Introduction

Hazards Recognition and Mitigation
Introduction

What is a Hazard

• A hazard is a …
  – Practice, behavior, condition or situation, or a combination of these, that can cause injury or illness in people, or damage to property.
  – Uncontrolled hazards may cause problems that range from minor nuisances to very serious consequences and even death.
Importance to Recognize

- Supervisors, managers, owners, workers ...
  - Must pay attention to hazards because they may seriously harm workers, public, property, environment.
  - Recognizing, assessing and mitigating or controlling hazards is an integral part of an effective safety program.
  - Hazards can be divided into two types: Health and Safety.
Health vs. Safety Hazards

• Health Hazards
  – Chemical: includes any form of chemical such as compressed gases, solvents, lead and others.
  – Physical: includes noise, vibration, heat, cold and radiation
  – Ergonomic: includes design of the workplace and jobs that involve repetition, force and posture.
  – Biological: includes organisms or toxic substances produced by living things that can cause illnesses or disease in humans (e.g., bacteria, viruses, fungi, parasites and insects).

TIP: OSHA’s top health standards cited by the agency in 2011 included: Hazard Communication (e.g. materials safety data sheets,
Hazards

Health vs. Safety Hazards

• Safety Hazards:
  – Machine: includes hazards from moving parts like rotating shafts, belts, pulleys, blades and saws.
  – Energy: includes pneumatic or hydraulic pressure, steam, heat and electricity.
  – Material Handling: includes manual and mechanical handling (e.g., lifting, lift trucks, conveyors)
  – Work Practices: includes failure to have or follow safe work practices.
Hazards

Focus Four

• The top four causes of construction fatalities: Falls, Struck-By, Caught-In/Between and Electrocutions.
  – Falls – 260 (35%)
  – Electrocutions – 76 (10%)
  – Struck by Object – 63 (8%)
  – Caught-in/between – 32 (4%)
Hazard Recognition Tools

Observations / Concerns

- Observation and Worker Concerns
  - Most common method of recognizing hazards is by observation and through worker concern.
  - Individuals may notice hazards or have concerns about potential hazards at any time and should report these.
  - Encourage reporting of suspected hazards by all employees.
  - Having the advantage of “fresh eyes” can identify previously unnoticed hazards.
  - Existence of hazards may indicate inadequate, substandard or deteriorated controls, practices or working conditions.

TIP: Workers often see problems or raise concerns when they believe something in the workplace is hazardous. They may have pain or discomfort, notice unusual odors or strain to complete certain tasks. Supervisors are required to be competent and to take every reasonable precaution to protect the worker. Therefore, supervisors should investigate worker concerns to determine if there is a hazard or if controls could be improved.
Hazard Recognition Tools

Inspections

• Workplace inspection is a regular and common method of recognizing hazards.
  – Identify hazards that could endanger the health or safety of anyone in your workplace.
  – Workplace are intended to:
    • identify and record potential and actual hazards
    • identify any hazards that require immediate attention
    • ensure that existing health and safety standards and procedures are met
    • ensure that existing controls are working
    • collect information to make recommendations for corrective actions
Hazard Recognition Tools

Inspections

• Five Steps to Effective Inspections
  – 1. Establish inspection procedures
  – 2. Prepare for the inspection
  – 3. Conduct the inspection
  – 4. Report the findings and make recommendations
  – 5. Follow-up
Hazard Recognition Tools

Investigations

- Using information collected from an investigation is an important method of recognizing hazards.
  - Investigations are conducted to gather information on the root causes of an incident or situation that may have caused an illness, injury, or damage to property.

- Investigations help:
  - identify the immediate and root causes of the incident, injury or illness
  - analyze the information gathered to determine ways to prevent future incidents, injuries and illnesses
  - improve or update policies, procedures and training programs

TIP: It is good practice to investigate any injury, illness or incident (near miss) to help prevent more serious events the next time. Completing effective investigations can also have a positive effect on the organization’s bottom line by improving worker–employer relations. Interviews are an important part of the investigation process.
Investigations

• Four Steps to Effective Investigations:
  – 1. Secure and manage the scene
  – 2. Notify the appropriate people
  – 3. Investigate
  – 4. Report
Hazard Recognition Tools

