

such additional safety orders as he deems necessary. When, in the master's judgment, a hazardous cargo is not being handled or stowed in accordance with regulations, he should stop the operation until the improper practice or deficiency is corrected. Any disagreement which may arise in U.S. ports between the master and the terminal activity regarding proper handling or stowing, will be referred by the master to the appropriate MSTS commander or his representative, and the captain of the port for guidance, with a full statement of the circumstances leading to the master's stopping of the operation. When such disagreement arises in overseas ports where no MSTS representative is present, the master may refer the matter to the cognizant subarea commander for guidance.

c. Safety Inspector. MSTS commands having cognizance over the loading or discharge of ammunition and other hazardous cargoes shall appoint a safety inspector from among the qualified members of their respective staffs. The safety inspector shall be responsible for insuring that ships' officers and MSTS personnel involved in the operation are indoctrinated in the safety regulations and precautions to be observed. Continuous observation of the loading or discharging operation by the safety inspector is not required. The safety inspector will arrange to visit ships engaged in loading and discharging hazardous cargo as frequently as local conditions and circumstances may require. The safety inspector will assist the commanding officer or master in all matters pertaining to the loading or discharging operation, including providing liaison between the ship and the terminal activity.

d. Inspection. Prior to loading military explosives in any controlled ship, an inspection shall be conducted by the master, a representative of the shipper service, and an MSTS representative. MSTS Form 9032-1, Ship Readiness Inspection for Hazardous Cargo, is to be used as a guide to the inspection party; however, it is not intended to restrict the extent to which the inspection is to be conducted. MSTS commands will submit requisitions for additional copies of MSTS Form 9032-1 to COMSTS.

e. Applicability of Foreign Regulations. Comply with all local regulations issued by foreign authorities to the extent that such regulations supplement CG 108, Rules and Regulations for Military Explosives, which, in any case, will be regarded as minimum requirements in any port. In the absence of any specific local regulations or instructions, commands shall be governed by a scrupulous regard for safety at all times.

f. Waiver of Applicability. In the event that an MSTS commander is convinced that the regulations contained in CG 108, Rules and Regulations for Military Explosives, are inappropriate in any specific instance, the details of the situation shall be

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communicated to COMSTS for determination.

g. Permit to Handle. The area or subarea commander having cognizance over any port of the U.S. or its territories shall insure that a permit to handle military explosives or lethal chemicals is obtained from local Coast Guard authority. Overseas area and subarea commanders shall insure that all controlled ships conform in this regard with local government regulations.

h. Stowage Plans. In preparing to load any cargo into a controlled ship, the shipper service is required to submit a pre-stowage plan to the cognizant MSTS representative for his review. The MSTS representative submits the prestowage plan to the ship's commanding officer or master for approval. If there is no MSTS shore representative, the shipper service submits the prestowage plan directly to the ship's commanding officer or master. On completion of loading a final stowage plan is submitted by the shipper service to the MSTS representative for review and to the ship's commanding officer or master for approval. With ammunition and other hazardous cargo, particular care must be exercised in the preparation and approval of stowage plans. As a prerequisite to approval by the ship's commanding officer or master, sufficient information must be provided on each plan to permit identification of the Coast Guard class of each lot of cargo. Location of each different class of ammunition must be sufficiently specific in each plan to permit analysis of compatibility and safety of stowage. Any cargo for which a Coast Guard class cannot be identified is to be considered "suspect" and treated in accordance with paragraph j. below. As indicated in paragraph b. above, the ship's commanding officer or master has the final responsibility and authority to approve or disapprove prestowage plans, amendments thereto, and the final stowage plan.

i. Cargo Handling. It is the responsibility of the shipper service to perform or provide for the loading and discharge of all cargo. In the handling of ammunition and other hazardous cargo the shipper service must furnish a qualified expert to supervise operations. Loading and unloading parties must be adequately briefed on the operation. It is sometimes necessary to load or discharge hazardous cargo in ports or areas where experienced stevedoring personnel are not available. In such instances, it is the responsibility of the shipper service to provide sufficient expert supervision to insure that cargo will be safely handled. The ship's commanding officer or master has final responsibility and authority to approve or disapprove the manner in which cargo is to be handled, or is being handled.

j. Unclassified or "Suspect" materials. Military explosives, chemicals or hazardous materials not classified by USCG 108 shall be

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handled and stowed in accordance with special instructions issued by the activity owning the cargo. The shipper shall provide the MSTS activity and the master with complete information of the characteristics and special stowage requirements of unclassified or "suspect" material. The loading or unloading or dumping of unclassified or "suspect" material shall be under the direct supervision of a specialist familiar with the peculiarities of the material. Ammunition, explosives, chemicals and other hazardous materials not known to be safe shall be regarded as "suspect" and shall not be accepted until certified safe for shipment by the shipper. Examples of hazardous material to be regarded as "suspect" are as follows:

(1) Deteriorated or damaged ammunition, explosives, or chemicals to be disposed of by dumping at sea. Cargo to be dumped shall be so prepared prior to loading as to require no treatment aboard ship other than movement to and from place of stowage.

(2) Ammunition or explosives offered for shipment from foreign stowage or service.

(3) Dynamite which is over six months old.

(4) Wet packed explosives which show signs of drying.

**k. Vehicles.**

(1) Except as otherwise provided wheeled or tracked vehicles of all types, whether propelled by gasoline or diesel fuel, shall be transported in controlled ships with tanks completely defueled and with battery leads removed from terminals adequately taped and secured.

(2) Procedures for obtaining waivers of navigation and vessel inspection laws to permit MSTS controlled ships to carry out their assigned missions in support of troops deployed under emergency conditions are contained in COMSTS INSTRUCTION 5800.2.

**1. Fueled Vehicles.**

(1) Vehicles ready for operation with fuel in tanks may be transported in controlled ships under the following conditions.

(a) Where controlled ships operate as a part of an amphibious task force and the orders of the Navy Task Force Commander so specify.

(b) On landing-craft ships and on "roll-on/roll-off" ships especially designed for the transportation of such vehicles, and operating efficient means of exhausting all noxious or combustible

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gases to the open air.

(c) On USCG certificated vessels which have been granted a specific waiver by the captain of the port.

(2) When fueled vehicles are transported, the following safety precautions shall be observed except when the commander of an amphibious task force deems it necessary for operational reasons to suspend observation of one or more precautions:

(a) Detailed inspection of all fuel systems of motor vehicles shall be made to insure against leaks.

(b) Such precautions as necessary shall be taken to prevent spillage of gasoline due to movement of the vehicle, motion of the ship, or to expansion of gasoline.

(c) Fire-fighting equipment of continuous foam and portable CO<sub>2</sub> types, fog nozzles, rescue-breathing apparatus and proximity fire-fighting clothing shall be kept ready for immediate use.

(d) Propulsion motors shall be shut off and not restarted until ship has completed its voyage.

(e) Vehicle lights shall be shut off and not relighted until the ship has completed its voyage.

(f) Brakes shall be set and the vehicles adequately secured.

(g) The frames of all vehicles shall be grounded during passage.

(h) All smoking and open fires shall be prohibited in any hold in which vehicles are stowed and in a wide danger area around the vehicles when stowed on deck.

(i) "NO SMOKING" signs shall be posted in all appropriate holds and areas.

(j) No vehicles shall be fueled or defueled below decks except in cases of urgent necessity and only with specific permission of the commanding officer or master.

(k) Only repairs or adjustments of an urgent nature may be made to vehicles while on board the ship.

(3) Vehicles, whether self-propelled or not, fitted with refrigerating or heating equipment, using a flammable liquid or gas

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as fuel may be accepted for transportation on landing-type ships and "roll-on/roll-off" ships, and such refrigerating or heating equipment may be operated while the vehicles are on board, subject to observance of the following precautions:

(a) Installations shall be rigidly mounted and free of any movement other than normal vibrations of operation.

(b) A shut-off control, easily accessible to the operator, shall be fitted to the fuel and electrical supply of refrigerating or heating equipment.

(c) Refrigerating or heating equipment, while in operation aboard ships, shall be under constant supervision by qualified personnel either from ship's complement or shipper service personnel.

(d) Fuel tanks for the supply of refrigerating or heating equipment shall be of sufficient capacity to contain fuel for the duration of the expected voyage. Such tanks shall not be refueled except in cases of urgent necessity and only with the specific permission of the commanding officer or master.

(e) The commanding officer or master may, when he deems necessary for any cause, require the cessation of operation of refrigerating or heating equipment attached to a vehicle while on board the ship.

m. Hazards in Flammables. Toxic vapors and fire are the principal hazards in flammables of all types. For a thorough understanding of the dangers involved personnel are referred to Chapters 2-9 and 2-15 herein and to Chapters 15 and 92 of Bureau of Ships Technical Manual. Precautions for doing hot work in the vicinity of flammables are described in Chapter 2-8. The following additional hazards must be kept in mind:

(1) Where gasoline is handled in bulk or as package goods the distance which ignition sources must be kept from possible leaks or spills is considerably increased because of the ease with which gasoline vapors travel. Care must be taken to keep these vapors from accumulating in low places or in confined spaces.

(2) Diesel and fuel oils are not especially irritating or harmful to the skin if exposure is not prolonged. Where fuel oil must be cleaned off it can be done primarily with a rag dampened with diesel oil. (Never use gasoline.) Any remainder can be removed with a liberal application of soap and water. Both fuel oil and diesel oil must be kept away from the mouth, and medical aid must be obtained if any is swallowed accidentally. Vapors can be particularly dangerous,

and the precautions set forth in Chapter 2-9 must be strictly followed.

