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Techniques for Hazard Recognition for the Field Employee

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Introduction

Even within organizations with the best of safety and health management systems, both the line organization and safety and health professionals can overlook hazards. Therefore, multiple techniques must be used to recognize potential hazards so that controls can be implemented to prevent unwanted events, such as injury, illness, and property damage. There are many hazard recognition techniques, and almost all organizations need to use a variety of techniques in order to be more assured that hazards are recognized. The most common and most effective hazard recognition techniques are:

- OSHA Required PPE Hazard Assessment [§1910.132(d)(1)]
- OSHA Required Demolition Plan [§1926.850(a)]
- Pre-Job Safety Analysis
- Start-of-Shift Hazard Assessment
- Risk Mapping
- Blueprint Reviews
- Turnaround and Outage Planning
- Operational Readiness Reviews
- New Equipment Reviews
- New Chemical Purchases
- New Chemical Equipment Reviews
- Permitting (Confined Space Entry, Hot Work, Lift Plans, Hot Taps, Barricading, Scaffold Tagging, Working Alone, Excavations, and Working Overhead are examples)
- S/H/E Project Reviews
- Training and Education
- Perception Surveys
- Management of Change
- Safety by Design
- Final Safety Checks (The Ten-Second Drill, Out-of-View Observations, Looking for Differences, and Pre-Use Equipment Inspections)
- What If?
- Behavioral Observations

- Inspections and Audits
- Job Safety Analysis, Job Hazard Analysis, and Job Safety and Health Analysis
- Activity Safety Analysis
- Documentation Reviews
- Hazard Operability Studies
- Employee Suggestion Systems
- Work Orders
- Incident Investigation/Analysis
- Action Critiques
- Safety Policy Reviews
- Demolition Audits
- Job Cessation Reviews

Every organization needs techniques that are effective for different personnel within the organization. There must be techniques that the safety and health professionals can use, that supervisors and managers can use, and that the individual employee performing the job or task can use before the job or task is started.

When Can Hazards Be Recognized?

There are three opportunities to recognize hazards:

1. *Before Exposure to the Hazard:* The hazards should be initially recognized in the planning, design and preparation phase. This is the best time to recognize potential hazards because, at this point, no one has been exposed to any hazards. There should be adequate time allowed to review the upcoming job and determine what hazards may be presented.
2. *During Exposure to the Potential Hazards:* After the job, task, or operation has started, hazards can be found, preferably before an unwanted event occurs.
3. *After Exposure to the Hazard Ceases:* After exposure has occurred, recognition may be the result of an incident such as an injury or illness, or could be the result of a critique or review of the task or job just performed. This phase also includes review of work permits, policies and procedures, and debriefing of the individuals that took part in the job.

To be effective, multiple techniques may be required to be used simultaneously or back to back to find hazards. Many hazard recognition techniques are useful when applied at all three of these opportunities. The key objective for every organization is to implement enough techniques at all phases of the operation to find and control hazards.

The Layered Approach to Hazard Recognition

Hazard recognition is actually a multi-layered approach. The first three layers are used before exposure and are diagrammed in Figure 1.

