Module 4: Hazard Analysis & Risk Assessment

❖ Lecture Objectives

This module discusses the causes of incidents and how to analyze them in a practical fashion so that some action can be taken to intervene or prevent the occurrence of the situation; and the relationship between unsafe acts and unsafe conditions, and how they relate to hazards.

Hazard Analysis

Hazard Analysis and Risk Assessment are typically carried out in five steps:

1. Define the scope of work and describe the system and its components
2. Identify hazards
3. Evaluate the impact of the hazards on
   o the environment and public
   o the facility and institution
   o the equipment and personnel

   Assess the likelihood and severity of each hazard (assess the risk)

4. Resolve hazards, identify required personal protective equipment (PPE), verify engineering and/or administrative controls, and determine if risk has been reduced to an acceptable level

   o iterate back to step (1) to ensure no additional hazards have been introduced by controls or changes to the system and its components.

5. Follow up actively with periodic review of work scope and hazards

The Hazard Analysis and Risk Assessment process should include members of the project and/or safety teams that have expertise in the various aspects of the project (e.g., project management, chemical systems, electrical systems, waste management, etc.). The process should continue throughout the operational lifetime of a system. New hazards may be identified
for an aging system or as operational envelopes change over time. These new hazards, and their associated risks, must be continually identified, evaluated and resolved.
**What is risk assessment?**

A risk assessment is simply a careful examination of what, in your work, could cause harm to people, so that you can weigh up whether you have taken enough precautions or should do more to prevent harm. Workers and others have a right to be protected from harm caused by a failure to take reasonable control measures.

Accidents and ill health can ruin lives and affect your business if output is lost, machinery is damaged, insurance costs increase or you have to go to court. You are legally required to assess the risks in your workplace so you must put plans in place to control risks.

**How to assess the risks in your workplace**

Follow the five steps in this leaflet

1. **Identify the hazards**
2. **Decide who might be harmed and how**
3. **Evaluate the risks and decide on precaution**
4. **Record your findings and implement them**
5. **Review your assessment and update if necessary**

Don’t overcomplicate the process. In many organisations, the risks are well known and the necessary control measures are easy to apply. You probably already know whether, for example, you have employees who move heavy loads and so could harm their backs, or where people are most likely to slip or trip. If so, check that you have taken reasonable precautions to avoid injury.
Job Safety Analysis (JSA)

Definition:

A Job Safety Analysis (JSA) is a method that can be used to identify, analyze and record 1) the steps involved in performing a specific job, 2) the existing or potential safety and health hazards associated with each step, and 3) the recommended action(s)/procedure(s) that will eliminate or reduce these hazards and the risk of a workplace injury or illness.

Hazard Types:

The following hazards should be considered when completing a JSA:

- Impact with a falling or flying object.
- Penetration of sharp objects.
- Caught in or between a stationary/moving object.
- Falls from an elevated work platform, ladders or stairs.
- Excessive lifting, twisting, pushing, pulling, reaching, or bending.
- Exposure to vibrating power tools, excessive noise, cold or heat, or harmful levels of gases, vapors, liquids, fumes, or dusts.
- Repetitive motion.
- Electrical hazards.
- Light (optical) radiation (i.e. welding operations, etc.).
- Water (potential for drowning or fungal infections caused by wetness).

Conducting the analysis:

1. Select jobs with the highest risk for a workplace injury or illness.

2. Select an experienced employee who is willing to be observed. Involve the employee and his/her immediate supervisor in the process.
3. Identify and record each step necessary to accomplish the task. Use an action verb (i.e. pick up, turn on) to describe each step.

4. Identify all actual or potential safety and health hazards associated with each task.

5. Determine and record the recommended action(s) or procedure(s) for performing each step that will eliminate or reduce the hazard (i.e. engineering changes, job rotation, PPE, etc.).

**Trash Compacting**

*Wisconsin State Fair Park*

Trash compacting is accomplished at the Wisconsin State Fair Park by an assigned multi-person grounds crew. Each full dumpster is rolled into the liftgate and secured in position. The operator then activates the liftgate to lift/tip the dumpster, which is sprayed clean. After being lowered, the dumpster is rolled to a designated area for placement on the grounds.
When performing this activity, always remember to take the following safety precautions:

<table>
<thead>
<tr>
<th>Steps</th>
<th>Always Remember to ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Push/pull full dumpster into hydraulic lift gate.</td>
<td>Use your <strong>body weight</strong> by pushing the dumpsters to move them. Pull to steer/guide the dumpster. Wear protective canvas or leather gloves. Drain water from dumpster, if possible, to reduce the weight.</td>
</tr>
<tr>
<td>2. Raise hydraulic lift gate to &quot;UP&quot; position, dumping contents.</td>
<td></td>
</tr>
<tr>
<td>3. Spray remaining trash residue from raised dumpster with water hose.</td>
<td>Wear eye or face protection when spraying/cleaning the dumpster.</td>
</tr>
<tr>
<td>4. Lower hydraulic lift gate and emptied dumpster back to ground level.</td>
<td>Stay clear from the lowering area.</td>
</tr>
<tr>
<td>5. Pull the empty dumpster from the lift gate to the designated area for placement on grounds.</td>
<td>Push dumpsters to move, pull to steer/guide. Wear protective canvas or leather gloves</td>
</tr>
</tbody>
</table>
**Accident investigation**

What is an accident and why should it be investigated?

