A TECHNICAL REPORT
STUDENT INDUSTRIAL WORKING EXPERIENCE SCHEME
(SIWES)

Held at

TAFAKO NIGERIA LIMITED

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DEDICATION

I dedicate this technical report to the Almighty Allah, the giver of knowledge, wisdom and who is rich in mercy.

ACKNOWLEDGEMENT

I take this opportunity to express my profound gratitude and deep regards to the creator of heaven and earth, the one who knows the beginning and the end, the alpha and the omega, the Almighty Allah and also to my guides (MR & MRS TAOFIK, and to all those who has helped me during my SIWES programme. The blessings, help and guidance given by them, time to time has carry me so this far and shall carry on the journey of life on which I am about to embark. I also take this opportunity to express a deep sense of gratitude to compliment my mentor for his cordial support valuable information and guidance which helped me in completing my SIWES through various stages.

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CHAPTER ONE

1.1 INTRODUCTION TO SIWES

Students Industrial Work Experience Scheme (SIWES) is a Skills Training Program designed to prepare and expose Students of Universities, Polytechnics, Colleges of Technology, Colleges of Agriculture and Colleges of Education for the Industrial Work situation they are likely to meet after graduation. The Scheme affords Students the opportunity of familiarizing and exposing themselves handling equipment and machinery that are usually not available in their institutions.

1.2 HISTORY OF SIWES

The Students' Industrial Work Experience Scheme (SIWES) was initiated in 1973 by the Federal Government of Nigeria under the Industrial Training Fund (ITF) to bridge the gap between theory and practice among products of our tertiary Institutions. It was designed to provide practical training that will expose and prepare students of Universities, Polytechnics, and Colleges of Education for work situation they are likely to meet after graduation.

Before the establishment of the scheme, there was a growing concern among the industrialists that graduates of institutions of higher learning lacked adequate practical background studies preparatory for employment in industries. Thus the employers were of the opinion that the theoretical

education going on in higher institutions was not responsive to the needs of the employers of labour.

As a result of the increasing number of students' enrolment in higher institutions of learning, the administration of this function of funding the scheme became enormous, hence ITF withdrew from the scheme in 1978 and was taken over by the Federal Government and handed to National Universities commission (NUC), National Board for Technical Education (NBTE) and National Commission for Colleges of Education (NCCE). In 1984, the Federal Government reverted back to ITF which took over the scheme officially in 1985 with funding provided by the Federal Government.

1.3 OBJECTIVES OF THE PROGRAMME

The specific objectives of SIWES are to:

- Provide placements in industries for students of higher institutions of learning approved by relevant regulatory authorities (NUC, NBTE, NCCE) to acquire work experience and skills relevant to their course of study
- Prepare students for real work situation they will meet after graduation.
- Expose students to work methods and techniques in the handling of equipment and machinery that may not be available in schools.

- Make transition from school to the labour market smooth and enhance students' conduct for later job placement
- Provide students with the opportunity to apply their knowledge in real life work situation thereby bridging the gap between theory and practice
- Strengthen employer involvement in the entire educational process and prepare students for employment in industry

Promote the desired technological knowhow required for the advancement of the nation.

1.4 OBJECTIVES OF ESTABLISHMENT

- To provide optimum and individual care to patients.
- To develop recognition for patients needs for privacy and preservation of dignity.
- To maintain good relationship with patients, relations and the community through health education.
- To carry out diagnosis and intervention.
- To provide training for students.
- To maintain sufficient hospital supply of equipment and promote their utilization and maintenance.

  To treat and control diseases.

CHAPTER TWO

2.1 PRECAUTIONS TAKEN IN ELECTRICAL AND ELECTRONIC ENGINEERING

Electrical and Electronic Engineering involves working with high-voltage equipment, circuits, and installations. Proper precautions are essential to ensure safety and prevent accidents. The following precautions are taken:

- **Use of Personal Protective Equipment (PPE)**: Engineers and technicians wear insulated gloves, safety boots, and eye protection when handling electrical components.
- **Proper Earthing and Grounding**: Ensuring all electrical equipment is properly earthed to prevent electric shocks.
- **Avoiding Water Exposure**: Electrical work should not be conducted in wet or damp environments unless properly insulated tools and equipment are used.
- **Lockout/Tagout (LOTO) Procedures**: Before maintenance, power sources should be locked and tagged to prevent accidental energization.
- **Use of Insulated Tools**: Working with insulated screwdrivers, pliers, and wrenches reduces the risk of electric shocks.
- **Following Circuit Diagrams**: Ensuring proper adherence to circuit schematics to prevent short circuits or equipment failure.
- **Regular Equipment Inspection**: Periodic checking and maintenance of electrical equipment to detect faults early.

