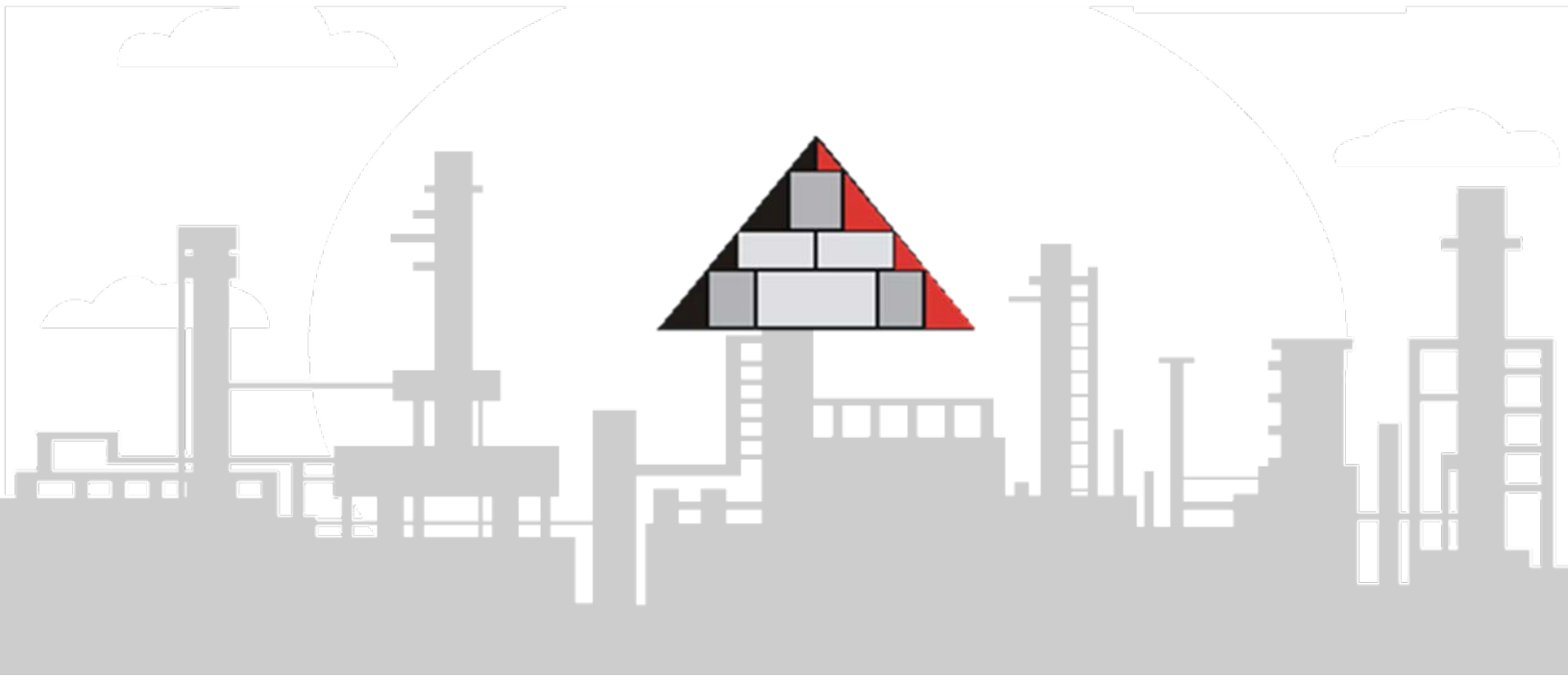
Point Lisas Energy Association (PLEA)



PLEA HSSE ASSESSMENT AND TRAINING GUIDE

Version 3 -2022

Table of Contents

Introduction

This study guide provides an introduction of many of the safety principles that will be presented in the PLEA 10 Hour HSE Awareness course. This study guide also introduces numerous safety terms used in the course. Becoming familiar with these safety terms will promote better understanding of the course material and the course exam. **It is NOT intended to replace training on the course content.**

The materials in this course have been designed to build specific knowledge, skills and attitudes. Considerable time has been committed to the development of these materials in order to ensure their effectiveness.

This manual may not cover all regulations that govern the safety and health of a worker in an industrial location, nor is it a substitute for legal counsel.

Disclaimer

The information contained in this Study Guide is presented as a GUIDE ONLY for the promotion of illness/injury prevention and to assist companies in complying with rules and regulations relating to General Safety. It is not a comprehensive review of all actions, which may be taken to minimize damage, loss or to successfully comply with local regulations.

PLEA makes no representation or warranties, expressed, implied or statutory regarding the suitability of this material for use in developing a comprehensive illness/injury prevention and safety program. Consult with your legal advisor concerning matters involving legal issues.

Everyone must help keep each other safe. Employers have the job of identifying and describing the hazards at your worksite…You have the responsibility to learn and follow the 'safe work practices' that you will be taught.

About the Study Guide

Goal

This Study Guide was developed to provide help to trainees taking the PLEA course. This study guide provides written introduction of many of the safety principles that will be presented in that course. This study guide also introduces numerous safety terms used in the course. Becoming familiar with these safety terms will promote better understanding of the course material and the course exam.

Introduction

This study guide introduces the key points that the PLEA HSSE Assessment program covers. This guide accompanies **training** that workers must complete and does not cover all of the details that the PLEA course provides. To ensure your safety on-the-job as well as properly prepare you for the course exam, you will need to focus on the safety principles and practices that are communicated in the training course.

How to Use This Guide

Read the information contained in this study guide. If there are terms you are not able to pronounce, ask an instructor for assistance. It is likely that you will see these words again in the course material and the exam.

- Contractor companies – For workers who cannot read, we urge they attend an adult learning program. The Energy Chamber of Trinidad and Tobago (ECTT) may be able to provide you with a learning program to assist with language and/or reading skills upon request.)
- Persons will be required to read to pass your written exam. However, the ECTT has provisions for oral examinations.

Icon Map

The following icons may be used in this Study Guide to designate a specific action:

Symbol	Meaning
	**Definition:** Key term that is often field-specific and may be unfamiliar
	**Example:** Descriptive illustration to show or explain a course concept
	**Participant Note:** Additional information to elaborate on a point made in the course content
	**PLEA Note:** Requirements that may differ at PLEA Companies
	**Knowledge Check**: A question to test your understanding of the section

Module 1: Introduction

Prior to the proclamation of the Occupational Safety and Health Act, 2004 as amended (the OSH Act) in 2006, matters relating to occupational safety and health were dealt with by the Factories Inspectorate, which was established under the Factories Ordinance of 1948.0F[1] The scope and applicability of the OSH Act are to ensure that industrial establishments, in the private and public sectors, manage safety, health and welfare in the workplace using the legal compliance requirements as a minimum standard.

Employers have specific responsibilities related to workplace safety.

This training is does not cover the OSH ACT of Trinidad and Tobago. Employers must educate their employees about the duties and provisions under this act. As an employee, OSHA gives you the right to report identified workplace hazards that have not been addressed. To report any workplace hazards to OSHA, you may call 623-OSHA (6742).

As a contractor employee, you are also responsible for following all safety regulations; informing your employer of any unsafe condition; reporting all injuries (no matter how minor they seem); and wearing the proper personal protective equipment. Remember, ***everyone*** on a job site has a responsibility to prevent injuries and incidents.

Participant Notes	Recap: **Employer's responsibilities:** - Inform you of any known safety and health hazard on the job site. - provide a safe environment to perform work. **Contractor's responsibilities:** - follow all safety regulations (wearing all PPE is incorporated into this point) - highlight any unsafe condition - report all injuries

[1] *https://www.labour.gov.tt/about-us/key-relationships/state-agencies/occupational-health-and-safety-authority-agency*

Knowledge Check	1) What is your responsibility on the worksite regarding your safety? A. follow all safety regulations (wearing all PPE is incorporated into this point) B. highlight any unsafe or at-risk condition C. report all injuries D. All of the above *Answer:* *D. All of the above*

Module 2: Process Safety Management (PSM)

The primary goal of the Process Safety Management of highly hazardous chemicals is to prevent **unwanted releases of hazardous chemicals otherwise known as Loss of Primary Containment**.

Extra attention must be given to chemicals in locations that would cause the greatest danger to employees or the environment.

Process Safety is about keeping the PROCESS IN THE PIPE

Introduction

Process Safety Management requires thinking ahead to determine what could go wrong and then doing something to control those problems that could happen because of failures in process, procedures or equipment. In this way, potential hazards are identified and prevented before the work begins. Process Safety Management pays special attention to highly hazardous chemicals that could cause serious injury to people or our environment.

Examples of types of Processes

- Gas - (natural gas); hydrogen, oxygen, nitrogen
- Liquid – Methanol, Ammonia, Acids, LNG, diesel, gasoline

All plant sites must develop an effective process safety management program. The information below describes the things that make up a PSM program.

Why do we need Process Safety Management?

1. To prevent major disasters involving **catastrophic releases of toxic, reactive, flammable, or explosive chemicals.**
2. Standard framework to manage the process safety risks.

Personal Safety Vs Process Safety

What is the difference?

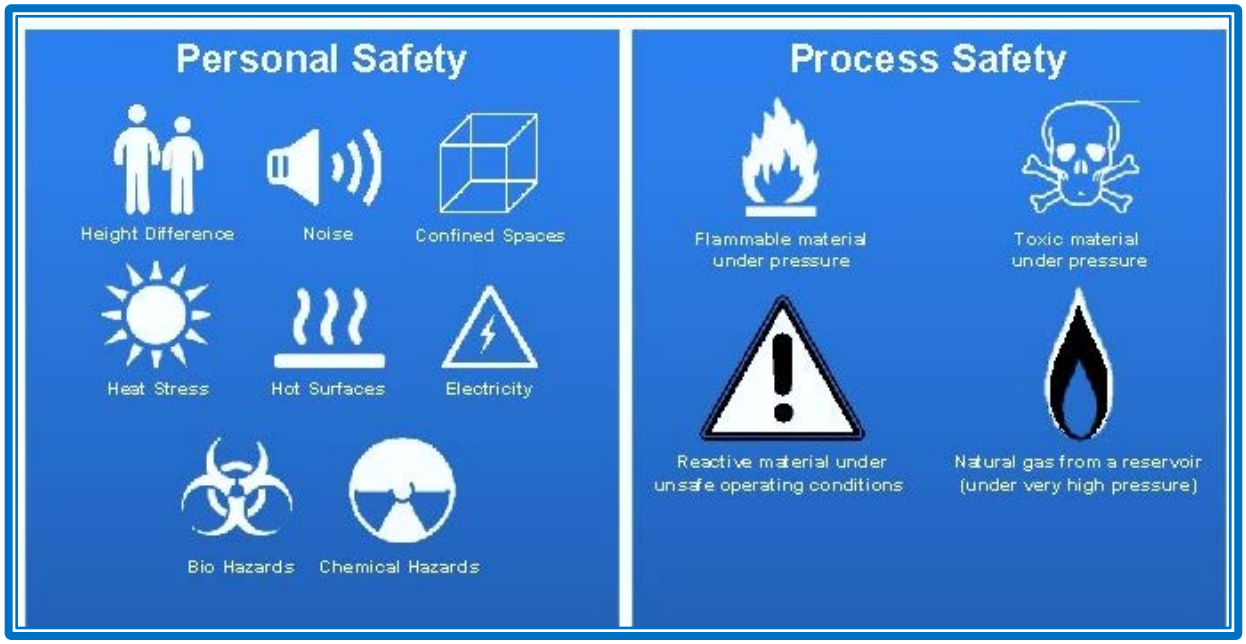


FIGURE 1- PROCESS VS PERSONAL SAFETY

Personal Safety vs Process Safety

Personal Safety definition - Process Safety Management aims to prevent **large-scale disasters**, like fires and explosions. Personal (or occupational) Safety Management, on the other hand, aims to prevent more **individual-level** safety incidents, like falls, cuts and vehicular accidents.

Basic Elements of Process Safety Management

- **Employee Involvement in Process Safety Management** – Employees must be trained and informed, so they know how to prevent exposure to, or protect themselves from, the hazards of chemicals.
- **Process Safety Information** – The employer must compile complete and accurate written information concerning process chemicals, process technology, and process equipment.
- **Process Hazard Analysis (PHA)** – This is an evaluation of the potential hazards of a process or job and is one of the most important elements of a successful process safety management program.

FIGURE 2 - PSM ELEMENTS

- **Operating Procedures and Practices** – Operating procedures tell you how to safely perform a job. It tells the data to be recorded, operating conditions to be maintained, samples to be collected and evaluated, and the safety and health precautions that must be taken all the time.

- **Employee Training** – All employees, including maintenance and contractor employees who could be impacted by the hazards of chemicals must be trained so that they know the hazards and how to protect themselves, their fellow employees and the citizens of nearby communities.

- **Contractors** – Employees must be hired who can accomplish their job tasks without compromising the safety and health of that employee or others. Contractor management is a system of controls to ensure that contracted services support both safe facility operations and the company's process safety and personal safety performance goals.

