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Masters and pilots in the Portland, Maine, area let their counterparts on other vessels know of their intentions and the location of their vessels by making security calls on VHF-FM channel 13. This system, discussed in the article beginning on page 82, could be readily adapted for use in other ports.

Marine Worker Safety

Coast Guard personnel and marine and shipyard workers should be on guard against the hazards of microscopic asbestos fibers.

1 Asbestos

by Alan L. Schneider
Ship Design Branch
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While most people today know that asbestos is a hazardous substance, it may surprise them to know that this is not a recent discovery. More than two millenia ago the Greeks realized that asbestos miners had a shorter-than-usual lifespan and were never really "healthy." Yet only in the last decade or two have the true dimensions of asbestos' risks become known.

Asbestos is familiar to most people as the common name for a group of fibrous minerals with excellent fireproofing and insulating properties. The airborne fibers from asbestos can do great damage to the body. If they enter the lungs, they can remain there for life. These small fibers can lead to asbestosis (a noncancerous destruction of lung tissue), lung cancer, mesothelioma (cancer of the lining of the chest and abdomen), and cancer of the gastrointestinal tract. These are very serious and often fatal diseases. No effective treatment for mesothelioma is known, and lung cancer is a very difficult cancer to cure. Unfortunately, asbestos has been widely used on ships as boiler and pipe insulation, in tiles, paints, gaskets, tapes, and cements, and in mattresses and protective clothing. For many years, most ships' bulkheads contained asbestos as a fireproofing and insulating material. It is estimated that by the time awareness of the hazards of asbestos had spread, some 11 million Americans had been exposed. Among these are many who have served in the Coast Guard as well as most

This article is the first in a series of articles which will appear intermittently. It was adapted from a paper delivered by the author at the Thirteenth Intersociety Conference on Environmental Systems, held in San Francisco July 11 - 13, 1983. It is printed here with the permission of the Society of Automotive Engineers, Inc., which released the paper in its SAE Technical Paper Series as a copyrighted publication.

marine and shipyard workers.

The Coast Guard recommends that, when new ships are built, asbestos not be used. Fortunately, acceptable substitutes now exist for almost all applications. As for existing ships, as long as the asbestos-containing materials remain intact, the fibers should not enter the air, so the risk should be minimal. Both age and normal ship motions tend to reduce the integrity of insulation, however, and this may cause the microscopic fibers that are the major health threat of asbestos to be released into the air.

Although there is universal agreement that asbestos fibers are very hazardous to health, there is no universally accepted standard for a permissible level of exposure. The exposure limit recommended by the National Institute of Occupational Safety and Health is 0.1 fiber per cubic centimeter (all standards in this paragraph are for fibers longer than 5 micrometers). The American Conference of Governmental Industrial Hygienists limit varies from 0.2 to 2.0 fibers per cubic centimeter, depending on the type of mineral making up the asbestos. The Coast Guard-recommended standard is a level of no more than 2.0 fibers per cubic centimeter averaged over an eight-hour workday.

According to some estimates, as little as four hours of heavy exposure to asbestos fibers can lead to a fatal cancer. Two types of operations involving installed asbestos, repairing damaged sheets and removing the asbestos, are especially worrisome in this respect. Working with installed asbestos will cause fibers to be released, and all of the limits in the preceding paragraph will be easily exceeded unless special procedures are followed. This can be a major problem on older merchant vessels and some Coast Guard vessels, a number of which were built before World War II.

The Coast Guard realizes that any procedure for dealing with this problem has to avoid making the situation worse. The policy the Coast Guard has adopted for use on its own ships is to repair damaged asbestos sheets and encapsulate or seal rather than remove defective asbestos wherever possible (while repairing damaged sheets will cause fiber release, the problem is less serious than it would be with removal). Other safeguards practiced and recommended by the Coast Guard include keeping unnecessary personnel away from the work site, wetting the asbestos (if it must be removed) thoroughly before removal, using hand tools rather than power tools, wet sweeping debris with approved high-efficiency vacuums, and disposing of waste materials properly. Personnel are required to wear respiratory protection and special clothing when working in an area likely to contain asbestos fibers. Ships containing asbestos insulation are periodically inspected for deterioration of asbestos and tested for fibers in the air.

While these techniques have proven quite effective for Coast Guard vessels, a formal rulemaking requiring crews on merchant vessels to follow similar practices was judged not feasible for a variety of reasons. In an effort to encourage voluntary compliance with accepted safe work practices, the Coast Guard issued a Navigation and Vessel Inspection Circular (NVIC 5-80) in early 1980. The guidelines in this document are based on Coast Guard experience with reducing exposure to asbestos. Copies of NVIC 5-80 can be ordered from the following address: Commandant (G-MP-4/14), U.S. Coast Guard, Washington, DC 20593, Attention: NVICs. A check or money order payable to "Treasury of the United States" should accompany each order; the cost of the NVIC, including postage and handling, is $3.75 per copy.

What can be done for those who have already been exposed to asbestos? There is no way of knowing how many of these workers will contract asbestos-related diseases, since there is usually a delay of from 10 to 40 years between exposure and the appearance of disease. These people can do two things to reduce their risk, however. First, they can have periodic chest X-rays; these will identify cancers at an early stage. Second, they can stop smoking. While the latter is an excellent idea under any circumstances, it is doubly important for these people. It has been documented that smokers exposed to asbestos have a much greater incidence of lung cancer than either unexposed smokers or exposed nonsmokers. Furthermore, there is some evidence that stopping smoking reduces the risk to exposed workers even after the exposure has terminated.

The industry's voluntary cooperation has greatly assisted the Coast Guard in its efforts to limit asbestos exposure. The industry has helped achieve rapid dissemination of warnings about the asbestos hazard and the measures recommended to reduce the risk. ‡

Watchkeeping

A period in port may be an opportune time for a vessel to undergo maintenance and repairs. In the close quarters of a port, the effects of a mishap such as a fire or a discharge of pollutants are magnified. Clearly, the engineering watch in port is a very important one.

This is the final article in a four-part series on watchkeeping adapted from the International Maritime Organization's International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW). Part 1 covered the navigational watch, part 2 covered the in-port watch for deck officers, and part 3 focused on the engineering watch underway and at unsheltered anchorages. This month's conclusion to the series deals specifically with the engineering watch in port.

The STCW Convention will go into effect for signatory nations in April 1984. Since the United States has not yet ratified the Convention, the principles elaborated in the articles **are recommendations only and should not be seen as regulations or policy.** However, U.S. mariners who enter ports of signatory nations will be required to comply with the Convention's provisions, and all licensed mariners should familiarize themselves with the guidelines and the STCW Convention.

The regulatory proposal for a new U.S. licensing structure (described in detail in the February 1983 issue of the *Proceedings* and published in the Federal Register on August 8, 1983) was developed with an eye to harmonizing its provisions with those of the STCW wherever possible.

STCW Resolution 4

Recommendation on Principles and Operational Guidance for Engineer Officers in Charge of an Engineering Watch in Port

Introduction

1. This Recommendation applies to a ship in service while it is in port safely moored or safely at anchor and relates to the requirements of watchkeeping engineer officers during these periods. Particular requirements may be necessary for special types of propulsion systems or ancillary equipment and for ships carrying hazardous, dangerous, toxic, or highly inflammable materials or other special types of cargo.

Watch arrangements

2. The chief engineer officer of every ship is bound, in consultation with the master, to ensure that engineering watchkeeping arrangements are adequate to maintain a safe engineering watch while a ship is in port. The following points are among those to be taken into account when the composition of the engineering watch, which may include appropriate engine room ratings, is decided:

(a) type of ship;

(b) type and condition of machinery;

(c) special modes of operation dictated by unfavorable weather, ice, contaminated or shallow water, emergency conditions, or damage containment or pollution abatement proceedings;

(d) qualifications and experience of the ratings forming the watch;

(e) the need to ensure the safety of life, ship, cargo, and port and protection of the environment;

(f) international, national, and local rules;

(g) the desirability of maintaining the normal routine of the ship.

3. Under the direction of the chief engineer officer, the engineer officer in charge of the watch is responsible for inspection and testing, as required, of all machines and equipment in his charge.

4. (a) On all ships having 3,000 kW of propulsion power and over there should always be an engineer officer in charge of the watch.

(b) On ships having 1,500 to 3,000 kW of propulsion power there may be, at the master's discretion, no engineer officer in charge of the watch, provided there is a deck officer in charge of the ship and provided the ship is not carrying hazardous cargo in bulk. The chief engineer officer should be consulted before such an arrangement is approved.

(c) On ships having less than 1,500 kW of propulsion power there need not be an engineer officer in charge of the watch, provided the ship is not carrying hazardous cargo in bulk.

5. The composition of the watch should, at all times, be adequate to ensure the safe operation of all machinery related to cargo operations, the safety of the ship and the port, and protection of the environment.

6. The engineer officer, while in charge of a watch, should not be assigned or undertake any task or duty which would interfere with his supervisory duty with respect to the ship's machinery system.

