Building electrical installation

LEVEL III

Based on November 2018, Version 5 Occupational standards (OS)

Module Title: Identifying OHS Hazards and Risk

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LG #49	LO #1- Contribute to workplace hazard identification
Instruction Sheet	

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

- Contributing to the selection of hazard
- Accessing hazard identification tools, techniques processes and methods
- Recognising and Reporting hazards
- Providing information and assistance to persons

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:

- Contribute to the selection of hazard identification tools, techniques, processes and methods suitable for the workplace
- Access hazard identification tools, techniques processes and methods to identify hazards in the workplace
- Recognise hazards in the workplace, report these hazards to designated personnel and record them in accordance with workplace procedures
- Provide information and assistance to persons conducting workplace inspections or testing

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 “Try to understand what are being discussed ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1- Contributing to the selection of hazard

1.1. Contributing to the selection of hazard

A successful hazard evaluation program requires tangible management support; sufficient, technically competent people (some of whom must be trained to use hazard evaluation techniques); adequate, up-to date information and drawings; and selection of the techniques (matched to the complexity and hazard of the process). Fortunately, a variety of flexible hazard evaluation techniques exist. Below is a simple listing of generally accepted techniques:

Qualitative Techniques: A qualitative analysis uses words to describe the magnitude of potential severity and the likelihood that that severity will occur.

(1) Identify potential accident circumstances and

(2) Evaluate the scenario in sufficient detail to make a reasonable judgment of risk. If the team is confused on the risk, a situation identified in a qualitative hazard review may be further analyzed using one or more of the quantitative techniques.

Preliminary Hazard Analysis: The Preliminary Hazard Analysis is often used to evaluate hazards early in the life of a process.

Quantitative Techniques: These do not identify possible accident situations, but they instead aid in risk judgment by provide more detailed, statistical evaluations of the risk of a specific situation.

Factors Influencing the Selection of Hazard Evaluation Techniques

Each hazard evaluation technique has its unique strengths and weaknesses. Understanding these attributes is prerequisite to selecting an appropriate hazard evaluation technique. The process of selecting an appropriate hazard evaluation technique may be a difficult one for the inexperienced practitioner because the “best” technique may not be apparent. As hazard analysts gain experience with the various hazard evaluation methods, the task of choosing an appropriate technique becomes easier and somewhat instinctive. The thought process behind selecting hazard evaluation techniques is complex, and a variety of factors can influence the decision-making process. The importance that each of these categories has on the selection process may vary from facility to facility, company to company, and industry to industry. However, the following general observations about the relative significance of these factors should be true for nearly every situation.

Self-check 1	**Written test**

Name…… ID…… Date…….

Test I: Choose the best answer (2 point each)

1. Hazard evaluation program requires

A. Tangible management support B. technically competent people to evaluate.

C. adequate, up-to date information D. all

2. Which one is not hazard evaluation technique?

A. Qualitative

B. Quantitative

C. A and B

D. all

3. Hazard evaluation technique is selected based on

A. hazard evaluation strengths

B. Hazard evaluation weaknesses.

C .none of the above

D.A&B

Note: Satisfactory rating > or = 3 points **Unsatisfactory - below 3 points**

Score----------

Rating----------

Information Sheet 2- Accessing hazard identification tools, techniques processes and methods

2.1. Accessing hazard identification tools, techniques processes and methods

Important Processes to Identify and Analyze Hazards

Inspection

Formal and informal safety inspections on a daily, weekly, monthly basis are important in making sure the workplace remains free of hazards that could cause injury or illness.

Observation

Observation, informal and formal, is quite important in daily workplace safety. Employees and managers can mark hazardous conditions and unsafe or inappropriate behaviors while they conduct their other tasks. Formal observation programs can be successful tools for gathering and analyzing data so that safety can be improved.

Proactive Hazard Identification Methods

Here are a few examples of methods you could adopt to identify health and safety hazards before an incident occurs: conducting pre-start discussions on the work to be carried out encouraging workers to recognize and highlight hazards while performing work carrying out safety inspections and audits of the workplace and work procedures conducting job safety analyses (or similar task evaluation processes) monitoring, measuring and testing the working environment such as noise monitoring, electrical testing and atmospheric testing; analyzing proposed new or modified plant, material, process or structure; conducting hazard (or risk) surveys reviewing product information, e.g. safety data sheets, operating manuals; and researching publicly available data on hazards, e.g. newspaper articles, industry or safety regulator alerts; and Looking at past incident and near-miss reports.

Self-check 2	Written test

Name…… ID…… Date…….

Directions**:** Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1. In what way do you check that the workplace is free of hazards that could cause injury or illness?

A. Inspection

B. coordination

C **.**Observation

D. all

.2. Which one of the following is the way in which the conditions at work site is checked by naked eye

A. Observation

B. Quantitative

C.A and B

D. all

3. Which one of the following adaptations is made to identify health and safety hazards before an incident occurs:

A. conducting pre-start discussions on the work to be carried out
B. encouraging workers to recognize and highlight hazards while performing work
C. Carrying out safety inspections and audits of the workplace and work procedures
D .all

Note: Satisfactory rating > or = 3 points Unsatisfactory - below 3 points

Score----------
Rating----------

Information Sheet 3-Recognising and Reporting hazards

3.1. Recognising and reporting hazards

Reporting procedure

If you are a worker:

1. Report hazards to your supervisor, unless there is an immediate threat to life, safety, property or the environment, in which case you must call Protection Services .For physical hazards that you detect in public areas .you can contact the Building Management Agent or Facilities directly , unless your supervisor has instructed you. You may report non-urgent hazards orally or in writing to your supervisor.

.• For hazards requiring immediate attention, provide immediate oral notice, followed by written report when needed. In case of a personal threat or workplace violence, consult and follow Policy.

2. If you are not satisfied with the supervisor's follow-up, raise the matter again or ask your functional occupational health and safety committee (FOHSC) for help.

If you approach the FOHSC: Document your concerns on the Hazard Report Form.

- The FOHSC investigates and then recommends the best action to the supervisor.
- The FOHSC and the supervisor must ensure that workers are informed about how the (take it as your local situation) Hazard is being, or has been, resolved.

