Proceedings

of the Marine Safety Council

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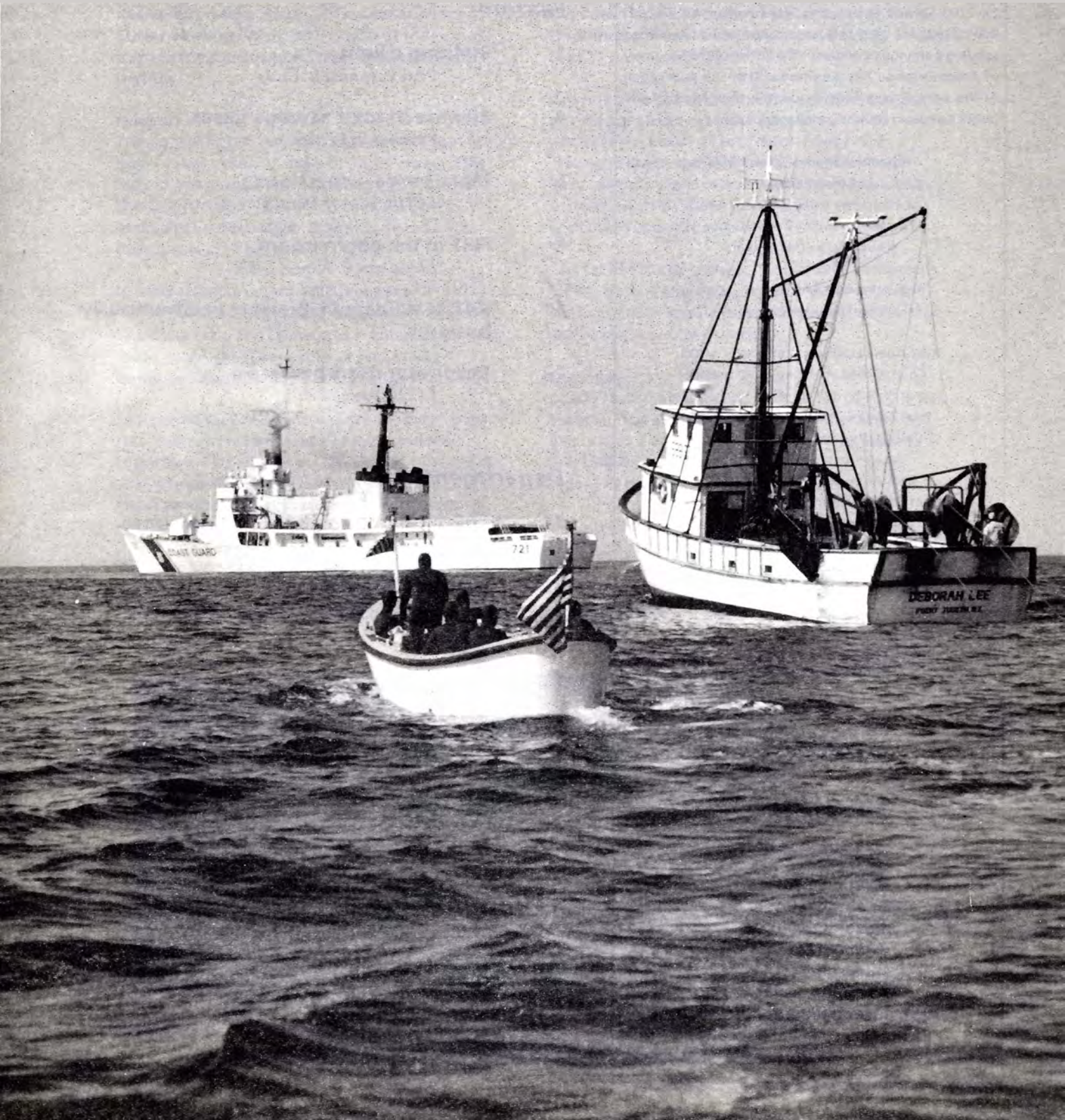

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Proceedings
of the Marine Safety Council

March, April, 1990 — *Vol. 47, No. 2*
May, June, 1990 — *Vol. 47, No.3*

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Features

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Cover

A boarding team from the USCGC GALLATIN approaches the fishing vessel Deborah Lee from Point Judith, Rhode Island. (U.S. Coast Guard photo)

Introducing a new editor:

Betty A. Murphy, the former editor of *deckplate*, a technical magazine published by the Naval Sea Systems Comand, U.S. Navy, is the new editor of *Proceedings Magazine*.

Building a light

PA3 Veronica L. Cady

It's not a big ship nor a fast ship. And it's not flashy, but it sure is busy. The Coast Guard Cutter *Hudson* (WLIC 801) is one of the busiest ships in the black-hulled fleet in the Seventh District.

Hudson

The construction tender *Hudson* is 160 feet long and 14 years old. Its crew of 15 services 1,490 aids to navigation from Melbourne, Florida to the Dry Tortugas islands, to the St. Lucie River and Lake Okeechobee. The aids include 906 dayboards, 547 lights and 37 buoys.

In 1989, *Hudson* spent 186 days away from its home port of Coast Guard Base Miami Beach. The crew rebuilt 85 navigation aids, completed more than 180 other projects and made numerous routine dayboard changes.

Captained by CWO4 Joe Kalista for more than two years, the crew works like clockwork together. They have to. The ship's crane has a safe working load of 18,000 pounds -- enough to crush several men if something swings the wrong way.

The inherent danger of buoy deck work is obvious. Each man must look out for the next. "You come and watch us," notes *Hudson*. Executive Officer BMC Bob Sennholtz. "If these guys didn't care enough to watch out for their shipmates, it would be easy for somebody to get hurt."

Anyone who sets foot on Sennholtz's buoy deck during construction must have on a life preserver, a hard hat and steel-toed boots. Taking pride in the fact that there has never been an injury on his buoy deck, the executive officer sees that these Coast Guard regulations are followed faithfully.

"As far as I'm concerned," Sennholtz comments, "if we go out and do a job, and make it back with all the fingers and toes we went out with, we've had a successful trip."

Sand Key

Lately *Hudson* has been seeing a lot of Key West, Florida. The ship went there initially on December 3 and stayed for about two weeks. Starting on January 2, it spent another two weeks in the area. Why?

Because of a lighthouse -- the Sand Key Light, which is located about six miles southwest of Key West.

Continued on page 2

USCGC Hudson (WLIC 801)
(Photo by PA3 Veronica Cady)

Continued from page 1
On November 12, 1989, a fire destroyed most of the 136-year-old lighthouse, damaging the upper level to the extent that the beacon could not be replaced in its proper location. A temporary beacon was placed on the lower level, to remain until the entire structure could be rebuilt with a brand new light.

Objection
In early December, after plans were completed to build the new structure in an area just south of the old light, a Key West environmental group objected to the location. The group, Reef Relief, expressed concern that it would destroy live coral at Sand Key, a popular recreational diving spot.

In a letter to the Seventh Coast Guard District Office of Aids to Navigation in Miami, Reef Relief Executive Director Craig Quirolo strongly recommended that "no living coral be destroyed by placement of additional structures on the surrounding coral reef habitat at Sand Key Light."

With the assistance of Florida's natural resource and environmental regulation departments, an alternative site for the new lighthouse was chosen. It was to be constructed in 15 feet of water in an area of dead coral and sand about 200 yards east of the old light.

Over a two-week period, when the second site was being selected, *Hudson* stood by patiently at Group Key West, servicing some aids that needed attention. The ship returned to Miami in time for the crew to enjoy the Christmas holidays with their families.

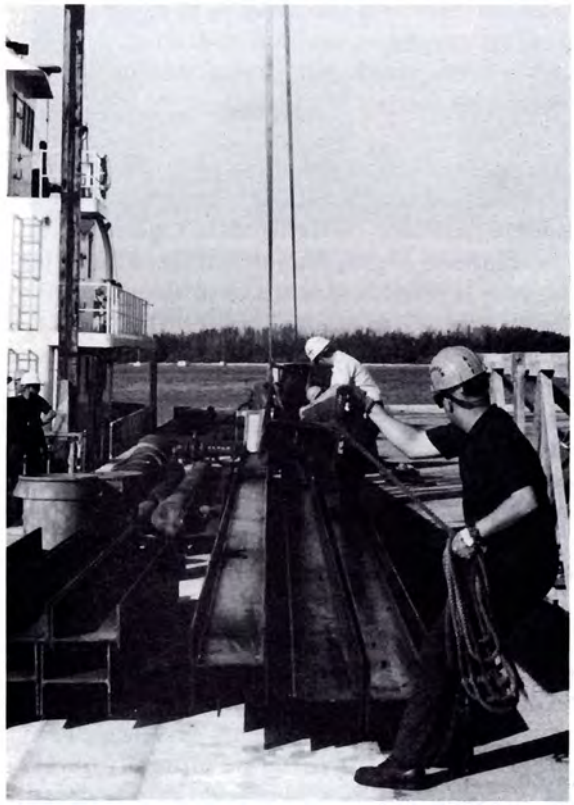
Bad weather
On the day after New Year's, *Hudson* set sail again for Key West to construct the new lighthouse. This time the weather objected.

