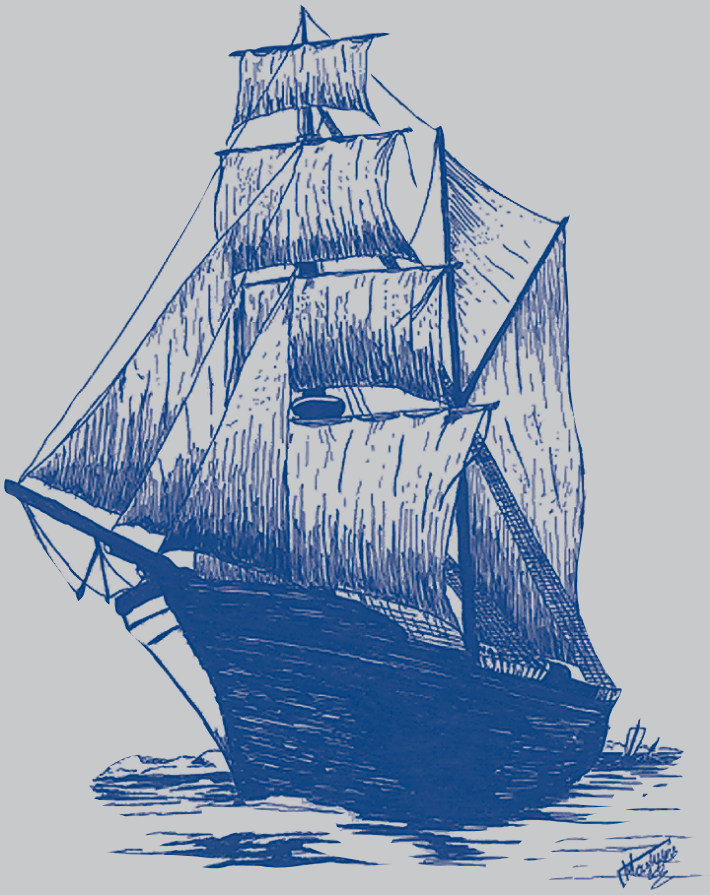
ACHIEVING HEALTH AND SAFETY IN THE BUILDING AND REPAIR OF SHIPS AND BOATS



By the
Bureau of Labor Education
The University of Maine

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ACHIEVING HEALTH AND SAFETY IN THE BUILDING AND REPAIR OF SHIPS AND BOATS

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"... to assure as far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources:

Each employer shall:

(1) furnish to each of [their] employees, employment and a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm;

(2) comply with occupational safety and health standards promulgated under this Act;

(3) provide proper safety and health training and education to employees;

Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders pursuant to this Act which are applicable to [their] own actions and conduct."

— Public Law 91-596, Occupational Safety and Health Act of 1970

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Introduction

In 2002 there were over 5,500 fatalities reported by industries in the United States.[1] A total of 4.7 million injuries and illnesses were reported in private sector workplaces in 2002, resulting in a rate of 5.3 cases per 100 equivalent full-time workers.[2] The Liberty Mutual 2002 Workplace Safety Index estimates that direct costs for occupational injuries in 1999 rose to $40.1 billion, with indirect costs reaching over $200 billion.[3]

Shipyard work is very hazardous, with an injury-illness incidence rate of 16.6 that is more than twice that of construction and general industry.[4] While boatyard work is more diverse, and usually smaller in scale, it also poses many serious risks to workers. Hazards in shipyards and boatyards include exposure to toxic substances, ergonomic injuries, hazardous atmospheres, electrocution, falls, fires, and explosions, among others.[5] Effective safety and health programs can help to eliminate or minimize such hazards.[6]

Because of these high risks, OSHA (U.S. Occupational Safety and Health Administration) has targeted shipyard and boatyard work in its Strategic Management Plan to reduce injuries and illnesses, and prevent fatalities.[7] Also, OSHA is working with the maritime industry to address these hazards (e.g., see OSHA's innovative new "Shipyard Employment eTool").[8]

These realities point out the great need for labor and management in all areas, especially ship and boat yards, to play an active role towards insuring that healthful and safe working conditions exist on the worksite or in the workplace. This publication contains important information for helping labor and management in ship and boat yards to deal with occupational health and safety challenges through the use of the law, hazard identification and abatement, and joint labor-management committee programs.

The approach and emphasis of this manual is its practical, clear focus on hazard identification and abatement (Chapter I), the use of employment law (Chapter II), and joint labor-

management safety and health committee programs (Chapter III). Chapter III also provides a listing of resources and materials on occupational health and safety relevant to ship/boat building and repair.

The ultimate effectiveness of any training will depend on the presence of a number of elements, geared to the requirements of each workplace operation. However, training is only one element of the challenge to maintain a safe and healthful workplace. An effective workplace safety and health program should have all of these components, according to the U.S. Occupational Safety and Health Administration (OSHA 2268, *Shipyard Industry*, p. 1):

- ♦ Management Commitment and Leadership
- ♦ Employee Participation
- ♦ Hazard Identification, Assessment and Control
- ♦ Accident and Incident Investigation
- ♦ Training
- ♦ Program Evaluation
- ♦ Record Keeping
- ♦ Procedures for Multi-Employer Workplaces

Source: **http://siri.uvm.edu/graphics/Safety_Management/Safety_plan.gif**

This manual is not a comprehensive guide to all possible kinds of hazards and risks. It supplements and complements other sources of information on occupational safety and health, but does not replace them. More detailed information on OSHA provisions concerning safety and health in shipbuilding and boat building can be obtained from OSHA; particularly in the OSHA publication *Shipyard Industry*, OSHA 2268 (1998 Revision).

Ultimately, it is the responsibility of everyone from top management to individuals in the yard to ensure that workplace safety and health is maintained to the highest degree possible. Those most directly at risk, however, are workers, supervisors, and worker/owners on the front lines who are exposed to these hazards on a daily basis, and it is to these individuals that this manual is dedicated.

Endnotes

[1]U.S. Department of Labor, Bureau of Labor Statistics: **http://www.bls.gov/news.release/pdf/cfoi.pdf**

[2]U.S. Department of Labor, Bureau of Labor Statistics: **http://www.bls.gov/iif/oshwc/osh/os/ostb1232.txt**

[3]U.S. Centers for Disease Control and Prevention, National Institute of Occupational Safety and Health (NIOSH): **http://www.cdc.gov/niosh/about.html**

[4]U.S. Department of Labor, Occupational Safety and Health Administration (OSHA): "Safety and Health Topics: Ship Building and Repair," and U.S. Dept. of Labor, Bureau of Labor Statistics, Injury and Illness Incident Rates, 2002, p. 1 (The incidence rate for private industry is 5.3). **http://www.osha.gov/SLTC/shipbuildingrepair/index.html#Processes%20and%20Related%20Hazards**

[5]OSHA:**http://www.osha.gov/SLTC/etools/shipyard/index.html**

[6]OSHA: **http://www.osha.gov/SLTC/etools/shipyard/shiprepair/sr_index.html**

[7]OSHA: "OSHA Industry Concentrations for FY 2003 - FY 2004;" **http://www.osha.gov/StratPlanPublic/How_the_seven_industries_were_chosen.html**

[8]**http://www.osha.gov/SLTC/etools/shipyard/index.html.** The "Shipyard Employment eTool" is an interactive, "stand-alone," Internet-based training tool and highly visual source of safety and health information which can be used by workers, managers, and employers.

Chapter I:
Identifying and Abating Hazards in Ship/Boat Building and Repair

The first critical step necessary for reducing accidents, injuries, and occupational diseases in ship/boat building and repair, involves establishing ongoing education on hazard identification and abatement for employees and employers. While there are many commonalities in hazards across the ship/boat building and repair industries, there are also some major differences, and also much diversity based on the size and type of the operation. This chapter discusses approaches for developing a program to identify and abate hazards in these industries. Given the great diversity among individual workplaces and the work processes within them, users of this manual should view it as a flexible tool, to be applied as needed.

OSHA has outlined several key components of workplace safety and health programs ("SHPs") in the shipyard industry, describing the responsibilities of both employers and employees. In addition to establishing a detailed and systematic workplace safety and health program or SHP, employers must take certain steps to identify workplace hazards, and must periodically:

- Physically inspect the workplace;
- Review available safety and health information; and
- Evaluate the seriousness of identified hazards that are not covered by OSHA standards.[1]

In addition, employees exposed to serious hazards need to receive training, "so that they are able to assist in protecting themselves and other employees."[2] Not all hazards are covered in OSHA regulations, however. Both employees and employers must have a vigilant and systematic approach towards hazard recognition, identification and abatement, to deal with serious hazards such as chemical, physical, biological and ergonomic hazards which may cause death or serious harm, whether or not they are specifically covered by OSHA standards.[3]

While OSHA regulatory language for most boatyards is based on OSHA's 1910 Standards for General Industry, rather than 1915 Standards for the Shipyard Industry, these same general principles for workplace safety and health programs are certainly applicable to the boat building/repair industry as well. Chapter II of this manual examines these legal standards in more detail.

Characteristics of the Ship/Boat Building and Repair Industries Relevant to Hazard Abatement and Recognition

Ship/boat building and repair have several characteristics in common. Both industries involve the construction and repair of vessels, often but not always next to or on the water. There are many extremely hazardous conditions and job tasks frequently associated with both industries. In general, the larger the boatyard facility or operation, the more similar it will be to a shipbuilding facility. While shipbuilding typically involves working primarily with metals as the most fundamental material, boat building varies greatly, depending on whether the operation builds boats of fiberglass, metal or wood. In addition, while shipyards are typically quite large, the size and nature of boat building operations ranges from larger manufacturing plants where boats may be mass produced, to small boatyards with only a few employees, to backyard boat building projects with only one individual or a family involved in the construction of the boat. Finally, shipyards are more likely to be unionized facilities with collective bargaining, while boatyards are less likely to be unionized, and large shipyards are more likely to have a joint labor-management safety and health committee.[4] Unionization however, is not a requirement for the creation of a joint labor-management safety and health committee.

Types of Hazards and Their Impacts

It is useful to divide occupational illness and injury into three major categories: accidents or injuries, chronic ergonomic and noise injuries,[5] and occupational illnesses, both acute and chronic. Since accidents are typically discrete

events and are more easily observable and documented, much training material tends to focus on accidents. However, it is extremely important for workers to be aware of other workplace hazards that may cause potentially debilitating chronic injury and illnesses as well.

The topic of this chapter is on hazard recognition and abatement, focusing on the Ohio State University (OSU) "Hazard Recognition Program,"[6] which categorizes workplace hazards into five main types of hazards. This chapter also will describe a creative "Worksite Systems Analysis" (University of Maine/Bureau of Labor Education)[7] that concentrates on the various elements contributing to hazardous situations, and helps in understanding how accidents or hazards may unfold over time. While the Hazard Recognition Program and the Worksite Systems Analysis can be especially useful in helping workers and supervisors avoid workplace accidents, they can be utilized to deal with hazards leading to chronic injury and workplace-related illnesses as well.

Hazard Identification and Recognition Program: A Practical Approach

One useful approach to dealing with the somewhat overwhelming challenge of recognizing and reducing workplace hazards in ship/boat building and repair is to start from a simple and straightforward system of types or categories of workplace hazards. This is a much more usable method than simply trying to draw up a comprehensive list of every potential hazard or risk in these industries.