If you are a supervisor:

1. In the event of a non-critical accident or injury, ensure that the worker receives first aid or advice.

For critical injuries: Advise Protection Services will then contact the Office of Risk Management.

The Office of Risk Management will notify the ministry of Labor without delay.

Properly investigate all accidents, incidents, concerns, threats, building-related hazards, physical hazards or non-conformances reported to you orally or in writing.

Types of hazards

Physical -Conditions in which objects materials or structures can cause material or bodily damage. Examples include flammability, explosiveness, noise, electric shock, heat and cold extremes, radiation, slippery surfaces, low ceilings, etc.

Fig 1 -physical hazard at construction site

Chemical that can lead to contamination by harmful substances. Examples include toxic gases, noxious fumes, corrosive liquids or powders, etc.

Fig 2-chemical damage on human when drink it

Biomechanical-Conditions that give workers biomechanical stress (body and movement). Examples include workbench height, chair design, workstation set-up, etc.

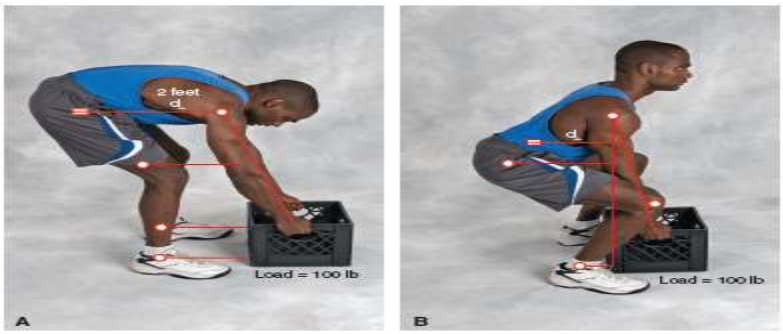

Fig-3-when a body is stressed by hard work

Psychosocial Conditions that can affect the thoughts behavior and mental well-being of workers examples include stress from using equipment without proper training or instruction or from being coerced into using defective tools or materials; burn-out or depression from constant exposure to high-tension situations, etc.

Fig-4- mental well-being stressed person

Biological

Conditions where living organisms can pose a threat to human health. Examples include syringes carrying potentially infected blood, specimen containers with potentially infected materials, viruses from air-conditioning systems, etc.

Self-check 3	**Written test**

Name…… ID…… Date…….

Test I: Choose the best answer (2 point each)

1. To whom do you report first if hazard occur in work place by considering yourself as worker?

A. supervisor

B. advisor

C **.**coordinator

D. all

2. If hazard occur in workplace and it is not urgent in what way do you report to your supervisor

A. Observation

B orally

C writing

D. A&B

3. Which one of the following is different?

A. supervisor C. Employee

B. FOHSC D. Employer

4. Who have more responsibility to get first aid for labor in any working environment when accident happens?

A. supervisor C. all

B. Employee D. none of the above

Note: Satisfactory rating > or = 4 points **Unsatisfactory - below 4 points**

Score----------
Rating----------

Information Sheet 4- Providing information and assistance to persons

4.1. Providing information and assistance to persons

Information and advice services enable people, cares and families to take control of, and make well-informed choices about their Care and Support and how they fund it. Not only does information and advice help to promote people's Wellbeing by increasing their ability to exercise choice and control, it is also a vital component of preventing or delaying people's need for Care and Support.

The Local Authority can provide information and advice services directly or it can do so through partnership/collaboration with communities, other agencies or a relevant partner. Some information or advice may be more accessible when provided impartially (for example advice in relation to challenging a decision made by the Local Authority).

People who are likely to need information and advice include, but are not limited to:

People (and/or their families) wanting to plan for their future Care and Support needs;

People (and/or cares) who may have developed Care and Support needs or whose current Care and Support needs may have become greater;

People who have not presented to the Local Authority for assessment but who are likely to be in need of Care and Support.

People who have been referred to the Local Authority and are either awaiting allocation for an assessment or other course of action;

People who have already been assessed and are in receipt of Care and Support from the Local Authority;

People whose Care and Support plans are currently being reviewed;

People who are subject to adult safeguarding concerns;

Informal or paid cares, professionals or agencies that have concerns about a person with needs for Care and Support;

People seeking information about financial matters concerning care and support, including understanding the financial implications of any Care and Support needs

People wishing to complain, question or challenge a decision made by the Local Authority Care and support staff who have contact with and provide information and advice as part of their jobs.

Self-check 4	Written test

Name…… ID…… Date…….

Directions**:** Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (2 point each)

1. Why do you inform persons in the workplace about the work situation?

A. enables people, cares and families to take control of, and make well-informed

B. to support them as guidance

C **.**to increase productivity

D. all

2. Who needs information and advice in the workplace about the work being ongoing

A. People wanting to plan for their future

B. People whose current Care and Support may have become greater

C. People seeking information

D. all

3. Which one of the following is different?

A. supervisor

B. FOHSC

C. Employee

D. Employer

4. Who have more responsibility to get first aid for labor in any working environment when accident happens?

A. supervisor

B. Employee

C. all

D. none of the above

Note: Satisfactory rating > or = 4 points Unsatisfactory - below 4 points

Score----------
Rating----------

LG #50	LO#2- Gather information about workplace hazards
Instruction sheet	

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

Researching collecting and recording information about OHS hazards and their associated risks

Seeking additional information, expertise or specialist advice from within or external to the workplace when limit of own skills and knowledge is reached

Conducting a workplace inspection to collect further information about OHS hazards and associated risks

Contributing to the support of OHS practitioners and employees in accessing workplace sources of information and data regarding hazard identification

Contributing to the support of OHS practitioners and employees accessing external sources of information and data related to hazard identification

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:

Research, collect and record information about OHS hazards and their associated risks

Seek additional information, expertise or specialist advice from within or external to the workplace when limit of own skills and knowledge is reached

Conduct a workplace inspection to collect further information about OHS hazards and associated risks if required

Contribute to the support of OHS practitioners and employees in accessing workplace sources of information and data regarding hazard identification

Contribute to the support of OHS practitioners and employees accessing external sources of information and data related to hazard identification, where required

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
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4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
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7.Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
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Information Sheet 1- Researching, collecting and recording information about OHS hazards and their associated risks

1.2. Research, collect and record information about OHS hazards and their associated risks

Hazards can be introduced over time as workstations and processes change, equipment or tools become worn, maintenance is neglected, or housekeeping practices decline. Setting aside time to regularly inspect the workplace for hazards can help identify shortcomings so that they can be addressed before an incident occurs.

