If your company is working towards OSHA's SHARP or VPP certification, you need to be conducting a Job Hazard Analysis (JHA) on all hazardous tasks. This course is designed to introduce the important steps in conducting a Job Hazard Analysis (also called Job Safety Analysis) for the purpose of writing a safe job procedure. This course includes a discussion of conducting a risk assessment, prioritizing jobs, writing the steps, determining hazards, including safety precautions, and tips on writing safe job procedures.
Conducting a Job Hazard Analysis (JHA)

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Contact OSHAcademy to arrange for use as a training document.

This study guide is designed to be reviewed off-line as a tool for preparation to successfully complete OSHAcademy Course 706.

Read each module, answer the quiz questions, and submit the quiz questions online through the course webpage. You can print the post-quiz response screen which will contain the correct answers to the questions.

The final exam will consist of questions developed from the course content and module quizzes.

We hope you enjoy the course and if you have any questions, feel free to email or call:

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Revised: August 12, 2019
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**Course Introduction**

This online course explains what a job hazard analysis (JHA) is and offers guidelines to help you conduct your own step-by-step analysis. The course also will help you take the information from a JHA to write a safe job procedure (SJP) that can be used for training employees.

**What is a hazard?**

A hazard is the potential for harm. In practical terms, a hazard often is associated with a condition or activity that, if left uncontrolled, can result in an injury or illness.

**What is a job hazard analysis?**

A job hazard analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment. Ideally, after you identify uncontrolled hazards, you will take steps to eliminate or reduce them to an acceptable risk level.

**Why is job hazard analysis important?**

Many workers are injured and killed at the workplace every day. Safety and health can add value to your business, your job, and your life. You can help prevent workplace injuries and illnesses by looking at your workplace operations, establishing safe job procedures, and ensuring that all employees are trained properly.

**What is the value of a job hazard analysis?**

Supervisors can use the findings of a job hazard analysis to eliminate and prevent hazards in their workplaces. This is likely to result in fewer worker injuries and illnesses; safer, more effective work methods; reduced workers' compensation costs; and increased worker productivity. The analysis also can be a valuable tool for training new employees in the steps required to perform their jobs safely.

This course introduces you to the Job Hazard Analysis process and also touches on how you can use it as a valuable tool for training.
Module 1: Prepare to Conduct the JHA

Introduction

The first step in preparing to conduct a JHA is to review all of the jobs in the workplace and make a list of those jobs that might require a JHA.

Involve Your Employees

Get together with your employees and talk about the actual and potential hazards and unsafe behaviors they believe might exist in their current work and surroundings. Discuss the possible accidents that might result from the hazards and behaviors. Next, come up with ideas to eliminate or control those hazards and behaviors. By the way, if you can eliminate or reduce hazards, don't wait until the JHA is conducted. Eliminate or reduce the hazard as soon as possible.

The JHA Format

In this course we use a very simple process and format for developing a JHA. The table below shows the basic layout of the form we'll be using. We'll fill in the columns later as we cover each topic. You will see a great variety of JHA forms used by various companies. As you can see below, the JHA format includes the job description and three columns:

1. Basic Job Step
2. Hazards - Possible Injuries
3. Preventive Measures
Sample JHA Worksheet

Sample JHA Worksheet

JOB: _____________________________

<table>
<thead>
<tr>
<th>BASIC TASK STEP</th>
<th>HAZARDS - POSSIBLE INJURIES</th>
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SAFE JOB PROCEDURE

1. What is the first step in the Job Hazard Analysis process?
   a. List corrective actions
   b. List all jobs that might require a JHA
   c. Determine the hazards in each step of the job
   d. Develop the steps in the job

Employees are Prone to Use Their "Own" Procedures When Not Being Supervised

It is very important to involve your employees in the JHA process because they have a unique understanding of the job, and this knowledge is invaluable for finding hazards. Involving employees will help minimize oversights, ensure a quality analysis, and get workers to "buy in" to the solutions because they've helped in some way to develop the procedures. If they are not involved in developing the JHA, they will not be as likely to "own" the safe job procedures. As a result, they may not want to use safe procedures and practices that they believe have been "imposed" on them.

Look for Hazardous Conditions and Unsafe Behaviors

- During the job development process, focus primarily on identifying hazardous conditions and unsafe behaviors. Remember, it takes a hazard and exposure to the hazard before an accident can occur. Remember, it takes a hazard and exposure to the...
hazard before an accident can occur. It makes sense to look for hazards and job steps with unsafe behaviors that create exposure. Sources to help identify hazardous conditions and unsafe behaviors include:

- Safety Data Sheets (SDSs)
- Experienced workers
- Accident and incident reports
- First aid statistical records
- Behavior Based Safety (BBS) reports
- Safety committee meeting minutes
- Safety inspection reports
- Previous JHAs
- Existing work procedures
- Equipment manuals
- Preventive/corrective maintenance records

2. What is the focus of the JHA job review process?
   a. Determining the most dangerous jobs
   b. Identifying hazardous conditions and unsafe behaviors
   c. Properly sequencing the job steps to reduce hazards
   d. Analyzing each job to ensure all steps are present

Hazards

If hazards that pose an immediate danger to an employee's life or health exist, take immediate action to protect the worker. Any problems that can be corrected easily should be corrected as soon as possible.

