

THE OPPORTUNITIES IN A SMALL-SCALE SANDCRETE BLOCK-MAKING INDUSTRY IN NIGERIA: THE INGREDIENTS FOR SUCCESS

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Abstract

This paper highlights the huge opportunities in the small-scale sandcrete block making industry in Nigeria. It explains the ingredients whose understanding is necessary for engaging in the profitable and sustainable small-scale sandcrete block making business. These ingredients include the available resources, material requirements, the basic production and quality management practices, cost analysis and the key success factors. It is recommended that entrepreneurs and unemployed youths can consider the small-scale sandcrete block making industry as a means of engaging in profitable employment in Nigeria.

Keywords: Housing, sandcrete block, sand, cement, unit cost, self-employment

1. INTRODUCTION

Sandcrete block-making is the production of different sizes of “cement blocks,” from a right mixture of cement, sand and water. The sandcrete block-making business is a whole lot of activities involved in the process of producing, storing, distributing and selling of “cement blocks” which are used in the construction of buildings or similar structures, including the management of the entire process for a profit. The Bank of Industries of Nigeria (BOI, 2018) categorizes sandcrete block-making business among the ‘block “moulding [industrial] cluster;,” comprising all “industries directly involved in the construction of residential housing, commercial and industrial buildings, roadways and other physical structure.”

For the entrepreneur, the business of sandcrete block-making can easily spill over to other related product lines needed in the building and construction industry, such as interlocking tiles, concrete balustrades, concrete pillar covers, electric poles, and culvert rings, concrete pipes and so on. In this paper the terms “sandcrete block” and “cement block” mean the same thing and are used interchangeably.

According to a report quoting the Nigerian Minister of Finance, Mrs. Adeosun (Olanrewaji, 2018), Nigeria requires about 17 million additional housing units to meet her housing needs, amounting in financial terms to about NGN59.5 trillion going by estimate of the Federal Ministry of Lands, Housing and Urban Development (BOI, 2018). Given the proposition (by BOI) that sandcrete block makes about 90% of building construction blocks, and agreeing that people will continue to build new houses and that

housing and infrastructural development will remain indispensable to the government development efforts, the huge opportunity in sandcrete block making industry in Nigeria becomes obvious.

This paper aims to impact on the entrepreneurs, the unemployed youths and graduates with the important skills for a successful operation of a small-scale sandcrete making business in Nigeria. To accomplish the aim, the following important ingredients for engaging in a profitable small-scale sandcrete block making business in Nigeria are concisely explained under the following headings.

1. Resources Available for the Manager of a Small-Scale Sandcrete Block Industry
2. Estimating Material Requirement for Production of Sandcrete Blocks
3. Basic Production and Quality Management Practices for a Small-Scale Sandcrete block Industry.
4. Cost Analysis of a Small-Scale Sandcrete Block Production Industry
5. Key Success Factors

The facts presented in this paper are based on field study-involving sandcrete block industry sites’ visits and desk study-using documented materials. Prices used in the estimates in section 5 are market prices in June 2018 at Afikpo, Ebonyi State, Nigeria.

2. RESOURCES AVAILABLE FOR THE MANAGER OF A SMALL-SCALE SANDCRETE BLOCK INDUSTRY

In addition to land or business premises, a sandcrete block producer will require other key resources which can be broadly categorized as the 5Ms :- Materials, Machinery, Manpower, Methods and Money.

2.1 Land

Land or the premises used for a block making industry should be accessible both to customers and for supplies of raw materials. When possible it is preferable to acquire a land that is close to a main road and where water supplies can be guaranteed. Land may be acquired by a purchase, a lease or a rent agreement. However the agreement should not be done in a rush, because it is important to avoid encumbrances, and so to involve all the necessary stakeholders, such as family heads, community leaders, legal practitioners, government agencies, etc. The entrepreneur, especially a beginner, cannot afford unpredictable litigations after being duped or short-changed.