Hazard is defined as Sources of potential harm in terms of human injury, ill health, damage to property, damage to the environment, or a combination of these, including:

- Biological
- Chemical
- Environment
- Mechanical and/or electrical
- Nuclear
- Physical
- Psychosocial
- Radiologic

There are three main areas of risk associated with the staging of events:

- Financial Risk
- Public Safety Risk
- OHS Risk

It is difficult to separate these three areas as they are all interrelated, for example; incurring a fine for non compliance of OHS regulations represents a financial risk as well as an OHS risk. Similarly, Potential hazard identified as a public safety risk may also represent a risk to employees or contractors. As interrelated as they may be however, these three areas all require their own particular form of strategic planning and an individual management system to administer and document their specific processes.

Collect existing information about workplace hazards

Information on workplace hazards may already be available to employers and workers, from both internal and external sources.

How to accomplish it

Collect, organize, and review information with workers to determine what types of hazards may be present and which workers may be exposed or potentially exposed. Information available in the workplace may include:

Equipment and machinery operating manuals

Safety Data Sheets (SDS) provided by chemical manufacturers.

Self-inspection reports and inspection reports from insurance carriers, government agencies, and consultants

Records of previous injuries and illnesses, such as OSHA 300 and 301 logs and reports of incident investigations

Workers' compensation records and reports

Patterns of frequently-occurring injuries and illnesses

Exposure monitoring results, industrial hygiene assessments, and medical records (appropriately redacted to ensure patient/worker privacy)
Existing safety and health programs (lockout/tag out, confined spaces, process safety management, personal protective equipment, etc

Input from workers, including surveys or minutes from safety and health committee meetings.
Results of job hazard analyses, also known as job safety analyses.

Information about hazards may be available from outside sources, such as:
OSHA, National Institute for Occupational Safety and Health (NIOSH), and Centers for Disease Control and Prevention (CDC) websites, publications, and alerts.
Trade associations
Labor unions, state and local occupational safety and health committees/coalitions ("COSH groups"), and worker advocacy groups
Safety and health consultants

Self-check 1	Written test

Name…… ID…… Date…….

.

Test I: Choose the best answer (2 point each)

1. Which one of the following is true about hazard in workplace?

A. Sources of potential harm in terms of human injury

B. damage to property

C. Damage to the environment,

D. all

2. In which of the following may hazard occur in workplace

A. biological

B. Psychosocial

C. chemical

D. all

3. from where information we get about workplace hazards

A. from both internal

C. A&B

B. from external sources

D. Employer

4. Which one of the following is considered as information in the workplace

A. Equipment and machinery operating manuals

B. Safety Data Sheets (SDS) provided by chemical manufacturers

C. Records of previous injuries and illnesses

D. all

Note: Satisfactory rating > or = 4 points Unsatisfactory - below 4 points

Score----------

Rating----------

Information Sheet 2- Researching collecting and recording information about OHS hazards and their associated risks

Developing your knowledge, skills and behaviors to a high standard cannot be done by simply you, on your own. Seeking guidance and advice from others is essential for supporting and developing your work practice effectively because others may have:
More experience than you that they can share with you

●More knowledge than you around specific areas of your work such as dementia care, food hygiene, moving and positioning individuals

● Different ideas and suggestions for how to work more effectively such as when managing difficult situations at work.

● A good insight into your strengths but also your weaknesses and so this can help you continue to improve and develop your work practice

● A good insight into you and how they can help you be the very best you can be and so others can be a good source of support for you.

Self-check 2	Written test

Name…… ID…… Date…….

Test I: Choose the best answer (2 point each)

1. When do you seek additional information, expertise or specialist advice from within or external?

A. when limit of own skill is reached.

B. when limit of own knowledge is reached.

C**.** A&B

D. all

2. Why you seek guidance and advice from others

A. more experience than you that they can share with you

B. More knowledge than you around specific areas of your work

C. to get Different ideas and suggestions

D. all

3. from where information we get about workplace hazards

A. from both internal

B. from external sources

C. A&B

D. Employer

4. Which one of the following is considered as information in the workplace

A. Equipment and machinery operating manuals

B. Safety Data Sheets (SDS) provided by chemical manufacturers

C. Records of previous injuries and illnesses

D. all

Note: Satisfactory rating > or = 4 points Unsatisfactory - below 4 points

Score----------

Rating----------

Information Sheet 3- Conducting a workplace inspection to collect further information about OHS hazards and associated risks

Inspect the workplace for safety hazards

Hazards can be introduced over time as workstations and processes change, equipment or tools become worn, maintenance is neglected, or housekeeping practices decline. Setting aside time to regularly inspect the workplace for hazards can help identify shortcomings so that they can be addressed before an incident occurs.

How to accomplish it

Conduct regular inspections of all operations, equipment, work areas and facilities. Have workers participate on the inspection team and talk to them about hazards that they see or report.

Be sure to document inspections so you can later verify that hazardous conditions are corrected. Take photos or video of problem areas to facilitate later discussion and brainstorming about how to control them, and for use as learning aids.

Include all areas and activities in these inspections, such as storage and warehousing, facility and equipment maintenance, purchasing and office functions, and the activities of on-site contractors, subcontractors, and temporary employees.

Regularly inspect both plant vehicles (e.g., forklifts, powered industrial trucks) and transportation vehicles (e.g., cars, trucks).

Use checklists that highlight things to look for. Typical hazards fall into several major categories, such as those listed below; each workplace will have its own list:

- General housekeeping
- Slip, trip, and fall hazards
- Electrical hazards
- Equipment operation
- Equipment maintenance
- Fire protection
- Work organization and process flow (including staffing and scheduling)
- Work practices
- Workplace violence
- Ergonomic problems
- Lack of emergency procedures

Before changing operations, workstations, or workflow; making major organizational changes; or introducing new equipment, materials, or processes, seek the input of workers and evaluate the planned changes for potential hazards and related risks.

