TECHNICAL REPORT

ON

STUDENTS' INDUSTRIAL WORK EXPERIENCE

SCHEME (SIWES)

Undertaken at

SEVEN-UP BOTTLING COMPANY LTD ILORIN
OLD ASADAM ILORIN

Written by

USMAN KAZEEM

ND/23/EEE/PT/0137

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

KWARA STATE POLYTECHNIC

Submitted To:

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
INSTITUTE OF TECHNOLOGY, KWARA STATE POLYTECHNIC,
P.M.B. 1376 ILORIN

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FORAWARD OF NATIONAL DIPLOMA (ND) CERTIFICATE IN ELECTRICAL AND ELECTRONIC ENGINEERING

DEDICATION

I dedicate this work to the Almighty Allah who had made this training a success for me. I thank all my well wishers for their support and words of encouragement they offered to me during my training, most especially the entire team of **Seven up Bottling** for accepting me whole heartedly. May God bless you all, Amen.

ACKNOWLEDGMENT

I am grateful to Almighty Allah for His abundant Grace and guidance throughout m industrial training. It would have been impossible without many people. I remain grateful to my industry-based supervisor, Engr Kolawole Joseph Adekunle for his untiring effort, taking his time to give me a clear explanation of the things that were difficult for me.

His patience and accurate guidance gave me the impetus to complete this training. I also appreciate my institution lecturer in the department of Electrical and Electronics Engineering.

My appreciation also goes to my parents, uncles, friends and fellow students for their supports and love towards making this task a success.

ABSTRACT

They key purpose of the "Student Industrial Work Experience Scheme" is to make the students industrially sound and fit. Not only the skills acquired but also exposes them to the work ethics of their profession. This report analyses the major experiences I have acquired during my industrial training at Seven up Bottling Company LTD Ilorin. During this period, I was exposed to rewinding of electric motor, Pump Machine, electric machines (i.e motors and generators), construction of motors starters, transformer installation and general Electrical wiring, etc. Each and every experience I have acquired during my training at the company is explained in every chapters of this work.

TABLE OF CONTENTS

CHAPTER ONE

1.0 ABOUT INDUSTRIAL TRAINING FUND (ITF)

The Industrial Training Fund (ITF) was established in the year 1971 under Degree 47 of 8th October, 1971. The Provision of the decree empowers ITF to promote and encourage the acquisition of skills in industry and commerce with a view to generate a pool of trained manpower sufficient enough to meet the needs of the Nigerian economy.

The main purpose of the ITF Services is to estimate human performance, improve productivity and induce value added production in industry and commerce. The Fund through its SIWES, Vocations and Apprentice training programmes, also builds capacity for graduates and youth self-employment in the context of small industrialization in the economy.

1.2 ABOUT STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

The students Industrial Work Experience Scheme (SIWES) was established by the ITF in 1973. The Scheme was founded to solve problems of poor practical skills preparatory for employment in industries by Nigerian graduates of tertiary institutions.

The Scheme was designed to equip undergraduates with the skills required to cope in the labour market after graduation and designed for a duration of 12 months for polytechnic and colleges of education students and 6 months for university students. During this period for the training, the students are expected to acquire all necessary practical skills and theoretical knowledge already gained from their respective institutions and apply them to field practice to solve real life related problems.

The Scheme also exposes the students to the technological advancement and development of engineering in the economy. Therefore, participation in SIWES has become a necessity and a prerequisite for the award of Diploma and Degree Certificates in specific disciplines in the Nigerian Tertiary Institutions, in accordance with the Education Policy of the Ministry of Education and Nigerian Universities Commission (NUC).

1.2.1 OBJECTIVES OF SIWES

Listed below are some of the objectives of the students industrial work experience scheme:

- It exposes students to industry based skills and knowledge needed by the industries after graduation.
- It bridges the gab between theory and practical.
- It exposes students to the necessary experiences in manipulating industrial equipment and machineries that are not available in the schools.
- It grants establishments the avenue to access the quality of graduates of tertiary institutions both practically and theoretically.

