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NATIONAL CERTIFICATE: ELECTRICAL ENGINEERING NQF LEVEL 2

APPLY AND MAINTAIN SAFETY IN A WORKING ENVIRONMENT

UNIT STANDARD: 258925

LEARNER GUIDE

APPLY AND MAINTAIN SAFETY IN A WORKING ENVIRONMENT

Unit Standard Number : 258925
Level Of The NQF : 2
Credits : 5
Field : Field 12 - Physical Planning and Construction
Sub Field : Electrical Infrastructure Construction

Learner Information:

Details	This section should be completed
Name and Surname	
ID Number	
Organisation	
Date started	
Completion date	
Student signature	
Facilitator name	
Facilitator signature	

Learner Guide Introductions

About the learner Guide and its purpose:

This Learner Guide provides you with a comprehensive understanding of ***Apply and maintain safety in a working environment*** and is therefore seen as the necessary tool that will be utilized to meet the correct assessment requirements to become competent in this Unit standard.
This Learner Guide forms part of a series of Learner Guides that have been developed for **National Certificate: Electrical Engineering NQF level 2.** The Learner Guides are developed and presented in a modular format. They are designed to enhance the knowledge and skills of students, and thus giving them the ability to efficiently and effectively complete the specific tasks

The Purpose of the unit standard

This unit standard is for persons in the Electrical Engineering, Generation, Distribution, Transmission, Construction, and Renewable Energy Sectors.

A person credited with this unit standard will be able to:

- Adhere to safety signs, regulations and procedures related to a working environment.
- Care for safety equipment.
- Follow appropriate safety procedures before, during and after job processes.
- Report and record safety anomalies.

This unit standard will contribute to the full development of the learner within the electrical engineering and construction environment by providing recognition, further mobility and transportability within the field of Physical Planning and Construction. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and upliftment within the electrical engineering and construction environment.

Learning assumed to be in place and recognition of prior learning
The following knowledge, skills attitude and/or equivalent:

- Introduction to the industry.
- Ability to distinguish colour.
- Knowledge of relevant sections of the OHS Act.

Session 1

Adhere to safety signs, regulations and procedures related to a working environment

Personal protective equipment is selected for a specific job

Personal protective equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards. Personal protective equipment may include items such as gloves, safety glasses and shoes, earplugs or muffs, hard hats, respirators, or coveralls, vests and full body suits.

What can be done to ensure proper use of personal protective equipment?

All personal protective equipment should be safely designed and constructed, and should be maintained in a clean and reliable fashion. It should fit comfortably, encouraging worker use. If the personal protective equipment does not fit properly, it can make the difference between life and death.

When it is necessary?

It is necessary to use the correct PPE as soon as your surrounding requires the use, most of the times especially in the construction and manufacturing industry, the site would be littered with safety signs indicating the need for PPE and also the specific PPE required. When any hazards are identified during the risk assessment, the need for PPE would also be identified, for instance if there is a lot of workers tossing bricks, grinding, demolishing, and so forth, the need for PPE would be clear as the work site is identified as an hazardous environment. It is very important to remember that PPE can only be used as a safety measure and not a guarantee.

What kind is necessary?

When entering a work site for the first time, inductions are very common, as it allows any workers to be informed of all the dangers, and also explains which PPE is required to be worn where. If an induction wasn't done, no need to fear as most of the worksites indicate which PPE is required on signs, usually situated at entrances. Safety officers may also be a good source of information if you are unsure.

What are the different types of PPE?

