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An American National Standard

Standard Guide for Basic Elements of Shipboard Occupational Health and Safety Program[1]

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1. Scope

1.1 This guide covers the basic elements of a Shipboard Occupational Health and Safety Program (SOHSP). These elements are applicable to all vessel types including but not limited to tank vessels, dry bulk carriers, passenger vessels, roll-on roll-off vessels, ore bulk oilers, offshore supply vessels, tugboats, towboats, and barges. The elements described are fundamental pieces of a systematic occupational safety and health program and may be used by company line managers, health and safety personnel or consultants who are implementing, improving, or auditing the effectiveness of a shipboard health and safety program.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ANSI Standards:*[2]

ANSI Z4.1-1986 Minimum Requirements for Sanitation in Places of Employment

ANSI Z41-1991 Personal Protection – Protective Footwear

ANSI Z87.1-1989 Practice for Occupational and Educational Eye and Face Protection

ANSI Z88.2-1992 Respiratory Protection

ANSI Z89.1-1986 Protective Headwear for Industrial Workers

ANSI Z244.1-1982 (R1993) Safety Requirements for the Lock Out/Tag Out of Energy Sources

ANSI/ASA S3.18-1979 (R1993): Guide for the Evaluation of Human Exposure to Whole Body Vibration

ANSI/ASA S3.44-1996 Determination of Occupational Noise Exposure and Estimation of Noise-Induced Hearing Impairment

ANSI/AWS Z49.1-1994 Safety in Welding, Cutting and Allied Processes

2.2 *Other Documents:*

NFPA 306-1997 Control of Gas Hazards on Vessels[3]

NFPA 1991-2000: Vapor Protective Suits for Hazardous Chemical Emergencies[3]

NFPA 1992-2000: Liquid Splash Protective Suits for Hazardous Chemical Emergencies[3]

IMO A.468(XII) Code on Noise Levels Onboard Ships[4]

IMO A.849 (20) Code for Investigation of Marine Casualties and Incidents[4]

IMO A.864 (20) Recommendations for Entering Enclosed Spaces Aboard Ships[4]

46 CFR 16.210 Pre-employment Testing Requirements[5]

U.S. Coast Guard Navigation and Vessel Inspection Circular 2–98 Physical Evaluation Guidelines for Merchant Mariner's Documents and Licenses[5]

3. Significance and Use

3.1 This guide does not set specific performance or technical criteria, but recommends that companies set policies and objectives and develop procedures for managing their health and safety program. Companies should consider their unique organization, culture, and hazards on their vessels and the possible effects of their operations. The elements are intentionally flexible and may be tailored to address any size of operation or any vessel type. Note that although the standard is aimed at the shipboard occupational health and safety program, some of the elements address activities and commitments that must be completed or made by shore side personnel (for example, executive management commitment and provision of adequate resources). Key to the effectiveness of the program is the implementation of each element within an interconnected system.

[1] This guide is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.07 on General Requirements.

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[2] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

[3] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, http://www.nfpa.org.

[4] Available from International Maritime Organization, 4 Albert Embankment, London SE1 75R, United Kingdom.

[5] Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, http://www.access.gpo.gov.

4. Basic Elements

4.1 *Executive Management Commitment and Leadership*—Executive management commitment and leadership is a precondition for an effective SOHSP. Executive management commitment and leadership includes, but is not limited to integrating health and safety into the management structure and fabric of the company, developing a health and safety policy, developing health and safety objectives, providing resources to achieve the objectives, defining stewardship responsibilities and providing authority to carry out those responsibilities, and establishing accountability for safety and health as a part of job performance reviews. Further guidance is provided in Annex A1.

4.2 *Employee Participation*—Employees from all levels including crewmembers, officers, masters, persons in charge, and shoreside personnel should be directly involved with the SOHSP. Shipboard and shoreside employees should be involved in developing, implementing, evaluating, and modifying the SOHSP. Employees should also participate in setting health and safety objectives and performance criteria. This involvement might be through employee membership on safety committees that provide input to management for the development of safety and health policy, debate and set health and safety goals, measure and evaluate performance, and recommend modifications to the program based on their evaluation. Shoreside and shipboard employees should work together to achieve safety and health goals. For example, shoreside personnel should participate on vessel safety committees since their decisions affect vessel operations and ultimately the health and safety of vessel personnel. In large companies, individual vessel safety committees might submit recommendations to an overarching safety committee that evaluates the recommendations and sets policy to apply appropriate recommendations to the entire fleet. Further guidance is provided in Annex A2.

4.3 *Hazard Anticipation, Identification, Evaluation and Control*—The core function of any health and safety program is prevention. Health and safety hazards including fire, reactivity, and chemical and physical hazards, need to be anticipated and prevented from occurring. Hazards and unsafe operating procedures need to be identified and addressed so they will not endanger employees or the public and will not damage the vessel, cargo, or third party property. Potential hazards should be systematically anticipated, identified, evaluated, and controlled. Tools such as job hazard analysis, industrial hygiene exposure assessments, and risk assessment/management methodologies enable the evaluation and control of hazards. Further guidance is provided in Annex A3.

4.4 *Training*—Employees should receive training appropriate for their duties and responsibilities so that they may work safely and not endanger their shipmates or the public. In addition, employees who have specific health and safety responsibilities (generally supervisors with responsibility for the safety of others, but also nonsupervisors who are assigned to safety committees or as crew member representatives) should receive training to enable them to carry out their health and safety program responsibilities. Further guidance is provided in Annex A4.

4.5 *Record Keeping*—Company records sufficient to demonstrate the effectiveness of the health and safety program should be maintained. Data that enables trend or pattern analysis for root causes is particularly desirable. For example, results of audits that evaluate effectiveness of the safety and health management system should be maintained. Records that indicate industrial hygiene exposure assessments have been conducted and appropriate controls have been implemented should be maintained. Current job safety analyses and corresponding standard operating procedures with safe work practices should be documented. Injury and illness data should be maintained to enable the identification of trends and patterns that associate the injury or illness with a common cause, which can be addressed. Training topics, lesson outlines, and attendees should be documented. Where appropriate, such records should permit evaluation of the program on individual vessels as well as across an entire fleet. Further guidance is provided in Annex A5.

4.6 *Contract or Third Party Personnel*—When contract or third party personnel are on board to perform work, vessel personnel should provide information regarding potential hazards on the vessel that may affect the contract or third party personnel. Potential hazards related to the work conducted by contract or third party personnel should be provided to the vessel owner/operator and/or the master/person in charge. Each employer should provide appropriate information regarding vessel and work hazards to their own employees. For example, exchange of information on chemical hazards might be accomplished by exchanging appropriate material safety data sheets (MSDS), then each employer can inform their own employees of the hazards identified in the MSDS. Further guidance is provided in Annex A6.

4.7 *Fatality, Injury, Illness, and Incident Investigation*—Personnel injuries, occupational illnesses, and “near miss” incidents should be promptly investigated. The current incident and other similar occurrences should be analyzed to identify the primary (root) cause and any contributing factors. The investigation report, setting forth primary cause, contributing factors, and corrective measures should be presented to management. Followup action that specifically addresses the report’s recommendations for corrective action should be undertaken and documented. Further guidance is provided in Annex A7.

4.8 *Systematic Program Evaluation and Continuous Improvement*—Maintaining an effective health and safety program is an ongoing process. The SOHSP should have systems for detecting, reporting, and correcting nonconformities to the program. Some type of “formalized” evaluation should also be conducted on a periodic basis consistent with other aspects of the vessel’s management plan. The evaluation should determine whether the SOHSP is appropriate for the vessel and its operations, that actual practices are consistent with the programs and procedures in the SOHSP, and that the SOHSP is effective. Comparison of data and records (refer to Annex A5,

Record Keeping) to performance objectives and criteria (refer to Annex A1, Section A1.3, health and safety objectives) can provide important indicators of the effectiveness of the SOHSP. Further guidance is provided in Annex A8.

