KWARA STATE POLYTECHNIC, ILORIN

INSTITUTE OF TECHNOLOGY
AGRICULTURAL AND BIO-ENVIRONMENTAL ENGINEERING DEPARTMENT

A TECHNICAL REPORT ON
STUDENTS INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

BY

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ND/23/ABE/FT/0023

Agricultural And Bio-Environmental Engineering Technology, Institute of Technology, Kwara State Polytechnic, Ilorin

HELD AT
KWARA STATE MINISTRY OF AGRICULTURAL AND RURAL DEVELOPMENT
P.M.B 1386, OLD JEBBA ROAD, ILORIN, KWARA STATE.

BEING A REPORT SUBMITTED TO THE SIWES UNIT, INSTITUTE OF TECHNOLOGY CHAPTER, KWARA STATE POLYTECHNIC, ILORIN

IN PARTIAL FULFILLMENT FOR THE REQUIREMENT FOR THE STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

NOVEMBER, 2024

DEDICATION

This report is dedicated to God Almighty, my family, whose support was unwavering, and to the resilience within me, which has propelled me to successfully complete this Student industrial work experience through my own determination, hard work, and perseverance.

ABSTRACT

This report is based on Student Industrial Work Experience Scheme (SIWES) held at KWARA STATE MINISTRY OF AGRICULTURAL AND RURAL DEVELOPMENT, ILORIN. P.M.B 1386, Old Jebba Road, Ilorin, Kwara State. it gives brief explanation about the SIWES program vis-à-vis its history, objectives and aims, while also provides a brief description, roles and functions of KWARA STATE MINISTRY OF AGRICULTURAL AND RURAL DEVELOPMENT, Ilorin. It further focuses more on the technical exposure and experience gained from the engineering Department of the Ministry to be specific. It finally gives an account of the equipments used, types and their function respectively as well as some of the problems and challenges faced and provide recommendations that can further improve the program.

ACKNOWLEDGEMENT

I would like to thank the Almighty God, my strong pillar, my source of inspiration, wisdom, knowledge and understanding. he has been source of my strength, commitment and patience to pass various obstacles throughout this program also, my profound gratitude goes to the Kwara State Polytechnic Management for including the Student Industrial Workshop Experience Scheme (SIWES) to the National Diploma Programme which enable me to learn and gain more experience outside the campus.

Also, I will like to say a big thank you to the management of Kwara State Ministry of Agricultural and Rural Development, Ilorin for giving me the opportunity to be trained under an organization of high status.

I would also like to express my deepest gratitude to my industrial-base supervisor in person of Engr. Sulyman and other co-supervisors for their series of training on different activities on administrative and professional ethics.

I would not end this acknowledgment without appreciating my parents for their unwavering support, co-operation, encouragement and understanding throughout the duration of the SIWES programme.

DECLARATION

I hereby declare that, I from Agricultural and Bio-Environment Engineering Technology Department, Institute of Technology, Kwara State Polytechnic, Ilorin. underwent the four months students industrial work experience scheme (SIWES) at MINISTRY OF AGRICULTURAL AND RURAL DEVELOPMENT, ILORIN. *P.M.B 1386, Old Jebba Road, Ilorin, Kwara State.* from 5th August to 30th November, 2024.

I also declare that to the best of my knowledge, all sources of knowledge used have been duly acknowledged.

ADEGBOYE AYOMIDE ADEDAYO
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CHAPTER ONE

1.0 INTRODUCTION TO SIWES

Students Industrial works experience scheme (SIWES) skill acquisition programme was introduced by the Federal Government of Nigeria to expose undergraduate in Engineering, Technology and Sciences of Tertiary Institutions (University, Polytechnics, Mono-technics and Colleges of Education) to industrial environment so as to acquire basic skills existing in their respective disciplines to smoothen their entry into industrial practices on completion of their studies and also reduce periods spent in training fresh graduates as new employees. It was first initiated and funded by industrial training fund (ITF) during the formative years 1973/1974.

The scheme forms part of the approved Minimum Academic Standards (MAS) in the various Degree programmes for all Nigeria universities. It is an effort to bridge the gap existing between theory and practice of engineering and technology, science, agriculture, medical, management and other professional educational programmes in the Nigeria Tertiary Institution. The programme mediate exposing students to design and construction of machines and equipment, professional work method and ways of safe-guarding the work area and workers in industries and organizations.

