MODULE 6: Personal Protective Equipment

Introduction

The PPE must be considered only after engineering and administrative controls have been found ineffective, not feasible or insufficient. It must be used only as a last resort. The selection of PPE must comply with the existing OSH standards and using these in the workplace must be combined with training and orientation on their proper use, limitations and advantages.

You must monitor proper usage and maintenance of PPE in order to attain satisfactory performance and properly administer the PPE program in your area of responsibility.

This module thus aims to impart the proper usage of PPE to the learner in order to prevent accidents at work.

Objectives

At the end of this lesson, the students should be able to:

- Distinguish the appropriate type of PPE you need in your workplace
- Illustrate the limitation of PPE
- Develop programs to introduce PPE for your company

Defining hazards

What is a hazard? A hazard is anything that produces adverse effects on anyone. Examples of hazards are slippery floors, falling objects, chemicals and many more. What do you think make these occurrences hazardous? As we discussed in Module 3, unsafe/unhealthy acts bring about unsafe/unhealthy conditions, causing hazards in the workplace. Although some hazards are intrinsic in nature or force majeure, a human hand is still behind most of the hazards we now encounter.

Classification of hazards

Hazards may be classified into direct, physical, chemical, biological and ergonomic. Let us discuss each of these.

A. **Direct hazards** – These are very common in companies that utilize oil, water or any liquid in the production process and in the construction industry where there are a lot of falling debris, like small pieces of wood, nails, and hand tools.

   Examples:
   - Unguarded moving parts of machines
   - Falling/flying particles
   - Slippery floors

B. Physical hazards

1**. Noise.**

The following table is the allowable time a worker can stay in a work area without hearing protection.

Allowable Exposure to Noise
8 hrs --- 90 db
4 hrs --- 95 db
2 hrs --- 100 db
1 hr --- 105 db

For an eight-hour exposure, the allowable noise level is 90 db.

2. **Extreme Temperatures** are of two types: **extreme heat** which can cause heat stroke and **extreme cold** which can cause hypothermia.
3. Radiation also has two types: the ionizing radiation and the non-ionizing type.

Ionizing radiation

- Ultraviolet (UV) light or alpha particle - from the sun can be shielded by paper
- Beta particle – can penetrate paper but not concrete. .
- Gamma ray – can penetrate concrete. This can be shielded by using lead like in the x-ray room which is made up of sheeted lead in-between concrete to prevent outside exposure.

Non-ionizing radiation

- radio waves, electric waves and infrared rays. An example is the welding process which produces infrared rays that can damage the skin.

Radiation is dangerous because it cannot be detected by the five senses but it destroys the cells and tissues of living organisms, and has long-term effects.

Three safety practices for controlling body exposure to radiation:

a. Time – the shorter the time, the lower the exposure received
b. Distance – the greater distance, the lower the exposure received
c. Shielding – may be lead, steel, iron or concrete

4. **Extreme Pressure** – These are pressures beyond the allowable levels needed by the human body. Normal atmospheric pressure is 14.7 psi, and even a small change in the atmospheric pressure has a corresponding effect to humans. Examples of workers exposed to extreme pressure are those involved in excavation work, scuba diving, and piloting airplanes.

5. Vibration

C. **Chemical Hazards** – These are substances in solid, liquid or gaseous forms known to cause poison, fire, explosion or ill effects to health. Examples include gases, fumes, vapor, mist and dust. These are airborne particles or airborne toxic elements that evaporate in the air and can cause irritation, discomfort and even death.

   Chemical routes of entry to the body are by inhalation, ingestion and skin absorption.

D. **Biological Hazards** – These are hazards caused by viruses, fungi and bacteria.

E. **Ergonomic Hazards** – These are caused by improper posture or postural stress.

Hazard control measures

There are three methods in controlling hazards: engineering, administrative and PPE.

Engineering method – this is the application of engineering technology to control hazards. An example is machine guarding which prevent anyone from coming in contact with moving parts of a machine during the operation. Other examples are installation of safety devices like emergency stop, limit, grab-wire and photo electric switches. These prevent accidents in case of improper work practices.

Other forms of the engineering method involve substituting hazardous substances with less hazardous ones (**substitution**) and isolating hazardous process (**isolation**)

Administrative method – this aims to minimize the exposure of humans to
workplace hazards and employs administrative approaches such as rotation and shifting.

PPE – these are considered as the last line of defense. These devices provide limited protection to the ones using them.

Program to introduce PPE

Once it is decided that personal protective equipment is going to be used, then the

following steps need to be undertaken:

1. write a policy on the usage of PPE and communicate it to employees and visitors as needed
2. select the proper type of equipment
3. implement a thorough training program
4. ensure that employees knows the correct use and maintenance of the equipment
5. enforce proper use and maintenance of PPE

Policy

The policy should state the need for the use of PPE. It may also contain exceptions or limitations on the use of PPE.

Selection of Proper Equipment

After the need for personal protective equipment has been established, the next step is to select the proper type.

In selecting the proper protector, consideration should be given to the kind and degree of hazard. Where a choice of protectors is given and the degree of protection required is not an important issue, worker's comfort may be a deciding factor.

The first step in selecting PPE for respiratory protection is to contact a supplier. Manufacturers and distributors do not just helping the selection of the most useful equipment, but can give valuable aid in fit-sizing, cleaning, care and storage.

Proper Training

The next step is to obtain the workers complete compliance with requirements to wear the PPE. Several factors influence compliance, among them are:

- The extent to which the personnel who must wear the equipment understand its necessity
- The ease and comfort with which it can be used, or work with a minimum of interference with normal work procedures

A training program outline may include:

- Describing hazards and/or conditions in the workplace
- Telling what can/cannot be done about them
- Explaining why certain types of PPE have been selected
- Discussing the capabilities and/or limitation of the PPE
- Demonstrating how to use, adjust or fit PPE
- Practicing using PPE
- Explaining to workers how to deal with emergencies
- Discussing how PPE will be paid for, maintained, repaired and cleaned.

Maintenance Program

All equipment must be inspected periodically before and after use. A record of all inspections with the date, tabulated results, the recommendation of the manufacturer for the maintenance of the device, and the repair and replacement of parts supplied by the manufacturer of the product should be kept.

Enforcement

Employees need to know how the use of PPE will be enforced. Many companies have some kind of disciplinary actions, such as unpaid time-off, and finally, termination.The enforcement of the use of PPE is critical to a successful program.

Uses of PPE

You can check out many websites on the Internet that describe and sell various PPE. Commonly used PPE in the workplace include: helmet, respirator, spectacles, earplugs, gloves, safety shoes, etc. The following are the functions and uses of PPE.

1. **Head Protection**

   A safety hat is a device that provides head protection against impact from falling objects and protection against electrocution. Safety hats should be inspected prior to each use. Any one of the following defects is a cause for immediate removal of the PPE from service:

   - Suspension systems that show evidence of material cracking, tearing, fraying or other signs of deterioration. Suspension should provide a minimum clearance of 1 to 1.25 in. (2.5 – 3.2 cm) between the top of the worker's head and the inside crown of the hat.

   - Any cracks or perforations of brim or shell, deformation of shell, evidence of exposure to excessive heat, chemicals or radiation. Shells made of polymer plastics are susceptible to damage from ultraviolet light and gradual chemical degradation. This degradation first appears as a loss of surface gloss called chalking. With further deterioration, the surface will begin to flake away.

2. **Eye Protection**

   A device that provides eye protection from hazards caused by:

   o Flying particles
   o Sparks
   o Light radiation
   o Splashes
   o Gases

Goggles come in a number of different styles for a variety of uses such as protecting against dust and splashes: eye cups, flexible or cushioned goggles, plastic eye shield goggles and foundry men's goggles.

Eye protectors must meet the following minimum requirements:

- Provide adequate protection against the particular hazards for which they are designed
- Be reasonably comfortable when worn under the designated conditions
- Fit snugly without interfering with the movements or vision of the wearer
- Be durable
- Be capable of being disinfected
- Be easily cleaned
- Be kept clean and in good condition

3. Face Shields

Face shields should only be used as eye and face protection in areas where splashing or dusts, rather than impact resistance is the problem. In the case of grinding operations (plus other operations), a face shield is only secondary protection to other protective devices, such as safety goggles.

4. Ear Protection

Hazard:

- excessive noise - Noise exceeding 85-90 dB or more on eight hour exposure.

Examples: Ear plug
Ear muffs
Canal caps

The prevention of excessive noise exposure is the only way to avoid hearing damage. Engineering and administrative controls must be used if acceptable sound levels are exceeded. If such controls fail to reduce the sound levels to acceptable limits, personal hearing protection must be used.

Earmuffs must make a perfect seal around the ear to be effective.

5. Respiratory Protection

Respiratory protection is required when engineering improvements and administrative controls can't eliminate risk. Engineering controls include, isolation of the source of contaminants; design process or procedural changes, etc. Administrative controls on the other hand include, monitoring, limiting worker exposure, training and education, etc.

Hazards:
o Mists or Vapors
o Gases

o Smoke
o Fumes
o Particulates or dust
o Insufficient oxygen supply

Types of respirators are divided into two categories:

A. Air purifying respirators

- **Particulate respirators or mechanical filters** - screen out dust, fog, fume, mist spray or smoke. Such filters need to be replaced at frequent intervals.

- **Chemical cartridge devices** - remove contaminants by passing the tainted air through material that traps the harmful portions. There are specific cartridges for specific contaminants. These should be used and no substitutions should be made.

B. Air supplying devices

- **Self-contained** are those where the air supply is easily transportable and they protect against toxic gases and lack of oxygen. A common example is the self-contained breathing apparatus (SCBA), where the air tank is strapped to the wearer's back.

- **Supplied-air respirators** get air through an air line or hose. The breathable air is supplied by an air compressor or uncontaminated ambient air.

Air Contaminants – are divided into four types, gaseous, particulate, combination of gaseous and particulate and oxygen deficiency.

- **Gaseous contaminants** include gases and vapors.
- **Particulate contaminants** include dust, fumes, mist, fog and smoke.
- **Combination contaminants** usually consist of gaseous materials and particulates and result from operations such as paint spraying.
- **Oxygen-deficient atmospheres** are those that have less than 19.5 percent by volume. They often occur in confined spaces and are considered to be immediately dangerous to life and health.

6. Hand and Arm Protection

Hand and arm protection is required when workers' hands are exposed to hazards such as harmful substances that can be absorbed by the skin, severe cuts or lacerations, severe abrasions, chemical burns, thermal burns, and temperature extremes.

