

# PROTECTION

## Restart video and discussion (10 min)

### Restart the video:

- ▶ After the discussion, start the video over. When the video is over, discuss as a class how Lucas responded to scenario 3.

### Start the discussion:

- ▶ Below are some questions for inspiring discussion. Make sure the main points on the next page are discussed and well understood by all.

### Questions to stimulate discussion:



- What did Lucas do well? How did he negotiate with his boss?
- Should he have negotiated with his boss before going up the ladder with Fernando?
- When did Lucas decide to go to the workers' center of help? Would you have done the same?
- Based on the information from the video and the Workers' Manual, how will OSHA respond to the complaint? When does OSHA make an investigation?
- What can employers do to improve workers' safety?

# PROTECTION

## Restart video and discussion (continued)

### Worker rights under OSHA:

- Request information from your boss about the hazards to your health and safety.
- Receive the necessary training and information.
- Request that the OSHA Area Director investigate working conditions.

### Employer responsibilities under OSHA:

- Complete the general responsibility of maintaining a workplace that is free of danger.
- Reduce or eliminate any potential hazards.
- Ensure that all workers use equipment that is safe and well maintained.

### Read aloud:

- If the worker has tried to fix a hazard in the workplace, but the employer refuses to act, the worker should come to the nearest worker center. Remember! Our workers' center will help you fill out the online form and will serve as your representative.
- Employers can ask for a consultation with OSCHON, the Occupational Safety and Health Consultation program. It's a free service that helps employers. [Reference this section of the Workers' Manual].



**CEDPA**

A SAFETY AND HEALTH TRAINING IN CONSTRUCTION  
WORKERS DEFENSE PROJECT / PROYECTO DEFENSA LABORAL

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# WORKER MANUAL | FALLS (ALTURAS)



"Workers' Defense Project taught me how to be safer at work. Now I'm not afraid of asking questions, and I'm even learning how to facilitate safety trainings for other members."

—JORGE DE LOS SANTOS



## FALLS (ALTURAS)

PROTECT YOURSELF FROM FALLS IN CONSTRUCTION

# PROTECT YOURSELF FROM FALLS

## Falls are very serious!

- Falls are the leading cause of death in construction. In 2010, there were 264 fall fatalities (255 falls to lower level) out of 774 total fatalities in construction. These deaths are preventable.
- Trips, slips and falls on ladders make up a huge proportion of injuries and fatalities among construction workers.
- The use of railings, fall protection systems, covers and personal fall arrest systems can prevent many falls.

## Plan, Provide, Train!

- **PLAN** ahead to get the job done safely.
- **PROVIDE** the right roof equipment.
- **TRAIN** everyone to use the equipment safely.



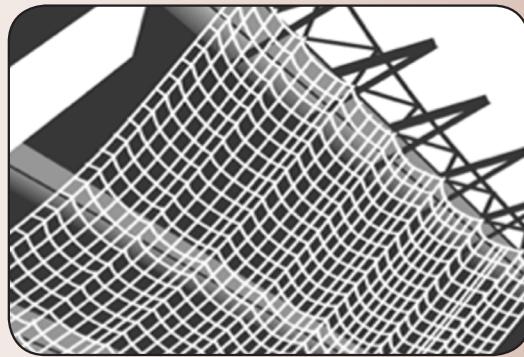
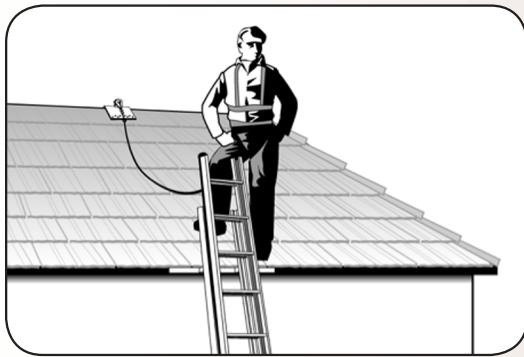
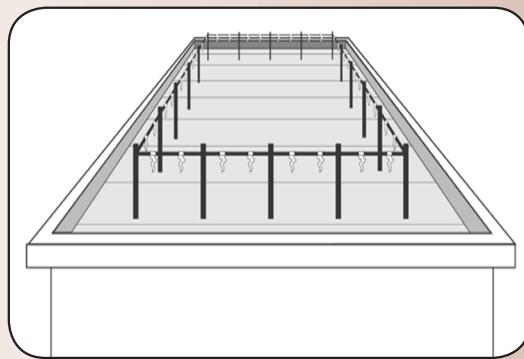
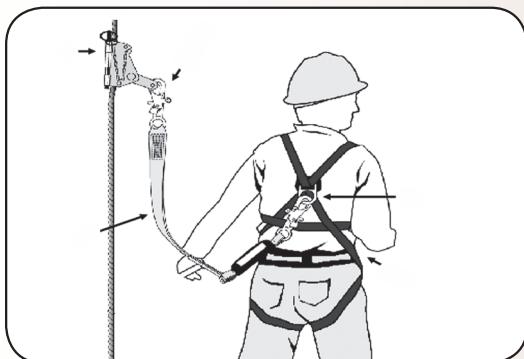
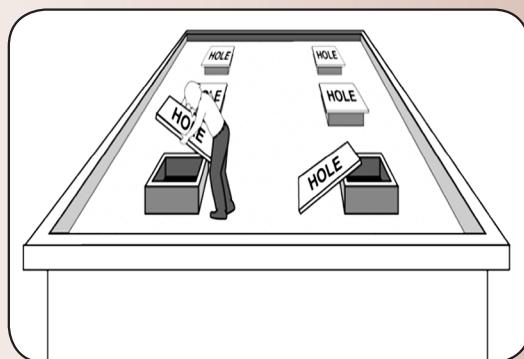
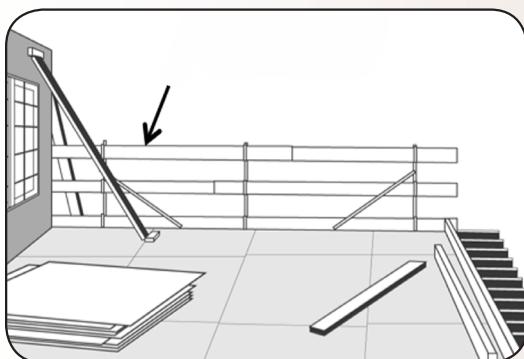
### REMEMBER!

While working at heights over 6 feet (1.8 meters) over the level below you, or while working over dangerous equipment, always use fall protection.

# PROTECT YOURSELF FROM FALLS

## What kinds of fall protection are there?

Where employees are exposed to falling 6 feet (1.8 meters) or more from an unprotected side or edge, the employer must select either a guardrail system, safety net system, or personal fall arrest system to protect the worker.



# LADDER SAFETY

## When does OSHA require use of ladders?

A ladder (or stairway) must be provided at all work points of access where there is a break in elevation of 19 inches (48.2 centimeters) or more except if a suitable ramp, runway, embankment, or personnel hoist is provided to give safe access to all elevations.

### REMEMBER!

A competent person should inspect ladders for visible defects, and shall mark damaged ladders with "don't use!" and throw them away.



### REMEMBER!

Never carry anything in your hands while going up or down a ladder. While climbing a ladder, keep three points of contact at every moment.

# LADDER SAFETY

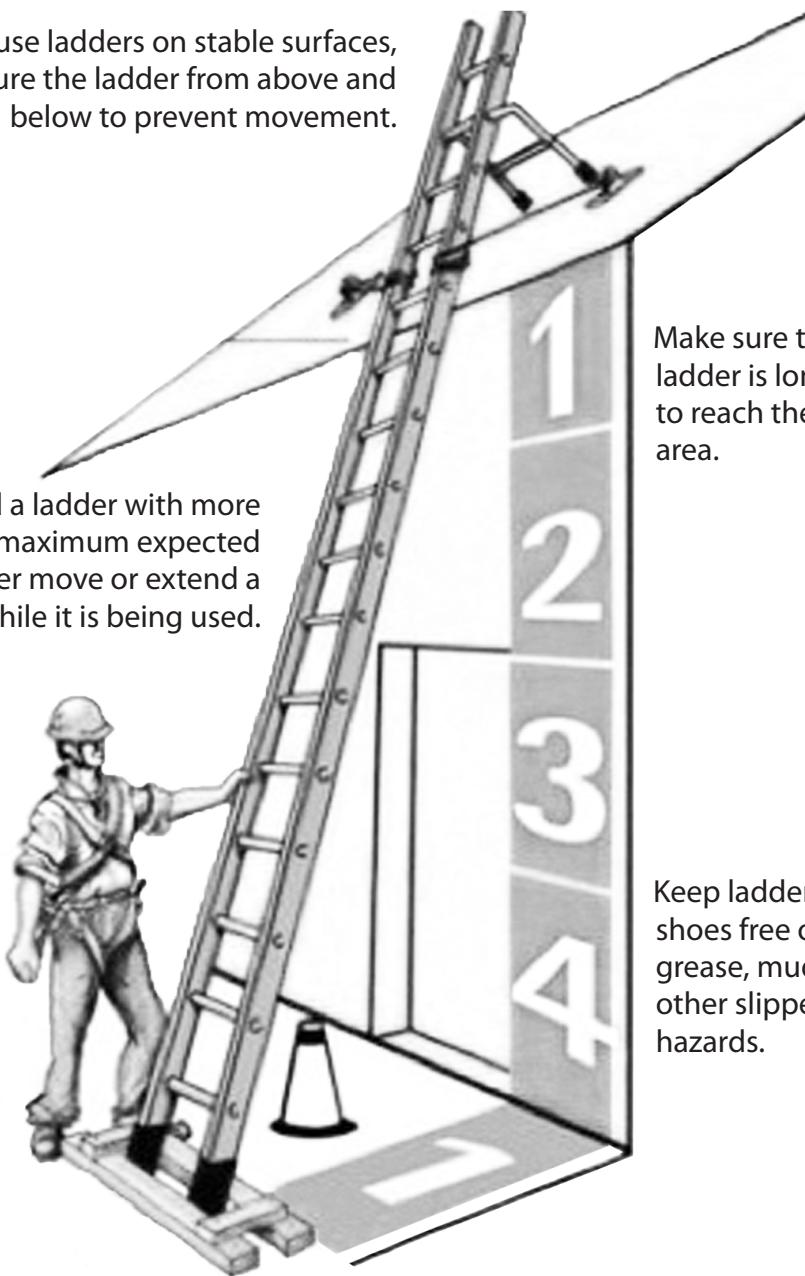
Falls from ladders can be prevented!

Only use ladders on stable surfaces, and secure the ladder from above and below to prevent movement.

Never load a ladder with more than their maximum expected weight. Never move or extend a ladder while it is being used.

Make sure that the ladder is long enough to reach the work area.

Keep ladders and shoes free of oil, grease, mud, and other slippery hazards.



# LADDER SAFETY

## What about portable ladders?



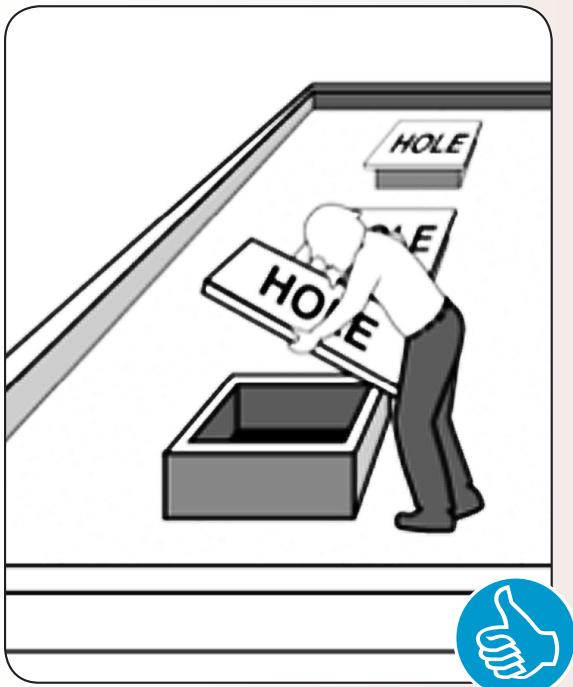
- Only use portable ladders in their fully open position.



- Don't use the top rung of a portable latter as a step or a seat.

# SAFETY AND FLOOR OPENINGS

## Cover all holes!

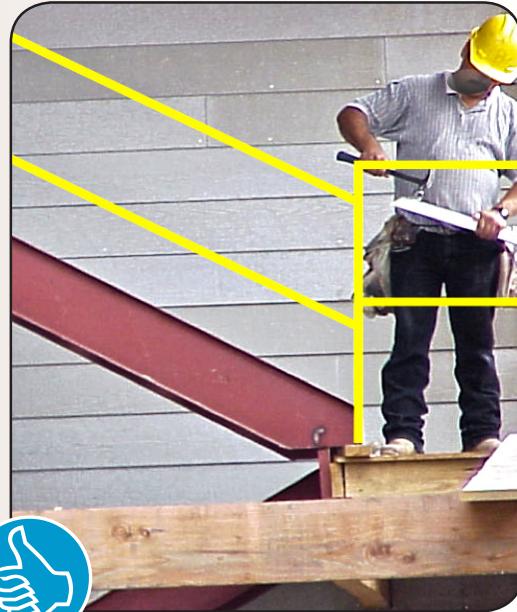


- Every opening in floors and roofs should have a cover.
- All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.
- Covers should sustain at least twice the maximum expected weight of workers, equipment, and materials.
- Every cover should be painted with a distinctive color or marked with the word "HOLE" or "COVER".

# SAFETY AND UNPROTECTED EDGES

## When and how should you use handrails?

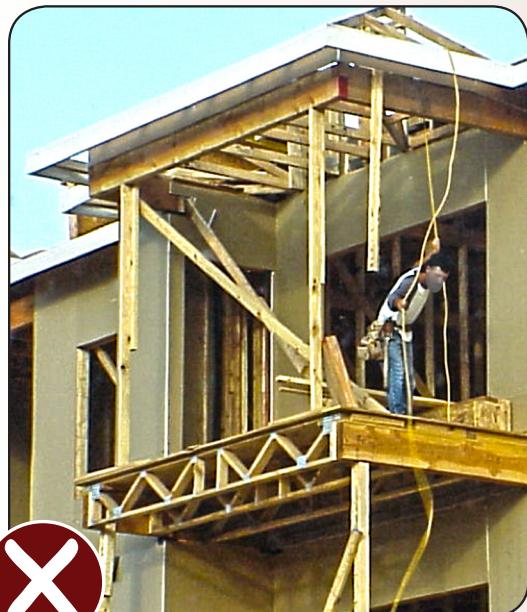
- Stairs that have four or more steps should have at least one handrail. Each employee on ramps, runways, and other walkways shall be protected from falling 6 feet or more to lower levels by guardrail systems.
- Handrails should be finished and well maintained to prevent dangerous irregularities.
- Handrails should be wide enough to grasp to prevent falls.
- A stair railing shall be of construction similar to a standard railing with a vertical height of not less than 36 inches (91.5 centimeters) from the upper surface of top rail to the surface of tread in line with face of riser at forward edge of tread.



# SAFETY AND UNPROTECTED EDGES

## When are guardrails necessary?

- Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet (1.8 meters) or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches (1 meter) above the walking/working surface must be protected from falling by the use of a guardrail system, a safety net system, or a personal fall arrest system.
- Guardrails on the sides of buildings should have top and middle rails, as well as toe boards where there is a danger of falling materials.
- Top edge height of top rails or equivalent guardrail system members shall have a vertical height of approximately 42 inches (106.6 centimeters), plus or minus 3 inches (7.6 centimeters) above the walking/working level.
- Guardrail systems shall be surfaced so as to prevent injury to an employee, with a strength to withstand at least 200 pounds (90 kilograms), the minimum requirement applied in any outward or downward direction, at any point along the top edge.



# SAFETY AND UNPROTECTED EDGES

## What is a warning line?

A warning line is erected all around sides of the roof work area and shall consist of ropes, wires, or chains with a minimum tensile strength of 500 pounds, and supporting stanchions capable of resisting, without tipping over, 16 pounds applied horizontally.

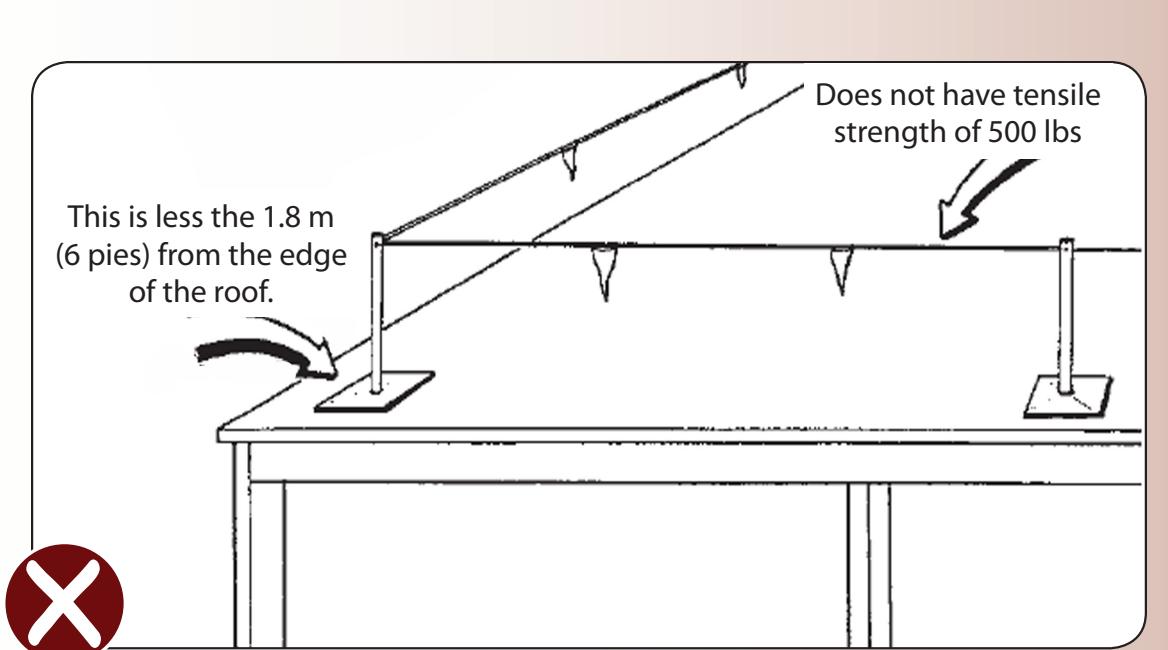
Each employee engaged in roofing activities on low-slope roofs with unprotected sides and edges 6 feet (1.8 meters) or more above lower levels shall be protected from falling by guardrail, safety net, or personal fall arrest systems or a combination of a:

- Warning line system and guardrail system,
- Warning line system and safety net system,
- Warning line system and personal fall arrest system, or
- Warning line system and safety monitoring system.

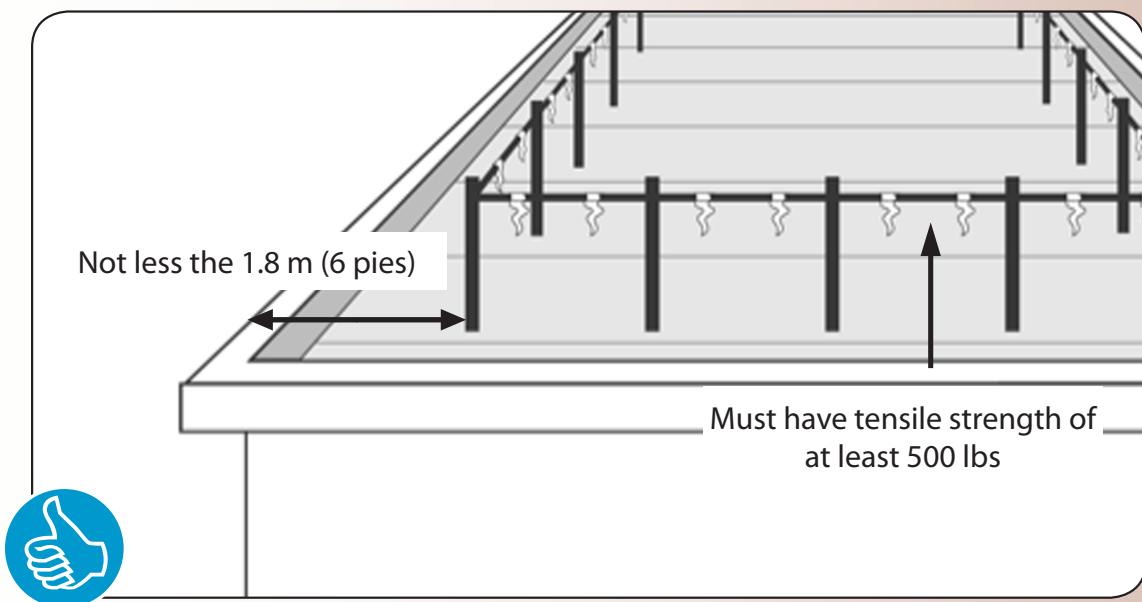


This worker should not be at the top without fall protection. One should use warning lines in combination with another form of fall protection.

# SAFETY AND UNPROTECTED EDGES



The warning lines shall be erected not less than 6' from the edge of the roof.



Rope, wire, or chain shall be rigged so that its lowest point (including sag) is 34 inches and its highest point is 39 inches from walking/working surface and shall be flagged with high visibility material at not more than 6' intervals.

# SCAFFOLD SAFETY

## When is a scaffold safe to use?



- Scaffolding should be designed and constructed adequately.
- Use guardrails on scaffolding that is 10 feet (3 meters) or taller.
- In addition to guardrails, personal fall arrest systems are recommended for jobs on platforms that are 10 feet (3 meters) or higher.
- A competent person should inspect all scaffolding before beginning the job and after any changes made to the scaffolding.



# SCAFFOLD SAFETY

Be careful up there!



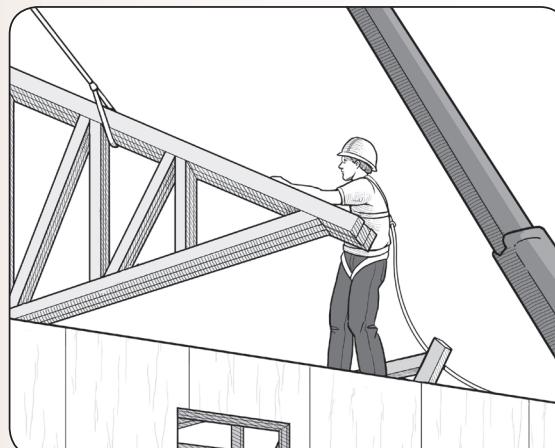
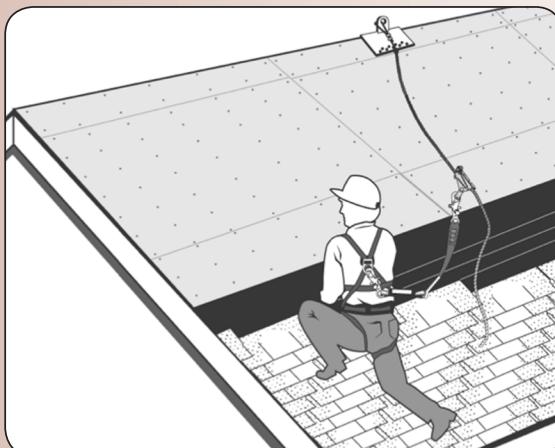
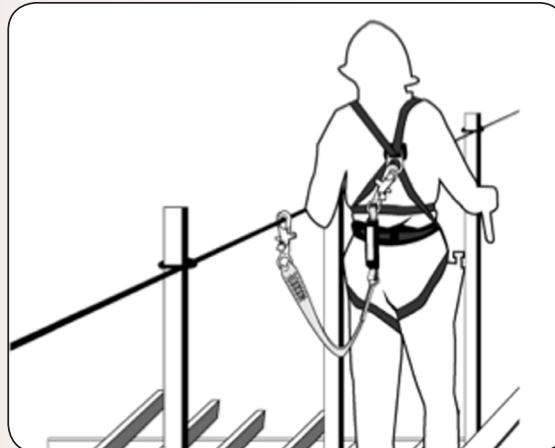
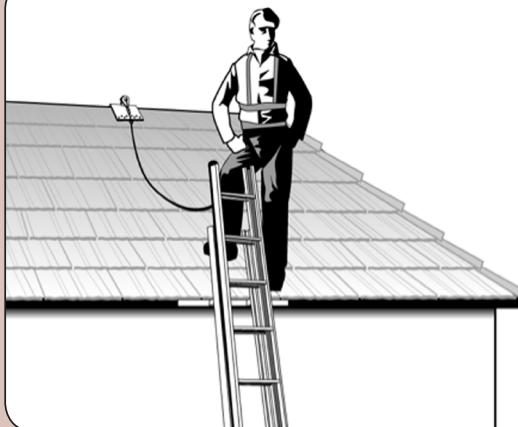
- Never use blocks, bricks or ladders on top of scaffolding to reach higher, nor to climb onto scaffolding.
- Never use bricks, blocks, or barrels to support scaffolding.
- All scaffolding should be able to support at least four times the expected weight.
- Only use ladders that are designed for use with scaffolding. The ladder should be firmly secured to the scaffolding at all times.



# PERSONAL FALL ARREST SYSTEMS

## What are personal fall arrest systems used for?

- They reduce the risk of injury if you fall, but they do not keep you from falling.
- They should be examined before each use for damage or deterioration. A personal fall arrest system consists of an anchorage, connectors, body harness and may include a lanyard, deceleration device, lifeline, or a suitable combination of these. Body belts used for fall arrests are prohibited.

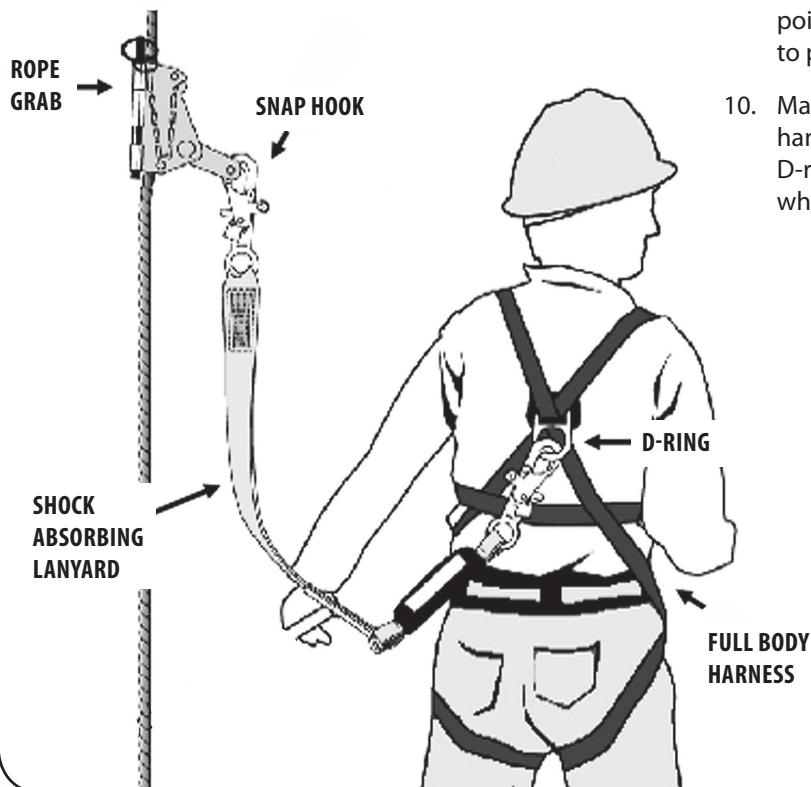


Source: [www.orosha.org](http://www.orosha.org)

# PERSONAL FALL ARREST SYSTEMS

## How to Wear a Full-Body Harness

1. Hold the harness by the back D-ring. Shake the harness to allow all straps to fall in place.
2. With waist and/or leg straps unbuckled, release snaps and unbuckle at this time.
3. Slip straps over your shoulder so the D-ring is located in middle of the back.
4. Connect the waist strap. The waist strap should be tight, but not binding.
5. Pull the buckle portion of the leg strap between your legs and connect to opposite end of the leg strap. Repeat the procedure with second leg strap.
6. After all straps have been buckled, tighten all friction buckles so harness fits snug but allows free range of motion.
7. If the harness contains a chest strap, pull it around the shoulder strap and fasten it in middle chest area. Tightening will keep the straps taut.
8. To remove the harness reverse the procedure.



9. Reconnect the waist strap after removing the harness. This will give you a starting point when next attempting to put harness on.
10. Manufacturer's recommend hanging the harness by the D-ring to help keep its shape when not in use.

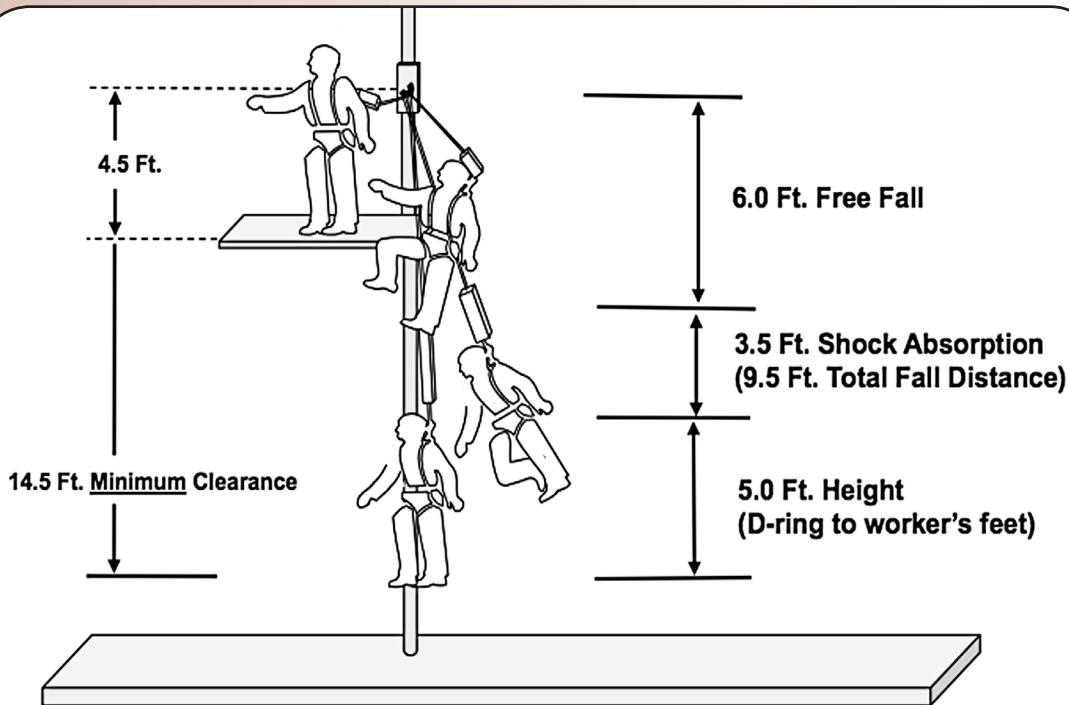
Source: [www.orosha.org](http://www.orosha.org)

# PERSONAL FALL ARREST SYSTEMS

## How should one measure fall distance?

<b>FREE-FALL DISTANCE*</b>	The distance of the fall from the anchor to the activation of the deceleration device.
<b>+</b> <b>DECELERATION DISTANCE</b>	From the activation of the deceleration device to a complete stop.
<b>=</b> <b>TOTAL FALL DISTANCE</b>	The combination of the two above, plus any other condition, such as the stretch of a rope.

\* With a Personal Fall Arrest System, the maximum allowable free fall is 6 feet.

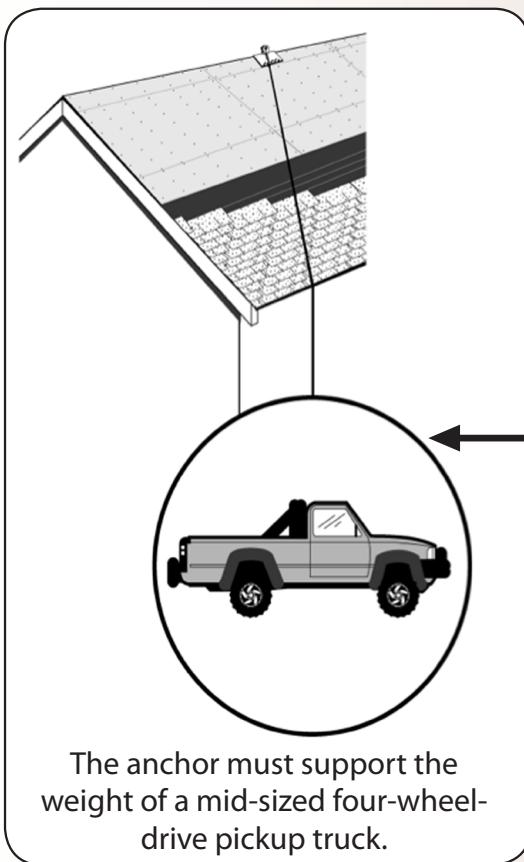


6-foot lanyard with shock absorbing lanyard measuring 3.5 feet fully elongated. Actual distance from D-ring to workers' feet may vary. Potential obstructions may affect the Total Fall Distance. Fall arrest devices must be evaluated individually.

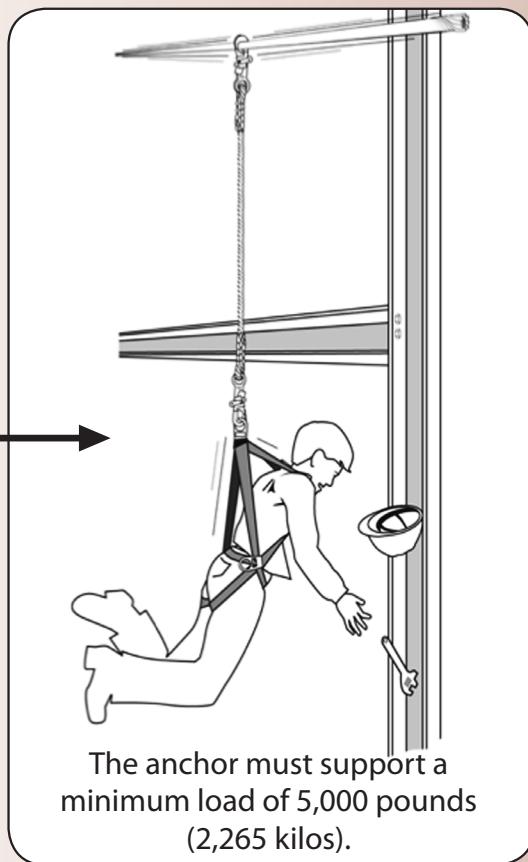
# PERSONAL FALL ARREST SYSTEMS

## How much weight should an anchor support?

- The anchor must support a minimum load of 5,000 pounds (2,265 kilos), approximately the weight of a mid-sized four-wheel-drive pickup truck. Or, be designed by a QUALIFIED person with a safety factor of two times the impact force of a worker free falling six feet.



The anchor must support the weight of a mid-sized four-wheel-drive pickup truck.



The anchor must support a minimum load of 5,000 pounds (2,265 kilos).



### REMEMBER!

A competent person is capable of identifying existing and predictable hazards in the surroundings or working conditions which are hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Source: [www.orosh.org](http://www.orosh.org)

# FALL SAFETY IN CONSTRUCTION

## Employer responsibilities

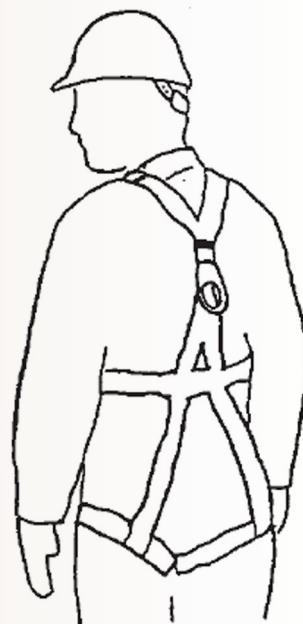
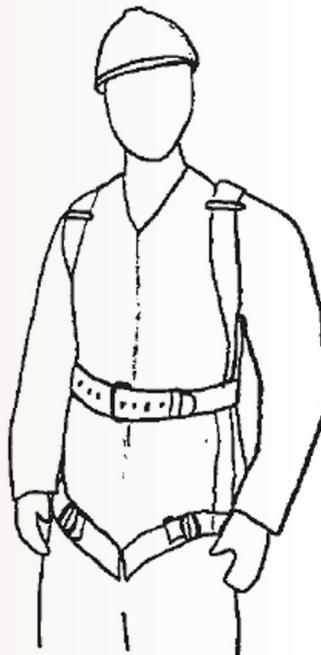
Employers are required to assess the workplace to determine if the walking/working surface on which employees are to work have the strength and structural integrity to safely support workers.

Employees are not permitted to work on those surfaces until it has been determined that the surfaces have the requisite strength and structural integrity to support the workers.

Employers must provide a training program for each employee using ladders and stairways. The program must enable each employee to recognize hazards related to ladders and scaffolds and to use proper procedures to minimize these hazards.

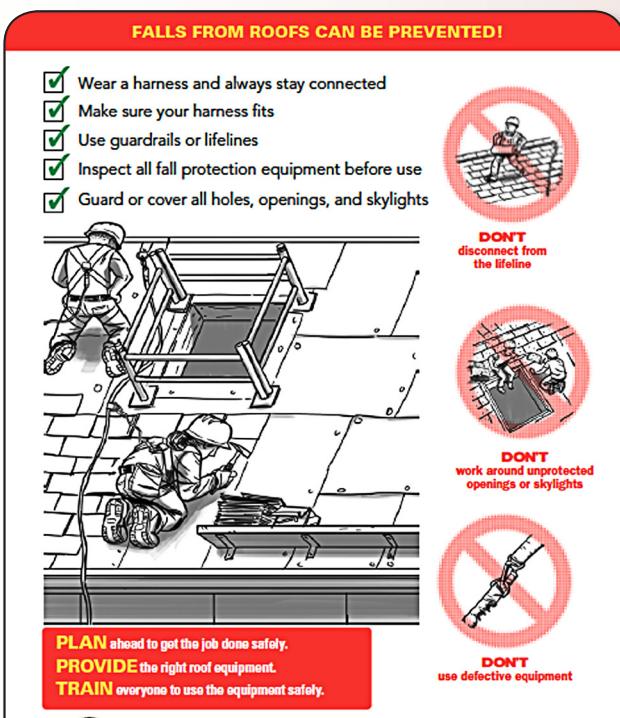
For example, employers must ensure that each employee is trained by a competent person in the following areas:

- The nature of fall hazards in the work area,
- The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used,
- The proper construction, use, placement, and care in handling of all ladders and scaffolds, and
- The maximum intended load-carrying capacities of ladders and scaffolds used.



