7/8

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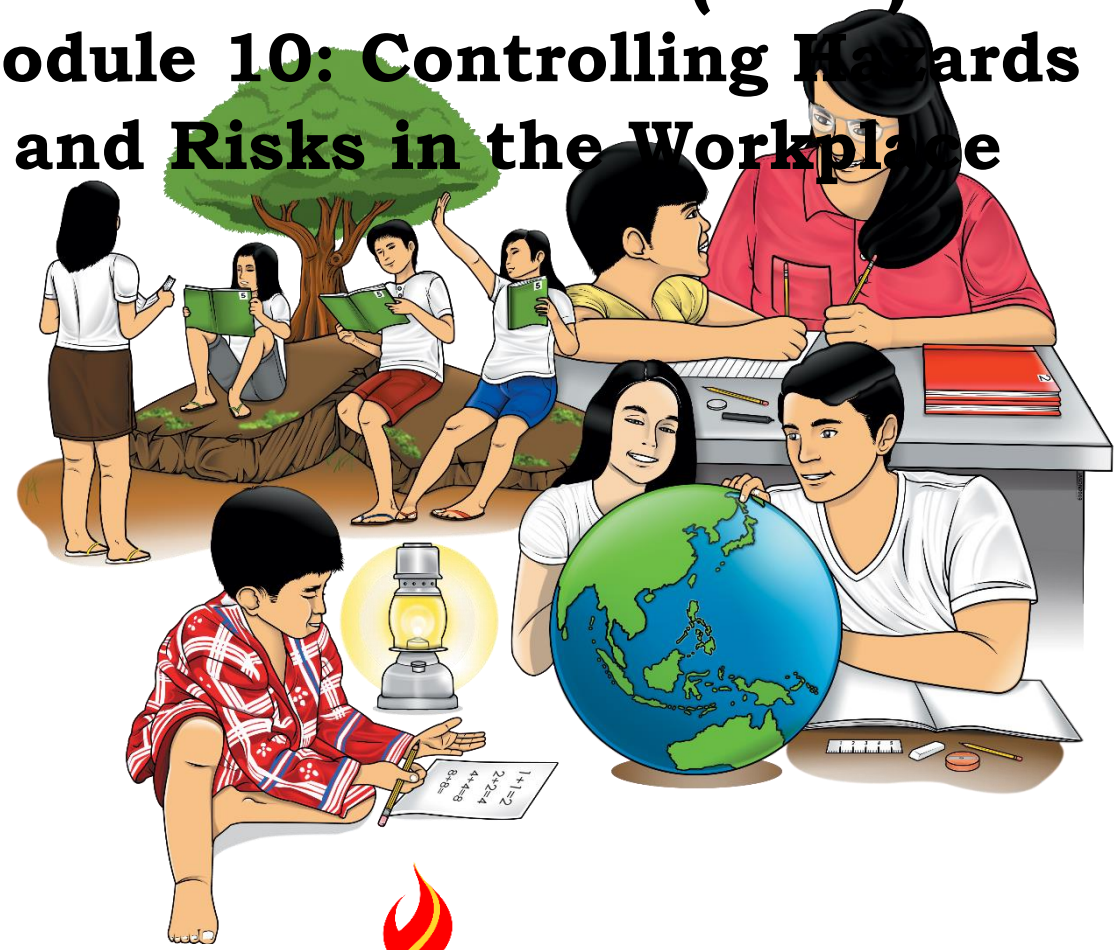
DEPARTMENT OF EDUCATION

Technology and Livelihood Education

Exploratory Course

Electrical Installation and Maintenance (EIM)

Module 10: Controlling Hazards and Risks in the Workplace



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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

Congratulations! You are most appreciated for reaching this far. You will be a promising electrician. This module was designed and written with you in mind. It is here to help you master how to control hazards and risks in the workplace. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

Safety first! This is a common reminder in all workplaces. Electrical laboratory is one of them. As you engage in the workplace, you always encounter tools and equipment materials to watch.

After going through this module, you are expected to:

1. Determine the effects of hazards and risks;
2. Evaluate hazards and risks; and
3. Follow procedures for controlling hazard and risks in the workplace. **(TLE_IAEI7/8OS-0i-2)**

Are you ready to answer the questions in *What I Know*? If you are, you may start now. Good luck!

What I Know

Hey achiever! You now reach the point of knowing how to keep yourself safe as always.

Keeping safety first in mind, you can actually eliminate hazards and risks if you are well-verse on where it will occur. Knowing them is actually avoiding them. As it is said, “Know Disaster, No Disaster.”

So, before you explore more on this topic, let’s determine how much you already know about controlling hazards and risks in the workplace.

Pre-test

ACTIVITY 1. Match and Identify

A. Direction: Match the personal protective equipment category in Column A based on its type of protection in Column B. Write your answer in your activity sheet.

