

PART II

GENERAL SAFETY

PRECAUTIONS

**PART
II**

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CHAPTER 1
HOUSEKEEPING AND HYGIENE

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2-1-1 HOUSEKEEPING ESSENTIAL TO SAFETY. Good housekeeping practices are essential to safety as well as to efficient working operations. Many potential accidents and fires are prevented when working areas, warehouses, storerooms ashore and afloat are maintained in a clean and orderly condition.

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2-1-2 GOOD HOUSEKEEPING RULES.

- a. Provide adequate lighting.
- b. Keep machines, equipment and working surfaces clean and orderly.
- c. Provide adequate tool storage and maintain in neat order.
- d. Remove hazardous objects from floor or ground areas during work, and clean up work areas as soon as work is completed.
- e. Remove and dispose of scrap and waste daily.
- f. Provide approved waste containers in sufficient number.
- g. Clean up immediately any spilled flammable liquids, greases, or other dangerous or slippery substances from working floors or paved areas.
- h. Remove broken straps, exposed nails, or wire from containers or unit loads.
- i. Allow eating only in authorized places.
- j. Keep offices and rest rooms in orderly condition.
- k. Use containers, pallets and units of sound construction only.
- l. Maintain proper and safe storage of hazardous packing materials, such as excelsior, saw dust, wood cellulose, preservation liquids and chemicals.
- m. Aisles and work areas shall be kept clear at all times.
- n. Eliminate tripping hazards such as telephone, light, and power cables.
- o. Place flammable waste (such as: oily rags, steel wool and sweepings of excelsior) in special covered metal containers.
- p. Provide regular inspections by supervisory personnel for unsafe conditions, unsafe acts, and cleanliness.
- q. Maintain adequate emergency fire fighting equipment and access thereto.
- r. Remove ice, snow or sleet from outside walkways, ramps,

docks and stairways, and spread sand, fine gravel or fine cinders to prevent slipping. Ice should be treated first with calcium chloride or sodium chloride to prevent the sand from blowing off.

s. Floors should be kept dry. This is especially important for linoleum covered floors or floors which are waxed and polished. Rugs or mats should be kept smooth to prevent tripping.

t. Keep hose, cable and wire off floors and removed from walkways and work areas.

u. Use soap and hot water to clean decks and floors, gasoline, naphtha, thinners, or other highly flammable materials will not be used.

v. Floors and decks and other work surfaces shall be kept free from protruding nails, splinters, holes and loose boards.

w. Life rings will be provided at docks and piers where depth of water is a hazard should personnel fall overboard. Life rings will be maintained at 200-foot intervals at all times.

x. Areas beneath or within 50 feet of buildings shall not be used for storage of combustible material and shall be regularly policed to keep them free from accumulation of debris and combustible vegetation. Dry weeds and grass shall not be permitted by buildings and railroad properties. Grass should be cut frequently and weeds cut or destroyed by weed killer compounds.

y. Flammable liquids shall not be poured into sewers or drains on the ground. They shall be collected in steel drums, cans or other designated receptacles and disposed of as prescribed by local command.

z. Non-slipping, non-corrosive safety treads shall be used around door coamings and at the foot of ladders/stairs. Non-skid safety plated or other abrasive devices shall be installed adjacent to doorways, ladders, operating deck areas, around machinery, bits, etc., where slippery conditions from wet decks may exist.

aa. Stairs.

(1) Stair treads, unless made of wood, should have anti-slip surfaces.

(2) Stairways over 88 inches wide shall be provided with an auxiliary handrail in the center, and a handrail on each side. Stairways over 44 inches but less than 88 inches wide shall have

railings on each side. Stairways between 22 and 44 inches should have at least one handrail.

(3) Stairway openings shall be guarded by railings not less than 36 inches nor more than 42 inches from floor surface to top of railing. Stairway railings shall be not less than 30 inches nor more than 34 inches from the top of the railing to the surface of the tread at the face of the riser. Intermediate railings or suitable screening shall be provided from the top of the railing down to the floor or treads.

(4) Stairs should be well lighted. Stairs should be kept clean, dry and free of slippery substances, refuse or stored material.

(5) Where practical, the duties of employees should be planned so that they will require as little use of the stairs as possible. Employees and/or other personnel should be instructed to walk, not run on stairs and to use the handrail.

bb. Doors.

(1) Haste in opening doors and entering doorways shall be prohibited, since it is impossible in most cases to determine whether another person is opposite the door or whether obstructions may be present.

(2) Clean glass and/or plastic vision panels of average eye height are desirable in solid doors, in areas where not prohibited other than fire-screen doors.

(3) Door stops of the loose type shall be put in a safe place when not in use so as to prevent their becoming a tripping hazard.

(4) Springs on self-closing doors shall be kept at the proper tension so that doors will not close too rapidly.

(5) Door hardware shall be kept in good repair.

(6) "Caution-Open Door Slowly" shall be posted on doors which open into passageways.

* (7) Watertight doors, reefer doors, etc., equipped with dogs to force door frame against it's gasket, shall be provided with two dog wrenches (pipe) installed on or adjacent to each door.

* cc. Smoking in berths or beds is prohibited and signs to this effect shall be conspicuously posted in each room.

2-1-3 OFFICE AND LOUNGE AREAS SAFETY, ASHORE/AFLOAT.

a. General.

(1) Fixtures attached to ceilings shall be kept securely fastened. Personnel shall at no time work directly underneath fixtures which are being replaced or repaired.

(2) Sharp-pointed pencils or uncapped fountain pens shall not be carried in belts or placed upright in the handkerchief pocket.

b. Filing Cabinets. Overbalancing from various causes is the primary hazard in connection with the use of filing cabinets. The following precautions against overbalancing and other hazards should be taken:

(1) Individual upright filing cabinets should be secured to prevent overbalancing. Where there are two or more they should be fastened to each other. When steel filing cabinets are aligned in rows, back to back, it has been found that a 1½-inch angle iron fastened on the floor in front of each row will not only keep the cabinets in line but will prevent them from falling forward when drawers are extended.

(2) Cabinets with projecting locking devices should not be aligned with cabinets lacking such devices. Such an arrangement increases the possibility of a worker striking a projecting corner or locking lever, and serious injury can result. The same hazard exists when cabinets of unequal size are aligned. Cabinets of the same size and style should be aligned.

(3) Never leave a file drawer open when it is not being used. Do not have more than one drawer of a file open at one time, since cabinets easily overbalance.

(4) Do not place heavy material or files of smaller size (such as card-index files) on the tops of file cabinets.

(5) Sharp burrs on metal filing cabinet edges should be eliminated before cabinets are used.

c. Desks.

(1) Splinters and loose veneer on desks should be covered or sandpapered before the desk is used.

(2) It is advisable to equip desks and other pieces of furniture with rubber feet to prevent "creeping". This is especially true when desks are placed in close proximity, since in such cases employees often injure their fingers or hands in attempting to realign desks. Shipboard furniture such as chairs, tables, pianos, etc. are to be properly stowed and secured *

to prevent same from coming adrift when the vessel rolls. All passenger lounge furniture shall be fitted so as to facilitate permanent securement in place. Folding chairs and other chairs that are not otherwise secured shall be equipped with rubber feet. Swivel type chairs other than fixed type (secured to deck) are not permitted for use aboard ship.

(3) The handle should always be used when closing disappearing typewriter compartments. Because of the weight of the typewriter this section of the desk closes rather rapidly and may cause injury to fingers or hands.

(4) Points of pencils, pens, and other sharp objects should always be laid on the desk with the point away from the person sitting at the desk. When possible, containers should be provided in which to keep sharp objects when not in use. Razor blades should have the cutting edge covered when kept in a desk drawer.

(5) Broken glass tops should be disposed of promptly and the desk should not be used until the broken top has been removed. Glass tops should not be used unless absolutely necessary because the reflected light causes eyestrain.

(6) Pencil sharpeners and other equipment should not protrude from tops of desks or other furniture.

(7) Desk drawers should never be left open, since a person can inadvertently strike or stumble over them and suffer serious injury.

(8) Matches of a nonsafety type should not be left in desk drawers.

d. Chairs.

(1) Weak spring-tension adjusting bolts on swivel chairs may break and throw the occupant with considerable force. Bolts should be checked regularly.

(2) Personnel should not sit in a tilted position in any chair.

e. Typewriters.

(1) Check typewriter well mechanism on desks regularly to see that connections are secure.

(2) Do not have lighted cigarettes or matches in the vicinity when cleaning the typewriter.

(3) Do not at any time place typewriters on sliding shelves of desks.

f. Miscellaneous Office Machines.

(1) Before using office machines, be sure they are properly located and not in danger of falling. Use hold down on shipboard equipment to prevent same from coming adrift when the vessel rolls.

(2) Never clean or lubricate electrical appliances when they are in operation. When cleaning electrical appliances which are controlled by a switch on the machine, be sure the switch is turned off and the plug pulled.

(3) Do not touch any electrical connection with wet hands. Be sure that all electrical equipment is grounded.

(4) Protection should be provided against moving parts on addressograph, mimeograph, bookkeeping, tabulating machines, and other types of power-driven office equipment.

(5) When office machines are equipped by the manufacturer with 3-wire (grounded) electrical circuits, ground wires must be connected prior to placing machines in operation.

g. Fans.

(1) Each ventilating fan within 7 feet of the floor or on working platforms which are exposed to contact, should be completely covered with wire mesh of not less than 20-gauge, the openings of which will reject a ball one-half inch in diameter.

(2) Fans should be checked regularly to be sure there are no loose blades or defective guards.

(3) Small electric fans should not be placed on boxes or low tables, or in any other position where an individual might catch hands or clothes in the revolving blades.

h. Baskets.

(1) Personnel shall not put broken glass in wastebaskets. If a tumbler or other piece of glassware has been broken, it is suggested that this material be packed in heavy paper, marked "broken glass", and placed alongside the wastebasket at the end of the day so that the person removing waste paper will not be cut accidentally.

(2) Distorted or damaged metal or wire baskets should

be repaired or replaced promptly, since sharp edges and points can cause injury.

i. Ladders.

(1) Small ladders and stands used in some offices shall be equipped with treads of nonslip material and safety feet.

(2) Rolling and trolley-type ladders shall be provided with braking attachments.

(3) Ladders having split or broken parts (rails, steps) shall be immediately placed out of service.

(4) Ladders shall not be painted except with clear lacquer, shellac or varnish, so that defects may be seen.

* (5) Portable metal ladders (aluminum, etc.) shall not be used by electrical equipment and shall be permanently and conspicuously marked, "Caution -- Do not use near electrical equipment." These warning signs shall be placed on the inside of each side rail between the third and fourth rungs from the bottom of the ladder.

j. Duplicating Machines.

(1) Spirit duplicating machines should not be used in confined areas, such as small offices, without exhaust ventilation. The spirit fluid used as a solvent in these machines is usually a mixture of ethanol, methanol (methyl alcohol), cellosolve, and other toxic and explosive chemicals. Duplicating machines operated steadily in small rooms shall be provided with an enclosing hood over the receiving basket and a canopy type hood is suggested for the receiving tray. Both hoods shall be provided with mechanical ventilation designed to give an air flow of at least 100 linear feet per minute through the working openings of the hood. The maximum allowable concentration for methyl alcohol based on an 8 hour per day exposure is 200 ppm. Personnel should be extremely careful to avoid ingestion of this fluid as it is highly toxic when swallowed.

