TECHNICAL REPORT 0N

STUDENTS INDUSTRIAL WORKS EXPBRIENCE SCHEMES (SIWES)

HELD AT

GBENGA AUTO MECHANICAL ENGINEERING

CONTACT OFFICE

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SUBMITTED TO:

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DEDICATION

I am delight to dedicate this report to Almighty **Allah** who gave me the grace and opportunity to complete this programme.

PREFACE

The student industrial work experience scheme (**SIWES**) helps in exposing students to the practical application of their course and to get used to equipments and machines used in the factory. The **SIWES** was established to promote student skill in industrial practice and pre-expose them to working experience in industrial setting.

The **SIWES** programme covered a period of four months from August to November 2024 and it is a partial fulfilment of a two year academic programme to obtain an **OND** certificate in Engineering. The report explains the description of work done.

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CHAPTER ONE

1.0 INTRODUCTION

SIWES program was established in year 1973 by the federalGovernment of Nigeria through the industrial Training Fund (ITF) under the National Board of Technical Education (N.B.T.E) and it has its head quarters in Jos, plateau state.

There are other reasons behind the establishment of SIWES program, but the major reason is to learn the practical aspect of their field of study while still in course of study, which will help to face the future challenges in their respective field of study.

1.1 DEFINITION OF SIWES

Student Industrial Work Experience Scheme (SIWES) can simply be defined as a course by which student are exposed to practical training in their respective field of study. Its aim is to expose students to work practically in their respective disciplines. However, the scheme therefore was introduce to enable students match theoretical classroom knowledge with related practical knowledge in the industrial environment.