2.2 EQUIPMENT USED IN ELECTRICAL AND ELECTRONIC ENGINEERING

Various tools and equipment are used in electrical and electronic engineering for installations, testing, and maintenance. Some of the commonly used equipment include:

- **Multimeter**: Used for measuring voltage, current, and resistance in circuits.
- **Oscilloscope**: Essential for analyzing waveform signals.
- **Screwdrivers and Pliers**: Used for wiring, loosening, and tightening components.
- **Soldering Iron and Soldering Lead**: Used to join electronic components and wires.
- **Drilling Machine**: Used for making holes in walls or panels for wiring installations.
- **Insulation Tester**: Helps in testing the insulation resistance of cables and electrical components.
- **Clamp Meter**: Used to measure current flow without direct contact with live wires.
- **Transformer**: Used to step up or step down voltage in electrical circuits.

CHAPTER THREE

3.1 SOME EQUIPMENT AND THEIR USES

Equipment	Uses
Multimeter	Measures voltage, current, and resistance in a circuit.
Oscilloscope	Analyzes electronic signals and waveforms.
Soldering Iron	Used for joining electronic components together.
Clamp Meter	Measures the current flowing through conductors.
Insulation Tester	Tests the insulation resistance of electrical components.
Drilling Machine	Used for making holes for electrical installations.
Screwdrivers	Used for assembling and disassembling electrical components.
Pliers	Used for holding, bending, and cutting wires.

3.2 CONNECTION OF DOUBLE SOCKET

Connecting a double socket involves the following steps:

1. **Turn Off the Power**: Ensure the power supply is switched off to prevent electric shocks.
2. **Prepare the Wiring**: Strip the insulation off the live (L), neutral (N), and earth (E) wires.
3. **Connect the Wires to the Socket Terminals**:
    - Live wire (brown) to the live terminal (L).
    - Neutral wire (blue) to the neutral terminal (N).
    - Earth wire (green/yellow) to the earth terminal (E).
4. **Secure the Connections**: Tighten the screws to ensure firm connections.

5. **Fix the Socket on the Wall**: Screw the socket onto the back box.
6. **Restore Power and Test**: Switch on the power and test the socket with a tester.

3.3 HOW TO FIT A LAMP HOLDER

1. **Turn Off Power Supply**.
2. **Prepare the Lamp Holder** by opening its terminals.
3. **Connect the Wires**:
    - Live wire to the central terminal.
    - Neutral wire to the outer terminal.
4. **Tighten the Screws** to secure the wires.
5. **Attach the Holder to the Fixture**.
6. **Insert the Bulb and Test** after restoring power.

3.4 HOW TO FIT A 3 BY 3 KNOCKOUT BOX

1. **Mark the Installation Point** on the wall.
2. **Drill and Insert Wall Plugs**.
3. **Place the Knockout Box and Screw It Securely**.
4. **Feed the Electrical Wires Through the Box**.
5. **Secure the Box Cover** if necessary.

3.5 How to Fit a 3 by 3 Blank Cover

1. **Align the Blank Cover with the Knockout Box**.
2. **Place the Screws into the Provided Holes**.
3. **Tighten the Screws** to hold the cover firmly in place.
4. **Ensure It Is Flush with the Wall** for a neat finish.

CHAPTER FOUR

4.1 PIPING OF BATHROOM T-LIGHT

Piping in electrical installations refers to the process of laying electrical conduit pipes to protect and route electrical wiring. In a bathroom, installing a T-Light involves:

- Selecting **PVC or metal conduit** to prevent exposure to moisture.
- Marking the **piping route** from the switch to the ceiling where the T-Light will be fixed.
- Drilling holes and inserting conduit pipes to pass electrical wires safely.
- Connecting wires from the switch to the light fixture following standard wiring procedures.
- Ensuring proper **earthing and waterproofing** to avoid electrical hazards.

4.2 WORK OF A ROUND BLANK COVER AND ITS USES

A round blank cover is used to seal unused electrical junction boxes. Its purposes include:

- **Safety:** Prevents accidental contact with live wires.
- **Aesthetics:** Covers open electrical boxes for a neat finish.
- **Protection:** Shields internal wiring from dust, moisture, and physical damage.
- **Flexibility:** Allows future expansion by providing access points for additional wiring.

4.3 USES OF CEILING ROSE

A ceiling rose is a decorative and functional component in electrical installations, commonly used in lighting setups. Its uses include:

- Acting as a **junction point** for wiring connections between the ceiling and light fixture.
- Providing **mechanical support** for hanging pendant lights.
- Serving as an **insulating barrier** between live wires and external surfaces.
- Enhancing the **aesthetic appearance** of lighting installations.

4.4 USE OF 2-GANG SWITCH

A **2-gang switch** is a double-switch unit that controls two separate electrical circuits from a single panel. Its functions include:

- **Controlling two different light sources** from one location.
- Providing **convenience in room lighting** by allowing independent control of multiple fixtures.
- Enhancing **energy efficiency** by operating only the required lights instead of all at once.
- Commonly used in **living rooms, bathrooms, and staircases** where separate lights need individual control.