(2) Methanol is highly flammable with explosive limits of 6 to 35 per cent by volume in air. To put out fires, in small quantities of this material, dry chemical, carbon dioxide, or large quantities of water may be used. This material should be used and stored in a cool place away from acute fire hazards and open flame.

(3) Fluid containers should be provided with warning labels with such information as "Poison-Flammable. Do not take internally. Do not breathe excessive vapors. Avoid skin contact as much as possible." (See 2-14-14 on alcohols.)

k. Pictures and Bulletin Boards. Pictures and bulletin boards aboard ship shall not be under a plate-glass cover. Plexiglass or safety glass (not tempered) shall be used.

l. Mirrors. Mirrors larger than sink mirrors shall be provided with heat treated or laminated heat treated glass. Old type sink mirrors that have broken shall be replaced with heat treated or laminated heat treated glass.

2-1-4 PRINCIPLES OF FIRE. Since fire is one of the greatest and most frequent hazards met in almost any area, fire safety has been given special importance in this publication and is treated in detail in the various chapters. However, for a full understanding of the hazards, and the safety methods necessary, it is desirable that personnel have a knowledge of the principles behind fire prevention and fire fighting. The following paragraphs explain the classification of fires and the treatment of them on the basis of removing at least one of the factors necessary for combustion.

a. Classification of Fires.

(1) Class A fires are those involving wood, rubbish, etc.

(2) Class B fires are those involving oil or oil soaked materials.

(3) Class C fires are those involving electrical equipment.

b. Cause of Combustion. Three factors are necessary for combustion, (1) fuel in the form of vapor; (2) oxygen; and (3) sufficient heat to raise a combustible material to its ignition temperature. All three of these factors must be present in the same place at the same time in order to have a fire. When anything burns, it is not the actual substance which is consumed by the flame, but the vapor of the substance in combination with the oxygen of the air. A piece of wood held in a flame will not catch fire until it has been heated to a point where vapor is given off. Therefore, highly volatile products, such as gasoline, which vaporize at ordinary temperatures and pressures, present a most serious fire hazard.

c. Spontaneous Ignition. If a large mass of certain combustible materials which has been soaked in oil is allowed to stand, and the heat generated by the slow oxidation process is not allowed to escape, the temperature of the mass rises. If this heating is allowed to proceed, the material reaches its ignition temperature and starts to burn. For this reason paint-soaked rags and oily waste must be stored in a way least

likely to accelerate oxidation and most likely to cause any heat of oxidation to be absorbed by the surroundings. Use only self-closing metal receptacles for discarding oily waste and dispose of such collections daily.

d. Principles of Extinguishing Fires. In order to extinguish a fire one of the three factors necessary for combustion must be eliminated. This may be done by any one of the following methods:

(1) If the fuel is removed, the fire is extinguished by starving.

(2) If combustion-supporting oxygen is removed, the fire is extinguished by smothering. The use of foam, carbon dioxide, steam, and sometimes sand, is based on this principle.

(3) If heat is removed from a fire, the fire is extinguished by cooling. In ordinary fires this is usually done by the application of water. In oil fires, however, water is not used alone because of the fact that a jet of water disperses the oil and spreads the fire. In an oil fire a water fog nozzle should be used. Water fog will extinguish the fire by combining cooling and smothering. Water should not, however, be used in an area containing electrical equipment since water is a conductor of electricity. Dry powder or carbon dioxide extinguishing agents should be used.

2-1-5 FIRE-EXTINGUISHING METHODS. The subject of fire extinguishers is a highly specialized one and new methods are being developed constantly. The MSTS Damage Control Manual and NAVSHIPS Technical Manual shall be referred to for guidance in fire extinguishing methods.

a. Foam Extinguishers. Foam extinguishers are used primarily for oil and gasoline fires. Foam is lighter than the lightest oil products and will float on the surface of the liquid, forming a flexible blanket which cuts off oxygen from the burning oil and extinguishes the flame. The cooling effect of water in the foam also helps to lower the temperature.

(1) Foam may be produced mechanically by the use of air, water, and protein solutions. Foam systems have recently been installed in United States aircraft carriers. Instantaneous operation of these systems is possible through reliable pushbutton control which puts the entire apparatus in motion in about 12 seconds. A new foam-generating and pumping unit has also been developed for use on land.

(2) Foam may be produced chemically directly from a small extinguisher. A 2½-gallon extinguisher will produce from 20 to 22

gallons of foam. In chemical foam-stabilizing agent dissolved in water; an inner chamber contains a water solution of aluminum sulfate. When the extinguisher is inverted the chemicals mix, creating carbon-dioxide gas which permeates the liquid and forms a tough, durable foam.

b. Carbon Dioxide Extinguishers. Carbon dioxide extinguishers are used effectively on oil and electrical fires. The liquid carbon dioxide upon contact with air turns into gas which blankets the fire by shutting off the supply of oxygen.

c. Dry Chemical Extinguishers. Dry chemical extinguishers have been in general use in the Navy only since World War II. They contain chemically processed bicarbonate of soda which is released when a turn of the hand wheel punctures an inner cartridge of carbon dioxide or nitrogen. The chemical releases smothering gas on the fire and at the same time releases a cloud of dry chemical which shields the operator from the heat.

d. Carbon Tetrachloride Extinguishers. Carbon tetrachloride extinguishers shall not be used under any circumstances. Carbon tetrachloride fumes in even very small amounts are extremely toxic, and when heated, phosgene and other deadly gases are liberated.

2-1-6 WARNING SIGNS AND MARKING OF INHERENT HAZARDS.

a. Posters and Signs. Regardless of operation, steps shall be taken at the start to impress workmen that each particular project is to be a safe one with no added dangers of fire. This can best be accomplished through the use of posters and signs prominently placed throughout work areas.

b. "No Smoking" Signs. Signs shall be posted in areas where flammable materials are stored, and in work areas where smoking is not permitted.

c. Marking of Hazards to Personnel.

(1) Hazards to personnel, such as low beams, high hatch coamings and other strike against, stumbling and tripping hazards, shall be painted with alternate bands of black, MSTS Code 48, and brilliant yellow, MSTS Code 47, particularly in shipboard troop areas. Band stripes shall vary from $1\frac{1}{2}$ inches to 4 inches in width depending upon the size and disposition of the area to be painted; small areas will require smaller stripe widths. On interior stairways a 4 inch band of brilliant yellow shall be applied immediately under the tread on the top and bottom risers. Cargo hold ladder handrails shall be painted solid yellow from

the deck up six feet and from the top down one foot. Top and bottom rungs shall also be painted solid yellow. (See COMSTSINST 4750.1B)

(2) Professional judgement and experience shall be the guidelines for the use of these warning stripes. Such striping shall not be used in shipboard cabin passenger areas on dependent transports and under no circumstances will these warning stripes be applied to the exterior hull of a ship.

(3) The top and bottom riser on stairways in shipboard dependent areas may be painted white, MSTs Code 17, as a safety feature.

2-1-7 IMPORTANCE OF GENERAL HYGIENE. The well-being of workers is maintained by the application of environmental controls and by work habits which eliminate or minimize occupational hazards. Such things as lighting, ventilation, and cleanliness throughout working area must be maintained at proper levels at all times in order to assure the best possible health as well as high efficiency levels for workers. Safe and healthful working conditions must be maintained in all Naval activities and the following general precautions shall be observed.

2-1-8 INDIVIDUAL RESPONSIBILITY.

a. Physical Examination. Both military and civilian personnel who are subject to exposures hazardous to health shall be given periodic physical examinations.

b. Co-operation. Although the primary responsibility for many factors of health and safety lies with specially trained persons, who are hired for the purpose, all personnel shall be alert to the necessity for constant awareness and practice of precautions and shall co-operate with supervisors and other workers for the maintenance of high health and safety standards. Employees shall report all injuries and illnesses immediately in order that medical treatment may be promptly rendered to offset complications.

2-1-9 VENTILATION.

a. Control of Contaminants. Whenever materials, substances, or their by-products which release contaminants are being processed, adequate preventive measures shall be taken to eliminate these contaminants, either at the point of origin or by local exhaust.

(1) Exhaust systems shall be so constructed as to provide air velocities recommended for the capture of dust, fumes, smoke, mist, gases, and vapors at the point of operation. Atmospheric contaminants

removed by exhaust systems shall be disposed of in such manner that they do not re-enter the breathing zone of workers.

(2) In areas where harmful concentrations of atmospheric contaminants cannot be eliminated, respiratory devices approved by the Navy Department Safety Division shall be provided. Most types for various circumstances are enumerated in "Safety Equipment Manual", NAVEXOS P-422.

b. Heating. Heating equipment using carbonaceous fuel shall be vented to the outside.

2-1-10 ILLUMINATION. Good lighting not only decreases the hazards of accidents but also enhances the workmen's health and comfort. It also minimizes sight weaknesses and conserves manpower. The various chapters of this Instruction deal with individual lighting problems and the following general rules shall apply in all Naval installations:

a. Freedom from Glare. Adequate lighting shall be maintained at all times in working areas and traversed spaces, and such lighting shall be free from glare caused by exposed bulbs or reflected from highly polished surfaces.

b. Checking Lighting Conditions. Checks shall be made periodically on the amount of light, the presence of shadow, and spotty lighting. Provision shall be made for an adequate number of globes and reflectors to prevent glare, and for lamps of proper voltage, wattage, and type for the area.

c. Cleaning. Globes and reflectors do not give the proper light when dust and soot are allowed to accumulate. Globes, reflectors, and walls shall be kept clean at all times. Where painted areas are too dark to allow proper reflection, the walls shall be painted in light shades.

d. Minimum Levels.

(1) Minimum levels of lighting ashore shall conform to standards prescribed in NAVDOCKS MO-116, "Building Maintenance - Electrical" and NAVDOCKS DM-4, "Electrical Engineering".

(2) Minimum levels of lighting afloat shall conform to standards outlined in NAVSHIPS 250-560-4, "Lighting on Naval Ships".

e. Necessary Improvements. It must be understood that circumstances may prevent installing lighting systems that provide the above

foot-candles of illumination. Before attempting to improve lighting conditions, the Safety Director and Maintenance & Repair Officer should be thoroughly satisfied that improvements are necessary for health, safety, and efficiency.