(3) In very cold climate the vapor-air moisture in the space above the gasoline in tanks may become explosive. This condition should be suspected whenever the liquid temperature drops below 20° F. In such cases all regular fire precautions shall be taken and work involving burning, cutting, welding, or any other hot work shall be done by permit only.

n. Precautions Preliminary to Loading Flammables in Port.

(1) Although Chapter 2-9 emphasizes precautions to be taken against fire, the danger of destructive fire during loading is so great that additional warnings are necessary here.

(a) The following precautions shall be taken to prevent liquid gasoline or gasoline vapors from reaching the engineering spaces while fires are burning:

1 The port captain or superintendent and the commanding officer or master of the ship must agree whether it is necessary to keep fires burning because of weather conditions, possible necessity of immediate departure, or other urgent reasons.

2 If there is no vapor-collecting system and the reason for lighting fires is to raise steam for departure, tanks aft of amidships should be topped off before the fires are lighted so that any spill will not release vapors near the engineering spaces.

3 While fires are burning, there should be enough room left in all tanks being loaded to eliminate any possibility of a spill.

4 If fires are to be lighted only to raise steam for the ship's departure, no changes in the ship's cargo control system should be made during the time they are burning, and no changes to shore lines or pumps which might increase the pumping rate should be allowed.

5 A watch should be stationed near the boiler room ventilators to observe such conditions as leaks, overflows, changes in wind, or evidence of vapor, and to order ventilators closed and fires out at the first evidence of danger.

6 A watch should stand by in the boiler room to execute instantly any order from the ventilator watch.

7 The foreman or superintendent and a ship's officer should patrol the ship personally, observe conditions, and

check the rate at which tanks are filled.

8 If there is danger of possible enemy attack, it may become necessary to top off while gasoline is being loaded and to switch ship's lines and even draw samples without cutting fires.

(b) No fires, open flames, or open lights shall be allowed on the ship's deck, in the vicinity of vents, or in any compartment on, facing, or adjacent to that part of the deck on which cargo hose is to be connected. Proper warnings shall be posted prohibiting open flames and smoking.

(c) No repairs involving hot work shall be permitted.

(d) Extreme care must be taken when tugs or other boats come alongside, as these may have open flames or fires, or may be operating electronic transmitting equipment.

(e) Stacks of coal-burning tugs, dredges, pile drivers, and other coal-burning equipment should be fitted with spark arrestors. Stacks must never be cleaned out when the vessel is lying at a fuel dock.

(2) Care of the Area.

(a) Under no circumstances shall cigar or cigarette butts, pipe ashes, or matches (whether smoldering or extinguished) be thrown overboard or through portholes while a ship is moored to a fuel pier or is within the vicinity of such a berth. Such rubbish shall never be thrown from any enclosure on the wharf where smoking or fire is permitted.

(b) When gasoline is handled, avoidable sources of ignition both in ship and on wharf will normally be eliminated within a distance determined by safety and good practice; this is usually at least 200 feet (or at least 50 feet in the case of flammables other than gasoline) from the ship, cargo hose, or any other possible source of flammable vapor or liquid. Such sources of ignition include not only fires, matches, and smoking, but also trolley cars, locomotives, power boats, electrical equipment not specifically approved for use in hazardous atmospheres, and all motor vehicles not equipped with proper safety devices. They also include such sources of static electricity as steam or air jets, spray painting and sand blasting, and all sources of heat and sparks apt to be involved in mechanical repair work or in the use of electrical equipment, radio, or other electronic transmitting equipment.

(c) Except during an emergency the loading or discharging of flammables shall be discontinued during an electrical storm.

(3) Loading and discharging gasoline is, of course, more hazardous than the loading of fuel oil and diesel oil. When gasoline is loaded the following precautions shall be taken in addition to those in paragraphs (1) and (2):

(a) Adequate firefighting personnel and sentries must be posted during handling of gasoline.

(b) Procedures and safety precautions must be coordinated between the ship and any other activity participating in the gasoline handling.

(c) Limiting gasoline tank pressures must not be exceeded.

(d) It is imperative that accurate records of the amount of gasoline in each of the ship's tanks be maintained at all times.

(4) Preparing the Hoses.

(a) Before the fuel hose is connected for transfer of fuel oil between ships and piers, each group of loading or discharging connections on the deck shall be well grounded by means of a copper cable to the connections on the pier, and this connection is maintained until after the fuel hoses are disconnected. In hooking up this grounded cable, the circuit is closed and opened at the shore end rather than at the ship end to avoid possible sparks in the vicinity of explosive fumes. A switch at the shore end of the cable is useful for this purpose. (See also Chapter 2-9.)

(b) Gaskets shall be used in every hose joint. Where flanged couplings are used, a sufficient number of bolts is inserted to ensure a tight connection.

(c) Hose is connected and supported in a manner that will prevent chafing. When hose is supported by ship's tackle the fall is made fast to some stationary point on the ship, such as a cleat or bitt.

(d) Drip pans shall be hung under hose connections and expansion joints to catch drips and small spills.

o. Loading of Flammables.

(1) Providing a Hose Watch.

(a) When cargo is being discharged ashore, it is customary for the ship to provide a hose watch to stand by at all

times to signal the pumper if an emergency occurs or if there is a signal from the wharf and to check the pressures on the gages attached to the wharf risers and ship connections.

(b) When vessels are being loaded the depot should provide a hose watch to check for spills and leaks as well as to signal the pumper as outlined in paragraph (a). The absence or dereliction of a hose watch constitutes one of the most dangerous violations of safety rules.

(2) Safety During Loading.

(a) During the entire time that bulk or package cargo is being transferred at a fuel pier, the ship's fire hose should be connected to the ship's hydrants and let out ready for use in case of emergency. The ship's fire main should be connected to the shore fire main, if possible, when there is no steam or other power available in the ship. Before cargo transfer is started, other ship and dock or depot firefighting equipment shall be placed where it will be ready for immediate use.

(b) In the loading of flammables, the following safety rules shall apply:

1 Overheated bearings, glands, and stuffing boxes in tankers can cause serious fires and explosions in pump rooms. Frequent inspections shall be made while pumps are operating to see that bearings are kept well oiled and cool running.

2 To prevent spills, all sea cocks and sea suction valves should be locked or lashed shut except when actually in use. Scuppers that would drain any oil spill into the water should be plugged. Tank tops should be kept closed during cargo transfer and clamped down unless local orders require that they be unclamped, and tanks should be closely watched for leaks. Ullage plugs should be weighted or clamped down in accordance with the ship's regulations. Flame-arrestor screens, if used, must be in good condition, whole and unclogged and snugly fitting the ullage plate. If spills should occur the following precautions shall be taken;

a Oil spilled into the water should be cleaned up if possible, and any oil spill of consequence should be reported immediately to the commanding officer. The action to be taken may include warning vessels away, notifying downstream docks, calling the fire department to stand by, moving vessels from the dock, or (in quiet water) surrounding the oil with booms.

b Gasoline spills should be watched closely

and, if there is any suspicion of gas hazard, the surroundings should be tested for dangerous vapor concentrations.

c If fuel oil accumulates on the adjacent beach or on the wharf structure it shall be cleaned up immediately. The hose watch and wharfmen should observe the water at regular intervals for evidence of spilled oil; this is particularly important if fueling takes place at night.

3 Pressure must be maintained on the fire main during fueling.

(c) Stores may be handled direct to the poop deck during loading, if the winch is driven by steam, air, or explosion-proof motor. In addition, any goods may be handled in emergency;

1 if there is a vapor-collecting system, or

2 if all tanks are kept closed and there is no escaping vapor on the side where stores are being handled. Goods may be transferred during the discharge of gasoline cargo by permission of the responsible authorities. In no case shall any ammunition, cargo, or stores be lifted over any hose which is in service and under pressure.

(3) Over-all loading (loading through an open hose directly into a tank hatch) is permitted only for fuel oil and diesel fuel oil. It is necessary in some cases and a time saver in others. During over-all loading the free end of the hose should always be lashed in position or otherwise firmly secured. Over-all loading should be strictly prohibited when any vapor hazard exists.

(4) Additional Precautions for Night Loading.

(a) Cargo transfer at night involves extra accidents and mistakes. In the absence of local regulations, night loading of gasoline should be accompanied with the greatest possible caution and should normally require thoroughly adequate vapor-proof floodlighting.

(b) Personnel should be provided with approved safety flashlights or electric lanterns, and these should be carried at all times while the work is in progress.

(c) Special precautions should be observed in topping off tanks, which should be done under the direct supervision of the ship's officer and the foreman and at a somewhat slower speed than that permitted by daylight.

p. Precautions After Loading or Discharging.

(1) Breaking Connections.

(a) Pans or buckets are placed under all hose connections before the connections are broken.

(b) All hose is drained free of oil and washed out with salt water, if possible, after loading or discharging operations are completed.

(c) Extreme care must be taken to see that no oil escapes from hose or pipelines into navigable waters. Hose ends shall be covered immediately with wooden plugs or with blank flanges and gaskets, secured by at least three bolts.

(2) Drip pans and tubs should be emptied as soon as possible, either by the use of a hand pump or by pouring the contents into a drum.

