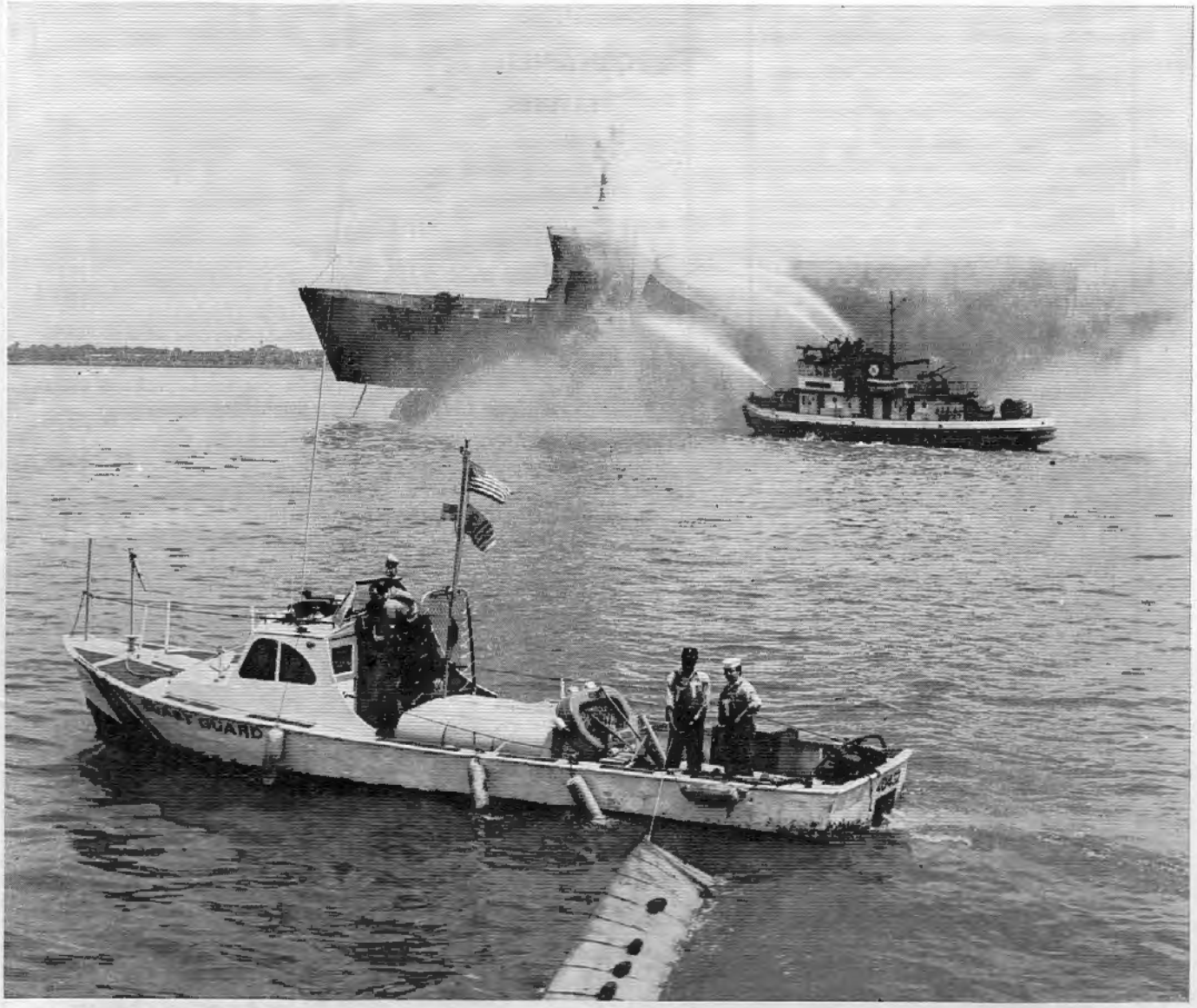
PROCEEDINGS
OF THE MARINE SAFETY COUNCIL



DEPARTMENT OF TRANSPORTATION UNITED STATES COAST GUARD

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PROCEEDINGS

OF THE MARINE SAFETY COUNCIL

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New York City Fire Department fire boats together with Coast Guard units worked into the early morning hours of June 2, 1973 to extinguish the blaze which left the *Sea Witch* and the *Esso Brussels* smoldering hulks. While outbound from New York harbor the *Sea Witch* suffered a loss of steering and collided with the tanker *Esso Brussels* as she lay at anchor. The spectacular fire which followed claimed the lives of 16 seamen and reduced the two vessels to piles of twisted steel.

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maritime sidelights

MIO ROTTERDAM

A Marine Inspection Office was established in Rotterdam, Netherlands on 1 August 1975. Coincident with this action the Merchant Marine Details in Bremen and Rotterdam will be disestablished.

This move will enable the Coast Guard to be more effective in providing its services to the United States merchant fleet. The increasing numbers of U.S.-flag vessels operating in the North Sea has necessitated this change. Many of these vessels operate only in this area, never returning to the United States where material inspections and surveys are normally carried out.

The Coast Guard is directly responsible for the administration and enforcement of a large part of the United States laws relating to navigation and shipping. In this regard, the Coast Guard inspects vessels from the drawing board to the scrapyard. To operate, most U.S.-flag vessels must have a valid Certificate of Inspection issued by the Coast Guard. Lifesaving, firefighting, and navigation equipment, as well as boilers and machinery are inspected and tested during construction and periodically during the life of the vessel. The vessel's personnel are required to obtain the necessary documents and licenses indicating their qualifications. The Coast Guard issues various licenses to qualified applicants from ordinary seaman to unlimited master. Investigating officers investigate marine accidents and casualties, and any misconduct, negligence, or incompetence of merchant marine officers and seamen holding Coast-Guard-issued documents. To carry out these duties the Coast Guard has established marine inspection offices in many ports throughout the United States.

This first marine inspection office outside the United States will provide material inspections, investigations, and limited licensing service for U.S. flag vessels operating in the North Sea and bordering coastal ports. Requests for inspections outside this area will be considered on an individual basis and evaluated upon the availability of resources.

LORAN–C

In the April 1972 edition of the Department of Transportation National Plan for Navigation, it was stated that the primary unresolved navigation issue was the designation of the government sponsored radionavigation system for the coastal confluence zone. The National Plan for Navigation stated that a choice would be made among four systems which were in operation, or appeared capable of being implemented within a reasonable time. These were Loran-A, Loran-C, differential Omega, and Decca. The Secretary of Transportation directed the Coast Guard, the agency given statutory responsibility for providing maritime navigation systems, to conduct a study and recommend a system. The factors to be considered were (1) capability to meet the technical requirements, and (2) costs, including system installation, operating expenses, present investment, and user equipment. As part of the study, the average navigational accuracy requirements in the coastal confluence zone as shown in the National Plan for Navigation were refined to show the ranges of accuracy required in various parts of the zone. In addition to the general navigation requirements, the needs of commercial fishermen and the scientific community were considered.

