Hazard Identification

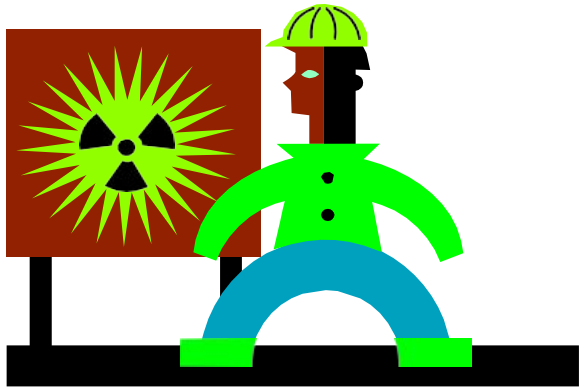
Mrs. Amrita Kodye-Domah

19/11/2022

Background

Hazard identification

Identifying hazard is the most important step in risk assessment, because hazards can only be controlled if they are identified.



What to identify?

- The hazard associated with the activity of each process/procedure;

- all the possible types of accidents, incidents and/or ill-health that can occur due to the hazards; and

- identify potential persons-at-risk

Process of Hazard Identification

- The process must be ongoing to ensure existing hazards are known, and
- New hazards recognized before they are introduced:
  - Prior to modification of facility
  - Prior to change in workforce
  - Before and during abnormal operations, troubleshooting
  - Facility early warning signals
  - Employee feedback
  - After an incident

Process of Hazard Identification

- A systematic, transparent and comprehensive process should be used based on a comprehensive and accurate description of the facility

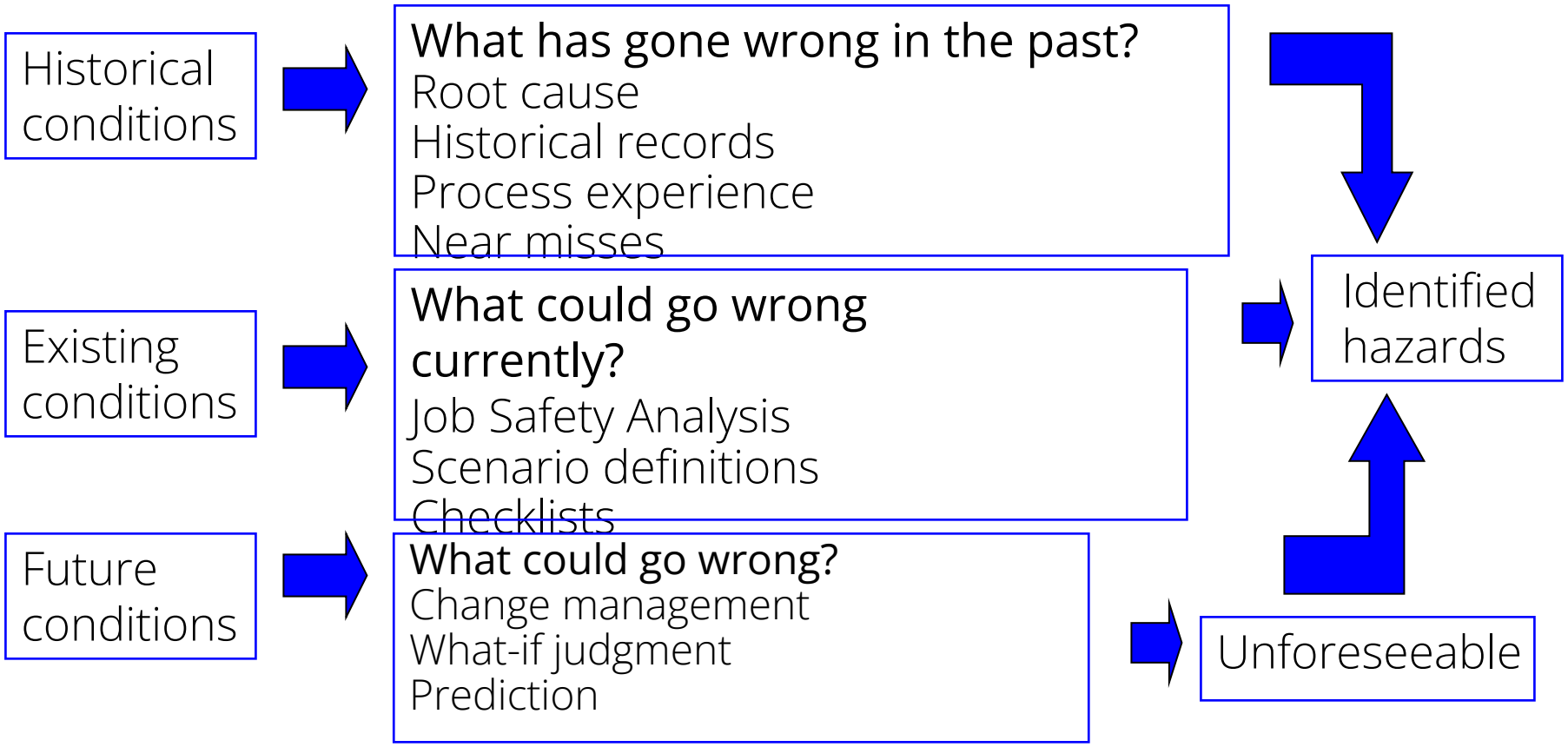
- Hazards should not be disregarded simply because:
  - ✔ They appear to be very unlikely
  - ✔ They have not happened previously
  - ✔ They are considered to be adequately controlled by existing measures

