**TECHNICAL REPORT ON THE STUDENTS' INDUSTRIAL WORK EXPERIWENCE SCHEME (SIWES)**

HELD AT

## TOKITO ENGINEERING WORKSHOP

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*BY*


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*SUBMITTED TO:*

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## DEDICATION

I dedicate this report to God Almighty for His Unlimited Grace, Consistent Love, Immeasurable Faithfulness, and for sparing my life throughout the period of my SIWES programme.

Secondly, I dedicate it to my parents **Mr & Mrs UMARU** for their undiminished support and unquantifiable assistance throughout the whole exercise and beyond.

## ACKNOWLEDGEMENTS

First and foremost, my deepest acknowledgement goes to God Almighty for His overwhelming love upon my life throughout the Scheme.

I appreciate my parents Mr. and Mrs UMARU and friends for their constant help and support.

I also appreciate all workers of Tokito engineering workshop, especially my supervisor Mr. SULYMAN who gave out of his tight schedules to attend to me.

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# CHAPTER ONE

## 1.0 INTRODUCTION TO SIWES

In 1974, the federal government of Nigeria introduced the National policy on industrial training called the student industrial work experience scheme (SIWES).

This program is under the umbrella of the ministry of education through the Industrial Training Fund (ITF), was design to help student acquire the necessary practical education experience in their fields of study and other related professions.

The program was established basically to impact elaborate practical understanding to student with respect to their various discipline. It is also intended that the student through a process of relation to academic knowledge and practical industrial application would understand the underlying principle and become better focused and acquire the practical application toward excellence in his/her discipline.

The student are expected to develop occupational competence that would facilitate their fitting into the world of work after graduation.

## 1.1 AIM AND OBJECTIVE OF SIWES

The student industrial work experience scheme (SIWES) has it major aims and objective of establishment. The following are the aim and objective of the program.

i. To provide student an opportunity to apply their theorical knowledge in really work situation, thereby bridging the gap between theory and practical.

ii. To expose student to working method and techniques in handing equipment and machineries that is not available in their various institutions.

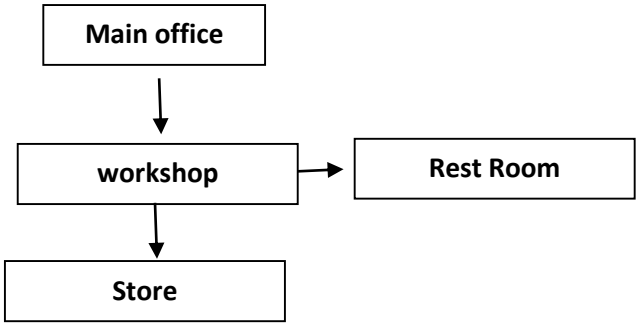
iii. To make the transition from the institution to the world of work easier and thus enhance student contact for later job placement

iv. To prepare student in skill development by participating in field works, particularly in writing report in their fields of works.

## 1.2 HISTORICAL BACKGROUND OF THE ORGANIZATION ATTACHMENT

Tokito engineering workshop was founded in year 2000 with a passion for innovative generator solutions. Initially, the workshop focused on repairing and maintaining generator for local businesses and household

## 1.3 ORGANIZATION CHAT OF THE ORGANIZATION




## 1.4 MAJOR ACTIVITIES OF THE ORGANIZATION

Tokito engineering workshop focused on repairing and maintaining generator for local businesses and household

## 1.5 WORKSHOP SAFETY

Safety is the preventive measure timely taken to guide against any form of hazard injury or accident in our daily activities in the workshop. Workshop safety is particularly focusing on ways of preventing danger particularly accident, injury a times death to personnel or other things around the operator while doing work. The following are the basic work shop safeties that must be comply with these include:

I. Do not use the hand to stop the working machine

II. Do not play with any tools

III. Know where the emergency stop buttons are positioned in the workshop in case of accident.

IV. Always listen carefully to the supervisor and follow the instructions.

## CHAPTER TWO

### 2.0 IDENTIFICATION OF TOOLS AND THEIR USES

1. **A flat spanner** is a hand tool used to tighten or loosen nuts and bolts. It's a type of spanner, which is a tool that provides grip and mechanical advantage to turn objects.

How it works

- Flat spanners have two flat ends and are made of strong, durable material.
- They're used to turn rotary fasteners like nuts and bolts.
- The spanner applies torque to turn the object.

2. **A screwdriver's** function is to turn screws in order to tighten or loosen them. Screws are often used to fasten objects together.

