TECHNICAL REPORT ON STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

HELD AT

KWARA STATE MINISTRY OF WORKS AND TRANSPORT

AHMADU BELLO WAY P.M.B 1342, ILORIN KWARA STATE

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DEDICATION

This report is dedicated to Almighty Allah, the creator of the whole universe for protecting my life throughout the programme and to my loving parents for their morally and financially support.

ACKNOWLEDGEMENT

I express my deepest gratitude to Almighty God for the gift of life, the giver and taker of all things. I am also profoundly thankful to my parents for their unwavering support and prayers, which have guided me through every step of my journey. May they live long to reap the rewards of their hard work.

My heartfelt appreciation goes to my parents, Mr. and Mrs. Abdulkareem for their spiritual, moral, and financial support, which contributed immensely to the success of my SIWES program.

I am sincerely grateful to the management and staff of the company, especially my supervisor for their invaluable support, guidance, and knowledge shared during my training. I also extend my gratitude to my lecturers and supervisors for their continuous encouragement and constructive feedback throughout the program.

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CHAPTER ONE

1.0 INTRODUCTION

The word SIWES refers to as student industrial work experience scheme.

It was established by industrial Training Fund (I.T.F) in 1973 and controlled by the National board for technical education (NBTE). Therefore this report book contains the highlight of what was done during the four month SIWES program from and the specific involvement and relevance of experience gained in the field of study.

However, I observed the four month attachment training programme at Package CC Service

1.1 DEFINATION OF SIWES

SIWES can be define as student industrial work experience scheme which induce practical knowledge of what the student have been broaden taught in school and express then to have both administrative and political idea.

1.2 AIMS AND OBJECTIVES OF SIWES

SIWES programme is therefore aimed at giving the student the opportunity to relate and translate their theoretical knowledge to the real world of work.

The specific objectives of SIWES as summarized by the federal government Gazette of April 1978 are listed below....

