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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Contents

features

departments

Cover

No, it's not an invader from outer space. This month's cover photo features the BioPak 45 Self-Contained Breathing Apparatus. This and other types of respirators, and their proper usage, are discussed in an informative article on respiratory protection beginning on page 76.

DIST. (SDL No. 107)
A: acde(2); fghklmntuv(1)
B: n(50); c(16); e(5); f(4); ghj(3); r(2); bkipq(1)
C: eglmp (1)
D: adgklm(1)
E: mn(1)
F: bckp(1)
Lists TCG-06, CG-13

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maritime sidelights

NOW HEAR THIS

If you read the "Open Letter to Vessel Owners and Operators" in this issue, you will learn that the Coast Guard plans to conduct a survey of noise levels aboard U.S. merchant ships in an effort to establish a basis for noise standards.

Why are noise standards necessary? Exposure to loud noises can permanently damage your sense of hearing. Such damage is not usually immediate but is a gradual, painless sneak thief. Unfortunately, because there is no pain or visual evidence associated with hearing loss, many people do not realize when they are in danger. Once your sense of hearing is ruined it cannot be repaired--the results are permanent.

Almost all noise-induced hearing damage can be easily prevented. Numerous protective devices are available: several types of earplugs, earcaps, and ear muffs. All kinds of protectors should be issued with instructions for proper use and care. Earplugs are effective only if properly fitted; this usually requires medical assistance.

Remember, protective equipment works only when used. If yon suspect that you are being exposed to hazardous noise levels, make use of hearing protectors. How can you tell if a noise is loud enough to cause ear damage? Many risk areas are posted for safety, so watch for signs. If you must raise your voice to be heard only one foot away, chances are good that the noise is too intense. Seek out noise sources--sometimes, adjustment of machinery can significantly cut the sound level.

Finally, schedule annual hearing tests. It's a good idea to take along the hearing devices you use and have them checked at the same time. With proper precautions, you need never be a victim of noise-indnced hearing loss.

NEW COLUMN ESTABLISHED

Beginning this month the Proceedings features a new department, KEYNOTES. The purpose of this column is to provide current information on Coast Guard rulemaking activities in an effort to encourage your comments. Important notices of proposed rulemaking and significant regulations will be summarized; you may wish to read the entire text in the Federal Register, or you may obtain a free copy from the nearest Marine Inspection or Marine Safety Office.

Remember, your suggestions and contributions concerning any department in the Proceedings are always welcome and appreciated.

IMCO OUTLINES SEAFARERS' STANDARDS

A conference of 72 nations met in London from June 14 through July 7, 1978 to establish minimum requirements for training, certification and watchkeeping for masters, officers and crew of merchant ships. The conference was convened by the Intergovernmental Maritime Consultative Organization (IMCO) in association with the International Labor Organization (ILO). The resulting International Convention on Standards of Training, Certification and Watchkeeping of Seafarers, 1978 is designed to ensure that the level of qualification for seafarers is uniformly attained in all countries. The new treaty has the stated purpose: "To promote safety of life and property at sea and the protection of the marine environment."

The need for such a treaty was realized as far back as 1970, when an IMCO working group reported "that in view of the continuing alarming rise in maritime casualties and pollution, it is necessary for urgent action to be taken, aimed at strengthening and improving standards and professional qualifications of mariners, as a means of securing better guarantees of safety at sea and protection of the marine environment." The following year IMCO established the Subcommittee on Standards of Training and Watchkeeping and tasked it with studying the subject and preparing a report of findings. By the 1978 conference a draft convention was ready for consideration.

Principal provisions in the articles of the convention pertain to issuance of certificates to seafarers and the control of such certificates on all ships when in the ports of a party to the convention. Based on the official assumption that human error in some aspects is a contributing factor in over 80 percent of maritime accidents, the implementation of the improved training standards should enable personnel to reduce the incidence of such casualties.

The mission of the conference was to work for a strong and effective convention capable of early ratification by all nations so that it might come into force as early as possible. The convention will enter into force 12 months after 25 nations, with combined merchant fleets constituting 50 percent of the gross tonnage of the world's merchant shipping, have either signed or ratified the treaty. Its benefits may become apparent much sooner, however, as many nations have already evolved comparable standards and will be striving to accomplish these before actual implementation of the convention.

The United States Coast Guard intends, at a later date, to publish proposed rules for implemencation of specific provisions of the convention, as well as the desirable portions of the resolutions adopted by the conference, which would call for higher standards than are presently required by U.S. rules and regulations for licensing of merchant marine personnel. Public comments will be invited at that time.

A copy of the final act of the conference may be obtained by writing: Commandant (G-MVP/82), U.S. Coast Guard, Washington, DC 20590.

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

USCG TASKS NAVY TO BEGIN MERCHANT VESSEL NOISE SURVEY

Open letter to: Vessel Owners and Operators

From : Chief, Office of Merchant Marine Safety, USCG Headquarters

Subj : Merchant Vessel Noise Survey

The Coast Guard has contracted with the Naval Ocean Systems Center (NOSC) to survey the noise levels of the U.S. Merchant Fleet. They will need to board a number of representative vessels. In order for NOSC to accomplish the work they are tasked to do, we are requesting that you cooperate with NOSC in the same manner as you would the USCG, by permitting noise measurements to be taken on board your vessels and providing other information and cooperation necessary to accomplish the measurements.

As background, the Coast Guard's position is that this work is essential to develop a basis for noise standards that would apply to merchant vessels. The distinctive noise exposure patterns on ships warrant study to determine the impact, need, or benefits if noise standards are to be developed which are different from the general industry (OSHA) noise standards. Additionally, there is increasing activity in the international community to establish IMCO guidelines for ship noise levels and noise exposure. This requires the Coast Guard to accomplish this work in order to properly respond to the various proposals.

Your cooperation in these efforts are appreciated. If you have questions on this program you may call Mr. Samuel Wehr (202-426-1444) or LCDR Paul Anderson (202-426-2183) of my staff or write U.S. Coast Guard, 400 Seventh Street, SW, Washington, DC 20590.

H. H. BELL
Rear Admiral, U. S. Coast Guard

New Executive Secretary Joins Marine Safety Council

Captain Philip J. Danahy has returned to Coast Guard Headquarters as the Executive Secretary of the Marine Safety Council. The former Executive Secretary, Captain G. Kirk Greiner, Jr., has been assigned to Portland, Oregon to serve as Commanding Officer, Marine Safety Office and Group Commander.

The Executive Secretary heads the eight-member officer and clerical staff of the Marine Safety Council. As the central figure in the Coast Guard public regulatory system, he is responsible for estahlishing procedures and coordinating the efforts of technical and legal personnel in developing regulatory projects. Maintenance of significant records, including public comments in response to notices of proposed rulemaking, falls under his jurisdiction.

A graduate of the U.S. Coast Guard Academy in New London, Connecticut, he received postgraduate training in Naval Architecture and Marine Engineering at the University of Michigan. He qualified as a deck watch officer and engineering watch officer aboard a Coast Guard icebreaker, participating in five Arctic and Antarctic patrols, and has served as Chief Engineer aboard cutters working out of East Coast and Gulf Coast ports.