Process of Hazard Identification

- The process should:
  - ✔ Be team-based
  - ✔ Use a process that is systematic
  - ✔ Be pro-active in searching for hazards
  - ✔ Assess all hazards
  - ✔ Analyze existing controls and barriers - preventative and mitigative
  - ✔ Consideration needs to be given in selecting the hazard identification technique (checklist, JSA, walkthrough, etc.)

Process of Hazard Identification

Conducting the hazard identification process – Consider the Past, Present and Future



Scope of Hazard Identification

Should consider :

Routine/Non-routine Activities Normal/Abnormal/Emergency Conditions

- Normal Condition: situation whereby the outcome is within expectation without any deviation whatsoever
- Abnormal Condition : situation whereby the outcome is beyond expectation and can be normalized easily
- Emergency Condition : Situation with catastrophic effect and external parties are needed to normalize the situation

Hazard Identification Techniques

Hazard Identification Techniques

The following list shows the main ways to identify hazards:

→ Walkthrough surveys

→ Inspection checklists

→ Past records

→ Accident investigations

→ Consultation

→ Documentation

Hazard Identification Techniques

- Checklists - questions to assist in hazard identification
- Brainstorming - whatever anyone can think of
- "What If" analysis - possible outcomes of change
- HAZOP - identifies "process plant" type incidents
- Job safety analysis – procedures
- Fault tree analysis - combinations of failures

Hazard Identification Techniques - Checklists

Hazard Identification Techniques

Checklists

Advantages

- Highly valuable as a cross check review tool following the use of other techniques
- Useful tool to review continued compliance with safety management systems

Disadvantages

- Tends to limit creative thinking
- Used alone introduces the potential of limiting to already known hazards - no new hazard types are identified
- On their own will rarely be able to satisfy regulatory requirements

Hazard Identification Techniques

Checklists

Sample Office Area Health and Safety Inspection Checklist

Work Environment Safety

	Description	Corrective Action Needed	Date
	Employees work areas are adequately illuminated.		
	Employees are not engaged in ergonomic hazards, e.g. ackward posture, prolonged repetitive motion, contact stress, etc.		
	Employees work areas are clean, orderly and don't present a hazard		
	Employees are not engaged in unsafe acts, e.g. using chairs as stepstools, using multiple extension cords, etc.		

Walking Surfaces

	Aisles correctly established and clear		
	No tripping hazards in evidence		
	Floors dry - not slippery		
	Cords not stretched across aisles or under carpets		
	Entrance mats available and used in wet weather		
	Carpet is secure and free of tears, lumps or loose pieces		

Stairways, Aisles, Storage Rooms, Halls, Emergency Exits, Fire Extinguishers

	Adequate lighting in stairways, aisles and storage rooms		
	Stairways clear - not cluttered		
	Stair treads in good condition		
	Handrails installed and in good condition		
	Halls kept clear of equipment and supplies		
	Emergency exit doors clearly marked and accessible		
	Fire extinguishers accessible and fully charged		

Bookcases, Shelves, Cabinets

	Bookcases and shelves not overloaded		
	Heavy storage shelves secured to wall		
	File drawers closed when not in use		
	Bookcases and cabinets secured against tipping		