2-1-11 INSECT CONTROL.

a. Insecticides. Materials which are insecticidally effective, are, with few exceptions, potentially toxic to human beings, and in certain instances are flammable or explosive. This is equally true for most of the solvents used in the preparation of insecticides. Articles 2-14-11 through 2-14-13 give safety precautions for the handling of solvents. Qualified persons who routinely mix, store, or apply insecticides should have full knowledge of the characteristics and possible effects of the material being used. Read all labels carefully and comply fully with directions given thereon. Also, see NAVMED P-5010-10 and BUMEDINST 6250.OA.

b. Use of Respirators. All Bureau of Mines approved gas masks with universal canister, Type N, provide adequate protection against most insecticide contaminants. Gas masks with full facepiece shall be worn by those applying insecticides in closed spaces or mixing insecticides in closed or inadequately ventilated spaces. Respirators with half-mask facepieces shall be used only for protection from dusts and mists while handling of and exposure to insecticides in the open or in well ventilated spaces. (See "Safety Equipment Manual", NAVEXOS P-422, Article 1.44, Item N) When applying insecticides outdoors, stand upwind.

c. Food Protection. Protect food, drinking water, and eating utensils from contamination.

d. Protective Clothing. Wear special protective clothing such as coveralls and gloves when handling insecticide concentrates. Bathe immediately if insecticides are spilled on skin or clothing. Personnel routinely handling insecticides should bathe and change clothing at the end of each work day.

e. Medical Attention. Consult a physician immediately in the event of internal poisoning or of serious skin contamination. This should also be done should personnel routinely using insecticides develop nausea, vomiting, loss of weight, or loss of appetite.

f. Fire Prevention. Do not use insecticides in the presence of open flames or of very high temperatures. Discard solvent soaked waste material in covered safety cans.

g. Storage. Store all pesticides in a safe and orderly manner.

Containers should be plainly labeled. Items bearing a "poison" label should be kept locked up. Do not store in the vicinity of food. Use special precautions when transporting insecticides to insure that they do not become available to unauthorized personnel.

2-1-12 RODENT CONTROL.

a. Fumigation. Fumigation as a method of rodent or insect control aboard ships shall not be attempted without proper authorization in each instance. Normal procedure is to request consultation through the officer in charge of a preventative medicine unit or disease vector control center listed in BUMEDINST 6250.8. If an entomology, Public Health, or environmental sanitation officer concurs in the need for disinfestation by fumigation, authorization may be provided by the officer in charge of the unit consulted or by the Bureau of Medicine and Surgery.

b. Carboxide Gas Fumigation. Carboxide gas will not be used in northern climates during the winter months, because ethylene oxide

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condenses to a liquid at about 52° F., and is deposited on compartment surfaces. When compartments are later reheated, the toxic gas again may vaporize the hazardous concentrations.

c. Handling Carboxide Cylinders.

(1) Rubber tubing or rubber hose shall never be used with carboxide. Any added connections must be of metal and suitable for working pressures of 800 pounds per square inch.

(2) Cylinders shall be securely lashed in an upright position before they are used, since the violent discharge of gas tends to unbalance the containers.

(3) Cylinders shall be grounded before use so as to avoid static sparks.

(4) Cylinder valves shall be tested in advance in order to be certain that there is no resistance to opening by hand. Then the valves of the cylinders shall be opened successively, beginning with the unit farthest from the exit and directing the nozzle or control valve away from the operator.

d. Ventilating Area After Fumigation. The area being fumigated by carboxide gas shall be opened at the end of 3 hours. The length of time required for airing varies according to the status of ventilation. Except in poorly ventilated spaces (see paragraph (4) below) it is ordinarily safe for personnel to resume their activities after 2 hours, but the exact period in specific cases must be determined by the person in charge of fumigation in conjunction with the medical officer. The following precautions shall be taken in ventilating the area:

(1) Personnel wearing self-contained oxygen rescue breathing apparatus shall open all air ports or other connections to the outside air and re-establish exhaust ventilation of the space which was fumigated. Supply ventilation may also be used if necessary.

(2) Where permanent mechanical exhaust ventilation is not provided, portable ventilating fans should be used for exhausting the space.

(3) Particular care shall be taken to clear spaces containing dead-air pockets where the odor of carboxide tends to persist.

(4) Personnel shall not enter storerooms or other poorly ventilated spaces until the day following fumigation.

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2-1-13 WASH AND LOCKER ROOMS.

a. Lighting.

(1) Light fixtures should be so installed that they cast sufficient light in all parts of the room, and the fixtures should be mounted near the ceiling out of reach of workmen.

(2) Switches should be so located that persons cannot operate them while in contact with a grounded conductor, such as any part of a water system. Switches should not be located in shower room or where personnel may touch them while bodies are wet.

b. Heating.

(1) Heating appliances shall be protected to preclude the possibility of workers being burned.

(2) Salamanders, stoves, or gas heaters must be vented to the outside air, and they shall not be used unless so vented.

(3) Open-flame heaters shall not be permitted.

c. Floors. Slipping and falling when floors are wet is a primary hazard in washrooms. Worn wood floors should be repaired and overlaid with ceramic tile. Worn concrete floors shall be covered with new concrete topping.

d. Hot Water Heaters. Heaters for supplying hot water should not be located in washrooms or locker rooms if any other arrangement is possible. If it is necessary to have heaters in the room, care should be taken to prevent the accumulation of unburned gas and carbon monoxide. Flues should be installed to exhaust the gases directly to the outside air. Water heater temperature controls for showers and sinks utilized by personnel shall not be set over 130°F.

e. Soap.

(1) Liquid or powdered soap dispensed in convenient containers is preferable for use in washrooms, since the concentration of acidity and alkalinity in such soaps can be predetermined. This is of vital importance where employees are exposed to dermatitis hazards. Mineral abrasives, wood-abrasive soap, and high-alkali soap are considered harmful and shall not be used.

(2) Soap used for industrial purposes shall not be used for the hands since such soaps, particularly scouring powders, contain a large amount of sodium carbonate.

(3) Soaps containing sand or pumice shall not be used,

since these contents are apt to settle in traps and clog the blum-
bing fixtures.

f. Showers. Wherever personnel may be exposed to excessive heat, moisture, dusts, or toxic vapors and liquids, the installation of shower baths is highly recommended. Showers shall always be installed where workers are exposed to poisonous dusts. The following precautions shall be observed in the installation and use of showers:

(1) Floors and approaches to showers should be of non-slip material such as concrete with an abrasive surface or ceramic tile.

(2) Each shower shall be provided with hot and cold water faucets so that users may regulate the temperature of the water. Controls shall be plainly marked, "Hot" or "Cold".

(3) Supply lines to the shower baths should be so placed as to avoid the possibility of persons coming in contact with the hot pipes.

g. Toilet Rooms.

(1) Personal Protection.

(a) Persons suffering from any communicable disease which may be spread by a common use of toilets shall be barred from the installation until the period of contagion is past.

(b) Expecterating on floors and walls shall not be tolerated.

(2) Chemical closets and privies should not be installed except temporarily during construction operations. Disinfectants shall be used as needed.

h. Lockers. All employees working with lead compounds or other poisonous or toxic materials should be provided with two lockers - one for street clothes, lunch, etc., and the other for work clothes. Where two lockers are used it is preferable to have the showers and washrooms between the locker for work clothes and the locker for street clothes.

(1) Preferably the lock should be a combination or key-less one, so workers will not have to carry keys.

(2) Lockers should be fastened in position to prevent overturning.

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(3) Lockers should have good ventilation and should be at least 4 inches off the floor. An exhaust system to such air through slots in the lockers to the outside of the building is recommended.

(4) Storage of old clothes and miscellaneous materials on top of lockers is prohibited.

(5) Workmen should not be permitted to keep oil-soaked or badly soiled clothes in lockers, as this practice may cause a serious fire.

2-1-14 MATERIALS HANDLING ACCIDENT CAUSES.

a. Kinds. The largest percentage of accidents suffered by employees in the Naval Establishment occur during materials handling operations. Mechanical handling causes fewer accidents but in most cases, they are of greater severity. Hand methods cause more accidents but generally of a minor nature. However, careful space planning, proper selection of equipment, and adequate training of employees will reduce the number of injuries due to handling of materials.

b. References. Only broad over-all precautions that will lessen the chance of injury will be included in this section. Precautions for the handling and storage of individual materials will be found under the appropriate headings in later chapters of this Instruction. For instance, stevedoring and the handling of fork trucks on shipboard will be found under Seamanship, Chapter 2-2. Detailed procedures for storage may be found in various Bureau of Supplies and Accounts publications and in the BuSandA Manual, Volume II.

2-1-15 PERSONAL PROTECTION.

a. Shoes. All personnel engaged in materials handling operations should wear approved safety shoes. Sandals and all types of open-toe shoes with thin soles shall not be worn.

b. Leg Guards. Foot guards and leg guards should be worn by employees working with or handling very heavy objects.

c. Gloves. Gloves shall be worn by all employees carrying, lifting or moving sharp or bulky objects that have sharp edges or projecting points. Unless other factors interfere all laborers should wear gloves.

d. Handling Acids. When handling acids, caustics, or strong solvents, personnel shall wear suitable approved gloves, rubber aprons, acid-resistant boots, and goggles or face shields.

e. Cleanliness of Personal Protective Equipment. The following *
items of personal protective equipment will be cleaned or disinfected
by the method indicated before stowing, before being used by another
person, and after being used:

<u>ITEM</u>	<u>METHOD</u>
1. Goggles, Chipper's, Eyecup Type	Immerse in warm soap and water using a clean cloth to scrub parts. Rinse in clean warm water and dry with clean cloth. When spattered with paint or other materials, wipe the parts with clean cloth and 70% denatured alcohol and dry with clean cloth.
2. Goggles, Chipper's Cover Type, Clear Lens	Same as Item 1.
3. Goggles, cover type, gas burns and welders	Same as Item 1.
4. Goggles, eyecup type, gas burns and welders, glare flash protection, w/o lens.	Same as Item 1.
5. Goggles, cover type rubber frame (ventilated) (acid)	Same as Item 1.
6. Air filtering twin cartridge half mask (chemical)	Wipe the parts with clean cloth and 79% denatured alcohol and dry with clean cloth.
7. Air filtering, twin cartridge half mask (metal fume and dust)	Same as Item 6.
8. Oxygen breathing apparatus	Same as Item 6.
9. Hard hat liners	Same as Item 6. (Replace after survey by Safety Officer.)

<u>ITEM</u>	<u>METHOD</u>
10. Rubber, acid resistant gloves	Immerse in warm soap and water using a clean cloth to scrub parts. Rinse in clear warm water and dry with clean cloth.
11. Ear plugs (noise protector)	Cleanse daily when in use with soap and warm water, rinse thoroughly and dry with a clean cloth. They should be kept in a container when not in use.

f. Belts. When working on high elevations, a life line and safety belt shall be worn unless other adequate precautions have been taken to prevent falling.

g. Rings. Finger rings should not be worn by personnel handling stores.

h. Physical Defects. Personnel with existing hernias, or who have a history of previous back strains shall not be assigned to duty requiring heavy lifting.