Based on this study, the Commandant recommended Loran-C be selected as the government-provided radionavigation system for the coastal confluence zone. After further investigations and consultations with other government agencies and the representatives of user organizations, the Secretary of Transportation selected Loran-C. This decision was publicly announced on 16 May 1974.

The National Plan for Navigation states, among other items, that the Department of Transportation National Navigation Policy is to ". . . coordinate planning for facility implementation and deployment in the interest of electromagnetic frequency conservation, overall economics, and avoidance of unnecessary duplication." It is therefore planned to gradually phase out Loran-A, as Loran-C service is provided or improved in any existing Loran-A service area.

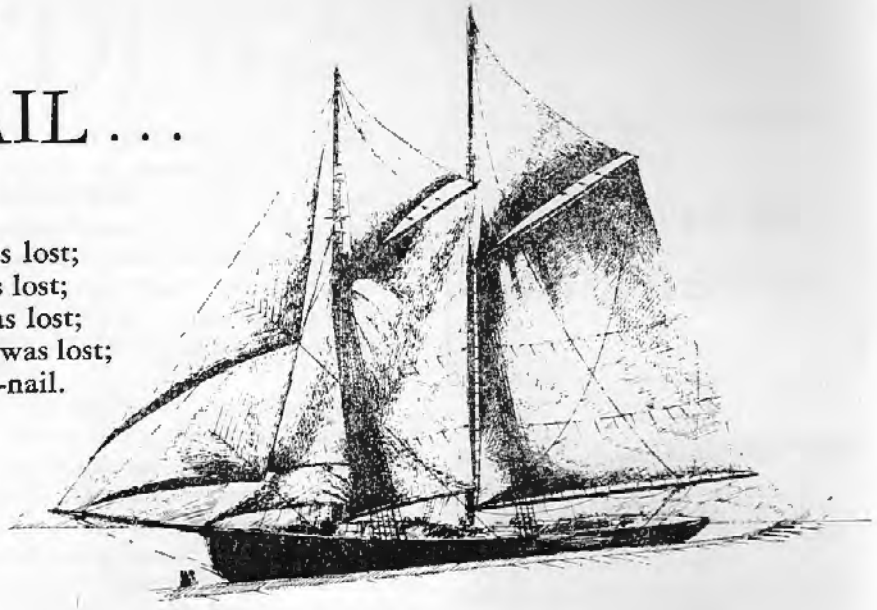
It is realized that there are a number of manufacturers, vendors, and users of Loran-A equipment, and a considerable investment in receivers. In order to allow a reasonable time for orderly phase-out of existing equipment, the 16 May 1974 announcement provides for about 5 years notice before the decommissioning of any U.S. operated Loran-A chain which has been providing navigational services for civil use in the U.S. coastal confluence zone. Included in the 5-year period for any area will be at least 2 years of simultaneous operation of the Loran-A and Loran-C systems.

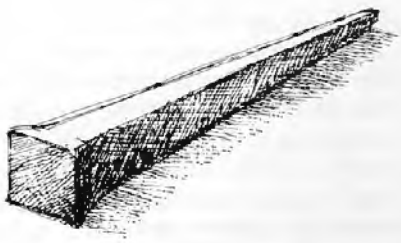
The National Plan for Navigation had defined the coastal confluence zone as the seaward approaches to

(*Continued on page 175*)

FOR WANT OF A NAIL . . .

. . . the shoe was lost;
For want of a shoe the horse was lost;
For want of a horse the rider was lost;
For want of a rider the battle was lost;
For want of a battle the kingdom was lost;
And all for want of a horseshoe-nail.





by CDR George F. Ireland, USCG

Benjamin Franklin made this proverb popular by publishing it in Poor Richard's Almanac in 1758. I don't know if Franklin was much of a sailor, although the history books tell us that he made some transatlantic crossings in the 1770's. Whether he was a sailor or not, his verse has a great deal of relevance for today's merchant marine.

My purpose is to illustrate with examples how a small, seemingly insignificant mechanical failure aboard a merchant vessel can compound itself into a catastrophe. Although these incidents did not occur for the lack of a horseshoe nail, this is an excellent analogy since they all originated from small items of hardware. I'm certain that most of you have had experiences in your professional careers where faulty valves, leaking O-rings, etc., disrupted a marine operation. What I am about to describe is that type of failure which has led to major marine casualties.

My purpose is not to find fault with vendors, builders, or even specific marine operators, but to show, by use of these examples, where attention to detail would have paid tremendous dividends.

On 1 June 1973, the U.S.-flag container vessel *Sea Witch,* fully loaded, was being piloted out of New York Harbor, having departed Howland Hook container terminal at about 2329 local time. After transiting the Kill Van Kull, the Master turned her to starboard and began to steady up to pass beneath the Verrazano Bridge. Although dark, the sky was clear with good visibility. In order to get lined up properly, and keep well clear of a passing tow, minor course changes were made. At 0036 on 2 June, the *Sea Witch* was abeam of the Stapleton Anchorage, an anchorage typically used by tankers and other vessels waiting for berths to become available. The *Esso Brussels,* loaded with crude oil, was anchored awaiting docking space at the Bayway refinery. Most of her crew were asleep. At this time the master of the *Sea Witch* noted a continued swing of the vessel's head to starboard. He discovered that the 12° right rudder applied to the steering gear could not be removed. The master shifted steering cables, and then shifted to non-fullow-up control in an attempt to regain steering. Neither action had any effect. He ordered the engine full astern, let go the port anchor, and sounded the general alarm.

At 0042, the *Sea Witch* struck the starboard side of the *Esso Brussels,* opening Nos. 7 and 8 starboard cargo tanks and starting the largest shipboard fire in New York Harbor since the *Texaco Massachusetts/Alva Cape* collision in June of 1966.

Both vessels quickly became engulfed in fire and thick black smoke. Carried by the ebb tide the vessels, now locked together, drifted beneath the Verazzano Bridge until they grounded in Gravesend Bay.

Although the final report has not yet been completed by the National Transportation Safety Buard, it is safe to say that the cause of this casualty was the dislocation of a $3/16''$ x $1''$ key from a keyway in the control linkage of the steering gear differential

controller installed aboard the *Sea Witch*. Investigators found that this key had moved forward from its slot and dropped into the jaws of a universal joint. Thus, motion initiated from the pilothouse steering stand could not be transmitted into the differential controller.

Using hindsight, it is easy to say that better connecting linkage would have prevented this casualty. Further—and perhaps more importantly—it could have been prevented by more attention to mechanical detail.

On 2 February 1975, while alongside a pier in Boston Harbor, the *Texaco Illinois,* a U.S.-flag World War II constructed tankship, suffered a 20-foot-long transverse crack across her main deck.

