A TECHNICAL REPORT

ON

STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME

(SIWES)

HELD AT

KWARA STATE MINISTRYOF WORKS AND TRANSPORT HEADQUARTERS ILORIN

BY

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Dedication

I gratefully dedicate this SIWES report to Almighty God, the most awesome and merciful who gave me the uncountable opportunity to participate in the program. I also dedicate it to special people such as my parents Mr. and Mrs. Abdulrasheed

ACKNOWLEDGEMENT

I thank God Almighty for his mercy and grace that kept me all through my industrial training period. I am greatly indebted to my parents, Mr. and Mrs. Abdulrasheed for their financial and moral support during the course of the programme and my SIBLINGS for their hospitality and care towards ensuring that my industrial training was a worthwhile and fulfilling one. I also want to thank everyone that contributed to the success of my industrial training; my industrial supervisors in my personal place of attachment Engr. Kola who taught me and made me to be sophisticated in the field of civil engineering. I greatly acknowledge you for your effort.

PREFACE

The student Industrial Experience Scheme [SIWES] is a programmed organized by the National Board of Technical Education [NABTE] to allow student to have practical training which is very important to Engineering Student for Awarding of their National Diploma and also to build solid foundation towards the upcoming challenges.

This technical report contains the various activities and experience undergone during my four month student Industrial Working Experience Programmed, which was held at Kwara State Ministry of works and Transport, Ahmadu Bello Way, Ilorin.

TABLE OF CONTENT

Title page

Dedication i

Acknowledgment ii

Preface iii

Table of content iv

CHAPTER ONE

1.0 Introduction

1.1 Definition of SIWES, goals and objectives

1.2 Historical Background of the organization

1.3 Organization Chart

1.4 Activities of the organization

CHAPTER TWO

2.0 Section of organization

2.1 Their specific functions

CHAPTER THREE

3.0 Student specific involvement at various sections

CHAPTER FOUR

4.0 Skills and knowledge acquired

4.1 Discussion

4.2 Interpersonally relationship within the organization

CHAPTER FIVE

5.0 Conclusion

5.1 Personal impression about the organization

5.2 Suggestion / recommendation to the organization

5.3 Suggestion / recommendation to the institution concerning SIWES

CHAPTER ONE

1.0 INTRODUCTION

The student industrial work experience scheme (SIWES), also known as Industrial Training is a compulsory Skills training program designed to expose and prepare students of Nigerian Universities, and other institutions.

SIWES introduction, initiation and design was done by the Industrial Training Fund (I.T.F) in 1993 to deputize students with the excellent skills of handling employer's equipment and machinery in all useful ways. The Industrial Training Fund (I.T.F) merely funded the scheme during its originative years.

However, due to financial constraints, the fund withdrew from the Scheme in 1978.The Federal Government, noting the significance of the skills training handed the management of the scheme to both the National Universities Commission (N.U.C) and the National Board for Technical Education (N.B.T.E) in 1979.The management and implementation of the scheme were however reverted to the I.T.F by the Federal Government in November 1984 and the administration was effectively taken over by the Industrial Training Fund in July 1985, with the funding solely borne by the Federal government.

The scheme provides students the great eventuality of introducing and showing up themselves to the needed experience in handling the best equipment and machinery that are usually not available in their institution. It supports students and makes them dependent.

Before the foundation of the scheme, there was a growing thought among industrialists, that graduates of institutions of higher learning having inadequate practical background studies preparatory for employment in industries.

Thus employers were of the opinion that the theoretical education in higher institutions wasn't liable to the needs of the employers of labor.

1.2 Aim and Objectives

The aims and objectives of student industrial work experience (SIWES**)** are as follows;

- SIWES gives room for students in institutions of higher learning to acquire industrial skills and experiences in their field of study.
- Prepare the students for the industrial work practices they are likely to encounter after graduation.
- Expose students to work methods and techniques in handling equipment and machinery that may not available in their institutions.
- Make the epidemic from school to the world of work easier and enhance the chances of students' contact for later job placement.
- SIWES gives students an opportunity to apply their knowledge in real work scenarios thereby bridging the gap between theory and practice.

CHAPTER TWO

2.0 DESCRIPTION OF ESTABLISHMENT OF ATTACHMENT

ACMARTY Nigeria Limited provides specialized consultancy services in different areas of engineering with particular emphasis on civil, highway, water disposal, surveying, structural engineering, project management and industrial development planning.

