COMPARATIVE ANALYSIS OF THE COMPRESSIVE STRENGTH OF HOLLOW SANDCRETE BLOCK USING CRUSHING STONE AND RIVER SAND

OLAMOJU A.M
Department of Building Technology
The Federal Polytechnic, Ilaro.
Ogun State,Nigeria.
Email: jasperjeep2001@yahoo.com, jasperjeep2016@gmail.com,
+23408033860114,+23408053522435

And

ADENAIYA A.O.
Department of Building Technology
The Federal Polytechnic, Ilaro.
Ogun State, Nigeria.
Email: midenaiya@yahoo.co.uk
+23408028356562

Being

Paper Presented at the 7th National Conference
Of the School of Environmental Studies,
The Federal Polytechnic, Ilaro.

Held At

International Conference Centre, The Federal Polytechnic,
Ilaro, Ogun State, Nigeria.

APRIL, 2019

ABSTRACT

Quality and standardization of all construction materials are of paramount importance and serves as a yard sticks for measurement reflecting the level of development attained by a nation. Sandcrete blocks are construction materials which have gained wide acceptance and used in the construction industries because of the many characteristics properties attached to them. In this research the study enhanced on the compressive strength of hollow sandcrete block. The test was done in accordance with the British Standard 2028(1968), while grain size distribution analysis was conducted on the sand aggregate and crushing stone used which is suitable for block making. Compressive strength test was carried out on the sandcrete block for each percentage of replacement on 7, 14 and 28days. Result of the experiment shows that the inclusion of crushing stone in the sand cement enhances the compressive strength of sandcrete block. Sandcrete block made with (1:8) mix proportion using 20% granite fine replacement give optimum compressive strength of 6.58N/mm². While the block produced using 15% has 5.77N/mm², control has 4.41N/mm², 5% has 4.39N/mm² and 10% has 4.04N/mm². Standardization of block manufacturing process and strict supervision of the manufacturer by the council for the regulation of engineering practice in Nigeria were recommended as measures to improve the qualities of sandcrete blocks.

Key Words: Sandcrete blocks, Compressive strength, Construction, Standardization.

INTRODUCTION

Blocks are made from mixture of sand, cement, and water and are called sandcrete blocks they are used extensively in all Africa countries including Nigeria for wall in building for a long time until perhaps few years ago, Abdullahi, M. (2005), this are manufacture in many part of Nigeria without any references to any specification either to suit local building requirement or for good quality work. Apart from using block wall for laterite, wood, and other forms of walling units have been used in building construction, but they have not made much progress when compare to the use of blocks.

The same can also be of bricks, the properties of block of interest include comprehensive strength, fire resistance, durability thermal conductivity and sound resistance these properties are dependent on the relative proportion of the constituent and the method of production process.

Traditionally, sandcrete blocks are made of cement, natural river sand, and water.

The constituent is mixed and placed in a mould which is remove immediately after compaction and leveling of the top. The newly produced block is self –supporting; hence they are often referred to as zero slump concrete. Individual blocked are joined together, after curing, to form walls using cement –sand mortar. But due to the scarcity and high cost of natural sand, there have been a growing interest especially in the developing countries in the use of crushed stone (or granite fines) in the production of blocks , concrete , and masonry product . Sand –quarry dust blocks are sandcrete block in which the sand portion has been partially replaced with granite fine (crushing stones)

The use of quarry dust or crushed stone in hollow sandcrete block according to Chaturanga ,Arama ,Wiranjith ,Dissanayake ,Haniffa , and Patanbandige (2008) is desirable because of the benefits such as useful disposal of a byproduct , and reduction of river sand consumption and increase in strength . Crushing stone has rough, sharp and angular particles, and as such causes a gain in strength due to better interlocking. Crushing stone has been identified as possible replacement for sharp sand inn concrete works.

Granite rock is abundant in Nigeria giving rise to many quarry sites with large heaps of quarry dust, hence, quarry dust can be reasonably used as alternative to river sand, Shahul and Seker ,(2009) observed that natural sand is not usually graded properly and has excessive silt, while quarry rock dust does not contain silt or organic impurities and can be produced to meet desired gradation and fineness as per requirement . This consequently contributes to improving the strength of sandcrete block. Agbede , Joel ,(2004) described quarry dust as a cohesionless sandy material acquired either naturally (which is rare) or artificially by the mechanical disturbance of parent rocks (blasting of rocks)for construction purpose composed largely of particles with a diameter range from 0.05mm to 5.00mm . They found in their study on "suitability of granite stone is cheaper than River Benue sand during rainy season.