Personal protective equipment	When it is required	Where is it required
Head protection includes **hard hat** 	a Hard hat is required when there is a possibility for head injuries	a Hard hat is commonly worn where there would be working on heights above you or where there would objects flying due to heavy construction
Respiratory PPE includes **dust masks** and **respirators.**  	Respiratory PPE would be used when chemicals would be present in the air. Dust when grinding may also require the use for respiratory PPE	Respiratory PPE would be required where the air is polluted by chemicals, especially at laboratories and mines. Respiratory PPE would also be required where task such as grinding and breaking is present.
Eye protection includes s**afety goggles** and **welding helmet**  	Eye protection are required when doing tasks that include flying debris, for instance grinding. When eyes are exposed to sharp UV rays from a welding arc, a welding helmet will be required.	Eye protection would be required in areas where eye injuries are very common to appear, like a steel manufacturing plant, factory where debris may hang in the air.
Hearing protection may include ear **muffs** and **ear plugs**  	Workers shall be required to wear hearing protectors when engaged in work that exposes them to noise that equals or exceeds 85 dBA	Hearing protection should be worn within an environment that exposes you to a continuous noise equal to or exceeding 85dBA. Noise protection should also be worn when operating load machinery.
Hand protection includes **gloves** 	Gloves are required when handling tools that has the ability to injure your hand, or handling material the are either sharp or warm. When working with heavy or fast moving machinery it is also required to wear gloves.	Gloves are required in an environment where the possibility of losing a finger or injuring your hand may seem common, especially in a factory that has a lot of machines, or in a mine.
Foot protection includes **steel point safety shoes** and **safety spats**  	When there is any risk of falling material, tools or random objects, foot protection is required. Safety spats include a solid shield that is tied onto your shoe with the use of your laces, in protects the top of the foot where the steel point doesn't cover.	Steel point safety shoes are required almost everywhere, as a tradesman always has the risk of dropping something on her/his foot. Spats are not that commonly required and are usually required and mines and construction sites, as these sites usually have the strictest rules regarding PPE.
Body protection includes **overalls** 	Overalls are required to be worn as soon as there is a possibility for any body type injury from as small as a cut on the arm to amputating your entire leg.	Overalls are almost required in any workplace containing tradesmen, construction workers and so forth. The reason being, any type of job that requires physical labor, the possibility for injuries are common.

Height Protection includes **safety harness** 	Safety harnesses should be worn whilst carrying out any task where there is a risk of falling	Safety harnesses are required in an environment above ground where there is a risk of falling.

Safety Procedures are followed for a specific job.

A safety procedure is a step by step plan of how to perform a work procedure. This is used in cases where deviation from the procedure could lead to injury or accident. The safety procedure is a document that is put together by groups within the organization, and is used as a template when performing a particular task on the job.

Safe working procedure (SWP)

a Safe working procedure (SWP) is a physical document filled in with the necessary information about the task that is about to be carried out. Safe work procedures must be based on a risk assessment. It contains the scope of the work to be done, as well as a risk assessment. This document grants you the necessary permission to carry out your tasks, with the understanding that you have identified all hazards, and have done the proper risk assessment. The goal of this SWP is to have a record of the job that took place for if anything had to go wrong, also allowing for a full investigation to specify if the mistake was an accident or due to negligence.

Safe working procedures does not follow a particular format, however should include the following:

- name or description of the work task
- date the SWP was created and date it was last reviewed or revised
- hazards that may cause harm to a worker
- common signs and symptoms of a musculoskeletal injury if the hazards of the job task could lead to this type of injury
- equipment / devices, personal protective equipment (PPE), or other safety considerations necessary to perform the task safely
- required training and / or relevant documentation needed to perform the task safely
- steps to perform the task safely including safe body positions and / or movements as appropriate
- indication that workers are to be trained on the SWP and employers must ensure workers follow them

What is an unsafe act?

An unsafe act is any personal characteristic or condition that may cause or influence an employee to act unsafely. These conditions may be mental, emotional or physical. Some of the types of unsafe acts could be: unaware of the job hazard, inattention to job hazards, low level of job skill or inadequately trained for a specific job. It could be the employee tried to avoid extra effort or tried to gain or save time by taking a shortcut. A slip and fall is an unsafe

act because the employee could have prevented the slip and fall if he or she had been paying attention to the walking surface.
That old safety slogan "Think Safety" means just that. Think about what you're doing, how you're going to do it and then use your judgment to perform the job without accident or injury. One more example. Let's say you fall off a ladder. The unsafe act contributing to the fall was perhaps your inattention to the footing, or perhaps you exceeded the limitations of the ladder. You contributed to the accident.

What is a risk assessment?
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 analyse 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 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).
- Analyse 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).

To do a Risk assessment the following steps are very important:

Steps	Explanation
1. Hazard identification	the process of finding, listing, and characterizing hazards.
2. Risk analysis	a process for comprehending the nature of hazards and determining the level of risk **Notes:** **(1)** Risk analysis provides a basis for risk evaluation and decisions about risk control.**(2)** Information can include current and historical data, theoretical analysis, informed opinions, and the concerns of stakeholders. **(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

Applicable Statutory requirements are adhered to

Statutory requirements are those requirements which are applicable by virtue of law enacted by the government. These are enacted by passing the law in the legislative assembly or parliament. Together, policies and procedures provide a roadmap for day-to-day operations. They ensure compliance with laws and regulations, give guidance for decision-making, and streamline internal processes. Following policies and procedures is good for employees and your organization as a whole.