(3) Taking ballast aboard an empty ship from which a gasoline cargo has just been discharged causes an outflow of vapor from the tanks and involves an ignition hazard differing only in degree from the hazard of cargo loading. In one way the danger may be greater, as the tanks may contain an explosive mixture. Taking ballast aboard should, therefore, be prohibited while fires are lighted, unless it is urgent that the ship leave and the commandant and ship's commanding officer agree that it is unsafe to leave the dock without ballast. When ballast is absolutely necessary all the applicable precautions for the prevention of fire shall be taken.

2-2-6 FIRE PREVENTION IN POWER BOATS

a. Fire Hazards. Safety precautions for power boats not specifically covered in this section, particularly those engaged in carrying passengers, shall comply where practical to the provisions of CG 323, Rules and Regulations for Small Passenger Vessels and Chapter 9820, BuShips Technical Manual, Section VI, "Boats and Lifesaving Craft."

(1) A fire is serious at any time, but in a gasoline or diesel-powered boat it has a more dangerous aspect. Boats are equipped with firefighting devices but the best safeguard to those concerned with the handling of boats is an intelligent appreciation of the hazard and a knowledge of what causes it. This information may then be used to prevent conditions leading to a fire. Fires result from improper housecleaning on the boat, defects or leaks in machinery and equipment, and improper ventilation. Details of these hazards and precautions against them are discussed in this section.

(2) As emphasized in Articles 2-2-1 thru 2-2-5, gasoline engines, of course, present the greatest fire hazard. On various gasoline-powered craft there exists the danger of explosion accompanied by fire. This may result from carburetor flooding, leaky gasoline lines, strainers, tanks, and flooding during fueling. Or, explosion and fire may result simply from vapors, which in gasoline are so highly flammable that they can be ignited by sparks so minute as to be invisible to the eye. For an understanding of precautions against gasoline hazards personnel shall become thoroughly acquainted with the facts presented in Chapter 2-9.

b. Qualifications for Crews. In addition to being a qualified swimmer, as required by the Bureau of Naval Personnel Manual, each man assigned as a member of a power boat crew should have the following qualifications:

(1) He shall have a thorough knowledge of safety precautions pertaining to the use and handling of gasoline and diesel fuel and the prevention of fires in power boats.

(2) He shall have the ability to operate the type of fire extinguisher installed in the boat to which he is assigned.

c. Inspections. Daily inspections of all power boats shall be conducted by the boat captain. Weekly inspections shall be conducted by a representative of Ship Operations Division. Monthly inspections or as circumstances warrant shall be conducted by a representative of the Command Safety Representatives. Deficiencies requiring corrective action shall be forwarded to the cognizant operating divisions.

d. Housekeeping and Ventilation. Good housekeeping in a power boat is essential for the protection of personnel and material and must be maintained at all times. The detailed daily inspection, (c), is indicative of the vast importance of the matter of cleanliness and good ventilation in all parts of the boat. Special attention shall be given to the following:

(1) Improperly maintained engines and engine rooms present a number of hazards:

(a) The engine room must be kept clear of clothing, and cleaning rags and waste shall be kept in a closed container and burned after use.

(b) Because gasoline vapor is highly combustible when mixed with air the use of gasoline for cleaning the engine or any other part of the boat is prohibited.

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(c) The greases and oils with which an engine becomes encrusted are a source of danger if not removed at regular intervals. These petroleum products will feed a fire, enabling it to get out of control rapidly.

(2) Bilges and sumps shall be kept dry and shall be frequently washed out to clear them of fuel and oil. They shall be washed before hoisting into the boat skids. The space directly under the engine can be readily washed down by using hot water or a steam hose. This method will carry heavy oil and grease over into the sump, from which it can be pumped. Where engine-room bilges are filled with brass-covered balsam wood or cork, frequent inspections should be made to ensure that the brass is tight and that no fuel can be absorbed by the filling medium.

(3) One of the essentials of good housekeeping in a small boat is to see that combustion cannot be brought about through carelessness with seemingly small items. As stated previously, there must be no smoking or naked lights in gasoline-engined power-boats. Further, only safety matches shall be allowed on board. This type of match must be struck on a prepared surface before it will ignite. The ordinary kitchen type can be ignited by a sharp blow or by accidental contact with some object.

(4) Proper Storage.

(a) Explosions and fires have occurred in cases where gasoline connections in motor launches have been broken by flukes while anchors were being removed from the gas tank compartments. The gas tank compartment is not intended for anchor storage, and because of the fire hazard involved it must not be used for this purpose.

(b) Life jackets have sometimes been stored in the gasoline tank compartments in motor launches. Although the hazard here is not great, the practice should be discontinued because of the fact that undetected leaks in the compartment can cause spills on the jackets. In addition, the jackets interfere with inspection in the compartments.

(5) The presence of fuel in the bilges or in a free state in a boat is dangerous, since the fumes can be ignited easily. The free fuel may come from leaks in the fuel lines or units of the system or may result from filling the fuel tanks too full. Fuel may flow through the vent holes because of the motion of the boat, or it may run out because of the expansion of the liquid as it becomes warm. The fumes must be disposed of by proper ventilation.

e. Care of Equipment.

(1) Every boat crew shall be instructed in the care and use of fire-fighting equipment. Power boats carry portable or built-in CO<sub>2</sub> extinguishers, and the following precautions shall be taken in caring for them and using them:

(a) Portable and built-in CO<sub>2</sub> extinguisher cylinders shall be weighed at 3-month intervals. Quarterly weights of the extinguishers shall be noted on the cylinder record card provided by the manufacturer. If weighing shows that a cylinder has lost 10 percent of its rated capacity it must be refilled.

(b) Instructions for inspection and refilling appear on a label plate furnished with the extinguisher. In built-in systems this plate should be installed in the bulkhead in the vicinity of the cylinder or pull box.

(c) Leakage can cause serious loss of capacity in a cylinder and go undetected unless cylinders are closely checked. Slow leakage often takes place under the sealing disk, or the sealing disk can be injured by inquisitive personnel and the resultant leakage not reported. Personnel shall be required to report accidental discharge of the contents of a cylinder so that the cylinder can be refilled as soon as possible.

(2) Electrical Equipment.

(a) Electric wiring shall not be permitted in the bilges, and precautions against static sparks, short circuits, and sparks caused by striking steel with tools must be taken.

(b) All naked electric terminals shall be wrapped with insulating tape.

(c) Batteries.

1 The battery box shall be located outside a closed engine compartment and should be provided with a suitable drip-proof cover.

2 The charging of batteries will produce hydrogen gas which, if trapped and ignited, will result in an explosion. This applies particularly to motorboats having their batteries under the seats in the after part of the boat. If the battery is charged (other than from the boat engine generator) while in the boat, hydrogen may collect under the seats. If the hydrogen is not removed it can be ignited by a spark from the battery caused by a loose terminal or by the disconnecting of charging wires. Batteries should

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either be charged on deck or removed to an open space in the boat until the operation is completed. Personal protective equipment, i.e., gloves, goggles, and aprons shall be used when servicing batteries.

(3) Other Equipment.

(a) The improper insulation of the exhaust pipe where it passes through the hull may set the boat afire. Elsewhere, a poorly insulated exhaust pipe may set fire to nearby objects or may ignite gas fumes if hot pipe is exposed to gas in the engine room. Poor insulation shall be corrected immediately.

(b) Carburetor drip pans are required to be installed in gasoline-engined boats which are not fitted with approved type drip-proof carburetors. The only authorized pan is a type which can be removed without any of the contents being spilled into the bilges.

(c) Portable gasoline containers shall be periodically inspected for leaks. If any leaky containers are found their contents shall be transferred immediately to a boat's tank or to a tight container, and leaky, defective gaskets and plugs shall be replaced. Water shall not ordinarily be introduced into a gasoline drum, but if a leaky container cannot be made tight by setting up on the filling and vent plugs, or if repairs are required involving the application of heat, the drum shall first be filled with water, emptied, and blown through with a stream or air jet to eliminate any vapor present. Repairs to gasoline drums or containers are not ordinarily required to be made by the ship's force, but are made at their distribution depots. Before a shipment of empty containers is made, the containers shall be carefully inspected to see that they are tight and that all plugs are secured. Unless this is done, the containers constitute a fire hazard to the carrier.

(d) The wire gauze in the filling connection is provided to prevent gasoline tank fires or explosions. It should never require removal. The dirt in the filling connection is usually scale and the connection itself can be backed out and replaced after being dumped. When replacing the filling connection, care should be taken that each part is set up tightly on its respective gasket.

f. Overhaul and Repair. Before any work is done inside the boat or on the hull or machinery, the bilges shall be thoroughly ventilated and cleared of any gasoline vapor present. All gasoline leaks, from whatever source, shall be stopped. When boats are to be repaired at a naval shipyard the fuel tanks shall be emptied and the bilges cleaned by the ship's force before the boats are sent to the shop.

g. Fueling Power Boats.

(1) General Precautions.

(a) Under normal conditions gasoline power-boats shall not fuel unless in the water, with the engines stopped, clear of other boats and, where possible, near enough to the ship to receive aid if needed. Except in emergency, boats shall not be fueled at night. They shall never be fueled when passengers are aboard.

(b) Proper Use of Fueling Equipment.

1 Piping.

a Fuel piping shall be extra heavy, and the joints and seams must be kept tight. Shellac shall be used in making up joints.

b Fuel feed lines shall in all cases be fitted with cutout valves installed near the fuel tank and shall be so fitted as to be readily accessible in an emergency. The cutout valves are to be fitted with extension rods and operating handwheels and shall be so located that they may be controlled from the engine compartment.