For the beginner, a land of 60 feet by 120 feet (18m by 36 m i.e. 648 square meter), or what we call a plot of land in Nigeria, can be ok. To facilitate operations, the premises can be partitioned into three (figure 2.1) to provide about 10% office/materials and equipment space, 40% sand dumping and block moulding space and 50% block packing space as shown. If possible the land premises should be clearly demarcated from the surrounding areas by any affordable means (wall, iron fence, wooden fence, etc. Separation of the business premises can reduce trespass by neighbours.

Office /materials/ equipotent space	Block packing- 50% of total space
Block moulding-- 40 % of total space	

Fig 2.1: sandcrete block making premises portioning

The premises should not be in swampy soil. Wet soil tends to slow down the process of moulding, drying, and packing of blocks, in addition to allowing sinking of vehicles that bring in raw materials or carry away blocks.

2.2 Materials

The raw materials for sandcrete block production are basically cement, sand and water. The sand can be sharp sand- collected from natural deposit sites or from deposits carried by runoffs of storm water on the ground, canal floor or stream bed. The sand collected from runoff deposit is usually referred to as “local sand” and it is usually darker in

colour due to presence of impurities. The block producer should consider availability of sand, customer demands (quality of blocks) and cost when deciding on the type of sand to use. Normally there is difference in prices between blocks produced using sharp sand and blocks produced using local sand. The producer/seller should be honest to the customers. Figure 2-3 is a picture of sandcrete blocks.



Fig 2.3: Newly moulded blocks (Sources: <http://land-for-sale-in-ogun-state.blogspot.com/2014/11/cost-of-making-blocks-vs-buying-blocks.html>. Accessed 09 July 2018)

It is important that the block manufacturer always monitors the supply of sand in terms of quantity and quality to avoid being cheated as such will impact negatively on output and profit.

Water can be obtained through rainfall harvesting, pumping from a river, sinking of own borehole or by purchase. An estimate of 15 litres of water per bag of cement (which corresponds to about 1: 0.5 cement to water ratio) can be used to calculate water requirements.

2.3 Machinery

The machinery consists of all the tools and equipment required for the production of sandcrete blocks. The tools include water tank/reservoir, wheel barrow, head pan, shovel, etc. The block-making equipment ranges from the manually-operated wooden block moulding device to the highly automated machines which can mix materials and produce high quality blocks (figures 2.4 -2.6).



Fig 2.4: wooden block mould



Fig 2.5: Semi-manual block making machine



Fig 2.6: Automatic block-making machine

Where affordable, tools and equipment may include distribution trucks; power generating set; public power installation; water borehole; transpallet; pallets and any other gadgets which are procured to facilitate management, production and selling of blocks. For optimum performance and long lifespan, all tools and equipment must be kept clean and be properly maintained.

2.4 Manpower

Manpower of the small-scale sandcrete block-making firm are all her employees, including the manager or the owner. It is important that all employees have defined roles and are qualified – in physical, academic and character terms -- for their respective duties. The block moulders in particular must be physically fit, cool-headed and ready to take instructions. It is also important for the manager to define the business objectives and communicate same to all employees. The inclination of the manager notwithstanding, the manpower objectives should ensure that quality remains exceptional, people perform well, resources are prudently managed and the industry is run profitably.

2.5 Methods

Methods encompass all tools and techniques for managing all resources, including the intangible resources such as time and goodwill. Methods therefore include production techniques, documentation techniques, selling and distribution techniques, accounting techniques and internal control system. Right method answers imperative questions from production to the selling of the sandcrete blocks. Method can answer such questions as: how many blocks can be moulded from 1 bag of cement? What is the unit cost of producing 1 block? How will the moulded blocks be stored?

How will the business account be kept? How can customers be gotten and retained? How can business integrity be maintained? Right methods can be acquired through education, experience, training/ workshops, and consultation.