Electrical Safety, Chairs, Chemical Products, Step Stools, Ladders, Air Movement

	Electrical outlets not overloaded		
	Equipment properly grounded (3 pronged plugs)		
	Electrical cords and plugs in good condition		
	Extension cords not substituted for permanent wiring		
	Chairs in good mechanical condition (springs/casters)		
	Chemical products properly used, stored and labeled		
	Paper cutter equipped with guard/ blade spring functioning		
	Safe step stools and ladders properly used when needed		
	Paper shredder guarded		
	Unobstructed air movement and vents		

SAMPLE MACHINE GUARDING SELF-INSPECTION CHECKLIST

Requirements for All Safeguards

- ❑ Do the safeguards provided meet the minimum OSHA requirements?
- ❑ Do the safeguards prevent workers' hands, arms, and other body parts from making contact with dangerous moving parts?
- ❑ Are the safeguards firmly secured and not easily removable?
- ❑ Do the safeguards ensure that no objects will fall into the moving parts?
- ❑ Do the safeguards permit safe, comfortable, and relatively easy operation of the machine?
- ❑ Can the machine be oiled without removing the safeguard?
- ❑ Is there a system for shutting down the machinery and locking/tagging out before safeguards are removed?
- ❑ Can the existing safeguards be improved?

Mechanical Hazards

The Point of Operation:

- ❑ Is there a point-of-operation safeguard provided for the machine?
- ❑ Does it keep the operator's hands, fingers, body out of the danger area?
- ❑ Is there evidence that the safeguards have been tampered with or removed?
- ❑ Could changes be made on the machine to eliminate the point-of-operation hazard entirely?

Power Transmission Apparatus:

- ❑ Are there any unguarded gears, sprockets, pulleys, or flywheels on the apparatus?
- ❑ Are there any exposed belts or chain drives?
- ❑ Are there any exposed set screws, key ways, collars, etc.?
- ❑ Are starting and stopping controls within easy reach of the operator?
- ❑ If there is more than one operator, are separate controls provided?

Other Moving Parts:

- ❑ Are safeguards provided for all hazardous moving parts of the machine, including auxiliary parts?

Non-Mechanical Hazards:

- ❑ Have appropriate measured been taken to safeguard workers against noise hazards?
- ❑ Have special guards, enclosures, or personal protective equipment been provided, where necessary to protect workers from exposure to harmful substances used in machine operation?

Electrical Hazards:

- ❑ Is the machine installed in accordance with National Fire Protection Association and National Electrical Code requirements?
- ❑ Are there loose conduit fittings?
- ❑ Is the machine properly grounded?
- ❑ Is the power supply correctly fused and protected?
- ❑ Do workers occasionally receive minor shocks while operating any of the machines?

Hazard Identification Techniques

Checklists

Sample Office Area Health and Safety Inspection Checklist

Work Environment Safety

	Description	Corrective Action Needed	Date
	Employees work areas are adequately illuminated.		
	Employees are not engaged in ergonomic hazards, e.g. ackward posture, prolonged repetitive motion, contact stress, etc.		
	Employees work areas are clean, orderly and don't present a hazard		
	Employees are not engaged in unsafe acts, e.g. using chairs as stepstools, using multiple extension cords, etc.		

Walking Surfaces

	Aisles correctly established and clear		
	No tripping hazards in evidence		
	Floors dry - not slippery		
	Cords not stretched across aisles or under carpets		
	Entrance mats available and used in wet weather		
	Carpet is secure and free of tears, lumps or loose pieces		

Stairways, Aisles, Storage Rooms, Halls, Emergency Exits, Fire Extinguishers

	Adequate lighting in stairways, aisles and storage rooms		
	Stairways clear - not cluttered		
	Stair treads in good condition		
	Handrails installed and in good condition		
	Halls kept clear of equipment and supplies		
	Emergency exit doors clearly marked and accessible		
	Fire extinguishers accessible and fully charged		

Bookcases, Shelves, Cabinets

	Bookcases and shelves not overloaded		
	Heavy storage shelves secured to wall		
	File drawers closed when not in use		
	Bookcases and cabinets secured against tipping		