2-1-16 HAND HANDLING.

a. Lifting. All personnel engaged in handling materials of any type should be instructed by their supervisors in, and shall carefully follow, the proper method of lifting heavy objects. The lifter stands close to the load, with feet solidly placed and slightly apart. With knees bent, he shall grasp the object firmly, and then lift by straightening the legs, keeping the back as nearly vertical as possible.

b. Lowering Material. Material shall never be thrown from elevated places to the floor or ground. Suitable lowering equipment shall always be used.

c. Signals. Lifting or lowering operations being performed by several persons shall be done on signal from one individual and only after everyone's feet, hands, etc., are in the clear.

d. Hand Trucks. Hand trucks and similar devices shall not be so heavily loaded that they cannot be easily handled. When going up or down a ramp or incline, the load shall always be below the worker. Thus, he will pull the load up and push it down.

e. Drums. Drums should be rolled by pushing with the hands. Gloves shall be worn when performing this operation.

f. Sharp Edges. Before any material is handled, it shall be examined and personnel shall be protected against sharp edges, protruding points, or other factors likely to cause injury.

g. Straps on Cargo. Defective or broken strapping on cargo shall be removed, repaired or replaced. When removing steel strapping, face shields or goggles shall be worn and the worker and those in the immediate area should stand to one side and out of the line the strapping will pass when cut.

2-1-17 MECHANICAL HANDLING.

a. Standard Equipment. Standard equipment shall be used for the handling of materials within naval activities. It shall be kept in good condition and personnel shall be thoroughly trained in its use and in attendant safety precautions.

b. Mechanical Alterations. Materials handling equipment is engineered and guaranteed by the manufacturers to perform specified functions. Mechanical alterations to power plants, hydraulic systems, operating levers and controls, lifting and structural members, counterweights, etc., may not be made without the approval of the Naval Material Command. Requests or recommendations to effect alterations will be addressed to the NMC via the chain of command and will include:

(1) Complete details of the proposed alteration including such photographs, blueprints, and engineering data as may be necessary.

(2) Reasons for the alteration and improvement expected to result therefrom.

2-1-18 FLOOR CAPACITIES.

a. Permissible Weight. Whether a warehouse is of single or multistory construction, floor load limits must be observed. Floor capacity is commonly stated in pounds per square foot. Usually the floor capacity gives the maximum allowable average weight over each area bounded by four supporting columns or over an entire section, and is not a positive indicator of the maximum weight which may be stacked at any one point. In some cases, however, it is to be regarded as the maximum weight at any one point on the floor. If the exact meaning of the floor capacity as stated is not known, the Engineering Office should be

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consulted. The load exerted on the floor by a stack of materials is determined by dividing the total weight of the stack by the square foot area it covers on the floor. Such calculations are simplified by regarding the area of the standard pallet as 16 square feet, or 13.5 square feet if a 40- by 28-inch standard pallet is used.

b. Volume of Combustibles. Permissible floor loading is also rated on the basis of volume of combustible material. In some cases, therefore, the weight limitation may not be the governing factor. See Bureau of Yards and Docks Technical Publication DM-8, Fire Prevention and Fire Protection.

2-1-19 STACKING MATERIALS

a. Palletized Materials. All palletized materials shall be so placed and secured as not to present a hazard in stacking when in transit, inside warehouses, between warehouses, in storage, and between warehouses and piers, loading docks, and platforms.

b. Arrangement. All material shall be stacked in an orderly manner so as not to present a hazard to personnel or likelihood of damage to material or equipment.

c. Crushable Containers. Crushable containers should have vertical supports placed in such a manner that weight of material stored above will not be supported by the containers.

d. Corner Markings. Suitable protectors made from either metal, wood, or cardboard shall be placed at corners of material at aisle intersections to prevent damage to material and containers. Such protectors shall be painted brilliant yellow high-lighted by black diagonal striping.

2-1-20 WORKING AISLES

a. Definition. Working aisles are those from which material is placed into and removed from storage. They are of two types: transportation aisles, running the length of the building, and cross aisles, running across the building. Determination of the number, width, and location of working aisles is a problem of major importance. Aisles determine bay boundaries and, therefore, limit the space actually used for storage.

b. Direction. Aisles should lead directly to doors whenever practicable. With mechanical operation, turning corners slows movement. The greatest number of accidents involving equipment occurs at corners or aisle intersections. When placement of a direct aisle results in considerable loss of space or is otherwise inefficient, the storage officer must weigh the loss of space against slower operation and increased hazards.

c. Widths Required for Trucks. The required aisle widths for using the common sizes of fork trucks are:

2,000 pound truck	10 feet
4,000 pound truck	12 feet
6,000 pound truck	14 feet

These are not the minimum aisles in which the trucks can operate. They are considered the minimum for reasonably fast operation and for two-way traffic. All widths stated are figured on the basis

of a 48-inch load length. They must be increased slightly if tractors and trailers are used within buildings in conjunction with fork trucks, in order to provide space for the removal of pallet loads from trailers.

2-1-21 FIRE PREVENTION

a. Accessibility of Fire-Fighting Equipment. Whenever possible, portable fire-fighting equipment should be placed along operating aisles for easy accessibility. When fire-fighting devices, including water valves and hose outlets, cannot be so placed, a 36-inch fire aisle must give access to them. Such equipment must never be obstructed. Fire aisles should in all cases lead to the nearest working aisle. Instructions of the safety engineer and local fire authorities must be followed.

b. Clearance of Stacks.

(1) Below automatic sprinkler deflectors the clearance shall be:

(a) stack heights not exceeding 15 feet -- 18-inch clearance;

(b) stack heights exceeding 15 feet -- 36-inch clearance;

(c) where hazardous commodities are involved, regardless of stack heights -- 36-inch clearance.

(2) Between stacks and walls, except as otherwise required for materials subject to excessive swelling, the clearance shall be:

(a) exterior walls and standard fire walls -- no clear space will be required;

(b) substandard fire walls (less than a four-hour rating) -- 24-inch clearance;

(c) when hazardous materials are stored in general purpose building, clearance shall be 24 inches.

c. Fire Doors. Around path of travel of fire doors, there shall be a 24-inch clearance unless a barricade is provided in which case no clearance shall be required. Material will not be stored within 36 inches of fire wall openings.

d. Storage of Flammables. Flammable materials, such as paints, oils, grease, gases, and gasoline, are best protected when placed in a special nonflammable building with extra fire-fighting equipment and additional fire-walls. Because of lack of such space,

however, it may be necessary to store flammables in a general storage warehouse. In this case, precautions will be taken to:

- (1) use end bays whenever possible;
- (2) remove and destroy leaky containers;
- (3) insure proper ventilation for materials which give off flammable or toxic vapors;
- (4) use only spark-enclosed or sparkproof fork trucks.

2-1-22 GENERAL REQUIREMENTS

a. Licensed Operators. Forklift trucks and industrial tractors shall be operated only by duly authorized operators who have been qualified and licensed in accordance with any recognized federal licensing authority.

b. Passengers. Industrial vehicular equipment shall never be used for personal transportation. No workman other than the driver shall ride on any industrial materials handling vehicle unless a permanent seat is provided.

c. Loads. The operator is responsible for all cargo being moved by his machine. He shall inspect and secure all questionable loads and shall refuse to transport unsafe or unlawful loads.

d. Steering Wheel Projections. No fork truck or other materials handling equipment shall be equipped with a steering knob except those especially designed for one-hand steering and provided with a steering knob by the manufacturer. Extensions to gear-shifting levers will be permitted only when approval has been granted by the Bureau of Supplies and Accounts via the appropriate management authority.

e. Clear Vision. All materials handling equipment will be free of cabs, windshields, enclosures, canopies, and any other device which may constitute a safety hazard by obstruction of vision. When equipment has an overhead safety guard in accordance with instructions herein, it will be free of any material that may obstruct vision in any direction.

f. Adjusting Mechanism. Operators shall not attempt to fix or adjust any mechanical part of any materials handling vehicle unless authorized to do so by their supervisor.

g. Gasoline-Powered Vehicles. Gasoline-powered and gas-electric-powered materials handling equipment will be equipped with

mufflers, gas fill caps, and metal sediment bowls. They shall have flame arresters when operating in flammable liquid storage areas where it is not feasible to use electric-powered spark-proof or explosion-proof equipment. Fuel shall be dispensed from Underwriters Laboratory approved containers. All fueling operations shall be done out-of-doors.

h. Vehicle Unattended. Operators shall never leave vehicle unattended while the motor is running.

i. Speed Limit and Care at Exits. Fork trucks and tractor-trailer trains shall not exceed the speed limit of 7 miles per hour. They shall slow down at all cross aisles and other passageways. When entering or leaving buildings, warehouses, etc., the operator shall come to a complete stop at entrance, sound horn, and proceed only when the way is clear. These vehicles shall be operated in a safe and prudent manner at all times.

2-1-23 FORK TRUCKS.

a. Overhead Safety Guards. Fork-lift trucks of all types will be equipped with an overhead safety guard fabricated from steel. Exceptions will be permitted only when the overhead safety guard would either increase the overall height of the fork truck or prevent the operator from having freedom of movement. Overhead guards will be capable of withstanding, without evidence of damage, a minimum drop of 5 feet of a wood box or container of 1 cubic foot of volume, weighing 100 pounds. Open spaces between steel bars or tubes will not exceed 6 inches.

b. Load Capacity. The load capacity, and gross weight of each fork truck, shall be stenciled on the machine in plain view of the operator. This capacity shall never be exceeded. Counterweighing of machine to increase lifting capacity is prohibited. Capacity shall be rated at 24 inches from heel of forks. The load capacity of fork extensions shall be computed in accordance with Bureau of Supplies and Accounts Publication NAVSANDA Pub. 284.

c. Standing Under Loads. No personnel shall ever stand under loads being hoisted or lowered by fork trucks.

d. Facing Forward. Operators shall always face in the direction of travel. All loads shall be carried in such a manner that operator's vision is unobstructed in direction of travel.

e. Ramps and Grades. Fork trucks transporting cargo up ramps or other grades shall be operated with the load up grade; carrying cargo down grade shall be done by backing down grade with the load up grade.

f. Channels Tipped. All loads being transported shall be carried with channels tipped back.

g. Hoisting Personnel. Fork trucks shall be used to hoist personnel only under the following conditions:

(1) Supervisors shall authorize all raising and lowering of personnel by fork trucks.

(2) Special "personnel pallets" with guard rails on four sides shall be used.

(3) During actual raising and lowering operations, all personnel shall face away from mast and keep hands clear of hoisting mechanism.

(4) Personnel shall never be transported when the forks of the fork lift truck are raised more than 18 inches above the floor level.

(5) Only skilled personnel shall be asked to perform tasks requiring elevation by fork trucks.

h. Lifting Vehicles. Slings or lifting pads shall never be attached to the overhead guards for the purpose of lifting the vehicle.

i. Nonoperating Position. When not in operation, the forks shall be lowered and rested flat on the floor.

j. Bumping Stacks. Stacks shall never be bumped or pushed by fork trucks in an attempt to straighten stacks.

k. Spacing. In all operations involving more than one fork truck, vehicles shall always remain 20 feet apart unless two vehicles are transporting the same object.

2-1-24 TRACTOR-TRAILER TRAINS (JITNEYS AND TRAILERS)

a. Traffic Regulations. Tractor operators shall obey all traffic regulations at all times.

b. Trailer Connections. Trailers shall be firmly hitched one to the other and to the tractor before beginning operations. These hitches shall be inspected at least four times daily.

c. Maximum Number of Trailers. No more than eight trailers shall be used per train while transporting material in dock or ship areas.

