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CHAPTER ONE

1.0 INTRODUCTION

Student industrial work experience scheme (SIWES) programmed, was establish in year 1973 by federal Government of Nigeria through the industrial Training Fund (ITF) under the NBTE (National Board for Technical Examination). It has it's headquarter in jos, plateau state. The major reason behind the establishment of SIWES programmed and the importance of the student to display their talents and also learn the practical aspects of their fields of study. After their graduation, they will have something valuable to contribute to the society. They will also be able to face future challenges in their respective field of study.

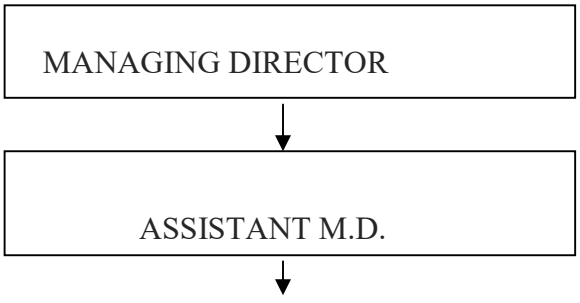
In accomplishment of my compulsory four months training program, I did my SIWES at PRIME SURVEY

I was involved in several operation on site and experience in relation to my career of study (BUILDING TECHNOLOGY).

1.1 AIM AND OBJECTIVES OF SIWES

- To enhance the knowledge of students (theory) of what they have been taught in school by backing it with enough practicals.
- To provide students the opportunity to apply their theoretical knowledge in real work situation, bridging the gap between university work and actual site work.
- To provide an avenue for students to acquire industrial skill and experience in their course study.
- To enable students to develop more affection for their chosen profession.
- To expose students to working method and technique in handling equipment and machineries that may not be available to them in school.

1.2 ORGANIZATION CHART



OPERATION OFFICER

CHIEF ENGINEER

SERVICE

CHAPTER TWO

2.0 INTRODUCTION AND BRIEF HISTORY ESTABLISHMENT

PRIME SURVEY is an organization that has keen interest in surveying. It was established in the year 2017 which is situated along Offa road, Ilorin.

OBJECTIVES OF ESTABLISHMENT

Prime Survey is to accurately measure and record the physical features of a piece of land, collecting data to create detailed maps and plans, which are then used for construction projects, property boundary definition, and other land development activities, ultimately enabling informed decision-making about land use and development.

2.1 MAJOR BUILDING EQUIPMENT AND THEIR USES

In building construction, tools and equipment are essential for executing tasks efficiently, accurately, and safely. During my SIWES training, I was exposed to various construction tools—both manual and mechanical—that are commonly used on-site for different activities such as setting out, block laying, concrete mixing, and finishing.

1. Concrete Mixer: A machine used to mix cement, sand, and water to produce concrete. It helps to ensure uniform mixing and saves time and energy compared to manual mixing.

2. Spirit Level: A tool used to check the horizontal or vertical alignment of surfaces. It contains a bubble in a liquid-filled tube that indicates level accuracy.

3. Measuring Tape: A flexible ruler used to take accurate measurements of distances, lengths, and widths on site, especially during setting out and layout.

4. Wheelbarrow: A small hand-propelled cart with one wheel, used to carry materials like sand, concrete, or blocks around the site.

5. Shovel and Spade: Tools used for digging, lifting, and moving bulk materials such as soil, sand, or gravel. Shovels typically have a pointed tip, while spades have a flat edge.

6. Trowel: A small hand tool with a flat metal blade used by masons to apply and smooth mortar when laying blocks or plastering walls.

7. Head Pan: A round metal or plastic container used for manually transporting small amounts of materials like mortar, sand, or concrete.

2.1.1 IMPORTANCE OF BUILDING EQUIPMENT

1. Increased Efficiency: Building equipment helps to speed up construction processes, reducing the time and labor needed to complete tasks.
2. Improved Accuracy and Quality: Tools and machines like spirit levels, concrete mixers, and measuring tapes enhance precision in measurements and construction work.
3. Reduction in Manual Labor: Heavy equipment such as excavators and concrete mixers reduce the physical strain on workers by doing most of the hard tasks.
4. Safety Enhancement: Proper equipment helps reduce accidents and injuries on-site, especially when used correctly.
5. Cost Effectiveness: Though equipment may be expensive initially, it reduces the long-term costs of labor, delays, and rework due to mistakes.

2.2 SITING: SITE SELECTION AND PREPARATION

Siting involves choosing a suitable location for a construction project, taking into consideration factors such as topography, soil condition, accessibility, and environmental impact. Site preparation ensures the land is ready for construction activities. This process was a key focus during my SIWES.

