

Structural construction work

Level-I

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Table of Content

Acknowledgment

Acknowledgment	4
Acronym	Error! Bookmark not defined.
Introduction to the Module	6
Module Instruction	7
Unit one: OHS legislative requirements	8
1.1. OHS work instruction	9
1.1.1. Industry OHS Standards and Guidelines.....	10
1.1.2. Health and Safety representatives	11
1.1.3. Safe work practice	13
1.1.4. Training for Construction Work.....	14
1.1.5. National safety Standards	15
1.1.6. OHS and Welfare Acts and regulations	16
1.1.7. Safety Codes of practice	16
1.2. Duty of care requirements.....	17
1.3. Safe work practice	19
1.3.1 General Safety Rules (safe working practices)	19
1.3.2. Smoking in designated area	21
1.3.3. Storage and removal of debris	21
Fig After sorting materials.....	23
Self check-1	25
Unit Two: construction hazards and control measures	27
2.1. Basic principles of risk management	Error! Bookmark not defined.
2.1.1. BASIC PRINCIPLES OF RISK ASSESSMENT	27
2.2. Common construction hazards	29
2.2.1. Hazards, Their Potential Effects and Their Control	29
2.3. Control Measures of hazards and risks.	31
something with the potential to cause harm	36
Self check-2	36
Operation sheet 2.1 Identifying Basic principles of risk management	37
Operation sheet 2.2. Identifying common construction hazards	37
Unit Three: OHS communication and reporting processes	38

3.1.OHS communication	38
3.1.1.OHS Documents.....	40
3.1.2.OHS Notice boards.....	40
3.1.3.Other Methods of OHS Communication	41
3.1.4.Electronic Communication via Email, Websites	41
3.1.5.Hazard and Incident Reports.....	41
3.2. Role of <i>designated OHS personnel</i>	42
3.2.1.Supervisors.....	42
3.2.2. Individuals (Staff Members, Students).....	43
3.2.3.Safety Officers	43
3.3.Safety signs and symbols	44
3.3.1. Safety Symbols and Their Meanings.....	44
3.4. Procedures and relevant authorities for reporting hazards,	51
Self check-3	53
Unit Four: OHS incident response procedures	54
4.1. Procedures for responding to incidents and emergencies.....	55
4.1.1.Evacuation.....	57
4.1.2. OHS procedures.....	62
4.1.3.Emergency response procedures.....	63
4.2. Procedures for first aid	65
4.3. <i>PPE</i> requirements	67
4.4. Fire safety equipment	68
Self check-4	72

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Acronym

OSH.....Occupational safety and health
OHOccupational health and safety
WHSworkplace health and safety
WHO World Health Organization

PPEpersonal protective equipment
 SWP.....Safe work practices
 WHMISWorkplace Hazardous Materials Information System
 HCSHazard Communication Standard
 GHS.....Globally Harmonized System
 CO carbon dioxide

Introduction to the Module

In Structural construction works Level filed; OHS requirements are legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire-fighting equipment, enterprise first aid, hazard control and hazardous materials and substances. Structural construction works Level filed.

This module is designed to meet the industry requirement under the irrigation and drainage occupational standard, particularly for the unit of competency: **Working Safely in the Construction Industry**

This module covers the units:

- OHS legislative requirements
- construction hazards and control measures
- OHS communication and reporting processes
- OHS incident response procedures

Learning Objective of the Module

- Identify OHS legislative requirements
- follow construction hazards and control measures
- Identify OHS communication and reporting processes
- Identify OHS incident response procedures

Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

1. Read the information written in each unit
2. Accomplish the Self-checks at the end of each unit
3. Perform Operation Sheets which were provided at the end of units
4. Do the “LAP test” giver at the end of each unit and
5. Read the identified reference book for Examples and exercise

Unit one: OHS legislative requirements

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Construction Industry OHS Standards and Guidelines
- Health and Safety representatives.
- safe work practice
- National Code of Practice Training for Construction Work
- National safety Standards
- OHS and Welfare Acts and regulations.
- Safety Codes of practice
- duty of care requirements
 - Access to site amenities
 - Smoking in designated area
 - Storage and removal of debris

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify Construction Industry OHS Standards and Guidelines
- Apply Health and Safety representatives.
- Apply safe work practice
- Apply National Code of Practice Training for Construction Work
- Apply National safety Standards
- Apply OHS and Welfare Acts and regulations.
- Apply Safety Codes of practice
- Apply duty of care requirements
- Apply *safe work practices*
 - Access to site amenities
 - Smoking in designated area
 - Storage and removal of debris

1.1. OHS work instruction

OHS requirements are legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire-fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.

Personal protective equipment includes those prescribed under legislation/ regulations/codes of practice and workplace policies and practices. Safe operating procedures include the conduct of operational risk assessment and treatments associated with workplace organization. Emergency procedures include emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.

Occupational safety and health (OSH) also commonly referred to as occupational health and safety (OHS) or workplace health and safety (WHS) is an area concerned with the safety, health and welfare of people engaged in work or employment. The goals of occupational safety and health programs include fostering a safe and healthy work environment. OSH may also protect co-workers, family members, employers, customers, and many others who might be affected by the workplace environment. In the United States the term occupational health and safety is referred to as occupational health and occupational and non-occupational safety and includes safety for activities outside work.

Occupational safety and health can be important for moral, legal, and financial reasons. In common-law jurisdictions, employers have a common law duty (reflecting an underlying moral obligation) to take reasonable care for the safety of their employees. Statute law may build upon this to impose additional general duties, introduce specific duties and create government bodies with powers to regulate workplace safety issues: details of this will vary from jurisdiction to jurisdiction. Good OSH practices can also reduce employee injury and illness related costs, including medical care, sick leave and disability benefit costs.

As defined by the World Health Organization (WHO) "occupational health deals with all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards." Health has been defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Occupational health is a multidisciplinary field of healthcare concerned with enabling an individual to undertake their occupation, in the way that causes least harm to their health. It contrasts, for example,

with the promotion of health and safety at work, which is concerned with preventing harm from any incidental hazards, arising in the workplace.

1.1.1. Industry OHS Standards and Guidelines

Workplaces under the jurisdiction are governed by your provincial legislation. The legislation places duties on owners, employers, workers, suppliers, the self-employed and contractors, to establish and maintain safe and healthy working conditions. The legislation is administered by your provincial legislation. Your officials are responsible for monitoring compliance

➤ Guidance

Effective OHS regulation requires that Work Safe provides clear, accessible advice and guidance about what constitutes compliance with the Act and Regulations. This can be achieved through Compliance Codes, Work Safe Positions and non-statutory guidance ("the OHS compliance framework"). For a detailed explanation of the OHS compliance framework, see the Victorian Occupational Health and Safety Compliance Framework Handbook.

➤ Policy

Not every term in the legislation is defined or explained in detail. Also, sometimes new circumstances arise (like increases in non-standard forms of employment, such as casual, labour hire and contract work, or completely new industries with new technologies which produce new hazards and risks) which could potentially impact on the reach of the law, or its effective administration by Work Safe. Therefore, from time to time Work Safe must make decisions about how it will interpret something that is referred to in legislation, or act on a particular issue, to ensure clarity. In these circumstances, Work Safe will develop a policy. A policy is a statement of what Work Safe understands something to mean, or what Work Safe will do in certain circumstances.

1.1.2. Health and Safety representatives

Duties of Employer

Employer is responsible for providing you with safe and healthy working conditions. This includes a duty to protect you from violence, discrimination and harassment. You must cooperate with your employer in making your workplace safe and healthy.

Your Responsibilities

You must also comply with the legislation. You have responsibilities to: protect your own Health and Safety and that of your co-workers; not initiate or participate in the harassment of another worker; and co-operate with your supervisor and anyone else with duties under the legislation.

Your Rights

The legislation gives your three rights:

The right to know the hazards at work and how to control them

The right to participate in Occupational Health and Safety and Health & Safety Manual

The right to refuse work which you believe to be unusually dangerous. You may not be punished for using these rights. An employer can be required to legally justify any action taken against a worker who is active in Health and Safety.

Your Right To Know

The Act requires your employer to provide you with all the information you need to control the hazards you face at work. For example, chemicals at the workplace must be listed. You are entitled to review this list. Your employer must train you to safely handle the chemicals you will work with. If you are inexperienced, you must receive an orientation which includes;

What to do in a fire or other emergency;

First aid facilities;

Prohibited or restricted areas;

Workplace hazards; and

Any other information you should know.

You must also be supervised closely by a competent supervisor

Your Right To Participate

You have the right to become involved in occupational Health and Safety. The legislation encourages employers and workers to work together to maintain a healthy and safe workplace. Employers at workplaces with (ten or more – consult your provincial act) workers must set up an occupational health committee of employer and worker representatives.

Committees Have Duties To:

Regularly inspect the workplace;

Conduct accident investigations;

Deal with the Health and Safety concerns of employees;

Investigate refusals to work;

Meet at least (four times a year – consult your provincial act); and return minutes of each meeting to the Division

Your Right to Refuse

You have the right to refuse to do work which you believe is unusually dangerous. The unusual danger may be to you or to anyone else. An unusual danger could include such things as:

A danger which is not normal for your occupation or the job

A danger under which you would not normally carry out your job *f*

A situation for which you are not properly trained, equipped or experienced

To exercise this right, use the following guidelines.

Once you believe that the work you have been asked to do is unusually dangerous, you should inform your supervisor. Make sure that the supervisor understands that you are

refusing to do the disputed job for health and safety reasons. Work with the supervisor to attempt to resolve the problem.