Taking over the watch

7. The engineer officer in charge of the watch should not hand over the watch to the relieving engineer officer if he has any reason to believe that the latter is not capable of carrying out his duties effectively, in which case he should notify the chief engineer officer accordingly. The relieving engineer officer of the watch should satisfy himself that the members of his watch are fully capable of performing their duties effectively.

8. Prior to taking over a watch, the relieving engineer officer should be informed by the engineer officer in charge of the watch as to

(a) standing orders of the day, any special orders relating to ship operations, maintenance functions, or repairs to the ship's machinery or control equipment;

(b) the nature of all work being performed on machinery and systems on board ship, the personnel involved, and potential hazards;

(c) the level and condition, where applicable, of water or residue in bilges, ballast tanks, slop tanks, sewage tanks, and reserve tanks and special requirements for the use or disposal thereof;

(d) any special requirements relating to sanitary-system disposals;

(e) the condition and state of readiness of portable fire-extinguishing equipment and fixed fire-extinguishing installations and fire-detection systems;

(f) authorized repair personnel on board engaged in engineering activities and their work locations and repair functions; other authorized persons and required crew;

(g) any port regulations pertaining to ship effluents, firefighting requirements, and ship readiness, particularly if there is a potential for bad weather;

(h) the lines of communication available between the ship and shoreside personnel, including port authorities, in the event that an emergency arises or assistance is required;

(i) other circumstances of importance to the safety of the ship, its crew, and cargo and protection of the environment from pollution;

(j) procedures for notifying the appropriate authority of environmental pollution resulting from engineering activities.

9. The relieving engineer officer, before assuming charge of the watch, should

(a) satisfy himself that he is fully aware of all standing and special orders relating to operations, maintenance functions, and repairs to the ship's machinery and control equipment;

(b) be familiar with existing and potential sources of power, heat, and lighting and their distribution;

(c) know the availability and condition of ship's fuel and lubricants and all water supplies;

(d) be familiar with the ship's ballast system and its controls;

(e) verify the presence of appropriate engine room ratings and satisfy himself that they are physically capable of performing duties effectively;

(f) be aware of cargo activities, the status of maintenance and repair work, and all other operations affecting the watch;

(g) be aware of auxiliary machinery in use for passenger or crew accommodation services, cargo operations, operational water supplies, and exhaust systems;

(h) be aware of the port requirements for pollution prevention and proper operation of on-board equipment to meet these requirments;

(i) be aware of all regulations concerning safety precautions and fire protection and of the means of communication with the shore fire service;

(j) be familiar with all shipboard detection and alarm systems and the appropriate response to the activation of those systems;

(k) familiarize himself as to the availability and operation of all fire-detection/alarm and -extinguishing systems, the method of fire containment, and the types of portable extinguishing equipment on board and their most effective use;

(l) be familiar with the location and use of the equipment provided for the safety of life in the presence of a hazardous or toxic environment;

(m) ascertain that materials for administration of emergency first aid are readily available, particularly those required for the treatment of burns and scalds;

(n) be aware of all means of communication on board and communications between ship and appropriate shore authorities;

(o) be ready to prepare the ship and its machinery, as far as is possible, for standby or emergency conditions as required.

Keeping a watch

10. The engineer officer in charge of the watch should pay particular attention to

(a) observance of all orders, special operating procedures, and regulations concerning hazardous conditions and their prevention in all areas in his charge;

(b) instrumentation and control systems and monitoring of all power supplies, components, and systems in operation;

(c) techniques, methods, and procedures necessary to prevent violation of the pollution regulations of the local authorities;

(d) the state of the bilges.

11. The engineer officer in charge of the watch should

(a) sound the alarm in emergencies when, in his opinion, the situation so demands and take all possible measures to prevent damage to the ship, its cargo, and the persons on board;

(b) be aware of the cargo officer's needs relating to the equipment required in the loading or unloading of the cargo and the additional requirements of the ballast and other ship stability control systems;

(c) make frequent tours of inspection to determine possible equipment malfunction or failure and take immediate remedial actions to ensure the safety of the ship, cargo operations, and the port and protection of the environment;

(d) within his responsibility, ensure that the necessary precautions are taken to prevent accidents or damage to the various electrical, hydraulic, pneumatic, and mechanical systems of the ship;

(e) ensure that all important events affecting the operation, adjustment, or repair of the ship's machinery are satisfactorily recorded.

We would like to reiterate that the practices enumerated here were taken from international regulations and recommendations, not U.S. laws or regulations.

Questions and comments regarding the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, should be directed to LCDR George N. Naccara, U.S. Coast Guard (G-MVP-3), Washington, DC 20593; tel. (202) 426-2240. Copies of the Convention can be ordered from the International Maritime Organization, 4 Albert Embankment, London SE1 7SR, England. The cost will vary according to the exchange rate but should be under $10. ↕

The Diver Flag Issue

Contrary to popular opinion, the Coast-Guard has not outlawed the traditional diver flag, the red flag with the white diagonal stripe.

"Why has the Coast Guard replaced the red-and-white diver flag with the 'A' flag signal?" This question has been asked by many divers who are under the mistaken impression they can no longer display the customary red flag with diagonal white stripe.

For the past year, there has been a great deal of interest among divers in Rule 27(e)(ii) of the Inland and International Navigation Rules. This rule states that small vessels restricted in their ability to maneuver and engaged in diving operations shall exhibit a rigid replica of the International Code flag "A" at least one meter in height. Many individuals and diving organizations have interpreted this to mean that the blue-and-white "A" flag signal was intended to take the place of their customary red flag with white diagonal stripe, thus making display of the latter superfluous if not illegal.

Public awareness and indignation over the supposed loss of the flag peaked with an article which appeared in the November 1983 issue of *Skin Diver* magazine. The title of the article, "Rally 'Round the Flag," was followed by the teaser "Sport Divers Lose Traditional Flag to Bureaucratic Bungling." Angry divers began writing to the Coast Guard and their Congressmen.

As stated in the opening paragraph of this article, this impression was a mistaken one.

The "A" signal did not replace the diver flag. The "A" flag signal is a navigation signal for a vessel, just like a ball or a diamond, while the red-and-white flag is a traditional sign that a diving operation is taking place.

Rule 27(e)(ii) dates back to the conference which produced the International Regulations for Preventing Collisions at Sea, 1972 (commonly called the 72 COLREGS). The international rules of the road have long required that a vessel restricted in its ability to maneuver exhibit three shapes, namely a ball, a diamond, and a ball, in that order, in a vertical line. At the 1972 conference, the maritime nations of the world agreed that small vessels which were unable to exhibit all of the required signals and were engaged in diving should have a special signal to indicate their lack of maneuverability. The signal agreed upon was the rigid replica, at least one meter in height, of the International Code flag "A."

The 72 COLREGS went into effect internationally on July 15, 1977. Shortly thereafter, the United States unified its Inland Rules, Western Rivers Rules, and Great Lakes Rules into one set of rules called the Inland Navigation Rules. The Inland Navigation Rules apply to all vessels operating on the navigable waters of the United States inside the COLREGS demarcation lines. These unified rules are very similar to the international regulations, and Rule 27, with its "A" flag signal requirement, is the same in both sets.

In June 1983, the diver flag issue was referred to the Coast Guard's Rules of the Road Advisory Council (RORAC), a 21-member group of experts from all segments of the marine community. The Council discussed the many letters received from divers expressing concern that they be allowed to continue to display their red-and-white flag. Council members considered a proposal to lessen the one-meter minimum-height requirement for the "A" flag signal as well as a proposal to amend the Inland Navigation Rules to allow recreational vessels to use the red-and-white diver flag instead of the blue-and-white "A" flag. After studying Rule 27, the Council recommended that the rule remain as it is. It also recommended that the Coast Guard prepare an interpretation of the rule explaining to divers and boat operators the differences between the two signals and reassuring them that display of the red-and-white flag was not prohibited.

RORAC reaffirmed the need for and sufficiency of the "A" flag signal as a means of indicating that vessels engaged in diving operations were restricted in their ability to maneuver. RORAC also recognized the red flag with diagonal white stripe as the identifying flag for divers and encouraged its use, either in conjunction with the "A" flag signal or, when the "A" flag signal was not required, alone. The red-and-white flag may not be used in lieu of the "A" flag signal because it does not serve as a navigation signal and does not indicate that a vessel is restricted in its ability to maneuver. The Council strongly recommended that, during diving operations, the red-and-white flag be exhibited on a float in the water to mark the location of divers, regardless of whether, in the determination of the operator, his or her vessel was required to exhibit the "A" flag signal.

A vessel engaged in diving operations, whether underway or at anchor, is usually considered restricted in its ability to maneuver if divers are attached to the vessel while diving. If divers are swimming free, it is the responsibility of the operator to determine if the vessel's movements are restricted by the diving operation. If the vessel cannot keep out of the way of other vessels as required by the Navigation Rules, the vessel must exhibit, by day, the "A" flag signal. At night, such a vessel must exhibit three lights in a vertical line, the highest and lowest being red and the middle one being white. If the operator of a vessel tending free-swimming divers feels that the diving itself does not interfere with the maneuverability of the vessel, the "A" flag signal is not required.

Since the traditional red flag with white diagonal white stripe is widely recognized, the Coast Guard believes that its continued use will promote safety, especially in cases where the "A" flag signal is not required.

