumps, skimmers, etc., all designed for pollution response. They are on standby 24 hours a day, every day, and all it takes to get them underway is a phone call. Of course, not just anyone can call them. It has to be a Federal On-Scene Coordinator, either from the Coast Guard or the Environmental Protection Agency. Just like a fire station, each team has its neighborhood as a primary response area (about a third of the country in the case of a strike team). Of course, members cross over lines whenever necessary to give each other a hand.

4. Another problem might be the "SWAT team" syndrome. Since the names "National Strike Force" and "strike teams" have a certain ring to them, people often expect the NSF to come swooping in, leaping out of planes with booms and skimmers held in their teeth, recon the area, and wipe out any pollution that dares to show itself. It doesn't work that way. Sure, they have training, good equipment, and a great deal of experience and are prepared to respond quickly, but there is a limit to what can be done in pollution response. They do put in their share of strenuous work, but what few people ever hear about are the innumerable hours spent monitoring a spiller's cleanup or the tedious documentation work that NSF members do. What sounds like glamorous, exciting work on the surface can, at times, be frustrating or routine and is often out in the middle of nowhere. The weather never seems to help, either. I've heard strike team members swear that spills never happen in nice weather—it is either blisteringly hot or freezing.

Enough said. Here is the article I came up with:

DEPT. OF TRANSP., USCG, CG-4514 (9-71)

Shore Duty That Keeps You "Underway"

"On the road again,
Goin' places that I've never been,
Seein' things that I may never see again,
I can't wait to get on the road again . . ." *

A jukebox in a truck stop cafe alternates between country-western and rock-and-roll music. The location: the Wyandotte exit off Interstate 64 in southern Indiana. The time: 6:30 a.m. A group of Coast Guardsmen occupies two tables in one corner of the restaurant, and large breakfasts are the order of the day. The servicemen make up about two thirds of the cafe's clientele at this hour. They have stopped at the cafe on their way back to the site of a gasoline barge fire on the Ohio River near the tiny burg of Alton, Indiana, after a well-earned rest at a motel in Corydon. Hot showers, clean sheets . . .

The men just described are members of the Coast Guard's National Strike Force (NSF)—a force dedicated to responding to pollution cases on the nation's waterways. A chance to sit and enjoy a hearty breakfast was a luxury for them, since there was no way of knowing when the next opportunity for a hot meal would be.

While most people in the Coast Guard (and many outside the service) have an idea of what the strike teams are and what their mission is, many people have either no idea, or a misconception of, what duty with the teams is really like.

Members of the NSF are skilled in pollution removal and containment methods, salvage, and damage control. They also provide communications as well as other forms of equipment

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support, along with diving services for vessel inspections and other underwater activities required in pollution response.

Calling in the Strike Team

A look at the Gulf Strike Team's response to a case on the Ohio River, not far from Louisville, Kentucky, in early December 1981 will give a clearer picture of this somewhat unique group within the Coast Guard. Two tugs with barges in tow collided, and several barges carrying petroleum products were damaged and caught fire. A great number of state and local agencies responded to the fire along with local Coast Guard units and other vessels on the river.

Neither the Coast Guard in general nor the NSF takes the lead role in ship or barge firefighting. Because of its familiarity with vessel safety and its involvement in marine disasters (search and rescue, pollution response, etc.), however, the Coast Guard is often brought in on fires in support and coordinating roles. In this case, there was an actual release of oil into the water and the potential for another, major, release.

The Federal On-Scene Coordinator (OSC) for pollution response in the area, the Commanding Officer of the Coast Guard Marine Safety Office (MSO) in Louisville, decided that certain personnel and equipment of the NSF would be needed to assist in the case.

LCDR Jim Tanner, Commanding Officer of the Gulf Strike Team (GST), remembered the initial call from MSO Louisville. "The OSC wanted three things in particular. First, he wanted the command post," Tanner said, referring to a mobile-home-type vehicle outfitted with office work spaces and communications equipment. "Second, he wanted an ADAPTS," Tanner continued, using the acronym for the Air Deliverable Anti-Pollution Transfer System—a high-capacity pump for offloading fuel and liquid cargo from damaged vessels. "And third, he wanted a comms package," said Tanner, employing service lingo for "communications package"—several portable radios for use at the many monitor stations that would be established during the case.

The mobile command post is shipped as a self-contained unit, complete with office work spaces and communications equipment.

The National Strike Force was formed in 1973 when the Coast Guard was given new responsibilities for environmental protection under the Federal Water Pollution Control Act. It consists of three strike teams:

The **Pacific Strike Team,** based in San Francisco,

The **Gulf Strike Team,** based in Bay St. Louis, Mississippi, and

The **Atlantic Strike Team,** based in Elizabeth City, North Carolina.

There is also a dive team, which is attached to the Atlantic Unit. Members of the dive team respond to calls throughout the nation.

Once the call came in, shortly after the collision occurred, members of the GST began putting together the proper equipment. This didn't take long, since the command post is a self-contained unit and all other pollution-reponse equipment maintained by the strike teams is pre-packed on pallets for quick loading onto trucks or cargo planes. In this case, a Coast Guard C-130 aircraft was available to fly the command post and several members of the team to an airfield near the scene. A GST tractor trailer was loaded with ADAPTS and other support equipment to be driven to the site on the fringes of Alton.

Setting Up

By the time the GST equipment arrived the following day, the fires on the tugboats and all but one of the barges had been extinguished. The command post arrived at the end of a dirt road beside the riverbank near a local picnic spot turned staging area. The GST members' initial duty was to get the command post set up

Strike team members (left) move an equipment pallet off of a tractor trailer and (right) get their equipment in place for the offloading of a barge.

and then join the OSC and his staff to assist in any way possible.

Logistics and communications are very important in any pollution response case. Yeoman First Class Russ Besancon, a GST member, noted how smoothly the establishment of the command post went. "It was great," he said. "The telephone man was practically waiting for the command post when it got there. Right after that, we had the power hooked up, and the command post was all set." In addition to arranging for utility services, Besancon and others on the strike teams often become involved in a kind of community-relations duty, especially when a case occurs near small, outlying towns. "Luckily, there was a little general store just up the road from the staging area. They had just about everything you could ask for up there. We did a lot of business there, buying things like gloves and supplies. They even opened up just for us a couple of times. Everyone in the town was really friendly and helpful." One local backhoe operator went so far as to turn down work with other customers to help out at the fire.

After the command post was set up and the tractor trailer arrived, the OSC and his staff met with firefighters and the vessel's owner to discuss plans for dealing with the potential pollution problem and the firefighting efforts. The barge owner was footing the bill for all firefighting activity, but the OSC and Coast Guard forces were on hand to coordinate pollution prevention and response and to provide logistics and communications support as needed.

The Strike Team Goes to Work

One of the barges that had been afire (the flames had now been extinguished) was damaged and still loaded with diesel fuel. It was decided that the fuel should be transferred to a safer vessel. The ADAPTS would be used to transfer the product.