The Hazard Recognition Program used in this manual was developed originally by the Labor Education and Research Service at Ohio State University. These hazard categories can be easily used by employees and employers in everyday work settings to recognize, reduce and abate such hazards:

1) Falling Hazards
2) Struck By or Striking Against Hazards
3) Getting Caught Hazards
4) Contact Hazards
5) Inhalation and Swallowing Hazards

This five-category system of Hazard Recognition will be helpful in identifying workplace risks and dangers in the building and repair of both ships and boats. Here are some examples from these industries, keeping in mind the special hazards common to each industry — particularly heavy metal exposure, explosions, and confined space hazards in shipyards, and exposure to toxic chemicals such as styrene and other toxics in boatyards.

Workplace Hazards in Ship/Boat Building and Repair, With Selected Examples

Source: **http://siri.uvm.edu/graphics/Industrial_Operations/Welding.gif**

1. **Falling Hazards** — There are two types of falling hazards: falls from a higher to lower level, and falls on the same level. Examples of ship/boat building and repair work where these hazards exist include:

a) work around unguarded areas and edges on a ship or boat, including hatches;
b) surface preparation and descaling from staging, decks, and end and wing walls of dry docks, where falls are complicated by a drowning hazard;
c) falls from an overturning ship during dry-docking and launching operations;
d) fabricating and repairing large structural components, where falls can result in drowning; and
e) falls due to poor housekeeping practices, such as failure to remove debris, tools and equipment, or ice from a work floor or surface.

2. **Struck By or Striking Against Hazards** — These hazards occur in ship/boat building and repair work where employees can be struck by objects, materials, equipment and/or vehicles. Often such hazards result from unsafe work practices, poor planning, and lack of training. Examples of hazards in ship/boat building and repair that fall under this category involve:

a) injuries associated with moving equipment for boat/ship building and repair (cranes, derricks, hoists, etc.);
b) injuries caused by objects falling from carrying devices, similar to construction industry;
c) powered industrial truck operations in shipbreaking;
d) work where materials or equipment are improperly stored or handled overhead; and
e) work where equipment, machinery, power tools or instruments are not fitted with appropriate guards.

3. **Getting Caught Hazards** — The three common types of hazards found in this category include caught in, caught on, and caught between. Examples of ship/boat building and repair work where these problems can occur encompass:

a) injuries, fatalities associated with an overturning ship during dry-docking and launching operations;
b) traumatic injury among divers while using underwater hull cleaning devices, where divers may get caught by moving brushes or the current created by the impeller;
c) injuries from fire, asphyxiation, and toxic exposures upon entry into confined spaces during fitting out process;
d) spaces with limited openings for entry and exit with unfavorable natural ventilation — not intended for human occupancy — can readily aggravate a hazardous exposure because of its design (e.g., double bottom tank, wing tank, cofferdam); and
e) unexpected complications associated with a relatively large confined space such as boat freezers, where explosions can occur.

4. **Contact Hazards** — Hazards within this category are quite varied. They include contact with: extreme temperatures resulting from hot or cold working surfaces that are not covered or shielded adequately; electrical current from improperly grounded or maintained electrical equipment, machines, or wiring; dangerous, toxic working materials, substances,

chemicals, and vapors; welding hazards, and exposure to excessive noise without adequate hearing protection. Employees and employers need to pay particularly close attention to electrical hazards, which according to OSHA, constitute the second highest cause of job-related fatalities in the U.S. Also, ergonomic hazards are in this contact category, such as unsafe work actions or procedures caused by aggravated, repetitive motions; forced and strained exertions, excessive vibration, and strained or awkward postures over extended periods of time. (See "Appendix I, Shipyard Trade Occupational Risk Matrix (STORM)" for further information on ergonomic injuries in shipbuilding).

Examples of some ship/boat building and repair hazards in this area include:

a) fitting out work exposes workers to electrocution hazards from portable electric hand tools, or working on a ship's electrical circuits;
b) hearing loss from noise is pervasive in fitting out work; engineering controls are difficult to implement because workstations are not fixed;
c) fitting out work also may expose workers to frostbite, hypothermia, heat exhaustion, heat cramps, dehydration, etc., from exposure to extreme weather;
d) underwater work on ships can cause decompression sickness among divers while making temporary underwater hull repairs;
e) fires and explosions from explosive atmospheres in tanks during tank cleaning for ship repair; and
f) ionizing radiation not only on conventionally powered but also on nuclear powered vessels. [1915.57]

5. **Inhalation and Swallowing Hazards** — These hazards result from toxic vapors and substances released into the work environment. Such worksite toxics may not only contaminate water and food consumed by workers, but also may be absorbed through the skin. Examples of these hazards found in ship/boat building and repair are:

a) respiratory irritation and systemic poisoning from exposure to toxic fumes and particles from welding and painting operations;
b) respiratory damage and systemic poisoning from exposure to toxic substances used in boat building and repair;
c) lead poisoning during stripping and chipping operations involving lead paints;
d) respiratory damage or chronic disease from exposure to asbestos;
e) damaging exposure to pigments, anti-fouling and anti-rust paint components (e.g., organo-mercury compounds, copper oxide, arsenic, organo-tin compounds, cadmium, and chromium).

Many hazards fall into more than one category. For example, a worker may be exposed to danger in a confined space where there is a hazard from explosion or inhalation of toxic fumes.

Hazards in Boat Building and Repair: Special Considerations

At present, there is much more readily available specific regulatory language and information on hazard recognition and occupational health and safety for the shipyard industry than for boatyards, in part because of the smaller scale and greater diversity among boatyards and in boat construction. Nonetheless, it is critical for workers, owners, and supervisors in boatyards to be familiar with risks and hazards specific to this industry.

Boat builders need to be especially mindful of a number of different hazardous substances, depending on the materials which they are coming in contact with at work. At a minimum, sufficient ventilation and personal protective equipment, including but not limited to safety glasses, hearing protection, gloves, protective footwear, and respirators, are among the basic precautions that are critically important in a boatyard, in addition to complying with all applicable OSHA standards.

Wood dust is one of the most commonly encountered chemical hazards in boat building, particularly in the construction of wooden boats.[8] Methylene chloride (MC)[9] and styrene[10] are also major concerns in boat building and repair, and there are detailed guidelines for working with these chemicals. Other chemical hazards in the boat building industry include: epoxy resins, methyl ethyl ketone peroxide (MEKP),[11] sodium hydroxide, toluene, acetone, isocyanates,[12] and even such natural materials as turpentine and pine tar.[13] Manufacturers of aluminum boats may encounter hazards similar to those found in shipbuilding, such as welding hazards.

Boat builders, whether at the commercial boatyard or in the backyard boat shop, can protect themselves by keeping their shops well ventilated and clean, and by following product safety information. Boatyards that comply with OSHA 1910, General Industry Standards (*CFR 29, Labor*) should consult Subpart Z, Toxic and Hazardous Substances, Parts 1915.1000 through 1915.1450. OSHA 1915, *Shipyard Industry,* also covers hazardous substances under Subpart Z, and under the same parts as the 1910 standards. See the Resources section of this manual in Chapter III to find these reference materials, as well as other references on hazardous materials in boat building and shipbuilding.

Appendix III of this manual contains information on Material Safety Data Sheets and OSHA's Hazard Communication Standard that boat builders and shipbuilders must follow as well. Chapter II, particularly the section on NIOSH, also contains important information on ways labor and management can use the law for identifying and abating hazardous chemicals.

Using a "Worksite Systems" Approach for Hazard Recognition and Abatement in Ship/Boat Building and Repair

The University of Maine/Bureau of Labor Education "Worksite Systems" approach is based on an "organizational systems" model or way of thinking. This approach looks at a worksite or work situation as a system of interacting and

interdependent parts, within a larger environment or context. This can be thought of as a *worksite system.*

Each part or element of the worksite system, and its environment — such as the employer, employees, contractors, and the physical environment (including weather or bodies of water) — may potentially affect the functioning of the other parts. The worksite system and its environment is not a single snapshot or "still shot" at one point in time; rather, it is a constantly changing, dynamic process that is not entirely predictable. And larger worksites, with more elements, will be more complex.

Most workers and supervisors use such a dynamic "systems" approach intuitively, at least to some extent, in their planning and thinking in daily life. Similarly, when dealing with hazardous situations or machinery, an employee and/or employer must be able to anticipate or project possible outcomes based on his/her decisions, and also must take into account the possible actions or behaviors of other workers and supervisors, as well as the physical conditions. Of equal importance, the employer must do a job hazard analysis during each phase of the work, and each specific task assigned, and communicate this important hazard information to all employees and supervisors involved in the work.

Systems also involve inputs (e.g., labor, raw materials) and outputs (e.g., a completed physical structure or service), as well as some kind of work process which transforms the inputs into outputs. A worksite system has certain goals as well, such as completing a ship or boat structure within time deadlines, keeping within cost limits, and maintaining high quality.

Within a system such as a shipyard or boatyard, each part or element can be seen as playing a certain role or function within the system. When the parts mesh well together, the worksite system as a whole will tend to work smoothly, at least in theory — the project or tasks for each day or week are completed, deadlines are met, quality is attained, goals are fulfilled, morale is high, and workers leave at the end of their work day without accidents or hazardous incidents. Unpredictable occurrences are dealt with effectively.

On the other hand, if there is a problem with one or more of the pieces or elements — a crucial part does not come in when promised, bad housekeeping creates a hazard, communications are unclear, a key worker gets sick, or a machine malfunctions — the whole system may come to a grinding halt. This worksite systems model also highlights the key importance of appropriate, clear and complete information, and of effective communications. In other words, it is not only important to have the necessary labor, tools, materials, and technical plans; it's also critical to ensure that necessary information gets communicated effectively to different players.

This organizational systems approach to worksites can be very useful when applied to issues of health and safety in boatyards and shipyards. Experienced workers, supervisors, and others who analyze both the "big picture" (the workplace system as a whole) AND the individual elements or parts, often use this perspective intuitively, because it works.

Two major advantages of the worksite system model are that: a) it can be applied to any situation, and b) it can be used to analyze the potential for different possible outcomes over time. For example, the combination of inexperienced workers and/or managers, old or malfunctioning equipment, poor communications and hazardous weather conditions may greatly increase the probability of serious workplace accidents occurring at a given workplace.

One last element of a worksite, considered as a kind of organization, is that it tends to develop its own workplace culture or set of beliefs, values, and norms over time. Even identifiable occupational groups tend to develop their own subcultures, such as an emphasis on "toughness" or bravado. Whatever "rules" exist at any workplace, the informal culture may or may not support responsible health and safety practices. Any perceptive person who begins work at a new site quickly learns about the informal values and expectations of behavior at the site. Is the habit of "cutting corners" usually overlooked? Is a person's maximum standard performance typically at the minimum standard set for that job?

To summarize, workers, supervisors, owners and contractors can apply this worksite systems approach to analyze and abate specific hazards, as well as unsafe or unhealthy conditions or practices in shipyards and boatyards. This approach can help all the players at the worksite to work jointly to *identify and maximize* those factors and resources promoting safety and health within their work environment, and to *minimize and/or correct* those factors and conditions preventing the attainment of a safe and healthful worksite.

Appendix II-A lists some of the key factors promoting or undermining worksite safety and health, and can be used to help conduct a worksite systems analysis. In addition, Appendix II-B provides illustrations of some of the key elements in a worksite system, and offers a worksite systems analysis of an accident developing across time.

Chapter I:
Case Study Exercises

Instructions: For each of the following case study exercises, select a team spokesperson who will be responsible for summarizing and reporting on your group's findings and recommendations.

Case I

Discuss and identify the hazards you are exposed to where you work.