The winds had to be from the north or northwest and the seas calm for *Hudson* to be stable enough to start building. When the ship rrived at the site, the winds were from the southeast and the waves were too high.

The spuds, 35- to 45-foot steel legs used to support the ship during construction, swayed back and forth with the waves, causing *Hudson* to spring back and forth. Reluctantly, the crew ulled up the spuds and headed back to the pier.

The workers listened to weather forecasts over a weekend, hoping for good news. But, as Monday rolled around, conditions were still unfavorable.By Tuesday, the wind had shifted, although the waves were still larger than the crew would have liked. Hoping to get some work done before another front moved in, they set sail again for Sand Key.

Sand Key Light shown with Hudson in the background. (Photo by PA3 Veronica Cady)



Hudson crewmembers transfer building materials to a Key West pier for storage until construction of the light begins.
(Photo by FN Roger Conley)

More bad luck

Their bad luck continued. Upon driving the first pile, they discovered that the bottom was like marshmallows. There was nothing to support the piles. Back to Key West, *Hudson* went to report the latest in what seemed a never-ending stream of problems.

By this time, the crew was getting restless. They were used to getting jobs done and moving on. This project had been dragging on for more than a month.

On January 12, the *Hudson* set sail for the site again, this time with a representative from the Florida Department of Natural Resources on board. They determined that they could build on the spot using longer pilings, which would reach a solid base.

So back to the pier went the *Hudson,* and the crew spent a weekend lengthening the pilings.

During the following week, the weather showed no signs of relenting. The crew caught up on paperwork, ordered supplies and equipment, and conducted training sessions to fill the time.

Another delay

Faced with the unhappy prospect of waiting all winter for a calm day, the crew of *Hudson* decided to call it a day. They requested permisssion from their division chief to delay the construction of Sand Key Light until mid-summer.

On January 20, *Hudson* again departed Key West for Miami to pick up its normal routine, making up for lost time on the unfortunate lighthouse project.

Sand Key Light will have to take a back seat to other concerns for awhile. But when the call comes, *Hudson* and crew will be ready to build.

Public Affiars Specialist Third Class Veronica L. Cady is assigned to the Seventh Coast Guard District Public Affairs Office in Miami, Florida.

Beware of toxic sewage gases

Thomas J. Pettin

It was an early evening in November 1986, when Coast Guard medical and safety personnel were notified of an accident in southern Florida with numerous fatalities. The accident, which occurred on board a passenger vessel, involved toxic sewage gases.

While the vessel was in dry dock, crewmembers did maintenance chores on its sewage system. When they removed a valve and clogged pipe, sewage spilled on deck, releasing hydrogen sulfide and methane gases.

When the workers staggered through the accumulating muck to escape, they probably stirred up more deadly hydrogen sulfide. (When decaying organic matter is agitated, hydrogen sulfide is released in very high concentrations.)

Four crewmembers were found lying in three inches of sewage. They had died from asphyxiation.

What happened

The sewage treatment system aboard the vessel consisted of four aeration units, which are supposed to digest the organic waste material with aerobic bacteria, which is kept alive by oxygen.

When at sea, manually-operated pumps discharge the contents of the units overboard. However, when the accident occurred, the units were being used simply as holding tanks.

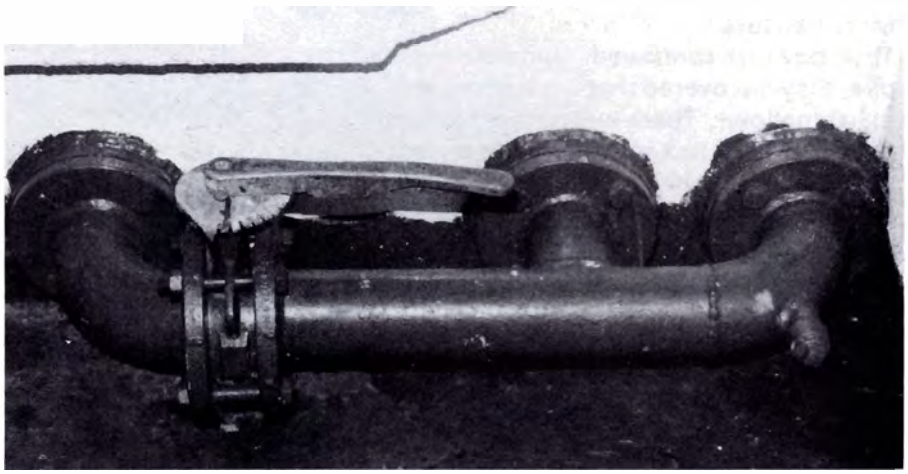
The air induction system, which mixes and breaks up incoming raw sewage to allow sufficient oxygen in, was not operating. Consequently, solids containing decomposing fecal matter settled to the bottom.

Without any oxygen, the digestive bacteria disappeared and the organic matter started to ferment. The tank contents rotted, generating toxic methane and hydrogen sulfide. The latter is heavier then air and tends to settle at the lowest level of a confining space.

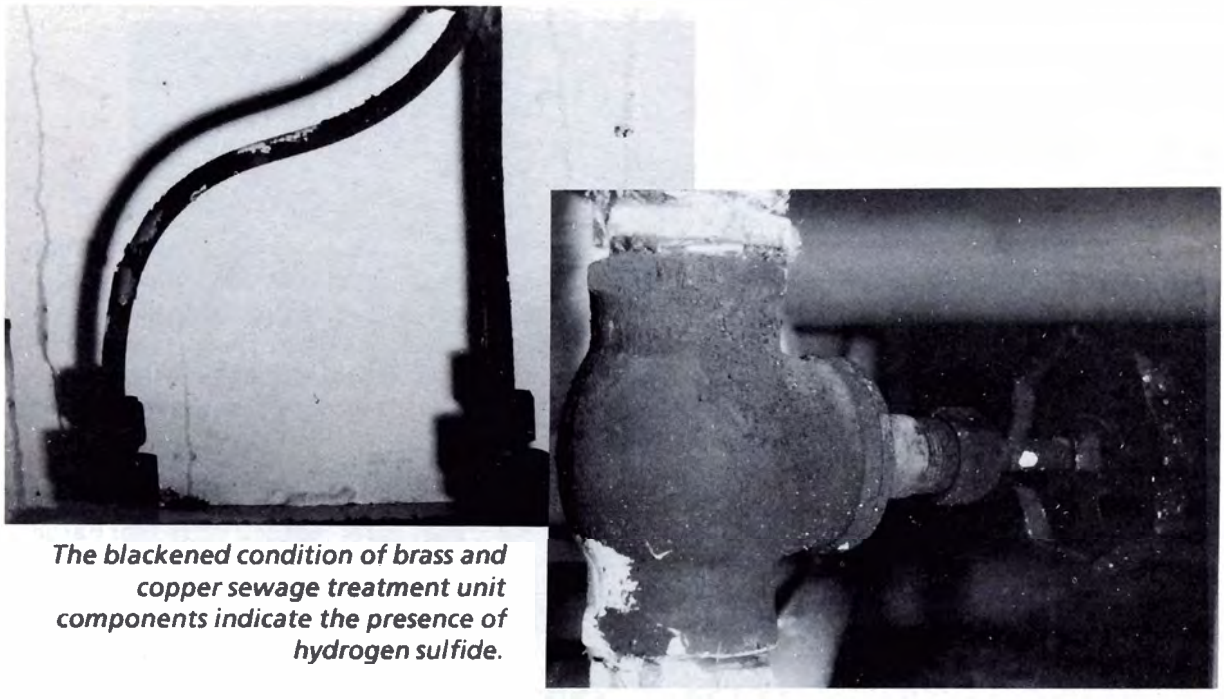
In this case, the valve and piece of pipe on which the crewmembers were working were on the lowest level of the space. When these two items were removed, the waste matter was discharged, releasing the deadly gases.

The gases

Hydrogen sulfide is a colorless poisonous gas characterized by the offensive odor of rotten eggs. Heavier than air, this gas is flammable to the point of being explosive at relatively low concentrations. It is an irritant, which causes asphyxiation by paralyzing the olfactory nerves. In high concentrations, hydrogen sulfide causes death by paralyzing the central nervous system.



The valve and pipe section that were removed to clear a clog in the line.



The blackened condition of brass and copper sewage treatment unit components indicate the presence of hydrogen sulfide.

Methane is colorless, flammable and has no odor. Lighter than air, methane forms explosive mixtures with air in certain proportions. If inhailed, it causes dizziness, difficulty in breathing and loss of consciousness. In high concentrations, methane can cause death by asphyxiation.