Investigation of this plating revealed that long slot-type openings once had been cut in the deck to facilitate the lowering of steel plates into the cargo tanks for bulkhead repairs. These slots were closed by welding from one side only. Welding preparation in this case included installation of backing strips along the root of the opening to be welded. However, small gaps existed where the ends of some of these backing strips butted against one another. Thus when the welding was done, very small notches were left in those areas where full penetration wasn't achieved.

Fortunately for the Texaco Company, the crew of the *Texaco Illinois,* and others, 2 February 1975 was a cold day in Boston. Air temperature had reach a low the previous evening of 22° F. This low temperature, together with the forces exerted on the ship during discharge of cargo, allowed that crack to appear and propagate while the ship was alongside the dock. Had it occurred at sea, it would have been a very grave situation. The cause of this casualty is best described as inattention to detail, by a number of people.

On 26 September 1974, the American flag tanker *Transhuron* drifted aground on Kiltan Island in the Indian Ocean. This vessel, a T–2 tanker with a 6000 SHP turbo-electric-drive propulsion plant, had suffered a fire in the propulsion control cubicle 2 days earlier. When finally extinguished by ship's force, the electrical propulsion switchboard was beyond repair.

Final review of this casualty is not complete; however, it is safe to say that the cause was the failure of a ⅜-inch diameter, black iron pipe nipple which was threaded into the head of a heat exchanger to accommodate a pressure gauge. This pipe nipple, placed in salt water service, corroded and broke away from the heat exchanger head, allowing salt water, under pressure from a circulating pump, to spray upward and come in contact with high voltage electrical components. Thus, the scene was set for the electrical fire which followed.

The engineers aboard the *Transhuron* fought bravely in the early hours of the morning and managed to extinguish the fire. After drifting ashore 2 days later, the *Transhuron* became a total loss, along with much of her cargo. Her crew was able to get away safely in lifeboats and no personal injuries were suffered.

Had this pipe nipple been of a nonferrous material, and similar to the material in the head of the exchanger to which it was connected, this casualty would not have occured.

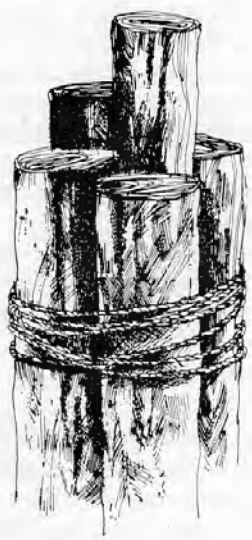
Again, as in the other cases, the cause can quite accurately be described as inattention to detail, the fault lying with a number of individuals.

Each of these casualties illustrates where a small defect resulted in a major marine casualty. Two of these failures resulted in total loss of a ship; one failure resulted in the loss of one ship and severe damage to another, and the loss of 16 lives.

One line of inquiry brought to mind by these examples concerns the statistical significance of this type of casualty. There are many ways to compare numbers; the most significant in this situation is to use the number of Marine Boards of Investigation convened by the Coast Guard. For a Marine Board of Investigation to be convened, it must be a major marine casualty, involve loss of life, or command significant public attention. From January 1972 to the present time, the Coast Guard has convened 18 Marine Boards of Investigation. Two of the casualties already described were investigated by Marine Boards. Thus it is fair to say that 2 out of 18, or 11 percent of the major marine casualties during the past 4 years were caused by seemingly insignificant failures.

The total dollar loss of these 18 casualties was approximately $64 million. The 16 lives lost in the *Sea Witch—Esso Brussels* casualty account for nearly 13 percent of the deaths resulting from those 18 casualties.

Since each of these statistics is large enough to be significant, the logical question which follows is how can this type of casualty be prevented? This is a good question and probably the most difficult one to answer. Years ago, when faced with a similar question about hardware, a former Chief of the Navy's Bureau of Weapons instituted a "KISS" program. K-I-S-S stood for "KEEP IT SIMPLE, STUPID". His efforts of course were directed at system designers who, in



his mind, kept designing overly complicated, trouble-prone, and unrealiable systems. Marine hardware, for the most part, has not reached that point; however, reliability is a prime concern when we talk about pollution prevention, hazardous cargoes, and ships designed to carry liquefied flammable gases.

The type of casualty described can be prevented by doing two things. First, in the initial design of the critical systems, full consideration should be given to results of a reliability analysis; secondly, by all of us paying attention to detail and being professional about our work. By us, I mean the Coast Guard as well as private industry, since we're all in the safety business. I'm inclined to think that this second item may be more significant than the first. With the trend towards more and more automated systems and less manning aboard large ships, the opportunity for small "insignificant" failures to occur is going to increase. There is a need for all of us to keep this in mind as we make decisions during the course of our professional lives.

A "buzz" word often heard today which has a real-world application in the promotion of making ships safer is *systems reliability analysis*. My production handbook defines reliability as the probability that a system will perform satisfactorily for at least a given amount of time when used under stated conditions. Systems reliability analysis, as applied to commercial ships, can relate to propulsion, cargo handling, navigation, steering, etc. It can be done at the design stage, which is preferable, or later on with existing systems.

Many recent designs include this, particularly those done for the Navy having to do with weapons systems or submarine construction where component failure can be catastrophic.

One portion of any such analysis includes a Failure Effect Mode Analysis where a system is "taken apart" on paper, piece by piece, and each portion is examined to see what effect its failure would have on the total system. Such an analysis, usually done at the design level, is accomplished to see that any final product will meet specifications and, of course, contribute towards a safer vessel. This sort of work is what made our space program so successful.

With replacement costs so high and the added costs incurred by failure to have ships available to operate when scheduled, extra money spent on analytical details such as reliability analysis may be justified.

The Coast Guard in this effort has two projects underway as research and development programs. One project, in the final stage right now, includes a demonstration of a reliability analysis for a typical modern marine steering system. The other program, which is just off the ground, will involve examination of an entire ship. This is an ambitious project but we think it is worthwhile and will benefit the entire marine industry.

In closing, I would like to give an account of a personnel casualty that took place this past year. It is especially pertinent since it resulted in the death of a Coast Guard Marine Inspector.

On 20 December 1974, an experienced U.S. Coast Guard Marine Inspector assigned to the Coast Guard Marine Inspection Office at New Orleans was detailed to inspect two barges located on the canal at Harvey, Louisiana. This inspector, a Coast Guard Chief Warrant Officer, had served in Merchant Marine Safety assignments for approximately 4 years, having served previously in the Norfolk, Va. office. He had served over 26 years in the Coast Guard.

The barges which he was detailed to inspect, *Exxon 158* and *Exxon 171*, are known as tank battery barges. Each is compartmented into six internal spaces and is fitted with two oil field storage tanks and four separator tanks with associated piping topside. Entry below decks is through a single manhole opening to each compartment. The gooseneck vent openings into the forward and after pairs of compartments are generally kept plugged because of local operating requirements.

