A REPORT ON

STUDENTS INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

UNDERTAKEN AT

LATEEF ELECTRICAL WORKS

NO 19, PRINCESS ROAD ILORIN KWARA STATE

FROM

JULY, 2024 – OCTOBER , 2024

BY

BELLO ABDULRAHMAN

ND/23/EEE/PT/0230

SUBMITTED TO
THE DEPARTMENT OF ELETRICAL AND ELECTRONICS ENGINEERIMG, INSTITUTE OF TECHNOLOGY, KWARA STATE POLYTECHNIC, ILORIN.

IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF NATIONAL DIPLOMA (ND) IN ELETRICAL AND ELECTRONICS ENGINEERIMG.

OCTOBER, 2024

DEDICATION

I dedicate this Students Industrial Work Experience Scheme (SIWES) report to God almighty for his grace and mercy towards the completion of the SIWES programme.

ACKNOWLEDGEMENT

I thank God Almighty for the glory, honor, adoration and mercy I received during the course of my study and when undergoing my industrial Training

My appreciation also goes to my supervisor in person of Mr. Muhammed Abdulateef during my training, who accessibility, untiring effort, patience and guidance and suggestions fabulously contributed to the completion of this report. Who do not just teach me but makes me understood all his teaching, may God Almighty continue to guide and protect him and his house hold.

My appreciation also goes to my parent Mr & Mrs. Bello for their support during my training. may God Almighty continue to guide and protect them.

REPORT OVERVIEW

This is an industrial attachment report for the Students' Industrial Work Experience (SIWES) programme carried out at Lateef Electrical Works No 19, Princess Road, Ilorin, Kwara State within the period of three months from July, 2024 to October, 2024.

The report comprises the background of SIWES, the description of the organization, its aims and objectives, the experiences gained as an industrial training student and the summary, conclusions and recommendations.

It has a total of 5 chapters with sub-chapters. It also has the preliminary pages, such as the title page, report overview and table of contents and recommendations on the improvement of scheme.

TABLE OF CONTENT

CHAPTER ONE

INTRODUCTION

The Students' Industrial Work Experience Scheme (SIWES) is a scheme established by the Industrial Training Fund (ITF) in 1973 to help students of tertiary institution in Nigeria acquire technical skills and practical exposure in an industrial environment based on various course of study.

Prior to the Establishment of SIWES, science and technology education in Nigeria was marred with the problem of lack of adequate practical and industrial skills and working experience that will prepare students of tertiary institution in Nigeria for employment opportunities in industries. It was in this view that the scheme was established and students in tertiary institution of Nigeria studying sciences and technology related courses were mandated to participate in the program to enable them have technical knowledge and working experience before graduating from their prospective institution and makes it a smooth transition from the lecture room to the world of work.

1.1 BACKGROUND TO THE STUDY

SIWES was established by industrial training fund to solve the problem of lack of adequate practical skills in preparation for employment in industries by Nigerian graduates of tertiary institutions.

The Students' Industrial Work Experience Scheme (SIWES) was designed, established and implemented by the Industrial Training Fund (ITF) in 1974 to ensure acquisition of field practical knowledge and skills by students before graduation, mainly coordinated by the National University Commission (NUC). The NUC recognizing the importance of job specifications in the scheme did set the necessary machinery in motion soon after the resolution was taken in 1998. However, from 1989-1993, the drawing up of the minimum academic standards documents (a major statutory of commission) owe resultant accreditation exercise and the movement of the commission secretariat to Abuja did not leave sufficient time to actualize this goal.

It was not until January 1996 at a 3 days national workshop in Jos that specification was drawn for the entire program that had industrial attachment component in the minimum academic standard documents. Participants were drawn from senior academic from universities across the country, SIWES coordinators and officers in all nine panels, each headed by a senior academic officer were constituted for the entire forty-six program. Prior to drawing job specification, however, a one-day meeting was held at which a five-day meeting was presented and the procedure content and format for presentation of the specification documents were decided.

SIWES commenced in 1974 in the aim of making education more relevant to bridge the gap between the theory and the practice of agriculture, engineering, technology and science related discipline in tertiary institutions in Nigeria.

For students in polytechnics and mono-technics and college of education, the duration of SIWES is for 4 months while university undergraduates go for a 6 months duration. Each institution is expected to have a SIWES coordinator who is in charge of all activities that pertains to students industrial training in the institution.

The production of SIWES job specification is without doubt a milestone in the development of academic activities in the national university system. The benefit derivable by the employer, universities and the students alike are immense and will go a long way to move the country forward technologically.

