

DEPARTMENT OF THE NAVY
MILITARY SEA TRANSPORTATION SERVICE
WASHINGTON, D. C. 20390

COMSTSINST 5100.17 CH-3
M-25
16 February 1970

COMSTS INSTRUCTION 5100.17 CHANGE TRANSMITTAL 3

From: Commander, Military Sea Transportation Service

To: Distribution List

Subj: MSTS Safety Manual

Encl: (1) New pages 1-1-1 thru 1-1-20, 1-2-3 thru 1-2-6, 1-3-1 thru 1-3-6, 1-4-1 thru 1-4-8, 2-1-1 thru 2-1-8, 2-1-11 thru 2-1-14, 2-1-17, 2-1-18, 2-2-3 thru 2-2-8, 2-2-13 thru 2-2-20c, 2-4-7 thru 2-4-10, 2-5-9, 2-5-10, 2-6-1, 2-6-2, 2-9-7, 2-9-8, 2-9-25 thru 2-9-28, 2-10-7 thru 2-10-9, 2-14-7, 2-14-8, 2-15-3, 2-15-4, 2-15-9, 2-15-10, 2-15-13 thru 2-15-16, 2-15-19 thru 2-15-22, 2-15-25, 2-15-26, 2-15-33, 2-15-34, 2-18-3, and 2-18-4.

1. Purpose. This transmittal forwards Change 3 to subject Instruction.

2. Action. Remove current pages 1-1-1 thru 1-1-19, 1-2-3 thru 1-2-6, 1-3-1 thru 1-3-5, 1-4-1 thru 1-4-8, 2-1-1 thru 2-1-8, 2-1-11 thru 2-1-14, (do not remove 2-1-14a) 2-1-17, 2-1-18, 2-2-3 thru 2-2-8 (do not remove 2-2-8a) 2-2-13 thru 2-2-20, 2-4-7 thru 2-4-10, 2-5-9, 2-5-10, 2-6-1, 2-6-2, 2-9-7, 2-9-8, 2-9-25 thru 2-9-28, 2-10-7, 2-10-8, 2-14-7, 2-14-8, 2-15-3, 2-15-4, 2-15-9, 2-15-10, 2-15-13 thru 2-15-16, 2-15-19 thru 2-15-22, 2-15-25 2-15-26, 2-15-33, 2-15-34, 2-18-3 and 2-18-4. Insert enclosure (1) as appropriate.

3. Cancellation. When the required action has been taken.

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Deputy

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PART 1
PROGRAM ADMINISTRATION

CHAPTER 1
GENERAL PROVISIONS

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1-1-1 SCOPE AND COVERAGE. This Instruction establishes and administers accident prevention and injury compensation programs for the Military Sea Transportation Service. The accident prevention program applies to all persons, military and civilian, employed by MSTS, ashore and afloat; to all persons embarked on MSTS ships whether as passengers, observers, or members of a scientific or technical group; and, to all persons classed as "invitees", including longshoring and repair personnel, while actually aboard ship. The injury compensation program is applicable to all civil service employees of MSTS. This Instruction is not applicable to contract-operated ships.

1-1-2 AUTHORITY.

a. Public Law 357. Public Law 357, as amended, authorizes and directs the heads of the various departments to develop, support, and foster organized safety promotion in order to: reduce the number of accidents and injuries among Government offices and employees; encourage safe practices; eliminate work hazards and health risks; and reduce compensable injuries.

b. Public Law 1028. Public Law 1028 provides, "The Secretary of the Navy may make such expenditures as he considers appropriate to prevent accidents and to promote the safety and occupational health of (1) members of the Naval service on active duty; (2) civilian officers and employees of the Department of the Navy; (3) members of the Coast Guard when it is operating as a service in the Navy; and, (4) members of the Coast and Geodetic Survey serving with the Navy. The expenditures may include payment for clothing, equipment, and other materials necessary for the purposes of this section."

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1-1-3 POLICY. COMSTS's policy is to conserve manpower and materials, both ashore and afloat, to the maximum degree possible through the application of a comprehensive, effective and continuous safety program.

1-1-4 BASIC PRECEPTS.

a. Support. The safety program within MSTS shall be aggressively supported and promoted at all levels of command to eliminate the loss of manpower and material to the end that maximum efficiency of operations will be realized.

b. Responsibility. Responsibility for safety rests with command, all levels of supervision, and the individual employee.

c. Importance. Safety shall be considered a paramount factor in all phases of MSTS operations.

d. Work Method and Operating Procedures. Work methods and operating procedures will be such that personnel shall not be unnecessarily exposed to dangers from injury due to accidents or occupational health hazards.

* e. Research Operations. Special emphasis shall be directed towards control and/or elimination of potential hazards associated with all research operations conducted aboard MSTS ships in compliance with NAVORD OP-3696, "Explosive Safety Precautions for Research Vessels."

f. Safety Devices and Guards. Safety devices and guards will be furnished for all potentially hazardous operations and danger points, and their use shall be mandatory.

g. Personnel Protective Equipment. Personnel protective equipment, devices, and apparel shall be made available to all MSTS personnel when required. Personal protective equipment shall be worn by all personnel engaged in hazardous work and its use shall be mandatory.

h. Physical Fitness. Personnel will be assigned only to those jobs they are physically qualified to perform. Physical examinations of civilian marine employees will be made at least annually. The physical standards as provided for in the MSTS Medical Manual, COMSTS INSTRUCTION 6000.1 shall apply.

i. Enforcement. All commands and all levels of supervision shall enforce safety rules and regulations. While disciplinary action is not normally required for this purpose, such action may be taken when justified by the circumstances.

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j. Treatment of Injuries. All injuries or diseases, however minor, arising out of employment or operations shall be treated by available facilities in accordance with existing regulations in order to reduce the severity of injuries.

k. Basic Operating Standards for Shipboard Safety. The marine safety statutes and regulations as administered by the U.S. Coast Guard shall constitute a complete set of basic operating standards for shipboard safety aboard MSTS ships. Where MSTS Safety Precautions (part 2 of the Instruction) specify additional safety requirements, these requirements shall also be met.

1. Supplementing Safety Precautions. Nothing in this Instruction shall relieve the Commanding Officer/Master of his ultimate responsibility for the safety of his ship, crew, passengers, and cargo. In any circumstances where safety precautions appear to be needed but have not been provided, or where existing safety precautions are deemed to be inadequate, the Commanding Officer/Master shall issue new precautions or supplement prevailing ones in the manner and degree he considers necessary to carry out his responsibility. In such instances, appropriate reports shall be made to COMSTS via the chain of command in order that corrections may be made to this Instruction.

1-1-5 ORGANIZATION OF RESPONSIBILITIES.

a. COMSTS. Under the policy control of the Chief of Naval Operations, COMSTS is responsible for the formulation and implementation of an accident prevention program. In carrying out this responsibility, COMSTS will:

(1) Establish safety policies and basic safety programs for subordinate commands.

(2) Administer, coordinate, and review all safety programs to insure uniformity and proper implementation by subordinate commanders.

(3) Furnish essential safety program guides, aids and materials to supplement standarized programs.

(4) Coordinate MSTS participation in safety activities conducted by other government or private organizations.

(5) Review and coordinate requests for the purchase of design of necessary safety devices, equipment or material.

(6) Approve and allocate safety budgets and review safety expenditures.

(7) Approve major changes in safety organization and activities affecting matters of policy.

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b. Responsibilities Ashore.

(1) The Commander, home port, is directly responsible for establishing and vigorously administering a safety program. Such a program shall be in accordance with all the requirements of this Instruction. He shall:

(a) Establish and actively support a safety organization to meet all the needs of the command.

(b) Execute the safety policies of COMSTS as required by this and other instructions.

(c) Review and take action on the reports and recommendations of the Command Safety Council.

(d) Submit safety reports as required by this Instruction.

(e) Submit to COMSTS recommendations for improvement of the safety program.

(2) Area and subarea commands will provide guidance and assist in developing and reviewing safety programs at subordinate commands.

(3) The Commander, home port, will appoint a Safety Council to assist and advise him of safety matters. The Council shall meet at least quarterly and submit a copy of the minutes to COMSTS and to each civil service operated ship in that command.

(a) The Command Safety Council will be composed of the following personnel or their designated subordinates authorized to make commitments for them:

Chief of Staff (Chairman)
Industrial Relations Officer
ACOS (Operations)
Engineering Officer
Supply Officer
Medical Officer
Chief Inspector
Director, Safety Division -
 Advisor and Coordinator

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(b) The Council shall recommend to the Commander, home port, regarding the following:

1 Safety objectives and problems.

2 Corrective action concerning major accident trends.

3 The effectiveness of the safety program as a whole, including operational and material safety, as well as personnel safety.

4 Placement of safety authority within the command and assignment of particular responsibilities concerning accident prevention consistent with this Instruction and other applicable regulations.

(4) Meeting of the Council should include only those members who have a direct interest in the questions under consideration at the meeting. Staff members shall be available to provide specific advice and guidance to the Council upon request.

(5) The Engineering Officer is responsible for matters of material safety. This responsibility includes:

(a) The integration of safety in all matters concerning maintenance, repair, alteration and conversion of ships assigned to MSTS.

(b) The review and evaluation of established engineering methods and procedures with relation to safety and insuring correction of any deficiencies.

(c) Insuring that all provisions of safety to protect the ship and her crew are met by repair facilities servicing MSTS ships.

(d) Acting promptly on repair items involving safety submitted on Voyage Repair Lists, Inspection Reports, Ships' Safety Minutes or other reports.

(6) The ACOS (Operations) is responsible for matters involving operational safety. This responsibility includes:

(a) Insuring the integration of safety principles and practices into all ship operational standards and procedures.

(b) Insuring effective action by his staff in matters of safety within their responsibility.

(c) Insuring that all provisions of safety necessary to protect the ship and her crew are met at port facilities used by MSTS ships.

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(7) The Director, Safety Division shall coordinate all safety within the command and provide guidance to all safety technicians and personnel of other divisions assigned specific safety duties, whether ashore or afloat. The Safety Division will function in an advisory capacity to the divisions ashore and ships afloat. The Safety Division is responsible for advising with regard to all practices involving ships' equipment or functions which are directly concerned with preservation of life and limb. The Director, Safety Division * stands as technical advisor to all divisions concerning questions on the safety of equipment or practices, whether or not safety of life or limb is of immediate concern. The Director, Safety Division, is responsible for:

- (a) Promulgation of safety rules and regulations consistent with this Instruction.
- (b) Conducting continual safety inspections aboard ship including underway and shipyard inspections.
- (c) Acting in an advisory capacity on matters of safety to the Commanding Officer, Department Heads, Masters and other supervisors
- (d) Recommending changes to procedures and conditions that will reduce hazards affecting crew members, passengers and invitees.
- (e) Cooperating with the Training Division in a program for training in safety and accident prevention for personnel ashore and afloat.
- (f) Maintaining complete and accurate files of all reported accidents, including both property damage and personnel injuries and preparing comprehensive analyses for correlation of findings with the Accident Prevention Program.
- (g) Exercising control as to the safety aspects of specification for the procurement of personal protective apparel, safety guards and other special devices.
- (h) Acting as a representative of the Bureau of Employees' Compensation in all cases of injury, occupational disease or death of employees.
- (i) Providing safety information, publications and other educational materials to meet the specific needs of the program.

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(j) Expedited review and evaluation of all ships' Safety Meeting Minutes.

(k) Maintaining a control file for follow-up of all unsafe conditions reported by ship's Safety Committees, or in work orders, in beneficial suggestions, by employee complaints or other sources. Reporting immediately by memorandum to ACOS (Operations) with information copies to the Chief of Staff and to the responsible division or office, any major hazardous condition aboard ship which comes to his attention.

(l) Coordinating with medical and placement officials to assure the proper selection and placement of personnel from the standpoint of safety.

(m) Correlating safety work with the work of the Medical Division in the control of occupational health hazards.

(n) Providing assistance to the Medical Division, as required, in radiological programs.

(8) Division directors and heads of offices will lend full support to the safety program and will take prompt corrective action on safety matters which are their responsibility.

(9) The Safety Division of each MSTS command will be staffed by qualified personnel based on the following standard, with clerical help adequate to handle the duties of the Division. Figures will include all MSTS civilian and military personnel ashore and afloat. Where necessary, specific increases will be made by COMSTS upon request.

(a) Commands having a total personnel compliment of under * 600:

Part-Time Collateral Duty Safety Officer
Part-Time Collateral Duty Safety Inspector

(b) Commands having a total personnel compliment of 600 to 5,000:

Director, Safety Division
One Safety Inspector for each 1,500 employees and major fraction thereof

(c) Commands having a total personnel compliment of 5,000 to 10,000:

Director, Safety Division
Assistant Safety Director
One Safety Inspector for each 1,500 employees and major fraction thereof

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c. Responsibilities Afloat.

(1) The Master of each ship is responsible for establishing a shipboard safety organization and program for the prevention of accidents involving his ship, passengers, crew, cargo, equipment and any other property. The Master's responsibility includes:

(a) Designating the 1st officer as ship's Safety Officer.

(b) Conducting safety inspections of the ship and her equipment and operations to assure conformance with applicable statutes and safe practices.

(c) Provide for training and adequate supervision of ship's personnel in matters of accident prevention.

(d) Assuring safe utilization of men, tools and equipment (including all necessary safety precautions, devices and protective equipment).

(e) Assuring complete accident/near accident investigation and reporting and prompt corrective action. (Reporting to include material and/or property damage sustained by the ship as well as personnel injury/death reports).

(f) Organizing the Ship's Safety Committee and initiating prompt action on committee recommendations.

(g) Following up recommendations and routing inspection findings to assure prompt action by responsible persons.

(h) Assuring that pertinent safety instructions are posted.

(i) Coordinating safety regulations of MSTS with those of the port of call, the ship repair facility, etc., visited by the ship.

(2) The Master shall establish a Ship's Safety Committee consisting of the Master as Chairman, the Safety Officer, the COMILDEPT and Medical Officer (where assigned) and all department heads as members. Representation of personnel assigned aboard (other than MSTS personnel, i.e. scientific, military, etc.) shall be invited and encouraged to attend. The Purser shall act as recorder. The meetings shall be held at least monthly and the date and time entered in the ship's log.

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Nonmember representatives for the unlicensed personnel may attend meetings at the discretion of the Master. Pertinent excerpts of the minutes shall be published and posted in crew areas; two copies, signed by the Master, shall be submitted to the Commander, home port, for review and evaluation by the Safety Division. The Safety Division will then forward one copy to COMSTS. The primary functions of the Committee shall be to:

*

(a) Review the ship's accident record, the predominant types of accidents/near accidents and their causes, including material and/or property damage.

(b) Review and discuss inspection reports, accident investigation findings and safety suggestions; formulate recommendations for cognizant authorities afloat and ashore.

(c) Determine necessity for and promulgate rules and regulations governing hazards peculiar to the ship.

(d) Record in the minutes any safety items requiring attention and/or assistance by the Commander, home port.

(3) Under the Master's direction the Ship's Safety Officer (1st Officer) shall be responsible for administering and coordinating all accident prevention activities aboard ship. This assignment of responsibility shall in no way relieve the Master or his staff of their responsibilities for the safety of the ship, crew, passengers, cargo and equipment or for the supervision or operation of the safety program. The Safety Officer's responsibilities include:

(a) Reviewing all accident reports for completeness (including signatures) and accuracy.

(b) Recommending preventive and corrective action to Master and following up on measures approved by the Master.

(c) Investigating, with the department head and other cognizant personnel, all accidents involving crew members.

(d) Distributing educational and promotional safety literature.

(e) Inspecting the ship for unsafe conditions and practices and following-up on corrective action required.

(f) Cooperating with the department heads in assuring compliance with matters pertaining to the safety program.

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(4) The Medical Officer, where assigned, will be responsible for notifying the Master; via COMILDEPT, at least once each day of all injuries treated.