2.1 Location and Brief History of Establishment

ACMARTY Nigeria Limited is located at Kilometer 1.5 off Asa-Dam Road, Pipeline Area, Ilorin, Kwara State of Nigeria. The company was formed because of the realization that Nigerian construction professionals should take the bull by the horn and dictate the pace for the complete development of the construction and real estate sector of the economy.

Because of the competitive nature of the terrain of business, the Organization is aware that forindigenous engineering companies to survive, a complete re-orientation of the Nigeria approach to business must be embraced.

The Core Services includes;

- Civil/Building works
- Inspection Services
- Maintenance and Environmental Services
- Consultancy Services
- Project Management Consultancy

ACMARTY Nigeria Limited provides and deploys the best in project management techniques and procedures in executing all projects to the highest standard Projects undertaken include Construction, Engineering and Architectural Design, Interior Decoration, Procurement and Consultancy to both private and corporate clients in Nigeria.**2.2**

ORGANIZATIONAL STRUCTURE OF THE ESTABLISHMENT

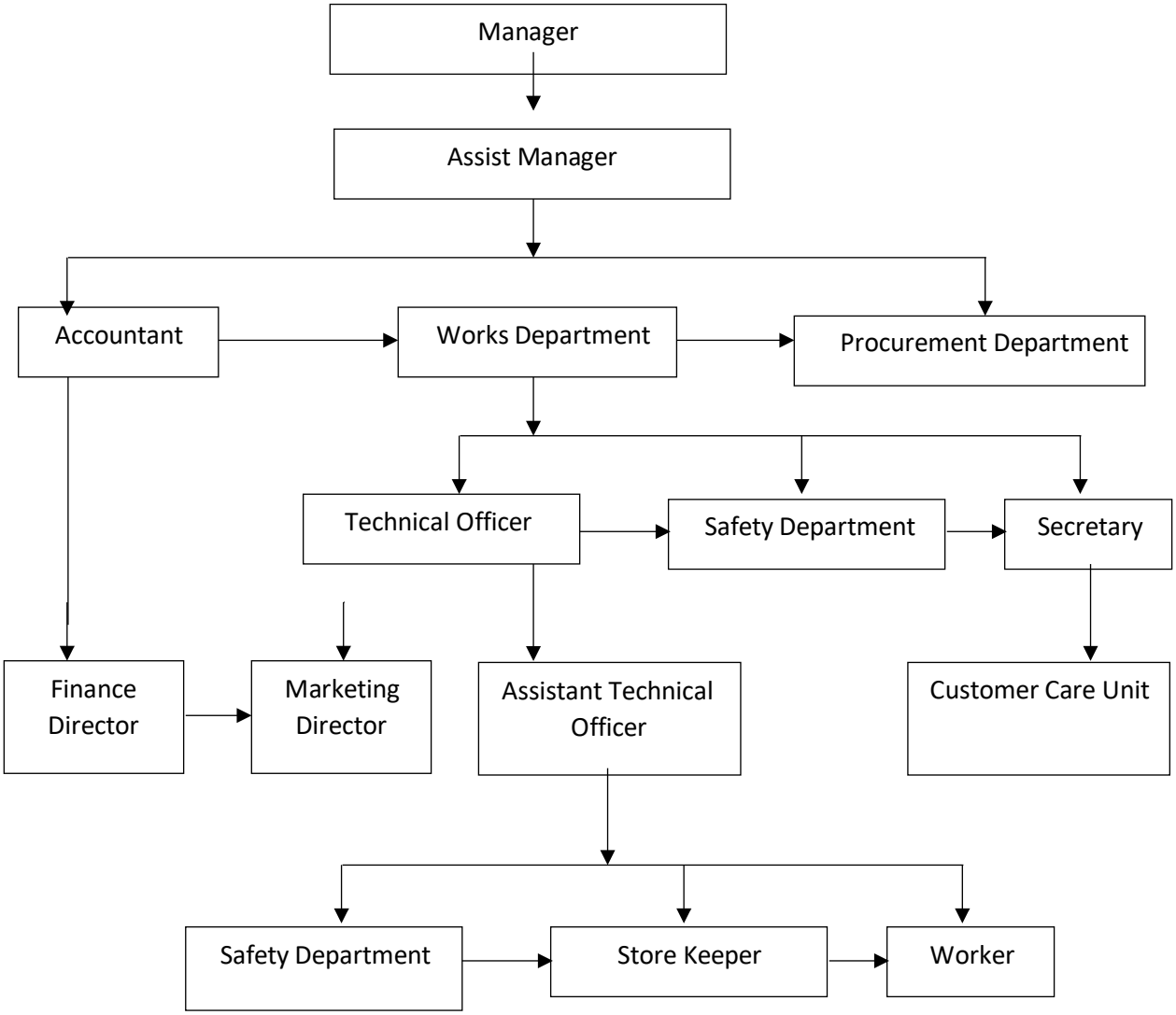


Figure 1: Organizational Structure of the Establishment

2.3 Various Departments / Units and their Functions

2.3.1 Various Departments / Units of the Company

The company comprises of various department such as;

a) Department of works
b) Safety department
c) Finance department
d) Marketing department
e) Mechanical department
f) Customer care department

Functions

a. **WORKS DEPARTMENT:** Is responsible for construction and maintenance of roads,structures.

b. **SAFETY DEPARTMENT:** Is responsible for the administrative operation, welfare, andhealth care of the workers/staff.

c. **FINANCE DEPARTMENT:** This area helps in marketing and distributing of productfrom the company.

d. **MECHANICAL DEPARTMENT:** This department is responsible for maintenance ofmachines and equipment.

e. **CUSTOMER CARE DEPARTMENT:** Handles customer complaints, provide appropriate solutions and alternatives within the time limits, follow up to ensure resolution, Keep records of customer interactions, process customer accounts and file documents for the company.

f. **MARKETING DEPARTMENT:** Plays a vital role in promoting the business and mission of the organization. It serves as the face of the company, coordinating and producing all materials representing the business.

2.3.2 Department Posted and Role Played

During the period of my SIWES, I was posted to the department of works and my dutiesincludes;

a. Reporting to the site manager or other senior project managers as required.