Self-check 3	Written test

Name…… ID…… Date…….

Test I: Choose the best answer (4 point)

1. Why we inspect in workplace

A. to identify shortcomings so that they can be addressed before an incident occurs

B. it is meaningless

C**.** to make funny

D. all

2. Which one of the following can be inspected at workplace?

A. equipment

B. work areas

C. facilities

D. all

3. Why do you document inspections?

A. to correct later hazardous conditions

B. to facilitate later discussion

C. to use as learning aids

D. all is possible answers

Note: Satisfactory rating > or = 3 points Unsatisfactory - below 3 points

Score----------
Rating----------

Information Sheet 4- Contributing to the support of OHS practitioners and employees in accessing workplace sources of information and data regarding hazard identification

Sources of work health and safety information

Three main sources overall to get information about work health and safety were Government documents and publications (33%), the Media (32%) and Employer/ Industry associations (31%). The Media was the most used source of work health and safety information for employers and sole traders operating in the Agriculture, forestry and fishing and Accommodation and food services industries.

employers indicated that they either provided their workers with information or notified workers about work health and safety policies and procedures through walks around the workplace alone or with other managers (68%), through informal communication with workers (54%) and during meetings on work health and safety with management and through notice boards (35% each). Importantly, 24% of manufacturing employers indicated they gave no information regarding work health and safety policies and procedures to their workers, followed by 18% in Agriculture, forestry and fishing and 17% in Road freight transport. Employers most commonly provided to their workers or workers obtained work health and safety information during a walk around the workplace either alone or with managers and through informal communication with work mates about work health and safety. Employers commonly provided information about work health and safety to part-time/ casual workers and full-time workers. One third of employers indicated that they provided work health and safety information to contractors/ sub-contractors.

Self-check 4	**Written test**

Name…… ID…… Date…….

Test I: Choose the best answer (point)

1. Which one of the following is OHS information?

A. Government documents

B. publications

C**.** Media

D. all

2. ----------is the most used source of work health and safety information.

A. data c. news

B. media D. all

Note: Satisfactory rating > or = 3 points Unsatisfactory - below 3 points

Score----------

Rating----------

Information Sheet 5- Contributing to the support of OHS practitioners and employees accessing external sources of information and data related to hazard identification

All workers need to know how to work safely and without risks to health. Employers must provide clear instructions, information and adequate training for their workers. Workers also have responsibilities with regards to safety and health including cooperating with their employers and following the instructions they have received.

Employers must not forget contractors and self-employed people who may be working for them and make sure everyone has information on: hazards and risks they may face; Measures in place to deal with those hazards and risks; How to follow any emergency procedures. Some workers may have particular training needs, for example: new employees need basic induction training in how to work safely, including arrangements for first aid, fire and evacuation; people changing jobs or taking on extra responsibilities need to know about any new safety and health implications.

Young workers are particularly vulnerable to accidents and employers need to pay particular attention to their needs, so their training should be a priority. It is also important that new, inexperienced or young workers are adequately supervised; worker representatives or safety representatives will require training that reflects their responsibilities; some people's skills may need updating by refresher training.

The employer's risk assessment should identify any further training needs associated with specific risks. If they have identified danger areas in their workplace, they must ensure that their workers receive adequate instruction and training on precautions they must take before entering these areas.

Employers also need to think about any legal requirements for specific job training. If employers introduce new equipment, technology or changes to working practices/systems, their workers will need to know about any new safety and health implications.

Workers also have responsibilities under international labor standards with regards to safety and health namely to: take care of their own safety and health and that of others; co-operate with employers to help them comply with their obligations; follow any instructions or safety and health training employers provide

tell employers about any work situations that present imminent and serious danger to their life or health; let you know about any other failings they identify in your safety and health arrangements.

Self-check 5	Written test

Name…… …… ID…… Date…….

Test I: Choose the best answer (2 point each)

1. Who give clear instructions, information and adequate training for their workers at workplace?

A. Employers

B. you

C**.** Media

D. all

2. Who have responsibility to respect instructions and work with it to minimize workplace hazard

A. Employers

B. Workers

C. news

D. all

3. Which one of the following is correct?

A. new employees need basic induction training in how to work safely

B. new employees need basic induction training for first aid

C. inexperienced or young workers are adequately supervised

D. all

4. When do employers give instructions and training in the workplace to minimize hazard and accident?

A. when employers introduce new equipment

B. when employers introduce new technology

C. when employers introduce new working practices/systems

D. all

Note: Satisfactory rating > or = 4 points Unsatisfactory - below 4 points

Score----------
Rating----------

LG#51	LO#3. Contribute to OHS risk assessment
Instruction Sheet	

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

- Using appropriate risk assessment tools to contribute to risk assessment
- Identifying, categorise and assess risk factors as a contribution to overall risk assessment
- Seeking additional information, expertise, or specialist advice to investigate the likelihood and consequence of identified risks
- Documenting outcomes of the risk assessment process in a risk register

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 appropriate risk assessment tools to contribute to risk assessment
- Identify, categorise and assess risk factors as a contribution to overall risk assessment
- Seek additional information, expertise, or specialist advice to investigate the likelihood and consequence of identified risks
- Document outcomes of the risk assessment process in a risk register

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Information Sheet 1- Using appropriate risk assessment tools to contribute to risk assessment

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Risk assessment is a term used to describe the overall process or method where you:

Identify hazards and risk factors that have the potential to cause harm (hazard identification).

Analyze and evaluate the risk associated with that hazard (risk analysis, and risk evaluation).

Determine appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated (risk control).

A risk assessment is a thorough look at your workplace to identify those things, situations, processes, etc. that may cause harm, particularly to people. After identification is made, you analyze and evaluate how likely and severe the risk is. When this determination is made, you can next, decide what measures should be in place to effectively eliminate or control the harm from happening. Risk- assesses the overall process of hazard identification risk analysis, and risk evaluation. Hazard identification is the process of finding listing and characterizing hazards. Risk analysis is a process for comprehending the nature of hazards and determining the level of risk.

Note:

(1)Risk analysis provides a basis for risk evaluation and decisions about risk control.

(2)Information can include current and historical data, theoretical analysis.

(3)Risk analysis includes risk estimation.