Coarse aggregate is readily available at limestone quarries and it is extensively used in Nigeria in the manufacturing of block, interlocking stone concrete etc. furthermore , crushed stone or granite fines have been found to produce blocks with higher strength when it is partially replace with sand .

METHODOLOGY

The entire test was carried out in the laboratory using the following apparatus/equipment. The apparatus involved are compression testing machine, weighing machine, hand mould, British standard sieve and specific density bottle. Batching of material will be by weight. The percentage of granite fines used to mould the block will range from 0%, 5%, 10% and 15%. Also water will be added until a reasonable workable mixes is obtained, and a continuous mixing is made with a shovel. The compressive strength will be determined at 7, 14, 21 and 28 days after the hollow block has cure. The blocks will then be crushed on the compression machine to determine its strength at failure.

All materials used for production of sandcrete hollow blocks for this work were obtained locally; crushing stone was used as fine aggregates and it was made free from crushed granite. Sieve analysis of granite fines was done to determine its grading, and fine materials passing through the sieve were collected for use while those retained were poured away. A total number of 75 sandcrete hollow blocks of five sets were molded comprising of an equal number of 450x225x225mm, each sets contains fifteen blocks. The percentage of granite fines replacement proportion used is 0% 5% 10% and 15%. Batching was done by weight, and the material was mixed thoroughly with a shovel to produce uniform and consistent color. The compacted material was remolded and kept in a dry place for curing, curing was done three times in a day, and then crushing for compressive strength was carried out age 7, 14, 21, and 28 days.

Cement

Crushing stone

River sand

Sample A 5%

Sample B 100%

Sample C 10%

Compressive Strength Test

Aim: To determine the compressive strength of the sandcrete hollow blocks. Apparatus: Compression machine, two steel plates, weighing balance and the block samples. Procedure: The sandcrete block was first weighed on the weighing balance so as to add the weight value to the compressive strength value read from the machine, and this sum is taken as the compressive strength value of the block sample. Then the compression machine is connected to the power source and the pointer on the reading calibration scale is adjusted to zero mark. The block was placed on the first metal sheet plate, while the second metal sheet plate was placed on top of the block to spread the load equally. The start button is depressed to initiate the electronic compression and as the compressive force is applied to the block, visible cracks appear on the block. Red pointer reading the compressive strength value in kilo-Newton (KN) gradually raises till it reached its peak and then the black pointer begins to drop back.

PRESENTATION AND ANALYSIS OF RESULT

The result of the physical property test on sharp sand, crushing stones and summary of this result are presented in table 1, while the particle size distribution curve for sharp sand and crushing stone

Table 1 Sieve analysis of sharp sand

Sieve size Mm	Weight retain G	% Retain	% Passing	Cumulative % retain	Cumulative %passing
4.75	82	163	10	82	10
2.36	54	27.0	30.55	45.5	40.55
1.70	17	8.5	25.56	54.0	66.11
0.60	35	17.5	16.11	79.5	82.22
0.425	17	8.5	11.11	80.0	93.33
0.30	16	8.0	6.67	88.0	100
Tray	24	12	-	100	100
Total	200	100			

$$\text{Fineness} = \frac{\sum \text{cumulative percentage retained}}{100} = \frac{357.5}{100} = 3.56\%$$

COMPRESSIVE STRENGTH TEST RESULT

Table1.2 Compressive Strength of Sandcrete Block on the 7th day of sample A

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	7	18.84	9200	92000	64500	1.43
2	7	18.20	6950	69500	64500	1.08

Source: Experimentation 2018

Table1.3 Compressive Strength of Sandcrete Block on the 14th day of sample A

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	14	18.32	7200	72000	64500	1.12
2	14	18.52	6900	69000	64500	1.08

Source: Experimentation 2018

Table 1.4 Compressive Strength of Sandcrete Block on the 28th day of sample A

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	28	17.83	7800	78000	64500	1.21
2	28	18.39	7300	73000	64500	1.13

Source: Experimentation 2018

Table 1.5 Compressive Strength of Sandcrete Block on the 7th day of sample B

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	7	18.92	4850	48500	64500	0.75
2	7	18.99	4350	43500	64500	0.67

Source: Experimentation 2018

Table 1.6 Compressive Strength of Sandcrete Block on the 14th day of sample B

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	14	18.41	8150	81500	64500	1.26
2	14	18.32	7150	71500	64500	1.11