**How it works**

- The head of a screwdriver fits into the shaped cavity and protrusion of a screw.
- Torque is applied in a clockwise or counter clockwise direction to turn the screw.

**Types of screwdrivers**

- **Flat head screwdriver**: Used to drive or remove screws with a flat head
- **Phillips head screwdriver**: Used to drive or remove screws with a Phillips head
- **Hex head screwdriver**: Used to drive or remove screws with a hex head
- **Torx head screwdriver**: Used to drive or remove screws with a Torx head
- **Offset screwdriver**: Used when a straight-shank screwdriver can't reach the screw

The following are the basic workshop hand tools and equipment used in mechanical workshop:

3. **Long nose pliers**, also known as needle-nose pliers, are used for gripping, bending, and cutting small objects and wires. They are useful for reaching into tight spaces and working on electronics, jewelry, and mechanical repairs.

**Uses**

- **Grip small objects**: Long nose pliers are ideal for gripping small objects with precision.
- **Reach awkward places**: The long shape of long nose pliers allows them to reach into small areas where fingers or other tools can't reach.
- **Bend loops**: Long nose pliers can be used to bend loops in wires.

- **Attach wires**: Long nose pliers can be used to attach wires.
- **Cut wires**: Some long nose pliers have integrated cutters for cutting soft wires and other materials.

4.

5. **A plug spanner** is a tool used to remove plugs from machines like motorcycles and generators. It can also be used on other machines that use similar plugs.

How it works

- Plug spanners are made of metal to avoid breaking.
- Some plug spanners are magnetic, which can help remove spark plugs from hard-to-reach places.
- The shape and handle of a plug spanner can help tighten the plug without deforming it.

6. **A cross wheel spanner**, also known as a cross wrench or tire iron, is used to loosen and tighten nuts and bolts on vehicle wheels. It's a key tool for automotive maintenance, such as changing tires and performing routine inspections.

How it works

- The cross design of the spanner provides extra turning leverage to make it easier to loosen or tighten the nuts
- The spanner's sockets come in different sizes to fit different lug nuts

**Types of cross wheel spanners**

- **Fixed length**: A single-piece tool that comes in different sizes
- **Telescopic**: Has an adjustable handle length to provide extra leverage
- **Multi-head**: Has multiple heads at either end or in a cross formation

## CHAPTER THREE

## 3.0 STUDENT SPECIFIC INVOLVEMENT AT VARIOUS SECTIONS

At TOKITO engineering workshop they deal mainly with repair of Generator, I was involved repair of different product of generator.

### An Engine generator

An Engine generator is best described as a machine, which transforms mechanical energy into electrical energy through combustion of a fuel. Although most of the engine driven generators have been argued to be hazardous to the environment but they offer various advantages to the users in industries.

An engine generator set is more commonly known as “Genset”. They are generally rated in horsepower or a torque, watts or Kilowatts. The main components of an engine driven generator include an engine, fuel supply mechanism, a constant engine speed regulator and a generator voltage regulator, cooling and exhaust systems, and lubrication system which have been described in detail in this article.

Generators usually use the following as fuel: gasoline, diesel, natural gas, propane, biodiesel, water, sewage gas or hydrogen. Generators of small size use gasoline (petrol) or diesel as a fuel, and the larger ones run on diesel, natural gas or propane. Some engines may also operate on diesel and gas simultaneously.

**Engine Generator**

**A.C Generator System**

AC generators (whether small, medium or large in size) comprise of various systems and components and in other to understand the working and construction of these generators, there is need to study the individual systems and components. This is the reason for this chapter.

The systems in an A.C. generator could either be mechanical or electrical and these systems comprise of different components which work together to ensure the proper functioning of the system. The various systems and their components are.

1. The Combustion System

2. The Exhaust System

3. The Starter System

4. Cooling and Lubrication System

5. The Lighting System

## 3.1 The Combustion System

The engine of a generator produces mechanical force and motion from the latent chemicalenergy in the fuel burnt in its combustion chamber. Hence, it is called an internal combustion engine. Various type of generator engines is designed to operate on different variety of fuels such as diesel, gasoline, propane (in liquefied or gaseous form), or natural gas. Smaller engines usually operate on gasoline while larger engines run on diesel, liquid propane, propane gas, or natural gas. Some other engines can also operate on a dual feed of diesel and gas, kerosene and gasoline in a bi-fuel operation mode.

Piston with Rings, Basket Bearing, Connecting rods, and Key

Adequate supply of pressure in the combustion chamber is ensured by the piston rings. The major problem encountered with use of piston is that carbon becomes deposited on the piston head and its sides after being used for some time and it leads to low efficiency of generators. But this can be fixed by removing the carbon or replacing the piston and piston ringsas we always did during my industrial training experience.

