STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME [SIWES] INDUSTRIAL TRAINING REPORT

HELD AT

TRANSMISSION COMPANY OF NIGERIA

WRITTEN BY

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PRESENTED TO

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DEDICATION

This report is dedicated to Almighty Allah the creator and the finisher of our faith, the one who strengthen and spare my life to complete my SIWES programme. May his name be glorified forever? And to my lovely parent in person of Mr and Mrs AHMED for their moral love and financial support towards the completion of the programme.

ACKNOWLEDGEMENT

My gratitude and sincere appreciation goes to Almighty Allah for his guidance and protection over my family, also for the strength and wisdom granted to me throughout my SIWES programme.

I wish to express my profound gratitude to my SIWES supervisor and other lecturers in the Electrical and Electronics department.

I also appreciate the effort of my parent of Mr and Mrs Ahmed over me. I pray God will keep blessing them.

CHAPTER ONE

INTRODUCTION

1.0 BRIEF HISTORY OF STUDENTS WORK EXPERIENCE SCHEME (SIWES)

SIWES is the accepted skill training programme which forms part of the approved minimum academic standards in the various degree programmes for all the Nigerian universities. It is an effort to bridge the gap existing between theory and practical of engineering and technology, science, agriculture, media management and other professional education programme in the Nigerian tertiary institutions.

The Students Industrial Work Experience Scheme (SIWES) was initiated in 1973 by the Industrial Training Fund (ITF). This was in response to the mandate given to the ITF through decree 47 of 1971, charging it with the responsibility of promoting and encouraging the acquisition of skills in the industry and commerce with the view to generating a pool of trained indigenous manpower sufficient to meet the need of the nation's economy. The Industrial Fund (ITF) introduced the scheme for employers to be involved in the entire educational process of preparing student for employment in our various industries with the vision "To be the foremost skills training and development organization in Nigeria and one of the best in the world" and mission "To set and regulate training standards and offer direct training interventions in industrial and commercial skills training and development, using a corps of highly competent professional staff, modern techniques and technology".The scheme is a tripartite programme involving the students, the universities and industries (employers of labor). It is funded by the Federal government of Nigeria and jointly coordinated by the industrial training fund (ITF) and the National Universities Commission (NUC)

1.1 AIMS AND OBJECTIVES OF SIWES:

The aim of SIWES is to put students through the labour market for them to apply and incorporate their classroom knowledge into the working practice of engineering and technology and other fields.

The objectives of SIWES programme include:

i. The opportunity of being familiarized and exposed to the mode of work, handling of
ii. To impact practical method of performing professional functions to undergraduate of the tertiary institutions
iii. Provision of an enabling environment where student can develop personal attributes such as critical thinking, creativity, leadership, time management, presentation skills and interpersonal skill and other.
iv. It make student appreciate the roles of their professions which enable them be a creators of change and contribute to grow of the economy and national development.
v. It make student to be aware of the work related problems and enable them to see how they can solve the difficulties them all them selves

1.2 BENEFITS AND CHALLENGES OF SIWES

A. BENEFITS OF THE SCHEME (SIWES)

i. It's gives opportunity for student to be in direct contract with junior, immediate and senior professional staff in the industry.

ii. There are several benefits derived from SIWES, some of which are:

iii. Its gives student opportunity of getting employment if such student if such student prove himself worthy of getting employed, and for the industries to evaluate the prospective employers.

iv. Successful SIWES operation provides the government the opportunity of reducing the importation of expatriate Engineers and professional personnel.