Upon arrival at the barge site, the inspector met with the owner's representative and discussed inspection procedures. The inspector was interested in examining below-deck barge structure. Gas Free Certificates for the barges were not available, but the inspector did have a copy of a certificate issued some 8 months previous for the *Exxon 158*. Since below-deck spaces were piped to contain only water ballast, and since these tanks had not been opened since issuance of the Gas Free Certificate, it was decided to go ahead with the inspection. The barge *Exxon 171* was to be inspected first, followed by the *Exxon 158*.

Inspection of the first vessel proceeded without incident. Each space was opened for the inspector, he entered, made his inspection, and then proceeded to the next tank. At all times a company representative was with him or nearby. As the aftermost starboard compartment of the *Exxon 158* was opened, air was heard rushing into the space, indicating that the compartment was under partial vacuum. The compartment immediately forward was then inspected, after which the two men discussed whether to continue the inspection or break for lunch; they decided to continue. The inspector entered the after starboard compartment, apparently unseen by the company representative who had gone forward to check on work in progress by two of his employees. Not seeing the inspector a few minutes later, he proceeded aft and found him lying unconscious in the bottom of the compartment. In an attempt to assist, he also entered and became unconscious but fortunately came to quickly and was able to get out of the space. After he was removed from the compartment attempts were made to revive the inspector, but with no suc-

cess. He was later pronounced dead on arrival at the local hospital. Review of the casualty revealed none of the tanks were examined for oxygen content prior to entry. Further, no mechanical ventilation was used to "air out" the tanks prior to entry. Examination of the tank sometime later showed that it contained 17 percent oxygen, and the adjacent port side compartment was found to contain only 12.3 percent oxygen.

As in the casualties discussed earlier, the cause of this casualty can be attributed to inattention to detail—specifically, failure to test the below-deck compartments for oxygen content.

It is hoped that the programs discussed in this article will aid the Coast Guard in being a more effective agency and thereby help to prevent future casualties similar to the *Sea Witch, Texaco Illinois* and *Transhuron.* We don't need *more* regulations, but *better* regulations. This, together with increasingly more professional attention by all parties, should contribute towards a safer merchant marine so that no more ships will founder "for want of a nail!"

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maritime sidelights

(*Continued from page 171*)

land, considered to extend about 50 nautical miles from the coast, although the distance could vary from about 20 to 120 nautical miles. The navigation system accuracy requirement was given as ¼ nautical mile. These were average requirements and served their purpose at the time the National Plan for Navigation was issued.

When the system comparison studies were initiated it was necessary to better define the requirements. The inner boundary of the coastal confluence zone is defined as the harbor entrance. The outer boundary is redefined as 50 nautical miles offshore, or the edge of the continental shelf (100 fathom curve), whichever is greater. The navigation system accuracy requirement has been established such that the system would provide 95 percent assurance that a vessel could be navigated with a tolerance of ¼ nautical miles along a track to its designated destination or within its designated shipping lane. Existing lane widths vary from 1 nautical mile at harbor entrances and in the Gulf of Mexico fairways to 5 nautical miles at the edge of high seas.

The coastal confluence zone decision, as well as other developments, will result in a number of changes to the National Plan for Navigation. Besides those Loran stations operated by the Coast Guard adjacent to U.S. waters, there are a number of overseas stations operated in response to requirements of the Department of Defense. Many of these also serve the civil community. To provide system users the greatest possible lead time, the most important system changes are as follows:

(a) Loran-A.—Current coverage will be found on the Loran-A Coverage Diagram, Defense Mapping Agency Hydrographic Center Chart N.O. 5131. Department of Defense has changed its requirement for Loran-A system operation from the end of 1974 to the end of 1977, except for Baffin Bay. This assumes that a worldwide replacement system such as Omega is operating in the areas concerned. The planned termination dates for the U.S.-operated Loran-A chains are:

Domestic	
Aleutian Islands	July 1, 1979
Gulf of Alaska	July 1, 1979
Hawaiian Islands	July 1, 1979
West Coast	July 1, 1979
Caribbean	July 1, 1980
East Coast	July 1, 1980
Gulf of Mexico	July 1, 1980
Overseas	
Baffin Bay	June 30, 1975 (completed)
Iwo Jima-Okinawa	Dec. 31, 1977
Mariana Islands	Dec. 31, 1977
Marshall Islands	Dec. 31, 1977

(b) Loran-C.—the existing Loran-C system will be upgraded and expanded to provide coverage for the entire U.S. coastal confluence zone and the Great Lakes. Overseas stations will continue to be operated by the Coast Guard in response to the requirements of Department of Defense. The planned dates for Loran-C chain operational certification to provide coverage for U.S. contiguous waters are:

West Coast	Jan. 1, 1977
Gulf of Alaska expansion	Jan. 1, 1977
East Coast reconfiguration	July 1, 1978
Gulf of Mexico expansion	July 1, 1978
Great Lakes expansion	Feb. 1, 1980

The Hawaiian Island Chain is under study to determine if the existing Loran-C coverage can be improved in the area of the major islands.

The phasing-out of one system and the phasing-in of another to replace it is not always a popular or simple task. It is fraught with problems and subject to attack by many. The Coast Guard, in carrying out its mandate under 14 USC 81 and the decision announced by the Secretary of Transportation on 16 May 1974, will provide the user community a superior radionavigation system for the coastal confluence zone—Loran-C—and will assure that the transition from Loran-A to Loran-C is executed to the mutual benefit of all concerned navigators.

TANKER REGULATIONS

On Tuesday, October 14, 1975 the United States Coast Guard published final rules regulating tank vessels carrying oil in domestic trade. The purpose of these rules is to govern the design and operation of seagoing U.S. tank ships and barges of 150 gross tons and over that carry oil in the United States domestic trade.

These regulations will effect in the immediate future a significant reduction of operational pollution from tank cleaning and deballasting operations. These regulations will be discussed more fully in the *Proceedings* in upcoming issues. ⚓

lessons

from casualties

At approximately 2027, 9 November 1974, a series of explosions occurred aboard the tank barge RTC 200 moored in Kill Van Kull in the New York area. The explosion caused the adjacent tank barge RTC 320 to ignite and explode. Both barges became engulfed in the resulting flash fire. The shock waves produced by the explosions broke windows in businesses and homes as far away as one-half mile. Both vessels sustained severe structural damage and dock facilities suffered minor fire damage. Despite the magnitude of the explosions there were no injuries or loss of life. Damage to the vessels is estimated to exceed $1 million.