LCDR Tanner recalled the operation. "It was a little harder than a normal pump job," Tanner said, comparing the task to other, "routine" transfer operations. "We wanted to keep the barge level so as not to spill cargo out or cause any strain on the vessel. The trouble was that we had to keep moving the pump from one tank to another to bring her up even—the regular lines and valves on the barge were damaged, so we couldn't just take suction on one tank and pump the cargo out through the barge's existing lines. My guys started that job Saturday afternoon and worked straight through into Sunday. They got 780,000 gallons off the damaged barge. That pump weighs several hundred pounds, and they kept having to move it back and forth. Those guys did one hell of a job," said Tanner, remembering just how difficult the circumstances were.

Southern Indiana has been known to be cold in early December, and this was no exception. Temperatures ranged from 5^{0} above zero to just above freezing most of the time. When the temperature did rise above stinging cold, the relief from the cold was countered by the transformation of the frozen dirt road and the riverbank into muddy quagmires.

Once the team had completed the transfer

of diesel from the damaged barge, the principal problem remaining was a burning gasoline barge. With a long slit down the side of tanks 4 and 5 of its port side, the barge had been pushed ashore about 200 yards downstream from the staging area. Thick orange flames rolled out of the side of the barge as a heavy black column of smoke rose from the scene. Many new arrivals on the scene said they had used the smoke to find their way to the remote site.

Because the barge owner accepted responsibility for firefighting, Coast Guard personnel were now involved in pollution response standby and firefighting support roles: fire-station monitors, communications stations, logistics, and documentation.

It took several attempts by both the local firefighters and later by commercial firefighters from Houston, Texas, to extinguish the blaze. Members of the strike team, like others at the site, found themselves going from one job to another as supplies, equipment, and personnel came and went from the scene.

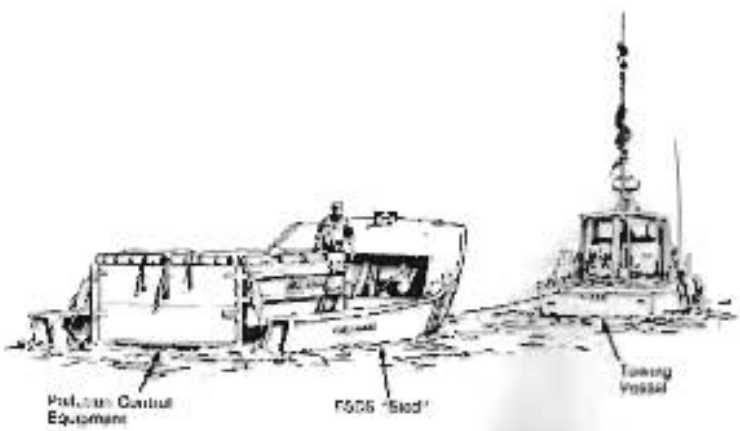
Masters of Many Trades

Strike team members handle transitions from one job to another smoothly. They are cross-trained in all jobs they may be called on to peform. It isn't unusual to see yeomen and boatswain's mates, officers, and enlisted men, trading off duties such as procurement, operating heavy equipment, monitoring, and documentation or simply lugging around supplies or equipment.

"You never really know what you might be doing next," said Damage Controlman Third Class Dennis Baxter, a GST member. Half sitting, half leaning across a formica desk top in the back of the command post, Baxter was taking advantage of a lull in the activity at the staging area. Having spent the morning hauling frozen fire hoses and barrels of foam concentrate to and from firefighting barges, Baxter appreciated the warmth of the command post. "One minute you'll be handling communications or keeping the logs, next thing you know you're off to set up some equipment or maybe making a run for parts."

The frustrating fire, cramped quarters, cold weather, and separation from home notwithstanding, GST members assigned to this case demonstrated an ability to maintain their sense of humor. A fireman opened the command post door, traces of the previous night's snow clinging to his mud-caked boots. He came in and started to pour a cup of coffee. "Well, when do you think this will all be over with?" he asked of anyone in the vehicle who cared to answer. Baxter, offering a humorous, seasonal response, sang out, "It's beginning to look a lot like Christmas . . ." A few of those on hand laughed; others seemed to be checking a mental

USCG Fast Surface Delivery System (FSDS)

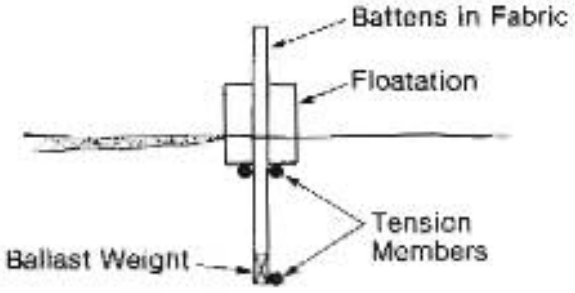


The **Fast Surface Delivery System** (FSDS), or "sled," was designed by the Coast Guard as a method of delivering pollution response equipment to a spill site. The sled is a shallow-draft, planing hull that must be towed by another vessel. The design of the sled gives smaller Coast Guard boats the capability of transporting heavy equipment that previously could be handled only by buoy tenders or other large ships. The stern section of the sled can be submerged to allow the loading and unloading of heavy cargo, such as the Coast Guard's open-water skimmer and skimming barrier. The FSDS sled is 45 feet long, has a 5-foot beam, and is capable of transporting 20,000 pounds of cargo.

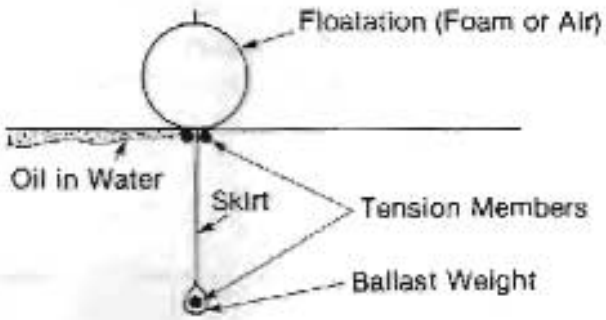
calendar to see just how close the holiday actually was. There wasn't much time to think about it, however, since news came in that another load of foam had arrived—almost.

About one mile away, two tractor trailers were parked with 55-gallon drums and 5-gallon containers of foam. In between the trucks and the staging area was a small bridge, too small for the trucks to cross. Circling around to a route with a stronger bridge would have taken too long, so all available personnel and any small trucks on hand were sent to bring the foam across in small loads. The transfer of foam containers went quickly and smoothly as GST and local Coast Guardsmen formed "bucket brigade" lines to the long trailers, passing the containers and rolling the drums onto waiting trucks.