1. Using the information and approaches cited previously in this chapter, develop strategies for abating these hazards.

2. How can labor and management work effectively to abate occupational safety and health hazards?

Case II

"A burner working in a confined space noticed that it was five minutes past the start of lunch break. In hurrying to get to the lunch area, he did not completely close the gas valve on his torch. Neither did he take the time to disconnect or shut off the gas supply to the torch at the manifold on deck, as he was taught to do in training. The escaping gas mixed with the air in the space until its explosive potential was reached and an electrical spark from equipment in the space ignited the mixture causing an explosion and fire. Fortunately, all the workers had left the area for lunch and no injuries occurred."[14]

1. Identify the specific hazards in this case.
2. What preventive measures should be taken to avoid this problem in the future?
3. Whose responsibility is it to make sure this problem does not happen again?

Case III

An employee was working on a deck where a crane was being used to transport materials. As the worker was directing the crane, she started walking backwards, signaling as she went. The worker experienced a major injury when she accidentally stepped off the deck.

1. What were the hazards involved which caused this injury?
2. What OSHA violations were committed?
3. What actions should have been taken to avoid the injury?

Case IV

A worker went to see his doctor, and reported that he had been having low back pain for some time. Until recently, he had dismissed his symptoms as those associated with the job, and with aging, and had been treating himself with ibuprofen. As a burner and welder he would frequently perform his work while bent over at the waist for long periods of time. Lately, he had been experiencing severe pain when bending at the waist, and had developed a weakness in his left leg that seemed to be getting worse. Finally, he decided to seek medical treatment.[15]

1. What is the likely source of this worker's pain?
2. What kinds of hazards are present in this situation?
3. Given the demands of this job, how might this kind of situation be avoided?
4. What are the possible solutions or responses to this situation? Is this problem only the worker's responsibility? If not, why not?

Case V

A new worker at a shipyard has been assigned to perform welding and other hot work in an outside location on a metal surface which has been coated with toxic coatings such as epoxies and lead-based paints. She has done this type of work before in enclosed spaces, but because this job is outside in the open air, she believes that there will be sufficient ventilation, and assumes that no protective equipment is needed.[16]

1. Is this worker correct in her assessment that she does not need respiratory protection? Explain.
2. What kinds of hazards are present in this situation?
3. What steps or strategies should be followed in this case, by both the employee and employer?

Case VI

"A worker performing hot work on a bulkhead stripped back the paint four inches where the welding was to be done, and began working. As the heat passed through the bulkhead, the epoxy paint on the other side of the bulkhead in the adjacent space began to smolder. Several employees working in the adjacent space were quickly affected by the noxious fumes and exited the space. Their eyes were burning and their throats were already becoming sore. They were advised to go to the medical department for treatment. One of the employees was suffering considerably more than the others. Her medical record revealed a preexisting sensitivity to epoxies, due to past exposures."[17]

1. What kinds of hazards are present in this case?
2. Discuss the actions that should be carried out by the employer and employees in order to prevent this type of accident in the future?

Endnotes

[1]OSHA, *Shipyard Industry:* OSHA 2268, OSHA, U.S. Department of Labor, 1998 (Revised).

[2]*Ibid.,* p. 9. The OSHA manual adds: "While many OSHA standards do set forth training requirements, it is important that employees who are exposed to serious hazards for which there are no standards or no training requirements are provided with training…. SHP training is meant to generally educate employees about workplace hazard awareness and prevention."

[3]*Ibid.,* p. 6. OSHA points out: "The hazard assessment and control process should address at least 'serious hazards,' workplace hazards that are causing or likely to cause death or serious physical harm to employees. This includes hazards covered by OSHA standards. This also includes all chemical, physical, biological, and ergonomic hazards not covered by OSHA standards that are causing or likely to cause death or serious physical injury or impairment."

[4]*Ibid.,* p. 4.

[5]Noise injuries are included in this category along with repetitive motion and other ergonomic injuries. They are similar in that they both tend to be long-term and cumulative in nature, and may both result in nerve damage, although noise would not typically result in musculo-skeletal injury.

[6]This approach was derived and adapted from: Labor Education and Research Service, *Hazard Recognition Slide-Tape Training Program,* Columbus, Ohio: Ohio State University. See also the use of this approach in the construction industry, in: William C. Murphy, *Achieving Health & Safety in Construction*, edited by John R. Hanson and Valerie J. Carter, Bureau of Labor Education, University of Maine, 1998, p. 26-35.

[7]*Ibid.,* p. 52-56 and 86-88. The Worksite Systems Analysis approach was developed by Valerie J. Carter, in collaboration with William C. Murphy and John R. Hanson.

[8]See OSHA guidelines and information on wood dust at: **http://www.osha.gov/SLTC/wooddust/recognition.html**

[9]See OSHA guidelines on exposure to methylene chloride: **http://www.osha.gov/SLTC/methylenechloride/factsheets/mcfsno1.html**

[10]See OSHA guidelines on styrene exposure:
http://www.osha.gov/SLTC/styrene/solutions.html
and NIOSH information:
http://www.cdc.gov/niosh/pel88/100-42.htm

[11]See NIOSH information on methyl ethyl ketone peroxide (MEKP): **http://www.cdc.gov/niosh/pel88/1338-23.html**

[12]For NIOSH information on isocynates, see:
http://www.cdc.gov/niosh/topics/isocyanates/

[13]The use of these chemicals is well documented from many resources available to boat builders, although much of the regulatory language governing their use is found in the OSHA 1910 General Industry Standards, rather than being specific to boat building. See, for example, David W. Carnell, "Safe Boatbuilding," **http://www.messingaboutinboats.com/archives/mbissuejanuary01.html**
Note: For additional information on MSDS please see:
http://www.ilpi.com/msds/index.html under the OSHA, NIOSH, and Other Government Resources Section located in the Safety References Section of this manual. Electronic Material Safety Data Sheets should be used as a reference only due to the possibility of power failure or computer malfunction during emergencies.

[14]Source: U.S. Department of Labor, OSHA, "Safety and Health Injury Prevention Sheets: Working with the Shipyard Industry;" **http://www.osha.gov/dts/maritime/sltc/ships/ships_combined.pdf** (Process: Hot Work, p. A23)

[15]Slightly adapted from U.S. Department of Labor, OSHA, "Safety and Health Injury Prevention Sheets: Working with the Shipyard Industry;" **http://www.osha.gov/dts/maritime/sltc/ships/ships_combined.pdf** (Process: Hot Work, p. A7)

[16]Based on information from U.S. Department of Labor, OSHA, "Safety and Health Injury Prevention Sheets: Working with the Shipyard Industry;" **http://www.osha.gov/dts/maritime/sltc/ships/ships_combined.pdf**
(Process: Hot Work, p. A27)

[17]U.S. Department of Labor, OSHA, "Safety and Health Injury Prevention Sheets: Working with the Shipyard Industry;" **http://www.osha.gov/dts/maritime/sltc/ships/ships_combined.pdf** (Process: Hot Work, p. A 28)

Chapter II:
Occupational Safety and Health Law

When workers and supervisors confront safety and health hazards in ship/boat building and repair, they have a right to take one or all of the following actions:

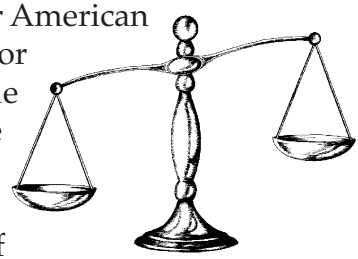
- exercise their rights under the Occupational Safety and Health Act (OSHA);
- request the National Institute for Occupational Safety and Health (NIOSH) to conduct an occupational health evaluation of their workplace;
- utilize OSHA standards and resources to identify as well as abate hazards found in ship/boat building and repair.

The following information will focus on how workers and supervisors can exercise their rights and responsibilities through these approaches.

OSHA

What Is the Purpose of OSHA?

The Occupational Safety and Health Act (OSHA) was passed by Congress in 1970 to assure, so far as possible, safe and healthy working conditions for American workers. OSHA is responsible for promulgating legally enforceable standards. Under the act, the Occupational Safety and Health Administration (OSHA) was created within the Department of Labor to enforce this statute. This federal agency seeks to implement this responsibility through:



- "strong, fair, and effective enforcement;
- outreach, education, and compliance assistance; and
- partnerships and other cooperative programs."[1]

Who Is Covered by This Law?

Essentially, OSHA covers all employers and employees in the private sector within the 50 states, as well as territories and jurisdictions under U.S. authority. Some examples include workers and supervisors employed in construction, manufacturing, business, ship/boat building and repair, agriculture, law, private educational and health care facilities, charitable organizations, labor organizations, and private relief agencies.

Who Is Not Covered By OSHA?

Those exempt from this law's coverage include: immediate family members employed on a farm that does not employ other employees; employment sectors regulated by other federal statute such as mining, certain truck and transportation sectors, and atomic energy; the self-employed; and public employees on the state and local levels of government including public education.

Do Employers Have a Duty to Provide a Safe and Healthful Workplace?

Yes. The entire act rests on the duty of the employer to provide safe and healthy working conditions. First, the employer "shall furnish to each of his/her employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm...." Second, employers "shall comply with occupational safety and health standards promulgated under this act." The standards are set by the Secretary of Labor, after notice and public hearings. Everything else in the act focuses on these two obligations.

What Do These Obligations Include?

The first obligation is the "general duty" clause, designed to cover all hazards which don't fall under a specific standard or regulation. OSHA may cite violations of this employer duty directly from the language of the act, where no published or promulgated standard exists. The "general duty" clause, also known as section 5(a)(1), only can be enforced when OSHA has determined: (1) that there is no

standard, (2) that it is a recognized industry hazard, (3) that the employer has knowledge of the unsafe condition; or that the condition is of a nature that could cause death or serious physical harm.

The second obligation is compliance with existing federal occupational safety and health standards. These standards are detailed and technical, and cover nearly all aspects of the job environment with special standards for selected industries. Employers also have a number of other legal responsibilities. Specifically they must:

- be familiar with OSHA standards, comply with all applicable OSHA standards, rules, and regulations, cooperate with OSHA compliance officers; and abate any cited OSHA violations within the time required;
- provide OSHA-mandated training, keep employees informed about OSHA as well as safety and health matters concerning them; and, upon request, provide employees with copies of OSHA standards;
- provide workers with tools and equipment that are safe, along with personal protective equipment that is adequate and used properly when needed;
- establish and maintain a system to warn employees of potential hazards; this includes an evaluation of work-place conditions, and abating potential hazards;
- maintain updated operating procedures and insure effective communication of them to employees;
- establish and maintain records of work-related injuries and illnesses; this includes keeping track of these incidences through the OSHA Log of Workplace Injuries and Ilnesses (OSHA 300), posting a copy of the OSHA 300A form, which is a Summary of Work Related Injury and Illnesses from February 1 to April 30 of the previous year; and providing current and past employees, as well as their representatives with access to the previously cited log.
- under law, provide required medical examinations, and also provide employees and others with access to medical and exposure records of employees;

- post the following: "OSHA, It's the Law" poster (OSHA 3165), and any OSHA citations and abatement notices at or near the workplace or worksite involved;
- report to the nearest OSHA office within eight hours any fatal accident or one that results in the hospitalization of three or more employees.[2]

What Are the Duties of Employees Under This Law?

Each employee also is required to comply with occupational safety and health standards and "all rules, regulations, and orders issued pursuant to this act which are applicable to his/her own actions and conduct," such as wearing appropriate personal protective equipment, and following proper procedures. Employees also have a responsibility to report any of the following to their employer: hazardous conditions, and any job-related injury, illness, or fatality. Employees also must cooperate with OSHA compliance officers.

What Rights Do Employees Have Under OSHA?

In addition to the general right to a healthy and safe workplace or worksite, other specific employee rights under this law include the right to know about the hazards of their jobs; the right to refuse to work under certain specific circumstances; and the right to complain to OSHA to have their workplace or worksite inspected. The next three sections describe these rights in more detail.