1. Site Selection Criteria

- ✓ Topography – Flat or gently sloping land is ideal
- ✓ Soil Type – Firm soil that can support the building load
- ✓ Drainage – Good natural drainage to avoid water accumulation
- ✓ Accessibility – Easy access for materials and equipment
- ✓ Environmental Impact – Should be minimal and within regulation

2. Site Preparation Activities Observed

- ✓ Clearing: Removal of vegetation, debris, and topsoil.
- ✓ Levelling: Grading the land to the desired slope and elevation.
- ✓ Excavation: Digging trenches for foundation.
- ✓ Hardcore and Compaction: Filling and compacting with stones to support foundation.

3. Tools and Equipment Used

- ✓ Shovels, hoes, head pans for manual clearing
- ✓ Wheelbarrows and compactors for soil work

2.2.1 IMPORTANCE OF PROPER SITE PREPARATION

1. Provides a strong base for structural elements

2. Prevents uneven settlement

3. Enhances construction efficiency and safety

2.3 FOUNDATIONS

The foundation is the lowest part of a building structure that transfers the load of the building to the ground. It is one of the most critical elements in construction as it determines the stability, strength, and lifespan of the entire structure. During my SIWES training, I was introduced to various types of foundations, their classifications, and construction processes.

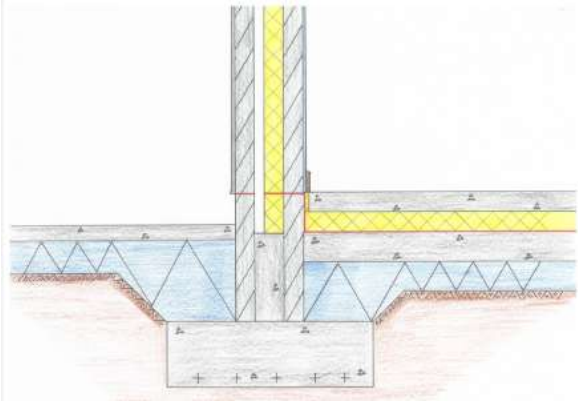
2.3.1 IMPORTANCE OF FOUNDATION IN BUILDING CONSTRUCTION

1. Load Distribution: It helps to evenly distribute the weight of the building to prevent settlement or collapse.

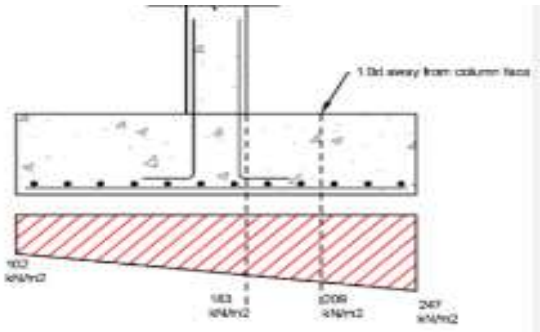
2. Structural Stability: A well-designed foundation anchors the building and ensures it remains upright and steady, even under adverse conditions.
3. Protection from Ground
4. Moisture: It acts as a barrier between the structure and ground moisture, reducing dampness.
5. Prevention of Structural Failures: A strong foundation mitigates the risk of cracks, tilts, and other structural problems.

2.3.2 TYPES OF SHALLOW FOUNDATIONS STUDIED

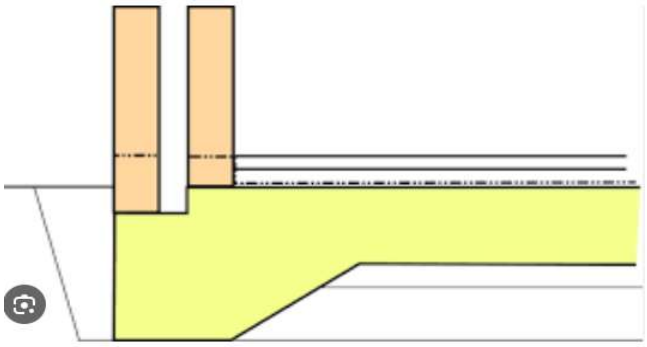
1. Strip Foundation: This is a continuous strip of concrete used to support load-bearing walls. It is the most common type we practiced on site.



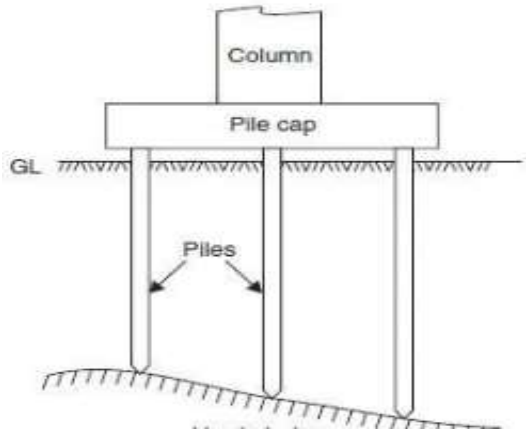
2. Pad Foundation: A square or rectangular concrete pad used to support a column.



