TECHNICAL REPORT ON THE STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

HELD AT

DEPARTMENT OF WORKS

(EJIGBO LOCAL GOVERNMENT SECTARIAT)

PREPARED BY:

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SUBMITTED TO

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IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR AWARD OF NATIONAL DIPLOMA (ND) IN CIVIL ENGINEERING

CERTIFICATION

This is to certify that this report is original to the ADELAKUN DAMILARE MATTEW (ND/23/CEC/PT/0085) of the Department of Civil Engineering, institute of Technology, Kwara State Polytechnic, Ilorin and was supervised accordingly by;

SIWES SUPERVISOR ……

SIWES COORDINATOR ……

HEAD OF DEPARTMENT ……

PREFACE

This is a report of four months industrial training which was done as part of the requirement needed for the award of national diploma certificate which was embarked upon by the technical student after their first year of stay in school.

It is also done to enable the student's to be exposed the practical aspect of their curse of study and write down what he/she has gained during the training.

The program is aimed at correcting the incompetence in the school leaving the scientific and technical in country.

DEDICATION

This report is dedicated to the Almighty Allah, the Beneficent, the merciful, the cherisher of the universe, the uncreated creator of all creatures and the most knowledgeable who seek knowledge just from himself for giving me the opportunity, privilege an understanding to participate in the Student Industrial Work Experience Scheme (SIWES).

I also dedicated this report to my amiable parent MR & MRS ADELAKUN For their financial supports during the course of program. May Allah continue to bless them (AMIN).

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CHAPTER ONE

1.1 INTRODUCTION TO SIWES

The Student Industrial Work Experience Scheme (SIWES) is a skill training program design to expose and prepare students of Universities, Polytechnics, Colleges of Technology, Colleges Agriculture and or Colleges of Education for the Industrial work experience they likely to meet after graduation. The scheme also affords students the opportunity of familiarizing and exposing themselves to the needed experience in handling equipment and machinery that are usually not available in their institute. Before the establishment of the scheme, there was a growing concern among industrialists that graduate of tertiary institution lack adequate practical background (studies) preparatory for employment in industries. Thus, the employers were of the opinion that the theoretical education going on in institutions of higher learning was not responsive to their needs. It is against this background that the rationale for initiating and designing the scheme by the fund during its formative years-1973/74 was introduced to acquaint students with the skills of handling employer's equipment and machinery. The ITF solely funded the scheme during its formative years. But as the financial involvement becomes unbearable to fund, it withdrew from the scheme. The federal government handed over the scheme in 1979 to both the National Universities Commission (NUC) and the National Board for Technical Education (NBTE). Later, the Federal Government in November 1984 reverted the management and implementation of the SIWES programme to ITF and it was effectively taken over by industrial training fund in July 1985 with the funding being solely borne by the Federal Government.

SIWES is a tripartite programme involving the students, the Polytechnic and the industry (employer of labour). The programme is funded by the Federal Government of Nigeria and jointly coordinated by Industrial Training Fund (ITF) and National Board for technical Education (NBTE)

1.2 AIMS AND OBJECTIVES

Specifically, the objectives of the Students Industrial Work Experience Scheme (SIWES) are to:

➢ Provide an avenue for students in institutions of higher learning to acquire industrial skills and experience in their course of study, which is restricted to Engineering and Technology

including Environmental studies and other courses that may be approved. Courses like, NCE (Technical), NCE Agriculture, NCE Business, NCE (Fine and Applied Arts) and NCE (Home Economies) in colleges of Education are also included.

➢ Prepare students for Industrial Work Experience they are to undergo after graduation

➢ Make transition from school to world of work easier and enhance students contacts for later job placement

➢ To Enlist and strengthen employer's involvement in the entire education process and prepare students for employment in Industry and commerce

➢ To satisfy accreditation requirement set by the NBTE.

➢ To provide student opportunity to see the real World of theirs

CHAPTER TWO

2.1 BRIEF HISTORY OF THE ESTABLISHMENT

Ejigbo Local Government Area in Osun State, Nigeria, has a history dating back to the pre-colonial period, with Ejigbo town being founded by Akinjole Ogiyan. The local government was formally established in 1976 when old Oyo State was created, and has been in existence since then. The Department of Works, like other government departments, plays a crucial role in the development and maintenance of infrastructure within the local government area.