- **Pre-Startup Safety** – All important elements such as start-up, shut-down and operating procedures, including emergency procedures must be in place and the operating staff trained before a startup. The development of P&IDs (Piping & Instrument Diagrams) must be available prior to startup for training assistance.

- **Mechanical Integrity** – An employer must operate and maintain the process in a safe manner and process equipment as designed to ensure safety. Equipment needs to be replaced when it is worn out.

- **Work Permits** – It is also important that non-routine work be well communicated, not only to those who will do the work, but to any persons that could be affected by the work. Work Permits give authorization to workers to do special tasks only after many things are in place that can ensure the safety of that work. See also Section 13.

- **Managing Change** – The management of change covers such areas as changes in process technology, changes in instrumentation, or changes in the equipment itself. **Not properly managing change has been a primary cause of many accidents.**

- **Investigation of Incidents** – The investigation of an incident is the only way to determine the underlying causes of incidents and then determine any steps that could prevent the same or similar events from reoccurring in the future. The focus of all investigations should be to obtain facts and context and not to place blame. For this purpose, ALL accidents, injuries, and incidents (even "near-miss" incidents) must be reported to the proper personnel.

- **Emergency Preparedness** – Each employer must have an Emergency Action Plan that lays out what action employees are to take should there be a release of hazardous chemicals. This plan tells how personnel will evacuate if there is a release of hazardous chemicals. Employees must be trained so they will know what to do if such a situation occurs. See also Section 17

- **Audits** – The employer must have trained personnel to audit the site's process safety management program. This audit is to ensure that the site is doing what they say they

will do, and also to help determine if what they are doing meets the requirements of what it was designed to do.

An important question to ask yourself how your work impacts Process Safety.

Here are some examples:

Job	PSM Area	Impact
1- Instrument Technician	Preventative Maintenance of Gas/Fire detection systems	Early warning of PSM incidents
2- Insulator	- Insulation of Piping - Protection from Corrosion (under insulation)	Corrosion -Damage to pipe and chemical leak
3- Welders	Integrity of piping and vessels	Leaking piping

Participant Notes

Process Safety is a shared responsibility – See more in this video.

- https://www.youtube.com/watch?v=7JpjpnZeebU

 **Participant Notes**	Recap: The primary goal of the Process Safety Management of highly hazardous chemicals is to prevent unwanted releases of hazardous chemicals otherwise. **There are several basic elements of process safety. Some of these include: -** - Employee involvement - Emergency preparedness - Management of Change - Incident investigations - Process safety information **When working on a plant as a contractor – Key things to note** - What is the process/chemical you can be exposed to? - What does the Risk Assessment /Permit to Work say about controls? - How does YOUR job impact process safety? - How do you report a leak, weird smell, or other concern? - Where do you go in an emergency?
 **Knowledge Check**	**Q.** Name any 3 basic elements of Process Safety. 1. _____ 2. _____ 3. _____ Answer: - Employee involvement - Emergency preparedness - Management of Change - Incident investigations - Process safety information - Contractor Management - Mechanical Integrity - Training - Work Permit - Audits - Operating Procedures and Practices - Process Hazard Analysis - Pre-Start up Safety

Module 3: General Safety

Introduction

You must know and follow all the site rules of the facilities you will be working in. Each plant or facility will have its own rules for security and safety, and you will receive training to learn what those rules are before you will be allowed to work at that site. Although this course cannot tell you about the specific rules for the site where you will be working, it can tell you some of the basic rules that apply to every site.

This section will include information on:

- Safety Basics
- Operating Motorized Equipment
- Ergonomic Work Practices
- Line of Fire
- Housekeeping
- Fit to work

Safety Basics

Only employees with proper identification (and personal protective clothing PPE) will be allowed into a facility. NEVER allow anyone to use your ID badge.

You must learn the plant site policies where you will work. You will be given that information before you enter the plant to start your work through site Orientation. When you enter the plant's property, you are required to follow its policies and rules.

This will include the parking area where you park your vehicle while you are working and designated muster areas for emergencies. There may be **restricted areas** within a site where smoking, cellular phones and other electronic devices are prohibited.

Cameras, drones, and other recording equipment are allowed **only** with special permission by the site "owner."

REMEMBER

- Everyone at the worksite has the responsibility and authority to stop any at risk act or condition in the workplace.
- TTOSHA's "Right to Refuse Work" gives you the right and obligation to stop a work activity if you have reason to believe your own safety or a co-worker's safety is in jeopardy or if the work plan is not clearly established or understood.
- This is also true if you believe the situation could have a negative impact on the environment.
- **"Right to Refuse Work" involves stopping the work, notifying supervision, and correcting any unsafe condition or act that could result in an incident before resuming the work.**

Operating Motorized Equipment

Motorized equipment including **vehicles, cranes, forklifts, manlifts etc.** You must have permission to operate any motorized equipment (even your own vehicle). Remember, pedestrians (people on foot), bicycles, and emergency equipment have the right of way.

Also remember vehicles must stop not only for pedestrians, but they must also stop when they are directed by a flag person.

Cranes

- Cranes can never be operated in a position where their boom or line can come within 10 feet of any overhead power line without special approval.
- Crane operators must never allow their load to swing over people. The load being handled by a crane must be controlled by the use of a tagline.
- Crane operators can only take directions from a designated spotter or signalman. The spotter/signalman can verbally communicate or use hand signals to direct the crane operations.

Forklifts

Approximately 100 workers are killed each year in a forklift accident. Many of these deaths are caused when the forklift overturns. Another major cause of death is when pedestrians are struck and killed by forklifts.

- Forklift operators must be trained in the relevant forklifts.
- Must use the seatbelt and wear PPE as required by the PLEA Company.

PLEA Companies may have **additional requirements** for Cranes, Forklifts, Manlifts etc – Please check with your PLEA Company representative for site specific requirements.

Ergonomic Work Practices

The science of finding the best fit between you and your job conditions is known as **ergonomics**. Some examples of good ergonomic practices include:

- Good posture
- Proper body mechanics
- Good placement of computer equipment
- Comfortable handles and grips

Research has shown that early reporting of pain or discomfort helps minimize the injuries associated with work tasks. If you experience pain or discomfort as a result of your work activities, you should report this information to your supervisor as soon as possible.

Examples:

- Pulling on a spanner.
- Bending to lift an object.
- Use of tools that vibrate – jackhammer etc.

Line of Fire

Line of fire = The zone within a work area where there is risk of (serious) injury from machinery or equipment.

Line of fire hazards are mobile heavy equipment, lifting and hoisting, dropped objects, tensioned lines/devices, objects with roll/fall potential, pressurized equipment, machinery and tools, electrical equipment, projectiles, pushing and pulling.

You are in the line of fire when you are at risk of coming into contact with a force your body cannot endure.

Line of fire is one of the most common incidents in PLEA.

- Struck By – Grinder kick back, falling objects from height.
- Caught in between – Hand injuries – Squeezed fingers.

Line-of-fire examples include:

1. In the path of moving equipment – Such as vehicles, forklifts, etc

2. Underneath lifted loads or objects that could fall.

3. Working next to unstable materials that could shift.

4. Working next to objects under tension or pressure.

5. Placing hands or body in equipment that can rotate.

FIGURE 3 – LINE OF FIRE - TAKEN FROM SAFETYTALKIDEAS.COM

How can YOU keep out of the Line of Fire?

Keep yourself and others out of the line of fire:

⚠ Position yourself to avoid:

- moving objects
- vehicles
- pressure releases
- dropped objects

⚠ Establish and obey barriers and exclusion zones – example areas that have caution and danger tape.

⚠ Take action to secure loose objects and report potential dropped objects.

Housekeeping

Effective housekeeping[2] can help control or eliminate workplace hazards. Poor housekeeping practices frequently contribute to incidents. If the sight of paper, debris, clutter and spills is accepted as normal, then other more serious hazards may be taken for granted.

Housekeeping is not just cleanliness. It includes keeping work areas neat and orderly, maintaining halls and floors free of slip and trip hazards, and removing of waste materials (e.g., paper, cardboard) and other fire hazards from work areas. It also requires paying attention to important details such as the layout of the whole workplace, aisle marking, the adequacy of storage facilities, and maintenance. Good housekeeping is also a basic part of incident and fire prevention.

Poor housekeeping can be a cause of incidents, such as:

- tripping over loose objects on floors, stairs, and platforms
- being hit by falling objects
- slipping on greasy, wet, or dirty surfaces
- striking against projecting, poorly stacked items, or misplaced material

[2] https://www.ccohs.ca/oshanswers/hsprograms/house.html

- cutting, puncturing, or tearing the skin of hands or other parts of the body on projecting nails, wire or steel strapping

Housekeeping order is "maintained" not "achieved."

Cleaning and organization must be done regularly, not just at the end of the shift. Integrating housekeeping into jobs can help ensure this is done. A good housekeeping program includes:

- clean up **during the shift**
- clean up **after the shift**
- **day-to-day** clean-up
- waste disposal
- removal of unused materials
- inspection to ensure clean-up is complete

Example	Click on link to see more about line of fire hazards. https://www.youtube.com/watch?v=KMoYtHhcqAs&t=1s
Participant Notes	RECAP: **Basic Site Safety** covers the site-specific basic safety requirements for each PLEA facility. It will cover the evacuation protocols and what is allowed and not allowed on the Plant site. **Motorized Equipment** references basic safety requirements of cranes and forklifts. These include not walking under the load of the crane and being aware to not walk in the path of a forklift. **Ergonomics** is making sure you can carry out your work task without body discomfort or injury by ensuring the use of the right tools or appropriate working conditions.

	Line of Fire discusses removing yourself outside of a danger zone where persons can be caught within machinery or struck by materials that can cause serious injuries. **Housekeeping is more than cleanliness** – it includes keeping work areas neat and orderly, maintaining halls and floors free of slip and trip hazards, and removing of waste materials (e.g., paper, cardboard) and other fire hazards from work areas
 **Knowledge Check**	**Q1**: What is something that Basic Site Safety will cover? _____ *ANSWER: Site Safety orientation for each PLEA Plant.* **Q2**: Can a crane operate within 10 feet of power lines? **Yes, or No?** *ANSWER: No* **Q3**: What one requirement to operate forklifts? _____ *ANSWER:* Must be trained. **Q4:** Ergonomics means that I have to get the right tool and make sure the right working conditions are in place so that I don't have body discomfort or possible injury. **True or False?** *ANSWER: True* Q5: Dropped objects from heights is an example of a Line of Fire hazard that you should prevent by securing the objects and putting in a barricaded area where these objects can potentially fall to prevent persons from being exposed. **True or False?** *ANSWER: True*

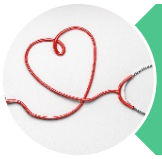
General Safety - Fit to Work

Your fitness to work is an important element in your daily routine.

Lack of fitness such as chronic fatigue, lifestyle diseases, substance abuse can lead to errors on the job, fainting etc. that may put you or your co-worker at risk.

Fitness can be impacted by:

Chronic Fatigue – Working more than fourteen hours daily without breaks



Lifestyle Diseases – Diabetes, High Blood Pressure

Substance Abuse – Taking illegal drugs, overusing prescription drugs, drinking significant amounts of alcohol

Definition: Fit for Duty

A condition in which an employee's physical and/or state of mind (psychological) enables them to continuously perform assigned tasks safely.

Fit for duty responsibilities span a large and diverse group within organizations and industry in general. As a result, human resources, occupational nurses, health and safety departments etc. all have responsibilities in relation to fit for duty beyond the more traditionally viewed roles of workers, employers, supervisors, etc.

Fit for duty is even more important when doing high risk work – Example working in confined spaces, work at heights, working under Self Contained Breathing Apparatus etc.

Workers have a duty to themselves, other workers, members of the public and their employer. As such, workers are responsible for:

- Being fit for duty at the beginning of and throughout your workday or shift, including when scheduled for on-call work.

• Notifying your employer of any health issues that may influence their ability to perform work safely. This can include where you may have phobias that can impact your work (*fear of heights, fear of the dark etc*).

• Ensuring you are not under the influence of legal or illegal drugs, alcohol, or substances that influence their ability to perform their assigned duties.

• Ensuring you do not participate in harassment or violence and notify their supervisor if you observe these unacceptable behaviours.

• Participating in various fit for duty assessments, such as pre-placement or pre-assignment, on-going, post-incident and random as required in accordance with company policies as well as the Client's requirements.

Examples - How can health impact workers

- A person who is afraid of the dark going in a confined space and panicking
- A person with uncontrolled diabetes falling ill from excess sugar.

Note: PLEA Companies may have specific fitness to work requirements for high-risk work.

Participant Notes	RECAP: - Your health and fitness can impact your ability to work safely. - There are two ways your fitness can be impacted - physical and/or state of mind (psychological) - Fitness can be impacted by substances such as alcohol, prescription drugs, and illicit drugs as well as mentally through phobias (Fears), workplace violence, etc.
Knowledge Check	**Q: You have taken a prescription medication that makes you feel drowsy -and your job is the operations of forklift. Should you** a. Advise your supervisor. b. Pretend like you are ok and operate the forklift. c. None of the above. **Answer:** c. None of the above

Module 4: Hazard Communication (HazComm)

Everyone must help keep each other safe. Employers have the job of identifying and describing the hazards at your worksite. You have the responsibility to learn and follow the 'safe work practices' that you will be taught.