Probable cause

The proximate cause of this casualty was the lack of knowledge on the part of the vessel's owner/operating company and crew concerning the lethal gases generated by decomposing organic matter in the sewage treatment units. Furthermore, the crew did not recognize the telltale oder of rotten eggs nor the blackened brass and copper fittings which indicate the presence of hydrogen sulfide.

According to the vessel's first engineer, it was not uncommon for the crew to perform maintenance and repairs on the plumbing and sewage systems. These tasks routinely require the piping systems and/or tanks to be opened to clear them of any blockages. The engineer admitted that he was not aware of the danger of toxic gases building up in these systems until the accident.

Precautions

it is vital to be sure that crewmembers responsible for onboard sewage-treatment systems are aware of the potential hazards involved. They must be impressed with the fact that incidents of asphyxiation and toxic vapor casualties are common and predictable.

This terrible accident could have been avoided had certain precautions been taken. The crew had had problems pumping the sewage before the vessel entered the shipyard. The engineers suspected that the desludging piping was clogged.

If the crew had been aware of the potential danger, they would have used portable blowers to clear the air and kept a watch outside the space. A breathing aparatus would have been within easy reach. and, in all likelihood, would have averted this tragedy.

Whenever work is to be done in a space where there might be poor air quality, PRECAUTIONS MUST BE FOLLOWED. BE AWARE OF POTENTIAL HAZARDS AND DANGERS, AND NEVER ENTER A QUESTIONABLE AREA WITHOUT A BREATHING APARATUS.

Mr. Pettin is a program analyst in the Coast Guard's Marine Investigation Division, Marine Safety Evaluation Branch.

More barge inspections

LCDR Marvin Pontiff

The Coast Guard recently advised its field inspection units to review the structural soundness of all tank barges operating on "other than still water routes" in their zones.

Of particular concern are inland barges, 20 years of age or older, carrying petroleum products and operating on waterways such as sounds, exposed locations in the Intracoastal Waterway or on the Great Lakes between rivers.

Special scrutiny will be given to transversely-framed, single-skinned barges with lapped joint hull construction, which do not have formal engineering or maintenance staffs. (Transversely-framed barges have main strength members running from side to side instead of fore and aft, and generaly are not built to withstand the stresses of exposed waters.)

Current inspections
The Coast Guard routinely inspects all tank barges that carry combustible or flammable liquid cargo in bulk. Such vessels normally are inspected internally and drydocked at least every three years. They undergo operational inspections annually.

Fatigue failure
Older barges are susceptible to fatigue failure, which is characterized by groups of small cracks, aggravated by corrosion. Mid-plate cracks originating from corrosion pits or detail notches may be fatigue cracks. Inspectors have been advised to be extremely careful in evaluating such cracks.

Cause of failure
Improper loading is a major cause of structural failure. Barges which are more than 300 feet long are required to have loading manuals. Those under 300 feet should be loaded according to good marine practice, which includes balancing loads between individual tanks to prevent extreme stresses to the hull girder.

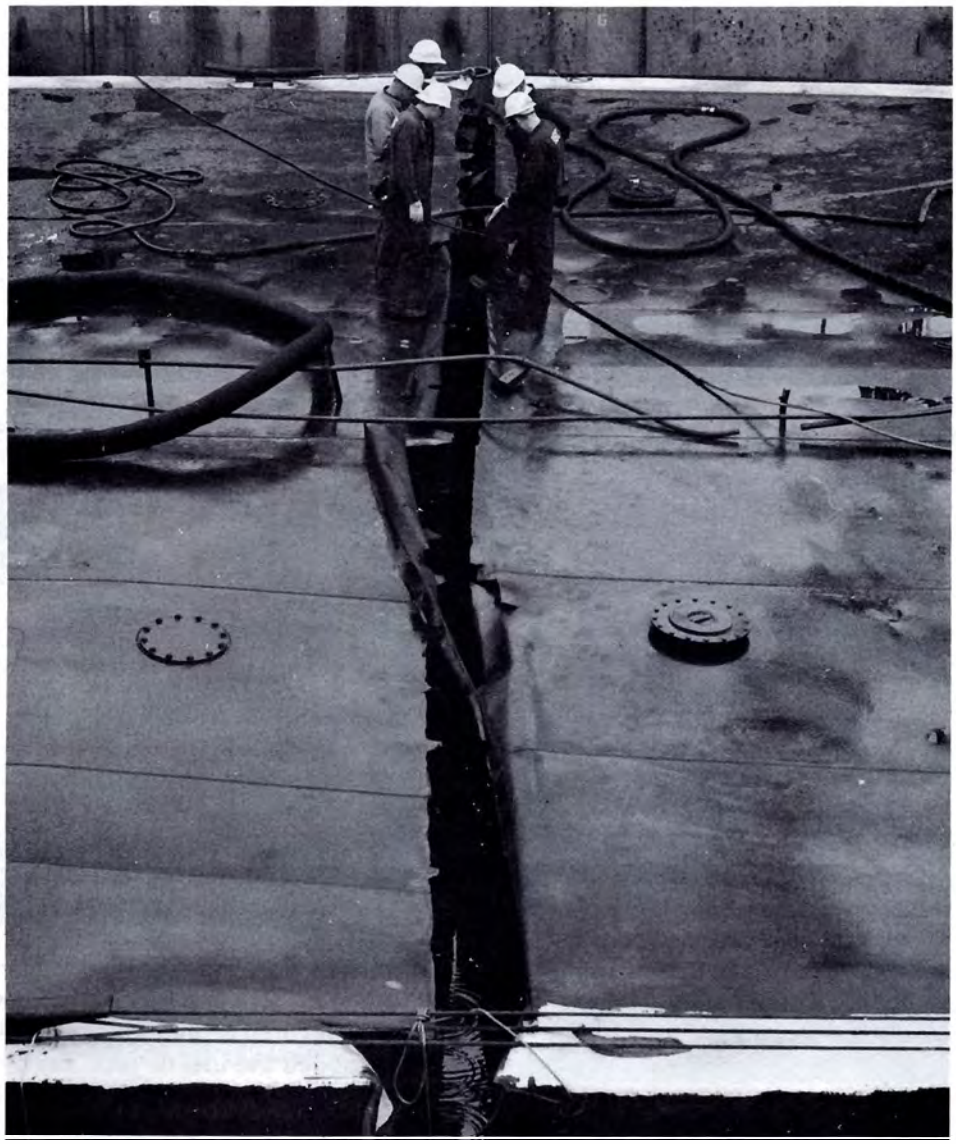
All tankermen should be aware of the proper loading procedures for their particular barges.

Recommendations
The Towing Safety Advisory Committee (TSAC), an industry group formally designated to advise the Coast Guard on barge inspection and operation matters, completed a study of structural problems common to older, inland tank barges in March 1990. **The group recommended that construction and inspection standards be upgraded for all tank barges.**

Although the committee found no evidence that construction standards were inadequate for existing vessels operating on river and intercoastal routes, it concluded that they may not be strong enough for those on ocean routes inside the boundary lines. **The committee recommended that vessels operating on ocean routes inside boundary lines be reviewed on a case-by-case basis.**

TSAC recommended that both the Coast Guard and vessel operators more closely examine the condition of older tank barges at scheduled inspections.

The group recognized that many factors contribute to the decision to keep a vessel in service, including its operational history, hull condition,



Inspectors survey damage to the deck of a tank barge which resulted from structural damage.

cargo and maintenance. **It is recommended that a structural analysis be conducted by the American Bureau of Shipping (or equivalent organization) if mid-section fatigue cracks are detected.**

The committe did not specifically recommend that future inland tank barges be restricted to double-hull or double-side construction. It will study the issue and make another report in July, 1990.

The TSAC chairman is Mr. Joseph H. Pyne, President , Dixie Carriers, Inc., P.O. Box 1537, Houston, Texas 77251. **(Telephone (713) 622-5502.**

LCDR Marvin Pontiff is assigned to the Merchant Vessel Inspection and Documentation Division.

FIRE
in the engineroom

LT. James P. Kemp, USN

A Class Bravo fire in a main machinery space aboard a large Navy Ship killed six sailors. Repairs cost $3.3 million.

The fuel-oil leak that caused this fire resulted from improper maintenance on a butterfly valve on the fuel-oil transfer system. Several other factors increased the seriousness of this mishap and hindered the efforts of firefighters.

Before the fire

The ship was headed home after a five-month deployment. An oil king (crewmember responsible for oil stowage and transfer) was transferring fuel to correct a minor list when he tried to operate a butterfly valve located in the fireroom in the fuel-oil transfer system. The operator gearbox on top of the valve cracked, and a portion of the gearbox casing and valve handwheel broke off.

