PRODUCTION OF 450 X 225 X 225MM (9") SAND BASED BLOCK

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TITLE PAGE

**PRODUCTION OF [450*255*225mm] ("9")
SAND BASED BLOCK**

BUILDING DEPARTMENT SCHOOL OF TECHNICAL STUDIES

**FEDERAL COLLEGE OF EDUCATION (TECHNICAL)
P.M.B. 60 GOMBE STATE**

PRESENTED BY

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APPROVAL PAGE

This project has been approved for the school of technical education studies, Federal College of Education (technical) Gombe, Gombe State, for the award of the Nigerian certificate in education (NCE) in building technology.

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DEDICATION

With gratitude to almighty God, I wish to dedicate this project to my beloved mother Mrs. Movihinga Ugba.

ACKNOWLEDGEMENT

I thank the almighty God, who is guiding me through out the course of my studies here in F.C.E (T) Gombe. I wish to acknowledge the special role played by my project supervisor Mallam Hassan Jibrin Suleiman, Who despite his tight schedule was able to go through my work and effect the necessary correction.

I acknowledge the immense contribution of the following people who in no small way rendered much assistance to my academic pursuit: Mr. Augustine I Shula. Mallam Idris Ibrahim Dangi, Ortamen Jacob Akaager Gbenda, Rev. Daniel Dooyum Dagbera (JP), Engr, Peter Ter Deekpe, Ortament Dennis Mvendaga Mtse, Ortamen Joseph Azaye, Isaac Shawon and my wife Ankwase. A. Ugba. Finally I am indebted to my colleges and friends who assisted me in one way or the other in the course of my academics endeavors, may the almighty god reward each one of you abundantly for this gesture.

ABSTRACT

This production work is one of the national certificates in education (NCE) conditions, for with out it the programme cannot be completed. This project report in details talk about the nine-inch block production. The procedure of how the block is been produced and the materials that are used for the producing the block which are: - (i) cement (ii) fine aggregates and (iii) water. The water serves as lubricant, which is added to facilitate the mixing. The preliminary work started by mixing the cement with sand, two to three times before mixing or adding water to it, so that the mixing would be uniform. The mixing is also carried out manually because we want to drive the practical skills on how to produce block by using such methods. Evaluation process will follow during and after the production so as to make sure that all the information given has been followed according to standard for durability, strength and stability during the production exercise.

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INTRODUCTION

In ancient years, man have made the use of mud or clay in a suitable sizes and shapes to produce block as a building unit or component where air or sun is used for drying them and lay them in a work set mud or clay with sufficient strength to be used as a walling unit. But today cement, with hard durable clean sand is used for producing block. However blocks varies in shapes and size, which are made base on the owners need or choice. Blocks are classified according to specific properties the manufacturers usually have a good variety to choose from depending on the requirement of the user. Blocks are generally used for construction work either civil or in building industries for example blocks are used in building a living accommodation, store accommodation etc. block also provide partition and division of building into rooms and compartment. Block has importance of serving any construction in the building industry.

CHAPTER ONE

1.0 THE MATERIAL THAT ARE USED IN MANUFACTURING OR PRODUCTION OF NINE-INCH BLOCK

The chapter is about the blocks, which are made from a mixture of aggregate (durable clean sand) cement and water. On setting and hardening the block has to attain sufficient strength to be used as working units.

1.1 THE MATERIALS THAT ARE USED IN MANUFACTURING OR PRODUCING BLOCKS

Different types of materials are used in manufacturing blocks. These materials are cement, fine aggregate (hard durable clean sand) and water.

CEMENT: - are the most widely used materials. It is manufacture from chalk or limestone and clay, which are grounded into powdered form mixed together and fired in a kiln to form clickers causing a chemical reaction. On leaving the kiln, the resultant material with additional gypsum is grounded into a fine powder known as cement.

TYPES OF CEMENT

We have various types of cement namely: -

(i) Ordinary Portland cement.

(ii) Rapid hardening Portland cement.

(iii) Sulphate resistant cement and

(iv) Low heat Portland cement e.t.c.