If the problem cannot be resolved by the supervisor to your satisfaction, and no worker health and safety representative or occupational health committee exists at the workplace, your supervisor should phone the Division and ask for advice. You also have the right to contact the Division at any time.

The supervisor has the right to assign you to other work (at no loss in pay or benefits) until the matter is resolved.

1.1.3. Safe work practice

Every workplace has hazards. As an employer, you have a legal responsibility to look after your employees' safety and protect them against health and safety hazards at work. In order to manage workplace health and safety and help prevent accidents and sickness absence, it's important to identify, monitor and reduce the risk associated with workplace hazards.



Fig.1

What are workplace hazards?

Simply put, workplace hazards are any aspect of work that cause health and safety risks and have the potential to harm.

Some hazards are more likely to be present in some workplaces than others, and depending on the work that you do; there will be hazards that are more or less relevant to your business.

What are workplace hazards?

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1.1.4. Training for Construction Work

➤ OHS induction training

OHS induction training’ means construction safety awareness training undertaken prior to commencing construction work. OHS induction training includes general, site induction and task

specific training that meets the requirements of this Code and which is completed to the satisfaction of the person delivering the training.

➤ Operational construction zone

‘Operational construction zone’ means the area on the site where construction work is undertaken, which generally does not include the site offices, amenities or designated delivery and plant service areas.

➤ Person with control of a construction project

‘Person with control of a construction project’ means a person, other than a client or a designer, who has the authority to specify requirements for plant and materials and to determine work practices, systems of work and appropriate measures to address health and safety risks arising from a construction project. The person with control of a construction project is usually a person appointed by the client to manage the project.

➤ Person with control of construction work

‘Person with control of construction work’ means a person, other than a client or a designer, who

has the authority to specify requirements for plant and materials and to determine work practices,

systems of work and appropriate measures to address health and safety risks arising from construction work at a construction site.

1.1.5. National safety Standards

All employees and students who use tools as part of their job duties are required to follow these guidelines. This is necessary in order to prevent accidents and injuries due to improper or abusive tool use. Supervisors are responsible for training employees and students on how to use tools properly, monitoring tool use, and ensuring its safe operation. Facility Management foremen and department technicians shall perform yearly inspections on these tools to ensure their safe operation.

All persons are required to use applicable personal protective equipment (PPE) while using any tools.

Check for working safety guards, shields, warning labels, and other devices.

Always choose the right tool for the job. Screwdrivers are not designed to be punches, chisels, or pry bars.

When using cutting tools such as chisels, axes, knives, and saws, ensure that the cutting device is sharp. Dull tools are more dangerous than sharp ones.

Visually inspect tools before using them. Cracked, bent, chipped, and otherwise broken tools shall be repaired or discarded.

When working with electrical equipment, ensure that all metal hand tools are insulated to prevent electrical shock.

1.1.6. OHS and Welfare Acts and regulations

➤ The Act

The *Occupational Health and Safety Act 2004* (the Act) is the cornerstone of legislative and

administrative measures to improve occupational health and safety in Victoria.

The Act sets out the key principles, duties and rights in relation to occupational health and safety. The general nature of the duties imposed by the Act means that they cover a very wide variety of circumstances, do not readily date and provide considerable flexibility for a duty holder to determine what needs to be done to comply.

➤ **The Regulations**

The *Occupational Health and Safety Regulations 2007* are made under the Act. They specify the ways duties imposed by the Act must be performed, or prescribe procedural or administrative matters to support the Act, such as requiring licenses for specific activities, keeping records, or notifying certain matters.

1.1.7. Safety Codes of practice

A code of practice is a practical guide on how to comply with the legal duties under the Work Safe work practices (SWP) are usually written methods showing how to perform a task with minimum risk to personnel, equipment, materials, environment and processes. These are guidelines like do's and don'ts but may not always be suitable when a new hazard been identified. Employees should know, understand and follow the SWPs those are applicable to own work.

➤ **Safe Work Practices (SWP)**

Safe work practices (SWP) are developed as an outcome of a hazard assessment and these should conform to the practices within the concerned industry. These guidelines help the workers to work in the safest way unless a new hazard been identified. SWPs are not step by step procedures. As the new workers are more prone to accidents at workplaces, they need to be trained more on SWP. An example of SWP is placing a notice 'mind your steps' at the beginning of a staircase.

The following features are helpful in implementing safe work practices at workplace:

- Induction training for new employees.
- Training on communication and teamwork during normal and emergency situation.
- Training on fire safety and emergency procedures.
- Training on hazard identification, risk control, use of personal protection equipment (PPE) and first aid.

- Observation of ergonomics to reduce injuries to workers.
- Use and maintenance of appropriate tools for work and keeping them in good working condition.

1.2. Duty of care requirements

May include, but not limited to:

Legal responsibility under duty of care to do everything reasonably practicable to protect others from harm

Own responsibilities to comply with safe work practices, including activities that require licences, tickets or certificates of competency

relevant state OHS requirements, including employers and self-employed persons, persons in control of the work site, construction supervisors, designers, manufacturers and suppliers, construction workers, subcontractors and inspectors.

Manager/supervisor

The manager or supervisor is responsible for the health and safety of all employees within their working area. The manager or supervisor must ensure all policies and procedures are followed according to Occupational Health & Safety.

1.2.1. Duties/Responsibilities

➤ **Manager or supervisors duties**

The manager or supervisor has the following major duties and responsibility to ensure the health and safety of its employee's. These are:

- 1) Ensure that all reasonable steps are taken to prevent accidents.
- 2) Ensure that standards and procedures are developed and maintained.
- 3) Be familiar with the Occupational Health & Safety act and any revised regulations and ensure they are followed.
- 4) Ensure that all employees are instructed in the procedures and requirements of Occupational Health & Safety.
- 5) Review accident reports, safety audits and other related material relative to health or safety.

➤ **Safety Officer**

The Safety Officer has the following major duties and responsibility to ensure the health and safety of its employee's. These are:

1. Ensure that all reasonable steps are taken to prevent accidents.
2. Be familiar with Occupational Health & Safety act, the company policy and any other legislation pertaining to health or safety.
3. Ensure all policies and legislation is followed by all levels of employees.
4. Ensure safety meetings are held and minutes are recorded, posted and filed accordingly to Occupational Health & Safety regulations.
5. Ensure all accidents are reported and investigated.
6. Ensure MSDS sheets are provided for all hazardous materials delivered to the workplace and are readily available for employees to review.
7. Review all MSDS and advise/train employees in the safe use, storage and transportation of controlled or dangerous products including what to do in case of an accidental spill or emergency.
8. Ensure employees are instructed in the procedures and requirements of Occupational Health & Safety.
9. Review all accidents and near misses to determine root and basic causes, with suggestion/implementation of changes to prevent re-occurrence.
10. Ensure all employees are trained in WHMIS (Workplace Hazardous Material Information System)

➤ **All Other Staff duties**

The workers also have the responsibility to maintain their health and safety at the workplace area. These are:

- 1) Comply with all Company Procedures, Safety Policy and requirements of Occupational Health & Safety.
- 2) Be responsible for working safely and carrying out their duties with skill and care as to not cause accidental injury to themselves, fellow employees or the general public.
- 3) Immediately report all injuries, near misses or potential hazards to their supervisor.
- 4) Know the location of all fire extinguishers, fire alarms or other warning devices.
- 5) Ensure all personal safety equipment is being used properly.
- 6) Never engage in dangerous hazard area.
- 7) Maintain clean and orderly work area.
- 8) When in doubt.... ASK

1.3. Safe work practice

May include, but not limited to:

Access to site amenities, such as drinking water and toilets

General requirements for safe use of plant and equipment

General requirements for use of personal protective equipment and clothing

Housekeeping to ensure a clean, tidy and safer work area

No drugs and alcohol at work

Preventing bullying and harassment

Smoking in designated areas

Storage and removal of debris

1.3.1. General Safety Rules (safe working practices)

All accidents, injuries or near misses, regardless of their nature, shall be promptly reported to the safety officer.

Clothing shall be appropriate to the duties being performed. Long pants, a clean neat shirt and steel toed shoes are the minimum requirements.

Hard hats and safety vests are provided for all warehouse staff and must be worn at all times in the warehouse, loading or unloading of vehicles in the yard.

Running is not permitted except in extreme emergencies.

Smoking is not permitted in any part of the warehouse or office. You may only smoke in designated areas.

Visitors and customers are to be escorted by staff while on company property.

Hand tools are to be used for their intended purpose only.

Only licensed personnel may operate forklifts or other warehouse equipment and must wear a seatbelt while doing so.

Riding on equipment is prohibited except where designated for operator.

Horseplay, fighting or tomfoolery is strictly prohibited on Your Company Name premises.

All spacers are to be of equal proportion and undamaged. Damaged spacers are dangerous.

Open lifts are to be stored on the floor or in assigned bunks. Do not stack an open lift; this act will result in disciplinary action up to and including dismissal. All lumber lifts must be banded.

Only solid spacers are to be used on lumber products, no particle board spacers.

All banded products will be placed securely in the bunks.

All spills will be immediately cleaned up and reported.

Drawers and filing cabinets will be kept closed when not in use.

Filing cabinet drawers are to be filled from the bottom up or the cabinet is to be securely fastened /anchored.

Lifts and clutter will be cleaned up before the end of your workday.

Aisles are to be kept clear at ALL times.