Risk evaluation– the process of comparing an estimated risk against given risk criteria to determine the significance of the risk.

Risk control actions implementing risk evaluation decisions.

Note: Risk control can involve monitoring, re-evaluation, and compliance with decisions.

What is a hazard?

The meaning of the word hazard can be confusing. Often dictionaries do not give specific definitions or combine it with the term "risk". For example, one dictionary defines hazard as "a danger or risk" which helps explain why many people use the terms interchangeably.

There are many definitions for hazard but the most common definition when talking about workplace health and safety is:

Hazardous any source of potential damage, harm or adverse health effects on something or someone.

Basically, a hazard is the potential for harm or an adverse effect (for example, to people as health effects, to organizations as property or equipment losses, or to the environment).

Sometimes the resulting harm is referred to as the hazard instead of the actual source of the hazard. For example, the disease tuberculosis (TB) might be called a "hazard" by some but, in general, the TB-causing bacteria (Mycobacterium tuberculosis) would be considered the "hazard" or "hazardous biological agent"

What are examples of a hazard?

Workplace hazards can come from a wide range of sources. General examples include any substance, material, process, practice, etc. that has the ability to cause harm or adverse health effect to a person or property.

Table1. Hazards and Their Effects

Workplace Hazard	Example of Hazard	Example of Harm Caused
Thing	Knife	Cut
Substance	Benzene	Leukemia
Material	Mycobacterium tuberculosis	Tuberculosis
Source of Energy	Electricity	Shock, electrocution
Condition	Wet floor	Slips, falls
Process	Welding	Metal fume fever
Practice	Hard rock mining	Silicosis
Behavior	Bullying	Anxiety, fear, depression

Workplace hazards also include practices or conditions that release uncontrolled energy like: an object that could fall from a height (potential or gravitational energy), a run-away chemical reaction (chemical energy),

What is risk -risks the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. It may also apply to situations with property or equipment loss, or harmful effects on the environment.

For example: the risk of developing cancer from smoking cigarettes could be expressed as:"cigarette smokers are 12 times (for example) more likely to die of lung cancer than non-smokers", or "The number per 100,000 smokers who will develop lung cancer" (actual number depends on factors such as their age and how many years they have been smoking).

These risks are expressed as a probability or likelihood of developing a disease or getting injured, whereas hazard refers to the agent responsible (i.e. smoking).

Factors that influence the degree or likelihood of risk are: the nature of the exposure: how much a person is exposed to a hazardous thing or condition (e.g., several times a day or once a year), how the person is exposed (e.g., breathing in a vapor, skin contact), and the severity of the effect. For example, one substance may cause skin cancer, while another may cause skin irritation. Cancer is a much more serious effect than irritation.

What is a risk assessment?

Risk assessment is the process where you:

Identify hazards and risk factors that have the potential to cause harm (hazard identification).

Analyze and evaluate the risk associated with that hazard (risk analysis, and risk evaluation).

Determine appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated (risk control).

What types of hazards are there?

A common way to classify hazards is by category:

Biological- bacteria, viruses, insects, plants, birds, animals, and humans, etc.,

Chemical- depends on the physical, chemical and toxic properties of the chemical,

Ergonomic- repetitive movements, improper set up of workstation, etc.,

Physical- radiation, magnetic fields, pressure extremes (high pressure or vacuum), noise, etc.,

Psychosocial- stress, violence, etc.

Safety- slipping/tripping hazards, inappropriate machine guarding, equipment malfunctions or breakdowns

Why is risk assessment important?

Risk assessments are very important as they form an integral part of an occupational health and safety management plan. They help to:

Create awareness of hazards and risk.

Identify who may be at risk (e.g., employees, cleaners, visitors, contractors, the public, etc.).

Determine whether a control program is required for a particular hazard.

Determine if existing control measures are adequate or if more should be done.

Prevent injuries or illnesses, especially when done at the design or planning stage.

Prioritize hazards and control measures.

Meet legal requirements where applicable.

What is the goal of risk assessment?

The aim of the risk assessment process is to evaluate hazards, then remove that hazard or minimize the level of its risk by adding control measures, as necessary. By doing so, you have created a safer and healthier workplace.

The goal is to try to answer the following questions:

What can happen and under what circumstances?

What are the possible consequences?

How likely are the possible consequences to occur?

Is the risk controlled effectively, or is further action required?

When should a risk assessment be done?

There may be many reasons a risk assessment is needed, including:

- Before new processes or activities are introduced.
- Before changes are introduced to existing processes or activities, including when products, machinery, tools, equipment change or new information concerning harm becomes available.

How is a risk assessment done?

Assessments should be done by a competent person or team of individuals who have a good working knowledge of the situation being studied. Include either on the team or as sources of information, the supervisors and workers who work with the process under review as these individuals are the most familiar with the operation.

In general, to do an assessment, you should:

- Identify hazards.
- Determine the likelihood of harm, such as an injury or illness occurring, and its severity.
- Consider normal operational situations as well as non-standard events such as maintenance, shutdowns, power outages, emergencies, extreme weather, etc.
- Review all available health and safety information about the hazard such as Safety Data Sheet (SDS), manufacturers literature, information from reputable organizations, results of testing, workplace inspection reports, records of workplace incidents (accidents), including information about the type and frequency of the occurrence, illnesses, injuries, near misses, etc.
- Understand the minimum legislated requirements for your jurisdiction.
- Identify actions necessary to eliminate the hazard, or control the risk using the hierarchy of risk control methods.
- Evaluate to confirm if the hazard has been eliminated or if the risk is appropriately controlled.
- Monitor to make sure the control continues to be effective.

- Keep any documents or records that may be necessary. Documentation may include detailing the process used to assess the risk, outlining any evaluations, or detailing how conclusions were made.

When doing an assessment, also take into account:

The methods and procedures used in the processing, use, handling or storage of the substance etc.The actual and the potential exposure of workers (e.g., how many workers may be exposed, what that exposure is/will be, and how often they will be exposed).

.

How are the hazards identified?

Overall, the goal is to find and record possible hazards that may be present in your workplace. It may help to work as a team and include both people familiar with the work area, as well as people who are not - this way you have both the experienced and fresh eye to conduct the inspection. In either case, the person or team should be competent to carry out the assessment and have good knowledge about the hazard being assessed, any situations that might likely occur, and protective measures appropriate to that hazard or risk.