(5) Each department head shall assure that members of his department are instructed, while on duty, in the safe working practices of the department, including safe operation of all equipment within the department. Special attention will be directed to newly assigned personnel. The instructions shall be of a continuing nature. He will appoint one or more responsible crew members to act as Safety Committee-men. These men will report immediately any unsafe practices or condition to the department head.

(6) The responsibility for safety is a line function of all department heads and subordinate supervisors. The establishment of a special staff for the maintenance of safety within MSTS does not relieve anyone of his responsibility for accident prevention. Specifically, it is each supervisor's responsibility to:

(a) Maintain a high level of safety consciousness in employees through continuous emphases on safety.

(b) Assure that each employee under his supervision is thoroughly indoctrinated in the safe working practices necessary to his job.

(c) Continually inspect and analyze work methods and the work area for accident hazards and take immediate corrective action.

(d) Investigate and complete required reports immediately after every accident/near accident as well as injury/death occurring under his supervision.

(e) Assure that employees immediately report all injuries, however minor.

(7) The employee is responsible for his own personal safety and the safety of his fellow crew members. The assignment of safety functions to a specific person or group of people in no way relieves him of this responsibility.

1-1-6 ACCIDENT PREVENTION PROCEDURES.

a. Inspections.

(1) The Safety Engineer or his designated representative shall conduct frequent inspections of ships in addition to participating in the command's inspection program. Any discrepancies noted in his inspections shall be reported to the Master in writing, and a copy retained by the Safety Office for follow-up purposes.

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(2) Accidents/near accidents, installation of new equipment, establishment of new procedures, and relocation of operations may all be cause for special surveys. These surveys will be made at the call of the command and shall have Safety Division representation when any aspect of safety is involved in the survey.

(3) Ships' officers are required to conduct continuous safety inspections in performing the assigned responsibilities of their positions. Check lists incorporating safety factors suited to the department involved should be used as an inspection guide by the ships' officers.

b. Inspection Follow-up. Safety inspections are conducted to reveal unsafe practices and conditions; the important factor in any safety inspection, however, is follow-up of the inspection findings. It shall be the responsibility of the inspector finding the discrepancy to take action leading to correction. The procedures noted below shall be followed:

(1) The person discovering the unsafe condition shall:

(a) Determine who is responsible for corrective action;

(b) Advise the responsible person of the condition and the recommended corrective action;

(c) On subsequent inspection, check the corrective action.

(2) The responsible person shall:

(a) Take any corrective action within his authority;

(b) Report hazardous ship's equipment which requires replacement on the departmental Voyage Supply List, identifying each item as a "safety item";

(c) Report unsafe physical conditions on the department's Voyage Repair List, identifying each item as a "safety item".

(3) The command home port shall:

(a) Review Ship's Safety Council minutes for safety discrepancies reported therein which deserve the attention of the command but do not require detailed report;

(b) Take necessary action;

(c) Advise the Master of the action taken;

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(d) Disseminate those recommendations with fleet applicability.

(4) All persons designated above shall assign the highest priority to safety items and shall maintain follow-up records until correction is accomplished.

c. On the Job Safety Training. It is a supervisor's duty to assure that the personnel under his supervision are instructed in the safe procedures for carrying out their jobs. Department heads shall assure that on the job safety meetings are conducted at least semi-monthly throughout all work levels of the department. These meetings should consist of brief forceful talks with discussion. Accidents that have occurred, safety regulations of the department, potential hazards of the department's operations and related subjects are encouraged as topic material.

d. Protective Equipment, Devices and Apparel. There shall be available on each ship for use by employees, protective equipment, apparel and devices which the employee would not normally be expected to provide. Rather than furnish protective items on an assigned individual basis, protective equipment should be centrally controlled within the department concerned and issued at the time of need. Regular maintenance and sterilization will be undertaken. Maintenance of this equipment, above that which can be done aboard ship, shall be accomplished through Navy activities in the area which have the necessary facilities.

(1) The Safety Division shall coordinate the review and approval of safety equipment contained on the ship's allowance lists with the Engineering Division. Government furnished equipment will include such items as:

Respirators
Goggles
Welding masks
Rubber and asbestos aprons and gloves
Safety belts
Welders leathers, gloves and/or mitts
Helmets (hard hats)
Wet weather gear
Meat cutters mesh gloves

(2) The Medical Department will be responsible for administering a complete sight conservation program.

1-1-7 DEFINITIONS. The need for common understanding as a basis for conducting the safety program of MSTS requires definitions and uniform meanings which shall be used by all activities. For purposes of this Instruction the terms below will carry the meanings indicated.

a. Accident. An unplanned happening or event that takes place without one's foresight or expectation which either:

(1) results in injury to an employee, passenger, or invitee and:

(a) occurs on government premises or while an employee is on official duty beyond such premises;

(b) occurs while on voyage away from the home port whether ashore or afloat;

(2) results in material damage to a ship's hull, propulsion plant or other equipment.

b. Near Accident. Either of the following constitutes a near accident situation (A safety lesson may be learned and/or corrective action initiated as a result of this type information):

(1) Near Miss. An occurrence which except for fate or timely action would have resulted in damage or personal injury. Example: Man-overboard, electric shock, toxic exposure, etc.

(2) Hazardous Condition. A condition which has the potential to cause damage to or loss of equipment or personnel injury.

c. Injury. Injury as used in a. above, refers to any harm or impairment to the body through physical damage, industrial illness or disease. Injuries are classified as follows:

(1) First Aid Case. First Aid Case shall be the term applied to any injury which causes an employee to receive treatment without loss of time or transfer to another regular job, and he stands his next regularly scheduled watch or performs his regular duties within four hours of the time injured.

(2) Disabling Work Injury. An injury which results in death, permanent total disability, permanent partial disability or temporary total disability as defined as follows:

(a) Death. Any fatality resulting from injury, regardless of time intervening between injury and death. (Does not include death due to hostile action, suicide or homicide).

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* (b) Permanent Total Disability. Any injury other than death which permanently and totally incapacitates a person from following any gainful occupation or which results in loss, or the complete loss of use of any of the following in one accident:

1 Both eyes.

2 One eye and one hand or arm or leg or foot.

3 Any two of the following not on the same limb:
hand, arm, foot, or leg.

* (c) Permanent Partial Disability. Any injury other than death or permanent total disability which results in the loss or complete loss of use of any member or part of a member of the body, or any permanent impairment of functions of the body or part thereof, regardless of any pre-existing disability of the injured member of body function. The following injuries are NOT classified as permanent partial disability but should be considered under provisions of temporary total disability or First Aid Case:

1 Inguinal hernia, if it is repaired.

2 Loss of fingernails or toenails.

3 Loss of finger tip or tip of toe without bone involvement.

4 Loss of teeth.

5 Disfigurement.

6 Strains or sprains which do not cause permanent limitations of motion.

7 Fractures that do not result in permanent total or permanent partial disability or the permanent restriction of normal function of the injured member.

* (d) Temporary Total Disability. Any injury which does not result in death, permanent total or permanent partial disability, but which prevents an employee from performing his work for a full shift on any day subsequent to the day of injury.

* d. Light Duty (Temporary Partial Disability). Any case wherein the disabled employee cannot perform the duties of his own position but can perform the duties of another regularly established job is a light

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duty case. Light duty assignments are to be recorded in all reports as first-aid cases. If the employee refuses to perform a light duty assignment, he will be granted sick leave unless the Master is sure that he may perform the duties of the assignment without aggravation or undue discomfort of his injury. If the Master feels that the employee can perform the light duty assignment but the employee refuses, he will be considered to have absented himself from his duties and will be carried in a non-pay status for the period covered by such a refusal. A letter explaining the assignment and the circumstances of refusal will be forwarded by the Master to the Commander, home port, for filing in the employee's personal folder. When an employee refuses light-duty assignment aboard a ship which has no medical officer and medical authority later certifies that the employee was, in fact, incapacitated for the assignment, he will be entitled to sick leave covering the period of refusal.

e. Invitee. An invitee is any person other than a passenger or employee (military or civilian) of MSTS, aboard ship for an authorized purpose. (Master Labor Contract personnel in COMSTSFE are considered employees of MSTS for accident reporting purposes).

f. Property Damage. Damage reportable in accordance with this Instruction is limited to damage or loss of equipment or property resulting from an accident to or in a unit which either prevents that unit from operating normally or wherein the restoration by repair or replacement:

(1) Requires 5- man-hours or more, or

(2) Costs 200 dollars or more for material.

g. Basic Wage Rate. Basic Wage Rate as used in computing disability payments includes salary before deductions and the value of subsistence, quarters, or other considerations furnished to him on the job as a part of his pay for services rendered. Overtime and premium pay shall not be taken into account.

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1-1-8 AWARDS.

a. Local Awards. COMSTS endorses the promotion of accident prevention competition among ships of subordinate commands. Commands having more than one civil service manned ship in each class (passenger or other) assigned for administrative control shall establish local safety awards. Two such awards will be granted in any command based on the safety achievement in passenger and in non-passenger ships. Granting awards will be considered on the basis of major factors as follows:

Safety inspection
Ship's accident prevention programming
Accident frequency rates
Adequacy of reporting procedures
(Accident/near accident reports, material
and property damage reports, Safety
meetings, etc.)
Adequacy of safety equipment and material.

1-1-9 SAFETY CHECK LISTS. The purpose of these Check Lists is to provide the inspecting officer with reminders of items of safety for inclusion in his routine inspections and shall not restrict the scope of his safety inspections in any way. The sample check lists provided may be supplemented or modified to meet the particular needs of each ship.

a. Deck Department Safety Check List.

(1) Decks.

Tripping hazards, heavy weather precautions, slippery deck areas, stanchions and life lines.

(2) Ladders, Straight.

Rungs, security, hold backs on hatches, two handed use.

(3) Ladders, Inclined.

Treads, hand rails, stanchions, man ropes.

(4) Ladders, Portable.

Pilot ladders secured, hand line in place, proper stowage, life ring and lanyard at ladders, rungs, strength, security of rungs.

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(5) Illumination.

Adequacy at ladders, gangways, holds, rooms, passageways and compartments; availability and condition of electric torches, extension cords and lighting fixtures (explosion proof where required).

(6) Hatches.

Officer in attendance, safety lines rigged, t'ween deck protection; condition and stowage of tarps and battens; hatch beam security (uncovered until all boards in place).

(7) Winches.

Wire rope fastening; lubrication of reaving, oiling and greasing of breaks; guarding, signals.

(8) Smoke Stack.

Hook for suspending Bos'n's Chair, notification of Chief Engineer before men sent aloft, security stays, stack gas sign.

(9) Bos'n's Chair.

Rigged, lowered and raised by user; inspected and tested before use; supervision of use.

(10) Painting.

Condition of stages, bos'n's chairs properly rigged, inspected and tested; attendant on deck during over side work; life line and ring buoy in place; jacob's ladder rigged to stage; life vest worn; no smoking.

(11) Gangways.

Security and maintenance of rigging, manropes, stanchions; watch on duty, illumination, life ring and line provided; safety net rigged.

(12) Lines.

Men in clear of running lines; hung off cleats; made fast to capstan or gypsy; stowage, becketts on eye of mooring lines; fast to bitts, not gypsy heads.

(13) Cargo Gear.

Inspection; fittings, bridles, strong backs, wire slings, splices, open hooks moused, safety shackles, chains and snatch block hooks; logging.

(14) Hand Rails.

Security of stanchions; in place and rigged around deck openings.

(15) Handling Materials.

Security of rigging; inspection; block and tackle and chain falls, spliced slings, lifting area and position and method when lifting.

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(16) Protective Equipment.

Adequate stowage, spare parts, maintenance and instructions: proper utilization of.

(17) Smoking Regulations.

Restricted areas marked, ventilators screened, means for disposal of butts and matches.

(18) Fire-Fighting Equipment.

Marking of valves, stations; hoses reeled or flaked at hydrants, one length attached, spanner wrenches; check on extinguishers; instructions in use of.

(19) Gasoline and other Inflammables.

Stowages, safety fittings, safety can, no smoking signs.

(20) Tools.

Conditions, maintenance, stowage, use.

(21) Confined Space.

Tested, certified, ventilation, rescue equipment.

(22) Shops.

Cleanliness, lighting, guards, stowage.

(23) Housekeeping.

Orderliness, emergency exits, clear aisles.

(24) Unsafe Acts.

Horseplay, taking unsafe positions, failure to use protective equipment or guards.

(25) The Individual.

Inexperience, lack of knowledge, inattention, disobedience of rules, fatigued, poor habits, mental and physical fitness, temperament and attitude.

b. Engine Department Safety Check List.

(1) Boilers.

Guage glasses, test cocks, operating boiler, condition of burners, lighting off procedures, stack cleaning gear, warning (out of operation) tags, boiler compound labeled and stowage.

(2) Electrical Equipment.

Protection of exposed terminals, safety signs, grounding, grating rubber mats for switchboards, working hot lines, insulated tools, locks when working on equipment, rubber gloves.

(3) Main Engine.

Propeller all clear signal, warm up porcedure.

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- (4) Fire-Fighting Equipment.
Inspection and adequacy of.
- (5) Floor Plates and Grating.
- (6) Machinery Guards.
Condition, in place, maintenance.
- (7) Illumination.
Adequacy, condition.
- (8) Ladders and Hand Rails.
Loose, bent, missing rungs, blocking of, hatch openings, equipped with hold backs.
- (9) Machine Shop.
Containers for refuse, guards in place, condition, use and stowage of tools, illumination, deck condition.
- (10) Refueling.
No smoking, bonding, oil spills.
- (11) Unsafe Acts.
Horseplay, practical jokes, taking unsafe positions, failure to use protective equipment or guards, chance taking.
- (12) The Individual.
Inexperienced, lack of knowledge, inattention, disobedience of rules, fatigue, poor work habits, mental and physical fitness, attitude.
- (13) Miscellaneous.
Lagging, stowage of spare parts, cleanliness, general housekeeping, personal protective equipment.

c. Steward Department Safety Check List.

- (1) Crew and Passengers' Quarters and Mess.
Refuse containers, security of personal gear, security of inflammables, dead light hold backs, watch and bill stations, door warning signs, hooks, illumination.
- (2) Galley.
Burner operation and maintenance, security of material on shelves and stove, galley deck, refuse containers, cleanliness of space and equipment, hold backs, stowage of knives, cleanliness of china, safety devices (Power-operated equipment, operating condition of).
- (3) Storeroom.
Security of stowage, hold backs.

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(4) Refrigerator Boxes.

Condition of gratings, mats outside door, warning alarm and emergency lights, cleanliness, door hold backs.

(5) Unsafe Acts.

Horseplay, taking unsafe position, failure to use protective equipment or guards, chance taking.

(6) The Individual.

Inexperienced, lack of knowledge, inattention, disobedience of rules, fatigue, poor work habits, physical and mental fitness, cleanliness, attitude.

1-2-5 REPORTING PROCEDURES.

a. Navy Personnel. Reports shall be submitted in accordance with articles C-9801 and C-9802, BUPERS Manual 1959 for Navy personnel.

b. All Other Persons. Message reports for all other persons will include the following (except invitees - ALFA, BRAVO and CHARLIE only required):

(1) ALFA: Full name, and, as appropriate, rank, rate, rating or grade; file, service, "Z", badge, or social security number; and, branch of service. (Name of individual and name of principal in the case of civilian dependent passengers.)

(2) BRAVO: Diagnosis of illness or injury (Note: if unknown, specify nature of complaint or symptoms, ie. headaches, stomach pain, etc.), prognosis (examples are: "not serious", "guarded", "serious", "critical"), cause of injury or death, and disposition of patient if transferred.

(3) CHARLIE: Date, time, and ship's position.

(4) DELTA: Full name, relationship, and address of next of kin. (Indicate in message when next of kin is aboard or if NOK has been notified.)

c. Death. In case of death, the following will be included in the message:

(1) ECHO: Next port of call and estimated date of arrival.

