TECHNICAL REPORT ON STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

HELD AT

DELRAM CONSTRUCTION COMPANY NIGERIA LIMITED

BY

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DEDICATION

I specially dedicate this report first and foremost to Almighty Allah who has been there for me right from the beginning to this very point. Special thanks also to my ever supportive Mr and Mrs. JIMOH , for her relentless support and compassion towards me duringthe course of my SIWES training.

ACKNOWLEGDEMENTS

All praise to Almighty Allah, the creator of the universe for his mercy, favor, blessing and provisions. With great honour and gratitude, I dearly appreciate the effort of my parents Mr and Mrs. JIMOH for guiding me through during the course of this work. And also my supervisor Your supervision and support are appreciated. My sincere appreciation also goes to my sweet mother Mrs JIMOH, for her parental care and support, thank you. I also want to extend my appreciation to my friends for taking me as their child and accommodating me during my industrial training and so many others I could not mention here. I really appreciate your love and care during the course of this training.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND OF SIWES

Students' Industrial Work-experience Scheme (SIWES) is one of the Industrial Training Fund (ITF) programme which was introduced in 1974 due to the inability of engineering and technology students in Nigeria universities and polytechnics to meet the practical aspects of their training. That is, the needs to enable students match their theoretical school knowledge with the practical aspect of their training in industry. The Training lasts for six months. According to Ekpenyong (2011), one of the principles underlying any industrial work experience scheme for students in institutions of learning is the desire to marry the practical with the theoretical learning which characterizes conventional classroom situations with a view to striking a balance between theory and practice. The author stressed further that it was in realization of this that the ITF when it was established, set out to study the extent to which the theoretical knowledge that students in engineering technology and other allied fields in Nigerian institutions offering technology based courses related to the kind of work experience expected of them by employers. The result of the ITF survey showed a great disparity between students' knowledge and their ability to apply it in relevant jobs. In order to bridge the gap between the two, the ITF in 1974 established a co-operative internship programme, which enabled students of technology to spend some part of their courses for relevant on the-job practical experiences in appropriate areas of the Nigerian industry (Ekpenyong, 2011). The author further stressed that the internship programme, SIWES, can therefore be seen as that which is intended to give Nigerian students studying occupationally related courses experience that would supplement their theoretical learning as a well of equipping the students with the needed skills to readily contribute their quota to national economic and technological development after function in the world of work. This need to combine theoretical knowledge with practical skills in order to produce results in the form of goods and services or to be productive is the essence and rationale for industrial training, and a basic requirement for the award of B.Eng.

1.1.2 BRIEF HISTORY OF SIWES

In recognition of the shortcomings and weakness in the formation of SET graduates, particularly with respect to acquisition of relevant production skills (RPSs), the Industrial Training Fund (which was itself established in 1971 by decree 47) initiated the Students' Industrial Work

experience Scheme (SIWES) in 1973. The scheme was designed to expose students to the industrial environment and enable them develop occupational competencies so that they can readily contribute their quota to national economic and technological development after graduation. Consequently, SIWES is a planned and structured programme based on stated and specific career objectives which are geared toward developing the occupational competencies of participants. In spite of the challenges faced by SIWES in the four decades of its existence, the Scheme has not only raised consciousness and increased awareness about the need for training of SET students, but has also helped in the formation of skilled and competent indigenous manpower which has been manning and managing the technological resources and industrial sectors of the economy. Participation in SIWES has become a necessary condition for the award of degrees and diplomas to SET students graduating from higher institutions in Nigeria. It is therefore, not in doubt that SIWES is a veritable means or tool for National Economic Development. The main thrust of ITF programmes and services is to stimulate human performance, improve productivity, and induce value-added production in industry and commerce. Through its SIWES and Vocational and Apprentice Training Programmes, the Fund also builds capacity for graduates and youth self-employment, in the context of Small Scale Industrialization, in the economy. The Industrial Training Fund is a grade 'A' parastatal operating under the aegis of the Federal Ministry of Industry, Trade and Investment. It has been operating for 45 years as a specialist agency that promotes and encourages the acquisition of industrial and commercial skills required for national economic development.