Captain Danahy began Merchant Marine Safety duties in 1958. Prior to assuming his present position in July of this year, he was Commanding Officer, Marine Safety Office, Jacksonville, Florida (Captain of the Port and Officer in Charge, Marine Inspection).

The Captain is a Registered Professsional Engineer and a member of SNAME (Society of Naval Architects and Marine Engineers), ASNE (American Society of Naval Engineers), the United States Naval Institute and the Propeller Club of the United States. He has been awarded the Coast Guard Commendation Medal on two separate occasions for his work with the Cargo and Hazardous Materials Division at U.S. Coast Guard headquarters.

Captain Danahy has four sons, one of whom began a career with the Coast Guard in 1976.

VICE COMMANDANT URGES RESPONSE TO PROPOSED REGS

In February 1978 the following speech was presented by Vice Commandant-Designate Robert H. Scarborough, Jr. to the International Shipmasters Lodge Convention in Cleveland, Ohio. On July 1 he received appointment to the position of Vice Commandant, United States Coast Guard. This speech appeared previously in the Lake Carriers' Association May-June 1978 Bulletin.

Good evening, ladies and gentlemen. I am going to spend a few minutes this evening telling a story about the sea--about the masters, the mates and the sailors. This story is not a sea story, for a sea story is somewhat like a fairy tale. The only real difference between a sea story and a fairy tale is the way it begins. A fairy tale always begins with "Once upon a time," but a sea story can be identified as it begins with "This is no bull."

Our nation and its quality of life have always been dependent upon the seas and the men who sail on them. Our nation was founded as a result of ships plying between the European Continent and the United States, bringing the immigrants and goods to our shores. In turn, the development of our shores was dependent upon trade with nations across the seas. In the beginning the master's word was law. He held the power of life and death over the men who sailed on his ships. Not only could he extract the maximum penalty of death for disciplinary infractions, but the lives of the sailors completely depended upon his skill in saving the ship from disaster. Many times this skill was found lacking as witnessed by the widows' walks on the homes by the shore. This power vested in the master was an absolute necessity, for instant obedience meant the difference between a successful voyage and a sea disaster.

However, there were abuses of power and public outcries for reform and limitations on this power came as a result of these abuses. Dana's book, Two Years Before the Mast, led to legislation placing severe restrictions on the disciplinary power of the masters. A series of tragedies in the late 1800's led to even more legislation and controls over the safety of vessels and the master's conduct. Even here these controls were vested in men who had sailed and knew the rigors of the sea and the need to balance the master's authority with controls over abuses.

Those who lived near the water were those who lived because of the sea. Either they sailed on it or were dependent upon the ships for their livelihood. Men who controlled the shipping companies were, in a few instances, entrepreneurs, but most were sailors who also knew the rigors and the language of the sea and could converse with the masters in their language. The seas and the lakes and the rivers were there for commerce, and the ships and the masters held sway. Others could use the waters, but only when they did not interfere with commerce. There was very little thought given to commerce interfering with the use of the water by others.

But times have changed. The nation grew away from the waters as a source of its livelihood. We became a nation of farmers and industries dedicated to domestic growth and international trade. Other modes of transportation grew and the sea was no longer the only means of trade. The beauty of the shore attracted men who looked to the land for their livelihood, merchants, manufacturers, etc. They appreciated the beauty of the ships but they did not understand the difficulties faced by the masters in navigation in close waters, and they could not tolerate or appreciate that the ships could interfere with their use of their waters.

Nevertheless, the shipping companies continued to prosper, but the sailors in company management slowly gave way to specialized managers, cost-concious bookkeepers, the lawyers with their focus on the letter of the law. All important, all skilled, but many with a lack of appreciation for the rigors of the sea and the difficulties faced by the seaman. The legislators, too, focnsed their attention to the needs of the land. More and more legislation came into belng as a result of the constituents' demands that placed even greater restrictions on the master's authority to navigate and control his vessel. More and more restrictions were placed on the master as to how he could navigate his vessel, when he could navigate his vessel and even where he could navigate his vessel. The nation took to the waters for recreation, and the master found that not everyone he met on the waters was as skilled and knowledgeable as he. The recreational boaters, the weekend sailors, flocked to the waters. Many were skilled, but many were not.

The master met other vessels operated by people who did not even know the rules of the road or the common courtesies of the sea and certainly had no appreciation of the difficulties he faced in navigating his vessel in narrow and restricted waters. The competition for the communication channels became severe. Again, many of those using the communication channels lacked knowledge in the requirements or the courtesies of joint use of the airways. The regulators too grew, and whereas the master had been regulated by sailors, he now faced a growing number of laws and regulations enforced by people who had never sailed the seas for their livelihood and who had no appreciation for the problems he faced, nor in fact even understood the language he spoke.

In the last decade we have seen a growing number of laws and regulations dealing with the protection of the environment which restrict the discharging of materials from ships into the waters and the air, with speed limits placed on the ships to protect the shore in the interests of the land owners at the expense of allowing masters the decisions which had traditionally been theirs as to how to best navigate their ship through restricted waters. Disasters at sea which had once been accepted as the risk one took to go to sea are no longer tolerated, and increasing legislation and regulations have been passed in an attempt to eliminate casualties at sea. The states and local governments that once recognized the preeminence of the federal government in the control of interstate commerce and in the regulations governing shipping are now questioning this preeminence and they are too looking at laws to control the waters and the men who sail on them.

With this increase in the number of entities exercising control over the master, the master wonders where are those who speak his language, those that can appreciate his problems and have a respect for the difficulties he faces.

I would like to be able to stand here before you this evening and tell you that this will change, that the master will again be controlled by those who have gone to sea and understand his language, but this is not so. A new balance is being formed between those who understand the sea and those who wish to use the waters for other than commerce. What I can tell you, however, is that as new regulations are proposed, the Coast Guard wants the comments and opinions of those who are being regulated--the masters, the mates and the sailors. I ask you to assist us in finding new ways to solicit your opinions, comments and suggestions on proposed changes to the regulations so that everyone may get the greatest benefits from the seas and the waters. Thank you.

REPORT
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SMITHSONIAN OPENS HALL OF MARITIME ENTERPRISE

The Museum of History and Technology in Washington, DC has a newly opened exhibit dedicated to the U.S. Maritime Industry. Valued at over $1 million, the 12,000 square feet of displays boasts numerous models, including an operating ship engine room and tugboat pilot house. Dr. Melvin H. Jackson, featured separately in this issue of the Proceedings, planned and completed this exhibition prior to his recent retirement from the Smithsonian.

RAISING ANCHOR-- Workmen are silhouetted against the bright summer sun as they hoist a huge anchor into place while outfitting the new tanker "Kenai" at the Sun Shipbuilding and Dry Dock Company, Chester, Pennsylvania. The tanker, being built for charter to a subsidiary of The Standard Oil Company (Ohio), will be used to transport Alaskan crude oil. When fully loaded the ship will he able to carry over 840,000 barrels of oil, and will have a draft of 54 feet. Sohio, which owns more than half of Alaska's North Slope crude oil, now operates the world's largest fleet of American flag tankers which are used to move the oil to consumers in the lower 48 states.