Here's a more detailed look at the history:

Pre-Colonial Era: Ejigbo town was founded after the old Oyo Empire by Akinjole Ogiyan, a descendant of the Oyo king.

1976: Ejigbo Local Government Area was created as part of the formation of old Oyo State.

Local Government Administration: The local government area has been administered by both civilian and military administrations.

Economic Activities: The economy of Ejigbo is largely based on agriculture, with a focus on food crops like yam, cassava, and corn, as well as tree crops like cocoa and palm oil.

Department of Works: The Department of Works is responsible for infrastructure development and maintenance within Ejigbo Local Government Area, including road construction, building maintenance, and other public works projects.

CHAPTER THREE

3.0 EXPERIENCE GAINED DURING THE SIWES PROGRAM

1. Compactors

Compactors, sometimes called rollers, are used to compact construction materials or the ground. Different types of compactors will be available for different compacting purposes.

For example, smooth wheel rollers are used to compact shallow layers of soil or asphalt.

Sheep-foot rollers are used for deep compaction jobs. And pneumatic tired rollers are used for compacting fine-grained soils and layers of asphalt.

2. Tipper

A tipper is a trucker where the rear platform or bed can be raised at the front to allow the load to be dumped by gravity. Sometimes called a tip truck, tippers are used for rough and tumble mining and quarrying operations and to carry bulk loads in construction and infrastructure projects. Tippers have complete maneuverability, high performance, and long-term endurance, resulting in lower operational costs.

3. Cranes

A crane is a handy machine in civil engineering. A crane is composed of pulleys and cables that allow them to lower and lift loads well beyond the capabilities of humans. Cranes not only help with lowering and lifting loads, but they can also move loads horizontally.

Many civil engineering companies use cranes at construction sites to help them move heavy materials that their workers can't move under their own power. Cranes can be static or mobile

machines. A mobile crane will have large wheels to provide stability and support to the crane when it's hoisted in the air carrying a heavy load.

A static crane, or a tower crane, is typically used to construct skyscrapers and other tall buildings.

4. Telehandlers

Telehandlers are hoisting equipment are used to lift heavy materials to heights or provide a construction platform to construction workers at great heights. They contain a long, telescopic boom that can be lowered or forwarded.

Different types of equipment, like a bucket, cabins, forklifts, lifting jibs, and more, can be attached to the end of the telescopic boom based on what's needed for the job.

5. Conveyors

Conveyors are machines used to move materials from one location to another. They can be used to move materials of any size, shape, or weight.

Conveyor systems are used in several industries, including pharmaceutical, food processing, print finishing, agriculture, automotive, mining, electronics, aerospace, bottling and canning, and packaging.

We include conveyors in our list because sometimes the shaft of the conveyor is supported by wheels which allow the movement of the shaft around a construction site.

Wheeled conveyors can be used at construction sites to move bulky stones and bricks from one point to the other.

6. Rammer Machine

This rammer machine, also known as a plate compactor or jumping jack, is a type of construction equipment used to compact and densify soil, gravel, sand, and other materials. It is commonly used in building construction, road construction, and landscaping projects.

7. Dumper Truck

This machine is designed for large capacity loads to be carried over a long-distances on or off site. Usually, it capacity ranges from 5 to 15 m3, some even up to 50m3 or above.

3.1 IMPERIAL AND METRIC SYSTEM

The differences between metric and standard imperial systems lie in the fundamental definitions of their respective units. The table below shows some commonly used units from the metric and the imperial systems.

The two measurement systems used by different countries of the world are the imperial system and the metric system. Currently, the imperial system is used in three countries - United States, Liberia, and Myanmar -, while the rest of the countries use the metric system

or the System International (SI). Units of measurement in the imperial system are based on the measurements done in ancient times according to the human form. On the other hand, the metric system is based on the definition of a meter, which was determined by scientists in the late eighteenth century.