- It enables students to develop and build a strong communication skill with staffs at work and inter-personal relationships.
- It helps students develop the ability to work in team (team work).
- It exposes students to work ethics of their profession.
- The scheme also enables students to have the opportunity to implement practical ideas gained from laboratory in school to solve life-related problems.

1.3.0 COMPANY PROFILE

1.3.1 SEVEN UP BOTTLING COMPANY ILORIN KWARA STATE

Seven up bottling company Ilorin is an engineering firm envisioned towards electrical energy system which includes generators and motors rewinding general industrial and domestic electrical installation, repairs of electrical and electronic equipments.

The services rendered by this company include:

- Production of Starter Panels
- Rewinding of electric motors and generators.
- Electrical domestic wiring.
- Repairs of Electrical and electronic equipment.
- General Electrical Installation
- Solar Panel and inverter installation Production of Industrial batteries charger.

1.3.2 OBJECTIVES OF THE COMPANY

Some of the objectives of the company are as follows:

- They focus on the provision and enhancement of both renewable and clean energy system.
- They serve as a source of employment for both skilled and unskilled workers.
- They serve the need of skills and knowledge acquisition for undergraduate and apprentice.

CHAPTER TWO

2.1 AREAS OF EXPERIENCE

While undertaking my industrial training, I was involved, taught and exposed to experiences on production of motor starter panels such as the Direct On Line starter (DOL) production of industrial battery charger, rewinding of electric motors and generators, etc.

2.2 STARTER PANELS

An electric motor starter is an electrical switching and protective device used to switch ON/OFF (Start/Stop) an AC motors. During Startup of induction motors, the motors draw a huge amount of current. This huge starting current can damage the windings of the motor. In order to avoid this damage, different techniques are employed to reduce the starting current using motor starter. However, these techniques depend on the ratings of the motor and the load connected to the motor. And at the same time, the motor starter also protects the motor from overloading and over-current. The methods employed to achieve this starting current reduction are:

- The full voltage method: The Direct On Line starter uses this method.
- The reduced Voltage method: the Star-Delta starter and the Auto-transformer starter uses this method.

There are three kinds of electric motor starter namely:

- Direct On line Starter
- Star-Delta Starter
- Auto-transformer Starter

But for the purpose of this work, I will focus mainly on the Direct On Line starter (DOL) and the Star-Delta starter.

2.3 DIRECT ON LINE STARTER (DOL)

The Direct Online Starter uses the full voltage technique whereby the motor is directly connected to full voltage from the line through MCCB or circuit breaker and relays for overload and overcurrent protection. Thus, the Direct On Line starter is mainly used with small induction motors rated below 5HP.

This starter is also known as "across the line starter" because it always connects the AC motor directly to the mains.

In Direct On Line starter (DOL) method of starting motor, the motor starter winding is directly connected to the line or main supply and protects the motor circuit against over current and overload that may cause damage to the entire system.

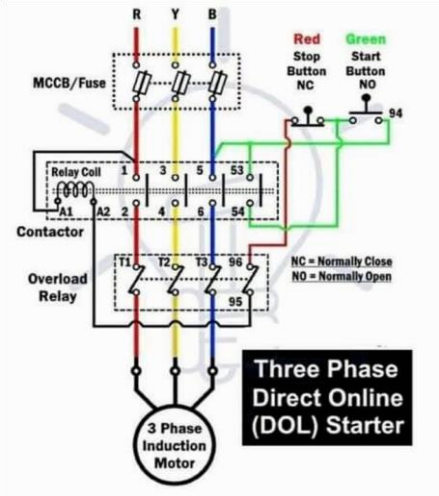

Fig. 1: A Direct On Line starter Connection

The components used to construct this starter includes magnetic contactors, Relays (Thermal Overload relay and electronic overload relay), push button switch, MCCB or Circuit breaker and connecting wires.

- **Magnetic Contactors:** Magnetic Contactor is an electromagnetic switch that operates electromechanically to switch electrical circuits. It opens and closes multiple contacts remotely as current flows in or out through the system.

- **Overload Relay:** This is a detective device which protects the motor against overloading.