RESPIRATORY PROTECTION

YOUR RIGHT TO BREATHE SAFELY

Lieutenant T. J. Haas
Cargo and Hazardous Materials Division
U.S. Coast Guard Headquarters

In recent years, ever-increasing attention has been given to the hazards associated with the manufacture and handling of a vast array of chemical substances in use today. The acute hazards of these substances--flammability, toxicity, etc.,--though all too often underestimated, are well known. We are only beginning to discover the long-term effects of many chemicals, however. Recently, such terms as polyvinyl chloride, kepone, benzene and PCB's have become familiar in the news as each came under suspicion of causing cancer, nervous disorders, or other grave health problems.

Engineering controls, such as substitution of a less hazardous material, isolation, enclosure, exhaust ventilation, dilution ventilation, wet methods, and good housekeeping, are used today to eliminate or minimize the hazards. When control methods are not feasible, or when temporary and unusual conditions exist, personal protective equipment (i.e., hard hats, respirators, etc.) is the last line of defense for ensuring a safe and healthful workplace.

Many personnel are engaged in hazardous operations that do not have feasible engineering controls, nor do they have control over the conditions found at their workplaces. For instance, the marine inspector entering a cargo tank may encounter unknown concentrations of a hazardous chemical; a damage control-man may enter a space which has been depleted of oxygen due to fire; or a boatswainmate may be exposed to a chemical solvent when painting. All these jobs require a certain amount of personal protection, which may include the use of a respirator.

Anyone who has ever been assigned sea duty would think OBA, oxygen breathing apparatus, is synonymous with respirator. In this article I will examine what respirators are, how they are used, and finally, describe a respirator program. After all, it's your right to breathe safely.

Single-use filter mask. Photo courtesy 3M Company.

What are respirators, and how are they used? There are two basic types of respirators: air-purifying and atmosphere-supplying. The air-purifying respirator is dependent on the contaminated air, and contaius an air purifying element--a filter, a sorbent material, or a combination of both. The atmosphere-supplying respirator is independent of contaminated air, and is either self-contained or uses an air-line and hose mask for air supply.

There are many types of air-purifying respirators. The single-use filter mask is placed over the breathing zone and is used for nuisauce dusts. Some are designed for dusts such as asbestos that pose a health risk. However, there has been only limited guidance concerning which atmospheres they are appropriate for. Often they are used until there is an increase iu breathing labor or they become visibly dirty. Further, it is impossible to get aud maintain a good seal. These respirators should be used as sparingly as possible in "non-toxic" dust situations, and then discarded after use.

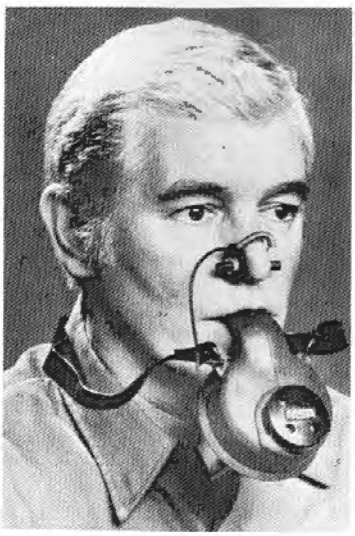
A mouth-piece respirator includes a nose clip and a mouth piece. This device, approved for escape only, is not to be used for entry into a hazardous environment. It has limited application and should never be used to perform normal work operations.

There are two types of oral-nasal (ON) respirators. The first is called a quarter-face mask, which uses a two point suspension system to keep it on the face. This type of ON respirator tends to leak as the wearer moves his jaw. The second is the half-face mask, which uses a four point suspension system. The chin of the wearer fits into this ON respirator and possible leakage is minimized. Either single or dual cartridges may be used to filter the contaminated atmosphere.

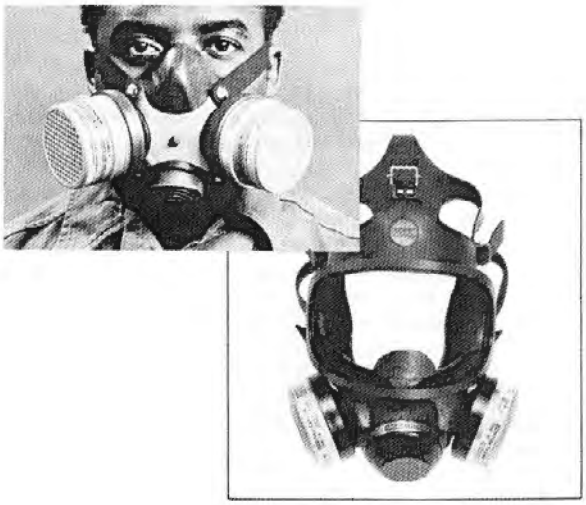
Finally, there is the full-face mask respirator. This type affords the wearer an excellent fit, since the seal is around the whole face, and is not over the nose bridge. Dual cartridges, chin canisters, or harness cannisters (usually called a gas mask) are used with this respirator.

The mask in all respirators is made of various materials, including neoprene rubber, silicon rubber, plastic, or combinations of these. Straps are made of rubber or other elastic materials, and the connectors are made of metal or plastic.

Two basic types of elements, filters and sorbents, are used to clean the contaminated air. A filter used on a respirator is a mechanical medium, which is either free or enclosed. The simplest but least efficient is the dust filter used for large size particulate matter no more toxic than lead. These are often made of rosin-impregnated wool felt. Mist/liquid aerosol filters usually carry the same approval and limitations as the dust filters. The fume filter, used for small particulate matter no more toxic than lead,



Mouth-piece respirator. Photo courtesy Mine Safety Appliances Company (MSA).



Half-face and full-face masks. Photo: MSA.

is more efficient. High efficiency filters are used for dust, fumes, and mists having threshold limit values (TLV's) less than .05 mg/m^3. These filters possess very small pore size and can even be used for radionuclide filtration in the range of 0.3 micron. Two special filters have been developed for asbestos and radon daughter nuclides. One note: as the filter efficiency increases, so does the breathing resistance. To overcome this problem, some manufacturers have introduced a battery-operated blower incorporated with the filter system to make breathing more comfortable.

Sorbent materials found in cartridges and cannisters are a second way of filtering a contaminated atmosphere. These are primarily used for substances that the wearer can detect at or below the established TLV, and incorporate the use of an end-of-service-life indicator. The sorbents used work on an absorption or adsorption principle, and are usually either charcoal or silica gel. The cartridges contain approximately 100 cc of sorbent; chin cannisters from 300-500 cc and the harness style from 1200-1800 cc.

Also available are combination filter/sorbent elements which are approved for the combination.

Some warnings about the use of sorbent filters are in order. They are worthless for high concentrations of vapors, since the sorbent can become saturated and cause a breakthrough. For example, 1000 parts per million (ppm) of an organic vapor cartridge should be the maximum concentration for a half-mask respirator. Additionally, some organic vapor cartridges or cannisters are not effective for certain organic vapors. An example is methyl alcohol. For some acid gases such as SO_2 and HCl, certain maximum concentrations are set by the manufacturer, and can range from 10 to 500 ppm.