5. Keywords

5.1 health; safety

ANNEXES

(Mandatory Information)

A1. MANAGEMENT COMMITMENT AND LEADERSHIP

A1.1 Health and safety programs are most effective when they are integrated into the management structure of a company, rather than treated as an "add on" program. Examples of integrated health and safety efforts include:

A1.1.1 Developing Standard Operating Procedures (SOPs), written to the education level of the person who must follow the SOP, that integrate safe work practices and basic operational functions,

A1.1.2 Making design review by qualified health and safety personnel an element of the acquisition procedures, and

A1.1.3 Making consultation with qualified health and safety personnel a part of the process when making changes to operations.

A1.2 Executive management sets the tone for the entire SOHSP through their policy regarding health and safety. Examples of values that can be stated and commitments that can be made in company policy include:

A1.2.1 A statement that the company will make every effort to provide a safe and healthy workplace and that working safely is a condition of employment,

A1.2.2 Statements that convey how important each crew member is to the vessel as a fellow worker and as a company resource:

A1.2.2.1 "The basic safety policy of this company is that no task is so important that an employee must violate a safety rule or put himself or herself at risk of injury or illness in order to get it done.",

A1.2.3 A written commitment to provide resources necessary to implement the health and safety program could also be included in the policy statement, and

A1.2.4 Management can demonstrate commitment to the safety and health policies through word and action. For example, managers visiting vessels should follow safety rules and standard operating procedures, including use of hearing protection, safety glasses, safety shoes, protective clothing, and so forth.

A1.3 Setting and attaining health and safety objectives demonstrates a company's commitment to improvement of health and safety performance. Objectives provide a target against which those who are responsible for health and safety may measure their progress. Quantifiable objectives are desirable since often, "What gets measured gets done." (Refer to Annex A8, Systematic Program Evaluation, for examples of performance measures and an overall program audit.) Health and safety objectives may include:

A1.3.1 Eliminate lost time incidents,

A1.3.2 Report "near miss" incidents or problems, evaluate, and if appropriate, implement changes to prevent a more serious incident or accident in the future,

A1.3.3 Develop and implement a program of evaluations through drills and other means (for example, simulators) to ensure that personnel are competent to carry out their duties,

A1.3.4 Improve the health and safety program by reviewing, considering, and implementing appropriate published industry practices and consensus standards rather than relying on the imposition of new regulatory standards. Examples of consensus standards to consider include, but are not limited to: ANSI Z41-1991, ANSI Z87.1-1989, ANSI Z88.2-1992, ANSI Z89.1-1986, ANSI Z244.1–1982 (R1993), ANSI/ASA S3.18-1979 (R1993), ANSI/ASA S3.44-1996, ANSI/AWS Z49.1-1994, ANSI Z4.1-1986, NFPA 1991-2000, NFPA 1992-2000, NFPA 306-1997, IMO A.864 (20), and IMO A.468(XII).

A1.3.5 Complete periodic comprehensive (or area-specific) hazard review,

A1.3.6 Reduce exposure levels to airborne vapors to acceptable levels through appropriate controls,

A1.3.7 Complete annual respiratory fit testing on schedule,

A1.3.8 Develop and implement acute toxic exposure procedures addressing first aid procedures, obtaining additional emergency medical assistance, and appropriate medical surveillance tests (for example, S-phenylmercapturic acid in urine following a potential benzene overexposure), and

A1.3.9 Develop and implement an occupational health medical surveillance plan.

NOTE A1.1—The intent of this medical surveillance plan is to ensure employees are not overexposed to hazards on the job including chemicals, radiation, noise, and so forth. This section is not intended to address requirements of the Americans with Disabilities Act or issues covered by physical standards related to watch keeping published elsewhere.

A1.4 Company management holds the authority to dedicate necessary resources to achieve health and safety objectives. Necessary resources may include:

A1.4.1 Access to health and safety information,

A1.4.2 Training, including classroom and on-the-job training, that cover topics identified by the company's risk assessment process as well as those required by international or national standards. These topics would include but not be limited to existing chemical and mechanical hazards,

A1.4.3 Qualified health and safety professionals, either on the company staff or hired as consultants,

A1.4.4 Capital investments in engineering controls, and

A1.4.5 Personal protective equipment.

A1.5 Defining stewardship responsibilities and providing authority to carry out those responsibilities is an essential component of management commitment. For example:

A1.5.1 *Company Management Should:*

A1.5.1.1 Designate a shoreside person who has access to the executive management of the company and is responsible to ensure essential health and safety issues are clearly communicated to executive management of the company and decisions regarding those issues are clearly communicated back to the vessel.

A1.5.1.2 Ensure adequate resources of time, funds for health and safety equipment, training and expertise are available to effectively implement the program throughout the company.

A1.5.1.3 Ensure that a safety committee or other mechanism to involve crewmembers in health and safety issues is created on each vessel adequately.

A1.5.1.4 Ensure that the elements of the shipboard health and safety program are integrated and systematically implemented throughout the company and on each vessel.

A1.5.1.5 Ensure that objectives are developed and performance measures are reported from each vessel.

A1.5.1.6 Ensure that all appropriate programs are developed and implemented including, but not limited to respiratory protection, hearing protection, confined space entry, and lock out-tag out.

A1.5.1.7 Set a good example for employees by following established safety rules on vessels and by staying current on training commensurate with duties.

A1.5.1.8 Report unsafe practices or conditions observed while on a vessel to the supervisor of the area.

A1.5.2 *Master/Person-In-Charge/Operator Should:*

A1.5.2.1 Ensure each crewmember receives an initial vessel orientation, covering company safety policy, emergency procedures, access and egress, fire fighting, job hazards, and information on hazardous materials before beginning work. Document the completion of this orientation.

A1.5.2.2 Ensure each crewmember is competent to perform a task or job by requiring a prejob explanation and/or walk through of all procedures including safe work practices before starting work on that project or equipment. Require prejob refresher training if the employee cannot demonstrate this competence.

A1.5.2.3 Ensure each crewmember has been issued and received training on the use of required personal protective equipment (PPE) before starting work on a project requiring PPE.

A1.5.2.4 Complete periodic walk-around health and safety checks of the vessel (accompanied by appropriate personnel including those who have responsibilities or work in certain areas, for example, chief engineer and an oiler in engine spaces and first mate and able-bodied seaman on deck).

A1.5.2.5 Periodically observe work performance of employees for compliance with safety rules contained or documented in the SOHSP.

A1.5.2.6 Set a good example for subordinates by following established safety rules and attending training as appropriate.

A1.5.2.7 Complete a preliminary investigation of all accidents and report findings to company management.

A1.5.2.8 Provide information to company management suggesting changes to company-wide standard operating procedures or equipment that will improve employee safety.

A1.5.3 *Officers/Other Management Personnel Should:*

A1.5.3.1 Act as the master's or person-in-charge's representative and implement examples listed for the master in areas over which they exercise supervision (for example, first mate responsible for "deck" personnel and Chief Engineer responsible for "engineers").

A1.6 Management should establish accountability for health and safety as part of job performance reviews. Performance reporting regarding health is as important and should be as routine within the company as reports regarding timeliness of delivery, cargo loss or contamination, or citations regarding violations of regulations.