Right-to-Know

OSHA requires all employers to inform employees about workplace or worksite hazards, on the necessary precautions to be taken when working around these hazards, and emergency procedures that must be followed relating to these hazards. Employees also have the right to: (a) "observe any monitoring or measuring of hazardous materials, and see any related monitoring or medical records;" and (b) review the log and summary of work-related injuries and illnesses documented by their employer in OSHA forms 300 and 300A.[3]

Additional resources and approaches for enabling employees to obtain practical, important information on work hazards include:

Material Safety Data Sheets

Any company that manufactures, imports, or distributes hazardous chemicals must provide a material safety data sheet (MSDS) to the employer to which they ship those chemicals. The MSDS must list the chemicals' properties and dangers, the proper means of handling them, appropriate medical treatment in case of exposure, fire and explosion limit information, dangerous chemical reactions, acute and chronic health hazards, handling and labeling disposal procedures in case of accidents, and how to avoid exposure. Manufacturers, distributors, and importers of chemicals have to label all hazardous containers. Labels must identify the chemical, warn of potential dangers, and provide the name and address of the manufacturer, distributor, or importer. Appendix III provides more information on Material Safety Data Sheets.

Training

OSHA requires employers to provide employees with information and training on work hazards that is both adequate and effective. Specifically, "employees who are exposed to serious hazards must be trained so that they are able to assist in protecting themselves and other employees."[4] In addition to being relevant and applicable to the occupational health and safety conditions of the workplace, according to OSHA, basic topics that need to be included in this training involve:

- "the nature of the hazards to which the employee is exposed and how to recognize them;
- what the employer is doing to control these hazards;

- protective measures that the employee needs to follow to prevent or minimize exposure to these hazards;
- procedures to be followed in an emergency;
- the employer's safety and health program and the employee's role in that program, including opportunities to participate in it."[5]

Right to Refuse

The federal OSHA law stipulates that workers have a right to refuse to do a job under certain specific circumstances when they believe "a danger exists which could reasonably be expected to cause death or serious physical harm immediately." In other words, a hazard must be both serious and imminent. For example, a boiler about to explode is clearly an "imminent danger." On the other hand, a long-term exposure to toxic substances may not meet the "imminent danger" classification because there would normally be sufficient time to have such a hazard abated through regular OSHA inspection procedures.

When an "imminent danger" condition is discovered by an employee, he/she should act immediately by contacting a supervisor, and union representative if a member of a union. If the condition or act is not corrected, and the worker then chooses to exercise the right to refuse in this imminent danger situation, it is very important that they tell their supervisor, preferably with another person present, that while they are refusing to work at that location or function which places their life in immediate imminent danger, they are willing to continue to work at another location or function that does not pose an imminent danger.

Also, if an "imminent danger" situation is not remedied, the OSHA Area Office should be contacted. If the compliance officer determines an "imminent danger" exists, the official will attempt to have the employer abate the condition. Failing to accomplish such action, the OSHA official can then initiate legal action with the Secretary of Labor's office.

Right to Complain

If a workplace or site is unsafe or unhealthful, a number of corrective actions can be taken. First, where possible, the most expedient and fastest way to abate a hazard or correct a violation is to bring it to the attention of the employer. If this is not possible or has not worked, employees have the right to complain to OSHA, and request an inspection or investigation. Employees can do this via the phone, mail, fax, e-mail, or online. A complaint can be initiated by calling this federal agency at 1-800-321-OSHA(6742), or contacting the nearest regional, area, or state office of OSHA, or through an OSHA consultation office at **www.osha.gov.**[6] Employees also have the right to have their name withheld from their employer if they file an OSHA complaint.

What About OSHA Investigations and Inspections?

Investigations

OSHA responds to complaints by conducting either on-site inspections or off-site investigations. Generally, complaints involving "low-priority" hazards that are filed by phone, fax, e-mail, or online, are dealt with through OSHA's off-site, phone/fax investigation approach. The following summarizes OSHA's procedures when conducting this approach:

After receiving this type of a complaint, OSHA contacts the employer by phone, describes the alleged hazard, and confirms the contact with a follow-up letter or fax to the employer. Within five days, the employer must provide a written response that describes any problems and/or hazards found to exist along with the corrective actions initiated or planned. If OSHA finds the employer's written response to be adequate in addressing and correcting the hazard, an inspection will not be conducted. OSHA also provides the employee or employee representative who filed the complaint with a copy of the employer's written response. If this individual does not find the employer's response and corrective actions to be satisfactory for correcting the hazard or problem, they have the legal right to request that an on-site OSHA inspection be conducted. According to OSHA, employees do

not give up this inspection right if they are not satisfied with a phone/fax investigation.[7]

Inspections

Any of the following conditions will trigger an OSHA inspection:

- a written, signed complaint, from an employee or employee representative, claiming that an "imminent danger" exists, or that an OSHA violation exists that could cause serious harm or death;
- inadequate response from an employer to a previous OSHA phone/fax investigation;
- "imminent danger" situation or condition (OSHA places a top priority on taking immediate and corrective actions in cases of "imminent danger");
- accident resulting in the death of an employee or the hospitalization of three or more workers;
- "planned or programmed inspections" in employment sectors with statistically high incidences of occupational hazards and related injuries;
- follow-up or check-up inspections to OSHA inspections conducted previously.[8]

How Are OSHA Inspections Conducted?

An OSHA inspection consists of four parts. First, an OSHA compliance officer arrives at the workplace or site, and presents credentials to a designated employer representative. Next, an opening conference is held to enable this official to explain the purpose of the inspection and why it is being conducted. Also, during this meeting the employer and employees select their respective representatives to accompany the compliance officer during the walkaround part of the inspection. If one exists, a union designates this employee representative.

The third part is the inspection itself, which may involve only an inspection of a specific complaint or problem area, or it may involve an inspection of the entire work establishment or site. Work areas, processes and procedures, tools, equip-

ment, machinery, and any other relevant factors are inspected for both hazards and violations. During this inspection, the compliance officer may consult with the employer and employee representatives, as well as other employees in both labor and management. This official also checks and monitors whether the employer has maintained records properly on work-related injuries, deaths, and illnesses required by OSHA (discussed previously). Records also are reviewed regarding employee exposure to dangerous substances and materials.

The fourth part consists of the closing conference where the compliance officer meets with the employer and employee representatives together or separately. At this conference or conferences any unsafe or unhealthful conditions identified during the inspection are discussed along with "all apparent violations for which a citation may be recommended."[9] In addition, both employers and employees are informed of their respective rights and responsibilities after the inspection.[10]

What is an OSHA Citation?

A citation is issued when a violation of OSHA is found as a result of an inspection. The citation serves to inform both labor and management about the specific OSHA standards and regulations that have been violated. Also, it identifies any hazardous conditions that need to be abated that are covered by the general duty clause of the law, the proposed time allowed for the violations and hazard(s) to be abated, and the proposed penalties to the employer.[11]

What Rights Do Employers Have After an OSHA Inspection?

After an OSHA inspection has been conducted, employers have the right to:

- contest an OSHA citation, abatement time, or proposed penalty within 15 working days of its receipt;
- within this 15-working-day contest period, request an informal conference with the OSHA area director, who is authorized by OSHA "to reach settlement agreements

with employers that adjust citations, and penalties to avoid prolonged legal disputes;"[12]

- the protection of the confidentiality of trade secrets observed by any OSHA compliance officer during an OSHA inspection;
- apply for a temporary variance from a standard if compliance is not possible due to unavailability of materials, equipment, or personnel needed to institute the necessary changes in the specified time;
- apply for a permanent variance from a standard if proof can be supplied that the employer's facility, operation, procedures, working conditions, and approach provide protection that is at least as safe and healthful as the OSHA standard;
- appeal an OSHA citation, proposed abatement period, and penalty to an administrative law judge assigned to the case by an independent federal agency known as the Occupational Safety and Health Review Commission. Any party involved in the case, including individual Commission members, also can request a further review by the entire three-member Commission itself. And, the Commission's rulings can be appealed to a U.S. Court of Appeals.[13]

What Rights Do Employees Have After an OSHA Inspection?

After an OSHA inspection, employees also have a number of specific rights. These include the right to:

- have a separate closing conference with the compliance officer to discuss matters of employee concern relating to occupational health and safety in the workplace;
- request an informal conference with OSHA in order to discuss any findings, concerns, or issues identified during the inspection, including but not limited to any impending citation, proposed penalty, or employer contest; this informal conference has to be conducted by OSHA within the 15-working-day contest period.

- request an informal review of any decision issued by OSHA when this agency has decided not to issue a citation after an inspection based on an employee's complaint;
- contest the hazard abatement time stipulated in an OSHA citation;
- contest an employer's request to extend the hazard abatement period which is filed as a "Petition for Modification of Abatement (PMA);"[14] this has to be done within 10 days after workers or their representative have received a copy of this PMA.
- participate in any hearing to appeal an OSHA citation, abatement period, and proposed penalty.[15]

What are the addresses, phone, and fax numbers of the OSHA offices in Maine?

U.S. Department of Labor
OSHA Augusta Area Office
Federal Building, Room G-26
40 Western Avenue
Augusta, Maine 04330
Phone: 626-9160
Fax: 622-8213

U.S. Department of Labor
OSHA Bangor District Office
Federal Building, Room 240
202 Harlow Street
Bangor, Maine 04401
Phone: 941-8177
Fax: 941-8179

What Do OSHA Standards Cover?

In addition to the general-duty clause, OSHA has established safety and health standards that cover virtually all conceivable aspects of the work environment. Examples include:

Source: **www.iwitts.com**
by permission

- control of ventilation, temperature, and noise levels;
- hazard communication;
- keeping the workplace clean and orderly;
- emergency exits, fire protection, sprinklers, and evacuation plans;
- confined spaces and excavations;
- medical and first-aid treatment;

- handling and storage of compressed gas, radiation, flammable materials, explosives, toxic materials, hazardous substances and wastes;
- personal protective equipment, and fall protection;
- training procedures;
- electrical standards;
- general working conditions (waste disposal, toilets, showers, dressing rooms, and food handling).

The standards also set limits for air contaminants, fumes, and exposure to toxic chemicals. Periodic testing and monitoring of certain substances is required. Some examples are asbestos, dust, radiation, and carbon monoxide. As cited previously, when monitoring is required, employees have a right to observe the testing and have access to the records which indicate exposure to toxic or harmful materials.

The requirements specified in OSHA standards go beyond the traditional use of safety glasses, steel-toed shoes, and ear plugs. For example, OSHA standards can require changes in work practices, the environment, and machinery and not simply personal protective equipment, which also may be needed and required. When the Occupational Safety and Health Act was passed and as it has evolved, it has been accepted that the solution to occupational health and safety is not layer after layer of personal protection, but basic systemic and structural changes in job environments, practices, and any other relevant factors.

Which OSHA Standards Apply to Shipyards and Boatyards?

Shipyards

OSHA's 1915 standards "apply to all ship repair, shipbuilding, and shipbreaking employments, and related employments on the navigable waters of the U.S. (including dry-docks, graving docks, and marine railways) or at facilities located adjacent to navigable waters."[16] "Subpart B – *Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment,* and Subpart I – *Personal Protective Equipment,* apply to shipyard employment work in vessels

and vessel sections and on land-side operations regardless of geographic location."[17]

For clarification, in its directive OSHA points out how, when a shipyard hazard exists and the 1915 standard covering it is either limited or nonexistent, then OSHA's applicable Part 1910 general industry standard would apply.[18]

Boatyards

Employees and employers engaged in "boat building, repairing, or breaking operations, and related activities on or adjacent to a navigable waterway of the U.S.," also are covered by the previously cited OSHA Part 1915 shipyard standards, and applicable Part 1910 general industry standards.[19] However, OSHA's Shipyard Toolbag Directive of October 2003 allows manufacturers of mass-produced recreational boats that do happen to need a water launch to comply under 1910 rather than 1915, at their discretion. Otherwise, the "navigable waters" ruling still applies.