Operators: The ITF, the coordinating agencies (NUC, NCCE, NBTE), the employers of labor and institution.

Funding: The Federal Government of Nigeria.

Beneficiaries: Undergraduate students of the following; Agriculture, Engineering, Technology, Environmental, Sciences, Education, Medical sciences and Pure and applied sciences.

1.2 OBJECTIVES OF SIWES

1. It provides an avenue for students in tertiary institutions to acquire industrial skills and work experience in their course of study.
2. It helps students develop skills in the application of theory to practical work situations.
3. It increases a student's sense of responsibilities
4. Makes the transition from school to the world of work easier and enhances students contacts for later job placement.
5. It prepares students to enter into full time employment in their area of specialization upon graduation.
6. It helps students to develop skills and techniques directly applicable to their careers.
7. It provides students the opportunity to develop attitudes conducive to effective interpersonal relationships.
8. It provides students the opportunity to understand informal organizational interrelationships
9. It provides students the opportunity to test their interest in a particular career before permanent commitments are made.

CHAPTER TWO

DESCRIPTION OF ESTABLISHMENT OF ATTACHMENT

2.1 LOCATION AND BRIEF HISTORY OF ESTABLISHMENT

LATEEF ELECTRICAL WORKS situated at No 19, Princess Road Ilorin Kwara State. The organization is primarily focuses on installation, maintenance, repair, and troubleshooting of electrical systems, including wiring, lightning, control panels and appliances.

I Bello Abdulrahman begin my SIWES attachment on 8th July 2024. I obtain placement with organization and started my SIWES training immediately

PROFILE OF THE COMPANY

The LATEEF ELECTRICAL WORKS is a popular known electrical Worls in kwara State is owned by private owner. It focuses on installation, maintenance, repair, and troubleshooting of electrical systems, including wiring, lightning, control panels and appliances.

2.2 OBJECTIVES AND CORE VALUES OF THE ESTABLISHMENT

The objectives and core values of the LATEEF ELECTRICAL WORLKS is to ensuring safe and reliable electrical systems through proper installation, maintenance, and troubleshooting, optimizing energy efficiency, complying with electrical codes, prioritizing customer satisfaction, developing employee skills, and maintenance a focus on workplace safety; all while aiming to deliver quality services and achieve profitable operations.

2.3 FUNCTIONS OF THE ESTABLISHMENT

The primary function of LATEEF ELETRICAL WORKS is to generate, transmit, and distribute electricity to residential, commercial, and industrial customers, ensuring a safe and reliable supply of power by managing the entire process from power plants to individual homes and businesses through installation, maintenance, abd repair of electrical systems.

CHAPTER THREE

ACTUAL WORKDONE WITH EXPERIENCE GAINED

During my Students Industrial Working Experience Scheme (SIWES) at the LATEEF ELECTRICAL WORKS , I was able to learn and gain a lot of industrial and organizational experience as goes:

THE BASICS OF HOME ELECTRICAL WIRING

Since the 1940s, any house built (or any older home that has been rewired) has had to follow an electrical code: the NEC—written with safety in mind. NEC code identifies types of electrical wires and electrical cable types by color. When you remove a switch plate, you've probably noticed yellow, white, black, red or green wires. They are not there to be decorative; each serves a specific purpose, and some don't play nicely with others.

HOW TO CONNECT ELECTRICAL WIRES

When you're doing wiring installation, you need to identify the parts of the wiring cable, the non-metallic electrical cable: the outer sheathing (the jacket) and the inner wires. The colored "wire" you see—the green, black, red, blue or white—is actually the sheathing that covers the inner copper wires. If you look closely, you'll see markings stamped on the sheathing to let you know the number and gauge of wires inside.

WHAT TYPE OF WIRE IS USED FOR RESIDENTIAL?

Most modern homes use nonmetallic (NM) cable that consists of two or more wires wrapped inside the colored sheathing mentioned previously. The package of wires usually contains one or more hot wires plus a neutral and a ground. To accommodate wiring in an older home or if your wiring just needs work, you can splice the old wires with new NM cable using a junction box that protects wire connections. The larger circuit wires carry circuit voltage that can be really dangerous to touch. If you don't know what kind of wires you have, consider them all to be dangerous.

ELECTRICAL WIRING MISTAKES TO AVOID

An electrical “oops” moment could be really serious, causing short circuits, shocks or fires. These are a few common mistakes you’ll want to avoid:

-- Never connect wires outside of electrical junction boxes. If there’s no box, add one and connect the wires inside it.

--Remember the three-inch minimum on wire length. Don’t cut your wires to short. IF you do, add six-inch extensions.

