SAFETY STAFF

Construction Safety & Injury Prevention Program

WORKBOOK

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Construction Safety & Injury Prevention Program

The Construction Safety & Injury Prevention Program (CSIP) 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. 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 specifically for the Hawaii market.

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 construction. 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.

Fatal Four Statistics	Top 10 most frequently cited OSHA standards violated
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

Evaluations

Your attendance already is a critical component of the continuation of these types of programs. We ask you provide information so that you can evaluate the success 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!)

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

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?

_____

_____

_____

_____

_____

_____

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

_____

_____

_____

_____

_____

_____

Module 1-2: Workplace Safety & Employee Engagement

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.

<u>Steps</u>

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: Control Engineering: Zero Incidents 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

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

_____

_____

_____

_____

Rules to prevent falls

_____

_____

_____

_____

Rules to prevent “struck by” incidents

_____

_____

_____

_____

Rules to prevent caught in/ between incidents

_____

_____

_____

_____

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?

_____

_____

_____

_____

_____

_____

Handout 1: Job Safety Analysis

JOB HAZARD ANALYSIS (J.H.A.)

Job: Putting Out A Fire — Using A Dry Chemical Fire Extinguisher

Tools/Equipment Required	**Material Required**	**Personal Protective Equipment**
Dry Chemical Fire Extinguisher		Hard Hat Safety Glasses

Steps	Sequence of Steps	Potential Accidents or Hazards	Recommended Safe Job Procedure
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. ever 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:**

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

1

Module 2-1: Safety Inspection Procedure

Activity 1: Safety in the Workplace

Work in groups to answer the following questions

DISCUSSION! List some things that you might include on a Safety Inspection checklist.

Inspection Examples: Emergency Equipment, Office Safety, Fire Safety, Electrical Safety, Storage Methods, Building Safety, etc.

I. _____

II. _____

III. _____

IV. _____

V. _____

Safety Inspection Review

I. Identification of workplace hazards is an important part of the inspection process. **True/ False**

II. Inspections must be conducted by the safety officer only. **True/ False**

III. ORM requires all agencies to conduct and _____inspections

IV. Hazards found in the workplace should be corrected as soon as possible. **True/ False**

V. Indoor air quality issues are part of the inspection process. **True/ False**

VI. Inspections must be conducted and documented using a checklist that reflects actual working conditions. **True/ False**

VII. Life Safety Code 101 only applies to office buildings. **True/ False**

VIII. Observing employees at work must be part of your_____.

IX. Hazards which pose imminent danger must be _____ and corrected immediately.

Handout 1: Sample Safety Inspection Checklist

SAMPLE SAFETY INSPECTION CHECKLIST

NAME OF AGENCY/OFFICE: _____

Area(s) Inspected: _____ **Inspected by:** _____ **Date:** _____

	ITEM	YES	NO	CORRECTIVE ACTION – DATE
1.	Is there litter or spilled liquid on the floor?			
2.	Are floor surfaces chipped: does carpeting show worn spots or holes?			
3.	Are warning signs posted near cleaning areas, repair work or redecorating efforts?			
4.	Are aisles free of boxes, wastebaskets, chairs, and other obstacles that impede traffic?			
5.	Are restrooms kept clean and floors dry?			
6.	Do cords present a tripping hazard?			
7.	Do cords look frayed?			
8.	Are cords draped over hot pipes and/or appliances?			
9.	Are flimsy extension cords in use?			
10.	Are all appliances connected with three-pronged plugs?			
11.	Are electrical outlet boxes or bonnets exposed so that they present a hazard?			
12.	Are cover plates for electrical switches or receptacles cracked or broken?			
13.	Do employees stand on chairs, desks, boxes, drawers, or other improvised ladders?			
14.	Do employees lean way back in chairs with their feet off the floor?			
15.	Do employees put tops on cups of coffee or other liquids while carrying them through the office?			
16.	Do employees run in the office?			
17.	Are stairwells well lit?			
18.	Are stairway handrails, treads and/or risers in good condition?			
19.	Are stairs free of litter, spills or clutter?			
20.	Are desk or file drawers left open?			
21.	Are files, lockers, cabinets, and bookcases bolted securely?			
22.	Is more than one file drawer open at once?			
23.	Are files top-heavy with empty drawers at the bottom and full drawers on top?			
24.	Are transparent glass doors marked so they can be seen?			
25.	Must employees step up or down to go through a doorway? If so, is a warning sign posted?			