Examples of hand protection

appropriate gloves
hand pads
barrier cream
sleeves (for arm protection)

Hazards:
o Pinch points
o Hot surfaces
o Chemical substances
o Sharp objects
o Electrica

Selection of hand PPE shall be based on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards identified.

Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. There is no one type of gloves that provides protection against all potential hand hazards, and commonly available glove materials provide limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. Before purchasing gloves, request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated.

The following is a guide to the most common types of protective work gloves and the types of hazards they can guard against.

a. Metal mesh, leather or canvas gloves - Provide protection against cuts, burns, and sustained heat.

b. Fabric and coated fabric gloves - These gloves are made of cotton or other fabric to provide varying degrees of protection.

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

7. Foot and Leg Protection

Hazards:
o Falling or rolling objects
o Sharp objects
o Hot surfaces
o Wet, slippery surfaces
o Electricity

Conductive Shoes protect against the buildup of static electricity or equalize the electrical potential between personnel and the ground. These shoes should be worn only for the specific task(s) for which they are designed, and should be removed at task completion and not used as general purpose footwear. This type of shoes must not be used by personnel working near exposed energized electrical circuits. Personnel must avoid wearing 100 percent silk, wool, or nylon hose of socks with conductive hose because these materials are static producers. Likewise, foot powders must be avoided because they are insulators and interfere with electrical conductivity.

Electrical Hazard Safety Shoes are non-conductive and protect against open circuits of 600 volts or less under dry conditions. The insulating qualities may be compromised if the shoes are wet, the rubber sole is worn out, or metal particles are embedded in the sole or heel. Electrical hazard shoes are not intended for use in explosive or hazardous locations where conductive footwear is required. This footwear should be used in conjunction with insulated surfaces.

8. Fall Protection

Travel restraint system is an assembly composed of body belt and proper accessories that prevent a worker in a high elevation working area from traveling to an edge where the occurrence of fall may happen.

Fall arrest system is an assembly composed of full-body harness, safety lanyard and proper accessories or a safety net which protect a worker after a fall by stopping the fall before hitting the surface below.

Lifelines shall be secured above the point of operation to an anchorage or other structural member.

9. **Torso/ Full Body Protection** must be provided for employees if they are threatened with bodily injury of one kind or another while performing their jobs, and if engineering, work practices, and administrative controls have failed to eliminate these hazards.

Workplace hazards that could cause bodily injury include the following:

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

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

As with all protective equipment, protective clothing is available to protect against specific hazards. Depending upon the hazards in the workplace, it may be needed to provide the workers with one or more of the following:

- Vest
- Jacket
- Apron
- Coverall
- Surgical gowns
- Full-body suits

These protective clothing come in a variety of materials, each suited to particular hazards. These materials include the following:

- **Paper-like fiber** - Disposable suits made of this material provide protection against dust and splashes.

- **Treated wool and cotton** - Adapts well to changing workplace temperatures and is comfortable as well as fire resistant.

- **Duck** - This closely woven fabric protects employees against cuts and bruises while they handle heavy, sharp, or rough materials.

- **Leather** - Leather protective clothing is often used against dry heat and flame.

- **Rubberized fabrics, neoprene, and plastics** - protective clothing made from these materials protect against certain acids and other chemicals.

Be aware that different materials will protect against different and physical hazards. When chemical or physical hazards are present, check with the clothing manufacturer to make sure that the material selected will provide protection from the specific chemical of physical hazards in the workplace.

Rule 1080

Rule 1080 of the Occupational Safety and Health Standards (OSHS) requires employers to provide appropriate personal protective equipment to workers. Employers can be held liable if they fail to furnish their workers with the necessary PPE.

1081 General Provisions:

1081.01
Every employer shall at his/her own expense furnish his/her workers with protective equipment for the eyes, face, hands and feet, protective shields and barriers whenever necessary by reason of the hazardous nature of the process or environment, chemical or radiological or other mechanical irritants or hazards capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

1081.02
All protective equipment shall be of approved design and construction appropriate for the exposure and the work to be performed.

1081.03
The employer shall be responsible for the adequacy and proper maintenance of personal protective equipment used in his workplace.

1081.04
No person shall be subjected or exposed to hazardous environmental condition without protection.

Commonly asked questions and answers

Q. When must I provide PPE?
A: You must provide PPE for employees if:

- Their work environment presents a hazard or is likely to present a hazard to any part of their bodies;
- Their work processes present a hazard or are likely to present a hazard to any part of their body;
- During their work, they might come into contact with hazardous chemicals, radiation, or mechanical irritants;
- You are unable to eliminate their exposure or potential exposure to the hazard by engineering, work practice, or administrative control.

Q: If employees wear eyeglasses with prescription lenses, may I consider these as eye protection?
A: No. Eye glasses designed for ordinary wear do not provide the level of protection necessary to protect against workplace hazards. Special care must be taken when choosing eye protectors for employees who wear eyeglasses with corrective lenses such as the following:

- Prescription spectacles, with sideshields and protective lenses meeting the requirements of the standard, that also correct the individual employee's vision.
- Goggles that can fit comfortably over corrective eyeglasses without disturbing the alignment of the eyeglasses.
- Goggles that incorporate corrective lenses mounted behind protective lenses.

You also must provide protective eyewear to employees who wear contact lenses and are exposed to potential eye injury. Eye protection provided to these employees may also incorporate corrective eyeglasses. Thus, if an employee must don eyeglasses in the event of contact lens failure or loss, he or she will still be able to use the same protective eyewear.

Q: Could employees wearing hard hats and working at elevations create a potential hazard for the employees working below?
A: To protect employees working below, you must provide chin straps for the protective helmets worn by employees working at higher elevations such as aerial lifts or at the edge of a pit. The chin straps should be designed to prevent the hard hats from being bumped off the employee's heads.

Q: Is there one kind of glove that will protect against all workplace hazards?
A: No. The nature of the hazard(s) and the operation to be performed will determine your selection of gloves. The variety of potential occupational handinjuries may make selecting the appropriate pair of gloves more difficult than choosing other protective equipment. Exercise care in choosing gloves designed for the particular circumstances of your workplace.

Q: Why should workers be outfitted with the more expensive industrial respirators when look alike "nuisance masks" are available?
A: Respirators filter toxic dusts and mists commonly found in industrial and manufacturing settings, such as welding, grinding, sanding, and maintenance or repair applications. Respirators meet minimum performance standards and the government approved agencies certify them.

A "nuisance dust mask" on the other hand, has no approved government certification and meets no government performance standards. Nuisance dust masks should not be used when exposures to hazardous conditions may exist. The iltration efficiency of nuisance dust mask is lower and the face seal around the nose and mouth is less effective than that of approved respirators.

Q: Is cotton sufficient as earplugs?
A: Plain cotton does not effectively protect against occupational noise. You may, however, choose from several products that are effective at protecting your employees' hearing. Appropriate hearing protectors include: single-use earplugs, pre-formed or molded earplugs, canal caps, and earmuffs.

Q: Once I have selected the specific PPE for my workers, how do I make sure they use it properly?
A: Train your workers to use the protective equipment. Teach them to know…
- Why the PPE is necessary as well as the specific hazards in their work area.
- How the equipment will provide protection to them.
- The limitations of the PPE
- How to properly put on the protective equipment
- How to identify signs of wear such as scuffed, cracked, holes, etc.
- How to clean and maintain the PPE
- The company PPE policy, rules and regulations

Summary

To sum it up, you must consider many factors when selecting PPE to protect yourself, your colleagues or your workers from workplace hazards. With all of the types of operations that can present hazards and all of the types of PPE available to protect the different parts of a worker's body from specific types of hazards, this selection process can be confusing and at times overwhelming. Because of this, it is highly recommended that you implement a PPE Program to help you systematically assess the hazards in the workplace and select the appropriate PPE that will protect your workers from those hazards.

The basic information presented here attempts to establish and illustrate a logical, structured approach to hazard assessment and PPE selection and application for you to use as a starting point for your PPE Program.

Assessment 6: Make a poster in 1/8 illustration board about PPE.

References: (adopted from various sources).

MODULE 7: OSH Programming

Introduction

After understanding the basic concepts and principles of safety and health in the workplace, we will now proceed to the discussion on ensuring that OSH activities and interventions are appropriate and are sustained by the company. Organizations that are really concerned on OSH always plans and develop programs based on sound written policies that reflect the organization's vision, mission, goals and objectives. Rule 1045 of the OSH Standards requires employers to develop and implement their respective safety and health policy and programs. This module will help you to design your own OSH programs specific to the unique conditions and situations of your company.

Objectives

At the end of this lesson, the students should be able to:

1. Illustrate the development of Occupational Health and Safety program.

I. OSH Policy

Before you can design your company's safety and health program, foremost is the necessity to ascertain your company's S and H policy. What is your company's commitment on safety and health? Do you have the strong leadership and the necessary mechanism to implement this?

Firstly, let us define what a policy is. The American Heritage Dictionary defines policy as a plan or course of action, as of a government, political party, or business, intended to influence and determine decisions, actions, and other matters. It is central in any organization inasmuch as this gives the direction for which the company operates its business. It embodies the company's principles and guidelines in accomplishing itsgoals and objectives.

Consequently, a safety and health policy is a document stating the top management's safety **objectives**, the level of safety that can be performed by the organization, and the **responsibility** of the organization's members for executing the policy and ensuring safety. For example, if the company policy states that safety and health is primordial in its operations, then this becomes the impetus for OSH programs and activities to be implemented. The policy is the basis for planning and budgeting of OSH-related activities of the company.

Characteristics of an OSH Policy

An OSH policy is characterized by the following:

1. Specific to the organization, concise, clearly written, dated, and signed.
2. Indicates management commitment, support and accountability.
3. Includes principle and objectives of protecting SH of all members of the organization.

4. States compliance with OSHS and related laws.
5. States objectives to continually improve the OSH MS
6. Employees are aware of the Policy (communicated/posted)
7. Covers all workers and communit

The OSH policy should be company-specific and should be formulated based on its distinct nature. It should be clearly written so that all employees will understand its tenets. The policy should state management's resolve to promote safety and health in the workplace. The date and the signature of the company president of chief executive officer are equally important since this signifies accountability of said policy. It should highlight the participation of both the employees and management so everybody shall be solidarity responsible and accountable in its implementation.

Here is an example of an OSH Policy:

ABC Corporation ensures a safe and healthy workplace for employees conducive to greater productivity.

The Corporation is committed to continually improve its occupational safety and health management systems and comply with all relevant safety legislation and requirements to prevent accidents resulting in personal injury and illnesses, damage to equipment and materials, and operational interruption.

Concern for occupational safety and health is a shared responsibility between the Corporation and its employees.