A	B
1. Gloves	a. protect foot from falling object, compression, etc.
2. Earmuffs	b. protective eyewear
3. Respiratory	c. protects hands from infection and contamination, etc.
4. Goggles	d. hearing protection from noise, warm, cold etc.
5. Steel toe shoes	e. protects against inhalation of hazardous substances
6. Safety harness	f. protective layer between worker and floor
7. Insulate matting	g. fabricated, treated to protect personnel against hazards
8. Insulated ladder	h. strap to protect person, object or animal from injury
9. Protected clothing	i. protects head from falling objects against
10. Hard hat	j. insulated equipment use for climbing

B. Directions: Determine the different effects of each major types of hazards and risks in the workplace. Write it in your activity notebook.

Hazards and Risks	Potential Effects to Physical Health
1. Physical Hazards	1.
	2.
2. Chemical Hazards	1.
	2.
3. Biological Hazards	1.
	2.
4. Ergonomic Hazards	1.
	2.
5. Psychological Hazards	1.
	2.

Did you answer all the test items?

Very Good! You are now ready to proceed to *Lesson 1* of this module.

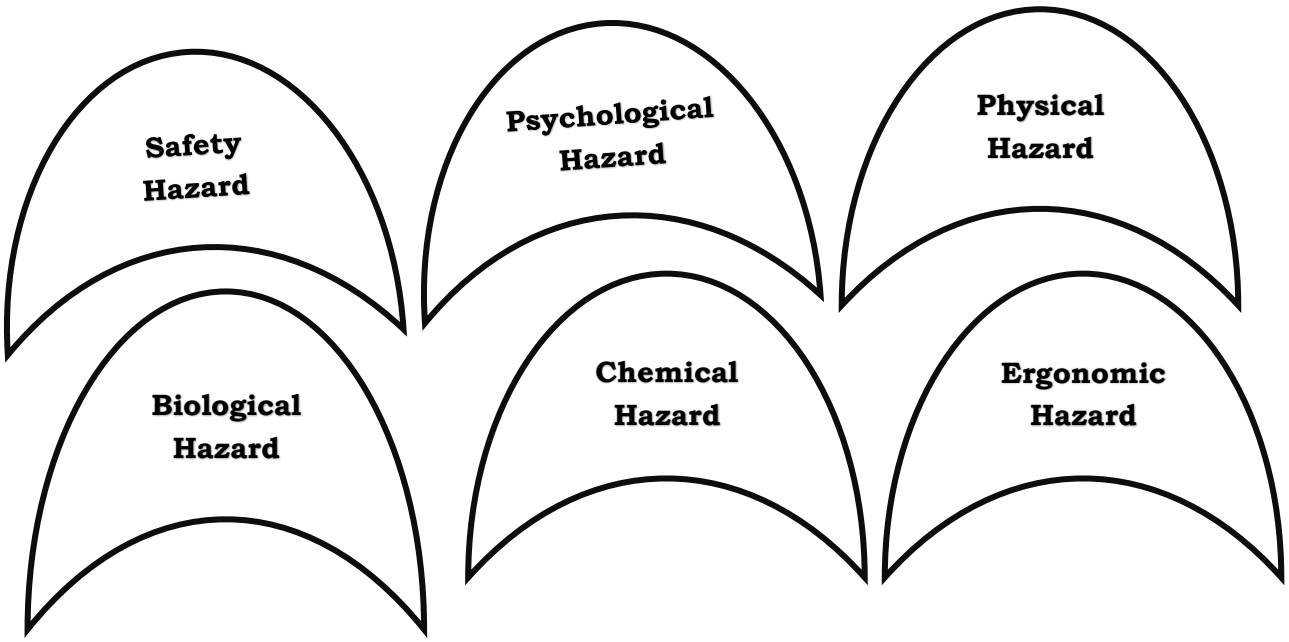
Lesson 1 Controlling Hazards and Risks in the Workplace

Smile! You are making things just in standard. Focusing on safety, you will always end productive. Remember, in every job, in making projects, in wiring installation, repairing and maintaining electrical tools or power tools and equipment, risks may happen. As you go deeper in this lesson you feel safer in all your endeavor relative to electrical task.

What's In

ACTIVITY 2. Find Me!

Directions: Identify common ways to classify hazards (Occupational Health and Safety) with corresponding harm or effects on physical health. Write the correct answer in your activity sheet.



_____1. Splash acid in the eyes
_____2. Bacteria
_____3. Bullying/stress
_____4. Slipping/tripping hazard
_____5. Toxic properties
_____6. Constantly noisy
_____7. Incorrect machine guarding
_____8. Repetitive movement
_____9. Radiation
_____10. Violence

Notes to the Teacher

When teaching this lesson, you must emphasize to your learners to strictly follow the list of Pre-cautionary procedures in any work activity in the workplace. Being safe while working can be attained by controlling hazards and risks. Being the teacher, you are duty bound to consider safety as the priority for your learners.