Behaviors
Some jobs may require potentially high-risk behaviors that should be identified in a JHA. High risk behaviors that might increase the probability and severity of an injury or illness include:

- Working at any elevation
- Lifting, lowering, pushing, pulling and other manual handling operations
- Others working above or below the work area
- Use of bridge cranes, man lifts, or other heavy equipment
- Working on or near energized equipment/components
- Working alone or in isolated workplaces
- Operating vehicles (i.e. trucks, forklifts, etc.)
- Working within a confined space or under temperature extremes

3. **If hazards pose an immediate danger to an employee's life or health, when should the hazards be corrected?**
   
   a. Within the same day  
   b. Immediately  
   c. Immediately after the JHA is completed  
   d. In a timely manner after the JHA is completed

**Review Incident/Accident History**

Review your worksite's history of accidents and illnesses that needed treatment and incidents that required repair or replacement of equipment. It's also important to look at near miss events in which an injury did not occur but could have. These events are indicators that existing hazard controls (if any) may not be adequate and deserve more scrutiny.

**Conduct a Risk Analysis**

Once you have identified tasks you believe might require a JHA, it's important to prioritize each task. To do this, analyze each task to determine their degree of risk. To determine the degree of risk objectively, it's important to know what risk is, so let's discuss the concept.
4. Once you have identified tasks you believe might require a Job Hazard Analysis, it's important to _____ each task.
   a. identify
   b. list
   c. prioritize
   d. note

Risk = Probability x Severity x Exposure

The overall risk inherent in a job is a function of three variables: probability, severity and duration. The greater the probability, severity and exposure - the higher the risk while doing a job. More on this later.

Probability

Probability describes the likelihood that a worker will be injured or become ill if exposed to a hazard. Common terms used to describe probability are:

- **unlikely** - Injury from exposure has low probability. Less than 50% chance.
- **likely** - Injury from exposure has moderate probability. 50/50 Chance.
- **very likely** - Injury from exposure has high probability. Greater than 50% chance.

5. Which of the following is defined as the likelihood a worker will be injured if exposed to a hazard?
   a. Risk factor
   b. Exposure risk
   c. Severity
   d. Probability

Severity

Severity is an estimate of how serious the injury or illness will be as a result of an accident. The severity of an injury or illness for any given exposure is largely fortuitous: it's a matter of chance or luck. For instance, someone could fall from a plan and live to tell about it. It's not the fall, it's the nature of the sudden impact and orientation of the body that determines the severity of the injury. The common terms used to describe severity are:
• **Minor** - other than serious physical harm that does not prevent the employee from continuing to work in the same job.

• **Serious** - serious physical harm that prevents the employee continuing to work in the same job.

• **Death** - fatality

**Exposure**

Exposure is the condition of being exposed to hazard such that the employee is somehow affected by that hazard.

• Physical exposure can be thought of as "arms-length" exposure to physical hazards. Exposure can be much farther than arms-length if a biological hazard exists. If the employee can get injured or ill as a result of proximity to a danger zone, physical exposure exists.

• Environmental exposure occurs when the employee can suffer some kind of injury or illness as a result of a hazardous environment. Distance does not matter. For instance, an employee may suffer hearing loss as a result of working near loud continuous noise sources.

6. _____ describes how serious an injury or illness may be as a result of an accident.

   a. Risk factor
   b. Exposure risk
   c. Severity
   d. Probability

**Factors that Increase Risk**

There are many factors that may increase the probability and severity of an accident. You may need to be able to discuss the factors that you considered if someone wants you to justify the particular level of risk at which you arrived. Some of these factors include:

• The number of employees exposed to hazards

• The number of hazards in the procedure

• The number of opportunities for unsafe behaviors
- The frequency of exposure to hazards
- The employee's belief about the hazards
- The duration of exposure to specific hazards
- The proximity of employees to the point of danger
- The complexity of the procedure
- Potential severity of the injury or illness when exposed
- Unreasonable workload (physically/mentally incapable of meeting expectations)
- Working under distress (hurry, fatigue, illness, and personal problems).

7. Which of the following is NOT listed as a factor that increases risk?
   a. Proximity of employees
   b. Nature of the task
   c. Frequency and duration of the exposure
   d. Number of employees exposed

The Risk Assessment Matrix
Another simple technique to help determine the overall risk of the jobs for which you'll be conducting a JHA, is called the Risk Assessment Matrix. It's a simple process to determine the risk level of each job:

1. List all of the jobs that you are analyzing.
2. Estimate the probability and severity of each job.
3. Next, place the task in the appropriate section of the risk matrix.

Once you've entered all tasks, you can easily prioritize each job to determine which jobs to analyze first.
8. This simple technique can be used to help quickly determine risk for a job.

a. Probability/Severity Chart
b. Fix the safety management system
c. Risk Assessment Matrix
d. Surface/Root Cause Analysis

**Crunch the Numbers**

To more precisely determine risk, you may want to use numerical values like those described in the tables below. Quantifying risk helps justify how you’ve prioritized jobs.

Using the two tables on the right, you can develop "risk scores" to indicate the degree of risk in each job.

For example, a job in which exposure to a danger zone is likely to result in an injury or illness would receive a Probability Score of "6" in the table to the right.

In this case, a job in which exposure might result in a lost time injury to one worker would receive a Severity Score of "50".

Multiplying the Probability Score (6) by the Severity Score (50) in the example to the right would result in a Risk Score of 300.