Boatyards that are not adjacent to or located on navigable waters of the U.S. are covered by OSHA's 1910 standards. This includes enterprises performing boat building, repair, breaking, and related activities, including recreational boats.

What About OSHA's General Duty Clause?

It is important to remember that for identified hazards not covered by a specific OSHA standard, then OSHA's General Duty Clause, 5(a)(1), is applicable to both shipyards and boatyards.

Are Shipyards and Boatyards Covered under OSHA's Hazard Communication Standard?

Yes, boatyards covered by 1910 standards are covered by this standard. Also, the requirements specified in OSHA's Hazard Communication standard in the shipyard industry "are identical" to those specified in the 1910.1200 general industry standard on hazard communication.[20] Appendix III provides an informational overview on this standard as well as Material Safety Data sheets.

Can a Worker be Disciplined or Penalized for Filing an OSHA Complaint?

No. It is illegal for a worker to be disciplined or punished for filing an OSHA complaint. Although a copy of the complaint will be presented by the compliance officer to the employer, the person complaining may have his or her name kept confidential. The complaint form provides a signature line which will not be revealed to the employer. Even if an employer knows who is invoking the OSHA complaint, the employee is given legal protection under section 11(c)(1) of the law, which states: "No person shall discharge or in any manner discriminate against any employee because such employee has filed any complaint or instituted any proceeding under... this act... or because of the exercise... of any right afforded under this act."[21] If the employee notifies the Secretary of Labor or a local OSHA office within thirty days of any act of discrimination, the Secretary can investigate the complaint and go to federal district court to get appropriate relief including rehiring or reinstatement with back pay.

Can OSHA Ever Give Employers Advance Notice for an Inspection?

Yes, but only under special circumstances which include:

- imminent danger situations which require swift correction;
- inspections that must take place after regular business hours, or that require special preparation;
- cases where notice is required to assure that the employer and employee representative(s), or other personnel will be present; and/or
- situations in which the OSHA area director determines that advance notice would produce a more thorough or effective inspection. In such a case, employers must inform their employees' representative or arrange for OSHA to take this action.

Determining and Evaluating Occupational Health Hazards Through NIOSH

In addition to working with OSHA on routine hazards, those employed in ship/boat building and repair also can utilize the resources of the National Institute for Occupational Safety and Health (NIOSH) for identifying and evaluating new or challenging health hazards on the job. An employee, employee representative, and employer have the right to request a Health Hazard Evaluation from NIOSH when any of the following conditions apply:

- "employees have an illness from an unknown cause;
- employees are exposed to an agent or working condition that is not regulated by OSHA;
- employees experience adverse health effects from exposure to a regulated or unregulated agent or working condition, even though the permissible exposure limit is not being exceeded;
- medical or epidemiological investigations are needed to evaluate the hazard;
- the incidence of a particular disease or injury is higher than expected in a group of employees;
- the exposure is to a new or previously unrecognized hazard;
- the hazard seems to result from the combined effects of several agents."[22]

The typical NIOSH health hazard evaluation involves an onsite visit of the workplace where a trained NIOSH official first meets with the employer and employees to discuss the problem(s). While observing the work areas as part of this evaluation, this official can interview employees and supervisors, review records regarding the hazard and employee exposure, and conduct any necessary medical tests including the utilization of NIOSH sampling devices. All of this can involve several visits. After its study is completed, NIOSH submits its findings to OSHA, the employer, and affected employees as soon as possible. The findings and recommendations contained in this report are not enforceable. Rather,

they are advisory and comprise a useful source for enabling an employer to address any problems or hazards identified in the evaluation.

Information to request a NIOSH health-hazard evaluation can be provided by contacting NIOSH via:

Phone: 1-800-35-NIOSH (1-800-356-4674)
Fax: 513-841-4488
Mail: NIOSH, Hazard Evaluation and Technical Assistance Branch
4676 Columbia Parkway, R-9
Cincinnati, Ohio 45226
E-mail: Using the form available through the NIOSH home page by going to: **HHE Request Form.**

What On-site Consultation Services are Available to Small Businesses?

Upon request, consultation services can be provided to small employers seeking occupational health and safety assistance at their workplace or site. Because the program is funded by OSHA, there is no cost to an employer who requests it. This service is designed to provide a thorough "appraisal of all work practices and environmental hazards of the workplace and all aspects of the employer's present job safety and health program."[23] These confidential consultation services, which are completely separate from OSHA's enforcement functions, are administered in Maine by the Safety Division of the Maine Bureau of Labor Standards (Phone: 207-624-6460). Since this program is a consultation service, no penalties or citations can be issued for any occupational health and/or safety problems identified during the process.[24]

Chapter II:
Case Study Exercises

Instructions: For each of the following case study exercises, select a team spokesperson who will be responsible for summarizing and reporting on your group's findings and recommendations:

Case I

As a group, develop strategies on how labor and management can work together to achieve a healthful and safe workplace or site by exercising their rights and responsibilities under the Occupational Safety and Health Act.

Case II

At the XYZ Ship and Boat Company employees often work below a crane while heavy objects are being moved and placed overhead. There is a rule against doing this while the crane is in operation, but the company doesn't enforce it and the workers want to make more money. Three months ago a worker was injured severely when a piece of steel slipped off a hook that lacked a safety latch. Hoists for moving objects are used far above capacities. A number of employees are very worried about their safety, but also need the money.

1. What rights do these employees have in this highly dangerous situation?
2. When exercising these rights, what are the correct procedures that should be followed by these workers?
3. What should management do in this case?
4. In the future, what approaches and procedures need to be adopted by labor and management to ensure greater protections against abnormally dangerous work situations?

Case III

Identify the chemical hazards where you work.

1. How can labor and management work together to educate each other about the hazards posed by these chemicals, and the proper safeguards to employ when using and storing them?

2. Develop a specific strategy utilizing OSHA's Hazard Communication Standard and Material Safety Data Sheets (MSDS) outlined in Appendix III.

Case IV

Recently, a boatyard has started using a new chemical compound in the coating of its fiberglass boats. As this chemical is being applied, a number of employees have complained that it causes dizziness and nausea.

1. What can the employees and employer of this yard do about this situation?

2. Which government agencies can provide assistance, and how can they be utilized effectively?

Endnotes

[1]Occupational Safety and Health Administration, U.S. Dept. of Labor, *All About OSHA, Occupational Safety and Health Administration,* OSHA 2056-08R, 2003. p. 21.

[2]*Ibid.*, p. 4-5.

[3]*Ibid.*, p. 6.

[4]OSHA, U.S. Dept. Of Labor, *Shipyard Industry,* OSHA 2268, 1998 (Revised), p. 9.

[5]*Ibid.*, p. 10.

[6]Occupational Safety and Health Administration, U.S. Dept. of Labor, *All About OSHA, Occupational Safety and Health Administration,* OSHA 2056-08R, 2003. p. 7.

[7]*Ibid.*, p. 7, 22. This section is a summary of the detailed OSHA inspection procedures cited on these pages.

[8]*Ibid.*, p. 22-23.

[9]*Ibid.*, p. 25.

[10]*Ibid.*, p. 23-26 provide detailed information on the entire OSHA inspection process.

[11]*Ibid.*, p. 25.

[12]*Ibid.*, p. 28.

[13]*Ibid.*, p. 15, 27-29.

[14]*Ibid.*, p. 28.

[15]*Ibid.*, p. 25, 27-29.

[16]U.S. Dept. of Labor, OSHA, "OSHA INSTRUCTION," Effective Date: 10/22/03, Appendix A, p. A-1.

[17]*Ibid.*

[18]*Ibid.*, p. A-2.

[19]*Ibid.*, p. 15.

[20]OSHA, U.S. Dept. Of Labor, *Shipyard Industry,* OSHA 2268, 1998 (Revised), p. 192.

[21]Occupational Safety and Health Act, P.L. 91-596, 1970, and amended by P.L. 101-552, 1990, Sec. 11(c)(1), p. 14.

[22]NIOSH Home Page, NIOSH Health Hazard Evaluations, p. 2.

[23]OSHA, U.S. Dept. Of Labor, *Shipyard Industry,* OSHA 2268, 1998 (Revised), p. 194.

[24]*Ibid.*

Chapter III:
Attaining Health and Safety in Ship and Boat Yards

This chapter consists of two parts. The first deals with labor-management safety and health committees, and suggested safety structures, for attaining as well as maintaining healthful and safe worksites. The second section supplies information on occupational health and safety resources available to labor and management in the ship/boat building and repair industry.

Labor-Management Health and Safety Committees

Joint labor-management committees often can serve as an efficient means for workers and managers to work cooperatively in the abatement of job hazards and the resolution of disputes over occupational health and safety. However, this joint committee approach only is useful when both sides are willing to make an honest and concerted effort to maintain safe and healthy working conditions and eliminate job hazards. The following recommendations are important criteria for determining the effectiveness of this type of an approach:

1. In terms of representation, a labor-management safety committee should be comprised of an equal number of labor and management. It is a good idea to have at least 1 or 2 members of any worker safety committee serve on this joint committee in addition to other employees.
2. The committee should be co-chaired by one member representing workers and one representing management. Meetings should be held at the call of either co-chair or at the request of any member. However, at least one meeting should be held every month to discuss health and safety conditions at the worksite. For larger organizations it is often helpful that a set day and time be

established for the monthly safety committee meeting (e.g., the second Thursday of every month at 1:00 p.m.). This sets an expectation within the organization that a specific day and time have been set aside to focus solely on the efforts of the safety committee. This method establishes a priority on the meeting calendar for planning purposes. Also, there should be an agenda and fixed length established for every meeting, with each session starting and ending on time.

3. The purpose of this body should involve formulating and implementing an effective safety program throughout the worksite. In addition, the safety committee provides the overall direction to the organization by setting realistic goals, reviewing applicable OSHA standards, and establishing the vision necessary for improved safety performance.
4. Each member should have mobility within designated sections of the worksite to move around, observe, and interview employees and supervisors about occupational health and safety problems. Safety committee members should establish a specified safety and housekeeping inspection program where safety committee members are actively involved in performing worksite safety and housekeeping inspections on a rotating schedule. If the committee is working within a large organization the areas inspected may have to be broken up into segments. Each area should be inspected at least quarterly.
5. Follow-up meetings should be held to ensure that previously identified hazards and safety problems have been corrected, with written documentation of all activities completed. Follow up on identified deficiencies may be done by reviewing work orders, checking off items completed against the inspection list, or by participating in work planning sessions so that priorities may be set on items identified during the inspection.
6. All committee members should be compensated for the time spent on all safety committee functions. This

would include not only time spent at meetings, but also time spent on inspections, handling safety complaints, and disseminating information on occupational safety and health.

7. The composition of the committee also is a direct determinant of its effectiveness. It is very important to have representatives of employees and management on the committee who are in a position to resolve safety hazards and problems as they arise.

Safety and Health Committee Roles

Safety and health committees can play a number of effective and useful roles, which can include:

1. Reviewing safety statistics and trends;

On a monthly basis the safety committee should be updated on the injury and illness incident rate for the previous month, types of accidents that occurred during the month and preventive measures implemented, and historical injury data for the upcoming month to prevent recurrence of previous experiences (e.g., heat stress, exposure to cold, major impacts to work systems from shutdowns, start ups, contractors). At this time the safety committee needs to review where the safety effort is in relation to goals that were established for the year. All of this information needs to be communicated to all employees on a monthly basis, so that all members of the organization will become active participants in the safety effort.