b. Ensuring that requirements as specified by the site engineer or other senior project managers are met.

c. Monitoring labour and building materials.

d. Supervising on-site construction work and relaying instructions from senior project managers.

e. Reporting any concerns that might negatively impact the project progress.

CHAPTER THREE

3.0 Plastering

Plaster may be defined as Lean_Mortar used mostly for covering masonry surfaces. They are lean mixes of Binding Materials (Lime or Cement) with fillers material such as Sand or Crushed stones.

They are specially prepared for two reasons.

- For Protection.
- For Decoration.

In protective covering, the Plaster saves the Bricks or Stones from Direct Destructive Attacks of Atmosphere such as Wind, Rain and Harmful Industrial Gases.

As a decorative finish, Plasters are used to give many appealing shades and finish designs to the construction.

3.1 Types of Plaster

1. Cement Plasters.

These are the homogeneous lean mixture of Portland Cement and sand with water. They have been found suitable for all type of plastering work such as *Protective* and *Decorative* Finishes.

The most common proportion for Cement Plasters

- For external surfaces
- For internal surfaces

However, the ratio of sand can be increased to as much as 8 like **(1:8)** depending upon the nature of construction.

Cement Plasters are generally applied only in a single coat. It is important that the surface of plasters should be kept wet at least for 3 days after its application.

2. Gypsum Plaster

These are that type of plasters in which gypsum is used as a Binding Material instead of Cement or Lime.

The Gypsum Plaster are commonly used for making Architectural fancies and Decorative Designs on wall and roofs. Their most important Properties are:

- They have great resistance to fire.
- They provide comparatively better insulation against heat and sound.
- They set and harden quickly.
- They undergo very little expansion and contraction.

Types of Gypsum Plaster

Following types are commonly used.

(1.) Ready Mix:

This Consists of Plaster of Paris and Aggregates (Sand) in a dry-mix form in a Predetermined proportions.

This type of Plasters possesses three times better insulation properties than the ordinary cement or lime plasters.

(2.) Gypsum Neat Plaster:

It is prepared by mixing commercial grade of Plaster of Paris with the desired quantity of sand in the dry state.

The dry mixture is then reduced to a homogeneous paste with simultaneous addition of water and shuffling with the help of Trowels**.**

(3.) Keen's Cement Plasters:

It is a high density gypsum plaster that is capable of taking fine polish on its finished surface.