1.1.3 VISION STATEMENT

To be the prime skills training development organization in Nigeria and one of the best in the world.

1.1.4 MISSION STATEMENT

To set and regulate standards and offer direct training intervention in industrial and commercial skills training and development, using a corps of highly competent professional staff, modern techniques and technology.

1.2 AIM OF SIWES

The effort is aimed at helping/training students in the Nigerian tertiary institutions the practical aspect of their field of study by exposing students to machines and equipment, professional work methods and ways of safeguarding the work areas and workers in industries and other

organizations.

1.2.1 OBJECTIVES OF SIWES

The Industrial Training Fund's policy Document No. 1 of 1973 which established SIWES outlined the objectives of the scheme. The objectives are to:

1. It provides an avenue for students in institutions of higher learning to acquire industrial skills and experience during their course of study.
2. It expose Students to work methods and techniques in handling equipment and machinery that may not be available in their institutions.
3. It makes the transition from school to the world of work easier and enhance students' contact for later job placements and a chance to evaluate companies for which they might wish to work.
4. It provides students with the opportunities to apply their educational knowledge in real work and industrial situations, there by bridging the gap between theory and practice.
5. The programme teaches the students on how to interact effectively with other workers and supervisors under various conditions in the organization.

1.2.2 IMPORTANCE OF SIWES TO CIVIL ENGINEERING

1. It exposes students to more practical work methods and techniques in civil engineering.
2. It provides students in civil engineering with an opportunity to apply their theoretical knowledge to real life situations.
3. It enables students in civil engineering to gain experience in handling equipment and machineries.
4. It provides an environment whereby students in civil engineering can develop their creativity and interpersonal skills through software design techniques.
5. It is one of the requirements for the award of Bachelor of Engineering Degree (B.Eng.) in Civil Engineering.

1.2.3 JUSTIFICATION FOR CHOICE OF INDUSTRY

Theoretical knowledge alone would not usually prepare and prepare an educated person for the world of work. The worker or productive individual must not only be knowledgeable but also be versatile in the application of skills to perform defined jobs or work. Both education and training are important; there cannot be effective education without some training input and there cannot be effective training without some educational input. The productive individual, particularly in this millennium, must be able to combine and utilize the outcomes from the two forms of learning (Know-How Ability and Do-How Capability) for production of goods and services which is crucial in pursuing careers in science, engineering and technology (SET) disciplines.

CHAPTER TWO

2.0 THEORETICAL FRAMEWORK

2.1 CIVIL ENGINEERING

Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including works like roads, bridges, canals, dams, and buildings. Civil engineering is the second-oldest engineering discipline after military engineering, and it is defined to distinguish non-military engineering from military engineering. It is traditionally broken into several sub-disciplines including architectural engineering, environmental engineering, engineering, control, structural engineering, earthquake engineering, transportation engineering, construction surveying, and construction engineering, etc. Civil engineering takes place in the public sector from municipal through to national governments, and in the private sector from individual homeowners through to international companies.

2.1.2 TRANSPORTATION ENGINEERING SYSTEM

Highway engineering is one of the most important branches of transportation system. (Gupta 2009), in his opinion defines Highway Engineering as the art of planning, design, construction and maintenance of road system. While Rogers (2003) defines Highway Engineering as the application of scientific principle to the planning, design, maintenance of a highway project or system of projects. We conclude that Highway Engineering is the science and technology dealing with road engineering. However, the term road or road ways was called Highway, which refers to a road way constructed on small embankments a little above the general ground level to avoid drainage and maintenance problems. Its scope includes development, planning, alignment, geometric design and location, highway material, pavement design, maintenance and construction, traffic operation and its control, economic consideration, finance and administration, road architecture, arboriculture and landscaping. On the other hand, Transportation Engineering involves planning, design and supervision of construction, maintenance and operational stages of the country's infrastructure which is related to the movement of goods and people from their origin to destination (Hill, 2001).