A2. EMPLOYEE PARTICIPATION

A2.1 Full participation in developing, implementing, evaluating, and continually improving the SOHSP helps those on board the vessel see the SOHSP as something that is the result of a value they share with vessel owners/operators. Personnel directly involved with the work are often the best source of information on health or safety hazards and often can suggest effective methods for abating those hazards. Shoreside personnel need to be directly and heavily involved with the SOHSP because they are integral in setting the rules and schedules for vessel operation. Shoreside personnel also represent the vessel to management and are the link to the resources and authority necessary for the success of the SOHSP. Specific ways that crewmembers, officers, and shoreside personnel can contribute to the SOHSP include:

A2.1.1 Participating in periodic vessel inspections,

A2.1.2 Evaluating safety and health program materials,

A2.1.3 Developing standard operating procedures that incorporate safe working practices,

A2.1.4 Conducting job safety/hazard analyses (JSAs/JHAs),

A2.1.5 Reviewing and analyzing injury and illness data,

A2.1.6 Participating in risk assessment and risk management activities,

A2.1.7 Participating in accident/incident/problem investigations,

A2.1.8 Developing solutions to health and safety complaints and disputes,

A2.1.9 Evaluating safety and health training activities, and

A2.1.10 Evaluating the safety and health management system.

A2.1.11 Line or operations personnel including crewmembers, officers, and shoreside personnel outside the health and safety staff may need training in health and safety techniques such as job safety/hazard analysis, reviewing injury and illness data for trends, risk assessment, and investigations. This initial training investment enables those who do the work to meaningfully participate in identifying and solving health and safety problems. Those crewmembers, officers, and shoreside personnel who receive additional training in health and safety and actively participate in the development of the vessel or company SOHSP, or both, also become health and safety "champions" among their peers. Additional information on training is provided in Annex A4.

A2.2 Since health and safety objectives and performance may directly affect crewmembers' and officers' current and/or future health and safety, they should be involved in setting those objectives and performance criteria. This participation may be accomplished through health and safety committee involvement, labor negotiations, or other mechanism suitable to the specific company. Refer to Annex A1, Section A1.3 for examples of health and safety objectives and performance criteria.

A2.3 Employees should:

A2.3.1 Fully understand (including underlying principles) and follow established standard operating procedures and safety rules.

A2.3.2 Report unsafe conditions or actions to supervisor as soon as they become aware of them.

A2.3.3 Report all injuries to supervisor promptly.

A2.3.4 Report all accidents, near misses, or problems to supervisor promptly.

A2.3.5 Use personal protective equipment (PPE) in good working condition where it is required.

A2.3.6 Do not remove or defeat any safety device or safeguard.

A2.3.7 Encourage shipmates by words and behavior to follow standard operating procedures and use safe work practices on the job.

A2.3.8 Make suggestions to supervisor or safety committee representative about changes to operating procedures, work practices, or equipment that will improve safety.

A3. HAZARD ANTICIPATION, IDENTIFICATION, EVALUATION AND CONTROL

A3.1 Potential hazards on the vessel and created by the vessel should be systematically anticipated, identified, evaluated, and controlled. Hazards that should be discovered, evaluated, and controlled by the SOHSP include hazards addressed by international conventions and national regulations and other hazards that are causing or likely to cause illness, death, or serious physical harm to workers or the public. Types of hazards to consider may include:

A3.1.1 Hazardous atmospheres caused by oxygen deficiency, flammable or toxic gases or vapors, and biological agents,

A3.1.2 Chemical hazards and the proper handling of vessel generated hazardous wastes,

A3.1.3 Physical hazards including noise, vibration, radiation, electricity, uncontrolled mechanical energy, and shifting cargoes that may engulf a crewmember,

A3.1.4 Ergonomic factors including fatigue, workstation design, and poor team practices,

A3.1.5 Collisions, groundings, or rammings and their resultant impacts, and

A3.1.6 Drowning.

A3.2 Methods of anticipation include:

A3.2.1 Systematic requirements for vessel and equipment design and modification review by qualified health and safety personnel,

A3.2.2 Periodic management review of the vessel and its operation, its equipment, and its fitness for purpose,

A3.2.3 A procurement system that automatically requires consideration of health and safety aspects of items ordered,

A3.2.4 Consideration of fitness for current conditions, and

A3.2.5 Systematic review of vessel and shoreside team practices.

A3.3 Methods of identifying hazards include:

A3.3.1 Vessel inspections,

A3.3.2 Industrial hygiene exposure assessments of chemical and biological hazards including inhalation and dermal exposure routes and physical hazards such as vibration and ergonomic hazards,

A3.3.3 Job safety analyses including risk assessment, both statistical and expert opinion based,

A3.3.4 Employee hazardous condition notification system including easy-to-understand labeling system for all possible mechanical and chemical hazards,

A3.3.5 Review of available safety and health data to identify trends,

A3.3.6 Readers interested in physical standards may refer to U.S. Coast Guard Navigation and Vessel Inspection Circular 2-98, Physical Evaluation Guidelines for Merchant Mariner's Documents and Licenses, and

A3.3.7 Readers interested in preemployment drug tests may refer to 46 CFR 16.210.

A3.4 Methods of hazard evaluation include:

A3.4.1 Comparison of industrial hygiene exposure levels to standards identified in the SOHSP (for example, standards required by regulation or prudent levels adopted by the company in the absence of regulatory requirements).

A3.4.2 Risk analysis tools, including:

A3.4.2.1 Hazard effects and control analysis,

A3.4.2.2 Hazard control analysis,

A3.4.2.3 Fault tree analysis of possibilities based on expert opinion,

A3.4.2.4 Management oversight and risk analysis, and

A3.4.2.5 Task hazard analysis.

A3.5 Methods of hazard control are hierarchical. In order of preference, they include:

A3.5.1 Inherent safe design and verification of design output to design requirements.

A3.5.2 Material substitution such as:

A3.5.2.1 Nonhazardous insulation for asbestos lagging,

A3.5.2.2 Citrus-based cleaning agents for solvent-based cleaning agents, and

A3.5.2.3 Nontoxic paint for toxic paint.

A3.5.3 Engineering controls such as:

A3.5.3.1 Closed gauging,

A3.5.3.2 Vapor recovery systems, and

A3.5.3.3 Climate-controlled spaces such as control booths in engine rooms.

A3.5.4 Administrative controls such as:

A3.5.4.1 Systematic review for fitness of vessel for operations,

A3.5.4.2 Standard operating procedures that incorporate safe work practices. Some activities that might require standard operating procedures with integrated safe work practices include:

A3.5.4.3 Machinery startup and shutdown operations,

A3.5.4.4 Emergency response to machinery failures,

A3.5.4.5 Getting underway and entering port operations,

A3.5.4.6 Cargo loading and unloading operations,

A3.5.4.7 Response to unplanned or emergency situations during cargo operations,

A3.5.4.8 Man overboard procedures,

A3.5.4.9 Lifeboat-launching procedures,

A3.5.4.10 Watchkeeping procedures,

A3.5.4.11 Teamworking procedures such as bridge resource management taught in simulators with practice by actual team members,

A3.5.4.12 Prejob planning and briefings,

A3.5.4.13 Job hazard/safety analyses (JHAs/JSAs),

A3.5.4.14 Emergency procedures,

A3.5.4.15 Systematic inspection of incoming equipment and equipment in use to ensure conformation to specifications identified in the SOHSP (for example, personal protective equipment),

A3.5.4.16 An easy-to-understand labeling system for all possible mechanical and chemical hazards, and

A3.5.4.17 Occupational medical surveillance programs tailored to vessel and cargo hazards.

A3.5.5 Specific programs that need special attention within the overall SOHSP:

A3.5.5.1 Respiratory protection program,

A3.5.5.2 Hearing loss prevention program,

A3.5.5.3 Safe lifting procedures,

A3.5.5.4 Permit-to-work programs for operations such as lock out and tag out, tank or hold cleaning operations, confined space entry, hot work operations, including a gas-freeing program, working aloft, and

A3.5.5.5 Health and safety equipment control, calibration, and maintenance procedures.

