ANALYSIS OF VARIOUS BRICKS BY MANUAL BRICK MAKING MACHINE

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Abstract

A shelter is a basic architectural structure or building that provides protection from the local environment. Having a place of shelter, of safety and of retreat, i.e. a home, is commonly considered a fundamental physiological human need, the foundation from which to develop higher motivations. One of the most materials used for building of shelter is block/bricks, but majority of the people cannot afford these materials (blocks or bricks) due to high cost.Normally Bricks are made up of wooden mould box with more Human efforts. It depends upon the weather condition and Manpower. Thus, this research focused on manual brick making machine that produces high quality bricks for affordable cost housing.

Keywords: *Bricks, Housing, Manual*

Introduction:

Buildings serve several societal needs – primarily as shelter from weather, security, living space, privacy, to store belongings, and to comfortably live and work. A building as a shelter represents a physical division of the human habitat (a place of comfort and safety) and the outside (a place that at times may be harsh and harmful).Ever since the first cave paintings, buildings have also become objects or canvasses of much artistic expression. In recent years, interest in sustainable planning and building practices has also become an intentional part of the design process of many newbuilding. Naturalbuildings a range of building systems and materials that place major emphasis on sustainability. Ways of achieving sustainability through natural building focus on durability and the use of minimally processed, plentiful or renewable resources, as well as those that, while recycled or salvaged, produce healthy living environments and maintain indoor air quality. Natural building tends to rely on human labour, more than technology.

The materials common to many types of natural building are clay and sand. When mixed with water and, usually, straw or another fibre, the mixture may form *cob* or *adobe* (clay blocks). Other materials commonly used in natural building are: earth (as rammed earth or earth bag), wood (cordwood or timber frame/post-and-beam), straw, rice-hulls, bamboo and stone. A wide variety of reused or recycled non-toxic materials are common in natural building, including urbanite (salvaged chunks of used concrete), vehicle windscreens and other recycled glass. Other materials are avoided by practitioners of this building approach, due to their major negative environmental or health impacts. These include unsustainably harvested wood, toxic wood-preservatives, Portland cement-based mixes, paints and other coatings that off-gas volatile organic compounds (VOCs), steel, waste materials such as rubber tires in regions where they are recycled, and some plastics; particularly polyvinyl chloride (PVC or "vinyl") and those containing harmful plasticizers or hormone-mimicking formulations.

Keywords: Natural building, Design, Materials

Working procedure:

Initially we planned to create a prototype of manual bricks making machine by using thermocol with various parts included and to construct where originated machine .

The prototype with various single parts were as to make a machine us

* Frame

*Hopper

*Mould

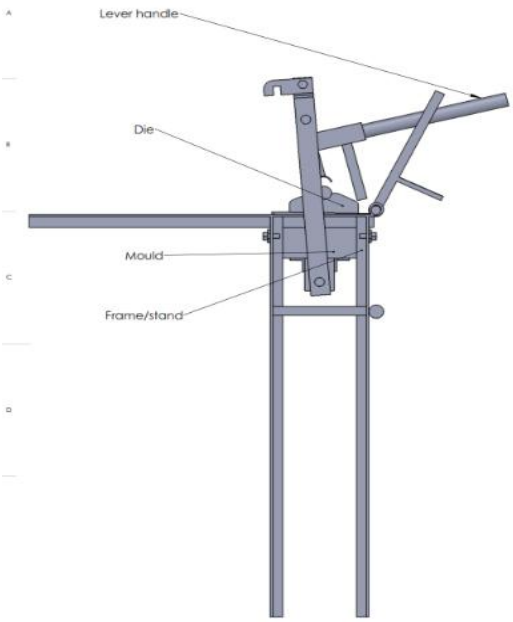
*Die.

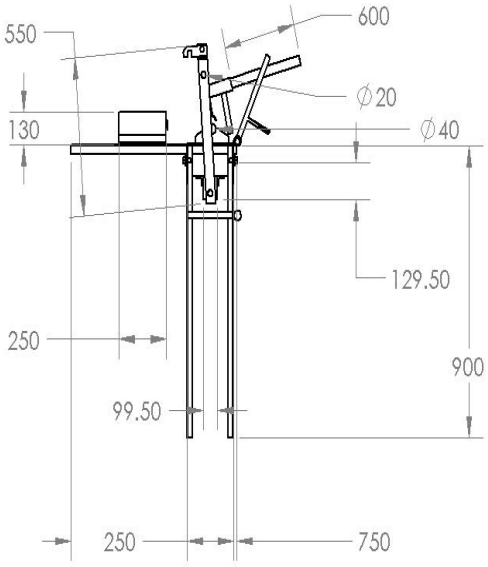
*Handle lever

*Handle

constructing a prototype accurate dimension was done and to check the working method with assumptions we made it .Design calculation of the mould box for the ejection of wet bricks the machine frame the support the bulk of the entire structure next we have planned to create our model in CAD modelling software .