PART 2
GENERAL SAFETY PRECAUTIONS

CHAPTER 2
SEAMANSHIP

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2-2-1 SAFETY FOR PERSONNEL. Safe practices in specific operations whether afloat or ashore will be found in the Chapter applicable to the work or duties performed.

a. Safety Drills for Working Personnel. Proper supervision and the conducting of drills are vital to prevention of accidents and saving of lives. The following general precautions shall be taken:

(1) The commanding officer/master shall make a study of the conduct of routine and emergency drills and shall note and eliminate any unsafe practices.

(2) During boat drills crews launching lifeboats shall be supervised to decrease the hazard of anyone's slipping falling, or being pushed overboard.

(3) When conditions warrant, passengers shall be issued life jackets before embarking in a boat.

(4) Life jackets shall be worn by boat crews during boat drills, when the boat is hoisted or lowered over the side, when boats are operated in strong tides and adverse weather, and when manning the boats over a boat boom.

b. Damage Control Precautions.

(1) The urgent nature of damage control operations can lead to a neglect of safety precautions appropriate to the situation. Driven by the need to act rapidly, men sometimes take chances they would not even consider taking in less dangerous situations. This is unfortunate, since there are few areas in which safety precautions are as important as they are in damage control. Failure to

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observe safety precautions can lead (and, in fact, has led) to the loss of ships.

(2) Because damage control includes so many operations and involves the use of so many items of equipment, it is not feasible to list all the detailed precautions that must be observed. Some of the basic precautions that apply to practically all damage control work are discussed in the following paragraphs. For additional precautions not covered below, consult the MSTTS Damage Control Manual, COMSTS INST 3541.5B.

(3) Never take any action to control fires, flooding, or other damage until the situation has been thoroughly investigated and analyzed. Although speed is essential for damage control, correct action is even more important.

(4) Never underestimate the extent of the damage. Do not overlook the possibility that hidden damage may be more severe than the damage you can see. Do not overlook the very real danger that exists from damage which is not giving immediate trouble; for example, do not overlook the dangerous nature of small holes at or just above the waterline.

(5) Do not assume that damage has been permanently controlled merely because fires have been put out, leaks plugged, and compartments dewatered. Fires may flare up again, plugs may come out of holes, and compartments may spring new leaks. KEEP CHECKING!

(6) Do not leave doors and hatches open any longer than necessary while you are making repairs. Emphasize this point in all damage control training. War time records of naval ships show many cases of progressive flooding which were the direct result of failure to close doors or hatches.

(7) Do not try to be a one-man damage control organization. Report all damage to damage control central or to a repair party before you take any other action. The damage control ORGANIZATION is the key to successful damage control. Separate, uncoordinated actions by individual men may well do more harm than good.

(8) Bear in mind that many actions taken to control damage can have a definite effect on ship's characteristics such as watertight integrity, stability, and weight and movement. The dangers involved in pumping water into the ship to combat fires are well known. Less obvious, perhaps, is the fact that the repair of structural damage may also affect the ship's characteristics. For example, the addition of high or off-center weight produces the same general effect as high or off-center solid flooring.

(9) While most repairs made in action would not amount to much in terms of weight shifts or additions, it is possible that a number of relatively small changes could add up to enough to endanger an already damaged and unstable ship. The only way to control this kind of hazard is by making sure that all damage control personnel report fully and accurately to damage control central. Ship stability problems are worked out in damage control central, but the information must come from repair personnel.

(10) In all phases of damage control, it is important to make full use of all available devices for the detection of hazards. Several types of instruments are available on most ships for detecting dangerous concentrations of explosive, flammable, toxic, or asphyxiating gases.

(11) COMBUSTIBLE GAS INDICATORS (sometimes called EXPLOSIVE METERS) are used to detect dangerous concentrations of flammable or explosive vapors. The FLAME SAFETY LAMP is used to detect lack of oxygen. CARBON MONOXIDE INDICATORS are used on some ships to test for the presence of the deadly carbon monoxide gas. If you are not entirely familiar with the operation of these hazard-detecting devices, study the information given on them in Chapter 92 of the Bureau of Ships Technical Manual.

c. Swimming from the Ship. Only the commanding officer/master may authorize swimming from the ship. The medical officer will recommend the sanitary maintenance to be observed in and around swimming sites and the prohibition of swimming in contaminated waters. About 50 yards off the side of the ship a power boat shall be stationed carrying a capable petty officer, a man to keep watch on the swimmers, and a life guard. Two petty officers shall be stationed on deck. Personnel shall be assigned both on deck and in the boat to keep lifejackets and ring buoys with line attached ready for instant use. One man on the ship and one in the boat shall carry a rifle for protection against such danger as sharks. Swimming must be done in pairs (buddy system) and all swimmers must remain between the lifeboat and the ship.

d. Passenger Safety (Civilian)

(1) In ships carrying passengers there is an added responsibility on the part of everyone to ensure their safety as well as the safety of working personnel. COMILDEPTS and their staff shall thoroughly indoctrinate passengers and troops of the hazards of shipboard life prior to and at frequent intervals during the voyage. The following precautions shall be taken:

(a) Furniture is to be properly stowed and secured to prevent items such as chairs, tables, pianos, and deck chairs

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from going adrift when the vessel rolls. This applies equally to baggage in staterooms.

(b) Guard racks shall be installed on tables, shelves, vanities, and other exposed areas during heavy weather to keep glassware from falling and breaking on the deck.

(c) Ladders shall be provided for the use of passengers getting into and out of upper berths. Nonslip coverings or safety treads shall be used on all stairways and ladders used by passengers.

(d) Lifelines shall be rigged on the promenade deck when necessary.

(e) All exits from troop, cabin passenger areas and crew spaces shall be maintained in designed conditions ready for immediate use. No exits will be barred without explicit authority from the commanding officer/master and then only for as long as the immediate necessity prevails.

(f) All stair tower doors and ventilation systems shall be maintained in designed condition. Doors will be kept closed normally to prevent spread of smoke and fire. No material, equipment or obstruction will be permitted in stair tower ladder wells or landing that will reduce the size of the escape route.

(g) Door checks shall be installed on doors leading into cabins and connecting washrooms unless fitted with hydraulic door closers.

(h) Metal ash trays will be provided in all authorized smoking areas. Glass ash trays will not be used.

(i) Towel racks or other projections which would puncture a person if thrown against them by the motion of the ship are prohibited.

(j) Discarding lighted matches, cigarettes, cigars or other burning embers out portholes or in waste baskets is prohibited.

(k) No personal electric equipment other than razors will be used by passengers unless approved by the engineering officer. Electrical razors with split or cracked plastic shells shall not be used.

(l) Bunk guards or lee rails shall be provided to prevent personnel from falling out of upper and lower berths.

(m) Dead light securing hooks shall be periodically inspected to determine whether they are defective.

(2) Passengers shall be encouraged to co-operate in preventing accidents by following the safety rules below:

(a) Report any unsafe condition observed.

(b) Never move furniture which has been secured.

(c) Never pass by or stand near open hatches while cargo is being loaded or discharged.

(d) Never smoke in berths or beds.

(e) Never wear high heels while playing deck games or during rough weather.

(f) Never attempt to enter or leave an upper berth without using a ladder.

(g) Never climb or descend stairways or ladders without using the handrails. Use handrails also while in the shower or bathtub.

(h) Never try to close a port or replace a dead light without assistance when a vessel is rolling or pitching.

(i) Never leave unsecured baggage in staterooms. Foot lockers and/or trunks shall not be stowed in staterooms and/or quarters.

(j) Do not use the windward deck doors.

(k) Passengers shall be assigned station number and location for emergency drills.

(l) Do not attempt to move around in unlighted cabins.

(m) Do not permit children to pick up or carry infant children and caution them to exercise extra care in their movements during rough weather.

(n) Do not leave matches or cigarette lighters where children can have access to them in their cabin when alone.

(o) Do not permit young children in upper berths.

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(p) Do not permit young children to climb on any of the ship's structure or play on or near playpen equipment on which or by which they might be injured.

(q) Parents are responsible for supervising their own children's activities while on board ship.

(r) Keep hand on door knob when opening or closing door to control the swing of the door. Never place hand on the edge of the door or on the door jamb. Watch out for young children to prevent closing doors on their hands.

(s) Parents must report all injuries to children immediately to the ship's doctor.

2-2-2 SAFETY IN WORK AREAS. The following precautions relate to safety in working spaces insofar as general housekeeping and protective devices are concerned.

a. Use of Protective Devices.

(1) Nonslipping, noncorrosive safety treads shall be used around door coamings and at the foot of ladders and steps and nonskid safety plates or other abrasive devices shall be installed adjacent to doorways and ladders where slippery conditions from wet decks may exist.

(2) Suitable guards shall be placed near all open hatches, cargo working areas, or other open spaces. When cargo is being worked through an untrunked hatch in an occupied troop space, ship's force will rig cargo nets or cargo save-alls around the periphery of such hatch in such a manner as to preclude troops from falling through the open hatch. Emergency exits from all spaces shall be clearly marked and kept clear for easy access.

(3) Stanchions supporting chain railings shall always be secured with toggle pins.

(4) The ship should furnish a sufficient number of topping lift stoppers, where necessary, for safely shifting boom topping lifts.

b. Safety in Gangways and Passageways.

(1) All gangways and passageways shall be kept clean, clear, and well-lighted. When decks, gangways, docks, or other passageways are slippery because of ice, oil, grease, or other material, the affected areas shall be cleaned up at once or covered with sand, cinders, sawdust, or other antislip material.

- (2) No materials or obstructions shall be allowed in/on gangways or passageways.
- (3) Gangway stanchions shall be bolted or secured at the bottom with toggle pins to prevent the stanchions from being pulled out of their sockets.
- (4) Overcrowding of gangways shall not be permitted.
- (5) Whenever practicable, a gangway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and safely secured shall be used. If a gangway is not practicable, a substantial straight ladder, extending at least 36 inches above the upper landing surface, and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a gangway nor straight ladder can be used, a jacob's ladder may be used. Each side of such gangway, and the turntable if used, shall have a railing with a minimum height of approximately 33 inches measured perpendicularly from rail to walking surface at the stanchion, with a mid-rail. Rails shall be of wood, pipe, chain, wire, or rope and shall be kept taut at all times.
- (6) The gangway shall be kept properly trimmed at all times.
- (7) Gangway safety nets shall be rigged beneath gangways (other than completely enclosed type) at all times.
- (8) When the lower end of a gangway overhangs the water between the ship and the dock in such a manner that there is danger of persons falling between the ship and the dock, a net or other suitable protection shall be rigged at the foot of the gangway in such a manner as to prevent falling from the end of the gangway.
- (9) If the foot of the gangway is more than one foot away from the edge of the apron, the space between them shall be abridged by a firm walkway equipped with railings with a minimum height of approximately 33 inches with mid-rails on both sides.
- (10) Supporting bridles shall be kept clear so as to permit unobstructed passage for persons using the gangway.
- (11) When the upper end of the means of access rests on or is flush with the top of the bulwark, substantial hand rail approximately 33 inches in height shall be provided between the top of the bulwark and the deck.
- (12) Life line turnbuckles with fine threads in good condition must be modified. (See sketch on page 2-2-8a.) Deficient turnbuckles shall be replaced with 3/4" diameter, 8 acme threads life line turnbuckles.