FIGURE 4 -PHOTO TAKEN FROM USOSHA

Introduction

All employees have the right to know the safety and health hazards of chemicals they may be exposed to on the job. This is important to reduce illness and injury.

The information within this section will summarize:

- Some general requirements of the TT OSH Act and the US OSHA's Standard
- What makes a chemical "hazardous"?
- General requirements of a hazard communication programme.
- How information on hazardous substances is communicated.
- Examples of some hazardous chemicals

TTOSHA Chemicals Management Requirement –

PART II - GENERAL DUTIES (6) –

Section 3 - An employer shall—

(b) obtain or prepare, as may be prescribed, an unexpired chemical safety data sheet for all hazardous chemicals present in the workplace;

(c) ensure that the identification required by paragraph (a) and chemical safety data sheets required by paragraph (b) are available in English and such other languages as may be prescribed.

(d) ensure that when hazardous chemicals **are transferred into other containers or equipment** the contents are indicated in a manner which will make known to employees, their identity, any hazards associated with their use, and any safety precautions to be observed; and

(e) ensure that **information is provided on the handling and disposal of hazardous chemicals** which are no longer required and containers which have been emptied but which may contain residues of hazardous chemicals, so that the risk to safety and health and to the environment is eliminated or minimised.

(4) An employer shall ensure that a hazardous chemical is not used, handled or stored in the industrial establishment unless the prescribed requirements concerning identification, chemical safety data sheets and worker instruction and training are met.

What makes a chemical "hazardous"?

A Hazardous Substance is any substance which can cause injury (a physical hazard) or cause illness (a health hazard) in a person.

A hazardous substance can hurt you in one of two ways:

- If the substance can cause an explosion, fire, or cause a violent reaction, it is called a physical hazard. Gasoline is an example of a substance that can create a physical hazard.
- If a substance causes you to get sick or become ill, then it creates a health hazard.

Participant Note: In chemicals that produce a **health hazard**, the substance will cause either chronic health conditions (conditions or symptoms that do not go away) in the body, acute health conditions (conditions or symptoms that cause sudden and often intense reactions, that will go away after a time), or both.

General Requirements of a Hazard Communication Program

The employer must inspect the worksite to find out if there are hazardous substances. If there are, **US OSHA** requires them to have a written Hazard Communication Program.

This program will explain how your employer will make sure you understand about the hazards at the worksite. Some of the things that are included in this program are:

- Lists of Chemicals
- Labels and Warning Signs
- Safety Data Sheets (SDS)[3]

Chemical Lists

Employers must have a complete list of all hazardous substances at their worksites.

Labels and Warning Signs

All containers (from small bottles to big vessels) must be labelled, tagged, or marked to identify what is in them. The purpose of warning signs in the workplace is to tell you information about the hazards. Be sure that you read and understand the warnings the signs communicate.

There are two different types of labelling systems that are used on the big vessels and drums where you work.

- The National Fire Protection Association (NFPA) labelling system
- The Hazardous Materials Identification System (HMIS).

Although these are different systems, they have much in common. The purpose for warning signs, the NFPA, and the HMIS labels is to give you hazard information.

Look at the pictures of these labels.

The HMIS and the NFPA labels are alike in many ways: They use the same colour codes:

[3] *Material Safety Data Sheets (MSDS) are now referred as Safety Data Sheets (SDS) - https://unece.org/about-ghs*

blue=health, red=flammability, yellow=reactivity.

Another thing they have in common is the "number" warnings that both systems use.
The numbering system ranges from 0 to 4.

Example: On the blue health area,
0 = no health hazard,
1= slight health hazard,
2= moderate health hazard,
3= Extreme Danger
4= very severe or deadly health hazard

If a substance is not marked and you are not sure what a substance is, ask your supervisor.

Sometimes you will need more information than can be put on a label or a warning sign. If you need more information, the best place to look is to the chemical's SDS (Safety Data Sheet).

Information Found in an SDS

A Safety Data Sheet (SDS) is written or printed material about a hazardous chemical.
Chemical manufacturers and importers of hazardous chemicals are required to develop SDS for hazardous chemicals. Employers, in turn, must have a current SDS for each chemical on the list of chemicals used by their company.

What kind of information can be found in an SDS?

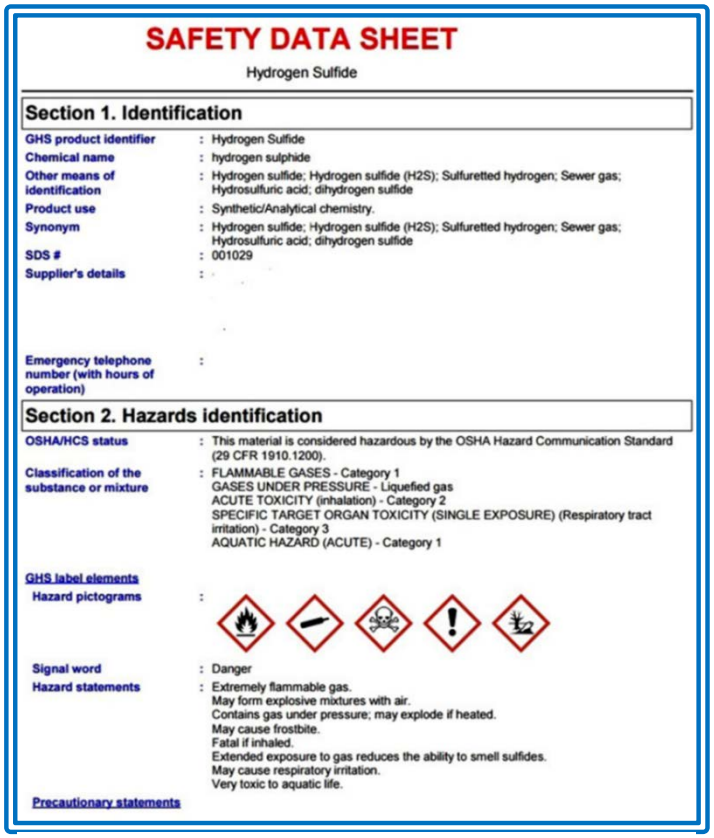
Each SDS must contain:

- The identity used on the label.
- The physical and chemical characteristics of the hazardous chemical (such as the vapor pressure and flash point).
- The physical hazards of the hazardous chemical (such as any fire, explosion, and reactivity hazards).
- The health hazards of the chemical, including the signs and symptoms of exposure and any medical conditions resulting from exposure to the chemical.

- The primary routes of entry
- The relevant exposure limits
- Whether the chemical is a cancer-causing agent

Participant Note: PEL (Permissible Exposure Limit) is the measurement OSHA uses to identify the maximum amount of substance that a person can safely be exposed to at any one moment in time. Another measure for exposure limits

determines how much exposure is allowable within a normal 8-hour workday. This measurement of exposure is called a "TWA" meaning Time-Weighted-Average (of 8 hours).



SAFETY DATA SHEET

Hydrogen Sulfide

Section 1. Identification

GHS product identifier	: Hydrogen Sulfide
Chemical name	: hydrogen sulphide
Other means of identification	: Hydrogen sulfide; Hydrogen sulfide (H2S); Sulfuretted hydrogen; Sewer gas; Hydrosulfuric acid; dihydrogen sulfide
Product use	: Synthetic/Analytical chemistry.
Synonym	: Hydrogen sulfide; Hydrogen sulfide (H2S); Sulfuretted hydrogen; Sewer gas; Hydrosulfuric acid; dihydrogen sulfide
SDS #	: 001029
Supplier's details	:
Emergency telephone number (with hours of operation)	:

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas ACUTE TOXICITY (inhalation) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 AQUATIC HAZARD (ACUTE) - Category 1
GHS label elements	
Hazard pictograms	:
Signal word	: Danger
Hazard statements	: Extremely flammable gas. May form explosive mixtures with air. Contains gas under pressure; may explode if heated. May cause frostbite. Fatal if inhaled. Extended exposure to gas reduces the ability to smell sulfides. May cause respiratory irritation. Very toxic to aquatic life.
Precautionary statements	

FIGURE 5 - SDS EXAMPLE

How information of hazards is communicated

Another part of the written Hazard Communication Program will tell how your employer plans to warn you about the hazards that may exist. Your employer will warn you about the hazards and how to protect yourself. In fact, one of the main goals of the BOP course is to provide training which covers the general information you need.

Additionally, the labels and warning signs will serve as another form of hazard communication. All of these methods of communication work together to make sure you have the information you need to be safe.

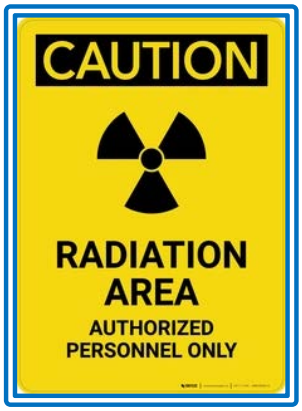
Examples of Some Hazardous Chemicals

Each work area has different types of hazardous chemicals. It is important to realize that chemical hazards do not only exist inside containers, but sometimes chemical hazards exist outside the container as well.

Examples of such chemical hazards would be:

- Asbestos
- Lead
- Radiation
- Acid

Asbestos: Asbestos contains fibres that are very strong and resistant to heat and chemicals. Asbestos is often used to insulate vessels and piping. Asbestos is used in siding, shingles, and floor tiles. Under normal conditions, these fibres do not pose a health hazard, but they do become hazardous if something happens to cause these fibres to be released into the air. When released in the air these fibres can cause lung cancer, gastrointestinal cancer, or a lung condition called asbestosis. You must be properly trained and wear the proper PPE if you work where there are dangerous concentrations of asbestos.



Radiation: The X-raying of equipment, microwaves, and lasers are all forms of radiation. When equipment is being used that emits radiation, it is important that you obey all warning signs and never go through radiation barricades.

If you are doing work that may require you to work near such chemicals where exposure could present physical harm, then you will receive special training on how to take proper precautions against exposure.

Acids – Example Sulphuric Acid

Sulfuric acid (H2S04) is a corrosive substance, destructive to the skin, eyes, teeth, and lungs. Severe exposure can result in death. **Workers may be harmed from exposure to sulfuric acid.**

The level of exposure depends on dose, duration, and type of work being done.

- Main Uses: Manufacture of fertilizers and other chemicals; petroleum refining; battery components.
- Appearance: Clear colourless oily liquid. Yellow to dark brown in colour when impure. Odour: Odourless

 **Participant Notes**	RECAP - Hazcom covers communicating information about hazardous chemicals onsite. It will go into details about a Safety Data Sheet and what this document communicates including the name of the chemical, what is hazardous about the chemical, PPE requirements and first aid measures. - HAZCOMM also covers labelling of chemicals and the NFPA and HMIS systems frequently used to communicate hazardous information about chemicals in big vessels or drums.
 **Knowledge Check**	Q: Should all containers containing a chemical be labelled? **Yes, or No?** *ANSWER: Yes*

Module 5: Personal Protective Equipment

"PPE" means Personal Protective Equipment. Before you do any work, you must know what could hurt you. Then you can choose the right PPE for the job. You must understand how the PPE will protect you, and you must know how to inspect it, wear it, and store it.

Introduction

Personal Protective Equipment (PPE) is specially designed to protect you…from head-to-toe. Each type of PPE is made to protect you from certain hazards or dangers… so you must know what danger or hazard is present before you can choose the proper PPE.

The information within this section will describe:

- Types of the PPE that you may need to use.
- When PPE must be used
- What you must know about the PPE you use

Many Types of PPE are used for Protection from Hazards

You must wear some PPE to enter a plant…no matter what job you will be doing there. More than likely, you may need to wear safety glasses, hard hat, long pants, long-sleeve shirt, steel-toe shoes, and leather work gloves. Different companies will require different PPE.

You may need special PPE for a certain job or work in a certain area in the plant. Some examples of types of special PPE that you may be required to wear are face-shield, ear plugs, respirators, or personal fall protection device.

Your employer will make sure you are given this PPE and that you are properly trained to use it. Before you begin any job, your employer will determine what hazards could harm you while you do work. The employer can then decide what PPE should be used to prevent injury.

If you are ever unsure of what PPE you need, check your work permit. If you are still unsure…ask your supervisor!

Head Protection – All "hardhats" provide protection from injury caused by falling objects. Sometimes different classes of hardhats are needed. (Electricians would use a class of hardhat that also would help to protect them from electrical shock, for example.)

Eye Protection – Safety glasses must be approved by the American National Standards Institute (ANSI) and will have a Z87.1 number stamped on the glasses. **Remember, your prescription glasses are NOT safety glasses, unless designed for this purpose and classified as Z87.1.**

Face Protection – A face shield must be used if there is a chance that a hazardous chemical could splash onto your face.