Handout 2: Sample Hazard Control Log

Department				Agency		
Location				Date		
Date	Hazard	Immediate Temporary Control	Long-term Solution	Hazard Detected	Priority	Schedule/ Date Completed

Hazards not corrected after 30 days send log to:

Reviewed By: Date:

Reviewed By: Date:

Priority:

E= Emergency
A= Today
B= One Week
C= One Month
D= Three Month

Module 2-2: Incident Investigation Procedure

Activity 1: Discussion
OSHA Incident Investigation Form

Using this information based on a real incident as a guideline, fill out the following form. Feel free to add details to complete the form.

Tom Huns has worked full-time at the ABC construction company for 2 years. Two months ago, he was promoted to Assistance Project Manager. On Tuesday, at 12 pm Tom was on his lunch break. He was working on a project which entailed erecting a billboard sign on the H-1 ramp near the Waipahu exit. The frame for the billboard had been put up the day before. While Tom was eating his lunch in his truck, the structure of the billboard sign fell. Part of the torsion bar fell on Tom's truck while he was sitting inside. Luckily, Tom was inside his truck and survived the accident with two broken legs and a concussion.

After investigating, it was determined that the cause for the collapse was from the welded joint between the stub pipe and the 12-foor long cantilever beam and there was a tear of the tubular section of the cantilever beam near the junction of the stub pipe. Bob Reed had been in charge of welding and inspecting the structure, but he had left early yesterday. Devin Woe, Bob's apprentice, had been put in charge of welding while Bob was gone. No one had inspected Devin's work to ensure that it was done properly.

Form Section

SECTION A: INFORMATION

Company Name: _____ Date: _____

Investigator (or) Team Name (s) and Titles:

Name _____	Title
_____	_____
_____	_____
_____	_____

SECTION B: INCIDENT DESCRIPTION/ INJURY INFORMATION

1) Name and Age of Injured Employee: _____

Employee's first language: _____

Employees Job Title: _____

Job at time of injury: _____

Type of employment: □ Full-time □ Part-time □ Temporary □Seasonal □ Other: _____

Length of time with Company: _____

Length in current position at the time of the incident: _____

Description and severity of injury: _____

2) Date and time of incident: _____

3) Location of Incident: _____

4) Detailed description of incident: Include relevant events leading up to, during, and after the incident. (It is preferred that the information is provided by the injured employee.)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

6) Description of incident from additional employees with knowledge, including relevant events leading up to, during and after the incident. Include names of persons interviewed, job titles and date/time of interviews.

SECTION D: RECOMMENDED CORRECTIVE ACTIONS TO PREVENT FUTURE INCIDENTS

Module 2-2: Incident Investigation Procedure

Activity 2: Discussion: Root Causes

Work in groups to answer the following questions

Root Causes are the underlying reasons the incident occurred, and are the factors that need to be addressed to prevent future incidents. If safety protocols were not being followed, **why were they not being followed**? If a machine was faulty or a safety device failed, **why did it fail?** It is common to find factors that contributed to the incident in several of these areas: equipment/ machinery, tools, procedures, training or lack of training, and work environment. If these factors are identified, you must determine why these factors were not addressed before the incident. Create a list of general questions to identify the root cause of the previous incident.

I. _____

_____

II. _____

_____

III. _____

_____

IV. _____

_____

V. _____

_____

Module 2-3: OSHA Inspections

Activity 1: Introduction to OSHA

Answer some brief questions about OSHA

DISCUSSION! What is the purpose of OSHA?

_____

_____

_____

_____

_____

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 2-3: OSHA Inspections

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 aimed at specific high-hazard industries or individual workplaces that have experienced high rates of injuries and illnesses also receive priority.

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.

Work in groups to answer the following questions

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

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 2-3: 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.

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 2-3: OSHA: Penalties & Contesting

Quiz! OSHA Penalties

Matching! Draw a line to match the violation type to the definition

WILLFUL	A violation that has a direct relationship to safety and health, but probably would not cause death or serious physical harm.
SERIOUS	A violation that the employer intentionally and knowingly commits or a violation that the employer commits with plain indifference to the law.
REPEATED	A violation that is the same or similar to a previous violation.
OTHER-THAN-SERIOUS	A violation where there is substantial probability that death or serious physical harm could result and that the employer knew, or should have known, of the hazard

Handout 3: OSHA Penalty Contesting FAQs

OSHA FAQs

I. **Will a decision to contest anger the OSHA office and will result in future inspections, harassment, discrimination, etc.?**
Consideration: The present laws do not permit the OSHA 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

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

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

Module 2-4: 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

Appendix 1: Incident Investigations A Guide for Employers

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.