# FALL SAFETY IN CONSTRUCTION

For more information, see the following resources from OSHA:



Occupational Safety & Health Administration **We Can Help** What's New | Offices

Home Workers Regulations Enforcement Data & Statistics Training Publications Newsroom Small Business OSHA

**PLAN. PROVIDE. TRAIN.**  
Three simple steps to preventing falls.

Home Educational Materials and Resources Training Media Resources

**Highlights en Español**

- [Poster](#), Also available as a 1 MB PDF
- [Fact Sheet](#), Also available as a 1 MB PDF

**Prevention Videos (v-Tools)**

- Falls in Construction
  - [Floor Openings](#)
  - [Fixed Scaffolds](#)
  - [Bridge Decking](#)
  - [Reroofing](#)
  - [Leading Edge Work](#)
  - [Falls prevention](#), California Fatality Assessment and Control Evaluation (FACE)

**Campaign Partners**

- [National Institute for Occupational Safety and Health \(NIOSH\)](#)
- [The National Occupational Research Agenda \(NORA\)](#)

**PLAN**  
ahead to get the job done safely.

**PROVIDE**  
the right equipment.

Welcome to OSHA's Fall Prevention Campaign

Source: <http://www.osha.gov/stopfalls/>

# FALL SAFETY IN CONSTRUCTION

## Additional resources

For more information about preventing work related injuries and illnesses, you can check out the information provided by the following organizations:

### **OSHA'S RESIDENTIAL CONSTRUCTION REGULATIONS**

Description of Occupational Safety & Health Administration (OSHA) safety & health regulations. <http://www.osha.gov/SLTC/residential/index.html>

### **NIOSH CONSTRUCTION INFORMATION**

Free information about safety and health hazards in the construction industry. <http://www.cdc.gov/niosh/construction/>

### **CENTER FOR CONSTRUCTION RESEARCH & TRAINING**

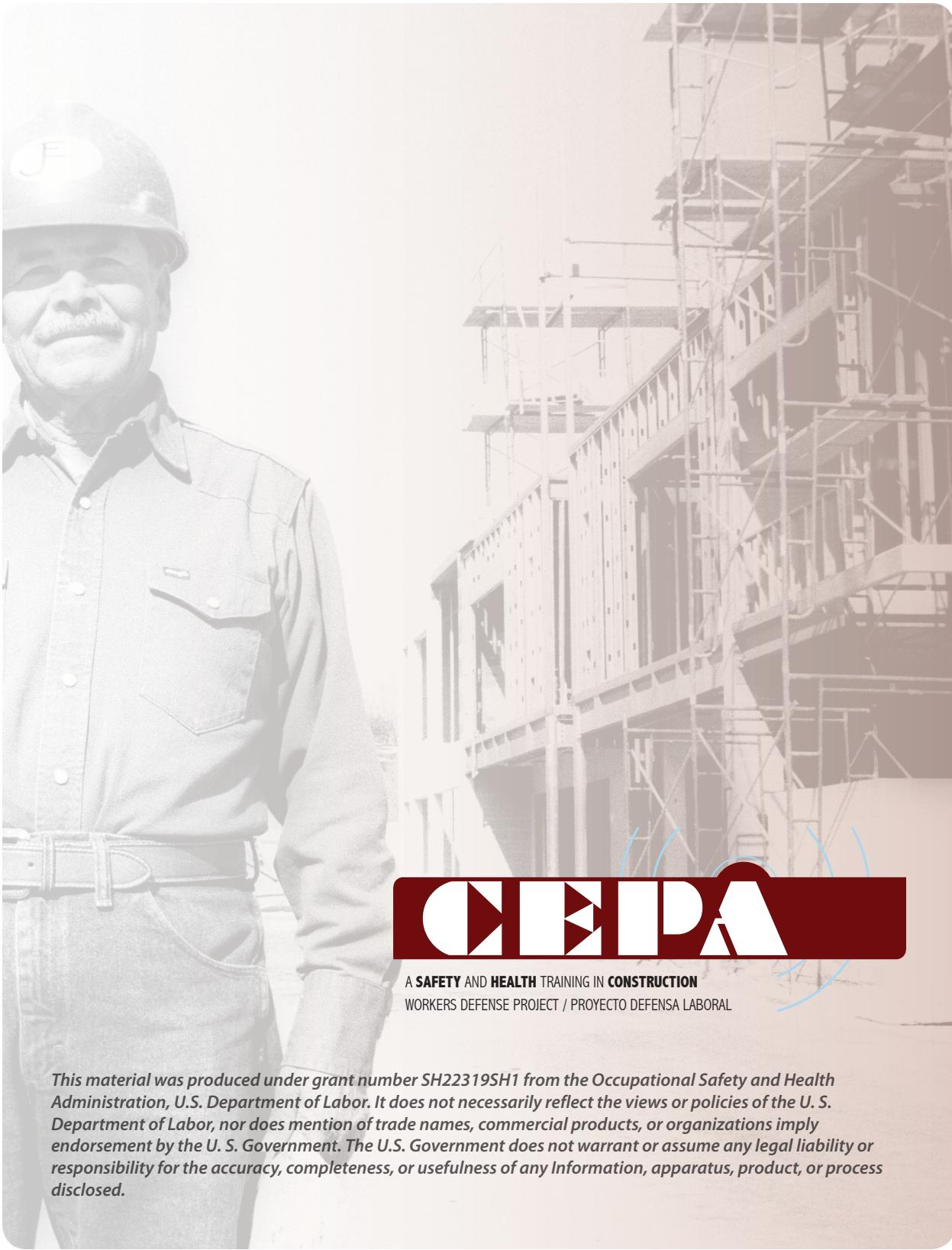
Source for information about controlling and eliminating construction safety and health hazards and training. <http://www.cpwrconstructionsolutions.org/>

### **NATIONAL ASSOCIATION OF HOME BUILDERS**

Safety & health information from home builders' trade association. <http://www.nahb.org/page.aspx/category/sectionID=616>

### **INTERFAITH WORKER JUSTICE & NDLON**

Affiliated Worker Centers provide safety & health training in English and Spanish and assist workers with other employment problems, like "wage theft". <http://www.iwj.org/network/workers-centers>  
<http://www.ndlon.org>



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# CURRICULUM | FALLS (ALTURAS)



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—JORGE DE LOS SANTOS



## FALLS (ALTURAS)

PROTECT YOURSELF FROM FALLS IN CONSTRUCTION

# FALL PROTECTION

## Introduce the topic (1 min)

### Read aloud:

- Next we'll talk about how best to protect yourself from falls when working up high. Did you know that trips, slips, and falls on ladders form a large part of all injuries and fatalities among workers? The use of handrails, fall protection systems, covers and personal fall arrest systems can prevent many falls. We'll discuss various fall hazards and how to avoid them.

## Assignment 1 (5 min)

### Hazard Photos. Pass out photos of fall hazards to each group:

- Based on your own experiences, the information in the Workers' Manual, and the video, each group should identify the fall hazards and how best to correct them using the hierarchy of controls (presented at the beginning of the training). You have 5 minutes.

# FALL PROTECTION

## Presentations and summary (5 min)

**Reports:** When the groups have finished discussing, ask that each group present how they would respond to the fall hazards in the photos.

- ▶ While they explain, ask the other groups if they agree, and/or if they would suggest something different. Next ask both other groups to present their responses to the fall hazards.

### Ladders:

- Make sure that the ladder is long enough to reach the work area.
- Keep ladders and shoes free of oil, grease, mud and other slippery hazards.
- Only use ladders on stable surfaces, and secure the ladder from above and below to prevent movement.
- Don't carry anything in your hands while going up or down a ladder.

### Scaffolds:

- Scaffolding should be designed and constructed adequately.
- Never use bricks, blocks or barrels to support scaffolding. Don't use ladders on top of scaffolding to reach higher, nor to get onto scaffolding.
- All scaffolding should support at least 4 times the expected weight.

# FALL PROTECTION

## Presentations and summary (continued)

### Fall Protection:

- The main types of fall protection are guardrail systems, covers, and personal fall arrest systems, such as full-body harnesses.
- Fall protection is obligatory when workers can fall 6 feet or more or while working over dangerous equipment.
- Fall protection systems should be examined before each use for damage and deterioration



**Remember! You must use some kind of fall protection whenever you are working six feet or higher.**

# FALL PROTECTION

## Video and assignment 2 (10 min)

### Read aloud:

- Pay close attention to the scenarios at the end of the video.  
Each group will be assigned a scenario.

### Begin the video. Assignment 2, after the video:

- Based on your own experiences, the information in the Workers' Manual, and the video, each group should discuss how you would respond to the assigned scenario.
- **While they explain, ask the other groups if they agree, and/or if they would suggest something different. Next ask both other groups to present their responses to the scenarios.**

### Questions to stimulate discussion:



- When is fall protection necessary in construction work?
- Why should you always have three points of contact while going up and down a ladder?
- How should you carry materials and tools while using a ladder?
- Does your boss provide fall protection at work? If so, what kinds?



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**OSHA LOCAL:**

Austin Area Office  
La Costa Green Bldg.,  
1033 La Posada Dr. Suite 375  
Austin, Texas 78752-3832  
TEL (512) 374-0271  
FAX (512) 374-0086

**OSHA REGIONAL:**

525 Griffin Street, Suite 602  
Dallas, Texas 75202  
TEL (972) 850-4145  
FAX (972) 850-4149  
FSO FAX (972) 850-4150

**OSHA NATIONAL:**

U.S. Department of Labor  
Occupational Safety & Health Administration  
200 Constitution Avenue  
Washington, D.C. 20210  
TOLL-FREE 1-800-321-6742  
WEB SITE [www.osha.gov](http://www.osha.gov)



**Workers Defense Project**  
*Proyecto Defensa Laboral*

**WORKERS DEFENSE PROJECT**

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## **SAFETY VIDEO DIALOGUE**

### **Workers Defense Project**

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#### **HEAT**

Construction work in Texas has its own challenges. Sometimes working outdoors is unpleasant and very dangerous if you do not know how to take care of yourself. You have to pay attention to humidity and be aware of heat strokes, because it could happen to any person at any time. If you have a heat stroke the best that could happen to you is that your work would diminish, and the worst that could happen would be losing your life.

I am here with Jorge. It is nice meeting you. We are here to discuss how you should work in order to ameliorate and prevent weather effects, particularly when it is hot.

Jorge: Well, here in Texas we have whole weeks during the summer with temperatures no lower than 100 F and with high humidity in the environment. Our bodies are not used to these weather conditions of high heat and humidity. They cannot stay fresh due to transpiration and can be stressed by heat, a condition commonly known as sunstroke.

Interviewer: Jorge can you tell me how is that different from feeling hot?

Jorge: Sunstroke is the sign that your body is not working well anymore due to an excess of heat. It can happen to anybody and can be fatal if it is not treated on time.

Interviewer: Heat and humidity provoke stress. It makes sense. People should consider this when they work outdoors with the sun hitting directly on them and there is no breeze.

Jorge: Yes, it makes a lot of sense. If you know you will be working outdoors you should follow some advices. First of all you need to keep yourself hydrated. You should avoid drinking alcohol and caffeine, because they accelerate dehydration. You also need to take breaks. You work for a period of time and then rest under the shade, and rehydrate. This way you prevent sunstroke.

Interviewer: It seems that this situation happens a lot during the summer. How do I know when I am feeling just too hot or if I am really experiencing a sunstroke or heat stroke?

Jorge: With sunstroke people tend to have headaches, feel dizzy and might faint. They might also feel weak and throw up. Their mood changes, they become grumpy and confused as if they were lost or did not know what is going on.

Interviewer: Is that how sunstroke feels like?

Jorge: Yes, that is how sunstroke feels like.

Interviewer: How is it different from a heat stroke?

Jorge: Sunstroke is dangerous, but heat stroke is way more serious and it could be fatal. One of the most important differences between sunstroke and heatstroke is that with the former your skin is humid and with the latter it is dry, hot, and with no sweat. People start to feel confused but the worst symptom is when they have convulsions. This is very dangerous because it can lead to death.

Interviewer: It is really hot here, let's go to the shade and keep talking.

Jorge: Yes.

Interviewer: Fortunately, thanks to WDP efforts in collaboration with the City of Austin the city now allows construction workers a 10-15 minutes break every 3½ hours. It is important to consider other things such as refreshing every 15 minutes, taking water or sports drinks, and wearing baggy and light color clothes.

Jorge: Also making sure that all coworkers are able to identify the symptoms and distinguish between sunstroke and heat stroke. If someone feels bad due to heat excess, this is what we can do: Call 911, place that person in a cooler and ventilated area, loosen his clothes, make him sip water, make sure he is breathing well and that no one is blocking his access to oxygen. You can also moisten his body with water to lower its temperature.

Interviewer: If one person suffers from a heat stroke and stops sweating he obviously cannot help himself and will need other people to help him.

Jorge: Of course.

Interviewer: Thanks Jorge for meeting us and for sharing these practical and simple ideas to prevent sunstrokes and heat strokes.

## INTERACTIVE

1. It is too hot to be working without taking breaks and without taking any water, but I am afraid of telling something to the boss, because he could fire me and send me home.

2. I already took a glass of water in the morning and I have been drinking coffee all day long. I have always worked under the heat and nothing has ever happened to me. I am sure I am going to be just fine.
3. It has been such a hot day and I feel very bad. I have been working and my head is hurting really bad, and I even feel like throwing up.

## **ELECTRICITY**

We all know that working with electricity is very common, although it is dangerous. Each day a worker dies due to electricity. The majority of workers are not electricity specialists they are only using wrong wires or cables. To learn more about electricity let's meet Quirino Juárez.

Interviewer: How are you?

Quirino: Hi, how are you? How have you been doing?

Interviewer: I just wanted to make you a question. What is a non-electricity worker most common mistake?

Quirino: Ok, that is a very good question. Most of the time, when people get electrocuted it is because they are not using tools correctly. To prevent being electrocuted you need to check all the equipment to make sure it is in good condition. This will help prevent problems constantly caused by accidents.

Interviewer: While I was working I was handed a wire that was torn, can you plug an extension like this one?

Quirino: Well, before you use a wire or cable, that is, an extension like this, you need to check it, making sure everything is fine.

Interviewer: You mean that it is not torn or broken?

Quirino: Exactly, that it is not torn or has broken parts. For example, this one is missing a ground pin.

Interviewer: I see, it is called ground pin.

Quirino: Yes, and it is torn on the other side so it can't be used.

Interviewer: Can I tape it to cover the torn? Would that work?

Quirino: No, that is not right.

Interviewer: Should I not try it then?

Quirino: No, don't try because it is very dangerous. It is not right, don't do it. What we have to do is mark this cable and throw it away.

Interviewer: To the garbage can?

Quirino: Exactly.

Interviewer: Great!

Quirino: I am going to show you a wire-cable that you can actually use. Look, in order to know if a cable or wire is authorized, it should have proper covering and a protection device to alleviate the tension. Only use those cables that are designed for heavy work, they will be marked every 2 feet and those are the ones you should use for the type of work you do.

Interviewer: Great! I came to work and I brought my cable. Can I plug it over there?

Quirino: No, you cannot plug it there because it is already full. You can't plug more cables there because it will overheat. You can't use that plug.

Interviewer: But that is the way I do it at my place where I have like twenty plugs in the same plug and nothing has ever happened to me.

Quirino: Well, maybe the voltage is lower in your place than it is here. At the construction site the voltage is more powerful and you cannot do that. What I recommend is a GFCI. You plug it on-to the wall and you can place your cable here.

Interviewer: I can plug it now?

Quirino: Look at that puddle. Never try crossing a cable or any other equipment over a puddle. You should use equipment with double isolation when doing your work. This is the symbol for double isolation. You don't need three pins. This is one of the things that I would recommend you. Be careful with the puddle. Look, try not to pick it from the floor. Before picking it up you have to unplug it. Now you can pick up your appliance-machine.

Interviewer: Are we good now?

Quirino: Yes, you can pick it up now. It is dangerous to have the extension close to a puddle, because if the appliance-machine falls in the water you can get electrocuted. To avoid this it is better to first unplug it and then you can pick it up.

Interviewer: I am so glad I am outdoors! This way I do not have to worry about electricity because I work with manual tools.

Quirino: Well, that is not right. Even if you do not work with electric equipment, remember there are plenty cables above and if a scaffold is touching them and you happen to touch the scaffold you can get electrocuted. Also, you can get electrocuted if a crane is touching those cables. The best way to do it is locating the work place, inspecting the area where you will be working, so that nothing is touching electricity cables.

Interviewer: If there are several cables all around my work place and I am using a crane, I need to be very careful with the way I move it and raise it to carry the material up.

Quirino: You are saying you are not an operator, that you do not use electric equipment, only manual ones, and if you accidentally touch that crane, and the crane is touching a cable, it could be very dangerous.

Interviewer: What could possibly happen to me?

Quirino: You would get electrocuted.

Interviewer: I would be very scared and I would die. That would be such an electric shock!

Quirino: Never assume that it is safe to touch a cable even if it seems it is isolated. Also, another important thing is that all electric equipment should be kept at least 10 feet away from the electric cable. Scaffolds should be farther enough. If something seems too close, you should let your supervisor know about it. If a cable falls down while you are driving, remain inside and keep driving, and if your car stops, remain inside until you receive news about the cable not being electrified.

Interviewer: What if there is an emergency and I have to leave the vehicle?

Quirino: If you need to leave the vehicle, you should try jumping with your two feet, without touching the vehicle and the ground at the same time.

## **PROTECT YOURSELF**

### 1. Luciano Márquez-Day Laborer

We normally work on these roofs, which usually are sheer and get slippery when wet. No, we do not use harnesses. Nobody has told us to use them.

### 2. Alan Shephard-General Contractor

A lot of people working in construction think that the key to this business is reducing costs and time. This will ultimately lead to a dangerous situation causing serious injuries or even death.

### 3. Luis Galindo-Responsible for the project

Climb the ladder!

Boss: You gotta be kidding me! What is going on here? I thought I told you guys I want a lot more work done. What is going on here?

Worker: I know boss, but we are trying to work as fast as possible, we are using the ladder the way you taught us last week.

Boss: Listen, Lucas. I've been doing these 20 years. I don't need you wasting your time holding the bottom of this ladder. Do I make sense? Then, get up there. It is going to be fine. Here is your paintbrush and your bucket. If this thing isn't done by the end of the weekend you and I are going to have another talk. Do I make sense?

Worker: Boss, I think we should change the ladder insurance policy. They are very old and badly placed. Next time someone will get badly hurt. My brother in law told me we should report what happened to OSHA.

Boss: With OSHA? Do you know what OSHA? It is de 'migra', the 'fедерales'. Do you know what they are going to do? They are going to send you back to Mexico. What do you think about that? Go and talk to OSHA.

Worker: Fernando broke his arm and next time someone could die.

Boss: You are lucky he didn't die, you were right there under the ladder with him. If you had been paying attention none of this would have happened. You know what? Why don't you just go to lunch, think about it for a little bit, and don't come back until you are ready to be part of this team. There is a lot of people that would like to have your job.

PAUSE: You got 10 minutes to discuss possible answers. Continue when you are ready.

Worker: Is there someone who can help me? Good morning, I just arrived to this country, started a new job and I want to know if you can help me with something.

Woman: Yes, I have a couple of minutes. Let's talk in the other room.

Worker: Thanks.

Woman: It makes me so angry that they think they can intimidate people just like this. You shouldn't worry. You did exactly what someone in your position should have done. Here in WDP we work with a lot people in your same situation. I think you should file a complaint to OSHA and we can help you with it.

Worker: No, to be honest, I don't think so. My family does not have papers and we don't want anybody else to find out.

Woman: Look, a lot of people worry about that but the truth is that they are not going to ask you about your migration status. OSHA investigators only care about health and safety at work. This doesn't have to do anything with your migration status.

Worker: What can they do for me? Can they make my boss change their safety policies?

Woman: OSHA can fine the companies that violate OSHA laws and it can also investigate until they find out what is going on.

Worker: Investigation? What if they find out that I did not follow the safety procedures? What if they find out all about it?

Woman: Workers are responsible for following safety protocols and procedures. However OSHA never punishes individual workers. Seriously, this is your boss responsibility. You have complied with his rules and used the protection equipment he provided. You also informed your supervisor about hazardous conditions, told your boss when Fernando was injured and it was your boss who did not comply with his obligations. According to OSHA, your boss responsibility is to provide a work place free of hazards and to reduce the possibility of dangers to a minimum degree. Your boss needs to make sure that all of his employees are using tools and equipment safely, and that they are in good condition.

Worker: We didn't even have harnesses, and both the roofs and ladders were poorly placed.

Woman: You can file a complaint via mail, fax or email. In Austin, WDP has presented several workers cases to OSHA, but any labor center in any city should help workers filling out this form. You just have to answer some basic questions and pay attention to the part titled 'hazard description and location', where we will register all the details.

Worker: What type of stuff is OSHA looking for?

Woman: Complaints that always result in an investigation are the ones describing a danger that is a violation to the law or in cases where an accident actually occurred, if the situation that caused the accident persists. Other cases that lead to investigation are situations where an imminent danger exists or companies that work on naturally dangerous conditions or companies with a long history of violations and investigations.

Worker: What you are describing is exactly what is going on at work right now.

Woman: Look Lucas, I really think you have a strong case and I am very proud of you for defending yourself and your coworkers and not letting the patron intimidate you.

Lucas: It feels good to know that we are not alone in this. It feels good to know that we are defending ourselves and that we are fighting for justice.

## **FALLS (ALTURAS)**

Jaime: It is obvious that we all know we should use special equipment against falls from heights, but did you know we should use this equipment to prevent falls starting at 6 feet?

In the year of 2007 442 people died from falls in construction work. This means that more than each day one person dies from a fall at a construction site in the U.S. Half of the 24,000 construction workers that suffered severe fall at their work sites had to miss work due to the severity of their injuries. What causes this situation? Let's meet Felix so that he tells us a little bit about it.

Jaime: Félix, What's up? How are you? Can you show us an unprotected area?

Félix: Of course Jaime, we always have to remember that unprotected floors and sites should use the guardrail system. This includes handrails, the sides of the building, and even open windows when the lower part is less than 3 feet from the base. Guardrails: They require an upper crossbeam, an intermediate crossbeam and a lower crossbeam when there is danger of falling materials. The guardrail should be supported every 8 feet and should support at least 200 pounds, that is, an adult man. It is very important to use the warning system in the absence of a guardrail system. But the warning system is more than just a couple of ropes and flags. One thing is that you can only use this system when there is small inclination angle. These lines should be visible, 3 feet from the ground and no more than 6 feet from the ceiling. It is useful if you think of the length of a human body that has tripped. The rope should support the weight of two big men, 500 pounds. Without splitting, the poles-posts should support at least 16 pounds without tipping over.

Jaime: Félix, does this show me that underneath is a hole?

Félix: Yes, if there is a dangerous hole at the construction site, there should be a fence surrounding the hole and the hole should be covered.

Make sure covers are secured prevent displacement.

Félix: There it says "hole" and it should be safe, but it is very important to talk to the supervisors, because it could support a person, but it is unlikely that it would support a vehicle.

Jaime: There are strict regulations on how to build a scaffold. Even if they are usually built in a hurry, they should be safe and leveled. If you notice that there is something wrong, do not hesitate on asking your supervisor and make sure his response makes sense.

Scaffolds 10 feet or taller require fall protection.

Félix: Scaffolds should support 4 times the estimated load and should be fully planked, have a minimum width of 18 inches, and be free of holes, gaps, and debris.

Jaime: There should be a distance of no more than 14 inches from the work surface to the scaffold?

Félix: Yes, with greater distances we would need more guardrails. In a building with a greater height you need more guardrails for the scaffold to be safer.

Jaime: How about the support base? How can we make sure that it is completely safe?

Félix: That is a very important question. With a concrete floor you need to use plaques with the supports, you can't just put anything because you would slip and fall.

Jaime: I see. I shouldn't use bricks or ladders to reach something else. In fact, this would be very dangerous because I could fall or get injured, my equipment could even fall on someone else. Can you show us some examples?

Félix: You are right. Let's go.

Jaime: Let's go.

Jaime: Wow Félix! Look at all the safety equipment we have. We have 3 basic parts. What is this?

Félix: This is called full body harness

Jaime: How about this one?

Félix: These are the connectors.

Jaime: and this one?

Félix: These are the anchors.

Jaime: Can I try one on?

Félix: Of course Jaime.

Jaime: It fits me very well. Does it mean I am ready to work in construction?

Félix: Remember that starting at 6 feet you must use your safety systems and more importantly, if you do not feel comfortable wearing it, ask your safety supervisor to teach you how to wear it.

Your employer must provide training on fall protection equipment.

Félix: It is very important to place the support at a distance above you to support the weight if you fall and prevent you from falling down to the ground. It is always important to verify that the fall system is one single angle, above you, in case you fall.

Jaime: Are you ready?

Félix: I am ready.

Félix: This was a direct fall. This is why it is important to place the supports above you to prevent you from falling. As I said this was a direct fall, but what happens when you fall, and swing while hanging? I am going to hold you, and you will swing so that you realize what are the dangers you would face when a worker is swinging from the roof.

Jaime: This is a swinging fall.

Félix: Exactly

Jaime: I am letting myself fall.

Félix: Yes, go on.

Jaime: it is very important that I fall directly and not in a swinging way because I can hit myself on a wall, or against overhead power lines, or even hit a coworker.

Félix: You could hit your head, become unconscious, and that would be very dangerous.

Jaime: Thanks you very much Félix. We have learned a lot from you. From now on I will feel safer while working at the heights. Now I feel like a real construction worker. I appreciate your help.

# **INSTRUCTOR MANUAL**

Construction  
Safety & Injury Prevention  
Program

**GUIDE**

*This material was produced under grant SH29640SH6 from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.*



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# INTRODUCTION

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The Building Industry Association of Hawaii has developed the Construction Safety & Injury Prevention Program (CSIP) and Safety & Injury Prevention Plan (SIPP) to educate participants on safety hazards in the workplace. It is with gratitude that we thank those who have been involved in its development, including providing curriculum, support, and guidance. Thank you, Program Trainers!

The goal of CSIP is to address prevention and identification of construction safety and health hazards to “secure safe and healthy workplaces, particularly in high-risk industries” (DOL’s Strategic Objective, Performance Goal OSHA 2.1). SIPP has been specially designed to provide technical assistance to businesses to develop a customized, comprehensive written safety and health program. A written safety and health program will protect workers and businesses.

This program is funded through the Susan Harwood Training Grant program, through the Occupational Safety and Health Administration, U.S. Department of Labor. The purpose of this program is to teach workers, safety staff, and employers to recognize, abate, and prevent safety and health hazards in the workplace. Additionally, this program will inform workers about their rights and employers about their responsibilities under the OSH Act. Additionally, the development of CSIP and SIPP has been made possible with the support from local organizations, businesses, and individuals including the Hawaii Safety Alliance and the Hawaii Chapter Veterans of Safety.

This program is comprised of four primary training sections depending on the employment status of participants. Programs are tailored towards: Safety Resource Staff, Worker, Manager/ Employer/ Supervisory Staff, and the Trainers.

This resource provides the general instructional approach to CSIP. It should be used in conjunction with the PowerPoint slides, the Student Workbook, and additional handouts. This Instructional Manual does not include any of the materials in the Student Manual or the presenter notes at the bottom of the PowerPoint slides.

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# EVALUATIONS

As this program has been funded through a grant, continued support for these types of programs necessitates lively engagement. Participants are asked to complete evaluations in order to understand the importance and effectiveness of this program. Immediately following the training session, you will distribute two evaluations to the class. Participants may be asked to fulfill a third evaluation a few months after the training. Each evaluation assesses a different aspect of the training and each are equally important. These evaluations are intended to measure the effectiveness and efficiency of the program.

The types of evaluations are described below:

1. **Level 1- Training Session Reaction:** Level 1 evaluations focus on how the participants felt about the training program itself and teaching methods used. More specifically, these questions are designed to evaluate if the training was useful and relevant. The results of this evaluation will be used to improve future training programs.
2. **Level 2- Learning Evaluation:** Level 2 evaluations focus on the skills and information that participants retain. The results will not affect the participants in any way. This evaluation is shared with the Funder to demonstrate how the training program was effective.
3. **Level 3-Training Impact Assessment:** Level 3 evaluations will occur a few months after the conclusion of the CSIP program. This evaluation demonstrates how much of what was learned has been applied to the workplace. This will measure the impact of the training program in the workplace.

# **CONSTRUCTION SAFETY & INJURY PREVENTION PROGRAM (CSIP)**

# TRAINING OVERVIEW OF ALL COURSES

## PROGRAM GOALS

The objective of this program is to provide training and education for workers and employers on the recognition, avoidance, and prevention of safety and health hazards in their workplaces, and to inform workers of their rights and employers of their responsibilities under the OSH Act.

## TARGET AUDIENCE

The target audiences for this training is

- Workers
- Safety Managers/Coordinators
- Employers, Managers, Supervisors

Harwood emphasizes participation from:

- Small businesses (less than 250 employees)
- New businesses
- Limited English proficiency workers
- Non-literate and low literacy workers
- Young workers
- Temporary workers
- Minority and other hard-to-reach workers
- Workers in high-hazard industries and industries with high fatality rates

## PROGRAM MATERIALS

This Training Program includes PowerPoint Presentations, handouts, Participant Workbooks, and this Instructor Manual.

All target audience segments begin with the same introduction material via PowerPoint. This provides an overview of the training program and is pertinent to all participants. Then, the materials have been customized for each target audience segment. There is overlap, particularly between Safety and Managers, as this information is pertinent to both groups.

All materials, training logistics, and funder considerations will be thoroughly reviewed during the Trainers' Meeting.

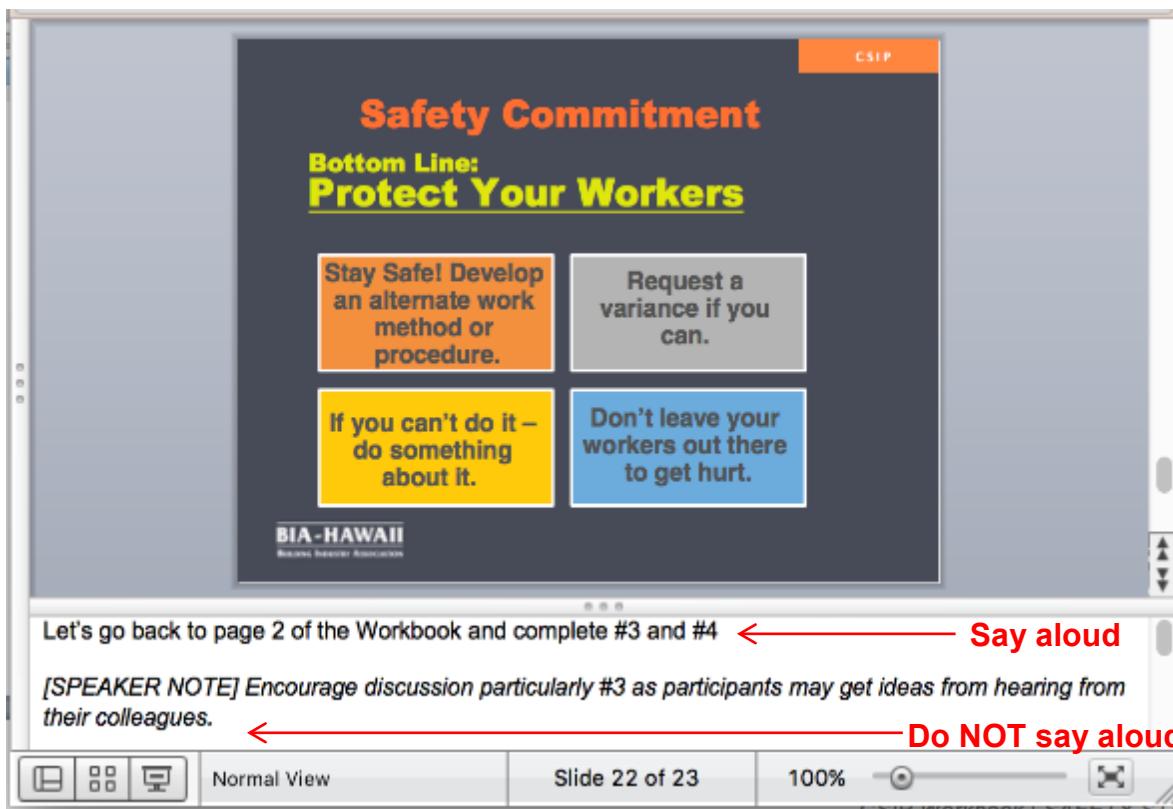
## PowerPoint Presentation (PPT)

The PPTs are designed to be a learning tool to create an interactive and lively training experience. There are discussions, activities, and various learning tools built in to keep our adult learners engaged.

Please review the PPTs thoroughly. There are three types of Notes accompanying some slides.

- [SPEAKER NOTE]: Notes affixed with this designation are NOT meant to be said aloud but are notes to you, the speaker. They are in italics to further differentiate between other types of notes.
- Those Notes without a designation are meant to be said aloud to the class. You do not have to read word-for-word (in fact, we recommend avoiding this!). To sound natural, put these into your own words. See Figure 1 for an example.
  - Some notes have the target audience segment identified at the beginning of the note. For example, “[WORKER] Turn to page 13 of your Workbook”. This demonstrates a PPT that will be presented to more than one target audience segment. The note represents which target audience segment is to receive the instruction. See Figure 1 for an example.

**Figure 1:** Screenshots showing Presenter Notes



What hazards are common, either at your workplace specifically or more generally, and real or potential?

[SAFETY] Jot these down on page 8 of your Workbook **To be read aloud to Safety participants**

[WORKER] Jot these down on page 3 of your Workbook **To be read aloud to Managers participants**

The Note screen will be visible during your presentation. Please still take care to review before your presentation so that you know what's coming.

Because you are an expert in the field, it is expected that you will elaborate on some points to further enrich the material. The notes are intended as a prompt, but you are free to reveal more or less than what's indicated, based on your participants' engagement, time remaining, etc.

All Sections will close with a Question slide. This is an opportunity for a quick check in with the class to ensure that the material is being understood. As an expert in safety & injury prevention trainings, feel free to spend more time on any topics that your participants indicate.

### Workbook

Workbook activities are designed to support in-class activities, discussion, and provide a long-term resource to participants. Activities are indicated in the PPT notes, showing the page of the Workbook where they can be found, as demonstrated in Figure 1.

The Workbooks are for the participants to keep. Their responses can be kept as private as each participant prefers and can serve as a long-term resource. Before beginning each session, tell participants that are blank pages in the back of the Workbook for note taking.

### Instructor Manual

This Instructor Manual is intended to provide a detailed look at what the training program entails. Coupled with the Trainers' Meeting, we hope that these resources will prove practical.

## Additional Learning Tools

- Flipchart/Whiteboard: available to detail engaging discussions. There are prompts within the PPT Notes, though feel free to make use of these resources at your discretion.
- Handouts are included in the Workbook and referenced in the PPT Notes. The Appendices include additional information, such as inspection checklists, to further enrich the curriculum.
- Note pages are included at the end of each target audience segment Workbook.

A final note: you are the master of your domain (class)! Feel free to base the level of activity on how your participants are responding, how much time you have remaining, and which activities you find most appealing.

# SAFETY MANAGER/COORDINATOR TRAINING

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## PROGRAM GOALS

The goal of this training session is to prepare Safety Staff members and to help them become more familiar with unique challenges that they may face, especially since they are employed at a small business. They may wear many hats and may not have a good handle on all that's expected of them. Safe workplaces start with a consistent message from leadership. Safety Staff, individuals who are primarily responsible for safety and injury prevention oversight at their businesses, will learn the steps needed to encourage leadership commitment, employee engagement, and practical tools to reduce hazards and reduce injuries.

## TARGET AUDIENCE

The target audience for this training is Safety Managers/Coordinators.

## LEARNING OBJECTIVES

Topics to be covered:

- Safety Manager Responsibilities
- Safety Commitment
- Maintaining a Safe Workplace
- Safety Training Protocols
- Identifying, Evaluating, and Controlling Potential Hazards
- Costs of Injury Claims and OSHA Violations
- In-house and OSHA Safety Inspections
- Incident Investigations
- Affirmative Defense
- Safety Rules
- Job Safety Analysis
- Emergency Plans and Protocols

# SAFETY MANAGER/COORDINATOR TRAINING SYNOPSIS

## MODULE 1

### Topics

1. Leadership Commitment to Operational Safety
2. Workplace Safety & Employee Engagement
3. Hazard Identification Plan
4. Workplace Safety Rules & Hazard Control

### Activities

#### 1. Leadership Commitment to Operational Safety: Module 1-1

- Slide 3: Activity 1- Company Emphasis (*page 3*)  
Participants will answer questions 1 & 2 on workplace Safety.
- Slide 18: Video  
A short video is embedded in the slide.  
Use flipchart or whiteboard to follow up with a Discussion.
- Slide 22: Activity 1- Company Emphasis (*page 4*)  
Participants will answer questions 3 & 4 on workplace Safety, followed by a class discussion.

#### 2. Workplace Safety & Employee Engagement: Module 1-2

- Slide 8: Class Discussion on “what might be some reasonable goals & objectives of a small construction business?”  
Use flipchart or whiteboard to capture ideas.
- Slide 11: Class Discussion on “how to effectively communicate safety, in words and actions, to ensure the staff understands the significance.”  
During the discussion, play devil’s advocate. Ask participants questions, such as “what are some ways that company’s may be communicating the opposite?” I.e. “This job is late.... hurry!” does not promote safety.
- Slide 15-16: Scenario Discussion  
Use the following scenario to spark discussion: as the Safety Coordinator, you work with management to implement a new safety program to improve safety performance. You let all employees know past incident rates and set goals. You then post the goals on the company’s safety bulletin board.  
Using slide 16, ask participants the following questions,
  - Do you feel as though this is an acceptable goal?
  - You’re communicating that you expect 50% less lost work days; is this what you want to communicate?
  - Although it’s an impressive decrease, if the goal is zero incidents, that’s what should be communicated: Employees and leadership team should agree that the vision is zero lost-time incidents.
- Slide 19-21: Handout 1- Workplace Safety (*page 5-6*)  
Handout discusses steps used for implementing an incident policy that will foster a company towards minimal incidents.

## MODULE 1

- Slide 31: Group Activity 1 - Safety Statement (*page 7*)  
Working in groups, participants will create a general Safety Statement (a document that addresses how health and safety are managed in the workplace). Doesn't necessarily need to be for their business; any business, real or imagined, will do.
- 3. Hazard Identification Plan: Module 1-3
  - Slide 9: Activity 1- Group Discussion (*page 8*)  
Participants will answer questions about identifying and resolving hazards.
  - Slide 36: Activity 1- Group Discussion (cont'd) (*page 9*)  
Participants will answer questions about hazards at their workplace.
  - Slide 39: Group Activity 2- Hidden Messages (*page 10*)  
First, students will compose vague and unclear messages they may (or do) hear management tell employees regarding work and/or safety.  
*Example: "lift properly."*  
Next, students will strengthen these messages to ensure the safety protocols are clear.  
*Example: Instead of "lift properly," management could remind employees to "Use the 4-step lift method when lifting heavy objects:*
    1. Size up the load
    2. Lift with your legs
    3. Move the load
    4. Get set and lower"
- 4. Workplace Safety Rules & Hazard Control: Module 1-4
  - Slide 4: Activity 1- Safety Rules (*page 11-12*)  
Working in groups, participants will brainstorm some general safety rules that can be used to avoid Focus Four injuries.
  - Slide 10: Activity 2- Spot the Hazards (*page 13*)  
Working together, participants will analyze and identify hazards in the photograph.
  - Slide 14: Handout 1- Job Safety Analysis (*page 14*)  
This document explains the protocol for using a fire extinguisher. Review steps with class and discuss how/why this may be useful.
  - Slide 20: Handout 2- Standard Operating Procedures (SOPs) (*page 15*)  
Have groups talk about SOPs and use the flipchart or board to list ideas. Have each group come up with a needed SOP for their type of work. If needed, use the SOP document as an example.
  - Slide 22-25: Class Discussion  
Instigate a class discussion about the importance of protecting employees from hazards and any issues/concerns that may arise. Also ask students to discuss administrative and/or work practice controls that are familiar to them.

### **At the end of this Module, participants will**

- Understand the role of Safety Managers and Safety Committees
- Develop a safety statement
- Know how to protect workers
- Develop workplace safety rules
- Be able to compose a job safety analysis document

## MODULE 2

### Topics

1. Safety Inspection Procedure
2. Incident Investigation Procedure
3. OSHA Inspections
4. Emergency Planning & Emergency Response Procedures

### Activities

#### 1. Safety Inspection Procedure: Module 2-1

- Slide 12: Handout- Sample Inspection Forms: Construction & Equipment (*Appendix*)  
Review forms with students and ask if there are any questions.
- Slide 35: Activity 1- Safety Inspection (*page 16*)  
This page has two activities:  
First Activity: Encourage participants to work in groups to think of things that they may include in a safety checklist (such as check fire extinguisher, light bulbs, wiring, etc.). Remind them that the items do not have to be related to each other.  
Second Activity: Students will answer true or false questions. This can be individually, in groups, or as a class. Answers can be found in Appendix.
- Slide 42: Handout 1- Safety Inspection Checklist (*page 17*)  
The Checklist can be used as a class exercise or a resource for later.  
If using as an exercise, break into small groups and have them identify some additional items to add to the checklist.
- Slide 46: Handout 2- Hazard Control Log (*page 18*)  
Have students review sheet and ask for examples of how they may log a hazard at their workplace.