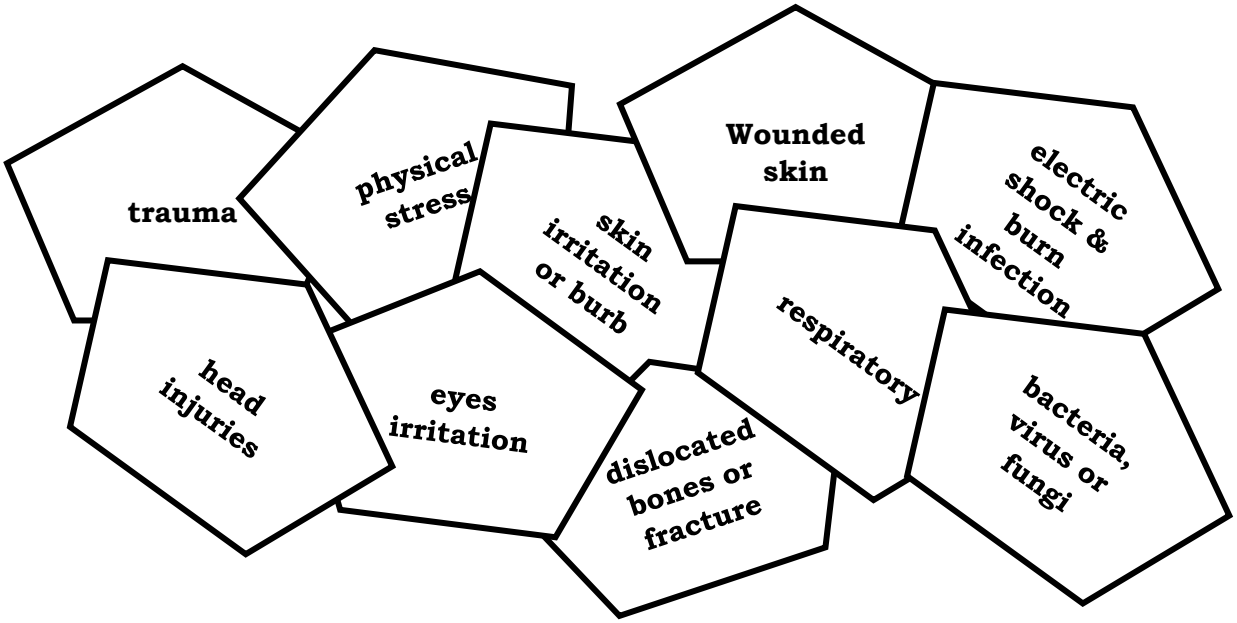
What's New

Wow! You are making "*safety first*" a habit. A "*safety first*" habit means you are strictly following the list of pre-cautionary procedures in any work activity. That's perfect! Being aware of the possibilities of hazards and risks is a good thing.

Take this lesson more seriously. This will mean the preservation of your life and those near you. Get ready on the next activity.

Activity 3. Do I Know You?

A. Direction: Determine the different exposure to hazards and risks with its possible effects. Write your answer in your activity sheet.



Hazards and Risks Exposure	Effects
1. Exposed to live wire	a._____
2. Sliding on wet floor	b._____
3. Inhaling harmful chemicals	c._____
4. Falling from ladder	d._____
5. Bullying	e._____
6. Over fatigue	f._____
7. Exposed to asbestos dust	g._____
8. Animal to droppings	h._____
9. Exposed to falling objects	i._____
10. Exposed to falling dust/particles	j._____

What is It

Go, go, go! This time you will learn more about determining the effects of hazards and risks that may happen. Evaluate and apply how to control it. Are you ready?

I. Controlling Hazards and Risks

The six main categories of hazards are as follow:

1. **Biological.** Biological hazards include viruses, bacteria, insects, animals, etc., that can cause adverse health impacts. For example, mould, blood and other bodily fluids, harmful plants, sewage, dust and vermin.
2. **Chemical.** Chemical hazards are hazardous substances that can cause harm. These hazards can result in both health and physical impacts, such as skin irritation, respiratory system irritation, blindness, corrosion, and explosions.
3. **Physical.** Physical hazards are environmental factors that can harm an employee without necessarily touching them, including heights, noise, radiation, and pressure.
4. **Safety.** These are hazards that create unsafe working conditions. For example, exposed wires or a damaged carpet might result in a tripping hazard. *These are sometimes included under the category of physical hazards.*
5. **Ergonomic.** Ergonomic hazards are a result of physical factors that can result in musculoskeletal injuries. For example, a poor workstation setup in an office, poor posture and manual handling.
6. **Psychosocial.** Psychosocial hazards include those that can have an adverse effect on an employee's mental health or wellbeing. For example, sexual harassment, victimization, stress and workplace violence.

A general definition of adverse health effect is "any change in body function or the structures of cells that will lead to a disease or health problems".

Adverse health effects include:

- body injury
- disease
- change in body functions, growth or development
- effects on a developing fetus (teratogenic effects, fetotoxic effects)
- effects on children, grandchildren, etc. (inheritable genetic effects)
- decrease in life span
- change in mental condition resulting from stress, traumatic experiences exposure to solvents and the likes
- effects on the ability to accommodate stress.