The Coast Guard encourages boat operators to familiarize themselves with the navigation rules which govern the conduct of *all* vessels on international and inland waters. The rule dealing with the "A" flag signal is one of 38 rules which form these collision avoidance rules. When marine accidents involving vessels occur, liability is apportioned on the basis of adherence to the rules. The Coast Guard publishes these rules in a book titled *Navigation Rules: International - Inland*, available for $6.50 a copy from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The stock number is 050-012-00192-8. Checks or money orders should be made payable to the Superintendent of Documents. VISA or MasterCard holders may order over the phone by dialing (202) 783-3238.

VHF-FM Channel 13

Better use of an existing resource—the bridge-to-bridge radiotelephone—could take some of the surprises out of navigating a harbor or channel.

by CAPT William J. Brogdon, Jr.

A ship approaches a point of land while steaming out of a harbor and begins a slow turn. It is a clear day, nothing is in sight, and the radar shows no targets other than land. As the ship starts to turn, however, the lookout reports a tug and barge approaching from around the point. The pilot sounds one blast on the whistle and makes a quick call on channel 13, and he and the tug master maneuver to meet safely.

As a ship steams slowly up a channel in a busy port, the master and pilot are startled by a prolonged blast followed by three short ones. A small ship begins to back out of a berth between two covered piers. Again there is some quick maneuvering to avoid a collision.

A ship entering a large harbor on a clear night is proceeding routinely until the pilot notices something odd among the many lights on the shore. It is a downbound ship, just approaching the next turn in the channel and blending in with the background lighting. The pilot makes a call on channel 13 and calls for one blast on the whistle. The meeting is routine, but the mate wishes he had paid better attention to the radar.

"Where did that one come from?" he says. "I didn't see her till just a minute ago."

"Hidden by the lights," says the pilot. "But the lookout should have seen her."

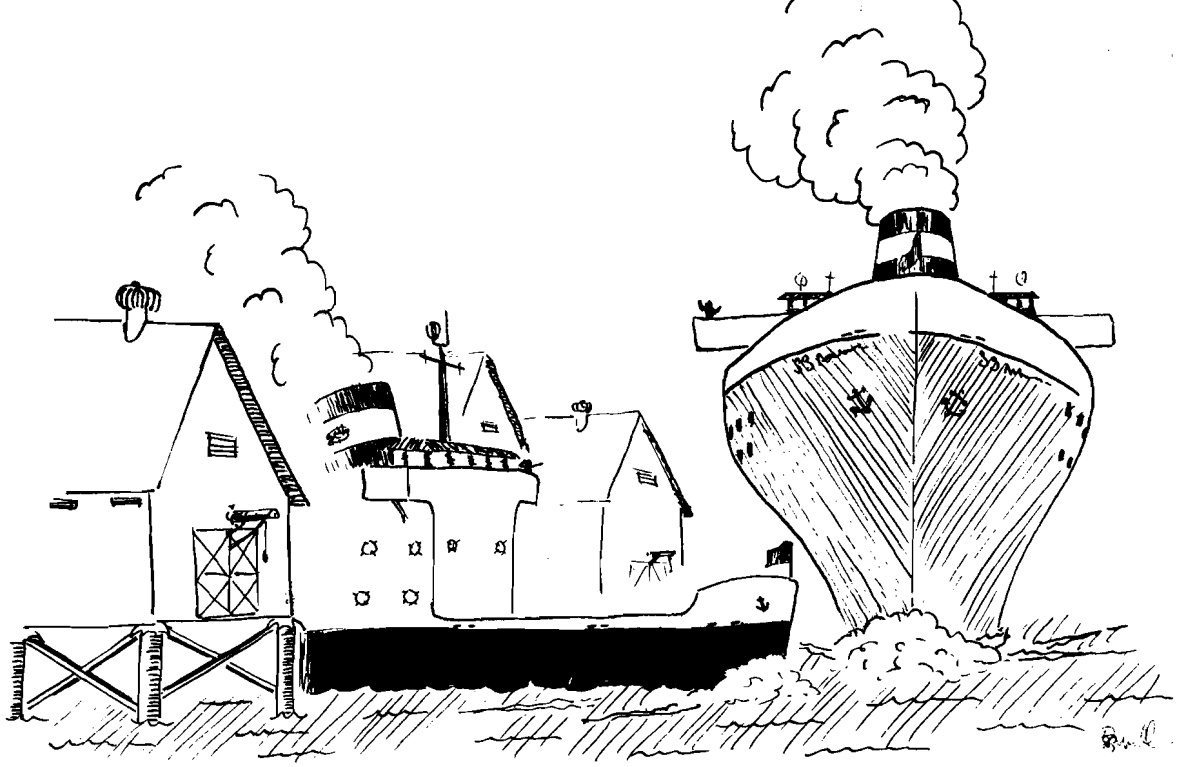
Of course he should have, in spite of the background lighting. Both the pilot and the mate could have seen the other ship, too, and either of them could have seen the target on radar. The ships in the first two examples, though, could not have been seen, even by the most alert lookout or radar operator. These incidents ended safely, but there were some anxious moments nonetheless.

Why did these vessels get so close aboard before they became aware of each other's presence? Why didn't they use VHF-FM channel 13? The answer to both questions is that the procedures required by the Bridge-to-Bridge Radiotelephone Act are triggered by a sighting, either visual or radar. This means that ships that are out of sight of each other do not exchange calls. Nor is there any requirement for plans such as unmooring to be announced in advance. Channel 13 has the potential to be much more valuable than it is now, but making it so would require a few changes in procedure.

In the winter of 1981 the Coast Guard met with members of the maritime community in Portland, Maine, to look for simple ways to improve the quality of information available to the masters and pilots using VHF-FM. The system we devised entails very little cost or effort. It has been in use for over two years and has proven to be popular and useful. I believe this system has a great deal of value and should be adapted for use in other ports.

Our goal was to develop a system that would provide complete and up-to-date information on the shipping in the harbor. To achieve it, we had to build on the strengths and remedy the weaknesses of the existing system.

CAPT Brogdon, now with the Office of Research and Development at Coast Guard Headquarters, wrote this article while serving as Commander, Coast Guard Group Portland (Maine).



". . . the master and pilot are startled by a prolonged blast . . ."

Bridge-to-Bridge Radiotelephone

Use of channel 13 in a VHF-FM bridge-to-bridge communication system became mandatory on U.S. waters in 1973 with passage of the Vessel Bridge-to-Bridge Radiotelephone Act. Masters and pilots immediately began to use channel 13 to arrange safe passage under the Rules of the Road. This reduced the confusion which often reigned prior to their being able to talk to one another and probably prevented a number of disasters which might have occurred had they continued to rely on whistle signals alone.

Although the Great Lakes had a system of bridge-to-bridge radiotelephone use prior to 1973, the system as a whole is relatively new. There is only one paragraph on how to *use* the radiotelephone in the Bridge-to-Bridge Radiotelephone Act and the regulations which were promulgated in its wake (Part 26 of Title 33 of the Code of Federal Regulations), and it is in very general terms. Procedures and usage have, like Topsy, "just growed."

In some ports which have Vessel Traffic Services, there is formal regulation of bridge-to-bridge radiotelephone use. Frequencies, reporting points, intentions, and destinations all must be reported as specified by regulations or operating procedures. Also, the Coast Guard monitors the appropriate radio channels, which reduces improper use. Ships in ports without a VTS, however, enjoy little of this systematic exchange of information, and there has been little effort to improve procedures.

The system could stand such improvement, for it does have weaknesses. Most significantly, it relies on sightings to generate calls. This works fairly well in clear weather, somewhat less well in foggy weather when radar becomes the principal means of sighting ships, and not at all when targets are obscured by bad weather or background lights. There are numerous collisions (the BLACKTHORN and CUYAHOGA tragedies come to mind) which have been caused in part by ships' officers' lack of awareness that other ships were in their vicinity and on collision courses.

Under existing law, blind turns, for example, are announced only by the whistle signal, as per Rule 34(e) of the Navigation Rules. A radiotelephone supplement would be logical, but it is not mentioned in Rule 34 (Maneuvering and Warning Signals) or Rule 9 (Narrow Channels).

Yet another problem is that many smaller vessels are not required to listen on channel 13; passenger-carrying ferries are a particular worry in this respect. Their courses typically cross channels, and they run in all weather conditions. A ferry crossing a busy channel presents an especially serious hazard to a ship.

Circuit discipline also has been a problem in many ports, reducing the effectiveness of the bridge-to-bridge system.

NTSB Encourages VHF Radiotelephone Use

The National Transportation Safety Board (NTSB) completed a recent investigation by encouraging "the use of VHF radiotelephones by the bridge watch to assist in establishing meeting arrangements on waters not covered by the U.S. Vessel Bridge-to-Bridge Radiotelephone Act" (Safety Recommendation M-82-57).