Do not unload a truck alone under any circumstances, if someone cannot help you then wait or call someone else for help

1.3.2. Smoking in designated area

Smoking in the workplace affects the health and income of the smoker. Scientific evidence has shown that exposure to second-hand tobacco smoke is a potential source of the same illnesses as smokers are liable to contract, such as cancer, heart and lung diseases. All air pollution caused by smoking is an occupational health problem. This problem is more acute where the workers are exposed to other dangerous substances, such as asbestos; or if the worker is particularly sensitive because of, for example, asthma or pregnancy. In addition to being a health problem, smoking is a safety hazard. Explosions and fires could often be avoided if smoking were prohibited. Lack of concentration during smoking and the potential source of conflict between smokers and non-smokers also argue in favor of considering the adoption of appropriate measures to deal with the phenomenon seriously. There are also economic aspects to be considered when promoting smoke-free workplaces. Smoking is a particular burden for low-income smokers because of the additional cost and the

health effects of smoking. Employers and the society as a whole can also gain from cleaner air in terms of increased productivity, lower maintenance costs, and lower health costs, among other benefits.

An important factor in the process of regulating smoking at work is the measurement of tobacco smoke in the air. If the results from air measurement find high levels of pollutants, this can be used as an argument for proponents of regulations, or as a tool by the ones who evaluate and control smoking regulations. The most commonly used method is to survey the perceptions of workers, which does not always produce an accurate result. More reliable measuring methods are often time-consuming and costly.

1.3.3. Storage and removal of debris

Sorting generally involves loading materials onto an inclined metal belt a chain belt and passed across a manual sort line consisting of a flexible rubber belt and integral sort stations providing a place for several workers to stand, usually opposite from one another down the length of the belt. Materials are identified, grabbed, and deposited in vertical openings at each sort station. The effectiveness of the manual sort line is largely determined by the performance of the picking operation which precedes it; for example large materials on the belt can be difficult to manage and or obstruct recoverable materials passing by on the belt beneath

Remove all items from the workplace that ***are not needed*** for current production or administrative operation.

Housekeeping: Stairways, walkways, scaffolds, gangways and access ways shall be kept free of building material, tools, accumulated rubbish and obstructions.

Materials or equipment stored on the street, footpath and other public places with permission from the proper Authority, and conforming to Sec 1.5.3, shall not interfere with vehicular traffic or pedestrians on the highway or street. The piles shall be arranged to leave a safe walkway unobstructed for its full length, and adequately lighted at night and at all other necessary times.

Material and equipment shall not be located within 7.5 m of a street intersection. These shall neither be so placed as to obstruct normal observation of traffic signals nor to hinder the use of public transit loading platforms.

Keep “*only what is needed, only in the amount needed, and only when it is needed*”.

Why Sort is important?

Space, time, money, energy and other resources can be managed and used most effectively

Problem and hassle in the work flow are reduced.

Communication between employees is improved.

Product quality and Productivity is enhanced.



Fig. 2.



Fig After sorting materials

Manual and Mechanical Material Handling

➤ What is material handling?

Manual material handling is the lifting, carrying or moving of materials, articles or things. Mechanical materials handling is the movement of materials, articles or things by such means as lift trucks, conveyors, or cranes and hoists.

found that the most common MSD orders issued were due to obstructions on floors interfering with safe movement of materials; unsafe material lifting, carrying and moving; unsafe storage of material and lack of examination of lifting devices.

Construction is a high hazard industry that comprises a wide range of activities involving construction, alteration, and/or repair. Construction workers engage in many activities that may expose them to serious hazards, such as falling from rooftops, unguarded machinery, being struck by heavy construction equipment, electrocutions, silica dust, and asbestos.

The information, tools, and resources provided in these Construction Industry web pages are designed to assist those in the industry - whether worker or employer - to identify, reduce, and eliminate construction-related hazards.

storage requirement by classification of materials

Stored materials shall be separately stored under following classifications, with appropriate care necessary precautions to each Classification:

- a) Climatically Sensitive Materials
- b) Durable Materials
- c) Materials Vulnerable to Rough Handling
- d) Inflammable and/or Fire Sensitive Materials
- e) Hazardous Materials

Under each classification a list of commonly used materials are listed below. Other materials used but not mentioned here shall be treated under one or more of the above listed classifications which most closely match the unlisted material.

Self check-1

Test-I Matching

Instruction: select the correct answer for the give choice. You have given 1 Minute for each question. Each question carries 2 Point.

- | A | B |
|--------------------------|---|
| -----1. OHS requirements | A. means construction safety awareness training undertaken prior to commencing construction work. |
| -----2. (SWP) | B. the workplace affects the health and |

- income of the smoker
- 3. training’
- 4. (OSH)
- 5. Smoking
- C. Safe work practice
- D. Occupational safety and health
- E. Legislation/regulations/codes of practice and enterprise safety policies and procedures.

Test II: short Answer writing

Instruction: write short answer for the given question. You are provided 3 minute for each question and each point has 5Points.

1. What the duets of employe ?
2. Write down at least four committee duties ?
3. What is OHS requirements?
4. What is safety ?

Note: Satisfactory rating – above 60% Unsatisfactory - below 60%

You can ask you teacher for the copy of the correct answers

Unit Two: construction hazards and control measures

This unit to provide you the necessary information regarding the following content coverage and topics:

- Basic principles of risk management.
- *Common construction hazards*
- *control Measures* hazards and risks

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify Basic principles of risk management.
- *Identify and discuss Common construction hazards*
- *Identify control Measures hazards and risks*

➤ **Definitions:**

Hazard: something with the potential to cause harm. (This can include substances or machines, methods of work and other aspects of work organization).

Risk: The likelihood that the harm from a particular hazard is realized. The extent of risk covers the population which might be affected by a risk and that risk therefore reflects both the likelihood that harms will be caused and its severity.

Risk Management: is a set of coordinated processes and activities that identify, monitor, assess, prioritize, and control risks that an organization faces

2.1.1.BASIC PRINCIPLES OF RISK ASSESSMENT

It is recognized that in order to be considered competent to carry out risk assessment training will be necessary.

Regulation 3(1) of the Management of Health and Safety at work Regulations 1999 requires that a suitable and sufficient risk assessment is carried out.

➤ The general principles are to:

- Identify the hazards
- Decide who might be harmed
- Evaluate the risks
- Decide whether existing controls are adequate
- Record findings
- Review assessment and revise if necessary

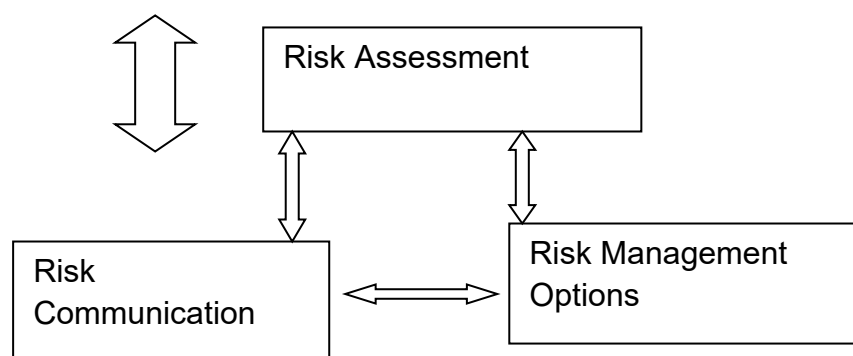
The risk assessment process needs to take account of the views of those involved in the activity being assessed.

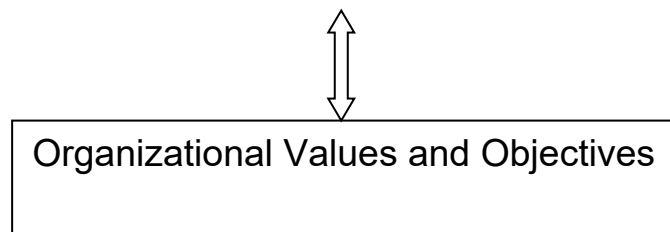
➤ **A risk assessment should:**

- Ensure significant risks and hazards are addressed
- Ensure all aspects of the work activity are reviewed
- Take account of non - routine operations e.g. maintenance, cleaning operations etc.
- Be systematic identifying hazards and looking at risks
- Take account of the way work is being organized and the effects this can have on health
- Take account of the risks to visitors and contractors
- Account should be taken of young persons and new and expectant mothers when carrying out risk assessments and identify the preventive and protective measures that are required

➤ Risk Management

Three key elements of the RM process are risk assessment, risk management options, and risk communication. These elements are interrelated and support one another, but rely on different sources of information and therefore involve different groups of individuals. Assessment is focused on evidence and science-based information. Evaluation and selection of risk management options further involves policy and values-based information. Communication entails a two-way exchange of information about science, values, and perceptions. Successful RM and integration of these three elements depends on the Forest Service clearly establishing organizational values and objectives, which we address first





Fig

2.2. Common construction hazards

2.2.1. Hazards, Their Potential Effects and Their Control

The occupational hazards to which health workers are exposed are well documented and generally fall into the following six basic categories:

1. Biological or infectious hazards: These include infectious and biological agents such as bacteria, viruses, fungi, or parasites that may be transmitted through contact with contaminated material or with bodily fluids or secretions (examples of these hazards include the human immunodeficiency virus [HIV]; hepatitis B and C viruses; tuberculosis bacillus). Biological and infectious agents may be transmitted to a person through inhalation, injection, or by skin contact. Sources include patients, asymptomatic carriers, or vectors such as rats, cockroaches, and mosquitoes. The number of organisms in the environment, coupled with their virulence and a person's resistance to them, determine whether the person will contract the disease or not.