(2) FOXTROT: Whether the ship has adequate facilities for preserving the remains or disposition of remains.

d. All Message Reports Except Those Involving Civilian Marine Personnel. All message reports, except those involving civilian marine personnel, will be made to the Secretary of the Navy with COMSTS and the cognizant MSTS administrative commander as information addressees.

e. Message Reports Involving Military Personnel. Message reports involving military personnel (other than Navy), their dependents, and all other civilian passengers will include, as appropriate, the following information addressees:

(1) The Commandant of the Marine Corps (Code DNA) for cases involving Marine Corps personnel and their dependents.

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(2) The Adjutant General, Department of the Army, (Code AGPS) for cases involving Army personnel and their dependents.

(3) The Chief of Staff, U. S. Air Force (Code PMP) for cases involving Air Force personnel and their dependents.

(4) The Commandant, U. S. Coast Guard (P-S), for cases involving Coast Guard personnel and their dependents.

(5) American Red Cross, Headquarters, Washington, D. C., for cases involving Red Cross employees and their dependents.

(6) The cognizant sponsoring service for cases involving personnel not covered above.

f. Judge Advocate General. The Judge Advocate General of the Navy will be included as an information addressee on all messages involving personal injury or death exclusive of cases involving military personnel and civil service employees.

g. Message Reports Involving Civilian Marine Personnel. Message reports involving civilian marine personnel, on voyage, will be made to the cognizant MSTS administrative commander with COMSTS and the Secretary of the Navy as information addressees. Whenever an employee is left ashore for hospitalization, the nearest MSTS representative will also be made an information addressee. In case of death or missing at sea, on voyage, the report will be made to the Secretary of the Navy, with COMSTS, the cognizant MSTS administrative and operational commander, the Bureau of Medicine and Surgery, the Bureau of Employees' Compensation (when death occurs as a direct result of the nature of employment), and the commandants of the naval districts in which (1) the home port is located, and (2) the next of kin resides, as information addressees. Serious or critical illness, injury, or death occurring in the home port will be reported to the Industrial Relations Officer, who will be responsible for making the reports required by this Chapter. When an employee is transferred to a shore facility in CONUS other than a USPHS hospital, the nearest USPHS facility shall be an info addressee. In addition, messages should include what personal effects and valuables accompanied employee.

h. Progress Reports. Following the initial message, reporting serious or critical illness or injury to civilian marine personnel, progress reports will be sent weekly until the patient is removed from the serious list or transferred to another ship or shore treatment facility. If the patient is transferred, a message report shall be made immediately. The receiving facility will be requested to make weekly progress reports to all concerned until the patient is removed from the serious list. Any change in the patient's condition will require an immediate report.

1-2-6 NOTIFICATION OF NEXT OF KIN. The cognizant service (Army, Navy, Air Force, or Marine Corps) will be responsible for notifying the next of kin for cases involving military and dependent personnel of their respective services. The cognizant MSTS administrative commander will be responsible for cases involving civilian personnel.

1-2-7 NOTIFICATION OF DEATH (Civilian Personnel). Wherever possible, notification will be by personal visit of a representative of the MSTS command. If the next of kin cannot be promptly located, COMSTS will be advised by message with the Bureau of Medicine and Surgery and the commandant of the naval district in which the next of kin resides as information addressees.

a. Information to be Excluded. Under no circumstances will the notification contain information concerning the conduct or line of duty status of the individual nor will any information be given which would jeopardize security.

b. Information to be Included. The information to be included in the notification depends on the locale of the death. See Article 1-2-8 below for the substance of information to be conveyed.

c. When Next of Kin Resides Within Commuting Area. When the next of kin resides within the commuting area of the home port or official duty station, a copy of the notification will be left with the next of kin by the command representative making the personal visit. COMSTS will be advised by message of such personal notification, with information copies to the Bureau of Medicine and Surgery and the commandants of the naval districts in which (1) the next of kin resides and (2) death occurred.

d. When Next of Kin Does Not Reside Within Commuting Area. When the next of kin does not reside within the commuting area of the home port or official duty station, notification will be by message, and the commanding officer of any naval activity that is located within commuting distance of the next of kin, will be requested by priority message to have an officer make a personal visit of notification in the name of MSTS. All message requests will contain the following statement: "UNDER NO CIRCUMSTANCES WILL NOTIFICATION BE MADE BY TELEPHONE". Additionally, under no circumstances will the notification message be delayed in order that the personal visit be accomplished.

1-2-8 MESSAGE NOTIFICATION FORMS. As appropriate, one of the following messages will be sent or personally delivered to the next of kin. Examples are shown for civilian marine personnel, appropriate paraphrasing will be accomplished for cases involving shore personnel.

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In all cases, the Bureau of Medicine and Surgery, COMSTS, and the commandants of the naval districts in which (1) death occurred, and (2) the next of kin resides, will receive information copies. The information addressees will not appear on the copy sent or personally delivered to the next of kin.

a. Death in Home Port. In case of death of an employee in the home port or its commuting area, and if an MSTS responsibility exists in accordance with Article 1-2-4, the next of kin will be notified by means of the following message:

IT IS WITH DEEP REGRET THAT I OFFICIALLY NOTIFY YOU OF THE DEATH OF YOUR (relationship, full name, and rating) OF THE (name of ship) ON (date, place) FROM (cause). HIS DEATH IS A GREAT LOSS TO MSTS AND HIS SHIPMATES AND FRIENDS JOIN ME IN EXPRESSING OUR SINCERE SYMPATHY. KNOWING THAT YOU WILL BE INTERESTED IN MAKING BURIAL ARRANGEMENTS PLEASE NOTIFY ME BY COLLECT TELEGRAM OF DISPOSITION YOU DESIRE MADE OF THE REMAINS. REGRET NAVY IS NOT AUTHORIZED TO DEFRAY EXPENSES. HOWEVER PLEASE LET ME KNOW IF ADVICE OR ASSISTANCE IS DESIRED IN WORKING OUT NECESSARY ARRANGEMENTS. LETTER FOLLOWS: (name and title of MSTS commander).

b. Death Away From Home Port Within CONUS. In the case of death of an employee in the service of a ship away from the home port and its commuting area, but within the continental limits of the United States, the next of kin will be notified by means of the following message:

IT IS WITH DEEP REGRET THAT I OFFICIALLY NOTIFY YOU OF THE DEATH OF YOUR (relationship, full name and rating) OF THE (name of ship) ON (date, place) FROM (cause). I WISH TO ASSURE YOU OF EVERY POSSIBLE ASSISTANCE TOGETHER WITH THE SINCERE SYMPATHY OF MSTS, HIS SHIPMATES AND FRIENDS. KNOWING THAT YOU WILL BE INTERESTED IN MAKING BURIAL ARRANGEMENTS THE FOLLOWING INFORMATION IS OFFERED. NAVY MAY ALLOW AN AMOUNT NOT TO EXCEED \$250 TOWARD PREPARATION AND ENCASEMENT AND WILL DEFRAY ALL COSTS OF SHIPMENT TO THE PLACE DESIGNATED BY YOU NOT TO EXCEED COST OF SHIPMENT TO HOME OR OFFICIAL STATION. PLEASE NOTIFY (commandant of the naval district where death occurred) BY COLLECT TELEGRAM NAME AND ADDRESS OF FUNERAL ESTABLISHMENT TO WHICH YOU DESIRE REMAINS CONSIGNIED. LETTER FOLLOWS: (name and title of MSTS commander).

c. Death Outside CONUS. In the case of death of an employee outside the continental limits of the United States, the next of kin will be notified by means of the following message:

IT IS WITH DEEP REGRET THAT I OFFICIALLY NOTIFY YOU OF THE DEATH OF YOUR (relationship, full name, rating) OF THE (name of ship) ON (date, place) FROM (cause). KNOWING THAT YOU WILL BE IMMEDIATELY INTERESTED IN MAKING BURIAL ARRANGEMENTS THE FOLLOWING INFORMATION IS OFFERED. REMAINS

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PART 1
PROGRAM ADMINISTRATIONCHAPTER 3
ACCIDENT REPORTING AND ANALYSIS

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Accident Analysis	1-3-3
Calendar of Accident Report Forms	1-3-4

- * 1-3-1 SCOPE. All accidents/near accidents shall be reported for both military and civilians, regardless of the degree of injury or extent of property damage. The degree of injury and the extent of property damage are the results of the accident. From the point of view of accident prevention, the causes of accidents/near accidents are paramount. The difference between a minor accident and a major accident is only a fraction of an inch or a second of time; the cause can be the same; therefore, all accidents/near accidents must be reported in order that preventive measures may be taken to eliminate and/or reduce the waste of manpower and materials.
- * 1-3-2 ACCIDENT REPORTING PROCEDURES. Accident reporting procedures shall be followed in accordance with current editions of OPNAVINSTS 5100.11 and OPNAVINST 3040.6. Reports required herein are in addition to reports required by Chapter 1-2 (Message Reporting) and Chapter 1-4 (Injury, Illness, and Death Treatment and Compensation) of this Instruction and other current instructions.
 - a. Home Port Area. Major accidents in the home port area involving injury to personnel and/or property damage will be reported immediately by telephone to the Safety Division. The headquarters Staff Duty Officer shall be notified when the occurrence is outside regular working hours.
 - b. Master's Responsibilities. Masters are responsible for reporting accidents/near accidents involving personnel and/or property damage (see paragraph d. below). Responsibilities for reporting accidents/near accidents incurred aboard ship by persons other than crew members are contained in the current edition of COMSTSINST 3120.2, Administrative and Operating Procedures for MSTS Ships in Service (USNS) (Civil-service-manned).
 - c. NAVSO 5100/9 - Dispensary Permit. NAVSO 5100/9 forms shall be prepared by the supervisor for civilian employees only, to be used as authority for medical treatment or civilian employees at any naval medical facility or ship's hospital. Forward original to the Safety Division, home port.

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* d. OPNAV Form 5100/1 - Accidental Injury/Death Report.

OPNAV Form 5100/1, "Accidental Injury/Death Report" and OPNAV Form 3040/1, "Forces Afloat Accident/Near Accident Report," (Personnel Injuries, Property Damage, and Near Accidents).

* (1) In addition to the submission of accident reporting forms as indicated above, in cases of disabling work injuries, property damage and near accidents, (as defined in paragraph 1-1-7, DEFINITIONS, of this Instruction), MSTS ships and shore activities shall forward an advance copy directly to Commander, Naval Safety Center.

* (a) OPNAV Form 5100/1 shall be prepared (in triplicate) for all injuries (however minor) or deaths sustained by crewmembers while on voyage, in the ship, and while on authorized liberty away from home port; and this report shall be signed by the Master as the reviewing official and air mailed to home port Safety Division from the first port of call. OPNAV Form 5100/1 (in triplicate) shall also be prepared for all injuries or deaths occurring at MSTS shoreside activities. Home port Safety Division will forward original to Naval Safety Center and one copy to Safety Division COMSTS for disabling work injuries only.

* (b) OPNAV Form 5100/1 shall be prepared (in triplicate) for all injuries sustained by "invitees," which might possibly lead to claims against the Government. Original and two copies together with any photographs and background information shall be sent to the Safety Division, home port which will forward original to JAG and a copy to Safety Division, COMSTS.

* (c) OPNAV Form 5100/1 shall be prepared (in duplicate) for all injuries sustained by passengers. Original and one copy shall be sent to the Safety Division, home port, which will send the original to Safety Division, COMSTS.

* (d) OPNAV Form 3040/1 shall be prepared (in triplicate) for all accidents involving property and/or equipment damage sustained by MSTS ships or shore activities. This form shall also be utilized to report near accidents. Original and two copies shall be sent to the Safety Division, home port, which will forward the original to Naval Safety Center and a copy to Safety Division, COMSTS.

* (2) When an Accidental Injury/Death Report (OPNAV Form 5100/1) contains adequate information about the accident to determine and record causative factors and to assist in preventing similar injuries, or no reportable damage was caused by the accident, an OPNAV Form 3040/1 is not required.

e. BEC Forms. See Chapter 1-4 of this Instruction for forms required by the Bureau of Employees' Compensation for injuries and occupational illnesses of civilian employees.

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f. Marine Index Bureau. All cases of injury or illness of civilian marine personnel shall be reported to the Marine Index Bureau in accordance with COMSTSINST 5100.2B.

* g. Motor Vehicle Accidents. Reports of motor vehicle accidents shall be made in accordance with NCPI 5100, Section 9. One copy of SF 91A shall be forwarded to Safety Division, COMSTS. One copy of NAVEXOS 5100/7, Motor Vehicle Accident Summary, shall be forwarded to Safety Division, COMSTS by each command which operates motor vehicles. Negative reports are required. Original of NAVEXOS 5100.7 with copy of SF 91A shall be forwarded to Commander, Naval Safety Center.

1-3-3 ACCIDENT ANALYSIS.

* a. NAVEXOS 110 - Quarterly Injury Data Report. The Safety Division of each command shall prepare Quarterly Injury Data Reports in accordance with NCPI 5100, Enclosure (1). The original of this report is to be submitted to Commander, Naval Safety Center, and one copy to Safety Division, COMSTS. The Safety Division, in reporting the total number of personnel accidents, accidents experienced, hours worked, frequency and severity shall separate the figures for marine and shore employees. In computing accident rates for civilian marine personnel, the following formula shall be used.

(1) Marine Frequency - No. Disabling Work Injuries x 1,000,000
Crew Man Days x 24 hours

(2) Marine Severity - No. of Days Lost x 1,000,000
Crew Man Days x 24 hours

(3) There shall be no exception made when reporting and recording injuries. All injuries sustained, including those incurred while fighting, intoxicated, on leave, or on liberty, shall be reported. However, when submitting statistical reports for award purposes, injuries attributable to the misconduct of the injured (e.g., intoxication, fighting) or those injuries sustained while off the ship in a leave or liberty status, or injuries sustained as a result of hostile acts shall not be charged to the accident experience of the subordinate command.

(4) Cases of a non-accident injury type such as tuberculosis, heart disease and the like, shall not be reported on the NAVEXOS 110 until approved as occupationally connected by the Bureau of Employees' Compensation.

b. MSTS Report 12190-2 - Quarterly Accident Summary. At the end of each calendar quarter, subordinate commands having ships under their cognizance shall submit a Quarterly Accident Summary to COMSTS. This report shall include:

(1) Individual ship standings.

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- (2) The number of first aid cases in the quarter.
- (3) The number, days lost, frequency, and severity of disabling work injuries in the quarter broken down into - military or civilian - shoreside or marine.
- (4) Cost estimates for the quarter and year to date, including personnel injury and property damage cost.

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1-3-4 CALENDAR OF ACCIDENT REPORTING FORMS

<u>No.</u>	<u>Title</u>	<u>For</u>	<u>By</u>	<u>Submitted</u>	<u>Number and Distribution</u>
<u>INJURY REPORTS</u>					
NAVS0 5100/9	Dispensary Permit	Each Injury	Supervisor completed by Medical	Immediately following	Two copies - Orig. to Safety Division home port
OPNAV Form 5100/1	Accidental Injury/ Death Report	Each Accidental Injury or Death	Immediate Supervisor	Within 24 Hrs. of accident	Original and two to Safety Division home port which will send original to Commander, Naval Safety Center and copy to Safety Division COMSTS for each DWI. <u>In addition, originator will forward advance copy immediately to Commander, Naval Safety Center in disabling work injury cases only.</u>
NAVEXOS 110	Quarterly Injury Data Report	Civilian and Military Personnel	Director Safety Division	Quarterly (within 10 days)	Original to Commander, Naval Safety Center, copy to COMSTS.