4.5 HOW TO FIT A TV SWITCH

A **TV switch**, also known as a coaxial TV socket, is used to connect television sets to a cable or antenna system. The installation process involves:

- Selecting the appropriate **location on the wall** for the switch.
- Marking and **cutting a mounting box** space if not already installed.
- Running a **coaxial cable** from the antenna or service provider to the switch.
- Connecting the **coaxial cable** securely to the switch terminals.
- Fixing the switch to the wall, ensuring a **tight and stable connection**.
- Testing the signal with a TV to confirm proper functionality.

CHAPTER FIVE

5.1 TYPES OF LED LIGHTS

LED (Light Emitting Diode) lights come in various types based on design, application, and functionality. Some common types include:

- **Bulb LED Lights** – Standard replacement for incandescent bulbs, used in homes and offices.
- **Tube LED Lights** – Alternative to fluorescent tube lights, offering better efficiency and longevity.
- **Panel LED Lights** – Commonly used in ceilings for uniform light distribution.
- **Surface-Mounted LED Lights** – Designed for installation on ceilings or walls without needing a false ceiling.
- **Recessed LED Lights (Downlights)** – Embedded into ceilings for a modern look.
- **Strip LED Lights** – Flexible strips used for decorative and accent lighting.
- **High Bay LED Lights** – Used in warehouses and industrial settings.

5.2 HOW TO INSTALL A 15W SURFACE LED LIGHT

1. **Turn Off Power** – Ensure the power supply is off at the circuit breaker.
2. **Mark the Position** – Choose the installation spot and mark the screw holes.
3. **Drill Holes and Insert Wall Plugs** – For firm fixture support.
4. **Connect the Wires** – Attach the **live (L), neutral (N), and earth (E) wires** to the LED terminal.

5. **Fix the Light to the Ceiling/Wall** – Secure with screws.
6. **Turn on Power & Test** – Restore power and check the functionality.

5.3 INSTALLATION OF KNOCKOUT BOX

A knockout box is a metal or plastic box used for housing electrical outlets, switches, or junction points. Installation steps:

1. **Mark and Cut the Mounting Space** – If embedding, cut the required size in the wall.
2. **Secure the Box** – Screw or clip it in place.
3. **Knock Out Required Holes** – Remove metal or plastic plugs to pass electrical cables.
4. **Insert and Secure Wires** – Run electrical wires through conduit and into the box.
5. **Cover with a Switch or Socket Plate** – Finalize by attaching the required fixture.

5.4 HOW TO INSTALL AN EXTRACTION FAN

An extraction fan removes moisture, smoke, and odors from rooms like kitchens and bathrooms. Installation steps:

1. **Choose the Installation Location** – Near an external wall or ceiling vent.
2. **Drill a Hole for Ventilation** – Ensure proper size for fan fitting.
3. **Run Electrical Wiring** – Connect to an existing power source and switch.
4. **Fix the Fan to the Wall/Ceiling** – Secure with screws.
5. **Test the Fan** – Turn on power and check airflow efficiency.

5.5 INSTALLATION OF WATER HEATER

Water heaters require proper electrical and plumbing connections. Steps include:

1. **Shut Off Power & Water Supply** – Ensure safety before installation.
2. **Mount the Heater on a Wall Bracket** – Secure with bolts.
3. **Connect Water Pipes** – Inlet (cold water) and outlet (hot water) pipes.
4. **Wire the Electrical Connection** – Connect live, neutral, and earth wires properly.
5. **Turn on Power & Test** – Check for leaks and ensure proper heating.

5.6 INSTALLATION OF DOORBELL AND DOORBELL SWITCH

1. **Choose the Installation Location** – Near the front door for easy access.
2. **Fix the Doorbell Unit** – Secure it on the wall.
3. **Install the Doorbell Switch** – Near the entrance at a convenient height.
4. **Run the Wires (For Wired Systems)** – Connect power supply and chime unit.
5. **Insert Batteries (For Wireless Systems)** – If battery-operated, install new batteries.
6. **Test the Doorbell** – Ensure the button activates the sound unit.

CHAPTER SIX

6.1 CONCLUSION

During the **Student Industrial Work Experience Scheme (SIWES)**, I gained practical knowledge in **electrical and electronic engineering**, particularly in **installation, wiring, safety precautions, and equipment handling**. The experience enhanced my understanding of how theoretical concepts are applied in real-world electrical projects.

I learned how to install and troubleshoot various electrical fixtures, including **LED lighting, switches, sockets, extraction fans, water heaters, and doorbells**. The hands-on training also emphasized the importance of safety procedures, proper wiring techniques, and professional installation standards.

Overall, the **SIWES training** was a valuable opportunity to develop technical skills, problem-solving abilities, and workplace discipline.

6.2 RECOMMENDATIONS

Based on my experience, I recommend the following:

- **Improved Training Facilities** – Schools and companies should provide better training environments with modern equipment.
- **Strict Adherence to Safety Regulations** – Electrical work requires proper safety measures to prevent hazards.
- **More Hands-on Practice** – Practical training should be prioritized over theory to enhance technical skills.
- **Use of Standard Tools and Equipment** – Substandard materials should be avoided to ensure durability and efficiency.
- **Encouragement of Internships** – More organizations should support SIWES programs to bridge the gap between academics and industry experience.