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.

Step 2. COLLECT INFORMATION

Incident information is collected through interviews, document reviews and other means. Appendix E 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 experience. 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

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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 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 was 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/IncInvGuide4Empl_Dec2015.pdf

Appendix 2: Documenting Incident Reports

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

- Camera
- Charged Batteries (for phones, cameras, equipment, etc.)
- Video / Audio recorder
- Measuring devices in various sizes
- Leveling rod
- Clipboard and writing pad
- Pens, pencils, markers
- Graph paper
- Incident investigation forms
- Flashlight
- tape
- Photo marking cones
- Personal protective equipment: Gloves, hat, eyewear, ear plugs, face mask, etc.
- Magnifying glass
- High visibility plastic tapes to mark off area
- First aid kit
- Latex gloves
- (Various types: bags, jars, containers, etc.)
- Identification tags
- Strings, stakes, warning Carpenters ruler
- Hammer
- Paint stick (yellow/black)
- Chalk (yellow/white)
- Protractor
- Clinometer
- Sampling [holding] containers with seals
- Straight-edge ruler (Can be used as a scale reference in photos)
- Variety of tape: Scotch, masking, duct
- Compass

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

Tips for Photograph Documentation:

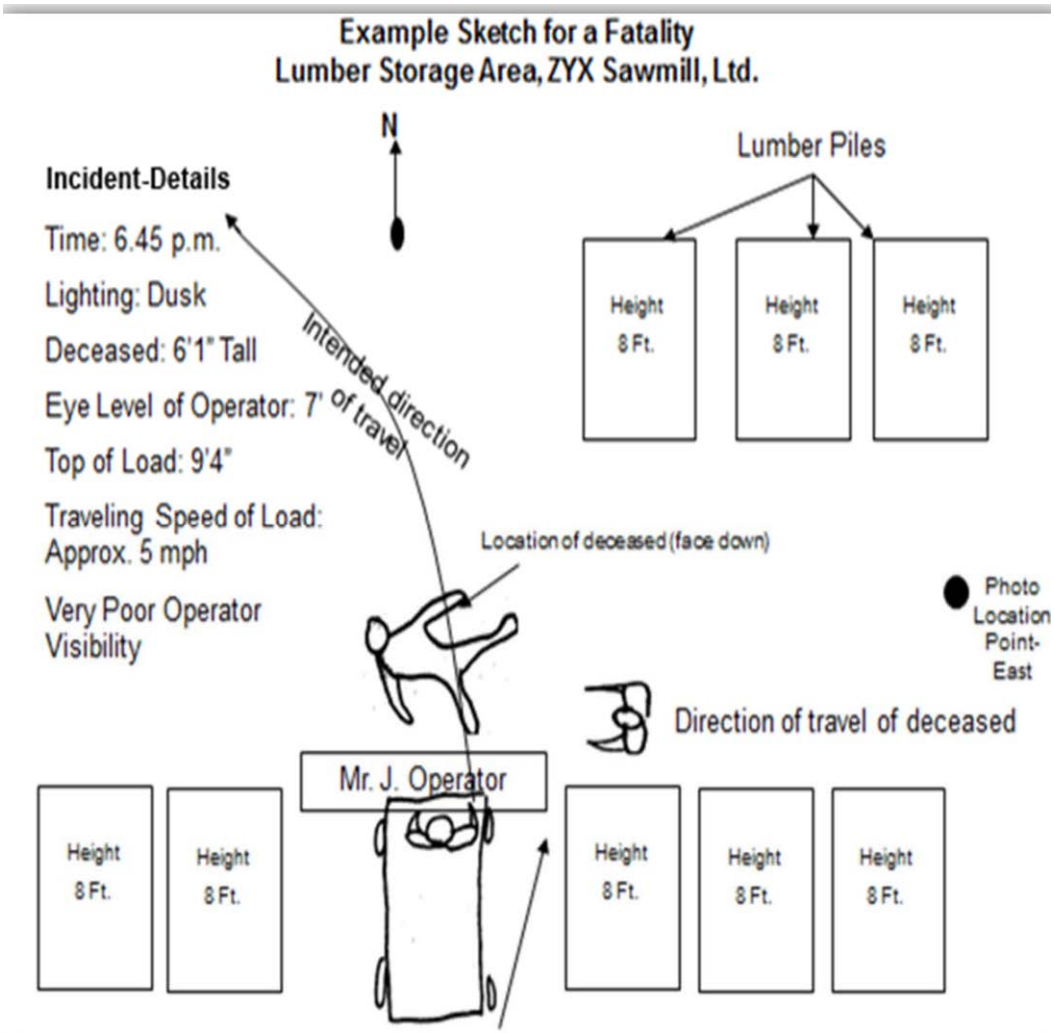
- Always make notes about the photos taken
- Start by taking distance shots first then move in to take closer photos of the scene
- Take photos at different angles (from above, 360 degrees of scene, left, right, rear) to show the relationship of objects and minute and/or transient details such as ends 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/IncInvGuide4Empl_Dec2015.pdf