An infection control program should define the necessary policies, procedures, and practices in order to minimize the risk of disease occurrence and transmission at a health care facility. This requires that workers be consulted and that the effort is supported by all of management and staff.

2. Environmental hazards: An adequate water supply and a clean overall environment are basic for protecting workers and patients in a health care center as asepsis and cleanliness are required for successful medical interventions. Adequate natural or artificial ventilation is essential to combat many of the threats to workers' health such as the transmission of tuberculosis and the exposure to anesthetic gases. In addition, health care facilities generate

contaminated water and hazardous solid waste that require proper treatment, processing, and disposal. Ignoring these hazards would put workers and the entire community at risk.

Most of the time, environmental hazards are generated by:

Inadequate supply, distribution, and availability of water for human consumption

- Air quality problems in confined spaces that aggravate chemical and biological hazards; and
- Improper handling of hazardous solid waste

3. Physical hazards: These hazards involve agents in the work environment such as radiation (X rays, laser, etc.), electricity, extreme temperatures, and noise that can cause tissue damage and other injury.

Physical hazards that affect health workers include exposure to noise, vibration, ionizing and non-ionizing radiation, and electricity. A systematic survey should be conducted in order to identify all possible hazards. For the purposes of identification, an inspection can be conducted during the installations with a properly trained person or a selected group representing the Health and Safety Committee following consultations with workers in each area. All hazards and potential risks should be identified and recorded.

4. Chemical hazards: These are various chemical substances that are toxic or irritating to the body system, including medications, solvents, and gases (for example, ethylene oxide, anesthetic gas wastes).

5. Mechanical hazards: These factors in the work environment increase or augment the risk of accidents, wounds, injury, or discomfort (e.g., poor lifting devices or inadequate equipment, slippery floors, etc.).

Psychosocial hazards: These are factors and conditions associated with work tasks or working environments that cause or augment the risk of stress, emotional strain, and interpersonal problems (e.g., stress, work shifts

2.3. Control Measures of hazards and risks.

Risk: The likelihood that the harm from a particular hazard is realized. The extent of risk covers the population which might be affected by a risk and that risk therefore reflects both the likelihood that harms will be caused and its severity.

The risk assessment process needs to take account of the views of those involved in the activity being assessed.

A risk assessment should:

Ensure significant risks and hazards are addressed

Ensure all aspects of the work activity are reviewed

Take account of non - routine operations e.g. maintenance, cleaning operations etc.

Be systematic identifying hazards and looking at risks

Take account of the way work is being organized and the effects this can have on health

Take account of the risks to visitors and contractors

Account should be taken of young persons and new and expectant mothers when carrying out risk assessments and identify the preventive and protective measures that are required.

➤ **Control Measures of risks**

When considering what control measures are required the following steps can be used in ranking order:

- eliminate the risk
- substitution (replacing existing chemical/substance with a safer alternative)
- Prevention (the use of fixed guards etc.)
- safe system of work
- written working procedures
- information, instruction and training
- supervision
- PPE (personal protective equipment)

It may be necessary to combined several control methods in order to reduce the risks to an acceptable level.

Note: PPE should only be used as a last resort after considering all other control methods. PPE can also be used to protect against any residual risks that remain after other control methods have been employed.

All PPE clothing and equipment should be of safe design and construction, and should be maintained in a clean and reliable fashion. Employers should take the fit and comfort of PPE into consideration when selecting appropriate items for their workplace. PPE that fits well and is comfortable to wear will encourage employee use of PPE. Most protective devices are available in multiple sizes and care should be taken to select the proper size for each employee. If several different types of PPE are worn together, make sure they are compatible. If PPE does not fit properly, it can make the difference between being safely covered or dangerously exposed. It may not provide the level of protection desired and may discourage employee use.

➤ **Selecting and checking PPE**

Personal protective equipment (PPE) is used to protect an individual from hazards associated with their work tasks or environment. Specific types of personal protective equipment include protective clothing, eyewear, respiratory devices, protective shields, gloves, and hearing protection.

➤ **Protective equipment that must be available**

These include:

- Rubber gloves or leather gloves
- Overalls.
- Face shields.
- Face mask and ear protectors
- Steel capped boots/shoes
- sunscreen lotion

➤ **Some of the commonly used PPE include the following:**

Eye protection (goggles)

It is required to use eye protection equipments like goggle, eye shield, to protect our eye from dusts, chemicals, etc by all workers engaged in hazardous activities or are exposed to identify eye hazards.



Hand Protection (leather glove)

It is required to use appropriate hand protection when hands are exposed to hazards, such as:

- Skin absorption from harmful substances;
- Cuts, lacerations or abrasions;
- Chemical exposure;
- Thermal burns and/or temperature extremes
- Potentially infectious material.



Body Protection

Chemical Resistant Clothing: Protective apparel designed to provide a barrier against a variety of chemical hazards. Chemical resistive clothing may be required for tasks where chemical splashing is anticipated or large volume transfers are conducted. Prior to selection of chemical resistant clothing, Laboratory Apparel and Scrub Suits: A wide variety of styles and materials are available to protect employees during laboratory operations. The selected type of lab coat or other apparel is designed to protect the wearer against accidental splashes or day-to-day handling of chemicals;



Over all



boots

Ear and Hearing Protection

Ear plugs and muffs are available for any employee potentially exposed to noise levels



Head protector (hard hat)



➤ Training Employees in the Proper Use of PPE

Employers are required to train each employee who must use PPE. Employees must be trained to know at least the following:

- When PPE is necessary
- What PPE is necessary?
- How to properly put on, take off, adjust and wear the PPE.
- The limitations of the PPE.
- Proper care, maintenance, useful life and disposal of PPE.

Employers should make sure that each employee demonstrates an understanding of the PPE training as well as the ability to properly wear and use PPE before they are allowed to perform work requiring the use of the PPE. If an employer believes that a previously trained employee is not demonstrating the proper understanding and skill level in the use of PPE, that employee should receive retraining. Other situations that require additional or retraining of employees include the following circumstances: changes in the workplace or in the type of required PPE that make prior training obsolete. The employer must document the training of each employee required to wear or use PPE by preparing a certification containing the name of each employee trained, the date of training and a clear identification of the subject of the certification.

something with the potential to cause harm

Self check-2 Test-I Matching

Instruction: select the correct answer for the give choice. You have given 1 Minute for each question. Each question carries 2 Point.

A	B
-----1. Hazard	A. The likelihood that the harm from a particular hazard is realized
-----2. Risk Management	B. Something with the potential to cause harm
-----3. Risk	C. Personal protective equipment
-----4. (PPE)	D. ethylene oxide, anesthetic gas wastes

-----5. Chemical hazards

F. is a set of coordinated processes and activities that identify, monitor, assess, prioritize, and control risks that an organization face

Test II: short Answer writing

Instruction: write short answer for the given question. You are provided 3 minute for each question and each point has 5Points.

1. What is a Chemical hazard?
2. Write PPE?
3. What is Biological or infectious hazards?
4. What is the difference between Chemical hazard and Physical hazards?
5. What is the difference between risk and hazards?

Note: Satisfactory rating – above 60% Unsatisfactory - below 60%

You can ask you teacher for the copy of the correct answers

Operation sheet 2.1 Identifying Basic principles of risk management

Purpose: To Control hazards and risk

Operation title: Techniques for Cleaning finished Pavers:

Step 1- wear PPE.

Step 2- select required tools and materials

Steps 3- clean the pavers with clean water.

Step 4- prepare diluting calciferous detergent with the ratio of 1:5 .

Step 4- scribe dirty things like ingrained and grease for 10-20 minutes.

Step 4- seal the surface by applying impregnator for 15 minutes.

Step 4- clean the impregnator with cleaned cloth.

Operation sheet 2.2. Identifying common construction hazards

Purpose: To Control hazards and risk

Operation title: - Identifying common construction hazards:

Identifying common construction hazards Step

1- Select required tools and equipment.

Step 2- select and collect broken tools and equipments.

Steps 3- identify safe work place.

Step 4- use PPE.

Unit Three: OHS communication and reporting processes

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

- OHS communication.
- Role of *designated OHS personnel*
- *Safety signs and symbols*
- Procedures and *relevant authorities* for reporting hazards

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identifies communication.
- Identifies Role of *designated OHS personnel*
- Identify *Safety signs and symbols*
- Identify Procedures and *relevant authorities* for reporting hazards

3.1. OHS communication

Communication is the process by which information is transmitted and understood between two or more people. Audience: People or a group of people whom a communication is aimed. This may include staff, students, visitors, contractors, external organizations and the general community.

Safety Personnel: Individuals in the workplace who have been elected or appointed to specific safety roles. These include health and safety representatives, safety officers, bio-safety officers, radiation safety officers, laser safety officers, first aid personnel and emergency wardens.

Responsibilities management /supervisor: is responsible for establishing a program to communicate health and safety information.

Office of Occupational Health & Safety (OHS): is responsible for posting or making available OHS materials specified in this procedure.