The cement that is generally used in manufacturing blocks is called ordinary Portland cement. It is manufactured by heating a mixture of powder clay and limestone with water the clinkers are grounded with the addition of a little gypsum (calcium Sulphate) to fine powder of cement. The chemical gypsum is to lengthen the setting time of the cement to give practical working conditions. It is then packed into 50kg capacity bag ready for transportation.

SAND: - the sand is obtained from pits or quarries, sand which is best for mortar mixing because of its angularity "sharp". However, the river bank, or sea sand contains some impurities but the sand is not suitable for use because it contains salt which contain and retain moisture in addition the sea sand is not good for mortar mixing. Sand should be well clean, sharp and free from clay or any other impurity. Dirty sand should never be used in manufacturing block, which reduce the adhesive value of the mortar and affect the block quality. It is also advice to use clean sharp sand.

WATER H2O: - The water to be used in block manufacture must therefore be clean, fresh and free from impurities such as salt, oil, grease etc. which will react with the cement and lower it strength

and durability where it would also affect the quality of the block. In short only clean water for drinking should be used for mixing the mortar.

However water has two advantages in mixing, which are as follows: -

(i). To enable the chemical reaction with cement which causes setting and hardening to take place.

(ii). To act as lubricant to render the mixing sufficiently for planning and compaction.

CHAPTER TWO

2.0 PROCESS IN MANUFACTURING BLOCKS

Different materials are used as an aggregate for block production, which have already been mentioned. The choice of these materials depend on the type of block to be manufactured or produced and it is essential to make the right choice. The aggregate that is commonly used for this type of block consist of hard durable clean sand cement and added with water to facilitate the mixing or to serve as lubricant.

2.1 BATCHING OF BLOCK MATERIALS

The process of measuring out the quantities of block materials or ingredients is known as batching this is done to carry out the mixed proportion so that the resultant would meet the specific standard. Blocks that are used for load bearing wall should have a mixed of one (1) bag of the ordinary Portland cement plus six wheel barrows of hard durable clean sand (1:6) i.e. batching by volume

The commercial producers may use their own which is much weaker than this proportion. It is advisable to take the specific standard proportion before using or mixing the aggregate.

2.2 MIXING

Before manufacturing of block a large number of mixing should be by either mechanical means or manually, but for this project manual type of mixing was used for the practical skills acquisition.

Dry mixing is first carried out in a large number of mixing so that the cement and sand would be uniformly mixed before water is added which will also allow the chemical reaction of the cement to take place. However, the wet mixing is also carried out in different number so that the sand, cement and water would eventually mix uniformly. The mixed is tested first by taking small quantity and pressed it in-between the palms and observes it to see weather there is a drop of water. Excessive water causes shrinkage and dispassion of the block during drying.

2.3 MOULDING

The moulding is carried out quickly after mixing, it can be either mechanical or manual. For this production as the mixing carried manually for practical skills acquisition, also the mouldings carried out manually by using a block moulder. The mortar or mixture of the sand, cement and water is placed into the block moulder, whereby the block moulder will be filled and be compacted, with the mixture or mortar very well before taking it to open air for drying. However, the block moulder is carried out

by two individuals, one at each edge and also turn it into its right position where by the full size of nine inch block is done.

CHAPTER THREE

3.0 CONSTRUCTION DETILS

This chapter is talking about the description of the method of construction, problems encountered and solution derived.

This include:

- Site clearance
- Transport
- Batching of the ingredients
- Mixing
- Moulding proper
- Curing
- Storage of the blocks
- Problems encountered and solution derived

3.1 SITE CLEARANCE

The work (production of the 450*255*225mm) blocks began with the clearing of the site where the blocks are to be moulded, this site is located beside the building technology workshop. The site was cleared prior to the commencement of the work in order to get a leveled ground where the blocks are to be moulded.

3.2 TRANSPORT

On completion of this the sand was then transported to the site in large quantity. Cement was brought to the same site and water was also fetched to the site in buckets.

3.3 BATCHING OF THE INGREDIENTS

The sand was measured out in wheelbarrows, i.e. (2) wheelbarrows full of sand to one bag of cement, when this was done then sand was now spread open and the one bag of cement poured over it.