#### 2. Incident Investigation Procedure: Module 2-2

- Slide 22: Activity 1- OSHA Incident Investigation Form (*page 19*)  
Read the scenario (found in the Workbook) to the class. Have students form groups. Before filling out the form, students will assume roles necessary for filling out the form. One student should be the recorder/interviewer, one student as the injured employee (Tom), another as the apprentice (Devin), and have other students as witnesses. The recorder will interview the other participants. Only the recorder should fill out the OSHA inspection form for the group. Let participants know that they may elaborate/add details in order to complete the form.
- Slide 26: Activity 2- Root Causes (*page 22*)  
Working in groups, have students brainstorm some general questions that can lead to finding out the root cause of the previous (or any) incident.

#### 3. OSHA Inspections: Module 2-3

- Slide 1: Activity 1- Introduction to OSHA (*page 23*)  
Students will answer some general questions about OSHA.

- Slide 7: Handout- OSHA Inspection: Being Prepared (*page 24*)  
Working in groups, students will discuss how they may prepare for an OSHA inspection. Additionally, students will work together to compose a OSHA complaint.
  - Slide 30: Handout 2- OSHA Penalties (*page 26*)  
Handout has OSHA penalty statistics, discuss data with students.
  - Slide 45: Handout 3- OSHA Penalty Contesting FAQs (*page 27*)  
Students will take a quiz on penalties. Next, discuss the Penalty FAQs.
4. Emergency Planning & Emergency Response Procedures: Module 2-4
- Slide 15: Activity 1- Emergency Action Planning (*page 29*)  
Working in groups, have students think of an emergency plan for the classroom. Tell students to imagine the room as their workplace and to jot down some things to include in their Emergency Plan. It can be bullet points, it doesn't need to be a full statement. Have groups share some of their ideas with the class.
  - Slide 38: Class Discussion- Emergencies  
Ask students about their experiences with emergencies in the workplace. Such as, "what emergencies have you experienced on the job?"  
"Besides those emergencies listed, what are others that we should consider?"  
"Does your company have an Emergency Action Plan?"

#### **At the end of this Module, participants will**

- Be able to identify workplace hazards
- Know the potential for Focus Four Hazards
- Develop safety inspection checklist
- Compose incident report
- Identify root causes of accidents
- Have a better understanding of OSHA's purpose
- Know what to expect during OSHA inspection
- Develop emergency planning protocols

# WORKER TRAINING

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## PROGRAM GOALS

The goal of this training session is to prepare workers to understand safety and health hazards as well as safety-related resources that are available to them. Participants will learn about their role in keeping a safe and healthful workplace.

## TARGET AUDIENCE

The target audience for this training is 189 employed and unemployed construction workers and contractors.

## LEARNING OBJECTIVES

Topics to be covered:

- Identifying, Evaluating, and Controlling Potential Hazards
- Identifying the Focus Four Hazards
- Injury Costs
- Work Tasks vs. Safety
- Standard Operating Procedures (SOPs)
- Types of Personal Protective Equipment (PPE)
- General Requirements of PPE
- Employer Responsibilities
- OSHA and State laws
- Disciplinary Policies
- Worker Rights
- About OSHA
- OSHA Penalties

# WORKER TRAINING SYNOPSIS

## MODULE 1

1. Hazard Identification Plan
2. Workplace Safety Rules & Hazard Control

### **At the end of this Module, participants will**

- Be able to identify workplace hazards
- Know potential for Focus Four hazards

### **Activities**

#### **1. Hazard Identification Plan: Module 1-1**

- Slide 9: Activity 1- Group Discussion (*page 3*)  
Participants will answer questions about identifying and resolving hazards.
- Slide 36: Activity 1- Group Discussion (continued) (*page 4*)  
Participants will answer questions about hazards at their workplace.
- Slide 39: Small Group: Activity 2- Hidden Messages (*page 5*)  
First, students will compose vague and unclear messages they may (or do) hear management tell employees regarding work and/or safety.

*Example: “lift properly.”*

Next, students will strengthen these messages to ensure the safety protocols are clear.

*Example: Instead of “lift properly”, management could remind employees to “use the 4-step lift method when lifting heavy objects:*

1. Size up the load
2. Lift with your legs
3. Move the load
4. Get set and lower”

#### **2. Workplace Safety Rules & Hazard Control: Module 1-2**

- Slide 4: Activity 1- Safety Rules (*page 6-7*)  
Working in groups, participants will brainstorm some general safety rules that can be used to avoid Focus Four injuries.
- Slide 10: Activity 2-Spot the Hazards (*page 8*)  
Working together, participants will analyze and identify hazards in photograph.
- Slide 14: Handout 1- Job Safety Analysis (*page 9*)  
The Job Safety Analysis document explains the protocols for using a fire extinguisher. Review steps with class and discuss how/why this may be effective.
- Slide 20: Handout 2- Standard Operating Procedures (SOPs) (*page 10*)  
Working in groups, have students talk about SOPs and use the flipchart or board to list ideas. Have each group come up with a needed SOP for their type of work. If needed, use the SOP document as an example.
- Slide 22-25: Class Discussion  
Instigate a class discussion about the importance of protecting employees from hazards and any issues/concerns that may arise. Also ask students to discuss administrative and/or work practice controls that are familiar to them.

## MODULE 1

## MODULE 2

1. Personal Protective Equipment
2. Disciplinary Policy & Employer Responsibilities
3. Worker Rights and Anti-Retaliation

### **At the end of this Module, participants will**

- Understand importance of PPE for hands, head, feet, hearing, eyes & face
- Understand general requirements associated with PPE
- Know employer responsibility under OSHA law
- Better understand disciplinary actions and policies
- Identify worker rights under OSHA
- Be able to file an OSHA complaint

### **Activities**

#### **1. Personal Protective Equipment (PPE): Module 2-1**

- Slide 2: Quiz- PPE (*page 11*)  
Students will take a brief quiz on PPE.
- Slide 9: Class Discussion  
Facilitate a discussion on typical job hazards that require PPE.
- Slide 13: Class Discussion  
Have students give examples of instances of improperly or not using PPE.
- Slide 19: Class Discussion  
Ask students about the PPE in their workplace. Find out how many students have been provided with a written PPE program from their employer. For those who have one, ask if there is anything they can think of that could strengthen it
- Slide 45: Class Discussion- Gloves  
Ask students about the types of gloves they use. If needed, the PPE Assessment (in the Appendix) has a list of different types of PPE gloves
- Slide 52-54: Handout 1-Noise Levels (*page 13*)  
Review slides with class and let students know that slides 52 & 53 are in the Workbook
- Slide 63: Group Activity 1- PPE Assessment (*page 14*)  
Have students work in groups and brainstorm some common tasks that would require the use of the different types of PPE listed. There is a nonexclusive list of possible answers in the Appendix.

#### **2. Disciplinary Policy & Employer Responsibilities: Module 2-2**

- Slide 20: Activity 1- Disciplinary Policy (*page 15*)  
Students will answer questions regarding disciplinary policies at their workplace. They will first identify specific policies that are in place and then

## MODULE 1

identify ways that they would improve these policies. Lastly, students will identify three general inviolable rules that they feel are important.

### 3. Worker Rights and Anti-Retaliation: Module 2-3

- Slide 20: Class Discussion

Ask participants if anyone has discovered safety and/or health problems in the workplace. Ask those who have experienced problems how the situation was handled.

- Slide 22: Activity 1-Worker Rights and Anti-Retaliation (*page 16*)

Working in groups, students will use information provided to file an OSHA report. Following the exercise, have the class discuss the results. Ask students, “what was included in their complaints” and “what, if any, additional information did they add to their complaint?”

# **MANAGER/ EMPLOYER/ SUPERVISORY TRAINING**

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## **PROGRAM GOALS**

The goal of this training program is to prepare to understand safety and health hazards and resources.

## **TARGET AUDIENCE**

The target audience for this training is 54 Managers, Employers, and Supervisory staff.

## **LEARNING OBJECTIVES**

Topics to be covered:

- Safety Managers and Management
- Safety Commitment/ Safety Statements
- Good Safety Management & Safety Philosophies
- Maintaining a Safe Workplace
- Safety Training Protocols
- Hazards
- Anti-Retaliation
- Employer Responsibilities
- OSHA standards
- Emergency Preparations

# MANAGER/ EMPLOYER/ SUPERVISORY TRAINING

## SYNOPSIS

### MODULE 1

#### Topics

1. Leadership Commitment to Operational Safety
2. Workplace Safety & Employee Engagement
3. Hazard Identification Plan
4. Workplace Safety Rules & Hazard Control

#### Activities

1. Leadership Commitment to Operational Safety: Module 1-1
  - Slide 3: Activity 1- Company Emphasis (*page 3*)  
Participants will answer questions 1 & 2 on workplace Safety.
  - Slide 18: Video  
A short video is embedded in the slide. Use the Flipchart to follow up with a class discussion on video.
  - Slide 22: Activity 1- Company Emphasis (*page 4*)  
Participants will answer questions 3 & 4 on workplace Safety, followed by a class discussion.
2. Workplace Safety & Employee Engagement: Module 1-2
  - Slide 8: Class Discussion on “what might be reasonable goals & objectives of a small construction business?”  
Use flipchart or whiteboard to capture ideas.
  - Slide 11: Class Discussion on “how to effectively communicate safety, in words and actions, to ensure the staff understands the significance?” During the discussion, play devil’s advocate. Ask participants “what are some ways that company’s may be communicating the opposite?” i.e. “This job is late.... hurry!” is not promoting safety
  - Slide 15-16: Scenario Discussion  
The scenario: as the Safety Coordinator, you work with management to implement a new safety program to improve safety performance. You let all employees know past incident rates and set goals. You then post the goals on the company’s safety bulletin board. Questions to ask, one at a time,
    - Do you feel as though this is an acceptable goal?
    - You’re communicating that you expect 50% less lost work days; is this what you want to communicate?
    - Although it’s an impressive decrease, if the goal is zero incidents, that’s what should be communicated: Employees and leadership team should agree that the vision is zero lost-time incidents.
  - Slide 19-21: Handout 1- Workplace Safety (*page 5-6*)  
Handout discusses steps for implementing an incident policy that will foster a company towards minimal incidents.

## MODULE 1

- Slide 31: Small Group Activity 1- Safety Statement (*page 7*)  
Working in groups, participants will create a general Safety Statement (a document that addresses how health and safety are managed in the workplace). Doesn't necessarily need to be for their business; any business, real or imagined, will do.
  - 3. Hazard Identification Plan: Module 1-3
    - Slide 9: Activity 1- Group Discussion (*page 8*)  
Participants will answer questions about identifying and resolving hazards.
    - Slide 36: Activity 1- Group Discussion (cont'd) (*page 9*)  
Participants will answer questions about hazards at their workplace.
    - Slide 39: Group Activity 2- Hidden Messages (*page 10*)  
First, students will compose vague and unclear messages they may (or do) hear management tell employees regarding work and/or safety.  
*Example:* "lift properly."  
Next, students will strengthen these messages to ensure the safety protocols are clear.  
*Example:* Instead of "lift properly," management could remind employees to "Use the 4-step lift method when lifting heavy objects:
      1. Size up the load
      2. Lift with your legs
      3. Move the load
      4. Get set and lower"
  - 4. Workplace Safety Rules & Hazard Control: Module 1-4
    - Slide 4: Activity 1- Safety Rules (*pages 11-12*)  
Working in groups, participants will brainstorm some general safety rules that can be used to avoid Focus Four injuries.
    - Slide 10: Activity 2- Spot the Hazards (*page 13*)  
Working in groups, participants will analyze and identify hazards in the photograph.
    - Slide 14: Handout 1- Job Safety Analysis (*page 14*)  
This document explains the protocols for using a fire extinguisher. Review steps with class and discuss how/why this may be effective.
    - Slide 20: Handout 2: Standard Operating Procedures (SOPs) (*page 15*)  
Ask the students about their experiences (good and bad) with SOPs and use the flipchart or board to list ideas. Have each group come up with a needed SOP for their type of work. If needed, use the SOP document as an example
    - Slide 22-25: Class Discussion  
Instigate a class discussion about the importance of protecting employees from hazards and any issues/concerns that may arise. Also discuss administrative and/or work practice controls that are familiar
- At the end of this Module, participants will**
- Understand the role of Safety Managers and Safety Committees
  - Develop a safety statement
  - Know how to protect workers

## MODULE 1

- Identify workplace hazards
- Identify potential for Focus Four hazards

## MODULE 2

1. OSHA Inspections
2. Emergency Planning & Emergency Response Procedures
3. Disciplinary Policy & Employer Responsibilities
4. Worker Rights and Anti-Retaliation: Module 2-4

### **Activities**

1. OSHA Inspections: Module 2-1
  - Slide 1: Activity 1- Introduction to OSHA (*page 16*)  
Students will answer some general questions about OSHA.
  - Slide 7: Handout- OSHA Inspection: Being Prepared (*page 17*)  
Working in groups, students will discuss how they may prepare for an OSHA inspection. Additionally, students will work together to compose a OSHA complaint
  - Slide 30: Handout 2- OSHA Penalties (*page 19*)  
Handout has OSHA penalty statistics, discuss data with students.
  - Slide 45: Handout 3- OSHA Penalty Contesting FAQs (*page 20*)  
Students will take a quiz on penalties. Next, discuss the Penalty FAQs
2. Emergency Planning & Emergency Response Procedures: Module 2-2
  - Slide 15: Activity 1- Emergency Action Planning (*page 22*)  
Working in groups, have students compose ideas to include in an emergency plan for the classroom. Tell students to imagine the room as their workplace and to jot down some things to include in their Emergency Plan. It can be bullet points, it doesn't need to be a full statement. Have groups share some of their ideas with the class.
  - Slide 38: Class Discussion-Emergencies  
Ask students about their experiences with emergencies in the workplace. Such as, "what emergencies have you experienced on the job?"  
"Besides those emergencies listed, what are others that we should consider?"  
"Does your company have an Emergency Action Plan?"
3. Disciplinary Policy & Employer Responsibilities: Module 2-3
  - Slide 20: Activity 1- Disciplinary Policy (*page 23*)  
Students will answer questions regarding disciplinary policies at their workplace. They will first identify specific policies that are in place and then identify ways that they would improve these policies. Lastly, students will identify three general inviolable rules that they feel are important.
4. Worker Rights and Anti-Retaliation: Module 2-4
  - Slide 20: Class Discussion

## **MODULE 1**

Ask participants if anyone has discovered safety and/or health problems in the workplace. Ask those who have experienced problems how the situation was handled.

### **At the end of this Module, participants will**

- Understand the importance of workplace safety rules
- Compose job safety analysis
- Develop emergency planning protocols
- Have a better understanding of OSHA's purpose
- Know what to expect during OSHA inspection
- Better understand employer responsibility under OSHA law
- Better understand disciplinary actions and policies
- Better understand how to file an OSHA complaint
- Better understand worker rights under OSHA

## **MODULE 3**

1. Safety & Injury Prevention Plan (SIPP): *continued in next section.*

### **At the end of this Module, participants will have developed:**

- A written, individualized Safety & Injury Prevention Plan

**SAFETY  
&  
INJURY  
PREVENTION PLAN  
(SIPP)**

# SAFETY & INJURY PREVENTION PLAN TRAINING

## PROGRAM GOALS

The goal of this training program is to provide technical assistance to Managers, Employers, and Supervisory staff to develop a customized, comprehensive written safety and health program, as required by HRS-110-12. Although an exemption applies to those businesses with fewer than 25 employees and less than \$100,000 in State of Hawaii contracts, a written safety and health program will protect your workers and protect your bottom line.

## TARGET AUDIENCE

The target audience for this training is 54 Managers, Employers, and Supervisory staff.

## LEARNING OBJECTIVES

Topics to be covered:

- Introduction to HIOSH
- Hawaii Administrative Rule: HRS 12-110-2
- Safety & Injury Prevention Plans

## SAFETY & INJURY PREVENTION PLAN CURRICULUM

Introduction rules and standards. Discuss employer responsibilities and rights according to OSHA requirements.

The first activity for this session includes a True/False quiz (found in Workbook) on Employer Responsibilities

Prior to composing the SIPP, participants will learn about each of the seven components. The Workbook contains discussion questions/activities to use after introducing each component of the SIPP. During the presentation, be sure to check Speaker Notes in PPT for more discussion questions. Remind participants that these activities will help them draft their SIPP.

The final Class Activity will be to develop a customized Safety & Injury Prevention Plan.

# SAFETY & INJURY PREVENTION PLAN TRAINING SYNOPSIS

## SIPP PRESENTATION

1. Introduction to OSHA
2. Discuss laws and employer responsibilities
3. Review 7 elements required for Safety & Injury Prevention Plan  
Including:
  - 1) Management Commitment
  - 2) Safety & Health Responsibilities & Policies
  - 3) Employees Participation
  - 4) Hazard Recognition
  - 5) Hazard Prevention & Control
  - 6) Emergency Planning
  - 7) Safety and Health Training and Education
4. Develop personalized SIPP

### **At the end of this Module, participants**

- Recognize laws and standards
- Develop Safety & Injury Prevention Plan
- Understand roles of safety committee members
- Identify workplace hazards
- Identify potential for Focus Four Hazards
- Develop Emergency Planning Protocols

### **Activities**

1. SIPP Presentation
  - Slide 11: Quiz 1- Your Legal Duties & Responsibilities (*page 25*)  
Students will take a brief quiz on legal duties and responsibilities.
  - Slide 19: Activity 1- Management Commitment (*page 26*)  
Students will answer questions about what is important to their workplace.
  - Slide 20: Discussion & Activity 2- Workplace Safety (*page 27*)  
Students will answer questions about safety policies in the workplace.
  - Slide 21: Discussion & Activity 3- Safety Committee (*page 28*)  
Students will discuss the safety committee at their workplace
  - Slide 24: Class Discussion & Activity 4- Hazard Recognition (*page 29*)  
Discuss record keeping with the class. As a class, brainstorm methods to reduce the burdens associated with recordkeeping.
  - Slide 31: Class Discussion- Safety and Health Training  
Instigate a discussion on the types of safety training the participants have conducted/experienced. Ask them which type they feel is most pertinent to their workplace. Also ask how they plan to ensure that their staff has been adequately trained? Who will be responsible for verifying?
2. SIPP Development: Appendix (*page 59*)

# ABOUT OSHA

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## History of OSHA

OSHA stands for the Occupational Safety and Health Administration, an agency of the U.S. Department of Labor. OSHA began because, until 1970, there were no national laws for safety and health hazards. OSHA's responsibility is worker safety and health protection. The U.S. Congress created OSHA under the Occupational Safety and Health Act of 1970 (the OSH Act). Congress passed the law and established OSHA "to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources."

## The purpose of the OSH Act of 1970:

To assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and training in the field of occupational safety and health; and for other purposes.

## What rights do you have under OSHA?

- Right to a safe and healthful workplace
- Right to know about hazardous chemicals
- Right to information about injuries and illnesses in your workplace
- Right to complain or request hazard correction from employer
- Right to training
- Right to hazard exposure and medical records
- Right to file a complaint with OSHA
- Right to participate in an OSHA inspection
- Right to be free from retaliation for exercising safety and health rights
- Worker responsibilities

## What responsibilities does an employer have under OSHA?

- Provide a workplace free from recognized hazards and comply with OSHA standards
- Provide training required by OSHA standards
- Keep records of injuries and illnesses
  - Set up a reporting system
  - Provide copies of logs, upon request
  - Post the annual summary
  - Report within 8 hours any accident resulting in a fatality or the hospitalization of 3 or more workers
- Provide medical exams when required by OSHA standards and provide workers access to their exposure and medical records
- Not discriminate against workers who exercise their rights under the Act (Section 11(c))
- Post OSHA citations and abatement verification notices
- Provide and pay for PPE

## **OSHA Standards**

OSHA standards fall into four categories: General Industry, Construction, and Maritime. OSHA standards are broken down into Parts. Part 1910 is known as the General Industry Standards. Some of the types of industries covered by the General Industry standards are manufacturing, the service sector, and health care. Part 1926 covers the Construction industry. Parts 1915, 1917 and 1918 are Maritime Industry standards.

OSHA's Construction, General Industry, Maritime and Agriculture standards protect workers from a wide range of serious hazards. Examples of OSHA standards include requirements for employers to:

- Provide fall protection
- Prevent trenching cave-ins
- Prevent exposure to some infectious diseases
- Ensure the safety of workers who enter confined spaces
- Prevent exposure to harmful chemicals
- Put guards on dangerous machines
- Provide respirators or other safety equipment
- Provide training for certain dangerous jobs in a language and vocabulary workers can understand

**OSHA issues standards for a wide variety of workplace hazards, including:**

- Toxic substances
- Electrical hazards
- Fall hazards
- Hazardous waste
- Machine hazards
- Infectious diseases
- Fire and explosion hazards and
- Dangerous atmospheres
- Hazard Communication
- Scaffolding
- Respiratory Protection
- Lockout/ Tagout
- Industrial Trucks
- Personal Protective Equipment
- Use/ exposure to lead
- Additionally, there is the general duty clause, Section 5(a)(1), requires that each employer "furnish ... a place of employment which [is] free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

Source: <https://www.osha.gov/about.html>

## NOTES





# MANAGER

Construction  
Safety & Injury Prevention  
Program

# WORKBOOK

This material was produced under grant SH29640SH6 from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

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# Introduction

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## Construction Safety & Injury Prevention Program

The Construction Safety & Injury Prevention Program (CSIP) and the Safety & Injury Prevention Plan (SIPP) programs have been made possible by the Susan Harwood Training Grant Program, which supports training and education programs for workers and employers on the recognition, avoidance, abatement, and prevention of safety and health hazards in their workplaces.

The goal of CSIP is to address prevention and identification of construction safety and health hazards to “secure safe and healthy workplaces, particularly in high-risk industries” (DOL’s Strategic Objective, Performance Goal OSHA 2.1). The Building Industry Association of Hawaii, along with contributions from local organizations, businesses, and individuals, such as the Hawaii Safety Alliance and the Hawaii Chapter Veterans of Safety, has developed CSIP. The CSIP Workbook is intended to accompany the presentations. It includes a number of activities, resources, and note pages to further enrich the information presented.

### OSHA Statistics:

Source: <https://www.osha.gov/oshstats/commonstats.html>

OSHA performed 31,948 federal inspections and 43,105 State Plan inspections (2016). In 2015, 4,836 workers were killed on the job, an average of more than 93 deaths per week, or more than 13 deaths every day; 937 of these workers were in the construction industry. The leading cause of deaths (excluding highway collisions) was as a result of the **Fatal Four**: falls, struck by object, electrocution, and caught-in/between. The Fatal Four caused 64.2% of the construction-related deaths in 2015. Eliminating the Fatal Four would save 602 workers' lives in America every year.

<u>Fatal Four Statistics</u>	<u>Top 10 most frequently cited OSHA standards violated</u>
I. Falls — 364 (38.8%) II. Struck by Object - 90 (9.6%) III. Electrocutions - 81 (8.6%) IV. Caught-in/between - 67 (7.2%) (This category includes construction workers killed when caught-in or compressed by equipment or objects, and struck, caught, or crushed in collapsing structure, equipment, or material)  (2015)	I. Fall protection, construction communication standard, general industry II. Hazard communication standard, general industry III. Scaffolding, general requirements, construction IV. Respiratory protection, general industry V. Control of hazardous energy (lockout/ tagout), general industry VI. Powered industrial trucks, general industry VII. Ladders, construction VIII. Machinery and Machine Guarding, general requirements IX. Electrical, wiring methods, components and equipment, general industry X. Electrical systems design, general requirements, general industry  (2016)

# Introduction

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## Evaluations

As this program has been funded through a grant, continued support for these types of programs necessitates lively engagement. Your attendance already is a critical component of the continuation of these types of programs. We are required to provide the Funder information so that they can evaluate the success of this program. The Funder wants your perception of the importance and effectiveness of this program. Immediately following the training session, you will be asked to fill out two evaluations. You will be asked to fulfill the third evaluation a few months after the end of the program. Each evaluation assesses a different aspect of the training and each are equally important. These evaluations measure your perception of the effectiveness and efficiency of the program. It is appreciated that you answer all questions honestly and to the best of your ability. Please provide detailed feedback so we may improve this program in the future.

The types of evaluations are described below:

1. **Level 1- Training Session Reaction:** Level 1 evaluations focus on your perceptions of the training program and the trainer(s). More specifically, these questions are designed to evaluate if the training was useful and relevant. The results of this evaluation will be used to improve future training programs.
2. **Level 2- Learning Evaluation:** Level 2 evaluations focus on the skills and information that you retain. The results will not affect you receiving your certification. This evaluation is shared with the Funder to demonstrate how the training program was effective.
3. **Level 3-Training Impact Assessment:** Level 3 evaluations will occur a few months after the conclusion of the CSIP program. The last evaluation demonstrates how much of what was learned has been applied to the workplace. This will measure the impact of your training in the workplace.

# Module 1-1: Leadership Commitment to Operational Safety

## Activity 1: Company Emphasis

## **Answer questions 1 & 2**

- I. How does your company treat workplace safety? (Don't worry! No one will see this!)

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- ## II. Who is responsible for ensuring work activities are accomplished safely?

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**Answer questions 3 & 4**

- III. What do you feel could be done differently at your company to ensure a safe workplace and/or reduce workplace hazards?

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- IV. What can you do differently to advance workplace safety at your company?

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# Module 1-2: Workplace Safety & Employee Engagement

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## Handout 1: Workplace Safety

### **Creating a company culture to implement Work Place Safety**

The first step towards implementing policies that will lead to a safe workplace is to change the overall safety culture of your company. While implementing a policy that will lead to no incidents is ideal, attaining a minimal incident policy is more realistic. In order to change the culture, one must be able to define a safety culture. A culture is an attitude that develops over time, based upon learning, personal experiences, beliefs, and upbringing; and is widely demonstrated by company staff. While adjusting your safety culture, keep in mind that most people are resistant to change. This change is an evolving process for some and a revolution for others.

How does the culture change? There are many ways to achieve the desired results of minimal incidents. The fundamental methods involve a grassroots approach of empowering the employee. In addition, top management support and promoting leadership actions within the organization will enhance the visibility of the safety culture.

The following are some important steps that can be used to foster a change in a company safety culture toward minimal incidents.

### **Steps**

- I. Define the need for change: must come from management. Management must communicate and demonstrate expectations and how employees will benefit from the change in safety culture
- II. Commit to the desired result: Management must provide guidance to achieve goals and target objectives to work towards the vision of minimal incidents. Demonstrated commitment must be evident from all levels of management. Too often, management voices its commitment, yet it does not know how to visibly demonstrate that commitment to employees.
- III. Assess current safety culture: Actively solicit employee input and, in return, provide feedback to employees. Examine technical and human factors, and identify and remove barriers that prevent desired performance. Evaluate environmental, organizational, and cultural influences.
- IV. Strategically plan for implementation: Use staff input and pertinent data collected to define critical issues and prioritize them accordingly. Develop goals and objectives that are aligned with the overall company culture. Determine the barriers that exist and create a strategy to address them.
- V. Focus on Incident Control: The vision is no incidents. Although there is some disagreement as to whether this is possible, the bottom line is to continue to work towards achieving minimal incidents.

- VI. Implement and communicate: It is necessary for behaviors to change. Be sure that there is consistency and commitment among leadership and clearly communicated goals.
- VII. Evaluate and measure results: Review progress and evaluate results on a regular basis. Are incidents increasing or decreasing? If there is an increase, the system is out of control. A decrease indicates that the system is improving and appears to be working towards long-term improvement.

### Roles

Management, the safety professional, and employees all play differing, but key, roles in developing the new safety culture.

- **Management**

Most of the time, management and employees are blamed for incidents. In reality, it is usually the management system alone that is to blame. Management must come to the realization that the organization needs to commit resources to allow safety improvements.

- **Safety Staff**

Some companies consider the safety professional "at fault" when an incident occurs. However, in many cases safety professionals are the driving force but are implementing management directives. The safety professional provides the appropriate mentoring, coaching, and guidance to help management make the right decisions. But, one must remember that executive management must be the authority; top-level managers must make the final decision.

- **Employee**

One of the keys to success is to involve employees in the safety process. Employees must understand that they must take an active role in the development and planning of the new safety culture. It is vitally important to the success of the process that employees are provided with the tools, funding, and resources to accomplish the given tasks

Source: <http://www.controleng.com/single-article/zero-incidents-achieving-a-new-safety-culture/7a24e7461aeb0cb3ae91f550c95b12b4.html>

# Module 1-2: Workplace Safety & Employee Engagement

## Small Group: Activity 1: Safety Statement

**Brainstorm ideas for your Safety Statement and then draft a sample Safety Statement.**

Here is an example:

It is the intent of XYZ Industries to provide a safe work environment for all our workers and the wellness of our people, families, and communities. We embrace healthy habits and behaviors. It is also our intent to properly manage any incidents that occur so as to minimize injury and other forms of loss. A well-managed workplace safety program can benefit our company in countless ways. In order for XYZ Industries to achieve our goals, we have developed a safety program outlining our policies and procedures regarding employee health and safety. Each and every individual must become familiar with the program, follow and enforce the procedures, and become an active participant in this workplace safety program.

While management (workplace safety officer and safety committee) will be responsible for developing, and organizing this program, its success will depend on the involvement of each employee. We look forward to your cooperation and participation.

## Your Safety Statement

# Module 1-3: Hazard Identification Plan

## Activity 1: Group Discussion

**Work in groups to answer the following questions**

What are some hazards that you can think of? (Doesn't need to be relevant to your job)

I. \_\_\_\_\_

IV. \_\_\_\_\_

II. \_\_\_\_\_

V. \_\_\_\_\_

III. \_\_\_\_\_

VI. \_\_\_\_\_



Eliminate the hazards you came up with.

I. \_\_\_\_\_

IV. \_\_\_\_\_

II. \_\_\_\_\_

V. \_\_\_\_\_

III. \_\_\_\_\_

VI. \_\_\_\_\_

## Identifying Workplace Hazards

List the hazards you encounter at your workplace:

- I. \_\_\_\_\_
- II. \_\_\_\_\_
- III. \_\_\_\_\_
- IV. \_\_\_\_\_
- V. \_\_\_\_\_
- VI. \_\_\_\_\_



What can be done (by the company, colleagues, and/or you personally) to mitigate these hazards to prevent injury?

- I. \_\_\_\_\_
- II. \_\_\_\_\_
- III. \_\_\_\_\_
- IV. \_\_\_\_\_
- V. \_\_\_\_\_
- VI. \_\_\_\_\_

# Module 1-3: Hazard Identification Plan

## Activity 2: Identifying Hazards: Hidden Messages

**Work in groups to answer the following questions**

Identify some unclear/ vague messages that employees receive regarding work and/or safety

*Example: Lift Properly*

- I. \_\_\_\_\_
- II. \_\_\_\_\_
- III. \_\_\_\_\_
- IV. \_\_\_\_\_
- V. \_\_\_\_\_

How can these messages be clearer to strongly emphasize safety as the priority?

*Example: Remember to always use the 4-step lift method when lifting heavy objects:*

1. Size up the load
2. Lift with your legs
3. Move the load
4. Get set and lower

- I. \_\_\_\_\_
- II. \_\_\_\_\_
- III. \_\_\_\_\_
- IV. \_\_\_\_\_
- V. \_\_\_\_\_

# Module 1-4: Workplace Safety Rules & Hazard Control

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## Activity 1: Safety Rules

**Safety Rules are intended to prevent accidents ensuring safe and successful business operations**



**DISCUSSION!** Develop some general safety rules that can be used to avoid Focus Four injuries at this site.

Rules to prevent electrical incidents

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Rules to prevent falls

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Rules to prevent “struck by” incidents

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Rules to prevent caught in/ between incidents

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# Module 1-4: Workplace Safety Rules & Hazard Control

## Activity 2: Worksite Analysis: Spot the Hazards

Work in groups to identify any hazards posted in the picture.



This company was cited for numerous hazards. How many can you find?

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# Module 1-4: Workplace Safety Rules & Hazard Control

## Handout 1: Job Safety Analysis

<b>JOB HAZARD ANALYSIS (J.H.A.)</b>			
<b>Job:</b> Putting Out A Fire — Using A Dry Chemical Fire Extinguisher			
<b>Tools/Equipment Required</b> <u>Dry Chemical Fire Extinguisher</u>	<b>Material Required</b> _____	<b>Personal Protective Equipment</b> Hard Hat _____ Safety Glasses _____	
<b>Steps</b>	<b>Sequence of Steps</b>	<b>Potential Accidents or Hazards</b>	<b>Recommended Safe Job Procedure</b>
1.	Remove Extinguisher from hanger.	Extinguisher may fall.	Grasp extinguisher securely.
2.	Carry extinguisher in upright position to fire.	Fall by tripping or slipping.	Observe walking areas, obstacles, slippery surfaces.
3.	Pull pin of extinguisher, hold hose or horn in one hand.	Contact with contents.	Maintain control of extinguisher, avoid exposing individuals to contents.
4.	Use the extinguisher.	a. Caught in spread of fire. b. Clothing catches on fire. c. Resurgence of fire.	a. Use contents with rapid sweeping motion at base of flame. b. Keep proper distance. c. Move away when extinguisher empties. never turn your back to fire. Renew attack when indicated.
5.	Promptly report use of extinguisher.	If not re-charged, potential for serious fire.	Always check extinguisher after use and have it re-charged and put back in service immediately.
6.	Take extinguisher out of service and have it re-charged.		
Developed By:	1.	2.	3.
Reviewed By:	1. (Name) _____ (Position) _____	Approved By: (Name) _____ (Position) _____	
Revised By:	Date: _____		

Source: <http://mhca.mb.ca/wp-content/uploads/2010/11/tab4form2jobhazardanalysissample2.pdf>

# Module 1-4: Workplace Safety Rules & Hazard Control

## Handout 2: Sample Standard Operating Procedure (SOP)

### SOP HS-039 HAND AND POWER TOOLS SAFETY PROGRAM

#### 1.0 POLICY

ECC's Hand and Power Tools Safety Program is prepared in accordance with 29 CFR 1910 Subpart P - *Hand and Portable Powered Tools and Other Hand-Held Equipment* (1910.241 to 1910.244); and 29 CFR 1926 Subpart I - *Tools - Hand and Power* (1926.300 to 1926.307).

#### 2.0 OBJECTIVE

The objective of ECC's Hand and Power Tool Safety Program is to reduce the likelihood of injuries and accidents caused by improper handling.

#### 3.0 SAFE OPERATING REQUIREMENTS

All hand tools shall be kept in good repair and used only for the purpose intended. Defective tools shall be acceptably repaired or removed from service. Tools shall not be thrown from one level to another, and when used overhead, shall be secured or placed in holders when not in actual use. All electrical tools shall be of the approved double or triple insulated type or grounded. Hand and portable power tools and equipment shall be guarded IAW 29 CFR 1910.243. Training on the use of hand tools/electrical tools shall be conducted by a competent person. Only trained/qualified employees shall operate tools.

#### 4.0 HAND ARM VIBRATION (HAVS) – REYNAUD'S SYNDROME

Power tools designed to have minimal vibrations will be more comfortable to use and less likely to result in hand arm vibration (HAVS) also known as Reynaud's syndrome. Hand-arm vibration is caused by the use of vibrating hand-held tools. The nature of these tools involves vibration (a rapid back-and-forth type of motion) that is transmitted from the tool to the hands and arms of the person holding the tool. HAVS causes numbness and blanching of the hands, and can progress to complete disability if the worker is not removed from exposure.

The harmful health effects of vibrating tools are related to the length of time that a worker has been using vibrating tools and to the frequency of the vibration. The longer a person uses a vibrating tool, and the faster the tool vibrates the greater the risk of health effects. Temporary tingling or numbness during or soon after use of a vibrating hand tool is not considered to be HAVS; however, tingling and numbness in the fingers lasting more than an hour after finishing work may indicate early stages of HAVS.

Many of the symptoms of vibration syndrome will disappear shortly after a worker stops using the types of tools with transmit vibration to the hands and arms. Fatigue and muscular pain in

# Module 2-1: OSHA Inspections

## Activity 1: Introduction to OSHA

**Answer some brief questions about OSHA**

**DISCUSSION!** What is the purpose of OSHA?

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What rights do you have through OSHA? (Choose all that apply)

- a) Right to a safe workplace; b) Health insurance; c) Right to complain or request hazard correction from employer; d) Right to know about hazardous chemicals; e) Vacation hours

What responsibilities do employers have under OSHA? (Choose all that apply)

- a) Keep records of injuries and illnesses; b) Provide and pay for most PPE; c) Provide medical exams and access to their exposure and medical records; d) Provide training required by OSHA standards

**DISCUSSION!** Name some things/areas that OSHA might inspect

I. \_\_\_\_\_

IV. \_\_\_\_\_

II. \_\_\_\_\_

V. \_\_\_\_\_

III. \_\_\_\_\_

VI. \_\_\_\_\_

# Module 2-1: OSHA Inspections

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## Handout 1: OSHA Inspection

Be Prepared! Know what they are looking for:

OSHA seeks to focus its inspection resources on the most hazardous workplaces in the following order of priority:

1. **Imminent danger situations**—Hazards that could cause death or serious physical harm receive top priority. Compliance officers will ask employers to correct these hazards immediately or remove endangered employees.
2. **Fatality or Severe Injury** —Employers must report:
  - All work-related fatalities within 8 hours.
  - All work-related inpatient hospitalizations, amputations, or losses of an eye within 24 hours.
3. **Complaints/ Referrals**—Allegations of hazards or violations also receive a high priority. Employees may request anonymity when they file complaints. **Referrals of hazards from other federal, state or local agencies, individuals, organizations or the media receive consideration for inspection.**
4. **Programmed inspections**—These inspections are aimed at specific high-hazard industries or individual workplaces that have experienced high rates of injuries and illnesses also receive priority.

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### On-site Inspections Preparation—

Before conducting an inspection, OSHA compliance officers research the inspection history of a worksite using various data sources; review the operations and processes in use and the standards most likely to apply. They gather appropriate personal protective equipment and testing instruments to measure potential hazards. Presentation of credentials—The on-site inspection begins with the presentation of the compliance officer's credentials, which include both a photograph and a serial number.

**DISCUSSION!** Name some things that you might do in order to prepare for an OSHA inspection

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**DISCUSSION!** Working as a small group, brainstorm an unsafe situation and compose an OSHA complaint. Describe briefly the hazard(s), which you believe exist. Include the approximate number of employees exposed to or threatened by each hazard. Specify the particular building or worksite where the alleged violation exists.

# Module 2-1: OSHA Inspections

## Handout 2: OSHA Penalties

**How much are penalties?** The present penalty structure is shown below. As the history of citations increases the probability and severity of high penalties in the future is multiplied.

### OSHA Penalties

Penalties are in the process of increasing significantly!

Type of Violation	New Maximum Penalty (January 2, 2018)
Serious Other-Than-Serious Posting Requirements	\$12,934 per violation
Failure to Abate	\$12,934 per day beyond the abatement date
Willful or Repeated	\$129,336 per violation

Source: <https://www.osha.gov/penalties/>

# Module 2-1: OSHA Inspections

## Handout 3: OSHA Penalty Contesting FAQs

### OSHA FAQs

**I. Will a decision to contest anger the OSHA or HIOSH office and will result in future inspections, harassment, discrimination, etc.?**

Consideration: The present laws do not permit the OSHA or HIOSH Compliance Officer or the agencies to take any actions against the employer.

**II. If the penalties are \$5,000 would it not be cost prohibitive to contest?**

Consideration: Litigation is expensive. It is not unreasonable to expect litigation costs to be in excess of \$10,000. There are other factors that will impact future penalties and costs. See the considerations for repeat violations.

**III. What if the citations are based on information and evidence that is incorrect or lacks the evidence of a *prima facie* case?**

For example, if an extension cord is found to be laid across an aisle in an unused back storage room, a contest showing that there were no employees exposed to the hazard may be possible. Or, if the worker was informed to move the extension cord or to not place it in the aisle, then a misconduct defense may be used.