PROPERTY DAMAGE AND ACCIDENT/NEAR ACCIDENT REPORTS

OPNAV Form 3040/1	Forces Afloat Accident/ Near Accident	Each Accident/ Near Accident and Property Damage	Designated Official	As necessary	Original and two to Safety Division home port which will send original to Commander, Naval Safety Center and copy to Safety Division, COMSTS. In <u>addition, an advance copy will be forwarded immediately to Naval Safety Center when property damage is involved.</u> (NOTE: See paragraph 1-3-2, D (2) for exceptions to the preparation of this form).
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<u>No.</u>	<u>Title</u>	<u>For</u>	<u>By</u>	<u>Submitted</u>	<u>Number and Distribution</u>
<u>REC FORMS</u>					

CA-16	Request for treatment	Each Civilian Accident Requiring treatment	Designated Official	As necessary	Original and one copy to employee for admittance to hospital, two copies to Safety Division, home port.
CA-1	Employee's Notice Injury	Each Civilian Accident where injury, however, minor occurs	Employee or some-one in his behalf	Within 48 hours of accident	Original and two copies to Safety Division home port which will send original to BEC in compensation cases. One copy retained in Employee's folder.
CA-2	Official Superior's Report of Injury	Each Civilian Accident resulting in lost time or medical charge	Immediate Supervisor	Within 48 hours of accident	Original and one copy to Safety Division home port which will forward original to BEC.

MOTOR VEHICLE ACCIDENT REPORTS (See NCPI 5100)

SF 91	Operator's Report of Accident	Each M/V Accident	Driver	As necessary	Original to Safety Division home port
SF 91A	Investigation Report of Accident	Each M/V Accident	Investigator	As necessary within 10 days	Original and two copies to Safety Division, home port which will forward original to Commander, Naval Safety Center and copy to COMSTS.
NAVEXOS 5100/7	M/V Accident Summary	Each Command Operating M/V	Safety Division	Quarterly 10 days following quarter	Original to Commander, Naval Safety Center one copy to Safety Division, COMSTS. One copy each to local Safety Division, Investigating Officer and Transportation Officer.

* Each Government motor vehicle accident involving fatality, DWI, or total damage of \$50 or more.

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PART 1
PROGRAM ADMINISTRATIONCHAPTER 4
INJURY, ILLNESS, AND DEATH TREATMENT
AND COMPENSATION

Scope	1-4-1
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1-4-1 SCOPE. This Chapter is concerned with the establishment and administration of an injury compensation program for civil service personnel in the employ of MSTS. A safe worker draws full pay regularly. Show him how to avoid the accident that causes the injury. If he is injured, abide by the regulations in this Chapter and in CMMI 810.

1-4-2 POLICY. It is the policy of COMSTS to provide full medical care for civil service personnel who suffer injury in the performance of duty; to provide full medical care to civil service marine personnel who suffer injury or illness while in the service of the ship; and, to provide compensation which is equitable to the individual and in the public interest for disability and death. To assure that employees receive without delay any medical benefits to which they may be entitled and to assure the administration of an equitable compensation program it is mandatory that supervisors:

a. Inform Subordinates. Inform subordinates of their rights and obligations under the provisions of this Chapter.

b. Report. Report every occupational injury and illness without delay in as complete detail as possible.

c. Provide Assistance. Provide assistance in the execution of necessary forms.

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1-4-3 **ELIGIBILITY.** In order to be eligible for compensation benefits, an injured employee must follow the rules and regulations of the Federal Employees' Compensation Act as defined in this Chapter. Compensation will not be paid when the injury or illness is the result of the employee's own misconduct, or is a result of his attempt to deliberately harm himself or another, or is a result of the employee's intoxication. The Federal Employee's Compensation Act provides that whoever makes in any affidavit or in any claim for compensation, any statement, knowing it to be false, shall be guilty of perjury. Such person or persons shall be punished by a fine of not more than \$2,000 or by imprisonment for not more than one year, or both.

1-4-4 **MEDICAL TREATMENT.** It is the duty of supervisors to authorize initial adequate medical treatment no matter how slight the injury to an employee may be. Therefore it is important that employees be encouraged to seek treatment for trivial injuries.

a. Place of Treatment. Treatment at United States hospitals and dispensaries is mandatory where practicable. Where there is no United States medical officer, hospital, or dispensary, treatment is to be secured from one of the private physicians in the locality designated by the Bureau of Employees' Compensation. If there is no United States medical officer or hospital, or no designated physician available, treatment should be obtained from any competent, well-trained physician available. When it is necessary to use the services of a private physician, a written authorization should contain pertinent information contained on Form CA-16.

b. Examination. An injured employee is required to submit to examination by a medical officer of the United States, a designated physician, or a duly qualified physician approved by the Bureau of Employees' Compensation as frequently and at such times and places as in the opinion of the Bureau may be reasonably necessary. If an employee refuses to submit himself for, or in any way obstructs any examination, his right to claim compensation is suspended until such refusal or obstruction ceases. No compensation is payable while such refusal or obstruction continues.

1-4-5 **AUTHORIZING TREATMENT.** The procedures and forms used in authorizing medical treatment for civilian employees shall be in accordance with the following.

a. Shore Employees. When injury occurs to a shore employee, he shall be issued NAVSO 5100/9 for treatment at the Naval Dispensary. Employees who are more seriously injured in the performance of duty, especially those losing time from work, will be issued a Form CA-16, Request for Treatment of Injury under the U. S. Employees' Compensation Act and sent to a United States Health Service (USPHS) dispensary, Government hospital, or to a designated physician, or, where none of these are available, to a duly qualified physician.

* b. Civilian Marine Employees. Supervisors will issue a CA-16 as authority for treatment of occupational injury at a USPHS Hospital, U.S. Military Hospital, or U.S. Medical Officer or designated physician. The NAVSO 5100/9 shall be used in addition to the foregoing for treatment at any naval medical facility or ships hospital. The Master's Certificate (PHS-125) shall be used only as authority for treatment of nonoccupational injuries.

1-4-6 COVERED MEDICAL TREATMENT. All medical services, appliances, drugs, and supplies which in the opinion of the Bureau of Employees' Compensation are necessary for the treatment of an injury shall be furnished to employees entitled to medical and other benefits. Such treatment and services for injuries sustained while in the performance of duty, including diseases proximately caused by the conditions of employment, whether resulting in lost time or not, shall be furnished. The attending physician may arrange for necessary hospital care at general ward rates. If the nature of the case requires care in a private room, special nursing services, x-ray examination, or consultation with specialists, prior approval must be obtained from the BEC if no government hospital is available. Prior approval for such services is not required where the patient is under the care of a United States medical officer or designated physician. Acceptance or entitlement to receive benefits under the Civil Service Retirement Act does not bar the right to medical treatment for occupational injuries.

* a. Emergency Treatment. In all cases of injury where emergency treatment is necessary, any duly qualified physician may render first aid treatment. Further treatment, if necessary, should be obtained as soon as practicable from a medical officer of the United States or from a designated physician, where available. Authorization may be given for emergency treatment before issuance of CA-16, provided that this form is issued within 48 hours thereafter, or satisfactory written explanation for the additional delay is given.

b. Recurrence of Disability. If an employee complains of a recurrence of disability after having recently been discharged from medical treatment on account of an injury recognized by the BEC as compensable, the supervisor may issue Form CA-16 provided that not more than six months shall have elapsed since the final action of that Bureau on the case. In all other cases, except emergencies, BEC should be queried for instructions.

c. Dental Treatment. All necessary dental treatment, including repairs to fixed false teeth or to natural teeth, needed to repair damage done by an injury are furnished by the Bureau of Employees' Compensation.

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d. Artificial Appliances and Dentures. When dentures or an artificial appliance, such as an eye or limb, is deemed necessary by the attending physician because of an injury which has been found by the Bureau of Employees' Compensation to have occurred while in the performance of duty, application therefore may be made to the Bureau. Similarly, repairs to appliances or dentures may be authorized by the BEC. However, no artificial denture or other appliance lost, broken, or otherwise injured in an accident, will be replaced by the BEC unless the effects of the personal injury incurred at the same time would have necessitated a change to the existing artificial denture, glasses, or other appliance.

e. Hernias.

(1) Hernia cases will be referred for surgery as soon as possible after diagnosis is made provided the case meets the requirements:

(a) The Medical Officer and Safety Officer agree that the case is of occupational origin.

(b) The Medical Officer is of the opinion that surgical repair is to the benefit of the employee (certificate on back of Form CA-32 must be completed and signed).

(c) The employee gives his consent to the operation (Item 15 on CA-32 is answered "yes" and face of form signed by employee).

(2) Form CA-16 shall be used to refer a hernia case to a USPHS hospital. Forms CA-1, CA-2, CA-32, and a copy of CA-16 must be submitted to BEC prior to the referral of the employee, but it is not necessary to wait until a reply is received before taking corrective action.

(3) In alleged recurrence of a hernia, follow procedures of 1-4-6b.

(4) The issuance of Form CA-16 in hernia cases shall not be construed as an approval of the claim by BEC.

1-4-7 REIMBURSEMENT.

a. Services, Supplies, or Appliances. If bills for medical, surgical, nursing, dental, or hospital services or supplies, or appliances, have been paid by an injured employee on account of any injury incurred while in performance of duty, an itemized bill may be submitted to the Bureau of Employees' Compensation for consideration. The bill must be signed by the person who has received payment and, when appropriate, should bear the full signature and title of any person acting for a payee.

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b. Transportation and Incidental Expenses. Where the means of transportation is not furnished by the Government, a claim for reimbursement of the cost of authorized transportation and necessary incidental expenses may be submitted to BEC for consideration. Standard Form 1012 (or Nav Compt 2021) should be used for claiming reimbursement. Vouchers submitted by a party other than the injured employee must contain a statement signed by the injured employee that services were rendered and that he was not paid any portion of it.

c. Marine Employees Non-Occupational. If a civilian marine employee pays for authorized medical treatment or transportation in cases of non-occupational injury or illness outside the continental United States an itemized bill may be submitted to the Commander, home port for consideration in accordance with 1-4-8.

1-4-8 MEDICAL AND DENTAL TREATMENT OUTSIDE CONUS. MSTS will pay for the cost of treatment for non-occupational illnesses and injuries extended to MSTS civil service marine personnel who have been referred to a treatment facility using the Master's Certificate (PHS-125) by the employing command, Master, or other competent authority, in accordance with the following:

a. In Foreign Areas. When, out of operational necessity, MSTS civil service marine employees are based, or assigned to ships operating for extended periods in foreign areas, MSTS will assume the cost of providing the same care the seamen would receive, where an USPHS facility is available. This shall not include the furnishing of crowns or inlays or the use of gold or other more precious metal for fillings.

b. On Voyage. In keeping with the policy of compensating in accordance with maritime practice, MSTS will assume the cost of medical and emergency dental care extended to all MSTS civil service maritime personnel while on voyage. Emergency dental care means those measures appropriate to relieve pain or to abort infection.

1-4-9 BASIC COMPENSATION BENEFITS. Any civil service employee who becomes ill or is injured as a direct result of the nature of his employment is eligible to receive compensation for his disability under the provisions of the Federal Employees' Compensation Act of 1916, as amended. The liability of the United States under the Act is exclusive, and in place of all other liability of the United States. The rights of civil service seamen to recover for disabilities which were proximately caused by their employment are limited to those provided by the Federal Employees' Compensation Act as administered by the Bureau of Employees' Compensation. If no claim is filed by an injured employee or by someone in his behalf prior to his death, the right to claim compensation for disability ceases and does not survive.

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a. Waiting Period. An employee who sustains injuries must be in a non-pay status for 3 calendar days as a waiting period before compensation under the Federal Employees' Compensation Act may commence. If the period of disability lasts over 21 days, a retroactive payment will be made to cover the 3-day waiting period. No waiting period is required in the case of a permanent disability.

b. Right of Election of Annual and/or Sick Leave. An injured employee has the right of election either to be placed on annual and/or sick leave allowable or to submit an immediate claim for compensation for disability. If an employee, having elected to apply for compensation, is placed on leave without pay pending decision on his claim for disability compensation and the claim is disallowed by the BEC, this period of leave without pay may be retroactively covered by accumulated and accrued annual and/or sick leave to his credit upon application by the employee.

c. Appeals. Employees may appeal to the Employees' Compensation Appeals Board from final decisions of the Bureau of Employees' Compensation. Such appeals should be filed with the Employees' Compensation Appeals Board, Department of Labor, Washington, D.C. 20211 within 90 days from the date of issuance of the decision of the Bureau of Employees' Compensation if the applicant resides within the continental United States or Canada, or within six months from such date if the applicant resides outside the continental United States or Canada. For good cause, the Board may accept an appeal filed within one year from the date of decision by BEC. The decision of the Board, if reconsideration by the Board is not granted, is final, subject to statutory right of review under the Act, upon expiration of 30 days from the date of the filing of the decision, unless the Board fixes in the decision a different period of time. A petition for reconsideration timely filed may be granted at the discretion of the Board.

1-4-10 NOTICES, REPORTS, AND CLAIMS FOR DISABILITY.

a. Employees' Notice of Injury. Any civil service employee who sustains an injury or illness which was proximately caused by his employment, or someone acting in his behalf, shall give written notice thereof to his immediate supervisor within 48 hours using Form CA-1. The notice shall be delivered personally to the supervisor for forwarding to the Safety Division of the employing command.

b. Disability Resulting in Lost Time. The Federal Employees' Compensation Act requires that every disability which is likely to result in any medical charge against the compensation fund or any disability for work beyond the day of occurrence, or which appears likely to require prolonged treatment or to result in future disability, shall be reported by the employee's supervisor to the safety representative of the employing command. Form CA-2, "Official Superior's Report of Injury", shall be used for this purpose. The safety representative of the employing command shall forward Forms

* CA-1 and CA-2 to the Bureau of Employees' Compensation without delay for any disability resulting in any lost time from duty, whether or not such time is covered by annual or sick leave. If the disability is not likely to exceed three days, the report may be withheld until the employee has returned to duty and "Report of Termination of Disability" noted thereon, thus eliminating the necessity for submission of Form CA-3 (see below). The following types of cases will be reported to BEC.

(1) When disability causes loss of time from work beyond the day on which the disability occurred. Included shall be all disabilities incurred by civil service marine personnel while on voyage and on leave from the ship.

(2) When any medical expense is incurred other than for dispensary out-patient treatment, or when the employee is referred to any other medical facility for treatment.

(3) When any permanent disability, either anatomical or functional, may result from the initial disability.

(4) Where there is a probability of future infection or disability.

(5) When the period of out-patient treatment extends more than ten days.

(6) When the employee indicates any desire or intention to file a claim with BEC.

* (7) Whenever the injury involves the back or eyes.

c. Termination of Disability or Return to Work. When a disabled employee is able to return to work after a period of disability caused by an occupational injury or illness, his supervisor shall immediately notify the safety representative of the employing command using Form CA-3, "Report of Termination of Disability", unless it has been previously reported on Form CA-2, above. The report must show the period of absence from work and the part of such period for which the employee will be paid on account or leave or for any other reason. Notice of termination of disability must be given on Form CA-2 or CA-3 for each injury resulting in a period of disability whether or not the supervisor has knowledge of the employee's intention to submit a claim for compensation.

d. Report of Death. If an injury to an employee results in death, the death will be reported to the Bureau of Employees' Compensation by information copy of the required report to SECNAV (1-2-5g). In addition, the supervisor will, as soon as possible, forward a copy of the death certificate to the BEC through the safety representative

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of the employing command and report the death on the lower portion of Form CA-3 showing the exact period of absence from work prior to the date and hour of death, and the part of such period, if any, during which the employee's wages have accrued, or for which they will be payable to his estate, on account of leave or for any other reason.

e. Claim for Basic Compensation for Injury. Whenever a civil service employee is injured as the result of the conditions of his employment, the supervisor shall advise the employee of his rights regarding compensation. For the purpose of claiming compensation, the employee or someone in his behalf should execute Form CA-4, "Claim for Compensation on Account of Injury," and submit it through his supervisor to the Safety Division for forwarding to the Bureau of Employees' Compensation. If such a claim is submitted more than 60 days after the injury, an explanation of the delay must accompany the claim.

f. Claim for Augmented Compensation. An employee disabled as the result of an injury, who has one or more persons dependent upon him may make application for augmented compensation, in addition to basic compensation payable for disability, so long as he remains disabled and such dependency continues. For the purpose of claiming this additional compensation, the employee or someone in his behalf should execute Form CA-4A, "Application for Augmented Compensation for Disability," and submit it with Form CA-4 or as soon after submission of theat form as possible.