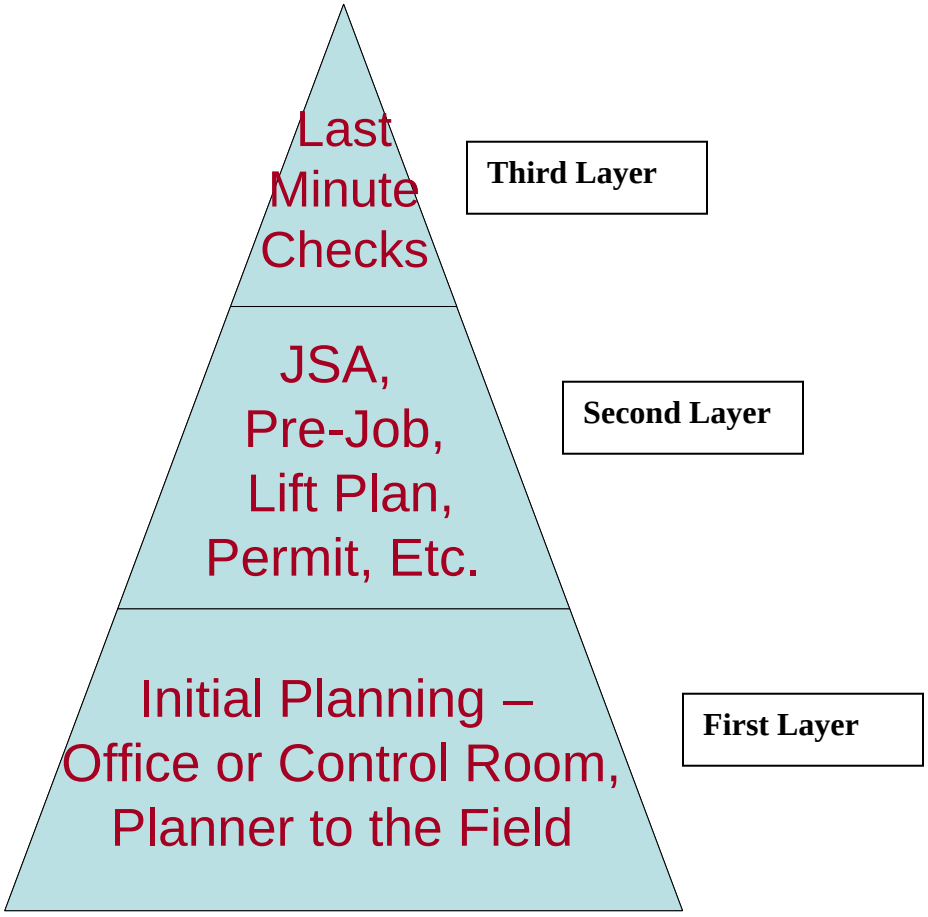

Figure 1. The Layered Approach to Hazard Recognition

These three layers include:

1. The first layer of hazard recognition, at the bottom of the pyramid, is the initial planning for the project, job, or task. The normal technique is a meeting in the office or control room by interested parties to discuss the task and what is needed to complete that task. This layer may also involve sending the planner to the job site to assess the procedures, tools, equipment, and personnel that will be needed. For example, AAA Construction is planning to replace a 5-ton air conditioning unit on the roof of a building with a larger air conditioner. The customer and contractor meet in the office to discuss how the job will proceed. They examine blueprints to understand roof load capacities, discuss expected weather conditions, evaluate the skill of the personnel needed and plan on the types of cranes, aerial lifts, tools and other equipment needed. A planner will most likely be sent to the job site to note visually what tools, equipment, personnel and documents will be needed. During this layer, general hazards, such as roof capacities, topography of the land, overhead power lines, height of the building, and so on, will be noted and evaluated. Therefore, the hazard

recognition techniques that might be used in this phase include blueprint reviews, risk mapping, management of change, and new equipment reviews. Ideally, safety and health professionals will be included during this phase, but all too often, they are not. It is common for nonspecific checklists and standard operating procedures to be used during this phase to help identify hazards.

2. The second layer of hazard recognition includes the formal written techniques commonly used to identify, evaluate, and control hazards. The broad plans, equipment, personnel, and environment have been prepared and evaluated in the first phase or layer. The second layer is the opportunity to prepare formal safety and health plans. A variety of options are available. For example, AAA Construction can prepare a series of job safety analyses (JSAs) for the various steps of the job. They may prepare a lift plan for using the crane. With the assistance of the safety and health professionals, they may prepare a complete safety, health and environmental review. Permits for overhead work, hot work and barricading may be used. These documents are a method for the planners of the task to review written documents that guide them and remind them of issues that must be considered.

3. The third layer of hazard recognition is for the field employee who performs the job or task. After the first two layers are concluded, the field employee may find that conditions have changed, the weather has changed, the planner overlooked hazards or did not estimate correctly how the job could be done, new people have been introduced to the job, or simply hazards were overlooked during the first two phases. The best hazard recognition techniques for the field employee at this time are the last-minute safety check, the ten-second drill, out-of-plain-view observations, looking for differences, and pre-use equipment inspections. Each of these five techniques is explained in more detail below.

Additional layers of hazard recognition may also be necessary to protect individuals who are exposed to the job during and after completion. These techniques might include, while the job is in progress, safety audits during the job, start of shift hazard assessments, behavioral observations, and updating permits. Once the job is completed, a job review should be conducted to assure that hazards were not left behind. For example, studs that held the original air conditioner in place, or an aesthetics barrier that was removed, may leave impaling or tripping hazards for those who will service the air conditioner.

Effective Hazard Recognition Techniques for the Field Employee

The best laid plans can go awry. For this reason, the field employee needs several techniques that can be used at the job site to find and control hazards that may have been overlooked or that developed after the initial planning. New personnel, changes in the weather or working conditions, unfamiliar equipment and tools, and mistakes during the planning process can cause hazards.

The following five techniques have a long history of being used effectively by the field employee just before the start of the job. Collectively, they are known as last-minute safety checks. But each has a distinct value and purpose:

1. *Final Safety Checks or Simple, Multi-Step Planning Process:* This technique is intended to be used before exposure to the hazard. Every task, job, and activity needs to be

rechecked after the planning and organizing phases. To do the job, task or activity safely, a simple, short, multi-step question process will cause the employee to stop and consider the hazards and controls. Some employers even put these processes on a wallet card, the back of the employee's ID, or on a sticker for the toolbox or hardhat (If you want to put a sticker on a hardhat, follow the hardhat manufacturer's requirements for applying adhesives to a hardhat.). There are many variations of the last-minute safety check, but most are based on four simple questions. The questions should be similar to:

- What am I about to do?
- What do I need to do this job, and how will I do it?
- How could I or someone else get hurt?
- What am I going to do to prevent injury?