2 Grounding must be maintained throughout fueling and until the hose has been withdrawn and the filling flap closed. The hose nozzle is provided with a grounding wire fitted at the end with a spring clip. Before the cover of the filling connection is unscrewed this clip should be clamped on the screen provided in the flange of the connection.

3 It is preferable to insert the nozzle of the grounded hose directly into the filling opening. However, when the use of funnels is unavoidable the funnels shall be fitted with 40-mesh wire gauze strainers. The use of a chamois strainer is prohibited.

4 Tank-fueling caps shall be kept in place when no fueling is being done.

(c) It has been emphasized in 2-2-1 thru 2-2-5, and cannot be overemphasized, that the great danger of fire during fueling calls for maximum precaution. No smoking and no naked lights (from oil lanterns, candles, matches, exposed electric switches, or slip rings or commutators of a dynamo) shall be permitted in the vicinity while fueling. There shall be absolutely no use of such lights in compartments containing gasoline engines or bilges or

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within 50 feet of gasoline storage tanks or gasoline vapor.

(2) Fueling procedure.

(a) The following precautions shall be taken before the filling pipe cap is unscrewed to ensure a maximum of safety during fueling:

1 Open the hinged covers fitted on the engine hood to permit a free circulation of air around the engine. Do not close these covers until fueling has been completed and the engine is operating satisfactorily.

2 Inspect the tanks and filling pipes. Do not fuel unless these are tight at all joints.

3 Close the cutoff valves at tanks.

4 See that the hatch in the coxwain's flat on motor launches fits snugly.

5 Close all openings (near the filling pipes) through which fuel vapor might pass into closed compartments.

6 In the 26-foot motor whaleboats, where no screw is provided, clip the grounding wire to the  $\frac{1}{4}$ -inch copper gooseneck vent pipe fitted on the tank. The grounding screw is not required to be fitted in diesel-engined boats.

7 Keep one member of the boat crew standing by with a portable CO<sub>2</sub> fire extinguisher ready for use. The extinguisher is not to be returned to stowage position until fueling is completed and the engine is operating satisfactorily.

(b) When all the above operations and the related precautions have been carried out, the following steps shall be taken in filling the tanks:

1 In standard tanks the filling pipe is the only opening provided for escape of vapor which is forced out of the tank during fueling. Therefore care should be taken not to push the nozzle so far into the filling pipe that it will choke the opening and thus prevent the escape of the displaced vapor.

2 If for any reason the hose nozzle is withdrawn during fueling and the ground wire becomes detached, the ground wire must be reattached to the screw before the nozzle is again inserted in the filling pipe (not required on diesel boats).

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3 The nozzle trigger shall be kept under control so that fuel will pass through the filling pipe strainer and so that overflowing can be avoided by reducing the flow when the tank is nearly full.

(c) If any fuel has been spilled, wash down and wipe dry.

(3) When fueling from shore stations, by portable containers, or while a boat is in skids, all the above precautions shall be taken when applicable to the situation. In addition, all precautions set forth in this article shall apply.

(a) Serious fires have occurred during fueling from shore stations when proper grounding connections were not made. Before permitting a gasoline-engined boat to fuel from a shore station, an inspection of such station should be made by the officer or petty officer in charge of the powerboat to see that grounding connections are provided by either the boat or the station. These grounding connections should be of wire or solid metal, and care shall be taken to see that the contacts are positive. Wrapping wire around the metal parts of the filling hose or using chains is not sufficient.

(b) Gasoline shall not be transferred to a boat from a drum or other portable container unless the container has been isolated from other containers. An exception to this rule is a vessel whose drums are stowed in quick-releasing racks, in which case the drum shall be left in its rack during fueling. An adapter shall be provided with a standard iron pipe-size screw thread on one end to fit the opening on a standard gasoline drum; the other end should be fitted with a 1½-inch inside diameter flexible metallic hose covered with rubber and fabric. This hose will be furnished in 25-foot lengths having couplings and nozzles with Navy standard threads. The standard gasoline filling hose nozzle is of the "wet hose" type, which will release gasoline only when the operating lever is gripped and will automatically cut off the flow when the lever is released. This instantaneous control prevents overfilling of tanks. Overflow of the tank should be carefully avoided, especially on boats where the filling fitting is located on deck. Therefore overflowing gasoline will pass overboard and not into the bilges.

(c) During fueling when a boat is in the skids, the following precautions shall be taken:

1 Adequate firefighting equipment shall be provided at the scene.

2 The fire main shall be under suitable pressure and hose led out to the scene from at least two fire plugs.

3 If practicable a metal hose, thoroughly grounded to the supply tank or drum and to the boat's tanks, should be used for transferring gasoline.

4 Where the use of a metallic hose is not practicable and a separate container must be used to pour gasoline into the boat's tanks, this container, the boat's tanks, and the supply tank or drum should be interconnected by a flexible conducting wire of adequate length. Portable containers shall be inspected after emptying to insure that all gasoline has been drawn off and shall then be closed tightly by setting up on the filling and vent plugs.

(4) Before starting an engine after fueling, or before starting when the engine has been idle for a day or more, every precaution must be taken to ensure thorough ventilation. The same precautions shall be taken if gasoline vapor is noticed when the boat is under way. Gasoline fires have occurred through ignition by sparks from some part of the electrical equipment while the engine was turning over; therefore it is necessary to the safety of both personnel and material to stop the boat and clear out the gasoline vapor before continuing to run the engine. The following precautions shall be taken:

(a) Fire extinguishing equipment shall be readily available, and a crew member shall be standing by ready to operate it if necessary.

(b) If door or hatch openings are inadequate to supply sufficient ventilation, air circulation may be induced by fanning or using an air bellows.

(c) Fuel lines shall be inspected for leaks and any that are found shall be corrected immediately.

(d) The engine must be inspected for loose electrical connections bare terminals, and damaged insulation. If any of these are found they must be repaired.

(e) If gasoline has been spilled into the bilges during fueling, the bilges shall be washed down, pumped, wiped out, and aired thoroughly before the engine is started.

2-2-7 UNDERWATER OPERATIONS. MSTS vessels authorized divers for Special Operations shall be guided by the provisions of the U.S. Navy Diving Manual, NAVSHIPS 250-538 July 1963, Part 3 (SCUBA Divers) and Chapter 9940, Section II of BuShips Technical Manual.

PART 2  
GENERAL SAFETY PRECAUTIONS

CHAPTER 3  
MEDICAL FACILITIES

Handling and Storage of Gases . . . . .	2-3-1
Injuries and/or Occupational Illnesses . .	2-3-2
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2-3-1 HANDLING AND STORAGE OF GASES

a. Specifications for Cylinders. All cylinders containing compressed gases, such as anesthetic gases, oxygen, or other gases used for medicinal purposes, whether or not these gases are flammable, shall be in accordance with the regulations of the Interstate Commerce Commission with respect to construction, testing, and fittings. Such cylinders shall be plainly marked with the name of the gas contained therein. Small cylinders, for use on anesthetic machines, shall also bear color markings in accordance with MIL-STD 101A. These markings should comply with those recommended by the Division of Simplified Practices, National Bureau of Standards, Washington, D. C.

b. Storage of Cylinders.

(1) In general, weather deck storage will be provided for flammable and explosive gases. In specific cases, below deck stowage is approved depending on the particular type, mission and arrangement of the vessel. In all such cases, these approved locations shall be shown on the plans of the vessel. Only cylinders connected to anesthesia machines shall be permitted in anesthetizing locations.

(2) Construction of cylinder storage or manifold enclosures shall be in accordance with article 232 of enclosure (1) of BuMed Instruction 5100.1B.

c. Handling of Oxygen Cylinders. Great care must be exercised in handling oxygen to prevent contact of oxygen under pressure with oils, greases, organic lubricants, rubber, or other material of an organic nature. The following safety requirements are to be followed:

(1) General Restrictions.

(a) Never drape an oxygen cylinder with materials such as hospital gowns, masks, or caps.

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(b) Never mix gases of any type in an oxygen or any other cylinder.

(c) Never use oxygen from a cylinder except through a pressure reducing regulator.

(d) Never attempt to use regulators which are in need of repair or cylinders having valves which do not operate properly.

(e) Never attempt to repair defective oxygen equipment unless properly qualified to do so.

(2) Protection from Lubricants.

(a) Never permit oil, grease, or readily combustible materials to come in contact with oxygen cylinders, valves, regulators, gages, or fittings.

(b) Never lubricate regulators, fittings, or gages with oil or any other combustible substance.

(c) Never handle oxygen cylinders or apparatus with oily hands, greasy gloves, or rags.

(3) Valves and Fittings.

(a) Never apply a fitting to a cylinder without first cleaning the particles of dust and dirt from the opening and closing the valve.

(b) Never bring an anesthesia machine to the patient without first opening the high pressure valve on the oxygen cylinder.

(c) Never permit oxygen to enter the regulator suddenly. Open the valve slowly. When opening the valve, point the face of the gage on the regulator away from the operator.

(d) Never use oxygen fittings, valves, regulators, or gages for any other service except oxygen.

d. Reference. For additional information on the precautions to be observed in connection with compressed or liquefied gases, see Chapter 2-9 (Fuels and Compressed Gases).

2-3-2 INJURIES AND/OR OCCUPATIONAL ILLNESSES. All injuries or occupational illness, regardless of severity shall be reported and treated. A treatment report of each injury or occupational illness,

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complete in details, shall be forwarded by the medical officer or first-aider each day to the deck officer on watch for entry in the ship's log.