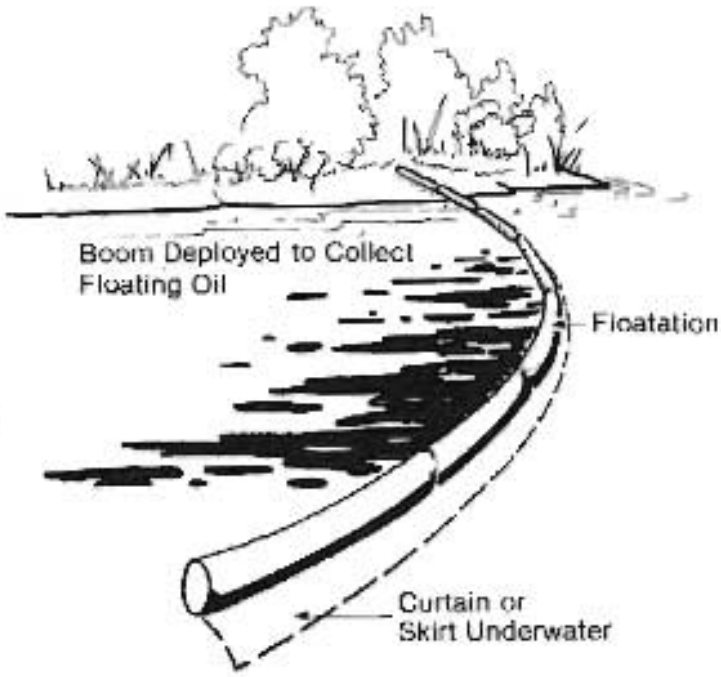
Boom Types



Fence Type - Centerline Floatation



Flexible Curtain Type



Oil containment boom or barrier is one of the most common pieces of pollution control equipment. Boom comes in a wide variety of sizes designed for different weather and sea conditions. Lengths of boom are used like a floating fence to corral or deflect oil so that it can be removed from the water.

Different styles and sizes of boom are all designed around the same basic concept. An upper barrier keeps oil, floating on the surface of the water, from spreading. Naturally, there must be some type of floatation for the boom. On smaller types, floatation sometimes serves as the upper barrier portion of the boom. A skirt hanging below the floatation provides for added containment capabilities. This skirt must be constructed so that it is strong enough to hold back oil yet flexible enough to give with the motion of waves. Lastly, a ballast, usually made of lead and located at the bottom of the skirt, is included to keep the boom upright in the water and keep the skirt and upper barrier vertical.

Like all other equipment, boom has limitations as to what it can do. The primary problem in this type of operation is entrainment—oil being washed or pulled under the boom by the current. No matter how deep the skirt extends, water will flow underneath it, and currents over about one knot will cause entrainment. One way to combat this is to angle the boom and deflect oil rather than attempt to stop its movement. In some situations, the oil can be diverted to a collection point or an area with a slower current.

Paperwork

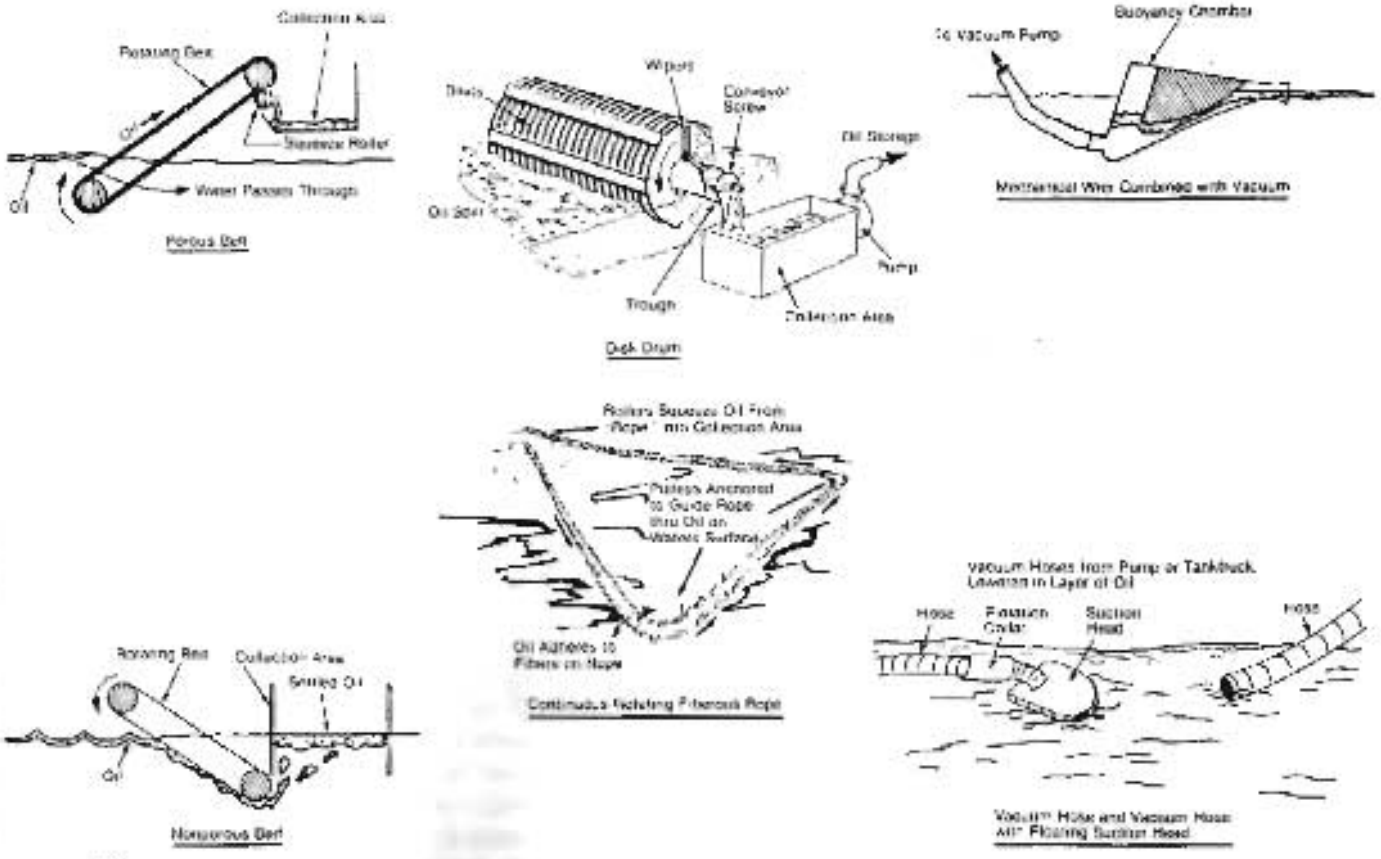
Like any other job, NSF duty involves paperwork. Keeping track of communications, logging all calls on the radio and phones, forwarding requests for equipment and information, and documenting the operation are all functions of the GST members assigned to the command post. These duties can be extremely important for case studies and legal proceedings that can arise after an incident is over.

The Final Stages

The barge fire was eventually put out. After several hours of checking and rechecking for any possible reflash, most of the firefighters were released from duty. The OSC informed LCDR Tanner that most of the GST personnel and equipment would soon be able to return to the base at Bay St. Louis, Mississippi, but a final decision would be made once the barge owner began successfully offloading the burned barge's gasoline into a sound vessel. GST members began strapping down the ADAPTS and other equipment for the trip back.

That evening, with the case all but over, "Miller Time" was declared by unanimous decision. Firemen, tugboat and barge crewmen, Coast Guardsmen, and others involved in the case found their way to the lounge at the motel where most of the response personnel had stayed when not on scene during the week-long case. Immediately occupying over half the available seats in the room, the diverse members of the crew began recounting the case

Principles of Common Skimmer Operation



There are many types and sizes of devices generally referred to as **skimmers,** which are used to pick up spilled oil and chemicals from the surface of water. They operate on various principles. Some skimmers employ a vacuum or suction, while others rely on physical contact or mechanical means for recovery of spilled products.