(Reprinted from the Newsletter *of the Radio Technical Commission for Maritime Services, Vol. 2, No. 9)*

In another of its recommendations, the NTSB urged the Coast Guard and the Federal Communications Commission to enter into an agreement to combat abuses on vessel bridge-to-bridge radiotelephone. An agreement was reached and was forwarded to the Coast Guard Districts in Commandant Instruction 16202.5, dated June 27, 1983. District Commanders are encouraged to enter into local agreements with FCC Regional Directors to provide education and enforcement in areas where abuses exist.

Vessel Traffic Services

Vessel Traffic Services effectively solve many of these problems. VTS watchstanders receive information from each ship and pass it on to others. In doing so, they maintain circuit discipline. A VTS usually provides radar or TV monitoring, and watchstanders can advise a ship master of approaching traffic which may or may not be participating in the system.

Vessel Traffic Services must manage an efficient flow of important information. Vital information concerning ship position, speed, and intentions must be passed both into and out of the Vessel Traffic Center. This keeps the circuits quite busy in large ports.

There is another problem: the channel system of a port often extends beyond the navigable waters of the United States. This creates legal worries, often puts VTS boundaries in the middle of channels, and gives rise to confusion.

There is also the sneaking suspicion on the part of many masters and pilots that the VTS is a prelude to controlled traffic, an idea they abhor. No amount of reassurance to the contrary has dispelled this notion.

The purpose of a Vessel Traffic Service is to remove uncertainty between vessels regarding location or intentions and promote more timely communications. Many ports are well suited to traffic information systems that are less expensive than VTS but still effective. Portland, Maine, was such a port; it needed improved communications rather than a full VTS.

Portland's VHF-FM System

I met with Captain Granville Smith of the Portland Pilots Association in December of 1980 to discuss the idea of a channel 13 system for Portland Harbor. My proposal was that vessels make security broadcasts at specified points to notify ships of their presence in the area. Portland Harbor, like many others, has blind turns, a bridge, and other obstructions which keep ships hidden from each other.

We drew up a general plan after determining that the scheme did not violate either the letter or the intent of the Bridge-to-Bridge Radiotelephone Act or the regulations. Then we invited a number of representatives of the shipping industry to attend a seminar at Coast Guard Base South Portland. Everyone involved cooperated so readily that we were able to devise a concrete system of VHF-FM security broadcasts at the first meeting.

The pilots, masters, and port captains presented many worthwhile ideas, such as the recommendation that a ship call 15 minutes prior to getting underway or 15 minutes prior to reaching the outer entrance of a harbor. These calls, like the security broadcasts at specific points, give advance warning to a master and avoid having two ships compete for the same piece of water at the same time.

We also explored the question of listening

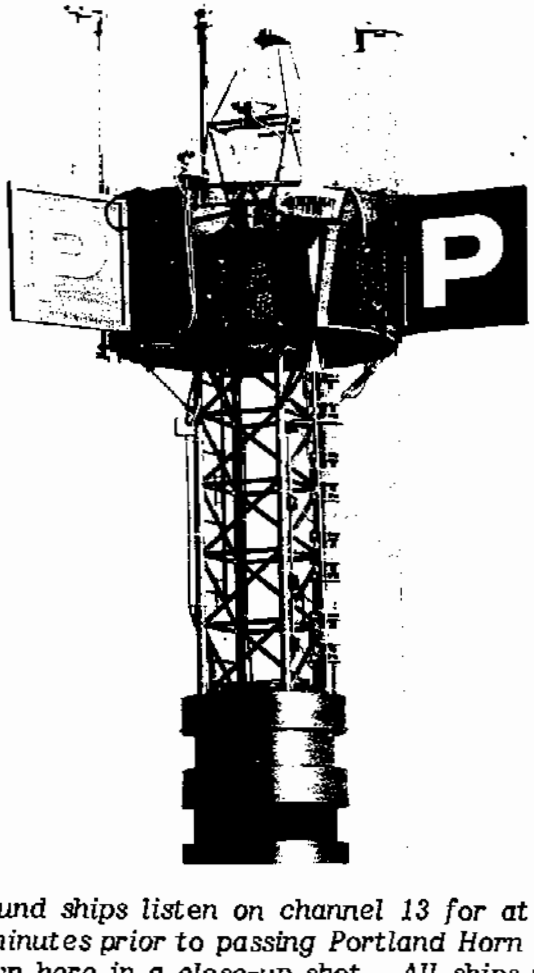
Spring Point Light, at an important turn in the channel, is a recommended security call point. (View to seaward, with Portland Head Light in the background)

watches on channel 13 for some of the commercial and passenger-carrying boats not required by law to listen on channel 13. Ferries, mentioned earlier, and cargo boats under 100 gross tons are excluded from the requirements of the Act but ply the harbor at all hours. If they are talking to one another or to their offices on a working frequency, they are temporarily away from channel 16, the calling, safety, and distress channel which vessels with VHF-FM are required to guard. There was also concern about the need to contact fishing boats which should be guarding channel 16. Potential misuse of channel 13 was also a subject of discussion. We attempted to deal with all of these concerns and suggestions.

We spent some time discussing special procedures for fog. The existing procedures, however, seem to work well. In fog conditions, masters and pilots make more frequent calls to ensure that they know about approaching traffic. Rather than specify additional points at which vessels should make security calls, we decided to recommend that they simply continue their practice of making them more frequently. An additional call at some point between the specified ones seems in keeping with the slower speeds and the need for information. By relying on the judgment of the people running the ships, we use their most valuable asset: their experience.

So that readers may see how the system is set up, a list of the specific proposals for the Portland area is printed on page 87. In drawing up this set of recommendations, we kept them succinct so that they would fit on one page and be easy to remember and use. The security broadcasts were set for intervals of about 15 minutes at significant turns or blind spots. It was important to ensure in this way that the radiotelephone be used only for significant information. The users also decided to ask smaller, more maneuverable vessels, tugs without tows and ferries, for example, to refrain from security broadcasts except in fog but to listen on channel 13 at all times and to respond if necessary.

This system of recommended security broadcasts does not in any way interfere with the established procedure of arranging meetings between vessels. In fact, it supplements it. Each ship's master, mate, or pilot makes sure he has the necessary information for his ship's safety. First, he listens 30 minutes prior to getting underway or approaching the outermost buoy. This length of time is sufficient for him to hear the security broadcasts from other



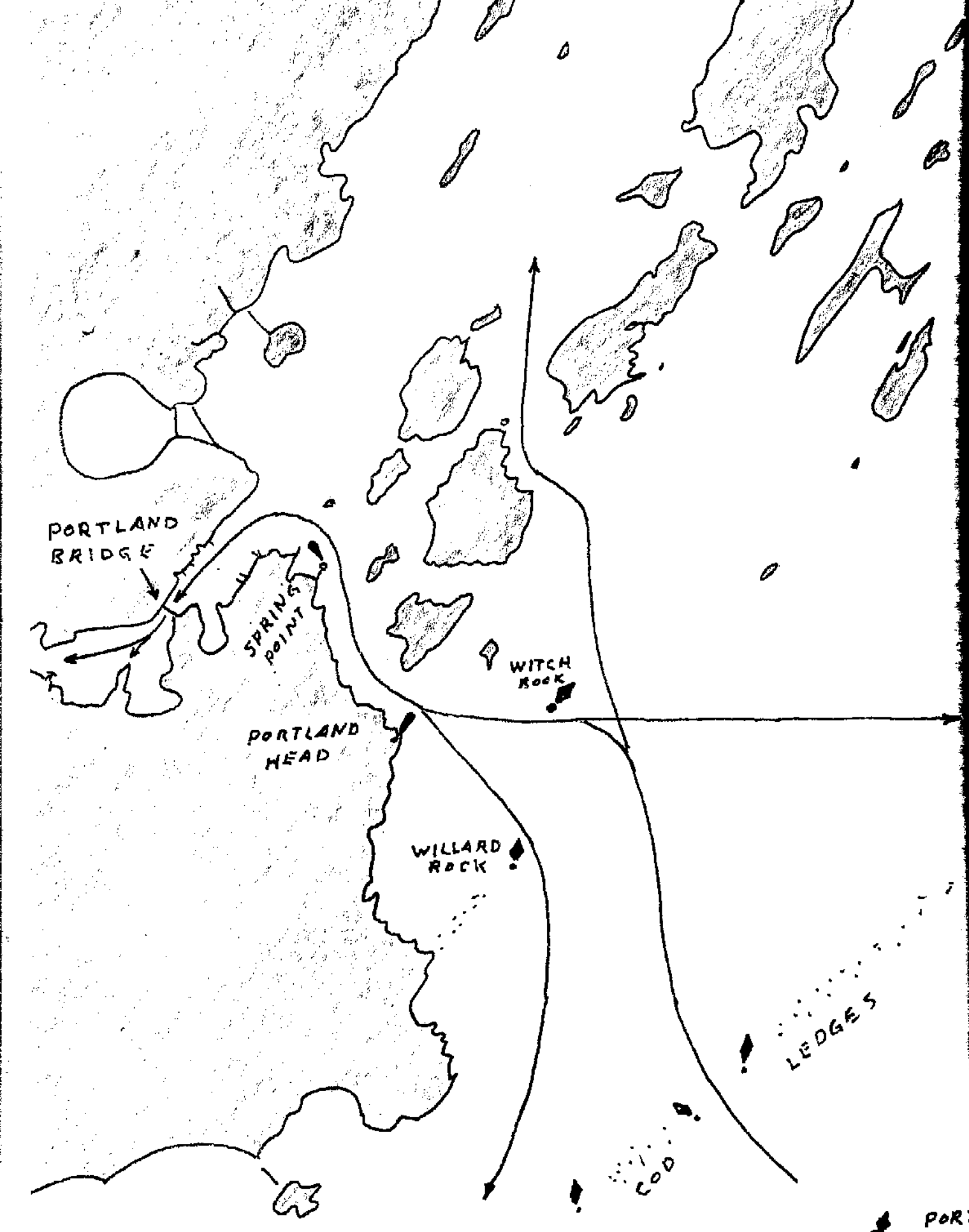
Inbound ships listen on channel 13 for at least 30 minutes prior to passing Portland Horn Buoy, shown here in a close-up shot. All ships which pass it make a security call.