3.2 COMMON UNITS OF MEASUREMENTS AND THEIR CONVERSIONS

Some common units of measurements and their conversions between the two measurement systems are:

1 meter (metric) = 1.0936 yards (imperial)

1 centimeter (metric) = 0.393701 inches (imperial)

1 kilogram (metric) = 2.2046 pounds (imperial)

1 liter (metric) = 0.264172 gallons (imperial)

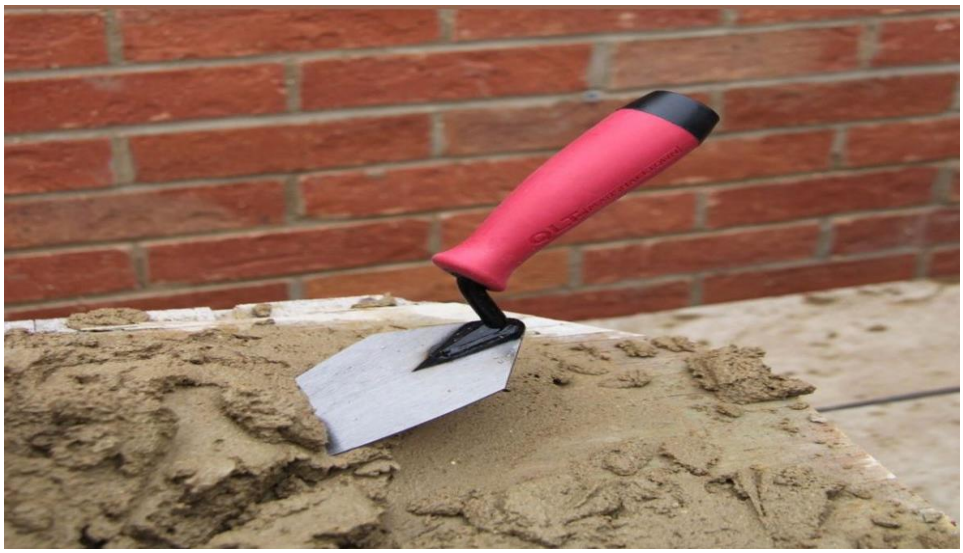
1 kilometer per hour (metric) = 0.621371 miles per hour (imperial)

3.3 INTERLOCKING PAVING INSTALLATION

Interlocking refers to a type of connection or joint between two or more objects, where they fit together in a way that prevents them from coming apart easily.

