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Design and Fabrication of Clay Bricks Machine

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Abstract: ***Clay brick played vital role in constructing area since ancient times for walls and columns. Source of soil and fossil fuel which is basic requirement, this are found in villages. Burning method improves the quality as well as properties of bricks. But in order to increase a production rate we have to use a mechanical linkage. For that we are going to built model of clay bricks machine which can produce 12 bricks at a time. This includes automated filling and levelling of surface of clay, bricks mould mechanism, sliding hopper. This will helpful due to increased demands of quality and low cost.***
Keywords: clay mould, clay bricks, mechanism, sliding, hopper.

I. INTRODUCTION

INDIA is 2nd largest brick producer after China and the largest 'soft-mud brick producer' in the world As India leading as developing country, so industries started automation in each their product. As clay bricks are economical than cement blocks and most of Indian people like to manufacture bricks by hand moulding, but its rate of producing of bricks is lower than that of producing by using industrial automation. Cost of automation is not economical for common man who is going to produce bricks. For that we are going to manufacture semiautomatic clay bricks machine in which filling of clay into the moulding by box is done by using automatic moving hopper. Clay which is present inside the hopper is kept rotating with the help of motor. Once we filled clay inside mould boxes then levelling of excess wet soil is done with the help levelling mechanism. For lifting a mould box a proper mechanism with handle is fixed. Generally clay bricks are more stronger, more enduring, and are considerably less prone to fire attacks.[3] They can sustain the most severe service conditions in building applications area as well as other engineering sector [2]. Machine which is to be designed and fabricated will not only more useful but also economical for common person. in this machine, there are twelve compartment for moulding. The time taken for producing twelve bricks will be same as that of the time used by an automated one to produce equal number of bricks, which shows that favourable efficiency. Therefore, we can use the clay bricks fabricated machine for mass production of clay [1].

II. LITERATURE REVIEW

S.K. Kolwale et al [2013] they designed and fabricated clay moulding machine which was producing four bricks at a time. They used clay with water for making a paste for filling clay mould boxes. Also they were tested this machine for one hour and they found that an average of 40 bricks were manufactured.
Mamta B. Rajgor et al [2013] developed a comparative study for governing the rate of bricks .Their study has included development of automated and rabotized construction . for that they developed fully automated bricks machine.

III.DESIGN CONSIDERATION

There are two major considerations while designing the clay bricks machine

A. External parameters

The most important external factors which are to be considered while designing the clay bricks machine are as follows: *Clay*
Clay is main parameter while producing a bricks. It should be easily available with its required properties in proper amount.

1) iron oxide with 5-6% give white to cream or buff colours, when its content get increases between 8 and 10% colour changes to pinks and reds.
2) Manganese with 1 to 4%, a range of grey and brown colours can be appeared also it decrease shrinkages.
3) Alumina with 20-30% give a plastic mass of when mixed with water; that can be shaped by pressure to form a brick
4) silica with 50-60% in plastic clay minimizes excessive shrinkage and defects in the structure in the temperature range of 1000^0c to 1200^0c.[5]

B. Design parameters

According to the various external factors and design requirements, the following parameters are calculated.

1) Outer frame dimension – 1075mm * 1425mm

2) Moulding box frame – 92mm * 34mm
3) Each box dimension – 230*115*80mm
4) Pipe diameter – 20mm
5) Thickness of casing – 2 mm

IV. WORKING PRINCIPLE

At starting moulding boxes are rest at plane ground and then clay is filled in that boxes with the help of hopper. Hopper that run on sliding mechanism and mixing of clay is done by screw type conveyor. Then levelling is done by linkage guided level rod it removes the excess soil above the moulding boxes. Once levelling is done then moulding boxes are lift and deep in water to remove clay that stick on boxes and then once again the operation is repeat. Bricks which produced are wet so removal of water becomes necessary for that drying and kilning process are used.

After production drying is done in sun energy up to 4-5 days to remove the water from brick. After drying collection is done and then firing is done in kiln.