**IV. What if the citation was classified incorrectly?**

If it is believed that sufficient evidence supports a reclassification or withdrawal of the citation then a contest should be seriously considered. If the conduct of the Compliance Officer is in question then a contest may be in order. Conference with an attorney is strongly recommended.

**V. What is the impact of the first set of citations?**

The first set of citations provides the basis for a history. These citations remain on the books for 5 years which means the Compliance Officer will search the history to see if previous citations were issued. The only criteria is whether or not a previous citation was issued.

**VI. Is it likely that we'll face additional inspections in the face of a violation?**

Once citations are issued, a future inspection can be expected. If a citation for \$5,000 was initially issued a repeat could be \$10,000, up to \$50,000. A decision to contest this citation must consider that the defense is the fact the citation is not a repeat AND the citation is not properly issued. This defense posture is very difficult and costly.

## **DEFENSE**

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### **I. What kind of defense is available?**

Once the citations are issued the burden of proof for any defense of the citations belongs to the employers.

### **II. The affirmative defense of infeasibility can be used if evidence and proof can be shown that it was impossible to comply with a standard or if compliance with the standard would create a greater hazard.**

In any event, the burden of proof means that the actions taken to not comply did NOT expose employees to a serious hazard.

### **III. The second type of affirmative defense is employee or supervisor misconduct or an isolated event.**

### **IV. The burden of proof is a high level of accurate information/evidence that a rule was established, communicated to employees, employees trained, active evidence of enforcement of the rules, etc.**

### **V. Finally, a defense of sorts that demonstrates that the Compliance Officer's evidence is inaccurate or incomplete.**

## **VI. PENALTIES**

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### **I. As the history of citations increases, the probability and severity of high penalties in the future is multiplied.**

# Module 2-2: Emergency Planning & Emergency Response Procedures

## Activity 1: Discussion: Emergency Plan

**DISCUSSION!** Compose an emergency plan for the classroom.

## Include:

- Conditions that will activate the plan
  - Chain of command
  - Emergency functions and who will perform them
  - Specific evacuation procedures, including routes and exits
  - Procedures for accounting for personnel, customers, and visitors

## Module 2-3: Disciplinary Policy & Employer Responsibilities

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### Activity 1: Work Policies

What are some disciplinary policies in place at your work?

- I. \_\_\_\_\_
- II. \_\_\_\_\_
- III. \_\_\_\_\_
- IV. \_\_\_\_\_
- V. \_\_\_\_\_

What are some disciplinary actions that you would change, add, or eliminate at work? Why?

- I. \_\_\_\_\_
- II. \_\_\_\_\_
- III. \_\_\_\_\_
- IV. \_\_\_\_\_
- V. \_\_\_\_\_

### GROUP DISCUSSION!

List three inviolable rules that you feel are important

- I. \_\_\_\_\_
- II. \_\_\_\_\_
- III. \_\_\_\_\_

# Module 3: Safety & Injury Prevention Plan

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## Introduction

The Safety & Injury Prevention Plan (SIPP) Program has been made possible by the Susan Harwood Training Grant Program, which supports training and education programs for workers and employers on the recognition, avoidance, abatement, and prevention of safety and health hazards in their workplaces.

SIPP has been specially designed to provide businesses with the tools to develop a customized, comprehensive written safety and health program.

We will cover a lot of material in this course, preparing you to have the tools, knowledge, and resources to fully craft your SIPP.

# Module 3: Safety & Injury Prevention Plan

## Quiz 1: Your Legal Duties & Responsibilities

Take the True/False Quiz to determine your understanding of your legal duties and responsibilities in workplace health and safety.

As an employer, what are your duties and responsibilities, according to HRS-12-110-2?

- I. Have a written safety and health program (employers with fewer than 25 employees are exempt). **TRUE or FALSE**
- II. The written safety and health program should encourage employee involvement in its structure and operation and in decisions that affect their safety and health. **TRUE or FALSE**
- III. The written safety and health program should assign and communicate responsibilities to managers and supervisors only. **TRUE or FALSE**
- IV. The written safety and health program should provide a reliable system for employees to notify management personnel or safety and health committee members of conditions that appear hazardous. **TRUE or FALSE**
- V. In terms of safe work practices, employers are responsible for notifying employees of practices, but are not responsible for making sure employees understand such practices. **TRUE or FALSE**
- VI. The employer shall eliminate or control all existing hazards within the workplace in a timely manner. **TRUE or FALSE**
- VII. Employers must ensure managers make periodic in-house safety and health inspections so that new or previously missed hazards can be identified. **TRUE or FALSE**
- VIII. In regards to safety and health training program, the employer shall develop and institute a safety and health training program for all employees, as well as training supervisors and managers on their responsibilities assigned to them under the program. **TRUE or FALSE**

## Module 3: Safety & Injury Prevention Plan

### Activity 1: Management Commitment

What are the most important components of your company Safety Policy?

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How does your business communicate to employees that your management is committed to safety?

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How do you know that your employees recognize your commitment to safety?

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# Module 3: Safety & Injury Prevention Plan

## Activity 2: Safety and Health Responsibilities

- I. How do your managers communicate in a way that prioritizes safety to the team?

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- II. What are some responsibilities that you have assigned (or will assign) to your Managers? Supervisors? Employees?

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# Module 3: Safety & Injury Prevention Plan

## Activity 3: Safety Committee

- I. What is the purpose of your Safety Committee?

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- II. In considering logistics of your Safety Committee and Employee Safety Meetings (i.e. how representatives are selected to join, length of terms, structure—i.e. do you have a chairperson and/or record-keeper, time/frequency), what are some ideas that work best for your company?

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# Module 3: Safety & Injury Prevention Plan

## Activity 4: Hazard Recognition & Hazard Control

### DISCUSSION

Record keeping can often feel burdensome on employers, managers, and employees. Discuss with the class, particularly those participants who have long-standing and effective Safety & Health plans, methods to reduce the strain. Consider record keeping as it applies to Employee's Injury/Illness Reports, Incident Investigation, and Safety Inspection Procedures.

Note pages are available at the end of this Workbook.

- I. What Safety Rules should be implemented that are specific to your workplace?

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- II. When considering the above, what Personal Protective Equipment must be made available?

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## Appendix 1: Answers

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### Worksite Analysis: Spot the Hazards (Page 13)

**Observations:** The make-shift ramp and make-shift tent, saw horse on the left and the flimsy wood brace on the right side, the spot where the ramp meets the wall: it's not easy for a worker to transition from the ramp to the scaffold, no one is wearing a hardhat, the worker in the window isn't wearing a fall protection harness, tools and clutter are all over the ground, creating trip hazards, the bags of mortar outside of the "tent" are trip hazards

### Introduction to OSHA (page 16)

**Purpose of OSHA:** Congress created OSHA to assure safe and healthful conditions for workers by setting and enforcing standards and providing training, outreach, education and compliance assistance. The OSH Act requires employers to provide a safe and healthful workplace for workers.

What rights do you have through OSHA? (Choose all that apply)

- a) Right to a safe workplace
  - b) Health insurance
  - c) Right to complain or request hazard correction from employer
  - d) Right to know about hazardous chemicals
  - e) Vacation hours
- All but b) health insurance and e) vacation hours

What responsibilities do employers have under OSHA? (Choose all that apply)

- a) Keep records of injuries and illnesses
  - b) Provide and pay for most PPE
  - c) Provide medical exams and access to their exposure and medical records
  - d) Provide training required by OSHA standards
- (All of the above)

# Rights & Responsibilities Under OSH ACT

## Worker Rights

- Right to a safe and healthful workplace
- Right to know about hazardous chemicals
- Right to information about injuries and illnesses in your workplace
- Right to complain or request hazard correction from employer
- Right to training
- Right to hazard exposure and medical records
- Right to file a complaint with OSHA
- Right to participate in an OSHA inspection
- Right to be free from retaliation for exercising safety and health rights
- Worker responsibilities

## Employer Responsibilities

- Provide a workplace free from recognized hazards and comply with OSHA standards
- Provide training required by OSHA standards
- Keep records of injuries and illnesses
  - Set up a reporting system
  - Provide copies of logs, upon request
  - Post the annual summary
  - Report within 8 hours any accident resulting in a fatality or the hospitalization of 3 or more workers
- Provide medical exams when required by OSHA standards and provide workers access to their exposure and medical records
- Not discriminate against workers who exercise their rights under the Act (Section 11(c))
- Post OSHA citations and abatement verification notices
- Provide and pay for PPE

## Appendix 2: Quiz Answers:

### Your Legal Duties & Responsibilities

All TRUE except for the below:

3. The written safety and health program should assign and communicate responsibilities to managers and supervisors only.  
**FALSE-** Assign and communicate responsibilities for all aspects of the safety and loss prevention program to managers, supervisors, **and employees** so that they all know and understand what is expected of them in the implementation of the program. Source: HRS-12-110-2-b-1-B-(v)
5. In terms of safe work practices, employers are responsible for notifying employees of practices, but are not responsible for making sure employees understand such practices.  
**FALSE-** The employer shall ensure that practices **are understood by all employees** and are underscored through training, positive reinforcement, correction of unsafe performance, and, if necessary, through a clearly defined and communicated disciplinary system. Source: HRS-12-110-2-b-2-(B)
6. The employer shall eliminate or control all existing hazards within the workplace in a timely manner.  
**FALSE-** The employer shall eliminate or control **all existing and potential** hazards within the workplace in a timely manner. Source: HRS-12-110-2-b-2-(A)
7. Employers must ensure managers make periodic in-house safety and health inspections so that new or previously missed hazards can be identified.  
**FALSE-** The employer shall conduct periodic in -house §12-110 4 safety and health inspections so that new or previously missed hazards or failures in engineering, work practice, and administrative controls are identified. The in-house inspections will be conducted by individuals who are trained to recognize hazardous conditions, as members of the safety and health committee or a person designated and trained by the employer for the facility's safety and health program. Source: HRS-12-110-2-b-3

## Appendix 3: Job Safety Analysis Template

<b>Job Safety Analysis</b>		
Job:		
Analysis By: Date:	Reviewed By: Date:	Approved By: Date:
Sequence of Steps	Potential Accidents or Hazards	Preventive Measures

# Appendix 4: Site Safety Inspections

## CONSTRUCTION SUPERVISOR SAFETY INSPECTION CHECKLIST

Date:	Job No.(s):	
Location:	Crew Member:	
Supervisor:		
ITEM	COMMENTS/ CORRECTIVE ACTION	
Housekeeping (Garbage, cleanliness, electrical cords, ladders)		
Drinking water/ sanitation requirements/first aid kit		
Electrical (such as proper grounding, lock & tag and GFCI [good condition, inspected])		
Proper personal protective equipment (PPE)		
Walking/working surfaces (tripping hazards, slippery surfaces, floor holes)		
Electrical tools (guards in place; good condition, stored properly)		
Cranes/ rigging equipment (for example: slings, properly stored and inspected)		
Excavation (properly sloped or shored; permits; inspections; barricaded daily)		
Flammables/combustibles (fire extinguishers, welding and cutting equipment)		
Hot work (Personal Protective Equipment, permit, combustibles, flammables protected)		

<b>Material Safety Data Sheets onsite with containers labeled</b>	
<b>Scaffold system fully assembled; tags; inspections; fully planked guardrails</b>	
<b>Proper barricading/ warning signs (trenches, fuel areas, storage construction sites)</b>	
<b>Fire extinguishers (monthly inspection, accessible, on mechanized equipment)</b>	
<b>COMMENTS</b>	

# Appendix 5: Sample Equipment Safety Inspection Checklist

		<b>CONSTRUCTION EQUIPMENT INSPECTION CHECKLIST Boom lift-Scissor-Fork Trucks</b>							
PROJECT/TASK:			COMPANY:						
DATE:	TIME:		M	T	W	Th	F	Sa	Su
(Circle One)									
<b>Type of Inspection:</b> <small>(Check One)</small> <input checked="" type="checkbox"/> Daily <input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing									
Make/Description:			Model:			I.D. No:			
<b>Inspected By:</b> (Name and Signature)									
EQUIPMENT	Acceptable	Not Acceptable	N/A	COMMENTS AND ACTION TAKEN					
Operation/Owners Manual									
Brakes									
Brake Lights									
Reverse Signal Alarm									
Horn/Air Horn									
Tires/Tracks									
Steering									
Seat Belt									
Operating Controls									
Fire extinguisher									
Lights									
Defroster									
Mirrors									
Instruments									
Coupling Devices									
Slope Indicator - Alarm									
Loose or missing parts									
Dents and damage									
Drive forward / reverse									
Harness/ Lanyards/ tie off									
Latches/ doors									
Exhaust Systems									
Hitches and Safety Cables									
Hydraulic Lines/ Air Hoses									
Engine Oil Level									
Hydraulic Oil Level									
Rollover Equipment									
Cleanliness									
Comments:			Fuel Level: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> F Hour Meter: Odometer:						

**Noted deficiencies must be approved by the Superintendent and/or Health and Safety Officer prior to operation.**

This inspection form is to be filled out at the start of the work shift upon deliveries by the Equipment/Truck Operator to ensure that the equipment/truck is safe to operate and is free from apparent damage, which could cause failure while in use. Once completed, this form is to be given to the Site Superintendent or Safety Officer to be kept on file on-site. In all cases, consult the manufacturer's data to ensure compliance with all inspection criteria, which may not be indicated.

# APPENDIX 6: Sample Construction Safety Inspection Checklist

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Construction Safety Inspection Form

Name (print):					Phone:				ORG Code:			
Building/Location:									Date:			
Item	Yes	No	N/A	Fixed Date	Item	Yes	No	N/A	Fixed Date			
<b>Program Administration</b>												
OSHA Posting					Materials properly stored/stacked							
Emergency numbers/contacts posted					Dust protection adequate							
Hazard Communication Program					Loads lifted correctly							
Daily/Weekly safety meetings held					<b>Excavations &amp; Shoring</b>							
Housekeeping/sanitation					Shoring proper for soil & depth							
Work areas orderly					Adjacent structures properly shored							
Adequate lighting					Necessary ladders provided							
Hand washing/toilet facilities					Excavation barricaded							
Passage, entry & walkways clear					Spoil set back at least 2 feet							
Clean eating/dining area					Equipment away from edge							
<b>Fire Prevention</b>					Equipment ramps adequate							
Fire extinguishers available					<b>Ladders</b>							
Correct extinguishers for job					Ladders in good condition							
No smoking posted and enforced					Side rails extend 36" above landing							
<b>Electrical/Utility</b>					Proper for job & secure							
Electrical hazards posted					Ladders fully open when in use							
Drop cords protected					<b>Scaffolding</b>							
Underground electrical lines staked					Equipment in good condition							
Lockout procedures utilized					Scaffold is tied to structure							
Access to breaker box clear					Guardrails, top, mid, toe boards in place							
Underground gas lines staked					Connections sound & secure							
<b>Hand &amp; Power Tools</b>					Planking cleats in place							
Hand tools in good working condition					Worker protected from falling objects							
Cords in good condition					<b>Welding &amp; Cutting</b>							
All mechanical safeguards in place					Screen & shields in place							
Proper tools utilized for each job					Electrical equipment grounded							
Tools grounded or double insulated					Compressed gas cylinders secure/upright							
<b>Heavy Equipment</b>					Proper personnel protection utilized							
Operation manuals available					Fire extinguishers immediately available							
Brakes, lights, signals & alarms operable					Welding cables in good condition							
Wheels chocked when necessary					<b>Personal Protective Equipment</b>							
Seat belts worn					Hardhats worn							
Daily inspections documented					Gloves available & used							
<b>Barricades &amp; Fencing</b>					Steel toe footwear							
Site fenced					Eye protection utilized							
Roadways & sidewalks fenced					Ear protection utilized							
Floor openings planked or barricaded					Safety belts & lanyards utilized							
Access/traffic controlled					Respirators & masks utilized							

## Appendix 8: Safety & Health Program Assessment Checklist

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Assess your Safety and Health Program, using your own checklist or the ones in this section.

### **SAFETY AND HEALTH PROGRAM AUDIT TOOL**

## SECTION 1: MANAGEMENT LEADERS

Requirement	Not Implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
Management implements and communicates a written policy supporting the safety and health program.					
Management defines specific goals and expectations for the program, and plans to achieve the goals.					
Management allocates appropriate resources (funds and time) to accomplish goals and manage the program.					
Management assigns responsibility and accountability for implementing and maintaining the program.					

Requirement	Not Implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
All workers know who has been assigned responsibility for the program.					
Management integrates safety and health into planning and budgeting processes.					
Management recognizes worker contributions to workplace safety and health.					
Management routinely demonstrates visible commitment to the program.					

## SECTION 2: WORKER PARTICIPATION

Requirement	Not Implemented	Partially Implemented	Implemented with only Minor Deficiencies	Fully Implemented	Evidence of Implementation
<b>Workers are encouraged to participate in the program, have the means to participate, and feel comfortable participating and providing input on safety and health issues.</b>					
<b>Workers are able to participate without encountering language, skill or education barriers; restrictions on participating during work time; or fear of retaliation or discrimination.</b>					
<b>Workers are assigned roles or are otherwise involved in <i>all</i> aspects of the program.</b>					
<b>Workers have access to information they need to understand safety and health hazards and control measures in the workplace.</b>					
<b>Workers know how to report an injury, illness, hazard, or concern, including good catches/near misses.</b>					
<b>Workers consistently report</b>					

Requirement	Not Implemented	Partially Implemented	Implemented with only Minor Deficiencies	Fully Implemented	Evidence of Implementation
<b>injuries, illnesses, hazards, and concerns, including good catches/near misses.</b>					
<b>Reports of injuries, illnesses, hazards, or other concerns are acknowledged promptly.</b>					
<b>Reports of injuries, illnesses, hazards, or other concerns are resolved promptly, after seeking worker input.</b>					

## SECTION 3: HAZARD IDENTIFICATION AND ASSESSMENT

Requirement	Not Implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
Written materials such as injury logs, safety data sheets, medical reports, workplace inspection results, incident investigation reports, and manufacturers' literature are reviewed to help identify hazards.					
The workplace is inspected regularly to identify conditions that pose or could pose a safety concern. Inspections cover all areas and activities and include plant and transportation vehicles.					
The workplace is evaluated to identify worker exposure to health hazards.					

Requirement	Not Implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
<b>Incidents (including close calls/near misses) are investigated to identify any hazards previously unrecognized or inadequately controlled. Investigations focus on identifying the root cause(s) of each incident.</b>					
<b>Hazards associated with emergencies and non-routine operations are identified.</b>					
<b>All identified hazards are characterized with respect to the severity of potential outcomes, likelihood an event or exposure will occur, and number of workers who might be exposed.</b>					

Requirement	Not Implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
<b>Interim controls are adopted while permanent controls are being determined.</b>					
<b>all serious and recognized hazards are addressed immediately, while remaining hazards are prioritized for further control.</b>					

## SECTION 4: HAZARD PREVENTION AND CONTROL

Requirement	Not implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
Options for controlling hazards are identified using sources such as OSHA, NIOSH, industry best practices, and input from workers.					
Responsibility for installing or implementing controls is assigned to persons with power or ability to implement the controls.					
Controls are selected according to the “hierarchy of controls”, emphasizing in order of priority: elimination, substitution, engineering controls, administrative controls, and PPE.					
A hazard control plan is used to plan and prioritize controls, and track and verify their installation.					
Responsibility for installing or implementing controls is assigned to persons with power or ability to implement the controls.					

Requirement	Not implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
<b>Interim controls are used when permanent controls cannot be immediately implemented.</b>					
<b>Controls are in place to protect workers during emergencies and non-routine operations.</b>					
<b>Once installed, controls are monitored to ensure workers understand their use and application and to verify they are effective.</b>					
<b>Controls are inspected and maintained</b>					

## SECTION 5: EDUCATION AND TRAINING

Requirement	Not implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
<b>Managers, supervisors and workers understand the elements of the safety and health program and how to participate in it.</b>					
<b>Employers, managers and supervisors understand: fundamental concepts of hazard identification and control; procedures for responding to workers' reports of injuries, illnesses and incidents; incident investigation techniques; their responsibilities under the OSH act; and workers' rights guaranteed under the act.</b>					
<b>Workers understand the employers' responsibilities under the program.</b>					
<b>Each worker understands his or her own role in the program.</b>					
<b>Workers know who to contact with concerns or questions, and understand the procedures for reporting injuries, incidents, hazards, and concerns.</b>					

Requirement	Not Implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
<b>Workers know they have a right to participate in the program and report injuries without fear of retaliation or discrimination.</b>					
<b>Workers can ask questions, receive answers, and provide feedback during and after training.</b>					
<b>Employers, managers, and supervisors understand their responsibilities under the OSH Act; procedures for responding to workers' reports of injury, illness or concern; techniques for identifying and controlling hazards; and fundamentals of incident investigation.</b>					
<b>Supplemental training is provided when a change in the workplace could introduce new or increased hazards.</b>					
<b>Supplemental training is provided when a worker is assigned a new task or given a new assignment.</b>					
<b>Training is provided in a language and at a literacy level that all workers can understand.</b>					

## SECTION 6: PROGRAM EVALUATION AND IMPROVEMENT

Requirement	Not implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
<b>Performance indicators are used to track progress towards program goals.</b>					
<b>Performance is tracked using both lagging and leading indicators.</b>					
<b>Performance data is analyzed and shared with workers.</b>					
<b>An initial review and subsequent annual reviews evaluate the program to ensure it is fully implemented and functioning as planned.</b>					
<b>Workers are involved in all program review activities.</b>					
<b>The program is modified as needed to correct shortcomings.</b>					

## SECTION 7: COMMUNICATION AND COORDINATION FOR HOST EMPLOYERS, CONTRACTORS AND STAFFING AGENCIES

Requirement	Not implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
<b>Before coming onsite, the host employer and any contractors or staffing agencies determine which among them will implement and maintain the various parts of the safety and health program.</b>					
<b>Before coming onsite all contractors, staffing agencies and their workers are informed of the hazards that may be present, the controls in place to address the hazards, and who to contact to report an injury, illness or concern.</b>					
<b>Before coming onsite, the host employer provides contractors and staffing agencies the opportunity to conduct site visits or inspections and to review injury and illness records and other safety and health information.</b>					

Requirement	Not implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
<b>Before coming onsite, contractors or staffing agencies inform the host employer of any hazards arising from their work onsite, the controls in place to address the hazards, and who to contact if they have a safety concern.</b>					
<b>Host employers communicate with contractors and staffing agencies to determine which will implement and maintain the various parts of the safety and health program.</b>					
<b>A mechanism is established to exchange information about hazards present in the workplace and measures in place to prevent or control them. for all contractors to use to report injuries, hazards, and concerns.</b>					
<b>Host employers include any safety-related specifications and qualifications requirements for contractors and staffing agencies in contracts and bid documents.</b>					

Requirement	Not implemented	Partially implemented	Implemented with only minor deficiencies	Fully implemented	Evidence of implementation
<b>Host employers coordinate with contractors and staffing agencies to ensure work is planned and scheduled to minimize impacts on safety.</b>					
<b>Workers know they have a right to participate in the program and report injuries without fear of retaliation or discrimination</b>					
<b>Temporary workers are adequately trained and equipped before arriving at the worksite.</b>					
<b>Safety and health policies and procedures of host employers, contractors and staffing agencies are consistent and understood by all workers onsite.</b>					
<b>Host employers and staffing agencies ensure enough trained and equipped workers are available and with enough lead time.</b>					
<b>Management from the host employer and staffing agencies are available to address day-to-day coordination issues related to safety.</b>					

Source: [https://www.osha.gov/shpguidelines/docs/SHP\\_Audit\\_Tool.pdf](https://www.osha.gov/shpguidelines/docs/SHP_Audit_Tool.pdf)

# Appendix 9: Incident Investigations: A Guide for Employers

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With an effective safety and health management program in place, all the involved parties are aware of the roles they play during the investigation. This helps the transition from emergency response and site safety to preserving the scene and documenting the incident. This is the time an employer's incident investigation program's written plan goes into effect and the incident investigation begins.

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## Step 1. PRESERVE/DOCUMENT THE SCENE

Preserve the Scene: Preserve the scene to prevent material evidence from being removed or altered; investigators can use cones, tape, and/or guards.

Document the Scene: Document the incident facts such as the date of the investigation and who is investigating. Essential to documenting the scene is capturing the injured employee's name, injury description, whether they are temporary or permanent, and the date and location of the incident. Investigators can also document the scene by video recording, photographing and sketching.

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## Step 2. COLLECT INFORMATION

Incident information is collected through interviews, document reviews and other means. The Appendix provides a checklist to use to help ensure all information pertinent to the incident is collected.

In addition to interviews, investigators may find other sources of useful information. These include:

- Equipment manuals
- Industry guidance documents
- Company policies and records
- Maintenance schedules, records and logs
- Training records (including communication to employees)
- Audit and follow-up reports
- Enforcement policies and records
- Previous corrective action recommendations

Interviews can often yield detailed, useful information about an incident. Since memories fade, interviews must be conducted as promptly as possible: preferably as soon as things have settled down a bit and the site is both secure and safe. The sooner a witness is interviewed, the more accurate and candid his/her statement will be.

An incident investigation always involves interviewing and possibly re-interviewing some of the same or new witnesses as more information becomes available, up to and including the highest levels of management. Carefully question witnesses to solicit as much information as possible related to the incident. Since some questions will need to be designed around the interviewee, each interview will be a unique When interviewing injured workers and witnesses it is crucial to reduce their possible fear and anxiety, and to develop a good rapport. When conducting interviews, investigators should:

- Conduct the interview in the language of the employee/interviewee; use a translator if needed
- Clearly state that the purpose of the investigation and interview is fact-finding, not fault-finding
- Emphasize that the goal is to learn how to prevent future incidents by discovering the root causes of what occurred
- Establish a climate of cooperation, and avoid anything that may be perceived as intimidating or in search of someone to blame for the incident
- Let employee know that they can have an employee representative (e.g., labor representative), if available/appropriate
- Ask the individuals to recount their version of what happened
- Not interrupt the interviewee
- Take notes and/or record the responses; interviewee must give permission prior to being recorded
- Have blank paper and or sketch available for interviewee to use for reference
- Ask clarifying questions to fill in missing information
- Reflect back to the interviewees the factual information obtained; correct any inconsistencies
- Ask the individuals what they think could have prevented the incident, focusing on the conditions and events preceding the injury

### **Step 3. DETERMINE ROOT CAUSES**

The root causes of an incident are exactly what the term implies: The underlying reasons why the incident occurred in a workplace. Root causes generally reflect management, design, planning, organizational, and/or operational failings (e.g., employees were not trained adequately; a damaged guard had not been repaired).

- Determining the root cause is the result of persistently asking “why”
- Determining the root cause is the most effective way to ensure the incident does not happen again

Finding the root causes goes beyond the obvious proximate or immediate factors; it is a deeper evaluation of the incident. This requires persistent “digging”, typically by asking “Why” repeatedly. Conclusions such as “worker was careless” or “employee did not follow safety procedures” don’t get

at the root causes of the incident. To avoid these incomplete and misleading conclusions in the investigative process, investigators need to continue to ask “why?” as in, “Why did the employee not follow safety procedures?” If the answer is “the employee was in a hurry to complete the task and the safety procedures slowed down the work”, then ask, “Why was the employee in a hurry?” The more and deeper “why?” questions asked, the more contributing factors are discovered and the closer the investigator gets to the root causes. If a procedure or safety rule was not followed, why was the procedure or rule not followed? Did production pressures play a role, and, if so, why were production pressures permitted to jeopardize safety? Was the procedure out-of-date or safety training inadequate? If so, why had the problem not been previously identified, or, if it had been identified, why had it not been addressed?

It cannot be stressed enough that a successful incident investigation must always focus on discovering the root causes. Investigations are not effective if they are focused on finding fault or blame. If an investigation is focused on finding fault, it will always stop short of discovering the root causes, because it will stop at the initial incident without discovering their underlying causes. The main goal must always be to understand how and why the existing barriers against the hazards failed or proved insufficient, not to find someone to blame.

The questions listed below are examples of inquiries that an investigator may pursue to identify contributing factors that, in turn, can lead to root causes:

- If a procedure or safety rule was not followed, why was the procedure or rule not followed?
- Was the procedure out of date or safety training inadequate? Was there anything encouraging deviation from job procedures such as incentives or speed of completion? If so, why had the problem not been identified or addressed before?
- Was the machinery or equipment damaged or did it fail to operate properly? If so, why?
- Was a hazardous condition a contributing factor? If so, why was it present? (E.g., defects in equipment/tools/materials, unsafe condition previously identified but not corrected, inadequate equipment inspections, incorrect equipment used or provided, improper substitute equipment used, poor design or quality of work environment or equipment)
- Was the location of equipment/materials/worker(s) a contributing factor? If so, why? (E.g. employee not supposed to be there, insufficient workspace, “error-prone” procedures or workspace design)
- Was lack of personal protective equipment (PPE) or emergency equipment a contributing factor? If so why? (E.g., PPE incorrectly specified for job/task, inadequate PPE, PPE not used at all or used incorrectly, emergency equipment not specified, available, properly used, or did not function as intended)
- Was a defect in the management program a contributing factor? If so, why? (E.g., a culture of improvisation to sustain production goals, failure of supervisor to detect or report hazardous condition or deviation from job procedure, supervisor accountability not understood, supervisor or worker inadequately trained, failures to initiate corrective actions recommended earlier)

## Step 4. IMPLEMENT CORRECTIVE ACTIONS

The investigation is not complete until corrective actions are implemented that address the root causes of the incident. Implementation should entail program level improvements and should be supported by senior management.

Note that corrective actions may be of limited preventive value if they do not address the root causes of the incident. Throughout the workplace, the findings and how they are presented will shape perceptions and subsequent corrective actions. Superficial conclusions such as "Bob should have used common sense," and weak corrective actions such as "Employees must remember to wear PPE," are unlikely to improve the safety culture or to prevent future incidents.

In planning corrective actions and how best to implement them, employers may find that some root causes will take time and perseverance to fix. Persisting in implementing substantive corrective actions, however, will not only reduce the risk of future incidents but also improve the company's safety, morale and its bottom line.

Specific corrective actions address root causes directly; however, some corrective actions can be general, across-the-board improvements to the workplace safety environment. Sample global corrective actions to consider are:

- Strengthening/developing a written comprehensive safety and health management program
- Revising safety policies to clearly establish responsibility and accountability
- Revising purchasing and/or contracting policies to include safety considerations
- Changing safety inspection process to include line employees along with management representatives.

Source: [https://www.osha.gov/dte/InclInvGuide4Empl\\_Dec2015.pdf](https://www.osha.gov/dte/InclInvGuide4Empl_Dec2015.pdf)

# Appendix 10: Documenting Incident Reports

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## **OSHA's Sample List of Items to Use to Conduct Investigation**

<i>Camera</i>	<i>Personal protective equipment:</i>	
<i>Charged Batteries (for phones, cameras, equipment, etc.)</i>	<i>Gloves, hat, eyewear, ear plugs, face mask, etc.</i>	
<i>Video / Audio recorder</i>	<i>Magnifying glass</i>	
<i>Measuring devices in various sizes</i>	<i>High visibility plastic tapes to mark off area</i>	
<i>Leveling rod</i>	<i>First aid kit</i>	
<i>Clipboard and writing pad</i>	<i>Latex gloves</i>	
<i>Pens, pencils, markers</i>	<i>(Various types: bags, jars, containers, etc.)</i>	
<i>Graph paper</i>	<i>Identification tags</i>	
<i>Incident investigation forms</i>	<i>Strings, stakes, warning</i>	
<i>Flashlight tape</i>	<i>Carpenters ruler</i>	
<i>Photo marking cones</i>	<i>Hammer</i>	
		<ul style="list-style-type: none"> <li>• Paint stick (yellow/black)</li> <li>• Chalk (yellow/white)</li> <li>• Protractor</li> <li>• Clinometer</li> <li>• Sampling [holding] containers with seals</li> <li>• Straight-edge ruler (Can be used as a scale reference in photos)</li> <li>• Variety of tape: Scotch, masking, duct</li> <li>• Compass</li> </ul>

## **Tips for Photograph Documentation:**

### **Tips for Video Documentation:**

- Video the scene as soon as possible; doing this early on will pick up details that may later add valuable information to the investigation
- Scan slowly 360 degrees left and right to establish location
- Narrate what is being taped, and describe objects, size, direction, location, etc.
- If vehicles were involved, record direction of travel, going and coming

- Always make notes about the photos taken
- Start by taking distance shots first then move in to take closer photos of the scene
- Take photos at different angles (from above, 360 degrees of scene, left, right, rear) to show the relationship of objects and minute and/or transient details such as ends of broken rope, defective tools, drugs, wet areas, or containers
- Take panoramic photos to help present the entire scene, top to bottom - side to side
- Take notes on each photo; these should be included in the incident investigation file with the photos
- Identify and document the photo type, date/time/location taken, subject, weather conditions, measurements, etc.
- Indicate the locations where photos were taken on sketches
- Identify the person taking the photo
- Place an item of known dimensions in the photo to add a frame of reference and scale (e.g., a penny, a pack of cards)

Source:

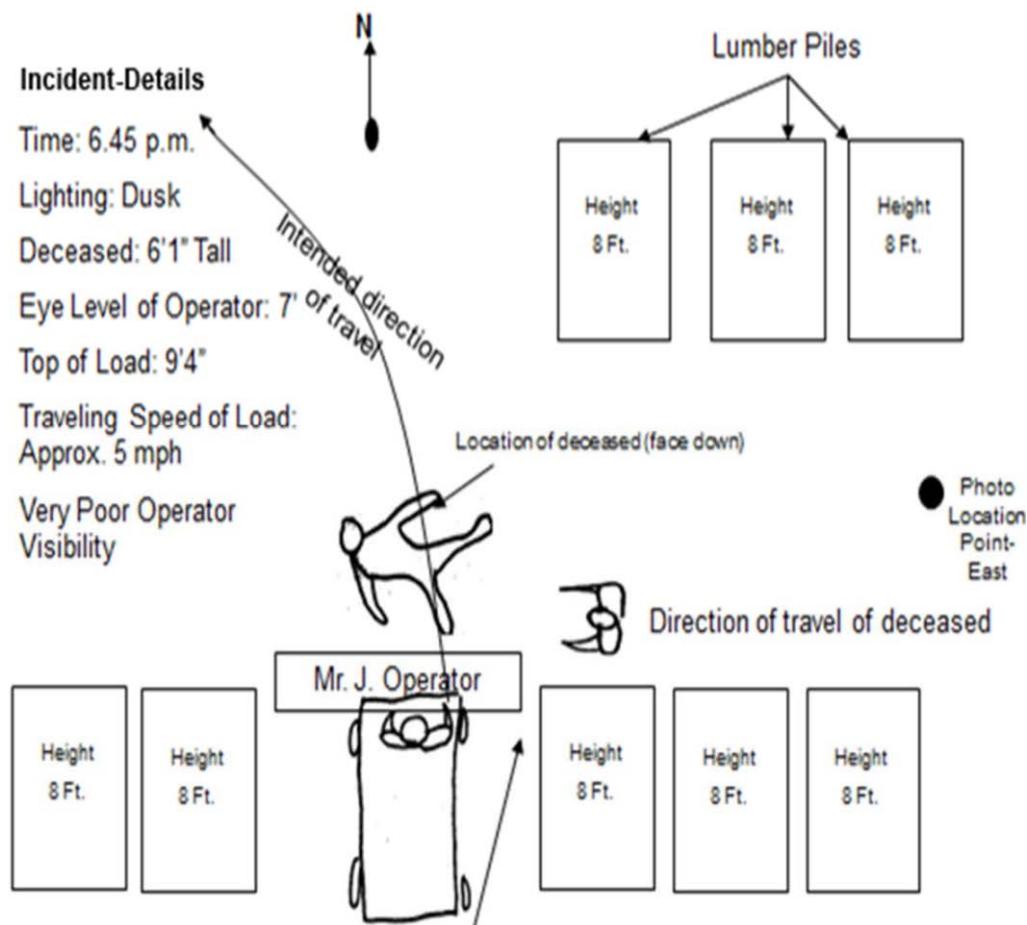
[https://www.osha.gov/dte/InclInvGuide4Empl\\_Dec2015.pdf](https://www.osha.gov/dte/InclInvGuide4Empl_Dec2015.pdf)

# Appendix 11: Advice for Sketching Incident Scenes

1. Make sketches large; at least 8" x 10" and clear, be sure to print legibly
2. Include "Incident Details" (i.e., time, date, injured, location, conditions, etc.)
3. Include measurements (i.e. distances, heights, lengths, etc.) and use permanent points (e.g., telephone pole, building) to clearly present the measurements
4. Indicate directions – N= North; E= East; W= West; S= South
5. Make notes on sketch to provide additional information such as the photo location and/or where people were at the time of the incident

Note: The sketch can be used during interviews to help interviewees identify their location before, during or after the incident

**Example Sketch for a Fatality  
Lumber Storage Area, ZYX Sawmill, Ltd.**



Source: [https://www.osha.gov/dte/IncInvGuide4Empl\\_Dec2015.pdf](https://www.osha.gov/dte/IncInvGuide4Empl_Dec2015.pdf)

# Appendix 12: Incident Investigation Checklist

Investigators should be sure their investigation answers the following questions

WHO?	WHAT?	WHY?
WHERE?	<p>What was the incident?</p> <p>What was the injury?</p> <p>What was the employee doing?</p> <p>What had the employee been told to do?</p> <p>What tools was the employee using?</p> <p>What machine was involved?</p> <p>What operation was the employee performing?</p> <p>What instructions had the employee been given?</p> <p>What specific precautions were necessary?</p> <p>What specific precautions was the employee given?</p> <p>What protective equipment should have been used?</p> <p>What protective equipment was the employee using?</p> <p>What had other persons done that contributed to the incident?</p> <p>What problem or questions did the employee encounter?</p> <p>What did the employee or witnesses do when the incident occurred?</p> <p>What extenuating circumstances were involved?</p> <p>What did the employee or witnesses see?</p> <p>What will be done to prevent recurrence?</p> <p>What safety rules were violated?</p> <p>What new rules are needed?</p>	<p>Why was the employee injured?</p> <p>Why and what did the employee do?</p> <p>Why and what did the other person do?</p> <p>Why wasn't protective equipment used?</p> <p>Why weren't specific instructions given to the employee?</p> <p>Why was the employee in the position?</p> <p>Why was the employee using the tools or machine?</p> <p>Why didn't the employee check with the supervisor when the employee noted things weren't as they should be?</p> <p>Why did the employee continue working under the circumstances?</p> <p>Why wasn't the supervisor there at the time?</p>
WHEN?	<p>When did the incident occur?</p> <p>When did the employee start on that job?</p> <p>When was the employee assigned on the job?</p> <p>When were the hazards pointed out to the employee?</p> <p>When was the employee's supervisor last check on job progress?</p> <p>When did the employee first sense something was wrong?</p>	HOW?
		<p>How did the employee get injured?</p> <p>How could the employee have avoided it?</p> <p>How could fellow workers have avoided it?</p> <p>How could supervisor have prevented it - could it be prevented?</p>

Source: [https://www.osha.gov/dte/IncInvGuide4Empl\\_Dec2015.pdf](https://www.osha.gov/dte/IncInvGuide4Empl_Dec2015.pdf)

# APPENDIX 13: OSHA Hazardous Materials

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## **1910.120 App B: General Description and Discussion of the Levels of Protection and Protective Gear**

This appendix sets forth information about personal protective equipment (PPE) protection levels, which may be used to assist employers in complying with the PPE requirements of this section.

As required by the standard, PPE must be selected which will protect employees from the specific hazards, which they are likely to encounter during their work on-site.

Selection of the appropriate PPE is a complex process, which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards; their routes of potential hazard to employees (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials (and seams) in providing a barrier to these hazards. **The amount of protection provided by PPE is material-hazard specific.** That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found which will provide continuous protection from the particular hazardous substance. In these cases, the breakthrough time of the protective material should exceed the work durations.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases, layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits, or equipment.

The more that is known about the hazards at the site, the easier the job of PPE selection becomes. As more information about the hazards and conditions at the site becomes available, the site supervisor can make decisions to up-grade or downgrade the level of PPE protection to match the tasks at hand.