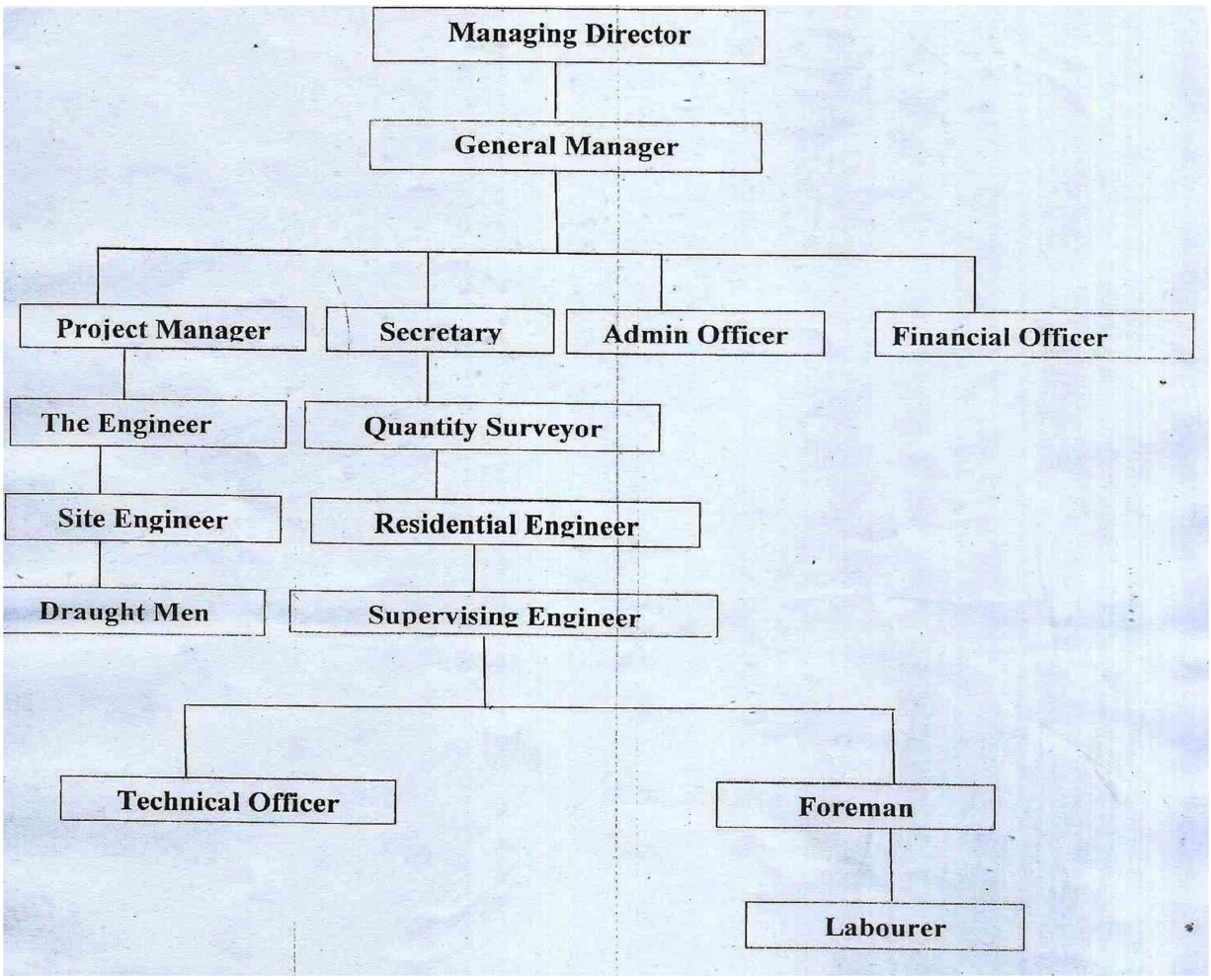
1. SIWES provide avenue for student in an institution of higher learning to acquire industrial skills and experience in their course of study.
2. Help student to gain increased maturity and understanding of the workplace.
3. The program teaches the student on how to interact with other workers and supervisors under various conditions in the organization.
4. The student will have chance to evaluate companies for which they might wish to work.
5. It exposes student to the work methods and techniques in handling equipment and machines that might not be available in educational institution.
6. It makes the transaction from school to the world of work easier.

1.3 HISTORICAL BACKGROUND OF THE ORGANIZATION

Kwara State Ministry of Works and Transport is situated along Ahmadu Bello way G.R.A, Ilorin. It was set up by the Kwara State Government. to control some specific activities in rural and urban settlement in terms of routes and other external works in the state. The organization was formally called PUBLIC WORKS COOPERATION. However, since the creation of the state in 1967, not until some years back when it was changed to present name, known as " Ministry of Works and Transport" with the headquarters located in Ilorin Kwara State Capital of Nigeria.

As the name implied, the organization set up is meant for construction of road network, drainage, building construction, electric installation and other public utilities within the state.

1.4 Organization chart



CHAPTER TWO

2.0 SECTION /UNIT OF THE ORGANIZATION AND THEIR SPECIFIC FUNCTION

The section of Kwara State Ministry of Works and Transport is divided into eight sections, namely are:

- **FINANCIAL SECTION:** This section is in charge of financial aspect of the organization, it issue out money for project execution and audit the outcome of any executed project and keep the account.
- **ADMINISTRATIVE SECTION:** This section foresees and ensures the smooth running of the organization. The section make sure that administrative setup of organization is in good order.
- **SECRETARIAT SECTION:** This section is keeping the necessary record of organization and file them for the reference and issue out letter to the state government if need arise and this section is headed by permanent secretary through the appointment.
- **SECURITY SECTION:** The security section is in charge of protection and ensures the well-being of an organization through proper security and the section is headed by the chief security officer.
- **MECHANICAL SECTION:** The mechanical section is responsible for the mechanical project of the organization and also to take proper maintenance of the engines available in the organization premises. Also, the section take charge of any state mechanical project and the section is coordinated by the Director of Mechanical department.
- **ELECTRICAL SECTION:** This section foresees the proper maintenance and efficiency of the organization, electrification project and also electronics. This section is coordinated by the Director of Electrical Engineering Department.
- **CIVIL ENGINEERING SECTION:** The civil engineering section is in charge of road network construction, bridges, building and in supervision of the organization project pertaining to civil work.
- **MECHANICAL SECTION:** The Kwara State Road Maintenance agency {KWARMA] was established by the state government to monitor road project, renovation of expiring point on the carriage across the state. KWARMA is embarking by the State Ministry of Works.