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Finally, the premise that "something is better than nothing" is a fallacy. A cartridge or canister may become damaged, leading to channeling of the vapor right through the sorbent material. An example is mercury vapor which can break through the sorbent material, causing high exposure to the wearer. The vapor is trapped in the mask and cannot be eliminated. Therefore, check the end-of-service-life indicator, and the element for damage. Further, read what the filters are approved for, and what limitations the manufacturer has placed on them. Parameters of cost, type, concentrations encountered, time, etc., should be included in the determination of what type of element is to be used with the respirator. The premise should be "something is not better than nothing."

The second main category of respirators is the atmosphere-supplying. First, the hose-mask respirator has limited application and is not used for atmospheres immediately hazardous to health. It is not a positive pressure device, i.e., a higher flow than the ambient pressure condition. It is either "lung" powered with a maximum hose length of 75 feet, or is a "blower" model with a 250-foot hose length. These devices provide the lowest level of protection of atmosphere-supplying respirators.

Air-line respirator. Photo: 3M Company.

Demand breathing apparatus. Photo: MSA.

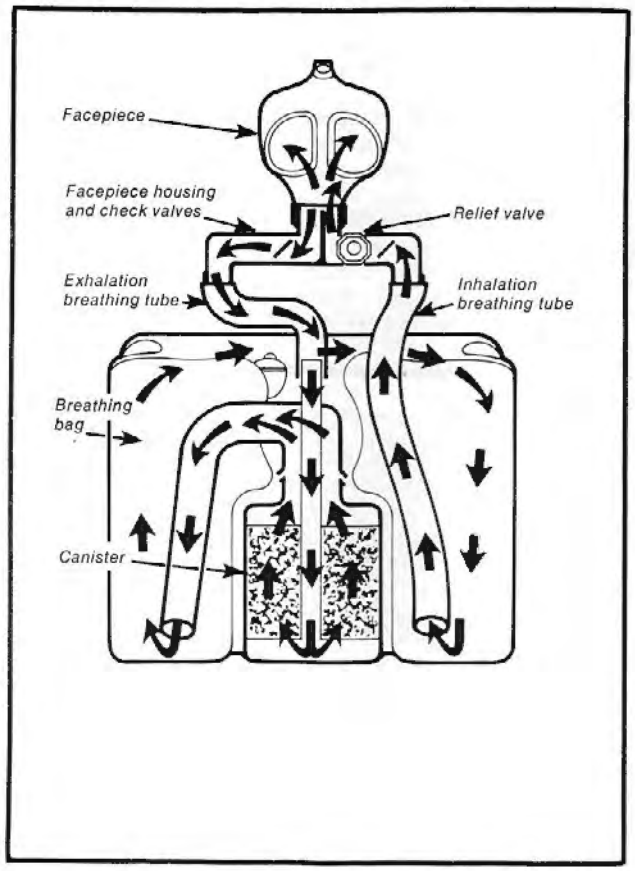
The second type, called an air-line respirator, comes in two modes. A continuous-flow air-line respirator delivers breathable air at a constant flow, usually at 15 cubic feet/minute (cfm). The continuous flow mode does produce a positive pressure in the mask but supplies considerably more air than is used in breathing. In the demand mode of airline respirators, a valve which regulates the flow of air opens only when a slight negative pressure is produced inside the mask as a result of inhalation. Since negative pressure is produced inside the facepiece, it must fit tightly to the face or contaminated air will be drawn in.

The third type of respirator in this category is the self-contained breathing apparatus (SCBA). One type the manufacturers have available is a small SCBA for "emergency egress only." It is rated at 3 to 15 minutes in duration and should not be used for entry into a contaminated area. This type usually has a high pressure, coiled source of compressed air and a plastic hood.

The other types of SCBA are the demand or positive pressure/demand breathing apparatus. Mine Safety Appliance, Scott, and Survivair are the only companies manufacturing these devices in the United States. These are open-circuit devices, meaning the air you breathe comes from a compressed air source, and is subsequently released to the surrounding atmosphere. The demand mode produces the negative pressure in the face mask and leakage is possible. The positive pressure demand mode is relatively new and provides a continuous slight positive pressure in the mask at all times. If a leak develops around the facepiece, contaminated air will not be drawn in. This is the ultimate in SCBA and can be used in atmospheres that are immediately dangerous to life or health; that is where there is an unknown hazard such as a toxic or low oxygen atmosphere. These devices, with a 30-minute air supply, weigh 32 pouuds. They are

back mounted and can be switched from the demand mode to the positive pressure demand mode. However, the manufacturers believe that the demand mode will be phased out since the positive pressure mode is safer and provides the best in respiratory SCBA protection.

Another type of SCBA uses recirculation to conserve the oxygen supply. The exhaled air is not expelled, but instead passes through a CO_2 absorber and enters a breathing bag to mix with fresh oxygen. The flow is then returned to the facepiece. This operation canses a negative pressure, and the same disadvantages of a demand mode detailed above are present. Some companies are working to make this SCBA a positive pressure unit.



Recirculation self contained breathing apparatus (SCBA). Diagram courtesy MSA.

There are definite advantages with this SCBA, since it has a longer duration (some up to two hours), and weighs considerably less than the positive pressure/demand SCBA discussed above (about 17 pounds).

Finally, the last type of SCBA is the oxygen generator or the familiar OBA. This device uses a chemical source of oxygen which is liberated when carbon dioxide and moisture are absorbed from the exhaled air. A breathing bag is provided to mix the incoming oxygen and the purified exhaled air. It can be used for 30 minutes only, and the cannister, once opened, cannot be resealed for future use. It also has a limited shelf-life if unopened.

Prior to 1969 there were no guidelines for the use of respirators. The first attempt to establish guidelines came from the American National Standards Institute (ANSI) when "Practices for Respiratory Protection," Z88.2-1969 was pnblished. This standard was a guide only, and not enforceable by law. In 1972 the Occupational Safety and Health Administration (OSHA) used Z88.2 when developing respirator regulations now found in 29 CFR 1910.134, under the authority of the Occupational Safety and Health Act (1970). These regulations have the force of law, and describe the basic elements of a minimal acceptable respiratory protection program.

Within the Coast Guard there are many facets to a good, effective respiratory protection program. Initially, a written standard operating procedure of the work practice must be developed. It is not a policy statement. It is a set of instrnctions written in such detail that the described operation can be performed repeatedly with a consistent, desirable end result. The standard operating procedure mnst be written specifically for the individuals performing the operation.

Next, a desirable part of the program is to determine work assignments and the medical status of the individuals involved. Some persons may not be able to wear a respirator due to the shape of the face, breathing difficulties, etc. At the same time, surveillance of the work area must be undertaken. Monitoring of the atmosphere in which the individual will work will he necessary.

Dependent on the last two criteria, the selection of an approved respirator must be made if engineering controls are not sufficient to ensure the safety of the worker. The respiratory device shall provide adequate respiratory protection against the particular hazard for which it was designed, in accordance with standards established by competent authorities. The competent authority, the National Institute of Occupational Safety and Health (NIOSH), tests and approves jointly with the U.S. Bureau of Mines (USBM) respiratory protective devices. Approved respirators carry an approval designation beginning with the letters "TC."