As is the case with most types of equipment, the effectiveness of skimming devices depends on many factors, including weather conditions, the type of product, and the location of the spill. Consequently, it is important to match the type of skimmer to the type of cleanup operation.

over cool drinks that somehow tasted better than usual. Finally, they had a chance to relax and swap a few sea stories.

But the job wasn't over yet, and the "celebration" didn't last long. Most of the response force members opted for a good night's sleep in preparation for wrapping things up.

The Wrap-up

The following morning the barge owner moored an empty barge alongside the burned one and rigged for offloading as Coast Guardsmen monitored the operation. By mid-morning, pumping had been started. By the end of the day, the OSC released the ADAPTS and most of the GST members. The command post and a few GST personnel would remain on scene until the offloading was complete and the barge stable.

LCDR Tanner told his men to meet for a planning session at the truck stop cafe on their way back to the motel. Everyone was tired, ready to go home. The case was just over a week old. With Russ Besancon taking notes, they worked out the details of getting everyone home. There was no cargo plane available, so the command post, when it was released, would have to be driven back.

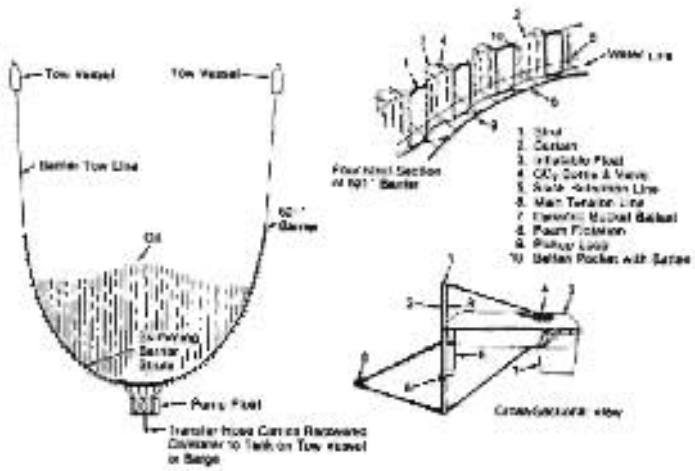
Call the airlines, check schedules, arrange for drivers for the truck and drivers for the command post, have the phone and power turned off . . .

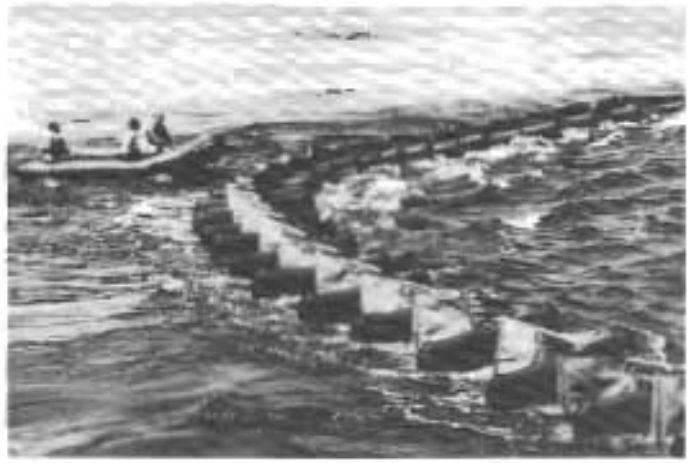
Very early the next morning the GST tractor trailer set off on its way home while a group of GST members headed for the airport to fly home. The command post was released later that same day and started out on the 15-hour drive. The two vehicles and their drivers did encounter an ice storm on the trip back, but there were no accidents.

Back at the Base . . .

Upon return from the case in Alton it was time for reports to be written, travel vouchers filed, and "normal" operations resumed. Normal operations for the NSF consist of equipment maintenance, administrative duties, and in-house and outside training for everything

Use of Open Water Oil Containment and Recovery System (OWOCRS) (USCG Skimming Barrier)





The **Open Water Oil Containment and Recovery System** (OWOCRS) is a floating, fencelike barrier designed to contain and skim oil in moderate sea conditions. This barrier, or boom, extends about 2 feet above and below the surface. It was designed to contain oil in 5-foot seas and winds to 17 knots but may work in more severe weather in certain circumstances. The OWOCRS is generally deployed in a U-shaped configuration—either moored or positioned by boats. A section in the center of the 621-foot OWOCRS is fitted with 6 vacuum hoses attached to a pumping system that allows for transfer of oil from the water to a barge or other containment vessel. The OWOCRS is considered the best boom or barrier system available at this time for containment and recovery operations in the open-sea environment.

from truck driving and engine repair to pollution response equipment deployment and chemical response techniques.

Although chemicals were not involved in the Alton barge case, response to hazardous materials is an area of concern to the NSF. Training for chemical response is intensive, and strike team members practice regularly with self-contained breathing gear and protective suits. Because the level of training for this duty is so high and the consequences of a mistake so great, there is even a specially designated "chemical response team" within each strike team.

Another specialized group within the NSF is the dive team. Located at the Atlantic Strike Team facilities, the dive team assists OSCs by conducting underwater inspections of sunken or damaged vessels. The dive team and the three strike teams, have a wide knowledge of marine mishaps and a great deal of experience in difficult situations. Because of this experience, they are available to assist in non-pollution-related cases such as search-and-rescue and other Coast Guard missions. The NSF is also on call to respond to inland spills at the request of Environmental Protection Agency OSCs.

Life on the Strike Team

When asked what duty on a strike team is like, NSF members provide a wide range of answers. Each man and woman on the various teams has his or her own likes and dislikes, goals, and specialties and interests. There are, however, many things about strike team duty that are constants.

Duty with the NSF involves a great deal of travel. The travel is usually on short notice and for an unknown duration. Travel associated with training, while it is scheduled, can also be extensive.

A great number of pollution incidents result in what are called "spiller cleanups." In a case such as this, the spiller conducts his own cleanup, often by hiring commercial cleanup contractors. The Federal government, sometimes represented by the strike teams, simply monitors to ensure that the job is done promptly, safely, and in a proper manner.

The situations faced by strike team members are almost always unusual if not dangerous. Individual members are given a great deal of responsibility and may wind up working independently. Even routine monitoring and documentation work sometimes involves many thousands of dollars' worth of equipment and manpower that must be accounted for.

The strike teams are almost always "outsiders," usually being called in to assist on a large or complex case. Occasionally, local Coast Guardsmen and other response personnel have viewed this as a reflection on their ability to handle a situation. That is not the case. The teams are simply extra forces available to help out any fellow Coast Guardsmen who request assistance. They are not sent on cases but rather asked to come by OSCs.

There are still misconceptions about what the strike teams are and what they do. LCDR Tanner mentioned one way to help any Cost Guardsmen who might be considering asking for a transfer to one of the teams. "It would help if people would just call up and ask to talk to someone on the team. They can talk about the different jobs, what it's like to travel so much, and whatever else they're concerned about. That way they would get a feel for what it's really like to be on the team," Tanner said.