CHAPTER THREE

3.0 RELEVANCE OF EXPERIENCE GAINED TO STUDENT FIELD OF STUDY

During my student industrial working experience at the Kwara Package CC Service. I have experience on the construction of building, drainage and culvert. Also I was introduced to some terms and technique used in construction.

3.1 DRAINAGE

Drainage is the construction of drain line in other to allow flow of water away from carriage way, in other to control the movement of water from damaging the road.

Types of drainage

1. Open Drainage
2. Close Drainage

METHOD OF DRAINAGE CONSTRUCTION

There are different types of drainage construction, but the most common ones constructed nowadays are:

1. Block drainage
2. Reinforced concrete drainage

1. BLOCK DRAINAGE

This is a type of drainage which is constructed using block, concrete and plastered with cement mortar. In this type of drainage, concrete prepared will be poured into the holes of the block for it to be able to withstand pressure, heavy load and prevent porosity.

2. REINFORCED CONCRETE DRAINAGE

This is a type of drainage which is constructed using reinforcement bar concrete. This type of drainage is stronger than the block drainage because of the reinforcement bar which makes it to gain strength and withstand external loadings.

3.2 Construction Procedure of Surface Road Side Drainage

Surface water (i.e., rain water) that falls on the ground surface such as; open field, paved areas or road surface, roof tops etc are channelled to a main drain naturally or through a constructed channel which is referred to as drainage.

Procedure for construction of a common drainage (trench) (1m x 1m U drainage) (reinforced). includes;

I. Marking of Alignment:

The surveyor marked out the alignment for the trench to be dug.

II. Digging/Excavation:

The surveyor marked out the dept of the trench to be excavated with a mechanical excavating machine.

III. The next step after excavation of drainage is the Concrete Blinding.

Blinding is done on the surface area in order to correct any irregularities in level of the bed of the excavated surface, and to provide a smooth, level and regular surface to receive the concrete base. It's usually ±50 mm depending on the rate of regularity of the surface area. Concrete Grading C10 or C15 as sub-soil might require. The blinding is a mass concreting and its advisable to spread to cover entire width of the excavated trench except where there is need for material management.

IV. Reinforcement (Iron Rod) positioning.

For a 1m x 1m drainage, a 12mm U shape reinforcement (spaced between 150mm to 300 mm or as designed) is placed into position on the blinded surface but positioned at the centre of the base with the aid of concrete biscuit to create a concrete cover.

V. Next step is laying of concrete base on the blinded surface and the positioned reinforcement.

A concrete base of 150 mm is to be laid or cast on the blinded floor, concrete grade C20 of ratio 1:2:4 is allowed (See concrete grading and mix ratio).

VI. After setting and drying of the concrete base, next is to position the side wall panel form work.

The floor base is marked to give the required one meter (1000 mm) internal width where the panel will be positioned. The panel wall spacing is 100mm, and wall height of 1000mm (1 meter), the panel is lubricated, clipped and prepared to accept the Concrete.

After casting, and setting, the panel is removed and concrete cured.

VII. Back filling and compaction of the back filling is done immediately after the back filling in order to avoid settlement.

3.3 CULVERT

A culvert in road construction is a hoe or pipe water which goes under a road and allows easy flow of water flowing through the drain. Culvert in another form of road drainage which is arises when a lying area or a steam or river, crosses.

The alignment of road at this point a culvert bridge has to be constructed to that the water of river as steam is made pass on the other side of the wad through them. Such culvert or structure is known as cross drainage work or simple drainage work. A culvert can be built in different from of Ring culvert

This can be practice by using of a concrete wood ring to construct culvert in other to allow the flow of water beneath the road pavement.