When the motor is used to drive large loads higher than its load capacity, there is an exponential voltage drop, causing large current flow through the system which may cause damage to the windings of the motor (causes it to burn), the overload relay detects this overloading fault and causes the circuit interruption. The overload interrupts the circuit when the current flow exceeds a certain limit but it is designed such that it tolerates the considerable high standing current. Therefore, it must be carefully selected such that its current limit does not fall below the starting current range.

- **MCCB OR Fuse:** This component of the Direct On Line starter protects the motor against over current that may result from short circuits. This is the first part of the DOL starter as it is connected directly to the line or main supply. Any sudden rise in current from the line will cause the MCCB to break or fuse to cut thereby protecting the motor from damaging.

- **Push button Switch:** The push button switch is a special type of switch suitable for use in motor starters. It's made of two buttons – The start button which has green in colour and it is always normally open (NO) and the stop button which has red colour and it's normally close (NC).

2.4 WORKING OF DOL STARTER:

The Direct On Line starter connects the main supply (R-Phase, Y-Phase and B-Phase) to the induction motor terminal through the MCCB or fuse.

The DOL starter is made of two main types of circuits; they are:

- **The Control Circuit:** The control circuit is responsible for starting and stopping the motor. The green start button and the red stop button are connected inside the control circuit. To start the motor, the green button is pressed down and released, so current is supplied to the motor and pushing the red button stops the motor. Hence, switching of the circuit is performed by the control circuit.

- **The Power Circuit:** The power circuit is responsible for supplying power to the motor. So the power circuit plays the role of supplying large amount of current required to power the motor.

2.5 STAR-DELTA STARTER

Unlike small induction motors (Induction motors below 5HP), large induction motors require a controlled starting voltage, and this is achieved by the reduced voltage starting method. The Star-Delta employs this method to safely starts an AC motor with a reduced starting current. AC motor are designed to operate in Star connection configuration at a lower voltage and in Delta Connection Configuration at higher voltage. It is safe and recommendable that large induction motors be started at lower voltage and run at higher voltage, now for this to be achieved, the Star-Delta Starter becomes the best option.

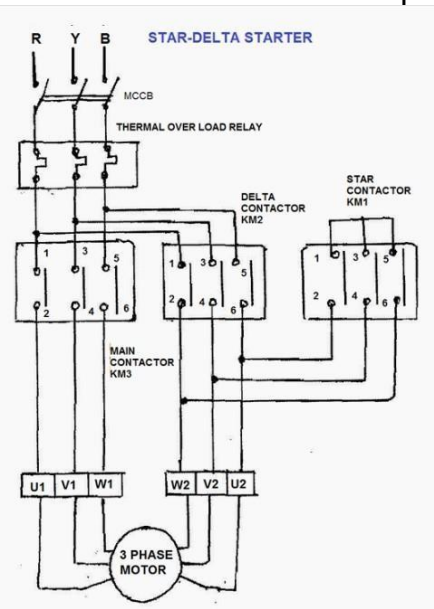

Fig. 2: Star-Delta starter Connection

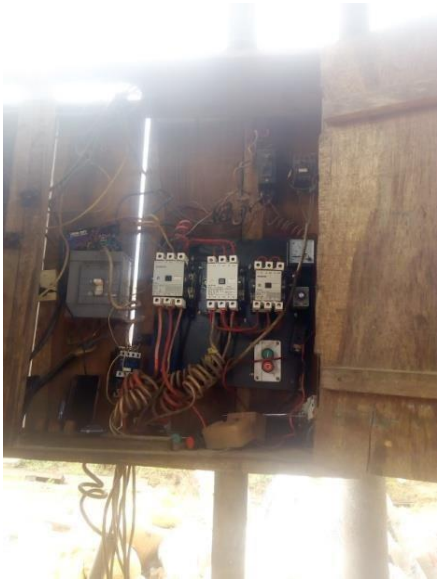

Fig. 3: Installed Star-Delta starter

The components require to construct the Star-Delta starter include contactors (three in number), thermal overload, MCCB or fuse, push button switch, timer-relay and connecting wires.

Unlike the Direct On Line starter, the Star-Delta starters uses 3 types of contactor namely:

- **Main Contactor:** It connects the main supply, R-phase, Y-phase, B-phase to the Primary terminals of the induction motor UI, VI, WI.