2-3-3 FIRST AID KITS. On ships and stations where medical treatment is available, first-aid kits shall not be kept in work areas.

PART 2  
GENERAL SAFETY PRECAUTIONS

CHAPTER 4  
COMMISSARY, MESSING, AND EXCHANGE FACILITIES

General . . . . .	2-4-1
Ship's Store . . . . .	2-4-2
Stock Room . . . . .	2-4-3
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2-4-1 GENERAL.

a. Responsibility of Personnel. It is the responsibility of all personnel to know how to perform assigned duties in a safe manner. The correct way to do a job is the safe way. A person who is not certain as to his particular assignment, or the correct way to do it, should immediately ask his superior to inform him. He should become thoroughly familiar with the safety precautions applicable to his duties and should apply these precautions at all times if it is possible to do so.

b. Unsafe Conditions. Unsafe conditions, including damaged and defective equipment, are to be reported to the supervisor without delay.

c. Clothing Hazards. Certain kinds of clothing may be accident hazards. Thin or broken soles, high heels, and scarfs, for example, have caused serious, and even fatal, accidents. Personnel should make sure that clothing is safe for a particular task. Open toe shoes and sandals are prohibited, and jewelry must be removed when a person is working near electricity and machinery or when he is handling heavy objects.

d. Lifting. When carrying out lifting operations, these rules should be observed:

(1) Keep back straight, bend knees, and let leg muscles do the work.

(2) Ask for assistance when handling heavy or bulky objects.

(3) Never attempt to lift anything when you are in an awkward position.

e. Climbing. Only a ladder set at a secure angle should be used for climbing. Ladders are to be equipped with safety feet. Makeshifts shall never be used in place of ladders.

f. Over-Reaching. Stretching in order to reach objects may result in strains or falls. Therefore over-reaching is to be avoided.

g. Running. Running, except in emergencies, is prohibited.

h. Horseplay. Personnel shall not indulge in horseplay or practical jokes. This kind of behavior often leads to injuries.

i. First Aid. Employees shall always arrange for first aid treatment to an injury, no matter how slight the injury may be. A scratch, if neglected or improperly attended, can lead to serious consequences.

j. Safety and Operating Instructions. Safety and operating instructions shall be posted adjacent to all equipment and visible to the operator.

#### 2-4-2 SHIP'S STORE

a. Stock Arrangement. Merchandise should be displayed on counters and shelves in such a manner as to achieve the maximum safety for personnel and customers.

(1) Merchandise should be stacked so that there is no danger of its falling. The heaviest items should be placed on the bottom of the stack and the upper items overlapping pyramid fashion. Merchandise is not to protrude beyond the edge of counters or shelves.

(2) Store cleaning compounds and other caustic solutions in cool, dry areas on lower shelves only.

b. Waste Disposal. Empty boxes and cartons, excelsior, and other waste material is not to be accumulated. Waste should be disposed of promptly.

c. Equipment Handling. The following precautions shall be observed in the handling and maintenance of equipment.

(1) Do not block the aisles with equipment.

(2) When pin tickets are used for price marking do not leave the pin points exposed. Insert them into the tickets. Do not

leave loose pin tickets on the counters.

(3) Keep drawers and doors closed when they are not in use.

(4) Arrange for repairs to be made as soon as possible on rough edges and splintered areas on equipment.

2-4-3 STOCK ROOM

a. Storing Merchandise. When storing merchandise, the employee should observe the following safety rules:

(1) Use shelving of sturdy construction.

(2) Place the heaviest material on the bottom of stacks and overlap the upper material pyramid fashion.

(3) Do not stack merchandise so high that it may fall. In the storeroom afloat, merchandise should be secured behind battens or lashed up if there is danger of its toppling.

(4) Do not place merchandise on shelves, in bins, or elsewhere, in such a manner that it protrudes into the aisles.

(5) Place flammable materials in lockers or in approved safety cans provided for them. Store the containers in approved flammable liquid stowage lockers.

(6) Keep a portable ladder in stock rooms for use in getting stock stowed in upper bins.

b. Ventilation. The stockroom should be properly ventilated. When entering a closed stockroom which has not been properly ventilated, arrange for another person to stand outside in case of emergency. The door should remain open.

c. Securing a Stockroom. It must be determined that everyone is out of a stockroom before it is secured.

d. Repairs. Rough areas, splintered edges, and other such hazardous conditions should be repaired as soon as possible.

e. Smoking. Smoking in stockrooms is prohibited.

2-4-4 RECEIVING ROOM

a. Equipment. The following rules apply to the type and use of equipment in a receiving room:

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(1) Trucks.

(a) Use hand-trucks or flat-trucks for moving heavy cases.

(b) Do not attempt to load merchandise on two-wheel hand-trucks without assistance.

(c) Do not overload hand-trucks.

(d) Never push hand-trucks rapidly or carelessly.

(e) Park empty trucks in an area designated for this purpose. Two-wheel hand-trucks should be parked in an upright position.

(2) Gloves are to be worn when handling wooden crates or performing other duties in which there is danger of injury to hands.

(3) Safety goggles must be worn when cases are being opened for protection against flying splinters and flying ends of bailing wire or metal strapping.

(4) Cartons and cases are to be opened with appropriate tools.

(a) Cartons which are not to be used again should be opened with a safety carton opener.

(b) Cartons which are to be used again should be opened with a spatula-shaped instrument.

(c) Cases should be opened with any of the following tools necessary: pinch bars, nail pullers, wire cutters, and steel strapping cutters. Hammers, lather's hatchet, axe, etc., should not be used for opening wood boxes or crates.

b. Unpacking Merchandise. Merchandise shall be unpacked in accordance with the following regulations:

(1) Wear gloves when unpacking merchandise.

(2) Unpack merchandise as soon as possible after its receipt.

(3) Remove protruding nails, staples, and wire from boxes and barrels before unpacking their contents.

(4) Beware of broken glass when reaching into packing cases in which glass items have been shipped.

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(5) Do not pick up broken glass with bare hands.

(6) Stack unpacked merchandise in a safe location and in safe piles to prevent its toppling or being trampled.

(7) Properly dispose of packing material immediately. Nails, pieces of wire, metal stripping, and other such packing materials may cause injury if dropped on the floor.

(8) Stow empty packing cases in a safe manner in an area designated for this purpose.

#### 2-4-5 BUTCHER SHOP

a. General. The following general precautions are to be observed in the butcher shop.

(1) Personnel must be careful not to crowd or jostle one another. Crowding and jostling are particularly dangerous in the presence of the cutting instruments and sharp pointed hooks which are found in the butcher shop.

(2) In addition to observing general housekeeping precautions, personnel in the butcher shop should be especially careful not to let meat trimmings lie about on the floor. They not only attract flies and insects but create extremely dangerous slipping hazards.

b. Cutting and Slicing Operations. Butchers must pay particularly close attention to their work when using cutting or slicing equipment. The slightest miscalculation or a minor slip can lead to a serious injury.

c. Hand-Operated Tools. The following precautions with reference to hand-operated tools are to be observed:

(1) Maintain a complete set of tools at each block so as to avoid unnecessary injuries which may be suffered from carrying the tools about.

(2) Keep the handles of tools clean and dry. Greasy or wet handles may cause accidents.

(3) Grip instruments firmly.

(4) Be sure your fingers are below the guard when using a sharpening steel.

(5) Use only sharp knives. Dull knives are greater accident hazards than sharp knives during cutting operations.

(6) Never hold a knife in your hand when carrying any other object.

(7) Be careful not to lay a piece of meat on a knife. The meat may conceal the cutting edge.

(8) Do not place knives in the wash water until ready to wash them. Lay them in plain view beside the sink.

(9) When using a cleaver, keep your free hand as far from the path of the cleaver as is necessary to assure safety.

(10) Use a hand meat hood when lifting or boning meat.

(11) Use a scoop to handle shrimp.

(12) Keep the surfaces of meat blocks level.

(13) Store tools in their proper places.

(14) Metal gloves shall be worn when hand slicing and boning meats.

d. Electrically Operated Equipment. Precautions relating to electrically operated equipment are set forth in Chapter 2-15 of this Instruction. In addition to those, the following specific precautions are to be observed when using electrically operated machines in the butcher shop:

(1) Power Meat Saw.

(a) Adjust the blade before the machine is started.

(b) Do not twist the blade while operating the machine.

(c) Never leave the machine running when it is not in use. Turn it off immediately upon completion of the cutting operation.

(d) Disconnect the machine before cleaning it.

(2) Electric Meat Grinder.

(a) Adjust the cutter before the power is turned on.

(b) Never feed the machine entirely by hand; use a pusher-stick.

(c) Do not attempt to remove anything from the machine while the machine is running.

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(d) Disconnect the machine before cleaning it.

(3) Cube Steak Machine.

(a) Do not permit your hand to get too near the feed slot when feeding meat into the machine.

(b) Disconnect the machine before cleaning it.

(4) Slicing Machine.

(a) Adjust the blade for size of cut before turning on the power.

(b) Make sure all guards are secured before operating the machine. Never use the slicer when the blade guard is off.

(c) Do not operate the machine with wet hands.

(d) Keep your hands away from the blade when the machine is running.

(e) Never put your hands under the guard on the slicer.

(f) Disconnect the machine before cleaning it.

(g) Use a cloth on a stick to clean the blade. Wipe from the center of the blade toward the cutting edge.

e. Reefer Boxes.