The oil king removed the gearbox and sent it to the machinery repair shop. He did not tag out the valve or place it in an out-of-commission status. He simply took out the bolts that held the gearbox in place and left the valve stem exposed.

That same afternoon, as the ship prepared to go alongside an oil tanker to refuel, the oil king remembered the butterfly valve was missing its operator gearbox. He submitted a check-off sheet and a diagram that showed a valve alignment which deviated from the normal refueling lineup.

The diagrams, however, did not show the one-valve protection to the disassembled butterflyvalve. No one told the commanding officer about the condition of the butterfly valve, nor was he aware of the deviation from the normal refueling valve alignment.

As the ship began to refuel, various valves in the system were successfully checked for leaks at 40 psi. The sending ship raised the pressure to 60 psi. As the oil king topped off one fuel tank, he mometarily shut one valve prior to opening another. This caused fuel pressure to jump to 70 psi, which blew the butterfly valve stem from its seat and allowed a high-pressure geyser of fuel to shoot into the overhead of the fireroom and ricochet onto the back and top of No. 3 boiler.

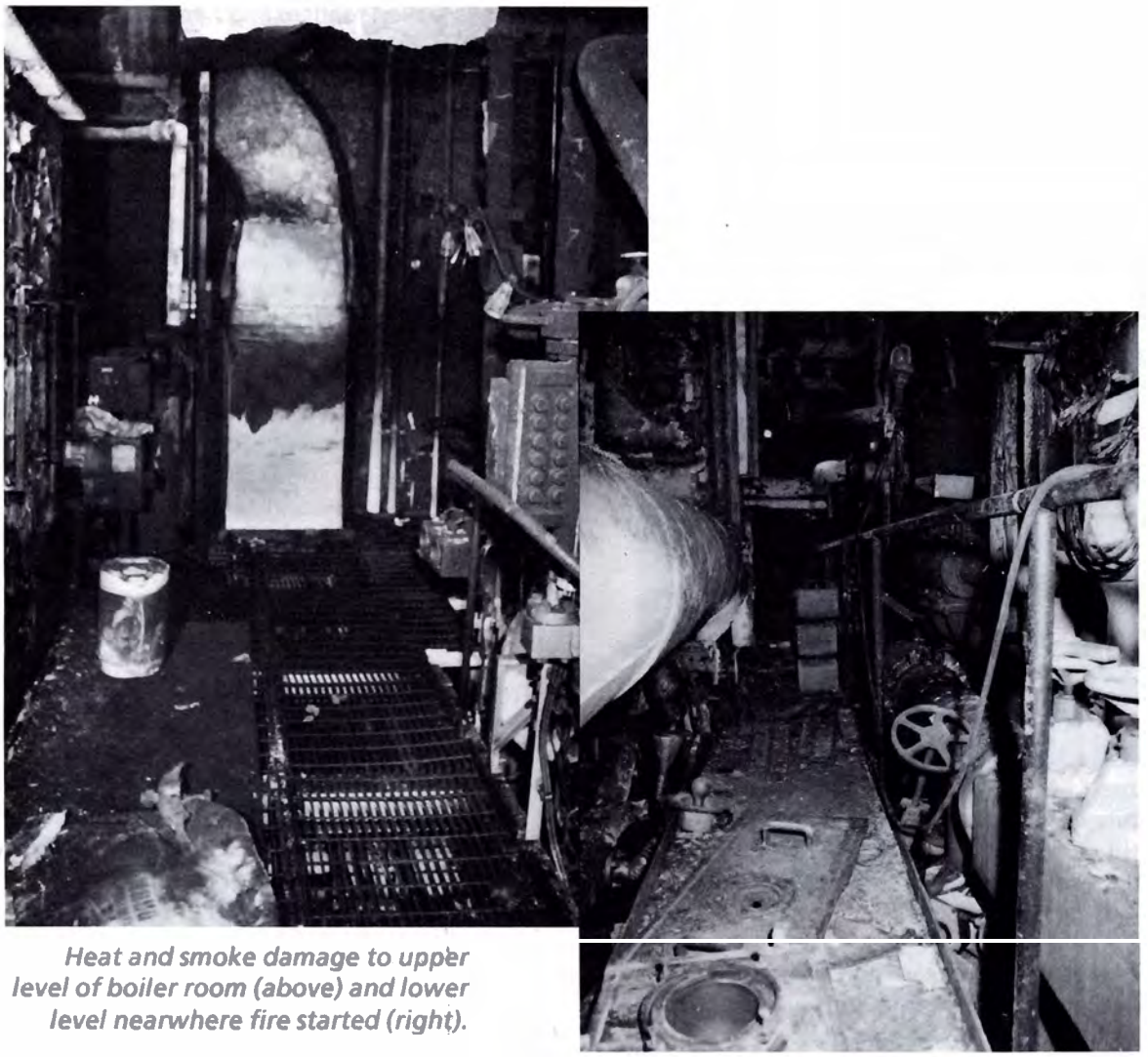
FIRE

As fuel hit the back of the boiler and hot steam lines, an explosion and a violent fire ripped through the overhead of the fireroom. Crew members described the flames as a "giant flame thrower shooting through space."

The machinery room filled with smoke and heat so intense the executive officer on watch ordered fires in the boilers secured, the throttle closed and the space evacuated. The watch team executed these orders and immediately began to evacuate the space. (The ship was not equipped with a halon or bilge sprinkler system.)

No attempts were made to control the fire because of the size and intensity of the flames. The ship executed an emergency breakaway, which stopped the fuel oil leak. Six crew members died from heat and smoke before they could evacuate the space. None were wearing emergency escape breathing devices (EEBDs).

The removal of this cracked gearbox assembly caused the fuel leak that started the fire.



Heat and smoke damage to upper level of boiler room (above) and lower level nearwhere fire started (right).

The fire, smoke and heat spread rapidly because the engineers routinely propped open one of the large hatches leading to the engineroom. This practice provided a ready supply of oxygen to the intense flames and heat. It also caused a chimney effect. Not only did the open hatch allow the fire to spread rapidly, but also made it impossible to secure the hatch and contain the fire.

Firefighting teams were stymied when the ship lost firemain pressure immediately after the fire broke out. It took them one hour to restore pressure. Loss of power to the two electric fire pumps on the line when the plant was secured caused the loss of pressure to the firemain. This problem was compounded by a controller failure on another fire pump being fed from the emergency switchboard during the transition to emergency power.

All attempts to use self-powered portable pumps were unsuccessful. Five different pumps were tried. Those that did start would not develop sufficient suction to draw sea water 30 feet from the waterline to the main deck.

Continued on page 10.

Intense heat damage to the main escape route from the boilerroom.

Continued from page 9

Factors

Interviews with crew members and a review of the ship's engineering training records revealed a lack of training in key areas of engineering casualty control.

Main-space fire training rarely varied. Scenarios always called for watch standers to evaculate thrugh one exit.

Crewmen did not know where EEBDs were and could not don them quickly.

Officers and CPOs were rarely involved in training.
No one monitored training.

Unqualified assistant oil kings were standing oil-king watches.

There were deficiencies in watch stander qualifications.

Senior crew members had a lackadaisical attitude towards training. They were rarely involved in drills and lectures.

Drills lacked realism and hands-on training with emergency equipment.

Emergency egress procedures were inadequate.

Moreover. . .
To prevent this mishap, the crew should have used the two-valve protection, proper tagout procedures and notified the commanding officer about the broken valve. The incomplete repair work on the butterfly valve caused the fire.

The practice of propping open a hatch aggravated the situation, and seriously reduced the crew's ability to control the damage.

Recommendations

Review your engineering casualty control and damage control programs.

EEBD training cannot be overemphasized. Personnel must be able to locate and don EEBDs automatically and quicly while on the move.

Procedures that are in any way different from the norm or established regulations should be vigorously challenged.

No matter how much trust you place in an individual to inform you of problems, never take anything for granted.

This article originally appeared in Fathom and is reprinted with the permission of the Naval Safety Center. The author, LT. James P. Kemp is Head, Engineering Systems Branch, Surface Ship Safety Programs Directorate, Naval Safety Center, Norfolk, Virginia. The phogographs were taken by PH2 Ellenwood.

RADM William M. Benkert posthumously honored

The late Rear Admiral William M. Benkert, USCG-Ret., was posthumously awarded the RADM Halert C. Shepheard Award for Achievement in Merchant Marine Safety. This award is given annually for a single outstanding contribution to merchant marine safety or for continued participation in activities advancing maritime safety over a period of time.

A 38-year veteran of the Coast Guard, RADM Benkert served as chief of the Office of Marine Environment and Systems from 1971 to 1974. In this position, he was responsible for port safety, law enforcement, aids to navigation, environmental protection and many other functions dealing with the federal regulation of ports and waterways systems. This required extensive international work, particularly with the International Maritime Organization (IMO) headquartered in London. In this connection, RADM Benkert was a leader of the 1973 International Conference on Marine Pollutionwhich adopted a treaty extending efforts to ontrol all forms of pollution from ships.