- **Star Contactor:** The Star Contactor enables the motor to be started at low voltage in the star configuration mode.

- **Delta Contactor:** It enables the motor run at high voltage in the delta configuration mode.

It must be noted that the three contactors used in a Star-Delta Starter are smaller than the single contactor used in a Direct On Line starter.

Timer-Relay: When a Star-Delta starter is in operation, there is always a switching between the star contactor and the delta contactor in milliseconds, this relay or timing during the switching is achieved by the presence of a timer-relay.

2.6 WORKING OF A STAR-DELTA STARTER: The star-delta starter employs the reduced voltage starting method. The voltage reduction during starting of the motor is achieved by reconfiguring the motor windings as shown in the figures below:

Starter

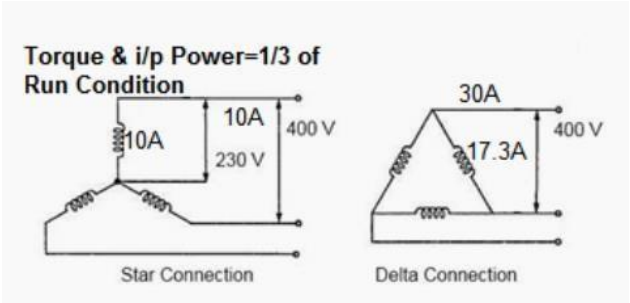

Fig. 4: Working Principle of Star-Delta

When the motor is started, the windings are initially connected in store configuration mode and reduces the starting voltage of each winding and also reduces the torque by a factor of 3.

The windings are then reconfigured as delta after a period of time and the motor now runs normally at a full voltage.

This type of starter is the most common reduced voltage starters. They are basically used to reduce the starting current of an AC motor by reducing interference and disturbances on electrical supply.

- **Power Circuit:** The MCCB or circuit breaker supplies power to the power circuit. The main contactor connects the main supply R, Y, B to the primary terminals of the motor UI, VI, WI initially; the main contactor, the star contactor, and the Delta contactor are closed. When the green start button is pushed down, the main contactor and the Star contactor are closed while the delta contactor remains open. After a period of time, the Star contactor is switched over to the delta contactor, and the delta contactor remains closed while the star contactor becomes open. The star and Delta contactors are electrically and mechanically interlocked, the switching between these contactors is achieved by a built-in timer-relay in the starter.

The star contactor shorts the secondary terminals of the motor U2, V2, W2 at first for a safe starting of the motor at the reduced voltage and provides 1/3 of Direct On Line (DOL) starting currency to the motor, reducing the high starting current needed to start huge capacity motors.

- **Control Unit:** This interchanging star connection and delta connection of Ac motor is accomplished by means of a control circuit. This circuit consists of the push button switches, main contactor and the timer-relay.
  The MCCB and the overload relays serve as protective devices; interrupting the system during overloading and when over current occur.

2.7 Advantages of Star/Delta Starter:

- The operation of the Star-delta starter is simple
- It is cheap compared to other reduced voltage method e.g Auto-transformer starter.
- Good torque and current performance
- It draws twice the starting current of the full load current of the connected motor.

2.8 Disadvantages of Star-Delta

- Low starting torque
- Six terminal (U1, V1, W1 and U2, V2, W2) required i.e the primary and secondary terminals of the motor are connected.
- It provides only 33% starting torque if larger loads are connected to the motor.
- In switching the motor configurations from Star to delta, the delta configuration of the motor is formed in the starter during construction of the motor.
- High transmission and current peaks.
- During the transition from Star to Delta, there always a transient spark which causes arcs in the contactors and generates heat.

2.9 Application of Star-Delta Starter

- This starter is applied too low to medium voltage and light starting torque motors.

CHAPTER THREE

3.1 REWINDING OF AC MOTORS AND GENERATORS

3.1.1 AC MOTORS

An AC motor is an electric machine driven by an alternating current (AC). Therefore, and AC motor is an electric machine that converts electrical energy into mechanical energy.

The AC motor is made up of two main parts, an outside stator which houses coils supplied with alternating current to produce a rotating magnetic field, and an inside rotor fitted to the output shaft producing another rotating magnetic field. This magnetic field generated by the rotor may be produced by permanent magnets, DC or AC electrical windings.

