SURFACE MINING

Level–II

Based on December, 2018 Version 2 OS and April, 2021 V1 Curriculum.

Module Title: Applying Awareness of mining and safety regulation

LG Code: MINSMN2M05LO (1-4) LG (14-17)

TTLM Code: MINSMN2TTLM 0421 V1

April, 2021 Adama Ethiopia

Contents

LG #14	LO1 Identify Equipment Safety

Instruction sheet

This learning guide is also developed to provide you the necessary information regarding the following **content coverage** and topics –

- Developing machine safety programs
- Understanding machine system requirements and specification.
- Carrying out Operation and maintenance of equipment

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to –**

- Develop machine safety programs
- Understand machine system requirements and specification
- Carry out Operation and maintenance of equipment

Learning Instructions**:**

1. : Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information “Sheet 1, Sheet 2 and Sheet 3
4. Accomplish the “Self-check 1, Self-check t 2, and Self-check 3” in page 5, 10, and 16 respectively.

Information sheet -1	Developing machine safety program

1.1 Introduction

Mining Machinery

The mining industry has developed machine safety programs with interventions and control technologies to reduce injuries to personnel working near machinery and mobile equipment.

Machine safety programs attempt to understand the machine system requirements and specifications and to address the human interface issues involving the operation and maintenance of the equipment.

Mining companies are also steadily introducing their preferred safety systems across global operations. Because of the individual nature of mines, a one-size-fits-all solution is difficult, so some form of harmonized corporate standards is more likely than product-specific mandates.

1.2. Implementing an equipment maintenance program

A. Preventive maintenance

Preventive maintenance includes measures such as systematic and routine cleaning, adjustment and replacement of equipment parts at scheduled intervals.

Following these recommendations will ensure that the equipment performs at maximum efficiency and will increase the lifespan of the equipment. This will also help to prevent:

- Inaccurate test results due to equipment failure
- Delays in reporting results
- Low productivity
- Large repair costs

B. Maintenance plan

A maintenance plan will include preventive maintenance procedures as well as provision for inventory, troubleshooting and repair of equipment. When implementing an equipment maintenance program, some of the initial steps will include:

- Assigning responsibility for providing oversight;
- developing written policies and procedures for maintaining equipment
- Developing the format for records, creating logs and forms, and establishing the processes to maintain records;
- Training staff on the use and maintenance of the equipment, and ensuring that all staff understands their specific responsibilities

C .Equipment inventory

The site should keep an inventory log of all equipment in the site. The log should be updated with information on new equipment and include documentation of when old equipment is retired. For each piece of equipment, the equipment inventory log should have a record of:

- Instrument type, make and model number and serial number so that any problems can be discussed with the manufacturer;
- Date the equipment was purchased, and whether it was purchased new, used or reconditioned;
- Manufacturer/vendor contact information;
- Presence or absence of documentation, spare parts and maintenance contract;
- Warranty's expiration date;
- Specific inventory number indicating the year of acquisition (this is especially useful for larger machineries

D. Inventory of spare parts

To ensure that the equipment's does not run out of spare parts, an inventory record of those used most frequently should be kept for each piece of equipment. The record should include:

- Part name and number;
- Average use of the part, and the minimum to keep on hand;
- Cost;
- Date when the part is placed into storage and when it is used (in and out stock log);
- Quantity of each part remaining in inventory

1.3 Risk control of machinery and equipment hazards

Where exposure to machinery and equipment hazards cannot be eliminated or substituted for machinery and equipment of improved design, risk controls must be applied to the hazards to prevent or reduce the risk (chance) of injury or harm. Workplace health and safety laws require the highest order control be applied.

Higher order machinery and equipment risk controls are preventative by nature, are effective and durable for the environment it is used in, and deal directly with the hazard at its source.

Lower order machinery and equipment risk controls, such as personal protective equipment (PPE), can prevent injuries, but are generally not as effective as higher order controls, as they rely more on worker behavior, maintenance programs and supervision.

Administrative controls use systems of work to reduce risk by providing a framework of expected behaviors

Effective machinery and equipment risk controls reflect some or all of the following characteristics:

- the hazard is controlled at its source
- contact or access to the hazard is prevented
- sturdy construction (correct materials with few points of potential failure)
- fail-safe (failure of the control system to be effective will result in machinery shut-down)
- tamper-proof design (as difficult as possible to bypass)

- presents minimum impediment to machinery and equipment operator
- easy to inspect and maintain
- does not introduce further hazards through the risk control action

Self-Check-1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the aim of developing machine safety programs in mining industry?2 point
2. What does mean Preventive maintenance?2 point
3. List some of the initial steps in maintenance plan?2 point

Note: **Satisfactory rating – Above 3 points** **Unsatisfactory – below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information Sheet -2	Understanding machine system requirements and specification.

2.1 Specification: A precise description of the physical or functional characteristics of a product, service or combination .A description of what the purchaser seeks to buy and what a bidder must respond to in order to be considered for award of a contract.

The success of the procurement activity relies on the specification being a true and accurate statement of the buyer's requirements.

2.2 Types of specifications

There are three types of specifications.

- **Functional specifications:** are specifications that define the function, duty or role of the goods or services.
  - ✓ It nominates what the goods or services are broadly required to do
  - ✓ Define the task or desired result by focusing on what is to be achieved rather than how it is to be done.
  - ✓ They do not describe the method of achieving the intended result. This enables suppliers to provide solutions to defined problems.
- **Performance specifications:** are specifications that define the purpose of the goods or services in terms of how effectively it will perform, that is, in capability or performance terms.
- **Technical specifications:** are specifications that define the technical and physical characteristics and/or measurements of a product, such as physical aspects (for example, dimensions, color, and surface finish), design details, material properties, energy requirements, processes, maintenance requirements and operational requirements.

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2.3. Understanding machine system requirements

All machinery and apparatus that is used in surface mines should be robust, fitted with appropriate protective safety devices and maintained in good condition.

Where the location of a mine site makes it difficult to get spare parts, it is even more important to keep machinery in good working order by regular servicing and maintenance.

Servicing and maintenance should be carried out according to a scheme prepared by the mine operator, or to the manufacturer's specifications.

As a safety measure, any power tool for hand-held use should be failsafe, i.e. operated with controls that require constant hand or finger pressure.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the definition of ***Specification***?(3 Point)
2. What are the three types of Specification? (3 Point)

Note: **Satisfactory rating – Above 3 points** **Unsatisfactory – below 3points**

.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information sheet 3	Carrying out Operation and maintenance of equipment

3.1. Machinery and Mining Operations

Types of machinery operating on mining sites

- Heavy machinery needed in mining for exploration and development, to remove and stockpile overburden, to break and remove rocks of various hardness and toughness, to process the ore and for reclamation efforts after the mine is closed.
- Bulldozers, drills, explosives and trucks are all necessary for excavating the land.
- In the case of placer mining, unconsolidated gravel, or alluvium, is fed into machinery consisting of a hopper and a shaking screen which frees the desired minerals from the waste gravel. The minerals are then concentrated using sluices or jigs.
- Large drills are used to sink shafts, excavate stops and obtain samples for analysis.
- Trams are used to transport miners, minerals and waste.
- Lifts carry miners into and out of mines, as well as moving rock and ore out, and machinery in and out of underground mines.
- Huge trucks, shovels and cranes are employed in surface mining to move large quantities of overburden and ore.
- Processing plants can utilize large crushers, mills, reactors, roasters and other equipment to consolidate the mineral-rich material and extract the desired compounds and metals from the ore.
- Conveyors, rock bolting machines, milling machines and haulage equipment such as trucks and loaders.