3.4 MIXING

Dry mixing of the cement and sand was thoroughly done until the mix become very uniform in appearance.

After this, the water was added to obtain the mix in a nice condition. Five (5) buckets of water was now added and this mix turned around to get the correct and uniform mix.

On completing the mixed mortar was now ready for moulding into blocks. A 450*225*255mm block mould was then brought out and it is well oiled within it in order to ensure the easy removal of the blocks. The mould was then loaded one for the production of one block at a time.

Adequate compaction of the block was done during the loading process to ensure a good compaction. The moulding was help in

two opposite dimension and off loading at the point at the point of the mould. The process was repeated until the mix of one bag was completely exhausted. This process continues with the one bag of cement after the other. Twelve bags were exhausted the first day on completion of the work on that day the curing of the blocks commence the following morning.

3.5 CURING

The curing process was done in the morning and evening for 28 days so as to ensure that at the end of the day quality blocks were obtained. However, in the course of this curing at certain points in time water was very scarce and as such the process was not done completely for 28 days. Some days were skipped as a result of shortage of water, so the strength development that is supposed to be acquire or attain by the blocks might not sufficiently achieved

3.6 STORAGE OF THE BLOCKS

The block storage is done in a quiet place, where people will not temper with it, so as to avoid breakage and also block should be handled with care to avoid chipping the edges of the blocks.

3.7 PROBLEMS ENCOUNTERD AND SOLUTION DERIVED

The curing process had a problem in the sense that at certain times, there wasn't water in the college premises. Inspite of this lack of water, alternatively it rained persistently within this period and that took care of the acute storage of water, which could have made the curing process failure. That is how the problem was solved so as to ensure total curing process of 28 days. Infact, the rain continue even beyond these days.

CHAPTER FOUR

4.0 EVALUATOIN

The block production was done through the standard method of production as a process. This started from the batching out of concrete ingredients, which were measured out according to the laid down procedure.

The essence of this is to ensure that these ingredients were measured out correctly before the mixing processes commence. This is to ensure that the end product is of sound quality so as to meet the desired production. The blocks were finally produced and cured up to the required standard days coupled with the fact that they were produced during the peak of the rain in the wet season. the rain also complemented greatly to the curing process.

The produced blocks at the end have shown great strength development. Although the produced block have not been fully put into practical usage, it can be concludcd that the product will meet the desired requirement for the production and when used to construct a wall it will not in any way fail or exhibit any crack.

4.1 TESTING OF BLOCKS

The blocks were tested using compressed testing machine and found to attain the desired strength needed for construction purposes for walls in our dwellings .it is hoped that when this blocks are put into use for any construction work they will surely withstand the functional requirements expected of them. They have proved to be worthy of their intended use. And this was found to be all right. The edges and other parts of the block tested, pr ved satisfactory, and confonned with the laid down standards. The measure of the various parts of the blocks also proved satisfactory and conformed to the standard dimensions of the blocks [450*225*225], i.e. 9 inches blocks. (9").

The reason for this assertion is that the 1500 blocks produced, were all very safe when they were packed in heaps. No damages were recorded. In very rare cases, can one-pack blocks of this number in heaps and experience no breakage or damages. It is only the blocks have developed adequate strength this will give a good result of this kind.

It against this background that the so produced blocks have said to have yield positive evolution.

CHAPTER V

5.0 CONCLUSION

The produced blocks were tested using compressed testing machine and found to attain the desired strength needed for construction purposes for walls in our dwellings. It is hoped that when theses blocks are put into use for any construction work, they will surely withstand the functional requirements expected of them. They have proved to be worthy of their intended use.

5.1 LIMITATIONS.

The block produced have been tested and found satisfactory for any constructional requirement. Bearing this in mind does not however entail their misusage in the course of taking up any construction. This is because if the blocks are not used properly, then there is a tendency that they will fail at a certain point in time. The effective and proper usage of the blocks during the construction of projects should therefore be ensured so as to attain good result.

5.2 SUGGESTIONS

This project has been carried out successfully, however, some minor problems were encountered. Such included the funding of the project by the students. As a result of financial hardship, it is not at all easy to cope with the task of financial problems by the students handling the project.