Along with the selection of approved devices, the appropriateness of the devices must be tested. A fit test must be performed to ensure the device is performing adequately for the individual wearer. The fit test can be either a qualitative

or quantitative evaluation. The qualitative test is rapid, inexpensive, and uses a minimal amount of equipment. This method is least accurate and is subjective upon the ability of the individual to sense an odor. Usually iso amyl acetate, "banana" oil, or an irritant smoke is used. The quantitative test is expensive (about $5,000) and time consuming, but it is very accurate in the determination of fit, and does not depend upon the subjectivity of the individual. For maritime workers' use, the qualitative fit test can be utilized. Since there is a large turnover of people this test can be made prior to duty or employment. One note: the wearing of beards should not be allowed for individuals required to wear respirators. The wearer with a beard is unable to get a good seal which can result in jeopardizing the individual's safety and health.

If possible, the individual should maintain exclusive custody and care of the respirator. Further, the individual required to wear a respirator must be instructed and trained on the use of the device. He must be made particularly aware of the limitations of the device, how to check for its operation, and how to determine if it is defective.

The respirators must be cleaned and disinfected after each use, and must he stored in a clean, dry area. During cleaning, the respirator must be inspected for defects. Defects must be immediately repaired, the parts replaced, or a new respirator be issued.

Finally, the respiratory program must be evaluated for effectiveness. This involves checking to see if all the steps above are being complied with. If changes in the work operation occur, the respiratory protection program may also need updating.

Proper selection, use, and care of respiratory protective devices used in hazardous environments is essential to protecting the health of personnel using these devices. Failure to choose the correct respirator or improper use and care of the device can endanger the health and/or life of the user.

Reprinted from The Coast Guard Engineer's Digest CG-133, Vol. 20, No. 199, Summer 1978

ABOUT THE AUTHOR: LIEUTENANT THOMAS J. HAAS

Lt. Tom Haas graduated from the U.S. Coast Guard Academy in 1973, and served aboard the USCGC ACACIA as operations officer. He attended the University of Michigan and received a Master of Science degree in Chemistry and a Master of Science degree in Environmental Health Sciences (Toxicology) in April 1977.

Lt. Haas is now at Coast Guard Headquarters in the Hazard Evaluation Branch, Cargo and Hazardous Materials Division. He is a member of the American Conference of Governmental Industrial Hygienists (ACGIH) and the Washington/Baltimore chapter of the American Industrial Hygiene Association (AIHA). Since coming to Headquarters, he has attended and spoken at several seminars dealing with industrial toxicology and respiratory protection.

Former Smithsonian Curator Heads Academy Museum

Editor's Note: A dream is coming true at the U.S. Merchant Marine Academy -- the story is told on page 85 of this issue. The following is a sketch of the man responsible for making this dream a reality.

Dr. Melvin H. Jackson left Yale College in 1936 to roam the Pacific as a mariner, sailing both as mate and as maater of numerous merchant vessels. He still maintains an unlimited master's license.

During World War II, he served with the U.S. Coast Guard on North Atlantic Convoy escort duty and later commanded LST 795 at Iwo Jima, Tacloban Bay and Okinawa. He worked after the war both as a ship's officer and marine company executive with several shipping firms.

A graduate of the University of Miami, Coral Gables, Florida, Dr. Jackson in 1956 became only the second person to ever receive a doctorate from Harvard University in Oceanic History and Affairs. After graduation, he taught marine history at the University of Miami.

Joining the Smithsonian Institution in 1961 as Associate Curator of the Division of Naval History, Dr. Jackson served at this post until April 1966 when he transferred to the Section of Marine Transportation. Two months later he was named Curator of the Section. Since 1971, he was particularly involved with the planning, design and promotion of the Hall of American Maritime Enterprise for the National Museum of History and Technology. He retired from the Smithsonian this February, after 16 years of service.

Dr. Jackson has published several articles as well as two books, Privateers in Charleston, 1793-1796, and Eighteenth Century Gun Founding: The Verbruggens at the Royal Brass Foundry. He is currently preparing a text to accompany the publication of a collection of ship drawings made in the 1930's under the federally sponsored Works Progress Administration.

Dr. Jackson, 63, currently resides in Kings Point, New York. He is married to the former Faith Reyher. They have three children.

Reprinted from the Kings Pointer, Volume 7, Number 2, Summer 1978

Marine Safety Council Membership

The Marine Safety Council gained a new member this June, when Rear Admiral Bernie E. Thompson became Chief of the Office of Boating Safety at Coast Guard Headquarters.

Rear Admiral Thompson and his family moved to Washington, DC from Governors Island, New York, where he spent the past two years as Chief of Staff at the Third Coast Guard District. Mrs. Thompson, Marie Woodbridge of Brookline, Massachusetts, is a graduate of the Connecticut College for Women. She and the Rear Admiral have a son, Craig, and a daughter, Karen.

Upon graduation from the U.S. Coast Guard Academy in 1948, newly-commissioned Ensign Thompson joined the Bering Sea Patrol on board the icebreaker USCGC NORTHWIND. The following two years were spent with the cutter STORIS out of Juneau, Alaska. In the autumn of 1950 he became Executive Officer of the tender TUPELO, based at Toledo, Ohio.

In successive shore duty he served as Chief of the Ninth Coast Guard District's Search and Rescue Section in Cleveland, Ohio. A transfer to Boston to be a Controller of the Rescue Coordination Center at the First District was followed by a 10-month command of the LORAN Transmitting Station at Cape Sarichef, Alaska. He served in the same capacity on Biorka Island, Alaska through 1954.

☆ ☆

Returning to the First Coast Guard District, then-Lieutenant Thompson was again assigned as a Controller of the Rescue Coordination Center. The next three years were spent as Commanding Officer aboard the USCGC HORNBEAM out of Woods Hole, Massachusetts. In 1960 he was stationed at Pearl Harbor with the Anti-Submarine Defense Force, Pacific Fleet.

After six months of study at the Armed Forces Staff College in Norfolk, Virginia, he reported to Coast Guard Headquarters to serve as Assistant Chief, Shore Units Division, and then as Naval Operations Liaison Officer. In 1967 he returned to sea as Commanding Officer of the USCGC CASCO out of Boston. Subsequent duties with the First District in Boston consisted of Director of Auxiliary, and Chief, Aids to Navigation Branch.

He returned to Juneau once more when assigned as Chief of Operations, 17th Coast Guard District. His achievements in that station brought him the Coast Guard Commendation Medal. In 1975 he was advanced to the position of Chief of Staff for the 17th District. The following year, and again this year, he was awarded the Coast Guard Meritorious Service Medal. It is a pleasure to welcome back to Coast Guard Headquarters Rear Admiral Thompson, a man of outstanding ability and accomplishment.

BEWARE! ENTER WITH CARE

death and disability await the unwary

On January 26, 1977, the Chief Mate aboard the SS NEW YORK was overcome by toxic gases while working in an empty cargo tank. Rescuers attempted to hoist him from the tank; the line they were using broke and he plunged 80 feet, sustaining fatal injuries. Rescue efforts also ended in gas inhalation injuries to the ship's Captain and another crew member.