Examples of this process include SCAN, used by ExxonMobil. First, Survey your surroundings for potential hazards. Next, Consider how your actions could create an additional hazard. Third, Analyze what could go wrong and hurt someone. And, fourth, correct the situation or if you are not able, Notify your supervisor to control the hazard.

Another example is SLAM, used by Marathon Petroleum. First, Stop, plant your feet, and prepare to look around at your surroundings. Next, Look for potential hazards. Third, Analyze what could go wrong and hurt someone. And, fourth, Mitigate the hazards either yourself if trained and authorized, or report the hazard, if not.

A third example is called First Things First. The developers of this last-minute safety check require that their employees recheck four key issues before starting any job or task:

1. Assure that any hazardous energy is controlled.
2. Assure that housekeeping is in order.
3. Assure that the correct personal protective equipment (PPE) is available, in good condition, and is used.
4. Assure that all potentially needed emergency equipment and procedures are accessible, in good condition, and that you understand how to use it.

A fourth example is the 3C Personal Risk Manager, developed and used by URS Washington Division. First, step back two yards for two minutes and ask:

1. Are there any unsafe Conditions?
2. Determine the Consequences of your actions.
3. Control the hazards.

The beauty of this technique is that no paperwork is necessary; employees learn a simple and quick method to identify hazards that may have just developed or were overlooked, and employees take further responsibility for their own safety.

For example, the old air conditioner has been removed and the new air conditioner has been set in place. Now, the crew needs to anchor the new equipment and attach it to the utilities. This crew would use the last-minute safety check before starting the job to assure that they aren't too close to the edge of the roof without fall protection, that the weather has not changed, that they have an escape route, and that their tools and personal protective equipment are in good shape.

2. *The Ten-Second Drill:* Other names for this technique include 360 Degrees, The Circle of Safety, and The Ten-Foot Circle. This technique encourages the employee to take ten

seconds before the start of the task to review surroundings. Why? Because the employee will be concentrating on his or her task and not necessarily nearby conditions. During movement around the task, or if there is a need to evacuate the area, potential hazards should be identified and controlled before starting. During this ten seconds, the employee would assure that a primary and a secondary means of egress is known and is accessible; that there are no impaling hazards nearby, such as an OS&Y valve stem or piece of rebar; that there are no holes or floor openings; that no drain covers missing; and that there are no hoses or electrical cords in the immediate vicinity that could create a tripping hazard.

For example, the crew preparing to install the new air conditioning unit would take about ten seconds and assure that there are no impaling hazards, no tripping hazards, no stumbling hazards, and that no unauthorized personnel are in the area.

3. *Out-of-Plain-View Observations:* It is fairly easy to walk through a work area and take a quick look at the obvious, in-plain-view items and find potential hazards. However, many hazards are behind closed closet or electrical panel doors, in drawers and toolboxes, behind and under desks and cabinets, above us and below us, inside of a pipe and otherwise just not in plain sight. Working surfaces may not be structurally sound, guard rails and walls (particularly glass walls) may not support the intended load, other people may walk under a grating or pipe chaise and be exposed to dropped objects, a weather pattern may be developing on the other side of the tanks or towers, and an exit door may hide a restricted means of egress on the other side of that door. I asked a contractor foreman of a work crew installing new machinery at a plant several years ago how his crew would escape if there was an emergency. I noticed before I asked him that there was a marked exit about 10 feet away but it had a piece of red barricade tape across the door, with a cardboard sign that stated “Keep Door Shut.” The foreman replied that his crew would go through that door, that the red tape wouldn’t stop them. I asked the foreman if he had checked what was on the other side of that door before starting the installation of equipment. The foreman laughed and answered that he had not. I said, “Let’s check it.” We walked over and opened the door and found that the stair tower had been removed and there was an 18-foot drop to the ground.

   In our example of installing the new air conditioner, the workers should check roof openings, such as skylights and ventilators, for out-of-view hazards, such as wasp’s nests and other hiding vermin in the new equipment, weak places in the roof, and roof holes where sparks could enter the building.

   In addition, some hazards that are not in plain view require testing devices to identify hazards. Ground fault detectors, current sensors, receptacle tension testers and air gauges may be necessary to identify hazards not in plain view. For example, an electrical receptacle looks innocent enough, but it may have no ground, reversed polarity, an open neutral or other hazard. Normally, employees in the field do not carry receptacle testers, electrical current testers and other testing equipment, but these employees can be advised to look for damage, missing parts, and modified parts as clues that further tests may be needed to identify hidden hazards.