II. Evaluating Hazard and Risks

A. Risk assessment is a term used to describe the overall process or method in evaluating risk. Consider the following:

- Identify hazards and risk factors that are potential to cause harm (hazard identification).
- Analyze and evaluate the risk associated with hazard (risk analysis, and risk evaluation).
- Determine appropriate ways to eliminate hazard, or control the risk when the hazard cannot be eliminated (risk control).

B. Factors that determine the degree of risks:

- How much a person is exposed to hazardous condition (the length of exposure) Example: (breathing in a vapor, skin contact or burn)?
- How severe is the effect (example: redness of skin in contact)?

Importance

Risk assessment is important as it forms an integral part of Occupational Health and Safety Management (OHSM) plan. In applying risks assessment, the following need to be carried out;

- Create awareness on hazards and risk.
- Identify who may be at risk (e.g., employees, cleaners, visitors, contractors, the public, etc.).
- Determine whether a control program is required for a particular hazard.
- Determine if existing control measures are adequate or if more should be done.
- Prevent injuries or illnesses, especially when done at the design or planning stage.
- Prioritize hazards and control measures.
- Meet legal requirements where applicable.

III. Application of the Hierarchy of Control

Once the hazard is identified and an assessment is carried, the final step is to apply the hierarchy of controls.

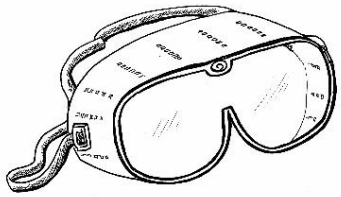
The hierarchy of controls helps to select and implement the most appropriate risk control measure for each hazard.

1. **Eliminate the hazard** is a hazard control strategy based on completely removing a material or process causing a hazard.
2. **Substitute the hazard** is a hazard control strategy in which a material or process is replaced with another that is less hazardous.
3. **Isolate the hazard** is achieved by restricting access to plant and equipment or in the case of substances locking them away under strict controls.

4. **Engineering control** is a method that is built into the design of a plant, equipment or process to minimize the hazard.
5. **Administrative control** is training, procedure, policy, or shift designs that lessen the threat of a hazard to an individual

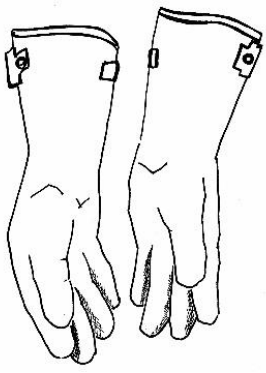
IV. Personal Protective Equipment (PPE)

1. **Goggles, or safety glasses**- forms of protective eyewear that usually enclose or protect the area surrounding the eye in order to prevent particulates, water or chemicals from striking the eyes.



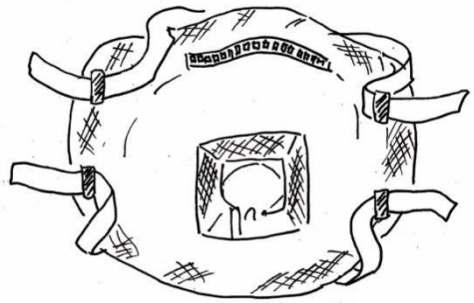
2. **Steel-toe boot** - a protective reinforcement in the toe which protects the foot from falling objects or compression.

3. **Gloves-** an important protective equipment to be worn when working with hazardous chemicals and other materials because they protect your hands from infection and contamination. Protective gloves should be selected on the basis of the hazards involved.

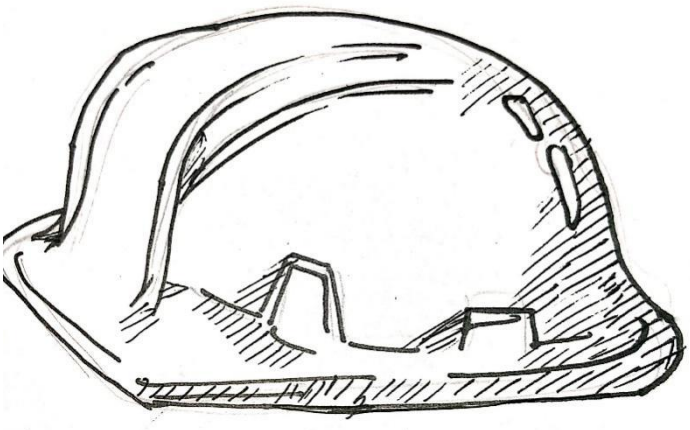


4. **Earmuffs** - objects designed to cover a person's ears for hearing protection or for warmth. Hearing protectors are required to prevent noise induced hearing loss.