All managers, supervisors and employees are enjoined to ensure that safety programs and practices are in place in their areas of responsibility.

October 8, 2011

Juan Dela Cruz
General Manager

II. Safety and Health Program Defined

The approved OSH policy lays the foundation of all programs and activities that will be conducted by the company.

A Safety and Health Program is a plan or outline of activities conducted to promote safety and health consciousness among management and workers in order that accidents and/or illnesses can be eliminated or minimized to the lowest reducible level. It is a written document that spells out management's commitment to protect its workers by undertaking measures to control exposures to hazards in the workplace.

A Safety and Health program contains an organized set of ideas, principles and procedures designed to be followed to achieve safety and health excellence. It is a detailed blueprint of standards and procedures reflecting workplace-specific accepted industry practices which is supported by both the management and the workers.

It has been found out that effective management of worker safety and health programs:

- Reduces the extent and severity of work related injuries and illnesses – the safety and health programs that are in place and followed by all concerned employees would include implementation of appropriate control measures to reduce workplace accidents and illnesses. Hence, if these are operational the cases of accidents and illnesses will be minimized.

- Improves employee morale and productivity – knowing that you are working in a company that values your overall wellness gives you security and peace of mind. This will result to greater productivity and efficiency among workers.

- Reduces workers' compensation costs – if accidents and illnesses are prevented then the costs for paying worker's compensation will be reduced.

III. Safety and Health Program Criteria

In designing the company's S and H program, the following criteria shall be considered, namely:

1. Workplace specific – as mentioned earlier on, the design of the safety and health should be responsive to the specific hazards and exposures brought about by the work processes and conditions of the company. One company's OSH program will not be exactly the same with other companies.

2. Must have commitment from the employer and senior management - management commitment is critical in the success of a program since they reflect the company's resolve to protect its worker and to ascertain that programs are carried out with no exceptions.

3. Must have input from the workers – while management leadership in implementing OSH programs is important, the concerns of the workers should be considered in the development of OSH programs and policies since they are the once directly involve and exposed to work hazards. They should be consulted in the course of developing respective programs.

4. Must assign clear responsibilities and accountabilities – the OSH program should spell out and clarify the specific responsibilities and accountabilities of all those who have a stake in company's OSH program to avoid confusion. Senior management must be accountable in implementing the programs while the supervisors and employees have the responsibility for carrying out specific elements of the program.

5. Each of the program's elements must be in writing – it is important that the OSH programs should be clearly written so that it cannot be misinterpreted and can be used as ready reference by everybody. If there is a written document then it would be easy for the employees to evaluate its compliance or suggest for some improvement.

6. Must address the safety and health of contractors- the OSH programs should not be limited to workers directly employed by the company but should also extend the

same to its contractors and service providers. This will ensure that everybody is following a common S and H standards.

7. Be available and effectively communicated – everyone should be made aware of the company's OSH programs and policy so they can abide on it. This can be done through the use of safety bulletins and orientations.

8. Must have an evaluation mechanism – the OSH program and policy is dynamic, hence, should be regularly monitored, reviewed and updated to make it responsive to the current situations and conditions of the company as well as applicable laws/orders of the DOLE and relevant agencies.

IV. Safety and Health Committee

In order to effectively implement the OSH programs, it is required that companies should have their own Safety and Health Committee. This is provided for in Rule 1040 of the OSH Standards.

The Safety and Health Committee is the planning and policy making group of the company in matters relating to safety and health. This is composed of employer and employee representatives such as the following:

- CEO/Manager or his representative
- Workers' Representatives (union members if organized)
- Company Physician, nurse or first-aider
- Safety Officer

This is the minimum requirements on the composition of the S and H committee. Depending on the actual needs, the company can increase its membership. The CEO or his representative chairs the Committee. This is to show the company's commitment in implementing the programs and activities that will be identified. It will give a strong signal that the company is sincere in its support. In cases where the company is not unionized / organized, the workers' representative shall be selected from among the workers through a majority vote. If there is a Labor Management Council (LMC), the worker representative sits in the committee.

The Safety Officer acts as the secretary and is the employer's focal person in the implementation of the safety and health programs. His specific duties are stipulated in Rule 1047.

V. Functions of the Safety and Health Committee

Being the focal group on workplace safety and health, the functions of the committee includes:

- Plans and develops accident prevention programs for the establishment
- Directs the accident prevention programs of the establishment
- Conducts safety and health meetings at least once a month

- Reviews report of inspection, accident investigations and implementation of programs
- Initiates and supervises safety training
- Develops and maintains disaster contingency plans.

VI. Components of an OSH Policy

The OSH policy can now be translated into various program interventions. It should cover a holistic approach and package of programs and activities. The OSHC adopts a framework in defining the components of an OSH policy. The same framework is used by the Center in selecting winners of its biennial Gawad Kaligtasan at Kalusugan (GKK) awards.

The OSH Policy Framework identifies the following components:

1. **Safety Control and Emergency Preparedness**. These include policies and programs to mitigate exposures of workers to direct physical hazards in the organization. Examples of these are programs relating to:
    a) Housekeeping
    b) Material handling and storage
    c) Electrical safety
    d) Machine guarding
    e) Personal protective equipment
    f) Fire safety orientations and exit drills
    g) Maintenance of firefighting facilities
    h) Incident/accident investigation analysis, recording and reporting
    i) Safety inspections
    j) Emergency preparedness plans and related training

    The policy on Emergency Preparedness is very relevant in view of the situations that can suddenly happen which can adversely affect the company and/or the community in general. Therefore, a fast and efficient response to emergencies is necessary.

    Emergency preparedness encompasses all activities that are necessary to prepare people and organizations to respond to emergencies and disasters which include typhoons, floods, industrial fire, chemical leaks, earthquakes and oil spills, among others.

    The importance of an effective workplace safety and health program cannot be overemphasized. There are many benefits from such a program including increased productivity, improved employee morale, reduced absenteeism and illness. However, incidents still may occur in spite of efforts to prevent them. Therefore, proper planning for emergencies is necessary to minimize employee injury and property damage. These include areas on:

    - declaring an emergency
    - evacuating workers
    - obtaining internal emergency resources

- obtaining help from external resources
- initiating emergency rescues
- tending to casualties

There are elements of an Emergency Preparedness Program that should be considered, namely:

a. Review the hazards – identify the hazards and risks that can happen in the organization or community
b. Evaluate resources – assess the available resources you have including the presence of trained manpower to respond to emergencies
c. Develop emergency plan and procedure- develop plans and proceduresthat should be observed before, during and after the emergency
d. Conduct training – train the right people who will respond to emergencies
e. Conduct drills and exercises - simulation of possible emergency scenarios through drills and exercise will prepare the employees in the event disasters and calamities will happen.
f. Educate public – conduct awareness programs for the general public so that they too will be prepared and will be a source of your support system
g. Integrate in community plan – it is important that the company keeps close coordination with the locality/community in order to have a synchronized response

2. **Industrial Hygiene Program** – this includes programs of the company that covers

- Inventory of chemicals
- Emergency contingency plan
- Capability building program for chemical users
- Materials handling and storage procedures
- Abatement of physical hazards

The company has to define the guidelines on how it will conduct its industrial hygiene program - who should be involved in terms of the IH activities, how these will be done, and what and to whom are the capability building interventions that will be conducted, etc.

3. **Occupational Health Program** - this include programs on

- Employment or hiring of medical staff
- Availability of clinical, dental and medical equipment
- Preparation and submission of Annual Medical Report
- Compilation of medical records of employees, including analysis of the data
- HMO or in-house health services or both
- Medical services and other programs implemented

4. **Environmental Protection and Community Relations** – aside from safety and health, the company programs should also cover the following:
   - Data on classification and volume of waste generated
   - Pollution prevention facilities (e.g. wastewater treatment)

- Employment of a Pollution Control Officer (PCO)
- List of outreach programs and description

5. **Social Accountability Programs** – these programs take into account the involvement of the company on issues such as
   - Policy on gender
   - Policy on Child Labor
   - Policy on PWDs
   - Other corporate social responsibility programs

6. Capability Building on OSH – this involves compliance by the company to mandated/specialized OSH training courses and conduct of activities to promote OSH. This includes
   - List of required orientations/ trainings on OSH provided (BOSH, CST, Drugs, HIV/AIDS, Gender/S&H, Anti-Sexual Harassment, Family Welfare, OSH-MS and others)
   - Training calendar of the company; other staff development activities
   - Plans on communicating OSH
   - Information program, materials and dissemination strategies
   - Monitoring and evaluation

As mentioned earlier, it is important to communicate the OSH programs to all the employees to generate their involvement. This could be done through:

Some Promotional Methods

- Safety Meetings – conducted regularly to remind workers on OSH
- Safety Contests – can include injury rate contest, non-injury rate contest e.g., safety slogan, poster, housekeeping
- Use of posters, bulletin boards, displays to publicize safety
- Other activities like safety campaigns, safety courses and demonstrations, public address systems, publications, suggestion systems

VII. Monitoring

It is necessary for any organization to monitor and evaluate the effectiveness of all its safety and health policies and programs. In doing this the company will be able to:

- Improve the performance of the program.
- Know if changes or revisions/improvements are necessary.
- Check areas that have to be prioritized.
- Assess program effectiveness
  - Number of accidents and injuries are trending downward
  - Cost of accidents and injuries is trending downward
  - Time lost due to work-related injuries or illnesses is reduced

Examples of indicators/areas to look at when monitoring the OSH program:

- 100% compliance on helmet and safety shoes
- Presence of signages and directional signs
- Zero unprotected wall and floor openings

Monitoring of compliance and effectiveness of the OSH programs can be done through the conduct of safety inspections/assessments, conduct of Work Environment Measurement and Annual Medical Check-up.

In closing, unless an organization has a written, well-defined, company- specific safety plan in which everyone in the organization logically understands their roles and responsibilities, all of the hard work, all of the expense, and all of the hopes for a successful program will be useless.

The greatest responsibility a person can have during his lifetime is to be accountable for another person's safety and health and for the protection of the environment.

Assessment 7: Compare and contrast OSH Programs of at least 2 establishments here in Surigao del Norte. Choose the ones that are accessible to you.

MODULE 8: Training of Personnel on OSH

Introduction

Some of the most crucial safety tools you can give your workers are education and employee training. A worker who truly understands the hazards and controls they are working with is much more capable of and likely to avoid injuries at work. By providing these same workers with in depth knowledge of your environmental, health, and safety (EHS) program, you also empower them to help you develop and implement changes that will keep them safer and save your company resources. On top of that, many OSHA standards have explicit training requirements that maritime, construction, agriculture, and general industries must include in their workplace safety training program.