The producer wish to suggest that in order to assist the students cope with their project well, the college authority should finance the project fully while the students provide the labour so as to enable them acquire the desired skills needed for the practical projects.

Equipment, tools and the needed necessary items should also be made available readily for this project even before the commencement of the task (s).

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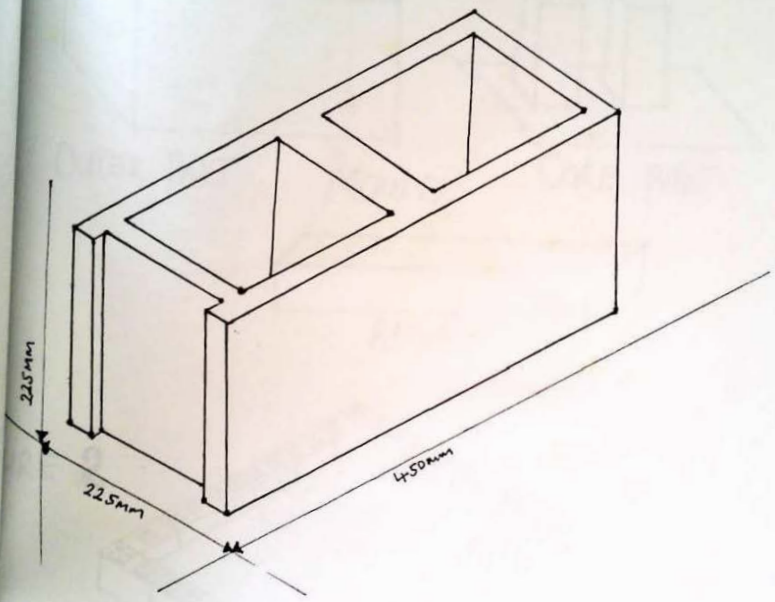
APENDIX A

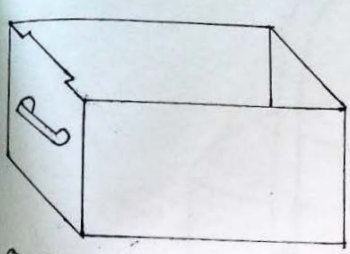
450MM X 225MM X 225MM (9INCH)



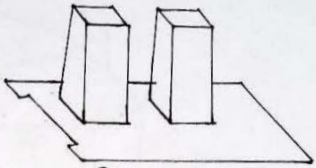
SAND BASED HOLLOW BLOCK.

APPENDIX B

1

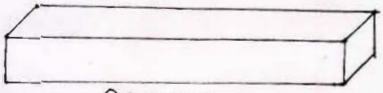


OUTER PART



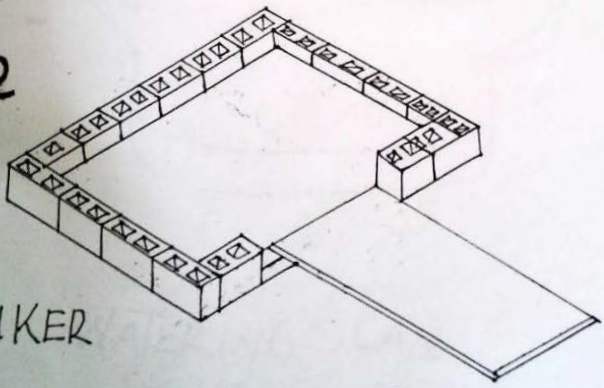
MOULD

CORE PART



RAMMER

URE 2

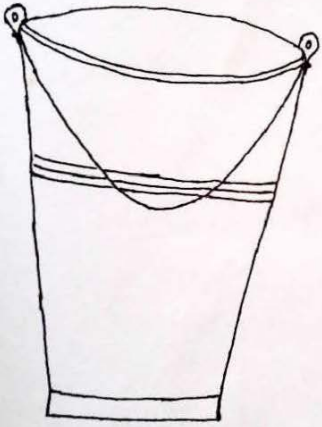


BANKER

SHOVEL

WATERING CAN

APENDIX D



BUCKET