Source: Experimentation 2018

Table 1.7 Compressive Strength of Sandcrete Block on the 28th day of sample B

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	28	18.44	9100	91000	64500	1.41
2	28	18.00	8700	87000	64500	1.54

Source: Experimentation 2018

Table 1.8 Compressive Strength of Sandcrete Block on the 7th day of sample C

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	7	17.53	5100	51000	64500	0.79
2	7	18.82	4300	43000	64500	0.67

Source: Experimentation 2018

Table 1.9 Compressive Strength of Sandcrete Block on the 14th day of sample C

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)

1	14	18.43	5300	53000	64500	0.82
2	14	17.64	8300	83000	64500	1.29

Source: Experimentation 2018

Table 1.10 Compressive Strength of Sandcrete Block on the 28th day of sample C

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	28	17.25	9100	91000	64500	1.41
2	28	18.11	9200	92000	64500	1.43

Source: Experimentation 2018

Table 1.11 Compressive Strength of Sandcrete Block on the 7th day of sample D

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	7	18.83	8000	80000	64500	1.24
2	7	18.82	9100	91000	64500	1.41

Source: Experimentation 2018

Table 1.12 Compressive Strength of Sandcrete Block on the 14th day of sample D

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	14	18.31	9900	99000	64500	1.53
2	14	18.58	10100	101000	64500	1.57

Source: Experimentation 2018

Table 1.13 Compressive Strength of Sandcrete Block on the 28th day of sample D

S/n	Age of Blocks	Weight of Blocks (kg)	Force of impact at failure (kg)	Load of Failure (N)	Area of Block (mm^2)	Load/Strength (N/mm^2)
1	28	18.66	9900	99000	64500	1.53
2	28	18.61	9800	98000	64500	1.52

Source: Experimentation 2018

Table 2 compressive strength test result for sample A (control) on the 7th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	1.43	0.17	0.0289
2	1.08	-0.23	0.0529
	$\sum X = 2.51$		$\sum(X - \bar{X})^2 = 0.0818$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{2.51}{2} = 1.26$N/mm^2

Variance, $\sigma^2 = \frac{\sum(X - \bar{X})2}{n-1} = \frac{0.0818}{2-1}$=0.0818

Standard deviation, $\sigma = \sqrt{\frac{\sum(X - \bar{X})2}{n-1}} = \sqrt{0.0818} = 0.286$N/mm^2

Table 2.1 Compressive strength test result for sample A (control) on the 14th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	1.12	0.02	0.0004
2	1.08	-0.22	0.0004
	$\sum X = 2.2$		$\sum(X - \bar{X})^2 = 0.0008$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{2.2}{2} = 1.1$N/mm^2

Variance, $\sigma^2 = \frac{\sum(X - \bar{X})2}{n-1} = \frac{0.0008}{2-1}$=0.0008

Standard deviation, $\sigma = \sqrt{\frac{\sum(X - \bar{X})2}{n-1}} = \sqrt{0.0008} = 0.0283$N/mm^2

Table 2.2 Compressive strength test result for sample A (control) on the 28th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	1.21	0.06	0.0036
2	1.13	-0.02	0.0004
	$\sum X = 2.29$		$\sum(X - \bar{X})^2 = 0.004$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{2.29}{2} = 1.15$N/mm^2

Variance, $\sigma^2 = \frac{\sum(X - \bar{X})2}{n-1} = \frac{0.004}{2-1}$=0.004

Standard deviation, $\sigma = \sqrt{\frac{\sum(X - \bar{X})2}{n-1}} = \sqrt{0.004} = 0.063$N/mm^2

Table 2.3 Compressive strength test result for sample B (control) on the 7th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	0.75	0.04	0.0016
2	0.67	-0.04	0.0016
	$\sum X = 1.42$		$\sum(X - \bar{X})^2 = 0.0032$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{1.42}{2} = 0.71\text{N/mm}^2$

Variance, $\sigma^2 = \frac{\sum(X - \bar{X})2}{n-1} = \frac{0.0032}{2-1} = 0.0032$

Standard deviation, $\sigma = \sqrt{\frac{\sum(X - \bar{X})2}{n-1}} = \sqrt{0.0032} = 0.0566\text{N/mm}$

Table 2.4 Compressive strength test result for sample B (control) on the 14th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	1.26	0.07	0.0049
2	1.11	-0.08	0.0064
	$\sum X = 2.37$		$\sum(X - \bar{X})^2 = 0.0113$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{2.37}{2} = 1.19\text{N/mm}^2$