Hearing Protection – Hearing protection must be worn when the noise is so loud that it could damage your hearing. If you work in noisy areas, you must wear hearing protection. You may need to use earplugs, earmuffs or the combination of both in extremely noisy environments.

Body Protection – Long-sleeve shirts and full-length pants may help to protect you from burns and spills. Sometimes chemical resistant suits or flame-retardant clothing may be required.

Foot Protection – Safety shoes and boots may protect your foot from injuries that would be caused by items dropping on or cutting the foot. A chemical resistant boot may be needed for some jobs.

Respiratory Protection – You must wear respiratory protection if the air in your work area may become hazardous to breathe.

Fall Protection – You must use personal fall protection when you work *six feet* [4]or more above the ground.

Hand Protection – Rubber gloves protect you from electrical shock. Neoprene or latex gloves protect the hands from certain chemicals. There are many other kinds of gloves. You must know exactly what the dangers are before you can choose the correct hand protection.

[4] See page 47 on PLEA requirements

When is Personal Protective Equipment Required?

Preferred order for Hazard Control Methods:

- Engineering Controls
- Administrative Controls
- Personal Protective Equipment (PPE)

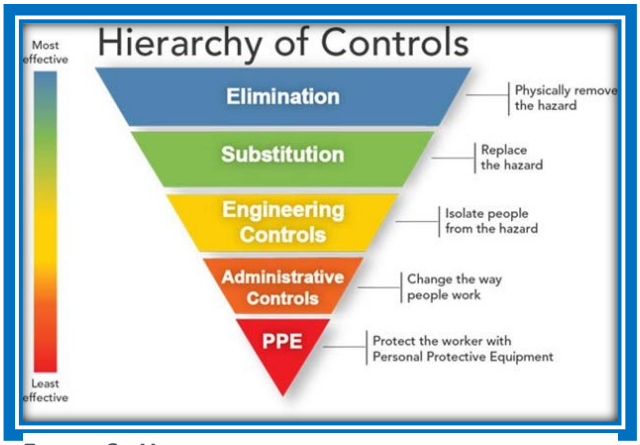


FIGURE 6 - HIERARCHY OF CONTROLS

Important!!

- PPE is used when the hazard can't be controlled by engineering or administrative controls.
- PPE should not be used to protect against hazards if the hazard can be controlled using some other method.
- If your PPE does not fit properly, is damaged or breaks, **it will not protect you**. You may be exposed to the hazard.

This is why employers must try to eliminate the hazards in the workplace. They do this with "Engineering Controls." Using engineering controls is the best way to control hazards in the workplace.

Examples of Engineering Controls

- Using mufflers or buying quieter tools so that you don't have to wear earplugs.
- Installing "guards" on equipment that will prevent you from touching a moving part by mistake.

Examples of Administrative Controls

- Rotating individuals out of hazardous areas for part of shift.
- Reducing the number of individuals allowed into hazardous areas.

What You Must Know About Your PPE

- If you are required to use any PPE, you will be trained in how it will protect you, how to wear it, store it, clean it, and inspect it.
- You must understand all the manufacturers' warnings and limitations of your PPE before you use it.

- PPE like hardhats have recommendations on **helmet and suspension lifespans**.

  Example - hard hat shells should be used no longer than 5 years, while suspensions should be replaced after 12 months. Both are the maximum time frame for replacement, calculated from date of first use.

You must inspect your equipment and ensure it is clean and not damaged - Every time you use it.

- PPE has adjustable parts and comes in a variety of sizes so that it will be "reasonably" comfortable. You must know how to adjust it so that it fits properly. PPE that does not fit cannot protect you the way it should.

Do not share your PPE[5] with anyone else.

 **Participant Notes**	RECAP: PPE stands for Personal Protective Equipment and covers a range of equipment used to protect your body against hazards. These can include: • protection for your eyes such as safety glasses and face shields, • protection for your body such as long-sleeved clothing and harnesses, • protection for your hands such as gloves or chemical resistant gloves, • protection for your feet such as safety shoes or boots, • protection for your hearing such as earmuffs or ear plugs, • protection for your head such as hard hats. **PPE should be the last line of defence. Engineering controls should first be attempted to remove accessibility to the hazard.**
 **Knowledge Check**	Q: What does PPE mean and give some examples? _____ _____ _____ **ANSWER** - What does PPE mean - Personal Protective Equipment. - Examples include - Hard Hat, Safety Glasses, ear plugs, respirator, safety boots, harness, Body protection, Face Protection etc.

[5] *SCBA (Self-Contained Breathing Apparatus) respirators however may be "shared". If you must use it, be certain that it has been properly cleaned and disinfected before you use it.*

Module 6: Respiratory Protection

You need respiratory protection if the air you breathe could hurt you. It is important to remember that before you can choose a respirator, you must understand the danger that is present…because each respirator was made to protect you from different hazards.

Introduction

This section will help you learn what is needed to protect your respiratory system.

You will learn:

- What you must know and do before you wear a respirator.
- The basic differences in respirators and how they protect you.
- What must occur before you use a Respirator?

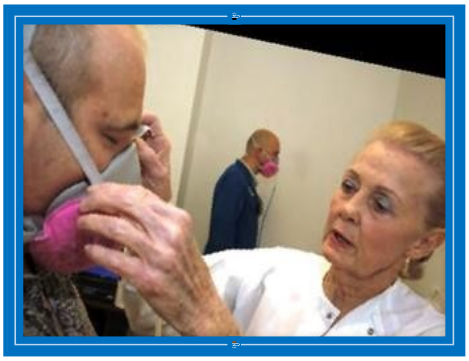
You must wear a respirator when hazardous air conditions may exist. Three things must take place, however, before an employee can wear a respirator:

- **Medical Evaluation** – You must have a medical evaluation to determine if you have a physical condition that would prevent you from safely wearing a type of respirator. You first will answer some questions. Next you may receive a physical examination. Last, you may be given a breathing test.

PLEA Companies OGUK Medicals are **not** equivalent to a medical evaluation for respiratory protection. Please check with your PLEA Company representative for site specific requirements

- **Training** – You must receive training before you wear a respirator. The training will describe when you need to use them, how it will protect you, and what it will protect you from when worn properly. You will learn how to put it on and take it off, check the seals, inspect it, clean it and store it. You should be tested to make sure you understood the training information.

- **Fit Test** - A fit test will be performed on each kind of respirator you will need to use. This will tell you what model or size of respirator should be worn and prove that you can get a good seal. This is done with special testing methods. If you are not able to get a proper fit, the respirator might allow contaminants to slip in through the cracks when you are wearing your respirator. Remember, beards, facial hair and glasses can interfere with a good face piece seal.



All three of these steps must be done BEFORE you use a respirator.

Facial hair (beards, etc)[6] is not allowed for persons that are required to wear seal fitting respirator in some PLEA Companies. Please check with your PLEA Company representative for site specific requirements.

Different Types of Respirators

Hazards in the air can take different forms. The air may be contaminated with:

- Particulates or dusts
- Organic mists or vapours
- It could be that the air is oxygen deficient

You must know which of these dangers is present before you can choose the right respirator. Each hazard may require a different type of respirator.

[6] *Refer to the CDC Guidelines for what type of facial hair can be grown that is compatible with seal fitting respirators - https://www.cdc.gov/niosh/npptl/pdfs/facialhairwmask11282017-508.pdf*

There are two basic classes of breathing protection:

1. **Air Supplied Respirators:**

Air Supplied Respirators (Hose fed) – This type of respirator uses supplied air that may come from an air compressor that is located where the air is known to be safe or from a bank of compressed air bottles. The air is sent to the respirator face piece through a hose.

Self-Contained Breathing Apparatus (SCBA) - This is another type of Air-Supplied Respirator. This type of respirator uses a tank of air that you carry with you. A self-contained breathing unit (SCBA) MUST be used if the conditions of the air are not known OR where the air is Immediately Dangerous to Life and Health (IDLH). Different SCBA's may last between 5 minutes to 45 minutes. 5-minute units are only to be used for escape or emergencies.

2. **Air Purifying Respirators:**

This type of respirator uses filters, canisters or cartridges that can remove specific contaminants from the air before it reaches your lungs. This type of respirator is only to be used if the air contaminants have been properly identified and the filter, canister or cartridge is designed to absorb the amount of contaminant in the air. They must never be used when the air quality is not known, and it could be Immediately Dangerous to Life and Health. The actual type of cartridge, canister, or filter that you will use is determined by the type of air hazard that exists.

Participant Note: WARNING: This type of unit must not be used if the air is Immediately Dangerous to Life and Health (IDLH).

It is important to know and follow the manufacturers' warnings and limitations for each respirator you use.

Participant Notes	RECAP: You need respiratory protection if the air you breathe could hurt you. To wear a respirator, you should be: - medically evaluated - undergo a fit test - receive training Hazards in the air can take different forms. The air may be contaminated with: • Particulates or dusts • Organic mists or vapours It could be that the air is oxygen deficient
Knowledge Check	Q: When would a respirator be needed? ANSWER: When there is a potential of a hazardous atmosphere where it can be dangerous for you to breathe

Module 7: Hearing Conservation

Introduction

We often take our 'hearing' for granted…but if you continue to expose yourself to loud noises, time after time, day after day, eventually, you could lose some of your ability to hear.

This will affect the "quality" of your life.

You will strain to hear what your loved ones are trying to tell you. You will not be able to tell what people are saying in noisy rooms. You won't be able to stop the constant buzzing or ringing in your ears. Your life will be forever changed…and it could have been prevented if you had protected your hearing!

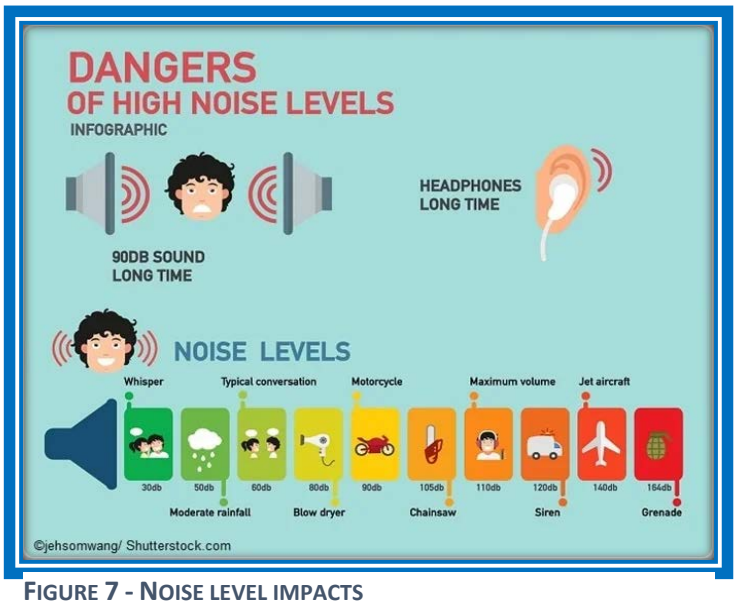


FIGURE 7 - NOISE LEVEL IMPACTS

This section will describe:

- What is involved in a Hearing Conservation Program?
- How sound affects your hearing
- Hearing Protection Devices
- Hearing Conservation Program

Safety standards such as NIOSH2F[7] and US-OSHA have identified how much noise you can safely be exposed to. If the noise you will be exposed to exceeds these safe limits, then your employer must put you in a "hearing conservation program." A hearing conservation program must include:

- **Checking The Noise in Your Work Area** – Periodically, your employer must check work areas for noise levels that may harm you.

[7] The National Institute for Occupational Safety and Health (NIOSH)

- **Hearing Tests** – This is called an **audiogram**. It is a simple, painless test that will determine how well you hear.
- **Hearing Protection/ Ear Plugs & Earmuffs** - You must wear some type of hearing protection, either ear plugs, earmuffs, (or a combination of both) if your job exposes you to 85 decibels in an 8-hour TWA or when you must go into any area that is determined to be a high noise area.
- **Training** – You must be trained every year on the proper use and care of each type of hearing protection you will use. You will also learn how too much noise can cause hearing loss and how hearing PPE can protect you.

FIGURE 8 - HOW TO INSERT EAR PLUGS

How Sound Affects Hearing

The effect noise has on you depends on how long you are exposed – and how loud the sound is. Noise is measured in decibels. *For example, at 20 decibels, a ticking watch is hard to hear.*

The 130 to 160 decibels a jet engine produces are painful and can cause immediate and permanent damage to your ear.

FIGURE 9 -HOW HEARING WORKS

When the hair cells are damaged or die, a condition called tinnitus may occur. Persons suffering from tinnitus have ringing or buzzing in their ears that never stops. Hearing loss due to excessive noise cannot be cured!

Exposure to noise can produce other symptoms besides ringing and buzzing sounds.

Another sign or symptom that indicates you are suffering from hearing loss would be "you just can't hear." Even signs or symptoms such as fatigue, elevated blood pressure, stress, tension, and nervousness can be signs of hearing problems.