2.1.3 ORIGIN OF HIGHWAY

The oldest mode of transportation was obviously on foot path. In those days, man travelled by watching stars or own shadows, or noting the direction of wind, so also felled trees were used to cross narrow streams and rivers were crossed by swimming or by rafts, and animals were used to transport men and materials. However, man felt the necessity of easy transport, later wheel was invented and simple animal drawn wheeled vehicles were a common and popular mode of

transportation for a long time.

2.1.4 SIGNIFICANCE OF HIGHWAY

Highways are vitally important to a country's economic development. The construction of a high quality road network directly increases a nation's economic output by reducing journey time and cost, making a region more attractive economically. The actual construction process will have the added effect of stimulating the construction market. A road is a thoroughfare, route, or way on land between two places that has been paved or otherwise improved to allow travel by foot or some form of conveyance, including a motor vehicle, cart, bicycle, or horse. Road network system in Nigeria has been classified into four categories these are:

a. Trunk A Roads: - This form the major network around which other categories of roads are built. They run through the length and breadth of the country. They connect ports, capitals of various states and also provide international links with neighboring countries.

b. Trunk B Roads: - These are the highway within the states, as they connect important towns and cities of the states. They also connect the cities of the states to federal highways end serve as the main arteries of traffic to and fro meet district roads.

c. Trunk C Roads: - These are also called local government roads. They are constructed with nearly the same specifications as those of the state highways. They are intended to connect areas of production and market with state highways and railways.

d. DFRRI Roads: - These are the least in Nigerian classifying system and they are connected to major district roads and railways. They are intended to serve the interior rural population of the district.

2.2 COMPONENTS OF ROAD STRUCTURE

Road Structure Cross Section is composed of the following components:

1. Crown
2. Camber
3. Surface/Wearing Course
4. Kerbs
5. Shoulder
6. Drainage
7. Base Course
8. Sub-base
9. Formation level
10. Sub Grade

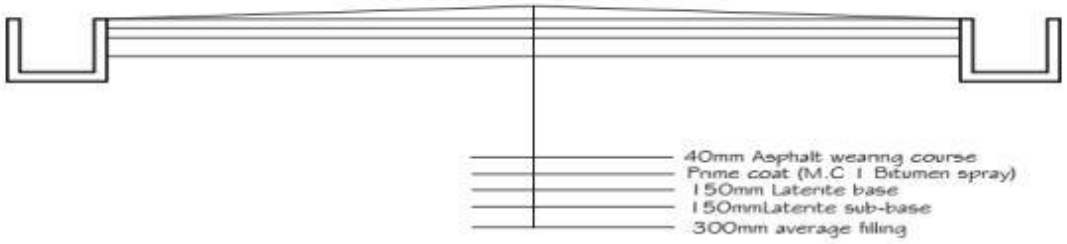

Plate 1.0: Road cross section

Plate 2.1: Road cross section

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2.2.1 ROAD AND WATER

The greatest threat to an asphalt road is water. When a road is laid down, it flexes and moves slightly to accommodate changes in temperature and load. All this flexing eventually leads to cracking. Water penetrates those cracks and through processes like freezing, causes damage to the roadway. Crack sealing cleans debris from these cracks then fills them with an asphalt based polymer that adheres to the sides and bottom of the cracks, preventing the water from getting in. Depending on the climate, the materials used, the pavement conditions and the technique used, crack sealing will last three to eight years. Crack sealing has two primary purposes:

1. To prevent the intrusion of water through the crack into the underlying pavement structure.
2. To prevent extraneous materials from entering the crack and causing further deterioration as the pavement expands and contracts with temperature changes.