3.2 The contributing factors to accidents with machinery

- Large, powerful moving machinery processing thousands of tons of ore and rock in poorly lighted and confined work areas in underground mines, and in adverse weather conditions in surface operations, contribute to the hazardous nature of mining.
- Improper operation of the machine and maintenance and repair.
- Poor visibility near mining equipment, machinery entanglements, slipping and tripping, operator error, and hazards associated with equipment maintenance.
- Ineffective safeguarding of workers near machinery through the required mechanical guarding around moving components, lockout/tag out of machine power during maintenance and backup alarms for mobile equipment.
- Poor proximity detection
- Mining machinery and haul trucks have extensive operator blind spots.
- Haul roads are unsealed and need constant maintenance, blind corners are common, and intersections change frequently.

3.3 Operation of some Common mines equipment's

3.3.1 Operation of pneumatic pick-hammers

Any mechanical part affecting the safe operation of pneumatic pick-hammers, such as hose connections pick retainer and the state of pick, should be checked for any defect by the equipment operator before being put into operation. The same applies to pneumatic drills.

Extraction operations by pick-hammer should be performed from a position which will not expose the operator to injury from falling material.

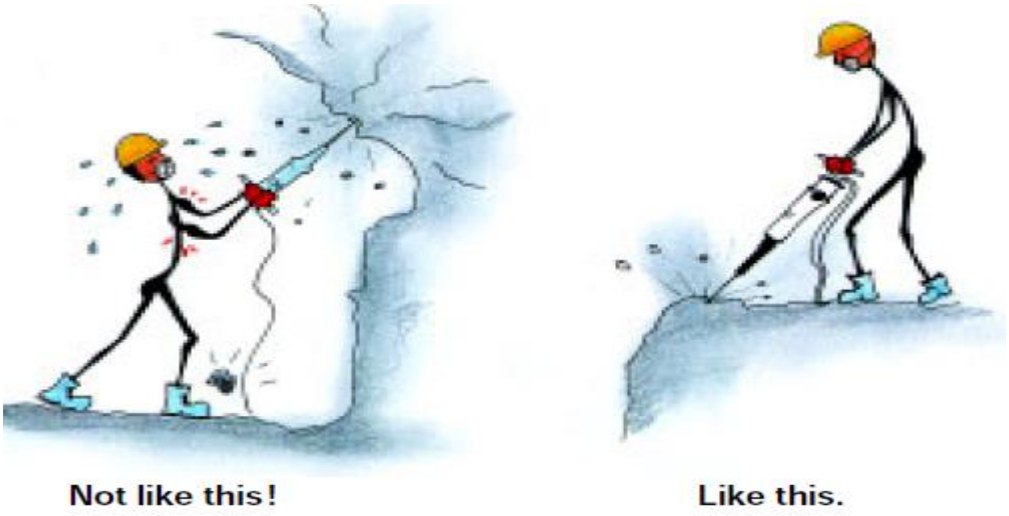

Figure 2 Use pick-hammers from a safe position.

- Lubricating oil should be used before a pick-hammer is started and at intervals as required during operation.
- Material that is to be broken by pick-hammers (secondary breakage) should be positioned or blocked to prevent any movement which could endanger persons in the work area.
- Before pneumatic pick-hammers are moved from one working place to another, the air compressor should be turned off and air bled from the hose.
- Pick-hammers should not be used for breaking material that could contain misfired explosives or detonators.

3.2.2 Drilling operations

- Drilling equipment should be inspected and any defects corrected before it is used.
- The drilling area should be inspected for hazards before starting drilling operations.
- Drill crews and others should stay well clear of rotating augers or drill stems. Persons should not pass under or step over a rotating drill stem or auger.
- Drills should be attended at all times while they are in operation.

- Persons should not hold the drill steel while collaring holes, nor rest their hands on the chuck while drilling.
- Persons should not drill when their footing is not secure or when standing on staging or equipment that is not suitable for drilling.
- Before drills are moved from one place to another the air compressor should be turned off and air bled from the hose.
- Holes should not be drilled where there is a danger of intersecting a misfired hole or hole containing explosive material

3.2.3. Compressors and Related Equipment

Compressed air vessels should have a safety certificate in accordance with regulations. Normally they should withstand at least five times the maximum design operating pressure.

All pipe/hose constructions and connections should be able to withstand the operating air pressure and flow. Suitable locking devices should be used at connections between machines and high pressure hose lines, particularly where a connection failure could create a hazard to the operator or other persons.

On any compressor or pressure storage vessel, safety equipment should be installed that is suitable for working constantly under the maximum permissible operating pressure. The equipment should include:

- Pressure gauge;
- Temperature gauge;
- Safety valve to release excess pressure.

Compressor air intakes should be as clean and dry as possible. Air filters should be used to ensure that only uncontaminated air enters the compressor.

The compressed air flow from the compressor to the point of use should be kept as dry and as cool as possible.

3.2.4 Conveying explosives

- Explosive material should be transported without undue delay to the blast site.
- Closed, non-conductive containers should be used to carry explosives and detonators to and from blast sites.
- Separate containers should be used for explosives and detonators.
- Explosive containers should be clearly marked, indicating their content.

3.2.5 Charging and shot-firing operations

- Explosives should not be taken to the blast site until the blast holes are ready to be charged.
- Explosives and blasting agents should be kept separated from detonators until charging begins.
- No person should smoke; have a naked light or any other appliance that could generate heat or sparks in the vicinity of holes that are being charged with explosives.
- Charges should be made up only at the time of use and as close to the blast site as conditions allow.

Before firing a shot hole the responsible person should:

- Check the completed circuit to ensure that the components are properly connected.
- Give ample warning to allow all persons to be evacuated from the blasting area.
- Guard or barricade all access routes to the blast area to prevent the passage of persons

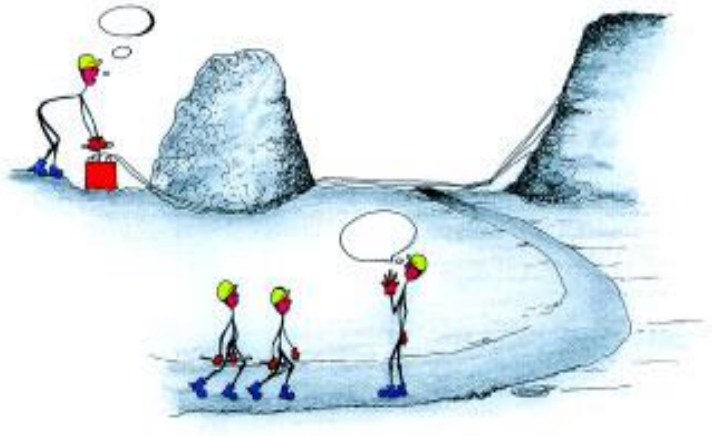

Figure 3.Give warnings; stay well clear before blasting.