To be sure that all hazards are found:

Look at all aspects of the work. Include non-routine activities such as maintenance, repair, or cleaning. Look at accident / incident / near-miss records.

Include people who work off site either at home, on other job sites, drivers, steelworkers, with clients etc.Look at the way the work is organized or done (include experience of people doing the work, systems being used, etc).Look at foreseeable unusual conditions (for example: possible impact on hazard control procedures that may be unavailable in an emergency situation, power outage, etc.).

Determine whether a product, machine or equipment can be intentionally or unintentionally changed (e.g., a safety guard that could be removed).

- Review all of the phases of the lifecycle.
- Examine risks to visitors or the public.
- Consider the groups of people that may have a different level of risk such as young or inexperienced workers, persons with disabilities, or new or expectant mothers.

How do you know if the hazard will cause harm (poses a risk)?

Each hazard should be studied to determine its' level of risk. To research the hazard, you can look at:

- Product information / manufacturer documentation.
- Past experience (knowledge from workers, etc.).
- Legislated requirements and/or applicable standards.
- Industry codes of practice / best practices.
- Health and safety material about the hazard such as safety data sheets (SDSs), research studies, or other manufacturer information.
- Information from reputable organizations.
- Results of testing (atmospheric or air sampling of workplace, biological swabs, etc.).
- The expertise of an occupational health and safety professional.
- Information about previous injuries, illnesses, near misses, incident reports, etc.
- Observation of the process or task.

Remember to include factors that contribute to the level of risk such as:

- The work environment (layout, condition, etc.).
- The systems of work being used.
- The range of foreseeable conditions.
- The way the source may cause harm (e.g., inhalation, ingestion, etc.).
- How often and how much a person will be exposed.
- The interaction, capability, skill, experience of workers who do the work

How are risks ranked or prioritized?

Ranking or prioritizing hazards is one way to help determine which risk is the most serious and thus which to control first. Priority is usually established by taking into account the employee exposure and the potential for incident, injury or illness. By assigning a priority to the risks, you are creating a ranking or an action list.

There is no one simple or single way to determine the level of risk. Nor will a single technique apply in all situations. The organization has to determine which technique will work best for each situation. Ranking hazards requires the knowledge of the workplace activities, urgency of situations, and most importantly, objective judgment.

For simple or less complex situations, an assessment can literally be a discussion or brainstorming session based on knowledge and experience. In some cases, checklists or a probability matrix can be helpful. For more complex situations, a team of knowledgeable personnel who are familiar with the work is usually necessary

Self-check 1	Written test

Name…… ID…… Date…….

Test I: Choose the best answer (2 point)

1. Which one of the following is correct about Risk assessment at workplace?

A. Identify hazards and risk factors that have the potential to cause harm

B. Analyze and evaluate the risk associated with that hazard

C. Determine appropriate ways to eliminate the hazard

D. all

2. Which one of the following correct about Hazard identification at workplace

A. a process determining the level of risk

B. a process of finding listing and characterizing hazards

C.A &B

D. all

3. Which one of the following is inclusive?

A. risk control

B. risk monitoring

C. risk re-evaluation

D. risk identification

4. --------is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to beyond limit.

A. risk

B. hazard

C. danger

D. all

5. Which one of the following is not biological hazard?

A. bacteria

B. viruses

C. radiation

D. animals

Note: Satisfactory rating > or = 5 points Unsatisfactory - below 5 points

Score----------

Rating----------

Information sheet 2-Identifying, categorise and assess risk factors as a contribution to overall risk assessment

Cost saving and time performance is usually essential to all parties who are involved in a construction project that is owner contractor, and. The main causes of disputes in construction projects involve delay and failure to complete the work in the specified cost and time frame. The delivery time of a project is a key factor to the owner in terms of cost as much as it is for the contractor.

Unexpected increase in cost and delays in construction projects are caused by owner, contractor, environments, etc. in which several types of risk factors may occur concurrently. The effect of cost overrun and schedule overrun do not only influence the construction industry but the overall economy as well.

Risk management has become an essential requirement for construction projects. Process includes Hazard identification, Risk assessment and Risk control. Risk is assessed by Qualitative Methods and Quantitative Methods. Risk management is the systematic process of identifying, analyzing, and responding to project risk and it includes maximizing the probability and consequences of positive attributes and minimizing the probability and consequences of attributes adverse to project objectives.

Project risk is an uncertain event or condition that, if occurs, has a positive or negative effect on a project's objectives. Components of risk are an event that may or may not happen, the probability of the occurrence of that event and the impact of the occurrence of that event. There are many sources of uncertainty in construction projects, which include the performance of construction parties, resources availability, environmental conditions, involvement of other parties, contractual relations, etc.

As a result of these sources, construction projects may face problems that cause delay(s) in the project completion time. The key success indicators of construction management system(s) include completing the project with cost and time, within the planned budget and duration, and within the required quality, safety, and environmental limits. These goals are interrelated where each of them is affecting and affected by the others. An accurate cost estimating and scheduling should be sought in order to meet the overall budget and time deadline of a project.

Time contingency is used to guarantee the completion time of either an activity or a project. Due to the unique nature of construction projects, cost overrun and schedule overrun uncertainty are essential for true budget and scheduling, which should be flexible enough to accommodate changes without negatively affecting the overall cost and duration. It is also essential to allocate a contingency value to both cost and time.

Yet, there are situations where there could be delays in activities, whether they are within the critical path or not, which result in a delay in the overall project duration. These delays will consequently have a negative impact on the quality, budget, and might be safety of a project. Therefore, estimating cost and time contingencies are seen as a prime factor in achieving a successful construction project. Although several industrial sectors developed and used software for estimating time and cost contingencies in order to minimize delays and avoid being over budget, yet limited efforts are reported in the literature in the area of predicting time contingency in construction projects.

The overall objectives of the presented research in this paper are as follows:

(1) To identify and study the factors that affect cost overrun and schedule overrun;

(2) To develop a probability distribution charts for likelihood, cost impact and schedule impact; and

(3) To quantify the Risk assessment impact on cost and schedule.