2.2.2 CRACK SEALING PROCEDURES

For crack sealing, the most important aspect of the procedure is the preparation of the crack for treatment. Also, the season when the crack sealing is done will affect its performance. If the cracks need to be routed or sawed to remove extraneous material, it should be done before cleaning the cracks. The routing or sawing is best accomplished using a vertical-spindle router, rotary-impact router, or a random-crack saw. After doing the routing or sawing, clean the cracks using

high-pressure air, sandblasting, wire brushing, hot air blasting or high-pressure water. Cleaning the cracks is an essential step to ensure that the sealant will adhere to the sides of the crack. After cleaning, check the cracks for depth. A backer rod should be placed in large deep cracks to conserve sealant. The backer rod should be a compressible, non-shrinking, non-absorbent material with a melting point higher than the temperature of the sealant. The backer rod should be about 25 percent wider than the crack, to prevent slipping or floating out after placing the sealant. After the cracks are prepared, they are sealed with liquid asphalt. Equipment used for crack sealing or filling varies from truckmounted pressure applicators with hand wands to pour pots. No matter what type of equipment is used, the crack should be filled with sealant material from the bottom to the top of the crack to prevent air bubbles from forming bubbles create weak spots in the sealant. Pour only the amount of material that will fill the crack.

CHAPTER THREE
HISTORICAL BACKGROUND OF THE DELRAM CONSTRUCTION COMPANY NIGERIA LIMITED

DELRAM CONSTRUCTION COMPANY NIGERIA LIMITED was incorporated in MINNA, Nigeria with Registration Number 778349. It was registered on 13 Oct 2008 and it's current status is active. Company's registered office address is NO.5, ZARUMAIROAD, MINNA,

Over the years, Delram Construction company Nigeria Limited has been pivotal in laying the foundations for Nigeria’s development, especially through the construction of critical industrial and civil infrastructure. Our projects include constructing major hospitals, roadways, critical bridges, essential buildings, and significant manufacturing plants, all contributing to the progress of contemporary Nigeria. Delram construction company Nigeria Limited has employed more than 1,000 people and we are deeply committed to investing in the training and education of our workforce,

fostering long-term job opportunities, and supporting growth and development in every aspect of our operations..

ORGANOGRAM OF DELRAM CONSTRUCTION COMPANY NIGERIA LIMITED

CHAPTER FOUR
EXPERIENCE GAIN DURING SIWES PROGRAMME

4.0 DRAINAGE SYSTEM

One of the most important aspects of the design of a road is the provision made for protecting the road from surface water or ground water. If water is allowed to enter the structure of the road, the pavement will be weakened and it will be much more susceptible to damage by traffic. Water can enter the road as a result of rain penetrating the surface or as a result of the infiltration of ground water. The road surface must be constructed with a sufficient camber or crossfall to shed rainwater quickly and the formation of the road must be raised above the level of the local water table to prevent it being affected by ground water. Water can also have a harmful effect on shoulders, slopes, ditches and other features. High water velocities can cause erosion which, when severe, can lead to the road being cut. Alternatively, low velocities in drainage facilities can lead to silt being deposited which, in turn, can lead to a blockage. Blockages often result in further erosion. A good road drainage system, which is properly maintained, is vital to the successful operation of a road. It has four main functions:

1. To convey rainwater from the surface of the carriageway to outfalls
2. To control the level of the water table in the subgrade beneath the carriageway
3. To intercept ground and surface water flowing towards the road
4. To convey water across the line of the road in a controlled fashion. The first three functions are performed by side drains and the fourth by culverts, drifts and bridges.