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PART 2
GENERAL SAFETY PRECAUTIONS

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 metal 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.
- o. 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 (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,

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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, naptha, 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 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 building 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-skid material(s) (treads, abrasive devices, etc.) shall be used around door coamings, top and bottom areas of ladders and stairs, operating deck areas, around machinery, bitts, lifeboats (embarkation points, bow and stern tenders stations) and any other areas where slippery conditions may exist.

aa. Stairs

* (1) Stair treads, unless made of wood, shall 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

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railing on each side. Stairways between 22 and 44 inches shall 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 railing or suitable screening shall be provided from the top of the railing down to the floor or treads.

(4) Stairs shall be well lighted. Stairs will 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 where permitted.

(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 its 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 handerchief 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 $1\frac{1}{2}$ -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 on 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

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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.

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(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) Ventilating fans within 7 feet of the deck or on working platforms, exposed to contact, shall be covered with wire mesh guard of not less than 20-gauge, which will reject a ball one-half inch in diameter. Suitable nylon mesh guard may be substituted.

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

(3) Small electric fans shall 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

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be repaired or replaced promptly, since sharp edges and point 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 near 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 shall 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 breath excessive vapors. Avoid contact as much as possible." (See 2-14-14 on alcohols).

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gallons of foam. 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 to decomposition, it emits high toxic fumes of phosgene.

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) Head bumping/or other protrusions shall be padded to reduce injuries. Low beams, stumbling and tripping hazards shall be painted with alternate bands of black, MSTS Code 48, and 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 exterior stairways a 4-inch band of 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 COMSTS INST 4750.B)

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

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(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," NAVMAT P-10470.

(3) Swabs, deck gear and other materials that may burn or otherwise introduce a toxic hazard into the system shall not be stowed in fan rooms or ventilation ducts.

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 Technical Manual, Chapter 9640, "Lighting".

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

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foot-candles of illumination. Before attempting to improve lighting conditions, the Safety Director and Engineering 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 with directions given thereon.

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 an exposure to insecticides in the open or in well ventilated spaces. 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 insecticide 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.

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since these contents are apt to settle in traps and clog the plumbing 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.

(4) At least one grab rail shall be installed in each shower aboard ship. *

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) Expectorating 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 keyless 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.

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(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 be 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 9920 of the Naval Ships Technical Manual.

c. Swimming from the Ship. Only the Commanding Officer/Master may authorize swimming from the ship.

d. Head Protection. Protective hard hats shall be worn by all crewmembers:

(1) When in the vicinity of overhead cargo operations, including the rigging and unrigging of cargo gear.

(2) When in engine spaces during overhaul and/or repair periods.

(3) When working over the side of the ship.

e. Passenger Safety.

(1) This article of particular concern for passengers applies equally to ships' crews and other persons on board. 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 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.

(n) Bunk light covers shall be kept in place at all times. *

(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. 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 portable pipe, wire, rope and chain railings shall always be secured in place with toggle pins or by other suitable means.

(4) The ship shall 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 steps properly secured and equipped with at least one 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 25 fathoms of yellow buoyant line attached shall be readily 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 shall 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.

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(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 life 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, Life Preservers 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 lifelines in rigging or unrigging a brow, boat or other gear, or in ships' boats, any part of which is outboard of lifelines, shall wear life jackets.

(6) Approved buoyant work vests are considered to be items of safety apparel and shall be carried aboard vessels to be worn by crew members when working near or over the water under favorable working conditions. They shall be used under the supervision and control of designated ships officers. Buoyant work vests shall not be accepted in lieu of any portion of the required number of approved life preservers. They shall not be substituted for the approved life preservers required

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to be worn during drills and emergencies. The approved buoyant work vests shall be stowed separately from the regular stowage of approved life preservers. The locations for the stowage of work vests shall be such as not to be easily confused with that for approved life preservers. Each work vest shall be subject to examination to determine its servicability prior to use. If found to be satisfactory, it may be continued in service. If a work vest is found not to be in a servicable condition, then such work vest shall be surveyed.

(7) 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:

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(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 tarpaulines. During stowage, keep it 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.

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(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 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. The ends of lifeboat winch shafts and the hand crank that engages this shaft shall be so constructed that, if power is accidentally applied while the crank is engaged, the crank will not turn but will disengage from the shaft. On square shafts, an adaptor shall be securely fastened to the ends of the shaft(s). In addition to the above and any precautions contained in equipment technical manuals and the MSTS Lifeboat Manual, the following shall 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

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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 track-way 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 life-boat, 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 of 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

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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.

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(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 will 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 with the minimum angle to the horizontal for which the gear is designed. 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 To prevent overloading of 10 ton cargo boom when used in unison in a "yard and stay" or "burtoned" arrangement, in addition to the SWL stencil required for a swinging boom and to ensure that the capabilities of ships' gear are clearly defined, all 5 and 10 ton booms will also be stenciled "SWL 3 Tons Burtoned." Ships having 3 ton booms will stencil "SWL 1 Ton Burtoned."

5 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 tieing, and repairs shall never be made even temporarily by bolting two links together or by the use of wire.

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

7 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.

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(b) The vessel's first officer or his designated representatives 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 cargo winch fall shall be so wound that the lever will have the same direction of operation as the load being handled.

2 All controllers shall be painly marked in accordance with hoisting and lowering positions. Topping left winch control levers should raise and lower booms uniformly on all booms as follows:

(a) Horizontal Controls

Lever in forward position - boom lowers
Lever in aft position - boom raises

(b) Vertical Controls

Raise lever - boom raises
Lower lever - boom lowers

3 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.

4 When personnel are required to work in the bight formed by the heel block, a preventer of at least 3/4" diameter wire rope, rove reasonably snug and properly secured, shall be rigged to hold the block and fall in the event the heel block attachment should fail. Heel blocks that are less than ten feet above the deck shall be so rigged as to prevent alternate raising and dropping of the block.

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* 5 Beam and pontoon bridles shall not be used unless they meet the following requirements:

(a) Bridles shall be long enough to easily reach the holes, rings, or other lifting attachments on the beams and pontoons. The bridles shall be of adequate strength and properly maintained, including covering or blunting of protruding ends in wire rope splices.

(b) Bridles for lifting hatch beams shall be equipped with toggles, shackles, or hooks or other devices of such design that they cannot be accidentally dislodged from the beams with which they are used. Hooks other than those herein described may be used only when they are hooked into the standing part of the bridle. Toggles, when used, shall be at least one inch longer than twice the longest diameter of the holes into which they are placed.

(c) Bridles used for lifting pontoons and plugs, shall have the number of legs required by the design of the pontoon or plug and all legs shall be used. Where any use of a bridle requires fewer than the number of legs provided, idle legs shall be hung on the hook or rings, or otherwise prevented from swinging free.

(d) At least two legs of all strongback and pontoon bridles shall be equipped with a substantial fiber rope lanyard at least eight feet long and in good condition. The bridle end of the lanyard may be of chain or wire.

(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 strongbacks 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 coaming 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.

(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.

(8) Each walk-in reefer door shall be provided with a hold-open, self falling, spring actuated, hook latch with a rubber bumper.

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* (9) Breather openings with plugs attached by short lengths of chain are placed in bulkheads and sometimes in doors and overheads of ships walk-in reefers. Alongside each breather opening, a label shall be installed with the inscription "KEEP PLUG OUT EXCEPT WHEN DEFROSTING, WASHING DOWN, OR WHEN AIR-TESTING SHEATHING." Breather plugs are not required when polyurethane foam insulation is used. 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".

(2) Handling of Hot Foods and Liquids.

(a) Do not allow the handles of cooking utensils to extend beyond the edge of the range.

(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.

(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

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report it. Then use available portable carbon dioxide (CO₂) 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.

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- (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.
- (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 and 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. A separate disconnect switch in the circuit between panel and fryer shall be located at the Galley entrance door. Post sign by disconnect switch in 3/4" letters "Caution - Disconnect Switch When Fryer Is Not In Use". Console-type deep fat fryers with permanently installed drains and reservoirs must be protected by an upper temperature limit thermostat and disconnect breaker as directed by NAVSHIPNOTE 9340 Ser #6660H-3390 dated 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.

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c. Pulling Nails. When nails or screws are being pulled, wrecking bars shall have a block placed under the jaws after a long nail or screw has been started.

d. Striking Bar. Wrecking bars shall never be struck with case-hardened steel tools. Wood, plastic, or soft steel objects shall be used for striking purposes.

2-5-17 WRENCHES.

a. Selection of Wrench. Care shall be used in the selection of the right wrench for the job. An extension shall never be used on a wrench.

b. Condition. Only wrenches in good condition shall be used. A bent wrench if straightened has been weakened and shall not be used.

c. Strain. A small wrench should not be overstrained.

d. Use as Hammer. No wrench shall be used as a hammer.

e. Machine in Motion. A wrench shall never be used on material in a machine in motion. The machine shall be stopped to permit working on the stock.

f. Wrench Faced Forward. An adjustable wrench shall be faced so that the movable jaw will be located forward in the direction in which the handle is to be turned.

g. Bite Near Middle. The bite of an adjustable wrench shall be taken near the middle of the jaws, so there will be teeth in front if the wrench slips. The teeth shall be kept sharp.

h. Working in Confined Space. There shall be adequate clearance between the worker and the wrench.

2-5-18 PORTABLE POWER TOOLS. GENERAL PRECAUTIONS.

a. Double Insulated Portable Power Tools. Uninsulated portable power tools shall not be used when double insulated shock proof tools are available in conformance with military specifications.

b. Inspection. Portable power tools shall be kept cleaned, oiled and repaired. They shall be carefully inspected before use. The switches must operate properly and the cords be clean and free of defects. The plug shall be clean and sound.

c. Grounds.

(1) The frames of portable electric tools and appliances

shall be grounded through a third wire in the cable containing the circuit conductors. Double insulated tools from sources qualified under applicable military specification are exempt from this requirement.

(2) Grounding circuits other than by means of the structure of the vessel on which the tool is being used, shall be checked to insure that the circuit between the ground and the grounded power conductor has resistance which is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

c. Fire Hazard. Sparking portable electric tools shall not be used where flammable vapors, gases, liquids, or exposed explosives are present.

d. Care of Cords.

(1) Care shall be taken that cords do not come in contact with sharp objects; they should not be allowed to kink, nor left where they might be run over.

(2) Cords must not come in contact with oil or grease, hot surfaces, or chemicals.

(3) Seriously damaged cords shall be replaced. They are not to be patched with tape.

(4) Tools shall be stored in a clean, dry place where the cord can be loosely coiled.

2-5-19 POWER TWIST DRILLS.

a. General. Precautions for hand drills as given in Article 2-5-6 are also applicable to power twist drills. In addition, the following requirements shall be met.

b. Drill Firmly Grasped. A portable power drill shall be grasped firmly during the operation to prevent it from bucking or breaking loose, thereby causing injury or damage.

c. Cleaning. When the work is completed, the drills shall be removed, and drill and motor shall both be well cleaned.

2-5-20 PNEUMATIC TOOLS.

a. Protective Apparel. Operators using this type of tool shall wear and use necessary personal protective devices.

b. Authorized Personnel. Only authorized and trained personnel shall operate pneumatic tools.

PART 2
GENERAL SAFETY PRECAUTIONS

CHAPTER 6
WEIGHT HANDLING AND CONSTRUCTION EQUIPMENT

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2-6-1 DEFINITION AND SCOPE. Weight handling equipment as referred to in this Chapter, encompasses cargo gear (including heavy lift booms) ship-board cranes, elevators, dumbwaiters, and conveyors. It does not include fork lifts, straddle carriers, and pallet trucks; for safety precautions covering the operation of such equipment, see Chapter 2-1.

2-6-2 PRINCIPAL CAUSES OF ACCIDENTS. The predominant unsafe practices and hazardous conditions in the operation of cargo gear, ship-board cranes, elevators, dumbwaiters and conveyors are listed below. Operators of all such equipment should study this list carefully, noting particularly the hazards connected with their own work. They should also heed seriously the instructions and warnings of their supervisors regarding safe practices to be followed during operation, making every effort to avoid accidents from any of the following major causes.

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- a. Swinging boom without looking, warning, or signaling.
- b. Riding the cargo hook in and out of the hatch.
- c. Operating equipment with defective or improperly functioning parts.
- d. Working or walking under suspended loads.
- e. Oiling, adjusting, or repairing equipment while it is in operation.
- * f. Using equipment with unguarded or inadequately guarded moving parts.
- g. Failing to use personal protective devices or clothing such as goggles, safety shoes, gloves and hard hats.
- h. Operating equipment in a thoughtless or unsafe manner.
- i. Allowing loaded cargo booms to contact stays, shourds, or other fixed objects.
- j. Failing to secure equipment, brakes, booms and winches before repairing or leaving the equipment.
- k. Poor housekeeping either on the equipment itself or in the operating area. Accumulation of oil and grease on deck near cargo winches and other deck machinery shall be promptly removed and cleaned. If the accumulation of grease and oil is the result of defective machinery, such equipment shall be repaired as soon as practical.
- * l. The safe working load of cargo booms and shipboard cranes shall not be exceeded. The certified safe working loads of the cargo gear are based on using the booms as swinging booms and not handling cargo by the burtoning method. It is, therefore, recommended that three tons be the maximum lift for burtoning loads when using conventionally rigged five and ten cargo booms. In instances where in the masters or commanding officer's opinion, the safe working load of the cargo gear would be exceeded in making assigned lifts, the master or commanding officer will obtain prior permission for such use from the area commander.

2-6-3 OPERATING.

- a. Operators. Operators of weight handling equipment shall be thoroughly familiar with the operation of the equipment prior to operating same.

agitation of petroleum liquid, or when poured from one receptacle to another or when passed through a filter.

(2) Dangerous static charges are frequently accumulated and discharged in such a way that fires and explosions result unless proper precautions are taken.

(3) Moving parts of machines, particularly in dry atmospheres may cause static electricity. Grounding of machines prevents the accumulation of dangerous charges. Moving belts which are not electrically conductive, such as those employed for conveyors and power transmission are also sources of static electricity. One method of combatting this source is the use of rubber belting containing a conducting component.

(4) Moving trucks and other moving vehicles are capable of generating static electricity. At one time the National Fire Protection Association required trucks to drag ground chains, but this requirement has now been dropped.

(5) The metal nozzle at the end of gasoline or other hydrocarbon fueling hose should be bonded to the coupling which is attached to the pump by a copper wire inside the hose and the nozzle should be held in contact with any metal tank or receptacle which is being filled with gasoline. An induced charge of electricity of considerable voltage may be accumulated by the friction of fuel flowing through a metal funnel when loosely placed over the inlet of a container being filled. Therefore, the funnel should be in metallic contact with the supply outlet.

(6) All metal receptacles, funnels, etc., used in the handling of gasoline should be in contact with each other or should be bonded together and grounded.

f. Electrical Storms. Never load or unload flammable products during electrical storms.

g. Repair Work. Do not perform any mechanical work or repair involving hot work such as burning, cutting, or welding unless a permit is issued by proper authority.

h. Spontaneous Ignition. If large masses of certain combustible materials which have been soaked in oil are allowed to stand and the heat liberated from 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. Thus accumulation of oily waste or paint-soaked rags in combustible buildings and containers is a cause of fires. For this reason materials subject to spontaneous ignition must be stored in a

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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 collection daily. The use of plastic containers for waste collection is prohibited.

i. Electrical Apparatus. Inspect electrical apparatus frequently and correct any condition likely to cause sparking. Whenever possible, open switches, and pull fuses before work is done on electrical equipment.

j. Engine Operation. Shut off gasoline tank-truck engines during the entire period of filling or discharging unless the truck is designed for engine operation to drive transfer pumps through a power take-off or unless the truck is approved for using gasoline in engines for operating pumps.

k. Vents. Care shall be taken that the flame arresters in the vent pipes from tanks are kept intact and no smoking, sparks, or flames shall be permitted in the immediate vicinity of such vents. The flame arresters shall be kept free from paint and accumulations of soot or lint.