➤ OHS communication processes

Health and safety communication shall be conducted through but is not limited to the following media (this also includes off-the-job safety):

- Central Safety Committee
- Letters/Memos to employees
- Direct communication between supervisors, management and employees
- Safety talks
- Posters
- Visual Aids
- Bulletins
- Newsletters or booklets
- Payroll inserts
- Email and other such avenues to be used

➤ **Off-the-job safety may include but is not limited to:**

- Employee Assistance Program
- Health and wellness
- Vehicle safety
- Personal health and safety
- Health and safety for home, recreation and leisure

Management is responsible to ensure that health and safety be communicated to all employees in any of the above media streams on a regular and ongoing basis. All health and safety communications are to be documented by the trainer / communicator. This documentation must include:

- The health and safety topic covered
- The name(s) of employees in attendance for the training
- Date(s) of training or communication
- Who conducted the training

Topics for health and safety communication may be determined by analyzing (but is not limited to) the following information:

- Incident trend analysis
- Investigation reports
- First aid reports
- Workplace inspection records
- Central Safety Committee minutes
- New safety legislation that recently has been introduced
- Ministry of Labor inspection reports
- Hazard alerts issued

3.1.1.OHS Documents

All new documents produced by OH&S must be communicated to all staff via:

- An email to Safety Officers, Health & Safety representatives and OHS committee chairpersons;
- Local OHS committees via the Consultants' report;
- The OH&S web site
- Major review to existing documents must be communicated to all staff via:
- An email to Safety Officers, Health & Safety representatives and OHS committee chairpersons; and
- The document history in the document appendix; and/or
- Local OHS committees; and/or
- The OH&S web site.
- Minor reviews to existing documents do not need to be communicated to all staff.

3.1.2.OHS Notice boards

The following information must be communicated via OHS notice boards

- Names and contact details of the Designated Work Group’s elected Health & Safety representatives and/or the area Safety Officer/s
- Names and contact details of First Aiders
- OHS Policy
- OHS Issue Resolution Procedures and
- If you are injured at work please noting the contact details of Work Safe agent.

3.1.3.Other Methods of OHS Communication

The following OHS information and methods of communication should be used, as determined appropriate to the needs of the organizational unit:

3.1.4.Electronic Communication via Email, Websites

Health and safety information should be circulated via email or posted on websites at:

- Organizational level;
- Faculty/divisional level and/or
- Academic /administrative level

Emails and websites can be used to:

- Publicize new OHS policies and procedures and programs
- Consult the University community during the development of OHS policies and procedures
- Ask for feedback; and
- Alert the University community or the members of a particular academic/administrative unit to OHS hazards.

3.1.5.Hazard and Incident Reports

Hazard and Incident information and statistics are communicated via the Occupational Health and Safety progress, formulated and disseminated by OH&S. These reports provide an overview of reported incidents and hazards and are shared at OHS committee meetings.

3.2. Role of *designated OHS personnel*

➤ OHS Responsibilities

H Heads of Academic/Administrative units

H Heads of academic/administrative units are responsible for managing OHS in areas under their control to ensure, so far as reasonably practicable, a healthy and safe environment for staff, students, and visitors.

These responsibilities include:

- Identifying, monitoring and communicating OHS legislative requirements within their unit
- leading by example in relation to OHS standards and the promotion of OHS awareness
- The risks associated with the activities of the unit are identified and managed effectively;
- ☐ Sufficient resources are allocated for OHS matters:
 - ✚ Local standards and practices comply with legislative requirements and University procedures and guidelines
 - ✚ OHS is discussed regularly at meetings

3.2.1. Supervisors

- The responsibilities of supervisors include:
- Actively practicing and developing in their staff and students proper attitudes towards OHS matters
- Controlling the risks associated with the work and study that they supervise using a documented risk management process
- Implementing University and local OHS procedures and guidelines

- Ensuring that they, and the staff and students that they supervise, undertake mandatory and recommended OHS training
- Participating in the investigation of reported incidents and hazards within the area they supervise
- Actively participating in workplace OHS inspections and audits
- Discussing OHS performance as part of staff appraisals

3.2.2. Individuals (Staff Members, Students)

Each staff member is responsible for ensuring that his or her own work or study environment and practices reflect high OHS standards in order to protect their own health and safety as well as the health and safety of others.

The responsibilities include:

- Complying with OHS policy, procedures and instructions
- Being familiar with emergency and evacuation procedures and complying with the instructions given by emergency response personnel such as Emergency Wardens and First Aiders;
- Participating in meetings, training and other health and safety activities as required;
- Reporting hazards, near misses, injuries and incidents
- Using a documented risk management process to eliminate or minimize OHS risks where appropriate
- Using and maintaining safety devices and personal protective equipment correctly
- Not willfully or recklessly endangering the health and safety of any person at the workplace.

3.2.3. Safety Officers

Safety Officers and deputy Safety Officers must:

- Be provided with sufficient time to address OHS issues
- Be provided with the resources and time to attend OHS training
- Be accessible to staff
- Have delegated authority to resolve OHS issues

➤ **The responsibilities of the Safety Officer include:**

- Providing advice, information, instruction and training on local OHS issues where appropriate
- Assisting with the formation and implementation of local OHS policies and procedures
- Assisting with the risk management of hazards and risks in the area
- Assisting with the investigation of hazard and incidents; and reporting all incidents, injuries, hazards and near misses
- Liaising with OH&S and the head of academic/administrative unit when monitoring and reviewing the department/school OHS legislative compliance
- Consulting with local Health & Safety Representatives on OHS issues
- Reviewing, analyzing and reporting of hazards and incident data
- Developing injury and incident prevention strategies for the academic/administrative unit
- Monitoring compliance with organization OHS Policy and procedures at a local level, including workplace inspections, building evacuations, induction and training needs of staff and students
- Participate in OHS audits as required
- Promoting University and local OHS programs and initiatives

3.3. Safety signs and symbols

3.3.1. Safety Symbols and Their Meanings

Takeaway: *Everyone in the workplace should know how to read the symbols on safety signs.*

Safety signs can be a tricky business. Some have words and a clear message, while many rely on visual symbols to warn of potential danger. This is also an effective way to communicate potential hazards – as long as workers understand what the symbols mean.

There are two different types of safety symbols: one refers to general safety protocols, while the other is used specifically for labeling chemicals that may be hazardous. Since most workplaces have a combination of both, it's important to understand each of them.

Why Use Safety Symbols?

These pictures may not say a thousand words, but they are universally recognized symbols that transcend language. No matter where you're working, you'll be able to understand the potential hazards you face simply by looking at the posted symbols.

The best occupational health and safety programs use a series of signs and symbols to convey a complete message. For example, a hazardous gas symbol may alert workers to the potential presence of a harmful gas. But an accompanying sign mandating the use of a gas mask takes it a step further by telling workers how to handle the hazard.

Signs and symbols are no substitute for training, but they do serve as important reminders. They can be particularly helpful for workers who are not familiar with a specific area or process. A simple sign with a safety symbol allows workers to efficiently identify the potential hazard and make an immediate decision.

3.3. Key Types of Safety Symbols

Most safety signs and symbols fall into one of four categories:

- Prohibition
- Warning
- Mandatory
- Emergency

Each category has its own specific color and sign shape that remains consistent around the world as per safety regulations.

By getting to know the key characteristics of each type of symbol, you'll be able to easily identify whether a sign is asking you to stop doing something, start doing something, take precautions, or advising you of emergency equipment or facilities.

Hazardous Chemicals Communication Standard

Workplace Hazardous Materials Information System (WHMIS) and Hazard Communication Standard (HCS) align with and draw on the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Using this international system helps ensure consistency in the classification of chemicals and the communication of hazard information on labels and safety data sheets.

The system uses pictograms on labels to alert users of the chemical hazards they may be exposed to. Every symbol consists of a black pictogram on a white background, framed by a red border. There are nine different pictograms, each representing a different chemical hazard classification.

Health Hazard



- Carcinogen
- Mutagenicity
- Reproductive toxicity
- Respiratory sensitizer
- Target organ toxicity
- Aspiration toxicity

Flame



- Flammables
- Pyrophorics
- Self-heating
- Emits flammable gas
- Self-reactive
- Organic peroxides

Exclamation Mark



- Irritant (skin and eye)
- Skin sensitizer
- Acute toxicity (harmful)
- Narcotic effects
- Respiratory tract irritant
- Hazardous to ozone layer

Gas Cylinder



- Gases under pressure

Corrosion



- Skin corrosion/burns
- Eye damage
- Corrosive to metals

Exploding Bomb



- Explosives
- Self-reactives
- Organic peroxides

Flame Over Circle



- Oxidizers
- Environment



- Aquatic toxicity
- Skull and Crossbones



- Acute toxicity (fatal or toxic)

Which Signs and Symbols Are Appropriate for Your Workplace?

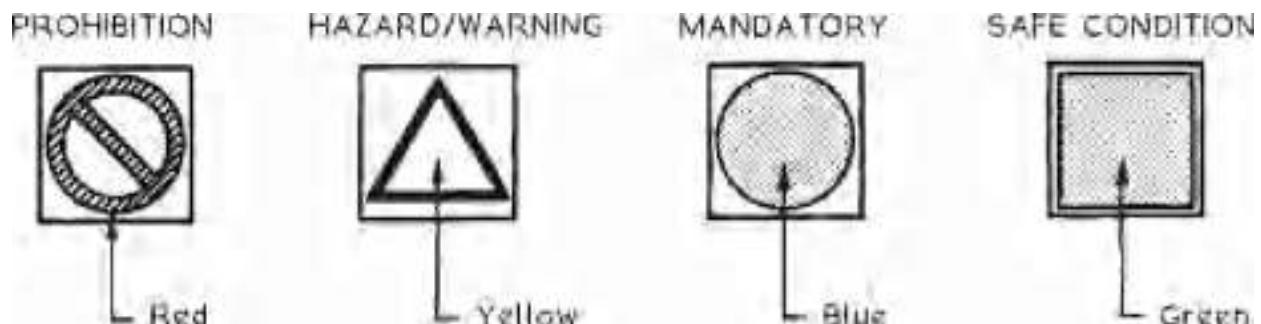
To know what symbols should be in your workplace, you'll need to perform a comprehensive risk assessment. Assessments should be conducted for each activity and at each designated workspace to make sure you identify all potential hazards. Once you have that information, you'll know where workers will need safety reminders.