B. CHALLENGES OF THE SCHEME

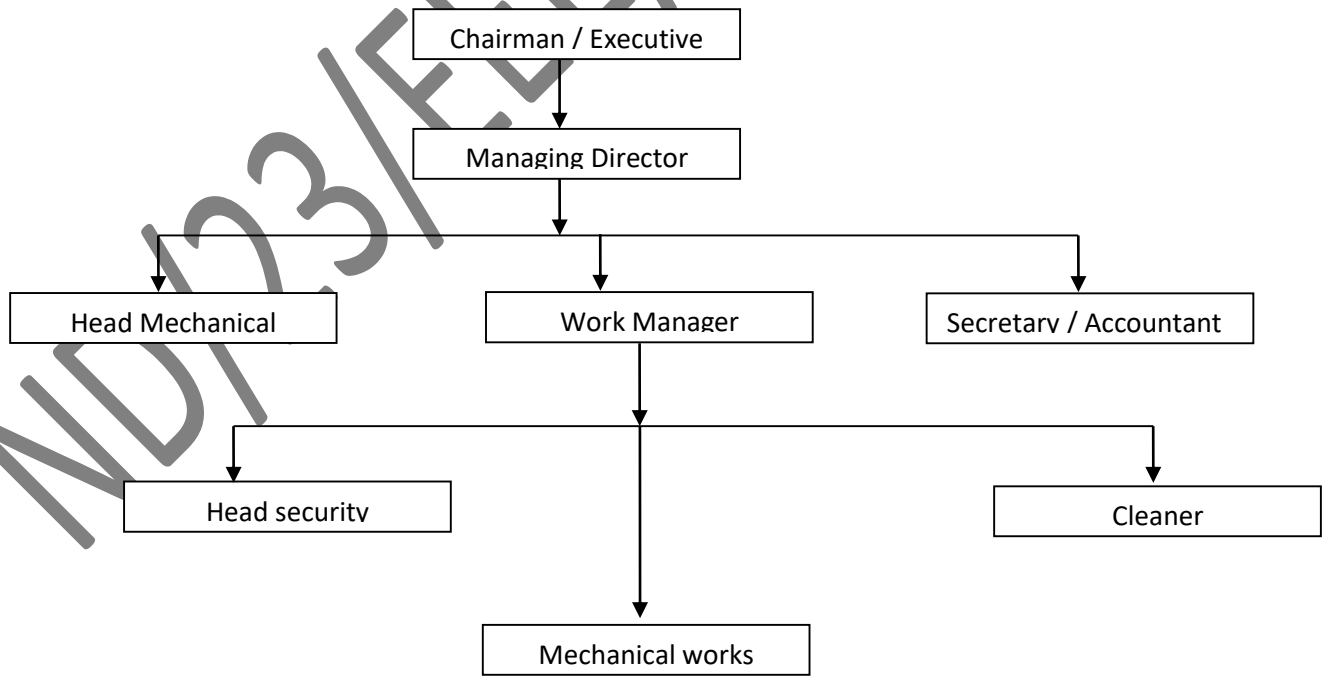
i. Inadequate funding for the maintenance of the scheme by the Federal Government of Nigeria.

ii. Inadequate and ineffective supervision of students on attachment by staff of institutions and ITF either due to lack of mobility or delays in payment of supervision allowance to both the staff and students.

iii. Growing number of Higher Institutions increases the number of eligible courses and hence students while the relevant industries are either shutting down or lack the capacity to accept such numbers.

iv. Acceptance of students to institution only based on vacancy.

ORGANISATION CHART



CHAPTER TWO

2.1 BRIEF HISTORY OF ORGANIZATION

The **Jebba Hydroelectric Power Station**, also **Jebba Power Station**, is a hydroelectric power plant across the Niger River in Nigeria. It has a power generating capacity of 578.4 megawatts, enough to power over 364,000 homes. The plant was commissioned on 13 April 1985, although commercial energy production began in 1983.