Variance, $\sigma^2 = \frac{\sum(X - \bar{X})2}{n-1} = \frac{0.0113}{2-1} = 0.0113$

Standard deviation, $\sigma = \sqrt{\frac{\sum(X - \bar{X})2}{n-1}} = \sqrt{0.0113} = 0.1063\text{N/mm}^2$

Table 2.5 Compressive strength test result for sample B (control) on the 28th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	1.41	0.03	0.0009
2	1.35	-0.03	0.0009
	$\sum X = 2.76$		$\sum(X - \bar{X})^2 = 0.0018$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{2.76}{2} = 1.38\text{N/mm}^2$

Variance, $\sigma^2 = \frac{\sum(X - \bar{X})2}{n-1} = \frac{0.0018}{2-1} = 0.0018$

Standard deviation, $\sigma = \sqrt{\frac{\sum(X - \bar{X})2}{n-1}} = \sqrt{0.0018} = 0.0424\text{N/mm}^2$

Table 2.6 Compressive strength test result for sample C (control) on the 7th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	0.79	0.06	0.0036
2	0.67	-0.06	0.0036
	$\sum X = 1.46$		$\sum(X - \bar{X})^2 = 0.0072$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{1.46}{2} = 0.73\text{N/mm}^2$

Variance, $\sigma^2 = \frac{\sum(X - \bar{X})2}{n-1} = \frac{0.0072}{2-1} = 0.0072$

Standard deviation, $\sigma = \sqrt{\frac{\sum(X - \bar{X})2}{n-1}} = \sqrt{0.0072} = 0.0849\text{N/mm}^2$

Table 2.7 Compressive strength test result for sample C (control) on the 14th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	0.82	0.24	0.0576
2	1.29	-0.23	0.0529
	$\sum X = 2.11$		$\sum(X - \bar{X})^2 = 0.1105$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{2.11}{2} = 1.06\text{N/mm}^2$

Variance, $\sigma^2 = \frac{\sum(X - \bar{X})2}{n-1} = \frac{0.1105}{2-1} = 0.0968$

Standard deviation, $\sigma = \sqrt{\frac{\sum(X - \bar{X})2}{n-1}} = \sqrt{0.1105} = 0.1105\text{N/mm}^2$

Table 2.8 Compressive strength test result for sample C (control) on the 28th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	1.41	-0.01	0.0001
2	1.43	0.01	0.0001
	$\sum X = 2.84$		$\sum(X - \bar{X})^2 = 0.0002$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{2.84}{2} = 1.42\text{N/mm}^2$

Variance, $\sigma^2 = \frac{\sum(X-\bar{X})2}{n-1} = \frac{0.0002}{2-1} = 0.0002$

Standard deviation, $\sigma = \sqrt{\frac{\sum(X-\bar{X})2}{n-1}} = \sqrt{0.0002} = 0.014 N/mm^2$

Table 2.9 Compressive strength test result for sample D (control) on the 7th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	1.24	-0.09	0.0081
2	1.41	0.08	0.0064
	$\sum X = 2.65$		$\sum(X - \bar{X})^2 = 0.0145$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{2.65}{2} = 1.33 N/mm^2$

Variance, $\sigma^2 = \frac{\sum(X-\bar{X})2}{n-1} = \frac{0.0145}{2-1} = 0.0145$

Standard deviation, $\sigma = \sqrt{\frac{\sum(X-\bar{X})2}{n-1}} = \sqrt{0.0145} = 0.120 N/mm^2$

Table 2.10 Compressive strength test result for sample D (control) on the 14th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	1.53	-0.02	0.0004
2	1.57	0.02	0.0004
	$\sum X = 3.10$		$\sum(X - \bar{X})^2 = 0.0008$

Total number of sample, n= 2

Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{3.10}{2} = 1.55 N/mm^2$

Variance, $\sigma^2 = \frac{\sum(X-\bar{X})2}{n-1} = \frac{0.0008}{2-1} = 0.0008$

Standard deviation, $\sigma = \sqrt{\frac{\sum(X-\bar{X})2}{n-1}} = \sqrt{0.0008} = 0.028 N/mm^2$

Table 2.11 Compressive strength test result for sample D (control) on the 28th day