vessels underway in the Portland area. Second, he makes a security call 15 minutes prior to his vessel's getting underway or, if inbound, 15 minutes prior to its passing the outermost buoy in Portland Harbor. He repeats the call when the vessel actually gets underway or passes the outermost buoy and includes its destination. In addition, there are certain points at which we recommend that a security call be made from each ship. This means that each incoming ship will hear the security broadcasts of each outbound one. Rather than relying on a Coast Guard VTS watchstander, the ship's pilot or one of the mates monitors this information.

This system, while it is very simple, seems to meet the needs of the people who use it. In fact, the response has been enthusiastic. To date, no significant problems have been reported.

The system includes, of course, all ships and tugs that are required by law to guard channel

Text continued on page 88


PORTLAND BRIDGE
SPRING POINT
WITCH ROCK
PORTLAND HEAD
WILLARD ROCK
LEDGES
COD
PORT
HORN

Left, a map of Portland Harbor.
Below, the specific proposals that make up the Portland VHF-FM System.

Recommended VHF-FM Procedures for All Ships in the Portland, Maine, Area Required to Have Bridge-to-Bridge Radiotelephone

The primary users of VHF-FM bridge-to-bridge radiotelephone in the vicinity of Portland, Maine, have agreed to adopt a system of security broadcasts as a supplement to the normal bridge-to-bridge radiotelephone procedures. This system will give masters and pilots up-to-date information on important marine traffic in that area. The guidelines are as follows:

1. Use channel 13 for all bridge-to-bridge communications, except when calling a small vessel which does not respond to a call on channel 13. In that case, channel 16 is appropriate, since all VHF-FM-equipped vessels are required to guard channel 16.

2. Listen 30 minutes prior to
   a. getting underway.
   b. reaching the vicinity of Portland Horn Buoy (inbound).

3. a. Make a security call 15 minutes prior to getting underway.
   b. Make a security call when passing Portland Horn Buoy. Inbound ships not passing Portland Horn Buoy, make a security call 15 minutes prior to passing Witch Rock or Willard Rock or 15 minutes prior to entering Hussey Sound.

4. Make a security call
   a. when passing Witch Rock LBB2, 1½ miles east of Portland Head Light,
      or Willard Rock LGB 7, 1½ miles southeast of Portland Head Light,
      or Hussey sound LGB 3, near Peak's Island (include your destination).
   b. when passing Spring Point Light.
   c. when passing Portland Bridge.
   d. when mooring or anchoring.
   e. when getting underway (include your route. Say, for example, "Bound for sea by Willard Rock").

5. If you must call another ship or station to pass any of the above information on channel 13, an additional security call is unnecessary. For a tug and a barge in Fore River, for example, a call to Portland Bridge 15 minutes prior to getting underway would suffice.

6. During low visibility, make security calls at more frequent intervals.

7. Vessels carrying passengers or cargo which are not required to comply with the provisions of the Bridge-to-Bridge Radiotelephone Act are encouraged to monitor and respond on channel 13. During periods of low visibility, it is appropriate for them to follow the security call procedures, except for paragraph 3.

8. Coast Guard Group Portland will monitor channel 13 and will be equipped to receive and transmit important information if necessary.

13 in U.S. waters. We encourage participation on a volunteer basis by the small tankers and ferries which are not required to guard channel 13 when they are underway. This effort has met with considerable success, and the small ferries and supply boats now carry a channel 13 receiver, which has greatly increased safety.

Fishing boats and yachts which have VHF-FM radios are required to guard channel 16. Compliance with this requirement has also improved under the channel 13 system. It may be that the use of the new system and its attendant publicity have improved mariners' awareness of the channel 16 requirement.

Coast Guard Group Portland monitors channel 13 to ensure that it remains free of non-navigational information. With approval from Headquarters, the Coast Guard can also broadcast on channel 13 in an emergency, such as a ship's losing its channel 13 capability.

Elements of this system were copied from practices in other ports and the practices of various operators in Portland Harbor. The Coast Guard has merely acted to bring them together and print the recommendations. We have given copies of the recommendations to all companies having significant marine traffic in Portland. We also distributed copies of the recommendations to a large number of incidental vessel users in this area.

Pilots in other ports might find a system like Portland's helpful.

Extending the System

In the spring of 1982, we met with commercial and Navy pilots in the Portsmouth, New Hampshire, area to explore the possibility of instituting a similar system in the Portsmouth-Kittery area. Although the ports are quite different, we used the same basic system, changing only the security broadcast points. The pilots report that the system is working very well.

The First Coast Guard District published the recommended procedures for using channel 13 VHF-FM in both ports in Local Notice to Mariners No. 16-83. This notice will help make even more users aware of the systems. We have recommended to the National Ocean Service that it include this information in the next printing of Volume I of *The Coast Pilot*.

The Coast Guard Marine Safety Office in Portland is developing a similar system for Penobscot Bay and approaches. This area is quite different from the other two, but the basic principles remain the same.

There is no doubt that a system like this would have application in a large number of ports. The users of channel 13 could determine appropriate check points and ground rules for security broadcasts similar to the ones in Portland.

Additional Considerations

Several questions remain. What about ports with heavy traffic? Portland, although a fine harbor, has seen a decline in ship and tug traffic over the past few years. Would this system work in a busy port? How about abuses of the channel 13 regulations?

While my answers to these questions are merely opinion, I feel that our experience here has given us some insight. First, doesn't heavy traffic generate a lot of chatter on the channel 13 frequency? Yes, it does, but a great number of these transmissions are to determine the very things that pilots and masters announce in the system of security broadcasts. So a formal system can eliminate the many calls in the blind for information.

It is important to choose the points for security broadcasts carefully. If they are too close to each other, there will be unnecessary transmissions. If they are too far apart, ships'

Inbound traffic converges at Portland Head Light at the entrance to Portland Harbor. Because it is close to other security call points, Portland Head Light is not a call point.

masters and pilots may not hear the security broadcasts. We have found that points chosen so that there is a call about every 15 minutes is a good compromise.

Since many of the transmissions are from hand-held radios, the radio range is appropriate for the distances involved. It is best for ships using installed radios to use low-power settings. If they use high power, there will be an unnecessary overlap in a long channel, thus adding to the noise level on the bridge.

Second, what about abuse? We have found that abuse of channel 13 has declined since the Portland system went into effect. No doubt some of this is due to having a set of procedures which has been accepted by the primary maritime interests. Some of the improvement is due to Coast Guard Group Portland's monitoring the channel. At first, we had to direct unauthorized users to working channels, but now there is better compliance with the regulations. We can tape-record the transmissions on channel 13 so that we have evidence of abuses.

Summing Up . . .

VHF is a fine system, but it deserves our attention. Simply letting the system evolve on its own is unlikely to lead to the most efficient use of VHF-FM bridge-to-bridge radiotelephone.

I feel that a proposal such as the one developed for Portland makes ideal use of Coast Guard expertise. We worked with the maritime community to come up with a radiotelephone system that increases safety without a great deal of additional expense for, or control of, the ship owner or operator.

Since users find it reasonable and logical, the system of broadcasts will continue to work without a great deal of effort on the part of the Coast Guard. The fact that it is a recommended system rather than one mandated by law or regulation probably has contributed to its overwhelming popularity.

We would like to ask your help in evaluating this system for use in other areas. Please review the recommendations carefully. Do you feel that these procedures would be of help in your area? I feel that I can say with assurance that the Coast Guard does not intend to force them down anyone's throat, but we would be glad to meet with the people who depend on bridge-to-bridge radiotelephone if they wish to establish such a system.

You can either write the editor of the *Proceedings* or contact your local Captain of the Port. This system is a purely voluntary one, designed to improve communications, not to cause additional expense or operating burdens.