Location

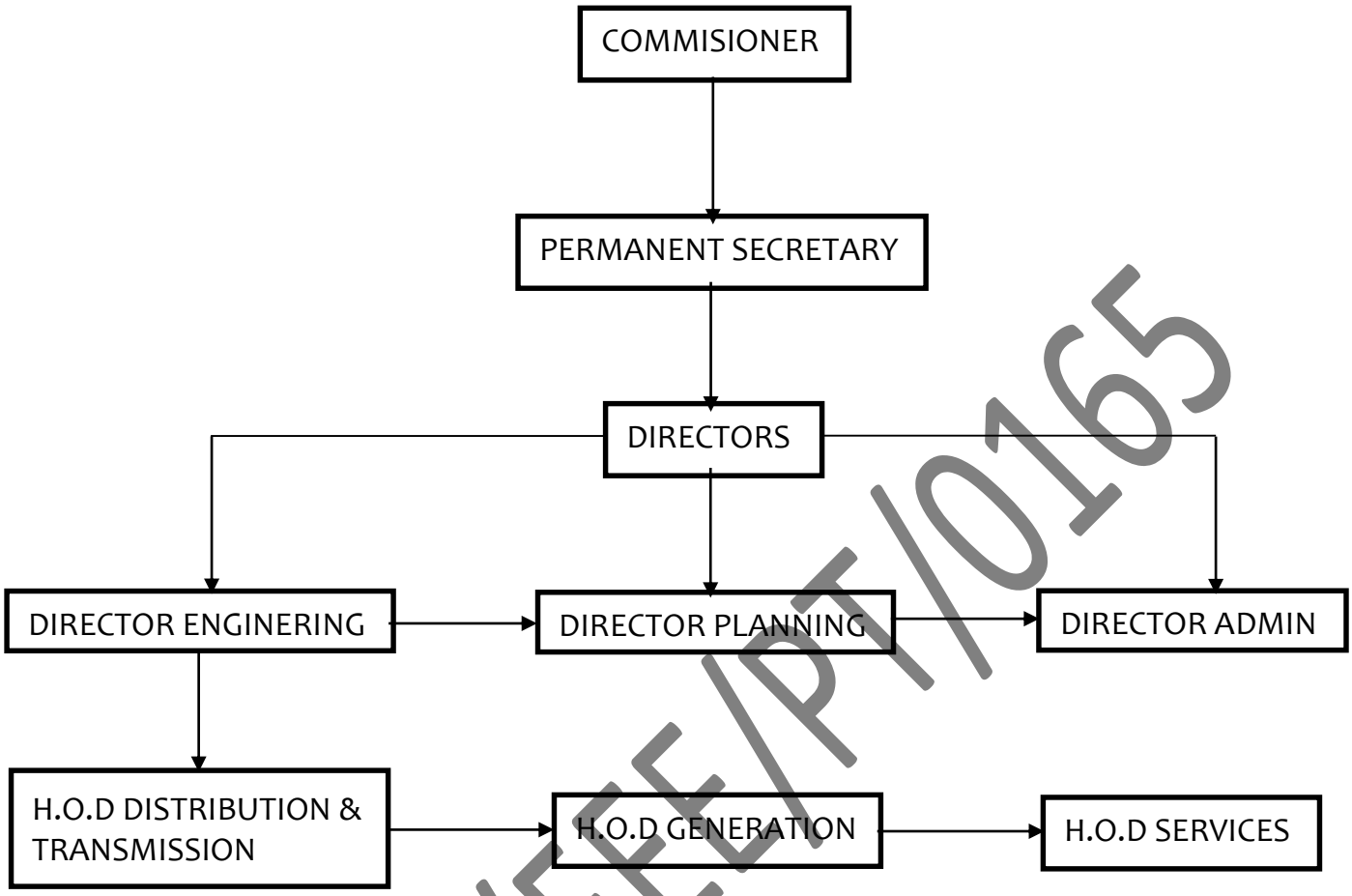
The Jebba Power Station is located about 100 kilometres (62 mi) downstream of the Kainji Dam, and approximately 40 kilometres (25 mi) southwest of Mokwa, the nearest urban centre.

This is approximately 256 kilometres (159 mi) by road, southwest of Minna, the capital of Niger State The power station sits astride the Niger River at the border between Niger State and Kwara State, approximately 91.5 kilometres (57 mi), by road, northeast of Ilorin, the capital city of Kwara State. Jebba Dam sits at an elevation of 71.917 metres (236 ft) above mean sea level.

2.2 OBJECTIVE OF ESTABLISHMENT

1. To be able to generate, transmit and distribute electricity across the situated state.
2. To train student the safety precautions so as to free from hazard while in the field.
3. Design and construction of different project.
4. To train student for future so that they will be self-employed.
5. To allow the student to know the application of what they have learnt in the theoretical aspect in the class.