4. *Looking for Differences:* One does not need to be a safety and health professional to find hazards. One simple technique is to teach employees to look for differences, based on their education, their life experiences and what they would normally expect to find in the workplace. When one sees something that is different or out of place, chances are good that a hazard exists. If someone sees something that is different and knows that a hazard

exists, that person should correct the hazard, if trained and authorized, or report the hazard if not. If someone sees something different and does not know if the difference is a hazard, then someone who would know should be consulted before the start of the task. For example, the use of duct tape and cardboard is usually a difference and, many times, is a clue that a hazard exists. Machine parts leaning against the wall or on the floor should be a difference. Electrical covers lying about should be a difference. If one machine is covered and a similar machine is not, that is a difference.

For example, the crew installing the air conditioner might notice that the concentric rings guarding the fans have different width openings. They may notice different gauges of sheet metal in the units themselves, or different sizes of electrical wiring. These are differences that may be just fine, or they may indicate a hazard.

5. *Pre-use Equipment Inspections:* As I assist clients on job sites, I find many examples of damaged and modified tools, ladders, slings, hoists, fork trucks, machine guards, and a host of other pieces of equipment that present hazards. The reasons for these findings include a belief by the employee that it is OK to use damaged equipment, an understanding by the employee that there is no hazard, failure on the part of management to teach the employee how to safely use the equipment, poor leadership among management and the first-line supervisor in allowing the damaged equipment to be used, and an inadequate inspection of the tool or equipment before use. Before an employee can conduct an adequate inspection, the employee must understand what is unsafe equipment, must know what is an acceptable and unacceptable risk, must know how to inspect the equipment, and must be given the time to inspect the piece of equipment.

   OSHA has numerous requirements to inspect equipment before use, such as for hoists and cranes [1910.179(j)], slings [1910.184(d)], respirators [1926.103(h)(2)], and aerial lifts [1910.67(c)(2)(i) and 1926.453(b)(2)]. Many other pieces of equipment should be inspected before use, such as grinders, hand tools, ladders, and personal protective equipment (PPE).

   For example, the crew installing the air conditioning unit should inspect their tools, lifting devices, ladders, aerial lifts, PPE, electrical and cord sets before starting the job. Any defective equipment should be discarded or repaired.

Steps to Take to Manage Hazard Recognition

Since every organization needs multiple hazard recognition techniques to be reasonably assured that most hazards will be detected and controlled before unwanted events occur, this system needs to be managed. There must be planning, coordination, leadership and control. The five steps to take to set up this management system are:

1. Prepare a list that includes all of the known hazard recognition techniques used at your organization. Start with the techniques described in this paper, and add other techniques as you learn that they are being used. On this list, try to give an example of how the technique is used, who uses the technique, and any time frame in which the technique may be used.
2. Using walkthrough observations, employee interviews, incident reports, near-hit reports, the OSHA 300 and other medical records, and your own knowledge of the work site, determine if there is a technique available that is likely to identify and analyze the

potential hazards for each task, each job, each operation. For example, at one plant that I visited, we found that there was no technique for the placement of new electrically operated equipment. Specifically, the plant bought a general-purpose, electrically operated water cooler and installed that water cooler in a Class I, Division 2 location (where the presence of flammable vapors is possible.)

3. Determine who uses that hazard recognition technique and then assure that adequate training and education has been provided so that the technique is used properly. The OSHA ten-hour and thirty-hour courses are good sources of training.

4. Implement a system to record or document all observed hazards found during the use of any of your techniques and then track the resolution of each hazard found. This documentation helps to manage hazard recognition and control, helps to evaluate the severity and priority of each hazard, and provides a method to give employees feedback on hazard control. The typical method used to track hazards is a simple spreadsheet on a computer that anyone at the location can access and read (but not change). Only those who have authority to update the spreadsheet should be making changes. Columns in the spreadsheet should include: Date of Hazard Finding, Location of Hazard, Finding, Resolution of Hazard Assigned To, Corrective Action Taken, and Date of Corrective Action or Resolution. You can also add a column for the Target Date to Resolve the Hazard.

5. Assure that the hazard recognition management system is audited annually, just as qualified personnel should audit all other safety and health management systems annually.

Summary

There are numerous hazard recognition techniques available. Every organization needs a variety of techniques to be able to find the different hazards that are present to be able to evaluate the severity and probability of an unwanted event occurring. The hazard recognition system must be properly managed through planning, organization, leadership and control. This system must be periodically audited to recognize deficiencies and needed improvements. Also, there must be several easy-to-use and practical techniques that the field employee can use.

Think about this: How badly can someone be injured at your work site? They could die, couldn’t they? Your employees deserve the best hazard recognition management system that you can provide.