In 1974, RADM Benkert became chief of the Office of Merchant Marine Safety, a position that gave him extensive regulatory authority over commercial vessels of all types, including all American ships, and foreign ships in American ports. He played a leading role in developing international rules and standards on safety and pollution prevention pertaining to cargo and passenger ships, fishing vessels and seafarers.

RADM Benkert, who died on December 14, 1989, retired from the Coast Guard in 1978, following a period of service which began in 1940, when he entered the Coast Guard Academy. ,

During his illustrious career, RADM Benkert received numerous awards including the Distinguished Service Medal, the Legion ofMerit and the Vice Admiral Land Medal bestowed by the Society of Naval Architects and Marine Engineers for outstanding accomplishment in the marine field.

RADM William M. Benkert

The Shepheard Award

The Shepheard Award was established in 1975 by the American Institute of Merchant Shipping in honor of the late RADM Halert C. Shepheard, who served in the Coast Guard as Chief of the Office of Marine Safety.

The award is administered by the American Bureau of Shipping, the international ship classification society, which headquartered in Paramus, New Jersey.

Respirator users beware

LCDR Joe Ocken

In 1988, the National Institute for Occupational Safety and Health (NIOSH) was informed of the death of a fire fighter wearing a self-contained breathing apparatus (SCBA) during a training exercise. The following year, a second fire fighter was injured while wearing an SCBA. NIOSH found potential problems with the certified SCBAs.

Causes
In both cases, the SCBA breathing tubes apparently separated from the respirator face pieces. The tubes and face pieces were held together by metal retaining clamps.

In the first case, NIOSH found that the clamp was bent and worn. It failed at a critical moment. In the second case, the original clamp may have been replaced with a jury-rig part (perhaps after the original part broke from fatigue). The jury-rig was not well suited to the job and failed in use.

To alert the public to these potential hazards, NIOSH issued a "Respirator User's Notice" in 1989. Although this notice deals specifically with metal clamps on SCBAs, it also points out important facts which apply to all respirator use.

Cleaning
Good respirator protection measures include thorough cleaning and sanitizing on a regular basis. Adequate cleaning will require some disassembly of the respirator. This should be done using the manufacturer's recommended procedures and tools to avoid premature wear or parts' damage.

Maintenance
Maintenance and repair go along with thorough cleaning, because the process provides an excellent opportunity to inspect each part of the respirator carefully.

The first case demonstrates the importance of following disassembly and cleaning by careful reassembly and inspection. Even though repeated dismantling could shorten the life of such a clamp, a good inspection during reassembly should have resulted in the replacement of the worn clamp -- and the saving of a life.

Spare parts
To make adequate repairs, the appropriate spare parts need to be available. Two serious problems can occur if they are not.

Instead of life-saving tools, respirators can be dangerous instruments if their faulty parts are not replaced with those designated by the manufacturer. Improvised or Jury-rig clamps or other parts can cause serious accidents, even death.

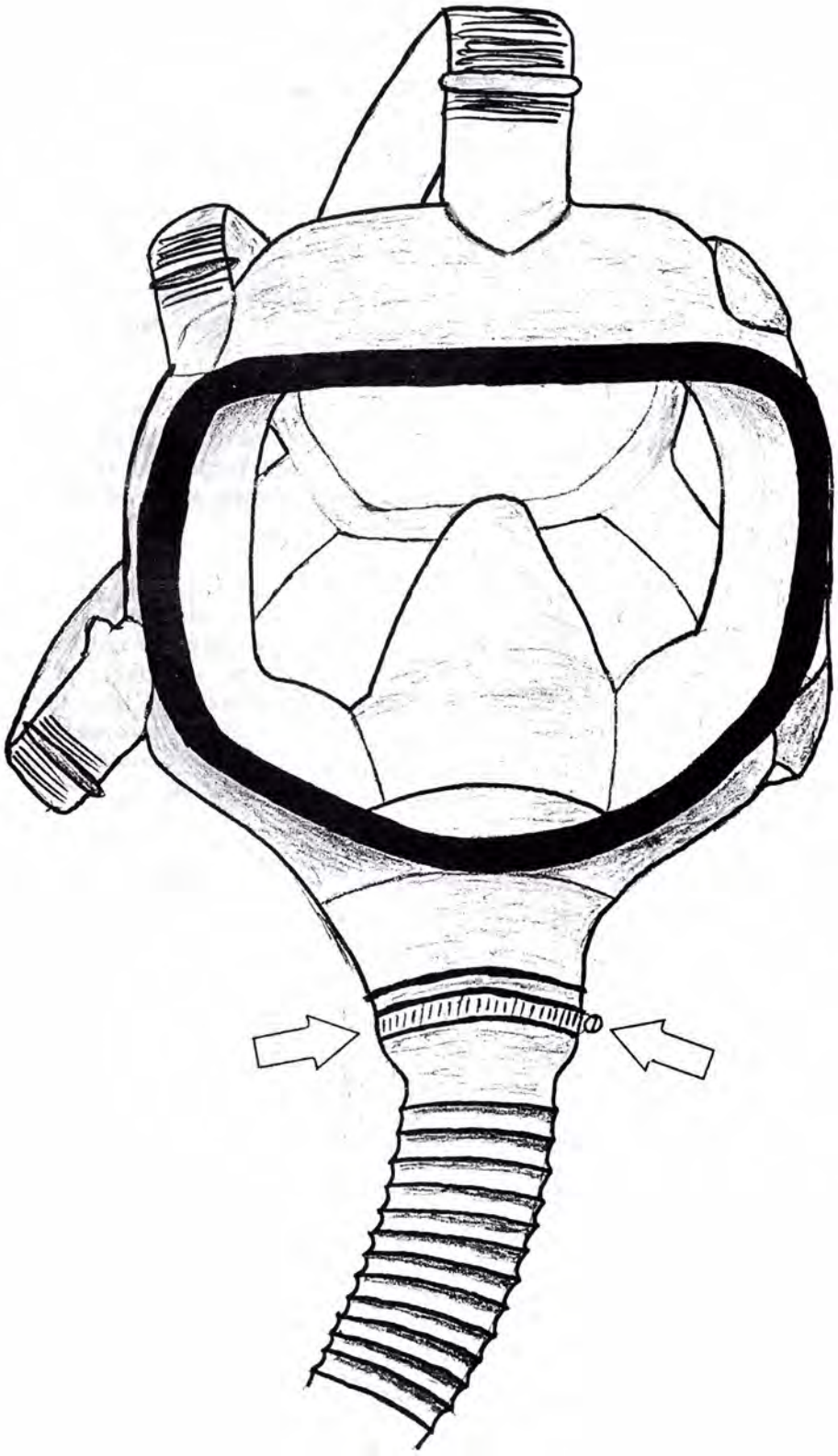
The second potential problem occurs when damaged respirators are not repaired immediately, but simply set aside. It is too easy for them to be mistakenly picked up and used.

Report failures
Any failures of clamps and other respirator parts should be reported to NIOSH as soon as possible. Send information to:

Division of Safety Research
Centers for Disease Control
National Institute for Occupational
Safety & Health--ALOSH
944 Chestnut Ridge Road
Morgantown, West Virginia
26505-2888

Coast Guard personnel should also report such incidents to Commendant (G-KSE).

LCDR Joe Ocken (G-MTH-1) is an industrial hygienist with the Marine Technical and Hazardous Materials Division.



Facepiece and inlet hose connection

Chemical of the Month

Todd Coggeshall

Turpentine

Shipped in tanks or galvanized drums, turpentine is primarily used as a paint and varnish solvent, and in the production of synthetic pine oil, resins, insecticies, oil additives, terpenes, esters, ethers and artificial flavoring.

In the past, the chemical was used in medicinal plasters to cure pleurisy and bronchitis, and to treat sprains. It was also used in veterinary medicine as a counter-irritant for worms.

Classified as an oleoresin,turpentine is a colorless liquid with a low viscosity and usually a distinctly pungent odor, although there is odorless turpentine.

It is distilled from the sap of coniferous trees and gum turpentine, a product of living trees. It is also recovered in a sulfate process by cooking wood pulp. A mixture of Pinene A and B, the chemical is classified as an olefin for cargo compatability.

Unreactive with water and most common chemicals, turpentine is a very stable compound. It is soluble in alcohol, chloroform and ether, and when exposed to air, it gradually hardens.

Health risks
Harmful if swallowed or inhaled, turpentine causes headaches, confusion, respiratory distress and skin irritation. If the liquid is ingensted, it may damage the kidneys and irritate the entire digestive tract. If it is inhaled, it may cause severe pneumonitis.