Appendix 3: 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



Source: https://www.osha.gov/dte/IncInvGuide4Empl_Dec2015.pdf

Appendix 4: Incident Investigation Checklist

Investigators should be sure their investigation answers the following questions

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

Source: https://www.osha.gov/dte/IncInvGuide4Empl_Dec2015.pdf

Appendix 5: Answers

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

Safety Inspection (Page 16)

I. **True** Identification of workplace hazards is an important part of the inspection process.
II. **False** Inspections must be conducted by the safety officer only.
III. **Document** ORM requires all agencies to conduct and _____inspections
IV. **True** Hazards found in the workplace should be corrected as soon as possible.
V. **True** Indoor air quality issues are part of the inspection process.
VI. **True** Inspections must be conducted and documented using a checklist that reflects actual working conditions.
VII. **False** Life Safety Code 101 only applies to office buildings.
VIII. **Inspection Procedure** Observing employees at work must be part of your_____.
IX. **Identified** Hazards, which pose imminent danger must be _____ and corrected immediately.

Introduction to OSHA (page 23)

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 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

OSHA Penalties Matching Answers (Page 27)

OTHER-THAN-SERIOUS: A violation that has a direct relationship to safety and health, but probably would not cause death or serious physical harm.

WILLFUL: A violation that the employer intentionally and knowingly commits or a violation that the employer commits with plain indifference to the law.

REPEATED: A violation that is the same or similar to a previous violation.

SERIOUS: A violation where there is substantial probability that death or serious physical harm could result and that the employer knew, or should have known, of the hazard.

Appendix 6: Site Safety Inspection

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)	
Material Safety Data Sheets onsite with containers labeled	
Scaffold system fully assembled; tags; inspections; fully planked guardrails	

CONSTRUCTION SUPERVISOR SAFETY INSPECTION CHECKLIST	
Proper barricading/ warning signs (trenches, fuel areas, storage construction sites)	
Fire extinguishers (monthly inspection, accessible, on mechanized equipment)	
COMMENTS	

Appendix 7: Sample Inspection Forms

Equipment Safety Inspection Checklist

Operator/ Inspector	Date	Time
Serial Number	Machine Hours	

What are you inspecting?	✓	What are you looking for?	✓	Evaluator Comments
For more information, please refer to the Operation and Maintenance Manual or any other applicable manuals and instructions for this product. If you have questions, please contact your local dealer				

With Engine OFF		Pass/Fail	Action Needed
Fuel	Leaks, Level		
Hydraulic Oil	Leaks, Level		
Engine Oil	Leaks, Level		
Radiator Coolant	Leaks, Level		
Transmission Fluid	Leaks, Level		
Tires	Condition and Pressure		
Forks, Top Clip Retaining Pin and Heel	Check Condition		
Hydraulic Hoses, Mast Chains, Cables and Stops	Visual Check, Leaks, Damage		
Overhead Guard	Attached, Damage		
Safety Warnings	Attached, Visible, Legible (Refer to Parts Manual for Location)		
Battery	Check Water/Electrolyte Level and Charge		
All Engine Belts	Cracked, Damage, Rips, Visual Check		
Engine Air Cleaner	Squeeze Rubber Dirt Trap or Check the Restricton Alarm (if equipped)		
Fuel Sedimentor (Diesel)	Condition		
Operator's Manual	In Cab		
Nameplate	Attached and Information Matches Model, Serial Number and Attachments		
Seat Belt, Buckle, Retractor	Condition, Torn, Ripped, Damage to housing		
Hood Latch	Adjusted and Securely Fastened		
Brake Fluid	Leaks, Level		
With Engine ON			
Accelerator or Direction Control Pedal	Functioning Smoothly and Properly		
Service Brake	Functioning Smoothly and Properly		
Parking Brake	Functioning Smoothly and Properly		
Steering Operation	Functioning Smoothly and Properly		
Drive Control – Forward/Reverse	Functioning Smoothly and Properly		
Tilt Control – Forward and Back	Functioning Smoothly and Properly		
Hoist and Lowering Control	Functioning Smoothly and Properly		
Attachment Control	Operation		
Horn and Lights	Functioning Properly		
Cab (if equipped) – Heater, Defroster, Wipers	Functioning Properly		
Gauges: Ammeter, Engine Oil Pressure, Hour Meter, Fuel Level, Temperature, Instrument Monitors	Functioning Properly		