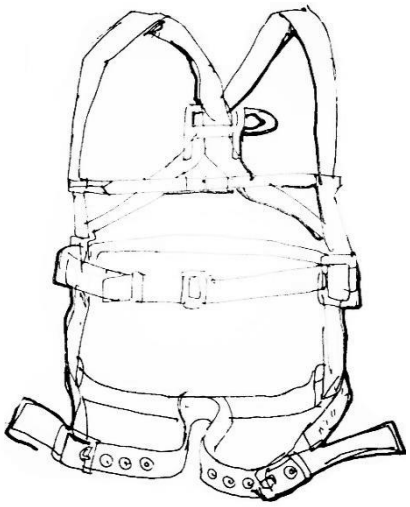
5. **Respiratory** - used to protect the individual wearer against the inhalation of hazardous substances in the workplace air.



6. **Hard hats** - required when working in areas where there is potential for injury to the head from falling objects. Designing it to reduce electrical shock is required when working near exposed electrical conductors that may contact the head.

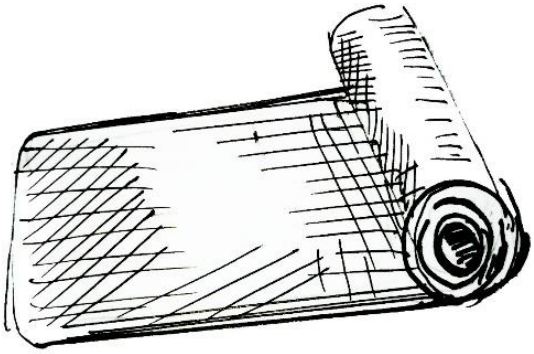


7. **Safety harness** - a form of protective equipment designed to protect a person, animal, or object from injury or damage.



8. **Protective clothing** - designed, fabricated, or treated to protect personnel against hazards caused by extreme changes in physical environment, dangerous working conditions, or enemy action.

9. **Insulated matting**- a tool used as a protective layer between the worker and the floor. This is helpful when working at switchboards, transformers, and other high-voltage areas.

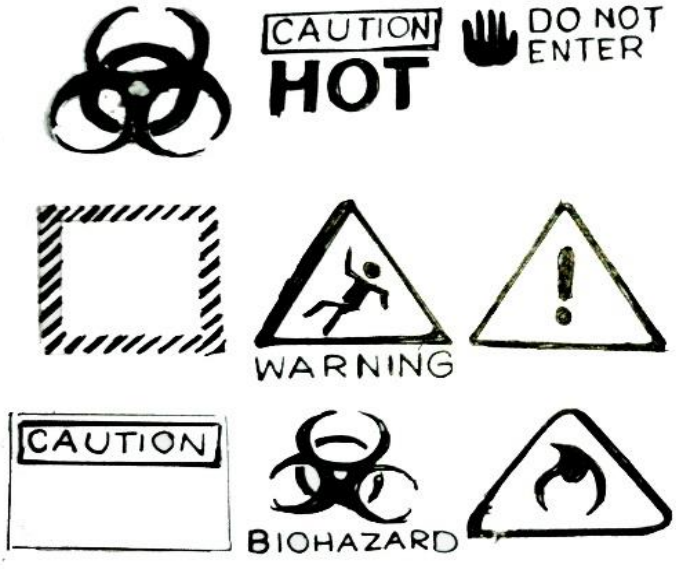


10. **Insulated Ladders** –stepladders that protect the person who is using it from electric shock. If a normal metal ladder accidentally touches a live electrical wire, it can be devastating but insulated ladders make it more harmless.

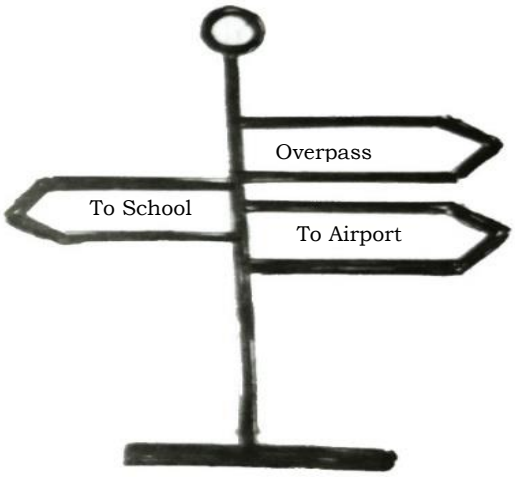
V. Accident Prevention Signs and Tags

In general, signs and symbols required shall be visible at all times when work is being performed, and shall be removed or covered promptly when the hazard does not exist anymore.

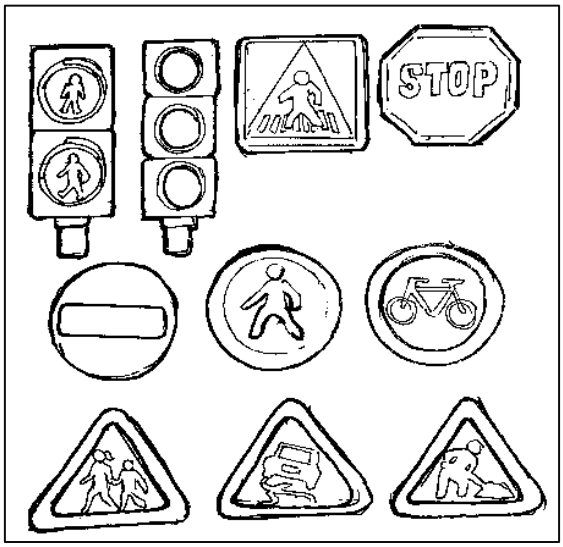
1. **Caution sign**- used in instances in which the particular hazard, obstacle or condition is not covered by a standard sign.