Electrical Safety, Chairs, Chemical Products, Step Stools, Ladders, Air Movement

	Electrical outlets not overloaded		
	Equipment properly grounded (3 pronged plugs)		
	Electrical cords and plugs in good condition		
	Extension cords not substituted for permanent wiring		
	Chairs in good mechanical condition (springs/casters)		
	Chemical products properly used, stored and labeled		
	Paper cutter equipped with guard/ blade spring functioning		
	Safe step stools and ladders properly used when needed		
	Paper shredder guarded		
	Unobstructed air movement and vents		

SAMPLE MACHINE GUARDING SELF-INSPECTION CHECKLIST

Requirements for All Safeguards

- ❑ Do the safeguards provided meet the minimum OSHA requirements?
- ❑ Do the safeguards prevent workers' hands, arms, and other body parts from making contact with dangerous moving parts?
- ❑ Are the safeguards firmly secured and not easily removable?
- ❑ Do the safeguards ensure that no objects will fall into the moving parts?
- ❑ Do the safeguards permit safe, comfortable, and relatively easy operation of the machine?
- ❑ Can the machine be oiled without removing the safeguard?
- ❑ Is there a system for shutting down the machinery and locking/tagging out before safeguards are removed?
- ❑ Can the existing safeguards be improved?

Mechanical Hazards

The Point of Operation:

- ❑ Is there a point-of-operation safeguard provided for the machine?
- ❑ Does it keep the operator's hands, fingers, body out of the danger area?
- ❑ Is there evidence that the safeguards have been tampered with or removed?
- ❑ Could changes be made on the machine to eliminate the point-of-operation hazard entirely?

Power Transmission Apparatus:

- ❑ Are there any unguarded gears, sprockets, pulleys, or flywheels on the apparatus?
- ❑ Are there any exposed belts or chain drives?
- ❑ Are there any exposed set screws, key ways, collars, etc.?
- ❑ Are starting and stopping controls within easy reach of the operator?
- ❑ If there is more than one operator, are separate controls provided?

Other Moving Parts:

- ❑ Are safeguards provided for all hazardous moving parts of the machine, including auxiliary parts?

Non-Mechanical Hazards:

- ❑ Have appropriate measured been taken to safeguard workers against noise hazards?
- ❑ Have special guards, enclosures, or personal protective equipment been provided, where necessary to protect workers from exposure to harmful substances used in machine operation?

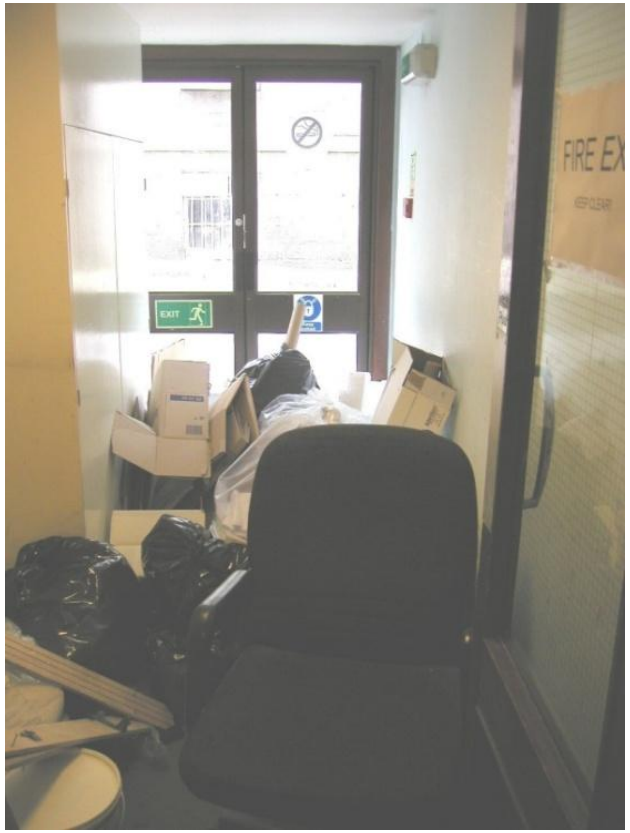
Electrical Hazards:

- ❑ Is the machine installed in accordance with National Fire Protection Association and National Electrical Code requirements?
- ❑ Are there loose conduit fittings?
- ❑ Is the machine properly grounded?
- ❑ Is the power supply correctly fused and protected?
- ❑ Do workers occasionally receive minor shocks while operating any of the machines?