2. Educating employees and supervisors about the law;

Committee members can play a key role in educating employees and supervisors about their rights and responsibilities under the Occupational Safety and Health Act and the OSHA standards. When performing this function committee members are in an excellent position to organize needed training programs on new changes and developments in these legal areas.

3. Recommending approaches on safety and health issues;

By providing an avenue of communication between employees and managers as well as serving as an informational resource, safety committees can recommend solutions to health and safety problems, by addressing bottlenecks that may occur, and providing the right resources to address specific issues.

4. Preventing workplace hazards;

Health and safety committees also can help to reduce accidents, injuries, and occupational disease by playing a role in preventing job hazards from occurring in the first place. By having access to information regarding employer health and safety records, right-to-know data on dangerous workplace chemicals and substances, and workplace injury and illness reports, committee members are in an excellent position to identify problem areas, analyze alternatives, and recommend solutions. Accident reports (without employee names) or news accounts about other facilities, also may be used as an informational tool to reinforce the message on preventing workplace hazards.

Determining the Size of the Committee

The appropriate size of a committee depends upon such factors as the size of the employee workforce, the number and variety of health and safety problems which exist at the worksite, the number of shifts in which workers are employed, and the size of the work area. Essentially, the exact size of the committee should be based upon the number of individuals needed to deal with health and safety problems efficiently and promptly. While such a committee should be comprised of at least four members, excessively large committees should be avoided.[1]

Selection of Committee Members

Committee members should be selected or elected based upon the following important criteria: 1) their interest and commitment in working towards the achievement of a safe

and healthy working environment, 2) their practical experience and knowledge in dealing with occupational safety and health problems, and 3) their willingness to participate in training programs designed to broaden their expertise in the field of occupational health and safety.[2] Committee members should serve under staggered term limits in order to ensure greater participation and continuity.

Preparing Committee Members[3]

In order to operate efficiently and effectively, committee members need to be knowledgeable and trained in all aspects of the safety and health tasks associated with their work. In addition, members should have the following information and resources:

1. past and current records on job-related accidents, injuries, and diseases on that worksite;
2. basic resource material on OSHA, including the law itself, and all appropriate safety and health standards, digests, and pamphlets;
3. worksite occupational health and safety problems identified by labor and management through the administration of a hazard recognition survey questionnaire;
4. bibliographical and audio-visual resources dealing with occupational health and safety in ship and boat building;
5. a computer linked to the Internet in order to access current resources and contacts on occupational health and safety in ship and boat building;
6. a listing of the names, addresses, and phone numbers of occupational health and safety resource people, including federal and state OSHA officials, physicians, attorneys, industrial hygienists, educators, and any other health and safety specialists who can provide resource information and assistance to committee members; and
7. information on available meeting and training opportunities for learning about trends and developments in the occupational health and safety field. Committee

members should plan on attending at least one training program per year.

Suggested Safety Structures for Shipyards and Boatyards

Outlined below are suggestions on how a ship/boat yard may choose to organize a formal safety structure at the worksite. This outline is very comprehensive and may not apply to all yards. The best structure for any particular yard depends on the size and the current health and safety needs of the yard. Therefore, it is up to the individual yard to establish a safety structure that will best serve the yard and its employees to support the health and safety effort.

Safety Department

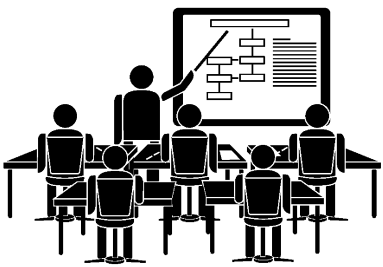
For larger yards a full-time safety professional may be on staff to work with all departments within the yard on health and safety issues. For smaller yards these responsibilities may be assigned to either designated individuals with other responsibilities or to supervisors/managers.

Safety Coordinator

A safety coordinator may be needed to assist the person with designated safety responsibilities in the yard. This position may be of limited duration during a time of need or it may be a full-time commitment. Typically this person maintains a presence "on the floor" and attends to specific duties required of the position.

Safety Committee

The role of the safety committee is to provide goals and the vision necessary to improve health and safety in the workplace. This committee should meet once a month to review safety statistics from the previous month, receive updates from active sub-committees, respond to proposals from members, discuss and address health and safety issues that



have surfaced, and oversee the safety effort year-to-date based upon goals established at the beginning of the year.

Sub-Committees

To support the safety committee several subcommittees may need to be formed to address specific areas of health and safety. A sub-committee should be activated to look at issues that need to be reviewed and make recommendations to the safety committee for action. Once a sub-committee's work has been completed the sub-committee may be deactivated until its services are needed on future issues. To provide continuity at least one member of any given sub-committee also should be a member of the safety committee. Examples of subcommittee activity might be in the following areas: a) proposed new OSHA standards, b) communications, c) training, d) inspections and follow up, e) safety policy review.

Yard Safety and Housekeeping Inspections

On at least a quarterly basis, all areas of a shipyard or boatyard should receive a safety and housekeeping inspection. These inspections should be comprehensive in nature to cover areas such as employee training, welding/burning permits documentation, confined space entry permit review, lockout audit, life safety equipment inspections, chemical labeling and disposal, and physical and health hazards identified by a walk-around inspection.

Department Safety and Housekeeping Inspections

On a monthly basis each department within the yard should hold its own safety and housekeeping inspection. These inspections should serve as a learning tool for department employees to build upon findings performed by the quarterly yard inspections. From the yard inspections department employees will learn hazard awareness and methods of preventing hazards from recurring in the future.

Crew Safety Representative

The crew safety representative is a person who serves as designated point of contact for employees within a work

group. In some cases employees may be hesitant to make direct contact with a supervisor or manager and may be more at ease bringing issues to a designated person in the work group. Typically the crew safety representative is a part of the work group. The crew safety representative works with the department supervisor to address health and safety issues in the work area. It is important that the supervisor and the yard provide the support necessary for the crew safety representative to succeed.

Monthly Department Safety Meetings

Every department in the yard should hold a monthly safety meeting with all department employees. The monthly safety topic may be selected by the yard safety representative or the department supervisor, depending on the standard that has been established. In addition to a monthly safety topic the monthly meeting should be a place where safety goals are reviewed to give an indicator of performance and any accidents and preventive measures that have taken place over the previous month. At this meeting employees also should have the opportunity to bring up any safety issues or concerns that may need to be addressed.

Toolbox Safety Review

At the start of each work day or shift a brief discussion of the day's upcoming activities should take place. This is a good opportunity to use the "Worksite Systems" approach to make employees aware of activities that may affect their work which are outside of the normal day-to-day operations, or activities they perform which may affect others. Depending on the particular work plan for the day this is also a good opportunity to focus on specifics such as condition of hand tools, cleanliness of glasses, goggles, and respirators, or other items that may be in use that particular day. This is also a very useful time to stress the importance of planning and coordinating jobs that may be particularly hazardous — so that everyone is on the same page regarding what needs to be done and how it should be done in terms of health and safety.

Ship/Boat Building and Repair Safety and Health Resources

Internet Resources

State of Maine:
Maine Department of Labor:
http://www.state.me.us/labor/SafetyWorks
http://www.safetyworksmaine.com/consultations/index.html

Maine Safety Council
http://www.mainesafety.org

The Council promotes safety, health, and accident prevention in Maine through education and training. It also serves as a resource for safety and health and educational materials for the workplace, the highway, and the home.

Maine Department of Labor publications and resources page:
http://www.safetyworksmaine.com/videos-pubs/index.html

OSHA, NIOSH, Other Government Resources:
http://www.cdc.gov/niosh/ergship/ergship.html

Ergonomic interventions in the building, repair, and dismantling of ships.

http://www.osha.gov/SLTC/etools/shipyard/index.html

Innovative OSHA etool for shipyard industry, focusing on ship repair. Extensive information on respective ship repair processes and associated hazards. Look for future development of etools for shipbuilding and shipbreaking, not yet available on this page. (eTools are "stand-alone," interactive, Web-based, highly visual training tools on health and safety.)

http://www.osha.gov/SLTC/shipbuildingrepair/index.html

OSHA page on shipbuilding safety, hazards, compliance issues.

http://www.osha.gov/SLTC/etools/shipyard/glossary.html
Glossary of technical terminology for shipyard topics.

http://www.osha.gov/dcsp/vpp/index.html
Information on OSHA Voluntary Protection Program for employers.

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=3060
Shipyard "Toolbag," clarifies relationship of Part 1915 to Part 1910 for boat builders.

http://www.osha.gov/pls/videos/videoloan.list
OSHA video loan information. OSHA videos may be freely copied.

http://www.osha.gov/OshDoc/toc_fact.html
Links to OSHA fact sheets, including Spanish versions.

http://www.osha.gov/dts/maritime/
"OSHA Assistance for the Maritime Industry" — extensive links to resources and information for maritime employers and workers.

http://www.osha.gov/dts.maritime/sltc/ships/ships_combined.pdf
Safety and Health Injury Prevention Sheets (SHIPS), jointly developed by the shipyard community and OSHA. An important resource.

http://www.osha.gov/pls/publications/pubindex.list
Order or download OSHA pamphlets, required posters, and other publications.

http://www.chemsafety.gov
Federal information on chemical accidents, investigations.

http://www.ilpi.com/msds/index.html
This is a handy reference site for Material Safety Data Sheet information. Note, however, that *this site should not be used in place of the hardcopy data sheets.* Hardcopy data sheets should always be on hand in case of power failures.

OSHA Print Resources That May Be Ordered or Downloaded (See Also the Internet Resources Section For More OSHA Publications):

The following OSHA resources, as indicated, can be found at:
http://www.osha.gov/pls/publications/pubindex.list

This publications page lists which resources may be ordered or downloaded in html or pdf (Adobe Acrobat Reader) format. Single copies of up to five publications may be selected and ordered from the page. For the electronic downloads, file size for Acrobat Reader (pdf) versions are provided with the citations here.

If you do not have Acrobat Reader, you may download a free copy from:
http://www.adobe.com/products/acrobat/readstep2.html

Some resources are also available from Fogler Library at the University of Maine, Government Documents; call numbers are provided with the citations. Use web-site resources for newest revisions. Note: some Fogler Library records have direct link to electronic file.

U.S. Dept. of Labor, Occupational Safety and Health Admin. *All About the Occupational Safety and Health Administration.* Washington, DC: DOL/OSHA, 2003. (OSHA 2056-08R).
Orono Government Documents, L 35.2:OC 1/2/994 (1994 rev.)
http://www.osha.gov/pls/publications/pubindex.list
Order, or download, 252 KB. Free resource.
This booklet gives general background on such topics as the history and purpose of OSHA, the law, state programs, standards and guidance.