OSHA does not actually offer any certified training courses, so it is up to your company to provide the safety training program you need to stay compliant and keep employees safe. The closest thing offered would be the OSHA certifications under their Outreach program which includes a 10-Hour and 30-Hour course covering both the basic and more advanced training on common workplace safety and health hazards.

Your organization's workplace safety training program must relate to the operations conducted on your worksite and the hazards the employees will face. For example, if any workers must provide first aid as part of their duties, those workers would need bloodborne pathogen training. Training must be as relevant as possible to the individual taking the training course and should cover the use of tools and equipment needed to complete the tasks associated with the course.

Some states have been approved by OSHA to operate their own health and safety programs, so you must then also meet the state guidelines rather than just the federal ones. These states have unique OSHA approved plans that may differ from the federal requirements on workplace safety training.

Objectives

At the end of this lesson, the students should be able to:

1. Discuss the importance of training the personnel on OSH.
2. Illustrate the need for training personnels on safety.

Is Workplace Safety Training Required?

Workplace safety training is as vital as workplace safety itself. It enables the management to ensure a safe and healthy work environment. It also helps the employees to recognize safety hazards and correct them. It enables them to understand best safety practices and expectations.

Safety training is all the more important for organizations like hospitals and construction companies that use hazardous materials and equipment.

Safety training is vital for employees or workers with regard to understanding of safety practices related to their jobs; otherwise, a worker will find himself/herself at a higher risk for workplace injury, illness or death.

Safety training in modern businesses has become quite unavoidable due to the following reasons –

- Communications − The growing multiplicity of today's employees brings a wide variety of languages and customs.

- Computer skills − Computer skills are becoming an essential for managing administrative and office tasks.

- Customer service − The growing contest in today's worldwide marketplace makes it grave that employees understand and meet the needs of customers.

- Diversity − Diversity training generally comprises of explanation about how people have different vista and views, and comprises techniques to value multiplicity.

- Ethics − Today's society has growing assumptions about corporate social control. Also, today's various workforces bring a wide variety of values and significance to the workplace.

- Human relations − The enlarged stresses of today's workplace can include misunderstandings and dispute.

- Quality initiatives − Initiatives such as Total Quality Management, Quality Circles, standard, etc., needs basic training about quality idea, instructions and standards for quality, etc.

- Safety − Safety training is disapproving where working with heavy equipment, dangerous chemicals, tedious activities, etc., but can also be useful with real advice for avoiding attacks, etc.

- Sexual harassment − Sexual harassment training generally includes careful explanation of the organization's policies about sexual harassment, especially about what are unsuitable behaviors.

Workplace Safety Meetings

Safety meetings and safety talks are generally thought of as departmental or team meetings. These repeated meetings, ranging from weekly to monthly depending upon the conditions, allow the manager or trainer to −

- evaluate any accidents experienced by members of the group,

- go over any unsafe practices observed,

- acknowledge the requirement for safe work practices, and
- to answer any questions that employees may have about equipment operation or other safety issues.

Topics for a safety meeting can be chosen on the basis of −

- An evaluation of the most recent accidents and near-misses at the benefits or within the similar industry
- Post-installation of new machinery or equipment and their handling
- Associated corporate safety goals
- Any specific subjects that required to be covered from a legal or insurance standpoint
- Proposal from employees, safety inspectors, contractor safety representatives, insurance representatives, or other knowledgeable observers

Where there are numerous work shifts, such meetings should be conducted repeatedly or be held at a place and time that will enable all affected employees to participate. Online safety training is a pragmatic and efficient way to deliver safety meetings and talks for numerous work shifts.

Workplace Safety Training – Benefits

Hazards are pervasive to every organization or all types of industries, hence it is essential for an organization to make provisions for safety training for their workers and to update the safety programs and norms on a regular basis.

There are many sources of online information about training and development. Several of these sites indicate reasons for managers to conduct training among employees. These reasons include –

- Educate employees on the basics of health and safety
- Increased focus by employees on their tasks
- Increased job pleasure and confidence among employees
- Increased employee inspiration
- Increased effectiveness in processes, deriving in financial gain
- Increased ability to adopt new skills and methods
- Increased change in scheme and products

- Increase employee turnover
- Increase company image, e.g., conducting ethics training
- Risk management, e.g., training about sexual harassment, diversity training.
- Increased productivity and satisfaction among personnel by keeping the workplace safe

When Do Employees Need Workplace Safety Training?

According to OSHA training requirements, employees must be trained on safe working procedures when they are first hired, assigned to new jobs or tasks, when a new process or material is introduced to the workplace that may be hazardous, and when they are responsible for performing tasks that are hazardous. Depending on the standards for the training they are being given, employees may also be required to complete annual training. For example, bloodborne pathogen training must be completed annually, but hazard communication training is only required in the event of a procedural change that introduces a new hazard to the workplace.

It can be difficult to track the numerous industry standards, courses that employees must complete, and retraining that has to take place. The easiest and most efficient way to stay on top of delivering training, tracking upcoming training, and pulling records is through the use of employee training software. If you do not currently have one, here is a good place to try one yourself.

Online Safety Training

In a letter published by OSHA, they recognized that online training improves the tracking process and learning engagement, and added that:

"…OSHA BELIEVES THAT COMPUTER-BASED TRAINING PROGRAMS CAN BE USED AS PART OF AN EFFECTIVE SAFETY AND HEALTH TRAINING PROGRAM TO SATISFY OSHA TRAINING REQUIREMENTS, PROVIDED THAT THE PROGRAM IS SUPPLEMENTED BY THE OPPORTUNITY FOR TRAINEES TO ASK QUESTIONS OF A QUALIFIED TRAINER, AND PROVIDES TRAINEES WITH SUFFICIENT HANDS-ON EXPERIENCE."

Essentially, OSHA wants employers to develop comprehensive and immersive training programs. While online safety training offers many benefits, no single training method is the perfect solution to keeping employees safe. Online training should be supplemented by other methods such as experiential learning; however, the right software will also track that for you. Some OSHA training standards actually require that hands-on training be provided, so the software is really only a measurement and tracking tool to help make your job easier. A good example of this would be providing forklift online training videos before employees attend a forklift driver hands-on session.

Online training is great for introducing topics, reinforcing topics, and putting time back into the trainer's schedules. The online courses allow employees to access them anywhere, anytime, and at their own pace. In fact, the BasicSafe software has been shown to cut down on time waste by 90% as compared to other methods of training tracking.

What to Look for in Training Software

If your new to training software here are some tips to help you find the right one.

Ease of Use

This is probably the most important piece to any software. Knowing that it will be easy for all levels of your organization to access and use is extremely important. For this reason, it is highly recommended that you use some sort of trial or demo of the software.

Reminders

Keeping track of workplace safety training can be very time consuming. For this reason, notifications of some sort will be helpful in keeping up on training and staying in compliance.

Interactivity

Engagement is a significant factor in determining the effectiveness of training. The more interaction that a training format requires, the more employees will retain from it. For this reason, look for software that allows use of training videos and hands-on type training to get the most out of your time and money.

Tracking

The right software will provide you with real time metrics on the training health of your organization. Metrics like pass rates, expired training, and passed due training dates all help you to stay up to date and compliant. A good software will also allow the segmenting of employees by things like job title and supervisor, which allows for even more in-depth analysis of your workplace safety training.

Configurability

It is important that the training solution that you find allows you to modify the software to meet your organizations needs. As your training program itself evolves and grows, the software should be able to grow with it.

HAZCOM Training

According to the OSHA Hazard Communication (HAZCOM) Standard, organizations with hazardous chemicals in their workplaces must train employees how to work safety in areas where those chemicals are present. This training must cover the methods used to detect the release of hazardous chemicals in the work area and detail the physical, health, and other hazards of the chemicals. HAZCOM training also has to cover the ways in which employees can protect themselves from these hazards.

Employees also must be trained on the details of the organizations chemical inventory and container labels, safety data sheets (SDS), and the written HAZCOM program. All of this information must be easily accessible and the employees need to understand how to access it in case of emergency or when using the chemicals.

Who Needs HAZCOM Training?

According to OSHA, all workers "who may be exposed to hazardous chemicals under normal operating conditions or during foreseeable emergencies" must be trained on HAZCOM. It is best to be cautious here and include any employee who could ever possibly be exposed to the chemicals rather than risk injury, death, or OSHA fine.

Employees should receive this training at the time of their initial assignment, when a new hazard is introduced, or when a new type of chemical with different hazards is introduced.

Workplace Safety Training Method

Workplace safety education and training should provide employers, managers, supervisors with:

- The knowledge and skills to work safely and avoid unnecessary hazards
- The ability to help their peers avoid risks
- The awareness and understanding of the hazards present in your workplace and the ability to identify, report, and control them
- Specialized training on the unique hazards of their specific jobs and tasks

Besides the standard workplace safety training that your company provides to all employees, additional training should be given to employers, managers, supervisors, and workers with unique roles. For example: managers may need leadership training that involves the way your company intends to handle direction and resources associated with the safety program (e.g., near miss incident tracking). This training should include information on how they should be expected to participate in these programs.

Not all training needs to be done in a classroom setting. In fact, peer to peer training, on the job training, worksite demonstrations, and mobile micro training sessions are all proven effective ways to ensure that your employees understand safety concepts, hazards, controls, and workplace practices.

Some special cases apply and they can be found in the Special Cases section below.

A good way to provide general safety training in an efficient and effecting manner is by following these steps-

1. Provide all employees safety program awareness training
2. Train employers, managers, and supervisors on their specific roles in the program
3. Train workers on their specific roles in the EHS program
4. Train workers on hazard recognition and controls
5. Provide ongoing training sessions like those mentioned above to keep safety knowledge fresh

Safety program awareness training

All employees need to understand the structure, plan, and procedures of your safety program. It is also important that they know where to access this information in the future. All workplace safety training should be provided in a language and at the education level that your workers can understand. Understanding this program helps ensure that everyone can help develop, implement, and improve your safety program. Emphasis should be placed on the fact that the program will only work when everyone is involved and comfortable with it.

How to accomplish this-

- Provide training to all managers, supervisors, workers, contractors, subs, and temp workers on-
  - The EHS policies, procedures, and goals.
  - The functions of the EHS program.
  - Whom to contact with questions, concerns, or emergencies (make this easily accessible at all times).
  - How to report hazards, near misses, illnesses, and injuries.
  - Emergency response plans.
  - Employer responsibilities.
  - Worker's rights under OSHA.
- Provide training on the hazards of your workplace and the controls able to be put in place for those specific hazards.
- Work to reach an understanding that all workers have the right to fully participate in your safety program (report near misses, injuries, incidents, concerns, etc.) without fear of retaliation.