2.6 Money

As a very important resource for a small-scale sandcrete block industry, money represents all funds required for smooth running of business operations. Sources of funds include personal savings, grants from benefactors (relatives, friends, government agencies, philanthropists, charitable organizations, NGOs, donor agencies, etc) and loans (from individuals, cooperative society, commercial banks, micro-finance banks, Bank of Industry, etc). It is very important for the young entrepreneur to be very careful while negotiating for loans, especially outside the formal banking system. Loans with high interest rates, compound interests, subjective interest margins or undue collaterals may do more harm than good.

The bank of industries (BOI) is established in Nigeria to assist businesses (especially the Small and Medium Scale Enterprises -SMEs) engaged in manufacturing and processing activities. The Bank of industry usually gives out loan starting from a minimum of NGN5 million but may give lower amounts under certain conditions. Interested entrepreneur can visit the Bank of Industry website (<https://www.boi.ng/> and <https://www.boi.ng/block-moulding/>) for more details.

To be able to access loans there will be need for registration of business name and maybe a requirement for provision of a business plan. The CAC (Corporate Affairs Commission) website (<https://services.cac.gov.ng/login>) can throw more light on the registration process-which is usually simple. There are also private business name registration agents, but one has to be sure of genuine ones. For business plan, there are many samples in the internet, and a fairly educated person can easily adopt one. Otherwise there are small firms who write business plans for a fee.

3. ESTIMATING MATERIAL REQUIREMENT FOR PRODUCTION OF SANDCRETE BLOCKS

Having taking the overview of the resources available to a small-scale sandcrete block making manager, this section explains the techniques of estimating raw materials requirements for commercial sandcrete block production. Figures 3.1 and 3.2 are the pictures of sand and cement which are the major raw materials for the production of sandcrete blocks. Figure 3.3 is a picture of a dump truck which supplies a measured quantity of sand.



Fig 3.1: A trip of sharp sand. (Source: <https://www.toilet.com.ng/blog/wp-content/uploads/2018/02/sand-1.jpg>)



Fig 3.2: A pack of cement bags.



Fig 3.3: A dump tipper with dump box dimension- 3000 x 1820 x 600mm
(source:https://www.alibaba.com/product-detail/Sinotruk-CDW-Dongfeng-Foton-Brand-Light_60444959145.html?spm=a2700.7724857.normalList.15.29ed5a12DP0ytb)

Ordinarily estimating the raw material quantities for production of sandcrete blocks is simple: knowing the block sizes and calculating the required quantity of sand, cement and water. However the unregulated nature of block moulding industry in Nigeria gives rise to the use of different standards by different block producers in the country. As a consequence, there exist sharp practices in sandcrete block production industry in Nigeria, whereby inferior (very low quality) blocks are deliberately produced in order to maximize profit.

Instead of producing the number of block sizes based on “cement to sand ratio,” blocks are made using “cement to block ratio.” A common question in the sandcrete block making industry in Nigeria is “how many blocks can be made from 1 bag of cement?” The professional question however, should be: “what mix ratio of cement and sand can be used to produce standard sandcrete blocks of the desired quality or required compressive strength?”

In estimating the material requirement for production of sandcrete blocks the professional approach is to use cement to sand ratio. However, without prejudice to compromising quality standards, the mix ratio will be varied in this paper up to a point where the prevailing quantities of blocks being produced from 1 bag currently in Nigeria are achieved. This is to expose the ratio being used to produce large numbers of blocks from 1 bag of cement in Nigeria so as to relate such ratios to expert recommendations. A cement to sand ratio of 1:7, 1:8, and 1:9 sandcrete are recommended by experts for good quality sandcrete blocks.

In Nigeria sandcrete blocks are in different sizes, the most common being 5” (125mm)-solid, 6” (150mm)-solid and hollow, and 9” (225mm)-solid and hollow.

Computation of material requirements in this paper are based on the production of 5” (125mm) solid blocks, but the computation method can be used for the production of other sizes.