The 265,000 DWT tank vessel SS NEW YORK was built in 1976 and used to transport crude oil from various ports in the Persian Gulf to Brazil. The Chief Mate arrived on board November 13, 1976 in Sao Sebastiao, Brazil. After offloading cargo at San Sebastiao, the tanker departed for Ras Tanura, Saudi Arabia on January 18, 1977. The Chief Mate had received his license the previous July, and this was his first voyage in that capacity.

the Chief Mate was responsible for the ship's cargo, cargo tanks and cargo handling system. The SS NEW YORK has 19 cargo tanks, of which the No. 7 center tank is the largest. The vessel had been experiencing some difficulty with the cargo valves, and work had already been done on the hydraulic systems of several tanks. Prior to entering each tank, the following precautions were taken:

- Each tank was inerted, using the ship's inert gas system.
- Each tank was cleaned, using the fixed tank cleaning system.
- Each tank was purged with fresh air, using the inert gas system.
- Each tank was tested for oxygen content and presence of explosive gases.
- A fresh air breathing apparatus with hose, several lengths of compressed air hose, safety harness and safety line were brought to each tank hatch opening.
- The Captain stood by the cargo tank hatch, and at least one seaman stood by the tank area.
- The Captain and Chief Mate had "walkie-talkies" for communication.

On the evening of January 25, 1977, the Chief Mate entered the No. 7 center tank. This tank has a capacity of 209,616 barrels and is approximately 165 feet long, 86.7 feet wide and 86 feet deep. Access to the tank is through the cargo tank hatch, located on the port side of the tank. All precautions listed were taken prior to the Chief Mate's entry. As was standard for his other tank entries he did not wear breathing apparatus, and took along a flashlight, "walkie-talkie," tools, and wrapped a white rag around his head so he could be more easily seen from above. At the bottom of the ladder he reported via "walkie-talkie" that the tank smelled peculiar and he was coming out. After exiting the tank, he and the Captain had a short discussion and decided to run the inert gas system on the fresh air mode from 2000 to 2300 that evening, and from 0600 to 0800 the next morning prior to re-entry into the tank.

The inert gas system on the SS NEW YORK is designed to supply boiler gases, after scrubbing, to the 19 cargo tanks for the purpose

of lowering the oxygen content in those tanks below 5 percent. The system draws exhaust gases from both boilers into a scrubber, and from there through a blower and to the tank header through a deck water seal. The system is also designed to allow fresh air to be circulated through the tanks by allowing the blower to take suction from the atmosphere and discharge it into the tank header. When the SS NEW YORK left Sao Sebastiao the main steam turbine driven inert gas blower was inoperable, due to an unbalanced impeller. From that time until the casualty, all tank inerting and fresh air purging with the inert gas system was accomplished using the electrically driven auxiliary inert gas blower. The rated capacity of the main blower was 17000 SCFM (Specific Cubic Feet per Minute) while that of the auxiliary blower was 4250 SCFM. Previous experieuce had shown the time needed to clean No. 7 center tank was from 12 to 18 hours. Log entries from January 18 to 26, 1977 indicated that No. 7 center tank was washed for only eight hours and five minutes.

At approximately 0800 on January 26 the Chief Mate asked the boatswain to prepare No. 7 center tank for entry, and informed the Captain of his plan to re-enter the tank. The tank hatch was opened and all butterworth plates removed. Safety equipment, as listed earlier, was brought to the top of the tank hatch. At 0925, with the Captain standing at the top of the ladder and a seaman standing by the tank area, the Chief Mate entered the tank. He and the Captain both had "walkie-talkies" and the Mate on watch on the bridge also had on his "walkie-talkie" monitor. Upon reaching the bottom of the tank the Chief Mate reported that it smelled much hetter. When the Captain attempted further conversation with him, there was no response. The seaman saw a wide arc of light from the flashlight and reported to the Captain that there was trouble below.

Once it was realized that an emergency situation existed, several things happened immediately. One seaman descended halfway into the tank without breathing apparatus and returned to the main deck at once, stating that there was too much gas. The general alarm was sounded, and a compressed air hose was lowered over the Chief Mate. The Captain then put on the fresh air breathing apparatus and carried a harness, safety line and "walkie-talkie" into the tank. When he was about 25 feet from the Chief Mate his air hose and safety line tangled, so he removed the mask and walked aft with the idea of bringing him back to the air hose. The Captain was only about eight feet from the unconscious man when he, too, blacked out.

Two crew members were lowered into the tank in an attempt to reach both inhalation victims. They used a 2-inch manila line and a safety line but no breathing apparatus, since all the available air hose was in the tank. Neither stayed in the tank longer than three or four minutes, but both were giggling and irrational when hauled out. Once the air hose was freed another seaman was lowered using the same lines. He was wearing a safety harness and fresh air mask, and carried an extra harness. A new line was available to hoist up the two unconcious men, but the seaman untied the line used to lower him and tied it around the Chief Mate, then wandered off into the tank where he conld not be seen. Several crew members on deck began hoisting the Chief Mate out of the tank; when he was about six feet from the top the line broke, and he fell over 80 feet into the tank. Upon examination the line appeared new and not deteriorated, but worn in the area of the break. While raising and lowering several people the line had run over the sharp hatch coaming, probably weakening the fibers.

At 1030, with rescue efforts proving unsuccessful, the Second Mate assumed command and prohibited further entry into the tank. A MEDICO message was sent and answered by the British vessel W. M. NEAL, which was equipped with self-contained breathing apparatus. A rendezvous of the two ships occurred at 1600. The crew of the SS NEW YORK was instructed in the use of the self-contained breathing apparatus and rescue attempts resumed.

After numerous tank entries and a lapse of five hours, everyone was removed from the tank. The Captain and seaman revived almost immediately when brought out into the fresh air. Followup medical examinations reported them in good health, with no resulting impairment. The Chief Mate was removed from the tank and pronounced dead due to multiple injuries.

The SS NEW YORK arrived at Capetown, South Africa on January 29, 1977.

CONCLUSIONS

Although precautions were taken before tank entry, the Chief Mate still lacked effective protection from an unsafe atmosphere. He entered the tank without protective gear and equipment to test the air as he proceeded. The tank had not been cleaned sufficiently to dispel poison hydrocarbon vapors. The Chief Mate apparently had a false sense of security, as he had uneventfully completed repairs ou several other tanks in the same manner.

The fresh air breathing apparatus used in the rescue operations functioned properly, but was too cumbersome for effective use. Self-contained breathing apparatus would have been more useful. There is no evidence that equipment failnre contributed to the

As a result of this casualty, the Coast Guard will examine the need to have a self-contained breathing apparatus in each emergency outfit in addition to the fresh air breathing apparatus.

*** *** *** *** ***

The Coast Guard Cargo and Hazardous Materials Division has prepared a booklet on tank safety entitled "When You Enter That Cargo Tank," number CG-474. If you do not already have a copy of this publication, it is free upon request from: Commandant (G-MHM/3), U.S. Coast Guard, 400 Seventh Street, SW, Washington, DC 20590; phone (202)426-1577.