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Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Say true if the statements is correct and say false if the statement is incorrect (1 point for each)

1. In Mining we have different types of machineries and equipment's
2. Improper operation of the machine in mine site causes serious injury
3. No need of checking hoses and connections of pneumatic pick-hammers and pneumatic drills before starting work
4. Explosives and blasting agents should be kept separated from detonators until charging begins.
5. Explosive containers should be clearly marked, indicating their content

Note: **Satisfactory rating – Above 5 points** **Unsatisfactory - below5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

LG #15	LO #2-Respond to Mine Incident

Instruction sheet

This learning guide is also developed to provide you the necessary information regarding the following **content coverage** and topics –

- Appling Workplace and site emergency procedure
- Applying firefighting techniques
- Identifying, establishing and maintaining local operational emergencies
- Identifying , addressing and implementing potential risks, hazards and environmental issues
- Taking local measures to reduce impact of emergency

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, **you will be able to –**

- Apply Workplace and site emergency procedure
- Apply firefighting techniques
- Identify, establish and maintain local operational emergencies
- Identify , address and implement potential risks, hazards and environmental issues
- Take local measures to reduce impact of emergency

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 Sheet 4, Sheet 5, Sheet 6, and Sheet 7.
4. Accomplish the “Self-check 1, up to Self-check 7” in page 8, 11, 19, 25, 30, 33 and 39 respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, and Operation Sheet 2” in page 6 and 17.
6. Do the “LAP test” in page – 7 and 18 (if you are ready).

Information Sheet 1	Appling Workplace and Site Emergency Procedure

1.1. Definition of Emergency

An emergency is an abnormal and dangerous situation needing prompt action to control, correct and return to a safe condition.

1.2 Types of emergency

Potential emergencies in the meat industry include

- fire,
- explosion
- structural damage
- power or equipment failure
- refrigerant or gas leakage and
- Confined space mishaps.

1.3 Emergency plan

The goal of the emergency plan is to ensure the safety of all occupants of the affected area and minimize damage to assets .It describes:

- Emergency procedures, including:
  - ✓ an effective response to an emergency
  - ✓ evacuation procedures
  - ✓ identifying those that hold responsibility i.e. Wardens, First Aid officers
  - ✓ notification of emergency services at the earliest opportunity
  - ✓ medical treatment and assistance; and
  - ✓ Effective communication between the person authorized by the person conducting the business.
- Testing of the emergency procedures, including frequency
- Information, training and instruction to relevant workers in relation to implementing the emergency procedures.

1.4. Duties of the mine operator

The mine operator should:

- Notify the mining authority before starting operations at any mine and before discontinuing or abandoning any existing mining activity.
- Provide all the equipment, apparatus, facilities and finance to ensure, as far as reasonably practicable, good mining practice and an appropriate standard of occupational safety and health at the mine.
- Make sure everyone understands their safety and health responsibilities
- Appoint, depending upon the number of mineworkers employed and the nature and extent of mining operations, one or more competent persons supervisor to supervise and control the operations at the mine.
- Encourage the workforce to be actively involved in safety and health.

1.5 Obligations of mine workers

- No mineworker should take any action at work which could cause danger to other workers, damage to mining equipment or obstruct production.
- Every worker should fully comply with rules or instructions issued by the mine operator and should make proper use of and take reasonable care of any personal equipment provided for his protection.

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Answer the following questions neatly and clearly

1. What is the definition of emergency?(2 Point)
2. List at least three Obligations of mine workers to minimize emergency(2 Point)
3. List at least three Obligations of mine operator to minimize emergency(2 Point)

Note: Satisfactory rating – Above 3 points **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information Sheet – 2	Applying Firefighting Techniques

2.1 Fires and what makes up a fire.

The potential for a fire to occur in high risk environment is very likely, as there may be present a range of plant equipment, combustible waste and hazardous chemical and materials. Before fighting a fire it is crucial to understand more about fires, how they start, how they can be controlled and what to do after the fact.

There are three basic components that are required for a fire to ignite burn and continue to burn. These are described in the fire triangle.

- **Oxygen (O_2)**: is an essential part of the chemical reaction needed to create fire
- **Heat**: is needed for ignition and sufficient heat energy must be applied to raise the fuel to its ignition temperature
- **Fuel:** can be any materials that can be burn any combustible material solid, liquid or gas.

. The triangle illustrates the three elements a fire needs to ignite: heat, fuel, and an oxidizing agent (usually oxygen).

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Fig 2.1 fire triangle

2.2 Fighting a fire

Before you consider fighting a fire you must make sure that all people in the area are alerted and are evacuating. You must ask yourself if you should fight the fire at all.

General Fire Fighting Procedure

If you ever discover a fire follow these steps:

1. Remain calm.
2. Sound the fire alarm and/or alert all the occupants to evacuate.
3. Alert the fire brigade by dialing 000 (or your supervisor – depending on what procedures are currently in place).
4. Leave the area
5. Assemble with other staff at the evacuation assembly point.
6. Upon their arrival, inform the fire fighters of the situation

In addition if you are going to fight the fire;

- Attack the fire with the firefighting equipment that is available and suitable
- Send another person to raise the alarm.
- Arrange for power or fuel supplies feeding the area to be turned off.
- Approach the fire from a safe direction
- Do not turn your back on the fire.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Choose the best answer from the given alternatives (2 point for each)

1. What are the three elements of fire needs to ignite:

   A. Heat B. Fuel C. Oxygen D. All

1 list the basic steps for using modern portable fire extinguishers

3 One of the following is not general safety measures used to maintain fire protection in the workplace

A. Fire alarm systems
B. Poor housekeeping practices
C. Fire blankets
D. Fire extinguishers

Note: Satisfactory rating – Above 3 points **Unsatisfactory - below 3 points**

Score = _____

Rating: _____

Answer Sheet

Name: _____ Date: _____

Short Answer Questions

Information Sheet – 3	**Identifying, establishing and maintaining local operational emergencies**

3.1. Emergencies

An emergency is an undesired event that generates real or potential danger / risks, at any operation (on site or off site), that directly affect:

- The people: the health and welfare of employees, contractors and venders and the health and welfare of members of the general public.
- The property
- The process
- The environment
- The reputation of your mine
- An event need not be directly related to your mine's operations to adversely affect your mine's reputation.
- Public, media and / or government perceptions about our industry and its products can have a long-term impact.

3.2 Emergency Levels

Level 1 "Low"

A "Low Level" emergency is an on-site or off-site emergency. It can be controlled by area personnel from the affected area.

Level 2 "Medium"

A "Medium Level" emergency cannot be handled by the personnel of the affected area.

The Emergency Response Team is required. It does not exceed the resources of the site.

Level 3 “High”

A “High Level” incident is one which exceeds the resources available at the scene of the emergency and those available on-site. Outside help, such as government, industry and or corporate, is required.

3.3 Emergency preparedness local operational emergencies

An accident and subsequent emergency situation occurs when there is an uncontrolled release of energy resulting in the injury of workers. While there is a requirement that a site determines all foreseeable emergencies, the resulting injuries can be broken down into a number of generic areas.

- Existing medical conditions aggravated
- Excessive heat or cold
- Poisons (flora and fauna)
- Major trauma
- Chemicals
- Viral or bacterial infections
- Electrocution

A small mine can be prepared for an emergency and any resulting injury to its workers if it develops and implements an effective Emergency Response Plan (ERP).