These AC motors which were rewound are mostly industrial type of AC motors which are widely used for pumps, conveyors and several other industrial machineries. Such places include tissue mill, water proof industry, timber industry, water industry, etc. and some machines where these AC motors are used include extruder, sharpener machine, Band saw machine, etc.

Induction Motors: An induction motor uses an electric current produced by electromagnetic induction from the starter magnetic field to produce torque.

Synchronous Motor: In synchronous motors, the rotation of the shaft is at the same frequency as the current supply with the rotation period being equal to the integral number of AC cycles.

AC Motor

3.1.2. TYPES OF AC MOTORS

During my industrial training, I was taught that there are two main types of AC motors, which were mainly worked on. They are:

- Induction Motors or Asynchronous Motors
- Synchronous Motors

3.1.3 PARTS OF AC MOTORS

During my Industrial training, I was taught and shown the different parts of an AC Motor. They are:

- **Stator:** The stator is the stationery part of an AC motor that houses the field winding and serves as the motor electromagnetic circuit.
  The Stator is made of laminations stacked together and carries certain number of slots.

AC Motor Stator with Cover containing bearings and fan

- **Rotor:** The rotor is the moving part of an AC Motor. This part of an AC motor carries the poles of the motor.

AC Motor Rotor

- **Bearings:** The bearing supports and locate the rotor, transfer loads to the motor and keep the air gap small. With the bearings, friction is minimized and the motor rotate freely at various speeds.
  The main type of bearing often used in AC motors is the ball and roller bearings.

- **Air Gap:** This gap between the rotor is called Air gap. The air gap is a necessary part to be considered during design as it prevents the contact between the surfaces of the rotor and the stator and ease movement. During design, the air gap is made as small

as possible to promote the efficiency of the motor and enables sufficient magnetization to be achieved.

- **Fan:** It is obvious that during operations of AC motors, heat is generated in the windings. On this note, there is need for cooling system. Therefore, a fan is always attached to shaft of the rotor inside the enclosure at the opposite end of the circle of the machine that drives the motor.

- **Enclosure:** This part of the AC motor protects the internal parts of One motor from particles, liquids and ensures electrical safety.

Among all the above stated parts of an AC motor, I learned that the main components or parts of an AC motor are the stator and the Rotor.

During my Industrial Training, most machines where this induction motors were used include: band-saw machines, extruder machines, sharpener machines, blower machines, etc.

Fig. 8: AC Motors used in band-saw machines

3.2.1 AC GENERATOR

An AC generator is an electric machine that converts mechanical energy into electrical energy.

This mechanical energy is supplied as input to the AC generator by turbine and combustion engines. The output of this machine is then received as alternating current and voltage (power).

The AC generators operate on the principle of Faraday's law of electromagnetic induction. The EMF or Voltage produced by this generator can either be accomplished by rotating a conducting coil in a stationery magnetic field or rotating the magnetic field containing the static conductor. However, the EMF produced by this generator depends on the number of armature coil turns, magnetic field strength and the speed of the rotating field.

3.2.2 PARTS OF AN AC GENERATOR

During my Industrial Training, I was taught that the various parts of an AC generator are:

- **Field:** This consists of coils of conductors that takes voltage from the source and generate magnetic flux. This flux generated by the field cuts through the armature to produce voltage.

- **Armature:** In an AC generator, voltage is generated in the armature. It consists of coils of wire large enough to carry the full-load current of the generator.

An Armature containing slip rings and bearing with windings

- **Prime Mover:** The prime mover drives the AC generator. This could be a combustion engine, steam turbine or gas turbine or motor.
- **Rotor:** This is the rotating part of an AC generator. The prime mover is connected to it and drives it.
- **Stator:** The stator is the static component of an AC generator.

Fig. 10: An Alternator Stator containing Field windings and brushes

- **Slip Rings:** Stop rings are electrical components used to transmit power to-andfro from the rotor. They conduct the flow of power from the stator field winding to the rotating rotor winding.

- **Brushes:** The brushes are electrical connection that enables the transfer of power to-and-fro from the rotor through the slip rings. These brushes are made of carbon.