**The following are guidelines, which an employer can use to begin the selection of the appropriate PPE.** As noted above, the site information may suggest the use of combinations of PPE selected from the different protection levels (i.e., A, B, C, or D) as being more suitable to the hazards of the work. It should be cautioned that the listing below does not fully address the performance of the specific PPE material in relation to the specific hazards at the job site, and that PPE selection, evaluation and re-selection is an ongoing process until sufficient information about the hazards and PPE performance is obtained.

**Part A. Personal protective equipment is divided into four categories based on the degree of protection afforded.** (See Part B of this appendix for further explanation of Levels A, B, C, and D hazards.)

### **I. Level A - To be selected when the greatest level of skin, respiratory, and eye protection is required.**

The following constitute Level A equipment; it may be used as appropriate;

1. Positive pressure, full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA, approved by the National Institute for Occupational Safety and Health (NIOSH).
2. Totally-encapsulating chemical-protective suit.
3. Coveralls
4. Long underwear.
5. Gloves, outer, chemical-resistant.
6. Gloves, inner, chemical-resistant.
7. Boots, chemical-resistant, steel toe, and shank.
8. Hard hat (under suit)

9. Disposable protective suit, gloves, and boots (depending on suit construction, may be worn over totally-encapsulating suit).

**II. Level B - The highest level of respiratory protection is necessary but a lesser level of skin protection is needed.**

The following constitute Level B equipment; it may be used as appropriate.

1. Positive pressure, full-face piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved).
2. Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Coveralls
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.
6. Boots, outer, chemical-resistant steel toe and shank.
7. Boot-covers, outer, chemical-resistant (disposable)
8. Hard hat
9. [Reserved]
10. Face shield

**III. Level C - The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air-purifying respirators are met.**

The following constitute Level C equipment; it may be used as appropriate.

1. Full-face or half-mask, air-purifying respirators (NIOSH approved).
2. Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Coveralls
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.
6. Boots (outer), chemical-resistant steel toe and shank
7. Boot-covers, outer, chemical-resistant (disposable)
8. Hard hat.
9. Escape mask
10. Face shield

**IV. Level D - A work uniform affording minimal protection: used for nuisance contamination only.**

The following constitute Level D equipment; it may be used as appropriate:

1. Coveralls.
2. Gloves
3. Boots/shoes, chemical-resistant steel toe and shank.
4. Boots, outer, chemical-resistant (disposable)
5. Safety glasses or chemical splash goggles
6. Hard hat
7. Escape mask
8. Face shield

**Part B. The types of hazards for which levels A, B, C, and D protection are appropriate are described below:**

**I. Level A - Level A protection should be used when:**

1. The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; or the site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the skin,
2. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or
3. Operations must be conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.

**II. Level B protection should be used when:**

1. The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection.
2. The atmosphere contains less than 19.5 percent oxygen; or
3. The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

Note: This involves atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard; or that do not meet the criteria for use of air-purifying respirators.

**III. Level C - Level C protection should be used when:**

1. The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;
2. The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and
3. All criteria for the use of air-purifying respirators are met.

**IV. Level D - Level D protection should be used when:**

1. The atmosphere contains no known hazard; and
2. Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

**Note: As stated before, combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.**

Source: [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=standards&p\\_id=9767](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=9767)

## Protecting Employees from Workplace Hazards

- OSHA regulations require employers to protect their employees from workplace hazards such as machines, work procedures, and hazardous substances that can cause injury
- Employers must institute all feasible engineering and work practice controls to eliminate and reduce hazards before using PPE to protect against hazards

### Eye and Face Protection

#### Criteria

- Protect against specific hazard(s) encountered by employees
- Comfortable to wear
- Must not restrict vision or movement
- Durable and easy to clean and disinfect
- Must not interfere with the function of any other required PPE
- Meet requirements of ANSI Z87.1-1989 for devices purchased after July 5, 1994, and ANSI Z87.1-1968 for devices purchased before that date

#### Eye Protection for Employees Who Wear Eyeglasses

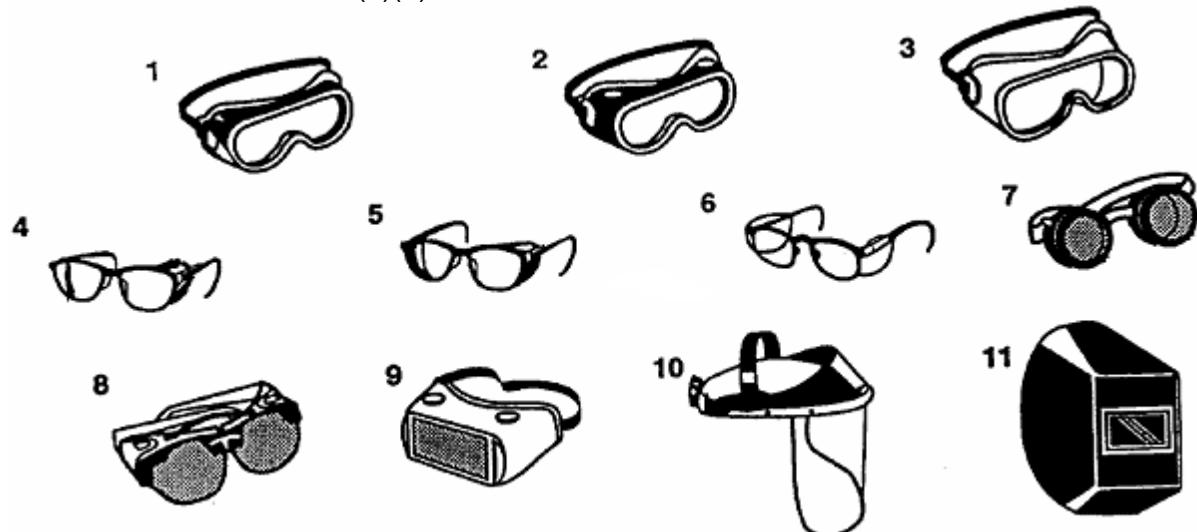
- Prescription spectacles, with side shields and protective lenses meeting requirements of ANSI Z87.1
- Goggles that can fit comfortably over corrective eyeglasses without disturbing their alignment
- Goggles that incorporate corrective lenses mounted behind protective lenses

#### Face Shields

- Do not protect employees from impact hazards
- Use face shields in combination with goggles or safety spectacles when you must protect your employees from impact hazards, even in the absence of dust or potential splashes

**Figure 1. Recommended Eye and Face Protectors**

Source: 29 CFR 1926.102 (a)(5) Table E-1



**Eye and face protectors are identified below by number and type. Refer to Table 1 for recommended usage applications.**

1. GOGGLES, Flexible Fitting, Regular Ventilation
2. GOGGLES, Flexible Fitting, Hooded Ventilation
3. GOGGLES, Cushioned Fitting, Rigid Body
4. SPECTACLES, Metal Frame, With Sideshields\*
5. SPECTACLES, Plastic Frame, With Sideshields\*
6. SPECTACLES, Metal-Plastic Frame, With Flat-Fold Side shields\*
7. WELDING GOGGLES, Eyecup type, Tinted Lenses\*\*
- 7A. CHIPPING GOGGLES, Eyecup Type, Clear Safety Lenses (not illustrated)
8. WELDING GOGGLES, Eyecup type, Tinted Plate Lens\*\*
- 8A. CHIPPING GOGGLES, Coverspec Type, Clear Safety Lenses (not illustrated)
9. WELDING GOGGLES, Coverspec Type, Tinted Plate Lens\*\*
10. FACE SHIELD (Available With Plastic or Mesh Window, Tinted/Transparent)
11. WELDING HELMETS\*\*

\*These are also available without side shields for limited use requiring only frontal protection.

\*\* See Table 2, Filter Lens Shade Numbers for Protection Against Radiant Energy.

**Table 1. Eye and Face Protector Selection Guide**

Source: 29 CFR 1926.102(a)(5)

Operation	Hazards	Recommended protectors: (see Figure 1)
Acetylene-burning, Acetylene-cutting, Acetylenewelding	Sparks, harmful rays, molten metal, flying particles	7,8,9
Chemical handling	Splash, acid burns, fumes	2,10 (for severe exposure add 10 over 2)
Chipping	Flying particles	1,3,4,5,6,7A, 8A
Electric (arc) welding	Sparks, intense rays, molten metal	9,11 (11 in combination with 4,5,6 in tinted lenses advisable)
Furnace operations	Glare, heat, molten metal	7,8,9 (for severe exposure add 10)
Grinding - light	Flying particles	1,3,4,5,6,10
Grinding - heavy	Flying particles	1,3,7A, 8A (for severe exposure add 10)
Laboratory	Chemical splash, glass	2 (10 when in breakage combination with 4,5,6)
Machining	Flying particles	1,3,4,5,6,10
Molten metals	Heat, glare, sparks, splash	7,8 (10 in combination with 4,5,6 in tinted lenses)
Spot welding	Flying particles, sparks	1,3,4,5,6,10

## Classes of Hard Hats

### Class A

- Used for general service (e.g., mining, building construction, shipbuilding, lumbering, manufacturing)
- Provide good impact protection but limited voltage protection

### Class B

- Used for electrical work
- Protect against falling objects and high-voltage shock and burns

### Class C

- Designed for comfort, offer limited protection
- Protect heads that might bump against fixed objects, but do not protect against falling objects or electrical shock

## Foot and Leg Protection



**Some of the potential hazards that would require foot and leg protection include:**

- Heavy objects such as barrels or tools that might roll onto or fall on employees' feet
- Sharp objects such as nails or spikes that might pierce the soles or uppers of ordinary shoes
- Molten metal that might splash on feet or legs
- Hot or wet surfaces
- Slippery surfaces

## **Foot Protection Requirements**

- Protective footwear purchased after July 5, 1994 must meet the requirements of ANSI Z41-1991
- Protective footwear purchased before that date must comply with ANSI Z41-1967

## **Foot and Leg Protection Choices**

- **Leggings.** Protect lower legs and feet from heat hazards, like molten metal or welding sparks. Safety snaps allow leggings to be removed quickly.
- **Metatarsal Guards.** Strapped to outside of shoes to protect instep area from impact and compression. Made of aluminum, steel, fiber or plastic.
- **Toe Guards.** Fit over the toes of regular shoes to protect only the toes from impact and compression. Made of steel, aluminum, or plastic.

- **Combination Foot and Shin Guards.** May be used in combination with toe guards when greater protection is needed.
- **Safety Shoes.** These have impact-resistant toes and heat-resistant soles that protect against hot work surfaces common in roofing, paving, and hot metal industries.
  - May have metal insoles to protect against puncture wounds
  - May be designed to be electrically conductive for use in explosive atmospheres
  - May be designed to be electrically nonconductive to protect from workplace electrical hazards

## **Hand and Arm Protection**

- When engineering and work practice controls fail to eliminate the risk of injury to your employees' hands or arms, protective gloves are the primary means of protecting their hands
- When the risk of injury includes the arm, protective sleeves, often attached to the gloves, may be appropriate
- Nature of the hazard(s) and the operation to be performed will determine your selection of gloves

## **Types of Gloves**

- Durable work gloves made of metal mesh, leather or canvas
- Fabric and coated fabric gloves
- Chemical and liquid resistant gloves
- Insulating rubber gloves\*

Asbestos gloves and asbestos linings **are prohibited**.

\* Detailed requirements for selection and use of insulating rubber gloves for use against electrical hazards are provided in 29 CFR 1910.137, and are therefore not included in this discussion.

## **Metal Mesh, Leather, or Canvas Gloves**

Sturdy gloves made from metal mesh, leather, or canvas provide protection from cuts, burns, and sustained heat.

- **Leather Gloves**
  - Protect against sparks, moderate heat, blows, chips, and rough objects
  - Welders in particular need the durability of higher-quality leather gloves
- **Aluminized Gloves**
  - Provide reflective and insulating protection against heat
  - Usually used for welding, furnace, and foundry work
  - Require an insert made of synthetic materials that protect against heat and cold
  - Asbestos inserts are prohibited
- **Aramid Fiber Gloves**
  - Aramid is a synthetic material that protects against heat and cold
  - Many glove manufacturers use aramid fiber to make gloves that are cut- and abrasive-resistant and wear well
- **Other Synthetic Materials**
  - Several manufacturers make gloves with other synthetic fabrics that offer protection against heat and cold
  - Cut- and abrasive-resistant and may withstand some diluted acids
  - Do not stand up well against alkalis and solvents

## Fabric and Coated Fabric Gloves

- Gloves made of cotton or other fabric protect against dirt, slivers, chafing, and abrasion but do not provide sufficient protection to be used with rough, sharp or heavy materials
- Cotton flannel gloves coated with plastic transform fabric gloves into general-purpose hand protection offering slip-resistant qualities
- Coated fabric gloves are used for tasks ranging from handling bricks and wire rope to handling chemical containers in laboratory operations
- For protection against chemical exposure hazards, always check with the manufacturer to determine the gloves' effectiveness against the specific chemicals and conditions in the workplace

## Chemical and Liquid-Resistant Gloves

- Gloves made of rubber (latex, nitrile, or butyl), plastic, or synthetic rubber-like material such as neoprene protect workers from burns, irritation, and dermatitis caused by contact with oils, greases, solvents, and other chemicals
- Use of rubber gloves also reduces the risk of exposure to blood and other potentially infectious substances

## Common Gloves Used for Chemical Protection

- **Butyl Rubber Gloves**
  - Protect against nitric acid, sulfuric acid, hydrofluoric acid, red fuming nitric acid, rocket fuels, and peroxide
  - Resist oxidation and ozone corrosion.
  - Resist abrasion and remain flexible at low temperatures.
- **Natural Latex or Rubber Gloves**
  - Comfortable wear and pliability along with their protective qualities make them a popular general purpose glove
  - Resist abrasions caused by sandblasting, grinding, and polishing and protect workers' hands from most water solutions of acids, alkalis, salts, and ketones
  - Hypoallergenic gloves, glove liners, and powerless gloves possible alternatives for those allergic to latex
- **Neoprene Gloves**
  - Good pliability, finger dexterity, high density, and tear resistance
  - Provide protection from hydraulic fluids, gasoline, alcohols, organic acids, and alkalis
- **Nitrile Rubber Gloves**
  - Provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene
  - Intended for jobs requiring dexterity and sensitivity, yet stand up to heavy use even after prolonged exposure that cause other gloves to deteriorate
  - Resist abrasion, puncturing, snagging, and tearing

## Body Protection

Workplace hazards that could injure your employees' bodies include the following:

- Intense heat
- Splashes of hot metals and other hot liquids
- Impacts from tools, machinery, and materials

- Cuts
- Hazardous chemicals
- Contact with potentially infectious materials, like blood
- Radiation

### **Types of Body Protection**

- Vests
- Jackets
- Aprons
- Coveralls
- Surgical gowns
- Full body suits

### **Materials for Protective Clothing**

- **Paper-Like Fiber.** Disposable suits made of this material provide protection against dust and splashes.
- **Treated Wool and Cotton.** Adapts well to changing workplace temperatures. Comfortable and fire resistant. Protects against dust, abrasions, and rough and irritating surfaces.
- **Duck.** Protects employees against cuts and bruises while they handle heavy, sharp, or rough materials.
- **Leather.** Often used against dry heat and flame.
- **Rubber, Rubberized Fabrics, Neoprene, and Plastics.** Provides protection against certain acids and other chemicals.

### **Hearing Protection**

- Noise exposure depends on:
  - Level of sound, measured in decibels on the A-scale (dBA)
  - Duration of employee's exposure to sound of various levels throughout the work day
- Measured with noise dosimeter, which indicates daily noise dose in percent

### **When is Hearing Protection Required?**

- As with other types of hazards, you must implement feasible engineering and work practice controls before resorting to PPE, in this case hearing protection
- OSHA's noise standard (29 CFR 1910.95) requires the use of hearing protection when the employee's noise exposure exceeds an 8-hour time-weighted average sound level (TWA) of 90 dBA (dose of 100 percent)
- Employees who are exposed to an 8-hour TWA of 85 dBA (dose of 50 percent) and who have measured hearing loss (as prescribed by the OSHA standard) are also required to wear hearing protection

### **Hearing Conservation Program (HCP)**

- All employees whose noise exposures equal or exceed an 8-hour TWA of 85 dBA must be included in a HCP
- HCP is comprised of five basic elements:
  - Exposure monitoring
  - Audiometric testing
  - Hearing protection
  - Employee training
  - Recordkeeping

## **Monitoring**

- Required to identify employees who are subjected to noise exposures of 85 dBA or more
- Must be repeated whenever change in production, process, equipment or controls increases noise exposures to extent that:
  - Additional employees may be over-exposed, or
  - Hearing protectors being used may be rendered inadequate

## **Audiometric Testing Program**

- Monitors employee hearing acuity over time
- Includes baseline and annual audiograms and initiates training and follow-up procedures
- Tests must be conducted by a professional or trained technician in an appropriate test environment

## **Hearing Protection**

- Must be made available to all employees exposed to an 8-hour TWA of 85 dBA or more
- Mandatory for those who have experienced hearing loss, defined as a “Standard Threshold Shift” in the OSHA standard
- Common types include ear plugs and earmuffs
- Hearing protector’s attenuation capacity shown by its Noise Reduction Rating (NRR) on package
- Proper fit very important

## **Training**

Annual training required in:

- Effects of noise
- Purpose, advantages, disadvantages, and attenuation characteristics of various types of hearing protectors
- Selection, fitting and care of protectors
- Purposes and procedures of audiometric testing

## **Recordkeeping**

- Noise exposure records must be kept for 2 years
- Records of audiometric test results must be maintained for duration of affected employee’s employment

## **Summary**

- OSHA requires that you implement a PPE program to help you systematically assess the hazards in the workplace and select the appropriate PPE that will protect workers from those hazards
- As part of this PPE program, you must do the following:
  - Assess the workplace for hazards
  - Implement engineering controls and work practices to control or eliminate these hazards to the extent feasible
  - Select appropriate PPE to protect employees from hazards that cannot be eliminated or controlled through engineering controls and work practices
  - Inform your employees why the PPE is necessary and when it must be worn
  - Train your employees how to use and care for the selected PPE and how to recognize PPE deterioration and failure
  - Require your employees to wear the selected PPE in the workplace

Source: [https://www.osha.gov/dte/library/ppe\\_assessment/ppe\\_assessment.html](https://www.osha.gov/dte/library/ppe_assessment/ppe_assessment.html) (Emphasis added)

## Appendix 14: Building your customized SIPP

Your customized Safety & Injury Prevention Plan (SIPP) provides a written safety and health plan. Put some time and thought into the following plan to ensure a safe workplace environment.

# Safety & Injury Prevention Plan

Your Written Safety  
& Health Program

(Enter your Company Name here)

**PLEASE CUSTOMIZE THIS SAFETY AND HEALTH PROGRAM ACCORDING TO YOUR WORKPLACE. REMEMBER, YOUR WRITTEN SAFETY AND HEALTH PROGRAM CAN ONLY BE EFFECTIVE IF IT IS PUT INTO PRACTICE!**

**Tailor your own Safety & Health Program plan to your actual business operations and potential hazards that your employees might encounter.**

**Your Program must be implemented in order to be effective. It also must be updated as changes occur in your business (new equipment, new processes, etc.).**

# Safety & Health Program

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(Customize by adding your company name here)

## Management Commitment

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### Safety Policy

**(Customize by adding your company name here)** places a high value on the safety of its employees. **(Customize by adding your company name here)** is committed to providing a safe workplace for all employees and has developed this program for injury prevention to involve management, supervisors, and employees in identifying and eliminating hazards that may develop during our work process.

It is the basic safety policy of this company that no task is so important that an employee must violate a safety rule or take a risk of injury or illness in order to get the job done.

Employees are required to comply with all company safety rules and are encouraged to actively participate in identifying ways to make our company a safer place to work.

Supervisors are responsible for the safety of their employees and as a part of their daily duties must check the workplace for unsafe conditions, watch employees for unsafe actions and take prompt action to eliminate any hazards.

Management will do its part by devoting the resources necessary to form a safety committee composed of management and elected employees. We will develop a system for identifying and correcting hazards. We will plan for foreseeable emergencies. We will provide initial and ongoing training for employees and supervisors. And, we will establish a disciplinary policy to ensure that company safety policies are followed.

**Safety is a team effort – Let us all work together to keep this a safe and healthy workplace.**

**(Customize by adding any additional policy items that you may have and/or deleting any that do not apply to your company.)**

# Safety and Health Responsibilities

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## Manager Responsibilities

1. Ensure that a plant/store wide safety committee is formed and is carrying out its responsibilities as described in this program.
2. Ensure that sufficient employee time, supervisor support, and funds are budgeted for safety equipment, training and to carry out the safety program.
3. Evaluate supervisors each year to make sure they are carrying out their responsibilities as described in this program.
4. Ensure that incidents are fully investigated and corrective action taken to prevent the hazardous conditions or behaviors from happening again.
5. Ensure that a record of injuries and illnesses is maintained and posted as described in this program.
6. Set a good example by following established safety rules and attending required training.
7. Report unsafe practices or conditions to the supervisor of the area where the hazard was observed.

**(Customize by adding any additional management responsibilities that you may have and/or deleting any that do not apply to your company.)**

## Supervisor Responsibilities

1. Ensure that each employee you supervise has received an initial orientation before beginning work.
2. Ensure that each employee you supervise is competent or receives training on safe operation of equipment or tasks before starting work on that equipment or project.
3. Ensure that each employee receives required personal protective equipment (PPE) before starting work on a project requiring PPE.
4. Do a daily walk-around safety-check of the work area. Promptly correct any hazards you find.
5. Observe the employees you supervise working. Promptly correct any unsafe behavior. Provide training and take corrective action as necessary. Document employee evaluations.
6. Set a good example for employees by following safety rules and attending required training.
7. Investigate all incidents in your area and report your findings to management.
8. Talk to management about changes to work practices or equipment that will improve employee safety.

**(Customize by adding any additional supervisor responsibilities that you may have and/or deleting any that do not apply to your company.)**

## Employee Responsibilities

1. Follow safety rules described in this program, OSHA safety standards and training you receive.
2. Report unsafe conditions or actions to your supervisor or safety committee representative promptly.
3. Report all injuries to your supervisor promptly regardless of how serious.
4. Report all near-miss incidents to your supervisor promptly.
5. Always use personal protective equipment (PPE) in good working condition where it is required.
6. Do not remove or defeat any safety device or safeguard provided for employee protection.
7. Encourage co-workers by your words and example to use safe work practices on the job.
8. Make suggestions to your supervisor, safety committee representative or management about changes you believe will improve employee safety.

**(Customize by adding any additional employee responsibilities that you may have and/or deleting any that do not apply to your company.)**

## **Employee Participation**

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### Safety Committee

We have formed a safety committee to help employees and management work together to identify safety problems, develop solutions, review incident reports and evaluate the effectiveness of our safety program. The committee is made up of management-designated representatives and one employee-elected representative each from the office, factory and outside sales divisions of our company.

- Employees in each division will elect from among themselves a representative to be on the committee. If there is only one volunteer or nomination, the employees will approve the person by voice vote at a short meeting called for that purpose. If there is more than one volunteer or nomination, a secret paper ballot will be used to elect the representative.
- Elected representatives will serve for one year before being re-elected or replaced. If there is a vacancy then an election will be held before the next scheduled meeting to fill the balance of the term.
- In addition to the employee-elected representatives, management will designate no more than three representatives but a minimum of one who will serve until replaced by management.
- A chairperson will be selected by majority vote of the committee members each year. If there is a vacancy, the same method will be used to select a replacement.

- In addition to the committee responsibilities explained above, duties of safety committee members include:
  - A monthly self-inspection of the area they represent
  - Communicating with the employees they represent on safety issues and
  - Encouraging safe work practices among co-workers.
- The regularly scheduled meeting time is 7:30 am for one hour on the first Thursday of each month, at the employee lunchroom. This may be changed by vote of the committee.
- A committee member will be designated each month to keep minutes on the attached minutes form. A copy will be posted on the employee bulletin board after each meeting. After being posted for one month, the minutes will be filed for one year. The minutes' form contains the basic monthly meeting agenda.

**(Customize by adding any additional safety committee information that you may have and/or deleting any that do not apply to your company.)**

## Employee Safety Meetings

All employees are required to attend a monthly safety meeting held on the first Thursday of each month in the lunchroom. This meeting is to help identify safety problems, develop solutions, review incidents reports, provide training and evaluate the effectiveness of our safety program. Minutes will be kept on the attached minutes form. Meeting minutes will be kept on file for one year.

**(Customize by adding any additional Employee Safety Meeting information that you may have and/or deleting any that do not apply to your company.)**

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## Hazard Recognition

### Record Keeping and Review

Employees are required to report any injury or work-related illness to their immediate supervisor regardless of how serious. Minor injuries such as cuts and scrapes can be entered on the first aid only log posted **(Customize by adding location of First Aid Only Log)**. The employee must use an "Employee's Injury/Illness Report Form" to report more serious injuries.

#### **The supervisor will:**

- Investigate a serious injury or illness using procedures in the "Incident Investigation" section below.
- Complete an "Incident Investigation Report" form.

- Give the “Employee’s Report” and the “Incident Investigation Report” to (Add the name or title of the person to whom this information will be given.).

**(Add the name or title of the responsible person) will:**

- Determine from the Employee’s Report, Incident Investigation Report, and any workers’ compensation claim form associated with the incident, whether it must be recorded on the OSHA Injury and Illness Log and Summary according to the instructions for that form.
- Enter a recordable incident within six days after the company becomes aware of it.
- If the injury is not recorded on the OSHA log, add it to a separate incident report log, which is used to record non-OSHA recordable injuries and near misses.
- Each month before the scheduled safety committee meeting, make any new injury reports and investigations available to the safety committee for review, along with an updated OSHA and incident report log.

The safety committee will review the log for trends and may decide to conduct a separate investigation of any incident.

**(Add the name or title of the responsible person)** will post a signed copy of the OSHA log summary for the previous year on the safety bulletin board each February 1 until April 30. The log will be kept on file for at least 5 years. Any employee can view an OSHA log upon request at any time during the year.

**(Customize by adding any additional Hazard Recognition policies that you may have and/or deleting any that do not apply to your company.)**

## Incident Investigation Procedure

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If an employee dies while working or is not expected to survive, when three (3) or more employees are admitted to a hospital as a result of a work-related incident or there is property damage that is estimated to be in excess of \$25,000, **(Customize by adding the name or title of person responsible for reporting to OSHA)** will contact their State or Federal Occupational Safety and Health Area Office within 8 hours after becoming aware of the incident. **(Add the name or title of the responsible person)** must talk with a representative of the department. During evenings and weekends, a message can be left on the answering machine. **(Add the name or title of the responsible person)** must report: the employer name, location and time of the incident, number of employees involved, the extent of injuries or illness, a brief description of what happened and the name and phone number of a contact person.

**DO NOT DISTURB the scene except to aid in rescue or make the scene safe.**

Whenever there is an incident that results in death or serious injuries that have immediate symptoms, a preliminary investigation will be conducted by the immediate supervisor of the injured worker(s), a person designated by management, an employee representative of the safety committee, and any other persons whose expertise would help the investigation.

The investigation team will take written statements from witnesses; photograph the incident scene and equipment involved. The team will also document as soon as possible after the incident, the condition of equipment and any anything else in the work area that may be relevant. The team will make a written "Incident Investigation Report" of its findings. The report will include a sequence of events leading up to the incident, conclusions about the incident and any recommendations to prevent a similar incident in the future. The report will be reviewed by the safety committee at its next regularly scheduled meeting.

When a supervisor becomes aware of an employee injury where the injury was not serious enough to warrant a team investigation as described above, the supervisor will write an "Incident Investigation Report" to accompany the "Employee's Injury/Illness Report Form" and forward them to **(Add the name or title of the responsible person)**.

Whenever there is an incident that did not but could have resulted in serious injury to an employee (a near-miss), the incident will be investigated by the supervisor or a team depending on the seriousness of the injury that would have occurred. The "Incident Investigation Report" form will be used to investigate the near-miss. The form will be clearly marked to indicate that it was a near miss and that no actual injury occurred. The report will be forwarded to the bookkeeper to record on the incident log.

An "Incident Investigation Checklist" form can be found in the Safety and Health Program Guide to help the supervisor carry out his/her responsibilities as described above.

**(Customize by adding any additional Incident Investigation policies that you may have and/or deleting any that do not apply to your company.)**

## Safety Inspection Procedures

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**(Customize by adding your company name here)** is committed to aggressively identifying hazardous conditions and practices, which are likely to result in injury or illness to employees. We will take prompt action to eliminate any hazards we find. In addition to reviewing injury records and investigating incidents for their causes, management and the safety committee will regularly check the workplace for hazards as described below:

*Annual Site Survey* -- Once a year an inspection team made up of members of the safety committee will do a wall-to-wall walk through inspection of the entire worksite. They will write down any safety hazards or potential hazards they find. The results of this inspection will be used to eliminate or control obvious hazards, target specific work areas for more intensive

investigation, assist in revising the checklists used during regular monthly safety inspections and as part of the annual review of the effectiveness of our Safety and Health Program.

*Periodic Change Survey* -- We will assign a supervisor or form a team to look at any changes we make to identify safety issues. Changes include new equipment, changes to production processes or a change to the building structure. A team is made up of maintenance, production, and safety committee representatives. It examines the changed conditions and makes recommendations to eliminate or control any hazards that were or may be created as a result of the change.

*Monthly Safety Inspection* -- Each month, before the regularly scheduled safety committee meeting, safety committee representatives will inspect their areas for hazards using the standard safety inspection checklist. They will talk to co-workers about their safety concerns. Committee members will report any hazards or concerns to the whole committee for consideration. The results of the area inspection and any action taken will be posted in the affected area. Occasionally, committee representatives may agree to inspect each other's area rather than their own. This brings a fresh pair of eyes to look for hazards.

*Job Hazard Analysis* -- As a part of our on-going safety program, we will use a "Job Hazard Analysis" form to look at each type of job task our employees do. The supervisor of that job's task or a member of the safety committee will do this analysis. We will change how the job is done as needed to eliminate or control any hazards. We will also check to see if the employee needs to use personal protective equipment (PPE) while doing the job. Employees will be trained in the revised operation and to use any required PPE. The results will be reported to the safety committee. Each job task will be analyzed at least once every two years, whenever there is a change in how the task is done or if there is a serious injury while doing the task.

**(Customize by adding any additional safety self-inspection policies that you may have and/or deleting any that do not apply to your company.)**

## Hazard Prevention and Control

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### Eliminating Workplace Hazards

**(Customize by adding your company name here)** is committed to eliminating or controlling workplace hazards that could cause injury or illness to our employees. We will meet the requirements of state safety standards where there are specific rules about a hazard or potential hazard in our workplace. Whenever possible we will design our facilities and equipment to eliminate employee exposure to hazards. Where these engineering controls are not possible, we will write work rules that effectively prevent employee exposure to the hazard. When the above methods of control are not possible or are not fully effective we will require employees to use personal protective equipment (PPE) such as safety glasses, hearing protection, foot protection etc.

### Basic Safety Rules

The following basic safety rules have been established to help make our company a safe and efficient place to work. These rules are in addition to safety rules that must be followed when doing particular jobs or operating certain equipment. Those rules are listed elsewhere in this program. Failure to comply with these rules will result in disciplinary action.

- Never do anything that is unsafe in order to get the job done. If a job is unsafe, report it to your supervisor or safety committee representative. We will find a safer way to do that job.
- Do not remove or disable any safety device! Keep guards in place at all times on operating machinery.
- Never operate a piece of equipment unless you have been trained and are authorized.
- Use your personal protective equipment whenever it is required.
- Obey all safety-warning signs.
- Working under the influence of alcohol or illegal drugs or using them at work is prohibited.
- Do not bring firearms or explosives onto company property.
- Smoking is only permitted outside the building away from any entry or ventilation intake.
- Horseplay, running and fighting are prohibited
- Clean up spills immediately. Replace all tools and supplies after use. Do not allow scraps to accumulate where they will become a hazard. Good housekeeping helps prevent injuries.

**(Customize by adding any additional safety policies that you may have and/or deleting any that do not apply to your company.)**

## Job Related Safety Rules

We have established safety rules and personal protective equipment (PPE) requirements based upon a hazard assessment for each task listed below:

**Work in or pass through any production area, for example the Machine shop or Paint shop**

Required PPE:

- Safety glasses. Check prior to use for broken or missing components (such as side shields) and for scratched lenses. Safety glasses must have a "Z87.1" marking on the frame. If they are prescription glasses, the initials of the lens manufacturer must be stamped into the corner of the lens to show that they are safety glass lenses.

Work Rules:

- Walk within marked aisles.
- Do not distract or talk with employees when they are using a machine.

The following rules are included as an example only. You must customize this program by adding any additional job-specific safety rules that you may have and/or deleting any that do not apply to your company. Be sure to include the, location, and required PPE.

### **Work with Bench Grinders: Machine shop**

#### Required PPE:

Eye protection (full-face shield with safety glasses under the shield).

#### Work Rules:

- Check that there is a gap between the tool rest and the wheel of no more than 1/8".
- Check that the upper wheel (tongue) guard has a gap of no more than 1/4".
- Check that the wheel edge is not excessively grooved. Dress the wheel if necessary.
- Do not grind on the face of the wheel.

**Work with Ladders:** All locationsRequired PPE:

- Full body harness when working at greater than 25' and both hands must be used to do the job. See the fall protection plan instructions described elsewhere in this program.

Work Rules:

- Before you use a ladder check it for defects such as loose joints, grease on steps, or missing rubber feet.
- Do not paint a ladder! You may hide a defect.
- Do not use a ladder as a brace, workbench or for any other purpose than climbing.
- Do not carry objects up or down a ladder if it will prevent you from using both hands to climb.
- Always face the ladder when climbing up or down.
- If you must place a ladder at a doorway, barricade the door to prevent its use and post a sign.
- Only one person is allowed on a ladder at a time.
- Always keep both feet on the ladder rungs except while climbing. Do not step sideways from an unsecured ladder onto another object.
- If you use a ladder to get to a roof or platform, the ladder must extend at least 3' above the landing and be secured at the top and bottom.
- Do not lean a stepladder against a wall and use it as a single ladder. Always unfold the ladder and lock the spreaders.
- Do not stand on the top step of a stepladder.
- Set a single or extension ladder with the base 1/4 of the working ladder length away from the support.

**Lifting Tasks:** All locations

**Required PPE:**

- Leather gloves – for sharp objects or surfaces
- Steel toe safety shoes in production and shipping areas (to be supplied by the employee) must be in good condition and be marked "ANSI Z41 C - 75"

**Work Rules:**

- Do not lift on slippery surfaces.
- Test the load before doing the lift.
- Get help if the load is too heavy or awkward to lift alone.
- Break the load down into smaller components if possible to provide a comfortable lift.
- Do not overexert!
- Make sure you have a good handhold on the load.
- Do not jerk the load or speed up. Lift the load in a smooth and controlled manner.
- Do not twist while lifting (especially with a heavy load). Turn and take a step.
- Keep the load close to the body. Walk as close as possible to the load. Pull the load towards you before lifting if necessary.
- Avoid long forward reaches to lift over an obstruction.
- Avoid bending your back backwards to loft or place items above your shoulder. Use a step stool or platform
- Do not lift while in an awkward position.
- *Use a mechanical device such as a forklift, hoist, hand truck or elevatable table whenever possible to do the lift or to bring the load up between the knees and waist before you lift.*
- Back injury claims are painful for the worker and expensive for the company. Lift safely!
- The signatures below document that the employee received training on how to lift safely.

Employee: \_\_\_\_\_ Training Date: \_\_\_\_\_

Trainer: \_\_\_\_\_

## **Disciplinary Policy**

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Employees are expected to use good judgment when doing their work and to follow established safety rules. We have established a disciplinary policy to provide appropriate consequences for failure to follow safety rules. This policy is designed not so much to punish as to bring unacceptable behavior to the employee's attention in a way that the employee will be motivated to make corrections. The following consequences apply to the violation of the same rule or the same unacceptable behavior:

*First Instance* -- Verbal warning, notation in employee file, and instruction on proper actions

*Second Instance* -- 1-day suspension, written reprimand, and instruction on proper actions

*Third Instance* -- 1-week suspension, written reprimand, and instruction on proper actions

*Fourth Instance* -- Termination of employment.

An employee may be subject to immediate termination when a safety violation places the employee or co-workers at risk of permanent disability or death.

**(The above rules are included as an example only. You must customize this program by adding any disciplinary rules that you may have and/or deleting any that do not apply to your company.)**

## **Equipment Maintenance**

---

The following departments have machinery and equipment that must be inspected or serviced on a routine basis. A checklist/record to document the maintenance items will be maintained and kept on file for the life of the equipment.

## **Machine shop**

<u>Equipment</u>	<u>Interval</u>	<u>Location of record</u>
Ederer 20-ton Crane	Monthly	Maintenance file cabinet
Omaha press brake	Weekly	Folder attached to the press

## **Vehicles**

<u>Equipment</u>	<u>Interval</u>	<u>Location of record</u>
1986 Toyota Forklift A68710*	Daily	File cabinet in the garage
1992 Ford Taurus LST385	Monthly	Vehicle glove box

\*Forklifts are required to be examined daily prior to being placed into service or after each shift if used on a round-the-clock basis.

**(The above rules are included as an example only. You must customize this section by adding any equipment maintenance rules that you may have and/or deleting any that do not apply to your company. Be sure to include the equipment, location, and required PPE.)**

## **Emergency Planning**

---

### Emergencies

What will we do in an emergency?

#### **In case of fire**

An evacuation map for the building is posted **(Customize by adding location, if this applies to your company)**. It shows the location of exits, fire extinguishers, first aid kits, and where to assemble outside **(Customize by adding meeting location for your location)**. A copy of the map is attached to this program.

All employees will receive training on how to use of fire extinguishers as part of their initial orientation. A fire evacuation drill will be conducted once a year during the first week of April.

**(Customize by adding fire drill and fire extinguisher training information as it pertains to your business.)**

- If you discover a fire:
- Tell another person immediately. Call or have them call 911 and a supervisor.
- If the fire is small (such as a wastebasket fire) and there is minimal smoke, you may try to put it out with a fire extinguisher.
- If the fire grows or there is thick smoke, do not continue to fight the fire.

Tell other employees in the area to evacuate.

- Go to the designated assembly point outside the building (i.e. north parking lot)
- If you are a supervisor notified of a fire in your area: Tell your employees to evacuate to the designated assembly location. Check that all employees have been evacuated from your area.
- Verify that 911 has been called.
- Determine if the fire has been extinguished. If the fire has grown or there is thick smoke, evacuate any employees trying to fight the fire.
- Tell supervisors in other areas to evacuate the building.
- Go to the designated assembly point and check that all your employees are accounted for. If an employee is missing, do not re-enter the building! Notify the responding fire personnel that an employee is missing and may be in the building.

**(Customize the above rules by adding procedures in case of fire as it pertains to your business.)**

**In case of a hurricane, tsunami or other events where Hawai'i civil defense will likely issue a warning.**

While severe weather will be continuously tracked, unless otherwise informed, all operations will continue as usual until we receive notification from Hawai'i civil defense. When the sirens are sounded, all supervisors will immediately report to the Main building conference room to receive further instructions on releasing employees from work. Prior to leaving, supervisors shall ensure that:

- The gas to the building is shut off. A wrench is available at the rear entrance to turn off the gas shut-off outside the building. All supervisors will be trained in the gas shut-off procedure.
- All electric power is turned off at the circuit breakers, to prevent equipment damage in the event of a power surge or other electrical fault. Only emergency lights will continue in operation.
- All personnel are cleared from the premises. Following shutdown and evacuation, no one may re-enter the premises until Civil Defense sounds the all-clear.