3.4 Emergency response plan

Emergency Response Plan is a set of written procedures for dealing with emergencies those minimize the impact of the event and facilitate recovery from the event

In developing an ERP some basic factors must be considered. Although operations may be similar to one another, each can be different in size and nature. As such each operation needs an individual plan in place that considers, as a minimum, the type of operation, site hazards, and the range of personnel, training of personnel, geography of the surrounding area, remoteness, and available equipment.

3.4.1. Nine Steps to developing an emergency response plan

1. Establish a planning team

Demonstrate management's commitment to the project by appointing a competent team leader and authorizing the leader and the team he assembles to take the necessary steps to develop an emergency response plan.

2 .Evaluate current plans, procedures and incident or drill records

A preliminary analysis of current emergency response plans and procedures provides a valuable benchmark to start the plan creation process. The team should also review records of the company's response to any previous emergency events or drills.

Documents to review:

- Health and safety policy
- Evacuation plan
- Fire protection and firefighting plans
- Security procedures
- Mutual aid agreements with other companies
- Risk management plan
- Records from previous incidents and drills
- Environmental policies
- JHSC inspection records
- Minutes from JHSC meetings
- Accident investigation records
- Records of past meetings with first responders (fire, police, medical, etc.)

3. Identify emergency resources

The location of the mine, pit or quarry will have a great deal to do with the emergency resources available and the time required for them to respond. Surface mines located near cities will have better and quicker access to resources than mines located in rural or remote locations.

4. Review codes and regulations

Some emergency situations may be caused or complicated by failing to follow the dictates of one or more codes of practice. Legislation is in place to direct companies on procedures to follow and notification to be given in case of an emergency.

5. Develop training programs

Everyone who works for the company requires some type of training. Even contractors and visitors may require some emergency response training and orientation.

6. Develop a communication strategy

Effective communication is essential to report emergencies to first response support teams, employees, neighboring businesses and residences, the community, news media and other interested parties such as employees' families and company customers. Even a temporary communication disruption can have a serious effect on the response process.

7. Write the plan

Every component of every emergency response plan requires the approval of some level of management. Plan development will proceed more smoothly and with fewer revisions if the approvals process and deadlines are established and understood beforehand.

8. Implement the plan

There are several aspects to plan implementation:

- Management can indicate its "buy-in" to the plan by adding a launch covering letter signed and dated by the most senior manager for the site or operation
- The employee introduction to the emergency plan may take place through safety meetings, orientation meetings or specific training programs
- Emergency preparedness information from the plan may be distributed or promoted through posters, bulletin board showings and employee newsletters
- Supervisors should make a habit of asking employees what they would do if a fire (explosion, hurricane, etc.) occurred.
- Plan implementation should include a launch with police, fire, medical and other support services

9. Identify hazards, estimate probability and assess potential impact on people, property and business

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Say True if the statements is correct and say false if the statement is incorrect

(2 point for each)

1. An emergency is an undesired event that generates real or potential danger / risks, at any operation (on site or off site).
2. A “Medium Level” emergency can be handled by the personnel of the affected area.
3. An accident and subsequent emergency situation occurs when there is an uncontrolled release of energy resulting in the injury of workers
4. Emergency Response Plan is a set of written procedures for dealing with emergencies that minimize the impact of the event

Note: **Satisfactory rating – Above 4 points** **Unsatisfactory - below 4 points**

Score = _____

Rating: _____

Answer Sheet

Name: _____ Date: _____

Short Answer Questions

Information Sheet –4	**Identifying, addressing and implementing potential risks, hazards and environmental issues**

1.1 Introduction

Environmental issues are harmful effects of human activity on the biophysical environment. Environmental protection is a practice of protecting the natural environment on the individual, organizational or governmental levels, for the benefit of both the environment and humans. Environmentalism, a social and environmental movement, addresses environmental issues through advocacy, education and activism.

4.2 Identification of Major Impacts of Mining

Generally, the environmental and social impacts are divided into waste management issues, impacts to biodiversity and habitat, indirect impacts, and poverty alleviation and wealth distribution

4.2.1. Environmental Impacts

Environmental impacts may be transient (often acute, associated with accidental discharges or explosions), temporary (only during operational activities) or chronic (long-term, arising from mineral extraction and waste disposal).

Major environmental impacts arising from mining activities include:

- Water accessibility and quality
- Air quality
- Land disturbance
- Waste generation
- Biodiversity loss
- Nuisance and disturbance

4.2.2 Social impacts are:

- Housing displacements
- Resettlement
- Employment
- Health and Safety
- Ecosystem services
- Socio political conflicts

4.2.3 Soil quality impact

The mining operations cause serious impacts on soil fertility by removing the topsoil and soil contamination. “Mining operations routinely modify the surrounding landscape by exposing previously undisturbed earthen materials. Erosion of exposed soils, extracted mineral ores, tailings, and fine material in waste rock piles can result in substantial sediment loading to surface waters and change in drainage pattern. In addition, spills and leaks of hazardous materials and the deposition of contaminated windblown dust and water runoff and leaching can lead to soil contamination”

4.2.4 Water resources impact

The most critical impact of mining in most of the cases is on water quality and availability of water resources. Acid mine drainage is one of the most prevalent factors and serious threats that affects the water through dissolved metals and contaminant leaching. Nevertheless, in other cases, leaching of toxic constituents, such as arsenic, selenium, and heavy metals, can also occur. Heap leaching and blasting operations also lead to elevated levels of cyanide and nitrogen compounds (ammonia, nitrate, and nitrite) in water resources.

The poor quality of water affected by mining is not only unsuitable for human consumption, but also has devastating effects on water bodies (rivers, lakes) and aquatic life. The surface water quality also negatively affects the terrestrial wildlife.

In general, the impacts of contaminated water are divided into following categories:

I. **Chemical:** The impacts are due to altered pH resulting into increased acidity or alkalinity; increased dissolved metals and the presence of synthetic compounds.

II. **Physical:** Physical impacts include the increased concentration of suspended solids causing turbidity, and adsorption of metal compounds onto sediments and soils.

III. **Biological:** This impact is seen in the form of species migration and death and also acute chronic toxicity.

IV. **Ecological:** Ecological impacts include habitat alteration, bioaccumulation of metals in food chain, species extinction and reduced primary productivity.

Fig 1.Impact of contaminated water

4.2.5 Impacts on air quality

Impacts of mining on air quality are observed during each stage of the mine cycle, but the mining operations like drilling, blasting, hauling, collection, and transportation are the major sources of airborne emissions and pollution.

During mining cycle, the ore extraction, generation of solid waste and ore refining and processing, create air pollution which have cumulative environmental and public health impacts.

4.2.6 Impacts as disturbance: Noise and Vibration

Noise pollution is one of the major impacts of mining activities, particularly from blasting, crushing, draglines, conveyors and process plants. Blasting operations affect their surroundings in the form of ground vibration, air blast, fumes etc. The blast energy is transmitted to the ground, creating vibration waves that propagate through the various soil and rock strata to the foundations of nearby building

4.2.7 Impacts on Wildlife fauna

Wildlife fauna includes the non-domesticated animals (or other organisms). Mining heavily impacts the wild fauna through the removal of vegetation and topsoil, ecosystem destruction, the release of pollutants, and the generation of noise.