4.1 SIDE DRAINS

The cost of side drains will normally be calculated as part of the cost of earthworks Side drains should be flat-bottomed if they are to be maintained by hand or 'v'-shaped if they are to be maintained by machine. Wide flat drains, known as 'meadow drains', can be used with advantage if there is room. The longitudinal gradient ofside drains should always exceed 0.5 per cent to reduce the possibility of silting up. In hilly terrain, providing side drains with the same gradient as the road may result in water velocities that are too high. It may therefore be necessary to reduce the maximum gradient to an acceptable level by the provision of shallow dams or scour checks. These are often constructed of masonry, but can also be constructed in concrete or even timber. Wide drains are preferred to reduce the velocity and so minimise erosion. The provision of turnouts or cut-off drains should also be considered to reduce or control the amount of water in the side drains. Costing may need to take account of these and the need to line drains with masonry or concrete in highly erodible soils. Various stages of side drain construction can be see in the figures

below;

Plate 4.0: Excavated Drainage trench

Plate 4.1: Blinding and concrete base

Plate 4.2: Arranged re-bars

Plate 4.3:Arranged re-bars with concrete base

The use of culvert pipes to convey surface water under a road alignment is common, and provides a relatively cheap and durable solution. Most countries make concrete pipes of up to one metre diameter and these may be cost effective provided that they can be transported and handled. Corrugated galvanised steel pipes, often known by the trade name 'Armco', are available in larger diameters and are usually more expensive, but lighter and easier to handle. There should be little maintenance required for either material other than an annual inspection and clearing of accumulated silt or debris, although corrosion may occur to metal pipes in some circumstances. Culvert pipes require headwalls to protect the ends of the pipe and to direct water either towards

or away from the culvert. The outfall of the culvert must be protected against scour and environmental damage downstream. A culvert is an opening through an embankment used for the conveyance of water by mean of pipe or an enclosed channel, or it is a transverse and totally enclosed drain under a road or railway. It is typically embedded so as to be surrounded by soil. A culvert may be made from pipe, reinforced concrete or other material. A structure that carries water above land is known as aqueduct.

Culverts are commonly used both as cross-drains for ditch relief and to pass water under a road as natural drainage and stream. A culvert may be a bridge – like structure design to allow vehicle or pedestrian traffic to cross over the water way while allowing the adequate passage for the water. The culvert type and shape selection is based on a number of factors including

a) Requirement for hydraulic performance

b) Limitation on upstream water surface elevation

c) Roadway embankment height.

CHAPTER FIVE

5.0 SUMMARY

I observed that Civil Engineers use their conceptual design method to build a structure for safety, stability, economy and durability. But at the same time supervising the project closely to make sure it is being executed exactly the way the design was and plan. they also accept material base on what the specification comes from the client to avoid using materials of poor quality that may alter their design calculation, for this may result in the failure of their structure.

5.1 CONCLUSION

This report has been able to x-ray an account of the entire work – experience garnered by me at the Delram Construction Company Nigeria Limited for the past 4 months, I had the

opportunity to see practical application of what I learned in my classes that comprises of use of earth moving equipment's use in excavation, grading earth spreading and piling, soil watering, compaction, spreading of MC1 , asphalt laying. In structural work how scafolding places. This experience made it possible for me to relate what I was taught in class with exactly what is happening on site. I therefore concludes that SIWES is of great benefit to students in tertiary institutions. It therefore implies that the proper and effective administration of SIWES will go a long way in boosting and enhancing the competencies of the workforce of the country.

5.2 RECOMMENDATION

In view of the relevance of the SIWES program, it is important that it is sustained by the government through the Industrial Training Fund (ITF) as it exposes the student to work tools, facilities, and equipment that may not be available in their respective institutions in relation to their course of study. To this end, I recommend that the following under-listed points should be implemented:

1. Students' Industrial Works Experience Scheme (SIWES) needs to be strengthened by all concerned stakeholder in order for its objectives to be fully realized.

2.Regular monthly allowances for students on attachment should be paid promptly.

3.Organizations should always accept students for SIWES and subsequently assign them to relevant jobs. Experience staff should always be made to train the students on attachment

4.There should be more funding of the scheme by the government in order for it to be more effective

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