Employer, manager, and supervisor role specific training

All members of your organization should be responsible for the worker's safety. It is important to provide training on safety related concepts and techniques that allow them to offer the safest environment to the workers. Providing specific training to individual roles will allow them to accomplish this task.

How to accomplish this-

- Provide training on the members roles and responsibilities under the Occupational Safety and Health Act and those that your company requires.
- Provide training on the rights guaranteed to the employees under the Act.
- Train members on the procedures for responding to reports of injuries, illnesses, incidents, and near misses and include information on how to avoid discouraging reporting.
- Train members on the concepts and techniques for recognizing hazards and controlling them. Include training on the hierarchy of controls.
- Train members on the incident investigation techniques used by your organization.
- Provide access and training in programs and tools used to accomplish these tasks.

Worker role specific training

Additional training should be provided to workers to ensure that they can accomplish any health and safety responsibilities assigned to them.

How to accomplish this-

- Train workers how to report near misses, injuries, illnesses, incidents, and concerns. Provide access to the systems your company uses for these tasks. (Don't have one? Try BasicSafe)
- Instruct workers with specific roles in the EHS program how to carry out their responsibilities.
- Provide opportunities for workers to give feedback and ask questions during and after the training.

Hazard recognition and controls

Understanding hazard recognition and control implementation can help workers eliminate hazards before an incident even occurs.

How to accomplish this-

- Provide training on the use of job safety analysis (JSA's).
- Train workers on general hazard recognition as well as job specific hazards.
- Train workers on hazard control measures as well as the hierarchy of controls.
- Provide training on proper use of work practice and administrative controls.
- Provide training on the proper use of required personal protective equipment (PPE).
- Train employees on any changes in facility, equipment, process, materials, or organization or when a worker is assigned a new job or task.

Ongoing training

Although providing safety training up front does help mitigate risk it is only the first step in keeping employees safe. Follow up training such as hands on sessions and micro-training sessions keep the knowledge fresh and top of mind.

How to accomplish this-

- Provide the resources needed for peer to peer safety training in the field.
- Train employees on the job with management led training sessions.
- Provide worksite demonstrations and give employees the opportunity to ask questions and give input.
- Provide micro training sessions, these are short, keep information easily digestible and do not affect work schedules as drastically as the other options so they are easier to include more regularly.
- Give access to all relevant training materials to all employees at all times.

Special Cases

Forklift Safety Training

The OSHA powered industrial truck (PIT) regulations found in Standard 29 CFR 1910.178 requires employers properly train any employee, contractor, or temp worker who will use a forklift on the job. If your workers will be operating a forklift or other PIT, they need to be trained on the following-

- Operating instructions, warnings, and precautions specific to the PIT they will be using
- Differences between a PIT and an automobile
- Identifying and mitigating hazards created by PIT's in the workplace
- How to perform inspections and maintenance
- Understanding the PIT's controls
- Other general safe use principles

According to this standard training must be administered as formal instruction, practical training, and professional evaluation. The practical phase should include hands-on teaching and demos, along with supervised use. Formal training can be lectures, presentations, training videos, written materials, and interactive online courses.

After receiving the practical and formal training, learners must take a professional evaluation in order to obtain their certification. This certification process falls on the employer and the certification document must include the operators name, their training and evaluation dates, and the name of the person performing the evaluation. OSHA requires that businesses maintain certification records for three years. For this reason, it is important to perform refresher training and evaluation at least every three years, but it is also required if an operator is observed using the vehicle in an unsafe manner or has had an incident involving the use of the PIT.

Confined Space Training

If your workplace contains permit required confined spaces, both the entrants and the attendants of these spaces must be trained in the safe work procedures required for working in confined spaces. Training must also be provided to any personnel who will be working near a confined space in order to prevent unauthorized entry.

This training should address the following-

- Your organization's policy and confined space program limiting access to these spaces
- Recognizing the warning and identification signs
- Changes in use or configuration of non-permit spaces that could require the space to become classified as a permit-required space
- Procedures that address employees or contractors of other companies who enter and work in the permit required spaces

Entrants need to be trained on-

- The hazards associated with confined space entry
- The use of barriers and shields around entry points
- How to install forced air ventilation systems
- How to monitor air quality within the space
- How to work lighting equipment and explosion-proof lighting equipment
- How to use all required PPE
- How to communicate with attendants and alert them of developing or existing hazards
- The workings of evacuation alarms
- How to exit the space safely

Attendants must be trained on-

- Hazards that may be encountered on entry
- How to recognize signs and symptoms of hazard exposure
- How to remain outside of the space and maintain count, communication, and identity of entrants
- How to summon rescue or emergency personnel or perform non-entry rescues

When must workers receive confined space training?

Before initial assignment all employees must complete confined space training. Additional training is needed if job duties change, confined space program changes, operation of these spaces presents a new hazard, or an employee's performance shows they require more training.

OSHA requires employers to track records of these trainings, keep them readily available, and include employee name, trainer signoff, and the dates of the trainings.

Electrical Safety Training

OSHA states that only qualified workers can perform maintenance and repairs of electrical equipment. These workers have to be trained to identify exposed live electrical parts and their voltage, and know the procedures to follow when they work on these parts or are close enough to be at risk. However, even non-qualified workers must also be trained on electrical safety.

Non-qualified workers should be trained on-

- Basic electrical terms
- How to identify and avoid electrical hazards
- The maximum voltage of energized components in the work area
- The use of PPE and any necessary insulated tools
- How to prevent circuits from being overloaded
- The types of conductive and flammable materials that need to be kept away from energized equipment and electrical sources
- Tasks and maintenance of electrical equipment that should be performed by qualified employees
- Hazards and circumstances specific to their work areas
- Whom to report electrical problems to
- What to do in case of an electrical accident or incident

When Should Electrical Safety Training be Provided?

Training should be provided prior to the assignment of tasks that may present electrical hazards, particularly since the National Institute for Occupational Safety and Health found that 41% of workplace electrocution incidents involved workers who had been on the job for less than a year. Refresher training should also be given as needed, especially if workplace changes introduce a new hazard, or an incident or accident occurs.

Driver Safety Training

A good driver safety training course should cover the following-

- Adjusting your seat to comfortably and safely complete maneuvers in an emergency
- Positioning of mirrors to minimize blind spots
- Safe passing tips
- Creating a safety cushion of space between yourself and other vehicles
- Basic emergency and maintenance equipment that needs to be kept with the vehicle
- Steps to familiarize yourself with a new vehicle
- Retaining visibility in bad weather and navigating poor conditions
- Vehicle inspection training
- The dangers of driving under the influence of drugs or alcohol

- Procedures to follow in case of vehicular accident
- Driver fatigue (Commercial drivers- Department of Transportation regulations on rest.)
- Distracted driving training

Bloodborne Pathogen Training

OSHA developed its Bloodborne Pathogens Standard 29 CFR 1910.1030 in order to protect at risk employees from exposure to these pathogens. It requires that employees are trained on the hazards of being exposed to blood or other potentially infectious material (OPIM) in the workplace. The employer must determine which jobs or tasks could potentially involve exposure, however there are some recommendations.

Employees who should receive the training include-

- Any employee who must administer first aid
- Employees whose job includes cleaning areas or surfaces contaminated with blood or OPIM
- Employees trained to provide medical, healthcare, or medical research services
- Housekeeping and janitorial staff at healthcare facilities

Workplace safety training does not need to be a difficult undertaking. With the right planning and tools, it can cut down on costs and keep employees safer. One of the easiest ways to cut down on the administrative effort and time waste associated with training is to provide all in one, accessible training software like the Training or Corporate Training tool offered by BasicSafe. These tools schedule and provide training and testing based on employee grouping, training category, and more. They also offer employees and management the ability to access training and provide feedback at any time through online or mobile use.

Tips for Effective Safety Training

Below are some tips you can use to make your safety training more effective. If you follow these tips, you'll definitely be heading in the right direction.

You'll notice the first two steps aren't directly related to safety training, but to safety in general. We think you'll agree they're logical starting points

1. **Identify Your Hazards**
   The first thing you can do is inspect the workplace for hazards. Your safety training won't be very good unless you know what hazards you're trying to protect your workers from.

   Performing a job hazard analysis (JHA) is a great way to get started. During a JHA, a team of people investigate a work area and look for hazards associated with a particular job. They'll then work to reduce those hazards, a point we'll get to shortly

2. **Control Your Hazards**
   It's good to do a JHA and identify your hazards. But it's even better to control your hazards. If you don't talk "Safety Manager 101," that means to make the workplace safer by eliminating or reducing the hazards.

   One great model you can use to do this is to follow what safety folks know as the hierarchy of controls. The hierarchy of controls gives you a simple pattern to use when trying to control hazards — try elimination first, substitution second, engineering controls third, work practice controls fourth and PPE fifth. Note that PPE is always a last resort and recognize that in some cases you may well use different types of controls in combination (for example, an engineering control and PPE).

3. **Know Your Safety Training Regulations**
   It's also a good idea to find out the safety training requirements that regulatory agencies like OSHA or MSHA place on your work site. First, because the law's the law, and compliance with the law is a good thing. But even though compliance with the law is a good thing, two even better reasons to check those safety training regulations are (a) to make sure you're not overlooking something the regulation may help you identify and (b) to set a "baseline minimum" for training that you can then exceed with your own training.

4. **Have a Method for Your Safety Training**
   It's a good idea to follow a proven, trusted method for delivering your safety training. If you haven't heard of ANSI Z490.1, the national standard for accepted EHS training practices, now's a good time to get familiar with it. The standard provides a step-by-step method for safety trainers like you.

5. **Know Your Learning Objectives**
   Early in the process of designing training, you'll want to create a set of learning objectives. Your learning objectives are the things you want your employees to do on their job as a result of your training. If you pick the right learning objectives (for example, to lock and tagout machinery before performing maintenance), you can then design your training to teach employees to perform those actions and create tests that evaluate if employees can perform those actions during training. So in short, your learning objectives are what everything else in your training supports.

6. **Know Your Employees**
   There's a much better chance that your employees will "get" your training and be safer workers as a result if you create training with their preferences in mind. Do they prefer classroom-style training or training in the field? Do they like to start training with some e-learning and then talk about it as a group? Are they comfortable with written material, or is that a struggle for them? What is their level of previous knowledge on the topic — and what existing knowledge can you use to make comparisons while introducing new knowledge? The more you know about your employees, the more effective your training will be.