What are the key statutory and regulatory requirements?
These include:

- State occupational health and safety laws and regulations.
- Laws and regulations on employment.
- Human rights legislation.
- The privacy acts of federal and state governments.
- State laws on the legal entity of your organisation whether it is an incorporated association or a company limited by liability.

Statutory requirements at the end of the day is basically a rule book. It contains all the do's and don'ts for the work place. It sets the limits to what you can do within a legal range, and it protects both employee and employer. With the statutory requirements are not adhere to as an employee, a list of consequences could arise such as: Hearings, fines, and even prosecution, and same for the employer.

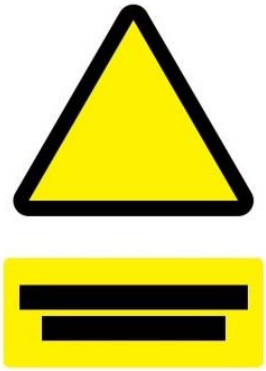
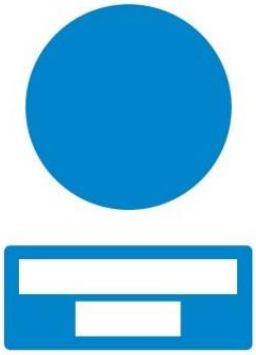
Safety signs and procedures are correctly interpreted

The purpose of having safety signage in the workplace is to identify and warn workers who may be exposed to hazards in the workplace. Safety signs can assist in the communication of important instructions, reinforce safety messages and provide instruction for emergency situations. Safety signs are a simple but effective way to warn people of hazards and risks. They may also outline measures your workers should take to minimise risks to their safety.

Where should signs be used?
Safety signs should be used in the following areas:

- anywhere containing a risk of serious injury, e.g. a fall risk;
- tasks or areas where correct PPE needs to be worn, e.g. hearing protection for noise exposure;
- wherever hazards exist that are not immediately obvious to a worker or member of the public, e.g. electromagnetic radiation;
- anywhere that vehicles, including forklifts and mobile cranes, commonly travel;
- anywhere containing dangerous goods or hazardous substances, including highly flammable or toxic materials;
- confined spaces; and

- **What type of safety signs are there?**

Type of sign	Defined
Prohibition: 	These signs should be used for "Do Not" commands. For example – to indicate that smoking is not allowed in a particular area. In the workplace they should be used to reinforce instructions prohibiting dangerous activities.
Warning: 	A sign giving warning of a hazard or danger (e.g. "Danger: High Voltage")These signs should be used to make people aware of a nearby danger. For example, a flammable liquid store.
Mandatory: 	A safety sign prescribing specific behaviour (e.g. "Personal Protective Equipment Must Be Worn"). These signs should be used to indicate actions that must be carried out in order to comply with statutory requirements. An area of a construction site where hard hats should be worn should also have appropriate signs at the entry points.

Emergency: 	A sign giving information on emergency exits, first aid, or rescue facilities (e.g. "Emergency Exit") These information signs should be used to indicate escape routes, emergency exits and first aid equipment.

The consequences of incorrect usage of safety procedures and personal safety

If a worker is not following procedure and it is not picked up on by supervisors and managers, the company may be exposed to greater liability for any workplace health and safety incidents that occur. The health of the worker is also put to the test, as not following the correct safety procedures can result in serious injuries and even death. There is many consequences in regard with incorrect usage of safety procedures and personal safety such as:

- **Increased injuries and death:** The most significant consequence of a poor safety culture is increased injury and death among employees
- **Higher costs:** Not having an easy-to-understand system for managing safety can increase costs significantly. Workplace injuries can lead to increased employee absence, higher healthcare costs, workers' compensation payments, lost productivity and business disruption.
- **Service quality:** The service quality decreases when the health and safety quality drops due to recklessness.
- **Damaged Reputation:** Your reputation depends in part on the safety of your operations. A damaged reputation due to poor safety practices can hurt your bottom line.
- **Legal issues:** Workplace safety incidents can also lead to workers' compensation claims and other legal issues that burden company resources and can further damage a company's reputation. Workers can also be prosecuted if unsafe acts are carried out intentionally.
- **Decrease in productivity:** Accidents due to poor safety practices in the workplace can drastically affect productivity.

Session 2
Care for safety equipment

Safety equipment is examined for damage or faults in accordance with worksite procedures

PPE stands for Personal Protective Equipment. As the name says, PPE's purpose is to protect employees in hazardous work environments. PPE typically is designed to protect the head (skull, ears, eyes, and face), the skin, hands and feet, and other bodily functions such as respiration and hearing. The importance of regular PPE inspections should never be underestimated. They should be performed regularly to ensure that the equipment has not lost its effectiveness.