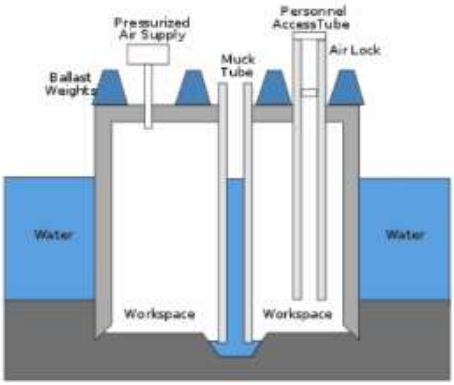
3. Raft Foundation: A large concrete slab that covers the entire footprint of the building. It is used in weaker soil conditions.



4. Deep Foundation Types (Explained in Theory)
   a. Pile Foundation: Long, slender columns driven deep into the ground to support heavy loads.



b. Caisson Foundation: Hollow cylindrical structures placed deep into the ground and filled with concrete.



2.4 CONCRETE: MATERIALS, MIXING, AND APPLICATION

Concrete is the most widely used material in construction, composed of cement, fine aggregate (sand), coarse aggregate (gravel), and water. During my SIWES experience, I learned both manual and machine mixing, as well as practical application in foundations and block work.

1. Composition of Concrete

- ✓ Cement: The binding agent
- ✓ Fine Aggregate: Fills gaps and provides smoothness
- ✓ Coarse Aggregate: Provides bulk and strength
- ✓ Water – Initiates the chemical reaction (hydration)

2. Mixing Methods

- ✓ Manual Mixing: Materials are turned over on a flat surface until uniform.
- ✓ Mechanical Mixing: Done using a concrete mixer for larger and more consistent batches.

3. Mixing Ratio

The common ratio used during training was 1:2:4 (cement:sand:gravel) for general construction work.

4. Application on Site

- ✓ Applied in strip foundations, columns, and floor slabs.
- ✓ Proper compaction and curing were observed for strength development.

2.4.1 IMPORTANCE OF PROPER MIXING AND APPLICATION

- ✓ Prevents weak spots
- ✓ Ensures uniform strength
- ✓ Enhances durability and load-bearing capacity

CHAPTER THREE

3.1 BLOCKS

Blocks are manufactured in a variety of materials clay and concrete being the most usual. They can be hollow and joggle jointed. Blocks work is treated in the same way for brick work. A block is a solid material that is commonly square in shape and usually has flat shape.

Block is a mixture of cement, sand and water which is usually form of different shape and size, depending on the mauling used.

Block has different size such as:

9x9x18 inches (225x225x450)mm.

6x9x18 inches (150x225x450)mm.

9x9x18 inches
(150x225x450)mm

6x9x18 inches
(150x225x450)mm

Ratio used for molding in my site was 1:2:4 which normally gives 45 pieces of 9x9x18 inches block and 60 pieces of 6x9x18 inches block.

Ratio 1:2:4

Cement …… (1)

Fine aggregate …… (2)

Coarse aggregate …… (3)

3.2 BLOCK SETTING

Block setting is the process of laying blocks or joining blocks together by using mortar in order to form to a regular shape wall of the building or Block setting is the process of laying blocks or joining blocks together by using mortar in order to form a regular-shaped wall of the building. It is one of the most important stages in building construction, as it determines the alignment, stability, and overall appearance of the structure.

The process begins after the foundation has been completed and cured. Accurate block setting involves proper alignment using tools such as spirit levels, plumb lines, and measuring tapes to ensure vertical and horizontal straightness. The mortar, typically made of cement, sand, and water, acts as a binding material to hold the blocks firmly in place.

Care must be taken to maintain uniform joint thickness, avoid mortar wastage, and ensure proper curing to achieve maximum strength. Openings for doors and windows are also considered during block setting by using lintels or leaving designated spaces. Good block setting enhances the durability, aesthetics, and structural integrity of the building.

3.3 WALLS

Walls are any continuous vertical member whose length and height are both much large than the thickness, walls are provided to enclose or divide the floor space in desired pattern. In addition walls provide privacy, security and give protection against sun, rain, cold and other adverse effects of weather. Walls are constructed by used building units like bricks, stone, construced by used building units like bricks, stone, concrete blocks (hollow or solid)

3.3.1 CLASSIFICATION OF WALL

Walls can be classified into following

1. LOAD BEARING WALLS: Are walls that support it own weight as well as the super-imposed loads transferred to it though floors/roofs. E.g external wall
2. NON-LOAD- BEARING WALLS: Are walls on the other hand that carries its own weight and is not designed to carry and superimposed load from the structure.