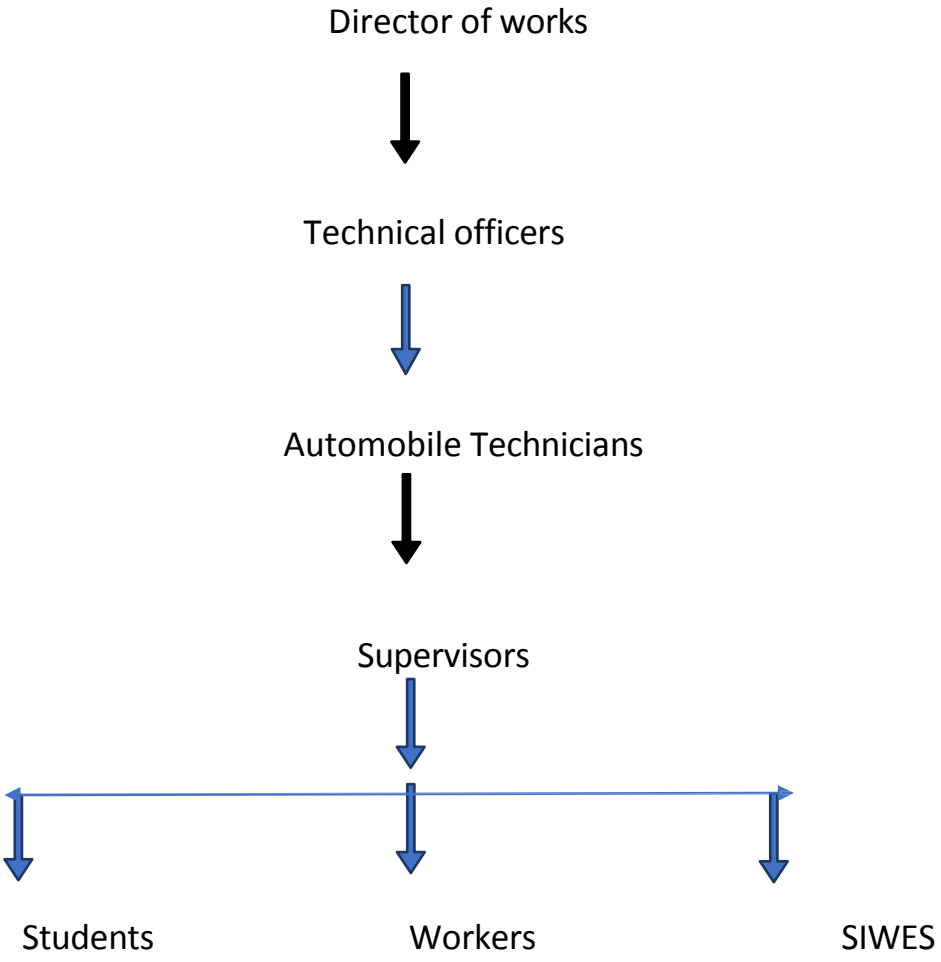
1.2 AIM AND OBJECTIVES OF SIWES

- SIWES helps the student to have experience and develop during industrial training.
- To improve students in the practical aspect of their field.

- It helps to improve quality of student in the level of their technology.
- It make es student to find their interests in the various fields of study.
- To prepare student for the future.

CHAPTER TWO

2.1. ORGANIZATION CHART



CHAPTER THREE

3.0 WORKDONE

3.1 VARIOUS TOOLS AND EQUIPMENT AND THEIR FUNCTION IN AUTOMOBILE WORK SHOP

Tools and **Equipment** can be any items or any apparatus that is

Used to achieved a goal or specific objective either mechanical or non-

Mechanical. Also tools are most componet in automobile work shops.

Plug spanner: used for removing plugs inside engine.

Sets of spanner: they are strong metal with jaw end for fitting over and Twisting nut. Different kinds of spanner are adjustable.

Screw driver: used for removing screws, types screw drives are flat and star.

Pliers: used for holding nuts and bolts, types of pliers are circle, clip long nose and ordinary pliers.

Adaptor: it is used to hold socket

Jack: used for lifting vehicle.

Chisel: for cutting thin sheet metals, types flat and pointed.

Hammer: for hammering our job. Types of hammer are ball, pen, iron, sledge, milling, millet and ordinary hammers.

Engine hoist: for removing engine inside vehicle.

3.2. ENGINE

An engine is a machine with moving parts that convert power into motion. The engine is the power house of the motor car; it converts the heat produced by the burning fuel into mechanical energy to turn the wheels. The fuel is a mixture of petrol and air, is burnt in a closed system cylinder engine hence the name is internal combustion. Petrol and air are mixed in a carburettor

and is drawn into a combustion chamber at the top of each cylinder. Pistons inside the cylinder, the compressed mixture which is ignited by a spark plug. As the mixture burns, which is expansion will occur forcing the piston down on its power stroke.

The up and down movement of the piston is transformed into rotary movement to drive the crankshaft, which in turn transmits power to the wheels,

through the clutch, gear box and final driver. The components part of the car engine are Carburettor, Spark Plug, Piston, Rotary Crankshaft, distributor, oil fitter, oil pump, cylinder block, cylinder head, cylinder, Coil, air fitter, pushrod, valve. fan, fan belt, alternator, timing chain, radiator and gear cover.

3.3. PART OF AN ENGINE AND THEIR FUNCTIONS

Carburettor: Is a device in the internal combustion of engine for mixing air with Fuel together and spray of liquid fuel.

Carburettor is a device for supplying a spark ignition engine with a mixture of fuel and air. Component of carburettors usually include a storage chamber for liquid, fuel, a choke, idling (slow running) jet, a main jet, a venture-shaped, air-flow restriction, an accelerator pump. The quantity of a butterfly-valve reduces the intake of air and allows a fuel- rich charge to be drawn into the cylinders when a cold engine is started. As the engine work up, the choke is gradually open either by hand or automatically by heat- engine speed-responsive controllers. The fuel flows out of the idling jet into the intake air as a result of reproduce pressure near the partially closed throttle valve. The main fuel jet comes into action when the throttle valve is further open. Then the venture shaped air-flow restriction create a reduced pressure for drawing fuel from the main jet into the air stream at a rate relates to the air flow so that a nearly constant fuel-air ratio is obtained. The accelerator pump injects fuel into the inlet air when the throttle is opened suddenly.