Strategies for Negative Risks or Threats are Avoid, Transfer, Mitigate or Accept. On the other hand Strategies for Positive Risks or Opportunities are Exploit, Enhance or Accept.

Delays have an adverse impact on project success in terms of time, cost, quality and safety. Time-delays and cost overruns are among the most common phenomena in the construction industry. Therefore, planners and schedulers have used time contingency to guarantee the completion time of either an activity or a project. The easiest and safest way to build a time contingency is to extend the project end date to a point where there is a comfortable amount of positive float, which may not be cost effective or acceptable to the client. However, it might not also be acceptable to proceed in a project with a zero float plan. There is no standard definition of contingency in which it could imply different meanings to estimators, contractors, and owners' organizations. Contingency is probably the most misunderstood, misinterpreted, and misapplied word in project execution. It is an amount of money or time (or other resources) added to the base estimated amount to achieve a specific confidence level or allow for changes where experience shows obligation. It can also be defined as the budget that is set aside to cope with uncertainties during construction or the amount of money/time needed above the estimate to reduce the risk of overruns of project objectives to an acceptable level within the organization. Treasury identified two major categories of contingency for construction projects:

1. Design Contingency– it addresses the changes during the design process for factors such as incomplete scope definition and inaccuracy of estimating methods as well as data.

2. Construction Contingency– it addresses the changes during a construction process. Under a traditional procurement arrangement, the contract typically contains a variation clause(s) to allow for changes and provide a mechanism for determining and valuing variations.

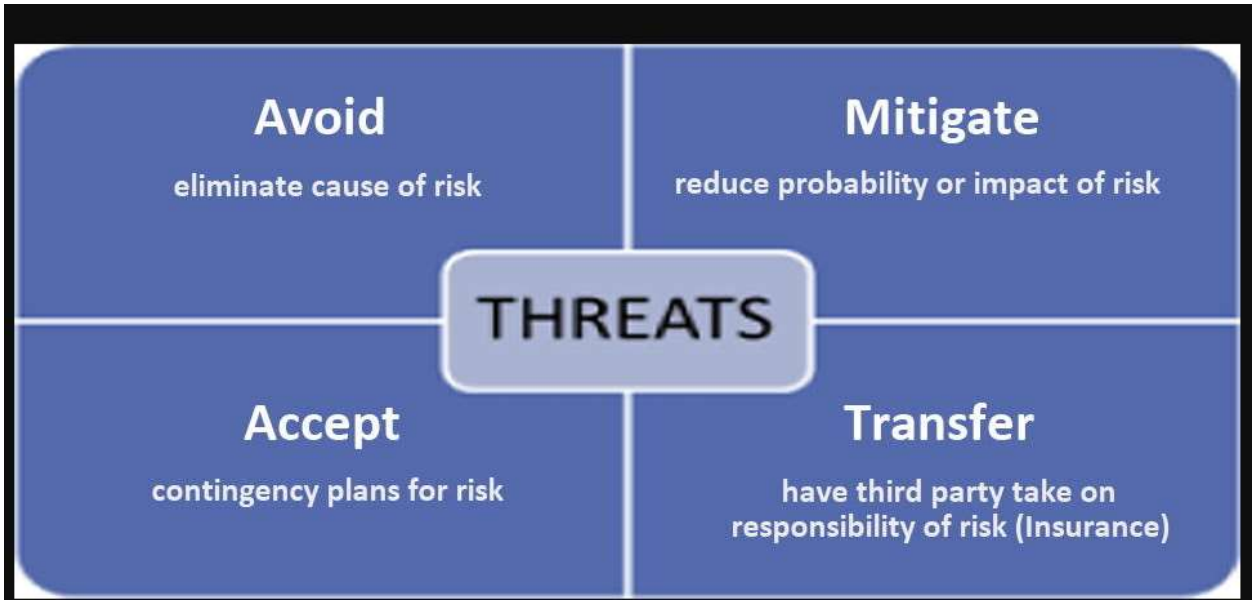

Fig.1 Strategies for negative risks

Hazard Identification: This is the process of examining each work area and work task for the purpose of identifying all the hazards which are “inherent in the job”. Work areas include but are not limited to machine workshops, laboratories, office areas, agricultural and horticultural environments, stores and transport, maintenance and grounds, reprographics, and lecture theatres and teaching spaces. Tasks can include (but may not be limited to) using screen based equipment, audio and visual equipment, industrial equipment, hazardous substances and/or teaching/dealing with people, driving a vehicle, dealing with emergency situations, construction. This process is about finding what could cause harm in work task or area.

Risk Assessment: Is defined as the process of assessing the risks associated with each of the hazards identified so the nature of the risk can be understood. This includes the nature of the harm that may result from the hazard, the severity of that harm and the likelihood of this occurring.

Self-check 2	Written test

Name…… ID…… Date…….

Test I: Choose the best answer **(**2 point each)

1. Which one of the following is the main dispute and hazard in construction work?

A. delay and failure to complete the work in the specified cost and time frame

B. stealing reinforcement

C. lack of labor

D. all

2. Unexpected increase in cost and delays in construction projects (hazard) are caused by

A. owner

B. contractor

C. environments

D. all

3. Which one of the following is inclusive?

A. Hazard identification,

B. Risk assessment

C. Risk control

D. Risk management

Note: Satisfactory rating > or = 3 points Unsatisfactory - below 3 points

Score----------
Rating----------

Information Sheet 3- Seeking additional information, expertise, or specialist advice to investigate the likelihood and consequence of identified risks

When you're in the workplace, you'll spend a lot of time every day gathering, conveying and receiving information and ideas – all important parts of being an effective employee. This could involve:

- interacting with others
- collecting information
- sharing information
- Developing and refining ideas
- giving and receiving instructions
- looking after clients.

Collecting information to collect information at work, you might have to use many forms of communication with a range of people. This could involve talking to someone face to face or on the phone, sending a letter or email, consulting a manual or code, or maybe looking something up online. Once you've found the information you were looking for, you need to share it with whoever needs to know and possibly record it for future reference. There are two essential skills to collecting information:

- Active listening
- asking the right questions.

Active listening Active listening means giving your full attention to the speaker so that you can:

• take in what they're saying

• understand their opinion

• let them know that you've understood.