4.2.8 Impacts on Social Values

The major social impacts of mining could be seen in the form of

- demographic change (e.g., size and composition of resident population),
- economic change (new pattern of employment and income),
- environmental change (land use changes, loss of natural habitat and hydrological regime), lifestyle and
- cultural impacts and
- health impacts

4.3. Hazard assessment

A hazard is anything, including work methods and procedures, which have the potential to harm the health and safety of a person. Hazards are present in all workplaces. They cannot always be removed but if they are controlled or managed well they will not be a big risk to employees or others.

In order to control hazards, they need to be identified. A simple inspection can identify hazards such as:

- Damaged or faulty tools and machinery
- Not working or damaged machinery guards
- Exposed electrical cables
- Toxic chemicals
- Messy workspace
- Poor conditions such as a wet and poorly ventilated work area

An explosive material is capable of releasing mechanical, chemical, or nuclear energy in a sudden and often violent manner that results in the release of high pressures and temperatures.

The following natural/industrial problem may be encountered during the mining operation.

- ✓ Flood: Filling of the mine pit due to excessive rains,
- ✓ Blasting- fly rocks and Boulders,
- ✓ Drilling- Noise and Vibration,
- ✓ Handling of overburden and heavy machinery,
- ✓ Storage of diesel,
- ✓ Slope failures at the mine faces or stacks.
- ✓ Premature explosions may cause collapse of walls and roofs on the shot fired.
- ✓ Shot firers may be injured by flying rock or other projectiles.

- ✓ Handling of misfired charges may cause explosions in the immediate vicinity of the shot fired. Accidental detonations may occur during the transportation or handling of explosives.
- ✓ Fumes released in explosions are dangerous to health and in some cases may cause acute poisoning. Walking on uneven terrain and slippery surfaces, or climbing on rocks, may cause slips, trips and falls.

Risk in the workplace can be defined as the chance of injury or loss occurring from a hazard. By removing a hazard from the workplace, such as a dangerous piece of machinery, then the risk of injury is also eliminated. If the machinery is fitted with a guard then the chances of it causing injury will be reduced. But the risk still exists as the guard could fail or not be used by an operator.

Risk assessment

Examples of activities that involve a lot of risk include:

- handling tasks that are repeated all the time
- high noise levels
- lifting and handling heavy items
- hot working conditions
- cold working conditions
- harmful dust or vapors

Risk management is the process of identifying, hazards and the potential risk they have of causing injury or harm. The better the hazard control, the lower the risk of injury or loss to the worker.

Steps in Risk Assessment

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Say True if the statements is correct and say false if the statement is incorrect

(2point for each)

1. Environmental issues are harmful effects of human activity on the biophysical environment
2. Air pollution is one of the social impact arising from mining activities
3. The mining operations cause serious impacts on soil fertility by removing the topsoil and soil contamination.
4. Mining have less impacts on the wild fauna through the removal of vegetation and topsoil
5. The major social impacts of mining could be seen in the form of demographic change, economic change, environmental change and cultural impacts and health impacts.

Note: **Satisfactory rating – Above 5 points** **Unsatisfactory - below 5 points**

Score = _____

Rating: _____

Answer Sheet

Name: _____ Date: _____

Short Answer Questions

Information Sheet- 5	Taking local measures to reduce impact of emergency

5.1 Hazards in the working environment and their Control Measures

In the working environment of a surface mine airborne contaminants (such as rock dust and fumes), excessive noise, vibration, heat stress and ergonomic problems can create health risks to mineworkers who are subject to frequent and prolonged exposure to them.

5.1.1 Dust

Airborne contaminants, such as rock dust, are mainly produced during drilling operations, mineral getting, loading, crushing of rock or ore, and blasting. Persons exposed to excessive dust for prolonged periods may suffer from permanent lung diseases, such as silicosis.

Dust should be controlled or suppressed by:

- Using wet drilling techniques.
- Using water sprays during mineral getting, loading, crushing.

In general, any rock surface being worked should be kept moist to reduce the escape of dust into the atmosphere**.** Where such dust control measures are not provided or have not been developed, mineworkers exposed to excessive dust concentrations in their working environment should always use personal protective equipment, such as dust masks, to prevent dust from being inhaled.

Figure 5.1.Use water to suppress dust and/or wear a dust mask.

5.1.2 Harmful fumes

Fumes, produced during shot-firing operations contain toxic gases (such as sulphur dioxide, nitrous oxide, nitric oxide, etc.) which, when inhaled, can lead to serious health damage.

Mine workers should not approach a working face after shot-firing until the dust and gaseous products of the blast have completely dissipated.

The exhaust from diesel engines also contains harmful fumes, including very fine, repairable particles. Frequent and prolonged exposure to diesel exhaust is a health risk and should be prevented.

As far as practicable, stationary diesel equipment should not be operated in stagnant zones or close to workplaces.

Simple dust masks do not protect against toxic gases which are present in after-blast fumes or in diesel exhaust fumes.

.

5.1.3 Noise

Repeated or prolonged exposure to excessive noise levels will lead to hearing impairment.

Potential sources of noise emissions include compressors, drilling machines, pick-hammers or other mechanical equipment used at a mine.

Wherever possible, such noise sources should be muffled with an effective acoustic absorbing material so as to reduce noise emissions to tolerable levels. Increasing the distance between the noise source and the listener is often a practical method of noise control.

Since the sound pressure of pick-hammers or drilling machines normally exceeds acceptable levels, every person working with or in the vicinity of such devices should always use ear protection.

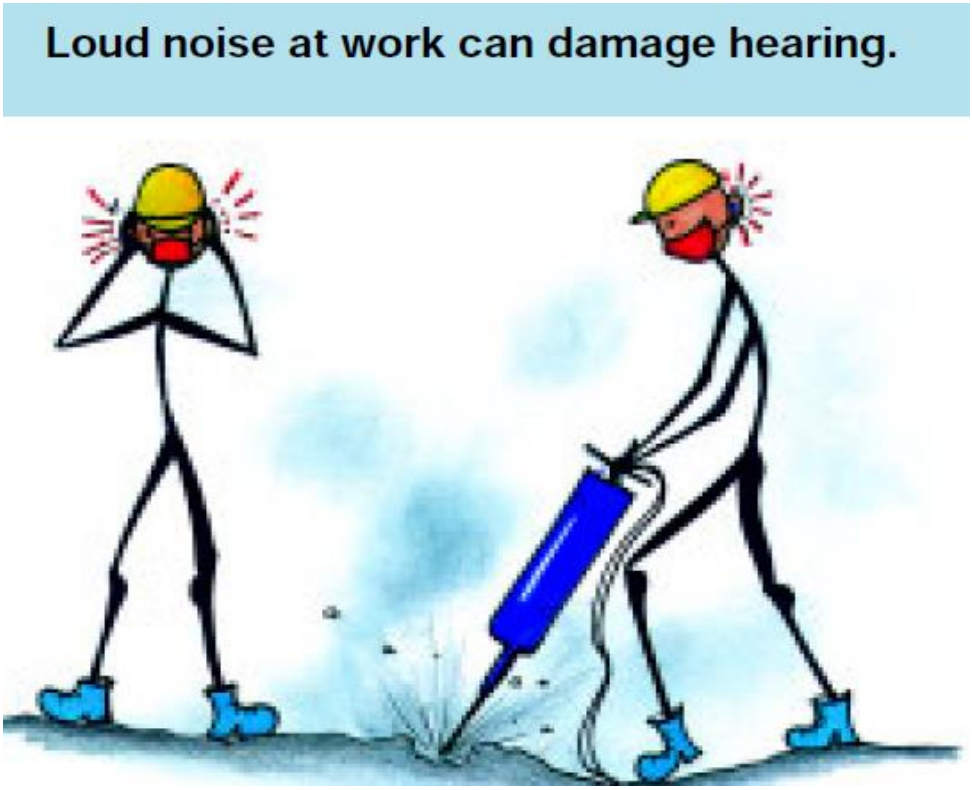

Figure 5.2.Use ear protection when near excessive noise levels.