Gypsum gauge plasters are made by mixing suitable proportions of Gypsum Plaster with lime putty (hydrated lime).

They are considered especially useful for providing a hard surface at the base within a short time.

(4.) Stucco Plasters:

It is commonly used for decorative purposes. It is applied on the external surface of construction and gives a Marble like finish to the structure.

Cement or Lime is commonly used as a Binding material in this type.

They are commonly applied in three coats (Base, Middle, and Finishing Course). The Finishing coat is polished with a soft cloth to obtain a brilliant shine.

Thus the resulting surface will be *strong, protective* and *quite appealing.*

Plastering

Plastering is the process of covering rough walls and uneven surfaces in the construction of houses and other structures with a plastic material, called plaster, which is a mixture of lime or cement concrete and sand along with the required quantity of water.

Requirements of Good Plaster

1. It should adhere to the background and should remain adhered during all climatic changes.
2. It should be cheap and economical.
3. It should be hard and durable.
4. It should be possible to apply it during all weather conditions.

5. It should effectively check the entry or penetration of moisture from the surfaces.
6. It should possess good workability.

Purpose of Plastering

1. making smooth surface of masonry
2. Increase durability of masonry
3. Provide plain surface for painting work
4. Provide protection against atmospherics attack
5. protect against moisture
6. Provide better aesthetic view

How to apply plaster on wall

- Before applying plaster on the wall you need to clean the existing wall by use a brush, remove all dust, salts, and other rubbish materials.
- Check the crack is not develop in the masonry wall. If crack is developed then first fill the crack by using repair materials.
- Check the verticality of masonry wall by using tool which is discussed above.
- Apply water on the rough surface of masonry for the purpose of cleaning make sure the masonry wall properly soaked water. otherwise masonry will extract water from the plaster surface, due to that cracks may be developed in plaster.

Formwork

Formwork is the term used for the process of creating a temporary mould into which concrete is poured and formed. Traditional formwork is fabricated using timber, but it can also be constructed from steel, glass fibre reinforced plastics and other materials. While formwork is a broad term that is used in relation to the forming process using a wide variety of materials, shuttering is a term that is often used to refer to the process of using plywood to form the mould.

Shuttering is perhaps the most popular type of formwork and is normally constructed on site using timber and plywood. A special grade of plywood is necessary for shuttering, and it must be water-resistant. It is easy to produce, although it can be time consuming for larger structures. It is used when the labour costs are lower than the cost of producing re-usable formwork from materials such as steel or plastic. It also has the advantage of being at a significant amount of concrete can be poured at once.

Site Clearing

This is the initial major work to be carried out on land. The extend work requires labor, plants and equipment's depending on the factors, i.e. size of site, nature of constituent to be removed from site, soil condition of site, debris to be removed from site.

During the process of site clearing, care must be taken in order not to damage existing facilities that may include, water mains, sewer gas, or oil pipe line.

The process of site clearing may equally include

- ✓ Dewatering operation
- ✓ Legal Claire
- ✓ Compensation for economic trees
- ✓ Insurance and special erotic for demolition work.

Site clearing may be done either by manual clearing method or mechanized clearing method.

Importance of Site Clearing

1. To reduce harmful material which can harm the workers in site especially in refuse dumped area.
2. To eliminate the fast grow of vegetable plants on site
3. To prevent settlement by knowing the different types of soil and the load bearing capacity of the area.
4. To identify layers of soil, In order to know how foundation is going to be excavated especially in swamping or marshy area.

Excavation

Excavation is the process of moving earth, rock or other materials with tools, equipment or explosives. It also includes trenching, wall shafts, tunnelling and underground. It is the preliminary activity of the construction project.

Topsoil excavation:- This involves the removal of the exposed layer of the earth's surface, including any vegetation or decaying matter which could make the soil compressible and therefore unsuitable for bearing structural loads. The depth will vary from site to site, but is usually in a range of 150-300 mm.

Earth excavation:- This involves the removal of the layer of soil directly beneath the topsoil. The removed material (referred to as 'spoil') is often stockpiled and used to construct embankments and foundations.

Rock excavation:- This is the removal of material that cannot be excavated without using special excavation methods such as drilling (by hand or with heavy machinery) or blasting with explosives.

Muck excavation:- This is the removal of excessively wet material and soil that is unsuitable for stockpiling.