Examples of Engineering Controls for Noise	Examples of Administrative Controls for Noise
• Enclosing noisy processes in sound-absorbing rooms. • Using rubber cushions or cardboard at the end of line chutes. • Replacing noisy metal parts with quieter plastic or rubber components. • Eliminating vibration noise by placing heavy equipment on resilient pads. • Ensuring equipment is properly maintained.	- Operating noisy machinery on a shift when fewer employees are present. - Rotating employees out of noisy areas for part of a shift - Hearing Personal Protective Equipment

Hearing PPE reduces your exposure to harmful noise. While wearing it, you will still be able to hear machine warnings and conversation. If hearing protection is needed, your employer will have the hearing protection devices you will need and will train you on its correct use.

Never remove hearing protection while you are still in a high noise area. Always move to a quiet place before removing or adjusting your hearing protection.

Here are the two basic types of hearing protection devices you may use:

- **Earplugs**: Most earplugs are made of soft fibre or foam that conforms to fit the ear canal. They come as pre-moulded or can be custom moulded to fit your ears. All types must be placed in the ear canal to seal it off, while leaving enough of the earplug exposed so that can be easily removed.

• **Earmuffs**: Earmuffs are ear cushions and cups attached to a headband or attached to a hardhat. In order to get a good seal, your entire ear must fit within the cups. Push aside or remove anything that may keep you from getting a good seal: hair, beard, hair clips, and earrings, for example. Glasses or goggles may affect the seal as well.

If the noise hazard is very loud, you may need to use both earplugs and earmuffs together. **Don't forget that you may be exposed to excessive noise exposure when you are "off the job." You must protect your hearing wherever you are – whether you are at work or at home!**

Participant Notes	RECAP: Loud or prolonged noise can cause hearing loss. A Hearing Conservation program implemented by companies includes an audiogram, training, identifying high noise areas and providing hearing protection PPE. Hearing protection PPE comes in two types: **ear plugs and earmuffs.**
Knowledge Check	Q: Name the 2 types of hearing protection devices? ANSWER: Earplugs and Earmuffs

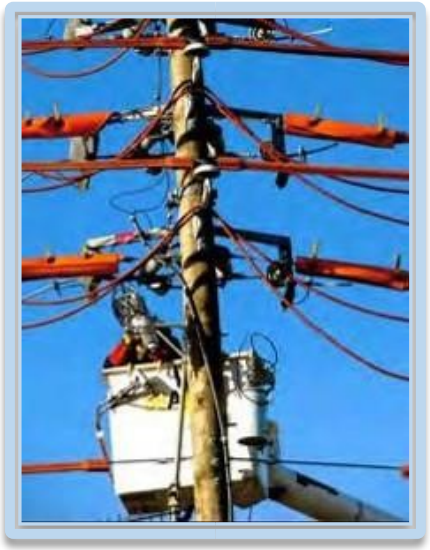
Module 8: Electrical Safety

Related Work Practices for Non-Qualified Workers

Each year hundreds of workers suffer pain, injury or death from electrical shock and burns. Never work on electrical circuitry if you are not "qualified". Stay a safe distance from overhead power lines and the dangers of electricity.

Introduction

A "qualified" worker is someone who has had training on how to avoid the electrical hazards of working on or near exposed energized circuitry. "Unqualified" workers, such as yourself, have not been trained.



Before you can work on any exposed electrical circuit or part, you must be "qualified." The purpose of this part of the training is to help you, the "unqualified" worker, understand the safe work practices of using portable electrical equipment. It will also help you understand the safe work practices for working near energized electrical equipment.

In this section you will learn:

- General Electrical Safety Guidelines
- Causes of Electrical Accidents
- Portable Electrical Equipment Safety Guidelines

General Electrical Safety

Practicing unsafe work practices near electricity can kill you! It may cause a mild shock, a severe shock, or even a deadly shock. It is important to understand the "safe work practices" that must be used when working near electricity or using portable electrical equipment. Here are some general safe work practices that should be followed:

- Always have good lighting whenever you are operating electrical equipment.

What is the Difference between "De-Energized" & "Energized" Equipment?

- De-Energized Equipment is equipment in which the circuits have been **disconnected from all their power sources**.
- Energized Equipment is equipment that has **exposed, live parts of circuits** that may be directly contacted, or contacted by tools or materials…and can cause electrical shock.

Never reach 'blindly' into areas that may contain energized parts. (You must be able to see what you are trying to touch at all times!).

Always use a ladder made of non-conductive material (material that does not conduct electricity) or have non-conductive side rails if you are working near electrical equipment.

- Always stay at least **10 feet (3 metres)** from electric lines with voltages up to **33 kilovolts (33,000 volts)** or less (Trinidad's high voltage lines range 12, 33, 66, 132 and 220 Kilovolts)
- This 10-foot (3 metres) rule is for "unqualified" workers and includes all the material or tools the employee is holding or carrying!
- Always stay at least 10 feet (3 metres) from electric lines with voltages of 50 kilovolts or less. (This 10-foot rule is for "unqualified" workers and includes all the material or tools the employee is holding or carrying!
- This 10-foot (3 metres) rule also includes any part of a vehicle the employee may be operating!)

Participant Notes	Non-conductive material means that electricity cannot flow through the material. **Fiberglass or wood** are non-conductive materials.

It is important to inspect your ladder each time you use it, not only to see that it is in good working order, but to ensure that it is CLEAN. It must be free of dirt, oil, and moisture because these materials are conductive…and using a ladder like this is an unsafe work practice that could cause you to be electrocuted.

Causes of Electrical Accidents

Most electrical accidents can be prevented. Electrical accidents are usually caused by working with faulty or unsafe equipment, working in unsafe environments, or using unsafe work practices. Unsafe work practices are responsible for over 75% of all occupational fatalities involving electricity!

Portable Electrical Equipment Safety

Using safe work practices when operating portable electrical equipment can protect you from electrical hazards. All portable electrical tools must have a grounding prong (or must be labelled as doubled insulated).

Make sure that any extension cords you need properly fit the plug for the electrical equipment you're using. Never cut off the grounding plug. Never raise or lower portable electrical equipment by its cord.

Participant Notes	**WARNING**: All electrical equipment should be grounded. Grounded equipment is permanently and continuously connected to the earth so that uncontrolled electrical discharge is unlikely to occur.

Why is it important to inspect your portable equipment at the beginning of your work shift and each time you use the equipment? Inspecting your equipment can prevent you from being shocked.

- **Look for visible wear, frays, breaks, or other damage to the insulation or outer jacket of the cord. Make sure the grounding prong is there.**
- If you find something damaged, connect a tag to it that says, "Damaged: Do Not Use!" and notify the proper individual. Never use portable electrical equipment that is damaged.

Ground-Fault Circuit Interrupters (GFCI)

A ground-fault occurs when there is a break in the low-resistance grounding path from a tool or electrical system. The electrical current may then take an alternative path to the ground through the user, resulting in serious injuries or death.

The ground-fault circuit interrupter, or GFCI, is a fast-acting circuit breaker designed to shut off electric power in the event of a ground-fault within as little as 1/40 of a second.

The GFCI is rated to trip quickly enough to prevent an electrical incident. If it is properly installed and maintained, this will happen as soon as the faulty tool is plugged in.

It works by comparing the amount of current going to and returning from equipment along the circuit conductors.

If the grounding conductor is not intact or of low impedance, the GFCI may not trip until a person provides a path. In this case, the person will receive a shock, but the GFCI should trip so quickly that the shock will not be harmful.

The GFCI will not protect you from line contact hazards (i.e., a person holding two "hot" wires, a hot and a neutral wire in each hand, or contacting an overhead power line). However, it protects against the most common form of electrical shock hazard, the ground-fault. It also protects against fires, overheating, and destruction of wire insulation. GFCIs must be inspected and tested before use.

Receptacle Type:

The Receptacle Type incorporates a GFCI device within one or more receptacle outlets. Such devices are becoming popular because of their low cost.

Portable Type:

Portable Type GFCIs come in several styles, all designed for easy transport. Some are designed to plug into existing non-GFCI outlets, or connect with a cord and plug arrangement. The portable type also incorporates a no-voltage release device that will disconnect power to the outlets if any supply conductor is open. Units approved for outdoor use will be in enclosures suitable for the environment. If exposed to rain, they must be listed as waterproof.

Cord-Connected Type:

The Cord-Connected Type of GFCI is an attachment plug incorporating the GFCI module. It protects the cord and any equipment attached to the cord. The attachment plug has a non-standard appearance with test and reset buttons. Like the portable type, it incorporates a no-voltage release device that will disconnect power to the load if any supply conductor is open.

FIGURE 3 - US. OSHA - GROUND-FAULT CIRCUIT INTERRUPTERS

IF SOMEONE IS SHOCKED…

- **Don't touch anyone in contact with a power source. Unplug appliance or turn off power.**
- If you can't turn off power, separate the victim from the power source with a dry pole, dry rope or dry clothing.
- **Don't touch the person directly. GET HELP!!!**

If the victim is not breathing, apply mouth-to-mouth breathing or cardiopulmonary resuscitation (CPR). Administering CPR requires training.

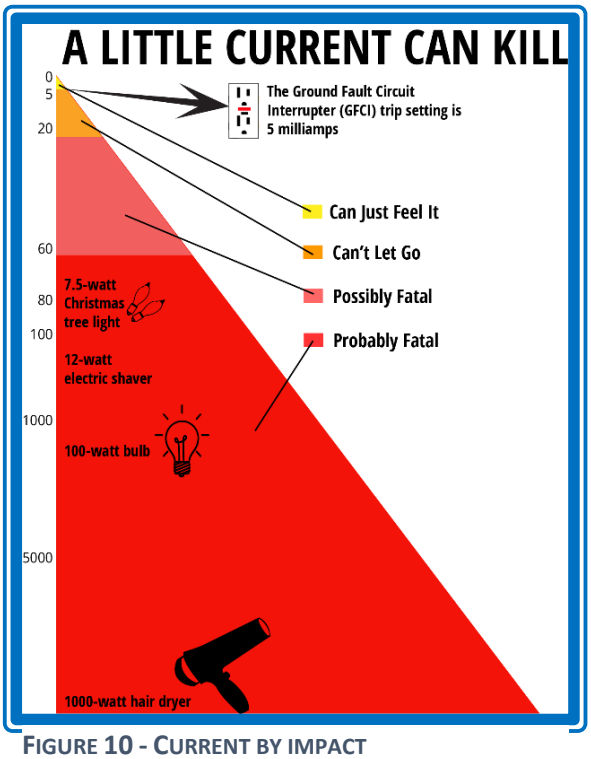


FIGURE 10 - CURRENT BY IMPACT

A hot work permit is required if the portable electrical equipment you will use is capable of sparking or could produce enough heat to ignite flammable or ignitable materials that may be present in the area.

Participant Note: A Hot Work Permit- is the type of permit that is required whenever a spark or heat could be generated during the job by welding, brazing, soldering, paint stripping or metal grinding where sparks could be generated, or unprotected electric lights in hazardous atmospheres etc. See Section 13, 14, 16

Sometimes you may need to work in an area where combustible or flammable gases could build up.

An explosion and/or fire could then occur if something created a spark or enough heat to ignite these vapours. When the work area could have such hazards, only specially designed electrical equipment can be used.

This equipment is “intrinsically safe” electrical equipment… equipment that would not spark or produce enough heat to cause a fire even in a combustible atmosphere.

When working on or near energized parts, just turning off a switch or pulling a breaker is not enough to ensure it will not be re-energized.

The power to the live parts or circuits must also be “locked out and tagged out.” Using lockout/tagout (LOTO) procedures is the best way you can prevent the risk of electrical shock.

Note 1) Cell phones**, cameras and other non-intrinsic equipment** are not allowed in some PLEA Companies without authorization and permits. Please check with your PLEA Company representative for site specific requirements.

Note 2) PLEA has electrical safety guidance and training requirements for persons that do electrical work – Please refer to your PLEA representative and the link for further information.

Participant Notes

RECAP:

- Understand the dangers of working near electrical equipment. Recall: what is a conductor and non-conductive tools.
- Always stay at least 10 feet (3 metres) from electric lines with voltages up to 33 kilovolts (33,000 volts) or less (Trinidad's high voltage lines range 12, 33, 66, 132 and 220 Kilovolts).
- Non-conductive ladders such as fiberglass or wooden ladders should be used when working near electrical equipment.
- Always use a GFCI as this can prevent you getting shocked should there be a fault in the circuit.

Knowledge Check

Q: Why should you use a fiberglass or wooden ladder when working near electrical equipment?

ANSWER: Fiberglass or wooden ladders are non-conductive (do not conduct electricity).

Module 9: Work at Heights and Fall Protection

Falls are the leading cause of fatalities for the construction industry and the second leading cause for general industry. Most of these deaths could be prevented by using safe fall protection practices and by using the proper PPE.