Note, however, that you might want to make sure the signs can be moved. After a while, workers become so familiar with the safety signs that they start to just be part of the background. To avoid this “sign blindness,” safety experts recommend switching up the location of your signs every so often to keep the safety message top of mind (learn more in *In Sight, In Mind: Reinforcing Safety Policies and Procedures*).

Conclusion

Safety signs and symbols exist to make identifying potential hazards easier. Keep things simple by spreading signs out within an area to avoid clustering them. Too many signs crammed together overwhelms workers with information and makes it less likely that they pay careful attention.

And remember that safety signs only work if everyone understands them. Conduct regular refresher training to ensure that every worker is familiar with the symbols and their meanings.



In addition, employers obligations include the need to provide:

Risk Assessment † provide and maintain safety signs where there is a risk to health and safety, e.g. obstacles. Train staff to comprehend safety signs.

Pictorial Symbols † pictograms alone are acceptable but supplementary text, e.g. FIRE EXIT, is recommended.

Fire/Emergency Escape Signs † A green square or rectangular symbol.

Positioning of signs † primarily for location of fire exits, fire equipment, alarms, assembly points, etc. Not to be located where they could be obscured.

Marking of Hazardous Areas † to identify designated areas for storing dangerous substances: Dangerous Substances (Notification and Marking of Sites) Regulations 1990. Yellow triangular symbol.

Typical Examples on Building Sites ~

PROHIBITION (Red)



Authorized
personnel only



Children must
not play on
this site



Smoking
prohibited



Access not
permitted

HAZARD/WARNING (Yellow)



Dangerous
substance



Flammable
liquid



Danger of
electric shock



Compressed
gas

MANDATORY (Blue)



Safety helmets
must be worn



Protective
footwear must
be worn



Use ear
protectors



Protective
clothing must
be worn

SAFE CONDITIONS (Green)



Emergency escapes



FIRE
EXIT

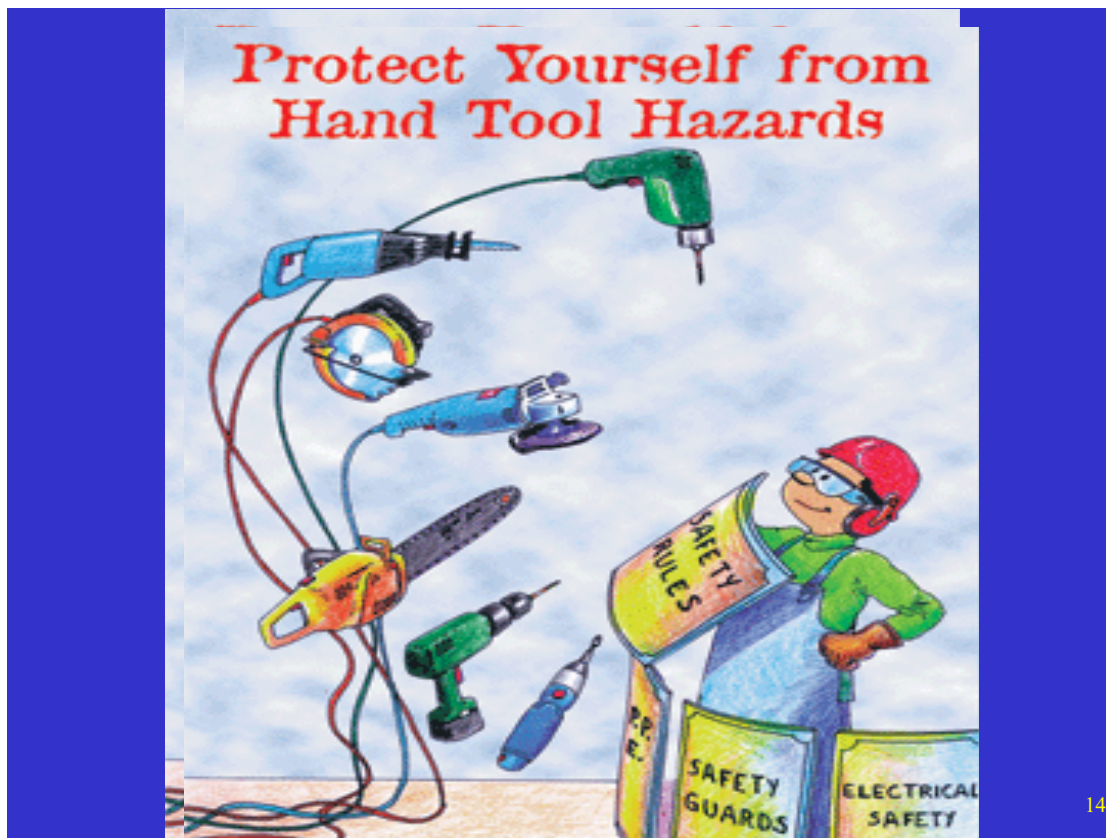


Treatment area



First aid point

Ref. BS 5499-1: Graphical symbols and signs. Safety signs, including fire safety signs.
Specification for geometric shapes, colors and layout.



3.4. Procedures and relevant authorities for reporting hazards,

➤ Safety Tips

- 1) If you are not sure.....ask.
- 2) Follow instructions and don't take chances.
- 3) Wear your personal safety equipment.
- 4) Never operate equipment you have not been trained for.
- 5) Keep your work area clean.
- 6) Stay clear of forklifts while they are being operated.
- 7) Avoid injury by lifting correctly. If it's heavy ask for help. Max weight to be lifted is 75lbs.
- 8) Make sure the job can be done safely.

9) DO NOT unload a truck alone.

➤ **Accident And Near Miss Reporting**

The following protocol must be followed.

- 1) All employees must immediately report any occupational injury, accident or near miss to the safety officer or their supervisor.
- 2) Supervisors must immediately tend to injuries and then report them to the safety officer.
- 3) Branch managers must immediately discuss the incident with the safety officer and injured persons.

The purpose of this procedure is to comply with Occupational Health & Safety act, workers compensation board and to determine the cause of the accident and make recommendations to prevent further re-occurrence. All reports of injury must be filed.

➤ **If an injury occurs a record must be kept and include the following:**

- a) Name of worker
- b) Name and qualifications of person giving first aid
- c) A description of illness or injury
- d) The first aid given to the worker
- e) The date and time the illness or injury
- f) The date and time the illness or injury was reported
- g) Where at the work side the incident occurred
- h) The work-related cause of the incident, if any

Self check-3

Test-I Matching

Instruction: select the correct answer for the give choice. You have given 1 Minute for each question. Each question carries 5 Point.

A	B
-----1. Communication	A. Individuals in the workplace who have been elected or appointed to specific safety roles
-----2. Safety Personnel	B.is responsible for posting or making available OHS materials specified in this procedure
-----4.management/ supervisor	C.can save lives, reduce pain and help an injured person make a quicker recovery
	D.responsible for establishing a program to communicate health and safety information

Test II: short Answer writing

Instruction: write short answer for the given question. You are provided 5 minute for each question and each point has 10Points.

- 1.What is OHS documents?
- 2.Write communication processes?
- 3.What is Communication?
- 4.Write The following information must be communicated via OHS notice boards?

Note: Satisfactory rating – above 60%

Unsatisfactory - below 60%

You can ask your teacher for the copy of the correct answers

Unit Four: OHS incident response procedures

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

- *procedures for responding to incidents and emergencies*
 - Basic emergency response
 - Evacuation
 - OHS personnel and authorities
 - Emergency services
- procedures for first aid
- *PPE* requirements
- *fire safety equipment*

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Follow *procedures for responding to incidents and emergencies*
 - Basic emergency response
 - *Identify* Evacuation
 - Follow OHS personnel and authorities
- Follow Emergency services procedures for first aid
- *Apply PPE* requirements
- *Identify fire safety equipment*

4.1. Procedures for responding to incidents and emergencies

What Safety Means:

1. Safety means a complete understanding of your work and knowledge of every step that must be taken and the realization that mistakes could be costly to yourself and to the company.
2. Safety means good judgment. Never rely on luck; always be prepared to cope with unexpected situations and being alert when following your routine.
3. Safety means remembering the safety rules set up by your company and applying them every minute when you are on the job.

➤ *Factors that Contribute to the Occurrence of Accidents in the Construction Industry:*

1. Fall from heights is the predominant causes of accidents
2. Lack of supervision for workers working at heights
3. Workers lack awareness on OSH
4. Workers have limited trainings
5. Due to lack of training, workers
 - a. Build improper temporary structures
 - b. Tolerate improperly guarded floors
 - c. Work with unstable/unsecured/scaffolds
6. Accident reports lack relevant information
7. Proper investigations are hardly conducted

➤ *Direct Costs of Accidents*

1. Emergency Medical Care
2. Equipment Damage or Material Spoilage
3. Compensation Payments
4. Investigations of Legal Authority

5. Insurance Premiums

➤ *Indirect Costs of Accidents*

1. Injured Worker

- Lost productivity on day of injury
- Lost productivity due to follow – up care
- Lost productivity after returning to work

2. Worker's Crew

- Complete added work
- Assisting injured worker
- Lost productivity due to inspection

3. Crew Around Accident Site

- Watching events and discussing accident

4. Training Replacement Worker

5. Supervisors

- Investigating accident
- Preparing reports
- Time with management, owner or regulatory agencies

Leading Causes of Fatal Accidents in Construction Sites

1. Falls from Heights

- Temporary Structures
- Excavation
- Roof
- Moving Vehicle and Equipment

2. Excavation and Trench Work

- Cave – in
- Falling of persons, materials and equipment
- Asphyxiation

3. Construction Machineries and Equipment

- Power Tools
 - Woodworking Machines
 - Heavy Machines
4. Cranes and Elevators
- Overloading
 - Lifting and Carrying of Loads
 - Erection and Dismantling

4.1.1.Evacuation

Excavation is defined as ground breaking or making trench in ground is called as excavation.