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Say true if the statements is correct and say false if the statement is incorrect(2 point each)

1. Airborne contaminants, such as rock dust, are mainly produced during drilling operations,
2. Dust should be controlled by using wet drilling techniques and water sprays during mineral getting, loading, crushing.
3. Fumes, produced during shot-firing operations contain less toxic gases
4. The main causes of injury are heavy loads, awkward working positions, repetition, working under pressure

Note: **Satisfactory rating – Above 4 points** **Unsatisfactory - below 4 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Operation Sheet -1	Applying firefighting techniques

2.1. Using Fire Extinguishers

There are four (4) basic steps for using modern portable fire extinguishers.

The acronym **PASS** is used to describe these four basic steps.

1. **Pull (Pin**) Pull pin at the top of the extinguisher, breaking the seal
2. **Aim-** Approach the fire standing at a safe distance
3. **Squeeze -**Squeeze the handles together to discharge the extinguishing agent inside. To stop discharge, release the handles.
4. **Sweep-** Sweep the nozzle from side to side as you approach the fire, directing the extinguishing agent at the base of the flames

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 30Min-45 Min.

Task 1: Perform the are four (4) basic steps for using modern portable fire extinguishers

LG #16	LO3 Maintain Personal Safety

Instruction sheet
This learning guide is also developed to provide you the necessary information regarding the following **content coverage** and topics – ▪ Using Personal protective equipment ▪ Recognizing dangers in heavy machinery operation This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, **you will be able to –** • Use Personal protective equipment • Recognize dangers in heavy machinery operation
Learning Instructions:
1. Read the specific objectives of this Learning Guide. 2. Follow the instructions described below. 3. Read the information written in the “Information Sheets 1 and 2”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them. 4. Accomplish from “Self-check 1 up to Self-check 2 in pages 5 and 11 respectively 5. Ask your teacher the key to correction (key answers) or you can request your teacher to correct

Information Sheet – 1	Using Personal protective equipment

The mine operator should provide, free of charge, the personal protective equipment that is to be worn when hazards cannot be eliminated and ensure that it is worn properly and maintained in good condition

Types of Personal Protective Equipment

Head protection

- Hard hats
- Helmets
- Bump Caps
- Guards
- Accessories

Hand protection

- Work gloves
- Chemical Hazard
- Mechanical Hazard
- Specialist Hand Protection
- Thermal Hazard

Eye and face protection

- Safety glasses
- Eye shields
- Over specs
- Eye wear accessories
- Face shields
- Visors
- Safety goggles

Breathing apparatus

- Escape sets
- Working sets

Protective clothing

- Chemical
- Hi-visibility clothing
- FE clothing
- Weather wear
- Work wear

Foot protection

- Safety footwear
- Food Industry Footwear
- ESD Footwear

Hearing protection (covered by specific Regulations)

- Ear defenders
- Ear plugs
- Communications sets
- Noise meters
- Acoustic foam

Respiratory protection (covered by specific Regulations)

- Filter respirators
- Lightweight respirators
- Powered respirators
- Detectors
- Monitors

Fall management equipment

- Safety harnesses
- Fall arresters

- Elbow and wrist supports
- Back supports

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Say true if the statements is correct and say false if the statement is incorrect (2 point for each)

1. The mine operator should provide the personal protective equipment that is to be worn when only hazards can occurred
2. Safety helmet, protective gloves and suitable protective foot wear be worn at all time in and around the time
3. Hearing protection can be used where excessive noise levels are produced where compressors, drilling machines or pick-hammers are used.
4. Safety belts and lines where there is a danger of falling

Note: **Satisfactory rating – Above 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information Sheet – 2	Recognizing dangers in heavy machinery operation

2.1 Machinery and mining operation

Heavy machinery need in mining for exploration and development, to remove and stockpile overburden, to break and remove rocks of various hazardless and toughness, to process the ore and for reclamation efforts after the mine is closed

- Bull dozers, drills, explosives and trucks are all necessary for excavating the land.in the case of placer mining, unconsolidated gravel, or alluvium is fed into machinery consisting of a hopper and a shaking screen or trammel which frees the desired minerals from the waste gravel.
- Large drills are used to sink shafts, excavate stops and obtain samples for analysis.
- Huge trucks, shoves and cranes are employed in surface mining to move large quantities of overburden and ore.
- Conveyors, rock bolting machines, milling machines and haulage equipment such as trucks and loaders

Planning a safe approach to a job can help identify the hazards of working with machinery. The hazard management process includes:

- Hazard identification
- hazard assessment :decide if the identified hazards are significant
- Hazard control :either by eliminating, isolating or minimizing the hazard
- A safety plan or hazard registers documenting this information
- hazard monitoring, including workplace exposure monitoring or health monitoring of workers
- A schedule to update the safety plan.

Identify Hazards

The first step in the hazard management process is to identify hazards, anything that could injure or harm someone. Do a workplace inspection to identify all machinery used.

Include common items that may not normally be thought of as ‘machines’. Also consider how other workplace items such as chairs and heaters can affect the use of machinery.

Hazard Identification Methods

Once you have identified all machinery, you can identify their hazards. A good hazard identification process is key to hazard management. You can identify hazards using:

- **Physical inspections.** Inspect the machinery and assess where someone could get injured or caught in the machinery.
- **Task analysis.** Identify the hazards involved in each task. This should include what happens when there is a blockage or the machine needs cleaning or maintenance.
- **Process analysis**. Identify hazards at each stage of the production process.
- **Best practice guidelines and standards.**
- **Hazard and operability analysis (HAZOP).**
- **Accident investigation analysis.** Identify hazards and causes of harm from investigations involving similar types of work.

2.2 Machinery hazards

Hazards are split into two categories:

- Mechanical hazards and
- Operational hazards.

The main hazards caused by the machinery itself. Many pieces of machinery use force and motion to cut, bend, join or shape materials. This force and motion can harm people. Some of the ways people can be hurt are covered in this section. Machines and machinery parts in the figures section are unguarded to show the hazards and danger zones.

A. Prime Movers

Prime movers are devices that turn energy into motion to power a machine. Prime movers include:

- water turbines
- electric generators

- electric motors
- electric rotary converters
- the head and tail race of water wheels
- Motors powered by burning fuel, such as coal, petrol or natural gas.

Prime movers also include motors powered by burning solid, liquid, or gas fuels such as coal, petrol or natural gas.

B. Transmission Machinery

Transmission machinery takes energy from a prime mover to the part of a machine where it is used. Every part of any transmission machinery should be securely fenced unless, because of its position or construction, it is safe. Transmission machinery can include gears, shafts, pulleys and belts, chains and sprockets, or friction drives.