Records Examination / Review
• Examining records ...
  – Assist in recognizing patterns and frequencies of injuries or illnesses.
  – By looking for trends, you will be able to decide where to focus prevention efforts.
  – The type of workplace records that may be examined include:
    • First aid reports
    • Worker’s comp. /liability claims
    • Incident reports
    • Inspection reports
    • Investigation reports
    • Material Safety Data Sheets (MSDSs)
Hazard Recognition Tools

Records Examination / Review

• The information gained from examining records can be used to:
  – identify injuries and illnesses and trends
  – measure the effectiveness of your health and safety program
  – raise awareness of health and safety
  – help to make recommendations and priorities
  – support decisions affecting health and safety.
Task Analysis

- Task and process analysis ...
  - Involves breaking a job or process down into individual steps and carefully looking for hazards at each one by examining it and its relationship to the other steps.
  - Task and process analysis should involve the people doing the jobs because they can provide valuable information about how jobs are done and where problems exist.

TIP: Three Steps to Task and Process Analysis
1. Identify tasks, steps and/or the relationship between these
2. Identify the contributing factors at each step
3. Identify the hazards associated with each task and contributing factor combination.
Recognition Procedures

Set Standards
• Develop standards and procedures for:
  – responding to observations and worker concerns
  – inspections
  – investigations (that will allow you to find the root causes of injuries and illnesses and solutions to hazards)
  – examining records (what records should be kept, what information should be tracked)
  – task and process analysis (documentation of methods and best work practices)
Recognition Procedures

Communicate

• Make sure workers know ...
  – The standards and know how and why to report hazards
  – Make sure results of inspections and investigations are communicated to the appropriate persons.
Recognition Procedures

Training

• Make sure the appropriate people are trained to:
  – identify hazards
  – report and respond to all observations and worker concerns
  – do inspections
  – do investigations
  – examine records
  – do task and process analysis (review how the work is done).
Recognition Procedures

Evaluate and follow-up

– Periodically review procedures

  • (both those procedures documented and being practiced on the jobsite) to see if hazards are being recognized and action taken.
Recognition Procedures

Acknowledge Success

- Make Improvements
  - acknowledge those who reported hazards and contributed to the recognition of hazards
  - revise procedures as needed.
Exercise

Now let’s consider a scenario in which we’ll ask you to:

1. Describe the types of recognition methods that are used or could be used to bring the hazard(s) to the employer’s attention. Describe the type of hazard.

2. Assess the potential consequences from the hazard (think about injury, illness and/or property damage) if nothing were done.

• Pete is a site supervisor overseeing a sheetrocking installation. Pete sees sheetrock dust on a daily basis and is not concerned about anything. If it gets a little dusty, Pete simply puts on a dust mask.
Hazard Evaluation

Testing and Metering

• Once a hazard is recognized or potentially recognized ...
  – You’re just not sure if it is a hazard, it may require further hazard evaluation, testing and metering.
  – Oftentimes a safety or industrial hygiene professional using approved exposure assessment strategies characterize and/or monitor workers’ potential exposures to a hazard such as electrical, noise, poor illumination, trench wall characteristics, chemical and physical hazards.
Hazard Evaluation

Baseline Surveys

• Safety and industrial hygiene staff may perform ...
  – Baseline surveys and periodic resurveys of work areas and operations as needed to identify and evaluate potential worker safety and health risks.
  – Surveys often include some type of safety or industrial hygiene monitoring, such as air or wipe sampling, to measure the amount or concentration of the hazards.

TIP: For example, it is common in today’s world for a contractor to conduct air and wipe sampling of surfaces to determine the presence and concentration of lead on a reconstruction project.
Hazard Evaluation

Hazard Determination

• With respect to chemical (e.g. gas, vapor, dust) and physical health hazards (e.g. noise, temperature stress, etc.),
  – Once the presence and concentrations of specific chemicals or classes of chemicals or types of physical health hazards have been established (e.g. heat stress), the degree of hazard associated with these chemicals or hazardous agents must be determined.
  – This is done by referring to standard reference sources (e.g. OSHA) for data and guidelines on permissible levels of exposure, flammability, heat illness index etc.
What is Hazard Control?

• Hazard Control is a type of hazard mitigation.
  – Hazard control consists of all those programs and steps necessary to protect workers from exposure to a hazard whether it be chemical, physical, biological or ergonomic or system, and
  – Procedures required to monitor worker exposure to hazards such as chemicals, materials or substance, or other types such as noise and vibration.