(1) Do not enter freezing rooms without proper clothing.

(2) The signal light which signifies whether anyone is in the box and emergency alarm shall be checked daily to determine that they are in working order. Make certain that the alarm signal device in reefer boxes is identified.

(3) Report immediately any evidence of escaping refrigerator gas.

(4) Do not carry objects which are large enough to obscure your view.

(5) Be careful not to snag yourself on meat hooks.

(6) Know how to operate emergency release.

(7) Report all burnt out lights in reefer boxes immediately.

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Make certain vapor globes and guards are kept in place over all lamps.

2-4-6 GALLEY

a. General.

(1) Mark double swinging doors "IN" and "OUT". Use correct door and pass through slowly.

(2) Handling of Hot Foods and Liquids.

(a) Do not allow the handles of cooking utensils to extend beyond the edge of the range. They can be bumped and serious burns to personnel result from spilled food or liquid.

(b) Before removing foods from hot ranges and ovens be sure that there is a clear place on which to set them.

(c) Use only the proper implements, such as pot holders and tongs, for handling hot foods.

(d) Carry hot liquids in covered containers with the covers securely in place.

(e) Do not bump into anyone when hot food is being carried.

(f) Mop up immediately grease which is spilled on the deck. Greasy decks are doubly hazardous. They can cause fires as well as falls.

(g) Where necessary, for safety of personnel, grab rails shall be provided. Ranges shall be provided with sea rails with adjustable barriers to resist accidental cook pot movement.

(3) Proper Use and Care of Utensils.

(a) Use only the proper implements for opening cans and other containers.

(b) Hold knives firmly. This cannot be done if the handles are wet or greasy.

(c) Knives are to be kept in a drawer designated for this purpose only. The handles should be kept to the front and the cutting edges should face in one direction.

(d) In case of fire in a range or oven immediately

report it. Then use available portable carbon dioxide (CO<sub>2</sub>) or dry chemical extinguishers on the blaze.

(e) Do not attempt to clean ranges and ovens while they are hot.

(f) Never clean electrically operated ranges and ovens with water. Severe shock may be suffered.

b. Vegetable Chopper.

(1) Make certain that the bowl is seated properly and that the chopping blade and guard are secure before starting the machine.

(2) Do not attempt to remove produce which has lodged between the blade and the housing until the machine is turned off and the blade has stopped revolving.

c. Potato Peeler.

(1) Never operate the peeler unless water has been properly applied.

(2) Do not put your hand in the machine while the machine is running.

(3) Do not adjust the peeler unless the power has been shut off.

d. Food Cutter.

(1) Be sure that the knives are in proper position and the guard is securely in place before starting the machine.

(2) Do not put your hands in the bowl while the knives are revolving.

e. Food Chopper.

(1) Feed the food chopper with a wooden push stick; never feed it with your hands.

(2) Keep the same knife and plate together, as they wear to fit each other. Improperly fitted knives can break and fly off the machine.

f. Food Mixing Bowl.

(1) Properly attach the mixing bowl before starting the machine.

(2) Keep your hands away from the mixing chamber while the machine is in operation.

g. Steam-Jacketed Kettle.

(1) Determine that the safety valve is in proper working order before using the kettle.

(2) Do not tamper with the safety valve or tie it closed. It is there to prevent the kettle from exploding.

(3) Kettle lids shall be fitted with weighted remote controls and so located that a person opening the lids will not be burned by steam released when lids are opened.

(4) Safety valves that are recessed and adjacent to other kettles shall be provided with a lanyard to offset burning hazard to personnel testing valves.

h. Pressure Cooker.

(1) Be sure that the safety devices are in proper working order before using the cooker.

(2) See that the cover is securely in place before turning on the heat.

i. Deep Fat Fryer.

(1) Power for the deep fat fryer shall be obtained from a lockable distribution panel. The fryers must be protected by an upper temperature limit thermostat and disconnect breaker as directed by NAVSHIPNOTE 9340 Ser #6660H-3390 dated 10 Jan 1967. The thermostat is designed to function when a maximum temperature of 470° F. is reached in the fryer. This unit is a snap acting type with normally open contacts which close when the upper temperature limit is reached.

(2) The circuits for the deep fat fryers shall be opened at the distribution panel and the panel locked when the galley is secured.

(3) The heating elements, thermostats, electrical connection, and switches of the fry kettles shall be cleaned and adjusted monthly by the electricians. More frequently, if needed.

(4) The electrical insulation of kettles shall be checked monthly by means of a megger test.

(5) Calibration of the lower thermostat shall be checked at least once a month by the following procedure: \*

(a) Suspend a thermocouple or a high-temperature mercury thermometer (at least 400° F.) in the center of the fat with the temperature sensitive section about 2½ inches below the surface of the fat

(b) Set the thermostat dial at 350, turn on switch, and heat the fat approximately 30 minutes.

(c) Turn knob on thermostat dial back and forth, after the fat has been thoroughly heated, until a small movement in either direction produces a "click" in the control circuit indicating opening or closing of the circuits. The average dial reading between the open and closed position will be the temperature control value. If this value does not agree with the thermocouple or thermometer reading, remove the dial knob, rotate the adjusting plate to either "raise" or "lower" as required. If a fry kettle thermostat or the electrical control operated therefrom is found to be defective, immediately place the fry kettle out of service until the defective thermostat or related electrical control has been replaced. (A thermostat is a delicate instrument and should be handled with care by a qualified person.)

(6) Before using a fry kettle, insure that the drain valve is closed tightly. Fill the kettle with fat to the level recommended by the manufacturer.

(7) Frying bacon in a fry kettle will cause the fat level to rise because of the bacon fat added by the cooking process. The higher fat level increases the fire hazard. After frying bacon the kettle shall be drained sufficiently to bring the fat down to the proper level.

(8) Under no conditions should the fat be heated to over 400° F. If this temperature does not seem hot enough for the work at hand, check the temperature of the fat with a high-temperature mercury thermometer. Make sure that the outside surface of food to be fried is as free from water as possible. Excess water in fat will cause the fat to boil over.

(9) Stir hot fat frequently so as to create a "whirlpool" effect at the center. This allows foreign matter or food particles in

the fat to settle in the sediment container. The container should be removed daily, the sediment removed, and the container replaced.

\* (10) Normally a fry kettle should not be installed adjacent to a range or griddle, as hot fat from the kettle may splash on the range or griddle and be ignited. However, in some cases, due to space limitations, it has been necessary to do so. If a fry kettle is so installed a baffle or shield shall be set up between the fry kettle and the adjacent equipment. The baffle or shield shall be at least 12 inches in height.

(11) Supply officers and chief stewards shall insure that all personnel operating fry kettles are thoroughly familiar with proper operating procedures and the dangers of improper operation, and that inexperienced personnel are not allowed to operate such equipment without qualified supervision.

\* (12) In case of fire in the fryer, secure power, remove basket, and place kettle cover over well to contain and/or extinguish the fire. Report the fire using normal shipboard procedures.

j. Grill.

(1) Do not allow grease to accumulate on the cooking area of the grill.

(2) Use only the tools provided for turning food and removing it from the grill.

(3) Maintain proper exhaust ventilation. The proper ventilation cannot be maintained if grease is permitted to collect in the exhaust. Clean the exhaust weekly or more often as necessary.

(4) Do not permit excessive grease to accumulate in the grease disposal trough.

(5) Be sure that burners are fully lit when in use and are turned off when not in use.

k. Disconnecting Power. Power for all equipment other than refrigerators shall be disconnected at the distribution panel when galley is secured.

2-4-7 MESS

a. Steam Table.

(1) Use the proper implements, such as pot holders and tongs, for handling the containers.

(2) Tilt containers away from you when inserting them into the wells.

b. Coffee Urn.

(1) Keep hot water to the safe level indicated by the guage on the urn.

(2) Be sure that the safety valve is in proper working condition.

c. Fountain. Use duck-boards between the fountain and the back bar area if it is possible to do so.

d. Ice Cream Freezer Unit With Cabinet.

(1) Never run hot water into any cold freezer.

(2) Lock the switch in the "off" position before cleaning the mixing drum.

e. Vending Machines.

- (1) Electric vending machines must be grounded.
- (2) Keep vending machines clean.
- (3) Report defective machines promptly.
- (4) Dispose of broken bottles immediately. Empty bottles should be placed in nearby cases provided for that purpose.
- (5) Use a hand-truck or other wheeled vehicle to lessen exertion and strain when transporting cases of bottles.
- (6) Stack cases in such manner as to avoid toppling and tripping hazards.
- (7) The areas around vending machines should be policed frequently to make certain these precautions are being observed.

2-4-8 SCULLERY

a. Dishes.

- (1) Do not stack glassware and dishes so high that there is danger of their toppling.
- (2) Never pick up broken glassware and dishes with bare hands.
- (3) Immediately place broken pieces in containers provided for that purpose.
- (4) Do not load silverware baskets too heavily for safe handling.
- (5) Do not expose your hands to dishwashing solutions. It is a strongly alkaline preparation which is unsuitable for laundry or personal use.

(6) Scullery, Hand Dishwashing.

- (a) Temperature for washing dishes should be between 110° and 130° F.
- (b) Rinse water temperature must be at least 180° F.
- (c) Remote control thermometer should be checked periodically for accuracy.

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(d) Dishrags will never be used in either the manual or machine dishwashing routines, since these rags accumulate grease, food particles and stains that serve as ideal culture media for bacterial growths to be spread to any article with which they come in contact during the washing process.