Commonly Used PPE includes:

- **Eye and face protection.** Full face shields, spectacles, and safety goggles protect the face and eyes. This type of PPE is required in air-tool operations, hot-work, woodwork, metalwork, etc. due to debris that may damage eyes and the face.
- **Head protection.** Common on construction sites, hard hats are designed to protect against falling or flying objects that may penetrate or impact the worker. Too-large or too-small hard hats are inappropriate for use.
- **Hearing protection.** Many workers are exposed to harmful noise levels, but since it's not visible to the human eye, industrial noise is often not considered a work-related hazard. However, the majority of all occupational hearing loss cases happen to people who work in the manufacturing sector. The exposure to noise is reduced thanks to earmuffs and earplugs, which are standard hearing protection assets.
- **Skin and hand protection.** Rubber gloves, chainsaw gloves, and cut- and heat-resistant gloves are typical assets for protecting one's hands to help avoid hazards related to working with hot and slippery materials, electricity, sheet metal, glass, and chemicals. A lot of work is done with the hands, so protecting the hands' skin is essential.
- **Respiratory protection.** If there are toxic substances and air contaminants present on site, then respiratory protection is critical. Workers need to be protected from pesticides, paint spray, fumes, dust, and other dangerous airborne substances.

The Importance of Regular PPE Inspections

PPE can lose its effectiveness or become damaged due to exposure to grit, dirt, chemicals, UV light, misuse, or general wear and tear. That's why regular inspections are essential for making sure that the PPE is fit for its purpose, in date, and fully compliant.

When not being used, PPE should be kept at room temperature away from moisture, UV light, and chemicals. These factors—along with dirt, grime, snags, and abrasion from work speed up the aging process for PPE. Inspection and maintenance help you extend the life of your safety equipment, and under no circumstances should the gear be taken for granted.

Through regular inspection, you will be able to see whether your PPE is past its useful life. If it is, it needs to be disposed of in a way that unwary workers can't find it and use it again. If there is a pile of old equipment in your working environment that just hasn't been thrown out, you should get rid of it so nobody can use it (intentionally or accidentally).

Report and record of faulty equipment in accordance with worksite procedures

An inspection on safety equipment is supposed to be done frequently to ensure the safety of the worker using it. If safety equipment is found to be damaged and unsafe it is very important to report and record it. A lot of companies request a checklist type form to be filled in during these types of inspections, so that all equipment is documented. Even though this is an excellent procedure to implement in a company, some companies don't implement this leaving you as a worker to inspect or not to inspect as you feel. If there are defects to be found in the safety equipment it is important to report it and record it.

Who to report to?

- Supervisors
- Managers
- Health and safety representatives

How to report?

- Talking to manager or supervisor
- Completing a hazard/incident report form
- Raising it at a staff meeting

Safety equipment is cleaned, cared for and stored safely

Storing And Maintaining Safety Equipment
Safety equipment needs storing correctly when not in use. It needs keeping clean and in good condition, with nominated individuals having responsibility for regularly checking equipment safety. If equipment parts such as filters need replacing, they should always meet the same safety standards as the originals.

Cleaning and maintenance instructions from the PPE manufacturer must be followed for reusable PPE. Never reuse any type of disposable (one-time use) PPE equipment, because you can be exposed to residues remaining on the PPE from the previous use, or to product moving through damaged or deteriorated PPE during reuse.

Storage
The importance of maintaining and carefully storing safety equipment is to prevent it from getting damaged, as well as alleviating risks of it falling and causing injuries. As well as making sure you're storing your PPE in the right place, it's just as important to ensure you're storing it in the right way.

The most important things to remember are to keep your PPE storage area clean, tidy, and organised. Avoid stacking things on top of each other excessively and utilise organisational tools like wall hooks and shelves where possible.

It should also be clear in your workplace who exactly is responsible for storing the equipment and maintaining it. This person (or people) will need to be trained in such a capacity and should be fully up to date with PPE legislation. This includes checking the expiry dates on hard hats and other equipment and having a working understanding of legal requirements.

Of course, there is some PPE that is not reusable and needs to be disposed of after use. In these circumstances, you need to make sure that potentially hazardous waste materials such as chemicals and biological waste are correctly dealt with according to legislation. There are very strict penalties for those found not to be complying with the law in this area.

Session 3

Follow appropriate safety procedures before, during and after job process

What is the appropriate safety procedure for the activity being undertaken?