It turpentine is swallowed, induce vomiting and call a doctor. If it is inhaled, immediately administer oxygen or artificial respiration as needed, then call a doctor. If eyes are contaminated, flush them out for at least 15 minutes. It turpentine comes in contact with the skin, wipe is off, and wash thoroughly with soap and water.

When handling turpentine spills or leaks, one should use a respirator (either an organic canister or air-supplied mask). Goggles or a face shield should be worn, along with rubber gloves.

Spills
In high concentrations, turpentine is extremely dangerous to aquatic life. If a spill occurs, try to contain the discharge as much as possible, avoiding contact with the liquid or vapor. Following this immediate response, call the fire department, and the appropriate health and pollution-control agencies.

Danger of fire
Turpentine is extremely flammable and can flash back along a vapor trail. The vapor may explode if it is in an enclosed area. Heavy black smoke accompanies a turpentine fire.

Turpentine fires should be fought with dry chemical or CO2. Water will probably be ineffective because turpentine floats on water. However, water should be used to cool drums not involved in the fire.

The danger of fire constrains the shipment of turpentine, which is regulated by the Coast Guard and the Environmental Protection Agency.

The chemical is classified as a flammable liquid (3.3) by the IMDG code. Therefore a flammable liquid label must be attached to all containers storing or transportating turpentine.

Turpentine

Chemical name: turpentine

Formula

$C_{10}H_{16}$

Synonyms

Spirits of turpentine

Physical properties

boiling point: Between 302 and 320°F,
(depending on the relative concentrations of Pinene A & B)
freezing point: -40°F
vapor pressure: .525 lbs per square inch at 55°F
1.237 lbs per square inch at 130 °F

Threshold limit values (TLV)

time-weighted average: 100 parts per million (ppm)
short-term exposure limit: 220 ppm for 30 minutes

Flammability limits in air

lower limit: 8% volume

Combustion properties

flashpoint: 95°F
autoignition temperature: 488°F

Densities

specific gravity at 15°C: .858 to .860

Identifiers

U.N. Number: 1299
CHRIS Code: TPT
Cargo Compatibility Group: Olefin

Todd Coggeshall was a Fourth-Class Cadet at the Coast Guard Academy when this article was written as a special project in chemistry for LT. Thomas Chuba.

Keynotes

Application request

CGD-90-018, National Offshore Safety Advisory Committee (April 5)

The Coast Guard is seeking applications to membership on the National Offshore Safety Advisory Committee (NOSAC). This committee advises the Secretary of Transportation on rulemaking matters related to the offshore mineral and energy industries. Five members will be appointed for terms commencing in January 1991.

To achieve the balance of membership required by the Federal Advisory Committee Act, the Coast Guard is especially interested in receiving applications from minorities and women. The committee will meet at least once a year in Washington, DC or another location selected by the Coast Guard.

Requests for applications should be received no later than 1 August 1990. To apply, write to Commandant (G-MP-2), room 2414, U.S. Coast Guard Headquarters, 2100 Second Street, S.W., Washington, D.C. 20593-0001.

For further information, contact Ms. Jo Pensivy, Executive Director, NOSAC, room 2414, Office of Marine Safety, Security and Environmental Protection, Planning Staff, (202) 267-1406.

Final Rule

CGD-87-016, Emergency Position Indicating Radio Beacons for Uninspected Fishing, Fish Processing and Fish Tending Vessels (April 19)

For a limited category of fishing vessels, the Coast Guard is suspending the compliance date of its final rule that requires Category 1 406 MHz emergency position indicating radio beacons (EPIRBs) to be carried on uninspected fishing, fish processing and fish tender vessels operating on the high seas.

This suspension is for those fishing vessels without galleys and berthing facilities. The Coast Guard is considering a less expensive alternative means of compliance for those vessels. This suspension will allow owners of these vessels to avoid the expense of purchasing Category I 406 MHz EPIRBs, at least until further Coast Guard consideration of the alternative is complete.

The effective date is April 19, 1990. For further information, contact LCDR Stanford W. Deno, Survival Systems Branch, (202) 267-1444.

Proposed Rule

CGD 87-016a, Emergency Position Indicating Radio Beacons for Uninspected Vessels. (April 19)

The Coast Guard is proposign to amend the uninspected vessel regulations by requiring emergency position indicating radio beacons (EPIRBs) to be carried on uninspected commercial vessels operating on the high seas and on the Great Lakes beyond three miles from the coatline.

The EPIRBs on Uninspected Vessels Requirements Act amended the shipping laws of the United States by requiring those vessels to have the number and type of EPIRBs prescribed by regulation. By implementing the law, the regulations will ensure rapid and effective search and rescue during emergency situations. Some other minor revisions to the regulations for uninspected vessels are proposed as well.

Comments must be submitted on or before June 18, 1990. Comments should be mailed to the Executive Secretary, Marine Safety Council (G-LRA-2/3600) (CGD 87-016a), U.S. Coast Guard, room 3600, 2100 Second St., S.W., Washington, D.C. 20593-0001. (202) 267-1477.

For further information, contact LCDR Stanford W. Deno, Survival Systems Branch, (202) 267-1444.

Proposed Rule

CGD 88-079, Commercial Fishing Industry Vessel Regulations (April 19)

The Coast Guard is proposing regulations for U.S. documented or state numbered uninspected fishing, fish processing and fish tender vessels to implement the provisions of the Commerical Fishing Industry Vessel Safety Act of 1988. These regulations would apply to all U.S. commercial fishing industry vessels, whether existing before, or built or altered after, the effective date of the regulations and would provide requirements for their equipment, design and operations.

Additional equipment would be required for documented vessels that operate beyond the Boundary Line or that operate with more than 16 individuals on board. Design and construction requirements would apply to vessels built after or which undergo a major conversion completed after the effective date of these rules, if those vessels operate with more than 16 individuals on board.

Additionally, casualty and injury reporting requirements are included that would apply to all underwriters of primary insurance for commercial fishing industry vessels, owners or commercial fishing industry vessels and all employees injured on such vessels.

These regulations are intended to improve the overall safety of commercial fishing industry vessels.

Comments on this notice must be received on or before August 20, 1990.

Comments should be mailed to Executive Secretary, Marine Safety Council (G-LRA-2/3600) (CGD 88-079), U.S. Coast Guard, 2100 Second Street, S.W., Washington, D.C. 20593-0001.

For further information, contact LCDR M.M. Rosecrans, Office of Marine Safety, Security and Environmental Protection (G-MTH-4/13), room 1304, (202) 267-2997.

Withdrawal of Notice Suspending Effective Date and Interim Final Rule

CGD 81-059a, Licensing of Officers and Operators for Mobile Offshore Drilling Units (April 18)

This rulemaking deals solely with the licensing of officers on mobile offshore drilling units (MODUs) and the manning of these vessels. The licensing structure implements National Transportation Safety Board (NTSB) recommendations for the establishment of personnel qualifications and manning regulations for this type of vessel. Compliance with these minimum standards will ensure that qualified individuals are on board to deal with marine safety-related matters.

Comments must be received on or before June 18, 1990. This regulation is effective on July 1, 1990, except for sections 15.301, 15.520 and 15.810, which will be effective on January 1, 1991. A notice suspending the Interim Rule's April 1, 1989 effective date published on February 28, 1989 (54 FR 8334) is withdrawn, effective July 1, 1990.

Comments should be submitted to the Executive Secretary, Marine Safety Council (G-LRA-2/3600) (CGD 81-059a), U.S. Coast Guard, 2100 Second Street, S.W., Washington, D.C. 20593-0001, (202) 267-1477.

For further information, contact LCDR Gerald D. Jenkins, Project Manager, Office of Marine Safety, Security and Environmental Protection (G-MVP), (202) 267-0224.

Final Rule

CGD 90-005, Offshore Oil Pollution Compensation Fund Barrel Fee Levy (April 24)

As mandated by recent legislative changes, the Coast Guard is resuming a $.03 fee on each barrel of oil produced on the Outer Continental Shelf. This action will permit the Internal Revenue Service to resume collections of the barrel fee from the owners of Outer Continental Shelf crude oil until the Offshore Oil Pollution Compensation Fund balance reaches its new statutory maintenance level of $200,000,000.The final rule is effective August 1, 1990.

For further information, contact Frank A. Martin, Jr., Offshore Oil Pollution Compensation Fund Manager, (202) 267-0535.

Final Rule

CGD 88-100a, Noxious Liquid Substances Lists (April 24)

The Coast Guard is adopting as a final rule, the interim rule on Noxious Liquid Substnaces (NLSs), which was published in the Federal Register on September 29, 1989 (54 FR 39999). This final rule also corrects errors found in the interim rule as published.

This rule is effective May 24, 1990.

For further information, contact Mr. Curtis G. Payne, Hazardous Materials Branch, (202) 267-1577.