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(13) The means of access shall be adequately illuminated for its full length. Lights shall not be attached to gangway handrails to eliminate possibility of electric shock and breakage.

(14) Unless the construction of the ship makes it impossible, the means of access shall be so located that drafts of cargo do not pass over it. In any event loads shall not be passed over the means of access while persons are on it.

(15) Where pier or wharf layout permits, ships authorized and equipped with lower landing platforms shall use this equipment to minimize the foot injury potential from the gangway roller. On vessels authorized and equipped with brows, same shall be used where the use of the ship's accommodation ladder would be impractical. Where lower landing platforms cannot be used, a roller guard shall be used.

(16) When ships are at berth, a lifering with 50 feet of line attached shall be available at the gangway.

c. Safety in Using Ladders.

(1) A backing plate or mesh shall be installed behind open type inclined ladders to prevent tools, materials, etc. from falling below in areas where maintenance is regularly conducted.

(2) When a ship is at anchor, accommodation ladders shall be rigged for the use and safety of passengers and ship's personnel going to and returning from liberty.

(3) When ladders are used in a seaway, care shall be taken to prevent fouling by small boats alongside.

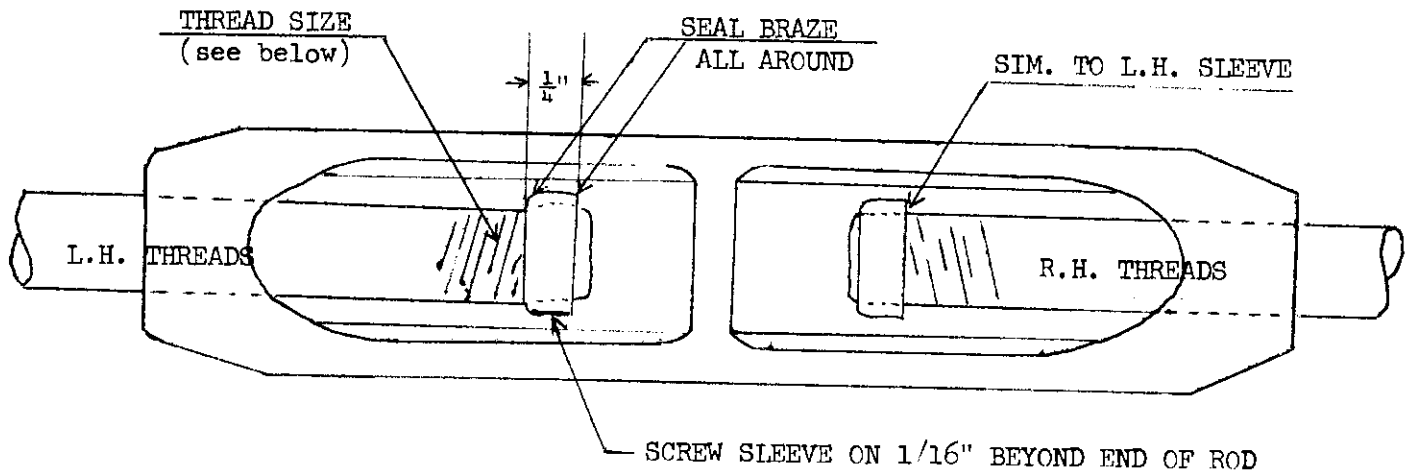
(4) When ladders are unshipped or roped off, care must be taken to ensure that dangerous access to the ladders is also roped off.

(5) When a fixed tread accommodation ladder is used, and the angle is low enough to require walking on the edge of the treads, cleated duckboards shall be laid over and secured to the ladder.

(6) Pilot ladders should be lashed to secure deck fittings and never made fast over or to hand railings.

(7) Portable ladders are always a hazard unless in good condition, well secured to prevent slipping and properly tended. The use of portable metal ladders for electric work or in areas where they could contact live electrical equipment, is prohibited.

SLEEVE STOP ON OPEN TURNBUCKLES



The sleeve material to be similar to turnbuckle.

The sleeve diameter should be $\frac{1}{8}$ " larger than rod and $\frac{1}{4}$ " thick.

The thread of sleeve to agree with rod. $\frac{1}{2}$ " - 20 or $\frac{5}{8}$ " - 18 as applicable.

Hex nuts modified to form sleeve may be used.

Screw sleeve $\frac{1}{6}$ " beyond end of rod.

Sleeve to be seal brazed all around on both sides.

(8) Bunk ladder or suitable hand holds and steps will be provided for safe access to and from upper berths.

(9) Treads and/or metal steps on inclined ladders shall be in good condition and not worn round at edges. *

d. Using Hatches and Doors Properly.

(1) Open hatches shall be provided with gratings or roped off to minimize danger to personnel.

(2) When hatches or doors are open, care must be taken to ensure that they are secured open. The regular prop or catch provided shall be used. When work is being done through an opening of one section of a hatch, the remaining beams shall be pinned or locked.

(3) Safety lines shall be rigged around the cargo hatch openings when cargo is not being worked. At such times hatch covers shall not be spread, since openings between the boards may cause accidents. Tarpaulins shall not be drawn across such openings unless all hatch boards are in place.

(4) Armored hatches fitted with balance weights and springs shall be inspected before closing to make certain that such fittings are properly installed and operative. No device that impairs the free functioning of the dogging-down mechanism may be used.

(5) Access through doors, scuttles, and hatches may never be blocked off without permission from the department head responsible for them. When permission is granted to block off an access, it must be done in such a way that free access can be regained in a minimum amount of time. Blocking of emergency exits is prohibited.

(6) Broken, split, or ill-fitting hatch boards must be discarded or repaired at once. All hatch boards and fore-and-aft and athwartship beams should, insofar as they are not interchangeable, be kept plainly marked to indicate the deck and hatch to which they belong and their position therein.

(7) Standard door openings with coamings in excess of 18" height shall be provided with an intermediate step. *

e. Providing Proper Illumination. Adequate lights shall be provided during the night at all ladders, gangways, deck house entrances, and alleyways. These lights shall be rigged to avoid a direct glare. In addition, the following precautions shall be taken:

(1) Personnel shall not be permitted to enter any unlighted cargo compartment unless a suitable portable light is carried.

(2) Flashlights shall be kept available for emergency use.

(3) Whenever cargo or ship's work is being performed at night, flood-lights shall be provided on the deck and overside. Portable cluster lights or cargo lights shall be used in the cargo holds. NOTE: The use of flood lights in cargo holds would blind the longshoremen working therein, particularly when drafts of cargo are being spotted in the hatch square.

f. Entering Closed Compartments. An element of danger exists whenever men must enter compartments that have been closed to all ventilation for a period of time. Occasionally the nature of the danger is known; that is, when there is an exact knowledge of the former contents of the space the hazards are known and the proper precautions can be taken. In many cases, there may be no reason to believe that hazards will exist. Even when there is no reason to fear danger, experience has shown that a very real hazard may exist. It is necessary, therefore, to assume that any closed space, blister, double bottom, tank, cofferdam, pontoon, or void contains gases with poisonous, asphyxiating, or explosive qualities. Where the hazard is known, personnel are referred to the appropriate chapter of this Instruction for steps to be taken. For example, refer to Chapter 2-9 for hydrocarbon vapor hazards and to Chapter 2-8, Section 3 for welding in confined spaces. Where hazards are not known the following steps shall be taken:

(1) First determine whether the atmosphere contains gases or vapor. Use a hydrocarbon vapor indicator for the test. If the test shows that explosive or flammable gases are present the compartment shall be treated according to the rules for the particular hazard.

(2) Aircraft carriers and roll/on roll/off type vessels carry carbon monoxide indicators. In these ships the atmosphere shall be tested for carbon monoxide after it has been determined (see paragraph (1) above) that no explosive vapors are present. If the carbon monoxide test is negative, a flame safety lamp shall be used to determine whether the oxygen in the atmosphere is sufficient to support life. The lamp shall be carried into the space by an observer who has a safety line attached to him and who maintains direct communication with a responsible person outside. If any dangerous condition is detected by the test (as disclosed by the action of the flame in the lamp) the observer shall come out immediately and ventilation shall be resumed. A satisfactory test must be made before personnel may stay in the area.

(3) In ships not supplied with carbon monoxide indicators, ventilation shall be carried on immediately after step 1 above if it has

been determined that no explosive vapors are present. The portable ventilator set shall be used, and the closed space shall be ventilated until there have been at least 2 complete changes of air. The flame safety lamp shall then be used, as described in paragraph (2), to determine whether the oxygen content is sufficient to support life. If the test shows insufficient oxygen, ventilation shall be repeated until a satisfactory test is made.

(4) When air conditions are found to be satisfactory, men may enter the spaces. However, the safety lamp must be kept operating at all times and direct communication with someone outside must be maintained. If the lamp at any time indicates dangerous conditions, the men must withdraw immediately, ventilation must be resumed, and tests must again be made before work is resumed. Further, if the lamp indicates, or if it is observed in any way, that explosive gases may be present, the men must withdraw and reventilation and retesting must be carried on.

2-2-3 DECK SAFETY.

a. Lines.

(1) Lines shall never be made fast to capstans or gypsy heads except in instances where extra lines must be led out due to high winds and heavy seas, and there are an insufficient number of bitts to accommodate same.

(2) If hawse pipe covers are not used, a safety guard shall be installed forward of each hawse pipe to prevent personnel handling lines or on lookout from stepping or falling into the opening.

(3) Personnel shall always stand clear of bights in a line.

(4) No person shall go aloft on the masts or stacks without first obtaining specific permission from the officer of the watch and then only to perform necessary work on duty. A warning sign in letters not less than 1 inch high, "CAUTION-DO NOT GO ALOFT WITHOUT PERMISSION FROM DECK OFFICER ON WATCH - WEAR A SAFETY BELT ALOFT," shall be posted at the base or in close proximity to any ladder leading aloft.

(5) Before authorizing men to go aloft on a mast or stack, the officer of the watch shall ensure that all power on radar and radio antennas in the vicinity of the men is secured while they are aloft, and that controls associated with the antenna are tagged, SECURED! MEN ALOFT; notify main engine control to refrain from lifting safety valves while men are aloft; ensure that men going aloft are equipped with safety belts and safety lines and that they will be properly tended and supervised. All tools, buckets, paint pots, and brushes shall be secured by a lanyard when used in work on masts and stacks.

(6) Deck officers inspecting reefer cargo spaces will report departures and returns to the deck watch.

(7) Engine department personnel entering cargo spaces under refrigeration report departures and returns to the engineering officer on watch.

(8) Heaving lines shall be made up with small canvas bags at one end. The use of heaving line monkey fists made up with metal weights is prohibited.

(9) While alongside any pier, fire warps will be properly rigged on outboard side of ship fore and aft to facilitate movement in case of fire or other emergency.

b. Chain Lockers and Anchors.

(1) If a chain locker is not self-stowing, illumination shall be provided before personnel are sent to the locker.

(2) Personnel in chain lockers engaged in tiering an anchor cable shall withdraw before any attempt is made to disconnect the windlass.

(3) In letting go an anchor, windlass operators shall wear goggles when handling the brake.