Carbon Brushes

- **5-pin Diode:** This diode has 5 different pins with 2 pins being DC (Positive and Negative) and the other 3 pins being AC (R-phase, Y-Phase and B-Phase). It enables the current from the exciter and from the field to be fed together and produce a steady output power. In small generators such as the SPG300 petrol generator, Automatic Voltage Regulator (AVR) is used to produce steady AC output power.

5-pin Diode

3.3.1 REWINDING OF AC MOTORS AND GENERATORS

During rewinding of the AC motor, the motor was carefully dismantled and examined, the old burned windings or coils removed from the slots of the stator. The windings then weighed with a weighing balance and the weight of the winding noted or recorded in pound (lb).

Mostly, the AC motors which were rewound were mostly 3-phase induction motors. After recording the weight of each winding, the same winding of equal weight is wound with the same size of coil measured in gauge. The type of coil mainly used is copper coil. This wound coils are then fitted into the slots in the stator as was done by the original manufacturers.

The number of slots in the stator depends on the phases of power that is supplied to the coils. For three phase motor, there are six slots having pairs of coil windings that are offset by 120^0 and can have three, six, or twelve coils.

Afterwards, the coils are connected together such that only six terminals (U1, V1, W1 and U2, V2, W2) are brought out. They are properly arranged and tightened up and the slots are properly laminated and the entire outside body of the coils are vanished, and dried up.

For AC Generators, the same approach took to rewound AC motors was also taken to rewound the field coils (stator winding) and the rotor winding.

Some AC generator rotors e.g three phase synchronous alternators possesses two set of rotor windings i.e the windings at the poles and the exciter winding.

Before rewinding and during the time when either the AC motors or AC generators are dismantled, accurate diagrams of how the coils were connected, how the coils were arranged in slot was taken down.

This method enabled us rewound the AC motor and AC generators the same way it was done by the original manufacturers.

An Armature before and after rewinding

Motor Stator (Field) before and after rewinding

CHAPTER FOUR

4.0 **TRANSFORMER**

- **Transformer**: The maintenance of Large Power Transformers, Generator Transformers, Unit service Transformers, Station service Transformers, (SCR) silicon control rectifier Transformers (16kv /660), Pole mounted Transformers (11kv/415kv) for water walls, Indoor dry-type transformers. 415v LV CB MCC, pump house, water treatment plant, and supplementary cooling system.
- **Switch Gear**: The maintenance of 11kv magnetic circuit breakers, 6.6kv Air circuit breakers, 6.6kv Vacuum circuit breakers, 6.6kv SF6 circuit breakers, 415v Air circuit breakers, (RMUs) Ring Main Units, Feeder pillars, 11kv isolators, 16kv isolators.
- **Protection**: The maintenance of Generator protection, Transformer protection, 11kv switch gears and line protection, 6.6kv switch gears protections, 415V L/C protection., Auxiliary protection i.e., lightening system, bus bar protection, Troubleshooting of faults using control circuit (elementary diagram), Relay coordination, control and protection schemes for generators, transformers, switchgear, lines, and bus bars.

Electrical II: This unit is responsible for the repair and maintenance of the electrical equipment whose voltage ratings are 415v and below. The section maintains the equipment under the categories listed below;

- **UPS**: The maintenance of Batteries (lead-acid, alkaline {dry type, wet type}), Chargers (semi-conductor rectifier, metal rectifier), Inverters (D.C to AC), Static switch (means of change over), Distribution boards (110VDC, 110VAC, 240VDC).
- **Hydrogen Plant:** The maintenance of Hydrogen plant Composition (Electrolyze, control panel, chemistry of water breakdown).
- **415V AC Induction Motors:** The maintenance of Boiler & Turbine 415v motors (Squirrel cage and wound rotors types), 240V DC motors (Emergency motors), local control panel
- **WTP/ Demineralization and CPP Plant:** The maintenance of the Water Treatment Plant, Demineralization Plant, and Condensate Polishing Plant equipment such as 415V AC electric motors, AC circuits breakers, control panels, MCC.
- **Water Well:** The maintenance of 415V AC submersible motors and their control panel.
- **GTG/EDG:** The maintenance of the Gas Turbine and Emergency Diesel Generator equipment such as batteries, control panels, etc.
- **Lighting System:** The maintenance of the indoor, outdoor and Emergency Lighting.