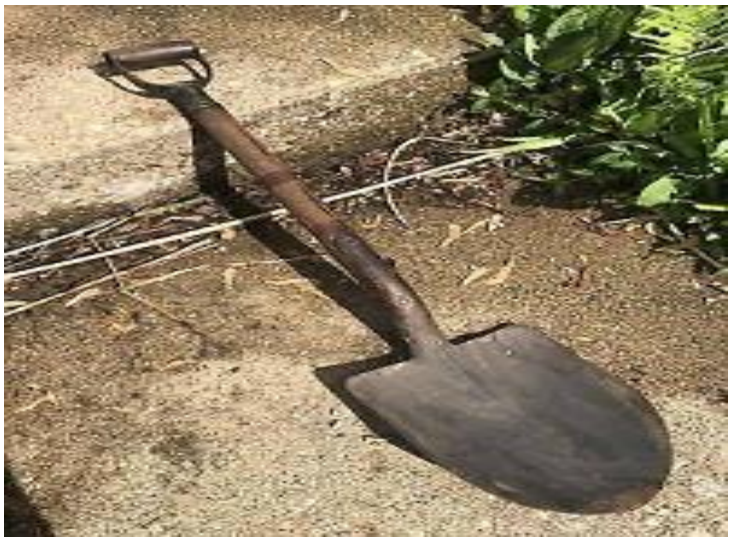
TOOLS AND EQUIPMENT

1. TROWEL: This is a small handheld tool with a flat, pointed blade, used to apply and spread mortal or plaster.



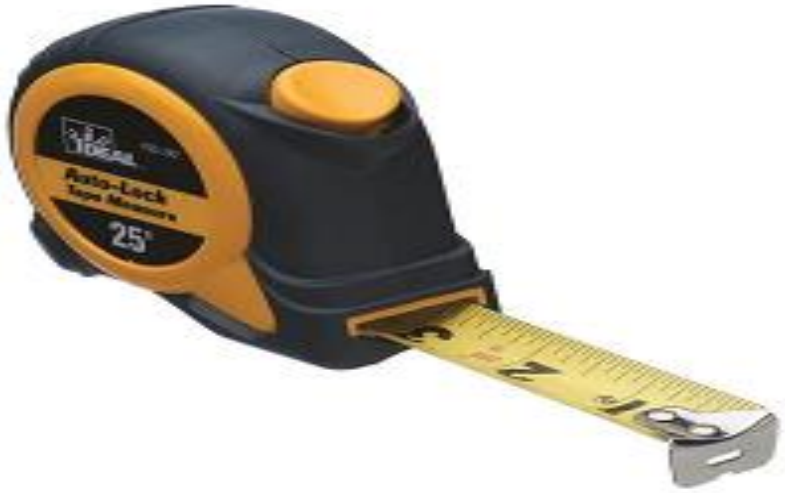
2. SPIRIT LEVEL: This is a device consisting of a sealed glass tube partially filled with alcohol or other liquid, containing an air bubble whose position reveal whether a surface is perfectly level.

3. SHOVEL: This is a tool used to dig, lift and move loose materials like dirt, gravel, snow and sand.



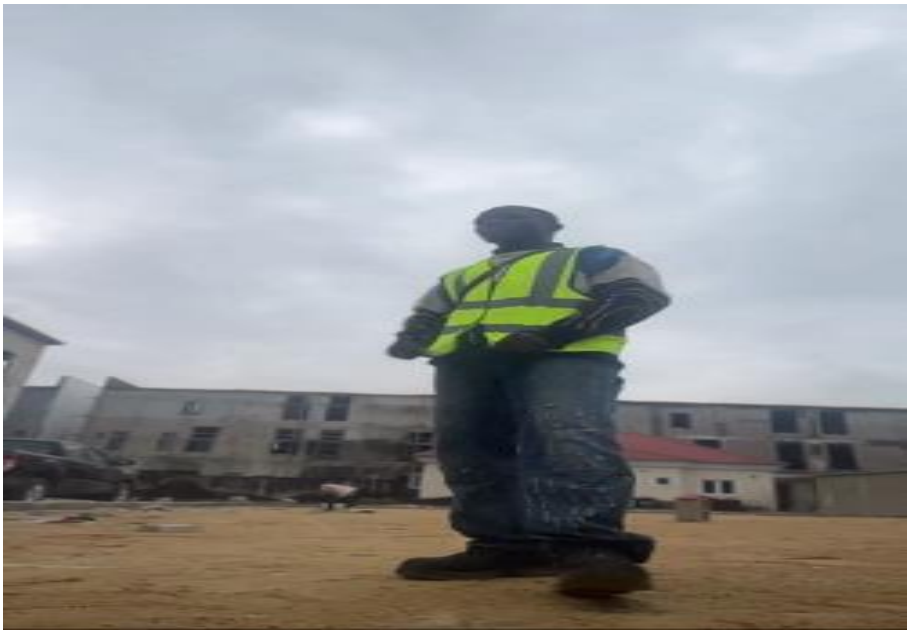
4. HEADPAN: This is a round container, like a bowl used in construction work to transport small quantities of mortar, cement, or concrete.

5. MEASURING TAPE: This is a flexible ruler used to measure distance or length.



3.4 PROCEDURE INVOLVED IN INTERLOCK INSTALLATION

A. Site clearing/bush clearing: The area where the interlock pavers were to be installed was cleared of debris and vegetation. The ground will then leveled using a leveling tool to ensure it was even and compact.



B. Excavation to level: A layer of compacted gravel will be laid down to provide a stable base for the interlock pavers. The gravel will spread evenly and compacted using a plate compactor.

C. Spreading and compaction: A layer of sand will be spread evenly over the gravel base course. The sand will leveled and compacted using a hand tamper.

D. Laying the Interlock Pavers: The interlock pavers will be laid on top of the sand course, starting from one corner and working our way across the area. Each paver will tapped gently into place using a rubber mallet to ensure they were securely locked together.

E. Cutting the Interlock Pavers: The interlock pavers will be cut to fit around edges or obstructions using a wet saw or a paver cutter.