The term "accident" can be defined as an unplanned event that interrupts the completion of an activity, and that may (or may not) include injury or property damage.

An incident usually refers to an unexpected event that did not cause injury or damage this time but had the potential. "Near miss" or "dangerous occurrence" are also terms for an event that could have caused harm but did not.

Reasons to investigate a workplace accident include:

- most importantly, to find out the cause of accidents and to prevent similar accidents in the future
- to fulfill any legal requirements
- to determine the cost of an accident
- to determine compliance with applicable safety regulations
- to process workers' compensation claims

Incidents that involve no injury or property damage should still be investigated to determine the hazards that should be corrected. The same principles apply to a quick inquiry of a minor incident and to the more formal investigation of a serious event.
What are the steps involved in investigating an accident?

The accident investigation process involves the following steps:

- Report the accident occurrence to a designated person within the organization
- Provide first aid and medical care to injured person(s) and prevent further injuries or damage
- Investigate the accident
- Identify the causes
- Report the findings
- Develop a plan for corrective action
- Implement the plan
- Evaluate the effectiveness of the corrective action
- Make changes for continuous improvement

As little time as possible should be lost between the moment of an accident or near miss and the beginning of the investigation. In this way, one is most likely to be able to observe the conditions as they were at the time, prevent disturbance of evidence, and identify witnesses. The tools that members of the investigating team may need (pencil, paper, camera, film, camera flash, tape measure, etc.) should be immediately available so that no time is wasted.

CAUSES OF ACCIDENTS

Primarily, accidents are caused by people. Equipment may be involved, but people handle the equipment. Most accidents are the result of Carelessness, Inexperience, and/or Wrong attitude.

Carelessness Some locations are potential danger spots. The lack of alertness may cause accidents resulting in injury or death. People working on piers, weather decks, and in the ship’s hold must be constantly on the alert for moving or falling objects. As personnel become familiar with a job, they may try to take “shortcuts; which place themselves and others in
danger. Fatigue is another cause of carelessness. As people tire, they are less alert and more likely to cause an accident.

**Inexperience** Unless personnel are indoctrinated and experienced in handling a particular piece of equipment, they should not be allowed to use it except under close supervision. Persons who operate cranes, capstans, winches, windlasses and other deck equipment must first get authority from the first lieutenant. A person may know how to drive a forklift, but may not be fully aware of the safety precautions that should be observed while operating it. Operating materials-handling equipment is not the only way that inexperienced personnel may cause accidents. A person working as a cargo handler for the first time may not be aware of the dangers involved. A minor mistake such as an improperly loaded cargo net may result in injury to the operator or someone else.

**Attitude** Some people work around dangerous machinery or equipment, explosives, acids, electrical equipment without mishap. They take necessary safety precautions. Others, however, working around dangerous objects or in dangerous work become overfamiliar with the dangers. They have a tendency to slack off in the practice of safety. The adage there are old electricians and bold electricians, but there are no old, bold electricians applies equally well to cargo handling. When individuals develop poor attitudes toward their work, a change must be made. Either in attitudes or in work assignments. If previous experience indicates that a person has a tendency toward unreliability, that person should not be permitted to operate materials-handling equipment nor work in a position where the individual’s unreliability could result in injury. Of course, the cause of unreliability should be determined and eliminated, if possible.
Module 4: Hazard analysis and risk assessment

1. When should you report environmental incidents and near misses
2. What information does a risk assessment give?
3. Explain using an example the meaning of the term ‘risk’
4. What does JHSC stand for? Joint health and safety committee
5. What does JSA stand for.?
6. Describe how a JSA is done
7. Name three things that a successful inspection must involve
8. Identify what must be done in preparation for an inspection
9. Outline the factors that must be considered in carrying out a risk assessment in the workplace
10. Describe the five basic steps in conducting a risk assessment
11. List the types of economic losses that can result from accidents or their possibilities
12. Identify documents required for completing an inspection report
13. Identify the risk factors that can increase the probability of workers becoming injured or ill as a result of an exposure
14. Describe the chain of accident causation model
15. Identify the main causes of an accident
16. Describe some of the things that result from an accident
17. Identify some basic causes for accidents
18. Why do companies need to investigate accidents
19. Describe an effective method for investigation of accidents
20. What are some of the reasons for not reporting minor incidents and near misses
21. Why is it important to report near misses
22. Define each of the following giving an example in each case
   a. Accident
   b. Near miss
   c. Near hit