*** *** *** *** ***

key notes

All comments on proposed rulemakings should be submitted to:

Commandant (G-CMC/81)
U.S. Coast Guard
Washington, DC 20590

Comments are available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, NASSIF Building, 400 Seventh Street, SW, Washington, DC 20590 phone (202)426-1477.

* * * * * * *

SECOND RADAR REQUIREMENT
CGD 77-016

A final rule was published in the Federal Register on July 24, 1978 requiring American and foreign vessels of 10,000 gross tons or more to carry an additional radar system when operating in the navigable waters of the United States. The effective date is Jnne 1, 1979.

* * * * * * *

COLLISION AVOIDANCE AIDS
CGD 77-016

The above final rule also withdrew the proposal for a Collision Avoidance Ald (CA) until it was further studied by the Intergovernmental Maritime Consultative Organization (IMCO).

LIQUEFIED NATURAL GAS FACILITIES
CGD 78-038

The August 3, 1978 Federal Register carried an advance notice of a proposed rulemaking concerning standards for safety, security, and environmental protection in the transportation, transfer, handling and storage of liquefied natural gas (LNG) at waterfront facilities. Existing Coast Guard waterfront facilities regulations were issued iu the 1950's and 1960's. Although some sections were revised in 1970, many have remained unchanged since the early 1950's. As a result, they do not take into account the exteusive development in technology and variety of waterfront marine activities. The proposed rulemaking, when final, will become an integral part of the revised and updated general waterfront facilities regulations.

Attention has been directed recently to the rapid increase in the number and complexity of petrochemical facilities and the transportation, storage and handling of a wide variety of new hazardous chemicals and dangerous cargoes. LNG has been of particular concern. It is the Coast Guard's position that the hazards associated with each hazardous material should be carefully evaluated and consistent regulatory action taken with due consideration of the risks associated with each.

Coast Guard proposed LNG facility regulations apply to the loading, unloading, storage and movement of LNG. They call for specified maintenance, repairs, tests and records. Fire protection reqnirements, safety equipment, and security reqnirements are also specified. Facility personnel are required to have training in specific areas depending upon their operational level. The proposals also set forth detailed operational requirements similar to those provided in the Coast Guard's present oil pollution prevention regulations (33 CFR Parts 154-156).

This advance notice is intended .to stimnlate useful comments and suggestions. Interested persons are invited to participate in this proposed rulemaking by submitting written views, data or arguments. Persons submitting comments should include their names and addresses, identify this notice (CGD 78-038) and the specific sections of the proposal to which their comments apply, and give reasons for their comments. Comments must be received on or before December 1, 1978.

* * * * * * *

BENZENE CARRIAGE REQUIREMENTS
CGD 75-075

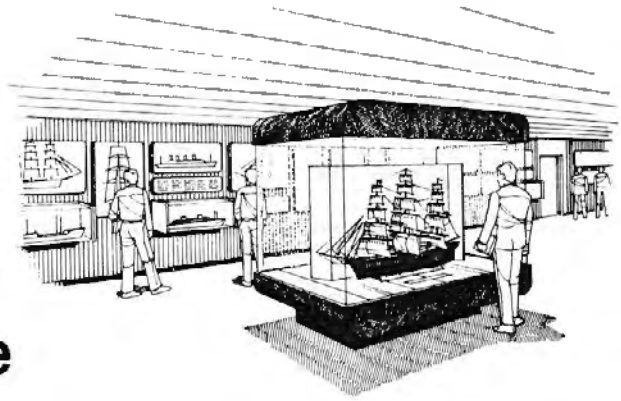
The Coast Guard is proposing to amend Parts 151 and 153 of Chapter 1, Title 46 to provide protection to maritime personnel from hazardous exposure to benzene vapor. The proposed rule appeared in the Federal Register on August 21, 1978. The probable danger to tankermen, ship's personnel and towboat personnel necessitates proposing some benzene exposure limits. The proposed limits should protect maritime personnel from the hazard of chronic exposure to benzene.

Studies conducted by the National Institute for Occupational Safety and Health (NIOSH) have determined that workers chronically exposed to low levels of benzene vapors incur an increased risk of certain blood disorders. In addition, recent studies indicate a possible cancer risk. These probable dangers to tankermen and other crew members on ships, barges, and towboats necessitate establishing benzene exposure limits.

Your input on this proposed rulemaking is encouraged. Comments, including name, address, and notice identification (CGD 75-075) will he accepted on or before October 5, 1978. A Draft Regulation Evaluation and Environmental Impact Assessment will be available for examination along with comments received at the office of the Marine Safety Council.

Museum of the

American Merchant Marine



There cannot be a more appropriate place to gather, preserve and display the artifacts of America's maritime history than at the United States Merchant Marine Academy at Kings Point, New York. Accordingly, the Academy will soon open the doors of the Museum of the American Merchant Marine.

With visions of such a museum the Academy in 1971 requested Dr. Melvin Jackson, then curator of the Section of Marine Transportation of the Smithsonian Institution, to survey its collection of memorabilia and give an opinion as to its museum worthiness. Although Dr. Jackson found a fine collection about which a maritime museum could be built, he was discouraged at the lack of facilities to house the museum. The project was momentarily abandoned.

In 1978 Dr. Jackson was contacted once again. Through the Kings Point Fund, a non-profit organization founded in 1958, an ideal site adjacent to the Academy campus had been acquired to house the envisioned museum. Known as the Barstow House, this property overlooks Long Island Sound with the New York City skyline as a backdrop.

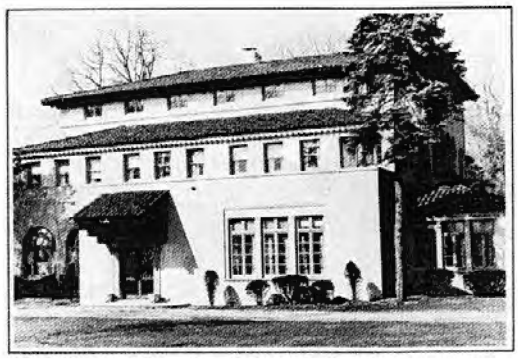
Dr. Jackson had heen involved in planning the Hall of American Maritime Enterprise at the Smithsonian, and was nearing retirement. Unable to resist the challenge of creating a new maritime museum, he agreed to take on the revival of the project. As a result, the Museum of the American Merchant Marine is now nearing completion.

Primarily, the museum's exhibits will narrate the origin and evolution of modern United States shipping. Emphasis will be placed on the Age of Steam and Steel, with insight into the influence of the industrial revolution of the 19th century and the technological revolution of the 20th century upon ocean borne trade. Displays will include a section tracing the art of navigatiou; a grouping of models and paintings to memorialize the SS UNITED STATES; and the two SAVANNAHS, the harbingers of the ages of ocean steam and nuclear navigation.

The mission of the Museum of the American Merchant Marine is educational, designed to appeal to the maritime community and the general public. Companies related to marine enterprises will be invited to prepare temporary exhibits to demonstrate their part in modern maritime industry. Museum visitors will learn of the laws and business methods governing maritime trade, changing economic factors and developing technology.