F. Sweeping and Compacting: The interlock pavers will be swept clean of any debris or sand. The pavers will then compacted using a plate compactor to ensure they were securely locked together.

G. Edging: Edging stones will be laid around the perimeter of the interlock pavers to provide a finished edge and prevent the pavers from shifting.

3.5 DRAINAGE DESIGN

The detailed drainage design is a plan or set of plans used to inform the Local Authority's drainage officer and/or Site of the requirements for surface water drainage system onsite, as it enhances the conceptual Suds strategy proposed as part of the drainage strategy.

PROCEDURE INVOLVED IN DRAINAGE CONSTRUCTION

1. Setting out and marking drainage alignment.
2. Site clearing/bush clearing.
3. Excavation to level.
4. Spreading and compaction.
5. Blinding.
6. Fixing reinforcement bars.
7. Erecting of Formwork.
8. Concrete casting.

3.6 FOUNDATION

Foundation is Part of a structural system that supports and anchors the superstructure of a building and transmits its loads directly to the earth. The bottom of the foundation must be below the frost line. The foundations of low-rise residential buildings are nearly all supported on spread footings, wide bases (usually of concrete) that support walls or piers and distribute the load over a greater area. A concrete grade beam supported by isolated footings, piers, or piles may be placed at ground level, especially in a building without a basement, to support the exterior wall. Spread footings are also used—in greatly enlarged form—for high-rise buildings. Other systems for supporting heavy loads include piles, concrete caisson columns, and building directly on exposed rock. In yielding soil, a floating foundation—consisting of rigid, boxlike structures set at such a depth that the weight of the soil removed to place it equals the weight of the construction supported—may be used.

3.6.1 PURPOSE OF FOUNDATION

• Foundations are the main reason behind the stability of any structure. The stronger is the foundation, more stable is the structure.

• The proper design and construction of foundations provide a proper surface for the development of the substructure in a proper level and over a firm bed.

• Specially designed foundation helps in avoiding the lateral movements of the supporting material.

• A proper foundation distributes load on to the surface of the bed uniformly. This uniform transfer helps in avoiding unequal settlement of the building. Differential settlement is an undesirable building effect.

• The foundation serves the purpose of completely distributing the load from the structure over a large base area and then to the soil underneath. This load transferred to the soil should be within the allowable bearing capacity of the soil.

3.6.2 CLASSIFICATION OF FOUNDATION

Foundation is major classified into two which includes:

1. Shallow foundations

Shallow foundations can be broadly classified into two – Footings and Raft.

Footings

The purpose of a foundation is to transfer the load of the entire building to the soil below. However, a footing is that part of the foundation under a wall, pillar, or column. The term footing is usually used in conjunction with shallow foundations. The purpose of the footing is to distribute the weight of the building over a larger area.

There are different types of footings namely

i. Spread Footing: In this type of footing, structural members that are circular, square, or rectangular are used to support a column or a wall. These structural members transfer the weight of the building to the soil below. This results in larger stability to the building. It is relatively easy to erect a Spread footing. Spread footings are classified into two based on whether they support a column or a wall.

ii. Isolated footings or Pad footings: are used to carry and spread concentrated loads as in the case of a column or a pillar. Isolated footings can have a square, rectangular, or circular top. They can be Simple, Sloped or Stepped.

iii. When the footing is used to support a load-bearing wall, it is known as Strip Footing or Continuous Wall Footing or Wall Footing. They have limited width and continuous length under the wall that it supports. Read more: Strip Footing

iv. Combined Footing: When two adjacent columns are close together, their footings may overlap. In such cases, it is customary to combine the two adjacent footings. Combined footing can also be used when a column is close to the property line, causing the spread footing to be eccentrically loaded. Combined footings can be rectangular or trapezoidal.

v. Strap Footing or Cantilever footing: A strap footing or a cantilever footing is a special type of footing where two isolated footings are connected with a structural strap or a lever. This strap serves as a connecting beam and is used when the distance between the columns is large. In such cases, a strap footing is more economical to use than a combined footing.

vi. Raft Footing or Mat footing: Mat or raft footings may be proposed when the allowable soil pressure is low or when the columns are placed too close to each other that they overlap with each other. It can also be used when the weight of the building is very high. In such cases, a large mat or slab will be used to support several columns and walls under the entire or a large portion of the structure. This slab increases the bearing capacity of the soil and also transmits the weight of the entire building to the soil.