1.1 HISTORY OF SIWES

SIWES (Student Industrial Working Experience Scheme) was established by ITF in1973 to solve the problem of lack of adequate practical skills preparatory for employment in industries by Nigerian graduates of tertiary institutions.

The Scheme exposes students to industry based skills necessary for a smooth transition from the classroom to the world of work. It affords students of tertiary institutions the opportunity of being familiarized and exposed to the needed experience in handling machinery and equipment which are usually not available in the educational institutions.

Participation in Industrial Training is a well-known educational strategy. Classroom studies are integrated with learning through hands on work experiences in a field related to the student's academic major and career goals. It also expose the student to the practical aspect of some course being offer in the school.

Successful internships foster an experiential learning process that not only promotes career preparation but provides opportunities for learners to develop skills necessary to become leaders in their chosen professions.

One of the primary goals of the SIWES is to help students integrate leadership development into the experiential learning process. Students are expected to learn and develop basic non-profit leadership skills through a mentoring relationship with innovative non-profit leaders.

By integrating leadership development activities into the Industrial Training experience, we hope to encourage students to actively engage in non-profit management as a professional career objective. However, the effectiveness of the SIWES experience will have varying outcomes based upon the individual student, the work assignment, and the supervisor/mentor requirements.

It is vital that each internship position description includes specific written, learning objectives to ensure leadership skill development is incorporation. Participation in SIWES has become necessary pre-condition for the award of Diploma, Degree and NCE certificates in specific disciplines in most institutions of higher learning in the country, in accordance with the education policy of government.

1.2 OPERATORS OF SIWES

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

Funding – The Federal Government of Nigeria

Beneficiaries – Undergraduate students of the following: Agriculture, Engineering, Technology, Environmental, Science, Education, Medical Science and Pure and Applied Sciences.

Duration – Four months for Colleges of Education and Polytechnics, and Six months for the Universities.

1.3 OBJECTIVES OF SIWES

1. SIWES students will develop skills in the application of theory to practical work situations.
2. SIWES students will develop skills and techniques directly applicable to their careers.
3. SIWES will aid students in adjusting from college to full-time employment.
4. SIWES students will require good work habits.
5. SIWES will increase a student's sense of responsibility.
6. SIWES will provide students the opportunity to develop attitudes conducive to effective interpersonal relationships.
7. SIWES will reduce student dropouts.
8. SIWES student will be prepared to enter into full-time employment in their area of specialization upon graduation.
9. SIWES will provide students the opportunity to test their interest in a particular career before permanent commitments are made.

10. SIWES students will develop employment records/references that will enhance employment opportunities.
11. SIWES will provide students the opportunity to understand informal organizational interrelationships.

The four (4) months Students Industrial Work Experience Scheme (SIWES) which is a requirement for the completion of my course of study. This SIWES program was undertaken at Kwara State Ministry of Agricultural and Rural Development, Ilorin of the AGRICULTURAL ENGINEERING UNIT.