On Wednesday, 6 November the tank barge RTC 200 discharged a cargo of gasoline. A hull leak was discovered in No. 2 starboard cargo tank. The vessel continued its scheduled cargo assignments with the No. 2 cargo tank secured and not used to carry cargo. On 6 November the vessel proceeded to the Standard tank cleaning docks in Bayonne, N.J., to rinse tanks in preparation for loading a cargo of unleaded gasoline. It is not known if the No. 2 cargo tank was rinsed at this time. The vessel operated without incident on 7 and 8 November, carrying mixed cargoes of kerosene and No. 2 oil. On 8 November, the tank barge loaded a cargo of 93 octane gasoline at the American Oil terminal at Carteret, N.J. The cargo was discharged at the American Oil Terminal, Newtown Creek, Brooklyn, on 9 November. The vessel was boarded by Captain of the Port personnel during discharge operations, no violations were found. The vessel then proceeded to the Kill Van Kull waterway yard under tow. The vessel was to be laid up at the yard until its next scheduled cargo assignment.

At approximately 1940 on 9 November, the RTC 200 arrived at the yard, and was moored port side to the starboard side of the Tank Barge RTC 320. The bargemen aboard the RTC 200 tended fenders forward and aft; the barge was made fast to the TB RTC 320. The personnel aboard the RTC 320 remarked that the RTC 200 landed "hard" against the RTC 320. As the bargemen aboard the RTC 200 made the vessel fast to the RTC 320, the workmen aboard the RTC 320 completed repairs to the port deep well pump and left the vessel. At approximately 2000 the bargemen secured the Tank Barge RTC 200 and walked across the main deck of the RTC 320 and up the dock to check out with the night watchman.

The barge captain and mate were met by the night watchman, who informed them that the company had left instructions for the bargemen to install blowers to ventilate and gas-free the No. 2 tank aboard the RTC 200. The tank was to be inspected to determine the extent of the reported leak. The watchman accompanied the bargemen to the dock and gave them two electric industrial blowers. The men then proceeded to install the blowers. Meanwhile, aboard the RTC 320 the barge's captain was busy stowing tools in the cabin. The repair work aboard the RTC 320 was completed and he was preparing to shut the barge down for the night. The main spotlight and generator were in operation onboard the RTC 320. The captain and mate boarded the RTC 200, and by the light of the RTC 320's spotlights started securing a blower into the expansion trunk of No. 2 port tank. The captain lashed a blower to the ladder of No. 2 port. He sent the mate back to the dock house to get electrical extension cords for the blowers. During the mate's absence the captain lashed the other blower into No. 2 starboard. He did not examine the blowers before installing them, nor did he examine the blower's electrical cords. The blowers were made fast to the ladders of the tank with manila line. The line was doubled to prevent the blowers from vibrating loose. After he secured the blowers in the expansion trunks, he left the barge. He went to the dock house and informed the night watchman that the blowers

This rupture was the avenue for venting the forces of the internal explosions.

When the blower landed on the dock its housing fractured allowing the internal motor to be torn loose. The motor casing was damaged from the impact and the electrical cord was severed. Notice the male plug with shielding missing.

As a result of the force of the explosions these hoses were thrown into the air and landed on the dock.

were set up but still required electrical extension cords before they could be operated. At approximately 2015 he left the yard to go home.

The mate found an electrical extension cord and returned to the RTC 200. He completed the setup of the electrical wires to the port blower. He did not examine the cord or fittings prior to making the installation. A yard worker assisted him in locating a junction box on the dock. At about 2010 he started the port blower and then left the RTC 200 and proceeded to the dock house. He then made arrangements with a yard mechanic to complete the setup of the starboard blower. He then left the yard. The yard mechanic located another extension cord, connected it to the starboard blower and activated it. Hearing both blowers operating, he left the barge and went to the dock house. The explosion occurred at approximately 2027, ten minutes after the starboard blower had been started.

Prior to the explosions, and while the yard personnel were installing the blowers aboard RTC 200, barge Captain Nilssen was working on the deck of the RTC 320. As he completed his deck chores and was about to secure the main deck floodlight there was a violent explosion on the forward starboard section of RTC 200. The explosion was described as being very loud, "like a rocket". A series of explosions then followed. The initial explosion was described as causing a very bright orange ball of flame. Captain Nilssen attempted to escape from the RTC 320. He was running to the starboard side of the barge when the force of one of the secondary explosions threw him off the main deck. He landed on his feet in a semi-crouched position and ran from the dock, seeking protection of some temporary storage sheds located in the parking lot. As he ran, he heard another series of explosions. It was reported that another man hearing the initial explosion raced up on deck of the RTC 320, and was blown off the stern of the barge into the water. He then swam under the dock, climbed aboard a tug, and reboarded the RTC 320 in an attempt to rescue Captain Nilssen. With a portable fire extinguisher in hand, he reach the aft portion of the burning barge and searched for Captain Nilssen for some time before being forced to retreat. The personnel in the dock house fled and took refuge in the parking lot. After the explosions had subsided the employees began to organize efforts to control the fire and account for the personnel.

The New York City Fire Department responded immediately and shore and land units arrived within minutes. Several company employees boarded in an attempt to insure that all accessible ullages and hatches were closed in order to prevent further explosions. All but two employees were accounted for. At about 2035 the New York City Fire Department started fire fighting efforts.

As these efforts were underway, the RTC 200 burned through her mooring lines and drifted on the ebb tide into the Kill Van Kull waterway. The moored tugs cast off lines and proceeded into the Kill Van Kull immediately after the explosions. The tug *Curtis Reinauer* took immediate action to control the drifting RTC 200. She was successful in preventing further drift, but in doing so became entanged in the drifting mooring lines. The tugs *Pamela* and *Nanice Ann Reinauer* stood by the disabled tug and barge until the entangled tug was freed. At approximately 2230 the RTC 200 sank by the bow on the southern margin of the Kill Van Kull waterway. At approximately 2248 the shoreside fire was declared under control. During this time three New York City fireboats and two Coast Guard harbor tugs assisted in the firefighting efforts. At 2300 the shoreside fire was declared out.

At 0015 on 10 November, the semi-submerged remains of the RTC 200 were beached on the property adjacent to the RTC yard. Local safety broadcasts for mariners transiting the Kill Van Kull were issued. At 0025, all employees were accounted for and it was ascertained that no injuries had occurred.

There is evidence in the record to indicate that the gas-freeing of the tanks aboard the RTC 200 was a routine task, which had been successfully accomplished on prior occasions. The record also indicates that the company yard and barge personnel had received "on the job" instructions concerning the manner in which gas-freeing tasks and blower installations were to be performed. The four persons involved in the installation of the blower on the RTC 200 had varying levels of experience in gas-freeing operations and shipyard procedures. None of the personnel however had received formal safety training in the handling of gasoline. The company had no written orders, safety checklists, or specific procedures to be adhered to during this type of gas-freeing operations. Prior to this casualty, gas-freeing operations were pursued in the normal course of business, and the safety aspects of the operation were generally overseen by the yard foreman or manager. On the night of this casualty the employees simply followed the terse company orders. Since the gas-freeing operation was commenced on a weekend, the normal complement of yard personnel were not on duty, and no one person was in a supervisory capacity to oversee the setup of the blowers. As a direct result of this casualty the company has taken remedial action to prevent the possibility of a similar situation occurring. The company has now modified existing procedures and is utilizing pneumatic mechanical venting equipment. The company is continuing to utilize the OSHA training program to have selected employees certified as cognizant personnel. ⚓

Marine Safety Council Membership

This is the third in a series of articles designed to acquaint our readers with the new members of the Marine Safety Council. Rear Admiral Sidney A. Wallace became a member in May upon succeeding the retiring RADM J. A. Palmer as Chief, Office of Public and International Affairs.