(e) Rubber gloves shall be worn when rinsing dishes by hand and other times as necessary for proper protection.

(f) Cracked glasses, dishes, etc. should be discarded.

b. Equipment.

(1) Pre-Rinsing Machine.

(a) Keep hands outside the hopper while the machine is in operation.

(b) Watch for sharp edges which may occur on the strainer, and make the necessary repairs.

(2) Dishwashing Machine.

(a) Be sure vent supply is in proper working condition.

(b) See that thermostatic controls are functioning properly.

(c) Heavy ship motion may cause scalding rinse water to surge from machine. During rough weather, exercise particular care in operation of machine. If necessary, secure and drain machine.

(d) Never allow the minimum temperature of the rinse water to fall below 180° F.

(e) Keep the side door closed while the machine is operating.

(f) Do not place your hands in the machine while the steam is on.

(g) Exercise care in feeding the machine to prevent hands from getting caught in the conveyor.

2-4-9 BARBER SHOP

a. General Rules.

(1) Keep the barber shop clean.

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- (2) Observe personal cleanliness. Barbers shall be examined by the medical officer at regular intervals.
- (3) Do not perform barber services on persons showing symptoms of diseases of the scalp or skin unless the medical officer has directed in writing that these services be performed.
- (4) Do not remove ingrown hairs or blackheads for customers.

b. Use and Care of Equipment.

- (1) Use extreme caution in handling such potentially dangerous equipment as razors and scissors. Avoid jostling.
- (2) Sterilize such equipment as razors, scissors, clippers, combs, and brushes before using.
- (3) In shops doing a large amount of business alternate clippers should be used so that the clippers will not become overheated.
- (4) Keep sterilizing cabinets in the proper sterilizing condition in accordance with instructions from the medical officer.

c. Grounded Electric Equipment. All electrical equipment such as clippers, hair dryers, etc. shall be grounded by means of a 3 conductor cord with an approved grounded type plug.

2-4-10 LAUNDRY

a. Care of Laundry Room.

- (1) Store acids, bleaches, and other strong solutions in cool, dry areas on lower shelves only.
- (2) Materials or bundles shall not be piled on shelves in such a way that they protrude into passageways or are likely to fall.
- (3) Keep the deck drains unclogged.
- (4) Sweep suds and water down the drains frequently.
- (5) Sleeping in the laundry room is prohibited.

b. Personal Protection.

- (1) Wear proper personal protective equipment such as goggles, rubber gloves, and rubber aprons when handling or using acids, bleaches, solvents, boiler compounds, and caustic solutions.

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(2) Employees shall not wear neckties or loose-fitting clothing.

(3) Wear goggles when using an air hose to blow dirt from pockets and cuffs.

(4) Do not attempt to pour acid from a carboy without use of a suitable carboy dispenser or rocker.

(5) If caustic solutions are spilled on the body, thoroughly wash the affected parts in accordance with posted instructions. Report to the dispensary for examination and for further treatment if it is required.

c. Preparing Clothes for the Laundry.

(1) When using a truck for heavy bundles of clothing the load should be so placed that the pusher has a clear view ahead.

(2) Dump laundry out of bags. Do not reach into the bags to pull the laundry out.

(3) Be sure that the pockets of clothing to be laundered are empty.

(4) Keep safety pins closed.

d. General Safety Rules.

(1) Nails projecting from soap or washing powder boxes or barrels shall be removed promptly when the package is first opened.

(2) All crating and packing materials shall be disposed of at the time they are opened.

(3) Storage bins, shelving, and timbers shall be watched for ragged edges and splinters, and such defects shall be corrected immediately.

(4) Barrels, boxes, and containers shall be properly marked as to contents and shall be stored so that the label can be seen without moving the container.

(5) All machines and safety devices shall be checked daily for defects, and any necessary repairs shall be made promptly.

e. Equipment.

(1) Washer.

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(a) Driving mechanisms of washers should be fully encased by metal guards.

(b) Be sure the power is off before loading or unloading the machine.

(c) Avoid straining muscles when unloading the washer. Do not attempt to unload too much at one time.

(d) Machines should be provided with approved means for holding the shell doors open.

(e) Safety interlocks are to be provided to prevent the cylinder from operating when the machine is being loaded or unloaded, except when using the "inch" device.

(f) The brakes should be capable of stopping and holding the cylinder against rotation when the current is shut off.

(g) Inspect cylinder doors daily to determine that they are in proper working condition.

(h) Cylinder doors should be fitted and wedged in such a manner as to prevent movement when they are locked.

(i) Swing the apron out of the way before closing cylinder doors.

(j) Latch the cylinder doors before starting the machine. The latch handles should be placed securely in their wells.

(k) Do not turn on the steam until the doors are closed and the safety switch is on. Never assume that the safety switch is on; be sure.

(l) Do not open the shell doors while the machine is in operation.

(m) Do not put bleach in the water when the steam is on.

(n) Do not allow the temperature of the wash water to rise above 160° F.

(o) Try to prevent rust remover from coming into contact with your skin. Thoroughly rinse fabrics which have been treated with rust remover.

(p) The washing machine should be provided with a drain to carry away suds and water without wetting the floor.

(2) Extractor.

(a) Check safety devices before operating the machine. If the mentioned safety devices are inoperative secure the extractor and do not use until it is repaired.

(b) Never operate the extractor with the cover open. This has often resulted in the death of the operator.

(c) Do not exceed the rated capacity when loading the machine. Overloading is injurious to the machine as well as an accident hazard to personnel.

(d) Distribute the load evenly. If the machine vibrates excessively, or the basket wobbles, stop the machine and redistribute the load.

(e) Keep away from the extractor while it is in motion, except when starting or stopping the machine.

(f) Do not use the foot brake to stop the tub while the tub is rotating at high speed.

(g) Adhere strictly to the manufacturer's precautions as to the frequency of starting and stopping the machine.

(h) Do not leave the brake on when the extractor is empty.

(i) The extractor should be provided with a drain to carry away suds and water without wetting the floor.

(3) Drying Tumbler.

(a) Be sure the power is off while loading or unloading the machine.

(b) Never overload the machine.

(c) The tumbler should be equipped with an approved means of holding the doors or covers on cylinders and outer shell open while loading or unloading the machine.

(d) Inspect daily the balancing mechanisms and safety latches to insure that the door will be secure when open.

(e) The interlocks on the doors, which prevent the cylinder and fan from rotating when the doors are open, should be inspected daily to determine that they are in proper working condition.

(f) High speed tumblers should be equipped with a dial or other approved means of indicating the position of the cylinder doors in relation to the case door.

(g) Be sure that the cylinder doors are latched and that the latch handles are secured in their wells before the machine is started.

(h) Never open the door while the tumbler is in motion.

(i) Clean lint from tumbler screens after every four hours of operation. Dispose of it immediately, by placing it in a container and covering it with water.

(j) Sufficient moisture should be maintained to prevent fires. Clothes should be removed from tumbler when dried to a weight not exceeding 30% above dry weight of clothes.

(k) Make sure that fans, feed belts, and cylinder drive mechanisms are enclosed in metal guards.

(4) Mangle.

(a) Keep hands at least 6 inches from the rollers when operating the machine.

(b) Never overlap pieces being run through the machine.

(c) When an article has started to pass through the rollers, never attempt to withdraw it.

(d) If an article becomes bound or fouled shut off the current and loosen the rollers. Do not attempt to extract the article in any other manner.

(e) The machine shall be equipped with a safety guard across the front of the feed rollers which will quickly stop the rollers when the guard is struck with the hand.

(f) This guard should be inspected daily to determine that it is functioning properly.

(g) Do not operate the mangle when this safety guard is not functioning properly.

(5) Press.

(a) Nobody but the operator should be permitted to stand close to the press when it is in use.

(b) Keep hands clear of the buck when the head is coming down.

(c) Air-operated presses are equipped with two push-button operating valves for safety. The arrangement is such that both hands must be used to close the press, thereby making it impossible for either of these valves be bypassed or left permanently open.

(d) Release the head when the press is not in use.

(e) When releasing the head, be sure nobody is standing at either end of the machine.

(f) Each press, excluding the hand or foot operated types, shall be equipped with an approved safety device which will prevent the operator's fingers being caught in the machine.

(6) Hand Iron.

(a) Each iron should be equipped with a pilot light to indicate when the current is on.

(b) Each iron shall be turned off and disconnected immediately after use and placed until cool where there is no danger of burning to articles or to personnel.

\* (7) All mechanical equipment mentioned in this chapter, also electrical equipment such as toasters, hot plates, heaters, etc., shall be securely mounted and/or fastened in position to prevent displacement due to motion of the ship.

PART 2  
GENERAL SAFETY PRECAUTIONS

CHAPTER 5  
PORTABLE TOOLS

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2-5-1 DEFINITION. The term tools as used in this section shall be understood to mean any small tool, device, or portable power tool normally operated by hand.

