

Design, Construction and Testing Of a Multipurpose Brick/Block Moulding Machine

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ABSTRACT : *The provision of shelter is one the most basic demand of a Man all over the World. It is one the most important challenges a man faces in his life. The problem of good shelter varies from place to place. A good shelter provides, first and foremost Security and Privacy. In the developed world the problem is less pronounced, but in the developing nation like Nigeria, the problem of shelter is more pronounced. There is about eighteen (18) million housing units' deficit in Nigeria. One of the most important materials used for building of a shelter is block/brick, but majority of the people cannot afford these materials (blocks or bricks) due high cost. Therefore, the production of high quality and affordable blocks/bricks is paramount to solving housing problems in developing countries especially in Nigeria. Thus, this research focused on design construction and testing of a multipurpose machine that produces high quality blocks/bricks for low cost housing. That is, for low income communities/earners. The constructed motorized compressive earth brick (CEB)/block making machine can produce on average a total of 2,215 bricks per day and 950 blocks per day. The cost of production of the machine was two hundred and eighty six thousand, eight hundred ninety (₦286,890.00) naira only. Whereas, the most common high-tech motorized CEB machine in Nigeria (Hydraform®) with an average capacity of about 3,000 bricks per day costs about six million naira (₦6,000,000.00K) only. Thus, the machine is very affordable for small scale enterprise (SME). In other words, bricks or blocks produced by using this machine are relatively cheap and affordable for those in the rural areas and for low income earners.*

KEY WORDS: *Compressive Earth Bricks (CEB), Bricks, Blocks.*

I. INTRODUCTION

It is an undisputed fact that shelter is one of the basic human necessities. However, irrespective of the importance of shelter, most people do not have access to good shelter, most especially in developing countries. In fact there is an estimated deficit of between 17 and 18 million housing units in Nigeria in 2012. [1]. The poor are most adversely affected by this housing shortage. The most important building materials for low-cost housing are blocks/bricks [2], but conventional quality concrete blocks are too expensive for low-income communities. Due to high cost of Portland cement, a lot of block producers use less than the recommended amount in the concrete mix making the blocks to be substandard. This is one of the most important contributing factors for the frequent building collapse in the country recently. Bricks / Blocks are solid pieces of hard substances, usually with flat sides, used as construction units [3]. They are sometimes referred to as masonry units (MU). Block and brick masonry are strong, fire-resistant, insect-proof building materials. They have a lot of thermal mass, which helps them retain heat and makes up for their relatively low insulation value. However, despite their similarities, block and brick have some major differences: Blocks are bigger in size as compared to bricks; blocks are usually made of concrete and hollow, while bricks, on the other hand, are smaller usually made of clay or other earthen materials and solid [4]. Compressed Earth Brick (CEB) is an alternative building material to concrete blocks which have been proved to be an excellent substitute. However, the full potential of CEB is yet to be utilized due to the fact that most of the commercially available machines that produce CEB are very expensive. The most common CEB machine (Hydraform®) is sold at about six million Naira. There are simpler and cheaper low income brick/block producing machines.

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