2. DEEP FOUNDATIONS

All the shallow foundations that we saw above are used in the case of smaller buildings and when the soil condition is strong. This might not suffice in the case of large buildings like residential and commercial complexes. For such buildings, the weight of the building must be dissipated at greater depths where the bearing capacity of the soil is much higher. It is under these circumstances that your structural engineer chooses a deep foundation.

There are three main types of deep foundations.

Piles

In pile foundation, long structural members, typically steel or concrete with reinforced steel are driven deep into the soil. There are different types of piles like Friction piles, DMC piles,

compaction piles, tension piles, batter piles, under-reamed piles, end bearing piles, rotary piles and sand piles.

Piers

Pier foundation makes use of cylindrical columns to support and transfer the load to the subsoil. They are of shallow depth and is used in places that are rocky. They are used when the required loading is small.

Caissons/Well foundations

These are used in extremely heavy structures like dams, bridges. In this type of foundation, a pre-fabricated, watertight, structure is sunk to a certain depth and is then filled with concrete. The caisson or box can be made of timber, steel, or concrete and ultimately becomes a part of the permanent Structure.

CHAPTER FOUR

4.1 FACTORS TO BE CONSIDERED BEFORE SELECTING A TYPE OF FOUNDATION

1. Soil conditions
2. Load characteristics
3. Foundation depth
4. Foundation type
5. Foundation performance
6. Foundation maintenance

SETTING OF BLOCK:

My work gave me a practical knowledge on how to set blocks wall for the foundation, that is laying of 9 inches blocks through the foundation etc.

Block setting is a process of sticking concrete or cement blocks together and bonding them with mortar to construct walls.

Blocks Types

Concrete blocks can be solid or hollow, and are often used for building walls.

Hollow blocks are lighter and easier to work with, and are popular for walls and fences.

Block Sizes

Concrete blocks come in variety of shapes and sizes, with faces usually measuring 450 x 225 mm and thickness ranging from 60-150 mm

MORTAR

Mortar is typically made from cement, sand, and water.

There are some steps for laying concrete block which are as follows:

1) Building a foundation
2) Set out reference points\
3) Place the corner block
4) Apply a 1 in (2.5) thick layer of mortar to the sides of each block
5) continue laying blocks and applying mortar until you reach the next comer
6) Apply mortar at the end of the block before placing the next block next to

4.2 CONSTRUCTION OF LINTEL:

After laying of blocks to the lintel level the carpenters visited the site amerally the welders with the materials to construct are hiers with. Lintel generall equires the span end bearing of 150mm at both ends, meaning the total lintel length is the span of the opening plus 300mm.

The word linte is a horizontal beam that spans openings in a wall, such as windows, door, and fireplaces, and supports the weight of the construction above it. Lintels are a vital part of a building's structural integrity and stability.

TYPES OF LINTELS

- TIMBER: This is the oldest type of lintel, often made from pine or oak.
- This type of lintel is commonly used in hilly area where timber 1s plentiful, but are rarely used in plains due to their cost, susceptibility to fire, and rot.
- BRICK: This is a type of lintel made by joining several bricks with mortar, or by a single vertical piece with clay or cooked cement.
- STONE: This consist of carved rock pieces or elongated shaped stones placed on posts or pillars.
- STEEL: This is a type of lintel that is made from structural steel, such as an I-beam or H-beam, and can be joined tomposts made of concrete, steel or other materials.
- REINFORCED CEMENT CONCRETE (RCC): This is a durable, strong, fire resistance and easy to construct materials.

4.3 LINTEL CONSTRUCTION GUIDELINES

1. A minimum bearing length of 10cm
2. A minimum width of 15cm
3. A lintel span no longer than 3.5 m over openings

4. All concrete lintels should be reinforced
5. Reinforced bars in RCC lintels should extend more than 600 mm b the edge of the opening

4.4 BEAM

A beam structure, sometimes simply referred to as a beam, is a type of structure used in construction and engineering to provide a safe and efficient load path that effectively distributes weight throughout the foundation of a building. These beams support the load by resisting being bent under the load's pressure. Beams resist this force in a lateral way as the force is applied to the axis.