If more than one employee is exposed while performing the task, you would multiply the Probability/Severity Scores total by the number of employees. In this case, let’s say two employees are working together on the job. Both are equally exposed. Using the formula below, the total Risk Score would by doubled to 600.

\[
\text{Risk} = \text{Probability (6)} \times \text{Severity (50)} \times \text{Exposure (2)} = 600
\]

You might consider any job with a risk score of 200 or higher to be a high risk and, therefore, the Risk Score in this example indicates conducting a JHA on this job should be a top priority.
9. When conducting a JHA and determining the degree of risk inherent in a job, _____.
   a. be sure to uncover surface causes for the risk
   a. the lower the probability/risk score the greater the concern
   b. the higher the probability and severity, the greater the risk
   c. focus on jobs that are performed most often

Prioritize Jobs - Worst First
Now that you have some idea how much risk is involved in each job, you can prioritize them. As mentioned earlier, a common strategy is to prioritize the most hazardous job first. If a JHA is required for many tasks in your workplace, priority should go to the following types of jobs, in order of priority:

1. Jobs with the highest injury or illness rates;
2. Jobs with the potential to cause severe or disabling injuries or illness, even if there is no history of previous accidents;
3. Jobs in which one simple human error could lead to a severe accident or injury;
4. Jobs that are new to your operation or have undergone changes in processes and procedures; and
5. Jobs complex enough to require written instructions.

OSH Academy Student Opinion
William I. says it's important to understand that all the (potentially) "severe events" should be addressed first, then down to critical, etc. William has seen many cases where customers and safety professionals have focused on frequency issues because there is data to review and success to demonstrate. Meanwhile, they ignore large loss potential events until they occur. In his opinion, as you address the large loss potential events, there is a corollary benefit to the "less severe but more frequent" incidents.
10. Which jobs should have the highest priority when conducting a Job Hazard Analysis?

a. Jobs with the highest injury or illness rates
b. Jobs in which human error could lead to an accident or injury
c. Jobs that have changed or are new to the organization
d. Jobs that are complex and require written instructions
Module 2: List the Procedure Steps

Introduction

Nearly every task can be broken down into a series of steps. Developing steps for a job is critical in the analysis process to improve the efficiency and effectiveness of each task.

One Step - One Action

The process of "analysis" in the context of a JHA includes breaking the "whole" procedure down into its basic steps. The idea is to carefully describe actions and hazards within each step, and how to mitigate those hazards through control strategies.

- Each step in the task being analyzed will describe an action. It tells what the worker does in each step.

- Actions may or may not be observable. An action may describe something that is done or not done.

1. In a Job Hazard Analysis, each step in the task being analyzed describes a/an _____. It tells what the worker _____ in each step.
   a. process, thinks
   b. procedure, reviews
   c. action, does
   d. action, thinks

The Actor and the Action

Each step of a procedure describes what the worker (actor) does (action), so let's take a look at each of these two components.

- Actor. The actor is an individual or object that directly participates or assists in the procedure. The actor initiates a change by performing or NOT performing a particular action in a step. In most JHA's the act need not be identified unless two more workers are performing the task.

- Action. An action is "the something" that is done by an actor. Actions may or may not be observable. An action may describe a behavior that is accomplished or not accomplished. NOT performing an action should be thought of as just as important as performing an action when developing a step.
It’s important to understand that when describing a step in writing, first identify the actor (if two or more workers are involved in the step) and then tell what the actor is supposed to do. For instance, take a look at the step below:

"Maintenance team leader: Attach the lockout device to the hasp."

In this example, the actor is identified because a team of maintenance workers is performing the task. The actor (Maintenance team leader) is identified first and then the action (attach) is described.

Also note that the statement is written in active tense. You would not state the step in passive tense. See the example of passive tense below:

"The lockout device is to be placed on the hasp by the maintenance team leader."

2. Each step in a task being analyzed in a JHA describes a unique _____.
   a. tool
   b. result
   c. action
   d. principle

Tips on Conducting the JHA

- Be sure to record enough information to describe each job action without getting overly detailed at this point. You will include more detail later in the safe job procedure.

- Avoid making the breakdown of steps so detailed that it becomes unnecessarily long. On the other hand, don't make it so broad that it does not include basic steps.

- Get input from other workers who have performed the same job.

- Review the job steps with an employee to make sure you have not omitted something.

- Point out that you are analyzing the task, not evaluating the employee’s job performance.

- Include the employee in all phases of the analysis—from reviewing the job steps and procedures to discussing hazards and solutions.

- It may be helpful to photograph or videotape the worker performing the job.
When conducting a Job Hazard Analysis, the objective is to _____ the task rather than _____ employee performance.

- audit, review
- evaluate, analyze
- analyze, evaluate
- audit, analyze

The JHA Format

The following task description will be used throughout the course to show how a job hazard analysis develops. As you can see, the JHA format includes three columns.

1. Basic Job Step
2. Hazards Present
3. Preventive Measures

The sample JHA below is used throughout the course and describes loading an empty truck trailer with pallets of product.

Sample JHA Worksheet

The table below shows an example of the first three steps in the JHA. Notice that the two persons performing the task are identified.

<table>
<thead>
<tr>
<th>BASIC TASK STEP</th>
<th>HAZARDS - POSSIBLE INJURIES</th>
<th>PREVENTIVE MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spotter: Spot position of trailer as it nears loading dock.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. When the trailer is in position, turn engine off, set parking brake, and notify forklift operator.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Driver: Set chocks.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Which of the following is TRUE regarding each JHA Basic Task Step?

   a. Combine steps when possible
   b. Describe the actions of one person
   c. List all persons performing a step
   d. Always use the term "Employee #"
Module 3: Describe the Hazards in Each Step

Introduction

A very important part in the JHA development process is to discover the hazards lurking within each step. A basic safety concept must be understood by all safety staff: to have an accident, a hazard and exposure to the hazard must exist.