--Never leave sheathing unprotected between frames, as in a ceiling installation. Staple it to a 2× 2 or use metal conduit if the wire runs along the wall.

--Avoid loose switches or loosely connected outlets.

--Never install a three-slot receptacle without a ground wire.

--Don’t recess an electrical box behind a wall surface. Instead, add a wall extension.

--Secure cable with a clamp so wire insulation doesn’t cut or fray.

COMMON HOUSEHOLD ELECTRICAL PROBLEMS

If you have old wiring, you probably have a whole set of issues. One of the more common ones is frayed insulation because there was no grounding, and the wiring wasn’t made to handle today’s heavy-duty appliances. There are several other common electrical problems that are not restricted to old wiring:

--Frequent surges caused by lighting, damaged power lines, or faulty appliances or wiring

--Dips in power supply because of faulty devices (or those made of poor-quality materials) connected to the power grid

--Light switches that don’t work correctly

--A circuit breaker that trips frequently

--An overloaded circuit breaker

--Shocks

--Lights that are too bright or too dim

--High electrical bills

--Lightbulbs that burn out too often

--“Possessed” recessed lights that go out and then come back on

ELECTRICAL PANELS

Most residential homes rely on the services of their local utility company for electricity. The power coming from the utility company goes through the electrical panel which acts as the main switchboard that distributes the electricity needs within each home. This can be for lights, appliances, and other devices used by members of the household.

There are 4 different types of electrical panels – the main breaker panel, fuse boxes, main lug panels, and subpanels. The main breaker panel is the mother of all the panels in your house. It regulates the circuit breakers and the electricity consumption within the home. Fuse boxes are made up of small fuses which are designed to prevent overloading within your circuits. Main lug panels are comprised of line wires that run into lugs eliminating the need for the main breaker. Subpanels are electrical panels that get their energy from the main panel through a particular circuit. They allow you to control the electrical consumption of members of your household.

Can you identify which types of electrical panels are used within your home? Have you also wondered when you should replace your electrical panel? On average, electrical panels should be replaced every 20 years. Old electrical panels like the fuse box need to be updated to one that can handle your present electrical consumption. However, if you experience flickering lights, the burnt smell coming from your electrical panel, frequent circuit breaker

trips, or if there's been a major addition to your electric appliances and devices, then you should have your electrical panel checked and replaced if needed.

HOW DO YOU INSTALL A 200 AMP BREAKER BOX?

Should you need to upgrade into a 200-amp breaker box, you'll need to get a work permit from your local building inspector, get in touch with your utility provider and ask them to temporarily stop the service on the day of installation so that you can proceed with the installation. It's a rather complicated and dangerous job that's why we highly recommend that you hire a professional electrician to get the job done. We here at Arc Angel Electric can install your 200-amp breaker box, take care of all the permits, and make the necessary inspection for safety purposes.

If you're installing the Square D brand 200-amp breaker panel, it should be the same as installing any other brand of 200-amp panel. The only difference is that the cables are connected through the back of the panel because of its back feed design. Again, we recommend that you leave this to the pros. Our professional electricians at Arc Angel Electric can help you with all your electrical projects.

A 200-amp service will give you the flexibility for your electrical consumption. You can upgrade your 100-amp panel into a 200-amp panel to comply with the new regulations and accommodate your growing need for electricity. Homeowners can change their electrical panel if they are knowledgeable about electrical stuff. However, it is best to entrust the job to electrical professionals at Arc Angel Electric to ensure the quality and safety of the work

HOW CAN YOU TELL THE DIFFERENCE BETWEEN A 100-AMP SERVICE AND A 200-AMP SERVICE?

A 100-amp service is usually good for a small home without electric heating. The 200-amp service is the current standard for newly built homes to serve all the electrical needs of modern equipment. Physically, the 200-amp breaker is larger than the 100-amp because it holds more circuit breakers.

HOW DOES AN ELECTRICAL PANEL WORK?

The electrical panel receives the electricity coming from your utility provider. The main breaker panel turns the power on or off in all the branch circuits within the house. Electrical current travels through hot wires in your circuit breakers to power your electrical devices.

WHERE SHOULD I PLACE MY ELECTRICAL PANEL?

The National Electric Code says that electric panels should be placed in a spacious room with clear working space, reachable, and well-lit. Your main breaker panel should be placed in an area that people in your house don't usually stay in. The Fire Department has recommended for the home electric panels to be attached outside the homes to make it easier for them to shut off electricity in case there's a fire. The secondary panels can be placed in other rooms such as the bedroom as long as no water can reach them. Therefore, you shouldn't put your electric panels in your bathroom or laundry room.