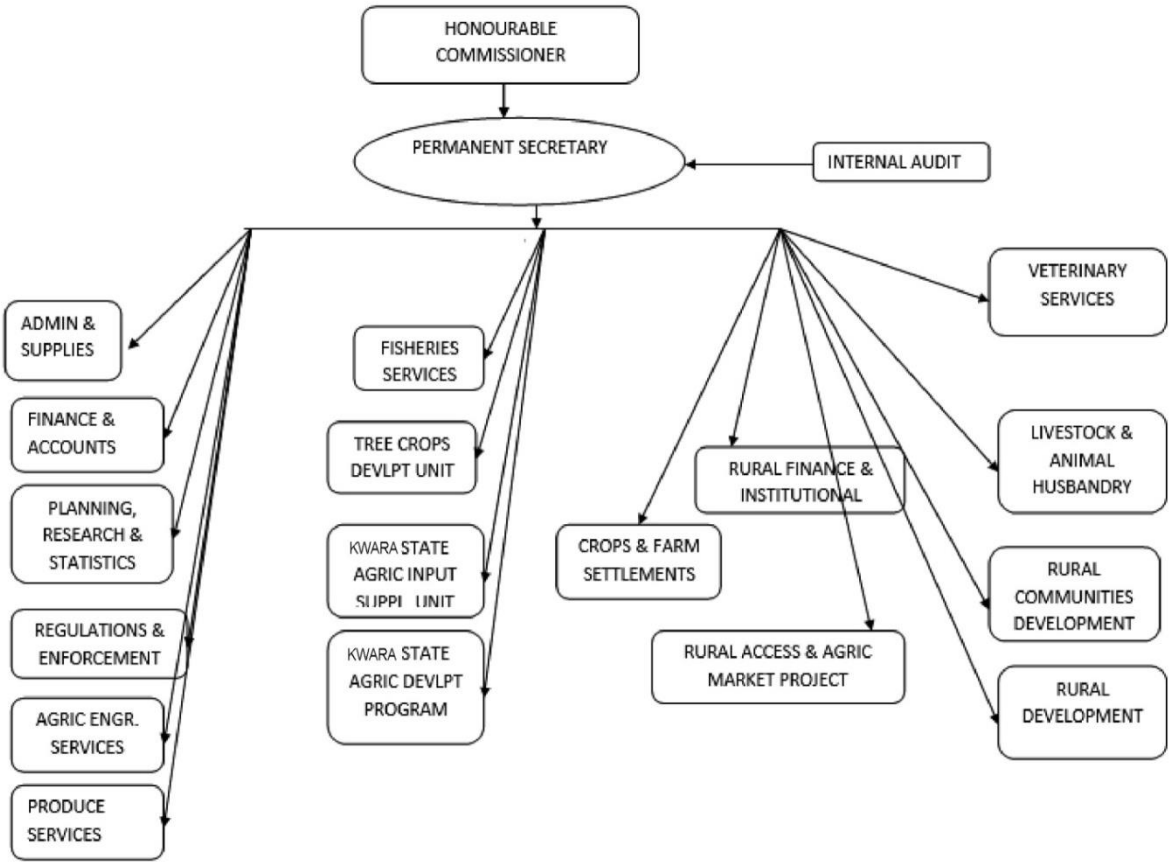
The Industrial Training period was carried out in Simba Workshop of Newsong Global Technology Service which is solely Install, Repair and Maintain Solar Renewable Power System.

CHAPTER TWO

2.0 DESCRIPTION OF THE ESTABLISHMENT OF ATTACHMENT

The four months Industrial training program was carried out at Kwara State Ministry of Agricultural and Rural Development (Agricultural Engineering Department). The establishment take operation on Irrigation and Drainage, Crop processing, Survey, Land Clearing and Land Forming, Lease of machinery, with repair/maintenance of farm machinery and implement. These operations are carried out within the premises and on farm sites, emphasizing efficiency, sustainability, and support for the agricultural community. The department's integrated approach to agricultural engineering plays a critical role in enhancing productivity and fostering rural development.

2.1 ORGANIZATION STRUCTURES



CHAPTER THREE

SAFETY REGULATION

3.0 NECESSARY REQUIREMENT FOR WORKING IN THE WORKSHOP

i. The ability to learn specific, practical techniques and apply this knowledge to solve technical problems.

ii. Good coordination and the ability to use equipment with accuracy;

iii. Flexibility in the work with and provision of support for other people.

iv. Necessary qualification with practical knowledge to be able to keep records of the task performed.

vi. Excellent oral communication skills in order to work effectively with colleagues from all parts of the organization and to explain complex techniques to interested parties.

3.1 GUIDE LINES FOR SAFETY IN THE WORKSHOP

Safety is the state of being 'safe', the condition of being protected from any physical or electrical and other types of consequence, failure, damage, error, accident or any other event that could be considered non-desirable. For anyone working in workshop, safety should be his/her first priority. Some guide lines for safety in the workshop.

i. Qualified or suitable trained personnel only to use equipment.

ii. Wear suitable attire for operating machinery or equipment.

iii. Keep equipment and the surrounding area clean and tidy at all times.

iv. Always seek instruction before using an unfamiliar piece of equipment.

v. Only use tools and machines for their intended purpose.

vi. Report any damaged equipment and do not use it until it has been repaired by a qualified person.

vii. Where machine guards are provided they must be kept in place.

viii. Never distract the attention of another staff member when operating equipment and never indulge in horseplay.

ix. Always use the appropriate personal protective equipment.

x. Long hair must be restrained.

xi. Familiarize oneself with all ON/OFF buttons on equipment, circuit breakers, and disconnect switches of a bench.

xii. Avoid loose wires, cables, and connections.

xiii. Assume any exposed metal is live with electricity unless otherwise verified.