- A hazard is an unsafe condition that could cause injury or illness to an employee.
- Exposure usually refers to an employee's placement relative to the hazard's “danger zone”. If the employee is within the danger zone, the employee is exposed.

1. A/An _____ is an unsafe condition that could cause injury or illness to an employee.
   - a. accident
   - b. hazard
   - c. exposure
   - d. action

How to Identify Hazards

A job hazard analysis is an exercise in detective work. Your goal is to discover the following:

- What can go wrong?
- What are the consequences?
- How could the hazard arise?
- What are other contributing factors?
- How likely is it that the hazard will occur?

To make your JHA useful, document the answers to these questions in a consistent manner. Describing a hazard by answering the questions above ensures you target the most important contributors to the hazard.
2. During a job hazard analysis, your goal is to discover each of the following EXCEPT _____.

   a. what can go wrong
   b. how could a hazard arise
   c. how likely a hazard will occur
   d. who is to blame for errors

Scenario

Rarely is an accident a simple case of a single event or cause. More frequently, many contributing events tend to line up to create the hazard. Here is an example of a hazard scenario that illustrates this idea: Chipperman's arm amputated while clearing jam

Wood coming from the infeed rollers jammed up as it fell onto the chipper conveyor belt. A chipperman tried to clear the jam without turning off any part of the machine or using a picaroon. His hand and arm were caught up in the teeth of the rotating rollers, and his body was pulled onto the chipper conveyor. The chipperman's arm was twisted off at the shoulder. Another worker heard his cries and rescued him before he was pulled into the chipper.

(Source: Worksafe BC)

Now, let's pretend the accident didn't happen and it was your job to identify the hazards and exposure inherent in this task. Let's ask the questions:

- What can go wrong? The worker's hand could come into contact with a rotating object that "catches" it and pulls it into the machine.

- What are the consequences? The worker could receive a severe or fatal injury.

- How could it happen? The accident could happen as a result of the worker trying to clear a snag during operations or as part of a maintenance activity while the conveyor is operating. Obviously, this hazard scenario could not occur if the conveyor is not rotating.

- What are other contributing factors? The hazards and exposure related to this task can occur very quickly. It does not give the worker much opportunity to recover or prevent it once his hand comes into contact with the rotating rollers. This is an important factor, because it helps you determine the severity and likelihood of an accident when selecting appropriate hazard controls. Unfortunately, experience has shown that training is not very effective in hazard control when triggering events happen quickly because humans can react only so quickly.
• How likely is it that the hazard will occur? This determination requires some judgment. If there have been "near-misses" or actual cases, then the likelihood of a recurrence would be considered high. If the pulley is exposed and easily accessible, that also is a consideration. In this example, the likelihood that the hazard will occur is high because there is no guard preventing contact, and the operation is performed while the machine is running. By following the steps in this example, you can organize your hazard analysis activities.

3. Which is true regarding accidents?
   a. They can always be blamed on an unsafe behavior
   b. They most often occur in the morning
   c. They always occur due to a lack of common sense
   d. They are rarely the result of one single event

Don’t Forget Potential Hazards
To ensure all hazards are identified, analyze each step to uncover potential, as well as actual, hazards produced by both the work environment and the action. Be sure to consider the questions below.

• Is there danger of striking against, being struck by, or otherwise making harmful contact with an object?

• Can the worker be caught in, by, or between objects?

• Is there potential for a slip or trip?

• Can the employee fall from one level to another or even on the same level?

• Can pushing, pulling, lifting, lowering, bending, or twisting cause strain?

• Is the work environment hazardous to safety or health?

• Are there concentrations of toxic gas, vapor, fumes, or dust?

• Are there potential exposures to heat, cold, noise, or ionizing radiation?

• Are there flammable, explosive, or electrical hazards?
4. Which type of chemical, when exposed to a heat ignition source, results in combustion?
   a. Toxic
   b. Flammable
   c. Corrosive
   d. Reaction

Common Hazards and Descriptions

Chemical (Toxic): A chemical that exposes a person by absorption through the skin, inhalation, or through the blood stream that causes illness, disease, or death. The amount of chemical exposure is critical in determining hazardous effects. Check Safety Data Sheets (SDS), and/or OSHA 1910.1000 for chemical hazard information.

Chemical (Flammable): A chemical that, when exposed to a heat ignition source, results in combustion. Typically, the lower a chemical’s flash point and boiling point, the more flammable the chemical. Check SDS for flammability information.

Chemical (Corrosive): A chemical that, when it comes into contact with skin, metal, or other materials, damages the materials. Acids and bases are examples of corrosives.


Explosion (Over Pressurization): Sudden and violent release of a large amount of gas/energy due to a significant pressure difference, such as rupture in a boiler or compressed gas cylinder.

5. Typically, the lower a chemical’s flash point and boiling point, _____.
   a. the greater is the chance of an explosion
   b. the more flammable is the chemical
   c. the more corrosive is the chemical
   d. the more toxic the chemical is to workers

Electrical (Shock/Short Circuit): Contact with exposed conductors or a device that is incorrectly or inadvertently grounded. Example: a metal ladder comes into contact with power lines. 60Hz alternating current (common household current) is very dangerous because it can stop the heart.