2. **Directional sign-** gives information about the location of either the driver or possible destinations and are considered a subset of the informative signs group.

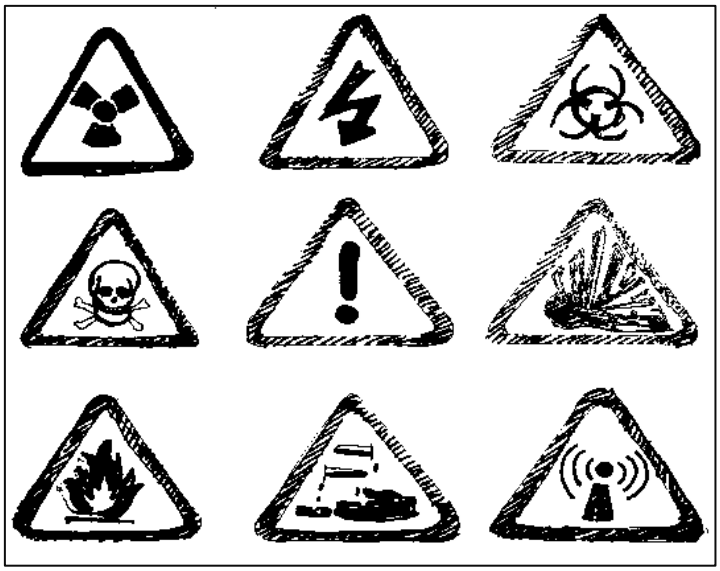


3. **Traffic signs or road signs**- erected at the side of or above roads to give instructions or provide information to road users.



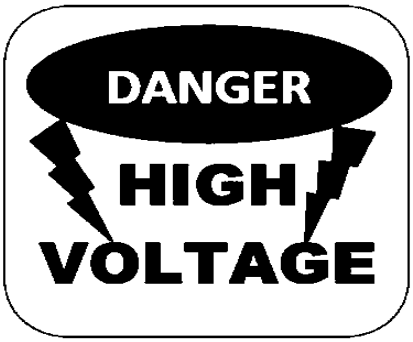
4. **Exit sign**- a device in a public facility (such as a building, aircraft, or boat) denoting the location of the closest emergency exit in case of fire or other emergency. Most relevant codes (fire, building, health, or safety) require exit signs to be permanently lit.

5. A **warning sign**- a type of sign which indicates a potential hazard, obstacle or condition requiring special attention.

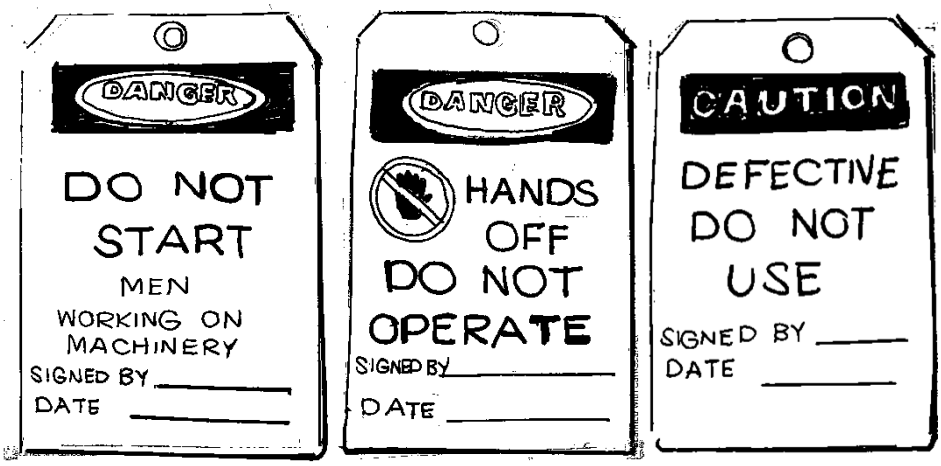


6. **Safety signs**- designed to warn hazards; indicate mandatory actions or required use of Personal protective equipment; prohibit actions or objects; and identify the location of firefighting or safety equipment or marking of exit routes.

7. **High voltage**- means electrical energy at voltages high enough to inflict harm on living organisms. Equipment and conductors that carry high voltage warrant particular safety requirements and procedures.



8. **Accident prevention tags**- used as a temporary means of warning employees of an existing hazard or to warn them not to start any switch or operation, because some other person may be injured.