Final Rule

CGD 88-100, Bulk Hazardous Materials (April 24)

The Coast Guard is adopting as a final rule, the interim rule on the carriage of bulk hazardous materials, which was published in the Federal Register on September 29, 1989 (54 FR 40005). This final rule also corrects errors found in the interim rule as published.

This rule is effective May 24, 1990.

For further information, contact Mr. Curtis G. Payne, Hazardous Materials Branch (202) 267-1577).

Final Rule

CGD 88-111, Great Lakes Pilotage (April 25)

The Coast Guard is amending the Great Lakes Pilotage Regulations. This rule: (1) Requires that an unqualified annual audit be submitted by each authorized pilot organization, performed in accordance with Generally Accepted Auditing Standards promulgated by the American Institute of Certified Public Accountants, (2) establishes general guidelines and procedures for ratemaking, (3) requires that the costs of all required support services directly related to the provision of pilotage be included in the rate base, (4) requires each pilotage pool to certify whether any support survice entity is related by beneficial ownership to a pilot, (5) clarifies the regulations to indicate that financial penalities can be applied to pilots as well as vessel operators who are in violation, (6) amends the steps that are to be followed when a pilot is not available within a reasonable period of time, and (7) amends the rate schedule by adding a charge to compensate a registered pilot for "dead heading" across Lake Erie when aboard a vessel whose master uses a "B Certificate" in lieu of the pilot.

These changes are necessary in order to increase the efficiency and effectiveness of the Great Lakes Pilotage System.The effective date is May 25, 1990.

For further information, contact Mr. John J. Hartke, Merchant Vessel Personnel Division (G-MVP/12), Room 1210, U.S. Coast Guard Headquarters, 2100 Second St., S.W., Washington, D.C. 20593-0001, (202) 267-0217.

Proposed Rule Withdrawal

(CGD 79-168, Lifesaving Equipment; Launching Equipment for Liferafts (May 1)

On February 13, 1986, the Coast Guard published in the Federal Register (51 FR 5377) a Notice of Proposed Rulemaking (NPRM) containing design and performance specifications that covered both launching devices and automatic disengaging devices for liferafts in accordance with the 1983 amendments to Chapter III of the 1974 Safety of Life at Sea Convention (SOLAS 74/83).

Now it is withdrawing this rulemaking (CGD 79-168), because, since the publication of the NPRM, the Subcommittee on Lifesaving, Search and Rescue of the International Maritime Organization (IMO) has prepared in draft new test procedures that cover such devices as part of a continuing project to revise IMO Assembly Resolution A.521(13) (Testing and Evaluation of Life-Saving Appliances). These procedures are based largely upon standards already applicable throughout Europe (where most of these devices are manufactured and sold), and differ substantially from those of the rules proposed in the NPRM.

Rather than impose rules that would soon come under extensive revision to harmonize them with the relevant standards of SOLAS 74/83, the Coast Guard will address these issues in a new rulemaking after the revision of Resolution A.521(13) is complete.

This withdrawal was effective May 1, 1990. For further information, contact Mr. Kurt J. Heinz, Survival Systems Branch, (202) 267-1444.

Interim Final Rule and Request for Comments

CGD 88-002A, Prevention of Pollution from Ships (May 2)

This action amends the Coast Guard's garbage pollution regulations by adding waste management plan and placard requirements for certain U.S. ships, including recreational vessels and fixed or floating platforms. These provisions are needed to ensure that persons on the ship are made aware of garbage pollution laws and penalties, and that garbage is discharged in accordance with a waste management plan based on those laws. This action should help reduce the number of unlawful garbage discharges and the resulting pollution.

This rule is effective on July 21, 1990. Comments on Section 151.59 (a)(2) and (b) must be received on or before June 18, 1990.

Comments may be mailed to the Executive Secretary, Marine Safety Council (G-LRA-2/3314) (CCG 88-002A), U.S. Coast Guard, 2100 Second St., S.W., Washington, D.C. 20593-0001, (202) 267-1477,

For further, information, contact LCDR Carl A. Crampton, Project Manager, Port Safety and Security Division (G-MPS), (202) 267-1477.

Notice of Meeting

CGD 90-027, National Offshore Safety Advisory Committee Meeting (May 1)

The National Offshore Safety Advisory Committe (NOSAC) Meeting will be held on August 1, 1990 in room 2230, DOT Headquarters (NASSIF Building).

For further information, Contact Ms. Jo Pensivy, Executive Director, NOSAC, room 2414, U.S. Coast Guard Headquarters, 2100 Second St., S.W., Washington, D.C. 20593-0001, (202) 267-1406.

Notice

Area To Be Avoided Off the Coast of Florida (May 9)

This notice advises the public of the April 22, 1990, proposal the Coast Guard submitted to the International Maritime Organization (IMO) to establish an area to be avoided off the Florida coast. The Coast Guard is seeking IMO adoption of an area to be avoided in an effort to prevent larger vessels from running aground and damaging the coral reefs.

The Coast Guard will implement the area to be avoided six months after IMO adoption.

For further information, contact Ms. Margie G. Hegy, Project Manager, Short Range Aids to Navigation Division, Office of Navigation Safety and Waterway Services (G-NSR-3), (202) 267-0415.

New Publications

Your Boat Belowdecks

In *Your Boat Belowdecks,* Thomas Reale and Michael draw upon their combined 35 years' experience in boatyards to produce a handy, single-volume, easy-to-read book for boat owners who are interested in doing their own maintenance and repairs, but are not interested in losing time and money at the boatyard.

This practical guide is written for the non-mechanic, beginning with a list of tools needed for each job and step-by step instructions on how to use them. These easy-to-follow steps are illustrated with line drawings, photographs, diagrams and tables.

Your Boat Belowdecks fills a gap in today's maintenance books by focusing exclusively on belowdecks systems, the "guts" of a boat -- and the most crucial and potentially costly to fix. In straightforward language, the authors explain how to maintain and repair engines, diesel fuel systems, batteries, filters, pumps, steering, stoves and heaters, and more. For each system, they explain how to provide the best preventive maintenance.

They describe simple troubleshooting steps that help boat owners repair breakdowns. Beginning with the symptoms, they explain how to identify possible causes, isolate the malfunction and replace or repair the faulty part. The authors carefully guide the reader throughout, cautioning against common mistakes and detailing the purpose of every bolt, wire and fuse.

Of great importance is the book's emphasis on safety, a vital ingredient for all boaters, whether underway or performing maintenance operations. However, three safety measures deserve additional emphasis.

It should be pointed out that all through hull fittings below the waterline should be made of non-ferous metal. Also, all flexible tubing and hoses whould be secured by double clamps, and fuel tank shut-off valves should be designed to be activated from outside the fuel tank space.

With the regular upkeep outlined in this guide, however, any boat owner can prevent problems from occurring, and be a "smarter shoppper" when and if the time comes for the boat to go to the boatyard.

Priced at $18,95, *Your Boat Belowdecks* was published on June 11,1990 by Hearst Marine, 105 Madison Avenue, New York City, New York 10016.

Service Guide '90

The Maritime Administration updated its Service Guide, listing United States flag liner companies serving ocean trade, the areas they serve and the types of service they provide. Copies of *Service Guide '90* are available from the Office of Market Development, Room 7207, 400-7th St., S.W., Washington, D.C. 20590, (202) 366-5508.

MARAD '89

The Maritime Administration released *MARAD '89,* its annual report to Congress for fiscal year 1989. Limited copies are available upon request from MARAD's Office of External Affiars, 400-7th St., S.W., Washington, D.C. 20590.

Shipbuilding and Repair Survey

The Maritime Administration issued its 1989 survey of U.S. shipbuilding and repair facilities. This survey is required by law primarily for use in determining whether an adequate mobilization base exists for national defense and national emergencies.

The *Report on Survey of U.S. Shipbuilding and Repair Facilities for 1989* may be obtained from MARAD'S Office of External Affairs, Rm. 7219, (202) 366-5807 or the Division of Ship Production, Rm. 2116, (202) 366-5841, Nassif Bldg., 400-7th St., S.W., Washington, D.C. 20590.

Shipboard Prototype

The three-volume technical report, ***Development of a Prototype for a Shipboard Contingency Planning System,*** is now available. This report was prepared by the American Bureau of Shipping (ABS) under the Maritime Administration's Marine Safety Technology Program.

The report describes ABS' development of a prototype computer system for shipboard contingency planning. The system allows the captain or mate to assess quickly the effects of a collision or other casualty, and to evaluate alternative/corrective actions by using a shipboard microcomputer.

The report may be obtained from the National Technical Information Service, 5285 Port Royal Rd., Springfield, Virginia 22161, (703) 487-4650.