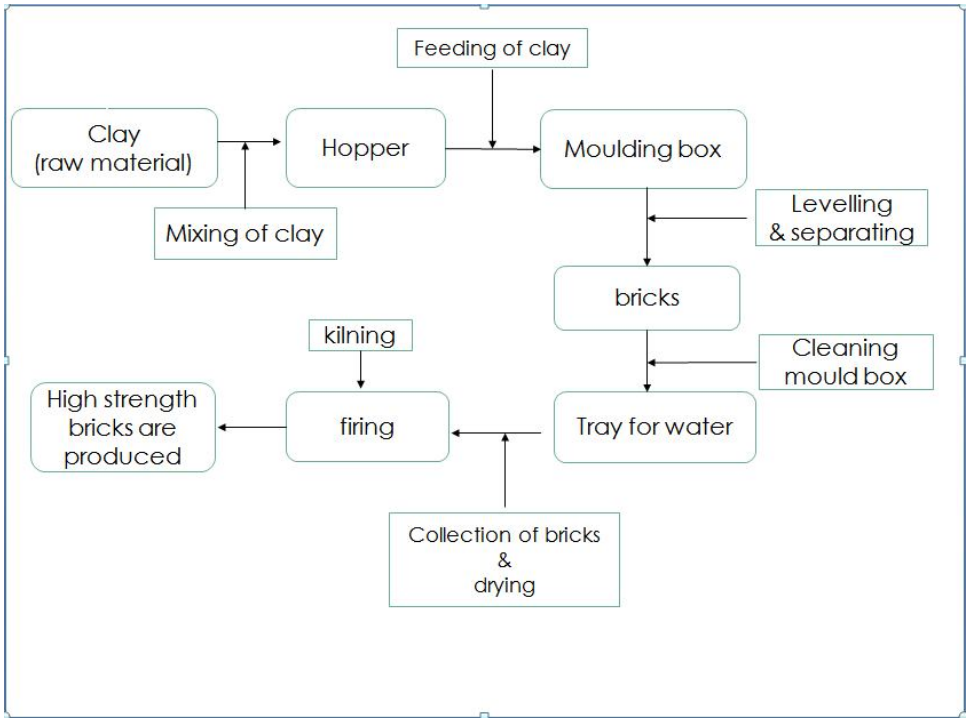

Fig 4 Block diagram for clay bricks machine.

V. COMPONENTS

In Clay bricks manufacturing machine once clay is fed into the moulding box, some vibratory motions are provided. So that clay will remains in moving conditions. When time comes to pour clay into the moulding boxes it's become easier. This machine has many parts which parts for mixing, feeding, levelling, cleaning.

A. Moulding box

Moulding box is a main component in clay brick machine. This is linked with a side strip members on both side. It moves with the four bar chain mechanism. During particular time period hopper is feed forward in order to fill the moulding box. Once box is filled with clay. Then the moulding box is ready to lift with handle provided to that mechanism with proper rectangular shape of bricks. Each box of bricks is made with the dimension of 23cm*11.5cm*8cm which is mostly used in rural areas. 14 gauge galvanised steel sheet is used for manufacturing.

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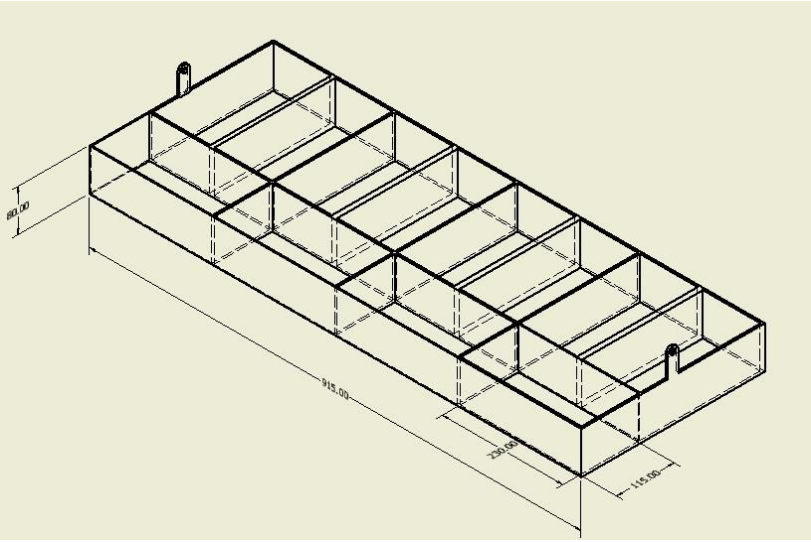

Fig. 1 moulding box

B. Hopper

Hopper is component having taper like structure who's top end as well as bottom end having rectangular section. it having a dimension of 32* 10 inches and 32*4 inches at top end and bottom end respectively. It's used to mix the clay with proportional amount of water to form a paste. To get united hopper kept in rotating motion. 18 gauge galvanised steel sheet is used for manufacturing.