Modelling: Solid Work 2017





Materials and methods:

PROPERTIES OF MILD STEEL

PHYSICAL PROPERTY

1. Density- 7860kg/m^3

2. Thermal conductivity - 63 W/m K

CARBON CONTENT

Low Carbon (or) Mild steel – 0.15% to 0.45 % carbon

MECHANICAL PROPERTY

1. Elasticity

2. Ductility

3. Toughness
4. Weld ability

In our design, screwed spindle have a main part hence the calculation are concentrated on it

OPERATION INVOLVED

1. Facing (Flat surface)
2. Gascutting (plate)
3. ArcWelding
4. Drilling

Fabrication process:

Material Used: Mild Steel

S.NO	COMPONENT	DESCRIPTION	EQUIPMENTS/TOOL USED
1	Frame	6*35*900 mm(4 No's for 4 sides) and 6*35*750 mm(2 No's for 2 sides)	Gas cutting and Grinding
2	Mould box	10*120*130 mm (2 No's of plates) and 10*130*250 mm(2 No's of plates)	Gas cutting ,Grinding and Arc welding
3	Die	20*99.5*129.5 mm	Gas cutting ,Grinding and Arc welding
4	Handle lever	10*40*600 mm	Gas cutting ,Grinding and Arc welding
5	Mould Cover	10*25*265 mm and Solid round dia =40 *110mm	Gas cutting ,Grinding and Arc welding
6	Nut & Bolt	Nut dia = 10 mm and Bolt dia = 20 mm	

Cement Block Composition:

Sl.No	**Materials/ Substances**	**Amount/Quantity**
1	Normal sand	1kg
2	Crusher Sand	2kg
3	Chips	250g
4	Water	400ml
5	Cement	600g
6	Extra mixing fluid	0.35 ml

Cement Block:

Design calculation:

DESIGN OF SHAFT

Diameter: 20 mm

Length : 200mm

Shaft subjected to Torsional

SHEAR STRENGTH

Load = 5Kg = 49.05 N

Area= $\frac{\pi}{4}D^2$

$=\frac{\pi}{4}(20)^2$

$= 314.15mm^2$

Shear stress, $\tau = \frac{\rho}{A}$

$= \frac{49.05}{314.05}$

$= 0.1561 {}^{N}/_{mm^2}$

Design of the welded joints

Arc welding was used for the welding parts joined. Tensile strength of the joints was calculated for using the relations

Area = weld length * weld size

Stress = Load / Weld area

Cement Block Test:

Equipment used: **Universal Testing Machine**

Equipment Specification:

1. Maximum loadcapacity: 1000 KN

Test Readings:

Size :100* 900*130mm

SL.NO	SPECIMEN	MAXIMUM LOAD CAPACITY (KN)	COMPRESSIVE STRENGTH (N/mm2)
1.	Cement Block	80	6.83
2.	Cement Block	90	7.69
3.	Cement Block	60	5.13
	Total Average Value		=6.55 N/mm^2

Where,

Compressive Strength = **Max.load Capacity/Projected Area of the Specimen**

1. Visual Inspection Test:

In this test bricks are closely inspected for its shape. The bricks of good quality should be uniform in shape and should have truly rectangular shape with sharp edges.

2. Hardness Test:

A good brick should resist scratches against sharp things, so for this we tested our cement block bricks by using a sharp tool or finger nail are used to make a scratch on brick. If there is no scratch impression on brick then it is said as good quality brick.

3. Colour Test:

A good brick should possess bright and uniform colour throughout its body.

4. Soundness Test:

Soundness test of bricks shows the nature of bricks against sudden impact. In this test,2 bricks are chosen randomly and struck with one another. Then sound produced should be clear bell ringing sound and brick should not break. Then it is said to be a good bricks.

Traditional Method of brick making:

1.More man power required.

2. Firing of bricks

3.More time consumption

4.Occupying more number of spaces.

5. Wastage of Bricks is high.

6. Surface finishing of bricks is not good.

7. Consuming more operation and time.

8. OriginalSize of bricks has been reduced after firing process.

Advantages:

1.Time consumption

2.Less Man power is required

3.Overall weight has been reduced

4.Capital cost of machine is reduced

5. Composition of brick is easily available.

6. No need of electricity.

7.Human compression is enough to make a brick rather than hydraulic devices.

8. Interlocking bricks can also be made by replacing Die.

9. All types of bricks should be made by this machine.

10. Good surface is obtained.

Conclusion:

1.We focused on design construction of a Manual Brick Making machine that produces high quality blocks/bricks for low cost housing.

2.This machine is very affordable for small scale enterprise (SME).

3.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.

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