Hazard Identification Techniques

Checklists

- Identify potential hazards so they are corrected before an injury occurs
- Implement or improve safety programs
- Increase safety awareness
- Display concern for workers' safety
- Communicate safety standards of performance



Hazard Identification Techniques

Checklists

Individual(s) conducting the inspection:

- Experienced with the facility and operation
- Knowledgeable of relevant regulations, codes and company policies
- Competent regarding the inspection steps
- Capable of collecting, evaluating and reporting the data

Hazard Identification Techniques

Checklists

Individual(s) conducting the inspection:

- Must be equipped with the proper PPE
- Knowledgeable on how to locate safety and health hazards
- Should have the authority to act and make recommendations

Hazard Identification Techniques

Checklists – Using checklist for safety inspections

- Research
- Organize
- Analyze
- Record
- Follow up

Hazard Identification Techniques

Checklists – Using checklist for safety inspections

Research

- Identify incident potential through research
  - ✔ Look at workplace layout
  - ✔ Look at all operations
  - ✔ Consider standards, policies and procedures
  - ✔ Analyze past losses and trends
  - ✔ Understand the safety concerns of employees

Hazard Identification Techniques

Checklists – Using checklist for safety inspections

Research

High Hazard Areas: Equipment and operations that involve *energy transfer* including: chemical, mechanical, pneumatic, physical, electrical, gravitational, etc. (unsafe conditions)

Procedures and behaviors, including: Use of protective equipment, safe operating speeds, following proper procedures, horseplay, inattentive behavior, etc. (unsafe acts)

Hazard Identification Techniques

Checklists – Using checklist for safety inspections

Organise

- Inspection objective and procedure
- Use a checklist for a guide
- List potential hazards
- Locate hazards in the work area
- Check your list with employees

Hazard Identification Techniques

Checklists – Using checklist for safety inspections

Analyse

- Address systems not just symptoms
- Determine if there are any system failures
- Look for causes or potentials for injury
- Job hazard analysis

Hazard Identification Techniques

Checklists – Using checklist for safety inspections

Record

- Observations
  - Do not include names
- Causes/potentials
- Solutions
- Distribute and post

Hazard Identification Techniques

Checklists – Using checklist for safety inspections

Follow-up

- Develop practical effective solutions
- Hierarchy of controls
- Develop an action plan
- Determine immediacy of solution
- Implement
- Act on solutions and follow up to ensure effectiveness

Hazard Identification Techniques

Checklists – how to document findings of safety inspection

In writing, in writing, in writing!

- Email
- Checklists
- Memorandums
- Written inspection reports

Hazard Identification Techniques – Job Hazard Analysis

Hazard Identification Techniques

Job Hazard Analysis

Advantages

- Provides first hand job related information
- Helps to create job-employee fit
- Helps in analysing training needs

Disadvantages

- Time consuming
- Mental abilities cannot be directly observed
- Does not always address process deviations

Hazard Identification Techniques

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.
- After uncontrolled hazards are identified, preventive action/controls are put in place to eliminate or reduce risk.

Hazard Identification Techniques

Job Hazard Analysis

- Also known as Job Safety Analysis
- Method of identifying hazards
- Means of breaking the process down into steps
- System for easily understanding hazards

Hazard Identification Techniques

Job Hazard Analysis – Why conduct JHA?

- A job hazard analysis can prevent work-related death, injuries or illnesses by eliminating or controlling identified hazards.

- It is a means to ensure that workers have the training, equipment and supplies to do their jobs safely.

Hazard Identification Techniques

Job Hazard Analysis – Why conduct JHA?

- New jobs which may not have a history within your industry must be evaluated so surprises don't occur during implementation
- Severity potential of a system will demand a JHA be performed due to the magnitude of hazard to personnel and the facility.
- The history of disabling injuries or fatalities resulting from a work task can be viewed industry-wide. This record will help to reveal what happened and the corrective actions taken by others.

Hazard Identification Techniques

Job Hazard Analysis – Why it is important?

- Once you know what the hazards are, you can reduce or eliminate them before anyone gets hurt
- The JSA can also be used to investigate incidents and
- To train workers how to do their jobs safely

Hazard Identification Techniques

Job Hazard Analysis – What jobs are appropriate for this technique?