Unclassified excavation:- This is the removal of a combination of the above materials, such as where it is difficult to distinguish between the materials encountered.

Excavation Purpose

Excavation can also be classified according to the purpose of the work:

Cut and fill excavation:- This is the process of excavation whereby the material that is cut or stripped. The removed topsoil and earth can be used as fill for embankments, elevated sections, and so on. It can also be used to form a level surface on which to build, as elevated sections of the site are 'cut' and moved to 'fill' lower sections of the site.

Trench excavation:-A trench is an excavation in which the length greatly exceeds the depth. Shallow trenches are usually considered to be less than 6 m deep, and deep trenches greater than 6 m.

Trench, or footing, excavation is typically used to form strip foundations, buried services, and so on. The choice of technique and plant for excavating, supporting and backfilling the trench depends on factors such as; the purpose of the trench, the ground conditions, the trench location, the number of obstructions, and so on.

The common techniques that are used include:

- Full depth, full length: Suitable for long narrow trenches of shallow depth, such as pipelines and sewers.
- Full depth, successive stages: Suitable for deep trenches where works can progress in sequence, reducing the risk of collapse.
- Stage depth, successive stages: Suitable for very deep trenches in confined areas, deep foundations and underpinning.

Basement Excavation:- A basement is part of a building that is either partially or completely below ground level. For more information, see Basement excavation.

Road Excavation:- This typically involves stripping topsoil and cut-and-fill. For more information, see Road construction.

Bridge Excavation:-This typically involves the removal of material for the footing and abutments of bridges. The work may be subdivided into wet, dry and rock excavation. Underwater excavations may require special methods of drill and blast. For more information, see Bridge construction.

Dredging

Dredging is the process of excavating and removing sediments and debris from below water level, typically from the bottom of lakes, rivers, harbours, and so on. For more information, see Dredging.

Over Excavation

Excavation that goes beyond the depth which is required for the formation of a below ground structure due to the presence of unsuitable material that must be removed.

Drainage

Drainage is the natural or artificial removal of a surface's water and sub-surface water from an area with excess of water. The internal drainage of most agricultural soils is good enough to prevent severe waterlogging (anaerobic conditions that harm root growth), but many soils need artificial drainage to improve production or to manage water supplie

Types of Drainage

1. Surface drainage

   Surface drainage is the removal of excess water from the surface of the land. This is normally accomplished by shallow ditches, also called open drains. The shallow ditches discharge into larger and deeper collector drains. In order to facilitate the flow of excess water toward the drains, the field is given an artificial slope by means of land grading

2. Subsurface drainage

Subsurface drainage is the removal of water from the root zone. It is accomplished by deep open drains or buried pipe drains.

i. Deep open drains

The excess water from the root zone flows into the open drains. The disadvantage of this type of subsurface drainage is that it makes the use of machinery difficult.

ii. Pipe drains

Pipe drains are buried pipes with openings through which the soil water can enter. The pipes convey the water to a collector drain. Drain pipes are made of clay, concrete or plastic. They are usually placed in trenches by machines. In clay and concrete pipes (usually 30 cm long and 5 - 10 cm in diameter) drainage water enters the pipes through the joints. Flexible plastic drains are much longer (up to 200 m) and the water enters through perforations distributed over the entire length of the pipe.

iii. Deep open drains versus pipe drains

Open drains use land that otherwise could be used for crops. They restrict the use of machines. They also require a large number of bridges and culverts for road crossings and access to the fields. Open drains require frequent maintenance (weed control, repairs, etc.).

In contrast to open drains, buried pipes cause no loss of cultivable land and maintenance requirements are very limited. The installation costs, however, of pipe drains may be higher due to the materials, the equipment and the skilled manpower involved.

Foundation

Foundation is the element of a structure which connects it to the ground, transferring loads from the structure to the ground. Foundations are generally considered either shallow or deep.[1] Foundation engineering is the application of soil mechanics and rock mechanics (geotechnical engineering) in the design of foundation elements of structures.

Purpose of Foundation

Foundations provide the structure's stability from the ground:

- To distribute the weight of the structure over a large area in order to avoid overloading the underlying soil (possibly causing unequal settlement).
- To anchor the structure against natural forces including earthquakes, floods, droughts, frost heaves, tornadoes and wind.
- To provide a level surface for construction.
- To anchor the structure deeply into the ground, increasing its stability and preventing overloading.
- To prevent lateral movements of the supported structure (in some cases).