A3.5.6 Security procedures to control entry and exit of personnel to and from the vessel

A3.5.7 Basic safety rules such as:

Do not do things which are unsafe to get the job done. If a necessary activity is unsafe, report it to the supervisor so it can be evaluated and alternate methods developed.

Mechanical guards must be kept in place at all times when machinery is being operated. Do not remove or disable any safety device!

No person may operate a piece of equipment unless they have been trained and are authorized. Notify supervisor that training is needed if asked to perform a function not learned in meeting the requirements for your license.

Use personal protective equipment whenever it is required.

Obey all safety warning signs.

Smoking is only permitted in designated locations and may be entirely prohibited at certain times, such as during cargo transfer operations.

Good housekeeping is an important part of accident prevention. Replace all tools and supplies after use. Do not allow rubbish or debris to accumulate where they will become a hazard.

A3.5.8 Employee assistance and wellness programs,

A3.5.9 Preemployment chemical tests for dangerous drugs,

A3.5.10 Incentive programs such as safety awards, bonuses, and vessel competitions, and

A3.5.11 Disciplinary policy that provides for progressive consequences depending on the severity or repetition of the violation of a safety rule, or both.

A3.5.12 Personal protective equipment such as:

A3.5.12.1 Safety glasses, goggles, hearing protection, safety shoes, protective clothing, chemical protective booties, respiratory protection, and

A3.5.12.2 Impervious gloves for food handlers as appropriate.

A3.5.13 Preventive maintenance of the vessel and equipment and basic housekeeping programs.

A4. TRAINING

A4.1 Training to enable all employees to recognize hazards and to take appropriate precautions should include:

A4.1.1 General orientation to the company,

A4.1.2 Overview of the company's health and safety program,

A4.1.3 Vessel orientation including access and egress,

A4.1.4 Emergency procedures in case of fire, confined space entry incident, release of hazardous chemicals or cargo, and overexposure,

A4.1.5 The nature of potential hazards to which employees may be exposed during routine tasks and how to recognize symptoms of exposure,

A4.1.6 Use of protective measures, such as standard operating procedures that incorporate safe work practices, and protective equipment and clothing (refer to Annex A3, Section A3.5, Hazard Control),

A4.1.7 Specific programs including respiratory protection, confined space entry, hearing loss prevention, lockout-tagout, fall protection, safe lifting, health and safety equipment control, calibration and maintenance, and

A4.1.8 Recognition and control of fatigue.

A4.2 Additional training for those with specific health or safety responsibilities may include:

A4.2.1 Risk assessment and risk management including:

A4.2.1.1 Health and safety data trend analysis,

A4.2.1.2 Job safety analysis, and

A4.2.1.3 Shipboard watch implications.

A4.2.2 Fatality, injury, illness, "near miss" incident, and problem investigation and root cause analysis.

A4.3 Effective worker protection programs do not stop at initial training. Effective programs evaluate the success of the training provided and offer refresher training on both a routine and as-needed basis.

A4.4 Elaborate training programs solely related to safety and health are not always needed. Integrating consideration of safety and health protection into all organizational activities is the key to effectiveness. Safety and health information should be integrated into other training about performance requirements and job practices.

A5. RECORD KEEPING

A5.1 Records are needed to document hazard control efforts such as job hazard analyses, industrial hygiene sampling, and training. Data collection systems that enable trend analysis help in identifying injuries and illnesses with common causes. A review of shipboard personnel injury and illness experience over a period of time may reveal patterns of injury and illness with common causes, which can be addressed. Similarly, a review of accidents, "near miss" incidents, or problems over time can reveal patterns of dangerous practice, which need correction to assure safety. The correlation of changes in injury, illness, and "near miss" incident or problem experience with changes in the safety and health program, operations, work processes, and personnel may help to identify potential causes and likelihood of personnel accidents, injuries, and illnesses, and danger or risk to the public. Audits that evaluate the effectiveness of the health and safety program can be used to identify weak points in the system.

A5.2 Examples of records that should be maintained include:

A5.2.1 Death, injury, illness, accident, "near miss" incident, and problem data including:

A5.2.1.1 Investigation reports and root cause analysis (see also Annex A7, Fatality, Injury, Illness, and Incident Investigation), and

A5.2.1.2 Injury, illness, near miss, and problem rates,

A5.2.2 Hazardous condition notifications and abatement actions,

A5.2.3 Crew member safety suggestions,

A5.2.4 Industrial hygiene monitoring results for both personal and area samples,

A5.2.5 Job safety analyses,

A5.2.6 Safety committee reports,

A5.2.7 Safety inspection reports or log entries,

A5.2.8 Medical surveillance data (aimed at identifying exposures so that proper interventions, including improvement of hazard controls, may be initiated),

A5.2.9 Training (refer to Annex A4 for a discussion of recommended training):

A5.2.9.1 Record training outline, date, and attendance,

A5.2.9.2 Record completion of courses such as fire fighting and confined space entry schools, and

A5.2.10 Safety and health management system audits (refer to Annex A8 for an example).

A5.3 The extent of recordkeeping necessary to document the effectiveness of the program will vary depending on the size of the company, level and nature of exposure to hazards on the vessel, and other factors. The records should be maintained as long as necessary in light of their intended use.

A5.4 Records of individual ships should also be shared with other ships and analyzed as a larger base of data to gain information on frequency of problems to identify trends better.

A6. CONTRACT OR THIRD PARTY PERSONNEL

A6.1 The vessel owner/operator or the master/person-in-charge, or both, should provide information on applicable elements of the company's health and safety program, vessel hazards, safety rules, standard operating procedures, and emergency procedures with contract or third party personnel who may be exposed to vessel or cargo hazards.

A6.2 The contractor or third party should inform his/her employees of the applicable elements of the vessel's health and safety program and of any known vessel or cargo hazards to which his/her employees may be exposed. The contract or third party person-in-charge should also direct his/her employees to follow the health and safety rules of the vessel to the extent that they meet or exceed the contractor's or third party's own requirements.

A6.3 The contract or third party person-in-charge should inform the vessel's master or person-in-charge of any health and safety hazards presented by their work and how they will address those hazards. The contract or third party person-in-charge should also inform the vessel personnel of any other health and safety hazards in the course of their work on the vessel.

A6.4 During the initial exchange of information regarding vessel hazards and hazards presented by the work intended, the actions of the contractor or third party toward the health and safety of the vessel crew and their own employees should be clearly identified. Likewise, the actions of the vessel personnel toward the health and safety of the contractor or third party should be clearly identified. Emergency procedures should be clearly agreed upon in advance.

A7. FATALITY, INJURY, ILLNESS AND INCIDENT INVESTIGATION

A7.1 The objective of an investigation is to prevent related incidents from recurring. An investigation should identify the circumstances of the injury, illness, or incident and reveal the proximate causes, contributing factors, and root causes by gathering and analyzing information and drawing conclusions. Identification and correction of causes may prevent similar incidents from recurring. Furthermore, identifying and correcting a true root cause may prevent other, apparently unrelated incidents, giving even more return on the effort expended to identify root causes. For example, if a problem with the company's training system was identified as the root cause for a confined space incident, then correcting the entire training system may prevent an injury that would have been caused by an untrained person improperly operating a piece of machinery.

A7.2 Start the investigation as soon as possible after the incident occurs. Interview workers involved in the incident and all witnesses. Discover situations leading up to the incident including several days before. These situations may include contributing factors. (Human factors including fatigue often are found as root or contributing factors and may accumulate over a period of time.) Examine the location of the incident and identify factors associated with the incident. Interview other company personnel as needed to determine root causes. Document the investigation and recommendations.