Introduction

The information in this section covers the following topics:

- Work at Height Work Hazard Awareness
- Types of Fall Protection Systems
- Personal Fall Arrest Systems
- Ladder Safety

Work at Height Work Hazard Awareness

If you must work in high places, **you must be trained so that you will understand the dangers of elevated work and know how to protect yourself from falls.** This will include training on the **personal fall arrest systems** you may be using.

Types of Primary Fall Protection Systems

Your employer is responsible for providing all the protection systems that are needed to protect you when you are working 6 feet or more above the ground.

Some PLEA Companies may have updated requirements from **six (6) to four (4) feet** (US OSHA). Please check with your PLEA Company representative for site specific requirements.

Some fall protection systems your employer may use are:

- **Personal Fall Arrest Systems**: A personal fall arrest system provides you with the most protection from fall, because it was designed to protect YOU. (More information on personal fall arrest systems is in the section below, titled Personal Fall Arrest Systems.)

- **Scaffolds**: Scaffolds provide you a safer and more comfortable working surface than a ladder. They are built according to strict safety standards. Some of these standards will be explained in the section below, titled Scaffold Safety.
- **Guardrail Systems**: You see this system at work everywhere you see a balcony. This is the rail that must exist above the edge of platforms. This guard rail will keep you from falling off the edge of a platform. The top of this rail must be 42 inches high above the platform.
- **Safety Nets**: Safety nets are effective types of fall protection when work is being done above walking/working surfaces where something could be dropped. These nets can prevent material from falling on persons working below when the area can't be barricaded and protected.

Personal Fall Arrest Systems

Since 1998, body belts are no longer acceptable as part of a personal fall arrest system because they can hurt you (the body belt only had a belt around the waist… not the chest and shoulders, as fall protection devices do now).

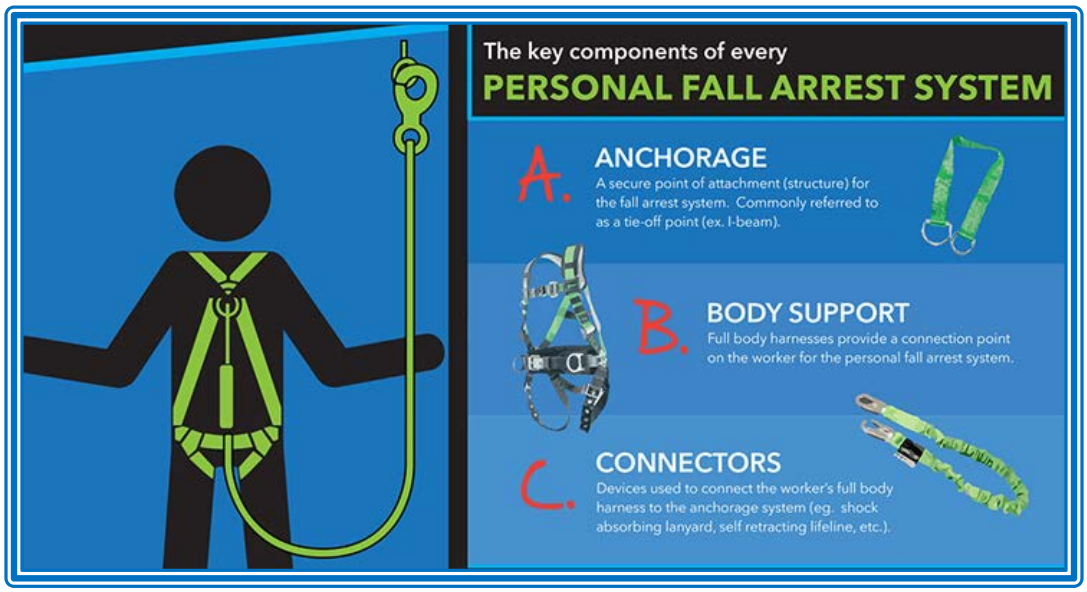
Today, safe fall protection systems are designed to distribute the impact of a fall more effectively.

Like all other PPE, **you must inspect your personal fall arrest system prior to each use.**

You must look for any visual signs of any significant defect: such as tears, cuts, abrasions, undue stretching, mould, or anything that might cause the system to fail.

Personal fall protection systems consist of three main parts:

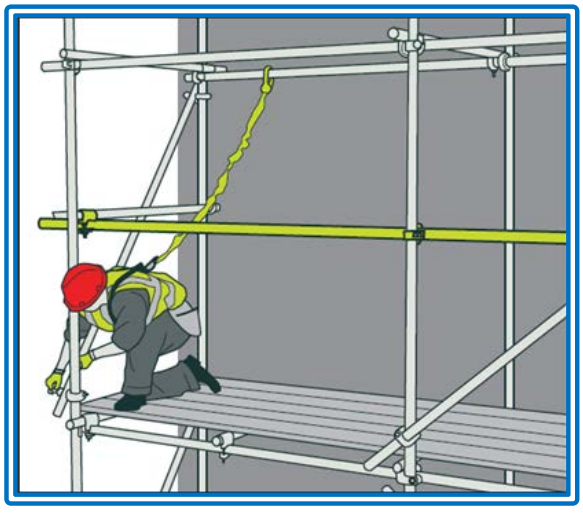
1. **Body Harness**: This is the part of the personal fall protection system that goes around the torso (shoulders to hips) of your body. If you were to fall, the impact of the fall is well distributed so that you won't be injured.



2. **Anchor**: This is the overhead structure that you will connect your lifeline to. This structure must be able to handle the intense force that occurs during a fall. The anchor point must be able to withstand 5000 lbs. of weight per employee that attaches to this point.

3. **Lanyard or Connector**: The lanyard or connector is what connects the harness to the anchor point and is designed to catch you if you do fall. This lifeline must be attached to the anchor point so that a person cannot fall more than six feet (called the “free-fall rule”). It is important to remember that your lifeline must never be used to lift or tie off material. It should ONLY be used to protect YOU!

100% means one lanyard hooked in all times.



Ladder Safety

The following requirements for ladder safety apply to all types of ladders, including those that are job-made ladders. There are three general types of ladders:

- Self-supporting portable ladders (normally called a “step ladder”),
- Non-self-supporting portable ladders (normally called an “extension ladder”) Fixed ladder (a permanent ladder).

Here are a few of the requirements for these ladders:

- Both the self-supporting and the non-self-supporting ladders must be able to handle at least 4 times their anticipated load.
- When portable ladders are used to get to an upper walking/ working surface, the ladder side rails must extend at least 3-feet above the upper surface.
- Ladders must be secured before working from them: If the ladder has adjustable feet, they must be positioned properly to ensure that they are on an even, flat, hard surface. The ladder must be tied-off securely at the top.
- You should **maintain a three-point contact with the ladder at all times** (that is, you should have two hands and one foot or two feet and one hand in contact with the ladder at all times). The top step of a step ladder must never be used as a “step.”

FIGURE 11 - THREE POINT

- Always face the ladder when ascending or descending the ladder. Never carry tools or material up a ladder that might drop or cause you to lose your balance. Instead, use a tagline (but not any part of your personal fall arrest system) to lift your tools to where the work is, or a tool-belt.
- Ladders shall be inspected periodically by the employer and by the user each time it will be used.
- Keep ladders free of oil, grease, and other slipping hazards.
- Look for such things as broken or missing rungs, split rails, corroded parts, etc. If any defect is identified, the ladder must be taken out of service and tagged with “DO NOT USE” or similar language until repaired.

- When putting a ladder in place, use an angle where the horizontal distance from the base of the wall to the foot of the ladder is ¼ the working height of the ladder to the support point.

In the photo Left, the worker is using a safe set up because the base of that 20-foot ladder is 4 feet (or ¼ of the working height) away from the 16-foot wall.

Participant Notes	**RECAP:** Deaths from falls when working at heights could be prevented by using safe fall protection practices and by using the proper PPE. Some fall protection systems are: • Personal Fall arrest systems • Scaffolds • Guard rails • Safety nets Personal Fall protection systems comprise of a body harness, anchor and lifeline. Individuals using ladders should maintain 3 points of contact, should always face the ladder when climbing or descending, ensure the ladder is placed on a secure even, flat surface and should inspect the ladder before use for damage. Step ladders, permanent ladders and extension ladders all have specific requirements for use. Follow all specific safe requirements for use of these ladders.
Knowledge Check	Q: Can you name at least 2 fall protection systems? ANSWER: • Personal Fall arrest systems – Lanyard/Harness • Scaffolds • Guard rails • Safety nets

Work at Heights: Scaffolding

Each year, more than 60 people die in scaffold-related incidents and 4,500 are injured. These incidents most commonly occur as a result of employee falls due to slipping or equipment collapse and impacts of falling objects. Electrical hazards also pose a threat to those on scaffolding.

Scaffolds must be designed by a person who meets US OSHA's the definition of "qualified" and erected by a trained crew under the supervision of a person who meets US OSHA's definition of "competent."

Definition: A *competent person,* by US OSHA's scaffolding standard, is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary or hazardous to employees, and who has the authorization to take prompt corrective measures to eliminate them. (OSHA, 2002)

Definition: A *qualified person* refers to someone who has a recognized degree, certificate, or professional training or who has extensive knowledge, training, and experience and who has demonstrated his or her ability to solve problems related to the subject matter or work.

Definition: A *scaffold user* is a worker who performs work from a scaffold.

Definition: A *scaffold erector* is a worker who is trained to erect, modify, and dismantle scaffolding.

The four main types of scaffolds are:

- Frame scaffolds
- Rolling tower, or mobile, scaffolds
- Tube and coupler scaffolds
- System scaffolds

Guardrails, mid-rails, and toe boards are installed on scaffolds ten feet or higher to prevent workers from falling. Always check that scaffolds and their components are able to support four-times the maximum intended load without failure.

Participant Notes	RECAP: Scaffolds should be inspected by qualified persons. The four main types of scaffolds are: • Frame scaffolds • Rolling tower, or mobile, scaffolds • Tube and coupler scaffolds • System scaffolds Guardrails, mid-rails, and toe boards are installed on scaffolds ten feet or higher to prevent workers from falling.
Knowledge Check	Q: What are the four main types of scaffolds are? ANSWER: 1) Frame scaffolds 2) Rolling tower, or mobile, scaffolds 3) Tube and coupler scaffolds 4) System scaffolds

Module 10: Excavations, Trenching, and Shoring

The potential hazards of excavating are among the most hazardous construction operations. This type of construction can be a safe operation when workers are aware of the hazards and an effective Safety and Health Program is used. *Applicable Trinidad and Tobago Regulation is Chap. 88:08 Occupational Safety and Health [Subsidiary] Occupational Safety and Health (Protective Measures) Order.*

Introduction

There are special potential hazards that are associated with excavations, trenching and shoring. Special precautions must always be taken to make sure that cave-ins do not occur. Special attention to the type of soil, stability of adjacent rock, as well as other activities that might change the stability of the excavation must always be considered.

Excavations

Excavations are any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal. Safety procedures apply to all open excavations that are made in the ground and include trenching.

Trenching

A trench is a particular type of excavation -where the excavation is deeper than it is wide. Excavations of any depth are at risk of collapse if they are unsupported. (It also must be less than 15 feet wide at the bottom).

Note: Depth of Excavations may differ, and excavation classifications may also be considered as confined spaces. Please check with your PLEA Company representative for site specific requirements

Shoring

Shoring is a structure such as a metallic, hydraulic, mechanical, or lumber system that supports the sides of an excavation. It is designed to prevent cave-ins.

Hazards

There are certain potential hazards that exist with excavations, trenching and shoring. There are atmosphere-related dangers that would include low oxygen levels or the existence of flammables or combustible gases.

Other hazards occur from instability of adjacent rock, adjacent activities, loose rock, or potential water hazards. When working in any excavation you must be alert to any changing condition.

Excavation Protective Systems are required for all excavations except those that are less than 5 feet deep that do not have any cave-in hazards or unstable rock. Excavation Protective systems include shielding, shoring, sloping or any combination of these safeguards.

Note: Excavation protective systems depth requirement may differ in the PLEA Companies. Please check with your PLEA Company representative for site specific requirements

A “means of egress” (escape) is required for trench excavations that are four feet or more in depth. Examples of approved means of egress could include stairs, ladders or ramps. Ways to get out of an excavation must be no more than 25 feet apart.

Participant Notes	RECAP: One of the main hazards of excavations are cave-ins. Special attention to the type of soil, stability of adjacent rock, as well as other activities that might change the stability of the excavation must always be taken into account. Excavations are any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.
Knowledge Check	**Q1**: Excavations are hazardous because: a. It may have unstable soil b. It can cave in c. A and B

	ANSWER: A and B **Q2:** Excavations over exceeding 4-6 feet deep and not obviously visible must be, at minimum: a. Barricaded or marked. b. Protected by guardrails. c. Covered with traffic plates. d No protection is required. ANSWER: A

Module 11: Fire Prevention

Fire Basics

Fire is a chemical reaction involving rapid oxidation of fuel. There are three things that are required in a fire: heat, fuel, and oxygen. If any of those three elements can be eliminated, the chemical chain reaction is stopped, and the fire will go out. Therefore, in order to put out a fire, you must cool the heat, remove the oxygen, or eliminate the fuel.