Some pertinent questions that can be answered by the estimate of material requirements include: how many of a given size of blocks can be produced from 1 bag of cement; at what mix ratio? How many blocks can be produced from a trip of sand of known volume?

The mix ratio of 1:8 as specified by the Nigerian Industrial Standard, NIS 87: 2007 is used in the computation. Portland cement (of density of 1506kg/m³) in bags of 50kg and dry sharp sand is used. The volume of trip of sand depends on the capacity of dump box of a tipper truck.

Fig 3.4 is a diagram of a 5” (125mm) sandcrete block.

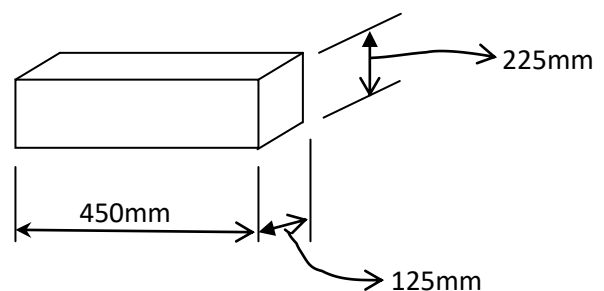


Fig 3.4: dimensions of 5” (125mm) sandcrete block in Nigeria

The following steps are followed in the determination of material requirements for the production of sandcrete blocks.

Step 1- Determine the volume of 1 bag of cement

Mass of 1 bag of cement, $m = 50\text{kg}$

Density of cement, $\rho = 1506\text{Kg/m}^3$

Volume of 1 bag of cement, $V = m/\rho$ ----3.1

Hence $V = 50/1506 = 0.033\text{m}^3$

(An alternative is to physically measure a cement bag directly and calculate the volume. One such measurement carried out in preparation to this paper yielded a dimension of 60cm x 12cm x 40 cm giving a volume of 0.028 m^3)

Step 2- Choose cement to sand mix ratio

In this computation we use the ratio of 1: 8, already explained.

Step 3- Compute the quantity of sand for mixing 1 bag of cement as follows:

Volume of 1 bag of cement = 0.03m^3

Mix ratio is 1:8

Therefore volume of sand = $0.03 \times 8 = 0.24\text{m}^3$

Step 4- Compute the volume of 1 bag of cement plus volume of sand required to mould block as:

$$\text{volume of cement + volume of sand, } V_{cs} = 0.03 + 0.24 = 0.27\text{m}^3$$

Step 5: Compute the volume of 1 block as follows:

$$\text{Volume of 1 block } B_v = \text{length} \times \text{width} \times \text{breadth} \text{ -----} 3.2$$

Referring to figure 4.4 for a 5" block'

Block volume, $B_v = 0.45 \times 0.125 \times 0.225 = 0.013\text{m}^3$

Step 6 Compute the number of blocks obtainable from 1 bag of cement as follows:

$$\text{Number of blocks, } N_b = V_{cs}/B_v \text{ -----} 3.3$$

Hence number of blocks (5") from 1 bag of cement @ 1: 8 mix ratio = $0.27/0.013 = 21$ blocks.

Number of blocks from other block sizes and mix ratios can be obtained using the same steps (1-6).

Now, number of 5" blocks can be estimated from a trip of sand from a dump (tipper) truck if the dump box volume is known.

Referring to the tipper on figure 4.3, as an example,

$$\text{Dump box capacity } D_b = 3 \times 1.82 \times 0.6 = 3.276\text{m}^3$$

Volume of cement to mould 3.276m^3 of sand from tipper @ 1: 8 mix ratio = $3.276/8 = 0.41$

Total volume of block solid material for tipper, $V_t =$ Volume of sand in dump box + volume of cement required to mould the sand = $3.276 + 0.41 = 3.685\text{m}^3$

$$\text{Number of Blocks} = V_t/B_v \text{ -----} 3.4$$

Hence number of 5" blocks @ 1: 8 mix ratio obtainable from a 3-ton tipper = $3.685/0.013 = 283$ blocks

Number of cement bags required to mould 283 blocks (5"@1:8 mix ratio) = $283/21 = 13.5$ bags

(21 is the number of blocks obtained from 1 bag of 50kg cement @ 1:8 mix ratio).