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

Hazard Identification Techniques

Job Hazard Analysis Team

- A Job Hazard Analysis requires the cooperation of all parties involved that includes:

  - ✔ Supervisors - Frontline Personnel responsible for making change
  - ✔ Employee - Person/ Crew most familiar with job
  - ✔ Safety Professional
  - ✔ Engineers - Technical Advisor

Hazard Identification Techniques

Job Hazard Analysis – Steps

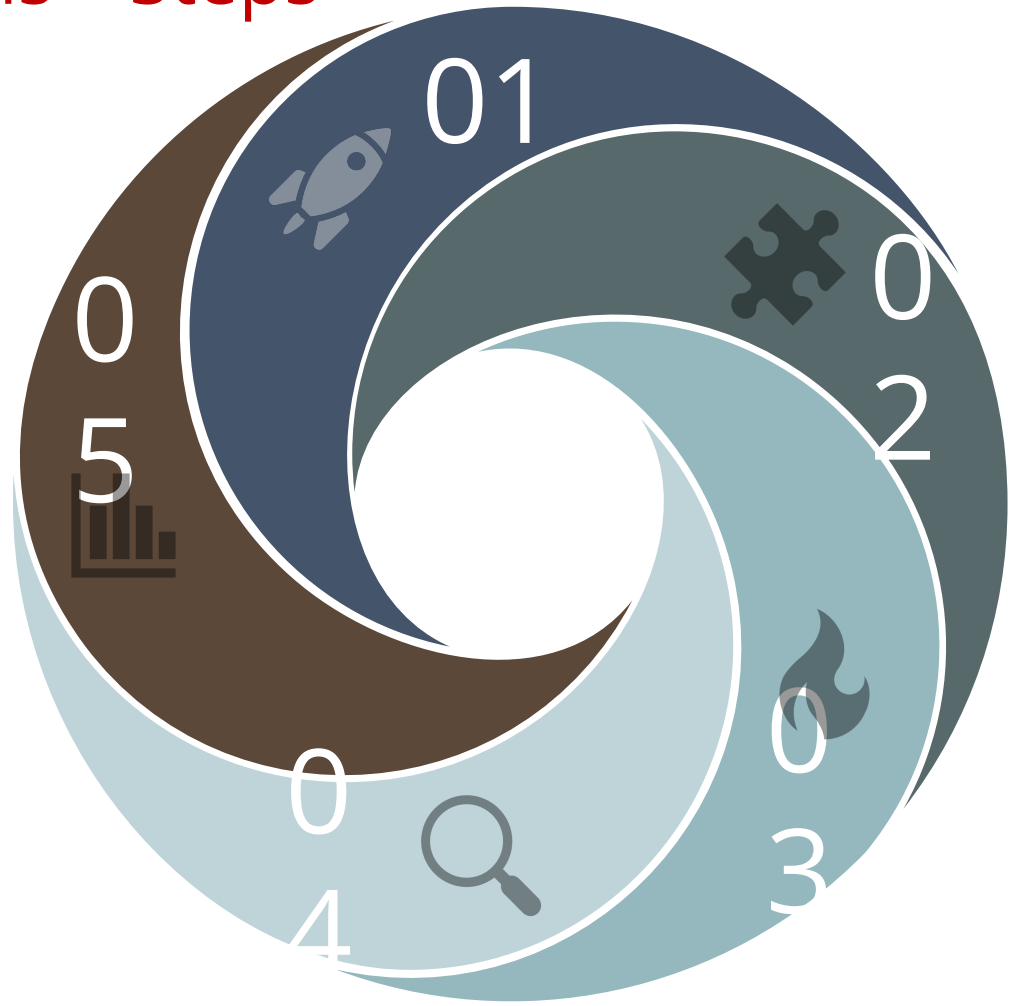
01 Involve Employees

02 Review accident history

03 Conduct preliminary job review

04 List, rank, and set priorities for hazardous jobs

05 Outline the steps or tasks



Hazard Identification Techniques

Job Hazard Analysis

1. Involve your employees

- It is very important to involve your employees in the hazard analysis process.
- 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 will share ownership in their safety and health program.

Hazard Identification Techniques

Job Hazard Analysis

2. Review your accident history.

Review with your employees your worksite's history of accidents and occupational illnesses that needed treatment, losses that required repair or replacement, and any "near misses" — events in which an accident or loss did not occur, but could have. These events are indicators that the existing hazard controls (if any) may not be adequate and deserve more scrutiny.