There are four classes of fire:

- **CLASS A** - This fire is made of ordinary combustibles (wood, paper, cloth, rubber, and some plastics). Generally speaking, the CLASS A fire is the only fire where water should be used to extinguish the fire.
- **CLASS B** – This fire is made of flammable or combustible liquids and gases. (Gasoline, kerosene, paint, paint thinners, propane, and butane, for example)
- **CLASS C** – This fire involves energized electrical equipment. (Electrical appliances, switches, panel boxes, electric motors and power tools, for example)
- **CLASS D** – This fire would involve certain combustible metals. These metals can burn at a high temperature and produce an extremely hot fire. (Magnesium, titanium, potassium, and sodium, for example).

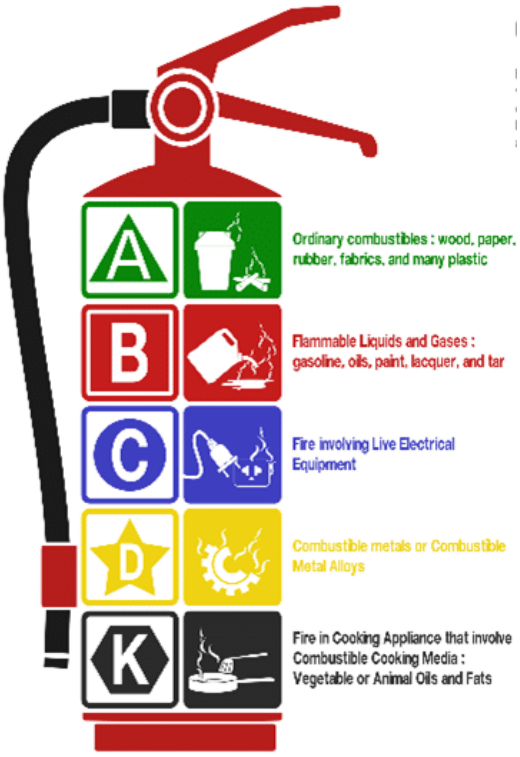


FIGURE 12 - FIRE EXTINGUISHER TYPES

You should only fight a fire if you are trained and know when and how to fight the fire. If a fire breaks out, report it immediately.

Even if you are properly trained, there are still some situations where you should NOT try to fight a fire:

- Never fight a fire if it is too large.
- Never fight a fire if it is spreading too quickly.

- Never fight a fire if the fire can block your only escape route.
- Never fight a fire if you do not have adequate firefighting equipment.

If a fire does occur, always remember six important points:

- Always call for backup.
- Do not fight a fire that is spreading.
- Keep a clear path to the escape exit.
- Be prepared for re-flash, which may occur after a fire appears to be extinguished when the elements of fire come together again and the fire resumes.
- Stop, drop, and roll if clothing or body catches fire.
- Do not run.

 **Participant Notes**	RECAP: There are three things that are required in a fire: heat, fuel, and oxygen. If any of those three elements can be eliminated, the chemical chain reaction is stopped, and the fire will go out. Different types of fires require different types of extinguishers.
 **Knowledge Check**	**Q1** – If you observe a fire in your work area what the first three things are you must do? ANSWER a- Always call for help b- Do not fight a fire that is spreading

Module 12: Work Authorization

Work Authorization – Permit to work.

Plant facilities utilize permit programs to assure that all the preliminary requirements are met, and permits are issued before a job can begin.

"A permit-to-work system"[8] is an integral part of a safe system of work and can help to properly manage the wide range of activities which can take place close together in a small space, such as in a storage area or process plant.

A permit-to-work is not simply permission to carry out a dangerous job. It is an essential part of a system which determines how that job can be carried out safely and helps communicate this to those doing the job. It should not be regarded as an easy way to eliminate hazard or reduce risk.

The issue of a permit does not, by itself, make a job safe - that can only be achieved by those preparing for the work, those supervising the work and those carrying it out.

The permit-to-work system should ensure that **authorized and competent people have thought about foreseeable risks and that such risks are avoided by using suitable precautions**. Those carrying out the job should think about and understand what they are doing to carry out their work safely and take the necessary precautions for which they have been trained and made responsible.

Examples of some of the types of permits that are used at worksites are:

- Hot Work
- Confined Space Entry
- Safe or Cold Work
- Line Entry/Breaking
- Excavation Permit
- Lockout/Tagout permits

[8] *HSE UK - Guidance on permit-to-work Systems - A guide for the petroleum, chemical and allied industries*

Before a work permit can be issued, the following minimum requirements must be met:

1. The scope of work has been well defined for the specific work location.
2. The scope of work, permit conditions and job safety analysis have been communicated to all persons involved prior to the start of work as well as to those persons who come to the work site after work has started.
3. Required atmospheric testing has been completed (where applicable)
4. Any change in the scope of work is accounted for by stopping the work, reassessing the risk, and reviewing/ revising the permit, as appropriate.

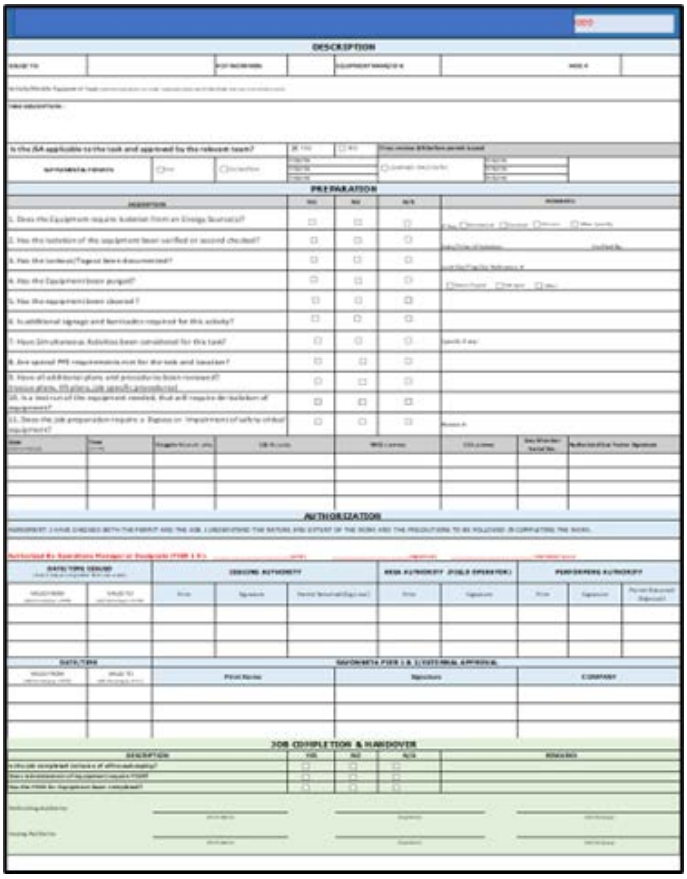


FIGURE 13 - PERMIT TO WORK SAMPLE

Here are some examples of types of permits!

Hot Work Permit

A hot work permit is required if the portable electrical equipment you will use is capable of sparking or could produce enough heat to ignite flammable or ignitable materials that may be present in the area.

Confined Space Entry Permit

A confined space entry permit is required when persons enter a Confined Space. Refer to section 14.

Lockout/Tagout permits

Required when there is a need to isolate energy to do work.
Energy can include:

- Electrical
- Process – Chemicals/Gas
- Pneumatic – Air
- Hydraulic – Fluid

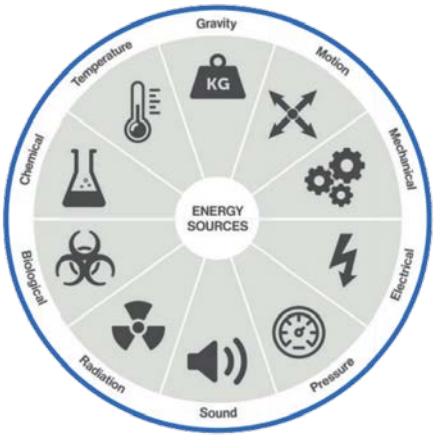


FIGURE 14 - ENERGY WHEEL

Line Entry/Breaking

Examples: Examples of some of the different types of work permits or procedures you may need for your job are:

Definition: - Line breaking means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury. Line Breaking Procedures – These procedures will identify what steps must have occurred before the line is opened that will assure that the line does not have pressure on it and that the contents in the line cannot start to come out while the work is being done.

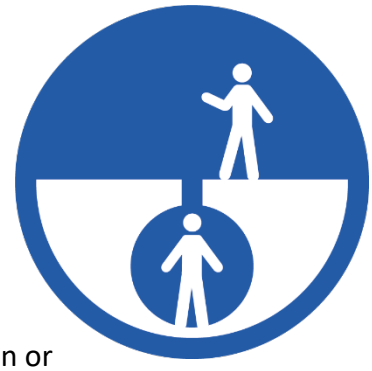
Definition:- Isolate or isolation means the process by which employees in a confined space are completely protected against the release of energy and material into the space, and contact with a physical hazard, by such means as: Blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; blocking or disconnecting all mechanical linkages; or placement of barriers to eliminate the potential for employee contact with a physical hazard.

 **Participant Notes**	RECAP: - A permit-to-work system is an integral part of a safe system of work and can help to properly manage the wide range of activities which can take place close together in a small space, such as in a storage area or process plant. - The issue of a permit does not, by itself, make a job safe - that can only be achieved by those preparing for the work, those supervising the work and those carrying it out. - When working on Plants – You should: o Work with a valid permit when required o Confirm if a permit is required

	o Determine if you are authorized to perform the work o Understand the permit o confirm that hazards are controlled, and it is safe to start o Stop and reassess if conditions change
Knowledge Check	**Q1** – Lockout- Tagout is required for what type of hazardous energy. A. Electrical B. Process – Chemicals/Gas C. Pneumatic – Air D. Hydraulic – Fluid Answer: ALL

Module 13: Confined Space Entry

Introduction



Confined Spaces present many hazards inclusive of low oxygen levels, toxic atmospheres, exposure to hazardous energy, engulfment by materials being stored in vessels, and falls.

Definition (TTOSHA) “confined space” means a space in which, because of its construction, location or contents, or of work activity therein, the accumulation of dangerous dust or fume or the creation of oxygen deficient atmosphere may occur;

Definition (US OSHA)

"Confined space" means a space that:

(1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and (2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and (3) Is not designed for continuous employee occupancy. A confined space must meet all three criteria.

Note: Your PLEA company may have additional definitions and requirements for confined space.

Confined Space Entry Basic Requirements:

1. You must be TRAINED to enter a confined space (PLEA 10 hour is not Confined Space training).
2. Confined Space Entry is approved and authorized through the Confined Space Permit.
3. The space is tested and safe to enter.

Participant Notes	RECAP: Confined Spaces present many hazards inclusive of low oxygen levels, toxic atmospheres, exposure to hazardous energy, engulfment by materials being stored in vessels, and falls. Some examples of confined spaces are tanks, piping, etc. Confined space work is high hazard and persons should be trained in these hazards and how to recognize them.
Knowledge Check	**Q1** – Confined Spaces present many hazards inclusive of low oxygen levels, toxic atmospheres, exposure to hazardous energy, engulfment by materials being stored in vessels, and falls. a) TRUE b) FALSE ANSWER: TRUE Q2- What is a confined space is: a. Is large enough and so configured that an employee can bodily enter and perform assigned work; and b. Has limited or restricted means for entry or exit. c. Is not designed for continuous employee occupancy. d. None of the above e. A, B, C ANSWER: E

Module 14: Job Safety Analysis (JSA)

Introduction

How familiar are you with Job Safety Analysis (JSA)? You may have heard it called "Pre-task Planning," "Job Hazard Analysis," or some other name.

This section is an introduction to the concept of JSA.

What is JSA?

A method used by employers to review tasks used in a procedure and uncover potential hazards before work begins. Each job can be broken down into steps or tasks.

The JSA identifies the **hazards** associated with each step of the job. You then list what controls should be in place and the specific procedures to follow to prevent an accident.

Definition4F[9]: what is a hazard: A hazard is any source of potential damage, harm or adverse health effects on something or someone. Basically, a hazard is the potential for harm or an adverse effect (for example, to people as health effects, to organizations as property or equipment losses, or to the environment).

Benefits of JSA

A JHA/JSA analyses the individual steps or activities that make up a job and pinpoints or identifies the hazards and potential hazards. A JSA can also identify less obvious hazards that may have been overlooked (i.e., in design, processes, or the result of changes in the workplace) because of its in-depth and detailed nature.

Some key benefits of JSA are:

- Improves job planning
- Helps employees to recognize potential hazards
- Involves all employees in determining the needed safety precautions
- Ensures that all employees are following the proper work practices

[9] https://www.ccohs.ca/oshanswers/hsprograms/hazard_risk.html

- Ensures good communication between all involved

Basic Steps to a JSA

A JSA breaks down the job procedures into steps or tasks. To perform a JSA:

1. Break the job down into steps.
2. Review each step; think of how the worker interacts with tools and the work environment as he or she is performing the step.
3. Identify any and all hazards associated with each step.
4. Develop a plan to eliminate, minimize, and/or control these hazards.
5. Review the results of the JSA with all impacted employees.
6. Document discussions.