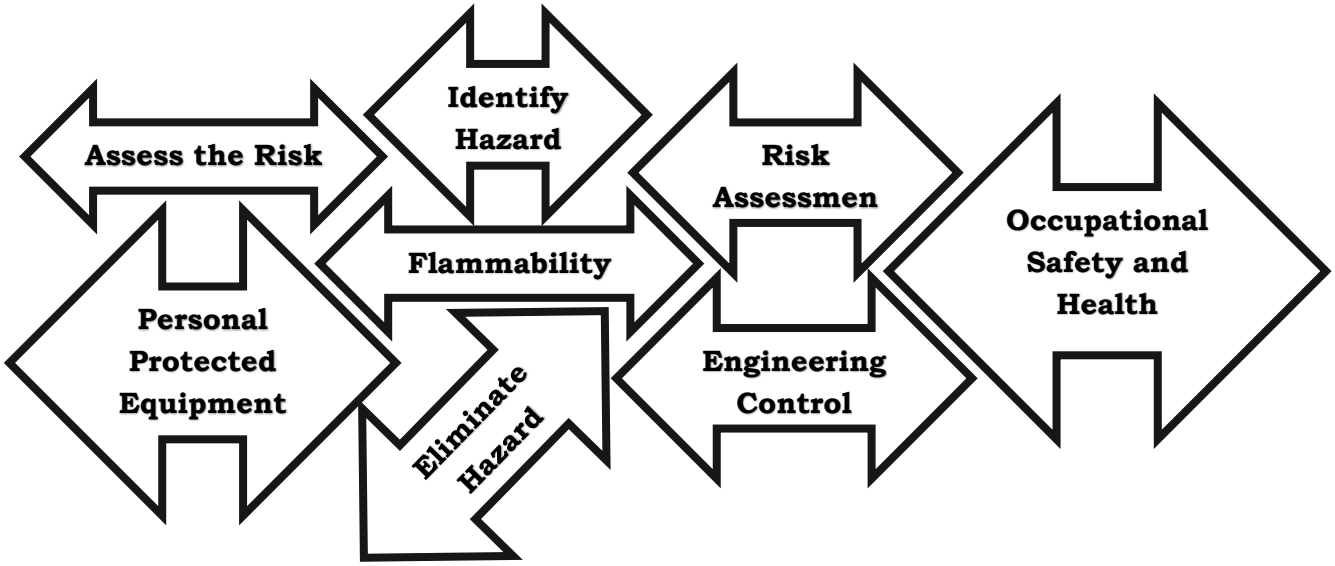
What's More

You are advancing! Do you want some more? The more you know, the more knowledge of the subject you will gain. Let's continue.

ACTIVITY 4. Try Me!

A. Identification

Direction: Identify what is referred to in the following statements. Write the complete and answer in your activity sheet.



_____1. It is a process where a person identifies, evaluates and determines the solution to risks.

_____2. Chemicals with lower flash points present a greater _____.

_____3. It is a cross disciplinary area concerned with a safety, health and welfare of people engaged in work or employment.
_____4. It identifies the source of the problem.
_____5. It includes ear and eyes protection, respiration and protective clothing.
_____6. It is the process to identify, analyze and evaluate hazard.
_____7. It may mean changing a piece part of machinery (ex. Using proper machine guard)
_____8. It limits the number of working hours in hazardous area.

B. TRUE-FALSE:

Direction: Read the statements below. Write **TRUE** if the statement is true and write **FALSE** if the statement is not correct. Write your answer on your activity sheet.

_____1. Before leaving work, you need to wash, shower and change your clothes to prevent contaminant from workplace to your family at home.
_____2. Safety sign and symbols are methods of hazard control.
_____3. Employer provides facilities at workplace for you to wash and take shower at least once a month.
_____4. Your protective clothing should not be cleaned regularly.
_____5. Good housekeeping reduces risk of fire and is cost-effective.
_____6. General cleanliness in workplace is an important method of controlling hazards.
_____7. Using of personal protective equipment causes working movement in a jerky way.

What I Have Learned

Congratulations! You are almost a real electrician now. You are learning the concepts first, apply it and now take precautions while at work. Let us review some of information about it.

Activity 5. STEP UP!

A. Direction: Complete the sentences below to show your further understanding about the topic in this module.

1. Risk assessments are very important as they form an integral part of an occupational health and safety management plan. They help to:
   Give at least three (3)
   _____
   _____
   _____
   _____
2. You have learned that the Risk assessment is a term used to describe the overall process or method where you:
   _____
   _____
   _____
3. At home, assess at least three (3) possible hazard and risks that may harm the physical health of your family.

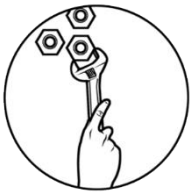
   _____
   _____
   _____

B. Directions: Choose the letter of the best answer. Write the letter on activity notebook.

1. Which of these are required to protect your hands from cuts, scrapes, punctures, burns, chemical absorption, and exhaust temperatures?
   A. goggles C. hard hat
   B. gloves D. safety shoes
2. Which of these are required protective reinforcement in the toe which guards the foot from falling objects or compression?
   A. earmuffs C. safety harness
   B. gloves D. safety shoes

3. Which of these are required to protect you when working in areas where there is a potential for injury to the head due to falling objects?
   A. safety harness C. protective clothing
   B. protective clothing D. safety shoes
4. Which of these are required when working in areas where there is a potential for injury to the head from falling objects?
   A. insulating matting C. hard hat
   B. insulated ladder D. safety shoes
5. Which of these are required used to protect the individual wearer against the inhalation of hazardous substances in the workplace air?
   A. earmuffs C. respirators
   B. insulating matting D. safety shoes

Nice job! Are you ready to apply what you have learned? Enjoy the activities.