Hazard Identification Techniques

Job Hazard Analysis

3. Conduct a preliminary job review.

- Discuss with your employees the hazards they know exist in their current work and surroundings.
- Brainstorm with them for ideas to eliminate or control those hazards.
- If any hazards exist that pose an immediate danger to an employee's life or health, take immediate action to protect the worker. Any problems that can be corrected easily should be corrected as soon as possible.

Hazard Identification Techniques

Job Hazard Analysis

4. List, rank and set priorities for hazardous jobs

- List jobs with hazards that present unacceptable risks, based on those most likely to occur and with the most severe consequences. These jobs should be your first priority for analysis.

Hazard Identification Techniques

Job Hazard Analysis

5. Outline the steps or tasks

- When beginning a job hazard analysis, watch the employee perform the job and list each step as the worker takes it.
- Be sure to record enough information to describe each job action without getting overly detailed.
- Avoid making the breakdown of steps so detailed that it becomes unnecessarily long or so broad that it does not include basic steps. You may find it valuable to get input from other workers who have performed the same job.
- Later, review the job steps with the employee to make sure you have not omitted something.

Hazard Identification Techniques

Job Hazard Analysis

5. Outline the steps or tasks

Breaking job into key components – example changing a light bulb

Too Much Detail	Too Little Detail	Right Amount of Detail
•Get ladder from storage. •Get new light bulb from storage. •Carry ladder and light bulb to light that needs changing. •Place ladder under light to be changed. •Ensure light switch is in the off position. •Climb ladder. •Remove light cover. •Twist light bulb in a counter clock-wise direction until it is free of the socket. •Remove old light bulb. •Insert new light bulb into socket. •Turn in a clock-wise direction until tightened. •Replace light cover. •Descend ladder. •Carry ladder back to storage.	•Get a ladder and new light bulb. •Change bulb. •Put ladder away and throw out old light bulb.	•Get ladder and new light bulb. •Turn light switch off •Place ladder under light to be changed. •Using ladder, change bulb. •Put ladder back in storage.

Hazard Identification Techniques

Job Hazard Analysis

5. Outline the steps or tasks

- Identify Hazards and Potential Accidents
- Search for Hazards
  - Produced by work
  - Produced by environment
- Repeat job observation as many times as necessary to identify all hazards.

Hazard Identification Techniques

Job Hazard Analysis

5. Outline the steps or tasks

Methods to identify hazards

- General inspections
- Special inspections
- Walk-around inspections
- Safety Investigations

Hazard Identification Techniques

Job Hazard Analysis

5. Outline the steps or tasks

Identifying Hazards

Describing a hazard in this way helps to ensure that your efforts to eliminate the hazard and implement hazard controls help target the most important contributors to the hazard. Good hazard scenarios describe:

- ✔ Where it is happening (environment),
- ✔ Who or what it is happening to (exposure),
- ✔ What precipitates the hazard (trigger),
- ✔ The outcome that would occur should it happen (consequence), and
- ✔ Any other contributing factors.

Hazard Identification Techniques

Job Hazard Analysis

Controlling Hazards

- After reviewing your list of hazards with the employee, consider what control methods will eliminate or reduce them.
- The most effective controls are engineering controls that physically change a machine or work environment to prevent employee exposure to the hazard.
- The more reliable or less likely a hazard control can be circumvented, the better.

Hazard Identification Techniques

Job Hazard Analysis

Controlling Hazards – Hierachy of Controls

1. Elimination of Hazard - *Remove or reduce*
2. Substitution of less hazardous material or reduce energy - lower speed, force, amperage, pressure, temperature, and noise.
3. Engineering Controls
4. Warnings
5. Administrative Controls & Procedures - *Remove or reduce the exposure*
6. Personal protective equipment (PPE) - *Put up a barrier*