2-5-2 GENERAL PRECAUTIONS.

a. Standards. All tools shall conform to Navy standards as to quality and type, and shall be used only for those purposes for which they were intended.

b. Good Repair. All tools in active use shall be maintained in good repair. All damaged or defective tools shall be turned in

for survey and disposal through supply channels.

c. Authorized Personnel. No tools shall be issued to or used by personnel not authorized to use them.

d. Dressing Tools. Toolkeepers shall issue only those tools they know to be safe. No shock tool with a mushroom head shall be permitted to leave the tool room; all cold chisels, chisel bars, cutters, or other shock tools with chipped, cracked, or mushroomed heads shall be dressed in accordance with standard practice before they are issued.

f. Protection of Edges. Toolkeepers shall give particular attention to keeping the jaws of wrenches in good condition, keeping sharpened tools sharp and protecting the sharp edges while tools are in storage.

g. Ammunition or Explosives. On work involving ammunition or exposed explosives, only tools specified in Bureau of Ordnance Publications pertaining to the ammunition or explosives shall be used.

h. Inspection. Portable electric and pneumatic tools shall be kept in the best possible condition, with frequent checking of switches and control valves, electric cord and hose connections.

i. Temper. If a tool shows signs of being improperly tempered, the toolkeeper shall withdraw it from service, find the trouble, and have it corrected.

j. Plastic Handles. Plastic handles on tools shall be of the nonflammable type.

#### 2-5-3 AXES AND HATCHETS.

a. Inspection. Axes and hatchets shall be inspected before being used; the handle shall be tight in the head, sound, and uncracked; blades shall be sharp and free of defects.

b. Direction of Cut. Cuts made with any tool having a cutting edge shall be made in a direction away from the body whenever possible.

c. Protection of Fellow Workers. No one shall work with an axe or hatchet without first making certain that all fellow workers are at a safe distance. No one shall cut toward a fellow worker.

d. Passing Handle First. In passing a tool to someone else, the worker shall pass the handle first, keeping a firm grip on the head until the other person has a secure hold on the handle.

e. Stowage. Sharpened tools are to be stowed so that their

edges will be protected and will not endanger personnel.

2-5-4 BRACES AND BITS.

a. Good Condition. The jaws of the brace chuck shall be kept in good condition, the gripping edges sharp and clean. Bits shall be kept well sharpened and clean.

b. Tightening Chuck. A wrench or pliers shall not be used to tighten the chuck of the brace.

c. Bit Firmly Gripped. The bit shall be firmly gripped in the brace.

d. Bit Breaking Through. Care shall be exercised to prevent the bit from suddenly breaking through the material being worked.

2-5-5 CHISELS, PUNCHES, DRIFT PINS.

a. Condition. A burred chisel or a hammer with a mushroomed head shall not be used. If a cold chisel is not properly tempered or sharpened for the job, or if it is defective in any way, it shall not be used.

b. Holding Chisel. Cold chisels shall be held in the safest way possible -- between the thumb and other four fingers; on horizontal cuts the palm should be up.

c. Protection from Flying Chips. Goggles shall be worn by persons using cold chisels. Other persons nearby shall wear goggles or shall be protected from flying chips by screens erected around the work.

d. Handles of Chisels. Handles of wood chisels shall be free of cracks and other defects and shall not be mushroomed.

e. Cupping Chisel in Palm. When cutting by hand with a wood chisel, the chisel handle shall be cupped in the palm of the hand and pressure exerted away from the body.

f. Making Cut. All cuts shall be made away from the body.

g. Working Close to Others. Care shall be taken that no other person is close enough to be injured if the chisel should slip or get away from the user.

h. Punches and Drift Pins.

(1) Punches and drift pins shall be kept in good condition and shall be properly tempered and dressed.

(2) Punches and drift pins shall be struck sharply and squarely; they shall be held firmly.

(3) Always use a chisel that is big enough for the job. Use a hammer that is heavy for the size of chisel.

2-5-6 DRILLS.

a. Condition. Only straight, undamaged, and properly sharpened drills shall be used.

b. Chuck. The chuck shall be tightened securely with the key provided. Wrenches or pliers shall not be used on any chuck. Drill shall be straight and true in chuck.

c. Work Firmly Clamped. The work shall be firmly clamped and, if of metal, a center punch shall be used to score the material before the drilling operation is started.

2-5-7 FILES, RASPS.

a. Handles. Every file or rasp shall be equipped with a securely-fitted, substantial handle, or the tang shall be rounded or cut off square.

b. Filing Close to Chuck. Filing work close to the chuck in a lathe shall be done left-handed.

c. Striking Rasp. A file or rasp shall never be hit. It shall be tapped gently against a block of wood to clear it. A steel wire brush should be used to clean files.

d. Prohibited Uses.

(1) An old file or rasp shall not be used to make a punch or chisel.

(2) A file shall never be used as a pry or lever.

e. Carrying Files. No one shall carry a file about his person without a handle over the tang.

f. Steadying End of File. The file should always be used with one hand grasping the handle and the other steadying the end of the file.

g. Holding Against Material. Files and rasps should be held against the material only on the cutting stroke, never on the return.

h. Selection of File. The correct file shall be used for the job; a fine file for fine work, a coarse file for coarse work.

2-5-8 HAMMERS.

a. Selection of Type. Care shall be used in selecting a hammer suitable for the job. The head shall be wedged securely and squarely on the handle and neither the head nor the handle shall be chipped or broken.

b. Free of Grease. The hammer shall be kept clean and free from oil or grease which might cause the handle to slip from the hands or cause the face of the hammer to glance from an object being struck.

c. Striking. The handle of the hammer shall be grasped firmly near the end, the eye kept on the point to be struck, and a true blow struck with the hammer face, which is hardened for this purpose; the hammer face shall not be damaged by striking steel harder than the face itself.

d. Tool Holders. In using sledge hammers to strike chisels or other similar shock tools, the workman holding the tool shall be provided with a tool holder so that in case the sledge misses the tool, it will not strike the holding workman.

e. Drawing Nails. When nails are being drawn with a hammer, after the nail is partly drawn, a piece of wood should be placed under the hammer to increase leverage and reduce the strain.

2-5-9 PIPE CUTTERS.

a. Free of Dirt. The pipe cutter shall be kept free of chips and dirt.

b. Oiling. The cutter shall be oiled frequently while the cut is being made.

c. Pressure on Wheel. No wrench, pliers, or other tool shall be used to increase the pressure on the movable wheel.

d. Method of Cutting. When a cut is being made, the employee shall cut a short way, then back off to tighten the wheel, and then cut again.

e. Supporting Pipe. The end of any long pipe shall be supported during the cutting operation.

f. Removing Burr. After the cut is completed, the burr shall be removed from the pipe with a file or reamer.

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2-5-10 PLIERS, SIDE CUTTERS, DIAGONAL CUTTERS.

a. Selecting Tool. Care shall be used in selecting the correct plier or cutter for the work to be performed.

b. Correct Tool. Pliers or cutters shall not be used on nuts, pipe fittings, etc. The wrench designed for that particular job shall be used.

c. Condition of Tool. The tool shall be kept free from grease and oil and the teeth or cutting edges shall be kept clean and sharp. The fulcrum pin, rivet, or bolt shall be properly oiled and shall be snug but not tight.

d. Cutting Short Pieces. When cutting short pieces, take care that they do not fly and cause injury.

e. Extensions on Handles. Extensions on the tool handle to increase leverage is prohibited.

f. Protection of Fingers. Fingers shall not be wrapped around the handle of a tool in such a way that they can be pinched or jammed if the tool slips from the work.

2-5-11 SAWS.

a. Cutting Across or With Grain. Only saws that are sharp and properly set shall be used. A crosscut saw shall be used for cutting across the grain; a ripsaw for cutting with the grain.

b. Guiding Cut. The saw shall be guided with the free hand when starting the cut; only one or two long, slow cuts upward shall be taken and then the hand shall be removed from the danger zone before the sawing is continued.

c. Line with Cut. The saw blade shall be kept in direct line with the cut.

d. Sticking Saw. If the saw sticks in wet or gummy wood, a small amount of oil or paraffin may be applied. In severe cases, a wedge may be used to hold the cut open.

e. Operator's Balance. The employee shall take care not to be thrown off balance when using one knee to steady the material being sawed.

2-5-12 SHOVELS AND PICK-AXES.

a. Inspection. Before the tool is used, it shall be inspected

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by the worker to be sure that it has a strong, smooth handle and grip free from splinters, checks, and splits, and that the blade is smooth, sharp, and free from twist.

b. Clearance. There shall be adequate clearance between men using shovels so that no one will be struck by either tools or material.

c. Use of Foot. The area of the ball of the foot, not the instep area, shall be used to press the tool into clay or other stiff material.

d. Reducing Body Strain. Unnecessary strain should be avoided by using the leg muscles as much as possible in digging and lifting loads, by being sure of footing, and by keeping the body balanced as much as possible.

e. Handing Tools. Tools shall never be thrown or tossed to another person, but shall be handed to him with the handle forward.

f. Leaving Tools. A tool shall never be left where personnel may stumble over it or strike against it; it shall be hung up or placed in the corner; the blade of shovels should be stuck securely in the ground.

#### 2-5-13 SCREWDRIVERS.

a. Size. Care shall be taken to select a screwdriver of the proper size to fit the screw.

b. Handle. No screwdriver with a split or splintered handle shall be used.

c. Starting Screw. An awl auger drill having bit or driver nail shall be used to start each screw.

d. Point. The point of the screwdriver shall be kept in proper shape with a file or grinding wheel.

e. Working from Ladder. The worker shall be well braced before driving screws from a ladder.

f. Correct Use. A screwdriver shall not be used as a substitute for a punch, chisel, nail puller, etc.

g. Electrical Work. Only screwdrivers with insulated handles shall be used for electrical work.

h. Tool Holders. Do not carry a screwdriver in your pocket with the blade end up. Use a tool case or sheath.