STORAGE CHAMBER (CARBURETTOR, INJECTOR)

Sparking plug: Is a device for delivering electric current from an ignition system to the combustion chamber of a spark-ignition engine to ignite the compressed fuel/air mixture by an electric spark, while containing combustion pressure within the engine, a spark plug has a mental threaded shell, electrically isolated from a central electrode by a porcelain insulator.

The sparking plug and ignition system

Piston: Is a component of reciprocating engine, reciprocating pump, gas compressor and pneumatic cylinders among other similar mechanisms. It is the moving component that is contained by a cylinder and is made gas- tight by piston rings. In an engine, its purpose it to transfer force from expanding gas in the cylinder to the crankshaft via piston rod and connecting rod. In a pump,the function reversed and force is transferred from the crankshaft to the piston for the purpose of compressing or ejecting the fluid in the cylinder. in some engines, the piston also acts as a valve by covering and uncovering ports in the cylinder wall.

The piston

Crankshaft: is a part of an engine that translates reciprocating linear piston Motion into rotation. To convert the reciprocation motion into rotation, the crankshaft has crank throws' or 'crankpins', additional bearing surfaces whose axis is offset from that of the crank, to which the "big ends' of the connecting rods from each cylinder attach. Its typically connects to a flywheel to reduce the pulsation characteristics of the four strokes cycle, and sometimes a tensional or vibration damper at the opposite end to reduce the tensional vibrations often caused allong the length of the crankshaft by the oylinders farthest from the Output end acting on the torsion elasticity of the metal.

The crankshaft

Oil filter: An oil filter is located on the side of the engine block, which is

lower, larger part of the engine. An oil pump circulates the oil passes through the engine and every time the engine oil circulates it passes through the filter which protects the engine by catching any large particles in the oil that might damage the engine if allowed to circulate freely. The oil filter serves a dual purpose, as

it also protects the engine by retaining a small amount of oil when the engine is turned off. The part that makes this retention possible is called the anti-drain back valve. While the engine is at rest, the oil drains into the bottom of the engie without proper lubrication when the car is started again. However the small amount of oil remaining in the filter will circulate quickly into the top of the engine during the couple of seconds after the car is started, restoring proper lubrication as soon as possible Fig. 9: Oil filter

Oil pump: it is used to pump oil throughout the engine and it also has a filter which remove the dirty in the oil before transferring it to the engine.

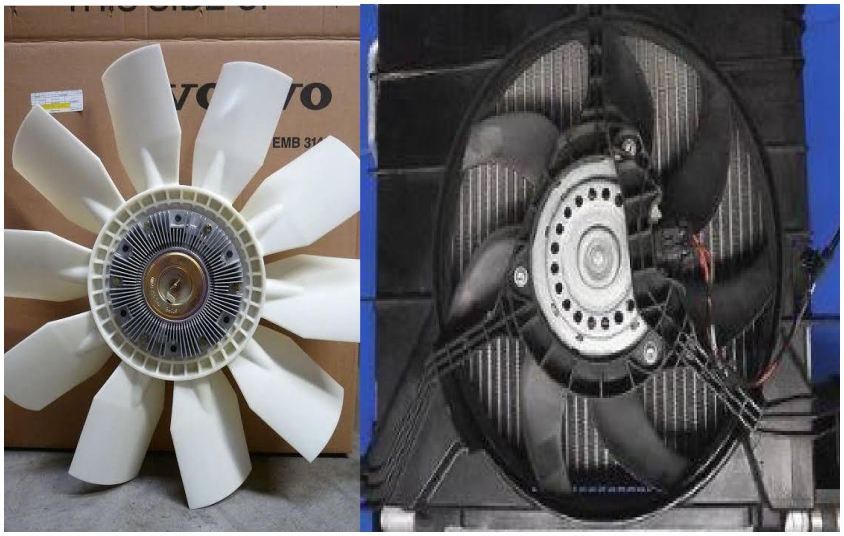
OIL FILTER

OIL PUMP

Valve: They are open and close at predetermined times, which for vary with diferent designs of engine. They control the entry of mixture and allow the exhaust gases to escape. The valves used in motor vehicle engine are called poppet or mushroom valve.