### **In case of earthquake**

Hawai'i has had earthquakes in the past. There will be no advance warning. The shock will be your only warning. Because there are power lines over the north parking lot, the south parking lot is the designated assembly location for earthquake evacuation. We have bolted tall narrow storage racks to the floors, walls or to each other to provide a wide base to help reduce the potential for collapse. A wrench is available at the rear entrance to turn off the gas shut-off outside the building. All supervisors will be trained in the gas shut off procedure. An earthquake drill will be conducted each year during the first week of September. In the event of an earthquake:

**(Customize by adding earthquake drill and evacuation information as it pertains to your business.)**

**If you are inside a building:**

- Drop under a desk or table, cover your head and hold on. Stay away from windows, heavy cabinets, bookcases or glass dividers.
- When the shaking stops, **(Customize by adding name or title of responsible person)** are to check for damage and available evacuation routes then begin an evacuation of their area to the designated assembly location. **(Customize by adding meeting location for your location)**
- Evacuation should proceed as quickly as possible since there may be aftershocks.
- Supervisors must account for each employee in their work group as quickly as possible.
- *First aid certified employees should check for injuries and help evacuate injured employees. Do not attempt to move seriously injured persons unless they are in immediate danger of further injury.*
- If a gas odor is in the building, tell a supervisor to turn off the gas at the main. Open windows.
- Supervisors and first aid employees must not re-enter the building once evacuation is complete.

- Do not approach or touch downed power lines or objects touched by downed power lines.
- Do not use the phone except for emergency use.
- Turn on a radio and listen for public safety instructions.

If you are outside: Stand away from buildings, trees, telephone and electric lines.

If you are on the road: Drive away from underpasses/overpasses. Stop in a safe area. Stay in the vehicle.

**(Customize by adding any additional rules and deleting any that do not apply to your business.)**

### **If an injury occurs**

- A first aid kit is kept **(Customize by adding the location of first aid supplies in your business)**. Also, each company vehicle is equipped with a first aid kit located in the glove box or under the driver's seat. Members of the safety committee check these kits monthly. An inventory of each kit is taped to the inside cover of the box. If you are injured, promptly report it to any supervisor. **(Customize by adding any additional locations of first aid supplies or deleting the above information if it does not apply to your business.)**
- All supervisors are required to have first aid cards. Other employees may have been certified. A list of current first aid and CPR certified supervisors and employees is posted on the safety bulletin board along with the expiration dates of their cards. **(Customize by adding the location of first aid trained personnel in your business)**
- In case of serious injury, do not move the injured person unless absolutely necessary. Only provide assistance to the level of your training. Call for help. If there is no response, call 911.

Aids/HIV and Hepatitis B are the primary infectious diseases of concern in blood. All blood should be assumed to be infectious. These diseases can both be deadly. Employees are not required to perform first aid as part of their job duties. In the event of a bleeding injury where first aid is needed, use gloves if possible to prevent exposure to blood or other potentially infectious materials. The injured person can often help by applying pressure to the wound. Gloves and a mouth barrier for rescue breathing are available in the first aid kits. If you are exposed to blood while giving first aid wash immediately with soap and water and report the incident to a supervisor. The appropriate follow-up procedures will be initiated, including medical evaluation, counseling, Hepatitis B vaccine and blood testing of the source person if possible. For further information, refer to HIOSH standard, §12-205.1 in Part 8 (Health Standards), Title 12 of the Hawai'i Administrative Rules.

# Safety and Health Training and Education

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## Safety Training

Training is an essential part of our plan to provide a safe work place at **(Customize by adding your company name here)**. To ensure that all employees are trained before they start a task that requires training, we have a training coordinator whose name is posted on the safety bulletin board.

**(Customize by inserting the name or title of the person responsible for training in your company.)** That person is responsible to verify that each employee has received an initial orientation by his or her supervisor, has received any training needed to do the job safely and that the employee file documents the training. The coordinator will make sure that an outline and materials list is available for each training course we provide:

<u>Course</u>	<u>Who must attend</u>
Basic Orientation	All employees (given by the employee's supervisor)
Safe Lifting	Any employee who lifts more than 20 pounds
Chemical Hazards (General)	All employees
Chemical Hazards (Specific)	An employee who uses or is exposed to a particular chemical
Fire extinguisher safety	All employees
Respirator Training	Employees who use a respirator
Forklift Training	Employees who operate a forklift
Lockout Training (Awareness)	All employees
Lockout Training (Advanced)	Employees who service equipment
Welding Safety	Employees who operate the arc welder

**(Customize by adding additional training required in your business and deleting any of the above training that does not apply.)**

## Safe Lifting Training Course Outline

### **Required Materials:**

- DVD Lifting and Carrying, HIOSH DVD60. Reserve at least two weeks in advance. Call (808) 586-9131
- Safe Lifting rules from Safety and Health Program

## **Outline: 1-hour class**

- Talk about injury statistics related to lifting and handling materials.
- Talk about some injuries that have occurred in our work place.
- Show DVD
- Answer questions from participants about DVD
- Go over safe lifting rules in the Safety and Health Program
  - Demonstrate techniques.
  - Discuss mechanical lifting aids such as hoists and carts that are available in our workplace.
- Have employees sign their names to the training roster.

**You are at the end of the Sample Safety and Health Program.**

**Be sure that you have added all of the required information to make it specific to your business operation. If you have any further information to add, please do so.**

## Notes

















# WELCOME TO...

## ***Health Hazards in Construction***

*Construction workers are exposed to a variety of health hazards every day. These men and women have the potential for becoming sick, ill and disabled for life.*

*Learn the health hazards on your job and know how to protect yourself...*

*Sadly, these health hazards (e.g., dangerous dust and other chemicals) can be unexpectedly brought home...*



*Learn how to protect your family!*

This publication contains:

1. The purpose for the Occupational Safety and Health Administration (OSHA) and its enforcement duty under law.
2. Common health hazards found in construction.
3. An explanation of Industrial Hygiene and toxicology.
4. Important terms and definitions used in health standards and toxicology.
5. Procedures for how to anticipate, recognize, evaluate and control health hazards in construction.
6. Hazard communication program for contractors & the Globally Harmonized System for Hazard Communication.
7. Respiratory protection program for contractors.
8. Hearing conservation program for contractors.

This program is dedicated to all the workers who have sustained a life threatening or disabling illness as a result of an occupational exposure.

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## OVERVIEW

**Employers have the responsibility to protect the safety and health of the worker. This course will help prepare an employer or its designated representative (job-site competent person) to understand and react to occupational health hazards in construction.**

Course participants will learn how to *anticipate, recognize, evaluate and control* occupational health hazards; these hazards include, but are not limited to: **chemical, physical, biological** hazards. Special consideration will be given to occupational **noise** exposure in construction.

In addition, the participant will learn how and when to make managerial decisions, such as how to implement a **job-site hazard communication program**, how to select appropriate **engineering & administrative controls** and how to properly implement a **personal protective equipment (PPE) program**. Also, participants will gain insight as to when to consult the expertise of an Industrial Hygienist and/or other qualified person.

The goal of this course (*Health Hazards in Construction*) is to enhance communication of health hazards between employers & employees, to prepare an individual to make competent decisions on matters of occupational health exposures in construction and to equip this person with the knowledge and skills necessary to perform frequent and regular inspections of the job-site. At the conclusion, each course participant will possess the confidence to recognize and avoid unsafe conditions and will be able to identify regulations applicable to health hazards in construction.

## INTENDED AUDIENCE

The target audience is the private sector construction employer, manager, employee or employee representative who, as part of a safety and health program, would either be acting to fulfill the requirements of a competent person (to conduct frequent and regular inspections of a job-site) or performing safety and health evaluations for their member employees and performing training as described in OSHA's construction safety & health standard 29 CFR 1926.



## RESPONSIBILITY TO SELF & FAMILY!

A worker's exposure to hazardous materials on the job can be unknowingly brought back to a person's home; heavy metals such as lead dust, concrete crusted clothing and variety of oils, greases and solvents can all be unintentionally poisoning your family!

As a worker who might be exposed to these hazards, you have a responsibility to wear personal protective equipment (PPE), practice good hygiene and take advantage of training programs like this. Learn of the hazards associated with your job and protect your family.



***Occupational health hazards can unexpectedly be brought home; wear personal protective equipment (PPE) on the job and do not bring home health hazards that can harm your family!***

# INDUSTRIAL HYGIENE

## ***Learning Goals:***

- Define industrial hygiene.
- Recognize industrial hygiene's relationship to OSHA.
- Identify and define job hazard analysis
- Be able to apply the classic industrial hygiene approach (*anticipate, recognize, evaluate & control*) to hazard abatement.

## ***Important Terms:***

- Industrial Hygiene**
  - *Anticipate (hazards)*
  - *Recognize (hazards)*
  - *Evaluate (hazards)*
  - *Control (hazards)*
- Toxicology**
- Job Hazard Analysis**
- Hazard Abatement**

## Industrial Hygiene

Industrial hygiene is the art and science of ***anticipating, recognizing, evaluating, and controlling*** workplace conditions that may cause workers' injury or illness. Industrial hygienists use personal and environmental monitoring and analytical methods to detect the extent of worker exposure and employ engineering, work practice controls, and other methods to control potential health hazards.

## ***The History of Industrial Hygiene***



4<sup>th</sup> Century B.C.



1<sup>st</sup> Century A.D.



1556 A.D.



1700 A.D.

Hippocrates -  
Noted lead toxicity in  
the mining industry.

Pliny the Elder -  
Devised a face mask  
made from an animal  
bladder.

Georgius Agricola -  
Publishes *De Re Metallica* -  
diseases associated with  
mining occupations.

Bernardo Ramazzini -  
“Father of Industrial  
Medicine” publishes *De  
Morbis Artificum Diatriba*  
(*The Diseases of Workmen*).

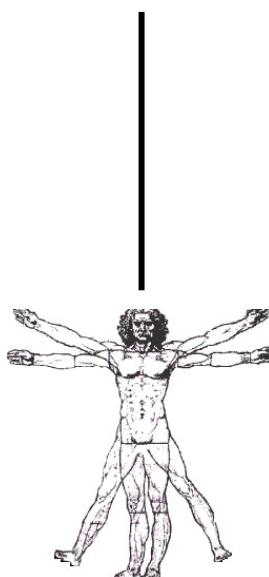
***There has been an awareness of industrial hygiene since the ancient times!***

# Health Hazards in Construction



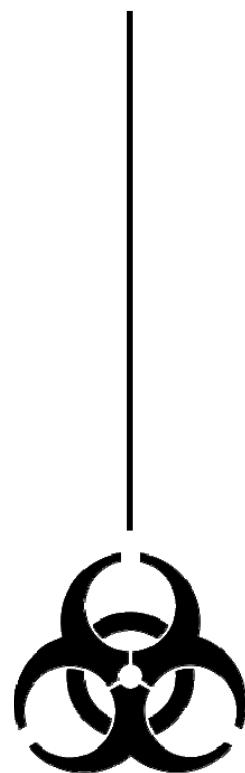
## Chemical

- Gases
- Vapors
- Fumes
- Dusts
- Fibers
- Mists



## Physical

- Temperature
- Noise
- Repetitive Motion & Awkward Postures
- Ionizing & Non-Ionizing Radiation



## Biological

- Fungi (Mold)
- Bloodborne Pathogens
- Bacteria
- Poisonous Plants
- Poisonous & Infectious Animals

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## Toxicology

Toxicology is the science that studies the poisonous or toxic properties of a substance. The basic assumption of toxicology is that there is a relationship among the dose (amount), the concentration at the affected site, and the resulting effects. As part of your job as a construction worker, study and learn the hazardous effects of the substances that you work with; study the dangers associated with the above *health hazards in construction*.

## Anticipation of Health Hazards

Health hazards can be anticipated by knowing the history of the work involved as well as through worker experience and education; learn all the hazards associated with your job and be better prepared to make good decisions regarding your health and safety.

Generally, hazards associated with a particular job are either inherent (present before the worker shows up); or hazards can be created by the work (e.g., welding & cutting, use of fuel powered equipment, etc.).

**To anticipate hazards:**

- Survey job-site conditions.
- Be aware of the actions and behaviors of workers.



**What hazards can you anticipate in this picture?**

**Old fuel storage tank be excavated – site being prepared for rebuild (fueling station).**

**Hazardous conditions that can be anticipated on construction job-sites include:**

- Confined or enclosed spaces (hazardous atmospheres).
- Contaminated soil conditions (hazardous atmospheres).
- Unsanitary conditions (poor housekeeping, poorly kept toilet facilities, etc.).
- Presence of hazardous materials (dangerous coatings on structures & metal containing alloys, concrete & silica).
- The use of hazardous chemicals (gases, solvents & glues).
- The presence of residues left by degreasing agents, usually chlorinated hydrocarbons (chloroform and carbon tetrachloride).
- Older buildings and structures; unoccupied dwellings (fungi/mold, asbestos & lead).
- Extreme temperatures (hot & cold environments; working outside or in attics, boiler rooms, etc.).
- Radiological exposures (nuclear power plants, antennas, hospitals, laboratories and the sun).
- Loud noise (use of tools and equipment).
- Hot work (welding and cutting).
- The presence of plant and/or animal wildlife (poisonous venom, feces, rabies...).

**Group Discussion...**

**What health hazards can you anticipate on your job?**

## Recognition of Health Hazards

### What do you see?

- **Visible material in the air** – If you see visible clouds of vapor or particles, there may be a serious exposure problem. Remember, however, that most gases and vapors are invisible, and that often the most dangerous particles are too small to see.
- **Settled dust** – If there is chemical dust on the ground or other surfaces, it probably got there by settling out of the air. If disturbed, settled dust can become airborne again.
- **Warning signs, labels & decals** – As required by OSHA's Hazard Communication Standard (29 CFR 1910.1200) and other applicable standards.



**Concrete cutting with saw creates obvious dust exposure.**

### Group Discussion...

**What health hazards do you see on your job?**

### Do you smell or taste anything?

- **Odor** – If you smell a chemical, you are inhaling it. However, some chemicals can be smelled at levels well below those that are harmful. The *odor threshold* is the lowest level of a chemical that can be smelled by most people. If a chemical's odor threshold is lower than the amount that is hazardous, the chemical is said to have good warning properties. It is important to remember that for most chemicals, the odor thresholds vary widely from person to person. In addition, some chemicals, like hydrogen sulfide, cause you to rapidly lose your ability to smell them; this is called olfactory fatigue. With these cautions in mind, knowing a chemical's odor threshold may serve as a rough guide to your exposure level.
- **Taste** – Never taste something that might be a hazardous chemical. However, if you inhale a chemical or accidentally get some in your mouth, it may have a particular taste that warns you're being exposed (e.g., metal fumes).



**Smell or taste could cause you to recognize a health hazard.**

### Group Discussion...

**What health hazards do you smell on your job?**

## Recognition of Health Hazards

### ***Do you hear anything?***

Loud noise can severely damage your hearing!

#### ***Sources of loud noise in construction:***

- Hand tools (e.g., metal hammers)
- Power tools (e.g., jackhammers, grinders, saws, powder actuated tools)
- Equipment (e.g., generators, excavators, cranes, trucks)
- Blasting



#### ***Group Discussion...***

#### ***What sources of loud noise are on your job?***

### ***Do you feel immediate symptoms?***

- **Particles in your respiratory system** – Your nose and airways have mucous which traps particles and removes them when you cough or blow your nose.
- **Narcotic effect** – When solvents are breathed in, they enter the blood stream and travel to other parts of the body, particularly the nervous system causing dizziness, headache, feelings of “drunkenness”, and tiredness. One result of these symptoms may be poor coordination which can contribute to falls and other accidents.



*Feeling sick, dizzy or nauseous could mean you are being exposed to a health hazard.*

#### ***Group Discussion...***

#### ***Have you ever felt sick or nauseous on the job (resulting from an on the job exposure)?***

## Recognition of Health Hazards

### **Not following safety procedures?**

***Learn to recognize unsafe conditions and unsafe behaviors...***

- Not implementing engineering and/or administrative controls (e.g., wet methods, ventilation, and dust collection systems).
- Not wearing appropriate Personal Protective Equipment (e.g., gloves, respirators, chemical suites, hearing protectors, etc.).
- Not practicing good housekeeping.
- Not following good hygiene practices.
- Not performing a hazard analysis (e.g., air monitoring, dust sampling, noise metering, and biological monitoring & medical surveillance).

***Know the safety procedures on your job and learn to recognize safety violations – report them and get them corrected!***



***Never eat, drink, smoke or apply cosmetics in the areas where hazardous work is performed; employers must train their employees on how to recognize and avoid unsafe conditions and unsafe behaviors!***

## Evaluation of Health Hazards

### ***Environmental & Personal Air Monitoring***

Environmental and personal air monitoring is one way to determine exposure to most chemicals. There are instruments to measure contaminants in the air – chemical hazards, such as hazardous gases, vapors, fumes, dust/fibers & mists; also physical hazards, such as noise, heat stress and radiation.

#### ***Environmental & Personal Air Monitoring:***

- Air monitoring does not measure you or what you are doing, but rather what you are exposed to on the job.
- Air monitoring must be done by a trained health professional (industrial hygienist or technician).
- Monitoring can be done by measuring the air in a fixed location in the work area (***area monitoring***) or by placing the monitoring equipment on individual workers and measuring the amount they are exposed to (***personal monitoring***).

NIOSH/John Rekus/elcoshimages.org



***Trained health professional wearing personal protective equipment; evaluating job-site conditions.***

### ***Personal Monitoring***

Personal monitoring is done to determine individual worker exposure and area monitoring may be done to estimate possible exposure of a group of workers in a particular area. Monitoring is usually done during a specific time period, often as an 8-hour shift or 15 minute period to ensure compliance with OSHA standards.

Air monitoring may be done in a number of ways. Some toxins are measured by placing a small pump on your belt and a filter cassette or tube clipped on your collar with a flexible tube running between them. The filter or tube should be located as close as possible to your breathing zone (the air in front of your nose and mouth which you breathe).

The pump pulls air through the filter or tube, which traps the dust or toxin. After the sample has been taken, the filter or tube is sent to a laboratory. The laboratory uses scientific methods to measure the amount of contaminant on the filter or tube. It may take several days or longer before the results are ready from the laboratory.



## Evaluation of Health Hazards

### ***Biological Monitoring & Medical Surveillance***

For chemicals that are absorbed by routes other than inhalation, such as through the skin and by ingestion, air monitoring may underestimate the amount of chemical absorbed into the body; to ensure accurate employee exposure, medical surveillance is sometimes necessary. The levels of the chemical (or its breakdown products) in the body can also be measured in the blood, urine, or exhaled air. Such testing is called biological monitoring. For several substances, biological monitoring is required by law when air monitoring results are above a certain level; employers must maintain the results of these tests as employee records.

#### ***Medical surveillance records include:***

- Employee exposure records (results from personal air monitoring).
- Employee medical records (results from biological monitoring).

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### ***Employee Exposure and Medical Records***

Workers with possible exposure to or uses toxic substances or harmful physical agents on job-sites have rights to access exposure records. These rights and responsibilities can be found in OSHA's standard 29 CFR 1926.33 (see 29 CFR 1910.1020 – Access to Employee Exposure and Medical Records).

#### ***Retention of Medical Records...***

- Employee medical records must be retained for at least the duration of the employee's employment plus 30 years.
- Employee exposure records for at least 30 years (personal air monitoring results).
- Background data related to environmental, or workplace, monitoring or measuring—such as laboratory reports and worksheets—must only be retained for 1 year, so long as you preserve certain interpretive documents relevant to the interpretation of the data for 30 years.



***Employee exposure and medical records must be retained by the employer.***

## ***Environmental & Personal Air Monitoring Devices***

<b>Hazard</b>	<b>Device</b>	<b>Description</b>
<b>Gases &amp; Vapors</b>  Examples: <ul style="list-style-type: none"><li>○ Carbon Monoxide</li><li>○ Hydrogen Sulfide</li><li>○ Methane</li><li>○ Ammonia</li><li>○ Chlorine</li></ul>	<b>Detector Tubes</b>  	Detects different gases and vapors; often used as a survey tool to determine if a substance is present or not – does not determine exact quantity or employee exposure.  Easy to use and gives instant color change results; uses either a hand or a battery operated pump.  Often non-specific and has a high standard of error ( $\pm 25\%$ ).  Low cost.
	<b>Sampling Tubes</b>  	Easy to use and can sample for more than one chemical on a single tube.  Tubes must be specific for type of gas or vapor.  Not real time measurement – delay in results.  Highly accurate in determining exposure.  Low cost.
	<b>Multi or single gas/vapor detector</b>  	Real time measurement device that provides instant results; can be used as personal alarm monitors.  Detects a variety of toxic gases and explosive environments.  Easy to use, but requires calibration to be accurate; requires on-going maintenance.  Sensors wear out (need replacement).  Moderate to high cost.
	<b>Passive badge gas/vapor sampler</b>  	Device worn to passively measure exposure.  Simple to use; just put it on and go to work.  Accurate device, but limited to the number of chemicals measured.  Not real time measurement – delay in results.  Low cost.
<b>Fumes, Dusts, Mists &amp; Fibers</b>  Examples: <ul style="list-style-type: none"><li>○ Lead</li><li>○ Silica</li><li>○ Asbestos</li><li>○ Paints</li></ul>	<b>Instant Swab Wipes</b>  	Detects the presence of lead in paint or metals.  Does not give detail as to amount, only if substance is present.  May show false positive results; perform second wipe to confirm.  Low cost.
	<b>Filter Cassette</b>  	Used to determine an average exposure over a period of time ( <i>time weighted average</i> ).  Samples taken in the “breathing zone” of the employee.  Not real time measurement – delay in results.  Specific filters required for different substances.  Moderate cost.

## ***Environmental & Personal Air Monitoring Devices***

<b>Hazard</b>	<b>Device</b>	<b>Description</b>
<b>Noise</b> <ul style="list-style-type: none"><li>o Decibels (dB)</li></ul>	<b>Sound Level Meter</b> 	Measures ambient noise levels and is used as a surveying instrument; provides real time instant reading. Easy to use. Accurate device. Calibration required. Varies in cost.
	<b>Personal Dosimeter</b> 	Measures personal exposures to noise and determines exposure over a period of time ( <i>time weighted average</i> ). Requires training to use. Accurate device. Calibration required. High cost.
	<b>Noise badge</b> 	Indicates that user is being exposed to high levels of noise. Simple to use. No calibration required. Real time instant reading; used as a personal alarm. Low cost.
<b>Radiation</b> <ul style="list-style-type: none"><li>o Ionizing</li><li>o Non-ionizing</li></ul>	<b>Film Badge Dosimeters</b> 	Measures personal exposure to ionizing radiation. Simple to use. Passive reading. Not real time measurement – delay in results. Low cost.
	<b>Survey Instruments (Geiger Counter)</b> 	Survey instrument to determine levels of ionizing radiation. Easy to use. Real time measurement. High cost.
	<b>Personal Alarm Monitors (RF)</b> 	Measures personal exposures and provides instant results; used as a personal alarm. Specific to type of radiation. Easy to use. Moderate to high cost.

## ***Environmental & Personal Air Monitoring Devices***

<b>Hazard</b>	<b>Device</b>	<b>Description</b>
<b>Temperature</b> <ul style="list-style-type: none"><li>○ Heat/Humidity</li><li>○ Cold/Wind</li></ul>	<b>Thermometer</b> 	Measures air temperature. Simple to use. Accurate device. Survey instrument. Real time measurement. Varies in cost.
	<b>Wet Bulb Globe Temperature (WBGT)</b> 	Estimates the effect of temperature, humidity, and solar radiation. Requires training to use. Accurate device. Calibration required. Measures personal exposures. High cost.
	<b>Thermo-Anemometer</b> 	A measure wind speed and calculates wind chill temperature. Simple to use. No calibration required. Real time instant reading. Moderate to high cost.

### ***Wet Bulb Globe Temperature (WBGT)***

The Wet Bulb Globe Temperature (WBGT) is a composite temperature used to estimate the effect of temperature, humidity, and solar radiation on humans.

Portable heat stress meters or monitors are used to measure heat conditions. These instruments can calculate both the indoor and outdoor WBGT index. With this information and information on the type of work being performed, heat stress meters can determine how long a person can safely work or remain in a particular hot environment.



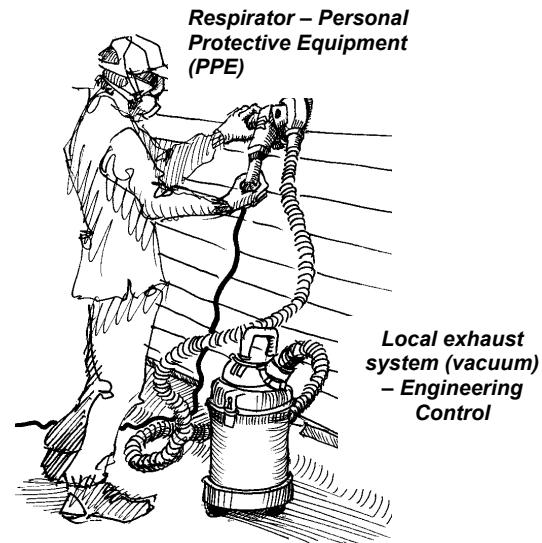
**Quest Technologies  
Wet Bulb Globe Temperature  
(WBGT) Device**

## Control of Health Hazards

### Hazard Abatement

To abate a hazard means to eliminate its affects; this would cause a worker who might otherwise be exposed to a hazard not be exposed by means of one or more control strategy. These control strategies are chosen by preference according to the **hierarchy of controls**.

**Implementing control strategies, such as engineering controls, safe work practices and wearing personal protective equipment will stop health hazards on your job!**



### Hierarchy of Controls

(See *Hierarchy of Controls*, page 32)

Controlling exposures to occupational hazards is the fundamental method of protecting workers. Traditionally, a hierarchy of controls has been used as a means of determining how to implement feasible and effective controls.

**OSHA requires that employers use the hierarchy of controls in order of preference for protecting the worker.**

#### **Hierarchy of controls in order of preference:**

1. **Elimination of hazard;** Substitution with safe alternative.
2. **Engineering;** Ventilation & wet methods.
3. **Administrative;** Work practices, scheduling workers to minimize exposure, extended breaks, etc.
4. **Personal Protective Equipment (PPE);** Respiratory and hearing protection, protection of face, hand, feet, eyes & whole body.

## Job Hazard Analysis

A job hazard analysis (JHA) is a technique that focuses on the relationship between the worker, the task, the tools, and the work environment; it's an essential first step that helps an industrial hygienist determine the sources of potential problems.

During a **job hazard analysis**, a competent industrial hygienist will examine all **materials & equipment** being used; look at the **process** in which work is being performed and assess the **people** performing the work.

**Questions that are asked during a job hazard analysis are...**

### What is it?

**Materials & Equipment** – What building materials, chemicals, tools and equipment are being used; what is the likelihood that these things will cause a potential health hazard (gases, vapors, fumes, dusts/fibers, noise, vibration, radiation, etc.)?



### How does it?

**Process** – How & where is the work being performed; potential health hazards can turn into toxic exposures if the process is not controlled.



### Who are exposed?

**People** – Who are exposed to the hazards; are these workers properly trained, qualified and wearing appropriate personal protective equipment (PPE)?



## Job Hazard Analysis Example

***Look at the pictures and complete the analysis...***

Job/Task:

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What are the hazards?

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How & who are exposed?

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What controls are being implemented?

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What (if any) further controls need to be implemented?

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## 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.

Determining whether a health hazard exists at your worksite is based on a combination of factors including observation, interviews, and measurements of the level of air contaminants arising from the work processes as well as an evaluation of the effectiveness of control measures in the workplace. These environmental measurements are then compared to acceptable exposure levels, such as OSHA standards or other guidelines.

## Use of Professionals & Consultants

If the work involves many different or complex processes, a professional may be needed to help conduct job-site evaluation and personal exposure monitoring. Sources of help include insurance companies, contractor associations, trade unions, and private consultants with safety and health expertise.

OSHA offers assistance through its regional and area offices and consultation services. Contact your local OSHA office for more information.

Even when outside help is received, it is important that all employees remain involved in the process of identifying and correcting hazards because job-site conditions change every day. New circumstances and a recombination of existing circumstances may cause old hazards to reappear and new hazards to appear. In addition, employees must be ready and able to implement whatever hazard elimination or control measures a professional consultant recommends.

## Occupational Health Teams

The goal of a multidisciplinary occupational health and safety team is to design, implement, and evaluate a comprehensive health and safety program that will maintain and enhance health, improve safety, and increase productivity. Such programs often provide similar results for the families of workers, with resultant financial and other benefits for the corporation. Occupational health and safety professionals include occupational and environmental health nurses, occupational medicine physicians, industrial hygienists, safety professionals, and occupational health psychologists. Other related members of the multidisciplinary team are ergonomists, toxicologists, epidemiologists, human resource specialists, and industrial/organizational psychologists.



***The most important member of the health team is you!***

## Review

***Match the letter to correct acronym, word or phrase...***

_____	<b>Industrial Hygiene</b>
_____	<b>Job Hazard Analysis</b>
_____	<b>Hazard Abatement</b>
_____	<b>Toxicology</b>

- a.** A technique that focuses on the relationship between the worker, the task, the tools, and the work environment; it's an essential first step that helps an industrial hygienist determine the sources of potential problems.
- b.** The art and the science of ***anticipating, recognizing, evaluating, and controlling*** workplace conditions that may cause workers' injury or illness.
- c.** An action taken that would cause a worker who might otherwise be exposed to a hazard not be exposed by means of one or more control strategy.
- d.** The science that studies the poisonous or toxic properties of a substance.

# OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA)

## ***Learning Goals:***

- Identify the Occupational Safety and Health Administration (OSHA) as being the authority for protecting worker's health and safety on the job.
- Recognize both employer and employee rights and responsibilities under OSHA law.

## ***Important Terms:***

- OSHA
- OSHA's General Duty Clause
- Worker rights under OSHA Law

## **You Have A Right!**

The Occupational Safety and Health Act of 1970 (OSHAct) was passed by the United States Congress to prevent workers from being killed or seriously harmed at work. The law requires that employers provide their employees with working conditions that are free of known dangers. The Act created the Occupational Safety and Health Administration (OSHA), which sets and enforces protective workplace safety and health standards.



## **Occupational Safety & Health Act of 1970**

### ***OSHA Duties...***

To assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the OSHAct; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; and by providing research, information, education, and conducting training in the field of occupational safety and health.

An important section of the OSHAct is the General Duty Clause.

## **General Duty Clause**

### **5. Duties**

#### **(a) Each employer**

- (1)** Shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employee;
- (2)** Shall comply with occupational safety and health standards promulgated under this Act.

#### **(b) Each employee** shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

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### ***What is OSHA's General Duty Clause?***

Section 5(a)(1) of the Occupational Safety and Health Act of 1970 has become known as the “**General Duty Clause**”. It is a catch all for citations if OSHA identifies unsafe conditions to which a regulation does not exist.

If the following elements are present, a “General Duty Clause” citation may be issued:

- (1)** An employer failed to keep the workplace free of a hazard to which employees of that employer were exposed.
- (2)** The hazard was recognized. (Examples might include: through job-site safety personnel, employees, trade unions and other associations/organizations.)
- (3)** The hazard was causing or was likely to cause death or serious physical harm.
- (4)** There was a feasible and useful method to correct the hazard.

***OSHA believes there is always a feasible and useful method to correct any and all health hazards!***

## Health Hazards are Recognized by OSHA

A number of health related hazards in construction have been well documented over the years. We all heard of asbestos and the deadly lung disease asbestosis; because of the risks associated with working with and around asbestos, an OSHA standard was established.

Other health hazards are regulated as well, e.g., lead fumes and dusts, noise and standards relating to specific chemicals have been put into effect to protect the worker. It is not possible to address all potential health related issues in regulations; however, OSHA does have policies on how to hold employers accountable to exposing their employees to harmful substances that are not otherwise addressed in its standards to protect health (*see OSHA Enforcement Policy, page 217*).

With a general understanding of how to anticipate, recognize and control exposures to occupational health hazards, and by knowing where to obtain information about a particular substance (chemical); a contractor will be better prepared to make good decisions that will have a positive affect on their workers' health.

*To learn more about OSHA standards and the health hazards associated with your job, go to [www.osha.gov](http://www.osha.gov)*

**Learn all there is to know about the health hazards on your job!**

**Stop health hazards before they stop you!**

- Lung Disease
- Skin Irritation & Rashes
- Hearing Loss
- Cumulative Trauma Disorders
- Cancer
- Death!



**Job Safety and Health  
IT'S THE LAW!**

**OSHA**  
Occupational Safety  
and Health Administration  
U.S. Department of Labor

**EMPLOYEES:**

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the OSH Act.
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice (OSHA 3165-12-06R) in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

**EMPLOYERS:**

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

**This free poster available from OSHA - *the Best Resource for Safety and Health***

Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA  
[www.osha.gov](http://www.osha.gov)

OSHA 3165-12-06R

## Refusing to Work because Conditions are Dangerous

Workers have the right to refuse to do a job if they believe in good faith that they are exposed to an *imminent danger*. "Good faith" means that even if an imminent danger is not found to exist, the worker had reasonable grounds to believe that it did exist.

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### ***Refusing work is protected if...***

***Your right to refuse to do a task is protected if all of the following conditions are met:***

- Where possible, you have asked the employer to eliminate the danger, and the employer failed to do so; and
  - You refused to work in "good faith." This means that you must genuinely believe that an imminent danger exists. Your refusal cannot be a disguised attempt to harass your employer or disrupt business; and
  - A reasonable person would agree that there is a real danger of death or serious injury (illness); and
  - There isn't enough time, due to the urgency of the hazard, to get it corrected through regular enforcement channels, such as requesting an OSHA inspection.
- 

***When all of these conditions are met, you take the following steps:***

- Ask your employer to correct the hazard;
- Ask your employer for other work;
- Tell your employer that you won't perform the work unless and until the hazard is corrected; and
- Remain at the worksite until ordered to leave by your employer.

<b>IF</b>	<b>THEN</b>
You believe working conditions are unsafe or unhealthy.	Call your employer's attention to the problem.
Your employer does not correct the hazard or disagrees with you about the extent of the hazard.	You may file a complaint with OSHA.
Your employer discriminates against you for refusing to perform the dangerous work.	Contact OSHA immediately. (800) 321-OSHA

## Review

*Match the letter to correct acronym, word or phrase...*

<input type="text"/> OSHA (acronym)	<b>a.</b> Employer must post employee rights notice (OSHA 3165-12-06R) in the workplace.
<input type="text"/> Employer responsibilities under OSHA law.	<b>b.</b> Occupational Safety & Health Administration
<input type="text"/> Worker responsibilities under OSHA law.	<b>c.</b> Contact OSHA immediately!
<input type="text"/> Your employer discriminates against you for refusing to perform dangerous work.	<b>d.</b> You must comply with all occupational safety and health standards.

# HEALTH STANDARDS IN CONSTRUCTION

## ***Learning Goals:***

- Overview OSHA's health standards in construction.
- Be introduced to the American Conference of Governmental Industrial Hygienists (ACGIH)®
- Be introduced to the National Institute for Occupational Safety and Health (NIOSH).
- Become familiar with the terms and definitions used to describe occupational limits relating to health hazards.
- Identify OSHA's special emphasis programs and compliance directives for enforcing health standards in construction.

## ***Important Terms:***

- Hierarchy of Controls**
- Permissible Exposure Limit (PEL)**
- Action Level (AL)**
- Ceiling (C)**
- American Conference of Governmental Industrial Hygienists (ACGIH)®**
- Threshold Limit Value (TLV)®**
- National Institute for Occupational Safety & Health (NIOSH)**
- Recommended Exposure Limit (REL)**
- Short Term Exposure Limit (STEL)**
- OSHA Special Emphasis Programs for Health**

## **Health Standards in Construction Overview**

OSHA's health standards in construction addresses issues such as; the **availability of medical services and first aid, sanitation of the job-site** (toilet facilities), the **availability of water** (potable and non-potable), **eating and drinking areas** and **vermin control**.

Health standards also cover exposures to air contaminants and other materials that can lead to illness and disability. These standards regulate **chemicals** in the forms of **gases, vapors, fumes, dusts, fibers and mists; noise and radiation**.

***OSHA currently regulates exposure to approximately 400 substances!***

## **Medical Services & First Aid (29 CFR 1926.50)**

- The employer must insure the availability of medical personnel for advice and consultation on matters of occupational health.
  - Provisions must be made prior to commencement of the project for prompt medical attention in case of serious injury.
  - In the absence of an infirmary, clinic, hospital, or physician, that is reasonably accessible in terms of time and distance to the worksite, which is available for the treatment of injured employees, a person who has a valid certificate in first-aid training must be available at the worksite to render first aid.
  - First aid supplies must be easily accessible when required.
- 

### **First Aid Kits...**

**First aid kits must be available on all job-sites where a hospital, clinic or physician is not available in terms of time and distance. Persons must be trained to use these supplies and be willing to give care.**

**An automated electronic defibrillator (AED) is highly recommended.**



## **Medical Services & First Aid (29 CFR 1926.50)**

- The contents of the first aid kit must be placed in a weatherproof container with individual sealed packages for each type of item, and shall be checked by the employer before being sent out on each job and at least weekly on each job to ensure that the expended items are replaced.
- Proper equipment for prompt transportation of the injured person to a physician or hospital, or a communication system for contacting necessary ambulance service, must be provided.
- In areas where 911 is not available, the telephone numbers of the physicians, hospitals, or ambulances must be conspicuously posted.
- Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use.

## First Aid Kits

### *Appendix A to § 1926.50 -- First aid Kits*

Minimal contents of a generic first aid kit as described in American National Standard (ANSI) Z308.1 "Minimum Requirements for Industrial Unit-Type First-aid Kits".

Item	Minimum Size or Volume	Quantity per Package	Unit Package Size
Absorbent compress	32 sq. in.	1	1
Adhesive bandage	1" x 3"	16	1
Adhesive tape	5 yd. (total)	1 or 2	1 or 2
Antibiotic treatment	1/32 oz.	6	1
Antiseptic swab	0.14 fl. oz.	10	1
Antiseptic towelette	24 sq. in.	10	1
Bandage compress (2 in.)	2" x 36"	4	1
Bandage compress (3 in.)	3" x 60"	2	1
Bandage compress (4 in.)	4" x 72"	1	1
Burn dressing	4" x 4"	1	1 or 2
Burn treatment*	1/32 oz.	6	1
CPR barrier		1	1 or 2
Cold pack (4" x 5")	4" x 5"	1	2
Eye covering, with means of attachment	2.9 sq. in.	2	1
Eye wash	1 fl. oz. total	1	2
Gloves		2 pair	1 or 2
Roller bandage (4 in.)	4" x 6 yd.	1	1
Roller bandage (2 in.)	2" x 6 yd.	1	1
Sterile pad	3" x 3"	2	1
Triangular bandage	40" x 40" x 56"	4	1

\* **Do not** put ointment on a burn unless a healthcare provider tells you to do so.

## **Sanitation of Job-Sites (29 CFR 1926.51)**

- An adequate supply of potable water (drinking water) must be provided in all places of employment.
- Portable containers used to dispense drinking water must be capable of being tightly closed, and equipped with a tap. Water must not be dipped from containers.
- Any container used to distribute drinking water must be clearly marked as to the nature of its contents and not used for any other purpose.
- The common drinking cup is prohibited.
- Toilets must be provided for employees and cleaned regularly.



**Potable water (drinking water) must be made available on all job-sites. To ensure freshness, seal the container with tape – record date and time.**

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## **Washing Facilities [29 CFR 1926.51(f)]**

**Good health starts with good hygiene!**

- The employer must provide adequate washing facilities for employees engaged in the application of paints, coatings, herbicides, or insecticides, or in other operations where contaminants may be harmful to the employees. Such facilities must be in near proximity to the worksite and must be so equipped as to enable employees to remove such substances.
- Washing facilities must be maintained in a sanitary condition.



**Portable washing facilities on construction job-sites will help to ensure proper hygiene and worker health.**

## ***Eating and Drinking Areas [29 CFR 1926.51(g)]***

- No employee shall be allowed to consume food or beverages neither in a toilet room nor in any area exposed to a toxic material.



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## ***Vermin Control [29 CFR 1926.51(h)]***

- Every enclosed workplace must be so constructed, equipped, and maintained, so far as reasonably practicable, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program must be instituted where their presence is detected.



## OSHA – Permissible Exposure Limit (PEL)

### ***What is a Permissible Exposure Limit?***

Health standards relating to exposure to gases, vapors, fumes, dusts/fibers and mists; noise and radiation, require some extra explanation. These standards limit the amount or concentration of a material (chemical, noise or radiation) that can be present in the workplace. To describe the limits, or amounts of these exposures, the term **Permissible Exposure Limit (PEL)** is used.