Using 1: 17 mix ratio, volume of cement to mould 3.276m^3 of sand = $3.276/17 = 0.193\text{m}^3$

Volume of sand and cement mixture = $0.193 + 3.276 = 3.469\text{m}^3$

Number of blocks = $3.469/0.013 = 267$ blocks

Number of cement bags = $267/42 = 6.5$ bags.

Note that the quantities of blocks obtained depends on the mix ratio and the volume of solid block, or :

Number of blocks = f (cement to sand mix ratio, volume of solid in the block).

So for a hollow block the volume of voids is not included in the calculation. A simple programme for calculating the number of sandcrete blocks that can be obtained from 1 bag of cement at a given block size and cement to block ratio is shown in table 3.1

Table 3.1: Programme for Calculating Number of Blocks Moulded From 1 Bag of Cement- Sample for 5” Solid Block

	A	B	C	D	E= C X D	F= D+E	G= F/A
type of block	Volume of solid (m ³)	Mix ratio	mix ratio factor	Volume of 1 cement bag (m ³)	volume of sand (m ³)	Volume of cement and sand (m ³)	Number of blocks
5" (0.45 X0.125 X0.225m)	0.013	1:8	8	0.03	0.24	0.27	21
5" (0.45 X0.125 X0.225m)	0.013	1:9	9	0.03	0.27	0.3	23
5" (0.45 X0.125 X0.225m)	0.013	1:10	10	0.03	0.3	0.33	25
5" (0.45 X0.125 X0.225m)	0.013	1:11	11	0.03	0.33	0.36	28
5" (0.45 X0.125 X0.225m)	0.013	1:12	12	0.03	0.36	0.39	30
5" (0.45 X0.125 X0.225m)	0.013	1:13	13	0.03	0.39	0.42	32
5" (0.45 X0.125 X0.225m)	0.013	1:14	14	0.03	0.42	0.45	35
5" (0.45 X0.125 X0.225m)	0.013	1:15	15	0.03	0.45	0.48	37
5" (0.45 X0.125 X0.225m)	0.013	1:16	16	0.03	0.48	0.51	39
5" (0.45 X0.125 X0.225m)	0.013	1:17	17	0.03	0.51	0.54	42
5" (0.45 X0.125 X0.225m)	0.013	1:18	18	0.03	0.54	0.57	44
5" (0.45 X0.125 X0.225m)	0.013	1:19	19	0.03	0.57	0.6	46
5" (0.45 X0.125 X0.225m)	0.013	1:20	20	0.03	0.6	0.63	48
5" (0.45 X0.125 X0.225m)	0.013	1:21	21	0.03	0.63	0.66	51