Valve

Fan: Is the device with rotating Blades that creates a current of air which cool the radiator.



Fan blade

Fan belt: Is a belt which drives the fan that cools the radiator of a motor vehicle. It is a loop with flexible material use as a mechanical linkage for two or more rotating shafts. Belts may be used as a source of motion, to transmit power efficiently, or to track relative movement. Belts are looped over pulleys. In a two pulley, the belt can either drive the pulleys in the same direction or the belt may be crossed, so that the direction of the shaft is opposite. As a source of motion, a conveyor belt is one application where the belt is adapted to the continuously carry a load between two point

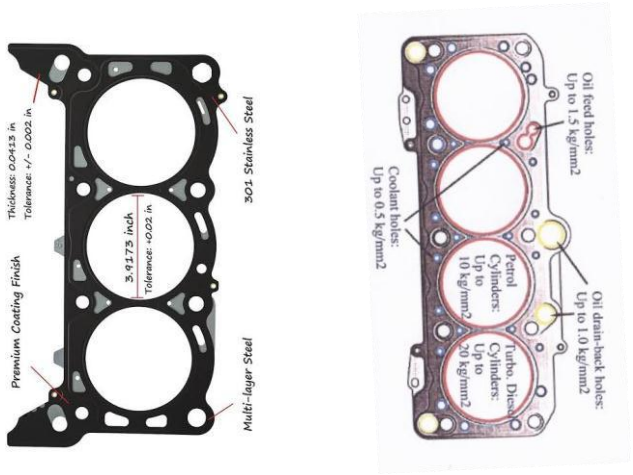
Fan belt

Radiator: is a cooling device which water in been stored and the water moves into the engine to cool it and return back.

They are heat exchangers use to transfer thermal energy from one medium to another for the purpose of cooling and heating. The majority of radiators are constructed to the function in automobiles, buildings and electronics. The radiator is always the source of heat to its environment, all through this may be for either purpose of heating, this environment or for cooling the fluid or coolant supplied to it, as for engine cooling. Despite the name, radiators generally transfer the bulk of their heat via convection, not by thermal energy though the term 'convector' is used more narrowly. Fig. 17:

RADIATOR

Top Gasket: it is gasket that sits between the engine block and cylinder head(s) in an internal combustion engine. The purpose is to seal the cylinders to endure maximum compression and avoid leakage of coolant or engine oil into the cylinder, such as it is the most critical sealing application in any engine, and, as parts of the combustion chamber it shares the same strength requirements as other combustion chamber components.



Top gasket

3.4 THE FUEL SYSTEM

The fuel system consists of the fuel tank, fuel gauge, fuel pump, carburettor intake manifold, connecting fuel lines, fuel filters and accelerator pedals and linkage. The accelerator pedals controls the amount of air fuel mixture entering the engine cylinders and thus the amount of power the engine produces.

1. The fuel tank provides a reservoir or storage container where the fuel is been stored for use.
2. The fuel gauge has an indicator needle on the instrument panel to show how full he tank is and this displayed on the dash board in front of the driver.
3. The fuel pump delivers fuel from the fuel tank to the carburettor under pressure.
4. The carburettor mixes the right proportion of the fuel and air and delivers into the engine cylinder.

Fuel filter: is a filter in the fuel line that screens out dirt and dust particles From fuel, before getting to the carburettor or injector pump, normally made Into cartridge containing a fuel paper.

Fuel filters

3.5. ENGINE SYSTEM AND PROBLEM DIAGNOSIS

Engine system and problem diagnosis the engine system as we all know is the conversion of chemical and electrical energy to kinetic energy (which passes motion or movement of the vehicle). These are the main component of vehicle movement.