S/N	Load/Strength N/mm^2	$(X - \bar{X})$	$(X - \bar{X})^2$
1	1.53	0	0
2	1.52	-0.01	0.0001
	$\sum X = 3.05$		$\sum(X - \bar{X})^2 = 0.0001$

Total number of sample, n= 2

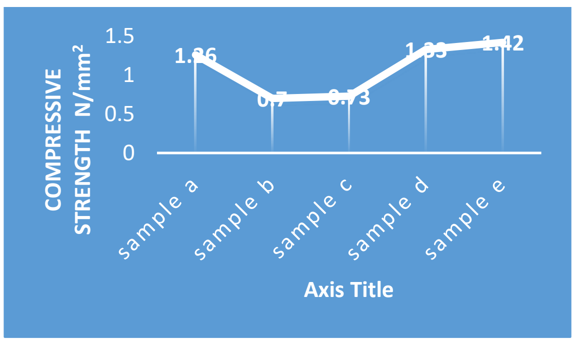
Mean compressive strength, $\bar{X} = \frac{\sum X}{n} = \frac{3.05}{2}$ = 1.53N/mm^2

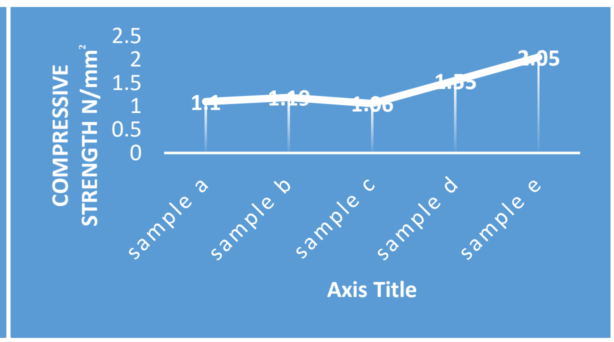
Variance, $\sigma^2 = \frac{\sum(X - \bar{X})2}{n-1} = \frac{0.0001}{2-1}$=0.0001

Standard deviation, σ = $\sqrt{\frac{\sum(X - \bar{X})2}{n-1}} = \sqrt{0.0001}$ = 0.01N/mm^2

Table 2.12 Compressive Strength Result

Days	SAMPLE A Control N/mm^2	SAMPLE B 5% Crushed Stone N/mm^2	SAMPLE C 10% Crushed Stone N/mm^2	SAMPLE D 15% Crushed Stone N/mm^2
7	1.26	0.7	0.73	1.33
14	1.1	1.19	1.06	1.55
28	1.15	1.38	1.42	1.53





DISCUSSION OF RESULT

The result show the summary of the compressive strength of hollow sandcrete blocks after curing and crushing in the 7, 14, 28 days. The compressive strength conducted on the sandcrete block for mix ratio (1:8) on the 7th day were 1.26n/mm^2, 0.71n/mm^2, 0.73n/mm^2 and 1.42n/mm^2, why the standard were also 0.286n/mm^2, 0.057n/mm^2, 0.085n/mm and 0.18n/mm^2 and the average mean strength for the three sample was 1.09N/mm^2. The compressive strength conducted on the sandcrete block on the 14th day were 1.1N/mm^2, 1.19N/mm^2, 1.06N/mm^2, and 2.05N/mm^2 why the standard deviation were also 0.028N/mm^2, 0.106N/mm^2, 0.332N/mm^2, and 0.34N/mm^2, and the average mean strength for the three samples was 1.39N/mm^2.

The compressive strength conducted on the sandcrete block on the 28th day were 1.15N/mm^2, 1.38N/mm^2, 1.42N/mm^2, and 1.52N/mm^2, while the standard deviation were also 0.063N/mm^2, 0.042N/mm, 0.014N/mm², and 0.113N/mm² and the average mean strength for the three samples were 1.4N/mm².

CONCLUSION

This research is to determine the compressive strength of sandcrete block of which the sharp sand has been partially replaced with crushed stone or granite fines in percentage. The replacement ranges from 0%, 5%, 10% and 15% (1:8) mix ratio. It undertook to study the quality of production through test and analysis in order to ascertain the compressive strength of hollow sandcrete block molded into shape from a mixture of sand, cement, and water.

The test carried out on the hollow sandcrete block on the 7, 14, and 28 day, shows that the inclusion of crushed stone in the sand cement enhanced the compressive strength of sandcrete block. Sandcrete blocks made with (1:8) mix proportion using 20% granite finest replacement gave optimum compressive strength of 6.86N/mm², and comply to Nigeria Industrial Standard NIS 87 (2004) standard for sandcrete blocks approved by standard organization of Nigeria (SON). This can be used in structural design where higher compressive strength is required, while the blocks produced using 15% crushed stone has 6.04N/mm², control has 4.6N/mm², 5% has 4.58N/mm², 10% has 4.22N/mm².