2-9-9 FIRE FIGHTING EQUIPMENT AND EXTINGUISHING METHODS. Specifications and instructions relative to the care, use, location, etc., of fire fighting methods and fire-extinguishing equipment are given in Bureau of Ships Manual, Chapter 93, NAVSHIPS 250-004 Fire Fighting Manual, MSTS Damage Control Manual, and CG Manual 239 - Fire Fighting for Tank Vessels.

2-9-10 TOXIC HAZARD. Petroleum fuel vapors may cause anesthetic effects when inhaled. Inhalation of atmospheres containing 0.07 to 0.28 percent by volume of gasoline vapors (equivalent to about 5 to 22 percent of the lower explosive limit) may cause slight dizziness in some individuals after 3 minutes exposure. 1.1 to 2.2 percent by volume causes intoxication after 10 to 12 breaths. Longer exposure or greater concentrations may cause unconsciousness or death.

a. Permissible Limit. The maximum permissible concentration of petroleum vapors in which it is safe for personnel to work an 8-hour day is 500 parts per million (0.05 percent by volume). Since the lower explosive limit is 1 to 1 $\frac{1}{4}$ percent for most fuels, it should be remembered that the concentration of vapors which can be tolerated by personnel is far below that required to produce explosive mixtures with air.

b. Symptoms. First symptoms of exposure to toxic vapors are headaches, nausea, and dizziness. If such symptoms are noted, they should be taken as warning of the presence of dangerous amounts of vapors in the air. Recovery from these early symptoms is usually

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between periods of actual use or in anticipation of a need for immediate use.

2-9-54 HANDLING CYLINDERS.

a. Handle With Care. Cylinders that contain flammable and/or explosive gases shall be handled with particular care. Every effort should be made to avoid their being dropped or allowed to strike forcefully against each other or any other object. Every precaution shall be taken to prevent bumping or striking the discharge valves during handling operations.

b. Caps in Place. The cylinder valve outlet cap and the cylinder valve protecting cap shall both be in place when cylinders are being handled. Unless ready service cylinders are secured in a special portable rack, regulators shall be removed and caps replaced before the cylinders are moved to a new location.

c. Transporting Cylinders. When loading or transferring cylinders, especially when using ship cargo gear, the cylinders shall be secured in a cradle, suitable platform, rack, or special container (such as a sand bag, stock 24-B-1062). Neither a sling (line or chain) nor electromagnets shall ever be used. A cylinder moved by hand should be tilted slightly and rolled on its bottom edge, without dragging or sliding. Hooks or lines through valve protection cap shall not be used for hoisting cylinders.

d. Fixed to Deck. Cylinders frozen to the deck or otherwise fixed shall not be pried loose with crowbars or similar tools.

e. Hand Trucks. When cylinders are transported by hand truck, they shall be securely held in position by chains, steel strapping or other means that will prevent falling from the truck. Hand trucks used by welders for holding cylinders of welding gases shall conform in general to the requirements of Specification Mil-T-19259, Truck, Hand 2 Wheel, Welding Cylinder Rack, Double Handle Type, Solid Rubber Tires.

2-9-55 STOWAGE OF COMPRESSED GASES, GENERAL.

a. Location. In general, weather-deck stowage will be provided for flammable and explosive gases. However, in specific cases, below-deck stowage is approved depending on the particular type, mission, and arrangement of the vessel. In such cases, these approved locations are shown on the plans of the vessel. (See BuShip Technical Manual, Chapter 9230)

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* b. Separating Flammable and Oxidizing Gases. Combustible gases shall never be stowed with oxidizing gases. Oxygen cylinder in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease) a minimum distance of twenty feet or by a non-combustible barrier (fire wall) at least five feet high having a fire resistance rating of at least $\frac{1}{2}$ hour. However, the inert gases such as helium, nitrogen, carbon dioxide or argon may be stowed with either flammable or oxidizing gases. Typical oxidizing gases are oxygen, chlorine and hydrogen peroxide.

c. Fire Apparatus and Oxygen Tanks. Fire extinguishers employing gases, fire-extinguishing cylinders permanently connected to fixed fire-extinguishing systems, and gases and chemical canisters for oxygen-breathing apparatus may be stowed in the vicinity in which they are used.

d. Compartments. Compressed gases aboard all vessels, except cargo vessels, shall be stowed only in compartments designated in applicable plans for the vessel.

(1) Necessary steps shall be taken to prevent the maximum temperature of the stowage compartment from exceeding 130° F.

(2) When provisions are made for mechanical ventilation, this ventilation shall be operated in accordance with the damage control classification assigned. The classification for closure of this system shall be "Z" or "W".

(3) Compartments containing compressed gases shall be ventilated for 15 minutes prior to entry, in event ventilation has been closed down, a suitable sign to this effect shall be prominently posted on the outside of the access door.

(4) Other flammable materials, especially grease and oil, shall be kept out of all stowage spaces and stowage space shall be kept clean.

(5) In compartments designated for the stowage of flammable or explosive gases, the installation of portable electric wiring and equipment shall not be permitted.

(6) Each individual cylinder shall be securely fastened in the vertical position (valve end up) by means such as metal collars.

2-9-56 WEATHER-DECK STOWAGE. When compressed gases are stowed on the weather deck, the following precautions shall be observed.

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a. Fuel and Oxidizing Gases. Oxygen and chlorine cylinders stowed on the weather deck shall not be in close proximity to fuel gas cylinders.

b. Protection From Elements. Cylinders containing compressed gases should be stowed that they will be protected insofar as practicable. During winter, cylinder valves shall be protected.

against accumulation of snow and ice. Warm (not hot) water shall be used to thaw ice accumulations in cylinder valve caps and outlets. During summer, cylinders shall be screened from direct rays of the sun.

c. Corrosion. Every effort shall be taken to prevent corrosion of threaded connections of cylinders which have been in stowage for extended periods of time. The use of grease or flammable corrosion inhibitors on oxygen is not permitted.

d. Area. The stowage area shall be as remote as practical from ventilation supply ducts and from navigation, fire control and gun stations.

2-9-57 TOXIC HAZARDS.

a. Leaking Cylinders. Particular attention shall be given to location of cylinder stowage to prevent fumes from leaking cylinders entering ventilating air intakes leading to spaces where personnel may be affected or flammable gases cause explosions.

b. Chlorine and Ammonia. Chlorine and ammonia are toxic and will produce fatal results if breathed in large quantities. In small quantities they are irritants and cause acute distress by attacking the tissues of the lungs.

c. Inert Gases. Helium, nitrogen, carbon dioxide, and argon are nonflammable gases and may be stowed with flammable gases. Although the inert characteristics of these gases are a fire protection, they will not support life, and sufficient concentration in a closed space will cause asphyxiation. Aerosol insecticide and carboxide are also nonflammable, however, where concentrations are present these gases are toxic. Freon likewise is nonflammable but in the presence of fire or red hot metal will decompose into phosgene gas, which is toxic.

2-9-58 EMPTY CYLINDERS.

a. Pressure. Though empty cylinders, with valves securely closed and valve protection caps in place, are comparatively less hazardous than full cylinders insofar as stowage is concerned, the former shall be handled and stowed with the same precautions as used with full cylinders. This is important since it is specified elsewhere that cylinders of some gases are not to be completely exhausted but should be considered empty when the gas pressure falls to about 25 p.s.i. gage.

b. Labeling. Empty cylinders should be tagged as "Empty" and segregated from full cylinders.

c. Valves Closed. Valves should be tightly closed and valve

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protection caps securely fastened to assure the return in good condition of empty cylinders to suppliers.

d. Rotation of Cylinders. Full cylinders should be used in rotation as received from the source of supply.

e. Disposition. Empty cylinders should be delivered to the nearest naval supply depot with valves closed and under some positive pressure, except where the design of the valve does not permit closing, as is the case with fire extinguishers. This is necessary to prevent condensation of atmospheric moisture in cylinders and in the case of acetylene cylinders to prevent loss of the solvent (acetone) and/or entry of air, should the cylinders cool considerably below the temperature at which they were discharged.

f. Drying of Cylinders. Cylinders used for aviators' breathing oxygen, dry nitrogen, dry argon, dry helium, or dry air, which are found to have open valves and/or a positive internal pressure of less than 25 p.s.i. gage, should be tagged "Dry Before Refilling."

2-9-59 ACETYLENE. See Chapter 2-8 for description of hazards and safety precautions.

2-9-60 CARBON DIOXIDE.

a. Characteristics. Carbon dioxide is a dangerous asphyxiant because it is not detectable by odor or by color when present in hazardous quantities. It is heavier than air and gives little if any warning to personnel exposed to it until they are completely overcome. The inhalation of carbon dioxide will produce various effects, depending on the length of time the carbon dioxide is breathed.

b. Treatment When Exposed. The treatment of exposed personnel consists of artificial resuscitation, administering oxygen, and keeping the patient warm and quiet.

c. Entering Contaminated Compartment. Do not enter an area or compartment containing hazardous amounts of carbon dioxide without being equipped with a breathing mask and an independent supply of oxygen, or if this is not practicable and the case is urgent, enter only when equipped with lifelines and with assistants standing by outside the area or compartment.

2-9-61 CHLORINE.

a. Contamination of Atmosphere. Chlorine should be used only by experienced and properly trained personnel. Where chlorine

prevent possible injury to operators and maintenance personnel.

b. Operating Compressors.

(1) Be sure that water is flowing through the condensers when the compressor is in operation.

(2) Be sure that the brine is circulating through the coolers on which the compressor is working.

(3) Do not start the compressor until after you have assured yourself that the discharge valve is open.

(4) Watch carefully the condenser pressure when starting; this will give you warning of any improper conditions.

(5) Extreme care must always be exercised by refrigeration machine operators and mechanics to make sure that only the appropriate gas for the particular type of machine is introduced into the system.

(6) When shutting down a compressor for overhaul or servicing, line fuses must be removed to prevent accidental starting which would jeopardize personnel working on or near the compressor.

c. Proper Use of Refrigerant Cylinders.

(1) Refrigerant cylinders shall never be connected to the refrigerating system except when the system is being charged or drained.

(2) If it becomes necessary to withdraw refrigerant from a system into cylinders, great care shall be taken to avoid overcharging such cylinders. The cylinders should be weighed before and after filling and checked against allowable weights stamped on them. If they are accidentally overfilled the excess should be allowed to escape immediately into a flowing water drain.

d. Inspection of Coils. The brine coils or expansion coil supports of refrigeration systems should be inspected at every defrosting period, or at least once a year, to see that they have not become corroded to an unsafe condition. Failure of these coil or pipe supports because of corrosion can damage the refrigeration system and seriously injure personnel.

e. Identifying Pipe Lines and Valves. For shore installations, refrigeration piping should be painted in accordance with "Color Code for Compressed Gas Cylinders and Piping," MIL Standard No. 101.

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f. Refrigerator Doors.

(1) Each door, including anteroom doors, if any, on walk-in refrigerators or cold storage rooms shall be equipped with inside door handle or bump bar for releasing the door fasteners or to force the door open from within the refrigerator or cold room. Doors fitted with locks shall be so arranged that the locks can be opened from the inside. Locks independent of inside-opening arrangements shall not be permitted. Appropriate instructions regarding emergency escape procedures shall be posted on the inside of the doors. Each emergency release fitted in refrigerator compartment doors shall be furnished a ring label marked "Release" around the shaft and adjacent to the release. An instruction plate lettered: "Emergency Release. To open door, unscrew ~~release~~ handle to the left all the way out. Then pull handle out and push door open." Both labels shall be of plastic with luminescent background outlining 3/8-inch high letters. Walk-in reefer box doors fitted with push type lock release handles for releasing doors from the inside shall have a sign of plastic with luminescent background and lettering "Push Handle to Release," posted by door handle.

(2) Reach-In Refrigerators.

(a) Electric lights in reach-in refrigerators shall be adequately guarded to prevent breakage.

(b) Doors or latching devices on reach-in type refrigerators and freezers which are not in use and placed in locations accessible to children shall have the doors or latching devices removed.

2-10-7 GROUNDED WALK-IN REFRIGERATORS (ADVANCED BASE TYPE).

a. Ground Metal Sheathing. Persons engaged in the operation and maintenance of advanced base type walk-in refrigerators shall make sure that the power and lighting circuits are grounded in accordance with the following criteria before commencing any work on the unit. The lighting circuit raceway, receptacle and switch box, exposed metal part of lighting fixtures, refrigerating unit including motor frame, motor starter enclosure and motor switch box and generator neutral and/or building service neutral shall be connected to a permanent ground. All electrical lines to the refrigerator should be checked to assure that they are properly connected and that no condition exists where the conductors contact exposed metal parts of the refrigerator.

b. Principle of Grounding. Electrical equipment is grounded by being connected to the earth or to some extended conductive body which serves the same purpose. The frames of motors, electrical

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conduits, switchboards, etc., and certain parts of refrigerators are grounded as a safety measure to prevent their becoming electrically charged. Anyone touching an energized part of the grounded equipment will be saved from serious injury because the current will not be likely to flow through him to the ground and produce a shock, burn, or possible fatality.

b. Vapor Removal From Tanks. When working with solvents in deep or nearly closed tanks such as vapor degreasing tanks, vapors shall be removed in accordance with recommendations of the manufacturer for the particular equipment used.

c. Unsafe Concentration. Toxic vapors or gases shall not exceed the maximum allowable concentration (part per million) established by the American Conference of Governmental Industrial Hygienists.

NOTE: Up-to-date threshold values shall be forwarded to the fleet from time to time by the home port safety division.

2-14-12 STORAGE AND HANDLING.

a. Method. Solvents will be handled and stored with regard to their particular properties concerning overheating, combustion, proximity to dangerous materials, and improper ventilation. Good housekeeping should be especially stressed in handling and storage areas. The quantity of hazardous material procured and used by an activity or ship must be kept at a minimum consistent with operational requirements or in accordance with the allowance and current regulations.

b. Containers.

(1) Solvent containers shall be constructed of plastics when compatible with contents and be kept tightly closed when not in use. They must be stored with the bung or outlet up. When a container is found to be leaking, the contents shall be immediately transferred to another container. Activities and ships shall assure that proper labels or markings are placed on containers when hazardous materials are transferred by them to other containers from the shipping container. Highly volatile material shall be stored only in an approved flammable liquid stowage locker. Keep out of the sun and away from heat.

(2) Never use pressure to empty containers. In case of spillage, flush with plenty of water, be sure empty containers are completely drained. Keep lights, fire, and sparks away from openings. Never drop containers. Never use empty containers for another purpose.

(3) Containers used for the storage and handling of solvents and hazardous materials in small quantities shall be approved by Underwriters Laboratories for the particular type of solvent or hazardous material.

(4) All containers in which solvents and hazardous materials are stored or used shall be plainly marked and instructions thereon shall be carefully read and complied with.

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a. List of Acids. The following acids are most frequently used in the Navy:

(1) Chromic, cresylic (Cresol), hydrochloric, hydrofluoric, oxalic, phosphoric, and sulfric.

(2) Hydrocyanic, poison gas; mixed acid (sulfric and nitric), may cause nitrous gas poisoning; nitric, may cause nitrous gas poisoning; perchloric acid solution, strong oxidant, corrosive fluid; and fuming sulfric, highly concentrated.

b. Working Precautions. When working with or near acids, operators must prevent splashing, spilling, spraying, or inhalation of acid fumes or gases. In metal pickling, where open tanks are used, acid burns are a particular hazard. Personal protective equipment i.e., acid type goggles, rubber gloves and rubber aprons shall be worn while handling acids.

c. Odors. Some acids, hydrogen sulphide for example, provide a warning by odor. However, odor cannot always be relied on for warning, inasmuch as the nose becomes readily fatigued in a short period of time, thus failing to warn.

d. Reflex Respiratory Action. Many acids warn by setting up a reflex respiratory action as in the case of sulfur dioxide which is practically irrespirable. Other gases such as nitrous oxide have little warning effect and set up no respiratory reflexes.

e. Warning.