2.3 ORGANIZATION STRUCTURE: MINISTRY OF ENERGY



2.4 THE VARIOUS DEPARTMENTS IN THE ESTABLISHMENT AND THEIR FUNCTIONS

Transmission company of Nigerian Jebba Sub-Region divided majorly into the three major departments, which are:

1. THE COMMISIONER
2. THE PERMANENT SECRETARY
3. THE DIRECTOR

THE COMMISIONER: This department is responsible for checking out the ministry day-to-day task performed, to ensure all machines are working at their stable condition and inform the other department if there will be any change in the organization

THE PERMANENT: This is the department that also work with the above-mentioned department, to assist, balance and record any financial expenses that will be needed in the organization.

THE DIRECTORS: The industry contain various departments, therefore each departments has its Director who are giving ideas and manage the activities of their subset. This is subdivided into three which are: Director Services, Director Planning and Director Engineering. The Director Engineering are the department that manages all the generation, transmission and the distribution of electricity in the ministry, they're required to manage the electricity to its core.

CHAPTER THREE

3.1 INTRODUCTION TO ELECTRICAL RULES AND REGULATIONS

For every organization, there are always some rule and regulation et aide that are governing that organization and same I applicable to the organization where the training was held

The following are the rule and regulation that govern the organization

- ✓ Don't work with wet hand and body on a cable with current
- ✓ When working you have to be at alert increase of any incident
- ✓ An Engineer must not put on suit and tie when going to site work

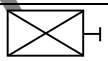
3.1.1 SAFETY PRECAUTION IN THE ELECTRICAL WORK

- ✓ Put on safety boot
- ✓ An engineer must put on head element when working
- ✓ An electrical engineer must put on nose cover when working
- ✓ An electrical engineer must wear apron when working

3.2 INTRODUCTION TO ELECTRICAL TOOLS AND USES

- ✓ **Tester**: it is used to check may there is current in a cable
- ✓ **Plier**: it is used to spill a cable or cut aluminum on copper cable bending spring it is use to bend a pipe
- ✓ **Knife**: it is use to pill a hard cable and to sharp peg
- ✓ **Hammer**: it is used to drive a nail to the wall
- ✓ **Clipping Hammer**: it is used for clipping cable wire to the wall
- ✓ **Soldering Iron:** for soldering cable conduit joint
- ✓ **Screw Driver**: for tightening and loosing large screw

3.3 SOME SYMBOLS THAT CAN BE SEE IN ELECTRICAL WORK

NAME	SYMBOLS
Live	L
Neutral	N
Earth	
Fan Regulator	
15 AMP Socket	
13 AMP Socket	
Distribution Board	
1-way switch	
2-way switch	
Cooker Control Unit [CCU]	
Change Over	

3.4 SOME COLOUR CODE IN ELECTRICITY

COLOUR	CODE
Yellow	Earth
Green	Earth
Blue	Neutral
Red	Live
Brown	Live

TRANSFORMER

3.5 INTRODUCTION TO TRANSFORMER

As explain by the ministry, Transformer is a passive component that transfers electrical energy from one electrical circuit to another circuit, or multiple circuits. A varying current in any coil of the transformer produces varying magnetic flux in the transformer's core, which includes a varying electromotive force [EMF] across any other coils wound around the same core. Electrical energy can be transferred between separate coils without a metallic [conductive] connection the two circuits. Transformers are used to changed AC voltage levels, such transformers being termed step-up or step-down type to increase or decrease voltage level, respectively. Transformers can also be used to provide galvanic isolation between circuits. Transformers have become essential for the transmission, distribution and utilization of alternating current electric power, A wide range of transformer designs is encountered in electronic and electric power applications. Transformer range in size from RF transformers less than a cubic centimeter in volume, to units weighing hundreds of tons used to interconnect the power grid.

3.5.1 TYPES &APPLICATIONS OF TRANSFORMER

There are two types of transformer, they are:

1. Step-Up Transformer
2. Step-Down Transformer

1. **Step-Up Transformer**: This is a type of transformer that is used in the generation station and during the transmission of the voltage produced from the generation source. It used to raise voltage of the source to a transmittable level, it is known that during the transmission of voltage through a distance, there is always voltage drop according to the distance of the transmission, step-up transformer is used to cover up for voltage drop during transmission, it increases the voltage so it can be used as the distribution station.