TIP: A hazard control program should be in writing, outline which methods are being used to control the exposure and how these controls will be monitored for effectiveness. Hazard control information and program must be effectively communicated to all supervisors who in turn communicate and enforce that program at the jobsite.
Hazard Mitigation / Control

Elimination

• Hazard elimination is the process of ...
  – Removing the hazard or hazards completely from the workplaces.
  – Essentially, the hazards are not present anymore. Hazard elimination is the most effective method in controlling hazard.

TIP: For example, sometimes a contractor, owner or worker will keep an old poorly guarded machine or tool or an old cracked wooden ladder around for infrequent use or “I might use that tool, or ladder sometime in the future”. Following hazard elimination, the tool or machine or ladder would be completely removed from the site and safely disposed of.
Substitution

- Substitution occurs when a new chemical or substance is used...
  - Instead of another chemical.
  - It is sometimes grouped with elimination because, in effect, you are removing the first substance or hazard from the workplace.
  - Goal is to choose a new chemical that is less hazardous than the original.
  - For example instead of using certain pesticides which may cause a biological hazard, use "natural" pesticides such as pyrethrins or instead of using organic solvents such as toluene or turpentine (chemicals that may cause various effects on body) use instead water-detergent solutions.

TIP: It is important that make sure the substitute or substance is not causing any harmful effects, and to control and monitor exposures to make sure to the replacement chemical or substance is below occupational exposure limits.
Hazard Mitigation / Control

Engineering Controls

• First and best strategy is to control the hazard at its source.
  – Engineering controls do this, unlike other controls that generally focus on the employee exposed to the hazard.
  – The basic concept behind engineering controls is that, to the extent feasible, the work environment and the job itself should be designed to eliminate hazards or reduce exposure to hazards.

TIP: Engineering controls include eliminating toxic chemicals and replacing harmful toxic materials with less hazardous ones, installation of guardrails or safety nets as fall protection, enclosing work processes or confining work operations, and installing general and local ventilation systems.
Hazard Mitigation / Control

Engineering Controls

• Engineering controls can be simple in some cases.
  – If feasible, design the facility, equipment, or process to remove the hazard or substitute something that is not hazardous.
  – If removal is not feasible, enclose the hazard to prevent exposure in normal operations.
  – Where complete enclosure is not feasible, establish barriers or local ventilation to reduce exposure to the hazard in normal operations.
Hazard Mitigation / Control

Safe Work Practices

- Safe work practices include
  - your company’s general workplace rules and other operation-specific rules.
  - For example, even when a hazard is enclosed, exposure can occur when maintenance is necessary.
  - Through established safe work practices, employee exposure to hazards can be further reduced.
Hazard Mitigation / Control

Safe Work Practices

- Work practice controls ...
  - Alter the manner in which a task is performed.
  - (1) following proper procedures that minimize exposures while operating production and control equipment;
  - (2) inspecting and maintaining process and control equipment on a regular basis;
  - (3) implementing good house-keeping procedures;
  - (4) providing good supervision and
  - (5) mandating that eating, drinking, smoking, chewing tobacco or gum, and applying cosmetics in regulated areas be prohibited.

TIP: Depending on the type of industry and the operations, work practices for specific OSHA standards or to recognized hazards may be required. Some of these specific areas include:

- Lockout/Tagout [29 CFR 1910.147].
- Confined Space Entry [29 CFR 1910.146].
- Hearing Conservation [29 CFR 1910.95].

This list is not all-inclusive. Refer to the specific OSHA standard for information and guidance on the required elements for these individual programs.
Hazard Mitigation / Control

Administrative Controls

• Safe work practices are a type of administrative controls,
  – Administrative controls include controlling employees' exposure by scheduling production and workers' tasks, or both, in ways that minimize exposure levels.
  – For example, the employer might schedule operations with the highest exposure potential during periods when the fewest employees are present.

TIP: Administrative controls also include scheduling additional relief workers, exercise breaks and rotation of workers. These types of controls are normally used in conjunction with other controls that more directly prevent or control exposure to the hazard.
PPE

• When exposure to hazards ...
  – Cannot be engineered completely out, when safe work practices and other forms of administrative controls cannot provide sufficient additional protection, or while such controls are being instituted, and in emergencies a supplementary method of control is the use of protective clothing or equipment.
  – This is collectively called personal protective equipment, or PPE.