Electrical (Fire): Use of electrical power that results in electrical overheating or arcing to the point of combustion or ignition of flammables, or electrical component damage.
**Electrical (Static/ESD):** The moving or rubbing of wool, nylon, other synthetic fibers, and even flowing liquids can generate static electricity. This creates an excess or deficiency of electrons on the surface of material that discharges (spark) to the ground resulting in the ignition of flammables or damage to electronics or the body’s nervous system.

**Electrical (Loss of Power):** Safety-critical equipment failure as a result of loss of power.

6. Which of the following is an example of a harmful electrical short circuit?
   - a. An electrical over-heat condition
   - b. A metal ladder contacting an exposed conductor
   - c. Rubbing wool, cotton, or nylon fabrics
   - d. Loss of electrical power to lights

**Ergonomics (Strain):** Damage of tissue due to overexertion (strains and sprains) or repetitive motion.

**Ergonomics (Human Error):** A system design, procedure, or equipment that is error-provocative (A switch goes up to turn something off).

**Excavation (Collapse):** Soil collapse in a trench or excavation as a result of improper or inadequate shoring. Soil type is critical in determining the hazard likelihood.

**Fall (impacts):** Conditions that result in falls from (Slip, Trip) height or traditional walking surfaces (such as slippery floors, poor housekeeping, uneven walking surfaces, exposed ledges, etc.).

**Fire/Heat:** Temperatures that can cause burns to the skin or damage to other organs. Fires require a heat source, fuel, and oxygen.

**Mechanical:** Self-explanatory. Typically occurs when devices exceed designed capacity or are inadequately maintained. Skin, muscle, or body part exposed to crushing, caught-between, cutting, tearing, shearing items or equipment.

**Noise:** Noise levels (>85 dBA 8 hr TWA) that result in hearing damage or inability to communicate safety-critical information.
7. A switch that goes up to turn equipment off is an example of _____.
   a. an ergonomic human error
   b. a mechanical error
   c. a physical error
   d. a work practice error

\textit{Radiation (Ionizing)}: Alpha, Beta, Gamma, neutral particles, and X-rays that cause injury (tissue damage) by ionization of cellular components.

\textit{Radiation (Non-Ionizing)}: Ultraviolet, visible light, infrared, and microwaves that cause injury to tissue by thermal or photochemical means.

\textit{Struck By (Mass Acceleration)}: Accelerated mass that strikes the body causing injury or death (Examples are falling objects and projectiles).

\textit{Struck Against}: Injury to a body part as a result of coming into contact of a surface in which action was initiated by the person. (An example is when a screwdriver slips.)

\textit{Temperature (Heat/Cold)}: Temperatures that result in heat stress, extreme exhaustion, or metabolic slow down such as hypothermia.

\textit{Vibration}: Segmental or whole-body vibration can cause damage to nerve endings, and organs.

\textit{Visibility}: Lack of lighting or obstructed vision that results in an error or other hazard.

\textit{Weather Phenomena (Snow/Rain/Wind/Ice)}: Self-explanatory.

8. Alpha, Beta, and Gamma particles are examples of _____.
   a. photo-chemical radiation
   b. ionizing radiation
   c. visible radiation
   d. non-ionizing radiation
Let's see what the sample JHA looks like now that we've identified some hazards in each step.

**JOB: LOADING PRODUCTS INTO TRAILER**

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**SAFE JOB PROCEDURE**

9. What type of hazard would be listed in column 2 of the JHA if an employee might receive a concussion if he did not wear a hard hat?

   a. Fire/Heat  
   b. Fall  
   c. Vibration  
   d. Struck-by
Module 4: Develop Preventive Measures

Introduction

After reviewing your list of hazards with the employee, next consider using hazard control methods that will eliminate or reduce them.

There are two primary strategies to permanently or temporarily reduce the risk of injury.

1. Eliminate or mitigate the hazard.
2. Control exposure to the hazard.

Each of these strategies employs a number of prioritized methods within what's called the "Hierarchy of Controls". The rest of this module will discuss the various hazard control methods within the hierarchy.

1. Which of the following are the two primary strategies to reduce the risk of injury in a task?
   a. Eliminate or revise the step in the procedure
   b. Wear personal protective equipment
   c. Mitigate the hazard and control the exposure
   d. Have a zero-tolerance for error

Hazard Control Strategies

Information obtained from a job hazard analysis are most useful when hazard control measures are developed and incorporated into the job. Everyone needs to recognize that not all hazard control strategies are equal. Some are more effective than others at reducing the risk in the job.

Remember, a very basic hazard control principle is that we must either (1) eliminate the hazard or (2) control exposure to the hazard. The second principle is that it's more effective to eliminate the hazard, if you can, than to control exposure to the hazard. After all, if you can get rid of the hazard, you don't have to manage the exposure. These two important principles guide safety and health professionals in constructing a "hierarchy" of hazard control strategies.

Hierarchy of Controls

In our training, we encourage the use of the "Hierarchy of Controls" (HOC) described within the ANSI/ASSP Z10-2012, Occupational Health and Safety Management Systems. The six strategies in this model include:

1. Elimination
2. Substitution

3. Engineering controls

4. Administrative controls

5. Personal protective equipment (PPE)

The idea behind this hierarchy is that the control methods at the top of the list are potentially more effective and protective than those at the bottom. Following the hierarchy normally leads to the implementation of inherently safer systems, ones where the risk of illness or injury has been substantially reduced. Let's take a closer look at the hierarchy of control strategies.