If the experience in Maine is any indication, such a system can be a big improvement over the present unstructured system of using bridge-to-bridge radiotelephone. Had the ships and tugs in the three examples at the beginning of this article been using such a system, they would have heard security broadcasts prior to seeing the other vessels. This would have reduced the danger of misunderstandings and collisions. ‡

Baptism by Fire

Combating a major fire in a port facility requires a coordination of efforts. Shoreside firefighters have to work hand in hand with personnel assisting from the water. When a serious fire broke out, Hampton Roads had a contingency plan in place. Would it work?

by LCDR J. H. B. Morton
and
LT M. J. Pontiff

The port of Hampton Roads recently experienced a significant marine facility fire when flames broke out in a pierside warehouse. This fire was the first major test of the port marine firefighting contingency plan developed last year by representatives from local, state, and Federal government agencies. The plan sets forth the responsibilities and jurisdictional areas of the various agencies in the greater Hampton Roads area. It also describes in detail how to set up and man an on-scene command post and contains lists of the specialized firefighting equipment available in the area as well as marine facilities and their points of access.

The first incident to set the plan in motion involved the Texaco Oil Shipment Terminal in the southern branch of the Elizabeth River. This facility is used for bulk liquid transfers and for processing, storing, and shipping drums of various lubricants and engine oil. It is located in an industrialized area of the port characterized by many bulk transfer facilities. On the 164-acre site are several large fuel-oil storage tanks and an oil-processing facility.

The Chesapeake Fire Department was called into action at 5:29 a.m., Sunday, September 25, 1983, to battle what was by then already a raging fire. The initial report was made by a nearby bridge tender who saw smoke and flames coming from the warehouse. The fire spread rapidly, and the first units arrived to find a potentially dangerous situation.

The first priority was to establish a buffer between the burning warehouse and the oil-processing building and bulk-fuel storage sites. To provide the necessary manpower and equipment to do this, the Chesapeake Fire Department implemented the mutual assistance agreement set forth in the contingency plan. This agreement provides immediate access to the specialized equipment and manpower of the cities of Norfolk and Portsmouth. Further, since the land-based fire units could deal with only one side of the fire, a call was put in to the Coast Guard and Navy to provide waterside firefighting assistance.

The Coast Guard Marine Safety Office in Norfolk was notified at 5:45 a.m., and the first Coast Guard unit arrived on scene at 6:10 a.m. The Captain of the Port assumed control of all Coast Guard units involved in the firefighting activities and coordinated Coast Guard concerns relative to port and vessel safety and environmental protection. The Coast Guard established a safety zone on the southern branch of the Elizabeth River extending one mile on either side of the facility. Vessel movement was restricted to safeguard watercraft transiting the area from floating debris. Coast Guard patrol boats remained on scene to exercise traffic control and enforce the safety zone restrictions throughout the period of danger.

Commercial vessels also responded to the call for assistance. Several Curtis Bay Towing Company tugs which were in the vicinity re-

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LCDR Morton and LT Pontiff are with the Marine Safety Office in Hampton Roads, Virginia. This article is a follow-up to an article LCDR Morton wrote for the July 1983 issue of the Proceedings *("Is Your Port Prepared for a Major Marine Fire?") describing the Hampton Roads firefighting contingency plan.*

sponded quickly and began immediate firefighting efforts. A total of eight Coast Guard, Navy, and civilian vessels responded to the call for assistance.

As units arrived, reports flooded into the command post of hundreds of 55-gallon drums on fire. Smoke and flames were reaching hundreds of feet into the air, and sporadically exploding drums were seen through most of the initial firefighting effort. The fire chief in charge immediately detailed one unit to fight the fire near the warehouse and sent his other units to protect the narrow buffer between the oil-processing building and the fire. Fortunately, the wind that day was from the northeast and blew the flames away from the storage tanks. The personnel on the assisting vessels, working to complement the shoreside effort, concentrated on maintaining the buffer area and dealing with the fire under the concrete apron of the pier.

The U.S. Coast Guard Cutter CHOCK joins in the efforts to fight the fire. What appears to be a tarpaulin in the upper righthand corner of the photo is actually what's left of the warehouse, which was made of corrugated aluminum and melted from the heat of the flames. Photo by Ray Gehman, staff photographer for the Norfolk Ledger Star

The original source of water for fighting the fire was a fire main feeding seven hydrants on the Texaco facility itself. This water, drawn from the Elizabeth River, was available only briefly; soon after the fire broke out, part of the pier collapsed, carrying away the fire-main piping and causing a loss of suction. A city-maintained hydrant was located some 3,800 feet away, and a 5-inch hose was run in to feed the shoreside effort. The interruption in the water supply did not af-

fect efforts to contain the fire, since all eight vessels were in place pouring some 10,000 gallons of water per minute on the fire.

The only other major difficulty encountered was fighting the part of the fire that had spread from the warehouse beneath the concrete pier to the wooden pilings. The flames there were some 60 feet back from the pier face, difficult to reach with water.

The general assignments worked well, and the fire was kept from spreading beyond the warehouse and pier to the processing plant.

The fire had left the once neat stacks of drums spread over the pier in various states of disarray. Some drums were badly damaged from the heat. Some were swollen and about to burst. As the wooden pilings underneath the pier continued to burn, the concrete on which the drums were piled was becoming hotter and hotter. The Captain of the Port's primary concern was removal of the drums from the pier. He was worried that the weakened remainder of the pier might collapse and spread drums, oil, and fire all over the river. The safety of the personnel who would have to deal with the 450-pound drums and the hot, unstable pier was paramount.

After discussing several alternatives, the facility representative, the Chesapeake fire chief, the Captain of the Port, and a construction contractor hired to assist in the drum removal operations agreed on a plan to pick up, drain, and move to a safe location all drums from the burning pier. A crane was brought in, and a small steel work barge was lifted into position over the pier with two workers on board. Personnel loaded the drums onto the barge one at a time, drained the oil into the barge, and moved the drums to a cleared location on a pier. Oil was then pumped from the barge into a vacuum truck. The process was slow but successful, and all drums were removed from the pier.

Once the drums had been removed, firefighters got the go-ahead to break up part of the concrete pier with a wrecking ball. This gave them access to the burning pilings underneath the concrete. The fire was finally extinguished early Tuesday morning.

Several important points were noted when the fire and the response efforts were reviewed:

- The participating agencies, because a plan was in place and because they had done their homework, were able to respond to a major fire rapidly and effectively. They did not need to spend valuable time trying to determine which Federal agencies could assist them.
- The on-scene organization fell into place with no confusion as to who should manage the firefighting effort. The Chesapeake Fire Department took control, units from the Norfolk Fire Department assisted under the direction of the Chesapeake Fire Chief, and the facility manager and his staff assisted in providing information on the facility's layout. The Coast Guard Captain of the Port, while concerned with the safety of the port, allowed the firefighters to fight the fire. He intervened only when their methods jeopardized other port safety concerns (he insisted, for instance, that the oil drums be removed before the pier was broken up). Responding Coast Guard and Navy units, while under the control of their parent organizations, communicated with the Chesapeake Fire Chief about his needs and their execution of his directions.
- The on-scene communications on the shore side were conducted on the area mutual assistance frequency. The system worked well. On the marine side, some difficulties were experienced because the vessels' communications equipment did not work on the same frequency as the fire department's. The parties involved are working to correct this weakness in the communications section of the contingency plan.
- The firefighters performed well in a fire that brought them face-to-face with different risks than they normally encountered. It was noted, however, that, had a vessel been involved, a higher degree of training would have been essential. This comment was particularly germane, as local efforts to structure a marine firefighting training program are reaching their final stages.

The overall opinion was that this first test of the Port of Hampton Roads' contingency plan went well. Thanks to the plan, the fire departments had the critical information necessary to make decisions and successfully battle this fire. The Captain of the Port expressed his gratitude to all involved for their cooperation and support in minimizing the navigation hazards and the threat of pollution posed by a fire of this type. ‡

Naphthalene: $C_{10}H_8$

Synonyms:	white tar napthalin

Physical Properties

boiling point:	218°C (424°F)
freezing point:	80°C (176°F)
vapor pressure at	
52°C (136°F):	1 mm Hg
218°C (424°F):	760 mm Hg

Threshold Limit Values (TLV)

Time Weighted Average:	10 ppm; 50 mg/m^3
Short Term Exposure Limit:	15 ppm; 75 mg/m^3

Flammability Limits in Air

lower flammability limit:	0.9% by vol.
upper flammability limit:	5.9% by vol.

Combustion Properties

flash point (o.c.):	79°C (174°F)
autoignition temperature:	567°C (1,053°F)

Densities

solid (water = 1.0):	1.145

Identifiers

U.N. Number:	2304
CHRIS Code:	NTM
Cargo Compatibility Group:	32 (Aromatic Hydrocarbons)

What chemical sublimes the way dry ice does, must be heated to near its flash point to be pumped, and smells like moth balls? The answer: naphthalene. Of all the regulated chemical cargoes, naphthalene is one of the most interesting, not only because of its toxicological characteristics but also because of its unique physical properties and its "split" status in the bulk shipping regulations: it is regulated in Subchapter O for carriage on ships and Subchapter D for carriage on barges.

Naphthalene is one of the few chemicals that do not exhibit the normal phase transitions from solid to liquid to vapor as temperature rises. At room temperature, solid naphthalene slowly vaporizes without going through the liquid state. This phenomenon, called "sublimation," is what solid carbon dioxide, or dry ice, undergoes as it turns into a vapor without ever melting.