They are normally provided as partition walls.

4.3.2 FUNCTION OF WALLS

- It provides necessary resistance to rain penetration
- It is capable of resisting both positive and negative wind pressure
- It give required degree of thermal insulation

3.4 Casting

Casting in building construction refers to the process of pouring freshly mixed concrete into a prepared formwork or mould to achieve a desired shape, usually for structural elements such as slabs, columns, beams, or foundations. The

purpose of casting is to ensure the concrete sets in the required dimensions and hardens to gain the necessary strength for structural stability.

Before casting, formwork is cleaned and treated with a release agent to prevent sticking. Reinforcement bars (rebars) are properly positioned within the formwork according to the structural design. The concrete mix, made from cement, sand, gravel, and water, is poured into the mould and compacted using tools like tampers or vibrators to eliminate air pockets and ensure even distribution.

After casting, the concrete is left to set and then cured for several days (usually 7–28 days) by keeping it moist to prevent cracking and to help it gain maximum strength. Proper casting ensures the durability, load-bearing capacity, and safety of the building.

3.4.1 IMPORTANCE OF CASTING

- ✓ Provides strength and support to building structures.
- ✓ Ensures durability and long-lasting construction.
- ✓ Forms building elements into required shapes and sizes.
- ✓ Embeds reinforcement bars properly.
- ✓ Reduces construction waste and cost.
- ✓ Allows flexible and complex designs.

3.5 DRAINAGE

Drainage system usually provided in the design of high way for the protection at the investment make in high way structure and for safety of the users in rural areas. Some portion of high way that provide for the surface drainage.

3.3 IMPORTANT OF DRAINAGE

Drainage and culvert are important part of highway and the reason why it cannot just be left out of the designing stage of highway are follow:

i. Water retained or logged on highway surface could cause fatal accident for moving vehicle especially those on high speed.

ii. Where drainage facilities are not provided, the sides of the roadway are normally subjected to erosion.

iii. See page of water it pavement and sub-grade will cause a structure failure of the road.

iv. The absence of the destruction of pipe culvert course hindrance to traffic flows.

In view of the above reasons, various types of drainage and culverts facilities are used to protect the highway against surface and sub-grade water. This is designed to covey water under, across along or away from the highway in the most economical, efficient and practical manner without damaging the highway or adjacent property.

CHAPTER FOUR

4.0 INTRODUCTION

4.1 WORK EXPERIENCE / ACTIVITIES CARRIED OUT

This chapter highlights the practical experience gained during my SIWES at PRIME SURVEY . The activities involved tasks related to block setting, concrete mixing and casting, site preparation, and drainage work. These hands-on experiences provided insights into construction processes and equipment use.

4.2 TASKS AND RESPONSIBILITIES

During my training, I participated in several tasks:

- **Block Molding & Setting:** I assisted in molding concrete blocks using a 1:2:4 mix ratio and helped set blocks accurately with mortar, ensuring proper alignment and level.
- **Concrete Mixing & Casting:** I observed and participated in mixing concrete for various construction tasks, including casting beams, slabs, and columns.
- **Site Preparation:** I was involved in clearing and leveling the construction site to prepare for foundations and structural work.
- **Drainage Work:** I assisted in installing drainage systems to manage water flow and prevent erosion.

4.3 SKILLS ACQUIRED

- **Technical Skills:** I gained hands-on experience with construction tools, block setting, and concrete mixing techniques.
- **Teamwork:** I learned how to work effectively with site workers and supervisors, ensuring tasks were completed efficiently.

- **Problem-Solving**: I developed the ability to address site challenges, such as ensuring proper compaction and dealing with weather-related delays.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

The SIWES program has been an invaluable learning experience, offering me the opportunity to apply theoretical knowledge in real-world scenarios. Throughout my time at PRIME SURVEY , I was exposed to key aspects of building technology, including block setting, concrete mixing, site preparation, and drainage installation. The practical skills and insights gained during the program have greatly enhanced my understanding of the construction industry.

The experience not only strengthened my technical abilities but also improved my problem-solving and teamwork skills. It has prepared me for future professional challenges and has sparked a deeper interest in pursuing a career in building construction.

5.2 RECOMMENDATIONS

Based on my experience, I recommend the following:

- **Improved Training Facilities**: Ensuring that SIWES students have access to modern tools and equipment will enhance their learning experience and skill acquisition.
- **More Hands-On Exposure**: Practical sessions should be prioritized to help students build a stronger foundation in their respective fields.
- **Continuous Collaboration**: Greater collaboration between academic institutions and industries will help bridge the gap between theory and practice, providing students with more real-world applications.

- **Mentorship Programs**: Establishing mentorship programs for students during their SIWES placements can offer guidance and improve their professional development.