(1) Avoid contact with eyes, skin, or clothing.

(2) Do not take internally; do not breathe vapors.

(3) Store in cool protected spaces and away from direct heat. For additional information regarding storage, see BuShips Technical Manual, Chapter 9300.

(4) Do not add water to acids. In diluting acids, the acid must be added to water slowly and with constant mixing.

(5) Spillage of some acids may cause fire or liberate dangerous gases.

(6) Care should be taken to avoid mixing any organic material (such as alcohol) with chromic acid, since an explosive mixture will result.

f. Treatment. In case of contact with acids, flush the affected part with plenty of water and get medical attention.

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3 Rubber sleeves or rubber gloves shall never be rolled down or worn inside out.

4 Personnel shall wear rubber gloves when cutting a supposedly dead cable or testing supposedly burned-out transformers.

5 Rubber gloves shall be checked by the user for punctures, tears, or abrasions. Cuffs should be rolled up and air forced into the fingers and palms of the gloves. If there is any leakage or thin spots evident, the gloves should not be used.

(b) Never wear protective equipment which you believe may be defective. Such equipment is to be tagged and turned in for repair or replacement.

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c. Other Protective Equipment.

(1) Danger signs and suitable guards, adequately illuminated, shall be provided to warn all personnel wherever live parts of electrical circuits or equipment are permanently exposed when the circuit voltage exceeds 30 volts. See 2-15-14 for warning signs specified for shipboard and shore electronics installations.

(2) On all circuits where the voltage is in excess of 30 volts, and where the deck or walls are of metallic construction, the worker should be insulated from accidental ground by use of approved insulating material. The insulating material shall have the following qualities:

(a) It shall be dry, without holes, and shall not contain conducting materials.

(b) The voltage rating for which it is made shall be clearly marked on the material, and the proper material shall be used so that adequate protection from the voltage can be supplied.

(c) On voltage below 600 volts, dry wood may be used or rubber mats. Where other than approved rubber mats are used, the marking provision of paragraph (b) above shall not apply.

(d) Care shall be exercised to insure that moisture, dust, metal chips, etc. which may collect on insulating materials is removed at once. Small deposits of such materials can become very great electrical hazards.

(e) All insulating materials on machinery and in the area shall be kept free of oil, grease, carbon dust, etc., since such deposits destroy insulation.

(3) Any area in and around high-voltage equipment shall be provided with insulated deck and work bench surfaces and clearly marked with high-voltage warning signs. The same consideration will be given to equipment of 110 volts or more when there is exposure to electric shock. Use of non-conductive rubber matting in these areas shall be in accordance with military specifications Mill-M-15562C. All rubber matting shall be cemented down except on gratings and removable floor plates where oily, wet surfaces may be encountered, wood gratings covered with rubber matting shall be used.

(4) Where static electricity is generated by movement of workmen in work areas such as hospital operating rooms, anesthetic

b. Fire Fighting. In the event of a fire, the following precautions are to be carried out:

(1) Rules Applying to All Fires.

(a) Immediately deenergize the circuit or equipment affected.

(b) In a few cases the means of calling the fire department may be much closer at hand than the electric power controls. In such cases the fire department should be called first, but circuits should be deenergized before fire fighting begins.

(c) Control the fire insofar as possible with the correct type of firefighting equipment until firefighting personnel arrive. Firefighting equipment must be kept readily available at all times.

(2) Rules Applying to Specific Situations.

(a) If an electrical fire occurs at a location where standpipes are available, the standpipes should be manned only by experienced firefighting personnel who are familiar with that equipment.

(b) In case of cable fires which the inner layers of insulation, or insulation covered by armor, support combustion, the only positive method of preventing the fire from running the length of the cable is to cut the cable and separate the two ends.

(3) Extreme care shall be taken to select the proper type of equipment to combat electrical fires. The preferred extinguisher for electrical fires is the Class C extinguisher. The stream from this extinguisher is nonconductive and can be directed against energized circuits without danger of shock. Fire extinguishers ordinarily used for electrical fires are the carbon dioxide and dry chemical types.

c. Inspection before Current is Restored. If the electrical wiring or apparatus has been affected by fire a careful inspection must be made before the current is turned on in the building.

d. Explosion-proof light Fixtures, Switches, Motors, Etc. Electric lighting shall be the only means used for illumination in areas where flammable liquids vapors, fumes, dusts, or gases are present. All electric equipment and installations shall be in accordance with provisions of the National Electrical Code for Class 1 locations. Lighting fixtures of the explosion-proof type shall not be disassembled or lamps replaced until it is certain that the circuit

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is dead. Vapor globes on these fixtures shall be securely replaced and periodically inspected to make certain they are securely in place.

2-15-3 INSPECTION AND MAINTENANCE.

a. Personnel Responsible. Inspection and maintenance work on electrical equipment shall be performed only by qualified and authorized personnel.

b. Inspections. Electrical appliances and equipment including all portable electrical tools, extension lights and extension cords shall be inspected on a monthly basis and tagged at the plug with date of inspection/test entered and kept current. Test for adequacy and functioning of safety features for damaged insulation and loose connections. Appliances and equipment found to be defective shall be removed from service.

c. Overhauling Machinery. Unauthorized modifications to electrical wiring and equipment shall not be made, nor shall authorized modifications be made by other than qualified personnel.

d. Cleaning. Electrical and electronic equipment must be kept clean at all times to ensure proper performance. The following precautions are to be observed when cleaning:

(1) Safety in Use of Cleaning Equipment.

(a) Brushes, dusters, brooms, or other such articles which may be used within four feet of or on electrical equipment having exposed or current-carrying parts shall not themselves contain any exposed metal parts.

(b) If a vacuum cleaner is necessary, use only one with a nonmetallic hose and an adequate dust receiver.

(c) Use sandpaper and files only upon competent advice.

(d) Do not use solvents unless absolutely necessary. When solvents are necessary, use only the smallest possible quantity of approved solvent. (See COMSTSINST 5100.9b or subsequent revision)

(2) Use only rubber or insulating hose in airlines for blowing out equipment. Use no more than 50 pounds of pressure to avoid damage to the insulation. Be sure the air is free from water. Never turn compressed air on yourself or others, since it can cause serious injury.

2-15-4 ELECTRICAL ENCLOSURES. All electrical equipment, such as transmitting antennas in permanent outside locations and having exposed carrying parts less than 8 feet above the ground or deck shall be

shall be installed in inside spaces and areas not exposed to excessive moisture. Polarized receptacles shall be installed in passageways for cleaning and polishing equipment; in galleys, pantries, etc. for commissary equipment; in shops, machinery spaces, storerooms, resistor rooms, etc. for portable tools and portable lights; at hatch coamings for cargo cluster lights and portable tools, where carried; in passengers' and crews' laundries for washers and irons (on D.C. electric irons using third wire as a rheostat, a fourth wire shall be provided for ground) for vending machines, water coolers, computing machines, surgical apparatus.

(3) Receptacles, other than polarized type, shall not be provided for offices, public spaces, and hospital areas. In the immediate vicinity of the stateroom lavatory or mirror, and in troop compartments single ordinary two-conductor receptacles shall be permitted; otherwise all other stateroom receptacles shall be of the polarized type.

(4) Bracket fans will not be required to have three-conductor cords, but the fan brackets or bases shall be grounded to the ship's structure through fastenings bolts, or pigtails shall be fitted with screw fastenings to hull structure. Where existing bracket fans have three-conductor cords, the ground leads shall be secured at the receptacles in an approved manner.

(5) Receptacle outlets of the type providing a grounding pole shall be of a distinctive design that will not permit the dead metal parts of portable apparatus to be connected to a live conductor.

(6) Where receptacle outlets on a ship are connected to different types of potentials, receptacle outlet types shall be selected so that a portable device cannot be plugged into a receptacle outlet of an unsuitable potential.

c. Grounding Masts. Mast stays shall be grounded at the deck to prevent accumulation of static charges. In order to avoid the formation of loops by the grounded mast stays and in order to reduce the magnitude of deviation of the radio direction finder, a rigging insulator is inserted in each mast stay near the top. The foregoing does not apply to vessels fitted with high-frequency direction finding equipment. Rigging on these vessels shall be broken by insulators in such a manner that no ungrounded portion is over 15 feet in length and no grounded portion over 8 feet in length.

(1) In order to prevent charring of wood masts, spars, etc., all metal fittings on them shall be grounded by means of a copper strip at least 1 by 1/32 inch.

(2) All electrical grounds on metallic standing rigging and jacob's ladders shall be inspected periodically for excessive

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deterioration at the points of contact between dissimilar metals. The connections shall be thoroughly cleaned and new parcelling and serving applied in accordance with NAVSHIPS Tech. Manual Article 9180.1.3 as necessary.

d. Wooden Buildings. In wooden buildings, care should be exercised to run all electric wiring at least four feet from all down-leads of any lighting protective system. All steel masts, metallic gutters and down spouts, steel beams, columns, and other metallic members of appreciable mass should be grounded.

e. Discharging Machines to Ground. The charge retained by electrical equipment when it is secured is, in certain cases, sufficient to cause a severe shock. Before the terminals of an apparently dead piece of equipment are touched, the equipment should be discharged to the ground. Capacitors, reactors, lighting arresters, transformers, and similar equipment with high values of capacity or inductance are particularly dangerous and should be discharged twice at intervals of not less than 15 seconds if the highest possible level of personal safety is to be attained.

2-15-8 PORTABLE ELECTRICAL EQUIPMENT. Electrically powered portable tools such as drills, grinders, scaling hammers, and sanders, including extension lights and extension cords, etc., may become sufficiently damaged during normal use to cause electrical shock to the user. Cases are recorded in which shock has been fatal. Shipboard conditions are especially conductive to increasing the severity of a shock because the person affected is usually in contact with the ship's metal structure and because the dampness often present in the user's clothing lowers electrical resistance. All personnel who use portable electric tools are cautioned to make certain that a proper ground connection is provided. (See Article 2-15-7 for grounding precautions.) A monthly test for ground continuity shall be conducted by cognizant engine department personnel, logged, and recorded in ship's Safety Council Minutes. Equipment shall be tagged at the plug and the data of inspection/test entered and kept current.

a. Portable Cables. Portable electrical cables shall be carefully selected and maintained. Spliced portable cables are extremely dangerous and shall never be used unless an emergency warrants the great risk involved. Portable cables shall be of sufficient length that they will not be subjected to longitudinal stresses or need to be pulled taut to make connections. Current-carrying capacity shall be ample for the expected power demanded. Portable cables shall be checked frequently while in service to ascertain degree of heating. Any cable which feels more than comfortably warm to the bare hand placed outside the insulation shall be checked immediately for overloading. Interconnections between lengths of portable cable shall be made only on approved connection block or by other approved fittings which shall be suitably insulated and enclosed to eliminate all possible hazards from fire or shock to personnel.

c. Blown Fuse. A blown fuse shall be replaced by a fuse of the same ampere capacity. Insertion of metal discs, coins, etc. in back of plug fuses, or the shorting out of cartridge type fuses, is strictly prohibited.

d. Removable Fuse Links. Plug fuses of the Edison base type and removable link cartridge type fuses are prohibited aboard ship (USCG 259). *

e. Secondary of a Current Transformer. Special precautions shall be taken to insure that the secondary of a current transformer is not opened or disconnected until it has been positively determined that the primary circuit has been deenergized. This precaution shall be observed regardless of the operating voltage of the circuit in which the current transformer primary is placed.

2-15-9 WORKING ON ENERGIZED CIRCUITS.

a. When Permissible. Repairs are not to be made on energized circuits except in an emergency. The commanding officer afloat or similar competent authority ashore shall determine whether an emergency exists. A circuit must be considered energized until it has been checked and the switch opened and tagged. (See Article 2-15-6 and Paragraph c., below).

b. Personnel Involved.

(1) Repair work on an energized circuit shall be performed only by qualified personnel fully aware of the dangers involved, including those dangers encountered on the so-called lower potential circuits (below 600 volts), as well as those on higher voltages (above 600 volts). *

(2) All work shall be supervised by qualified technicians or experienced communications or electronics material officers.

(3) Men shall be stationed by circuit breakers or switches, and telephones should be manned, if necessary, so that circuits or switchboards can be immediately deenergized in case of emergency. A man qualified in first aid for electric shock shall stand by during the entire period the work is being performed.

(4) Persons performing the work shall be insulated from ground and shall avoid possibility of contact with grounded hand rails and exposed metal deck or equipment frames.

c. Checking the Circuit. When a circuit below 600 volts is to be checked, the voltmeter or voltage tester will first be tested on a circuit known to be operating in order to determine if the testing device is in good condition. When voltages of 600 volts or more are to be measured, the following precautions are to be followed:

(1) Preparing the Equipment.

(a) Deenergize the equipment to be tested.

(b) High voltage capacitors and the terminals to which the test equipment is to be connected shall be discharged at least twice, with a minimum fifteen-second interval, by the use of a suitably insulated shorting or grounding bar.

(c) Attach a temporary but secure ground to the circuit.

(d) Ascertain that the test equipment controls are set correctly for testing of the high voltages.

(e) Connect to the desired test points, the test leads capable of safely carrying the high voltages.

(f) Remove the temporary ground from the circuit.

(g) Withdraw from the equipment under test, making sure that you are free from the leads and in a proper position for taking meter readings correctly.

(2) Taking the Measurements.

(a) Do not take the measurements directly, as by means of flexible leads or probes.

(b) Assign the responsibility of energizing the equipment to an assistant standing by the switch.

(c) Do not touch the test instruments while the power is on.

(d) After taking the reading, deenergize the equipment.

(e) Before removing the test leads, discharge high voltage capacitors and the terminals to which the test equipment is connected at least twice, with a minimum fifteen second interval, by the use of a suitably insulated shorting or grounding bar.

(f) Attach temporary ground to the terminals to which the test instrument is connected.

(g) Remove the test leads.

(h) Remove the temporary ground.

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2-15-10 WET AND DRY CELL BATTERIES.

a. General Precautions. The following general safety precautions are to be observed in connection with storage batteries and dry batteries:

(1) Keep flames and sparks away from the vicinity of batteries.

(2) When using tools around batteries exercise care not to short circuit battery terminals.

(3) Never open batteries except in well-ventilated spaces and only in extreme emergencies if the room temperature is above 125°F.

(4) Keep the temperature of the battery compartment below 95° F. if possible.

(5) Post appropriate warning signs outside entrance doors and in battery rooms, "Danger-Explosive Vapors--No Smoking--No Open Lights" and "Corrosive Liquids, Wear Protective Equipment." *

(6) Personal Protective equipment (approved goggles, gloves and apron) shall be available and worn when handling electrolytes or exposed to vapors. *

b. Ventilation of Storage Batteries. The following precautions are to be observed in connection with the ventilation of storage batteries:

(1) Be sure to ventilate a battery compartment which has been sealed before turning on the lights, making or breaking electrical connections, or performing any type of work in the compartment.

(2) Make certain the ventilating apparatus of a battery compartment is operating properly before starting a charge.

(3) Stop the charge if ventilation is interrupted, except in an emergency. Do not resume the charge until the ventilation has been restored.

(4) Avoid sparks when removing or replacing batteries in compartments which may contain fumes.

(5) Use only tools with insulated handles for removing and replacing batteries.

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(6) When using batteries with one terminal grounded, disconnect the grounded terminal before removing the battery and do not reconnect it until the battery has been replaced.

c. Charging Storage Batteries. The following precautions are to be observed when batteries are to be charged:

(1) Do not make repairs to the battery connections while its circuit is energized.