C. Drawing-In Or Trapping Hazards

Injuries can be caused when a part of the body is drawn into a 'nip-point'

In-running nips between two counter rotating parts (like meshing gears, rolling mills, mixing rolls, press rolls)

- In-running nips between a rotating surface and another surface moving along it (such as a power transmission belt and its pulley, a chain and its chain wheel, a rack and its pinion)
- Running nips between a rotating surface and another surface moving along it where material (like metal, paper, cable, rope) runs onto a reel, drum or shaft
- Nips between rotating and fixed parts, which can shear, crush or abrade, such as spooked hand-wheels, flywheels and screw conveyors.

D. Crushing Hazards : injured through crushing hazards that can happen when part of the body is caught:

- Between a fixed and moving part of a machine (such as the bed and tool of a power press)
- Between two moving parts of a machine (such as the support arms of a scissor lift platform)
- Between a moving part of a machine and a fixed structure (such as a counterweight and the floor)

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Answer the following questions neatly and clearly (2 point for each)

1. Least at least three hazard management process
2. Hazards caused by machines are split into two categories_____ and _____.
3. List at least three machines found in mining sites

Note: **Satisfactory rating – Above 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

LG #17	LO_4: Plan and Prepare for Initial Response First Aid

Instruction sheet
This learning guide is also developed to provide you the necessary information regarding the following **content coverage** and topics – ▪ Providing first aid management ▪ Identifying first aid requirements ▪ Identifying and highlighting dangers associated with the use of first aid applications ▪ Identifying and Appling different types of alarms and warning This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, **you will be able to –** ▪ Provide first aid management ▪ Identify first aid requirements ▪ Identify and highlight dangers associated with the use of first aid applications ▪ Identified and applied different types of alarms and warning
Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3 and Self-check 4, in page 10, 15, 21 and 25 respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, and Operation Sheet 2” in page 8.
6. Do the “LAP test” in page – 9(if you are ready).

Information Sheet – 1	**Providing first aid management**

1.1. Introduction

First aid is the immediate treatment or care given to someone suffering from an injury or illness until more advanced care is accessed or they recover.

The aims of first aids are to;

- Preserve life
- Prevent illness or injury from becoming worse
- Relieve pain, if possible
- Promote recovery
- Protect the unconscious

Workers and supervisors should be able to respond quickly to incidents and accidents and provide basic first aid and treatment to injured persons.

The mining operator should ensure that suitable, regularly replenished and properly maintained first-aid kit is provided at a strategic location where mining operations is performed.

Management the room must be managed by appropriately trained first aid personnel. This person will be responsible for assessing requirements, maintaining facilities and equipment and ensuring the room is immediately accessible.

The need for a first aid room will depend on the outcomes of your first aid assessment and size of work place. If a first aid room is deemed necessary, the following factors should be considered in determining its location, layout and management:

• **Location:** the room must be readily accessible during working hours, and situated at a convenient distance from toilets, sink or wash basin equipped with suitable drainage

and a supply of hot and cold running water, and a means of boiling water. It should also be close to motor vehicle access.

- **Workspace:** the room should be large enough to accommodate equipment and furniture, leaving enough space for people to administer first aid. Entrances and corridors must be wide enough to allow transport of injured persons supported by a stretcher.
- **Work environment:** the room should have a suitable floor covering so that it is easy to clean and maintain. It must also be well-lit and ventilated. It should have suitable heating and cooling.
- **Signs:** the room should be clearly identified with a recognizable first aid sign (white cross on a green background). A notice on the door should identify the person in charge, the person on duty, locations and phone numbers of the nearest first aiders and an emergency after-hours telephone number.

The minimum equipment required to ensure adequate first-aid treatment should include:

- a stretcher for transporting persons unable to walk;
- a blanket for persons in shock;
- sufficient bandages and sterile dressings for open wounds on limbs, body and head;
- splints for fractures of limbs;
- disinfectants;
- Any other first-aid material that may be required due to the nature of work and recommended by a competent physician.

1.2. system for maintaining first aid records

Personal information about the health of an employee is confidential. Development of a recording and reporting system for first aid must keep this in mind. Such a system should be integrated with other incident and accident reporting systems in the workplace, in particular with the register of injuries required by workers compensation laws. This could be coordinated by a management representative

The first aid report form should be filled out by the trained first aider and include information on:

- Date, name, time;
- Description of symptoms;
- The treatment provided;
- Any referral arrangements (e.g. ambulance, hospital, medical service).

1.3 Who needs to know about your first aid plan

Sick or injured employees may need to be taken to a first aid room (or suitable alternative) while recovering from an incident, waiting for medical attention to arrive or undergoing treatment of less serious injuries. The need for a first aid room will depend on the outcomes of your first aid assessment and size of workplace.

Trained first aiders need:

- Written procedures (in the form of a first aid plan) to ensure they understand their specific first aid responsibilities, and area/times of coverage.
- Regular first aid in-services to update knowledge, and discuss aspects of the first aid plan.

Employees: Information about the first aid plan must be provided to employees during their induction and at regular intervals (at least annually). Language and literacy requirements of employees must be taken into account.

Employees must understand:

  - Who to approach for first aid assistance;
  - What role they have in the first aid plan (e.g. reporting accidents and incidents to supervisors);
- Where to go for first aid assistance.

This information may be communicated using a combination of:

- Posters or signs in the workplace;
- Information sessions or team meetings;
- Newsletters, emails or memos;
- Induction training.

Managers and supervisors: Managers and supervisors must be familiar with first aid arrangements, and must understand their accountabilities under the first aid plan. They will also play an important part in making sure first aid information is provided to all employees.

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Say true if the statements is correct and say false if the statement is incorrect (2 point each)

1. Only Supervisors should be able to respond quickly to incidents and accidents and provide basic first aid and treatment to injured persons.
2. Rapid first-aid treatment can prevent further serious health damage or even loss of life to injured persons.
3. The need for a first aid room will depend on the outcomes of your first aid assessment and size of workplace
4. The first-aid kit for mining should not be easily accessible and ready for use at any time while any person is at work.
5. A stretcher is one the most equipment useful in mines for transporting persons unable to walk

Note: Satisfactory rating – Above 5 points **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Question

Information sheet - 2	Identifying first aid requirements

2.1. Working out first aid requirements

To ensure adequate first aid provisions, employers must identify

- Their potential problems,
- Assess their requirements and
- Consult with employees in the process.

The type of work performed will influence the hazards and the possible harmful consequences for employees. For example, employees in an office will have first aid requirements different from those in a manufacturing plant. Workplaces using hazardous substances may require specialized first aid facilities, such as eyewash stations and emergency showers.

Indeed, different areas within the one workplace may have different hazards, depending on the tasks being undertaken, and the equipment being used. So some areas within your workplace may have special needs for first aid facilities. Think about the types of activities and work performed across your workplace, and tries to anticipate the risks faced by employees.

2.2. Identifying potential injuries/illnesses and likely causes

To developing your first aid plan is to identify the likely injuries and illnesses that might occur in your workplace, and their potential causes. For example, injuries might include cuts, burns, sprains/strains, crush injuries or chemical poisoning. It is generally these injuries that require first aid treatment.

Don’t forget to consider common medical conditions that could occur in any workplace, such as asthma, epilepsy, heart attack or hypo glycaemia (in a person with diabetes).