RECOMMENDATIONS

It is advocated that the Nigerian standard Organization and other affiliated bodies like the Nigerian Institute of Building (NIOB), Council of Registered Builder of Nigeria (CORBON), Nigerian Society of Engineers etc., should periodically monitor and have control unit that checks the production of various block industry across the country and any industry that fails to adhere to a given standard after warning shall be punished. A form of seminar and conference should be arranged from time to time by these organizations to update people's knowledge in the way of producing blocks for construction purpose.

REFERENCE

Adullahi, M. (2005): Compressive Strength Of Sandcrete Block In Bosso Andshiroro Areas Of Minna, Nigeria. AU.J.T 9(2) 126-131

Afolayan, J. O, Arum, C., & Daramola, C. M. (2008). Characterization Of The Compressive Strength Of sandcrete block in ondo state Nigerian, journal, of civil engineering research 4(22)34

Agbede I.O and Joel M. (2004), "Suitability Of Quarry Dust As Partial Replacement For Sanding Hollow Block Production" Nigeria Journal Of Engineering Research And Development 33-37

Agbede, I. O. And Manasseh, J. (2008): Use of Cement-Sand Admixture In Lateritic Brick Production For Low Cost Housing. Leonardo Electric Journal Of Practices And Technology,12,163-174. Akanya ,J .(2008). Government mobe to resotore to standard to block moulding .

Anosike, M. N And Oyebande, A. A., (2012): Sandcrete And Quality Management In Nigeria Building Industry. Journal Of Engineering, Project And Production Management. Vol.2, No 1,33-46

Baiden , BK and Tuuli, M (2004). Inpact of quality control practice in sandcrete lock production , journal of architectural engineering , 10(2) 55-60

Cement And Concrete Association, Australia. (2008): Guide To The Specification And use Of Manufactured Sand In Concrete. Cement And Concrete Association, Australia Research. 11^{th} – 15^{th} February, Salford, U .K.

Ilangovana, R., N., And Nagamannib, K. (2008): Strength And Durability properties Of Concrete Containing Quarry Rock Dust As Fine Aggregate. ARPN Journal Of Engineering And Applied Science. Vol. 3 No. 5 20-26

International Journal Of Engineering Science And Technology (IJEST), Vol. 3, No 7,5436-5440.

Lohani T. K., M., Dash K. P And Jena, S.(2012): Optimum Utilization Of Quarry Dust As Partial Replacement Of Sand In Concrete International journal Of Applied Science And Engineering Research. Vol.1, No Pp 391 – 404

Mahmoud, H., Hamma, H.A and Abba, H. A(2010): Compressive Strength Of Marketed blocks

Production In Yola, Nigeria. Journal Of Engineering And Applied Science. Vol.2 74-81

Manasseh, J. (2010) use of Crushed Granite Fine As Replacement To River Sand In Concrete production, Leonnard Electronics journal Of practice And Technologies, Issue 17, 2010. 85 – 96.

Nagpal, l. Dewangan, A., Dhiman, S. And Kumar, S. (2013): Evaluation Of Strength Characteristics Of Concrete Using Crushed Stone Dust As Fine Aggregate.International Journal Of Innovative Technology And Exploring Engineering (IJITEE) ISSN: 227 3075, Volume -2, Issue-6, 102 -104.

Norman, S.,(2008): Sand Solutions: Replacing Natural Sand in Concrete. Quarry, 24-26 Oyekan, G. L. And Kamiyo, O. M (2008): Effects Of Granite Fines On The Structural And Hygrothermal Properties Of Sandcrete. Journal Of Engineering And Applied Sciences. (9), 735-741.

Okere, C. E., (2012): Structural Characteristics of Soilcrete Blocks. Unpublished ph.D. Thesis, Civil Engineering Department, Federal University Of Technology,Owerri.

Olufisayo, A. A. (2013): Strength properties Of Commercially produced Sandcrete Block in Ado Ekiti, Akure And Ile Ife. International Journal of Engineering Science Invention. Vol.2, Issue 8.25-34.

Omoregie, A. (2012): Impact of vibration time on compressive strength of hardened sandcrete blocks .buildibg 2 153-172.