Naphthalene will become a liquid if it is heated to its melting point, 80°C (176°F). Naphthalene must be liquefied for pumping onto or off of a vessel. Vapors from the heated naphthalene will cool rapidly as they are vented to the atmosphere and, once there, will crystallize, forming a naphthalene "snow," which, in turn, will sublime.

On ships, naphthalene is heated during transit to keep it in the liquid state. Naphthalene is thus designated as an "elevated-temperature" cargo.

Naphthalene carried on barges is loaded hot, but, since barges do not have installed heating systems, its temperature cannot be maintained at that level. The naphthalene may arrive at its destination in a solid form and have to be heated and returned to a liquid state before it can be pumped off.

The procedures followed on barges must make allowance for some of the troublesome physical properties of naphthalene. The chemical may crystallize in the venting, loading, and discharge piping, effectively sealing a tank and preventing the equalization of tank pressure and atmospheric pressure. If that happens, the cooling vapors in the tank may reduce the pressure in the tank to a level below atmospheric pressure, and the tank may collapse inward, rupturing the steel in the deck or elsewhere. When naphthalene is heated and reliquefied, the additional vapor generated may raise the tank pressure above atmospheric pressure; if the venting system has been plugged by crystallized naphthalene, the tank and deck may be ruptured outward.

Naphthalene presents a range of hazards to personnel working with or around the chemical. At one end of the spectrum are localized effects resulting from short-term exposure to high concentrations. At the other end are chronic effects, affecting entire body systems, resulting from continuous or repeated exposure to low concentrations.

Localized effects are caused primarily by the irritating properties of naphthalene. They include dermititis (in the case of skin exposure), cataracts (from eye contact), and, in some individuals, an allergic reaction to the chemical. Molten naphthalene can cause heat burns. Personnel can easily guard themselves against these effects by wearing goggles and protective clothing.

Vapor inhalation is a mixed phenomenon in that it may combine the characteristics of acute and chronic exposure: symptoms may begin appearing immediately, and entire body systems may be affected. Victims may exhibit any of the following: headache, malaise, irritability, confusion, excitement, sweating, vomiting, abdominal pain, irritation of the bladder, and blood hemolysis (disintegration of red blood cells). More severe effects include a life-endangering shutdown of the renal, or kidney, system.

The last group of health hazards, systemic effects from chronic exposure, is less well understood, but a German study indicates that, over the long term, exposure to naphthalene may result in cancer. Naphthalene was selected for a multi-year carcinogenicity study under the U.S. National Toxicology Program in July 1982.

Obviously, naphthalene, when transported in bulk, does present a serious health hazard. Employees may be endangered by exposure to the vapors or contact with the dust that crystallizes from the hot vapors. The limits set by the American Conference of Governmental Industrial Hygienists for short-term and workday-average exposure can be found in the table at the beginning of this article. The concentration deemed Immediately Dangerous to Life and Health (IDLH) is 500 parts per million (ppm). The types of respiratory protection needed for various concentrations are as follows:

Concentration	Protective Device
less than 10 ppm	none required
greater than 10 ppm but less than 100 ppm	half-mask air-purifying respirator with a protection factor of 10
greater than 100 ppm but less than 500 ppm	full-face-piece air-purifying respirator with a protection factor of 100
greater than 500 ppm	full-face-piece SCBA operating in the pressure-demand mode

The U.S. Coast Guard considers naphthalene shipped in the molten state a Grade C flammable liquid, although the chemical's flash point would qualify it for Grade E. It considers it so because the chemical's melting point and flash point are only 1°C apart and the Coast Guard is concerned that naphthalene heated to its melting point might present a significant fire hazard. Experience indicates, however, that there is more of a risk that barge tanks will be damaged because of the physical properties of the chemical than because of ignition of vapors.

If ignition should occur, the preferred method of extinguishment is application of water, carbon dioxide, or dry-chemical agents. Water, effective because it will cool the naphthalene below its flash point, will often cause extensive foaming of liquid naphthalene. Since the chemical is not reactive with water, the foaming should not be regarded as hazardous.

On a scale of 0 to 4 (4 being the worst), the National Fire Protection Association assigns naphthalene the following hazard classifications: flammability, 2; health, 2; reactivity, 0.

As stated earlier, regulations governing bulk shipment of naphthalene are different for ships and barges. For carriage on ships, naphthalene is regulated as a Subchapter O cargo in Part 153 of Title 46 of the Code of Federal Regulations. Under these regulations, PV valves and restricted gauging devices, as well as the cargo, can be heated to prevent crystallized naphthalene from plugging the piping. For carriage on barges, naphthalene is regulated as a Subchapter D cargo in Parts 30 - 40 of Title 46 of the CFR. The use of large-diameter gooseneck vents and open gauging on barges can minimize the effects of crystallization and often prevent plugging. Because the engineering requirements are less strict on barges than on ships, barge personnel must be especially mindful of the health and fire hazards of naphthalene and ensure that they are not exposed to excessive concentrations of vapors during tank gauging or loading. They must also be careful to ensure that sources of ignition are not present on the cargo deck.

This month's article was written by guest author LT K. W. Blackman of the Marine Safety Technology Branch, Office of Research and Development.

Keynotes

The Coast Guard published the following items of general interest in the Federal Register between December 22, 1983, and January 12, 1984:

Final rules:

COTP Charleston Reg. 83-22	Safety Zone Regulations; Myrtle Beach, South Carolina (published December 22)
CGD2-83-03	Safety Zone; Illinois Waterway, Mile 152.4 to 153.4; revocation (December 22)
CGD-83-1R	Special Anchorage Area; Fore River, Portland Harbor, Portland, Maine, and Anchorage Regulations in the Zone of MSO Portland, Maine; editorial changes (December 22)
COTP Baltimore Reg. 83-16	Safety Zone Regulations; Chesapeake Bay and Baltimore Harbor, Baltimore, Maryland (December 30)
CGD3 82-036	Drawbridge Operation Regulations; Passaic River, New Jersey (January 5)
CGD3 82-023	Drawbridge Operation Regulations; Great Channel, New Jersey (January 5)
COTP Baltimore	Notice of Ice Navigation Season; Northern Portion of Chesapeake Bay and Tributaries (January 5)
CGD 73-186	Berwick Bay Vessel Traffic Service, Morgan City, Louisiana (January 5)
CGD 83-009	Delegation of Authority Under Comprehensive Environmental Response, Compensation, And Liability Act of 1980 (CERCLA) (January 5)
CGD 83-009A	Delegation of Authority Under the Federal Water Pollution Control Act (FWPCA) (January 5)
31031-214	Written Warnings; administrative practice and procedure; interim final rule published in conjunction with the National Oceanic and Atmospheric Administration (January 6)

Notices of proposed rulemaking (NPRMs):

CGD7-83-21	Drawbridge Operation Regulations; Savannah River, Georgia (December 22)
CGD7 83-15	Anchorage Grounds/Special Anchorage Area, Charleston, South Carolina (January 5)
CGD 81-058	Boundary Lines; reopening of comment period (January 6)
CGD 79-077	Workplace Safety and Health Requirements for Facilities on the Outer Continental Shelf (January 9)
CGD3 83-060	Drawbridge Operation Regulations; Nacote Creek, New Jersey (January 12)

Notices:

CGD 83-072	Towing Safety Advisory Committee, Personnel Manning and Licensing Subcommittee; notice of meeting (January 5)
CGD 83-073	Towing Safety Advisory Committee; Boundary Lines Working Group; notice of meeting (January 5)
CGD 84-001	Houston/Galveston Navigation Safety Advisory Committee; notice soliciting applications for membership (January 9)
CGD 84-002	Lower Mississippi River Waterway Safety Advisory Committee; notice of meeting (January 9)
CGD 84-006	Great Lakes Registered Pilotage; notice of meeting (January 12)

Requests for copies of NPRMs should be directed to the Marine Safety Council at the following address:

Commandant (G-CMC)
U.S. Coast Guard
Washington, DC 20593
Tel.: (202) 426-1477

The Marine Safety Council office, Room 4402 at Coast Guard Headquarters, 2100 Second Street, SW, Washington, DC, is open between the hours of 9:00 a.m. and 4:00 p.m. Monday through Friday. Comments are available for inspection or copying during those hours.

* * *

Final rules:

Delegation of Authority Under CERCLA (CGD 83-009)

These rules delegate authority to Coast Guard officials to perform pollution response functions under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). This law provides authority to respond to releases of hazardous substances, pollutants, and contaminants into the environment. These delegations will allow field commands to respond rapidly to releases from vessels and facilities in the coastal zone.

These rules relate to agency management, procedure, and practice. They went into effect on January 5, 1984, the date of publication.

Delegation of Authority Under the FWPCA (CGD 83-009A)

These rules, published January 5, 1984, delegate authority, with certain limitations, to designated Coast Guard officials to remove oil and hazardous substances that pose a substantial threat of discharge into U.S. waters, shorelines, or other prescribed areas. This authority was recently delegated to the Commandant of the Coast Guard. Previous rules provided delegated authority to respond only to actual discharges. This new delegation was needed to provide effective Coast Guard response to substantial threats of oil and hazardous substance discharges.

These rules, like those concerning the CERCLA delegation of authority, relate to agency management, practice, and procedure. They went into effect on February 6, 1984.