2. **Step-Down Transformer**: This is a type of transformer that is used in the distribution region, it decreases the voltage that is transmitted from generation station and regulate it

to a level that can be consumed by the final consumer, and its distribution to various household for consumption.

The Applications of Transformer

Various specific electrical application designs require a variety of transformer types. Although they all share the basic characteristic transformer principles, they are customized in construction or electrical properties for certain installation requirements or circuit conditions.

In electric power transmission, transformers allow transmission of electric power at high voltages, which reduces the loss due to heating of the wires. This allows generating plants to be located economically at a distance from electrical consumers. All but a tiny fraction of the world's electrical power has passed through a series of transformers by the time it reaches the consumer.

In many electronic devices, a transformer is used to convert voltage from the distribution wiring to convenient values for the circuit requirements, either directly at the power line frequency or through a switch mode power supply.

Signal and audio transformers are used to couple stages of amplifiers and to match devices such as microphones and record players to the input of amplifiers. Audio transformers allowed telephone circuits to carry on a two-way conversation over a single pair of wires. A balun transformer converts a signal that is referenced to ground to a signal that has balanced voltages to ground, such as between external cables and internal circuits. Isolation transformers prevent leakage of current into the secondary circuit and are used in medical equipment and at construction sites. Resonant transformers are used for coupling between stages of radio receivers, or in high-voltage Tesla coils.

3.6 DISTRIBUTION TRANSFOMER

A distribution transformer or service transformer is a transformer that provides the final voltage transformation in the electric power distribution system, stepping down the voltage used in the distribution lines to the level used by the customer. The invention of a practical efficient transformer made AC power distribution feasible.

If mounted on a utility pole, they are called pole-mount transformers. If the distribution lines are located at ground level or underground, distribution transformers are mounted on concrete pads and locked in steel cases, thus known as distribution tap pad-mount transformers.

Distribution transformers normally have ratings less than 200 kVA, although some national standards can allow for units up to 5000 kVA to be described as distribution transformers. Since distribution transformers are energized for 24 hours a day (even when they don't carry any load), reducing iron losses has an important role in their design. As they usually don't operate at full load, they are designed to have maximum efficiency at lower loads. To have a better efficiency, voltage regulation in these transformers should be kept to a minimum. Hence, they are designed to have small leakage reactance.

TYPES OF DISTRIBUTION TRANSFORMER

Distribution transformers are classified into various types. They are:

- ✓ Single Phase
- ✓ Three Phases
- ✓ Pad-Mounted

3.7 TRANSFORMER BUSHINGS

In electric power, a bushing is an insulated device that allows an electrical conductor to pass safely through a grounded conducting barrier such as the case of a transformer or circuit breaker.

All the transformers windings are connected with the high voltage lines, therefore the end connection of the transformer should be taken care, in order to avoid flashover from the high voltage connection contact with the body of the transformer. Connection for the cables are made in the cable boxes in the secondary side for low voltage distribution transformer but in power transformer the both side of the transformer will be in high voltage since we need specially designed device which is called bushings.

3.7.1 CONNECTION OF DISTRIBUTION TRANSFORMER

The connection of this instrument changes according to the form of the distribution transformer that is applied. Single-phase types are manufactured either with one or two bushings, and they are arranged in wye shape. These primary sections can also be used with three-wire or four-wire wye connections only when arranged properly.

And also, these transformers are installed to the overhead lines in two approaches, and those are:

✓ **WYE**: Here, a phase to a neutral form of transformer is employed. It has a top section where it has a junction with either of the phases. The other section of the winding is attached to the neutral line, and it is grounded. A wye configuration is selected since unstable powers might cause currents in the neutral section, and with this connection, those include a direction towards the ground. While in the delta connection, the unstable powers develop voltage modifications on the three-phase wires.

✓ **DELTA**: Here, a phase-to-phase form of transformer is employed. It consists of two bushings where include a connection with two phases. The other section of the winding is attached to the neutral line, and it is grounded. The disadvantage of this configuration is that when any one of the primary phases is in the de-energy state, the other phase will result in the movement of current in a reverse direction which might cause problematic damages to the workers and staff.