Asking questions can be used to clarify or confirm what someone is saying to you, as we discussed in active listening. They can also be useful to keep a conversation going and get more information, especially from someone who is a reluctant communicator. Two main types of questions are open and closed questions. Closed questions such as 'Have you finished that job?' can be answered with just a 'yes' or 'no' response – they're good for getting a short, quick answer. However, too many closed questions can start to seem like an interrogation as they don't really give the other person the opportunity to direct the conversation at all. Open questions require a longer answer and tend to start with words like 'why' or 'how'. They allow the other person to give more information or an opinion and are friendlier when used in conversation. If you can develop good questioning skills, you will probably find you can interact more easily and effectively with people in your workplace.

Following on from the identification of hazards, the next step in the risk assessment process is the identification of the possible consequences of the realization of the hazards, that is, an assessment of who might be harmed, and of the effects and severity of the harm caused. This stage therefore involves the estimation of both the magnitude of the physical effects arising from realization of each hazardous event and the estimation of the severity of the harm caused to all those who may be affected (within the scope of the risk assessment).

If individual risk is being calculated, an estimate of the magnitude of the consequences of the event can be obtained by determining the extent over which a specified 'level of harm' would be experienced. If societal risk is being calculated, an estimate of the magnitude of the consequences of the event can be obtained by determining the number of people who would experience a specified 'level of harm'. In estimating the severity of the harm caused, it is important to consider all those who may be affected (within the scope of the assessment), including employees, other workers in the workplace, and members of the public.

Different approaches to estimating the consequences arising from realization of the hazardous events will be appropriate depending on the approach that is being adopted for the risk assessment, i.e. whether a qualitative or quantitative assessment is being carried out. However whether a qualitative or quantitative approach is adopted, the identification of the possible consequences should.

Self-check 3	Written test

Name…… ID…… Date…….

Test I: Choose the best answer **(**2 point each)

1. Which one of the following is the main day to day activity of an employee in the workplace?

A. interacting with others

B. collecting information

C. sharing information

D. all

2. Unexpected increase in cost and delays in construction projects (hazard) are caused by

A. owner

B. contractor

C. environments

D. all

3. Which one of the following is inclusive?

A. Hazard identification,

B. Risk assessment

C. Risk control

D. Risk management

Note: Satisfactory rating > or = 3 points Unsatisfactory - below 3 points

Score----------
Rating----------

Information Sheet 4- Documenting outcomes of the risk assessment process in a risk register

4.1. Documenting outcomes of the risk assessment process in a risk register

There are many situations at work when you will need to communicate in writing. You might need to complete forms, write letters take notes or send emails. The better you are able to express yourself in writing, the more effective you will be. Good writing is clear, easy to read, easy to understand and tells the reader exactly what they need to know.

A risk register is a tool that project teams can use to document and address project risks throughout the project life cycle. It is a living document – a comprehensive listing of risks and the way they are being addressed as part of the project risk management process. The risk register is maintained as part of the project file that also includes information related to uncertainties in the cost estimate and schedule.

Why use a risk register? - A new project team is formed for every project and disbanded when the project is complete. Also, project team members sometimes change, and the project experiences change over the duration of the project. Communication among project team members about the project objectives, costs, risks, etc., is vital. The risk register communicates project risks and helps the team members understand the status of the risks as a project moves from inception to completion.

How is a risk register used? - A risk register is best used as a living document throughout the project's entire life cycle, from project inception through construction, to record the evolution of project risks. There is no prescription for how extensive a project's risk register should be. The project team should decide the most beneficial use of the risk register, with the shared objective of minimizing the risk impact.

Managers should use the risk register as a management tool to provide a framework for reviews and updating that identifies, assesses, manages, and reduces risks (and exploits opportunities)to acceptable levels. Managers should also use risk registers for learning and application for future projects.

How is a risk register developed? – Development of the risk register, as well as the entire risk management process, is a Team process. The Design Project Manager initiates and "owns" the project risk management process until the project is moved to construction. The Project Manager should involve all functional design units, along with input from construction, in the risk management process from inception to hand-off to the construction team for their information.

Additionally, communication and consultation with project stakeholders is a crucial factor in developing and updating the risk register.

Self-check 3	Written test

Name…… ID…… Date…….

Test I: Choose the best answer **(**2 point each)

1. Which one of the following is the way through which documentation of a risk assessment?

A. sends emails

B. writes letters to concerned body

C. takes notes from work area

D. all

2. --------is a tool that project teams can use to document and address project situations throughout the project life cycle

A. risk register

B. contractor

C. environments

D. labor

3. Which one of the following is the advantage of project risk register?

A. it is used as a learning tool

B. it is used for future projects guidance

C. irrelevant

D. A&B

Note: Satisfactory rating > or = 3 points Unsatisfactory - below 3 points

Score----------
Rating----------

Operation sheet 1– Inspect the workplace for safety hazards

Procedure/steps to collecting existing information about workplace hazards

Step1: collecting information

Step2: organize information

Step3: review information

Lap Test 1	**Demonstration**

Name……ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates and materials you are required to perform the following tasks within 1 hour. The project is expected from each student to do it.

During your work: You can ask all the necessary information's to do the operation

Lap Test Title: Collect existing information about workplace hazards

Task Objectives / Demands: in accomplishing activities required for this project the student will be able to:

Know and understand Equipment and machinery operating manuals

Know Safety Data Sheets (SDS) provided by chemical manufacturers

Get Input from workers, including surveys or minutes from safety and health committee meetings

Understand Workers' compensation records and reports.

Reference Materials

Book:

1 Ethiopian Building Code Standard
2 Organizational Health and Safety books
3 The Health and Safety Poster and other HSE publications are available from www.hsebooks.com
4 Advanced electrical installation work fifth edition
5 estimating & costing (for the course of construction technology) First Edition : 2006

WEB ADDRESSES

https://youtu.be/KsUW5bHT64A

https://www.youtube.com/watch?v=JCQnx29au4g

https://www.youtube.com/watch?v=veF4uSUtrEY

https://www.youtube.com/watch?v=lfoTLeFooR4

https://www.youtube.com/watch?v=cXikq14Xu7w

https://www.youtube.com/watch?v=3UeV44KwM-I

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