U.S. Dept. of Labor, Occupational Safety and Health Admin. *Asbestos Standard for the Shipyard Employment Industry.* Washington, DC: DOL/OSHA, 2002. (OSHA 3145 Revised).
Orono Government Documents, L 35.2:AS 1/5
http://www.osha.gov/pls/publications/pubindex.list
Order only, no electronic version. Free resource.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
Crane or Derrick Suspended Personnel Platforms.
Washington, DC: DOL/OSHA, 2002. (OSHA 3100, Revised).
Orono Government Documents, L 35.2:C 85/2002
http://www.osha.gov/pls/publications/pubindex.list
Order, or download, 205 KB. Free resource.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
Model Plans and Programs for the OSHA Bloodborne Pathogens and Hazard Communications Standards.
Washington, DC: DOL/OSHA, 2003. (OSHA 3186-06R)
Orono Government Documents, L 35.2:B 62/2003
http://www.osha.gov/pls/publications/pubindex.list
Order, or download, 521 KB. Free resource.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
Control of Hazardous Energy: Lockout/Tagout.
Washington, DC: DOL/OSHA, 2002. (OSHA 3120, Revised)
Orono Government Documents, L 35.2:H 33/4/997 (1997 rev.)
http://www.osha.gov/pls/publications/pubindex.list
Order, or download, 174 KB. Free resource.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
OSHA Inspections.
Washington, DC: DOL/OSHA, 2002. (OSHA 2098, Revised)
Orono Government Documents, L 35.2:IN 7/996 (1996 revision)
http://www.osha.gov/pls/publications/pubindex.list
Order, or download, 461 KB. Free resource.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
Respiratory Protection.
Washington, DC: DOL/OSHA, 2002. (OSHA 3079, Revised)
Orono Government Documents, L 35.2:R 31/2002
http://www.osha.gov/pls/publications/pubindex.list
Order, or download, 273 KB. Free resource.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
Permit-Required Confined Spaces.
Washington, DC: DOL/OSHA, 2004. (OSHA 3138-01R)
Orono Government Documents, L 35.2:P 42/998 (1998 rev.)
http://www.osha.gov/pls/publications/pubindex.list
Order, or download, 486 KB. Free resource.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
Personal Protective Equipment.
Washington, DC: DOL/OSHA, 2003. (OSHA 3151-12R)
http://www.osha.gov/pls/publications/pubindex.list
Download only, 629 KB.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
Stairways and Ladders: A Guide to OSHA Rules.
Washington, DC: DOL/OSHA, 2003. (OSHA 3124-12R)
Orono Government Documents, L 35.8:ST 1
http://www.osha.gov/pls/publications/pubindex.list
Order, or download, 155 KB. Free resource.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
Hand and Power Tools.
Washington, DC: DOL/OSHA, 2002. (OSHA 3080 Revised)
http://www.osha.gov/pls/publications/pubindex.list
Download only, 171 KB.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
How to Plan for Workplace Emergencies and Evacuations.
Washington, DC: DOL/OSHA, 2001. (OSHA 3088 Revised)
http://www.osha.gov/pls/publications/pubindex
Download only, 251 KB.

U.S. Dept. of Labor, Occupational Safety and Health Admin.
Training Requirements in OSHA Standards and Training Guidelines.
Washington, DC: DOL/OSHA,1998. (OSHA 2254 Revised)
http://www.osha.gov/pls/publications/pubindex
Download only, 720 KB.

Regulatory Standards for Boatyards and Shipyards:

Shipyard Industry contains the 1915 standards, and generally applies to ship and boatyards located on navigable waters. *The Title CRF 29* standards, a two-volume document, contains the 1910 standards, General Industry, for boatyards not located on navigable waters.

Shipyard Standards (1915 Standards). U.S. Dept. of Labor, Occupational Safety and Health Administration. *Shipyard Industry.* Washington, DC: DOL/OSHA,1998. (OSHA 2268 Revised) Orono Government Documents, L 35.6/4:SH 6/998

Shipyard Industry is a free resource. Write to: U.S. Department of Labor, OSHA Publications, P.O. Box 37535, Washington, D.C. 20013-7535; or call (202) 693-1888, fax (202) 693-2498. You can also review these regulations online:
http://www.osha.gov/pls/oshaweb/owastand.display_standard_group?p_toc_level=1&p_part_number=1915

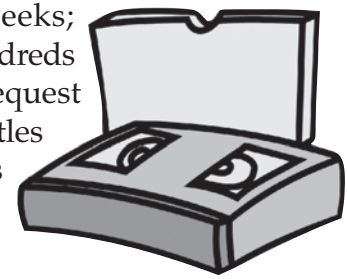
General Industry Standards (1910 Standards). The following two-volume publication contains the OSHA 1910 standards for General Industry: Office of the Federal Register, National Archives and Records Administration. *Code of Federal Regulations. 29, Labor.* Washington, D.C.: OFR/NARA, 2003 Orono Government Documents, AE 2.106/3:29/pt.900-1899/992

The 1910 Standards may be purchased from the Government Printing Office by Visa, MasterCard, or check.
By mail: Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.
By phone: (202) 512-1800.
Volume 1, $44.00, order # S/N 869-034-00104-1;
Volume 2, $27.00, order #S/N 869-034-00105-0.
You can also review these regulations online:
http://www.osha.gov/pls/oshaweb/owastand.display_standard_group?p_toc_level=1&p_part_number=1910

See also OSHA's Shipyard "Tool Bag" Directive, available *online only:* **http://www.osha.gov/OshDoc/Directive_pdf/STD_02-00-003.pdf** Appendix A of this document contains a detailed table covering the applicability of specific 1910 standards to shipyard employment.

Video Safety Resources

http://www.safetyworksmaine.com/videos-pubs/videolst.html
Maine DOL video library page. Call 1-877-SAFE-345 to borrow videos, which circulate for 2 weeks; maximum of 2 videos at a time. Hundreds of titles are available. The video request form is available on the web page. Titles include such shipbuilding topics as welding, confined spaces, cranes.



http://www.osha.gov/pls/videos/videoloan.list
OSHA video loan information. OSHA videos may be freely copied.

Special Safety Training Resources

http://www.safetyworksmaine.com/training/index.html
This link contains information on a **30-Hour General Industry Safety training course offered by the Maine Department of Labor.** This 5-day course introduces people new to the safety and health field to the OSHA standards for general industry (29 CFR 1910), which apply to most boatyards (see Regulations section of this manual). People who complete all 5 days receive OSHA 30-hour general industry course completion cards. Site includes search tool for locating courses for specific dates and Maine cities. Useful for those boatyards that comply under the OSHA General Industry Standards.

SafetyWorks
http://www.safetyworksmaine.com/consultations/index.html
Contact information for free, confidential on-site safety and health consultation, independent of OSHA. Includes sampling for air and noise exposures; information on OSHA compliance. Also call toll free, 1-877-723-3345.

Professional Associations

Maine Marine Trade Association, P.O. Box 3551 Portland, ME 04104-3551, 773-8725, Contact: Sue Swanton.

Periodicals and Related Resources

American Industrial Hygiene Association Journal. **http://aiha.org**

American Journal of Hygiene. Baltimore, Published by School of Hygiene and Public Health, Johns Hopkins University through the Johns Hopkins Press. Available at Fogler Library.

Maine Maritime Trade Association. *Summary of Findings and Action Plan for Maine Marine Trade Association.* Portland, ME: Marine Trade Businesses, Summer 2003. Contact: Sue Swanton, Maine Marine Trade Association, P.O. Box 3551, Portland, ME 04104-3551, 773-8725.

Stellman, Jeanne Mager. *Encyclopedia of Occupational Health and Safety,* 4th Ed. (print and CD). ILO., 1998. See Chapter 92, **Ship and Boat Building and Repair,** by James R. Thornton, Chapter Editor. Availability information: **www.ilo.org/public/english/support/publ/textoh.htm**

Hudock, Stephen D. *Compendium of Ergonomic Analyses of Shipyard Work Processes.* Cincinnati, OH: NIOSH, May 2003. 66 pp.; **http://www.cdc.gov/niosh/ergship/Compendium.pdf**

Chapter III:
Case Study Exercises

Instructions: For each of the following case study exercises, select a team spokesperson who will be responsible for summarizing and reporting on your group's findings and recommendations:

Case I

You are working at a yard that has 200 employees. There are 140 employees who are involved in boat construction, 20 maintenance employees, 20 yard service personnel, and 20 management and office support employees.

Exercise A.

By using your handbook as a reference guide, what type of formal safety structure would you propose for this yard?

Exercise B.

Looking at your own yard, what type of formal safety structure would you propose?

Case II

Your company has decided to form a labor–management safety committee. There are fifty employees at the company which operates one boatyard. The boatyard is made up of the following departments:

Marine Services — Provides launching and hauling services, tends moorings, repairs outboard and inboard engines, and takes care of boat storage areas.

Boat Repair — Repairs wooden, steel, and fiberglass hulled boats ranging in size from 12 to 70 feet.

Maintenance — Takes care of equipment repairs throughout the yard (this includes mechanical and electrical) for all yard-owned equipment.

Management — Includes human resources, yard manager, accounting, and two supervisors.

Sales — Two sales personnel spend 90% of their time on the road locating new business for the company.

Manufacturing — Involved in the building of steel and fiberglass hulled boats and occasionally a wooden hulled craft of various lengths. There are four standard models but custom built models will be made if the yard is capable.

Parts Room — Storage room for spare parts, rigging, and daily supplies.

College Student — "Helps out" in the yard in July and August.

Seasonal Help — Additional staff put on during the summer months to assist with launchings and moorings.

Based on the information provided above, a labor/management safety committee needs to be established, and the following questions and issues need to be addressed:

1. What will be the size of the committee?
2. List what areas will be represented on the committee and the reasons why.
3. How often should the committee meet?
4. Which workplace safety and health issues need to be dealt with first and why?

Case III

Recent accident statistics show that your yard is experiencing a high rate of back injuries. The safety committee, of which you are a member, needs to come up with effective recommendations on how to prevent back injuries in the workplace.

1. Identify resources, organizations, and individuals who can provide assistance to the committee in this area.

2. The committee is responsible for the implementation of certain policies and practices to help reduce back injuries. How should the committee do this?

Case IV

Assume that presently, the yard where you are employed does not have a safety committee or a formal safety structure in place. Although there are safety meetings and periodic training sessions, you and your coworkers feel that health and safety issues could be improved by having an active safety committee at the yard along with some type of safety structure.

You will need to propose this idea to the yard's management and owners by developing a rationale for why a safety structure and a safety committee are needed. This rationale should contain the following parts which need to be completed by you:

Part 1: Using the suggested safety structure information in the handbook as a guide, propose a safety structure for your yard and list the reason(s) why each of the elements of the structure are necessary.

Part 2: Propose a safety committee by listing departments within the yard that should be represented, and the number of employees from each department that should be on this committee.

Part 3: Propose roles that the safety committee would play in assisting with specific health and safety issues.

Part 4: What are you prepared to do as an individual to support the yard's new safety efforts?

Endnotes

[1]Fowler, Robert, *A Guidebook for Local Union Health and Safety Committees,* Berkeley California: Center for Labor Research and Education, p. 6.

[2]*Ibid.*

[3]Based in part on the previously cited source.