Source: field survey

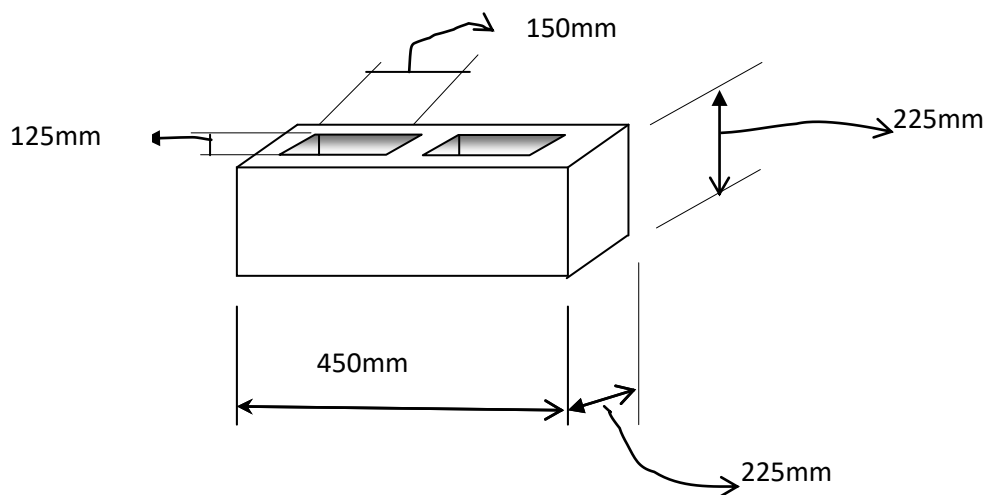


Fig 3.5: a sketch of hollow 9” (225mm) sandcrete block.

Figure 3.5 is a sketch of hollow sandcrete block mostly used in Nigeria.

Table 3.2 is a programme for calculating number of hollow 9” blocks that can be moulded from 1 bag of cement using different mix ratios.

Table 3.2: Programme for Calculating Number of Blocks Moulded from 1 Bag of Cement –Sample For 9” Hollow Block

	A	B	C	D	E= C X D	F= D+E	G= F/A
Type of block (hollow)	Volume of solid (m ³)	Mix ratio	Mix ratio factor	Volume of 1 cement bag (m ³)	Volume of sand (m ³)	Volume of cement and sand (m ³)	Number of blocks
9"	0.015	1:8	8	0.03	0.24	0.27	18
9"	0.015	1:9	9	0.03	0.27	0.3	20
9"	0.015	1:10	10	0.03	0.3	0.33	22
9"	0.015	1:11	11	0.03	0.33	0.36	24
9"	0.015	1:12	12	0.03	0.36	0.39	26
9"	0.015	1:13	13	0.03	0.39	0.42	28
9"	0.015	1:14	14	0.03	0.42	0.45	30
9"	0.015	1:15	15	0.03	0.45	0.48	32
9"	0.015	1:16	16	0.03	0.48	0.51	34
9"	0.015	1:17	17	0.03	0.51	0.54	36
9"	0.015	1:18	18	0.03	0.54	0.57	38
9"	0.015	1:19	19	0.03	0.57	0.6	40
9"	0.015	1:20	20	0.03	0.6	0.63	42
9"	0.015	1:21	21	0.03	0.63	0.66	44

The programmes in tables 3.1 and 3.2 can be run in Microsoft Excel worksheet and can calculate the number of blocks of any given size and mix ratio. It can be observed that at the mix ratio of 1: 8, one bag of cement can produce 21 and 18 blocks for a 5” solid block and a 9” hollow block respectively.

However in Nigeria at the moment some cement producers use one bag of cement to produce over 40 blocks for the 5”blocks and over 35 blocks for the 9” block. Unfortunately this attitude is the rule rather than the exception, and reflects on the prices of sandcrete blocks in the Nigerian open market. The consequence is the availability of low quality blocks at cheap prices. With no regulation and enforcement of standards in the block moulding sub-sector, the entrepreneur must operate with tact and wisdom to meet customer requirements, remain competitive and be profitable. The next section will examine production and quality management in a small-scale block industry.

4. BASIC PRODUCTION AND QUALITY MANAGEMENT PRACTICES FOR A SMALL-SCALE SANDCRETE BLOCK INDUSTRY.

Good production and quality management practices help the sandcrete block making business to have a competitive edge and remain profitable. Of course, quality control must go along with the production process, starting from the sourcing of raw materials to production, storage and distribution or selling of the sandcrete blocks.