Sidney Arthur Wallace was born at Alcoa, Tennessee, in 1927. He was graduated from the Baylor School at Chattanooga, in 1945, and from the U.S. Coast Guard Academy, New London, Conn., in 1949. In addition to his undergraduate degree in Marine Engineering, Admiral Wallace holds the degree of Juris Doctor with honors from the George Washington University National Law Center, Washington, D.C. (1968), and a Master's degree in political science from Auburn University (1969). Also in 1969 he was a distinguished graduate from the Air War College, Maxwell AFB, Alabama.

As an Ensign, he served his first tours of duty on board the cutter *Mendota* out of Wilmington, N.C., from June 1949 to July 1951, and on the cutter *Finch* out of Green Cove Springs, Fla. and Curtis Bay, Md. for the next 6 months.

From January 1952 to February 1953, Lieutenant (jg) Wallace took flight training at Pensacola, Fla., and Corpus Christi, Tex. There followed a series of assignments as search and rescue aviator at Coast Guard Air Stations at San Francisco, Kodiak, Elizabeth City, N.C., and Barbers Point, Hawaii.

Reporting to the Office of Operations at Coast Guard Headquarters, Washington, D.C., in June 1964, Commander Wallace served, successively, as Chief, Flight Safety Branch; Chief, Aviation Support Section; and Assistant Chief, Aviation Branch. Following a year of study at the Air War College, he assumed command of the new Coast Guard Air Station at New Orleans in August 1969. During that tour of duty he rose to the grade of Captain. He returned to Headquarters in May 1971 to assume the duties of Chief, Marine Environmental Protection Division. For his work in connection with an International Marine Pollution Conference in 1973, he was awarded the Coast Guard Commendation Medal.

By nomination of the President and approval of the Senate, Wallace was appointed Rear Admiral effective July 1, 1975. He was designated Chief, Office of Public and International Affairs in May. Admiral Wallace holds memberships in the American Bar Association, the District of Columbia Bar, the Maritime Law Association of the United States, Delta Theta Phi law fraternity, and the U.S. Naval Institute.

Admiral Wallace's wife is the former Jacqueline Theis of Islip, N.Y., a graduate of Connecticut College. They have two sons, Wesley, a student at the University of Washington, and Evan, who lives with his parents at Reston, Va. ⚓

COAST GUARD RULEMAKING

(Status as of 1 October 1975)

	Notice of proposed rulemaking	Public hearing	Deadline for comments	Awaiting final action	Withdrawn	Published as rule	Effective date
BOATING SAFETY							
Lifesaving devices on white water canoes & kayaks (CGD 74–159) comment period extended 6–12–75	2–4–75	.....	7–15–75	X	.....	.....	.....
Safe loading and safe powering standards (CGD 73–250)	3–6–75	.....	4–21–75	....	.....	9–23–75	3–23–76
Inboard safe loading standard (CGD 74–83)	3–6–75	.....	4–21–75	....	.....	8–13–75	2–9–76
Boats and associated equipment (CGD 75–110)	9–19–75	.....	11–5–75	....	.....	.....	.....
BRIDGE REGULATIONS							
Cheesequake Ck., NJ (CGD 73–162)	8–10–73	.....	9–11–73	X	.....	.....	.....
Chicago River, IL (CGD 74–137)	6–3–74	.....	7–16–74	X	.....	.....	.....
AIWW, Hallandale, FL (CGD 74–257)	11–5–74	.....	12–5–74	X	.....	.....	.....
Coney Island Creek, NY (CGD 74–300)	1–29–75	.....	3–4–75	X	.....	.....	.....
Matanzas River, FL (CGD 75–024)	1–29–75	.....	3–4–75	X	.....	.....	.....
Fox River, WI (CGD 75–035)	2–6–75	.....	3–7–75	X	.....	.....	.....
Oklawaha River, FL (CGD 75–062)	3–27–75	.....	4–29–75	....	.....	8–1–75	9–1–75
Mystic River, MA (CGD 75–053)	3–27–75	.....	4–29–75	X	.....	.....	.....
West Palm Beach Canal, FL (CGD 75–070)	3–27–75	.....	4–29–75	X	.....	.....	.....
Illinois River, IL (CGD 75–060)	4–1–75	.....	5–6–75	X	.....	.....	.....
Kent Narrows, MD (CGD 75–081)	4–1–75	.....	5–6–75	....	.....	8–8–75	9–8–75
Passaic River, NJ (CGD 75–052)	4–4–75	.....	5–6–75	X	.....	.....	.....
Back Bay of Biloxi, MS (CGD 75–088)	4–30–75	.....	6–10–75	....	.....	9–8–75	10–10–75
Lake Okeechobee, FL (CGD 75–076)	4–30–75	.....	5–29–75	....	.....	8–1–75	9–1–75
Peace River, FL (CGD 75–086)	4–30–75	.....	6–3–75	....	.....	9–19–75	10–20–75
Snake R. & Clearwater R., Lewiston ID & Clarkston, WA (CGD 75–099)	4–30–75	.....	6–10–75	X	.....	.....	.....
Coosaw R., FL (CGD 75–087)	5–5–75	.....	6–9–75	X	.....	.....	.....
Duwamish Waterway, WA (CGD 75–097)	5–13–75	.....	6–30–75	X	.....	.....	.....
Escatawpa R., MS (CGD 75–114)	6–9–75	.....	7–8–75	....	.....	8–1–75	9–1–75
Gulf Intracoastal Waterway, LA (CGD 75–131)	6–18–75	.....	7–22–75	X	.....	.....	.....
Tombigbee River, AL (CGD 75–153)	8–5–75	.....	9–5–75	X	.....	.....	.....
Clearwater Pass, FL (CGD 74–299)	8–12–75	.....	9–12–75	X	.....	.....	.....
Deep River, WA (CGD 75–172)	9–8–75	.....	10–17–75	X	.....	.....	.....
HAZARDOUS MATERIALS							
Miscellaneous Dangerous Cargoes (CGD 72–182)	11–11–72	12–12–72	12–29–72	....	.....	8–26–75 Corrected 9–9–75	11–24–75
Dangerous Cargo Regulations, miscellaneous (CGD 73–249)	1–16–74	.....	3–4–74	....	.....	6–18–75	9–17–75
Sodium sulfide solution and sulfur dioxide (CGD 73–275)	7–16–74 Corrected 9–5–74	.....	12–5–74	X	.....	.....	.....
Unslaked lime in bulk (CGD 74–224)	1–29–75	2–25–75	3–17–75	....	.....	8–15–75	9–15–75
Portable tanks, proposed DOT specification (CGD 74–292)	6–9–75	7–1–75	7–16–75	X	.....	.....	.....
Dangerous cargo labeling (CGD 75–050)	6–18–75	7–16–75	7–31–75	X	.....	.....	.....
MARINE ENVIRONMENT AND SYSTEMS (GENERAL)							
Pipelines, lights to be displayed (CGD 73–216)	9–19–74 Corrected 10–18–74	10–21–74	11–4–74	X	.....	.....	.....