A7.3 The final report should include:

A7.3.1 A summary outlining the basic facts of the incident,

A7.3.2 A narrative detailing the circumstances of the casualty or near incident,

A7.3.3 Analysis and comment that lead to logical conclusions or findings, establishing all the factors, including root cause(s) that contributed to the incident, and

A7.3.4 Immediate and long-term recommendations aimed at preventing similar accidents and correcting root causes.

A7.4 It may be helpful to categorize investigation data. An example of a one-page form divided into information categories is provided (Fig. A7.1). Additional pages might be used to capture the summary, narrative, analysis, and recommendations (Fig. A7.2).

A7.5 The information in this annex was drawn from the references below. Further guidance regarding accident investigation may be obtained from IMO A.849 (20) and Refs (**1** and **2**).

☐ Fatality, ☐ Injury, ☐ Illness, or ☐ Incident Investigation | Date: | Time:

Vessel Name:	Type of Vessel:	Class. Society:	Vessel Location:	Temp:	Wind Spd:	Sea State:

Vessel operation at time of incident:

- ☐ discharging cargo
- ☐ loading cargo
- ☐ gas freeing tanks
- ☐ stripping tanks
- ☐ cleaning tanks
- ☐ receiving fuel
- ☐ mooring at dock
- ☐ replenishment at sea
- ☐ transit harbor
- ☐ transit restricted channel
- ☐ resource exploration
- ☐ resource production
- ☐ trawling
- ☐ underway at sea

Employee Name: **Employee ID No.:**

Employee Position on Vessel:

- ☐ Deck Crew
- ☐ Deck Officer
- ☐ Engineering Crew
- ☐ Engineering Officer
- ☐ Master
- ☐ Steward
- ☐ Tankerman
- ☐ Person-In-Charge
- ☐ OIM
- ☐ Platform worker
- ☐ Passenger
- ☐ Gov. employee
- ☐ Longshore/harbor worker
- ☐ Visitor

Nature of fatality, injury or illness:

- ☐ Allergic rxn
- ☐ Asphyx.
- ☐ Thermal burn
- ☐ Chemical burn
- ☐ Electrical burn (shock)
- ☐ Aggravated old injury
- ☐ Abrasion
- ☐ Bruise
- ☐ Concussion
- ☐ Blister
- ☐ Drowning
- ☐ Strain
- ☐ Cut
- ☐ Hemorrhoid
- ☐ Sprain
- ☐ Fracture
- ☐ Puncture
- ☐ Hernia
- ☐ Infectious Dx.
- ☐ Heat Stroke
- ☐ Blood Clot
- ☐ Unknown
- ☐ Other _____

Part of body injured:

- ☐ Ankle
- ☐ Arm
- ☐ Back
- ☐ Chest
- ☐ Eye
- ☐ Finger
- ☐ Groin
- ☐ Hand
- ☐ Foot
- ☐ Head
- ☐ Knee
- ☐ Leg
- ☐ Hip
- ☐ Neck
- ☐ Shoulder
- ☐ Stomach
- ☐ Trunk
- ☐ Lung
- ☐ Multiple Inj
- ☐ Cardiovasc
- ☐ Other ____

Location when injured/at time of near miss:

- ☐ Unknown
- ☐ Aft area
- ☐ Bridge
- ☐ Cargo hold
- ☐ Pump room
- ☐ Cargo tank
- ☐ Deck stores
- ☐ Deck, open
- ☐ Engine rm
- ☐ Engine stores
- ☐ Fire room
- ☐ Forepeak
- ☐ Galley
- ☐ Fwd area
- ☐ Fuel tank
- ☐ Laundry rm
- ☐ Machinery spaces
- ☐ Mast, boom, rigging
- ☐ Mid-ship area
- ☐ Quarters
- ☐ Paint locker
- ☐ Offices
- ☐ Ballast tank
- ☐ Shaft alley
- ☐ Passageway
- ☐ Void
- ☐ Cofferdam
- ☐ Steering spc
- ☐ Mud pit
- ☐ Drill. platfom
- ☐ Windlass rm
- ☐ Other _____

Root cause(s):

- ☐ Management Commitment
- ☐ Record keeping
- ☐ Employee Involvement
- ☐ Contract/third party
- ☐ Hazard id, eval, control
- ☐ Investigation
- ☐ Training
- ☐ Systematic Evaluation

Signature Lead Investigator _____ **Date:** _____

Signature Captain/PIC _____ **Date:** _____

Lead Investigator: _____ **Captain/PIC:** _____

Related Vessel Casualty:

- ☐ Allision
- ☐ Fire or explosion
- ☐ Collision
- ☐ Machinery damage
- ☐ Strand/grounding
- ☐ Capsize
- ☐ Failure: hull, water tight doors, ports, etc.
- ☐ Listing
- ☐ Other: ___

Nature of Accident or Incident:

- ☐ slip/fall-stairs
- ☐ slip/fall-gangway
- ☐ slip/fall-deck
- ☐ slip/fall-other _____
- ☐ fall, same level
- ☐ fall, into water
- ☐ struck, falling object
- ☐ struck, flying object
- ☐ struck, moving obj.
- ☐ bumped fixed obj.
- ☐ struck, vessel
- ☐ struck, other _____
- ☐ pinched/crushed
- ☐ cut, bruise
- ☐ sprain/strain
- ☐ overexertion
- ☐ caught in lines
- ☐ burned, non-electric
- ☐ burned, electric
- ☐ scalded
- ☐ hypothermia
- ☐ hyperthermia
- ☐ diving accident
- ☐ asphyxiation
- ☐ acute toxic exposure
- ☐ chronic toxic expos
- ☐ disappeared
- ☐ other _____

Activity person undertaking when accident occurred:

- ☐ Deck duty
- ☐ Engine duty
- ☐ Drilling
- ☐ Fishing
- ☐ Handling cargo
- ☐ Handling lines
- ☐ Operating machinery
- ☐ Repairing machinery
- ☐ Steward duty
- ☐ Passenger
- ☐ Off duty - exercising
- ☐ Off duty

Proximate and contributory cause(s) of accident or incident:

- ☐ Intoxication, alcohol
- ☐ Intoxication, narcotics
- ☐ Adverse weather
- ☐ Faulty planning
- ☐ Command problem
- ☐ Haste
- ☐ Excessive task/wk load
- ☐ Task time problem
- ☐ Inappropriate policy
- ☐ Boredom, inattention
- ☐ Carelessness
- ☐ Judgment error
- ☐ Cognitive function error
- ☐ Inadequate training
- ☐ Fatigue
- ☐ Untimely info flow
- ☐ Inaccurate info flow
- ☐ Design-control interface
- ☐ Design-emergency sys's
- ☐ Design-general layout
- ☐ Design-work station
- ☐ Psychological factors
- ☐ Physical factors
- ☐ Deck cluttered
- ☐ Deck slippery
- ☐ Equipment failure
- ☐ Failure-use PFD
- ☐ No PFD available
- ☐ Chemical rxn or release
- ☐ Failure-use PPE
- ☐ No/Inad. PPE available
- ☐ Inadequate/miss guard
- ☐ Improper maintenance
- ☐ Insufficient ventilation
- ☐ Improper supervision
- ☐ Misuse of tools/equip
- ☐ Improper lighting
- ☐ Improper tools/equip
- ☐ Improper load/storage
- ☐ Material failure
- ☐ Inadequate/miss rail
- ☐ Mooring line surge

FIG. A7.1 Data Form

Statement of ☐ Injured/Ill Person, ☐ Witness, ☐ Supervisor, ☐ Investigator		
(Attach extra sheets, drawings, information if needed.)		
Name: (Print)	Signature:	Date:

FIG. A7.2 Statement Form

A8. SYSTEMATIC SHIPBOARD OCCUPATIONAL HEALTH AND SAFETY PROGRAM EVALUATION

A8.1 Tools that may help with program evaluation include:

A8.1.1 Trend analysis of fatality, injury, illness, and“ near miss” incident statistics,

A8.1.2 Trend analysis of records of “unsafe acts or behaviors”,

A8.1.3 Review of vessel safety committee reports and recommendations, and

A8.1.4 Review of hazardous condition notifications and abatement actions.