**Permissible Exposure Limit (PEL);** a legal standard set by OSHA for the maximum concentration of a chemical or substance in the air.

***IMPORTANT! To comply with OSHA's health standards related to environmental exposures to harmful gases, vapors, fumes, dust/fibers & mists; noise and radiation, employers must first attempt to eliminate or reduce exposure through administrative or engineering controls.***

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### ***Complying with OSHA Health Standards***

#### ***To achieve compliance with OSHA's health standards:***

- ***Administrative or engineering controls*** must first be implemented whenever feasible.
- When administrative or engineering controls are not feasible to achieve full compliance, protective equipment or other protective measures must be used to keep the exposure of employees to air contaminants within the limits prescribed.
- Any equipment and technical measures used for this purpose must first be approved for each particular use by a competent industrial hygienist or other technically qualified person.
- Whenever respirators are used, their use must comply with OSHA's respiratory protection standard (29 CFR 1910.134).

## ACGIH–Threshold Limit Value (TLV) ®

When OSHA started, it was given the task of enforcing safety and health regulations; in the beginning however, OSHA had no reference as to what is considered unhealthy or a health related violation. So, in an effort to put in place health standards, OSHA incorporated by reference the existing Threshold Limit Values (TLVs)® of Airborne Contaminants for 1970 of the American Conference of Governmental Industrial Hygienists (ACGIH).

(See OSHA Standard, 29 CFR 1926.55)

**The American Conference of Governmental Industrial Hygienists (ACGIH)**

Since the early 1900's, the ACGIH has been investigating, recommending, and annually reviewing exposure limits for chemical substances. The best known efforts by the ACGIH is the creation of the *Threshold Limit Values of Airborne Contaminants*; this publication contains a list of contaminants and their respected Threshold Limit Values (TLVs)®. Today's list of TLVs® includes 642 chemical substances and physical agents, as well as 47 Biological Exposure Indices (BEIs)® for selected chemicals.

For more information on the ACGIH, visit their website at [www.acgih.org](http://www.acgih.org)

### **OSHA Standard:**

#### **29 CFR 1926.55 Gases, Vapors, Fumes, Dusts (Fibers) & Mists...**

*Exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the "Threshold Limit Values of Airborne Contaminants for 1970" of the American Conference of Governmental Industrial Hygienists, shall be avoided!*

**Threshold Limit Value (TLV)®;** Levels of contaminants established by the American Conference of Governmental Industrial Hygienists (ACGIH) to which it is believed that workers can be exposed to with minimal adverse health effects.

**NOTE:** When OSHA started in the early 1970's, the Administration (OSHA) incorporated the ACGIH TLVs® into their construction safety and health regulations (29 CFR 1926). The standard reference is 29 CFR 1926.55; this makes any exposure above any listed 1970 ACGIH TLV® a violation of OSHA rule. (See 29 CFR 1926.55 Appendix A, page 219). Any new standards established by OSHA through its rule making process are issued Permissible Exposure Limits (PELs); the TLVs of these substances are then removed from 29 CFR 1926.55 Appendix A and are given their own standard number.

## NIOSH – Recommended Exposure Limit (REL)

The Occupational Safety and Health Act of 1970 created both NIOSH (National Institute for Occupational Safety & Health) and the Occupational Safety and Health Administration (OSHA). OSHA is in the U.S. Department of Labor and is responsible for developing and enforcing workplace safety and health regulations. NIOSH is part of the Centers for Disease Control and Prevention (CDC) in the Department of Health and Human Services. NIOSH is an agency established to help assure safe and healthful working conditions for working men and women by providing research, information, education, and training in the field of occupational safety and health.



[www.cdc.gov/niosh](http://www.cdc.gov/niosh)

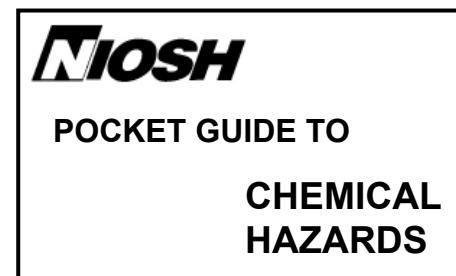
A Recommended Exposure Limit (REL) is an occupational exposure limit that has been recommended by NIOSH to the Occupational Safety and Health Administration (OSHA).

**Recommended Exposure Limit (REL);** Levels that NIOSH believes would be protective of worker safety and health over a working lifetime if used in combination with engineering and work practice controls, worker training and personal protective equipment.

 ***RELS are usually highly protective to health and are often used as best practices in industry.***

## NIOSH Pocket Guide to Chemical Hazards

The NIOSH Pocket Guide to Chemical Hazards is a publication of NIOSH and is intended as a source of general industrial hygiene information on several hundred chemicals/classes for workers, employers, and occupational health professionals. The information found in the NIOSH Pocket Guide should help users recognize and control occupational chemical hazards.



*For more information on NIOSH and to access the Pocket Guide to Chemical Hazards, go to [www.cdc.gov/niosh](http://www.cdc.gov/niosh)*

## Time Weighted Average (TWA)

The **8-Hour Time Weighted Average (TWA)** is the average employee exposure over an 8-hour period, based on chemical measurements close to the worker. The measured level may sometimes go above the TWA value, as long as the 8-hour average stays below it. Most chemicals with PELs have a TWA value. Some chemicals have **Ceiling** or **Short Term Exposure Limits** in addition to – or instead of – TWA values.

## Action Level (AL)

The exposure level (concentration in air) at which some OSHA regulations set to protect employees takes effect; for example, workplace air analysis, employee training, medical monitoring, and recordkeeping. Exposure at or above action level is termed occupational exposure. Exposure below this level can also be harmful. This **Action Level (AL)** is generally half the PEL.

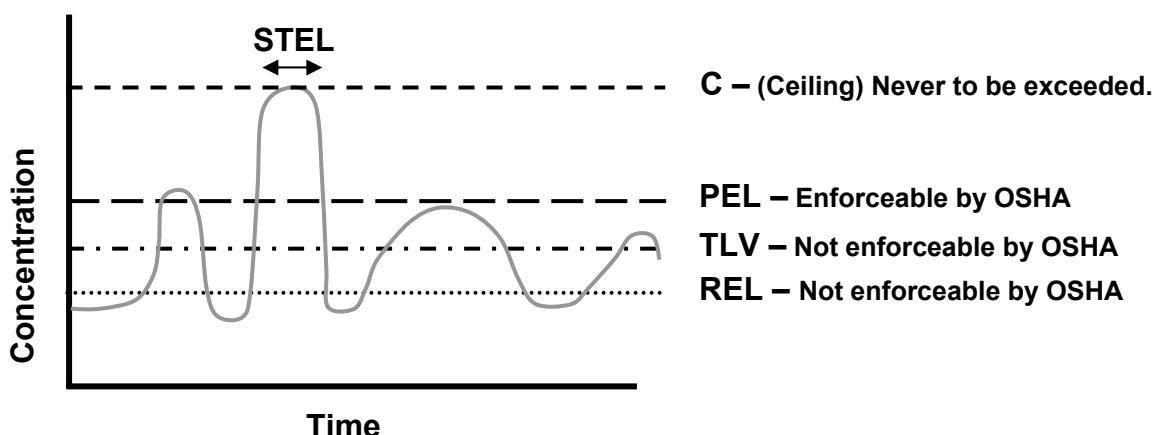
## Ceiling Limit (C)

The **Ceiling Limit (C)** is the maximum allowable level. It must never be exceeded, even for an instant.

## Short Term Exposure Limit (STEL)

The **Short Term Exposure Limit (STEL)** is a level that must not be exceeded when averaged over a specified short period of time (usually 15 minutes). When there is an STEL for a substance, exposure still must never exceed the Ceiling Limit, and the 8-hour average still must remain at or below the TWA.

## Exposure Limit Comparison Chart



## Hierarchy of Controls

Controlling exposures to occupational hazards is the fundamental method of protecting workers. Traditionally, a hierarchy of controls has been used as a means of determining how to implement feasible and effective controls.

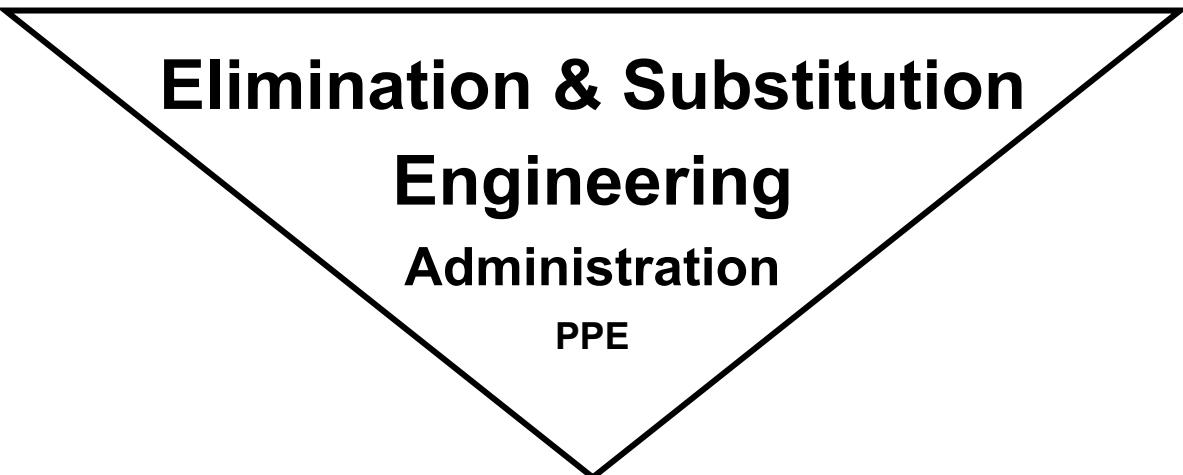
***OSHA requires that employers use the hierarchy of controls in order of preference for protecting the worker.***

### ***Hierarchy of controls in order of preference:***

1. ***Elimination of hazard;*** Substitution with safe alternative.
2. ***Engineering;*** Ventilation & wet methods.
3. ***Administrative;*** Work practices, scheduling workers to minimize exposure, extended breaks, etc.
4. ***Personal Protective Equipment (PPE);*** Respiratory and hearing protection, protection of face, hand, feet, eyes & whole body.

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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 job-sites, ones where the risk of illness or injury has been substantially reduced.



**Elimination & Substitution**  
**Engineering**  
**Administration**  
**PPE**

## Elimination & Substitution

**Elimination** and **substitution**, while most effective at reducing hazards, also tend to be the most difficult to implement in an existing process or job-site. If the project 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 for a hazard.

### **Elimination & Substitution include:**

- Automate the process by using equipment; remove or isolate the worker.
- Select and use a less toxic chemical; in an effort to reduce occupational illness, chemical manufacturers' have created less harmful substitutes.
- Sub-contract out jobs to more qualified people; know the limitations of your workers and be prepared to solicit the services of specially trained and equipped contractors. Some work may require a special license, i.e. lead & asbestos.

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**Elimination & Substitution Example...**  
**Skid steer loader with pneumatic hammer.**

### **Elimination & Substitution Example...**

**Demolition of structure using mechanical shears; combined with the safe work practice of spraying water will significantly reduce worker exposure to harmful dust.**



## Engineering Controls

**Engineering controls** are used to remove a hazard or place a barrier between the worker and the hazard. This barrier can be placed at the source of the hazard, between the source and the worker, or at the worker. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The initial cost of engineering controls can be higher than the cost of administrative controls or personal protective equipment, but over the longer term, operating costs are frequently lower, and in some instances, can provide a cost savings in other areas of the process. Examples of engineering controls include, **wet methods**, **mechanical ventilation** and **dust collection systems**.

**Engineering controls include:**

- Using dust suppression (**wet methods**) and/or dust collection systems.

**OR**

- Installing and using **mechanical ventilation**; general (dilution) and local (exhaust) ventilation systems.



**Engineering Control Example...**  
**Water suppression system on concrete saw.**

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**Engineering Control Example...**

**Dust suppression system on concrete saw using supplied water.**

## Dust Suppression & Collection Systems

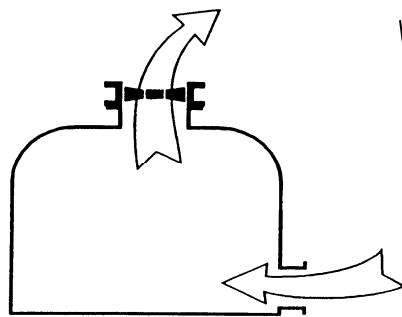
Some studies have shown that wet cutting methods can reduce average respirable dust levels by up to 94 percent. However, if an employer determines that the use of a wet saw in a particular circumstance is not feasible, and the brick, concrete block or masonry must be cut dry, then the employer would be required to explore other engineering control options. Dust collection systems can be used, but they are typically not sufficient to reduce exposures below permissible limits and employees will usually need to be protected with appropriate respirators as well; monitoring the air will confirm exposure.



**Engineering Control Example...**  
**Dust collection system in use**  
**while worker is wearing respirator.**

## Mechanical Ventilation

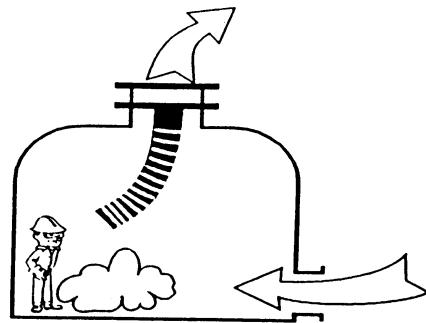
Mechanical ventilation consists of either **general (dilution)** ventilation systems or **local (exhaust)** systems.



### General (Dilution) Ventilation...

**Forces fresh air into an area and dilutes contaminants; this allows air to move through a space which ensures a fresh continual supply.**

**WARNING!** Pure oxygen must never be used for ventilation purposes.



### Local (Exhaust) Ventilation...

**Removes contaminated air at its source; this prevents harmful dust, fumes & mists from contaminating the breathing air of the worker.**

**WARNING!** Contaminated air exhausted from a working space must be discharged into the open air or otherwise clear of the source of intake air.

## General (Dilution) Ventilation

**General (dilution)** ventilation must be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain breathing air to safe limits, as defined by OSHA permissible exposure limits (PELs).

**General (dilution) ventilation works best when:**

- Air contaminants are widely disbursed throughout the area.
- Toxicity levels and concentrations are low.

General (dilution) ventilation can be applied to most jobs by simply opening a window or door and blowing fresh air into a space using a fan. *Turn the fan around to blow air out and it becomes an exhaust ventilation system.*



### Ventilation Systems Examples...

Air moving equipment can be set up to either blow (dilute) or suck (exhaust).



## Local (Exhaust) Ventilation

**Local (exhaust)** ventilation consists of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system must be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits as defined by OSHA permissible exposure limits (PELs).

**Local (exhaust) ventilation works best when:**

- Air contaminants are generated at a single source.
- There's a need to remove high levels and concentrations of a toxic material.



Courtesy of Sentry Air Systems, Inc.

Houston, TX USA

Model 300 Welding Fume Extractor

[www.sentryair.com](http://www.sentryair.com)

## Administrative Controls

**Administrative controls** are changes in work procedures such as written safety policies, rules, supervision, schedules, and training with the goal of reducing the duration, frequency, and severity of exposure to hazardous chemicals or situations.

### Administrative controls include:

- Gathering all specialty equipment, including, ventilators, warning signs, personal protective equipment, etc. before starting work.
- Performing operations that involve toxic substances at times when other workers are not present.
- Isolate the work to a few employees.
- Rotating workers through various job assignments.
- Prohibiting workers from working around hazardous substances once they have reached a predetermined level of exposure.
- Requiring workers in hot environments to take breaks in cool rest areas and providing fluids for rehydration.
- Prohibiting worker access to areas involving hazards such as lasers, toxic materials, or excessive noise.



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**Administrative Control Example...**  
**Posting signs is often required under certain regulations.**

## Isolate the Work

Isolation is a method of limiting exposure to only those employees directly working with a particular substance. It may be as simple as erecting signs and barricades to keep non-essential personnel away from potential exposure areas. The area inside the barricades is known as a regulated area.



## Work Practice Controls

Safe work practices include your company's general workplace rules and other operation-specific rules. For example, even when a hazard is controlled, exposure can occur if the worker is not familiar with such controls.

### Train employee on...

- Proper housekeeping & good personal hygiene.
- The proper procedures that minimize exposures.
- How to inspect and maintain process and equipment on a regular basis.
- No eating, drinking, smoking, chewing tobacco or gum, and applying cosmetics in hazardous areas.



**Frequent hand washing will help to prevent sickness and disease.**

## **Work Practice Control Example – Dust Control**

Sweeping and the blowing of dust creates an inhalation hazard; consider the use of a vacuum to clean up job-sites.

### ***Take precautions while sweeping!***

#### ***Safe work practices while sweeping:***

- Use a sweeping compound to reduce airborne dust.
- Wear personal protective equipment (respirator).
- Schedule clean-up operations appropriately.
- Warn others and clear the area of those who are affected by the dust and are not protected.



***Sweeping hazard!***

## **How to Use a HEPA Vacuum**

A preferred method of controlling dust on a job-site is to use a vacuum; using a high efficiency particulate air (HEPA) vacuum will keep exposure levels down and minimize worker exposure to harmful dust.

#### ***To use a HEPA vacuum:***

- Lightly mist area with water to keep dust levels down. Some HEPA vacuums can combine a wet wash with the vacuum. Read the manufacturer's instructions on how to use it.
- Begin with high areas first. Clean ceilings and walls working downward. Vacuum all surfaces in the room. Work in the direction furthest from the entry door toward it.
- Move slowly.
- Remember, dust can stick to surfaces. Vacuum slowly so the HEPA vacuum can pick up all the dust.



***Using vacuum technology will greatly reduce exposure to the inhalation of dust and potential toxins.***

## Personal Protective Equipment (PPE)

Controlling a hazard at its source is the best way to protect workers. However, when engineering, work practices and administrative controls are not feasible or do not provide sufficient protection, employers must provide **personal protective equipment (PPE)** to the employee and ensure its proper use.

***Personal protective equipment (PPE) can only be used as a last resort!***

***Consideration and use of PPE is only allowed when:***

- Engineering controls and/or work practices are not **feasible**;
- Engineering controls or work practices are being implemented;
- Engineering controls or work practices do not effectively reduce exposure to acceptable limits, or;
- In cases of emergency (e.g., confined space rescue, area evacuation, etc.)



***Personal Protective Equipment Example...  
Chemical resistant suit, gloves, safety  
glasses and face shield.***

### Feasible (Definition)

There are two key factors that would determine whether a control is feasible or not: **technological feasibility** and **economic feasibility**.

**Technologically feasible;** this is fairly straight forward, as long as all engineering and administrative controls are being implemented and yet levels still remain above permissible exposure limits (PELs), then in respect to the work being done; it is technologically not feasible to reduce exposures any lower. PPE may be worn in addition to engineering controls and administrative controls.

**Economic feasible;** OSHA would consider administrative or engineering controls economically feasible when the cost of implementing such controls will not threaten the employer's ability to remain in business, or if such a threat to viability results from the employer's failure to meet industry safety and health standards.

**OSHA interprets the term “feasible” to conform to its ordinary meaning...**

**“Capable of being done”; if a recognized and accepted engineering or administrative control exists, it must be implemented before allowing the use of personal protective equipment, such as respirators and hearing protectors.**

## ***Important Concerns Regarding PPE***

The purpose of protective clothing and equipment is to shield or isolate individuals from the chemical, physical, and biological hazards that may be encountered; PPE does not eliminate any hazard. During some operations, it is not always apparent when exposure occurs. Some hazards are invisible and offer no warning.

NIOSH/Pam Sussi/elcoshimages.org

### ***Important considerations for PPE:***

- No one piece of protective equipment and clothing is capable of protecting against all hazards.
- The use of protective clothing can itself create significant wearer hazards, such as heat stress, physical and psychological stress, in addition to impaired vision, mobility and communication.



***Worker protected with a powered air purifying respirator (PAPR) while using a grinder.***

In general, the greater the level of protective clothing, the greater the associated risks, and for any given situation, equipment and clothing should be selected that provides an adequate level of protection. Overprotection as well as under-protection can be hazardous and should be avoided.

### ***Questions regarding personal protective equipment (PPE):***

- Is the device approved?
- Is the device appropriate for the type of hazard?
- Is the worker wearing the device properly trained to understand the use, limitations and care instructions of the device?
- Does the material have sufficient strength to withstand the physical stress of the tasks at hand?
- Will the material withstand repeated use after contamination and decontamination?
- Is the material flexible or pliable enough to allow end users to perform needed tasks?
- Will the material maintain its protective integrity and flexibility under hot and cold extremes?

**HMIS (Hazardous Materials Identification System)**, developed by the National Paint and Coatings Association (NPCA), is a numerical hazard rating that incorporates the use of labels with color-coded bars. A special code identifying appropriate personal protective equipment (PPE) is also listed.

**NOTE:** Safety glasses must conform to the American National Standards Institute (ANSI Z 87.1 – Practice for Occupational & Educational Eye and Face Protection.

**NOTE:** Gloves must be selected based on type of chemical being used (see Chemical Glove Selection Chart, page 197).

Chemical Name	
<b>HEALTH</b>	0
<b>FLAMMABILITY</b>	0
<b>PHYSICAL HAZARD</b>	0
<b>PERSONAL PROTECTION</b>	0

## HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

HAZARD INDEX				PERSONAL PROTECTION INDEX					
4 = SEVERE HAZARD		An asterisk (*) or other designation corresponds to additional information on a data sheet or separate chronic effects notification.							
3 = SERIOUS HAZARD									
2 = MODERATE HAZARD									
1 = SLIGHT HAZARD									
0 = MINIMAL HAZARD		Additional Information							
A 	n 	o 	p 						
Safety Glasses	Splash Goggles	Face Shield	Gloves						
q 	r 	s 	t 						
Boots	Synthetic Apron	Full Suit	Dust Respirator						
u 	w 	y 	z 						
Vapor Respirator	Dust & Vapor Respirator	Full Face Respirator	Airline Hood or Mask	X Consult your supervisor for special handling instructions.					

Employers must provide and pay for **personal protective equipment (PPE)**.

## Personal Protective Equipment (PPE)

PPE is equipment worn to minimize exposure to a variety of hazards. Examples include items such as gloves, foot and eye protection, hearing protection, hard hats and respirators.

Employer Obligations	Worker Responsibility:
<ul style="list-style-type: none"> <li><input type="checkbox"/> Perform a “hazard assessment” of the workplace to identify and control physical and health hazards.</li> <li><input type="checkbox"/> Identify and provide appropriate PPE for employees.</li> <li><input type="checkbox"/> Train employees in the use and care of the PPE.</li> <li><input type="checkbox"/> Maintain PPE, including replacing worn or damaged PPE.</li> <li><input type="checkbox"/> Periodically review, update and evaluate the effectiveness of the PPE program.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Properly wear PPE.</li> <li><input type="checkbox"/> Attend training sessions on PPE.</li> <li><input type="checkbox"/> Care for, clean and maintain PPE.</li> <li><input type="checkbox"/> Inform a supervisor of the need to repair or replace PPE.</li> </ul> <p><i>Note: The employer must pay for replacement PPE, except when the employee has lost or intentionally damaged the PPE.</i></p>

## Employers Must Pay for Personal Protective Equipment (PPE)

With few exceptions, OSHA requires employers to pay for personal protective equipment used to comply with OSHA standards; employers cannot require workers to provide their own PPE. Even when a worker provides his or her own PPE, the employer must ensure that the equipment is adequate to protect the worker from hazards at the workplace.

### Employers are not required to pay for:

- **Everyday clothing;** such as long-sleeve shirts, long pants and normal work boots (including protective toe).
- **Ordinary clothing;** such as winter coats, jackets and gloves.

## ***Limitations & Use of Respirators***

Engineering and work practice controls are generally regarded as the most effective methods to control exposures to airborne hazardous substances. OSHA considers the use of respirators to be the *least* satisfactory approach to exposure control because...

- All respirators leak!
- Respirators provide adequate protection only if employers ensure, on a constant basis, that they are properly fitted and worn.
- Respirators protect only the employees who are wearing them from a hazard, rather than reducing or eliminating the hazard from the workplace as a whole (which is what engineering and work practice controls do).
- Respirators are uncomfortable to wear, cumbersome to use, and interfere with communication in the workplace, which can often be critical to maintaining safety and health.

***The costs of operating a functional respiratory protection program are substantial — including regular medical examinations, fit testing, training, and the purchasing and maintenance of equipment.***

## ***Use Only NIOSH Approved Respirators!***

***Respirator examples...***



***Half-Mask Negative Pressure Air Purifying (Elastomeric Type)***



***Half-Mask Negative Pressure Air Purifying Filtering Facepiece (Disposable)***

***Prioritize your efforts*** — justify your actions using the hierarchy of controls; ensure compliance with applicable OSHA standards and adequately protect and inform employees of potential health hazards.

## Respirator Types

The appropriate respirator will depend on the contaminant(s) to which you are exposed and the protection factor (PF) required. Required respirators must be NIOSH-approved and medical evaluation, fit testing and training must be provided before use.

<b>Approved filtering facepieces</b> – can be used for dust, mists, welding fumes, mold, etc. They do not provide protection from gases or vapors. DO NOT USE FOR ASBESTOS.	Disposable & easy to breathe through – easier to use under welding hoods/helmets and with face shields. Least protection (rated the same as elastomeric half-face). Not allowed for use in atmospheres with less than 19.5% oxygen.	 <b>Filtering Facepiece</b>
<b>Half-face respirators (elastomeric)</b> – can be used for protection against most vapors, acid gases, dust or welding fumes, mold. Cartridges/filters must match contaminant(s) and be changed periodically.	Can be used with a variety of cartridges/filters. Hard to get a good fit with some people. Requires regular cleaning and periodic disinfecting, requires maintenance and replacement of parts. Not allowed for use in atmospheres with less than 19.5% oxygen.	 <b>Half-Face (Elastomeric)</b>
<b>Full-face respirators (elastomeric)</b> – are more protective than half-face respirators. They can also be used for protection against most vapors, acid gases, dust or welding fumes and mold. The face-shield protects face and eyes from irritants and contaminants. Cartridges/filters must match contaminant(s) and be changed periodically.	Can be used with a variety of cartridges/filters. Built in safety eye protection (ANSI Z87). Requires regular cleaning and periodic disinfecting, requires maintenance and replacement of parts. Not allowed for use in atmospheres with less than 19.5% oxygen.	 <b>Full-Face (Elastomeric)</b>
<b>Powered-air-purifying respirators (PAPR)</b> – offers breathing comfort from a battery powered fan which pulls air through filters and blows air into the facepiece or hood. Hooded PAPR's may be worn by workers who have beards under certain circumstances. Cartridges/filters must match contaminant(s) and be changed periodically.	May be loose-fitting or tight-fitting. Can be used with a variety of cartridges/filters. Built in safety eye protection (ANSI Z87). Easier to fit, easier on heart and lungs. Requires regular cleaning and periodic disinfecting, requires maintenance and replacement of parts. Not allowed for use in atmospheres with less than 19.5% oxygen.	 <b>Loose Fitting PAPR</b>
<b>Self-Contained Breathing Apparatus (SCBA)</b> – is used for entry and escape from atmospheres that are considered immediately dangerous to life and health (IDLH) or oxygen deficient. They use their own air tank.	Built in safety eye protection (ANSI Z87). Easier to fit. Requires regular cleaning and periodic disinfecting, requires maintenance and replacement of parts. Requires Compressed Gas Association (CGA) Grade D breathing air. Can be used in Oxygen deficient atmospheres (less than 19.5% oxygen).	 <b>SCBA</b>

**Table 1. (29 CFR 1910.134) -- Assigned Protection Factors<sup>5</sup>**

Type of respirator <sup>1, 2</sup>	Quarter mask	Half mask	Full facepiece	Helmet/hood	Loose-fitting facepiece
Air-Purifying Respirator	5	<sup>3</sup> 10	50	.....	.....
Powered Air-Purifying Respirator (PAPR)	.....	50	1,000	<sup>4</sup> 25/1,000	25
Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode	.....	10	50	.....	.....
• Continuous flow mode	.....	50	1,000	<sup>4</sup> 25/1,000	25
• Pressure-demand or other positive-pressure mode	.....	50	1,000	.....	.....
Self-Contained Breathing Apparatus (SCBA)					
• Demand mode	.....	10	50	50	.....
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	.....	.....	10,000	10,000	.....

Notes:

<sup>1</sup> Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

<sup>2</sup> The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

<sup>3</sup> This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

<sup>4</sup> The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

<sup>5</sup> These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

### Facial Hair

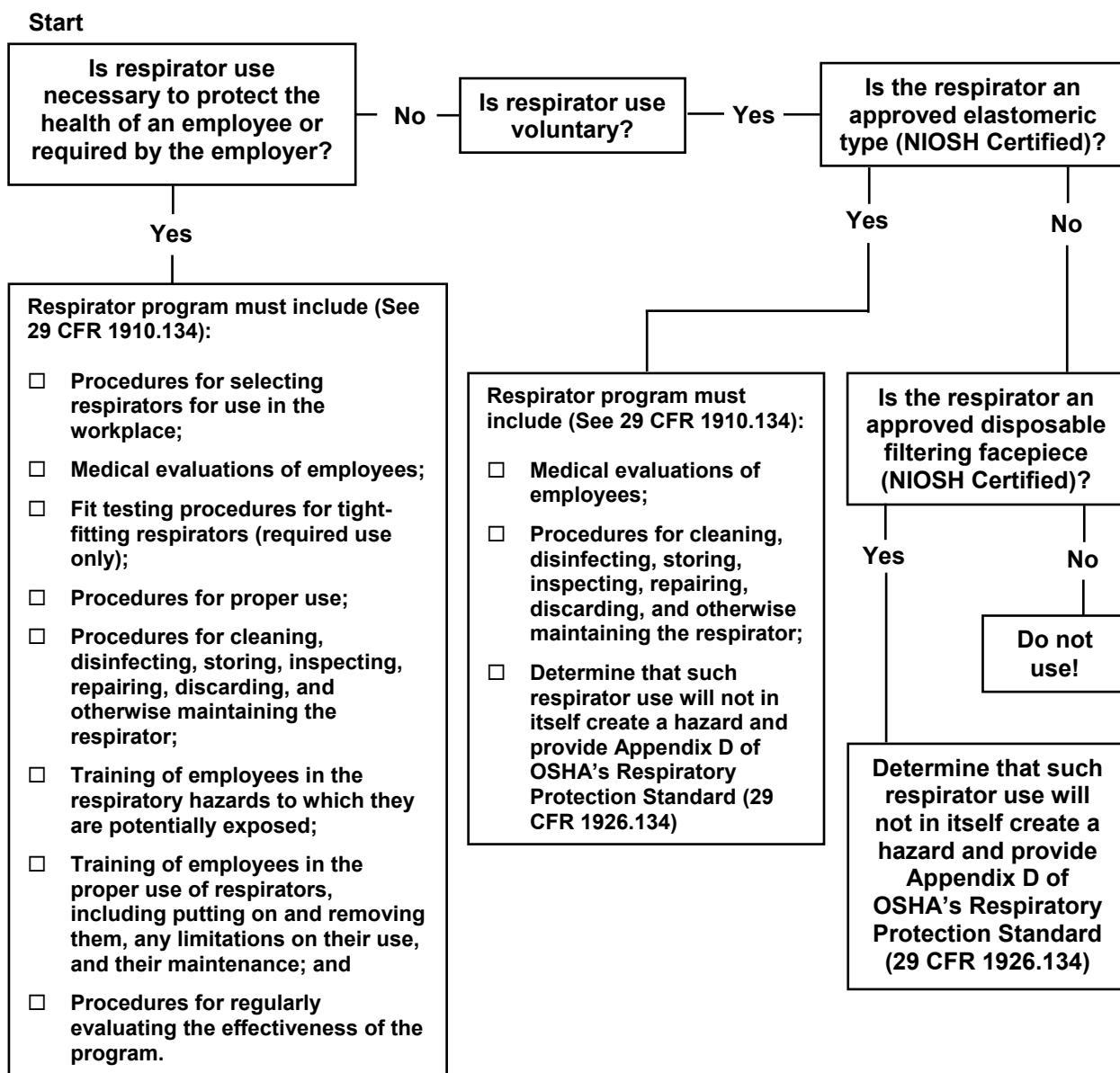
**Facial hair is not allowed while wearing a tight fitting facepiece respirator; it interferes with the fit and will allow more hazardous substances to leak into the facepiece. However, some mustaches, sideburns, and small goatees that are trimmed so that no hair underlies the seal of the respirator present no hazard and may be worn – only a properly performed fit test will ensure this.**



## ***Respiratory Protection Decision Flow Chart***

The allowable use of a respirator depends on certain circumstances; two scenarios in which an employee may wear a respirator are:

1. ***Employee must wear a respirator due to job-site conditions;*** if concentrations of airborne contaminants cannot be effectively minimized to below permissible exposure limits through engineering or administrative controls then respiratory protection must be worn.
  2. ***Voluntary use by employee;*** an employee may choose to wear a respirator under voluntary conditions when concentrations of airborne contaminants are below legal permissible exposure limits.
- 



OSHA considers health hazards to be a priority; a team of health experts (industrial hygienists) conduct workplace inspections focusing on health related issues. Health standards and **Special Emphasis Programs** are written to protect the worker and to give OSHA the authority to stop unsafe work.

## OSHA's Special Emphasis Programs

**National Emphasis Programs specifically targeting health hazards in construction:**

- National Emphasis Program – Crystalline Silica (CPL 03-00-007)
- National Emphasis Program on Lead (CPL 03-00-009)
- National Emphasis Program – Hexavalent Chromium (CPL 02-02-076)

In addition to these National Emphasis Programs, OSHA provides standards and compliance guides for the following health related topics...

- Inspection Procedures for the Hazard Communication Standard – OSHA Instruction CPL 02-02-038.
- Inspection Procedures for the Respiratory Protection Standard – OSHA Instruction CPL 02-00-120.
- Inspection Procedures for Hexavalent Chromium Standard – OSHA Instruction CPL 02-02-074
- Inspection Procedures for Occupational Exposure to Asbestos – OSHA Instruction CPL 02-02-063.

*For a complete listing of health standards and OSHA Special Emphasis Programs, go to [www.osha.gov](http://www.osha.gov)*

***WARNING!*** A cloud of dust surrounding a worker's face is a serious health hazard. This condition will not go unnoticed and is considered to be immediately dangerous to life and health!



**Review**

*Match the letter to correct acronym, word or phrase...*

<input type="checkbox"/> _____	<b>Elimination &amp; Substitution</b>	<b>a.</b> Dust suppression systems and mechanical ventilation.
<input type="checkbox"/> _____	<b>Engineering Controls</b>	<b>b.</b> Good housekeeping, proper hygiene, worker rotation and effective scheduling of work.
<input type="checkbox"/> _____	<b>Administrative Controls</b>	<b>c.</b> Respirators, chemical resistant suits and gloves, hearing protection and safety glasses.
<input type="checkbox"/> _____	<b>Personal Protective Equipment</b>	<b>d.</b> Redesigning work stations, using different tools and equipment to do a task, selecting less hazardous substances to perform a job.
<input type="checkbox"/> _____	<b>OSHA Special Emphasis Programs for Health</b>	<b>e.</b> Crystalline Silica (CPL 03-00-007), Lead (CPL 03-00-009) & Hexavalent Chromium (CPL 02-02-076)
<input type="checkbox"/> _____	<b>PEL (acronym)</b>	<b>f.</b> Action Limit
<input type="checkbox"/> _____	<b>AL (acronym)</b>	<b>g.</b> Short Term Exposure Limit
<input type="checkbox"/> _____	<b>C (acronym)</b>	<b>h.</b> Ceiling
<input type="checkbox"/> _____	<b>ACGIH® (acronym)</b>	<b>i.</b> National Institute for Occupational Safety & Health
<input type="checkbox"/> _____	<b>TLV® (acronym)</b>	<b>j.</b> Permissible Exposure Limit
<input type="checkbox"/> _____	<b>NIOSH (acronym)</b>	<b>k.</b> American Conference of Governmental Industrial Hygienists
<input type="checkbox"/> _____	<b>REL (acronym)</b>	<b>l.</b> Threshold Limit Value
<input type="checkbox"/> _____	<b>STEL (acronym)</b>	<b>m.</b> Recommended Exposure Limit

# COMPETENT PERSON

## ***Learning Goals:***

- Be able to identify the definition of competent person and know how to apply its meaning to construction job-sites.
- Identify the specific competent person requirements in OSHA's health standards.
- Learn an employer's responsibilities towards injury and illness prevention and be able to explain OSHA's employee training requirements.

## ***Important Terms:***

- Competent person
- Qualified person
- Industrial Hygienist
- Program administrator

To ensure a safe and healthful workplace, employers must designate a **competent person** to each job-site. This person has the responsibility to conduct frequent and regular inspections of the job-site, materials and equipment; this includes health related exposures. In addition to the inspection duties, a competent person will also perform regular and on-going safety training; this includes new hire worker orientation.

***Health hazard communication is an important part of a competent person's job!***

**COMPETENT PERSON** means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.



**29 CFR 1926.32(f)**

The term "**Competent**" (or similar meaning) is used in the following OSHA health related topics.

## Occupational Health and Environmental Controls

### *Ionizing radiation*

Any activity which involves the use of radioactive materials or X-rays, whether or not under license from the Nuclear Regulatory Commission, must be performed by **competent persons** specially trained in the proper and safe operation of such equipment. In the case of materials used under Commission license, only persons actually licensed, or **competent persons** under direction and supervision of the licensee, must perform such work.



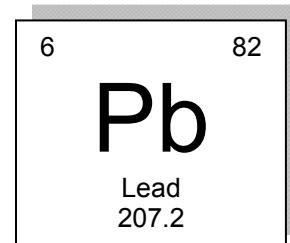
29 CFR 1926.53

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### **Lead**

The compliance (lead) program must provide for frequent and regular inspections of job sites, materials, and equipment to be made by a **competent person**.

29 CFR 1926.62



*Exposure to lead is a recognized health hazard in construction and is a leading cause of workplace illness.*



The term "**Competent**" (or similar meaning) is used in the following OSHA health related topics.

## Occupational Health and Environmental Controls

### **Gases, Vapors, Fumes, Dusts, and Mists**

Exposure of employees to inhalation, ingestion, skin absorption, or contact with any materials or substance at a concentration above those specified in [OSHA regulations], must be avoided!

To achieve compliance with [OSHA health standards] administrative or engineering controls must first be implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or other protective measures must be used to keep the exposure of employees to air contaminants within the limits prescribed [by OSHA]. Any equipment and technical measures used for this purpose must first be approved for each particular use by a **competent industrial hygienist** or other technically qualified person.

**29 CFR 1926.55**

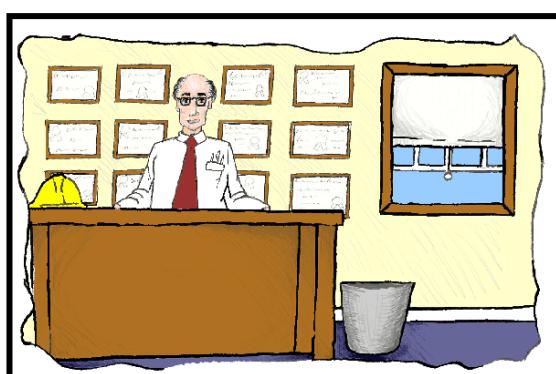
**QUALIFIED PERSON** means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

**29 CFR 1926.32(m)**



**INDUSTRIAL HYGIENIST** - A professional devoted to the anticipation, recognition, evaluation, prevention, and control of those environmental factors or stresses arising in or from the workplace which may cause sickness, impaired health and well-being, or significant discomfort among workers.

*American Industrial Hygiene Association*



The term "**Competent**" (or similar meaning) is used in the following OSHA health related topics.

## Personal Protective and Life Saving Equipment

### Hearing protection

Ear protective devices inserted in the ear must be fitted or determined individually by **competent persons**.