COAST GUARD RULEMAKING—Continued

	Notice of proposed rulemaking	Public hearing	Deadline for comments	Awaiting final action	Withdrawn	Published as rule	Effective date
Oil and hazardous substance liability (CGD 73–185)	12–4–74	.....	1–16–75	X	.....	.....	.....
Mooring barges on the Mississippi (CGD 74–185)	2–4–75	2–19–75 New Orleans	3–17–75	X	.....	.....	.....
Deepwater ports (CGD 75–002); corrected 5–19–75	5–7–75	6–6–75	6–23–75	X	.....	.....	.....
Demarcation line, Guayanilla Bay, PR (CGD 73–287)	6–18–75	.....	8–4–75	X	.....	.....	.....
MERCHANT MARINE SAFETY (GENERAL)							
Bulk Dangerous Cargoes, Inspection of Barges (CGD 73–271)	3–11–74	4–15–74	4–30–74	X	.....	.....	.....
First Aid Certificates (CGD 73–272)	4–2–74	.....	6–15–74	X	.....	.....	.....
Carriage of Solid Hazardous Materials in Bulk (CGD 74–13)	5–15–74	7–16–74	8–31–74	X	.....	.....	.....
Tank vessels in domestic trade (CGD 74–32)	6–28–74 Corrected 7–23–74	7–23–74 Seattle 7–30–74 Wash. D.C.	8–19–74	X	.....	.....	.....
Load line regulations, rail height adjustment (CGD 74–164)	10–4–74	.....	11–15–74	X	.....	.....	.....
Construction and equipment of tank vessels (CGD 74–127); advance notice 9–5–74	4–21–75	5–21–75	6–5–75	X	.....	.....	.....
Great Lakes pilotage (CGD 74–233)	11–5–74	11–20–74	11–26–74	....	.....	9–8–75	10–8–75
Manning of nautical school ships (CGD 74–201)	1–21–75	.....	3–6–75	....	.....	8–13–75	9–12–75
Licensing and certificating; apprentice mate endorsement (CGD 74–226); Comment period extended 3–7–75	1–23–75	.....	4–9–75	X	.....	.....	.....
Marine engineering systems and components; miscellaneous amendments (CGD 73–254); corrected 5–6–75	4–3–75	5–7–75	5–15–75	....	.....	9–2–75	9–29–75
Bulk grain cargoes; intact stability requirements (CGD 74–182)	4–17–75	.....	5–31–75	....	.....	8–20–75 Corrected 8–28–75 and 9–11–75	9–19–75
Oceanographic vessels (CGD 75–031)	6–12–75	.....	7–28–75	X	.....	.....	.....
Specifications for inflatable life rafts (CGD 75–040)	8–1–75	.....	9–15–75	X	.....	.....	.....
Metal borings, shavings, turnings, and cuttings (CGD 75–133)	8–1–75	.....	9–15–75	X	.....	.....	.....
Marine occupational safety and health standards (CGD 75–101); Advance notice	8–11–75	.....	12–9–75	....	.....	.....	.....
Tank vessels; air compressors, cargo handling room bilges (CGD 75–017)	8–13–75	.....	9–29–75	X	.....	.....	.....
Load line fee schedule (CGD 75–139)	8–15–75	.....	9–29–75	X	.....	.....	.....
Civil penalty procedures (CGD 75–123)	9–11–75	.....	10–27–75	X	.....	.....	.....
Vessel inspection regulations (CGD 75–074)	9–16–75	.....	10–31–75	X	.....	.....	.....
Fire hydrants and hose (CGD 74–60)	9–23–75	.....	11–10–75	....	.....	.....	.....

NOTE: This table which will be coutinued in future issues of the Proceedings is designed to provide the maritime public with better information on the status of changes to the Code of Federal Regulations made under authority granted the Coast Guard. Only those proposals which have appeared in the Federal Register as Notices of Proposed Rulemaking, and as rules will be recorded. Proposed changes which have not been placed formally before the public will not be included.

Nautical Queries

This month's "Nautical Queries" features questions selected from examinations presently in use for deck officers (2d and 3d Mate) and engineers (2d and 3d Assistant).

Deck

1. In the United States system of buoyage how is a midchannel buoy, that can be passed close aboard on either side, painted and lighted?

A. Black and white horizontal stripes with an interrupted quick flashing light.
B. Black and red vertical stripes with a Mo(A) light.
C. Black and red horizontal stripes with an interrupted quick flashing light.
D. Black and white vertical stripes with a Mo(A) light.

2. If the Greenwich Hour Angle of a body is 180° and your longitude is 90° east. Which of the following statements is (are) correct?

I. The local hour angle of the body is 090°.
II. The meridian angle of the body is 90° east.
A. I only.
B. II only.
C. Both I and II.
D. Neither I nor II.

3. Which of the following groups should be used to send the signal longitude 109° 34′ west?

A. D 0934.
B. Lo 10934 W.
C. G0934.
D. L 10934.

4. When underway in restricted visibility a sail-powered vessel must proceed at which of the following speeds?

A. Less than half the wind velocity.
B. Bare steerageway.
C. Less than 4 knots.
D. Moderate speed.

Engineering

5. Structural members that fit between the floors of a vessel and stiffen the double bottom are called

A. buckler plates.
B. intercostals.
C. boss plates.
D. floor stiffeners.

6. A bright, shiny appearance of the sealing surfaces on diesel engine compression rings indicates

A. properly functioning rings.
B. insufficient cylinder cooling.
C. combustion gas blowby.
D. excessive lubrication.

7. A camshaft in a two-stroke cycle engine rotates at

A. one-half crankshaft speed.
B. twice crankshaft speed.
C. crankshaft speed.
D. four times crankshaft speed.

8. A pressure-volume indicator measures cylinder pressure and

A. brake horsepower.
B. piston travel.
C. cylinder volume.
D. engine speed.

9. High-pressure fuel injection lines should be made of which of the following?

A. Steel jacket neoprene hose.
B. High resilient copper tubing.
C. Steel pipe with screwed fittings.
D. High resilient magnesium tubing.

10. Detonation in an operating diesel engine is caused by

A. Fuel vapor accumulation in the crankcase.
B. Excessively late fuel injection.
C. Water in the fuel oil.
D. Fuel or lube oil in the cylinder air charge during compression.