7. **Know and Acknowledge the "What's In It For Me?" Issue**

Your employees are going to pay attention to training and care about it if they know how it's important for them. If you start by explaining how training will keep them safe in their jobs (or better yet, ask them how it's related to their jobs), you're off to a good start. And remember to design the training so it's focused on how your workers actually work. Avoid simply reading off a safety regulation — that's too abstract. Make it personal.

8. **Know About Active Learning**
   One of those adult learning principles we talked about earlier is the importance of active learning. The idea is that people don't learn by passively sitting and listening to a lecture. Instead, they learn when they're being active. This can mean leading the training session themselves, actively participating in a Q&A session, sharing their thoughts and experiences, performing hands-on training and similar stuff. If you design training knowing that it's important for the workers to be active participants, they'll get more out of it and you'll have a safer work place.

9. **Know Your Adult Learning Principles**
   The "What's in it for me?" issue and active learning are part of what learning experts call adult learning principles. Adult learning principles are things that make adults more likely to learn, as you might have guessed. If your training includes these adult learning principles, it's going to be more effective and lead to a safer work place.

10. **Know How to Write and Talk**
    When you write training materials, or when you're speaking during a training session, it's important to use the right kind of language. And for effective training, that means using a conversational tone and the kind of language workers themselves use.

11. **Know About the Combined Power of Words and Pictures**
    We're visual creatures —most of the information that comes to us comes from our eyes. And so it's no surprise that training with good visuals (pictures, movies, real-life objects, etc.) can be very effective. Even better, many studies show that training that includes well-designed visuals and words together is even more effective. This is because our brains have two "processing centers," one for images and one for words.

12. **Know the Value of "Chunking"**
    Humans can only keep a small amount of information in our working memory — maybe only four — at any one time. If you give your workers more than that to handle, they'll get overwhelmed and nothing will "stick."

    The solution to that is to organize your training into tiny, bite-sized "chunks." (Yep, that's what it's called in learning and development.) Doing this will give your workers a better chance of retaining the information.

13. **Know the Importance of Testing**
    Training is good, but it's also important to test your employees to make sure they understand the important concepts and/or can demonstrate that they know

how to perform job tasks safely BEFORE you send them out on the floor to work. Don't forget to test. Without it, you're only hoping people have learned.

14. **Know How to Evaluate Your Training Effectiveness**
    And here's one last thing you want to know about effective safety training. To know if it's effective or not, you've got to evaluate the results — you can't just assume it worked. Get out on the field and observe behaviors and see what workers are doing. Check your near-miss numbers and your injury/illness/incident counts. Make sure your training is having the effect you're hoping for.

    If you can get data of key performance indicators (KPIs) for safety both before and after training is held, that can be a real benefit because it allows you to compare your data.

Assessment 8: Create a photo collage of the possible safety trainings conducted by any organizations. Use 1/8 illustration board.

References

https://info.basicsafe.us/safety-management/blog/safety-training-in-the-workplace
https://www.tutorialspoint.com/workplace_safety/workplace_safety_importance_of_training.htm
https://www.newpig.com/expertadvice/14-tips-for-effective-safety-training/

MODULE 9: OSH Legislation

Introduction

This module thus aims to familiarize you about the various government regulations regarding OSH and other responses to existing and potential OSH hazards.

OSH legislation and enforcement are key components of the government program to protect workers from work accidents and illnesses; and

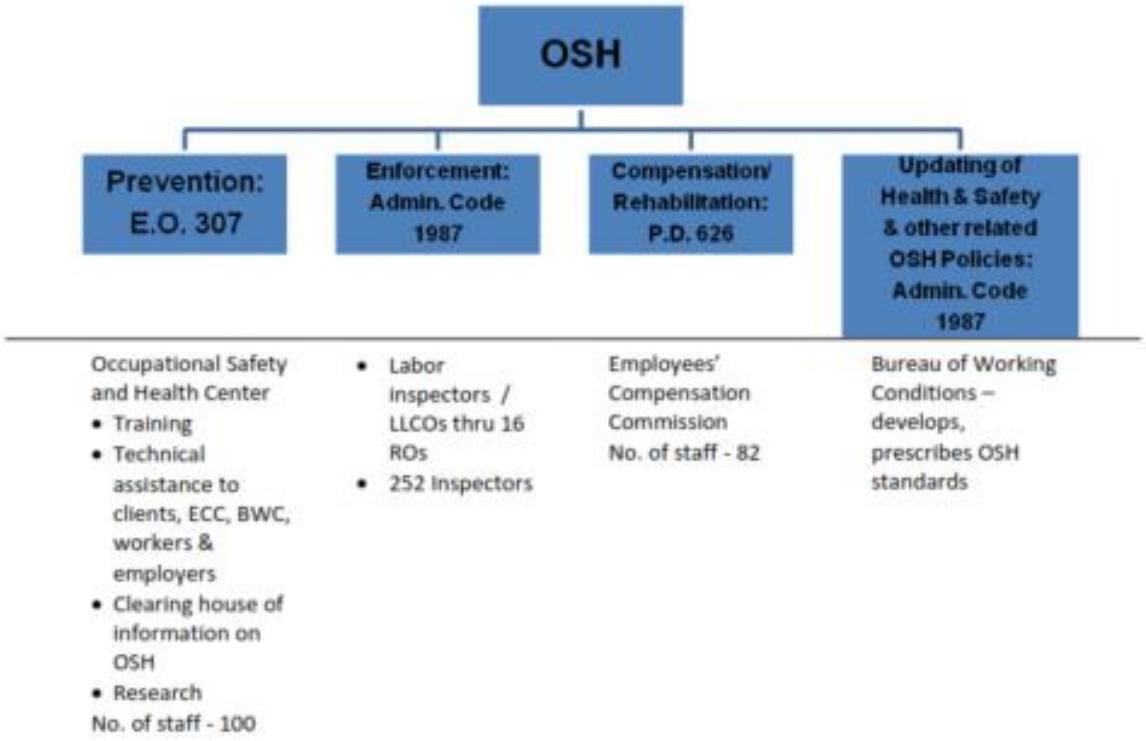
Here's something else: Legislation and enforcement are not the only approaches used in improving OSH in the Philippines. We have developmental strategies like the Zero Accident Program (ZAP), information drives and the like in order to put a positive note in OSH administration. In cases of work disabilities, there is also the Employees Compensation Program (ECP).

Objectives

At the end of this lesson, the students should be able to:

1. Identify laws and policies which govern OSH administration in the Philippines;
2. Determine government agencies which administer such laws;
3. Explain the various strategies for OSH administration

OSH Administration Framework in the Philippines



To know more about these agencies, you may follow the links provided below:

- Department of Labor & Employment (DOLE) – www.dole.gov.ph
- Occupational Safety & Health Center (OSHC) – www.oshc.dole.gov.ph
- Employees' Compensation Commission (ECC) – www.ecc.gov.ph
- Bureau of Working Conditions (BWC) – www.bwc.dole.gov.ph

Policy Framework

The focus of our discussion will be on those laws which are specifically administered by the Department of Labor and Employment (DOLE) under the Labor Code of the Philippines (LCP).

1. **Labor Code of the Philippines**
   - Article 162 – Safety and health standards. The Secretary of Labor and Employment shall, by appropriate orders, set and enforce mandatory occupational safety and health standards to eliminate or reduce occupational safety and health hazards in all workplaces and institute new, and update existing, programs to ensure safe and healthful working conditions in all places of employment.

   - **Article 164 – Training programs**. The DOLE shall develop and implement training programs to increase the number and competence of personnel in the field of occupational safety and industrial health.

   - **Article 164 – Administration of safety and health laws**.
     a. The DOLE shall be solely responsible for the administration and enforcement of occupational safety and health laws, regulations and standards in all establishments and workplaces wherever they may be located; however, chartered cities may be allowed to conduct industrial safety inspections of establishments within their respective jurisdictions where they have adequate facilities and competent personnel for the purpose as determined by the DOLE and subject to national standards established by the latter.
     b. The Secretary of DOLE may, through appropriate regulations, collect reasonable fees for the inspection of steam boilers, pressure vessels and pipings and electrical installations, the test and approval for safe use of materials, equipment and other safety devices and the approval of plans for such materials, equipment and devices. The fee so collected shall be deposited in the national treasury to the credit of the occupational safety and health fund and shall be expended exclusively for the administration and enforcement of safety and other labor laws administered by the DOLE.

   - **Article 128 Visitorial and Enforcement Power**.
     a. The Secretary of Labor and Employment or his duly authorized representatives, including labor regulation officers, shall have access to employer's records and premises at any time of the day or night whenever work is being undertaken therein, and the right to copy there from, to question any employee and investigate any fact, condition or

matter which may be necessary to determine violations or which may aid in the enforcement of this Code and of any labor law, wage order or rules and regulations issued pursuant thereto.

b. Notwithstanding the provisions of Articles 129 and 217 of this Code to the contrary, and in cases where the relationship of employer-employee still exists, the Secretary of DOLE or his duly authorized representatives shall have the power to issue compliance orders to give effect to the labor standards provisions of this Code and other labor legislation based on the findings of labor employment and enforcement officers or industrial safety engineers made in the course of inspection. The Secretary or his duly authorized representatives shall issue writs of execution to the appropriate authority for the enforcement of their orders, except in cases where the employer contests the findings of the labor employment and enforcement officer and raises issues supported by documentary proofs which were not considered in the course of inspection. (As amended by Republic Act No. 7730, June 2, 1994).

   An order issued by the duly authorized representative of the Secretary of Labor and Employment under this Article may be appealed to the latter. In case said order involves a monetary award, an appeal by the employer may be perfected only upon the posting of a cash or surety bond issued by a reputable bonding company duly accredited by the Secretary of Labor and Employment in the amount equivalent to the monetary award in the order appealed from. (As amended by Republic Act No. 7730, June 2, 1994).

c. The Secretary of Labor and Employment may likewise order stoppage of work or suspension of operations of any unit or department of an establishment when non-compliance with the law or implementing rules and regulations poses grave and imminent danger to the health and safety of workers in the workplace. Within twenty-four hours, a hearing shall be conducted to determine whether an order for the stoppage of work or suspension of operations shall be lifted or not. In case the violation is attributable to the fault of the employer, he shall pay the employees concerned their salaries or wages during the period of such stoppage of work or suspension of operation.

d. It shall be unlawful for any person or entity to obstruct, impede, delay or otherwise render ineffective the orders of the Secretary of DOLE or his duly authorized representatives issued pursuant to the authority granted under this Article, and no inferior court or entity shall issue temporary or permanent injunction or restraining order or otherwise assume jurisdiction over any case involving the enforcement orders issued in accordance with this Article.

e. Any government employee found guilty of violation of, or abuse of authority, under this Article shall, after appropriate administrative investigation, be subject to summary dismissal from the service.

f. The Secretary of DOLE may, by appropriate regulations, require employers to keep and maintain such employment records as may be necessary in aid of his visitorial and enforcement powers under this Code.