CHAPTER FOUR

4.0 ELECTRICAL MAINTENANCE

Electrical maintenance is the upkeep and presentation of equipment and system that supplies electricity to a residential, industrial or commercial building. It may perform by the owner or the manager of the site or by an outside contractor. The work is commonly on schedule based on the building, the complexity of the electrical system or on as needed basis.

The main areas of the general electrical maintenance commonly include the power outlet and the surge protectors, generators, and lighting system. These supply sources are checked for the structural integrity as well as internal stability. The maintenance plan normally includes regular replacement of the burned out fluorescent and incandescent lights. Many building managers in recent years have refilled their light with energy saving bulbs and elements.

There are two types of maintenance in used, which are;

i. PREVENTIVE MAINTENANCE

ii. RECTIVE MAINTENANCE

4.1 PREVENTIVE MAINTENANCE

This is also a general part of a building upkeep. This plan ordinarily includes the schedule inspection of large system and equipment by the technician. The purposes of this periodic assessment is to fix periodic wiring problem before they result into larger ones. This is particularly important in hospitals and factories that heavily rely on preventive systems for daily operations.

Electrical generators, switches and circuit breakers are regularly checked at fixed intervals to avoid operational failure but if flaws are discovered, technicians normally makes repairs, depending on the installation conditioned, the repairs are typically made by splicing wire together. In some situation, they are encased in metal tubing called conduit to protect them from wear.

These preventive methods are necessary to guarantee uninterrupted power suppl. They typically use a variety of hand tools, including hand drills, pillars wire cutters, screw driver, knives, conduit bender [bending spring]. Voltage, ampere, ohm meter are commonly used in maintenance operations.

If these are specific areas of concern in a building electrical system, the maintenance crew may use specialized testing method and the equipment to isolate the problem.

4.2 CORRECTIVE MAINTENANCE

This is a maintenance task performed to identify, isolate and rectify a fault so that the failed equipment, machine or system can be restored to an operation condition within the tolerance or limits established for in-service operation. Corrective maintenance also is a maintenance carried out after failure direction and is aimed at restoring an asset to a condition in which it can perform its intend function. it can also be sub-divided into immediate corrective maintenance in which work is destroyed in conformance to a given set of maintenance rules

4.3 SOME SAFETY PRECAUTION IN ELECTRICAL WORKSHOP

- Do not use pliers as hammers and screwdrivers as chisels
- Always use correct tools for the right job as incorrect tools used can result in accident
- Always keep your tools clean and neat after use
- Never toy or play with life wire for any reason
- Test the conductor polarity by means of a tester not by touching it ordinarily.

4.4 ELECTRICAL WIRING SYSTEM

It is the installation of electrical wire from the mains [source] to the final consumer for utilization. This consists of conductor, insulator, and mechanical protection accessories and some of the various electrical power accessories used in the installation such as ceiling rose, socket switch etc.

When choosing a system of wiring for building there are some factors which are needed to be considered before the execution, such as :

- The neatness of the job
- Time required to complete the wiring
- The durability of the installation
- Future extension and alternation
- Damage to the building by cut away
- Cost of installation
- Special considered like dampness, flammable etc.

In electrical wiring system all the cables used should be well protected and insulated. All joints should be well twist and taped well to avoid partial contact.

4.5 TYPES OF WIRING SYSTEM

There are three types of wiring system commonly used in Nigeria. Namely:

1. Surface wiring system
2. Conduit wiring system

Trucking wiring system

CHAPTER FIVE

5.0 CONCLUSION

The student industrial work experience scheme (SIWES) had contributed to my exposure and training in the field of electrical and electronic engineering**.**

The programme had also enabled me to put into practice the knowledge gained in the classroom with the actual industrial experience and to develop a critical and realistic approach to problems and their solutions in the electric field.

5.1 RECOMMENDATION

The Student Industrial Work Experience Scheme (SIWES) is very interesting and planned. This programme gives me more practical experience of what we have been taught in class because it deals with practical aspect of the field in which I specialized. Moreover, am using this medium to advice government to establish more company and pass the student to this company on their own.

Finally, industrial experience should be given priority by the government.