The major raw materials –cement and sand – must be purchased from trusted people. It is a fact that people manually re-bag cement in Nigeria into bags of lesser weights than normal which they sell at the price of normal 50kg bags to unsuspecting customers. Sand should not contain humus; it should not contain coarse aggregates; it should be dry unless the producer agrees to buy wet sand a lower cost. The density of wet sand is higher than that of dry sand, so there will be loss in the volume of sand due to shrinkage. It is important for the block manufacturer to know exactly the cement to sand ratio to be used and ensure that moulders adhere to it. It is equally important to know the quantity of sand being purchased, for instance, the capacity of the tipper dump box.

As already indicated, sandcrete blocks can be mass-produced in the industry using technologies ranging from semi-manual to sophisticated automatic machines (figures 3.5 and 3.6). They can be also produced manually using simple wooden or steel moulds (figure 3.4). For large scale production the steel moulds are preferable. For manual production, moulds can be placed in a smooth floor or any suitable platform. The mould’s internal surfaces should be kept clean at all times to produce blocks with clean surfaces. Wooden moulds should be lubricate overnight with oil before use and subsequently wiped with a cloth after days of production.

Curing of the blocks should start 16 hours after moulding, by sprinkling water on the surfaces. The blocks can be removed and stacked after 48 hours of moulding, but

wetting with water should continue for the next 12 days. Wet blocks should not be placed against a wall to avoid cracks. The blocks should be dry after curing. Maximum drying is achieved when the blocks are stacked in lots with spaces in-between and exposed to winds. For hollow blocks, they should be stacked such that the voids lay horizontally to form a continuous passage for the air to circulate. The blocks should be stacked in such a way as to prevent free fall and allow for easy counting.

From a professional point of view it might be necessary for the block manufacturer to send samples of produced blocks to laboratories to determine the compressive strength. This will enable the producer answer questions about quality should the need arise. The range of strength of sandcrete block specified in the Nigeria Industrial Standard (NIS 87:2000) is between 2.5N/mm^2 to 3.45N/mm^2 .

5. COST ANALYSIS OF A SMALL-SCALE SANDCRETE BLOCK PRODUCTION INDUSTRY

5.1 Introduction

It is important for the block industry owner or manager to have a basic idea of cost estimation and analysis. There is no hard and fast rule. The producer of sandcrete blocks must

have a consistent and accurate method of calculating the inputs and the outputs of the business, especially to determine unit production cost of each batch of sandcrete blocks so as to set a competitive profit margin. An illustration is treated in this section.

5.2 Illustrative Example

Analysis of cost of producing sandcrete blocks from a trip of sand.

Basic assumptions: 5" solid block; 1 trip of local sand from a tipper; mix ratio 1:8; number of blocks from 1 bag of cement is 21. The result of the analysis is presented in table 5.1.

Table 5.1: Cost analysis for production of 5" solid sandcrete blocks using a trip of sand moulded at the cement sand ratio of 1:8

S/N0	DESCRIPTION	QUANTI	UNIT COST	AMOUNT (NGN)
1	Trip of sand	1	12000	12000
2	Bags of cement @1:8 mix ratio: Cost analysis for production of 5" solid sandcrete blocks using a trip of sand moulded at the cement sand ratio of 1:8	13.5	2400	32400
3	Water @ 15 litres/bag	202.5	0.4	81
4	Labour - molding bags	13.5	600	8100
5	Labour - stacking blocks	283	20	5660
6	Sub-total			58241
7	Add 10% overhead			5824
8	Total cost			64065
9	Cost per block			226

Source: field survey.

The cost analysis can be done in same manner for different mix ratios. For example Table 5.2 is a production cost analysis for moulding solid 5" blocks from 1 trip of sand at a cement to sand mix ratio of 1:17.

Table 5.2: Cost analysis for production of 5” solid sandcrete blocks using a trip of sand moulded at the cement sand ratio of 1:17

S/N0	DESCRIPTION	QUANTITY	UNIT COST	AMOUNT (NGN)
1	Trip of sand	1	12000	12000
2	Bags of cement @ 1:17 mix ratio	6.5	2400	15600
3	Water @ 15 litres/bag	97.5	0.4	39
4	Labour - molding bags	6.5	600	3900
5	Labour - stacking blocks	267	20	5340
6	Sub-total			36879
7	Add 10% overhead			3688
8	Total cost			40567
9	Cost per block			152

Source: field survey.