Requirements of a Good Foundation

The design and the construction of a well-performing foundation must possess some basic requirements:

- The design and the construction of the foundation is done such that it can sustain as well as transmit the dead and the imposed loads to the soil. This transfer has to be carried out without resulting in any form of settlement that can result in any form of stability issues for the structure.
- Differential settlements can be avoided by having a rigid base for the foundation. These issues are more pronounced in areas where the superimposed loads are not uniform in nature.
- Based on the soil and area it is recommended to have a deeper foundation so that it can guard any form of damage or distress. These are mainly caused due to the problem of shrinkage and swelling because of temperature changes.
- The location of the foundation chosen must be an area that is not affected or influenced by future works or factors.

CHAPTER FOUR

MATERIALS AND EQUIPMENTS

Equipment Used For Manual Clearing Method

- ✓ Rake

- ✓ Cutlass

- ✓ Digger: A tool uses for digging the earth.

- ✓ Head pan: is a major equipment used on a site that has a space for disposal of disintegrated masonry

- ✓ Shovel: a tool used for digging, lifting and moving bulk materials such as soil, gravel etc.

- ✓ Hand trowel: a tool with blade for leveling, spreading and shaping substance such as cement of mortar.

- ✓ Wheel Barrow: used for the moving of materials (hauling) from one place to another.

Equipment Use for Mechanized Clearing Method

- ✓ Grader: this machine majorly used for leveling of finishing earthwork.

- ✓ Excavator: this is use to remove the top soil, and other excavating works.

- ✓ Ripper: it is use to fell the tree and rip materials usually rocks that has been blasted or drilled.
- ✓ Bulldozer: this is for clearing on site, and for earth moving work.

- ✓ Payloader: they are used for scoping, digging lifting earth materials into trucks.

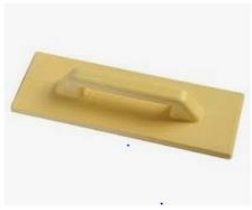
- ✓ Tilting Drum Concrete Mixer: This is a type of concrete mixer with a rotating hingeddrum in which the constituent materials are mixed thoroughly and can be tilted to enable emptying.

Tools used for plaster

1. Float
2. Floating rule
3. Plumb bob
4. miscellaneous tool

1. Float

A **float** is used to spread mortar or coal on the masonry surface. A wooden float is called a **skimming float**. It's size around 30cm*10cm and thickness is 10mm.



2. Floating rule

Floating rule is used to check the surface level of plaster.

3. Plumb bob

A plumb bob is a pointed weight attached to the end of the string, which is used to locate a vertical reference line called plumb.

Miscellaneous Tool

- Brush
- Spirit level
- set square
- straight edges

Spirit level is an instrument designed to check whether a surface is vertical or horizontal, this instrument is also know as **bubble level** or s**imply level.**

Same as **Set Square** is used to check wall is perpendicular or not.

CHAPTER FIVE

5.0 SUMMARY, CONCLUTIONS AND RECOMMENDATION

Summary:

In this research report, it is clearly conveyed that water is probably the greatest cause of distress in the pavement structure.

The control of surface and subsurface water is on the most important part of road maintenance. Poor drainage due to poor maintenance and insufficient culvert capacity and too low level of road line in marshy areas is also common cause of pavement failure. Delay in or neglect of road maintenance result in gradual deterioration

5.2 Conclusion:

I have really gained a lot during my four month of skills program. The program has really enlighten and exposed me to numerous and countless experience both theoretical and practical aspect of studies which now enable me to tackles and stand up to convey the interesting and beautiful aspect of civil engineering to the world.

5.3 Recommendation

I would suggest that the department should keep on the way of attaching student to an engineer to work with and the position of student to various sections to learn more about the field.

I would suggest that the department should give more attention so SIWES student in term of attachment with engineer poising with adequate facilities for practical work.

I would recommend that the department of civil engineer should encourage the deep target of other sections in the department like design and material as that of road construction unit.

I would recommend that the department should improve and modern computer outage for SIWES student interim of architectural design and bridge construction with computer.

In conclusion, I would advice department to give room for the young engineers who had received their experience scheme with them and had tested and justified to be given employment opportunity offer his/her course of study in their organization.