2. In the hierarchy of controls, _____ is the control method that is potentially most effective.
   
   a. substitution
   b. administrative controls
   c. elimination
   d. engineering controls

Elimination and Substitution

Elimination and substitution, while most effective at reducing hazards, also tend to be the most difficult to implement in an existing process. If the process is still at the design or development stage, elimination and substitution of hazards may be inexpensive and simple to implement. For an existing process, major changes in equipment and procedures may be required to eliminate or substitute a hazard.

These strategies are considered first because they have the potential of completely eliminate the hazard, thus greatly reducing the probability of an accident. Redesigning or replacing equipment or machinery may be expensive but remember the average direct and indirect cost of a lost-work injury can be more than $50,000 and easily more than $1 million to close a fatality claim.

Some examples of these two strategies include:

- Removing the source of excessive temperatures, noise, or pressure
- Substituting a toxic chemical with a less toxic or non-toxic chemical
3. Which of the following is an example of controlling hazards through substitution?

   a. Placing a GHS label on a toxic chemical container
   b. Wearing PPE when using toxic chemicals
   c. Replacing a toxic chemical with a less toxic chemical
   d. Removing the requirement to use a toxic chemical

Engineering Controls

If you cannot eliminate or substitute a hazard, the next best strategy is to "engineer the hazard out" by using control methods that physically change a machine or work environment. Engineering controls are built into the design of a facility, equipment or process to minimize the hazard. Engineering controls are a very reliable way to control worker exposures as long as the controls are properly designed, used and maintained.

If, during the JHA, you discover a hazard that can be engineered out, do it. Turn the dangerous step into a safe step that doesn't require safety precautions.

Engineering controls may include:

- Enclosing the hazard using enclosed cabs, enclosures for noisy equipment, or other means;
- Isolating the hazard with interlocks, machine guards, blast shields, welding curtains, or other means; and
- Removing or redirecting the hazard such as with local and exhaust ventilation.

4. Which of the following is an effective method to eliminate or reduce a hazard?

   a. Place warning signs
   b. Enclose the hazard
   c. Tell employees about the hazard
   d. Discipline anyone exposed to the hazard

Warnings

Warnings can be either visual, audible, or both. They may also be tactile. Warnings do not prevent exposure to a hazard, but they do provide a visual or audible indicator to warn people of potential danger. OSHA's 1910.145, Specifications for accident prevention signs and tags details the following types of signs:
• **Danger Signs** - Signs that alert people to specific and immediate dangers (including radiation hazards).

• **Warning Signs** - Signs that warn people of potential hazards that can lead to death.

• **Caution Signs** - Signs used to alert people to potential hazards. This class can also be used to caution people against certain unsafe practices. This class is for hazards that can result in minor (non-life threatening) accident or injury.

• **Safety Instruction Signs** - These signs offer instructions for how someone should act or perform to avoid possible hazards.

**Administrative Controls**

This is the "next best" strategy, if engineering control methods are insufficient. Since we can't get rid of the hazard in a JHA step, we'll need to manage exposure to it with safety precautions. Why are administrative controls lower on the hierarchy of controls? To work, administrative controls must rely on appropriate human behavior. According to Arthur Bloch's *Murphy's Law - Book Two*, "any system relying on human behavior is inherently unreliable." That's the problem. Humans can be rather unpredictable. Methods to eliminate or reduce employee exposure to hazards include:

• Developing new policies, procedures, and practices to reduce frequency/duration of exposure

• Revising work schedules to reduce the frequency/duration of exposure

• Monitoring the use of highly hazardous materials

• Alarms, signs, and warnings

• Buddy system

• Training

Note: Administrative controls may also be referred to as "work practice" controls in other safety-related literature.

In a best-case scenario, you might be able to eliminate the need for administrative controls if hazards can be eliminated through the use of engineering controls. The more reliable or less
likely a hazard control method can be circumvented, the better. Bottom line: If you can get rid of the hazard, you don’t have to manage exposure!

5. If you can eliminate the _____, you don’t have to manage _____.
   a. exposure, hazard
   b. problem, accidents
   c. hazard, exposure
   d. accidents, exposure

Personal Protective Equipment

Many procedures developed with a JHA will include the need to use PPE. Examples of PPE include respirators, hearing protection, protective clothing, safety glasses, and hardhats. PPE, as an administrative control strategy, is acceptable as a control method in the following circumstances:

- When engineering controls are not feasible or do not totally eliminate the hazard
- While engineering controls are being developed
- When safe work practices do not provide sufficient additional protection
- During emergencies when engineering controls may not be feasible

Interim Measures

Using a lower priority hazard control method over another higher priority control strategy may be appropriate for providing interim (temporary) protection until the hazard is abated permanently. If you can’t eliminate the hazard entirely, the interim control measures will likely be a combination of control methods used together. OSHA believes that feasible interim measures are always available if higher-level control methods are not possible.

6. The use of PPE to control exposure to hazards is acceptable in each of the following circumstances EXCEPT _____.
   a. when safe work practices are not sufficient
   b. when engineering controls are feasible and effective
   c. while engineering controls are being developed
   d. during emergencies when engineering controls are not feasible
**Involve Employees**

However, you decide to correct the hazards you've identified during the JHA, be sure to discuss your ideas with all employees who perform the job and consider their responses carefully. If you plan to introduce new or modified job procedures, be sure they understand what they are required to do and the reasons for the changes. The number one reason employees do not follow procedures is because they just don't know why the procedures are important.