A8.2 Performance measures that may assist in program evaluation include:

A8.2.1 Lost time incident rate,

A8.2.2 Fatality rate,

A8.2.3 Acute toxic exposure incidents per 1000 employee work hours,

A8.2.4 Number of nonconformities with standard operating procedures per 100 employee work hours,

A8.2.5 Percentage of training required by SOHSP completed on schedule,

A8.2.6 Percentage of annual respiratory fit testing completed on schedule, and

A8.2.7 Percentage of annual medical monitoring exams completed on schedule.

A8.3 The audit tool may be used to evaluate a SOHSP. The elements scored in the audit tool are the first seven elements of a SOHSP. Some elements are further divided into factors that are individually scored. The auditor should objectively score the vessel’s SOHSP on each of the individual factors and elements after obtaining the necessary information to do so.

A8.4 Calculate the overall **SCORE**, as follows:

A8.4.1 Score each element:

A8.4.1.1 The score for the Management Commitment and Leadership Element is the lower of the two scores of the General and Implementation Factors.

A8.4.1.2 The score for the Employee Participation Element is the lower of the two scores for the General and Hazard Reporting Factors.

A8.4.1.3 The score for the Hazard Anticipation, Identification, Evaluation and Control Element is the average of all six factors.

A8.4.1.4 The scores for single-factor elements are the scores for the factor.

The overall **SCORE** is the average score of the seven element scores and may be assigned a “verbal” description based upon the score.

SCORE	Level of Shipboard Occupational Health and Safety Program
5	Outstanding program
4	Superior program
3	Basic program
2	Developmental program
1	No program or ineffective program

APPENDIX

(Nonmandatory Information)

X1. RATIONALE

X1.1 This guide was developed by a group of management, labor, and government people involved in the shipping industry. Members of the group agreed that guidance in the area of occupational health and safety would be helpful to the shipping industry. However, they did not want a detailed prescriptive standard, nor did they want to produce something that already existed. The group researched existing guidance at the national and international levels and came to the agreement that research existed that outlined key elements to effective health and safety program implementation. These key elements are contained in this guide with amplifying information specifically geared toward the shipping industry. The literature used in development of the guide is listed in the Reference Section (**3-2**)[6].

[6] The boldface numbers given in parentheses refer to a list of references at the end of the text.

Program Element	Absent or ineffective(1)	Developmental(2)	Basic(3)	Superior(4)	Outstanding(5)
Management Commitment And Leadership					
General					
Implementation					
Overall Score for element		**Lowest of 2**	**Sections**		
Employee Participation					
General					
Hazard Reporting					
Overall Score for element		**Lowest of 2**	**Sections**		
Hazard Anticipation, Identification, Evaluation, & Control					
Anticipation, Identification, & Evaluation					
Control - General					
Control - Maintenance					
Control - Medical Program					
Control - Emergency Prep-Planning & Drills					
Control - Emergency Prep-First Aid					
Overall Score for element		**Average of**	**6 sections**		
Safety and Health Training					
General					
Overall Score for element		**Score of 1**	**section**		
Record Keeping					
Data Collection and Analysis					
Overall Score for element		**Score of 1**	**section**		
Contract and Third Party Personnel					
General					
Overall Score for element		**Score of 1**	**section**		
Fatality, Injury, Illness & Accident Investigation					
General					
Overall Score for element		**Score of 1**	**section**		
Overall Program Score		**Average of 7 Elements Rounded**			

NOTE 1—Tables A8.1-A8.14 provide the verbal descriptions anchoring the numeric indicators in Fig. A8.1.

FIG. A8.1 Evaluation Form

TABLE A8.1 Management Commitment and Leadership

General
Management commitment and leadership is a precondition for an effective SOHSP.
1 Management demonstrates no policy, goals, objectives, or interest in safety and health issues on this vessel.
2 Management sets and communicates safety and health policy and goals, but remains detached from all other safety and health efforts.
3 Management follows all safety and health rules and gives visible support to the safety and health efforts of others.
4 Management participates in significant aspects of the site's safety and health program, such as site inspections, incident reviews, and program reviews. Incentive programs that discourage reporting of accidents, symptoms, injuries, or hazards are absent. Other incentive programs may be present.
5 Site safety and health issues are regularly included on agendas of management operations meetings. Management clearly demonstrates—by involvement, support, and example—the primary importance of safety and health for everyone on the work site. Performance is consistent and sustained or has improved over time.

TABLE A8.2 Management Commitment and Leadership

Implementation

Implementation means tools, provided by management, that include:
• Resources:
  • budget
  • information
  • expertise/training
  • personnel
• Defined and assigned responsibilities
• Commensurate authority to carry out responsibilities
• Accountability

1 Tools to implement a safety and health program are inadequate or missing.
2 Some tools to implement a safety and health program are adequate and effectively used; others are ineffective or inadequate. Management assigns responsibility for implementing a site safety and health program to identified person(s). Management's designated representative has authority to direct abatement of hazards that can be corrected without major capital expenditure.
3 Tools to implement a safety and health program are adequate, but are not all effectively used. Management representative has some expertise in hazard recognition and applicable standards. Management keeps or has access to applicable standards on the unit and seeks appropriate guidance for interpretation of the standards. Management representative has authority to order/purchase safety and health equipment.
4 All tools to implement a safety and health program are more than adequate and effectively used. Written safety procedures, policies, and interpretations are updated based on reviews of the safety and health program. Safety and health expenditures, including training costs and personnel, are identified in the vessel budget. Hazard abatement is an element in management (officers/persons in charge/supervisors) performance evaluation.
5 All tools necessary to implement a good safety and health program are more than adequate and effectively used. Management safety and health representative has expertise appropriate to vessel size and operation and has access to professional advice when needed. Safety and health budgets and funding procedures are reviewed periodically for adequacy.

TABLE A8.3 Employee Participation

General
Employee participation provides the means through which those who actually do the work identify hazards, recommend and monitor abatement, and otherwise participate in their own protection.
1 Worker participation in workplace safety and health concerns is not encouraged. Incentive programs are present that have the effect of discouraging reporting of incidents, injuries, potential hazards, or symptoms. Employees/employee representatives are not involved in the shipboard health and safety program.
2 Workers and their representatives can participate freely in safety and health activities on the unit without fear of reprisal. Procedures are in place for communication between employer and workers on safety and health matters. Workers are able to refuse or stop work that they reasonably believe involves imminent danger. Workers are paid while performing safety activities.
3 Workers and their representatives are involved in the safety and health program, involved in inspection of work areas, and are permitted to observe monitoring and receive results. Workers and representatives have access to information regarding the shipboard health and safety program including health and safety data trend analysis, job task analysis, and industrial hygiene sampling data. A documented procedure is in place for raising complaints of hazards or discrimination and receiving timely employer response.
4 Workers and their representatives participate in workplace analysis, inspections and investigations, and development of control strategies throughout the vessel, and have necessary training and education to participate in such activities. Workers and their representatives have access to all pertinent health and safety information, including safety reports and audits. Workers are informed of their right to refuse job assignments that pose serious hazards to them pending management response.
5 Workers and their representatives participate fully in development of the safety and health program and conduct of training and education. Workers participate in audits, program reviews conducted by management or third parties, and collection of samples for monitoring purposes, and have necessary training and education to participate in such activities. Employer encourages and authorizes employees to stop activities that present potentially serious safety and health hazards.