See what injuries have occurred, or could occur, using a combination of the following methods:

- Review of accident, injury, incident and near miss data.
- Consultation with employees.
- Walk-through hazard survey of your workplace.
- Review of information on Material Safety Data Sheets and product labels.
- Review of health and safety information relevant to your business – from OHS specialists, industry associations, unions and government.
- Review findings from audits and incident investigations

Types of injury and illness which could occur in your workplace – and their potential causes. Use the common hazard tool Listed below to make sure you have considered typical problems.

Table 2 Common hazard, injuries/illnesses and likely causes

Hazard	Typical problems	Typical injury/ Illness requiring first aid
Manual handling	Over exertion/Repetitive movements	Sprains, strains, fractures
Falls	Falls from heights, slips and trips on uneven surfaces	Fractures, bruises, cuts, dislocations, concussion
Electricity	Contact with electrical current	Shock, burns, loss of consciousness, cardiac arrest
Plant	Being hit by projectiles, being caught in machinery overturning vehicles	Cuts, bruises, dislocations,
hazardous	Exposure to chemicals, e.g	Dizziness, vomiting, respiratory

substances	.solvents, acids, hydrocarbons	problems, burns to skin or eyes
temperature, UV radiation	Effects of heat or cold from weather or work environment	Sunburn, frostbite, heat stress, heat stroke, hypothermia
Biological	Allergens, needle stick, exposure to infectious agents	Severe allergic reaction, injuries, skin rash, infection
occupational violence	Intimidation, conflict, physical assault	Nausea, shock, collapse, physical injuries

After identifying the hazards in your workplace you need to assess how serious a problem they are likely to be. Consider:

- How often employees are exposed to the identified causes of injury/illness - the hazards of your workplace;
- How long employees are exposed to hazards while at work;
- The potential severity of the outcome of any injury/illness - ranging from minor cuts or bruises to long-term injuries or death.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Say true if the statements is correct and say false if the statement is incorrect

1. List at least three first aid requirements in your work area?3 points
2. List the common hazards found in your work site? 3 points

Note: **Satisfactory rating – Above 3 points** **Unsatisfactory - below 3 points**

.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information sheet - 3	**Identifying and highlighting dangers associated with the use of first aid applications**

3.1. A. Dangers Associated with the Use of First Aid and its Prevention

In any emergency situation, follow the emergency action steps:

1. Check: the scene and the person.
2. Call: the local emergency number.
3. Care**:** for the person

CHECK

Before you can help an injured or ill person, make sure that the scene is safe for you and any by standers.

Look the scene over and try to answer these questions:

- What is wrong?
- What happened?
- Is immediate danger involved?
- Is it safe?
- How many people are involved?
- Is anyone else available to help?

Is It Safe

Check for anything unsafe, such as spilled chemicals, traffic, fire, escaping steam, downed electrical lines, and smoke or extreme weather. Avoid going into confined areas with no ventilation or fresh air, places where there might be poisonous gas, collapsed structures, or places where natural gas, propane or other substances could explode. Such areas should be entered by responders who have special training and equipment, such as respirators and self-contained breathing apparatus.

Is Immediate Danger Involved

Do not move a seriously injured person unless there is an immediate danger, such as fire, flood or poisonous gas; you have to reach another person who may have a more serious injury or illness; or you need to move the injured person to give proper care and you are able to do so without putting yourself in danger from the fi re, flood or poisonous gas.

If you must move the person, do it as quickly and carefully as possible. If there is no danger, tell the person not to move. Tell any bystanders not to move the person.

How Many People Are Involved

Look carefully for more than one person. You might not spot everyone at first. If one person is bleeding or screaming, you might not notice an unconscious person.

In an emergency with more than one injured or ill person, you may need to prioritize care (in other words, decide who needs help first).

Is Anyone Else Available to Help

You already have learned that the presence of bystanders does not mean that a person is receiving help. You may have to ask them to help. Bystanders may be able to tell you what happened or make the call for help while you provide care. If a family member, friend or co-worker is present, he or she may know if the person is ill or has a medical condition.

What Happened

Look for clues to what caused the emergency and how the person might be injured. Nearby objects, such as a fallen ladder, broken glass or a spilled bottle of medicine, may give you information.

If the injured or ill person is a child, keep in mind that he or she may have been moved by well-meaning adults. Be sure to ask about this when you are checking out what happened.

If you find that a child has been moved, ask the adult where the child was and how he or she was found.

Call

Calling the local emergency number for help often is the most important action you can take to help an injured or ill person

Care

Once you have checked the scene and the person and have made a decision about calling the local emergency number, you may need to give care until EMS personnel take over. After making the 9-1-1 call, immediately go back to the injured or ill person. Check the person for life-threatening conditions and give the necessary care.

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Answer the following Questions neatly and clearly (2 point each)

1. The emergency action steps are _____, _____, and _____.

Note: **Satisfactory rating – Above 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information sheet - 4	**Identifying and applying different types of alarms and warning**

4.1 Introduction

There are many things used in the workplace to increase safety. Signs are used to warn people of potential dangers and show the location of safety and fire protection equipment. Different workplaces use different signs. You will need to know what signs are used in your workplace and what they mean. Following are some of the examples of

4.2 Types of safety signs.

- **Mandatory signs :**indicate an instruction that must be carried out

- **Prohibited action sign:** An action or activity that is not permitted.

- **Warning signs :**Warning signs are an alert of hazards or hazardous conditions

- **Danger Signs: Danger** signs provide a warning when a hazard is likely to be life threatening.

- **Fire Signs:** Fire signs advise the location of fire alarms and firefighting equipment.

- **Emergency Information Signs:** Emergency information signs indicate the location of emergency facilities.

Information Signs: Information signs have general information

- **Tags :**Personal Danger tags and Out-of-service tags are attached to alert people if equipment:

- ✓ Is not working
- ✓ Needs to be maintained or repaired
- ✓ Needs additional material like fuel or lubricant

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Say true if the statements is correct and say false if the statement is incorrect (2 point each)

1. Safety alarms are used in workplaces to give in the form of audible
2. The main objective of alarms is to maximize physical and economic loss.
3. mines require a special type of visual safety signs to instruct workers of hazards

Note: **Satisfactory rating – Above 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Reference

- 11 file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/First%20Aid/TAS.pdf
- 12 file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/First%20Aid/LO4-First%20Aid.pdf
- file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/Awareness%20INFO-2%20%20Equipment%20maintenance%20programme.pdf
- file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/Awareness%20%20specifications-practice-final-version.pdf
- file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/Awareness%20/Maintenance%20(technical)%20-%20Wikipedia.html
- file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/Awareness/20Machinery.pdf
- file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/Awareness/Environmental%20issue.pdf
- file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/Awareness/Best%20Safety%20&%20health.pdf
- file:///C:/Users/Administrator.FIRE7PDCOGLGII/Desktop/Awareness/OHS%20mining%20good.pdf
- file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/New%20folder%20guidetomachinery-equipmentsafety%20Best.pdf
- file:///C:/Users/Administrator.FIRE7-PDCOGLGII/Desktop/OHS%20Document/Best%20RIIWHS201D-Manual-V3-Work-Safely%20Best.pdf
- https://www.ilo.org/wcmsp5/groups/public/---dialogue/---sector/documents/publication/wcms_162738.pdf

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