**Sample JHA Worksheet**

Now let’s take a look at what our sample JHA looks like now that we’ve identified some hazards and their related preventive measures in each step.

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<td>3. Set chocks.</td>
<td>Driver could strike head on trailer. Driver could trip, slip, fall while in the dock well.</td>
<td>Avoid striking the trailer when setting the wheel chocks. Use handrails and use care when walking on slippery surfaces.</td>
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**SAFE JOB PROCEDURE**

7. What is the number one reason employees do not follow procedures?
a. They don't care
b. It isn't required
c. They don't know why it's important
d. Management doesn't provide specifics
Module 5: Write the Safe Job Procedure (SJP)

Introduction

The safe job procedure is the final result or product of the JHA process. The safe job procedure is an excellent document to use as a training lesson plan. In fact, you might include the safe job procedures you’ve developed as part of the safety training plan.

If the safe job procedure is poorly written and hard to understand (doesn't pass the "dummy test"), the JHA may not be effective as an on-the-job training tool. It's important to write a clear, concise, and concrete safe job procedure. So, let's take a look at some of the best strategies in writing safe job procedures.

1. The JHA Safe Job Procedure (SJP) _____.
   a. must include all elements required by OSHA
   b. can be an effective training lesson plan
   c. must be no more than one paragraph in length
   d. is not required unless the job is complex

Points to Remember

- Write in a step-by-step format. Usually, this means writing a number of paragraphs. Each paragraph should attempt to:

  1. Describe the step. Remember each step describes one action. For example, you might say, "Grasp the breaker switch and move it from the on to the off position (down)."

  2. Point out the hazard. If a step includes exposure to a hazard, there are four parts to the step:

     a. state the action

     b. identify the hazard

     c. describe the possible injury the hazard could cause

     d. identify the safety precaution to prevent the injury
For instance, you would continue the warning by saying, "Grasp the breaker switch and move it from the on to the off position (down). To prevent a possible serious burn injury if an arc flash occurs, be sure you turn your head and look away as you flip the breaker switch."

2. If a step includes exposure to a hazard, then there must be four parts to the written step. Which one of the following is one of those parts?

   a. Find the witnesses
   b. Describe the action
   c. Place blame
   d. Fix the problem

- Paint a word picture - concrete vs. abstract. The idea is to write the procedure in such a way that someone who is not familiar with the task can actually "see" each step occur. When writing safe job procedures, we tend to write in a technical style because it seems to be more "efficient." However, if you are going to use the safe job procedure as a lesson plan for conducting safety training, it’s probably a good idea to write in a more interesting conversational style.

- Write in the second person. For example, say "Be sure you...". Try to avoid writing in the third person such as, "Be sure the worker...". In most steps you won't have to worry about this because the person you are writing to is implied.

- Write in the present tense. Say "take" rather than "should be taken." This helps to create the word picture and streamline the safe job procedure.

- Write as clearly as possible. Say "use" rather than "utilize." Replacing more complex words with simple words helps to make sure your employees comprehend the material.

- If you use acronyms or jargon, make sure the meaning of the acronym is spelled out when first used. Make sure jargon is explained on first use.

3. Which of the following statements most closely follows the recommendations for writing JHA safety job procedures (SJPs).

   a. The worker should spot the trailer when it moves to the loading dock
   b. Be sure to use proper hand signals to spot the position of the trailer
   c. Proper hand signals should be utilized when spotting the trailer
   d. Using hand signals, the trailer should be spotted by the spotter at the appropriate time
• Remind the worker why it is important to do the step safely. Unfortunately, OR-OSHA rules don't emphasize this important part of the training. Nevertheless, you should always discuss the natural and system consequences of the employee's personal behavior. Remember, there is no successful safety management system without effective accountability.

• Include notes, cautions, or warnings. Tell the employee about the dangers and safety precautions to reduce the dangers in each step. Doing this also helps to emphasize the costs (injury, illness) and benefits (health) of using safety precautions.

• Keep sentences short. Grammar checker software can help you do this. Usually, a sentence of 7-15 words is adequate.

4. When writing the JHA Safety Job Procedure (SJP), be sure to do all of the following, EXCEPT _____.
   a. Keep sentences short: 7-15 words
   b. Emphasize why safety is important in each step
   c. Write only short phrases under 10 words
   d. Include notes, cautions, and warnings

Sample JHA Worksheet

Now let’s take a look at what our sample JHA looks like now that we’ve identified some hazards and their related preventive measures in each step and written the safe job procedure.

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3. Driver: Set chocks. Driver could strike head on trailer. Driver could trip, slip, fall while in the dock well. Warning: Avoid striking the trailer when setting the wheel chocks. Caution: Use handrails and use care when walking on slippery surfaces.

SAFE JOB PROCEDURE

Step 1. Spotter: Position the vehicle. Spot the position of the trailer as it nears the loading dock. Make sure the trailer is correctly positioned in the dock well. Warning: It's important to follow these procedures so you don't get caught between the trailer and dock when the trailer is backing up to the dock. Note: Be sure to keep others away from the area. Remove the awareness chain or bar from the front of the dock door once the trailer is properly positioned.