TABLE A8.4 Employee Participation

Hazard Reporting
A reliable **hazard reporting system** enables employees, without fear of reprisal, to notify management of conditions that appear hazardous and to receive timely and appropriate responses.
1 No formal hazard reporting system exists, or employees are reluctant to report hazards.
2 Employees are instructed to report hazards to management. Supervisors are instructed and are aware of a procedure for evaluating and responding to such reports. Employees use the system with no risk of reprisals.
3 A formal system for hazard reporting exists. Employee reports of hazards are documented, corrective action is scheduled, and records maintained.
4 Employees are periodically instructed in hazard identification and reporting procedures. Management conducts surveys of employee observations of hazards to ensure that the system is working. Results are documented.
5 Management responds to reports of hazards in writing within specified time frames. The workforce readily identifies and self-corrects hazards; they are supported by management to do so.

TABLE A8.5 Hazard Anticipation, Identification, Evaluation, and Control

Anticipation, Identification, and Evaluation
Anticipation, identification, and evaluation of hazards involves systematic review of vessel and equipment design, review of the vessel and equipment fitness for current conditions and operations, a procurement system that requires consideration of health and safety aspects of items ordered, vessel inspections, exposure assessments, job safety analyses, mechanisms for employees to report hazardous conditions, and review of health and safety data and records to identify trends.
1 No system or requirement exists for hazard review of planned/changed/new equipment or operations. There are no requirements to consider health and safety aspect of items purchased for the vessel. There is no evidence of comprehensive inspections for safety or health hazards, exposure assessments, routine job safety analysis, or health and safety data trend analysis.
2 The person-in-charge of operation and/or equipment changes considers health and safety implications of the changes but has not had appropriate training to be able to identify all health and safety consequences of the changes. The person responsible for procurement considers health and safety issues but has not been trained on hazards that may be encountered. Inspections for health and safety hazards are conducted by vessel and corporate personnel but only in response to accidents or complaints. The employer has identified principle health and safety standards appropriate for the vessel. Supervisors dedicate time to observing work practices and other safety and health conditions in work areas where they have responsibility.
3 Competent person(s) determine health and safety consequences of proposed changes in high-hazard operations or equipment before the changes occur and appropriate precautions are implemented. Competent person(s) determine health and safety hazards of all items procured and appropriate precautions are taken when the item is used. Vessel and corporate personnel with specific training in health and safety hazards conduct vessel inspections. Items in need of correction are documented. Inspections include compliance with relevant regulations, industry standards, and practices. Time periods for corrections are set. Current hazard analyses are written (where appropriate) for all high-hazard jobs and processes; analyses are communicated to and understood by affected employees. Hazard analyses are conducted for jobs/tasks/workstations where injury or illnesses have been recorded.
4 Competent person(s) in consultation with a qualified professional determines health and safety consequences of all proposed changes in operations or equipment before the changes occur, and appropriate precautions are implemented. Competent person(s) determine health and safety hazards of all items requested for procurement, identify appropriate substitutions for hazardous items, or ensure appropriate precautions are taken if a substitute cannot be identified. A qualified professional conducted a vessel inspection within the last five years, and competent person(s), trained in items identified by the qualified professional, conduct periodic inspections and appropriate corrective actions are taken promptly. The inspections are planned, with key observations or check points defined and results documented. Corrections are documented through followup inspections. Results are available to workers. Current hazard analyses are documented for all work areas and are communicated and available to all employees.
5 Qualified professionals in consultation with certified safety and health professional(s) analyze health and safety consequences of all proposed changes in operations or equipment, identify substitutions if possible, or ensures appropriate precautions are implemented as the change occurs. Competent person(s) in consultation with qualified professional(s) or certified safety and health professional(s), as needed, identify health and safety hazards of all items requested for procurement and obtain substitutes for hazardous items. Regular inspections are planned and overseen by certified safety or health professionals. Statistically valid random audits of compliance with all elements of the shipboard health and safety program are conducted. Observations are analyzed to evaluate progress. Documented workplace hazard evaluations are conducted by certified safety and health professional(s). Corrective action is documented and hazard inventories are updated.

TABLE A8.6 Hazard Anticipation, Identification, Evaluation, and Control

Control - General
Workforce exposure to all current and potential hazards should be prevented or controlled by using **engineering controls** whenever feasible and appropriate, **work practices** and **administrative controls**, and **personal protective equipment**.
1 Hazard control is seriously lacking or absent from the vessel.
2 Hazard controls are generally in place, but effectiveness and completeness vary. Serious hazards may still exist. Employer has achieved general compliance with applicable standards regarding hazards with a significant probability of causing serious physical harm. Hazards that have caused past injuries on the vessel have been corrected.
3 Appropriate controls (engineering, work practice, administrative controls, and PPE) are in place for significant hazards. Some serious hazards may exist. Employer is generally in compliance with voluntary standards, industry practices, and manufacturers' and suppliers' safety recommendations. Documented reviews determining the need for machine guarding, energy lockout, ergonomics program, materials handling procedures, bloodborne pathogen program, confined space entry program, hazard communication, and other generally applicable programs have been conducted. The overall program tolerates occasional deviations.
4 Hazard controls are fully in place and are known and supported by the workforce. Few serious hazards exist. The employer requires strict and complete compliance with all applicable regulations, consensus standards, and industry practices and recommendations. All deviations are identified and causes determined.
5 Hazard controls are fully in place and continually improved upon based on workplace experience and general knowledge. Documented reviews of needs are conducted by certified health and safety professionals.

TABLE A8.7 Hazard Anticipation, Identification, Evaluation, and Control

Control - Maintenance
An effective shipboard health and safety program will provide for **vessel and equipment maintenance**, so that hazardous breakdowns are prevented.
1 No preventive maintenance program is in place; breakdown maintenance is the rule.
2 There is a preventive maintenance schedule, but it does not cover everything and may be allowed to slide or performance is not documented. Safety devices on machinery and equipment are generally checked before each shift.
3 A preventive maintenance schedule is implemented for areas where it is most needed; it is followed under normal circumstances. Manufacturers' and industry recommendations and consensus standards for maintenance frequency are followed. Breakdown repairs for safety-related items are expedited. Safety device checks are documented. Ventilation system function is observed periodically.
4 The employer has effectively implemented a preventive maintenance schedule that applies to all equipment. Vessel experience is used to improve safety-related preventative maintenance scheduling.
5 There is a comprehensive safety and preventive maintenance program that maximizes equipment reliability.

TABLE A8.8 Hazard Anticipation, Identification, Evaluation, and Control

Control– Medical Program	
An effective shipboard health and safety program will include a suitable **medical program** where it is appropriate for the nature of the hazards.	
1	Management is unaware of, or unresponsive to occupational medical surveillance needs. Required medical surveillance, monitoring, and reporting are absent or inadequate.
2	Required medical surveillance, monitoring, removal, and reporting responsibilities for applicable standards are assigned and carried out, but results may be incomplete or inadequate.
3	Medical surveillance, removal, monitoring, and reporting comply with applicable standards. Employees report early signs/symptoms of job-related injury or illness and receive appropriate treatment.
4	Health care providers provide followup on employee treatment protocols and are involved in hazard identification and control on the vessel. Medical surveillance addresses conditions not covered by specific standards. Employee concerns about medical treatment are documented and responded to.
5	Health care providers periodically observe the work areas and activities and are fully involved in hazard identification and training.