3.4 TYPES OF CULVERT

1. Pipe single or multiple culverts.
2. Pipe arch single or multiple culverts.
3. Box culvert single or multiple culverts.
4. Bridge culvert.
5. Arch culvert.

3.5 PIPE CULVERT

Pipe culvert is made of smooth steel, corrugated metal, or concrete material. Their primarily purpose is to convey water under roads, although a variety of wildlife uses them as passageways.

3.6 BOX CULVERT

Box culvert ate used to transmit water during brief runoff periods. These are usually used by wildlife because they remain dry most of the year. Box culvert are usually made up of reinforced concrete (RCC)

3.7 STEPS/PROCEDURE OF CONSTRUCTING CULVERT

i. Excavation of the trench to the acquired depth and width

ii. Setting of the concrete inside the trench

iii. Construction as the earthwork

iv. Filling the trench with concrete and allow to dry

3.8 Equipment used in construction of drainage

- ✓ Machines used are: concrete mixer, tipper truck, excavator, dumper, water tanker and project car.
- ✓ Material used are: cement, granite, sharp sand, water, reinforcement bars, wood plank and nail
- ✓ Instrumental used are: shovel, wheel barrow, head pan, measuring tape, hammer and hand trowel.

CHAPTER FOUR

4.0 IDENTIFICATION OF PLANTS IN USED IN CONSTRUCTION

i. **Excavator:** It is a heavy construction equipment consisting of a boom, stick, bucket, and cab on a rotating platform known as the house. It is used for: digging of trenches, material handling, demolition, river dredging, etc.

ii. **Crane:** It is a type of machine that is generally equipped with a hoist, wire ropes or chains, and sheaves, that can be used to both lift and lower materials. It is mainly used to lift heavy things, and transport them to other places.

iii. **Pay Loader:** it is a heavy machine used in construction to move aside or load materials such as demolition debris, gravel, sand, dirt, etc.

iv. **Truck:** It is use for various hauling operation.

v. **Grader:** It is use for cutting the slope of an embankment for smoothing grade level, and for spreading loose materials.

vi. **Bulldozer:** It is use for the demolishing of existing structures and also use for clearing a virgin land in preparing for construction.

vii. **Low Bed:** It is use to transport machines from one place to another.

viii. **Hand Concrete Mixer:** It is used for mixing concrete at a stationary position.

ix. **Vibrating Roller:** It is use to compact soil and also roll on asphalt during lying

4.1 ROADS CONSTRUCTION

Road surface or **pavement** is the durable surface material laid down on an area intended to sustain vehicular or foot traffic, such as a road or walkway. In the past, gravel road surfaces, cobblestone and granite setts were extensively used, but these surfaces have mostly been replaced by asphalt or concrete laid on a compacted base course. Road surfaces are frequently marked to guide traffic. Today, permeable paving methods are beginning to be used for low-impact roadways and walkways.

4.2 Asphalt

Asphalt (specifically, asphalt concrete), sometimes called flexible pavement due to the nature in which it distributes loads, has been widely used since the 1920s. The viscous nature of the bitumen binder allows asphalt concrete to sustain significant plastic deformation, although fatigue from repeated loading over time is the most common failure mechanism. Most asphalt surfaces are laid on a gravel base, which is generally at least as thick as the asphalt layer, although some 'full depth' asphalt surfaces are laid directly on the native subgrade. In areas with very soft or expansive subgrades such as clay or peat, thick gravel bases or stabilization of the subgrade with Portland cement or lime may be required. Polypropylene and polyester geosynthetics have also been used for this purpose.

4.3 Pavement Construction

A highway pavement is a structure consisting of superimposed layers of processed materials above the natural soil sub-grade, whose primary function is to distribute the applied vehicle loads to the sub-grade. The pavement structure should be able to provide a surface of acceptable riding quality, adequate skid resistance, favourable light reflecting characteristics, and low noise pollution. The ultimate aim is to ensure that the transmitted stresses due to

wheel load are sufficiently reduced, so that they will not exceed bearing capacity of the sub-grade.