➤ **Excavation Hazards:**

1. Damage to underground facilities.
2. Personal, vehicle, equipment and materials falling inside excavation.
3. Cave-in, Soil collapse due to loose soil and heavy equipment moment.
4. Presence of toxic and flammable gases.
5. Injuries due to employees working very close to each other.
6. Expose of existing building foundation.

➤ **Excavation safety Precautions:**

1. Slit trench using shovel, Do not use pickaxe for slit trench.
2. Detection of underground facilities using metal or cable detector.
3. Trial excavation shall be carried out to ensure protection of underground facility before mechanical excavation.
4. Adapting soil protection method like stepping, sloping, shoring and close sheeting.
5. If excavation reached more than 3 meter, shoring or close sheeting shall be done.
6. Adequate barricade and excavation sign board.

7. Gas test inside excavation before job.
8. Temporary support shall be provided for existing foundations.
9. Adequate spacing between workers.
10. Ladder shall be positioned at least 1 meter above the landing level and is excavation exceed 1.2 meter two access is required.
11. There should be at least two means of access for person working inside excavation if walking distance is more than 7.5 meter.
12. Walkways across excavations should be made by scaffolding and jumping across excavation is not allowed.
13. Excavated soil, materials, equipment shall maintained distance of 0.5 meter away from the edge of excavation.
14. If engine driven equipment is using inside excavation; confined space conditions shall be followed.
15. Signal man shall always be present with heavy equipment like excavator, dump truck, and loader.

Types of Excavations:

1. Manual excavation – By shovel only.
2. Mechanical excavation – By excavator

➤ Excavation Authorization:

Excavation Authorization is require to identify and safe guard underground facilities such as pipe lines and cable etc. it is required for excavation deep more than half meter. After checking the drawing, site conditions and the effect on existing underground facilities.

Excavation authorization sign by:

1. Operations shift supervisor/asses custodian.

2. Instrument engineer.
3. Electrical engineer.
4. Corrosion engineer.
5. Telecommunication engineer.
6. Chief fire officer.
7. General work engineer.
8. Civil engineer.
9. Safety engineer.

Excavations more than 1.2 meters require confined space entry authorization and gas test shall be done prior to job.

➤ ***Excavation authorization need as per KNPC safe work practices**

➤ **Excavator requirements:**

1. Valid construction license is required for operator.
2. A Hot Work Permit in addition to an Excavation Authorization is require for the use of excavators.
3. Valid safety certificates.
4. Excavator operator has to be aware of blind spots where they may not see ground personnel.
5. Certified signal man / flag man with flags.
6. Personnel should not be inside the excavation while excavator in operation
7. Excavator operator shall be aware from blind spot.
8. The bucket shall always be lower to ground when not in use.
9. Two numbers of DCP fire extinguisher.

10. No hydraulic leakage.

11. Spark arrestor.

➤ Excavation	edge	Protection	System:
1			.Shoring
2	.Stepping	or	benching
3.			Sloping
4. Sheet Piling			



Shoring



Stepping or benching



Sloping



Sheet Piling

Identifying hazards and the outcomes of risk assessment and control procedures

➤ Hazard Identification Process:

1. Assemble the people that will be involved
2. Discuss possible hazards with employees
3. If practical, tour the entire operation
4. Hazards can be physical, chemical, biological or psycho-social
5. Look for possible hazards originating with people, equipment, material or the environment
6. Consider consequences of mis-use, lack of maintenance, error, etc. Keep asking “What if?”
7. Determine all items that need attention and any additional items
8. Review the findings
9. Rank the items on a “worst first” basis
10. Develop the necessary hazard control practices/procedures

4.1.2. OHS procedures

These may also be described as safe work procedures. These need to cover what needs to be done when carrying out tasks that may have risks or when working in a hazardous environment. For example, when cleaning an extracting room floor, an OHS procedure would explain:

- the purpose of the task and associated possible hazards
- who is to carry out the task and any special training or other requirements that they must meet
- the equipment needed to carry out the task and how it should be used
- what chemicals can be used and any safety precautions that need to be followed for those chemicals
- how to safely deal with excess water, for example by using a squeegee or mop or ‘sweep’ the excess water towards the drainage point in the floor
- requirement to place hazard warning signs to alert others to the hazard of excess water
- Emergency procedures to be followed (e.g. washing out chemicals on skin or eyes).

➤ **Three common OHS procedures are:**

- Emergency procedures
- First aid procedures
- Accident/near miss and hazard reporting procedures.

4.1.1. Emergency response procedures

1. Emergency situations are identified and reported according to workplace reporting requirements
2. Emergency procedures are followed as appropriate to the nature of the emergency and according to workplace procedures
3. Workplace procedures for dealing with accidents, fires and emergencies are followed whenever necessary within scope of responsibilities
4. Means of contacting the appropriate personnel and emergency services in the event of an accident are properly demonstrated according to the procedure.
5. Persons or services to be contacted in the event of a range of accidents and means of communication with emergency personnel are listed (burns, poisons, broken limbs, eye accidents, spills, explosions, falls, electrical accidents and so on).

6. Emergency and evacuation procedure is understood and carried out when required.
Promptly make transportation available to an appropriate medical facility
7. Emergency and evacuation procedures are demonstrated as required according to the given evacuation procedures.
8. Company evacuation procedures are followed in case of an emergency according to the given evacuation procedures
9. promptly provide to the victim and medical personnel:
 - Product name, registration number, and active ingredients.
 - All first aid and medical information form label
 - Description of how the pesticide was used

➤ **Emergency procedures**

Every workplace should have procedures to deal with emergencies.

Emergencies may include:

- fire
- chemical spill
- explosion
- Flooding
- armed hold-up

In most cases an emergency will mean the workplace has to be evacuated. Most organizations will have some sort of evacuation plan, especially if the public access the building. You are likely to find evacuation plans displayed somewhere highly visible, such as a bulletin board, or as a sign on the wall.

Evacuation plans should describe:

- How you are alerted to an evacuation, e.g. alarm or announcement
- How to evacuate the building, e.g. not using lifts, how to find your nearest exit
- Where to evacuate to, and who to report to so they know you are out of the building.

4.2. Procedures for first aid.

➤ First aid

A building site should have a first aid box which as minimum contents: -

- Plasters;
- Bandages;
- Ointments;
- Disinfectant.

Someone on site should be in charge of the box and know how to with broken bones, burns and electric shocks.

Basic Safety and Health Principles

Employers can reduce injuries resulting from handling and storing materials by using some basic safety procedures such as adopting sound ergonomics practices, taking general fire safety precautions, and keeping aisles and passageways clear.

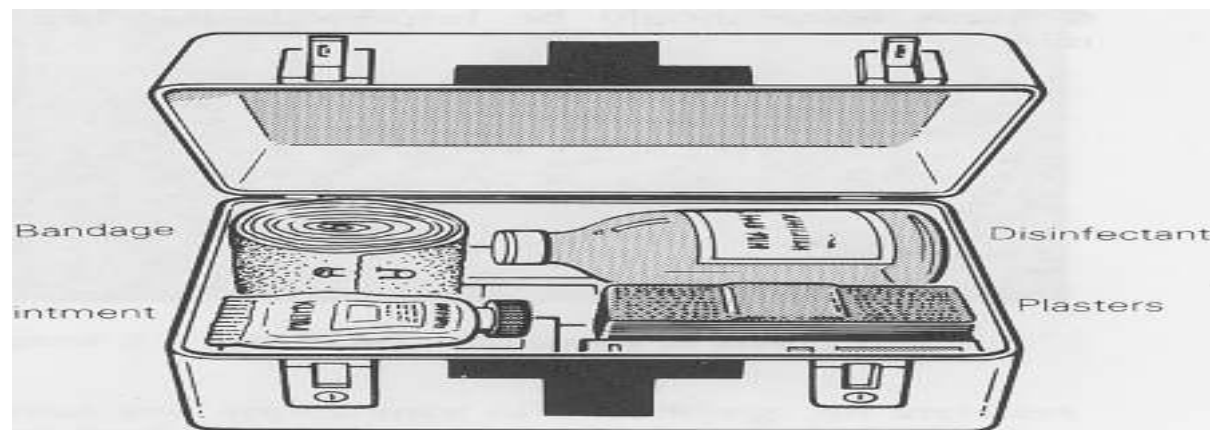


Figure 1.2 A simple first aid box.

First aid is the initial help given by a qualified first aid attendant to an injured or sick person. First aid treats injury, prevents further injury and promotes recovery. Most workplaces will have at least one first aid kit, and a trained first aider.

First aid can save lives, reduce pain and help an injured person make a quicker recovery. The Health and Safety (First Aid) Regulations require you to provide adequate and appropriate equipment, facilities and personnel to enable first aid to be given to your employees if they are injured or become ill at work. The minimum provision for all sites is:

- A first aid box with enough equipment to cope with the number of workers on site;
- An appointed person to take charge of first-aid arrangements;
- Information telling workers the name of the appointed person or first aider and where to find them. A notice in the site hut is a good way of doing this.