29 CFR 1926.101

### Respiratory protection

A respiratory protection program, when used, must be administered by a suitably trained **program administrator (competent person)**.

29 CFR 1926.103 (see 29 CFR 1910.134)

**NOTE:** In OSHA's Respiratory Protection Standard, the term "**Program Administrator**" is used to describe the person who has authority for ensuring compliance with the rule and administering the program.



### A comprehensive respiratory protection program will include:

- Procedures for selecting respirators for use in particular jobs.
- Medical evaluations of employees.
- Fit testing procedures for tight-fitting respirators (elastomeric facepieces).
- Procedures for proper use of respirators.
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators.
- Training of employees in the respiratory hazards to which they are potentially exposed.
- Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance.
- Review of the program.

The term "**Competent**" (or similar meaning) is used in the following OSHA health related topics.

## **Welding and Cutting**

### ***Welding, Cutting & Heating in way of Preservative Coatings***

Before welding, cutting, or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test must be made by a **competent person** to determine its flammability.

**29 CFR 1926.354**

**NOTE:** A **competent person** must determine the presence of any toxic exposure during all welding, cutting and heating activities.



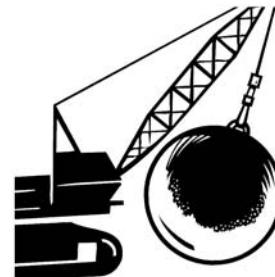
## **Demolition**

### ***Preparatory Operations***

Prior to permitting employees to start demolition operations, an engineering survey must be made, by a **competent person**...

**29 CFR 1926.850**

**NOTE:** An engineering survey includes determining the presence of any hazardous materials used on the property. When the presence of any such substances is apparent or suspected, testing must be performed and the hazard eliminated before demolition is started.



The term "**Competent**" (or similar meaning) is used in the following OSHA health related topics.

## Toxic and Hazardous Substances

### Asbestos

The employer must ensure that all asbestos work performed within regulated areas is supervised by a **competent person**...

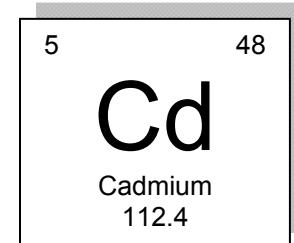
29 CFR 1926.1101



### Cadmium

Prior to the performance of any construction work where employees may be potentially exposed to cadmium, the employer must establish the applicability of this standard by determining whether cadmium is present in the workplace and whether there is the possibility that employee exposures will be at or above the action level. The employer must designate a **competent person** who must make this determination.

29 CFR 1926.1127



*Cadmium is an extremely toxic metal; it can be released into the air during welding, cutting and brazing operations; several deaths from exposure have occurred among welders who have unsuspectingly welded on cadmium-containing alloys.*



The term "**Competent**" (or similar meaning) is used in the following OSHA health related topics.

## Accident Prevention Responsibilities

### Safety & Health Programs

[Safety & Health] programs must provide for frequent and regular inspections of the job sites, materials, and equipment to be made by **competent persons** designated by the employers.

29 CFR 1926.20(b)



### Elements of an Effective Safety & Health Program...

**Management Commitment and Employee Involvement** – Establish clear policies for safe work and assign competent persons to the job-site to ensure that these safe work policies are being implemented and enforced. Communicate safety goals and provide visible top management commitment to show that the company is serious about safety.

**Worksite Analysis** – Conduct comprehensive baseline worksite surveys for safety and health hazards, perform regular inspections of the job-site and complete routine job hazard analyses.

**Hazard Prevention and Control** – Implement effective engineering, work practice (administrative) controls and provide personal protective equipment.

**Medical Management** – Ensure the availability of medical personnel for advice and consultation on matters of occupational health.

**Safety and Health Training** – Ensure that all employees understand the hazards to which they may be exposed and how to prevent harm to themselves and others from exposure to these hazards.

**Program Evaluation** – Review program to ensure that the existing policies, procedures and hazard prevention & control strategies are working and affective.

## Employee Training Requirements

**29 CFR 1926.21(b)**

- (1) The employer should avail himself of the safety and health training programs the Secretary (OSHA) provides.
- (2) The employer must instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.
- (3) Employees required to handle or use poisons, caustics, and other harmful substances must be instructed regarding the safe handling and use, and be made aware of the potential hazards, personal hygiene, and personal protective measures required.
- (4) In job site areas where harmful plants or animals are present, employees who may be exposed must be instructed regarding the potential hazards, and how to avoid injury, and the first aid procedures to be used in the event of injury.
- (5) Employees required to handle or use flammable liquids, gases, or toxic materials must be instructed in the safe handling and use of these materials and made aware of the specific requirements contained in OSHA's 29 CFR 1926 Subparts D, F, and other applicable subparts.



*Respirator Training  
Construction Safety Council*



*HAZWOPER Training  
Construction Safety Council*



*HAZWOPER Training  
Construction Safety Council*

## Employee Training Requirements

**29 CFR 1926.21(b)**

- (6) All employees required to enter into confined or enclosed spaces must be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required. The employer must comply with any specific regulations that apply to work in dangerous or potentially dangerous areas.



*Worker in confined space wearing full-facepiece (elastomeric) – air purifying respirator.*

***In addition to the general safety education and training requirements established by OSHA, additional rules may also apply to specific standards.***

***OSHA has specific training requirements for each of the following health related topics:***

- Employee Emergency Action Plans
- Medical Services and First-aid
- Ionizing Radiation
- Non-ionizing Radiation
- Gases, Vapors, Fumes, Dusts (Silica), and Mists
- Hazard Communication
- Methylenedianiline
- Lead in Construction
- Hexavalent Chromium
- Process Safety Management of Highly Hazardous Chemicals
- Hazardous Waste Operations and Emergency Response
- Hearing Protection
- Respiratory Protection
- Welding and Cutting
- Site Clearing
- Underground Construction
- Preparatory Operations in Demolition
- Asbestos
- Use of Carcinogens
- Vinyl Chloride
- Inorganic Arsenic
- Cadmium

## Review

***Match the letter to correct acronym, word or phrase...***

<input type="text"/> _____	<b>Competent Person</b>
<input type="text"/> _____	<b>Qualified Person</b>
<input type="text"/> _____	<b>Industrial Hygienist</b>
<input type="text"/> _____	<b>Program Administrator</b>

- a.** One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- b.** A professional devoted to the anticipation, recognition, evaluation, prevention, and control of environmental factors or stresses arising in or from the workplace which may cause sickness, impaired health and well being, or significant discomfort among workers.
- c.** One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.
- d.** The person who is responsible for administrating a respiratory protection program for an employer.

# HEALTH HAZARDS IN CONSTRUCTION

## ***Learning Goals:***

- Be able to explain what a hazard is and how workers might be exposed to occupational health hazards in construction.
- List the three categories of health hazards found in construction.
- Overview the health effects of these hazards on the human body.
- Define important terms used to describe dangerous & hazardous environments.

## ***Important Terms:***

- Health Hazard
- Acute Effects
- Chronic Effects
- Local Effects
- Systemic Effects
- Immediately Dangerous to Life & Health (IDLH)
- Hazardous Atmosphere
- Flammable & Explosive Environments
- Oxygen Deficiency Hazard

## ***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 Health Hazard?***

There are many definitions of health, but simply stated...

***Health is the general condition of a person in all aspects, including, but not limited to: physical, mental and social well-being and not merely the absence of disease or infirmity.***

A health hazard is any condition or activity that threatens a person's well-being.



***Learn all the health hazards on your job...  
Anticipate, Recognize, Evaluate and Control these hazards.***

Health hazards in construction can be classified into three (3) categories...

## Health Hazards Categories...

- 1. Chemical Hazards;** such as gases, vapors, fumes, dusts/fibers, mists and substances found in **OSHA PELs<sup>1</sup>, NIOSH RELs<sup>2</sup>, and ACGIH TLVs®<sup>3</sup>**
- 2. Physical Hazards;** such as temperature, noise, repetitive motion & awkward postures, ionizing and non-ionizing radiation.
- 3. Biological Hazards;** such as mold, bloodborne pathogens, bacteria, poisonous plants and animals, animal, bird and rodent feces.

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*Some health hazards are obvious, like working with chemicals...*



*Some health hazards are not so obvious, like awkward postures and noise exposure...*



<sup>1</sup> Occupational Safety & Health Administration Permissible Exposure Limits

<sup>2</sup> National Institute of Occupational Safety & Health Recommended Exposure Limits

<sup>3</sup> American Conference of Governmental Industrial Hygienists Threshold Limit Values

## Health Effects and the Human Body

Health hazards may cause measurable changes in the body - such as decreased pulmonary function, hearing loss and/or muscle fatigue and stiffness. These changes are generally indicated by the occurrence of signs and symptoms in the exposed employees - such as shortness of breath.

The following are example of health hazards and their effects on the human body.

	<b>Health Hazard</b>	<b>Health Effect</b>
<b>Chemical</b>	Gas	<ul style="list-style-type: none"> <li>▪ <b>Asphyxiation</b></li> <li>▪ <b>Reduced pulmonary function</b></li> <li>▪ <b>Damage to body tissue and organs</b></li> <li>▪ <b>Metal fume fever (inhalation of fine particles of zinc, magnesium and copper)</b></li> <li>▪ <b>Silicosis</b></li> <li>▪ <b>Asbestosis</b></li> <li>▪ <b>Mesothelioma</b></li> <li>▪ <b>Dermatitis</b></li> <li>▪ <b>Cancer</b></li> </ul>
	Vapor	
	Fume	
	Dust/Fiber	
	Mist	
<b>Physical</b>	Temperature	<ul style="list-style-type: none"> <li>▪ <b>Heat exhaustion and heat stroke</b></li> <li>▪ <b>Hypothermia and frost bite</b></li> <li>▪ <b>Hearing loss</b></li> <li>▪ <b>Cumulative trauma disorder</b></li> <li>▪ <b>Sunburn</b></li> <li>▪ <b>Tissue heating and burning</b></li> <li>▪ <b>Cancer</b></li> </ul>
	Noise	
	Repetitive Motion & Awkward Postures	
	Ionizing Radiation	
	Non-Ionizing Radiation	
<b>Biological</b>	Mold	<ul style="list-style-type: none"> <li>▪ <b>Allergic reaction</b></li> <li>▪ <b>Asthmatic reaction (constriction of bronchial tubes)</b></li> <li>▪ <b>Hepatitis</b></li> <li>▪ <b>HIV</b></li> <li>▪ <b>Histoplasmosis</b></li> <li>▪ <b>Infections</b></li> </ul>
	Bloodborne Pathogens	
	Bacteria & Viruses	
	Poisonous Plants & Animals	
	Animal, Bird & Rodent Feces	

The toxic action of a health hazard can be divided into **acute (short-term)** effects and chronic (long-term) effects.

## Acute Health Effects

**Acute health effects** are quickly seen, usually after exposures to fairly high levels or concentrations of hazardous substances. For example, fiberglass can immediately cause itchiness and skin irritation; an extremely loud noise can result in temporary or even permanent hearing loss.

A lethal concentration of carbon monoxide, CO (1200 ppm) is considered to be **Immediately Dangerous to Life and Health (IDLH)**; a worker exposed to this acute amount of CO can lose consciousness and die.

**Acute effects referred to most frequently are:**

- Irritation; rashes & dry skin
- Dermatitis (acute)
- Corrosivity; burns or dissolves skin tissue
- Sensitization; allergic reactions (anaphylactic shock)
- Metal fume fever
- Lethal Concentration (LC)

**Skin rashes, red dry skin and dermatitis are examples of acute health effects.**



**Acute Toxicity** - refers to those adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours.

**Lethal Concentration (LC)** - An indication of the lethality of a given substance or type of radiation.

**LC<sub>50</sub>** - Is the concentration of a material, which causes the death of 50% (one half) of a group of test animals. The LC<sub>50</sub> is one way to measure the short-term poisoning potential (acute toxicity) of a material.



**Skull & cross-bone symbol is used to warn of an acute toxicity hazard; Globally Harmonized System.**

The toxic action of a health hazard can be divided into acute (short-term) effects and ***chronic (long-term)*** effects.

## Chronic Health Effects

**Chronic effects** usually develop slowly. For example, if you breathe small amounts of asbestos fibers, you won't even notice them. There are no acute effects. But if you inhale asbestos month after month, year after year, you greatly increase your chances of getting asbestos disease, such as lung cancer. This is a chronic effect.

Other examples of chronic health effects include hearing loss and cumulative trauma disorders; these are examples of physical health hazards.

**Chronic effects referred to most frequently are:**

- Cancer
- Asbestosis
- Mesothelioma
- Silicosis
- Occupational Hearing Loss
- Cumulative Trauma Disorder

## Chronic Health Effects and Long-Term Disability

Most health effects experienced in construction are typically chronic; this makes it difficult to associate where the exposure occurred. For example, a worker in their later years presents with a chronic health effect. The exposures that may have caused the damage could have occurred very early in his working life.



**Chronic health hazard symbol;**  
**Globally Harmonized System.**



**Worker with chronic health problems; he needs oxygen.**

Health hazards to the body may be subjected to a small area of which a chemical or other substance makes direct contact; these are called ***local health effects***.

### Local Health Effects

A ***local health effect*** refers to an adverse health effect that takes place at the point or area of contact. The site may be skin, mucous membranes, the respiratory tract, gastrointestinal system, eyes, etc. Absorption does not necessarily occur.

An example of a local health effect is an exposure to strong acids or alkalis resulting in skin damage.

#### ***Examples of local health effects (corrosives, irritants & sensitizers):***

- Concrete burns
- Skin & eye irritation
- Dermatitis
- Poison Ivy
- Tissue damage
- Acid burn
- Sunburn



Pictogram for Corrosive  
Globally Harmonized System



Pictogram for Irritant & Sensitizer  
Globally Harmonized System

### Local Health Effect

Substance makes contact with body...

Damage to body occurs at point of contact.

#### Eye Irritation

Irritation to the Throat, Nose, Mouth & Lungs

Skin irritation & Tissue Damage

Other chemicals when exposed to the worker can be absorbed into the body and affect the whole body; these are called ***systemic health effects***.

## Systemic Health Effects

A ***systemic health effect*** refers to an adverse health effect that takes place at a location distant from the body's initial point of contact, for example, a chemical is inhaled into the lungs or absorbed through the skin, yet it affects the person's kidney, liver or other part of the body.

Substances with systemic effects often have "Target Organs" in which they accumulate and exert their toxic effect. Often these effects are not seen until a critical body burden is reached.



Pictogram for Carcinogen  
Globally Harmonized System



Pictogram for Toxin  
Globally Harmonized System

- Examples of systemic health effects (carcinogens, toxins and sensitizers):**
- Asbestosis & Mesothelioma
  - Silicosis
  - Metal fume fever
  - Kidney damage
  - Allergic reactions
  - Infections
  - Radiation sickness
  - Nervous system failure
  - Reproductive system damage

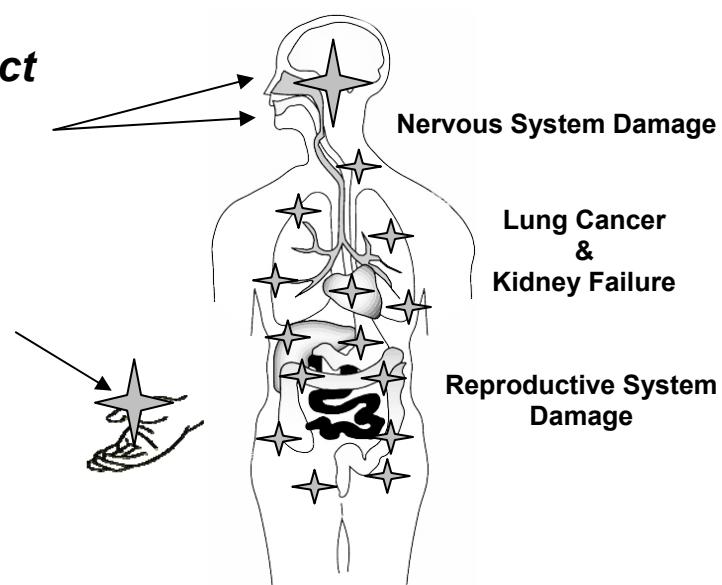


Pictogram for Sensitizer  
Globally Harmonized System

## Systemic Health Effect

Substance enters the body (see *Routes of Entry*) and is deposited throughout the system.

Damage to body occurs at locations remote from initial point of contact.



A work environment that poses an immediate threat to an employee's life and health are called ***Immediately Dangerous to Life & Health (IDLH)***.

## **Immediately Dangerous to Life & Health (IDLH)**

An IDLH condition is one that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a space.

***NOTE:*** Some materials may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

## **Potential IDLH Environments in Construction**

Because of their potential to contain hazardous atmospheres, confined or enclosed spaces are suspect IDLH environments.

### **Confined & Enclosed Spaces:**

- Storage Tanks
- Process Vessels
- Bins
- Boilers
- Ventilation or Exhaust Ducts
- Sewers & Manholes
- Underground Utility Vaults
- Tunnels
- Pipelines
- Open top spaces more than 4 feet in depth
- Temporary Enclosures (heating enclosures for break)
- Dumpsters
- Stair-wells
- Elevator Shafts
- Basements
- Attics
- Trenches & Excavations



*Hazardous atmospheres may exist in trenches. When a trench reaches a depth of 4 feet, they must be evaluated for IDLH conditions by a competent person.*

## Confined & Enclosed Spaces

**"Confined or enclosed space"** means any space having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere. Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than 4 feet in depth such as pits, tubs, vaults, and vessels.

**All confined or enclosed spaces must be evaluated for IDLH conditions!**

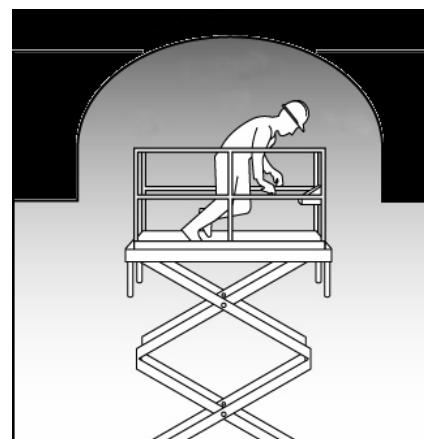
**Contractors must coordinate work in confined or enclosed spaces...**

- **Identify the hazards;** oxygen deficiency, flammable and/or toxic.
- **Classify the space;** enclosed space, confined space (hazards isolated), or permit required confined space.
- **Eliminate and/or control the hazards;** engineering controls (ventilation) and/or personal protective equipment (PPE).
- **Coordinate entry operations;** entrant & attendant responsibilities, ensure proper communication.
- **Ensure prompt rescue;** team readily available, properly equipped & trained!

**Enclosed space example...**

Confined and enclosed spaces can exist where you least expect them; always survey the job-site for potential hazardous atmospheres.

**Working in elevated lifts (locations) could cause you to be exposed to unexpected hazardous atmospheres.**



## Confined & Enclosed Spaces

**Entry into a confined space;** means the action by which a person passes through an opening into a space and is considered to have occurred as soon as any part of the body breaks the plane of the space.

**Confined space entry is serious and dangerous work; always follow approved confined space entry procedures!**

*This is not an approved entry →*



## Confined Space Entry Procedures

**Each employee who enters or is involved in the entry must:**

- Understand the procedures for confined space entry;
- Know the hazards of the specific space;
- Review the specific procedures for each entry; and
- Understand how to use entry and rescue equipment (picture).

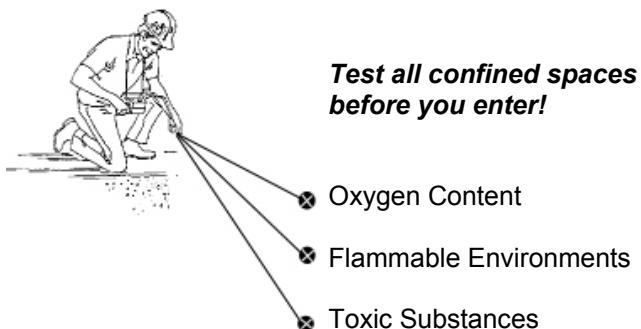


**Confined Space Training Facility  
(Construction Safety Council)**

## Confined Space Entry Permits

Confined Space Entry Permits must be completed before any employee enters a Permit-Required Confined Space. The "Permit" must be completed and signed by the **entry supervisor** before entry. Permits must be maintained on file for 12 months and an annual review of the confined space program must be conducted.

See Sample Confined Space Entry Permit, page 215.



Employees shall not be permitted to work in hazardous and/or toxic atmospheres!

## Hazardous Atmospheres

A *hazardous atmosphere* means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute and/or chronic illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10 percent of its *lower flammable limit (LFL)*.
- Airborne combustible dust at a concentration that meets or exceeds its LFL (*dust obscures vision at a distance of 5 feet or less*).
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
- Atmospheric concentration of any substance for which a permissible exposure limit (PEL) is published in OSHA's standards.

### **Hazardous Atmosphere:**

- Oxygen concentration below 19.5% or above 23.5%
- Flammable gas, vapor, mist in excess of 10% of its lower flammable limit (LFL).
- Airborne combustible dust at high concentrations.
- Exposure to any substance above OSHA's Permissible Exposure Limit (PEL).

*Inside containment preparing for abrasive blasting, blaster dressed in blasting hood with bib and protective clothing. Hazards include: Dust, Lead, Heat, Noise, and Stress.*



NIOSH/Mount Sinai/CHEP/elcoshimages.org

## Group Discussion – Hazardous Atmosphere

***Discuss potential hazardous atmospheres in your workplace.***

- Discuss how these spaces can cause illness, injury or death. What are the potential health effects?

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- Using the hierarchy of controls, how can these hazards be eliminated and/or controlled?

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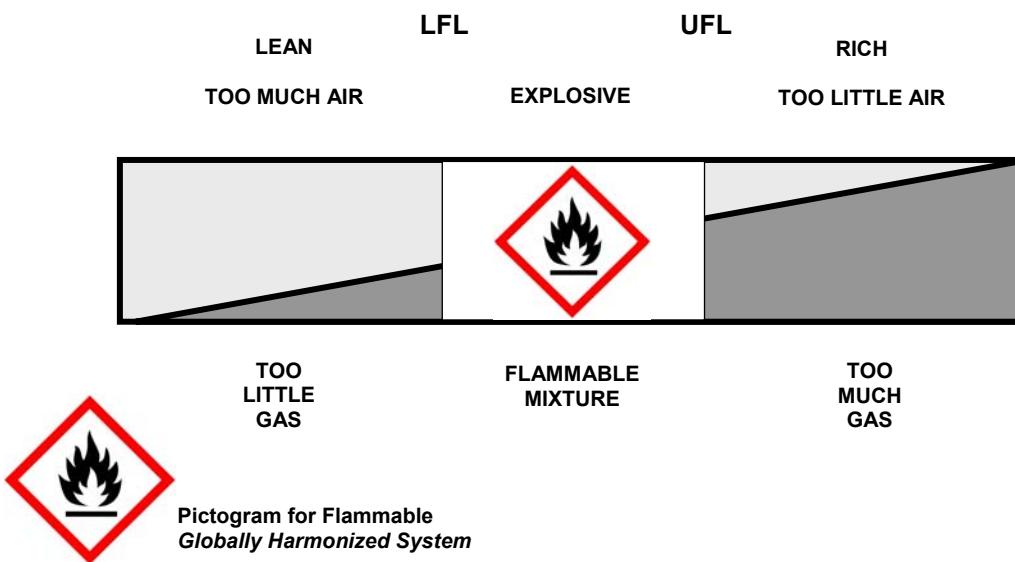


***Workers unprotected; this is a serious health risk. Behaviors like this must be avoided!***

## Flammable & Explosive Hazards

Flammable limits are defined as the concentration range in which a flammable substance can produce a fire or explosion when an ignition source (such as a spark or open flame) is present. The concentration is generally expressed as percent fuel by volume.

For example, Methane ( $\text{CH}_4$ ) has a Lower Flammable Limit (LFL) = 5.3%, and an Upper Flammable Limit (UFL) = 15.0%; if the air contains between 5.3% and 15% volume of air of methane (under normal atmospheric conditions), then a flammable environment exists.



**WARNING!** Atmospheres that are rich in flammable gas (above the UFL) must be ventilated thoroughly, with powerful blowers to completely bring the atmosphere down below the LFL.

### Examples of LFL & UFL

Substance	Lower Flammable Limit (LFL)	Upper Flammable Limit (UFL)
Acetylene	2.5%	100%
Propane	2.1%	9.5%
Gasoline	1.4%	7.6%

OSHA/EPA Occupational Chemical Database & NIOSH Pocket Guide to Hazardous Chemicals

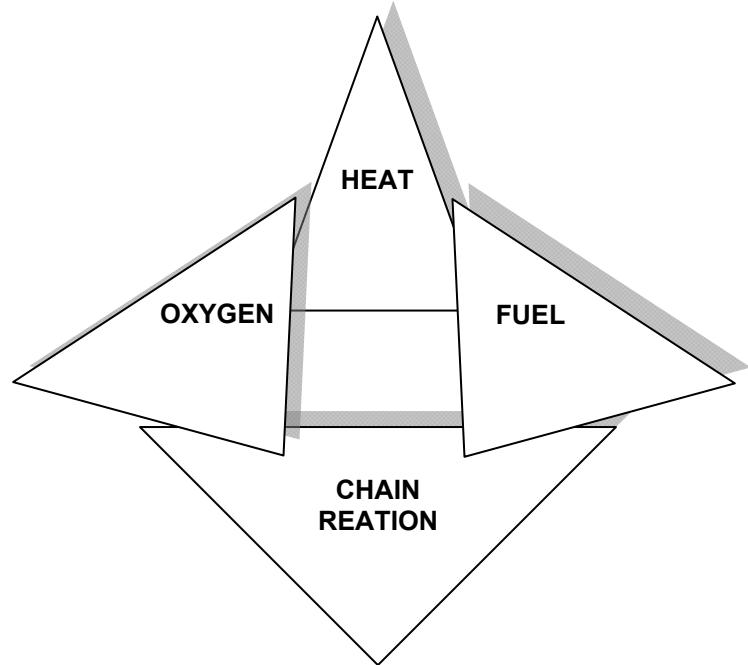
## Flammable & Explosive Hazards

To prevent fire and explosion, ensure that sources of fuel, heat and oxygen are controlled and that the storage and use of these substances are monitored by a competent person.

**Keep fuel, heat & oxygen separated!**

### Fire Tetrahedron

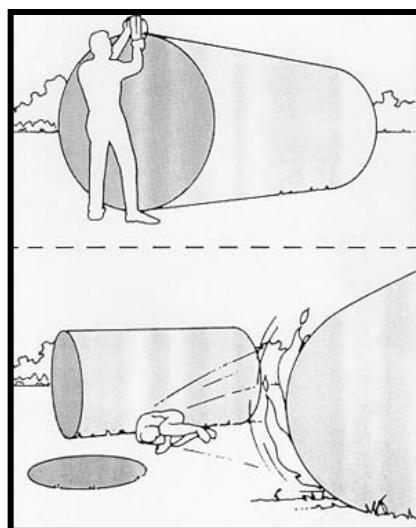
For a fire or explosion to occur, **fuel**, **heat**, **oxygen**, and a **chemical chain reaction** must be present. Removal of any one of these essential elements will result in the fire being extinguished or have never started.



### ACCIDENT REPORT FATAL FACTS

A laborer was killed when a gasoline storage tank he was cutting with a portable power saw exploded.

Although he had experienced working with the saw and scrap materials, the worker did not adequately purge the tank and test for vapors before beginning to cut. The tank had been used recently for underground storage at a service station. At the time of the explosion, the mechanic was cutting on the tank with a gasoline powered portable saw equipped with an abrasive epoxy disk for cutting metal. The explosion propelled the worker 10 to 15 feet from the tank into another tank.



*To see complete OSHA Fatal Fact #3, go to [www.osha.gov](http://www.osha.gov)*

## Flammable Materials (Storage & Use)

### Flammable Liquid (Storage & Use):

- No more than 25 gallons of flammable or combustible liquids may be stored in a room outside of an approved storage cabinet.

29 CFR 1926.152(b)(1)

- Not more than 60 gallons of flammable or 120 gallons of combustible liquids may be stored in any one storage cabinet. Not more than three such cabinets may be located in a single storage area.

29 CFR 1926.152(b)(3)

- Storage of liquid petroleum gas (LPG) within buildings is prohibited.

29 CFR 1926.153(j)

- Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids.

29 CFR 1926.152(a)(1)

### Propane - LPG ( $C_3H_8$ )

- Flammable liquid gas under pressure and can form explosive mixtures with air (LFL = 2.1%).
- May cause frostbite if exposed to skin.
- Simple Asphyxiant; can displace oxygen and cause suffocation.
- Gas density of LPG is 1.55 (air = 1)

**NOTE:** Before suffocation could occur, the lower flammability limit (LFL) of propane in air would be exceeded; possibly causing both an oxygen deficient and explosive atmosphere.



**Propane tanks connected to lift trucks are considered to be "in use" and may be left attached when truck is stored inside a building.**

**NOTE:** Containers in use means connected for use.

### When exchanging out propane (LPG) tanks:

- Be sure area is well ventilated.
- Turn off gas on tank.
- Let truck run gas out of line.
- Remove hose from tank (wear protective gloves).
- No Smoking!

## Hazard Recognition

No more than 25 gallons of a flammable or combustible liquid may be stored in a room outside of an approved storage cabinet.

**Violation →**

*Picture (right) shows more than 25 gallons of a flammable and combustible liquid stored in a room outside of an approved storage cabinet.*

**Good ↓**



*Photo courtesy of Justrite Mfg. Co.*



*Improper storage of flammable & combustible liquids and gases; creates a potential fire hazard as well as a toxic atmosphere. Notice the enclosed space hazard.*

## Hazard Control

An approved "Safety Can" for storage and handling of flammable or combustible liquids:

- A closed container of not more than 5 gallons capacity.
- Has a flash-arresting screen.
- Spring-closing lid and spout cover.

Safety cans are designed so that when subjected to heat, it will safely relieve internal pressure.

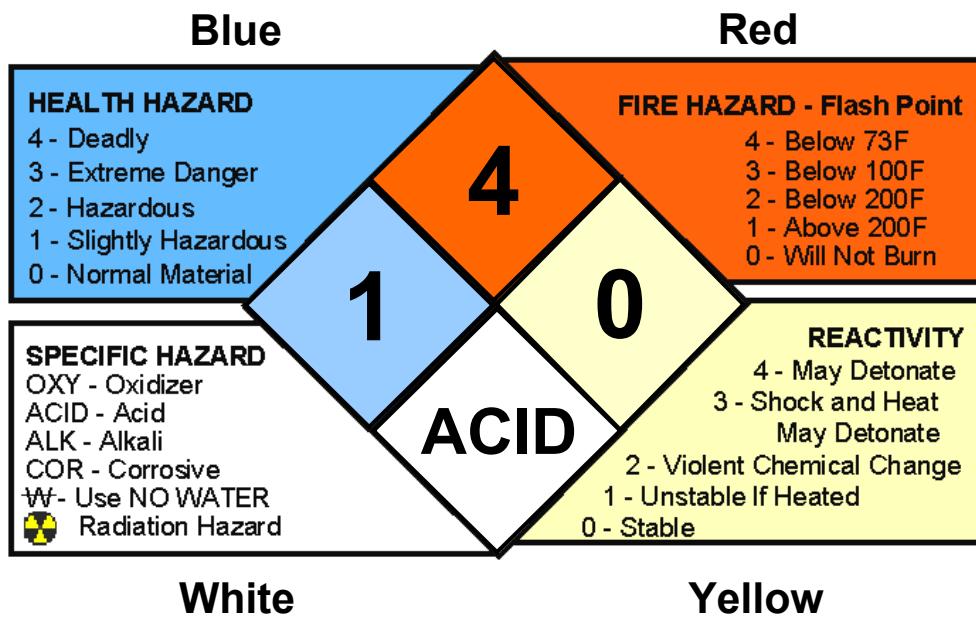


**"Safety Can"**

*Photo courtesy of Justrite Mfg. Co.*

## National Fire Protection Association (NFPA 704M)

The *NFPA 704M Diamond* is a means of disseminating hazard information for a material. The diamond is divided into four sections. Each of the first three colored sections (blue, red & yellow) has a number in it associated with a particular hazard. The higher the number is, the more hazardous a material is for that characteristic. The fourth section (white) includes special hazard information.



The NFPA 704M standard provides a readily recognized, easily understood system for identifying specific hazards. It addresses the health, flammability, instability, and related hazards that may be presented as short-term, acute exposures that are most likely to occur as a result of fire, spill, or similar emergency.

### The objectives of NFPA 704M are:

- To provide an appropriate signal or alert for the protection of both public and private emergency response personnel.
- To assist in planning for effective fire and emergency control operations, including clean-up.
- To assist all designated personnel, engineers, job-site, and safety personnel in evaluating hazards.

## The Globally Harmonized System of Classification & Labeling of Chemicals

The Globally Harmonized System of Classification and Labeling of Chemicals is a system for standardizing and harmonizing the classification and labeling of chemicals. It is a logical and comprehensive approach to defining health, physical and environmental hazards of chemicals and to communicate hazard information, as well as protective measures, on labels and Safety Data Sheets (SDSs).

Globally Harmonized System Pictograms		
	<b>Gas</b>	This is the symbol that will appear on chemicals that are; gases under pressure, compressed gases, liquefied gases, refrigerated liquefied gases, dissolved gases.
	<b>Aquatic Hazard</b>	This is the symbol that will appear on chemicals which are acutely hazardous to fish, crustacea, or aquatic plants.
	<b>Explosive</b>	This is the symbol that will appear on chemicals which are; unstable explosives, self-reactive substances and mixtures, and organic peroxides.
	<b>Flammable</b>	This is the symbol that will appear on chemicals that are flammable. Depending on the properties of the chemical(s); flammable gas, flammable aerosol, flammable liquid and vapor, flammable solid.
	<b>Corrosive</b>	This is the symbol that will appear on chemicals that have corrosive properties. Depending on the properties of the chemical(s); may be corrosive to metal, causes severe skin burns and eye damage, will cause serious eye damage.
	<b>Oxidizer</b>	This is the symbol that will appear on chemical that will release oxygen or behave like oxygen in a chemical reaction; causing a greater fire and explosion.
	<b>Irritant &amp; Sensitizer</b>	This is the symbol that will appear on chemicals with less severe toxicity; harmful if swallowed, harmful in contact with skin, harmful if inhaled, causes skin and eye irritation, may cause allergic skin reaction.
	<b>Acute Toxicity</b>	This is the symbol that will appear on the most severely toxic chemicals. Depending on the toxicity of the chemical, the skull and crossbones indicate that the chemical may be toxic or fatal; inhaled, swallowed, and/or contact with skin.
	<b>Chronic Health Hazard</b>	This is the symbol that will appear on chemicals that poses chronic health hazards; respiratory sensitization, germ cell mutagenicity, carcinogenicity, reproductive toxicity, specific target organ toxicity, and/or aspiration hazard.

## Hazard Symbols & Classes

**Hazard Class** is the nature of the physical or health hazard, e.g., flammable solid, carcinogen, oral acute toxicity.

Flame	Flame Over Circle	Exclamation Mark	Exploding Bomb
 Flammables Self Reactives Pyrophorics Self-Heating Emits Flammable Gas Organic Peroxides	 Oxidizers	 Irritant Dermal Sensitizer Acute Toxicity (Harmful) Narcotic Effects Respiratory Tract Irritation	 Explosives Self Reactives Organic Peroxides
Corrosion	Gas Cylinder	Health Hazard	Skull & Crossbones
 Corrosives	 Gases Under Pressure	 Carcinogen Respiratory Sensitizer Reproductive Toxicity Target Organ Toxicity Mutagenicity Aspiration Toxicity	 Acute Toxicity (Severe)



Aquatic Toxicity

## Physical Hazards Classification

**Hazard Category** is the division of criteria within each hazard class. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.

Hazard Class	Hazard Category							
	Unstable Explosive	Div 1.1	Div 1.2	Div 1.3	Div 1.4	Div 1.5	Div 1.6	
<b>Explosive</b>	Unstable Explosive	Div 1.1	Div 1.2	Div 1.3	Div 1.4	Div 1.5	Div 1.6	
<b>Flammable Gases</b>	1	2						
<b>Flammable Aerosols</b>	1	2						
<b>Oxidizing Gases</b>	1							
<b>Gases under Pressure</b> Compressed Gases Liquefied Gases Refrigerated Liquefied Gases Dissolved Gases	1							
<b>Flammable Liquids</b>	1	2	3	4				
<b>Self-Reactive Chemicals</b>	Type A	Type B	Type C	Type D	Type E	Type F	Type G	
<b>Pyrophoric Liquids</b>	1							
<b>Pyrophoric Solid</b>	1							
<b>Pyrophoric Gases</b>	Single Category							
<b>Self-Heating Chemicals</b>	1	2						
<b>Chemicals, which in contact with water, emit flammable gases</b>	1	2	3					
<b>Oxidizing Liquids</b>	1	2	3					
<b>Oxidizing Solids</b>	1	2	3					
<b>Organic Peroxides</b>	Type A	Type B	Type C	Type D	Type E	Type F	Type G	
<b>Corrosive to Metals</b>	1							
<b>Combustible Dust</b>	Single Category							

## Health Hazards Classifications

Hazard Class	Hazard Category			
Acute Toxicity	1	2	3	4
Skin Corrosion/Irritation	1A	2A	1C	2
Serious Eye Damage/Eye Irritation	1	2A	2B	
Respiratory or Skin Sensitization	1			
Germ Cell Mutagenicity	1A	1B	2	
Carcinogenicity	1A	1B	2	
Reproductive Toxicity	1A	1B	2	Lactation
STOT* – Single Exposure	1	2	3	
STOT* – Repeated	1	2		
Aspiration	1			
<i>Simple Asphyxiants</i>	Single Category			

\* STOT - Specific Target Organ Toxicity

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## Environmental Hazards

**Acute Aquatic Toxicity** means the intrinsic property of a material to cause injury to an aquatic organism in a short-term exposure.

**Chronic Aquatic Toxicity** means the potential or actual properties of a material to cause adverse effects to aquatic organisms during exposures that are determined in relation to the lifecycle of the organism.



## Group Discussion – Propane (LPG)

**Physical Description:** Colorless, odorless gas. [Note: A foul-smelling odorant is often added when used for fuel purposes.]

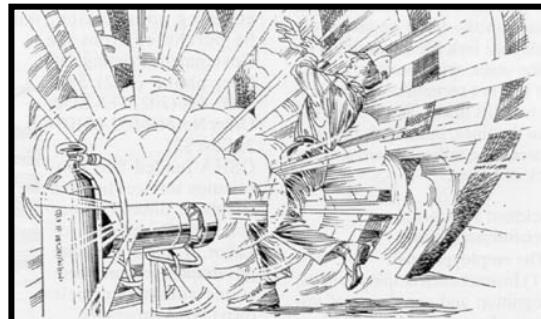
Propane – Physical Properties			
Gas Density: 1.55 (air = 1)	LFL: 2.1%	NFPA Fire Rating: 4 NFPA Health Rating: 1 NFPA Reactivity Rating: 0 NFPA Special Instruction: N/A	
Flash Point: -156°F	UFL: 9.5%		
Globally Harmonized System Label: 			

OSHA/EPA Occupational Chemical Database & NIOSH Pocket Guide to Hazardous Chemicals



Propane gas was being used to fuel a portable heater (blow torch). The torch flamed out, allowing gas to gather in the bilge area of a construction barge. The accumulated gas exploded with great force, killing the worker.

To see complete OSHA Fatal Fact #72, go to [www.osha.gov](http://www.osha.gov)



### Lessons Learned (Propane)

**Propane** – LPG (density = 1.55); a heavy gas in respect to air; it is also highly flammable with a NFPA rating of 4.

If not carefully monitored, LPG gas can migrate and collect into enclosed spaces where it mixes with air. If the volume of propane gas gets to 2.1% of the volume of the air, an explosive environment exists!



Store LPG outside in well ventilated areas and protect against accident damage.