Therefore, after long months or years of working and the engine develop fault but it is know to everyone using a vehicle that every three to two month on oil must be change in a vehicle engine.

However, we should know the types of fault or problem developed in vehicle, the causes and their respective correction.

HARD STARTING OF VEHICLE

★ **Causes**: key starter, fuel pump. disputor timing belt, if all these are not functioning properly it can cause hard starting.

★ **Solution**: changing of the key tarter fuel pump and increase the disputor, setting of the timing belt.

MAKING SOME SOUND OR JACKING WHEN DRIVING

★ **Causes:** fuel pump, fault may develop true the fuel pump pipe, if the fuel is not supplying to the engine it may causes the jacking, crank shaft and the engine set.

★ **Solution**: adjiusting the fuel occur from the fuel pump pipe, refill of the crank shaft if it can bear. It should be change and the set belt should also be change

PUMPING OF WHITE SMOKE FROM THE ENGINE

★ **Causes**: melting of the piston rings and dew of the engine oil.
★ **Solution**: ringing of the engine or the engine should be change completely and changing of the engine oil must be done.

MISSING WHEN DRIVING A VEHICLE

★ **Causes**: if the nozzles is dirty, welt plugs or damage plugs can cause the engine system not function properly.
★ **Solution**: changing of the plugs or the plugs should be clean and the nozzles should be service.

PUMPING OF BLACK SMOKE FROM THE ENGINE

★ **Causes**: injector or calibrator sometimes the nozzles causes it.

★ **Solution**: service them.

BRAKE FAIL PROBLEM

★ **Causes**: brake pad or (flexible pipe) master, damage of masters

rubbers causebrave problem or if the brake pad is been eaten down causes brake fuel.

★ **Solution:** changing of the brake pad or the brake pad should refill, master rubber must be change and replace the cut flexible pipe.

MAKING of NOISE FROM THE LEGS OF VEHICLE

★ **Causes**: noise make from the legs of vehicle can cause from the following. shock absorber, low arm, upper arm and shaft, if all these are not working in a good condition or the way they are not suppose to be working, noise will develop from the legs.

★ **Solution**: Damage shock absorber should be change, low arm, upper arm if it needs to repair or change some part should be done and change of the damage Shaft.

3.6 METHOD OF SERVICING MOTOR VEHICLE

- A motor vehicle service is a series of maintenance procedures carried

out at a set time interval or after the vehicle has travelled a certain distance.

✓ Maintenance tasks commonly carried out during a motor vehicle include;

I. Change the engine oil
II. Replace the oil filter
III. Replace the air filter
IV. Replace the fuel filter
V. Replace the spark plugs

Vi. Tone the engine

vii. Check level and refill brake fluid

viii. Check level and refill power steering fluid

ix. Grease and lubricate component

x. Check condition of the tyre

3.7. GEAR (COG WHEEL)

Gear is a rotating machine part having cut teeth, or cogs which mesh with

another toothed part to transmit torque in most with teeth on the gear being of identical shape and also with that shape on the other gear.

3.7.1 COMPONENTS OF GEAR (AUTOMATIC GEAR) ARE AS FOLLOW:

Fibre e, cup, big or small fibre, pin, gear fork, bearing, tooth being a reverse teeth, pipes, Rocka-Valves, cone and Valve body/machine/Brain box, seal cover, nuts, bolt, compress spring.

3.7.2 OPERATION CARRIED OUT IN GEAR

- **Replacement of faulty fibre**

Fibre is one major component of gear which is also use in selection of gear i.e. it assist gear brain box/machine in connection to select gear. Fibre has two categories.

1) Big fibre

2) Small fibre

- Big fibre functions for reverse movement while small fibre functions for forward movement.

- Small fibre function:

  Fibres are among inside the gear but of two different sets.