(2) Turn off the charging current before batteries are connected or disconnected on the charging line.

(3) Be extremely careful to keep open flames and sparks away from batteries while they are being charged. The hydrogen given off during this operation is highly flammable and may cause flash fires and explosions.

d. Handling Battery Acid. When handling battery acid, personnel are to observe the following precautions:

(1) Never pour the water into the acid; the acid must always be poured slowly into the water.

(2) Guard the eyes and skin from splashing acid.

(3) Do not store sulfuric acid in places where freezing temperatures are possible.

(4) Keep the electrolyte at a level above the tops of the separators.

e. Using Type 19026 Dry Batteries.

(1) The 300-volt B. Section of the Navy Type 19026 pack battery is capable of giving a very serious, and even fatal, shock upon contact. Extreme care must be taken not to come into contact with the terminals of this battery or of any high voltage battery. Post "Danger-High Voltage" signs in immediate vicinity and insulate deck areas.

(2) When this type battery is to be disconnected from the operating apparatus, the current flow shall be stopped before disconnecting the plug. It is possible for sufficient hydrogen gas to accumulate in this battery to produce a serious explosion if ignited, and a spark produced by pulling the plug from the socket while the current is flowing is liable to ignite accumulated gas.

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2-15-11 SWITCHES AND CIRCUIT BREAKERS. Switches and circuit breakers perform the same function, and the precautions to be taken with them overlap in many details. The following precautions shall be taken as they are applicable to the particular circuit:

a. Installation of Switches. Switches shall be installed so as to minimize the danger of accidental operation. Where practicable, they shall be installed so that gravity cannot operate them. When this is not practicable, they shall be equipped with suitable latches to prevent accidental closing. Except where absolutely necessary, switches are not to be installed in locations where explosives and/or flammable vapors exist. When they are installed in these locations, they shall be of the special explosion-proof type. Only safety-type switches shall be permitted at machines. Lampholders with pull-chain type switches are prohibited aboard ship.

b. Operating Switches. A workman shall not operate any system switch, circuit breaker, or other disconnecting device until he is instructed to do so by proper authority and is thoroughly familiar with the equipment involved. When operation has been authorized, the following precautions shall be taken:

(1) Preliminary Precautions.

(a) When maintenance or repairs involve switching operations which may affect the serving utility's system (shipyard or contractor) the Chief Engineer must notify the system operator of the utility, so that prearranged emergency measures may be followed if utility's circuit breakers trip out.

(b) When local branch circuits which feed moving or rotating parts are to be energized, men near moving parts must be notified that the circuit is to be energized. Where the men are not visible from the control station, a safety watch shall be maintained with adequate means of communication between the station and the watch.

(2) Safety During Work.

(a) During the time the electrical foreman is switching, the men on the job shall not follow him or congregate where the switching is being performed.

(b) Switch handles should always be moved to definite positions.

(c) Before doing any switching on a regulated feeder, workmen should be sure that regulators are off the automatic position and set in the neutral position.

(3) Safety With Special Type of Switches.

(a) Outdoor disconnecting switches shall not be operated without the disconnect pole provided for that purpose.

(b) Each time an air-break switch is opened, a check shall be made to make certain that all contacts are actually open and safe clearance is obtained on all three phases. The position of the operating handle is not to be depended upon as evidence that the switch is open.

c. Safety With Circuit Breakers.

(1) Before any work is done on a circuit breaker the following precautions shall be taken:

(a) All control circuits to which it is connected shall be deenergized.

(b) Draw-out circuit breakers shall be switches to the open position and removed before any work is done on them.

(c) Disconnecting switches ahead of circuit breakers shall not be opened until after circuit breaker is tripped to open position. No work shall be done on the opened circuit breaker until all isolating switches protecting it also have been opened.

(d) Where disconnecting switches are not provided to isolate circuit breakers, the supply bus to the circuit breaker shall be deenergized on all circuits where the voltage is in excess of 150 volts. On circuits where the voltage is below 150 volts, work may be done under emergency conditions with the circuit breaker energized by strict adherence to the provisions of regulations for working on energized circuits contained in Article 2-15-9 herein.

(e) Before working on an oil circuit breaker, workmen must be sure that the breaker cannot be opened or closed automatically. When possible, it should be in the open position or have the operating mechanism blocked.

(2) When operating circuit breakers follow these precautions:

(a) Use only one hand.

(b) Keep the hands clear of parts other than operating handles.

(c) Touch only one breaker handle at a time.

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2-15-14 SAFETY GUARDS AND WARNING SIGNS.

a. Explosive Vapors. Warning signs shall be displayed wherever explosive vapors are present. No electronic equipment or auxiliary control unit shall be energized within the area while these signs are up.

b. Rotating Antennas. Where personnel are sent aloft in the area of rotating antennas, switches actuating antenna movement shall be disabled and warning tags attached.

c. Whip Antennas. Transmitting or combination transmitting/receiving whip antennas shall be identified by painting the base "red" and conspicuously posting or stenciling "Danger - High Voltage". All receiving whip antennas shall be identified by painting their bases "blue".

d. Open Circuits. Warning tags requiring open-circuit condition shall be placed on all necessary power supply switches to prevent accidental application of power to units of an electronic system that are under repair or overhaul.

e. Radio Frequency. R. F. hazard signs shall be displayed in areas where the power of radio frequency radiation is sufficient to introduce a hazard to equipment or operating personnel. (See 2-15-16)

f. Permanent Signs. Danger or warning signs shall be permanently posted in conspicuous places and adjustable guards shall be installed in appropriate areas to prevent personnel from making accidental contact with antennas, antenna leads, power supply leads or terminals, fuses, or any uncovered contacts that have sufficient voltage and current characteristics to constitute a hazard to personnel.

g. Electrical Heating Lamps. Lamps shall be equipped with guards (periphery) (other than face) to minimize accidental contact with lamps.

2-15-15 ELECTRONICS - GENERAL.

a. Precautions With Radio Frequency Circuits. Detailed safety in the operation of electrical circuits is prescribed in Articles 2-15-9 thru 2-15-12. Due to the general use of radio throughout the Navy, however, the following precautions are emphasized:

(1) Energized high voltage circuits shall not be broken except when absolutely necessary and then only when authorized by a qualified officer or other responsible official.

(2) When other transmitting equipment is in use at the same installation or close by, workers shall take precautions to prevent shock, burns, or other injury due to energy picked up from adjacent antennas or equipment. Circuits shall be grounded to protect against such shock or

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burns. If the location of the protecting ground is not in the immediate areas of the working party, suitable warning tags shall be employed to prevent unauthorized removal of the protective ground.

(3) Contact with the insulation on wires carrying R.F. current shall be avoided. This insulation can act as the dielectric of a condenser when contacted, thus causing shock or burn injuries to personnel.

b. Preventing Shock From Capacitors and Pulse Forming Networks. Extreme caution shall be taken prior to working on or near deenergized circuits which employ large capacitors or pulse forming networks. A suitable grounding or shorting bar shall be used to short circuit all terminals and contacts to ground. This precaution shall be taken regardless of the length of time the equipment has been deenergized. Some pulse forming networks are capable of retaining their charge several hours after the equipment is secured and all power disconnected.

c. Hazards of Ungrounded Units. The chassis and frames of all power supplies and high voltage units removed for servicing shall be grounded prior to applying power to the unit. Personnel must remember that the removal of a unit or part from the normal location with an assembly and the energizing of the unit or part, while it is outside of the normal enclosure, removes the protection given by built-in protective features such as interlocks, grounds, and enclosures. Since these safety features then no longer exist, special precautions and safety measures must be taken.

d. Interlocks and Safety Devices. Safety devices on electronic equipment such as interlocks, overload relays, and fuses, shall not be altered, disconnected, or modified without specific authority.

e. Servicing and Adjusting. No person shall reach within or enter energized electronic equipment enclosures for the purpose of servicing or adjusting except when prescribed by official applicable instruction books and then not without the immediate presence and assistance of another person capable of rendering aid in an emergency. Caution shall be exercised when reaching into the enclosure of equipment having high voltage points. The metal shields or shells of some capacitors, klystrons, cathoderay tubes, and other components are at high potential above ground. Maintenance personnel shall be cautioned prior to servicing equipment which contains such components.

f. Precautions During Overhaul and Repair. Although local safety officials of a shipyard or repair facility will normally notify the Commanding Officer when electronic safety measures are required, ship's transmitting equipment shall be secured when:

(1) overhead cranes are operating in the close proximity of the transmitting antennas;

(2) personnel are removing rigging or structures aloft;

is considered to be the threshold of potentially dangerous R. F. radiation. Power densities approaching or exceeding the above figure are at present found primarily in the highly concentrated narrow beams of the high gain type antennas used for radars. A definite hazard exists from such radar beams, especially since the advent of fire control and missile guidance radars which can be depressed to low angles and are mounted at low levels on shipboard, thus making it probable that the main beam may be directed at personnel on the various decks. Other possible sources of high power density fields that could be hazardous are waveguide openings and feed horns during servicing or repair operations. The following precautions should be taken to insure that personnel are not exposed to power densities exceeding the 10 mw/cm^2 safe working level:

- (a) Ships operating radiating equipment shall post a radiating procedure plan in designated public spaces to indoctrinate personnel in the precautionary measures employed and procedures followed during radiating * operations that are considered hazardous to personnel.
- (b) Visual inspection of feed horns, open ends of waveguides and any opening emitting high energy R. F. electromagnetic energy will not be made unless the equipment is definitely secured for the purpose of such an inspection.
- (c) Personnel engaged in servicing radar equipment who are required to remain in the vicinity of the primary beam should wear wire mesh goggles or other approved types.
- (d) Aircraft employing high power radars shall be parked, or the antenna rotated, so that the beam is directed away from personnel working areas.
- (e) All personnel shall observe R. F. hazards warning signs which point out the existence of R. F. radiation hazards in a specific location or area.

2-15-17 X-RAY RADIATION HAZARDS FROM HIGH VOLTAGE ELECTRONIC EQUIPMENT.

a. General. When high velocity electron beams strike metal or other materials, x-rays are produced. The operation of some electronic devices depends on the acceleration of electrons, and when the accelerating voltage approaches or exceeds 15,000 volts the production of x-rays may become a hazard to personnel. Examples of such electronic devices are magnetrons, klystrons, thyratrons, cathode ray tubes and high voltage rectifier tubes. Currently, radars are about the only electronic equipment that use sufficient voltage on these devices to constitute a hazard. The x-rays produced by accelerating

potentials on the order of 15,000 volts are not hazardous beyond a foot or so from the source and do not require elaborate shielding to make the device safe for nearby personnel. However, as the accelerating potentials become greater than 15,000 volts, the x-rays produced have much greater energy and the difficulty of providing adequate shielding increases appreciably.

b. Servicing Electronic Devices That Produce X-ray Hazards.

When performing preventive or corrective maintenance on electronic devices that produce hazardous x-ray radiation as an undesirable by-product, the following precautions should be observed by maintenance personnel:

(1) Observe all warning signs on the equipment and all written safety precautions in the instruction manuals for the equipment that deal with x-ray hazards.

(2) Do not jumper interlocks that permit the servicing of operating equipment with the protective x-ray shielding removed, unless such procedures are called for in the instruction manuals.

(3) Be sure to replace all protective x-ray shielding when servicing is complete, so that operating personnel or others will not unknowingly be subjected to harmful x-ray radiation.

(4) When bench testing x-ray producing electronic devices be sure that adequate x-ray shielding is provided to protect all personnel in the testing area.

(5) Determine the latest safety precautions to be observed by maintenance personnel, including the use of the latest approved dosimeters, by consulting the ship's safety officer on shipboard or the industrial hygienist at shore installations.

2-15-18 WORKING ON ANTENNAS.

a. Cautions to Personnel. Division officers shall caution all men in their division not to venture or work close to an exposed radio or radio antenna unless it is first determined from the proper authority that the antenna is not and will not be energized. (See also article 2-15-16.)

b. Working Aloft. Before any work may be done on antennas aloft, authorization must be obtained from the Commanding Officer. While antennas are energized by transmitters, men shall not be permitted to go aloft except by means of ladders and platforms rendered safe by grounded hand rails or similar structures (and men shall be cautioned about smoke stack gases). Before sending men aloft, except as noted above, the Commanding Officer shall direct the communication

f. Switches. The covers of switches, circuit breakers, etc., shall be kept securely closed while powder is exposed in the vicinity.

g. Magazines.

(1) Magazines shall be kept scrupulously clean and dry at all times. Nothing shall be stored in magazines except explosives, containers, and authorized magazine equipment. Particular attention shall be paid that no oily rags, waste, or other foreign materials susceptible to spontaneous ignition are stored in them.

(2) Naked lights, matches, or other flame-producing apparatus shall never be taken into magazines or other spaces used as magazines.

(3) Before performing any work which may cause either an abnormally high temperature or an intense local heat in a magazine or other compartment used primarily as a magazine, all explosives shall be removed to safe storage until normal conditions have been restored.

2-18-3 MISCELLANEOUS ORDNANCE SAFETY PRECAUTIONS.

a. Small Arms. Safety precautions in (Army) FM23-5, FM23-35, and TM9-2117 safety regulations for firing rifles, revolvers, and shotguns shall apply to MSTS personnel firing or handling small arms.

b. Responsibility for Custody and Security of Small Arms. Masters of MSTS civil-service manned ships (USNS) are responsible for small arms aboard ship and should exercise such responsibility and care as per COMSTSINST 3120.2C and current local directives.

2-18-4 EXPLOSIVE SAFETY PROCEDURES FOR SHIPBOARD RESEARCH PROJECTS.

a. Applicability. The following instructions shall govern the handling, stowage, assembly, and firing aboard ship of explosives used in research projects. These explosives shall include, but are not limited to, in-service underwater sound signals, special underwater sound signals, demolition block type explosives, and all other type explosives used in conjunction with research projects.

b. Objective. The objective of this section is to establish explosive safety procedures that will reduce the safety hazards to a minimum and acquaint personnel with the hazards of explosives and materials used in research projects and to provide a uniform handling and firing method that shall be followed by all personnel involved.

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c. Master's Responsibility. In accordance with U.S. Navy Regulations, Article 0771, the Master is responsible for the safety of the ship and all persons on board and has the authority and responsibility to suspend any operation aboard his ship which he feels may endanger the lives of the personnel aboard.

d. Emergency Procedures. Personnel aboard ship involved in any way with the firing of explosives shall read and be familiar with the material in this section prior to participation. Practice firing runs shall be performed until the explosive shooter in charge is satisfied that the firing operations are satisfactory and safe. Emergency procedures shall be developed and practiced as applied to the specific ship assigned so that the firing team will know what action each shall take in the event of an emergency. The emergency procedures shall be reviewed by the Master of the ship with the chief scientist and a mutually agree method of operation adopted. The availability and location of medical assistance shall be clearly defined.

2-18-5 GENERAL PRECAUTIONS.

a. Handling All Explosives. All explosive materials must be handled with extreme care and protected against shock, friction, fire and extremes of heat, cold, moisture and direct sun rays.

(1) Compliance with NAVORD OP-3696, "Explosives Safety Precautions For Research Vessels," is required.

(2) Compliance with OP 4, Ammunition Afloat, is required and the additional specific precautions contained herein as applicable to research projects.

(3) Compliance with Code of Federal Regulations, Title 46, Part 146, governing the transportation or storage of explosives or other dangerous articles or substances, and combustible liquids on board vessels is required.

(4) The location, positioning, stowage and movement of explosives prior to and during firing shall be such as to prevent premature or accidental detonation of explosives. Explosives shall be placed so that they will not be ignited by the fire burst or detonated spontaneously from the accidental detonation of the charge at the firing location.

(5) All on-deck explosives shall be in closed ammunition or shipping containers or inside a steel deck structure with the door closed except for explosives placed on deck for immediate firing.

CAUTION: THE ARMING SAFETY PIN SHALL NOT BE REMOVED UNTIL THE SIGNAL IS BEING LAUNCHED.