Step 2. Driver: When the trailer is in position, verify the vehicle has been turned off, set the parking brake set, and notify the forklift operator. Warning: When exiting the truck, never jump. Many drivers are injured jumping from the cab of the truck or back of the trailer.

Step 3. Driver: Set the chocks. After exiting the truck, chock the wheels. Warning: Be sure not to strike your head against the truck with setting the chocks. Caution: Be careful when walking on slippery surfaces and use handrails when using ramps or stairs.
Module 6: Improve the JHA Process

Introduction

Periodically reviewing your job hazard analysis ensures that it remains current and continues to help reduce workplace accidents and injuries. Even if the job has not changed, it is possible that during the review process you will identify hazards that were not identified in the initial analysis.

It is particularly important to review your job hazard analysis if an illness or injury occurs on a specific job. Based on the circumstances, you may determine that you need to change the job procedure to prevent similar incidents in the future. If an employee's failure to follow proper job procedures results in a "close call," discuss the situation with all employees who perform the job and remind them of proper procedures.

• It may also be possible that the problem is with the procedure. Maybe it needs to be changed. Talk with employees about their reasons for the apparent unsafe behavior. You might be surprised to learn they have been "trapped" into doing the task that way.

• On the other hand, discipline may be appropriate if the safety management system has not failed the employee (the employer is meeting all safety obligations).

Any time you revise a job hazard analysis, it is important to train all employees affected by the changes in the new job methods, procedures, or protective measures adopted.

1. What would be the best response by a supervisor if a worker, using proper Job Hazard Analysis procedures, has a "close call" incident?
   a. Terminate the worker immediately
   b. Review JHA procedures with workers and revise as needed
   c. Remind all employees to use proper procedures
   d. Tell the safety manager

When is it Appropriate to Hire a Professional to Conduct a Job Hazard Analysis?

If your employees are involved in many different or complex processes, you may need professional help conducting your job hazard analyses. Sources of help include your insurance company, the local fire department, and private consultants with safety and health expertise. Some state OSHA agencies may offer assistance through consultation services.

Even when you receive outside help, it is important that you and your employees remain involved in the process of identifying and correcting hazards because you are on the worksite...
every day and most likely to encounter these hazards. New circumstances and a recombination of existing circumstances may cause old hazards to reappear and new hazards to appear. In addition, you and your employees must be ready and able to implement whatever hazard elimination or control measures a professional consultant recommends.

**2. Which of the following statements is FALSE regarding using third-party consultants to help conduct Job Hazard Analyses (JHAs)?**

- a. Employees need not be involved in the JHAs
- b. Be ready to implement consultant JHA recommendations
- c. They are important when analyzing complex processes
- d. Sources of help may include insurance companies

**Tips to Improve the JHA**

**Ergonomics.** To improve the JHAs and its related SJP, think about the "ergonomics" of the job. Find ways to further reduce lifting, lowering, pushing, pulling, carrying, throwing, holding, twisting, or tasks using force. A SJP should remove any unnecessary actions and prevent the need to do things more than once if possible. There should be as little heavy carrying as possible and also include rest breaks if needed. If feasible, provide mechanical aids such as hoists, adjustable workbenches, and hooks. Make sure tools and equipment are position so that they are in easy reach.

**Subject Matter Experts (SME).** A solid JHA improvement process will make good use of the experience and knowledge of workers and subject matter experts (SMEs) various safety and health specialties to review the tasks and identify new hazards. SMEs provide a level of involvement as experts in their field. They can effectively review the tasks and the hazards identified to determine the proper set of controls required. Workers and SMEs can also help improve the methods to communicate instructions or procedures.

**Training.** Any time you revise a job hazard analysis, it is important to train all employees affected by the changes in the new job methods, procedures, or protective measures adopted.

**3. To improve the JHA, each of the following is important to consider EXCEPT _____ .**

- a. discipline action for noncompliance
- b. the ergonomics of the task
- c. the use of subject matter experts
- d. the training needed
**Improve the JHA Process by Taking a Team Approach**

To further improve the quality of your JHA program, you may want to establish a formal JHA Team.

The JHA team membership might consist of:

- the first line supervisor, or designee, of the affected area as Team Leader
- non-exempt employees experienced in the job that the JHA will be conducted on. If this is a new type of task experienced employees will probably not be available.
- additional subject matter expert resources as needed to evaluate the task, including, but not limited to the area safety engineer, industrial hygienist, safety manager, fire protection, emergency preparedness coordinator, or safety observer, etc.

4. **Who is not likely to be a member of a job hazard analysis team?**
   - a. First-line supervisors
   - b. Experienced non-exempt employees
   - c. Upper-level management
   - d. Subject matter experts (SME)

**Team Responsibilities**

The JHA team might be responsible for:

- developing a JHA by defining the key steps of each job, identifying the potential hazards of each key step and recommending safe practices (e.g., engineering controls, administrative controls, etc.) to eliminate or reduce each hazard/exposure
- conducting the JHA for the selected process or activity by discussing and completing each of the sections on the JHA form
- recommending any changes required to facilitate personnel safety; including, but not limited to, specific procedures, policies, equipment, training, etc., that may be involved
- providing the appropriate manager with a completed copy of the JHA
5. JHA team responsibilities include all of the following, EXCEPT _____.

   a. Defining key steps in the JHA
   b. Completing each section of the JHA form
   c. Enforcing JHA procedures
   d. Recommending changes in JHA steps