What it's really like to be on the team.

"On the road again,
Goin' places that I've never been,
Seein' things that I may never see again,
I can't wait to get on the road again . . ."

Title 46, United States Code

The Maze Revisited:

An Update

on the Revision of the Shipping Laws

Editor's note: The June 1981 issue of the Proceedings featured an article entitled "Conquering the Maze: A Proposal for Reorganization of the U.S. Shipping Laws". Requests for copies of this article exceeded available stocks, but reprints have been made and can now be obtained by writing to the editor. The following article describes the steps which the Coast Guard has taken to further its efforts to produce a comprehensive reenactment of those portions of Title 46, United States Code, which it administers.

In the June 1981 issue of the Proceedings of the Marine Safety Council, it was noted that the Justices of the United States Supreme Court once had occasion to refer to the marine safety laws of this country as a "maze of regulation". It was also noted that the Coast Guard had undertaken the task of reorganizing

and rewording the hundreds of statutory provisions which come under its administration in a manner which would, to a great degree, straighten out the "maze."

Without a doubt, no area of Federal law is more confusing than that administered by the Coast Guard in its commercial vessel regulation programs. One consequence of the complexity of the law is the difficulty of enforcing it and, perhaps, the difficulty of obeying it. Coast Guard officers new to the commercial shipping regulation specialty require extensive training. Questions frequently arise which require the special expertise of a very small number of agency personnel who, after thirty or forty years' experience, have come to "know" Title 46. A kind of common-sense understanding supported by custom and tradition accepted by the industry has served to avert utter chaos in the administration of these laws, but it cannot be predicted how much longer the strain can be survived.

Because of its complexity, Title 46 has proved to be among the most difficult for Congress to enact as "positive law" (in other words, Congress has had difficulty reenacting the previously enacted statutes into a consolidated, organized title of the United States Code). The first attempt to "codify" Federal shipping law came in 1929, shortly after the adoption of the United States Code. That effort failed for reasons which have now become obscure. A similar effort in the late 1940s also failed. In the early 1960s, the Commandant of the Coast Guard, partially in response to the urgings of the Senate Commerce Committee, assembled a special team of three attorneys to draft in positive law form, without making any "substantive change of a controversial nature," a restatement of Title 46. This group worked diligently for almost three years and, in 1967, presented to the Commerce Committee a draft of "A Bill to Consolidate and Reenact Certain of the Marine Safety and Seamen's Welfare Laws of the United States." The draft received widespread approval and would have placed all of the commercial vessel safety law in a single, easily usable format for the first time in almost one hundred years. However, in the administrative upheaval resulting from the creation of the new Department of Transportation, the bill was scrapped.

Things remained unchanged from 1967 until 1971, when yet another restatement was attempted and eventually shelved. The project was not resumed until the spring of 1980, when the present Commandant designated the redrafting and simplification of the shipping laws one of his "milestone projects." A draft proposal, based largely on the 1967 bill, has now been prepared and is under scrutiny throughout the maritime community.

Two elements in the intended format are worth noting. One is the reorganization of related material into units. An example is the treatment of the Federal Boat Safety Act, which cuts across the areas of safety equipment for recreational vessels, manning of certain commercial passenger-carrying vessels, identification of undocumented self-propelled vessels, and negligent operation of all vessels. The intent to reorganize these matters with others of related or supplementary application is reflected in the proposal.

The other element is the tailoring of language to facilitate both temporary inclusion in the U.S. Code and ultimate assimilation into a truly "codified" title. The substitutions made necessary by non-statutory reorganization plans and other transfers of authority, especially since 1946, have frequently caused confusion in the shipping industry. Terms used in this draft restatement, as well as the internal cross references, have been designed to present the Code editors with the least need for editing and to minimize potentially confusing terminology.

The Coast Guard sought the opinions, cooperation, and assistance of those who would be most affected by the legislative proposal.

The purpose of the current legislative proposal is to make the law easier for the Coast Guard to administer, easier for the maritime community to apply, and easier for everyone to understand. The drafting of the legislative proposal began in earnest in May 1980 at the direction of the Commandant of the Coast Guard and under the guidance of the Chief Counsel and the Chief, Office of Merchant Marine Safety. Using as its foundation a 1967 Commerce Committee print of "A Bill to Consolidate and Reenact Certain of the Marine Safety and Seamen's Welfare Laws of the United States," the drafters

proceeded with their task, again under the general guideline that they make no "substantive change of a controversial nature." After eighteen months, a draft proposal was complete. The product divided existing marine safety and seamen's welfare laws into ten clearly defined chapters. It filled three hundred pages of text.

At this point, those close to the project came to understand that they were faced with the awesome task of testing what they had produced against the actual text of the existing shipping laws, knowing that any attempt to bring 108 years of piecemeal Congressional activity into a single, succinct document would invariably result in inadvertent omissions, conflicts, and editorial inaccuracies. The Coast Guard sought the opinions, cooperation, and assistance of those who would be most affected by the legislative proposal.

First, the drafters of the legislation went to the Coast Guard itself. A special panel of three senior and highly qualified officers whose careers had been concentrated in fields related to the regulation of commercial shipping was appointed by Rear Admiral Clyde T. Lusk, Jr., Chief, Office of Merchant Marine Safety, to examine the draft proposal for consistency with longstanding Coast Guard practices and interpretations. For several weeks the panel went painstakingly through the 300-page document, line by line. Once their comments had been evaluated and incorporated into the proposal, a second edition of the draft was produced and distributed to Coast Guard Marine Safety and legal personnel in some of the nation's busiest port cities. Meetings were then held between these persons and the draftsmen to determine whether the proposal was in conformity with the manner in which the law is now being applied by Coast Guard field units. Once the views of Coast Guard field and operational personnel had been obtained, the draft was again updated. At this point the Chief Counsel of the Coast Guard was confident that he had produced a draft proposal which accurately reflected the manner in which the Coast Guard construed and applied the existing provisions of the several hundred sections in Title 46 which come under its administration. However, work was just begining.

The next step was to obtain the views of those people whose commercial and recreational interests were regulated by the federal shipping code.

The next step was to obtain the views of those people whose commercial and recreational interests were regulated by the federal shipping code. A number of industrial groups, labor organizations, shipping companies, trade associations, and law firms were contacted and asked whether they would be interested in participating in the early stages of drafting a way out of the maze. The response was overwhelming. In the weeks that followed, copies of the legislative proposal and supporting documents were delivered to dozens of individuals and groups. As these organizations began their analyses of the proposal, the Coast Guard contacted the prestigious Maritime Law Association of the United States (MLA) and asked for its assistance. The MLA, an organization which has an acute interest in establishing uniform laws, expressed immediate support for the goals of the project through its President, John W. Sims, Esq., of New Orleans.

By the time this article is published, a draft of what is likely the largest single legislative initiative in the Coast Guard's history will have begun its voyage to Capitol Hill.