A safe system of work is a step-by-step method of carrying out a task that considers the hazards and risks involved and clearly states the control measures required before starting your task. The site-specific risk assessment will determine whether a safe system of work is required. The safe system of work must:

- Clearly state the task it covers;
- Highlight the major hazards;
- Detail the steps to safely complete the task (including means of isolation, who can undertake the task, how it is supervised, emergency controls, PPE requirements etc);
- Be provided to all employees who are to undertake the task.

All relevant staff must be made aware of the requirements of the safe system of work prior to the task being undertaken.

Is the correct PPE being used?

During the setting up of your safety work procedure before undertaking your task, the PPE required is going to come in consideration, as the use for the correct PPE is of outmost importance. PPE is very important as specified in the previous chapters, and the use of the incorrect PPE can result in long term damage (for instance not using earplugs whilst grinding can damage your ears in the long run) and fatal occurrences (for instances not using safety harness and falling from a tremendous hight can result in death). So it is very clear that the right PPE has to be in consideration before starting each task, therefore the following points should be considered:

- **What is the hazard?:** Height, falling objects, loud noise etc, are all considered hazards.

- **What is the effect of the hazard?:** Is it a long term effect, lethal effect or fatal effect? This will give you the necessary guidelines when planning for the correct PPE.

- **Identify the correct PPE:** After the hazard has been identified, and its effects had been brought under consideration, you have the necessary understanding of what PPE is going the correct PPE for the task.

Dispose of waste materials in such a way that it meets environmental requirements

Disposable PPE that has fulfilled its duty is considered a waste material. The World Health Organization states that **PPE** should be **disposed** of in a closed-lid receptable and not a regular garbage bin. This is because used **PPE** should be treated as infectious or offensive waste; **disposal** should be handled in a **way** that prevents the transmission of infectious disease to the wider population. If the PPE indicates that it is recyclable then it should be recycled, otherwise not. The reason for this is many types of PPE are flimsy or flexible in design (think gloves and masks) and can clog sorting equipment at the recycling centre, making it difficult to sort the right stuff.

closed-lid receptable

Session 4

Report and record safety anomalies in accordance with worksite procedure

What are unsafe conditions?

The **unsafe act** is a violation of an accepted safe procedure which could permit the occurrence of an accident. The **unsafe condition** is a **hazardous** physical **condition** or circumstance which could directly permit the occurrence of an accident.

Common types of unsafe working conditions

- Lack of training.
- Operating equipment without training or authorization.
- Using defective equipment, such as power tools or ladders.
- Failure to warn others about a safety hazard.
- Operation of equipment in an inappropriate manner.
- Workplace congestion.
- Poor housekeeping.
- Fire hazards.

Recording and reporting procedure

The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) require employers, or in certain circumstances others who control or manage the premises, to report to the relevant enforcing authority and keep records of:

- **work-related deaths**
- **work-related accidents which cause certain specified serious injuries to workers**.
- **cases of industrial diseases**
- **certain 'dangerous occurrences' (near-miss accidents)**
- **injuries to a person who is not at work, such as a member of the public, which are caused by an accident at work and which result in the person being taken to hospital from the site for treatment**

Reports to the enforcing authority of all of the above categories, must be made immediately by the quickest practicable. In addition, **records** must be kept of all

Why report and record?

Reporting and recording are legal requirements. The report tells the enforcing authorities for occupational health and safety (HSE and local authorities) about serious incidents and cases of disease. This means they can identify where and how risks arise and whether they need to be investigated.

It also allows HSE and local authorities to target their work and provide advice on how to avoid work-related deaths, injuries, ill health and accidental loss.

Information on accidents, incidents and ill health can be used as an aid to risk assessment, helping to develop solutions to potential risks. Records also help to prevent injuries and ill health, and control costs from accidental loss.

Dangers related to incorrect reporting

Timely **reporting** also allows sites to recognise clusters and trends of **incidents**, including potentially serious **incidents** (i.e. near misses). This, in turn, provides an opportunity for management to address root causes.

What happens if not reported?:

- Hazard may not be identified
- Incorrect assumptions may be made about exposure to hazard and associated risks
- Risk assessment may be flawed because it does not include all knowledge for the workplace or activity
- Outcome for the next person may not be so favourable.

What happens if incident reporting is not done well?:

- Risk assessment may be inadequate
- Control measures could be ineffective because they are based on insufficient or incorrect information.

What happens if not recorded?:

- Loss of operational knowledge
- No opportunity to identify trends or clusters of incidents over time (i.e. lessons learnt can be lost)