

Design and Fabrication of Bricks Making Machine from Bio-Degradable Waste using for Horticulture

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ABSTRACT

This paper reports of design of manual block-making machine; it is a small fraction of a bigger research-study. the various components that make up the final design was done in order to establish the forces, stresses and dimensions. The provision of manure is one the most basic demand of a Farmer all over the World. It is one the most important challenges a farmer faces in his life. The problem of good manure varies from place to place. A good farmer provides, manure to the farm which gives good cultivation. In the developed world the problem is less pronounced, but in the developing nation like Nigeria and India, the problem of farmer is more pronounced. There is about million farmer units' deficit in Nigeria and India. Therefore, the production of high quality and affordable manure is paramount to solving farming problems in developing countries especially in Nigeria and India. Thus, research was about designing and construction of a multipurpose machine that produces high quality manure bricks for low cost farming. That is, for low income communities/earners. The constructed compressive earth brick (CEB)/block making machine can produce on average a total of 300 bricks per day. Thus, the machine is very affordable for small scale enterprise (SSE). Bricks or blocks produced by using this block machine are relatively cheap for those in rural areas and for low income earners.

Keywords: Compressive Earth Bricks, Bricks, Blocks, Bio-degradable waste.

I. INTRODUCTION

It is well known that proper and complete development is one of the most important issues in the world at present days, involves to build our communities in such a way that , we make an impact on the environment through how we survive our lives. In past years, the use of solid waste derived from agricultural products as extender in the manufacture of blended mixture of manure and soil has been the focus of researchers in the agriculture sector.

The Eco-bricks mission is to provide a highly economical solution to a waste problem while helping to curb a destruction of the local environment caused by clay quarries. The bricks are using 75% cow

manure. Eco-bricks claim that process will raise participating farmer income by 53% which will help to raise quality of life.

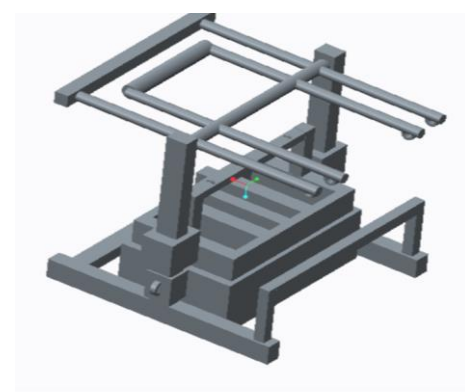


Figure 1. Design Model

II. LITERATURE REVIEW

[1]V.S.R. Pavan Kumar Rayaprolu et. al.(1) Presented result on study of cow dung ash (CDA) as supplementary cementing material in mortar and concrete. They highlighted the significance and necessity of consumption of these waste materials for the manufacturing of sustainable concrete for construction of green buildings in future.

[2]T. Omoniyi, S. Duna, et al.(2). They studied on the topic Compressive Strength Characteristic of Cow dung ash blended cement Concrete. This reports on an investigation into the use of cow dung ash as Supplementary Cementitious Material in concrete. Cement was replaced with cow dung ash up to 30% at 5% interval. Setting times and slump test were carried out on the fresh cement/CDA blended paste and concrete respectively.

[3] Peter Paa-Kofi Yalley, (3)he studied and research on the topic based on Strength and Durability Properties of Cow Dung Stabilized Earth Brick. This research, reports on the investigation into the strength and the durability properties of earth brick stabilized with Cow dung. A local earth was stabilized chemically by Cow dung. A best compressive strength at the dry state and after 15 minutes of immersion in water was obtained with cow dung stabilization at content of 20% by weight of earth. Bricks stabilized with 20% Cow dung contents by weight of earth has a dry and wet compressive strength of 6.64 and 2.27MPa respectively.

III. METHODS AND MATERIAL

Methods

- Pick up dry manure (cow dung , worm compost, sludge) in Pan using a spade and mixing the soil with the addition of water and properly mixing it.

- After mixing the dry manure , farming soil and water together the obtained mixture is then put into moulding blocks for making bricks
- After filling up the blocks the punching press is done over it.
- After punching the manure mixture the punch is unloaded and then the tray is pulled off.
- The wet bricks is then kept in the open air with sunlight and as soon as the bricks get dry it Will form the stiff and easy to break bricks.

IV. EXPERIMENTAL SET-UP



Figure 2. Punching plate



Figure 3. Moulding block



Figure 4. Brick moulding equipment.

V. CHEMICAL COMPOSITION OF MANURE (COW DUNG)

Table 1

Elements	Na	K	Ca	Mg	P	N	Zn
Percentage	.08	.3	1	.48	.84	1.37	286

VI. RESULTS

- ✓ On the basis of results obtained, the compressive strength vary with certain relation with the percentage of manure, soil and water in it, so we conclude that specimen soil 15% is best suitable
- ✓ The optimized mixed proportion is Manure 75% , Soil 15%, water 10% is best suitable to form brick.
- ✓ It is use for easy transportation and it is also use to provide compress and maximum quantity of manure in a sack to the farmer.



Figure 5

VII. CONCLUSION

Manure brick making machine can be produced from locally available mild steel to meet the specifications of imported Brick making machine. The moulded bricks are reasonable strong, hard, easy to break for farming purposes and environmental friendly. Thus, they are suitable for use for Farming , Horticulture and compress the manure waste or biodegradable waste

VIII. REFERENCES

- [1]. VSR.Pawan Kumar Rayaprolu et al, "Incorporation of Cow dung ash to motor and concrete", International Journal of engineering research vol.2 ,issue 3,may-june 20 2,pp-580-585.
- [2]. T. Omoniyi, S. Duna, et al,"study of plastic dust brick made from waste plastic", International Journal of mechanical and production engginering vol 5 issue- 0,oct-20 7.
- [3]. Peter Paa-Kofi Yalley,"use of waste and low energy material for construction" vol 2 oct-2008
- [4]. R.S. Khurmi, "Applied mechanics Strength of Materials", S. Chand & Company Ltd., Ram Nagar, New Delhi 0-055, (2005)
- [5]. R.S. Khurmi and J.K. Gupta, "A textbook of machine design" , Eurasia Publishing House Ltd., Ram Nagar, New Delhi, (2004).
- [6]. Soraj Kumar Panigrahi, Kommula Venkata Parasuram and Clever Ketlogetswe, Design and Development of Low cost Brick making

machine for producing Fly-ash- sand-Cement Bricks.

- [7]. R.Nithiya , Chris Anto . L, K.R. Vinod (2008) , Experimental investigation on bricks by using various waste materials".
- [8]. Ashby, M.F. (2005): Materials Selection in Mechanical Design, 3rd Edition, ELSEVIER Butterworth-Heinemann Publications,
- [9]. Autodesk Inventor, 20 6 (professional edition) Barkanov, E. (200). Introduction To The Finite Element Method, Institute of Materials and Structures, Faculty of Civil Engineering, Riga Technical University.
- [10]. Masonry units Concrete block Association, 2006, February. BS 5628:2005 – Code of practice for the use of masonry
- [11]. Shigley's Mechanical Engineering Design (8th edition), McGraw-Hill's, 054 pp. {ISBN 0-390-76487-6} Burdekin F. M., (2007) Generalizing the safety factor approach, Reliability Engineering and System Safety, pp. 964-973. Crespi, V., Galstyan, A., & Lerman, K.(20) Top–Down vs Bottom–up Methodologies in Multi–Agent System Design