In November 1981 the Chief Maritime International Law Division at U.S. Coast Guard Headquarters was invited to address the MLA's Committee on Coast Guard and Navigation at its annual meeting in New York. As a result of that meeting and other discussions, dozens of members of the Maritime Law Association examined portions of the draft proposal and provided the Coast Guard with their critical comments. On January 20, 1982, a meeting was held at Coast Guard Headquarters in Washington at which interested representives from all areas of the maritime community were invited to comment on the proposal. The substance of comments received up to that point was made known at the meeting. A general description of

the intent and purpose of the legislative proposal was offered, and objections and other comments were heard. At the conclusion of the meeting, the Coast Guard began to move rapidly to finalize its legislative proposal.

By the time this article is published, a draft of what is likely the largest single legislative initiative in the Coast Guard's history will have begun its voyage to Capitol Hill. With the Coast Guard's drafting effort drawing to a close, it is appropriate that notice be taken of some of the dozens of individuals and organizations who contributed in a most significant way to the production of a proposal which may in part simplify the "maze of regulation." They are James F. Moseley, Esq., of Jacksonville, Mark O. Kasanin, Esq., of San Francisco, Antonio J. Rodriguez, Esq., of New Orleans, Austin P. Onley, Esq., of Washington, DC, Morton H. Clark, Esq., of Norfolk, George R. Daily, Esq., of New York, R. V. Greenwood, Esq., of Houston; John H. Hanninen, Esq., of Cleveland, Robert B. Preston, Esq., also of Cleveland, Joseph Newton, Esq., of Houston, Raymond T. Letull, Esq., of Philadelphia, Captain T. E. Lohrey, Jr., USN, Force Judge Advocate, United States Pacific Fleet, Charles A. Bedell, Esq., of Houston, George W. Healy III, Esq., of New Orleans, Mr. Bryan Chiasson of the American Waterway Operators, Mr. Ben Webster of the Joint Maritime Congress, Mr. Julian Singman, Esq., of the Maritime Institute for Research and Industrial Development, Rear Admiral W. M. Benkert, USCG (Retired), of the American Institute of Merchant Shipping, Mr. Edward H. Middleton of the Maritime Institute for Resource and Industrial Development, Mr. Frank Pecquex of the Seafarers International Union, Arthur Abarbanel, Esq., and Donald L. Sapir, Esq., of New York, Mr. James L. Henry of the Transportation Institute, Mr. Elwood Hampton of the National Maritime Union, Ms. Barbara Bristilo of the AFL-CIO Maritime Committee, and Ms. Mel Hall-Crawford of Crowley Maritime Corporation. A special note of thanks to Gordon W. Paulsen, Esq., and Kenneth H. Volk, Esq., of New York for their efforts to make the comments of the membership of the Maritime Law Association available to the Coast Guard. J

Merchant Marine Registry and Seaman Certification Statistics Fiscal Year 1981

Original Merchant Mariners Documents Issued

QUARTER	ATLANTIC COAST	PACIFIC COAST	GULF COAST	GREAT LAKES REGION	TOTAL
1st—October - December	997	689	1,973	346	4,005
2nd—January - March	1,033	746	1,896	472	4,147
3rd—April - June	1,658	1,245	1,913	503	5,319
4th—July - September	946	1,122	1,738	463	4,269
TOTAL	4,634	3,802	7,520	1,784	17,740

Original Certificates of Registry as Staff Officers Issued

	ATLANTIC COAST	PACIFIC COAST	GULF COAST	GREAT LAKES REGION	TOTAL
Chief Purser	8	5	1	0	14
Purser	5	6	1	0	12
Senior Assistant Purser	2	3	0	0	5
Junior Assistant Purser	6	48	0	0	54
Surgeon	1	16	0	0	17
Professional Nurse	4	2	0	0	6
Marine Physician	0	0	0	0	0
Radio Officer	3	0	2	2	7
Others	0	0	0	0	0
TOTAL	29	80	4	2	115

Original and Additional Endorsements Issued

	ATLANTIC COAST	PACIFIC COAST	GULF COAST	GREAT LAKES REGION	TOTAL
AB—any waters, unlimited	295	191	270	126	882
AB—any waters, 12 months	255	117	381	82	835
AB—Great Lakes, 18 months	183	39	122	31	375
AB—other	53	84	107	9	253
Lifeboatman	711	315	142	57	1,225
Electrician	77	81	33	18	209
Oiler	319	198	77	63	657
Fireman/Water tender	302	146	47	60	555
Other Q.M.E.D. ratings	799	678	129	112	1,718
Tankerman	388	181	590	765	1,924
Entry Ratings and Steward's Department	6,397	4,864	6,365	1,198	18,824
TOTAL	9,779	6,894	8,263	2,521	27,457

Rear Admiral Clyde Thomas Lusk, Jr.
Chief, Office of Merchant Marine Safety

Clyde Thomas Lusk, Jr., was born on December 20, 1932, in Medford, Massachusetts. His family later moved to Milford, New Hampshire, where he attended and graduated from Milford High School. He then entered the United States Coast Guard Academy in New London, Connecticut, and graduated in 1954 with a Bachelor of Science Degree and a commission as Ensign.

His earliest assignments were as First Lieutenant on the United States Coast Guard Cutter DUANE (1954 - 1956) and Operations Officer on the United States Coast Guard Cutter EVERGREEN (1956 - 1957).

His first shore assignment was as Commanding Officer of Loran Station Spruce Cape in Kodiak, Alaska. In 1959 he was transferred to the Marine Inspection Office in Long Beach, California. He was subsequently transferred to Coast Guard Headquarters in Washington, DC, where he served on the staff of the Office of Merchant Marine Safety.

In 1965 he was assigned to marine industry training with the American Waterways Operators, Inc. Upon completion of training he was transferred to the Marine Safety Office in St. Louis, Missouri, where he served as Executive Officer and later as Commanding Officer. His next transfer brought him back to Washington, where he served first as a member of the Planning Staff of the Office of Merchant Marine Safety, then as Assistant Chief of the Merchant Vessel Inspection Division, and then as Director of Transportation Energy Policy on the staff of the Secretary of Transportation. In 1974 and 1975 he attended the Industrial College of the Armed Forces in Washington, DC. Upon completing his studies, he was transferred to New Orleans, Louisiana, where he served as Commanding Officer of the Marine Inspection Office and, subsequently, Chief of Operations of the Eighth Coast Guard District. He returned to Headquarters in 1980 to serve as Deputy Chief of the Office of Merchant Marine Safety.

Following is a resume of his appointments in rank:

- Ensign, May 1954
- Lieutenant (junior grade), December 1955
- Lieutenant, September 1958
- Lieutenant Commander, March 1965
- Commander, March 1970
- Captain, May 1974
- Rear Admiral, July 1981

Rear Admiral Lusk's medals and awards include: the Coast Guard Meritorious Service Medal (awarded twice), the Secretary's Award for Service—Silver Medal, the Coast Guard Commendation Medal, the Coast Guard Achievement Medal, a Letter of Commendation from the Commandant, the Coast Guard Unit Commendation Medal, the Expert Rifle and Pistol Medals, and the National Defense Medal.

Mrs. Lusk is the former Beverly J. Tasko of Wethersfield, Connecticut, a graduate of Connecticut College for Women. The Lusks have six children: Joan Elaine, Gaile Marie, Lois Elizabeth, Mark Thomas, Lori Ann, and John Edward. Admiral and Mrs. Lusk live in Arlington, Virginia.