**Crankshaft:** This component is usually forged from steel and it is the part of the engine which translates the reciprocating linear piston motion into rotation.

**Cylinder Block:** This is the component that houses the combustion chamber and its componentparts include the cylinder- where the piston is housed, the inlet and exhaust valves, and the cylinder cap- on which the spark plug is located.

Cylinder Block

Due to the heat from the combustion chamber, the cylinder block is shaped in a series ofradiating fins with a large area of metal to radiate heat away from the cylinder.

**Governor:** In gasoline generators, the governor regulates the amount of fuel admitted thereby maintaining a near constant speed no matter the load or fuel supply condition.

**Spark Plug:** The spark plug is responsible for ignition in the combustion chamber of the cylinder and as stated above, it is located on the cylinder cap. It causes the ignition of the air andfuel mixture from the carburetor.

**Generator fuel tanks** are containers designed to store and deliver fuel to a generator



**Carburetor:** The air and fuel mixture for combustion in the cylinder block is supplied in the correct proportion by the carburetor. Some generators make use of one carburetor while others use fuel injectors.

## 3.2 The Exhaust System

The incomplete combustion of carbonaceous fuel in the engine lead to pollution by the emission of sulphur (IV) oxide, SO2, carbon (II) oxide, CO and so on. These air pollutions

emissions might be fatal and exposure to the noise from the engine's exhaust for a long time can lead to loss of hearing. Therefore, the exhaust system must be installed in such a manner to prevent its emissions from accumulating from the combustion chamber in the engine.

**Silencer:** A silencer (Muffler) is a device for reducing the amount of noise emitted by the exhaust of an internal combustion engine.

**3.3 Starter:** The starter has a small catcher, big catcher, washer, coiling spring, starter rope, starter handle (with all made of plastic). Without this component, the generator cannot kick off.

**Battery:** Batteries are only present in large and some medium generator. The key or on/off button starter is operated by means of a battery and a battery charger is used to continuously keep the battery charged by supplying it with a precise voltage.


## 3.4 Cooling And Lubrication System

As the engine of a generator continues to work, the combustion in the internal combustion engine generates a great deal of heat and some of this heat is transferred to the walls of the engine. If the body of the engine is allowed to reach too high a temperature, failure will occur either as a result of the engine physically failing or any lubricants used degrading to the point that they no longer protect the engine. This brings about the need for cooling the generator engine.

Cooling is a very important factor as it relates to the life and performance of the generator.

## 3.5 The Lighting System

The lighting system is the electrical system of the generator which ensures that the mechanical energy is converted to electrical energy. It comprise of the following componentsdiscussed below:

**Capacitor:** This is a passive electrical component that is used to store energy in the electric field between a pair of conductors (called plates).

**Stator/Field Coil:** It is a stationary component which contains a set of electrical conductorswound in coils over a laminated iron core. It is responsible for creating the magnetic field.

# CHAPTER FOUR

## 4.0 EXPERIENCE GAINED

During the four months program, I gained a lot at TOKITO engineering workshop, I gain on how to service generator of different product, I know how to repair a leaking fuel tank, I gain on how to on how to change the capacitor. All this gives me the knowledge of maintaining and repairing of the generator.

I also gain a communication on how to attend to customers.

## 4.1 INTERPERSONAL RELATIONSHIPS WITH THE ORGANIZATION

My four month SIWES program has equipped me the knowledge of mechanical engineering design in term of maintaining and repairing of generator.

During the course of staying with the industrial base surpervisor at Tokito engineering workshop has turn a new movement in my course of study

## 4.2 SUGGESTION FOR IMPROVEMENT OF THE PROGRAM

The Industrial training Fund should have up and hold a committee on inspecting the student in their various organization that they are attached to as this will improve the level of seriousness of the student to the program. Also the federal government in collaboration with the Industrial training Fund (ITF) to increase the student allowance for the program as this will encourage them in active participation.

# CHAPTER FIVE

## 5.0 CONCLUSION

I found it interesting and I fully participated in it which in turn yields a successful result indeed it prepares me for future challenge in my chosen field. This SIWES program has turn out to be more interesting education due to the nature of the program itself.

## 5.1 RECOMMENDATION

The experience I gained during my SIWES program cannot be over emphasized I was practically oriented I humbly recommend that the SIWES program should be made compulsory for student of engineering, fields in order to gain more experience in their course of study.