WHAT SHOULD YOU NOT TOUCH IN A BREAKER BOX?

Always be cautious when working with any electrical panels. It has parts that can electrocute you and it can be lethal. Avoid touching the neutral bus bar, a neutral wire, main black cable, burnt or damaged parts, and exposed metal parts. Remember, it is only safe to touch a circuit breaker when all the power is turned off.

CHAPTER FOUR

ACTUAL WORKDONE WITH EXPERIENCE GAINED (Cont'd)

WIRING A RESIDENTIAL HOUSE

Wiring is complex and very different from other aspects of home improvement. Knowing how it works is of great benefit to you.

However, some localities only approve a licensed electrician for residential house wiring. This is because of the risks involved in making a simple error. You can do your installation under the supervision of a licensed electrician to avoid costly mistakes.

As a homeowner, you should know specific basic requirements for home wiring for your protection, even if you don't plan to do the wiring yourself.

Let's begin with the room-by-room requirements of home wiring.

REQUIREMENTS FOR WIRING VARIOUS PARTS OF THE HOME

Living room, Dining room, and Bedrooms

These standard living areas require a moderate power supply. The living room, dining, and bedrooms are generally served by 120-volt 15 or 20amp, which can serve more than one room.

Install a wall switch beside the entry door of the room. This switch is to enable you to light the room easily when you enter it. It will control ceiling fixtures or wall light. A pull chain should not control your ceiling light; install a switch.

Your dining room requires a separate 20amp circuit for a microwave or window air-conditioner. All wall sockets must not be more than 12 feet away from one another. If you have any wall section that is wider than 2cm, install an electrical socket.

BATHROOM

Remember that bathrooms are always wet, so be extremely careful. Bathrooms may need more than one circuit because of the lights, vent fans, and outlets for hairdryers and other appliances.

A 20-amp circuit is recommended for the outlet sockets in the bathroom. The circuit can be used to supply the whole bathroom (a single bathroom) if there are no heaters or vent fans with built-in heaters. You can also use a 20-amp circuit for sockets and another 15amp for the lighting.

If you plan to use a vent fan with a built-in heater, have a separate 20-amp circuit solely for it. Your sockets should be at least 120 volts for a bathroom and must have ground-fault circuit-interrupter protection (GFCI).

All light fixtures in the shower area, if not subject to shower spray, must be rated for damp locations. You may add an extra outlet close to the door for your vacuum cleaner, depending on the size of the bathroom.

KITCHEN

The kitchen uses more electricity than any other room in a house. A kitchen with standard appliances requires about seven circuits or more.

Kitchen lighting requires at least one 120/125-volt 15-amp circuit separately. It can power ceiling fixtures, canister lights, strip light, and under-cabinet lights. A switch must be installed for each set of light so that you can control lighting easily.

For portable plug-in appliances, install two 20-amp 120volt circuits for sockets in the countertop areas. Almost all standard kitchen appliances require a circuit dedicated to them. The dishwasher, garbage disposal, refrigerator, and microwave each require 120-volt circuits.

Install an electric range with a 240volt 50-amp circuit even if you won't need it right away. An electric range can be a selling point for you if you want to sell the house.

Check the manufacturer's recommendations to confirm the more appropriate circuit for your dishwasher and garbage disposal between the 15-amp and 20-amp circuits. As for

refrigerators and microwaves, the amperage would be 20-amp. Countertop sockets must not be placed farther than 6 feet apart.

HALLWAYS

Hallways can be very long, so they need efficient lighting. You have to install enough light to avoid casting shadows.

If your hallway is 10 feet long, you can use a general outlet. The switches should be installed three-way so that the ceiling light can be controlled from both ends. Make it four-way if the hallway serves a bedroom or any other room.

STAIRWAYS

All steps must be adequately lighted; you don't want trips and falls. Just like the hallway, you need the switches in three-way so that you can put it on or off from both ends. If your stairway has a turn, ensure that the area is appropriately illuminated.

STEPS TO FOLLOW WHEN WIRING A HOUSE

1. Design a wiring diagram

Your first step is to design a wiring diagram. The diagram will show the locations of the breaker box and the path each wire will follow to each outlet.

2. Disconnect power

It is hazardous to ignore this step. Don't be too self-confident. Cut off the power supply before doing any wiring in the home, no matter how little. Switch off the power that leads to your house meter or call your power supplier to cut it off for that short period.

3. Set up an electrical board

Mount your electrical panel at the spot where power enters your house from the supplier. Use a screwdriver and hammer to create holes that power leads can pass through.