- **Elevator/Crane:** The maintenance of the office elevator, cranes inside the plants, and their associated AC motors and control panel.

4.2 TRANSFORMER OIL PURIFICATION

The Transformer oil is an essential part of the high-power transformer because it serves as a coolant and Insulator. It is a means of insulation to the coil and also, prevents an explosion from occurring inside the transformer. A good working transformer oil has certain criteria such as the Dielectric strength of BS 148(30-60KV), Viscosity of 14.00cSt (max), Moisture not greater than 200 ppm, Acidity < 0.2mg/g, Flashpoint 1460C (min), Specific Gravity I participated in the transformer oil purification by assisting in conveying the High Vacuum Purifier to the unit 5 Gen. Transformer site, monitored the process for 4 days, helped in repairing oil filtration cable when it got burnt, and housekeeping the equipment used when the job was completed.

4.3 WORK DONE IN INSTRUMENTATION AND CONTROL DEPARTMENT

Instrumentation and control engineering (ICE) is a branch of engineering that studies the measurement and control of process variables, and the design and implementation of systems that incorporate them. Process variables include pressure, temperature, humidity, flow, pH, force, and speed. I actively participated in various maintenance jobs assigned to my team. Some of the maintenance jobs are discussed as follows:

1. ROUTINE CHECK ON CONTROL VALVES

A valve is a device that works to control, regulate, or direct flow within a system. The functions include:

i. To start or stop flow based on the valve state

ii. To regulate flow and pressure within a piping system

iii. To control the direction of flow

iv. To throttle flow rates within a piping system

v. To improve safety through relieving pressure

Based on the method of actuation, the valve can be categorized into three:

- **Manual Valves:** They are operated by hand using hand wheels, hand level, gear wheel, or chains to actuate.
- **Actuated Valve:** It can be Pneumatic (air actuated), Electrically (Solenoid & Electric motor), or Hydraulic. It allows remote control and automation for large-scale applications.

- **Automatic Valve:** It activates when a specific flow condition is met. For example, a check valve or a pressure relief valve is activated when an overpressure condition is met.

The common type of Valves:

1. **Ball Valve:** It is used for domestic purposes at home (tap). It turns 900 and uses a ball to control the flow.
2. **Butterfly Valve:** It requires 900 turns to fully open or close. It takes less spacing in piping than any other valve used in the plant.
3. **Gate Valves:** It is used to control the flow of fluid. It is used where 100% open or close control of flow is required. The inlet and the outlet most time have the same diameter.

CHAPTER FIVE

5.0 CONCLUSION, RECOMMENDATION AND REFERENCE

5.1 CONCLUSION

As a student, this program has increased my potentials and work attitude needed to guide me through my discipline after school whether I will work as self-employed or be in the industry. The program also enables the student to practicalise all they have learnt without practicals in their institutions, and also exposes them to a working environment experience, team work and work ethics.

It also helps the student to choose the specialization of their choice; either they love to focus on Telecommunications, Electricals, Electronics, Manufacturing, etc. Therefore, every student should take maximum use of the opportunity because it is important to them as future professionals.

5.2 RECOMMENDATION

In view of my experiences during the period of my industrial training, the following recommendations are made to students, universities, Industrial Training Fund (ITF) and the companies.

- Students must ensure they get a good placement for the training in time and gain the best knowledge from the 6-months period.
- Students should develop interest and focus during this period and make sure the six months elapse before backing out.
- It is hard to get a placement for the training by the students, however, the universities have a vital role to play by ensuring the they have good relationships with companies, firms and organizations so they can assist in placing the student in these firms on a yearly basis.
- Supervision should also be intensified by the I.T.F. to make the program more effective.
- The firms, industries or organizations should ensure they are well-structured and equipped so that they can give the students the best of the needed experiences.
- The industry-based supervisors should ensure that the students who are attached with them are given the best supervisions so that they can gain the best knowledge of their discipline.
- The firms must know that their role in the program is a contribution to the nation's educational system and national development and not a means of exploiting the students as a cheap labour.