Vinylidene Chloride: CH_2CCl_2

synonyms:	1,1-Dichloroethylene VDC VCl_2
Physical Properties	
boiling point:	31.6°C (88.9°F)
freezing point:	-122.5°C (-188.5°F)
vapor pressure at 20°C (68°F):	495 mmHg
Threshold Limit Values (TLV)	
time weighted average (TWA):	10 ppm
short term exposure limit (STEL):	20 ppm
Flammability Limits in Air	
lower flammability limit:	7%
upper flammability limit:	15%
Combustion Properties	
flash point (open cup):	-15°C (5°F)
autoignition temperature:	570°C (1058°F)
Densities	
liquid (water = 1.0):	1.21
vapor (air = 1.0):	3.4
Identifiers	
U.N. Number:	1303
CHRIS Code:	VCI

Mention of vinylidene chloride (VDC) first appeared in scientific literature in 1838. By the late 1920s and early 1930s, scientists were seriously experimenting with the chemical and it was no longer considered a "strange new fluid." What made it so interesting to scientists was its ability to "polymerize," that is, form larger molecules through the joining of the individual molecules, or "monomers". VDC can polymerize with itself and also with monomers of different types, yielding copolymers. The commercially important copolymers of VDC have been given the trade name "Saran".* Their impermeability to a wide variety of gases and liquids makes them an ideal material for latexes, fibers, films ("Saran Wrap"), and resins. Resins, because of their chemical resistance and resistance to wear, play an important role in the plastics industry, where they are used in molding operations. Lacquers made from VDC resins are used as coatings for board and paper products, especially in the food industry, where their resistance to fats, oils, and water vapor and their nontoxicity, to mention a few features, make them highly desirable for packaging.

For all its usefulness, VDC has many serious hazards which require that the persons handling it be thoroughly educated. VDC is thermally unstable; in other words, if it gets too hot, it will start to polymerize uncontrollably. The Coast Guard and the U.S. Department of Transportation require that VDC be inhibited for shipment, i.e., that a chemical be added to inhibit uncontrolled polymerization. When carried onboard vessels in bulk, VDC must be covered by an inert gas padding. That type of padding is generally used when VDC is shipped in packages, as well. This prevents contact with air and the resulting formation of peroxides, which are shock-sensitive and could explode. When protected from contact with air (more specifically, the oxygen in air), water, and light, the VDC is stable and can be easily and safely transported or stored.

If VDC, which is extremely flammable, is involved in a fire, proper respiratory protection must be worn by those fighting the fire. A positive-pressure self-contained breathing apparatus approved by the National Institute for Occupational Safety and Health and the Mining Safety and Health Administration (formerly the Mining Enforcement and Safety Administration) is recommended. The products of combustion in VDC fires include hydrogen chloride, a highly toxic and corrosive gas. VDC vapor is itself toxic and highly volatile; because of its "sweet smell," however, people often overlook the danger. Exposure to high concentrations of the vapor can produce irrational behavior, "drunkenness," unconsciousness, and even death. Victims of exposure should be removed to fresh air. If breathing has stopped, artificial respiration should be given immediately. Medical help

*Registered trademark, Dow Chemical Company

should be sought without delay. Speedy and complete recovery from the anesthetic effects of the vapor depends on quick response.

Inhibited VDC, which itself is irritating to skin and eyes, can present an additional health hazard if it is allowed to evaporate after spilling or splashing onto the skin or into the eyes. The evaporation of the VDC leaves behind the inhibitor, contact with which can cause local irritation or even burns. If inhibited VDC spills or splashes onto the skin, the affected areas should be washed with plenty of soap and water. If the eyes are affected, they should be flushed with copious amounts of water. Medical help should be sought immediately. Anyone who might be exposed to inhibited VDC should wear protective clothing (impervious gloves, an apron, shoes, and goggles or safety glasses with side shields). If the protective clothing is contaminated, it should be removed at once and not used again until thoroughly cleaned. Shoes should be cleaned and allowed to "air" before they are used again. There is evidence that long-term low-level exposure to VDC can produce kidney and liver damage.

If a spill or leak of VDC takes place, all sources of ignition should be immediately secured. The people handling the spill or leak should wear self-contained or air-supplied breathing apparatus, protective clothing, and spark-proof shoes and should use spark-proof tools.

Hazard Evaluation Branch
Cargo and Hazardous Materials Division

Lessons from Casualties

The Coast Guard is developing a Notice of Proposed Rulemaking covering the design, inspection, testing, and operation of cranes used in the offshore oil industry. Among other things, the proposed rules will require either an audible alarm or a device to prevent two-blocking (the striking of the travelling block against the boom crown block) on all cranes used in the offshore industry. It will also suggest minimum operator qualifications for the personnel who are to operate these cranes. The two proposed requirements stem in part from occurrences like the following incident:

A crane operator recently two-blocked a crane while he was lifting three men in a personnel basket. Two of the men died as a result of the incident. What should have been a routine lift suddenly became a tragedy. The operator, an individual with little more than a year's experience in operating cranes, was making a lift using a type of crane he had operated only three times previously. The crane was a Grove RT-58 secured on a deck barge. The individual was not being supervised. The Grove crane has a telescoping boom, a feature unfamiliar to the operator. His lack of knowledge

The crane operator was unfamiliar with the type of boom used in the Grove RT-58 crane, the telescoped section of which is barely visible at the top of this photograph.

about the consequences of telescoping the boom resulted in his two-blocking the crane, parting the wire rope and dropping a manned personnel basket into the water.

The basket in which the three men were riding was an expanded steel cargo basket about two feet deep, four feet wide, and six feet long. Chains from each corner of the basket led to a single wire sling. The basket was to be hoisted out over a faulty blowout preventer (BOP). One man was to steady the basket, another was to steady the wire rope sling, and the third was to connect the travelling block of a Link-Belt crane from a nearby derrick barge to the BOP. The crane boom was at a 30° angle from the horizontal and at about a 45° angle off the barge's center line. Another worker aboard the barge watched as the crane operator began telescoping the boom outward. This individual, who had had experience with telescoping booms, observed that there were only about ten inches separating the travelling block and the boom crown block, a much shorter distance than is generally considered safe. He turned back to his work, but his attention was soon drawn by a loud popping noise. The crane operator, his attention on the men in the basket, had continued to extend the boom. The travelling block had struck the boom crown block, and the loud popping noise was made by the parting of the cable.

The basket fell 35 feet into the water. One of the men surfaced immediately and was not injured. The second surfaced thirty seconds later and was pulled aboard the barge alive but breathing with extreme difficulty and suffering from what turned out to be a compound fracture of his right femur. He stopped breathing three to five minutes after being pulled from the water, and efforts at cardiopulmonary resuscitation were unsuccessful. The body of the third individual was found in the basket, which was discovered resting upside down in the silt on the bottom.

While the primary cause of this tragedy was poor crane handling by an operator unfamiliar with the equipment, there were additional factors that might have averted or at least lessened the consequences of the incident. None of the men in the basket was wearing a work vest or PFD of any kind; had they been wearing PFDs, the worker who surfaced after 30 seconds might have surfaced sooner and lived. American Petroleum Institute (API) Recommended Practice T-1 states that personnel should wear a Coast Guard-approved work vest "during all over water transfers . . . and when working near or over the water where there are no handrails."