What I Can Do

Eureka! New found knowledge indeed! You are almost through. Let us see how far have you learned by doing this activity.

ACTIVITY 6: Homework

Directions:

1. Download or watch a video presentation of different hazards and risks in a workplace
2. Make a reaction paper based on the video presentation you have watched. Use at least 50 words. Write it in your activity notebook.

Assessment

ACTIVITY 7. You can do it!

Directions: Select the best answer. Write the letter only on a separate sheet of paper.

1. Which of the following is a process where a person identifies, evaluate and determine the solution to risks?
   A. hazard assessment C. team assessment
   B. risk assessment D. administrative control
2. Which is considered as identifying the source of the problem?
   A. identify hazard C. team assessment
   B. risk assessment D. administrative control
3. Which of the following may mean changing a piece of machinery (ex. Using proper machine guard)?
   A. administrative control C. engineering control
   B. illuminate hazard D. self - control
4. According to Occupational Health Safety (OHS), which is one of the common ways to classify hazard by category?
   A. bacteria C. bullying
   B. repetitive movement D. physical
5. Which common type of hazards do bacteria, viruses, insects, plants, bird, animals or human belong?
   A. chemical C. biological
   B. physical D. ergonomic
6. Which equipment include protective clothing and eyewear and hearing protectors?
   A. personal protective equipment C. ladder
   B. steel-toe shoe D. rubber mat
7. Which area is concerned with the safety, health and welfare of people engaged in work or employment?
   A. administrative control C. engineering control
   B. eliminates hazard D. occupational safety & health
8. Which training, procedure, policy, or shift designs that lessen the threat of a hazard to an individual?
   A. isolate the hazard C. administrative control
   B. risk assessment D. eliminate hazard
9. Which method is built into the design of a plant, equipment or process to minimize the hazard?
   A. engineering control C. substitute the hazard
   B. risk assessment D. eliminate hazard
10. Which term is used to describe the overall process or method where you identify hazards and risk factors?
   A. engineering control C. substitute the hazard
   B. risk assessment D. eliminate hazard

11. Which among the signs means electrical energy at high enough voltage that can inflict harm on living organisms?
    A. danger sign C. high voltage sign
    B. warning sign D. caution sign
12. Which among the type of signs indicates a potential hazard, obstacle or condition requiring special attention?
    A. danger sign C. high voltage sign
    B. warning sign D. caution sign
13. Which general warning sign is used in instances in which the hazard, obstacle or condition is not covered by a standard sign?
    A. danger sign C. high voltage sign
    B. warning sign D. caution sign
14. Which sign gives information about the location of either the driver or possible destinations, and is considered a subset of the informative signs group?
    A. accident prevention tags C. directional sign
    B. warning sign D. exit sign
15. Which sign is used as a temporary means of warning employees of an existing hazard or to warn them not to start any switch or operation because other persons may be injured?
    A. accident prevention tags C. directional sign
    B. warning sign D. exit sign

Additional Activities

ACTIVITY 8. Action!

Directions: Dramatize a workshop setting where you can apply hazards and risks control. Group into 3.

Answer Key

Pretest

A.

1. c
2. d
3. e
4. b
5. a
6. h
7. f
8. j
9. g
10. i

Activity 2 - What's In

1. Chemical hazard
2. Biological hazard
3. Psychological hazard
4. Safety hazard
5. Chemical hazard
6. Physical hazard
7. Safety hazard
8. Ergonomic hazard
9. Physical hazard
10. Psychological

Activity 3 - What's New

1. Electric shock and burn
2. Wounded skin
3. Skin irritation or burn
4. Dislocate bones
5. Trauma
6. Physical stress
7. Lung cancer
8. Bacteria/viruses
9. Head injuries
10. Bacteria, virus or fungi

Activity 4 - What's More

A.

1. Risk assessment
2. Flammability
3. Occupational safety & health
4. Identify hazard
5. Personal protective equipment
6. Assess the risk
7. Engineering control
8. Eliminate hazard

B.

Activity 3

1. TRUE
2. TRUE
3. TRUE
4. FALSE
5. TRUE
6. TRUE
7. FALSE

Activity 5 - What I Have Learned

A.

1. Administrative Control
2. Engineering Control
3. Isolate the Hazard
4. Eliminate the Hazard
5. Risk Management

B

1. b
2. d
3. a
4. c
5. c

Assessment

1. b
2. a
3. c
4. d
5. c
6. a
7. d
8. c
9. a
10. b
11. c
12. b
13. d
14. c
15. a

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