2. **Presidential Decree 626**
   You may click this link - http://www.ecc.gov.ph/pd626.htm

3. **Presidential Decree 856 – Code on Sanitation**
   You may click this link -
   http://www.chanrobles.com/presidentialdecreeno856.htm

4. **Republic Act 8504** – An act promulgating policies and prescribing measures for the prevention and control of HIV/AIDS in the Philippines, instituting a nationwide HIV/AIDS information and educational program, establishing a comprehensive HIV/AIDS monitoring system, strengthening the Philippine National Aids Council, and for other purposes.

   You may click this link -
   http://www.chanrobles.com/presidentialdecreeno856.htm

5. **Republic Act 9165** - An act instituting the Comprehensive Dangerous Drugs Act of 2002 repealing Republic Act No 6425, otherwise known as the Dangerous Drugs Act of 1972, as amended, providing funds therefore, and for other purposes.

   You may click this link -
   http://www.lawphil.net/statutes/repacts/ra2002/ra_9165_2002.html

6. **Republic Act 6969** - An act to control toxic substances and hazardous and nuclear wastes, providing penalties for violations thereof, and for other purposes.

   You may click this link - http://www.pctc.gov.ph/initiatv/RepAct6969.htm

7. **Local Government Act** - decentralizes some national government functions to LGUs. Ex. Inspection of buildings, health care provisions, etc.

8. **Executive Order 307** – An Executive Order issued during President Corazon C. Aquino's term, establishing the Occupational Safety and Health Center in the Employees' Compensation Commission" attached agency of the Department of Labor and Employment as the national focal point on OSH trainings, researches, information and technical services.

   For further readings, you may click this link - http://www.oshc.dole.gov.ph/121/

The Occupational Safety and Health Standards (OSHS)

OSHS is actually a codification of all safety and health rules and regulations, including

safety orders then in existence at the time.

OSHS has many provisions. To some extent, many of its provisions have already been discussed in the technical discussions that have been undertaken in the previous modules.

Selected OSHS Provisions

What will be discussed instead are the significant and major provisions. These are significant in the sense that these are the most often-asked questions and which relates to items that will seriously affect the operations of the company. These are:

Rule 1001 - Purpose and Scope

1. The objective of this issuance is to protect every workingman against the dangers of injury, sickness or death through safe and healthful working conditions, thereby assuring the conservation of valuable manpower resources and the prevention of loss or damage to lives and properties, consistent with national development goals and with the State's commitment for the total development of every worker as a complete human being.
2. This standards shall apply to all places of employment except as otherwise provided in this Standards.

Rule 1005 - Duties of Employers, Workers and other Persons

1. Each employer covered by the provisions of this Standards shall:
   a. Furnish his workers a place of employment free from hazardous conditions that are causing or are likely to cause death, illness or physical harm to his workers.
   b. Give complete job safety instructions to all his workers, especially to those entering the job for the first time, including those relating to the familiarization with their work environment, hazards to which the workers are exposed to and steps taken in case of emergency;
   c. Comply with the requirements of this Standards; and
   d. Use only approved devices and equipment in his workplace.

2. Every worker shall cooperate with the employer in carrying out the provisions of this Standards. He shall report to his supervisor any work hazard that may be discovered in his workplace.

3. Every worker shall make proper use of all safeguards and safety devices furnish in accordance with the provisions of this Standards for his protection and that of others, and shall follow all instructions given by the employer in compliance with the provision of this Standards.

4. It shall be the duty of any person, including any builder or contractor or enforcement agent, who visits, builds, renovates, or installs devices, or conducts business in any establishment or workplace, to comply with the provisions of this Standards and all regulations of the employer issued thereunder as well as with other subsequent issuances of the Secretary.

Rule 1012.02 – Abatement of Imminent Danger

1. An imminent danger is a condition or practice that could reasonably be expected to cause death or serious physical harm before abatement under the enforcement procedure can be accomplished.

2. When an enforcement officer finds that an imminent danger exists in a workplace, he shall inform the affected employer and workers of the danger and shall recommend to the Regional Director the issuance of an Order for stoppage of operation or other appropriate action for the abatement of the danger. Pending the issuance of the Order the employer shall take appropriate measures to protect the workers.

3. Upon receipt of such recommendation, the Regional Director shall immediately determine whether the danger exists and is of such a nature as to warrant the issuance of a Stoppage Order or other appropriate action to minimize the danger.

4. The Order shall require specific measures that are necessary to avoid, correct or remove such imminent danger and to prohibit the presence of any worker in such location where such danger exists, except those whose presence are necessary to avoid, correct or remove such danger or to maintain a continuous process or operation. Where stoppage of operation is ordered, the Order shall allow such correction, removal or avoidance of danger only where the same can be accomplished in a safe and orderly manner.

5. Immediately after the issuance of Stoppage Order, the Regional Director shall furnish the Secretary, through the Director, within forty-eight (48) hours a copy of the Order and all pertinent papers relating thereto, together with a detailed description of the work conditions sought to be corrected, the safety and health rule violated by the employer and the corrective measures imposed. The Secretary shall review the Order issued by the Regional Director and within a period of not more than five (5) working days, issue a final Order either lifting or sustaining the Order of the Regional Director.

6. The Order shall remain in effect until danger is removed or corrected

Rule 1013 - Hazardous Workplaces

For purposes of this Standards, the following are considered “hazardous workplaces:”

a. Where the nature of work exposes the workers to dangerous environmental elements, contaminants or work conditions including ionizing radiation, chemicals, fire, flammable substances, noxious components and the like;
b. Where the workers are engaged in construction work, logging, firefighting, mining, quarrying, blasting, stevedoring, dock work, deep sea fishing, and mechanized farming;
c. Where the workers are engaged in the manufacture or handling of explosives and other pyrotechnic products;

d. Where the workers use or are exposed to power driven or explosive powder actuated tools;
e. Where the workers are exposed to biologic agents like bacteria, fungi, viruses, protozoas, nematodes, and other parasites.

Rule 1043.01 - Health and Safety Committee

The Health and Safety Committee is the planning and policy making group in all matters pertaining to safety and health. The principal duties of the Health and Safety Committee are:

1. Plans and develops accident prevention programs for the establishment.
2. Directs the accident prevention efforts of the establishment in accordance with the safety programs, safety performance and government regulations in order to prevent accidents from occurring in the workplace.
3. Conducts safety meetings at least once a month.
4. Reviews reports of inspections, accident investigations, and implementation of programs.
5. Submits reports to the manager on its meetings and activities.
6. Provides necessary assistance to government inspecting authorities in the proper conduct of their activities such as the enforcement of the provisions of this Standards.
7. Initiates and supervises safety training for employees.
8. Develops and maintains a disaster contingency plan and organizes such emergency service units as may be necessary to handle disaster situations pursuant to the emergency preparedness manual for establishments of the Office of Civil Defense.

Rule 1050 – Notification and Keeping of Records of Accidents and/or Occupational Illnesses

1053 Report Requirements
1053.01:

1. All work accidents or occupational illnesses in places of employment, resulting in disabling condition or dangerous occurrence as defined in 1053.02 shall be reported by the employer to the Regional Labor Office or duly authorized representative in duplicate and a copy furnished the employee of his duly authorized representative using form DOLE/BWC/HSD-IP-6. The formal report shall be submitted by the employer on or before the 20th day of the month following the date of occurrence of the accident or when the illness is established and an investigation report in the prescribed form shall be submitted by the Regional Office or duly authorized representative on or before the 30th day of the same month. In case of temporary total disability where the injured or ill employee has not reported back to duty on the closing date of reporting, an estimate of the probable days of disability shall be made and entered in the report and corrected after the return of the injured, the corrected days of absence shall be used.

2. Where the accident or illness results in death or permanent total disability, the employer, in addition to the written report required under sub-paragraph (1) above, shall initially notify the Regional Labor Office or duly authorized representative within twenty four (24) hours after occurrence using the fastest available means of communication.

3. All deaths and permanent total disabilities shall be investigated by the Regional Office or duly authorized representative within forty eight (48) hours after receipt of the initial report of the employer, prepared in duplicate using the prescribed form DOLE/BWC/OHSDIP-6a.

Reporting Forms
In summary, the following are the reporting requirements of the OSHS, which you can download at this link:
http://www.bwc.dole.gov.ph/Downloads/ViewDetails.aspx?id=1

- registration of establishments-IP-3
- report of safety and health organization- IP-5
- employer's work accident/illness report-IP-6
- annual work accident/illness exposure data report-IP-6B; and
- annual medical report form 47-A.

Rule 1070 – Occupational Health and Environmental Control

It is the basis for the conduct of work environment measurements (WEM) by the OSHC. It provides for certain values on the permissible level exposures of many contaminants and other physical hazards.

You may read the whole content of Rule 1070 at the Occupational Safety and Health Standards.

For additional information, you can download DOLE Memorandum Circular #1, series of 2000 entitled Implementing Guidelines for the Conduct of Workplace Environment Assessment (WEA) in Hazardous Establishments and Work Processes (see Appendix Number)

Rule 1080 - Personal Protective Equipment

1081 – *General Provision*
1081.01: Every employer as defined in 1002:

5. Shall at his own expense furnish his workers with protective equipment for the eyes, face, hands and feet, protective shields and barriers whenever necessary by reason of the hazardous nature of the process or environment, chemical or radiological or other mechanical irritants or hazards capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

6. Deduction for the loss or damage of personal protective equipment shall be governed by Article 114, Book III, Labor Code of the Philippines, and Section 14, Rule VIII, Book III, Omnibus Rules Implementing the Labor Code.

1081.02: All personal protective equipment shall be of the approved design and construction appropriate for the exposure and the work to be performed.

1081.03: The employer shall be responsible for the adequacy and proper maintenance of personal protective equipment used in his workplace.

1081.04: No person shall be subjected or exposed to a hazardous environmental condition without protection.

Rule 1980 - Authority of Local Government

1981.01: Types of Inspection:
For the purpose of this Standards, inspection activities shall be divided into Technical Safety Inspection and General Safety Inspection.

1. **Technical Safety Inspection** – shall refer to inspection for the purpose of safety determination of boilers, pressure vessels, internal combustion engines, electrical installations, elevators, hoisting equipment and other mechanical equipment.