(4) Personnel shall stand clear of the windlass when heaving around or veering anchor.

c. Cranes, Capstans, Winches and Windlasses. Only personnel who have been instructed in the duties required and who have been specifically authorized by the officer in charge shall operate cranes, capstans, winches, and windlasses. A list of authorized operators shall be kept in the deck department office. Except in an emergency, operation of the machinery is supervised by a responsible officer or petty officer. Operating instructions and safety precautions shall be posted at the place of operation. Safety guards shall be kept in place around windlass crossheads, cogwheels or other moving parts. Mechanical brakes installed on electrical winches for emergency use shall be maintained in good working order.

d. Booms.

(1) Booms should be topped or lowered only under the supervision of experienced personnel.

(2) Booms shall be lowered to the deck for changing gear or making necessary repairs.

(3) For topping or lowering of booms the safest method is to secure the topping lift to the drum of the winch.

(4) Booms shall be equipped with preventer guys. Worn out and discarded cargo runners or topping lift wires shall not be used. MSTS vessels equipped with Ebel and Farrell gear shall not be fitted with preventer guys. To do so will subject the gear to excessive stress such as occurs when the usual type of gear is tightlined.

(5) Booms shall be spotted clear of all standing rigging, topping lift wires or chains and other obstructions to prevent buckling, when under load, due to off-line stress.

e. Block and Tackle. Blocks and tackle shall be inspected before use for possible defects.

f. Life Buoys and Lifelines.

(1) When a ship is in port or when personnel are working over the side, life buoys with line attached shall be available.

(2) Men are not permitted to sit or lean on the lifelines.

(3) In maneuvering alongside a dock or during drills or evolutions, personnel are required to keep well clear of lifelines.

(4) When lifelines are removed for an extended period, officers and petty officers concerned are required to ensure that emergency lines are rigged to protect personnel.

(5) At sea, and in port under hazardous conditions of sea and weather, men are not permitted to work over the side without a life jacket and safety belt with a safety line attached and properly tended by another person on deck. Men having occasion to work outboard of life lines in rigging or unrigging a brow, boat or other gear, or in ships' boats, any part of which is outboard of life lines, shall wear life jackets.

(6) Ring buoys with a line attached shall be kept available for use when sea or Jacob's ladders are being used.

g. Rails and Storm Rails.

(1) Rails or equivalent protection shall be installed near the periphery of all weather decks accessible to passengers and crew.

*

- * (2) Such rails accessible to passengers shall be in at least three courses and not less than 42" high, except where the height of the rails interferes with the business of the vessel. All other rails shall be at least 36" high and shall be at least three courses approximately even spaced.
- * (3) Storm rails shall be installed in all passageways and at deck house sides where passengers or crew have normal access. Rails shall be installed on both sides of passageways which are 6 feet or more in width.
- * (4) On cargo ships, rails at least 36" high shall be installed near the periphery of all weather decks accessible to persons on board. Such rails on deck which extend outboard to side of vessel shall be at least three courses evenly spaced. Rails on deck which do not extend outboard to the side of the vessel, such as top of deck houses and winch houses, shall be in at least two courses evenly spaced.

h. Sewing Machines.

(1) Sewing machines should be equipped with a permanent guard so that the operator's fingers cannot pass under the needle. The machine should not be used at any time unless the guard is in place.

(2) Never touch the shuttle-carrier or the flywheel while the machine is in operation.

(3) Belt drives on sewing machines shall be guarded as is practical.

i. Bin Covers. Bin covers shall be provided with safety latches or props, so that they will not fall on personnel.

j. Propellers. Before permission is given the engine room to turn over a propeller, the following safety precautions shall be taken:

(1) Check all mooring lines and take in slack.

(2) Remove men working in the vicinity of the propeller.

(3) Maintain a bridge watch during the entire time the propeller is being turned over in order to stop the engine in case lines should part.

k. Smokestacks.

(1) Except in cases of emergency, personnel shall not be

permitted to perform work on the smokestack when a ship is underway.

(2) In the event that work must be done, precautions shall be taken to prevent blowing tubes, lifting safeties, or blowing of the whistle.

(3) Boatswain chairs shall be used instead of swinging staging.

(4) A brass warning plate must be affixed in plain sight to all smokestacks cautioning personnel about the poisonous gases and fumes therein.

1. Nylon Rope. The loading and handling characteristics of nylon rope are quite different from those of manila and other natural fiber ropes and certain precautions should be taken for the safe handling of nylon lines:

(1) At the breaking point, nylon rope is stretched $1\frac{1}{2}$ times its original length and the resulting snap-back is hazardous. No one shall stand in the direct line of pull when heavy loads are applied.

(2) To insure against overloading, a 40-inch length of cord should be attached to two points on the nylon line 30 inches apart. Loads should be kept below the safe working limit of line indicated by a taut cord.

(3) Do not use a single part of plain-laid rope for hauling or hoisting any load that is free to rotate. If one part of rope is essential, use cable-laid nylon hawsers.

(4) Do not stow nylon rope in strong sunlight for long periods. Cover it with tarpaulins. During stowage, keep it away from heat and strong chemicals.

(5) Be extremely careful when easing out nylon rope around bitts and cleats under heavy load. Because its coefficient of friction is lower than that of manila, the nylon rope may slip when eased out and cause injury to personnel unfamiliar with its oddities. For control in easing out, take two or three round turns on the bitt before figure-eighting the line. Use of the round turns provides a means for closer control in easing out or surging. Always stand well clear of the bitts during these operations.

(6) When sets of ropes are to be used in parallel - as are boatfalls, do not pair nylon rope with low elongation rope such as wire or manila.

(7) Use nylon rope stoppers for holding nylon hawsers under load. Do not use manila or chain.

(8) Nylon rope, because of its smoothness and elasticity, requires at least one extra tuck over that for manila rope. For heavy load applications, such as towing, take an additional backtuck with each strand.

(9) Mooring lines shall never be made fast to capstan or gypsy heads.

m. Lifeboats. The most effective safety precaution is a vigorous program of preventive maintenance! Most casualties are properly attributable to improperly maintained equipment rather than to design deficiencies or personnel failure. NAVSHIPS Technical Manual, Chapter 60, "Electric Plant - General", Sections II and IV, list certain precautions to be observed in connection with electrical equipment. In addition to the above and any precautions contained in equipment technical manuals and the MSTTS Lifeboat Manual, the following should be observed:

(1) See that all nonoperating personnel are clear of the area prior to any boat handling operation.

(2) Insure that qualified operators are present for every operation.

(3) Do not turn on the winch electric motor when a boat is being lowered. Post sign on lifeboat winch housing, "CAUTION - DO NOT ENGAGE HAND CRANK WHILE POWER IS ON."

(4) Insure that personnel riding the boat use life lines.

(5) Keep the number of personnel riding in a boat other than lifeboats, to the minimum required for launching and stowing operations.

(6) Insure that lifting hooks are secure before a boat is raised or lowered.

(7) Be alert for any possible malfunctioning and act quickly if it occurs.

(8) In the event davit arms on Type I and Type II davits are returned to stowage position without a boat, care should be exercised to prevent tipping of the floating block and subsequent chafing of the boat falls.

(9) Ascertain that stopper bars are removed from the trackway prior to hoisting a boat.

(10) When paying out empty falls under power, do not stop the winch motor by means of the brake interlock switch. Use the master switch for this purpose.

(11) Before personnel are permitted to work in or on a lifeboat, either stowed or in a suspended position, ensure that precautions have been taken to prevent the boat from falling due to accidental tripping of the releasing gear, movement of the davits or capsizing of a boat in chocks.

(12) Personnel shall not be permitted to remain in boats while the boats are being hoisted into final stowed position.

2-2-4 CARGO HANDLING.

a. Introduction. The safety regulations included in this section shall govern activity for all cargo handling. However, because of the special handling required for flammables and explosives (whether they are handled as cargo, for fuel, or for other purposes), they are treated separately in Article 2-2-5. All personnel handling cargo consisting of flammables or explosives shall be familiar with the regulations of Article 2-2-5 and the references given there as well as with the following precautions.

b. Safety for Personnel During Cargo Handling.

(1) All personnel are required to board and leave ships by the gangplank or by other means provided when cargo is being handled. Boarding or leaving a ship via cargo-handling gear or by climbing up or down a save-all, is prohibited. When ships' holds are equipped with stairways these must be used in lieu of ladders. Entering or leaving ships' holds by means of ships' cargo-hoisting gear is prohibited. In areas where the handrails have been removed to make way for cargo, ropes must be used to block off the space to prevent personnel from falling overboard.

(2) Open weather deck hatches around which longshoremen must work which are not protected to a height of 24 inches by coamings, shall be guarded by taut lines at a height of 36 to 42 inches above the deck except on the side on which cargo is being worked.

(3) Removable weather deck railings shall be kept in place except when cargo operations require them to be unshipped, in which case they shall be replaced as soon as such cargo operations are completed. When cargo operations are temporarily suspended, a line shall be stretched across the opening in the rail.

(4) Weather deck walking and working areas shall be kept reasonably clear of lines, dunnage and all other loose tripping or stumbling hazards. Gear or equipment, when not in use, shall be removed from the immediate work areas, or shall be so placed as not to present a hazard.

(5) Dunnage, hatch beams, tarpaulins or gear not in use shall be stowed no closer than 3 feet to the port and starboard sides of the weather deck hatch coaming, except that a reasonable tolerance shall be permitted where strict adherence is rendered impracticable due to the circumstances.

(6) All walking and working areas shall be adequately illuminated. Portable lights shall be equipped with substantial reflectors and guards to prevent flammable and other material from coming in contact with the bulb, except that guards are not required where the construction of the reflector is such that the bulb is deeply recessed. (See Article 2-1-10, Illumination.)

(7) Portable lights shall be equipped with heavy duty electric cords and may be suspended by such cords only when the means of attachment of the cord to the light is such as to prevent the light from being suspended by the electrical connections. All connections and insulation shall be maintained in safe condition.

(8) There shall be at least one safe and accessible ladder for each gang working in a hatch. However, no more than two such ladders are required in any hatch. When any fixed ladder is visibly unsafe, its use shall be prohibited.

(9) Straight ladders of adequate strength and suitably secured against shifting or slipping shall be provided as necessary when fixed hold ladders do not meet the requirement, except that when conditions are such that a straight ladder cannot be used, Jacob's ladders may be used.

(10) When cargo is stowed within four inches of the back of ladder rungs, the ladder shall be deemed "unsafe" for other than emergency use.

(11) Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured. They shall either hang without slack from the lashings or be pulled

up entirely.

(12) Immediately upon completion of discharge, each cargo space shall be examined to prevent over-carriage of cargo and to determine possible damage to insulation, lights, wiring, gratings, ladders, steam smothering systems, etc.

(13) Deck watch officers are authorized to stop cargo operations at any hatch when unsafe practices are noted that could cause injury to personnel or damage to government equipment.

(14) Fire hazards - smoking on vessel.

(a) Masters/Commanding Officers are directed to enforce the following smoking regulations on board MSTs vessels.