This new museum will house an important historical documentary of our nation's development through its merchant marine. All facets of this progress will be represented, from 17th century coastal traders to clipper ships, supertankers, LNG vessels and even foresight into the nuclear-powered merchantmen of the future. Hopefully, the museum will evolve into a study center devoted to our merchant marine.

In the words of Dr. Jackson, "here we will recall the deeds of gallant men and gallant ships."



Barstow House, home of the new museum.

Nautical Queries

The following items are examples of questions included in Third Mate through Master deck examinations and the QMED examinations.

DECK

1. The location of radio beacons is indicated on a chart by which of the following characteristics?

I. The abbreviation R Bn
II. The magenta circle around the location

A. I only
B. II only
C. Both I and II
D. Neither I nor II

2. A buoy of the United States system having red and black horizontal bands would have a light characteristic of

A. group occulting.
B. interrupted quick flashing.
C. morse letter "A".
D. quick flashing.

3. If a bearing taken to a known position of an object ashore is 320° by gyrocompass, and the charted bearing is 318.5° true, what course would you steer per gyrocompass to head directly toward the object?

A. 316°
B. 318.5°
C. 320°
D. 321.5°

4. In the uniform cardinal system of buoyage, a buoy in the eastern quadrant from a danger could

A. be black and white horizontally striped.
B. be black and white vertically striped.
C. have a red top mark.
D. be any of the above.

5. The equation of time is 12m 00s and the apparent sun is behind the mean sun. If you are 3° west of the central meridian of your time zone, what time will the apparent sun cross your meridian?

A. 1148
B. 1200
C. 1212
D. 1224

ENGINEER

1. The emergency signal for fires is sounded on the ship's whistle and general alarm as

A. a continuous ringing for 10 seconds.
B. one short ring followed by one long ring.
C. two long rings of at least 20 seconds.
D. a continuous ringing until the fire is extinguished.

2. If a person had received a severe electrical shock, but has fallen away from the electrical source and is still breathing, you should

A. give a stimulant to restore normal temperature.
B. keep the person lying down and warm.
C. apply cold compresses to any burned areas.
D. make the person stand up and walk around.

3. Combustible gases or vapors can be safely detected with the

A. flame safety lamp.
B. combustible gas indicator.
C. halide torch.
D. orsat apparatus.

4. If the fixed carbon dioxide fire extinguishing system for the paint locker suddenly discharges while you are in that compartment, you should immediately

A. drop to the deck to obtain oxygen.
B. leave that compartment for your own safety.
C. stop the ventilation and close the door.
D. look for the source of the fire.

5. If the safety valve starts to whistle on an oxygen-breathing apparatus, the person wearing the OBA should

A. go out into the fresh air.
B. open the by-pass valve wide.
C. close the by-pass valve until the whistling stops.
D. reset the timer for an additional 10 minutes.

ANSWERS

Deck
1. C, 2. B, 3. C, 4. C, 5. D

Engineer
1. A, 2. B, 3. B, 4. B, 5. A

MERCHANT MARINE SAFETY PUBLICATIONS

The following publications may be obtained from the nearest marine safety office or marine inspection office of U.S. Coast Guard. Because changes to the rules and regulations are made from time to time, these publications can be kept current between revisions only by referring to the Federal Register. (Official changes to all federal regulations are published in the Federal Register, printed daily except Saturday, Sunday, and holidays.) Following the title of each publication in the table below are the date of the most recent edition and the dates of the Federal Registers affecting each.

The Federal Register may be obtained by subscription ($5 per month or $50 per year) or by individual copy (75 cents each) from SupDocs, U.S. Government Printing Office, Washington D.C. 20402.

CG No.	TITLE OF PUBLICATION
101-1	Specimen Examinations for Merchant Marine Deck Officers (2d and 3d Mate) (4-1-77).
101-2	Specimen Examinations for Merchant Marine Deck Officers (Master and Chief Mate) (4-1-76).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (4-1-72). F.R. 7-21-72, 12-1-72, 6-18-75.
*115	Marine Engineering Regulations (8-1-77). F.R. 9-26-77.
*123	Rules and Regulations for Tank Vessels (8-1-77); Ch-1, 4-28-78). F.R. 8-17-77, 9-12-77, 10-25-77, 12-19-77.
169	Navigation Rules - International - Inland (5-1-77). F.R. 7-11-77, 7-14-77, 9-26-77, 10-12-77, 11-3-77, 12-6-77, 12-15-77, 3-16-78.
*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, 10-22-75, 2-5-76, 1-13-77, 11-3-77, 12-6-77.
174	A Manual for the Safe Handling of Flammable and Combustible Liquids and Other Hazardous Products (9-1-76).
176	Load Line Regulations (2-1-71). F.R. 10-1-71, 5-10-73, 7-10-74, 10-14-75, 12-8-75, 1-8-76.
182-1	Specimen Examinations for Merchant Marine Engineer Licenses (2d and 3d Assistant) (2-1-78).
182-2	" " " " " " " (First Assistant) (3-1-78).
182-3	" " " " " " " (Chief Engineer) (3-1-78).
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, 10-22-75, 2-5-76, 3-1-76, 6-10-76, 7-11-77, 12-6-77, 12-15-77.
*190	Equipment Lists (5-1-75). F.R. 5-7-75, 6-2-75, 6-25-75, 7-22-75, 7-24-75, 8-1-75, 8-20-75, 9-23-75, 10-8-75, 11-21-75, 12-11-75, 12-15-75, 2-5-76, 2-23-76, 3-18-76, 4-5-76, 5-6-76, 6-10-76, 6-21-76, 6-24-76, 9-2-76, 9-13-76, 9-16-76, 10-12-76, 11-1-76, 11-4-76, 11-11-76, 12-2-76, 12-23-77, 4-4-77, 4-11-77, 4-21-77, 5-19-77, 5-26-77, 6-9-77.
191	Rules and Regulations for Licensing and Certification of Merchant Marine Personnel (11-1-76). F.R. 3-3-77, 8-8-77.
227	Laws Governing Marine Inspection (7-1-75).
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, 10-1-75, 10-8-75, 6-3-76, 9-27-76, 2-3-77, 3-31-77, 7-14-77, 7-28-77, 9-22-77, 9-26-77, 12-19-77, 1-6-78, 1-16-78, 3-2-78.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (9-1-77). F.R. 9-26-77, 9-29-77, 12-19-77.
258	Rules and Regulations for Uninspected Vessels (4-1-77); Ch-1, 3-17-78). F.R. 9-26-77.
259	Electrical Engineering Regulations (7-1-77). F.R. 9-26-77.
268	Rules and Regulations for Manning of Vessels (7-1-77).
293	Miscellaneous Electrical Equipment List (7-2-73).
*323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (7-1-77); Ch-1, 3-17-78). F.R. 9-26-77, 12-15-77, 12-19-77, 7-17-78.
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, 7-11-77.
467	Specimen Examinations for Uninspected Towing Vessel Operators (10-1-74).
497	Rules and Regulations for Recreational Boating (7-1-77). F.R. 7-14-77, 8-18-77, 3-9-78. 4-27-78, 8-17-78.

*Temporarily out of stock.

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