3.2 IMPORTANT SIGNS/LABELS AND THEIR MEANING

In every workshop, safety is essential; luckily enough, there are danger signs on any product which are classified as harmful. These signs help to warn the workers/students of the possible danger or hazard in the workshop.

Some of the signs are:

i. Electric Shock;- can be found on a machine with electrical connections

ii. General warning:- This warning signs are usually used to indicate danger ahead.

CHAPTER FOUR

4.0 ACQUIRED SKILLS AND AREAS OF EXPOSURE

During my Student Industrial Work Experience Scheme (SIWES), I acquired various technical skills and was exposed to a range of practical applications and engineering concepts. These experiences are summarized as follows:

4.1 FARM LAYOUT PRACTICAL

During the practical session, I learned the principles of farm layout, which involves systematically arranging farm components like farmland, irrigation channels, pathways, and storage areas to optimize efficiency and productivity. The Activities involved analyzing land topography, identifying essential components, and designing layout plans with considerations for drainage, accessibility, and crop spacing. Tools such as measuring tapes, pegs, and ropes were used to mark boundaries and plan arrangements.

4.1.1 PURPOSE OF FARM LAYOUT

The purpose of the farm layout is to maximize land use, improve irrigation efficiency, and separate various farm activities for better organization and management. We explored different types of layouts, including block layout and strip layout, and their applications in real-world farming.

4.1.2 SPECIFIC OBSERVATION

One of my key observations was how proper drainage systems prevent waterlogging and improve soil health. I also noticed that aligning pathways with the natural slope of the land reduces erosion and simplifies transportation. During the practical, I suggested positioning the storage area closer to the access road to enhance operational efficiency.

4.1.3 IMPACT OF THE PRACTICAL

This session highlighted the importance of proper planning in ensuring sustainable and efficient farm operations. It provided hands-on experience in designing layouts that balance productivity and environmental sustainability.

MEASURING TAPE

PEGS AND ROPE

Measuring tapes, pegs, and ropes were used to mark boundaries and plan arrangements.

4.2 LAND SURVEY USING LEVELING COMPASS

I participated in land surveying using a leveling compass. This activity involved marking contours, identifying high and low areas, and preparing the land for effective irrigation and drainage systems.

4.2.1 TOOLS USED

- **Leveling Compass:** Measures angles and gradients.
- **Staff:** Marks specific heights for level determination.
- **Measuring Tape:** Ensures accuracy in distance measurement.

LEVELING COMPASS, TRIPOD STAND AND STAFF USED DURING THE PRACTICAL

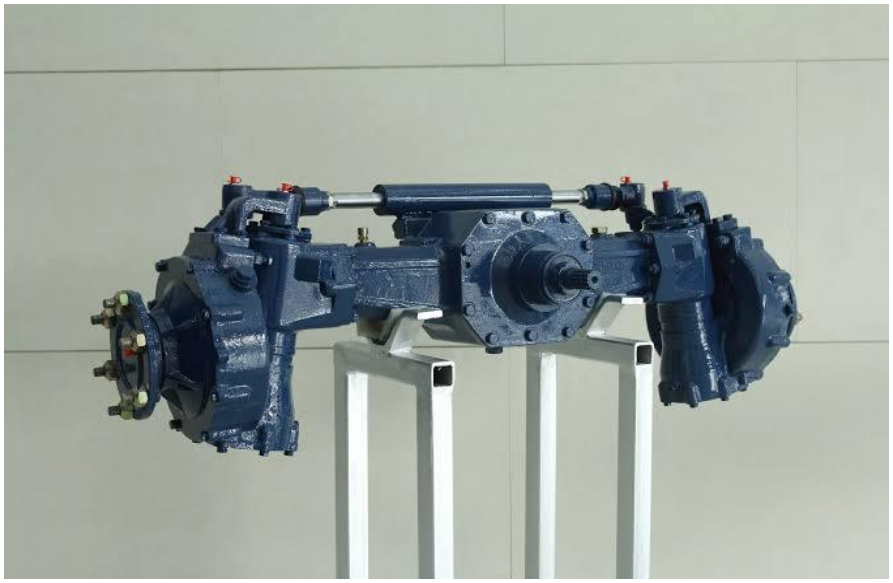
4.3 TRACTOR

A tractor is a powerful and versatile machine primarily used in agricultural, construction, and industrial applications. It is engineered to provide high torque at low speeds, making it capable of performing a variety of tasks such as plowing, tilling, planting, and transporting heavy loads.

