CHAPTER ONE

1.0 INTRODUCTION

Sandcrete block is a large rectangular material used in construction. It is an undisputed fact that shelter is one of the basic human necessities making it the third after food and clothing. Block were first known to have been in user at the river basin region of those of ancient Egypt and Greece. So instead of using stones and marbles, clay, mud, silt and straw were used to make blocks that were baked before use (sjostrom et Al. 1996). However, the durability became possible when blocks were fired in kilns.

1.1 HISTORY OF BLOCK MAKING MACHINE

Excavations have uncovered perfectly fired blocks as far back as 5000BC. Many other similar materials were used leading to the discovery of Portland cement in Mesopotamia as early as about 10,000BC (spence,1979). In 1900, Harmon S. Palmer invented the first commercially successful concrete block machine, but there were many reasons concrete block became widely used during the first half of the 20th century.

In general, the history of contemporary building material begins with the innovation in block machinery that took place at the turn of the 20th century. However, the history of block much earlier than these innovation building materials account for over 60percent of the total cost of building construction projects therefore, their quality is of primary concern for their reliabilities and efficient performance in building (Webb,1983).in Nigeria and other developing countries in Africa, over 90percent of building structures are constructed using Sandcrete block (Glanville and veville,1997).

Sandcrete technology is becoming the backbone of infrastructural development of every country (Anosike,2011). Sandcrete blocks comprise of natural sand, water and binder. Oyetola and

Abdullah (2011) added that cement, as a binder, is the most expensive input in the production of Sandcrete blocks.

1.2 TYPE OF BLOCK MOLDING PROCESSES

Concrete block molding (Using molds to cast materials like copper alloys).

Block moulding machines are generally categorized by their operating system into manual semi-automatic, and fully automatic, types.

Within these categories there are Variations based on the method of block production, such as hydraulic vibrator or a combination of both. Additionally, machines can be classified by their mobility with mobile and stationary options available.

Sandcrete blocks are building materials made from a mixture of sand, cement, and water, molded into block shapes and then cured. They are a widely used, cost-effective option for both load-bearing and non-load-bearing walls in construction.

1.3 FABRICATION PROCESS

1. Mixing: Sand and cement are combined in a specific ratio, typically 1:6 or 1:8 (cement to sand), along with water.

2. Molding: The mixture is placed into molds, often using a hydraulic press machine, to achieve the desired block shape and size.

3. Compaction: The mixture is compacted within the mold, either manually or through vibration, to eliminate air pockets and increase density.

4. Curing: The molded blocks are cured, typically by sprinkling with water, to allow the cement to hydrate and the blocks to gain strength.

Key Considerations:

Mix Ratio: The cement-to-sand ratio is crucial for the block's strength. A common ratio is 1:6, but this can vary.

Water-Cement Ratio: The appropriate amount of water is also important for proper hydration of the cement.

Compaction: Proper compaction ensures a dense and strong block.

Curing: Adequate curing is essential for the blocks to achieve their full strength.

Standard Sizes: Common sizes for hollow sandcrete blocks include 450mm x 225mm x 225mm, 450mm x 150mm x 225mm, and 450mm x 125mm x 225mm.

Strength: Sandcrete blocks have relatively low compressive strength compared to concrete and are susceptible to seismic activity.

Environmental Concerns: The use of dredged sand for sandcrete production can have negative environmental impacts.

1.4 METHOD OF MOLDING BLOCK

The process of moulding concrete blocks involves mixing cement, aggregates (like sand and gravel), and water, then placing the mixture into molds where it's compacted and allowed to cure. The method can range from manual tamping in simple molds to automated systems with vibrating and pressing mechanisms.

Detailed Process:

1. Mixing: The first step is to combine the concrete ingredients (cement, sand, water, and potentially admixtures) to achieve a consistent mix.

2. Molding: The mixed concrete is then placed into molds, which are typically made of metal and come in various sizes and shapes.

3. Compaction: The concrete within the mold is compacted to eliminate air pockets and ensure the block achieves the desired density and strength. This can be done manually by tamping or through vibration using specialized machines.

4. Curing: After molding, the blocks are cured, which involves keeping them moist and at a suitable temperature for a specific period (typically 14 days) to allow the concrete to gain strength.

5. Demolding and Storage: Once cured, the blocks are carefully removed from the molds and stored in a suitable location for further use.

1.5 TYPES OF MOLDING METHODS

Manual Molding: This involves hand mixing the concrete and compacting it within the mold using hand tools like a tamper.

Semi-Mechanized: This method uses a machine to mix the concrete and a vibrating table to compact it within the molds.

Fully Mechanized: This involves automated systems that mix, mold, compact, and demold the blocks.

Key Considerations:

Mix Ratio: The ratio of cement to aggregates (e.g., 1:6) is crucial for the strength and durability of the blocks.

Molds: The quality and design of the molds affect the final shape and dimensions of the blocks.

Compaction: Proper compaction ensures that the concrete is dense and free of voids, leading to stronger blocks.

Curing: Adequate curing is essential for the concrete to gain strength and durability (Barry, 1969).

1.6 MATERIALS FOR SANDCRETE BLOCK MAKING MACHINE

Mild steel is as low - Carbon Steel that goes by the name "Low Carbon Steel" Mild steel normally has a carbon Concentrate of 0.05 percent to 0.25 percent by weight whereas higher carbon steels typically have a carbon content of 0.30 percent to 2.0 percent. Anymore Carbon and the steel becomes cast iron (Hughes, E. 2010).

- unlike high carbon and other steels it is more ductile, machine able and weldable.
- During heating and quenching, it is nearly impossible to harden and strengthen the material.

1.7 AIM OF THE PROJECT

To Design, fabricate and evaluation the performance of horizontal vibrated modular twin mould sandcrete block machine.

1.8 OBJECTIVES

- We want to produce mobile block making machine.
- To meet minimum standard.
- To be cost effective.
- The Machine to be powered by electric vibrator.
- The machine to be more efficient than the previous
- To produce the machine with quality and Economical material.

1.9 PROBLEM STATEMENT

- There is problem in term of collapse.
- There is Challenges in production in terms of quality and availability.
- On site, production of block is a means of ensuring quality under close supervision.

- Challenges of installing block making machine on site lead manying to purchase block from Outside; the quality of such cannot be grantee.