4. Install conduits

Start from upstairs to the basement. It is easier this way, and you don't need to use a ladder to push the wire up. Start with the longest cable to avoid wastage. Have at least one foot of extra wire at each end.

Pass the wires through the drilled hole and fasten the clamps. Then, loosen the lugs on the brass bus bar. Put the red into one and the black into the other. Tie white cable to the silver bus bar

5. Understand outlets counts properly

You must know all the outlets needed and how many switches will run in a circuit as discussed above in the requirements for each room.

6. Set up connection

Now, drive a metal ground bar properly into the soil. Then run an eight gauge copper wire from the board to the shaft. Join the ground clamp and ground bus together on the service board.

7. Add a circuit breaker and electrical box

Your circuit breaker should be placed where it is easily accessible. It can be in the basement or utility room. Connect each electrical circuit to the service board to form a circuit breaker.

Connect the white wire of each cable to the silver bus bar and the ground wire to the ground bus bar. The black wire should separate breakers on a paired set.

To avert overloading, design your circuit to cut the length of the cable. Then mount an electrical box at every location of an outlet, light fitting, or switch.

ELECTRICAL SAFETY PRECAUTIONS

It’s vitally important to take safety precautions when working with electricity. Safety must not be compromised and some ground rules need to be followed first. The basic guidelines regarding the safe handling of electricity documented below will help you while working with electricity:

1. Avoid water at all times when working with electricity. Never touch or try repairing any electrical equipment or circuits with wet hands. It increases the conductivity of the electric current.

2. Never use equipment with frayed cords, damaged insulation, or broken plugs.

3. If you are working on any receptacle at your home then always turn off the mains. It is also a good idea to put up a sign on the service panel so that nobody turns the main switch ON by accident.

4. Always use insulated tools while working.

5. Electrical hazards include exposed energized parts and unguarded electrical equipment which may become energized unexpectedly. Such equipment always carries warning signs like “Shock Risk”. Always be observant of such signs and follow the safety rules established by the electrical code followed by the country you’re in.

6. Always use appropriate insulated rubber gloves and goggles while working on any branch circuit or any other electrical circuit.

7. Never try repairing energized equipment. Always check that it is de-energized first by using a tester. When an electric tester touches a live or hot wire, the bulb inside the tester lights up showing that an electrical current is flowing through the respective wire. Check all the wires, the outer metallic covering of the service panel, and any other hanging wires with an electrical tester before proceeding with your work.

8. Never use an aluminum or steel ladder if you are working on any receptacle at height in your home. An electrical surge will ground you and the whole electric current will pass through your body. Use a bamboo, wooden or a fiberglass ladder instead.

9. Know the wire code of your country.

10. Always check all your GFCI's once a month. A GFCI (Ground Fault Circuit Interrupter) is a RCD (Residual Current Device). They have become very common in modern homes, especially damp areas like the bathroom and kitchen, as they help avoid electrical shock hazards. It is designed to disconnect quickly enough to avoid any injury caused by over-current or short circuit faults.

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.1 SUMMARY OF ATTACHMENT ACTIVITIES

This is a complete report of an industrial training program carried out during my SIWES (2023/2024) at LATEEF ELECTRICAL WORKS No 19, Princess Road, Ilorin, Kwara State. Activities including installation, maintenance, repair, and troubleshooting of electrical systems, including wiring, lightning, control panels and appliances.

The experience gained has given me a sound knowledge on media house in general which has helped prepare me for the future journalism work.

5.2 PROBLEMS ENCOUNTERED

The success of my training is undisputed, but it was not devoid of rough edges. I experienced challenges likes the issue of expensive transportation was the problem because my place of attachment was a little bit far from my house.

5.3 SUGGESTIONS FOR IMPROVEMENT OF THE SCHEME

- Visiting of students during the program should be ensured by the ITF
- Students should be paid their allowance on time to ensure motivation
- Selection of placement should not be left to students. Polytechnics should make a means of allocating students to related companies
- Seminars should be organized for establishments to acquaint them with their roles towards students on training
- Government should participate fully in the provision of equipment in the placement centers

5.4 CONCLUSION

The period has contributed immensely to my academic experience. Students Industrial Working Experience Scheme (SIWES) is an important program for all students. It helps in tackling the issue of unemployment amongst youth as it teaches us way to be independent. The exercise made me understood part of what is expected as an electrician. It helped groom my relationship skills especially in areas where team work are required and

communicating with the staffs and students alike. It has exposed me to work ethics and routines.

The problems, if not tackled, will make it lose its usefulness and vitality notwithstanding the benefits of it.

Finally, I do hope the program will be improved so as to enhance manpower development and student’s skill in their respective field of study.