Participant Notes	RECAP: A JSA is a method used by employers to review tasks used in a procedure and uncover potential hazards before work begins. Each job can be broken down into steps or tasks. A JSA should be fit for purpose with hazards and controls specific to the task
Knowledge Check	**Q1** Name the first four steps in a JSA? 1_____ 2_____ 3_____ 4_____ ANSWER A. Break the job down into steps. B. Review each step; think of how the worker interacts with tools and the work environment as he or she is performing the step. C. Identify any and all hazards associated with each step. D. Develop a plan to eliminate, minimize, and/or control these hazards.

Module 15: Lockout / Tagout

Lockout/tagout procedures are not just used to protect persons from the risk of electrical shock. Lockout/tagout procedures are used to prevent injury from ALL types of energy. Types of Energy include:

1) Electrical
2) Chemical
3) Mechanical
4) Pneumatic (Air)
5) Potential or stored (springs, batteries)

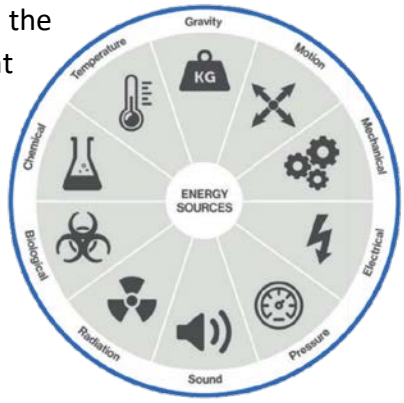


FIGURE 15 -ENERGY WHEEL

Three types of employees are covered by lockout/tagout and must be trained in the procedure: authorized employees, affected employees, and other employees. Each employee falls into one of these categories, which is based on the relationship of that employee's job to the machine or equipment being locked or tagged out and the degree of knowledge the employee has about hazardous energy.

Definition: An *authorized employee* is a person who locks or tags out machines or equipment to perform service or maintenance on that machine or equipment.

Definition: An *affected employee* is the worker who operates the equipment being serviced or maintained or works in an area where the servicing or maintenance takes place. In most cases, your role will be that of the affected employee.

An affected employee becomes an authorized employee when that employee performs service or maintenance work on the equipment.

Definition: *Other employees* are those whose work operations are or may be in an area where energy control procedures are being used.

"Other employees" need to understand if they see LOTO devices, they are not to touch them.

The basic steps of performing lockout/tagout procedure are as follows:

Before Work Is Done:

1. Locate and identify all energy sources and their isolating devices. (Equipment will usually involve at least two types of energy.)
2. Notify all authorized and affected workers. (People who work in the area should be told about the work so they will not disturb anything by mistake.)
3. Barricade the work area and provide sufficient warning signs. (If signs and barricades do not provide sufficient warning and protection, an attendant must be stationed to prevent and warn others to stay away from the area.)
4. Shut down the equipment. (Shut down equipment at the local start/stop switch.)
5. Isolate the equipment from all energy sources. (All sources of energy must be deenergized and disconnected. Circuit control devices, such as ON-OFF buttons, selector switches, and interlocks, must never be used as the only means of deenergizing circuits or equipment.)
6. Purge all hidden or trapped energy. *(This may be done by Operations or another team)*
7. Apply (put on) locks and tags on each device that was used to isolate the energy from its source. Remember: locks can only be put on by persons who are authorized to do so and can only be removed by the person who put it on (or supervisor in special circumstances.)
8. Verify (recheck to make sure) all energy has been isolated.

After Work is Complete:

- Visually inspect the area and ensure that all employees are clear of the area.
- Notify all authorized and affected workers that equipment is being put back into service and all energy sources will be re-established.
- Remove all locks and tags. This must be done by authorized personnel before reenergizing equipment.
- Verify that the equipment can operate properly after energy is restored if possible.

Participant Notes	RECAP: Lockout/tagout procedures are used to prevent injury from ALL types of energy. When working with energy there are steps you must take before and after the job. Before the Job: • Locate and identify all energy sources and their isolating devices. (Equipment will usually involve at least two types of energy.) • Ensure before you start work these have been isolated (check for locks, tags) also noted by the Permit. • Verify (recheck to make sure) all energy has been isolated. After the job • Ensure all employees know the job is completed before LOTO is removed. • Remove all locks and tags. This must be done by authorized personnel before reenergizing equipment. • Verify that the equipment can operate properly after energy is restored if possible
Knowledge Check	**Q:** Can you name three types of energy sources 1_____ 2_____ 3_____ Answer: 1) Electrical 2) Chemical 3) Mechanical 4) Pneumatic (Air) 5) Potential or stored (springs, batteries)

Module 16: Emergency Action Plans (EAPs)

As you learned in the previous section, it is important that an employer pre-identify how emergencies will be handled at each site. Then they must communicate those steps and procedures that they expect all personnel to follow. When you start work at a new site, it will be important that you learn everything your employer expects you to do in every type of emergency situation.

Introduction

Your workplace will have an Emergency Action Plan in case of emergency. This plan should be available no matter at what kind of location you are working, such as a refinery, chemical plant, machine shop, office building, hotel, or remote field locations. You should understand this plan in case of an emergency.

You need to know:

1. Emergency alarms (sounds/types)
2. Evacuation routes
3. Location of assembly areas (outdoor vs indoor)
4. Who is in charge?
5. Primary and secondary escape routes
6. Workers assigned to specific duties

Emergency Evacuations

Once you have evacuated the burning building or left a designated work area always report to a predetermined area so that an accurate count of all employees can be made. Some reasons for an emergency evacuation may be:

- Gas Leak

- Hazardous Spills
- Fire and Process Emergency

Know your warning systems and alarms for each job site and if an alarm sounds:

- Proceed to your designated assembly area.

- Be aware of wind direction -- exit crosswind and upwind.
- HEADCOUNT - Make sure everyone in your group is accounted for.

Note: Each site has its own system of emergency signals and an emergency plan. When an emergency evacuation signal is sounded you should stop all work and proceed to your evacuation location on foot.

To Report an Emergency:

1. State your name.
2. The nature of the emergency.
3. The location of the emergency.

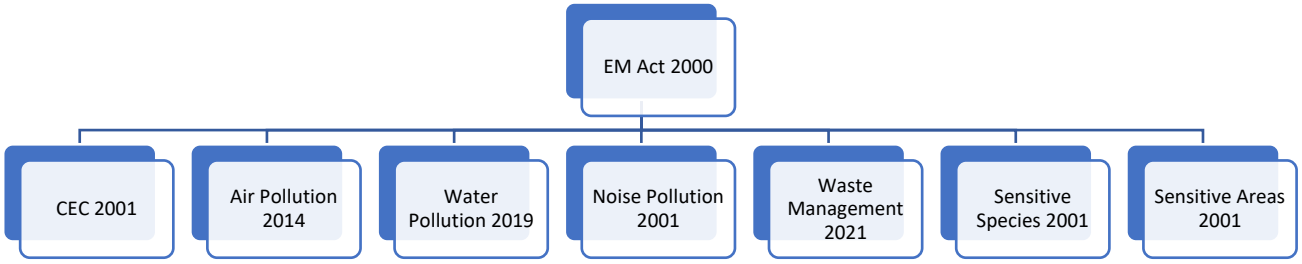
If you are injured on the job, if minor, properly report the injury and then seek medical attention.

Participant Notes	RECAP: **When you get to a site do you?** • Understand the type of emergencies? • Where to go to muster safely? • Understand why wind direction is important in chemical plants?

Knowledge Check	**Q1:** What are the 3 steps to report an emergency? **Answer** 1) State your name 2) The nature of the emergency 3) The location of the emergency Q2– Name (at least) 3 things you need to know when on a plant site about emergency actions? **Answer** 1. Emergency alarms (sounds/types) 2. Evacuation routes 3. Location of assembly areas (outdoor vs indoor) 4. Who is in charge? 5. Primary and secondary escape routes 6. Workers assigned to specific duties

Module 17: Environmental Management

Environmental Management is key in everyday work. Spills from equipment maintenance or chemical storage can get into drains, rivers and eventually the sea. Environmental management in Trinidad and Tobago is under the purview of the Environmental Management Authority (EMA). In March 1995, the Environmental Management Act No.3 was passed. It was later repealed and re-enacted as the Environmental Management Act (EM Act), Chapter 35:05 of 2000. The EM Act is legislation with the goal of ensuring **the protection, conservation, enhancement and wise use of the environment of Trinidad and Tobago**. The current regulations are below.



Key Environmental Management practices for job sites

1- Environmental pollutants – noise, waste, chemicals, etc should be managed in accordance with the laws of Trinidad and Tobago as above.
2- All chemical spills (oil, chemicals etc) and other hazardous material should be contained and not disposed of in drains/rivers.
3- Waste should be managed per the waste management regulations including the lifecycle tracking of hazardous waste.
4- Non-hazardous waste such as plastics, paper etc should be recycled where possible.

Participant Notes	RECAP: A. Environmental management in Trinidad and Tobago is under the purview of the Environmental Management Authority (EMA). B. There are several laws that control how the environment is managed including noise, waste, water, air and new developments. C. All contractor companies and employees should have environmental practices that are aligned to the EMA laws.
Knowledge Check	**Q1: Chemical Spills should be:** A. Washed down the drain B. Cleaned up and disposed of in accordance with the SDS C. None of the above **Answer** **B. Cleaned up and disposed of in accordance with the SDS** **Q2: Which of the following regulations are in effect in Trinidad & Tobago?** A. Waste Management Rules B. Noise Pollution Rules C. Air Pollution Rules D. All of the above **Answer** **D. All of the above**

Conclusion

We hope this study guide has helped you become more familiar with safety terms you will need to understand on the job.

This study guide has additionally provided you with important safety information and safe work practices you will be expected to follow when you are at work. If you have any questions about the information you have read, ask your BOP instructor.

While it is your employer's responsibility to teach you what you need to know to be safe on the job, it is YOUR responsibility to use this knowledge.

Test your knowledge with additional questions:

1. How can a worker find out what chemical is in a product that they use?

A. ask your supervisor
B. look on the label
C. read the SDS
D. all of the above

2. What is an example of a dropped object?

A. Tool
B. Bolt
C. Garbage at height
D. All of the above

3.Chose the correct combination to complete the following:
A simple definition of “line of fire” is being in_____.
Line of fire injuries occur when the path of a moving object or the release of hazardous energy intersects with an individual’s _____.

A. body, harm`s way
B. front, path
C. harm’s way, body
D. pathway, job

4. After you have started a job and the conditions of tasks in the job changes, what should you do?
a) Keep working
b) Do the best you can.
c) Ask another worker.
d) Stop the job and inform your supervisor.

5. What are some of the benefits of JHA/JSA?
a) To get longer breaks
b) To recognize hazards and improve job planning
c) To eliminate supervision to job hazards
d) To improve sign postings

6. What must you do with ladders that have defects?
a) Send them to a different job.
b) Remove them from service.
c) Wire or nail them together.
d) Mark with tags that say “use under emergency conditions only."

7. Facial hair prevents which of the following when using a respirator?
a) A complete facial seal with your respirator
b) You from having any skin irritation
c) Hair follicles prevents absorption of the contaminants
d) You do not need a respirator if you have facial hair

8. As an employee you are required to:
a) Use correctly the personal protection clothing and or devices provided for his use
b) To tell the employer what type and make of PPE he wants
c) To modify the PPE provided so that it suits the worker
d) To demand the replacement of PPE due to misuse, wilful damage or loss.

Answers

1.	d. all of the above
2.	d. All of the above
3.	c. harm’s way, body
4.	d. Stop the job and inform your supervisor.
5.	b. To recognize hazards and improve job planning
6.	b. Remove them from service.
7.	a. A complete facial seal with your respirator
8.	a. Use correctly the personal protection clothing and or devices provided for his use

How did you do?

Additional References for each topic

1. Trinidad and Tobago Occupational Safety and Health Act 2004 as amended 2006 - http://www.ttparliament.org/legislations/a2004-01.pdf
2. Canadian Centre of Occupational Health and Safety - Workplace Housekeeping - Basic Guide- https://www.ccohs.ca/oshanswers/hsprograms/house.html
3. Fitness to Work –STOW Element 7 - http://www.stowtt.info/downloads/20200601_Guidance_contractors.pdf
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5. The National Institute for Occupational Safety and Health (NIOSH) - https://www.cdc.gov/niosh/index.htm
6. Centre for Disease Control (CDC) - Facial Hairstyles and Filtering Facepiece Respirators- https://www.cdc.gov/niosh/npptl/pdfs/facialhairwmask11282017-508.pdf
7. US OSHA – Respirator Protection - https://www.osha.gov/respiratory-protection/training
8. Environmental Management Authority (EMA).