4.3.1 TRACTOR COMPONENT

- **TRACTOR AXLE**

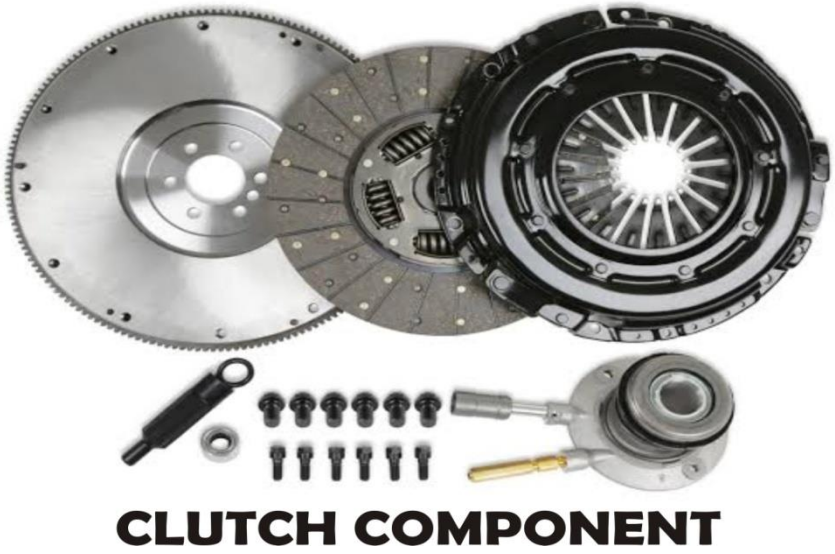
- **Components:** The axle comprises the axle shaft, bearings, differential, and housing.
- **Importance:** It transmits power from the tractor's engine to the wheels, enabling movement and load-bearing.
- **Working Principle:** The axle works by receiving rotational power from the transmission system, transferring it to the wheels. The differential allows the wheels to rotate at different speeds during turns to ensure stability.



FRONT WHEEL AXLE

- **CLUTCH**

- **Components:** It consists of the clutch plate, pressure plate, release bearing, flywheel, and release fork.
- **Working Principle:** The clutch disengages and engages the power flow from the engine to the transmission. When the pedal is pressed, the release bearing pushes the pressure plate away from the clutch plate, interrupting power transmission.
- **Importance:** The clutch allows smooth gear shifting, ensuring controlled power delivery to the drive train.



CLUTCH COMPONENT

4.3.2 FARM IMPLEMENTS MOUNTED TO THE TRACTOR

- **Implements:** These include plows, harrows, planters, and cultivators.
- **Attachment:** Implements are mounted using the three-point linkage system, which provides stability and ease of operation.
- **Functions:** Implements are used for soil preparation, planting, and other farming operations, reducing manual labor and increasing efficiency.

4.3.3 GENERAL MAINTENANCE

- Tighten loose screws and bolts.
- Regularly clean the tractor to prevent rusting.
- Store in a covered area to protect from weather elements.

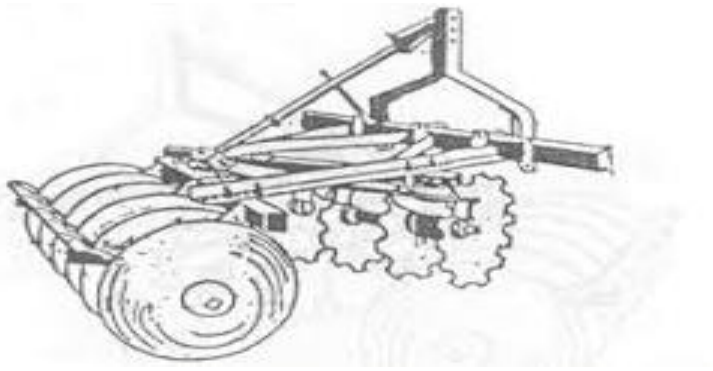
4.4 TILLAGE OPERATION

I participated in a tillage operation using a tractor-mounted implement. The operation involved primary tillage, where the soil was broken up and loosened to improve aeration and water infiltration. I observed the adjustment of the implement depth and angle to ensure optimal soil preparation for planting. I also assisted in monitoring the tractor's performance and ensured the even distribution of tilled soil across the field. Tillage operations can be classified into two main types:

1. **Primary Tillage:** This involves the initial breaking and loosening of the soil to reduce its compaction and improve its structure. During the practical session, we used a disc plow to break the soil, ensuring that it was aerated and ready for further operations.

DISC PLOUGH

2. **Secondary Tillage:** After primary tillage, secondary tillage was performed to refine the soil. This stage involved using a disc harrow to further pulverize the soil clods, level the field, and remove weeds. Secondary tillage ensures a finer soil texture suitable for planting seeds.



DISC HARROW

4.5 REPAIR OF DISC HARROW

I participated in a practical session focused on repairing a disc harrow, a crucial implement used in agricultural operations for soil preparation. The session began with an introduction to the components of the disc harrow, including the disc blades, frame, bearings, and axles.

4.5.1 MY PARTICIPATION

- **Inspection:** I assisted in examining the disc harrow for damages, identifying worn-out disc blades, loose bolts, and malfunctioning bearings.
- **Dismantling:** I participated in dismantling the damaged parts, using tools such as spanners, hammers, and wrenches.
- **Replacement and Repair:** I helped replace worn-out blades and lubricated the bearings to ensure smooth rotation.
- **Reassembly:** After repairs, I was involved in reassembling the parts, ensuring proper alignment and tightening of bolts.
- **Testing:** The repaired harrow was tested to confirm its functionality, and I contributed to making adjustments for optimal performance.

THE DISC HARROW WORKING PERFECTLY AFTER THE REPAIR

4.6 IRRIGATION AND DRAINAGE

I worked on setting up basic irrigation systems to ensure efficient water distribution. The practical aspect also involved understanding drainage methods to prevent waterlogging on the farm.

4.6.1 TYPES OF IRRIGATION

- **Surface Irrigation:** Water is distributed over the soil by gravity.
- **Sprinkler Irrigation:** Sprays water in a controlled manner, simulating rainfall.
- **Drip Irrigation:** Delivers water directly to the root zone through emitters.

4.6.2 COMPONENTS AND MATERIALS

- **Pipes:** PVC or aluminum pipes for water distribution.
- **Pumps:** Centrifugal and submersible pumps.
- **Valves:** Control the flow of water.
- **Filters:** Prevent blockages in the irrigation system.

Materials used during the irrigation practical

4.6.3 USE OF PUMPING MACHINE

I gained practical experience in the operation and maintenance of a pumping machine. This machine was primarily used for water supply in irrigation and other farm-related activities.

4.6.4 OBSERVATION AND OPERATION

I observed the setup and connection of the pumping machine, ensuring the correct alignment of the suction and delivery hoses. I also participated in priming the pump, starting the engine, and monitoring its operation to maintain a steady water flow.

PUMPING MACHINE

4.7 SKILLS ACQUIRED

- Knowledge of mechanized farming operations and implement handling.
- Proficiency in using land survey instruments.
- Understanding of tractor functionality and maintenance.
- Practical experience in irrigation system design and implementation.

4.8 CHALLENGES FACED

- Limited access to advanced land survey tools.
- Mechanical breakdowns during tillage operations.

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.0 SUMMARY

In summary, the student industrial work experience scheme (SIWES) has been carried out and it can be categorically said that objectives of the scheme has been achieved. It has exposed me to the four major units of a standard institutional Agricultural and Bio-environmental Engineering work experience (Farm Power and Machinery, Irrigation and Drainage, crop processing and farm storage structure).

The safety rules and regulations, operational guideline of some basic equipment in the workshop house were also exposed. In general, practical exposures to base engineering practicals have been learnt.

5.1 CONCLUSION

The Industrial Training Programme as its been designed has actually fulfilled its purpose by exposing undergraduate students of Engineering to industrial environment, use of tools, and equipments, practical knowledge and application of safety measure to life and properties.