4.5 THE VARIOUS COMPONENTS OF A BEAM

Main bars: This type of reinforcement is used to carry loads.
Support bars: A support bar is a reinforcement that is set in the top part of the beam and works to hold the beam's stirrups in place.
Stirrups: This type of reinforcement is used to offset the shear force or shear stresses of the structure.

4.6 TYPES OF BEAM

a. Continuous Beams: A continuous beam is one that has two or more supports that reinforce the beam. These supports are used under and between the beams and are typically vertical in nature. Continuous beams are thought to be more economical when compared to other beam types.

b. Simply supported beams: Simply supported beams are those that have supports at both end of the beam. These are most frequently utilized in general construction and are very versatile in terms of the types of structures that they can be used with. A simply support beam has no moment resistant at the support area and is placed in a way that allows for free rotation at the ends on columns or walls.
c. Fixed beams: A fixed beam is one that is fixed on both ends of the beam with supports. This type of beam does not allow for bending moment production and will not have any vertical movement or rotation. Fixed beams are most frequently used in trusses and similar structures.

d. Overhanging beams: An overhanging beam is one that is supported at two different areas, typically at one end and in the middle of the beam, but does not have a support at the other end of the beam, leaving it hanging. This type of beam extends beyond the walls or columns and the overhanging section of the beam is unsupported. An overhanging beam is a combination of a simply supported beam and a cantilever beam.
e. Cantilever beam: A cantilever beam is one that is free-hanging at one end of the beam and fixed at the other. This type of beam is capable of carrying loads with both bending moment and sheer stress and is typically used when building bridge trusses or similar structures. The end that is fixed is typically attached to a column or wall. The tension zone of a cantilever beam is found at the top of the beam with the compression at the bottom of the beam.

4.6 PURPOSE OF BEAM IN A STRUCTURE

a. Offsetting shear forces and/or beam momentum
b. Resisting loads
c. Distributing loads in a uniform fashion
d. Uniting the structure together

4.7 COLUMN

Column structural engineering is a structural element that transmits, through compression, the weight of the structure above to other structural elements below. In other words, a column is a compression member. The term column applies especially to a large round support (the shaft of the column) with a capital and a base or pedestal, which is made of stone, or appearing to be so. A small wooden or metal support is typically called a post. Supports with a rectangular or other non-round section are usually called piers.

FLOORING

Floring is a ho livel surface for that create levels within a building and it provide a stable, stories and create people, furniture, and equipment. The ay also divide space into stories and create more accommodation within a limited space.

FUNCTIONS TO BE CONSIDER IN FLOORING

1. Durability: How long the flooring will last
2. Maintenance: How much maintenance the flooring will require
3. Appearance: How the flooring looks
4. Sound Insulation: How well the flooring reduce noise
5. Damp proof: How well the flooring resists moisture
6. Fire resistance: How well the flooring resist fire

CHAPTER FIVE

5.1 CONCLUSION

Student Industrial Work Experience Scheme is very Essential for all student to be able to understand what their course of study will present to them after graduation and also learn beyond what they will be able to learn in school.

This report has been able to x-ray an account of the entire work – experience garnered by me during my SIWES program at Basilica Limited which is a core scheme in ITF and which is saddled with the responsibility of strengthening the effective teaching and learning of skill-based course such as Civil Engineering. I therefore conclude 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. I also concluded that SIWES is confronted with series of challenges and this may have hindered the realization of the goals and objectives of the scheme and it therefore needs to be given attention by all concerned stakeholders. Also, my general relationship with people and also work ethics has increased greatly.

5.2 RECOMMENDATIONS

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:

- Students' Industrial Works Experience Scheme (SIWES) needs to be strengthened by all concerned stakeholder in order for its objectives to be fully realized.
- Regular monthly allowances for students on attachment should be paid promptly.
- 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
- There should be more funding of the scheme by the government in order for it to be more effective.
- The companies should put in place all the necessary facilities needed to enhance the knowledge of the student in industrial attachment.

REFERENCES

- Kwara State polytechnic SIWES Students Manual
- Oxford English Dictionary