1 Smoking, carrying or possessing a lighted cigar, cigarette, pipe or match on the open decks of any ship when berthed or moored to any wharf or pier is prohibited. The Master/Commanding Officer of any vessel may designate smoking areas, such as the dining room, mess hall or other safe place, where crew members, permanent personnel, longshoremen, invitees or other personnel on board may smoke, except when vessel is flying a red warning flag or during any other restricted periods. Crew members may smoke in their rooms if port holes are closed; or, if port holes are open, port hole screens must be in place.

2 When loading explosives or other dangerous cargo, Masters/Commanding Officers will be guided by local port rules and regulations and U.S.C.G. Publication 108.

(b) Smoking may be permitted on the open decks of a vessel at anchor if the following conditions are met:

1 It is not contrary to smoking regulations as stated in paragraph (a) above.

2 No cargo operations are in progress.

3 It is not contrary to Masters/Commanding Officers Standing Orders.

(c) Smoking anywhere in cargo holds will be prohibited at all times.

(d) Adequate "No Smoking" signs will be posted in areas so designated.

c. Preparing Pier and Cargo Gear. Cargo and ships' stores loaded by longshoremen in United States ports will be handled in accordance with U.S. Department of Labor, "Safety and Health Regulations for Longshoring." Commanding officers/masters shall assure that responsible ship's personnel are familiar with these regulations and uphold COMSTS responsibility in connection therewith.

(1) In those instances where MSTs is a tenant agency, any unsafe conditions shall be reported to the terminal owner and/or operator for correction. Follow-up action shall be initiated until such time as the defect is corrected.

(2) Preparation and Maintenance of Ship's Gear.

(a) Proper Use of Gear and Tools.

1 Ship's cargo hoisting falls or whips shall not be used for mooring or shifting berths.

2 Cargo falls or ship's hoisting gear shall not be used to move railroad cars on piers.

3 Cargo booms should be tested and have their approved capacity plainly marked in a conspicuous manner and place, preferably at the heel of the boom. The safe working load ("SWL") for the assembled gear shall be marked on the heel of each boom. These letters and figures shall be in contrasting colors to the background and at least 2 inches in height. Where the boom is rated at varying capacities depending on the radius, tables indicating the maximum safe working loads for the various working angles of the boom and maximum and minimum radii at which the boom may be safely used shall be conspicuously posted near the controls and visible to the operator when working the gear.

4 Chains must be in good condition before they are used for sling loads. There shall be no kinks in chains, they shall never be shortened by wiring or tying, and repairs shall never be made even temporarily by bolting two links together or by the use of wire.

5 Blocks, crowbars, chain slings, and other equipment must not be thrown from the deck to the ship's hold or to the pier.

6 Neither the preventor nor the guy should have real slack in it, as it is almost a certainty that if one fails the other will part when it fatches up with a jerk after the slack is taken out, and there will be two pieces of gear flying around instead of only one. The preventer is useful only in keeping the guy from parting, not in holding the boom after the guy parts. The manila guy purchase shrinks when wet and stretches when dry, it must therefore, be checked from time to time during the job.

(b) The vessel's first officer or his designated representative shall inspect all cargo gear prior to stevedoring operations, and the results of such inspection shall be entered in the vessel's official Log Book. All other inspections conducted on ship's cargo and lifesaving gear will be entered in the Hull History Card, (NAVSHIPS #539).

(c) See Chapter 2-6 for additional information concerning wire rope and rigging.

1 Whenever possible the winch fall should be so wound that the lever will have the same direction of operation as the load being handled.

2 The boom guys and preventers should be kept as far away from the heel of the boom as possible, but not past the line of the fall. They should be made fast in order to divide the strain. Preventers should be made fast around the head of the boom, independent of all other fastenings. Booms should always be topped so as to avoid undue strain on both the boom and the topping lift. Special caution should be used where the Samson or derrick post is low. The dragging of one fall against the other, without plenty of sag is positively dangerous and must be avoided. Safety shackles shall be used on cargo boom fittings. Screw pin shackles may be used instead, provided the pins are moused.

3 When the location of winch controls is such that they expose a winch operator to the bight of the fall, an additional preventer should be placed on the lead block at the heel of the boom. The preventer should be not less than 5/8-inch wire cable and preferably 3/4-inch or larger. Lanyards must be attached to beam bridles and used when handling beams or pontoon hatch covers.

(3) Inspection and Preparation of Stevedore Gear.

(a) If tools, materials, appliances, or other gear are at any time found to be out of repair, defective, or unsafe in any way, this condition should be reported immediately.

(b) Stevedoring gear must be carefully inspected by designated and competent personnel before being issued for use. Any unsafe or doubtful gear must be discarded, marked, and so replaced that it cannot be used by longshoremen.

d. Loading and Discharging Cargo.

(1) Preparing the Hatch.

(a) Only cargo which must be removed to clear the beams should be hoisted from the hatch until the hatch covers and strongback are off and stowed clear of working gear.

(b) Strongbacks and hatch covers shall be stowed in such a way that they will not interfere with a safe walkway for hatch tenders from rail to hatch coaming and will not be tipped over or dragged into hatches or overboard by drafts of cargo. If a safe walkway cannot be provided, two hatch tenders should be used.

(c) If just one section of the hatch is being used, the strongback of the adjacent section shall be bolted to the hatch coamings or otherwise secured or removed before any cargo is worked through the section being used.

(2) Moving the Cargo.

(a) General Procedure.

1 No cargo should be loaded or unloaded at any intermediate deck by a fall or sling unless the hatch at that deck is safely covered or a secure landing platform, of a width not less than that of one section of hatch cover, has been placed across the hatch with all beams in place.

2 Wooden decks on ships and lighters must be protected when working heavy or rough-edged cargo across them.

3 The signalman must not give the signal to hoist or lower any load unless it is properly slung and all the cargo secure, and no load shall be moved until the proper signal is given.

4 Loads shall be hoisted evenly. Slack on falls should not be taken up or loads let go suddenly.

5 Loads shall never be suspended over a square of hatch or a string piece but shall be stopped over the deck.

6 Loads shall be landed slowly and guide lines used when necessary.

(b) When heavy weights are being hoisted or lowered aboard ship personnel supervising the operation are required to make sure that the gear used is of adequate strength and properly loaded. The following precautions shall be taken when heavy weights are moved:

1 A watch must be stationed below and the word "Stand Clear" given to men working or passing below.

2 Except where an emergency makes it impossible, the OOD shall detail a responsible petty officer to be present when boats, planes, and other heavy weights are hoisted.

(c) Palletized loads of packages of assorted sizes which are taken from piers for loading in ships shall be checked for safety before they are hoisted.

(3) Mechanically-powered vehicles.

(a) All automotive equipment shall be maintained in good working order and safety devices shall not be removed or made inoperative, except as otherwise provided. Operation and fueling of mechanically powered vehicles shall be in accordance with USCG 257, Section 97.70 and appropriate sub-paragraphs in U.S. Dept. of Labor Safety & Health Regulations for Longshoring. Close coordination and approval of the local shore-side fire authority should be obtained prior to fueling operations. *

(b) Fork lift trucks shall be equipped with operator's overhead guards of such design and construction as to protect the operator from boxes, cartons, packages, bagged material or other similar individual items of cargo which may fall from the load being handled or from stowage.

(c) The guard shall be of such construction that it does not interfere with good visibility, but openings in the top of the guard must not exceed six inches in one of the two dimensions, width or length. Larger openings may be permitted providing no opening is larger than the smallest unit of cargo that is likely to fall on the guard.

(d) The guard shall be large enough to extend over the operator in all normal circumstances of truck operation, including forward tilt. The overhead guard may be removed only at times when the construction of the truck is such that the presence of such a guard would prevent the truck from entering working spaces, and if the operator cannot be injured by low overhead obstructions.

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(e) Forks, fork extensions or other attachments shall be suitably secured to prevent unintentional disengagement.

(f) The vehicle weight, with and without removable counterweights, shall be clearly posted on all mechanically-powered vehicles.

(g) The rated capacity of every fork lift truck, with and without removable counterweights, shall be posted on the vehicle in such a manner as to be readily visible to the operator.

(h) Loads in excess of the rated capacity shall not be lifted or carried by lift trucks.

(i) If loads are lifted by two or more trucks working in unison, the total weight shall not exceed the combined safe lifting capacity of all the trucks.

(j) No load on a fork lift truck or industrial crane truck shall be suspended or swung over any employee.

(k) When mechanically-powered vehicles are used, adequate provisions shall be made to ensure that the working surface can support the vehicle and load, and that hatch covers, truck plates, or other temporary surfaces cannot be dislodged by movement of the vehicle.

(l) When mechanically-powered vehicles are left unattended, the controls shall be neutralized, power shut off, brakes set, and the forks, blade, or scoop shall be placed in the lowered position.

(m) When internal combustion engines exhaust into the hold or an intermediate deck and neither natural ventilation nor the ship's ventilating system is adequate to keep the carbon monoxide content below 100 parts per million, use blowers sufficient in size and number and so arranged as to do so. The intakes of blowers shall be adequately guarded by screens.

(n) When cargo is being worked through an untrunked hatch in an occupied troop space, ship's force will rig cargo nets or cargo save-alls around the periphery of such hatch in such a manner as to preclude troops from falling through the open hatch.

e. Stowing and Breaking Down Loads.

(1) When it is necessary to break down cargo, it should be done from the tops of tiers, one tier at a time. Tiers should never be dug into or pulled down. Overhanging pieces of cargo left

on a tier should be broken down to prevent their falling as a result of sudden shocks or jars.

(2) Proper Tiering and Blocking.

(a) Cargo should be tiered evenly, tied in, stepped back, or floored off in order to prevent collapse.

(b) Any object liable to roll or shift should be blocked in position.

(3) Sufficient dunnage should be used to keep general cargo from contact with the steel of a ship's internal structure (frames, stringers, coamings). In tiering, dunnage shall be used to provide a firm flooring.

(4) Special Precautions for Deck Stowage.

(a) Where cargo is stowed on or in any deck above a lower hold it must be adequately secured to prevent it from falling into the hold.

(b) Deck loads shall be so stowed as not to interfere with the safe operation of the winches. Care must be taken to prevent loose material from falling into the hatches or overboard.

2-2-5 HAZARDS IN HANDLING FLAMMABLES

a. Command Responsibility. MSTS commands are charged with the responsibility for insuring that controlled ships designated to load explosives or hazardous materials are in condition to receive such cargo prior to the commencement of loading. In this connection, they shall insure that the master or commanding officer has, or obtains, a current copy of CG 108, Rules and Regulations for Military Explosives, a copy of any local regulations pertaining to the handling of hazardous cargoes, a copy of COMSTS Instruction 8023.1B, and a copy of any special regulations which are known to be in effect at ports of call. They shall insure that ships laden with explosives which are to transit the Panama Canal, or call at a port in the Panama Canal Zone, are provided with a "Declaration of Explosive Cargo Carried" as required by the "Rules and Regulations Governing the Navigation of the Panama Canal and Adjacent Waters." The ships shall be provided with any special regulations or literature pertaining to a hazardous commodity not adequately covered by existing regulations.

b. Master's Responsibility. The master or commanding officer is always responsible for the safety of his ship, and he may issue