Answers

1. D 2. B 3. C 4. D 5. B 6. A 7. C 8. B 9. C 10. D

The August "Nautical Queries" included a question on the rules of the road that, while not incorrect, certainly was misleading. The meaning of a *two short—one long* fog signal was given as *vessel underway, not towing*. Our error was in not specifying the waters for which that answer was appropriate—namely, the "Western Rivers." Because of the considerable differences among the several sets of rules for U.S. waters, this sort of confusion is nothing new. Work is underway toward unifying the rules of the road for all the navigable waters of the United States, paralleling, as much as possible, the International Regulations for Preventing Collisions at Sea, 1972.

MERCHANT MARINE SAFETY PUBLICATIONS

The following publications of marine safety rules and regulations may be obtained from the nearest marine inspection office of the U.S. Coast Guard.* Because changes to the rules and regulations are made from time to time, these publications, between revisions, must be kept current by the individual consulting the latest applicable Federal Register. (Official changes to all Federal rules and regulations are published in the Federal Register, printed daily except Saturday, Sunday, and holidays.) The date of each Coast Guard publication in the table below is indicated in parentheses following its title. The dates of the Federal Registers affecting each publication are noted after the date of each edition.

The Federal Register will be furnished by mail to subscribers, free of postage, for $5.00 per month or $50 per year, payable in advance. The charge for individual copies is 75 cents for each issue, or 75 cents for each group of pages as actually bound. Remit check or money order, made payable to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

CG No.	TITLE OF PUBLICATION
101	Specimen Examinations for Merchant Marine Deck Officers (Chief Mate and Master) (1–1–74).
101–1	Specimen Examinations for Merchant Marine Deck Officers (2d and 3d mate) (10–1–73).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (4–1–72). F.R. 7–21–72, 12–1–72, 11–14–74, 6–18–75.
*115	Marine Engineering Regulations (6–1–73). F.R. 6–29–73, 3–8–74, 5–30–74, 6–25–74, 8–26–74, 6–30–75.
123	Rules and Regulations for Tank Vessels (1–1–73). F.R. 8–24–73, 10–3–73, 10–24–73, 2–28–74, 3–18–74, 5–30–74, 6–25–74, 1–15–75, 2–10–75, 4–16–75, 4–22–75, 5–20–75, 6–11–75, 8–20–75, 9–2–75.
169	Rules of the Road—International—Inland (8–1–72). F.R. 9–12–72, 3–29–74, 6–3–74, 11–27–74, 4–28–75.
*172	Rules of the Road—Great Lakes (7–1–72). F.R. 10–6–72, 11–4–72, 1–16–73, 1–29–73, 5–8–73, 3–29–74, 6–3–74, 11–27–74, 4–16–75, 4–28–75.
*174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (3–2–64).
*175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3–1–73).
*176	Load Line Regulations (2–1–71). F.R. 10–1–71, 5–10–73, 7–10–74.
182	Specimen Examinations for Merchant Marine Engineer Licenses (1–1–74).
182–1	Specimen Examinations for Merchant Marine Licenses (2d and 3d Assistant) (4–1–75).
184	Rules of the Road—Western Rivers (8–1–72). F.R. 9–12–72, 12–28–72, 3–8–74, 3–29–74, 6–3–74, 11–27–74, 4–16–75, 4–28–75.
190	Equipment List (8–1–72). F.R. 8–9–72, 8–11–72, 8–31–72, 9–14–72, 10–19–72, 11–8–72, 12–5–72, 1–15–73, 2–6–73, 2–26–73, 3–27–73, 4–3–73, 4–12–73, 4–26–73, 6–1–73, 8–1–73, 9–18–73, 10–5–73, 11–26–73, 1–17–74, 2–28–74, 3–25–74, 4–17–74, 7–2–74, 7–17–74, 9–5–74, 10–22–74, 11–27–74, 12–3–74, 12–30–74, 1–15–75, 1–21–75, 2–13–75, 2–19–75, 3–18–75, 3–19–75, 4–9–75, 4–16–75, 5–1–75, 5–7–75, 6–2–75 6–25–75, 7–22–75, 7–24–75, 8–1–75, 8–20–75, 9–23–75.
*191	Rules and Regulations for Licensing and Certification of Merchant Marine Personnel (6–1–72). F.R. 12–21–72, 3–2–73, 3–5–73, 5–8–73, 5–11–73, 5–24–73, 8–24–73, 10–24–73, 5–22–74, 9–26–74, 3–27–75, 6–2–75, 7–24–75, 8–13–75.
*200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5–1–67). F.R. 3–30–68, 4–30–70, 10–20–70, 7–18–72, 4–24–73, 11–26–73, 12–17–73, 9–17–74, 3–27–75, 7–28–75, 8–20–75.
*227	Laws Governing Marine Inspection (3–1–65).
*239	Security of Vessels and Waterfront Facilities (5–1–74). F.R. 5–15–74, 5–24–74, 8–15–74, 9–5–74, 9–9–74, 12–3–74, 1–6–75, 1–29–75, 4–22–75, 7–2–75, 7–7–75, 7–24–75.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (4–1–73). F.R. 12–22–72, 6–28–73, 6–29–73, 8–1–73, 10–24–73, 12–5–73, 3–18–74, 5–30–74, 6–24–74, 1–15–75, 2–10–75, 8–20–75.
*258	Rules and Regulations for Uninspected Vessels (5–1–70). F.R. 1–8–73, 3–2–73, 3–28–73, 1–25–74, 3–7–74.
*259	Electrical Engineering Regulations (6–1–71). F.R. 3–8–72, 3–9–72, 8–16–72, 8–24–73, 11–29–73, 4–22–75.
*266	Rules and Regulations for Bulk Grain Cargoes (5–1–68). F.R. 12–4–69, 8–20–75.
268	Rules and Regulations for Manning of Vessels (12–1–73).
293	Miscellaneous Electrical Equipment List (7–2–73).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (7–1–72). F.R. 7–8–72.
323	Rules and Regulations for Small Passenger Vessel (Under 100 Gross Tons) (9–1–73). F.R. 1–25–74, 3–18–74, 9–20–74, 2–10–75.
329	Fire Fighting Manual for Tank Vessels (1–1–74).
439	Bridge-to-Bridge Radiotelephone Communications (12–1–72). F.R. 12–28–72, 3–8–74, 5–5–75.
*467	Specimen Examinations for Uninspected Towing Vessel Operators (10–1–74).

CHANGES PUBLISHED DURING SEPTEMBER 1975

The following have been modified by Federal Registers:

CG–123, Federal Register of September 2.

CG–190, Federal Register of September 23.

*Due to budget constraints or major revision projects, publications marked with an asterisk are out of print. Most of these pamphlets reprint portions of Titles 33 and 46, Code of Federal Regulations, which are available from the Superintendent of Documents. Consult your local Marine Inspection Office for information on availability and prices.