Appendix I:
Shipyard Trade Occupational Risk Matrix (STORM)

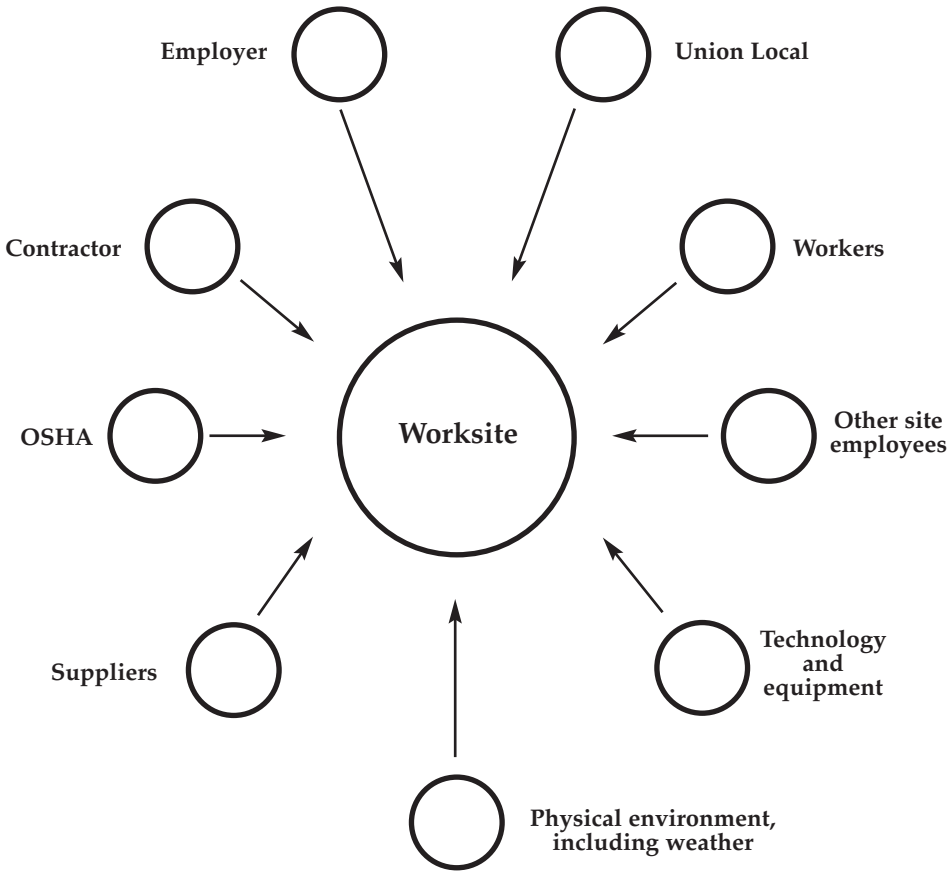
	Sustained Postures	Awkward Postures	Repetition	Vibration	Excessive Force
Abrasive Blasters	(1) Arms (2) Shoulders (3) Back	(1) Arms (2) Shoulders (3) Back	(1) Arms (2) Shoulders	(1) Arms (2) Shoulders	(1) Arms (2) Shoulders (3) Back
Burners/ Torch Cutters	(1) Knees (2) Back (3) Neck (4) Shoulders (5) Arms (6) Hand/Wrist	(1) Knees (2) Back (3) Neck (4) Shoulders (5) Arms (6) Hand/Wrist			
Electricians	(1) Back	(1) Back (2) Knees (3) Hand/Wrist	(3) Hand/Wrist (5) Arms		(1) Back (3) Hand/Wrist (4) Shoulders (5) Arms
Grinders/ Chippers	(1) Back (2) Knees (3) Arms (4) Shoulders (6) Neck	(1) Back (2) Knees (3) Arms (4) Shoulders (5) Hand/Wrist (6) Neck	(3) Arms (4) Shoulders (5) Hand/Wrist	(3) Arms (4) Shoulders (5) Hand/Wrist	(3) Arms (4) Shoulders (5) Hand/Wrist
Insulators	(2) Shoulders (3) Neck (4) Back	(1) Hand/Wrist (2) Shoulders (3) Neck (4) Back	(1) Hand/Wrist (2) Shoulders		(1) Hand/Wrist (2) Shoulders
Machine Operator	(1) Back (2) Neck	(1) Back (2) Neck	(1) Back (3) Shoulders (4) Hand/Wrist		(1) Back (3) Shoulders
Material Handlers		(1) Back (3) Shoulders (3) Arms	(1) Back (2) Shoulders (3) Arms		(1) Back (2) Shoulders (3) Arms
Outside Machinists	(1) Back (2) Neck	(1) Back (2) Neck	(3) Shoulders (4) Hand/Wrist	(3) Shoulders (4) Hand/Wrist	(1) Back (3) Shoulders
Pipefitters		(1) Back (2) Knees (3) Arms (4) Neck	(3) Arms (5) Hand/Wrist	(3) Arms (5) Hand/Wrist	(1) Back (3) Arms (5) Hand/Wrist

Relative Risk Factor	High Risk	Medium Risk	Low Risk	No Risk

Matrix based on analysis of injury and cost data and quantitative risk factor analysis of targeted shipyard work processes.

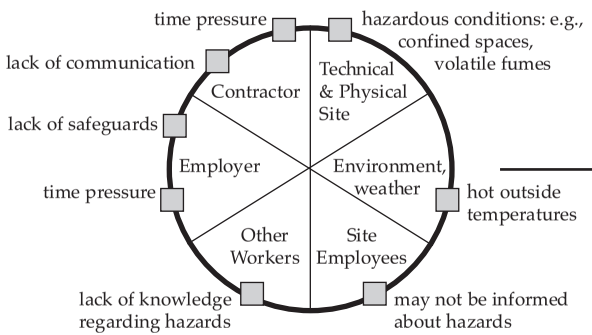
Source: Hudock, Stephen D. *Compendium of Ergonomic Analyses of Shipyard WorkProcesses.* Cincinnati, OH: NIOSH, May 2003, vii-viii.

Appendix II-A:
Some Key Elements in a Worksite System

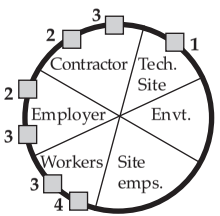


Appendix II-B:
How a Worksite Accident in a Shipyard Develops Across Time (Using a Worksite Systems Approach)

Initial conditions at Worksite
(7:30 a.m.)

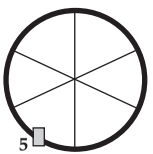


Later that morning
(8:30 a.m.)



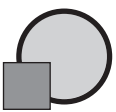
1) fumes from fuel seep into bilge on ship
2) time pressure to complete work fast
3) safety information on fumes not communicated
4) worker distracted by heat and stress

Later Still
(11:17 a.m.)



5) worker enters confined space of bilge and ignites welding torch

Accident Occurs
(11:18 a.m.)



6) worker severely burned in explosion

Appendix III:
OSHA's Hazard Communication Standard and Material Safety Data Sheets

The Federal Hazard Communication Standard

The following provides information on employee rights and employer requirements pertaining to this standard:

Hazard Evaluation

Employers covered by the standard are required to: (1) review the available scientific evidence concerning the hazards of chemicals they produce, use or import in their workplace and (2) report the information they find to their employees as well as to employers who purchase their products.

Written Hazard Communication Program

Employers must establish a written, comprehensive hazard communication program which includes provisions for container labeling, material safety data sheets, and an employee training program. Also, it must contain a list of the hazardous chemicals in each work area, the means the employer will use to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels), hazards associated with chemicals in unlabeled pipes, and the way the employer will inform contractors in manufacturing and non-manufacturing facilities of the hazards to which their employees may be exposed.

Labeling

All containers of hazardous materials leaving a manufacturer must be labeled with information regarding the safety and hazards of the substance. Specifically, all containers must contain the following information:

1) chemical or common name of all hazardous materials in the container;
2) name and address of the manufacturer or importer of the material;

3) warning information describing the hazards of the chemicals (both physical and health).

Material Safety Data Sheets

Employers covered by the standard must develop and maintain up-to-date material safety data sheets (MSDS) for each hazardous chemical produced, imported, and/or used in their workplace. In addition to the basic identity information required, the employer must provide data on:

1) the physical and chemical characteristics of the hazardous chemical;
2) known acute and chronic health effects and related information;
3) exposure limits;
4) whether the chemical is a carcinogen;
5) precautionary measures;
6) emergency and first aid procedures;
7) identification of the organization responsible for preparing the sheet.

Copies of the MSDS must be made accessible to all employees in the work areas.

Employee Information and Training

Employers must establish a training and information program for employees exposed to hazardous chemicals in their work area at the time of initial assignment and whenever a new hazard is introduced into their work area.

Information

The discussion topics must include, at least:

1) the existence of this hazard communication standard and the requirements of the standard;
2) the components of the hazard communication program in the employees' workplaces;
3) operations in their work area where hazardous chemicals are present;

4) where the employer will maintain hazard communications programs, lists of hazardous chemicals, and the required material safety data sheets.

Training

The employee training plan must consist of:

1) how the hazard communication program is implemented in that workplace, how to read and interpret information on labels and MSDS, and how employees can obtain and use the available hazard information;
2) the hazards of the chemicals in the work area;
3) measures employees can take to protect themselves from the hazards;
4) specific procedures put into effect by the employer to provide protection such as work practices and the use of personal protective equipment (PPE);
5) methods and observations — such as visual appearance or smell workers can use to detect the presence of a hazardous chemical they may be exposed to.

Applicability of Federal Preemption

The revised Hazard Communication Standard also clarifies (according to OSHA's interpretation) the "parameters of preemption." Specifically, this standard stipulates that any state or local government occupational "right-to-know" law is preempted by the Federal Hazard Communication Standard "unless it was established under the authority of an OSHA approved state plan."

Sources

U.S. Department of Labor, OSHA, *Chemical Hazard Communication,* 1985, OSHA 3084.

BNA, *Union Labor Report,* Washington, DC: BNA, August 27, 1987, p. 1 and July 28, 1988, p. 1 editions.

U.S. Department of Labor, *Federal Register, Rules and Regulations,* Vol. 52, No. 163, Washington, DC: U.S. Government Printing Office, August 24, 1987, p. 31861.

Research Institute of America, *Employment Coordinator,* New York, NY: RIA, December 21, 1988, ed., p. 4.

What Should Be Known About Material Safety Data Sheets (MSDS)?

What Are Material Safety Data Sheets?

Material Safety Data Sheets (MSDS) supply very important information about chemicals used in the workplace. In addition to providing the name and address of the manufacturer, they also describe the various properties and characteristics of the chemical substance, outline basic precautions which need to be taken for safe handling and use, and supply valuable information regarding health hazards relating to the substance. A MSDS is made up of eight sections:

Section I identifies the chemical, the name and address of the manufacturer, phone numbers for use in emergencies or to obtain more information, and the date in which the MSDS was prepared. (Note: The date is particularly important in making sure the information contained in the MSDS is fully up-to-date as required by law.)

Section II cites the hazardous ingredients and properties of the chemical. This includes the identity as well as common name of the chemical, OSHA Permissible Exposure Limits (PEL), established Threshold Limit Values (TLV), and any other recommended limits.

Section III contains information on the physical and chemical characteristics of the substance including the boiling point, vapor pressure and density, water solubility, appearance and odor, evaporation rate, and melting point.

Section IV supplies fire and explosion hazard data including the flash point of the substance, flammable limits, extinguishing media, special fire fighting procedures, and unusual fire and explosion hazards.

Section V includes information on some of the conditions which can cause the substance to react dangerously. For example, this section, entitled Reactivity Data, contains data on the stability and instability of the substance and conditions to avoid, its incompatibility with other materials, and any hazardous decomposition properties or by-products

associated with it. This section also supplies data on conditions that would cause this chemical to polymerize or break up and release hazardous chemicals into the work environment, and conditions to avoid.

Section VI describes both the acute and chronic health hazards associated with the chemical, its routes of entry into the body, whether through the skin, inhalation, or ingestion, carcinogenicity, signs and symptoms of exposure, medical condition generally aggravated by exposure, emergency first aid procedures, and whether there is an OSHA regulation on the chemical.

Section VII deals with precautions for safe handling and use of the chemical in terms of steps to be taken in case the material is released or spilled, waste disposal methods, precautions to be taken in handling and storing, and other precautions to be adopted.

Section VIII covers control measures needed to protect employees from exposure to the chemical. These measures include personal protective equipment, devices, and clothing, engineering controls including respiratory protection, local exhaust and mechanical controls, work and hygienic practices.

How Can A MSDS Be Obtained?

There are several ways in which workers can obtain a MSDS:

1. Employers covered by OSHA's Hazard Communication Standard must develop and maintain up-to-date MSDS for each chemical produced, used, or imported in their workplace. Copies of the MSDS must be made accessible to all employees in work areas during all shifts.
2. A MSDS also can be obtained by writing directly to the producer of the chemical.

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