Source: http://s7d2.scene7.com/is/content/Caterpillar/C10836855

Construction Safety Inspection Checklist

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
Program Administration					**Material Storage/Handling**				
OSHA Posting					Materials properly stored/stacked				
Emergency numbers/contacts posted					Dust protection adequate				
Hazard Communication Program					Loads lifted correctly				
Daily/Weekly safety meetings held					**Excavations & Shoring**				
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				
Fire Prevention					Equipment ramps adequate				
Fire extinguishers available					**Ladders**				
Correct extinguishers for job					Ladders in good condition				
No smoking posted and enforced					Side rails extend 36" above landing				
Electrical/Utility					Proper for job & secure				
Electrical hazards posted					Ladders fully open when in use				
Drop cords protected					**Scaffolding**				
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				
Hand & Power Tools					Planking cleats in place				
Hand tools in good working condition					Worker protected from falling objects				
Cords in good condition					**Welding & Cutting**				
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				
Heavy Equipment					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					**Personal Protective Equipment**				
Seat belts worn					Hardhats worn				
Daily inspections documented					Gloves available & used				
Barricades & Fencing					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: OSHA Hazardous Materials

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

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

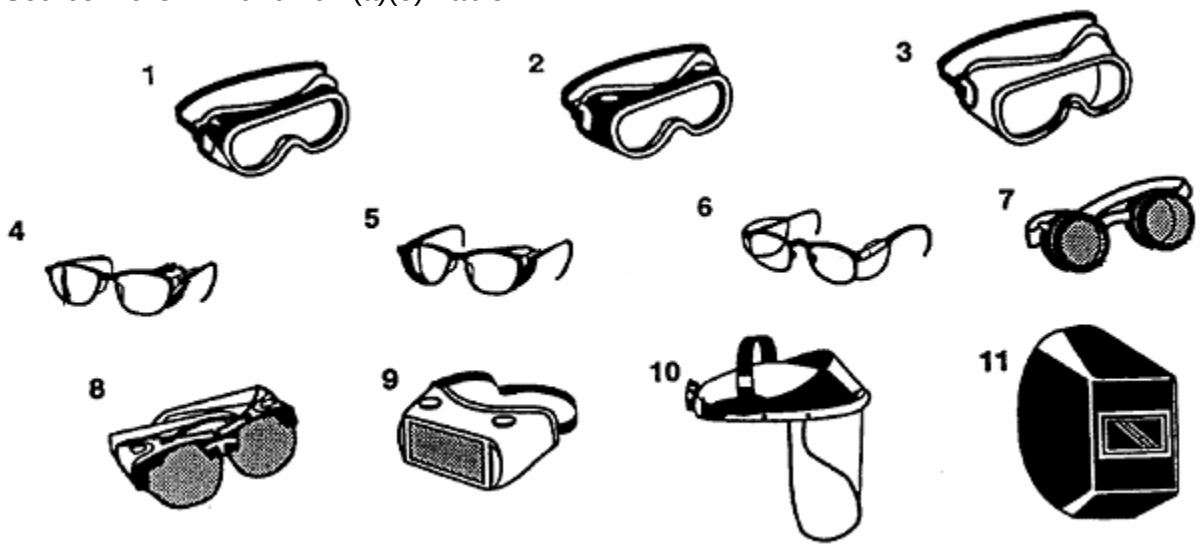
Eye Protection for Employees Who Wear Eyeglasses

- 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 sever 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
(Emphasis added)

Notes