An appointed person is someone you choose to take charge when someone is injured or falls ill and who will telephone for an ambulance if one is required. An appointed person should not attempt to give first aid for which they have not been trained.

The first-aid arrangements should cover shift working, night and weekend working where this is carried out. This may mean appointing or training several people to ensure adequate cover.

➤ **Accident/near miss and hazard reporting procedures**

Many organizations will have procedures to report accident/near misses and hazards in the workplace. Near misses are accidents that do not produce an injury or disease, and are ‘warning signs’ of an accident to come.

If an injury occurs a record must be kept and include the following:

- a) Name of worker
- b) Name and qualifications of person giving first aid
- c) A description of illness or injury
- d) The first aid given to the worker

- e) The date and time the illness or injury
- f) The date and time the illness or injury was reported
- g) Where at the work side the incident occurred
- h) The work-related cause of the incident, if any

4.3. PPE requirements

Note: PPE should only be used as a last resort after considering all other control methods. PPE can also be used to protect against any residual risks that remain after other control methods have been employed.

All PPE clothing and equipment should be of safe design and construction, and should be maintained in a clean and reliable fashion. Employers should take the fit and comfort of PPE into consideration when selecting appropriate items for their workplace. PPE that fits well and is comfortable to wear will encourage employee use of PPE. Most protective devices are available in multiple sizes and care should be taken to select the proper size for each employee. If several different types of PPE are worn together, make sure they are compatible. If PPE does not fit properly, it can make the difference between being safely covered or dangerously exposed. It may not provide the level of protection desired and may discourage employee use.

➤ Selecting and checking PPE

Personal protective equipment (PPE) is used to protect an individual from hazards associated with their work tasks or environment. Specific types of personal protective equipment include protective clothing, eyewear, respiratory devices, protective shields, gloves, and hearing protection.

Protective equipment that must be available

These include:

- Rubber gloves or leather gloves
- Overalls.
- Face shields.
- Face mask and ear protectors

- Steel capped boots/shoes
- sunscreen lotion

Employers are required to train each employee who must use PPE. Employees must be trained to know at least the following:

- When PPE is necessary
- What PPE is necessary?
- How to properly put on, take off, adjust and wear the PPE.
- The limitations of the PPE.
- Proper care, maintenance, useful life and disposal of PPE.

Employers should make sure that each employee demonstrates an understanding of the PPE training as well as the ability to properly wear and use PPE before they are allowed to perform work requiring the use of the PPE. If an employer believes that a previously trained employee is not demonstrating the proper understanding and skill level in the use of PPE, that employee should receive retraining. Other situations that require additional or retraining of employees include the following circumstances: changes in the workplace or in the type of required PPE that make prior training obsolete. The employer must document the training of each employee required to wear or use PPE by preparing a certification containing the name of each employee trained, the date of training and a clear identification of the subject of the certification.

4.3. Fire safety equipment

➤ Fire

• Use of firefighting equipment

Fire is a form of a chemical reaction that involves the rapid oxidation of combustible fuel (material) with the subsequent liberation of heat and light.

Fire Extinguisher Chart							
Extinguisher		Type of Fire					Special Notes
Colour	Type	Solids (wood, paper, cloth, etc)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats	
	Water	✓ Yes	✗ No	✗ No	✗ No	✗ No	Dangerous if used on 'liquid fires' or live electricity.
	Foam	✓ Yes	✓ Yes	✗ No	✗ No	✓ Yes	Not practical for home use.
	Dry Powder	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✗ No	Safe use up to 1000v.
	Carbon Dioxide (CO2)	✗ No	✓ Yes	✗ No	✓ Yes	✓ Yes	Safe on high and low voltages.
	Halon	Halon fire extinguishers are not recommended for home use but will knock fire down quickly and can be used on all domestic fire types.					

Figure 2.1 firefighting equipment

Many solids, liquids and gases can catch fire and burn. It only takes a source of ignition, which may be a small flame or an electrical spark, together with air. Any outbreak of fire threatens the health and safety of those on site and will be costly in damage and delay. It can also be a hazard to people in surrounding properties. Fire can be a particular hazard in refurbishment work when there is a lot of dry timber and at the later stages of building jobs where flammable materials such as adhesives, insulating materials and soft furnishings are present.

Many fires can be avoided by careful planning and control of work activities. Good housekeeping and site tidiness are important not only to prevent fire, but also to ensure that emergency routes do not become obstructed. Making site rules can help

Precautions to prevent fires

The following precautions should be taken to prevent fires:

- use less-easily ignited and fewer flammable materials, eg use water-based or low-solvent adhesives and paint;
- keep the quantity of flammables at the workplace to a minimum;
- always keep and carry flammable liquids in suitable closed containers;
- if work involving the use of flammable materials is being carried out, stop people smoking and don't allow other work activities involving potential ignition sources to take place nearby. For example, if floor coverings are being laid

- using solvent-based adhesives, don't allow soldering of pipes at the same time;
- ensure that pipes, barrels, tanks etc which may have contained flammable gases or liquids are purged or otherwise made safe before using hot cutting equipment, such as a cutting torch or angle grinder. A pipe or container may appear to be empty, but can contain enough material on its sides, or within rust or other sediments, to produce a flammable or explosive atmosphere within it when heated or disturbed. Specialist advice may be required;
- to minimize the risk of gas leaks and fires involving gas-fired plant:
 - close valves on gas cylinders when not in use;
 - regularly check hoses for wear and leaks;
 - prevent oil or grease coming into contact with oxygen cylinder valves;
 - do not leave bitumen boilers unattended when alight;
- store flammable solids, liquids and gases safely. Separate them from each other and from oxygen cylinders or oxidizing materials. Keep them in ventilated secure stores or an outdoor storage area. Do not store them in or under occupied work areas or where they could obstruct or endanger escape routes;
- have an extinguisher to hand when doing hot work such as welding or using a disc cutter that produces sparks;
- check the site at lunch time and at the end of the day to see that all plant
- And equipment that could cause a fire is turned off. Stop hot working an hour before people go home, as this will allow more time for shouldering fires to be identified; and
- Provide closed metal containers to collect rubbish and remove them from the site regularly. Collect highly flammable waste such as solvent-soaked rags separately in closed fire-resisting containers.

➤ ***Precautions in case of fire***

If a fire should break out, people must be able to escape from it. To achieve this consider the points in paragraphs 87-93.

Means of giving warning

Set up a system to alert people on site; this could be a temporary or permanent mains operated fire alarm (which should be tested regularly, eg weekly), a klaxon, an air horn or a whistle, depending on the size and complexity of the site.

Any warning needs to be distinctive, audible above other noise and recognisable by everyone.

Means of escape

Plan escape routes and ensure they remain available and unobstructed.

For work areas above or below ground, provide well separated alternative ways to ground level where possible. Protect routes by installing the permanent fire separation and fire doors as soon as possible. It is important that escape routes give access to a safe place where people can assemble and be accounted for. In a large chemical plant this may be a safety refuge, while on a small site the pavement outside may be adequate. Signs will be needed if people are not familiar with the escape routes (see Figure 7). Make sure that adequate lighting is provided for enclosed escape routes – emergency lighting may be required (see paragraph 78);

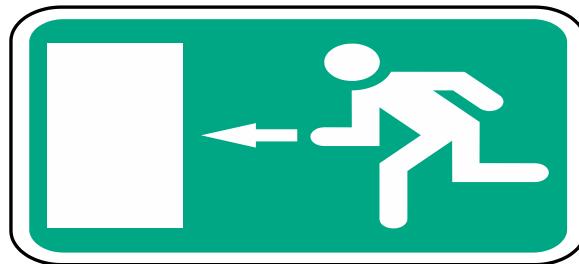


Figure An example of an emergency exit sign

Means of fighting fire

As well as providing fire extinguishers for hot work, fire extinguishers should be located at identified fire points around the site. The extinguishers should be appropriate to the nature of the potential fire:

- wood, paper and cloth – water extinguisher;
- flammable liquids – dry powder or foam extinguisher;
- electrical – carbon dioxide (CO₂) extinguisher.

Nominated people should be trained in how to use extinguishers.

If the building being worked in is occupied (eg an office, hotel or hospital), make sure the work does not interfere with the escape route from the building, or any fire separation, alarms, dry risers, or sprinkler systems. Check this with the building occupier or the Fire Brigade.

Fire doors should never be locked, left open or removed. Keep existing wet and dry risers ready for use and install any new ones as soon as possible.

Self check-4

Test-I Matching

Instruction: select the correct answer for the give choice. You have given 1 Minute for each question. Each question carries 2 Point.

A

B

-----1. Excavation

G. is used to protect an individual from hazards associated with their work

- tasks or environment
- 2. First aid H. mean the workplace has to be evacuated
- 3. Fire I. defined as ground breaking or making trench in ground is called as excavation
- 4. (PPE) J. can save lives, reduce pain and help an injured person make a quicker recovery
- 5. Emergency K. is a form of a chemical reaction that involves the rapid oxidation of combustible fuel (material) with the subsequent liberation of heat and light

Test II: short Answer writing

Instruction: write short answer for the given question. You are provided 3 minute for each question and each point has 5Points.

5. What is a Chemical hazard?
6. Write Hazard identification process ?
7. What is emergency ?
8. Write Excavation hazard ?
9. Write Emergency procedures?

Note: Satisfactory rating – above 60% Unsatisfactory - below 60%

You can ask you teacher for the copy of the correct answers