TIP: For example, respirators may be needed to protect against elevated dust levels. In addition, personal protective equipment such as gloves, safety goggles, helmets, safety shoes, and protective clothing such as high visibility clothing or personal flotation devices may also be required. To be effective, personal protective equipment must be individually selected, properly fitted and periodically refitted; conscientiously and properly worn; regularly maintained; and replaced as necessary.
Hazard Mitigation / Control

Preventive Maintenance Systems

• Good preventive maintenance plays a major role ...
  – Ensuring that hazard controls continue to function effectively.
  – Also keeps new hazards from arising due to equipment malfunction.
  – Reliable scheduling and documentation of maintenance activity is necessary.
  – Scheduling depends on knowledge of what needs maintenance and how often.
  – Point of preventive maintenance is to get the work done before repairs or replacement is needed.
  – Certain OSHA standards also require that preventive maintenance be done. For example, a preventive maintenance program is required for overhead and gantry cranes.
Emergency Preparation

• During emergencies, hazards appear that normally are not found in the workplace.
  – May be the result of natural causes (floods, tornadoes, etc.), events caused by humans but beyond control (train or plane accidents, terrorist activities, etc.), or within a firm’s own systems due to unforeseen circumstances or events.

TIP:
You must become aware of possible emergencies and plan the best way to control or prevent the hazards they present. Some of the steps in emergency planning include:
• Survey of possible emergencies;
• Planning actions to reduce impact on the workplace;
• Employee information and training;
• Emergency drills as needed
Summary and Conclusion

- Supervisors, managers and employees must initially and continually recognize all worksite conditions.
  - Become aware of hazards on your jobsite
  - Become aware of hazards in your industry
  - Create or actively participate in safety teams
  - Encourage employee reporting of hazards
  - Have an adequate system for reporting hazards
  - Have trained personnel conduct inspections of the worksite and correct hazards
  - Ensure that any changes in process or new hazards are reviewed
  - Seek assistance from safety and health experts
Summary and Conclusion

Continually Review Site

• Some ways to prevent and control hazards are:
  – Regularly and thoroughly maintain equipment
  – Ensure that hazard correction procedures are in place
  – Ensure that everyone knows how to use and maintain personal protective equipment
  – Make sure that everyone understands and follows safe work procedures
  – Ensure that, when needed, there is a medical program tailored to your facility to help prevent workplace hazards and exposures.
Summary and Conclusion

Sources of Information and Assistance

• Thank you for your time and success in completing this module.

• OSHA’s Safety and Health Management Systems eTool
  http://www.osha.gov/SLTC/etools/safetyhealth/

• OSHA’s booklet Job Safety Analysis
  http://www.osha.gov/Publications/osha3071.pdf
Summary and Conclusion

Employer Responsibilities

• Summary of most important:
  – Provide a workplace free from serious recognized hazards and comply with standards, rules and regulations issued under the OSHA Act.
  – Examine workplace conditions to make sure they conform to applicable OSHA standards.
  – Make sure employees have and use safe tools and equipment and properly maintain this equipment.
  – Use color codes, posters, labels or signs to warn employees of potential hazards.
  – Establish or update operating procedures and communicate them so that employees follow safety and health requirements.
Summary and Conclusion

Employer Responsibilities

• Summary of most important:
  – Provide medical examinations and training when required by OSHA standards.
  – Post, at a prominent location within the workplace, the OSHA poster informing employees of their rights and responsibilities.
  – Report to the nearest OSHA office within 8 hours any fatal accident or one that results in the hospitalization of three or more employees.
  – Keep records of work-related injuries and illnesses.
  – Provide employees, former employees and their representatives access to the Log of Work-Related Injuries and Illnesses (OSHA Form 300).

**TIP:** Employers with 10 or fewer employees and employers in certain low-hazard industries are exempt from this OSHA Log requirement.)
Summary and Conclusion

Employer Responsibilities

• Summary of most important:
  – Provide access to employee medical records and exposure records to employees or their authorized representatives.
  – Not discriminate against employees who exercise their rights.
  – Provide to the OSHA compliance officer the names of authorized employee representatives who may be asked to accompany the compliance officer during an inspection.
  – Post OSHA citations at or near the work area involved. Each citation must remain posted until the violation has been corrected, or for three working days, whichever is longer. Post abatement verification documents or tags.
  – Correct cited violations by the deadline set in the OSHA citation and submit required abatement verification documentation.