Had a two-block prevention device or audible alarm been installed, the casualty might never have occurred.

The retaining bar of the boom crown block was bent out of shape by the impact of the travelling block.

Clarification

The photograph which appeared in the Lessons from Casualties section of the December 1981 issue of the Proceedings was not of the vessel actually involved in the casualty described. The photograph, which was of a much larger supply vessel, was used simply to illustrate the phenomenon of a vessel sinking by the stern. We apologize for any confusion this may have caused.

In describing the incident as "typical of an all-too-common occurrence in the Gulf of Mexico," the author in no way intended to criticize the offshore services industry. He was merely attempting to highlight the problem of overloading so that additional lives might not be lost as a result of similar circumstances. The offshore services industry, in fact, worked with the Coast Guard in developing the regulations mentioned in the postscript paragraph, which are designed to reduce the likelihood of future casualties.

Coast Guard Urges Fishing Vessels and Other Uninspected Vessels to Use EPIRBs

The Coast Guard urges commercial fishing vessels and other uninspected vessels operating more than 20 miles offshore to use Class A or Class B Emergency Position Indicating Radio Beacons (EPIRBs).

The Coast Guard can cite a number of instances when extensive searches for overdue fishing vessels and other uninspected vessels were unsuccessful. In many other cases, craft were found with minimum search effort because they were carrying EPIRBs.

EPIRBs are effective lifesaving devices. Class A and Class B EPIRBs are designed to transmit on 121.5 MHz and 243.0 MHz, both aviation emergency frequencies. Class A EPIRBs are designed to float free and activate automatically when they become waterborne, whereas Class B EPIRBs must be manually activated; otherwise they have essentially identical characteristics. The EPIRB frequencies are guarded by many aircraft in flight. Although this coverage is not complete, use of such EPIRBs has resulted in many saves. Some examples:

December 1, 1978 - F/V FUGITIVE . . . Pacific Ocean . . . Vicinity of San Clemente Island . . . Vessel reported self sinking on VHF/FM . . . Extensive search by Navy and Coast Guard units . . . 2 hours later EPIRB signal detected by Coast Guard helicopter and 3 persons on board rescued from raft.

February 1, 1979 - S/V GYRIN . . . 50 miles southwest of Bermuda . . . Hit by large wave and capsized . . . Activated EPIRB which was detected by passing Navy aircraft . . . Panamanian M/V GERDT OLDENDORF diverted, rescued the two persons on board.

June 4, 1979 - S/V SOLACE . . . Atlantic Ocean . . . 250 miles north of Bermuda . . . Dismasted . . . energized EPIRB . . .Signal detected . . . Located in rain and darkness by Coast Guard C-130 . . . U.S. research vessel OCEANUS diverted to scene, recovered the vessel and 2 persons on board and took them to Bermuda.

July 4, 1980 - F/V MANTA . . . Pacific Ocean, 50 miles north of Kauai . . . Engine out . . . Activated EPIRB . . . Signal heard by passing MAC aircraft . . . Disabled vessel located by Coast Guard C-130 which obtained surface assistance from weapons recovery boat . . . Towed F/V MANTA to Port Allen, Kauai.

April 16, 1981 - S/V CANADIAN GOOSE . . . Caribbean . . . 150 miles northwest of San Juan . . . vessel broken up and 5 people clinging to debris in the water . . . EPIRB reported by passing commercial aircraft, and a Coast Guard HH3 located survivors and hoisted all 5 from the water and transported them to Puerto Rico in good condition. Survivors were in the water for 19 hours before being located.

Nautical Queries

The following items are examples of questions included in the Third Mate through Master examinations and the Third Assistant Engineer through Chief Engineer examinations.

DECK

1. Which of the following buoys are used in Vessel Traffic Separation Schemes at the entrances to ports?

A. black and white horizontally banded
B. black and white vertically striped
C. white and international orange, either vertically or horizontally banded
D. red and black horizontally banded

REFERENCE: Bowditch

2. The fore and aft row of deck plating which strengthens the connection between the beams and the frames and keeps the beams square to the shell is called the

A. sheer strake
B. starboard strake.
C. limber strake.
D. stringer strake.

REFERENCE: MMOH 14-5,

3. An inert gas system installed on a tanker is designed to

A. aid in the stripping and cleaning of cargo tanks.
B. increase the rate of discharge of cargo.
C. force toxic and explosive fumes from a cargo tank to vent to the outside atmosphere.
D. lower the oxygen levels inside cargo tanks, making explosion nearly impossible.

REFERENCE: Marton

4. The use of pulse groups and extremely precise timing at each Loran-C station makes possible the use of

A. high-frequency pulses.
B. a combination of high- and low-frequency pulses.
C. the same frequency for all stations in the system.
D. varied long and short pulses.

REFERENCE: Duttons

5. Every vessel should at all times proceed at a "safe speed." "Safe speed" is defined as that speed where

A. you can stop within your visibility range.
B. you can take proper and effective action to avoid collision.
C. you are travelling at a slower speed than surrounding vessels.
D. no wake comes from your vessel.

REFERENCE: Rules of the Road

1. Compensated flow control valves are used in a hydraulic system to

A. compensate for major leaks in the system.
B. maintain proper hydraulic fluid viscosity.
C. allow for pressure changes in the system.
D. assure constant hydraulic fluid temperature.

REFERENCE: Vickers Hydraulic Manual

2. Which preventive measure is the most practical way of assuring proper operation of a pressure-reducing valve in a hydraulic system?

A. The valve stem should be thoroughly lubricated with graphite and oil.
B. Seals and gaskets should be soaked in a solvent at frequent intervals.
C. The hydraulic fluid should be kept as clean as possible.
D. Personnel should avoid wetting new seals with hydraulic fluid when they are replacing them.

REFERENCE: Vickers Hydraulic Manual

3. If misalignment between a pump and its driving source exceeds that specified by the pump manufacturer, the shaft

A. flexible coupling will absorb all such misalignment.
B. total end float travel will be excessive.
C. lateral float will be greatly increased.
D. bearings will be overloaded and will fail.

REFERENCE: Karassik

4. In a flash-type evaporator, heated water under pressure is converted to vapor by a sudden

A. increase in its temperature.
B. decrease in its velocity.
C. increase in its pressure.
D. decrease in its pressure.

REFERENCE: Harrington

5. The function(s) of the economizer used with multi-staged, centrifugal, refrigeration compressors is to

A. cool the discharge vapor from the first-stage impeller.
B. cool the liquids in the economizer chamber.
C. permit some liquid to flash to gas as it passes through the high-side float.
D. all of the above.

REFERENCE: NAVPERS ENG 3 and 2

ANSWERS

1.C;2.C;3.D;4.D;5.D
ENGINEER
1.B;2.D;3.D;4.C;5.B
DECK

Correction

The answer shown for question 5 of the "ENGINEER" Nautical Queries in the November 1981 issue was incorrect. The correct answer is D.

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