Notice of proposed rulemaking (NPRM):

Workplace Safety and Health Requirements for OCS Facilities (CGD 79-077)

In an NPRM published January 9, 1984, the Coast Guard proposed issuing regulations concerning personal protection equipment and general working conditions on facilities and mobile offshore drilling units engaged in Outer Continental Shelf (OCS) activities. This proposal is part of a continuing effort by the Coast Guard to improve the safety of life and property on the OCS. The need to promote safe working conditions by regulating hazards in the workplace was identified in the OCS Lands Act Amendments of 1978. This proposal addresses that need.

Actions of the Marine Safety Council

The Marine Safety Council met in January to consider the following items:

CGD 83-070 Revision of Vessel Admeasurement Regulations

The purpose of this project is to consolidate the admeasurement regulations. These regulations, which are now in four different places in the Code of Federal Regulations, will be combined into a single part.

If the present session of Congress passes the Tonnage Measurement of Vessels Act, regulations implementing the provisions of that Act will also be included in the project. If the Act does not pass, the proposed regulation change will be limited to the consolidation.

Publication of a notice of proposed rulemaking will not occur until after the pending legislation has been either passed or defeated.

CGD 83-071 Update of Mobile Offshore Drilling Unit Regulations

The Mobile Offshore Drilling Unit (MODU) regulations were promulgated in 1978 and have not been changed since. This project would update those regulations to reflect technological advances and changes in industry practice. The project would also incorporate provisions of the Safety of Life at Sea Convention, 1974 (SOLAS 1974), which the United States ratified after the MODU regulations had been promulgated. Finally, the project would implement provisions of the Outer Continental Shelf Land Act Amendments of 1978 and 1982.

Most of the changes proposed in this project are editorial or for the sake of clarification. Substantive changes are anticipated for bilge- and ballast-system requirements.

An advance notice of proposed rulemaking is expected to be published in the Federal Register either this month or next month. ‡

ANSI Calls for Comments

A draft standard on barge transport of radioactive materials developed by the American National Standards Institute (ANSI), a national organization devoted to the voluntary use of consensus standards, is now available for industry comment.

The draft standard identifies the organization, equipment, operations, and documentation that are involved in domestic shipments of radioactive material in Type B packagings on inland and coastal waterways by barge. The standard covers selection of the barges and towboats, packaging, preparation of certificates and documents, radiological and non-radiological operations, emergency planning, insurance, recordkeeping, and physical protection of the package.

Copies of the standard are available from Mr. E. L. Wilmot, Organization 6323, P.O. Box 5800, Sandia National Laboratories, Albuquerque, New Mexico 87185; tel.: (505) 844-8906.

(Reprinted from the Weekly Letter *of The American Waterways Operators, Inc., Vol. XXXX, No. 46)*

Small Passenger Vessel Radio Inspection Interval Extended (FCC 83-563, PR Docket 83-428)

The Federal Communications Commission extended the period of time between inspections of radio equipment aboard small, compulsorily-equipped passenger vessels in a decision announced December 6, 1983. The action extends from two to five years the inspection interval for vessels carrying more than six passengers for hire in the open sea or in any tidewater within the jurisdiction of the United States adjacent to or contiguous with the open sea.

The amendment was made because the commission concluded that the improvements in maritime radiotelephone equipment, the increase in the number of vessels having such equipment, and the improvements in shipboard and shore communications warranted a change.

The FCC is also considering a proposal to extend the inspection interval for ships operating on the Great Lakes from one to two years. Such an action will require amendment of the Great Lakes Agreement between the U.S. and Canada. If Canada supports the move, the FCC will issue a Second Report and Order implementing this change.

For more information contact Nicholas Bagnato, tel.: (202) 632-7175, or consult the December 14 Federal Register, pages 55574 - 5.

(Reprinted from the Newsletter *of the Radio Technical Commission for Maritime Services, Vol. 3, No. 1)* ‡

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. The path of a celestial body during its daily apparent revolution around the earth is called its

A. ecliptic.
B. diurnal circle.
C. parallel of declination.
D. circle of position.

REFERENCE: Bowditch, Vol. I, 1977

2. While navigating a power-driven vessel at night, you see the red sidelight of another vessel on your port bow. Its after masthead light is to the right of the forward masthead light. You should

A. hold course and speed.
B. alter course to port.
C. stop the engines.
D. sound the danger signal.

REFERENCE: Commandant Instruction M16672.2, Rules 7 and 15

3. Bilge keels fitted on vessels are more effective at damping roll as the

A. pitching increases.
B. list increases.
C. rolling increases.
D. draft decreases.

REFERENCE: LaDage, Stability and Trim for the Ship's Officer, 1983

4. The best position for the guy in relation to the boom, viewed from above, is

A. parallel.
B. 4 feet aft of the the heel of the boom.
C. at right angles.
D. at a 45^{o} angle.

REFERENCE: Sauerbier, Marine Cargo Operations

5. Using the formula ($B = C^2 \times 900$), compute the breaking strength of a 3-inch manila line.

A. 7,600 lbs.
B. 7,800 lbs.
C. 8,100 lbs.
D. 8,300 lbs.

REFERENCE: American Merchant Seaman's Manual

ENGINEER

1. Failure to notify the Coast Guard (or other appropriate government agency) of an oil spill from your vessel could result in a fine of up to

A. $1,000.
B. $5,000.
C. $10,000.
D. $20,000.

REFERENCE: 33 CFR 153.205

2. Biasing in a pneumatic automated combustion control system refers to a set amount of increase or decrease in the

A. control pressure.
B. loading pressure.
C. supply pressure.
D. rate relay pressure.

REFERENCE: MEBA, Modern Marine Engineering

3. If lube oil analysis from a propulsion diesel engine indicates a high silica content, this points to

A. inadequate fuel filtration.
B. inadequate air filtration.
C. excessive cylinder liner wear.
D. breakdown of lube oil additives.

REFERENCE: Stinson, Diesel Engineering Handbook

4. What is the overall result of increasing the load on the secondary of a transformer?

A. A decrease in the primary voltage
B. An increase in the primary voltage
C. A decrease in the primary current
D. An increase in the primary current

REFERENCE: Hubert, Preventive Maintenance of Electrical Equipment

5. Which of the following factors will limit the mean effective pressure of diesel engine cylinders?

A. Heat losses and a decrease in the efficiency of combustion
B. A decrease in the charge, or volumetric efficiency in four-stroke engines
C. Incomplete mixing of the fuel and air
D. Any of the above

REFERENCE: Maleev, Diesel Engine Operation and Maintenance

ANSWERS

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

If you have any questions about the Nautical Queries, please contact Commanding Officer, U.S. Coast Guard Institute (mvp), P.O. Substation 18, Oklahoma City, Oklahoma 73169; tel.: (405) 686-4417. ‡

Please enclose your mailing label when sending in a change of address. Allow eight weeks for change to take effect.

Maritime Licensing, Certification, and Training

Last month we discussed the Coast Guard's expanded philosophy of training and encouraged all training institutions with quality maritime training courses to apply for Coast Guard approval of their courses. This month we answer the question "How do we apply for Coast Guard approval of our courses?"

The course approval process is explained in Section 10.30 of Title 46 of the Code of Federal Regulations. Other sections of the CFR and other documents may also apply for courses on certain subjects. Examples of such courses and the documents which apply to them are as follows:

- Lifeboatman - 46 CFR 12.10
- Radar Observer - 46 CFR 10.30-5
- Crude Oil Washing (proposed) - 33 CFR 157.152 and IMO Resolution A. 446(XI)
- Bulk Liquids (proposed) - 46 CFR 13
- Firefighting (proposed) - 46 CFR 10 and 13 and IMO Resolution A. 437(XI)
- Able Seaman and Qualified Members of Engine Departments - 46 U.S.C. 7315

A school wishing to have a course approved by the Coast Guard must submit a written request to the Merchant Vessel Personnel Division at Coast Guard Headquarters (G-MVP-3/14) via the Commanding Officer of the appropriate local office, either a Marine Safety Office or a Marine Inspection Office. This request should include

a. a description of the curriculum, including such information as the number of actual classroom hours required in each subject, the number of hours in a normal school day, the number of vessel underway hours, the number and type of examinations required, what audiovisual aids or simulators are to be used, and the class size and student/instructor ratio;
b. a description of the facility and equipment;
c. a list of instructors and summaries of their qualifications, experience, and background;
d. a recommendation as to what the course should be approved for, e.g., to substitute for the sea-service requirement for a particular license or seaman document, to substitute for a required examination, or to meet a regulatory requirement for training.

Upon receipt of this letter, the local Commanding Officer of the Marine Safety or Inspection Office will review the request and visit the training site. He or she will evaluate the school facilities, looking at such things as classroom environment, simulator installations, audiovisual aids, lifeboat installations, and vessels and their types, sizes, and areas of operation. Except in cases where the facility, faculty, or curriculum is unsatisfactory, the local office will forward the request to Headquarters along with its evaluation and recommendations.

Next month we will discuss some of the course elements the Coast Guard evaluates in the course approval process. ‡

☆U.S. GPO: 1983-421-449/801