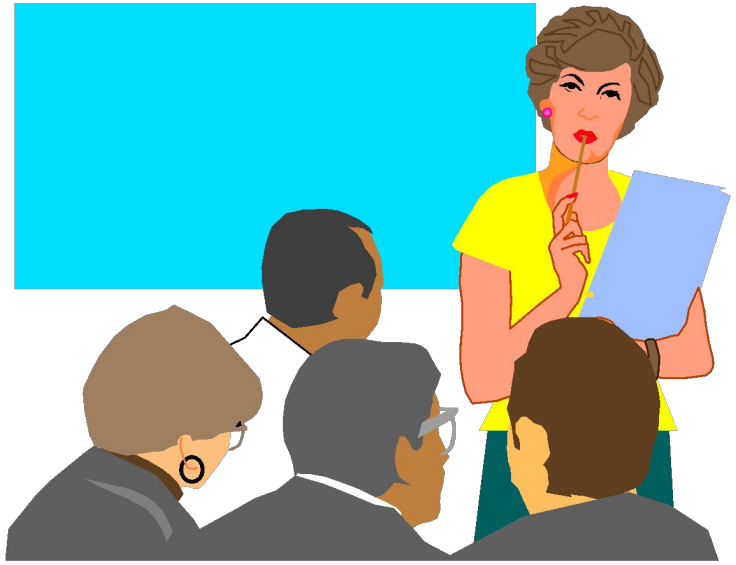
INTERIM MEASURES

Should also be taken if the risk cannot be engineered or managed right away.

Hazard Identification Techniques

Job Hazard Analysis - Review

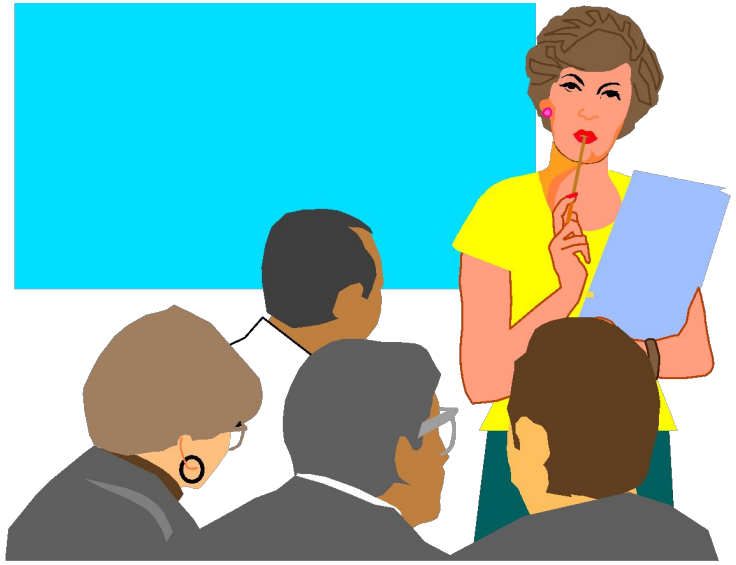
- During an accident/incident investigation process
- Prior to conducting training
- When work processes are changed or modified



Hazard Identification Techniques

Job Hazard Analysis

- Review risk assessments, plans etc:
- When changes occur – changes to work processes, alterations to the building or work patterns
- Introduction of new equipment, hazardous substances, significant increase in people
- At least annually



Hazard Identification Techniques

Job Hazard Analysis

Job Title:	Job Location:	Analyst	Date
Task #	Task Description:		
Hazard Type:	Hazard Description:		
Consequence:	Hazard Controls:		
Rational or Comment:			

Hazard Identification Techniques

Job Hazard Analysis

Tutorial: Changing a Flat Tire on an Automobile

Hazard Identification Techniques

Job Hazard Analysis

Changing a Flat Tire (too many steps):

1. Pull off road
2. Put car in “park”
3. Set brake
4. 4. Turn on “four ways”
5. Open door
6. Get out of car
7. Walk to trunk
8. Put key in lock
9. Open trunk
10. Remove Jack
11. Remove Spare
12. Carry Spare
13. Set Jack
14. Remove Flat

Hazard Identification Techniques

Job Hazard Analysis

Not Enough Steps:

1. Park car
2. Take off flat tire
3. Put on spare tire
4. Drive away

Hazard Identification Techniques

Job Hazard Analysis

Just Right:

1. Park car, set brake
2. Remove jack & tire from trunk
3. Loosen lug nuts
4. Jack up car
5. Remove tire
6. Set new tire
7. Jack down car
8. Tighten lug nuts
9. Store tire & jack

Hazard Identification Techniques

Job Hazard Analysis

- Parking car
  - Struck by traffic
- Removing tire & jack
  - Back strain
  - Strike head on trunk
- Loosen lug nuts
  - Back/arm strain
  - Slip & fall
- Jacking up car
  - Car could fall off jack
- Setting new tire
  - Fingers pinched
  - Back strain
- Tighten nuts
  - Back strain
  - Slip & fall

Thank you