From tables 5.1 and 5.2 it can be observed that the higher the mix ratio, the lower the quantity of cement and lower the unit cost of producing blocks. However the lower is the quality of blocks produced. It is the lower cost of production that lures producers of sandcrete blocks to lower the amount of cement used to produce blocks, thereby increasing the mix ratio and obtaining more number of blocks from 1 bag of cement. Sandcrete blocks produced at higher mix ratios are usually weak and visibly sandy. Nevertheless lack of regulation allows many operators in the sandcrete block industry to gain undue competitive advantage by producing poor quality blocks and selling them at ridiculously low prices.

The question might arise: can a professional producer keep to the standard mix ratio, and remain competitive? Can the professional ignore ethics and produce poor quality blocks all the same? If there were regulation and enforcement of standards in the block moulding industry in Nigeria, the answers to these questions would not have been farfetched. A fact is that any business that satisfies standards but makes loses, especially where competitors freely lower such standards, cannot survive. However it is not all clients who want low quality blocks. Professional clients (e.g. engineers, builders, house developers, government contractors) may not usually like to buy low quality blocks. Often these professional clients carryout projects that require more number of sandcrete blocks than those of many individuals building houses to provide family shelter or become landlords.

The professional sandcrete block producer can target professionals as key customers. Also, as already mentioned, the producer should be honest with block customers in satisfying their requirements, and letting them understand the relationship between the quality of blocks and available range of price options.

6. KEY SUCCESS FACTORS

As in any other human endeavour, success is not absolutely assured in the sandcrete block making business. However success is usually achieved by those who work for it, those who seek and find the key success factors and manipulate them to their favour. In any endeavour, there are some key factors that should not be neglected. In the context of this paper key success factors are those important elements which are required by the sandcrete block producers to accomplish or exceed their desired goals. Some of these key success factors are listed below.

- Determination** – Believe you can succeed and continue to take actions. “Take the first decisive step, and another, and another, until the goal is reached, the ambition is realized, the mission accomplished” (Norman, V.P, 1987 p38).
- Record- Keeping**- Keep from the onset, records of all transactions and major decisions.
- Ahead of competitors**- Always study your competitors and know what goes on in the block moulding industry. Be ahead of competitors of your own size.
- Customer is King**-Make old customers “kings” while you solicit for new ones. Get close to builders, engineers, potential and wealthy men and women in your neighborhood. Do not neglect artisans like welders, bricklayers, plumbers, draughtsman, etc, for they can offer clue to new clients.
- Internal Control**- Inspect what you expect. Never assume that people are doing what you ask them to do. Recount your cement bags, recount your blocks, do so directly or indirectly.
- Quality of raw materials** - Purchase raw- materials from trusted sources.

- g) **Accountability** - Maintain separate account for your sandcrete block industry.
- h) **Good working environment**- Maintain a clean and safe working environment. Provide a conspicuous signpost in front of your business premises to let people know what you do. Do not allow your stacked blocks to be covered by moss or overgrown with shrubs. Customers will take you serious if your work premises looks business minded.
- i) **Uniqueness**- Be different. Be honest. Be quality-minded.
- j) **Meditation**- Commit your business to God. Pray always.

7. CONCLUSION

From the foregoing this paper has highlighted the opportunities and explained the ingredients for a profitable small-scale sandcrete block industry in Nigeria. These ingredients include the available resources, material requirements, the basic production and quality management practices, cost analysis and the key success factors. It is recommended that entrepreneurs and unemployed youths can consider the small-scale sandcrete block making industry as a means of engaging in profitable employment in Nigeria, and by so doing reduce unemployment and contribute to economic development of the country.

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