2. **General Safety Inspection** – shall refer to inspection of the work environment, including the location and operation of machinery other than those covered by technical safety inspections, adequacy of work space, ventilation, lighting, conditions of work environment, handling, storage or work procedures, protection facilities and other safety and health hazards in workplace.

Rule 1990 – Final Provisions

1995: Penal Provisions
All violations of the provisions of this Standards shall be subject to the applicable penalties provided for in the Labor Code, PD 442 as amended.

Please read the links on http://www.chanrobles.com/legal4labor4.htm

Government responses aside from enforcement

With regards to government legislation as a whole, instructor reminds participants that enforcement is only one response but not the only response of the government. Such approaches include:

- Zero Accident Program (ZAP)
- Employees' Compensation Program (ECP)
- Work Improvement in Small Enterprises (WISE)
- Program on OSH in the Informal sector
- OSH in Schools
- Child Labor
- Quick Reaction Teams like Work ALERT, medical surveillance on SJS, and many others.

For the DOLE as a whole, voluntary compliance is still the best, where organizations implement OSH measures because they know that it will be to their great benefit. The OSHC flagship program of ZAP is an example of such program which emphasizes the spirit of voluntarism. Another key DOLE program is the Employees Compensation Program (ECP), the preventive aspect of which is implemented by OSHC.

Most Commonly-Asked Questions

1. How can participants get a copy of the OSHS?

   The BOSH training participants can get a copy free-of-charge from the Occupational Safety and Health Center (OSHC). The standards can also be downloaded at the OSHC website. External clients can also avail of the book through OSHC with a fee of Php 100.00 / each.

2. What happens when a company is found to have an "imminent danger situation"?

   A Stoppage Order can be issued by the Secretary of the DOLE, through the Regional Director concerned, in the work area where the imminent danger situation is located. It can only be lifted after the company has corrected the situation.

3. Why should companies comply with the OSHS?

   They should do so in order to prevent stoppage of company operations due to imminent danger situations. It also makes good public relations for a company to be known as taking care of its workers. But the most important reason for all is profits- a safe, healthy and contented worker is also a productive worker.

4. How are OSH Standards, say, TLV limits set?

   OSH Standards are set just like all government regulations- the office- in-charge (the BWC in this case) of the concern drafts the proposal based on: studies made; data/ feedbacks from inspection activities; or clamor from interest groups. The proposal goes through a review and evaluation process. These are then presented to the Secretary for approval and eventual implementation.

5. How are OSHS updated to ensure adequacy of protection for workers?

Same procedure as mentioned above.

6. How do our standards compare with international standards?

   Standards per country are set based on the internal needs of each country. The Philippines compared to our Asian neighbors, has better-developed labor laws including the OSHS. But the standards involving highly hazardous materials leaves much to be desired – the basis for our TLVs is still the 1978 TLVs of the American Conference of government Industrial Hygienists (ACGIH). These must be updated to make it at least at par with other countries.

Assessment 9

Essay: Read the statement/s carefully. Answer the given statement/s concisely. Write your answers on a separate sheet of paper.

1. Explain the role of government on safety management.
2. How does the government encourage “safety-first culture” in any organization?

MODULE 10: Plant Visit Simulation

Objectives

At the end of this lesson, the students should be able to:

1. Illustrate the importance of simulation to safety management.

Simulation: The Fastest Route to Health and Safety

Manufacturers have long used simulation to make better products, improve processes and get the most out of capital expenditure. Now, more and more manufacturers are also leveraging simulation technology to protect their workers against illnesses and injuries. In a virtual environment, equipment is tested, factories are built and plant layout is determined. If there are potential hazards, they are identified and addressed to ensure the real-life versions pose no danger to workers.

“You don’t want to use a real-world system to test worker safety and risk anybody getting sick or hurt,” says John Eskuri, Senior Director of the DELMIA Industrial Engineering Portfolio at Dassault Systèmes

Safety is the Sum of its Parts

There is no single dimension to safety on the factory floor. Safe equipment can be dangerous to a careless user. Conversely, no amount of safety training will protect workers in an inherently unsafe environment.

Advanced simulation technology empowers manufacturers to approach safety initiatives from all sides. A factory’s virtual twin is an accurate and highly detailed representation of its layout, equipment and processes. Machines and even people can be placed in and interact with the virtual factory. This allows manufacturers to run scenarios and answer questions like:

- How will plant safety be affected if we add a robot between two humans in this production line?
- What if a worker of above-average height spends four hours at a time at this workstation?
- What changes do we need to make to protect our workers from exposure to COVID-19?

Process and Plant Safety

Protection of humans and the environment from the hazards posed by technical plants – this is the main aim of Process and Plant Safety (PPS). Technology always comes with a certain amount of risk. What risks are acceptable? What protection measures are adequate for such hazards?

PPS has been in practice for over 100 years. Technologies have become better with time. Today, risks are avoided in a systematic manner. There exists internationally acceptable procedures for this purpose. Risk analysis are done and in doing so, adequate safety measures are derived. All the possible hazards need to be first identified and evaluated. This starts from identifying the hazardous material and hazardous chemical reactions. Such reactions are examined experimentally in laboratories. Pressure, temperature and flow parameters are monitored in a technical plant, in the event of malfunction.

- PPS Protection of humans and the environment from hazards posed by technical plants

Some plants are designed in such a manner that there is no possibility of a hazard, even in the event of malfunction – these are the so called inherently safe plants. Sensors with very high reliability (Process Control Technologies) or safety valves and rupture disk devices (End-of-Pipe technologies) are however still applied in most technical plants. Basically, for a technical plant to be deemed as safe, multiple independent protection measures (Layer of Protection) have to be implemented.

- Protection measures are selected proportionately based on the existing risk

In general the following is true: the larger the effects of a possible event in a technical plant, the higher the requirements in regard to protection measures. This principle is what is referred to as proportionality of risk.

Whenever a safety valve of a rupture device is activated, the hazardous material in the respective vessel must be collected and disposed safely. Apparatus such as separators, quenchers, absorbers etc. are installed downstream. Hazardous gases may only be released to the surroundings only when the allowable limits are not exceeded – this must be proven to the authorities.

Safety engineers in the PPS especially process the following tasks:

- Hazard and risk analysis
- Calculation of effects of events
- Evaluation of hazardous materials and hazardous chemical reactions
- Simulation of processes in pressurized apparatus in computation programs
- Sizing of protection equipment
- Design of containment equipment
- Calculation of propagation of hazardous material in the environment
- Recommendation of protection measures and evaluation of existing measures

- The work of a safety engineer is as diverse as the related safety technologies.

Safety engineering as such comes with a high degree of responsibility when it comes to determining the right protection measures, even though most parameters applied in calculations are approximated with high uncertainties due to their nature. One must learn to counter these uncertainties.

Improve Plant Safety with Virtual Simulation

New technologies and engaging training methods are helping workers better understand and strongly embrace the principles of plant safety.

Regardless of ongoing advances in technology, including the Industrial Internet of Things (IIoT), that are changing plant environments, maintaining safety remains a constant priority. Some might argue, though, that technological advances and automated processes have increased the potential for plant accidents.

According to Schneider Electric's Dr. Ian Willetts, while that argument might hold up in some scenarios, several factors are involved in plant safety. A vice president of Schneider Electric Software (schneiderelectric.com, Lake Forest, CA), Willetts shared the following insight on those factors, including best practices and modern tools for ensuring safety in today's industrial operations.

Does automation reduce safety?

"On one hand," Willetts said, "technological advancements are making plants smarter by automating dangerous tasks and reducing human involvement. But, they're also creating safety issues." Consider the growing numbers of plant control loops that are managed by a single operator. As a result, two issues emerge:

- The volume of accident instances increases across a broad span of single-person operations.

- The dwindling ability or time for the one person responsible for the multiple, automated control loops to manage abnormal situations.

Couple this greater complexity of tasks with the growing mentality of "if we are increasing our automation, then there is less need for on-the-job training," and it's easy to understand the growing concern around plant safety. As Willetts put it, "Operators are increasingly being treated like airplane pilots who observe and manage an automated process, hoping to be sufficiently responsive to handle an issue quickly, and correctly, when it arises."

What about the human factors?

Human error has always been a major contributor to plant accidents and safety issues, and one that existed long before new technology and automation. "This type of error, " Willetts observed, "is usually related to a lack of operator skills or, at times,

carelessness, and will typically come in the form of a mistake or from instances such as ignored measurements or alarms, policy violations, or noncompliance."

The desire to stay competitive, he said, also includes an increased pressure on workers to be more productive, which can lead to slips or lapses of attention, trying to cut a corner, skipping a routine, or miscommunication.

The potential for human error, of course, can never be completely erased. In Willett's view, that very fact makes a more compelling case for why ongoing training to maintain plant safety is critical.

But human error is only one of the factors in that value proposition. "Another human factor affecting the safety of today's industrial environments," he said, "is the significant demographic transformation taking place."

In industrialized nations, this demographic transformation is fueled by growing numbers of aging workers who are retiring and taking their knowledge base with them. It's a particular dilemma for the process industries. On the flip side, in many developing countries, a different demographic profile, which is often referred to as the "youth bulge," has become an issue.

According to Willetts, both of these demographics are creating a demand for ways to effectively assimilate newer, untrained workers more quickly than ever before. "And safety," he said, "is a major component of this training."

What to do?

To combat factors such as automated plant-control loops, human error, and aging or emerging workforces that can lead to safety incidents, Willetts encourages sites to adopt a "safety by simulation-based learning" mentality and leverage advanced tools such as operator-training-simulator (OTS) systems. He points to ongoing benefits these tools offer, including, among other things, improvements in accident prevention, best-practice adoption, and adherence to rules and procedures. They also lead to greater understanding of how changes in a plant (or plant design) can affect safety and how to properly communicate safety issues.

"Plants will only continue to get smarter," Willetts explained. "Plant-safety practices need to be just as smart."

There are so many available Plant Safety Simulation software in the market. Visit www.youtube.com for some examples.

Watch this video: https://www.youtube.com/watch?v=jsOrQgcTehY
A 14-minutes video. This is an example of Plant Visit Simulation: Take note on how they pointed out the compliance and non-compliance of safety procedures and protocols.

Assessment 10

Create a group of 3 among your classmates and do a plant visit. Take the video mentioned above as your guide. You have the prerogative to choose your teammates. Make sure that each of you must have a clear participation on this activity.

There are limited plants to choose from in the vicinity. Choose one with at least 10 workers.

References

https://bit.ly/3xoUPRB
https://cse-institut.de/prozess-und-anlagensicherheit/?lang=en