The order numbers and prices are:

Vol. I -- Executive Summary and Shipboard User's Manual PB909-185885/AS $17.00

Vol II -- Software Description and Data Base Generation PB90-185893/AS $23.00

Vol IIII -- Source Code Listings PB0-185901/AS $39.00

The set -- PB90-185877/AS $67.50

Affiliations Guide

The Maritime Administration has released an updated edition of its ***Maritime Labor-Management Affiliations Guide.***

This publication lists active United States shipping companies, seafaring and longshore labor unions, trade associations and management-labor affiliations under current collective bargaining contracts in the American merchant marine. Included are the officers, addresses and telephone numbers of labor and industry organizations.

Limited copies of the 33-page directory are available from MARAD's Office of External Affairs (202) 366-5807 or the Office of Maritime Labor and Training (202) 366-5755, 400-7th St., S.W., Washington, D.C. 20590.

Shipper's Stowage Guide

A revised and updated ***Shipper's Guide for Proper Stowage of Intermodal Containers in Ocean Transport*** is now available from the National Cargo Bureau, Inc.

This booklet explains how to successfully carry cargo from door-to-door on rail, highway and ocean transport, using the same freight container.
Single copies are available at no charge, upon request. A modest charge applies for additional quantities from the National Cargo Bureau, Inc., 30 Vesey Street, New York City, New York 10007, Attention: Captain James J. McNamara, Vice President and Chief Surveyor.

Merchant Marine Fleet

As of January 1, 1990, the privately owned, deep-draft fleet of the U.S. Merchant Marine totaled 485 vessels with a carrying capacity of about 23 million deadweight tons, according to MARAD. This includes 407 oceangoing ships and 78 Great Lakes vessels.

Compared with January 1, 1989, the number of ships in this fleet decreased by 17 vessels and the carrying capacity decreased by 1,162,000 deadweight tons.

Data sheets with a complete profile of U.S. maritime activities are available from MARAD's Office of External Affairs, 400 7th St., S.W., Washington, D.C. 20590 (202) 366-5807.

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:

Engineer

1. What statement is true concerning a three-phase alternator?

A. It has three separate but identical armature windings acted on by one system of rotating magnets.
B. It has one armature winding acted on by three identical but separate systems of rotating magnets.
C. All three-phase alternators are designed to operate with a 0.8 leading power factor.
D. The three phases provide power to the load through three sets of slip rings and brushes.

Reference: Hubert, *Preventive Maintenance of E*

2. What can cause below normal air pressure in the intake manifold of a turbocharged diesel engine?

A. excessive piston blowby to the manifold
B. Insufficient cooling water flow
C. Accumulated water in the air boxes
D. Clogged air intake filters

Reference: Stinson, *Diesel Engineering Handbook*

3. What could cause frost on the suction line?

A. Shortage of refrigerant
B. Expansion valve stuck open
C. Liquid line service valve closed
D. Condenser water temperature too high

Reference: Nelson, *Commercial and Industrial Refrigeration*

4. Which statement describes how the main *lectrical Equipment*propulsion turbine overspeed relay closes the throttle valve?

A. Excessive centrifugal force causes a spring loaded weight to trip a valve latch.
B. Excessive centrifugal force causes spring loaded flyballs to actuate a control lever.
C. Excessive speed causes an oil pump to deliver sufficient pressure to open a spring loaded relay valve.
D. Excessive speed causes an increase in lube oil control temperature which actuates a solenoid oil dump valve.

Reference: U.S. Naval Institute, *Naval Turbines*

5. Which extinguisher cannot be easily recharged aboard ship?

A. soda acid
B. carbon dioxide
C. dry chemical, cartridge operated
D. foam

Reference: CG 329, *Firefighting Manual for Tank Vessels*

6. A diesel engine emits blue exhaust smoke because of_____.

A. cold intake air
B. excessive compression pressure
C. excessive cylinder lubrication
D. a light load

Reference: Maleev, *Diesel Engine Operation and Maintenance*

7. A pole turbogenerator is used in conjunction with a 160-pole propulsion motor. If the generator is turning at 3,200 RPM, what is the speed of the propeller?

A. 40 RPM
B. 60 RPM
C. 80 RPM
D. 100 RPM

Reference: NAVPERS 10086-B, *Basic Electricity*

8. What is one indication of too much refrigerant in the system?

A. safety valve lifting
B. prolonged running
C. short cycling
D. oil absorbed in the crankcase

Reference: Osbourne, *Modern Marine Engineer's Manual, Vol. I*

9. What should you do if you detect an abnormal vibration in the operating turbine?

A. Notify the chief engineer and stand by the throttles.
B. Immediately slow the turbine until vibration ceases.
C. Immediately stop the turbine.
D. Open the turbine drains until vibration ceases.

Reference: Osbourne, *Modern Marine Engineer's Manual, Vol.* I

10. Which of the following holds true for both CO_2 and Halon 1301 fixed extinguishing systems?

A. A cylinder is considered satisfactory if its weight is within 10% of the stamped full weight of the charge.
B. If a protected space is ventilated mechanically, the ventilation system must be automatically shut down by the release of the agent.
C. To avoid confusion during an emergency situation, there should be only one action necessary (such as a single pull box) to activate the system.
D. All of the above.

Reference: MARAD, *Marine Fire Prevention, Firefighting, and Fire Safety*

Deck

1. You have a tow of chemical barges. The mate reports an ammonia smell around the head of the tow. You would suspect a leak in the barge carrying _____.

A. methyl chloride
B. heptane
C. propanolamine
D. morpholine

Reference: CG 388, *Chemical Data Guide*

2. The best procedure for using flare distress signals when abandoning ship in a raft would be?

A. immediately after abandoning ship, use all the signals at once
B. use all the signals during the first night
C. employ a signal every hour after abandoning ship until they are gone
D. only use a signal when you are aware of a ship or plane in the area

Reference: Hayler, *American Merchant Seaman's Manual*

3. The terms "cant frame" and "counter" are associated with the vessel's _____.

A. cargo hatch
B. forecastle
C. steering engine
D. stern

Reference: Baker, *Introduction to Steel Shipbuilding*

4. The equation of time is 8m 40s and the apparent Sun is ahead of the mean Sun. If you are on the central meridian of your time zone, the apparent Sun will cross your meridian at _____.

A. 11-51-20 ZT
B. 12-00-00 ZT
C. 12-04-20 ZT
D. 12-08-40 ZT

Reference: Bowditch, *American Practical Navigator, Vol. II*

5. As a last resort, a tourniquet can be used to

A. hold a victim in a stretcher
B. stop uncontrolled bleeding
C. **hold a large bandage in place**
D. restrain a delirious victim

Reference: *Ship's Medical Chest; Medical Aid*

6. You are loading military explosives including WP chemical ammunition, mortar ammunition, and TH-filled incendiary ammunition. Which of the following statements is true?

A. The incendiary ammunition must be stowed on deck in block units not exceeding 500 pounds.
B. If the SWL of your cargo gear is 7.5 tons, the maximum weight per draft when using a pie plate in a cargo net is 3960 pounds for the WP chemical ammunition.
C. Additional CO_2 must be available for firefighting as water is relatively ineffective in fighting a fire involving WP chemical ammunition.
D. Each side and the top of palletized loads of mortar ammunition must have an orange and black label reading "Explosive A."

Reference: 46 CFR 146.29-99

7. Your DR position is LAT 33'N, LONG 120'W. The star that would have the greatest SHA if the GHA of Aries is 90' would be a star with a _____.

A. GHA of 70'
B. GHA of 110'
C. GHA of 130'
D. meridian angle of 80'E

Reference: Bowditch, *American Practical Navigator*

8. The result of two forces acting in opposite directions and along parallel lines is an example of what type of stress?

A. tensile
B. compression
C. shear
D. strain

Reference: Baker, *Modern Ships*

9. You are scheduled to load a bulk shipment of steel turnings. Which of the following is true?

A. The primary hazard of this cargo is that it is subject to spontaneous heating and ignition.
B. The shipping paper should describe this cargo as "Waste; steel borings."
C. After loading, you may not sail if the temperature in each hold of steel turnings exceeds 130'F.
D. This cargo may not be transported in bulk unless a special permit is issued by the Coast Guard.

Reference: 46 CFR 148.01-7

10. A thirty pound plate would be _____.

A. 5/8" thick
B. 1/1" thick
C. 3/4" thick
D. 1" thick

Reference: Baker, *Introduction to Steel Shipbuilding*

Answers

Engineer
1-A; 2-D; 3-B; 4-C; 5-B; 6-C; 7-C; 8-C; 9-B; 10-B

Deck
1-D; 2-D; 3-D; 4-A; 5-B; 6-B; 7-A; 8-C; 9-A; 10-C

If you have any questions concerning "Nautical Queries," please contact U.S. Coast Guard (G-MVP-5), 2100 Second St., SW, Washington, DC 20593-0001; telephone (202)267-2705.

The Merchant Marine Officer Licensing statistics published in the January-February 1990 issue of *Proceeedings of the Marine Safety Council* were for 1988, not 1987.