Requirements of a pavement

An ideal pavement should meet the following requirements:

1. Sufficient thickness to distribute the wheel load stresses to a safe value on the sub-grade soil.
2. Structurally strong to withstand all types of stresses imposed upon it.
3. Adequate coefficient of friction to prevent skidding of vehicles,
4. Smooth surface to provide comfort to road users even at high speed.
5. Dust proof surface so that traffic safety is not impaired by reducing visibility
6. Impervious surface, so that sub-grade soil is well protected.
7. Long design life with low maintenance cost.

4.4 Types of pavements

Flexible pavements

Flexible pavements will transmit wheel load stresses to the lower layers by grain-to-grain transfer through the points of contact in the granular structure best quality to sustain maximum compressive stress, in addition to wear and tear. The lower layers will experience lesser magnitude of stress and low quality material can be used. Flexible pavements are constructed using bituminous materials. These can be either in the form of surface treatments (such as bituminous surface treatments generally found on low volume roads) or, asphalt concrete surface courses (generally used on high volume roads such as national highways).

Types of Flexible Pavements

- The following types of construction have been used in flexible pavement:
- Conventional layered flexible pavement,
- Full - depth asphalt pavement, and
- Contained rock asphalt mat (CRAM).

Rigid pavements

Rigid pavements have sufficient flexural strength to transmit the wheel load stresses to a wider area below. Compared to flexible pavement, rigid pavements are placed either directly on the prepared sub-grade or on a single layer of granular or stabilized material. Since there is

only one layer of material between the concrete and the sub-grade, this layer can be called as base or sub-base course.

Pictorial Representation of Discussions

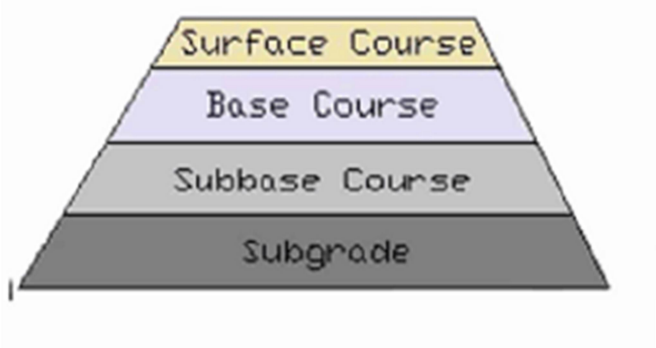


Fig 1. Section of Flexible Pavement

Fig 2. Section of Rigid Pavement

CHAPTER FIVE

5.0 CONCLUSION

The SIWES programme is an efficient an effective program which has bring much improvement to my field of study. I have gained a lot of experience from the various works done on field such as feeding of birds, hatching of eggs and formulation of feed. It is a programme that bridges the gap between theory and practical aspect, so therefore it has made me to have technical knowledge about what I have learnt theoretically in class.

It is a unique privilege for me to undergo this training, for its enables me to know the service to render as a agricultural and bio system engineer. I here appreciate the effort to the Federal Government and Industrial Training Fund (I.T.F) for improving the technological development of this country.

5.1 PERSONAL IMPRESSION ABOUT THE ORGANIZATION

I was highly impressed about the organization towards the acceptance of my SIWES letter in their organization. Also what impressed me most about the organization is the experience gained during my training under Civil Engineering Department at ministry of Works. This will help me facing the future challenges that may likely to occur in my field of study.

5.2 RECOMMENDATION TO THE ORGANIZATION CONCERNING THE SIWES PROGRAMME

I would recommend that the organization should appeal to the federal government to make provision for necessary equipment for the effectiveness of the programme.

I would recommend that the organization should provide transport facilities for SIWES students so as to move/carry them from the office to the site off construction.

5.3 RECOMMENDATION TO THE POLYTECHNIC CONCERNING THE SIWES PROGRAMME

I would recommend that the polytechnic should try to get a placement for the student by contacting all engineering organization to admit any student for their SIWES programme.

I would recommend that the polytechnic should try to give adequate supervision to the student in their place of attachment for student assessment before the completion of the programme.