TABLE A8.9 Hazard Anticipation, Identification, Evaluation, and Control

Control—Emergency Preparedness—Planning and Drills	
There should be appropriate **planning, training/drills, and equipment** for response to emergencies.	
1	Little or no effort to prepare for emergencies.
2	Emergency response plans for fire, chemical, and weather emergencies as required by regulation are present. Training is conducted as required by the applicable regulation. Some deficiencies may exist.
3	Persons with specific training have prepared emergency response plans. Appropriate alarm systems are present. Employees are trained in emergency procedures. The emergency response extends to spills and incidents in routine operation. Adequate supply of spill control and PPE appropriate to hazards on site is available.
4	Abandoned ship drills are conducted in accordance no less than annually. The plan is reviews by a qualified safety and health professional.
5	Vessel personnel with emergency response assignments have adequate training. All potential emergencies have been identified. Emergency response plans and performance are reevaluated at least annually and after each significant incident. Procedures for terminating an emergency response condition are clearly defined.

TABLE A8.10 Hazard Anticipation, Identification, Evaluation, and Control

Control—Emergency Preparedness—First Aid	
First aid/emergency care should be readily available to minimize harm if an injury or illness occurs.	
1	First aid/emergency care cannot be ensured.
2	First aid/emergency care is available on every shift.
3	Personnel with appropriate first aid skills commensurate with likely hazards on the vessel and as required by applicable regulations are available. Management documents and evaluates response time on a continuing basis.
4	Personnel with *certified* first aid skills are always available on-site; their level of training is appropriate to the hazards of the work being done. Adequacy of first aid is formally reviewed after significant incidents.
5	Personnel trained in advanced first aid and/or emergency medical care are always available on-site.

TABLE A8.11 Safety and Health Training

General	
Safety and health training should cover the safety and health responsibilities of all personnel who work on the vessel or affect its operations. It is most effective when incorporated into other training about performance requirements and job practices. It should include all subjects and areas necessary to address the hazards on the vessel.	
1	Vessel personnel depend on experience and peer training to meet needs. Master/person-in-charge/others in supervisory positions demonstrate little or no involvement in safety and health training responsibilities.
2	Some orientation training is given to new hires. Some safety training materials (for example, pamphlets, posters, videotapes) are available or are used periodically at safety meetings, but there is little or no documentation of training or assessment of worker knowledge for a given topic. Masters/persons-in-charge/and others in supervisory positions generally demonstrate awareness of safety and health responsibilities, but have limited training themselves or involvement in the site's training program.
3	Training includes regulatory rights and access to information. Training required by regulations is provided to all vessel employees. Supervisors attend training in all subjects provided to employees under their direction. Vessel personnel can generally demonstrate the skills/knowledge necessary to perform their jobs safely. Records of training are kept and training is evaluated to ensure it is effective.
4	Knowledgeable persons conduct safety and health training that is scheduled, assessed, and documented, and addresses all necessary technical topics. Employees are trained to recognize hazards, violations of regulations, and vessel practices. Employees are trained to report violations to management. Training is followed up with performance observation and feedback. All site employees—including supervisors and masters/persons-in-charge—can demonstrate preparedness for participation in the overall safety and health program. There are easily retrievable scheduling and record keeping systems.
5	Knowledgeable persons conduct safety and health training that is scheduled, assessed, and documented. Training covers all necessary topics and situations, whether addressed in regulations or not, and includes all persons on the vessel (unlicensed personnel to the master or person-in-charge, contractors, and temporary employees). Employees participate in creating site-specific training methods and materials. Employees are trained to recognize inadequate responses to reported program violations. Retrievable recordkeeping system provides for appropriate retraining, makeup training, and modifications to training as the result of evaluations.

TABLE A8.12 Record Keeping

Data Collection and Analysis	
An effective shipboard occupational health and safety program will collect and analyze injury, illness, and "near miss" incident data for indications of sources and locations of hazards, and jobs that experience higher numbers of incidents. By analyzing injury, illness, and "near miss" incident trends over time, patterns with common causes can be identified and prevented.	
1	Little or no collection and/or analysis of injury, illness, or "near miss" incident data. Exposure monitoring is not conducted or documented.
2	Injury, illness, and "near miss" incident data is collected and analyzed, but not widely used for prevention. CG-2692 is completed for all reportable marine casualties. Exposure records and analysis are organized and are available to safety personnel.
3	Injury, illness, and "near miss" incident logs and exposure records are kept, are audited by shoreside management personnel, and are essentially accurate and complete. Rates are calculated so as to identify high-risk areas and jobs. Liability claims are analyzed and the results are used in the program. Significant analytical findings are used for prevention.
4	Shoreside management and vessel master/person-in-charge and supervisors can identify the frequent and most severe problem areas, the high-risk areas and job classifications, and any exposures that exceed OSHA PELs, ACGIH TLVs, or company standards. Data are fully analyzed and effectively communicated to employees. Injury, illness, and "near miss" incident data are audited and certified by a responsible person.
5	All levels of management and the workforce are aware of results of data analyses and resulting preventive activity. External audits of accuracy of injury, illness, and "near miss" incident data, including review of all available data sources are conducted. Scientific analysis of health information, including nonoccupational databases is included where appropriate in the program.

TABLE A8.13 Contract and Third Party Personnel

General	
An effective safety and health program protects all personnel on the vessel, including the employees of contractors, subcontractors, and third party personnel. It is the responsibility of shoreside management and the vessel master or person-in-charge to address contractor safety and third party safety.	
1	Shoreside management and the vessel master or person-in-charge make no provision to include contractors and third party personnel within the scope of the vessel's health and safety program.
2	Vessel safety policy requires contractor and third party personnel to conform to applicable regulations and other legal requirements.
3	The master/person-in-charge designates a representative to monitor contractor and third party safety and health practices, and that individual has authority to stop contractor practices that expose host or contractor employees to hazards. Management informs contractor and employees of hazards present at the facility.
4	Shoreside management investigates a contractor's safety and health record as one of the bidding criteria. Shoreside management contacts third party personnel management if necessary to correct unsafe third party behavior.
5	The vessel's health and safety program ensures protection of everyone employed at the work site including full-time employees, temporary employees, contractors, and third party personnel.

TABLE A8.14 Fatality, Injury, Illness, and Incident Investigation

	General
	An effective shipboard occupational health and safety program will provide for **investigation of accidents and "near miss" incidents**, so that their causes, and the means for their prevention, are identified.
1	No investigation of accidents, injuries, near misses, or other incidents is conducted.
2	Some investigation of incidents takes place, but root cause may not be identified, and correction may be inconsistent. Supervisors prepare injury reports for lost time incidents greater than 72 h.
3	All "OSHA recordable incidents" are documented in a log. Reports are generally prepared with cause identification and corrective measures prescribed.
4	"OSHA recordable incidents" are always investigated, and effective prevention is implemented. Reports and recommendations are available to employees. Trained safety personnel systematically review quality and completeness of investigations.
5	All loss-producing accidents and "near-misses" are investigated for root causes by teams or individuals that include trained safety personnel and employees.

REFERENCES

(1) *Essentials of Safety and Health Management* , R. W. Lack, ed., CRC Press, Inc., 1996 .

(2) "Human Factors Digest No. 7, Investigation of Human Factors in Accidents and Incidents," International Civil Aviation Organization Circular 240-AN/144.

(3) *14 Elements of a Successful Safety and Health Program*, National Safety Council, 1994, and *Basic Elements of a Shipyard Health and Safety Program*, National Shipbuilding Research Program, SP-5 Committee.

(4) *How to Write an Accident Prevention Program*, State of Washington Department of Labor and Industries, 1996 (Draft).

(5) *Petroleum and Natural Gas Industries—Health, Safety and Environmental Management Systems*, International Organization for Standardization Technical Committee 67, ISC 6N159 (Draft).

(6) *AIHA Guidance Document: Occupational Health and Safety Management System*, American Industrial Hygiene Association, 1996.

(7) *Employee Health and Safety Code of Management Practices*, Responsible Care,® Chemical Manufacturer's Association.