✓ Upper fibre

✓ Downward fibre (The pin key both of them together)

Note:

a) If fibre is faulty the machine/brain box/valve body of gear can select gear but only one condition which is by force.

b) Fibre is located inside the selection cup.

- Fibre burns and if when burn, there is no any method to use than to buy/replace another, to help in selection of gear.

3.7.3 SERVICING OF GEAR COMPONENT

Un-tighten all bolts and nuts that connect all different part of gear and take everything out i.e. take out every component of gear. Wash away the dirty part with petrol after cleaning out the fluid (oil) inside.

Check all components of gear and test them if any of them is faulty, then we replace with another part and couple it back.

Note:

Washing with petrol is very necessary and important and changing of the fluid (oil), using the appropriate gear oil (Transmission oil).

3.7.4. FUNCTION OF SOME GEAR COMPONENT

- **Fibre**: helps in main/normal gear selection
- **Pin:** to key down the fibre when arranging
- **Machine/valve body**: mainly for gear selection
- **Bearing**: for rolling and rotating some tools
- **Onside bearing**: this is only meant for reversing
- **Seal cover**: use to cover the fibre after the arrangement is properlydone.
- **Oil filter**:To filter fluid (oil) pass through it before circulating to all the component of gear.
- **Valves**: flowing in and out of fluid.
- **Tooth**: the main component to act with instruction given for either gear one (1), gear two (2) etc.

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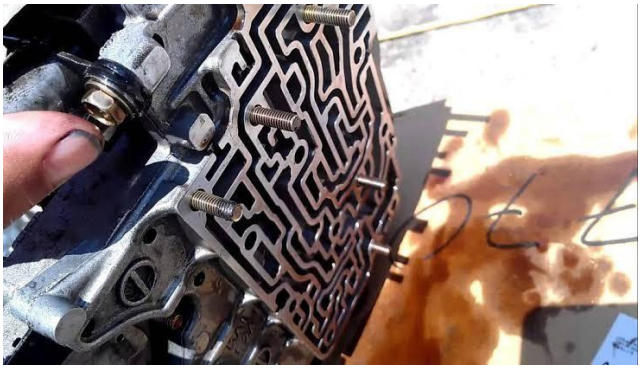

3.8 BLOCKING OF OIL IN ITS FILTER

The oil is no more flowing again. The oil filter is metallic in nature and has a net that covers it. The oil filter has two (2) metallic net that covers it. Namely:

a. The inner net
b. The outer net

The inner net is thicker than outer net and the outer net is flexible. so oil is not flowing out due to some dirt in the inner net. So we are to un-tighten the outer net and blow out the dirt in the inner net, then cover it back to allow free

flow of oil in it.

CHAPTER FOUR

4.0 EXPERIENCE GAIN

In summary, this program has exposed me to some practical aspect in relation to my course of study (Mechanaical engineering) and I benefitted greatly from the grogram. What I learnt at various site involves the following:

- Different between Automatic and Manual vehicle
- The requirement need on how a motor vehicle is been service
- Identification of engine component
- Functions of different tools

CHAPTER FIVE

5.0. CONCLUSION

The student industrial work experience scheme (SIWES) in an interesting and programmed that adds more value to students view and objectives of their fiel of studies.

More so. it adds advancement to the student experience on the theoretical

aspect of their course, since they are exposed to the real practical aspect during the programmed.

Furthermore, it widens the horizon of students, because it makes them understand the rules and regulations governing their field of studies. This would guide them when they establish on their own.

5.1 SUGGESTION AND RECOMMENDATION TO THE ORGANIZATION AND POLYTECHN SIWES PROGRAM

SIWES coordinator and the polytechnic authority should try to stop the habit of rejecting students for SIWES program by the industry. The institution supervisor should make it a priority to visit their designated students in the various organizations to update the student's log book.

Finally, they should resist the habit of staying in school and wait for their wards to finish the SIWES program only for them to sign their training log book and award them grade of the choices without checking the performance of the student in the field.