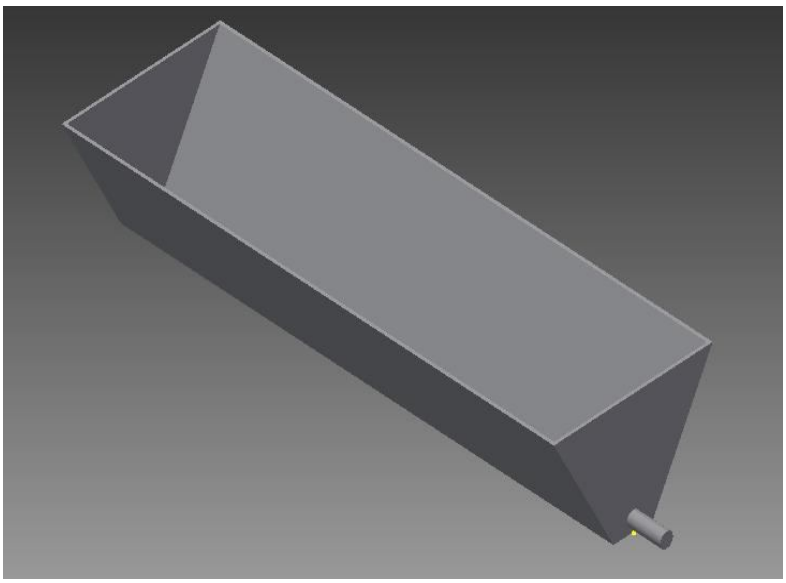

Fig. 2 Hopper

C. Water containing tray

It contains the water in which moulding boxes are going to deep in order to remove excess clay which was adhered to wall of mould. It used to deep moulding boxes in water to wash the used moulding boxes. 18 gauge galvanised steel sheet is used for manufacturing. It having a simply rectangular section with a dimension of 100*40*15cm

D. Linkage mechanism

It use to lift the moulding boxes with handle. As shown in fig. 3. two strips are used vertically who's one end is connected to moulding box. and other to strip which connecting to horizontal pipe other end to vertical strip. So when handle push down moulding box get lifted upward.

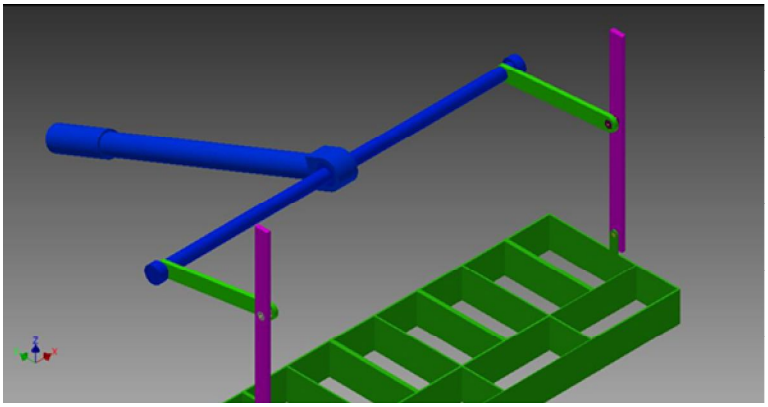

Fig.3. Lifting mechanism

E. Levelling mechanism

When moulding boxes are filled with clay, the excess amount of clay is removed by this mechanism. In this a straight strip with same length of moulding box is used. It remains in idle position while no filling.

VI. CONCLUSION

Clay bricks machine can be manufactured from available material like mild steel to meet the specifications of machine. The moulded bricks are reasonable strong, hard, and environmental friendly. Thus, they are suitable for use for pavements, walls and other structural purposes.

VII. ACKNOWLEDGMENT

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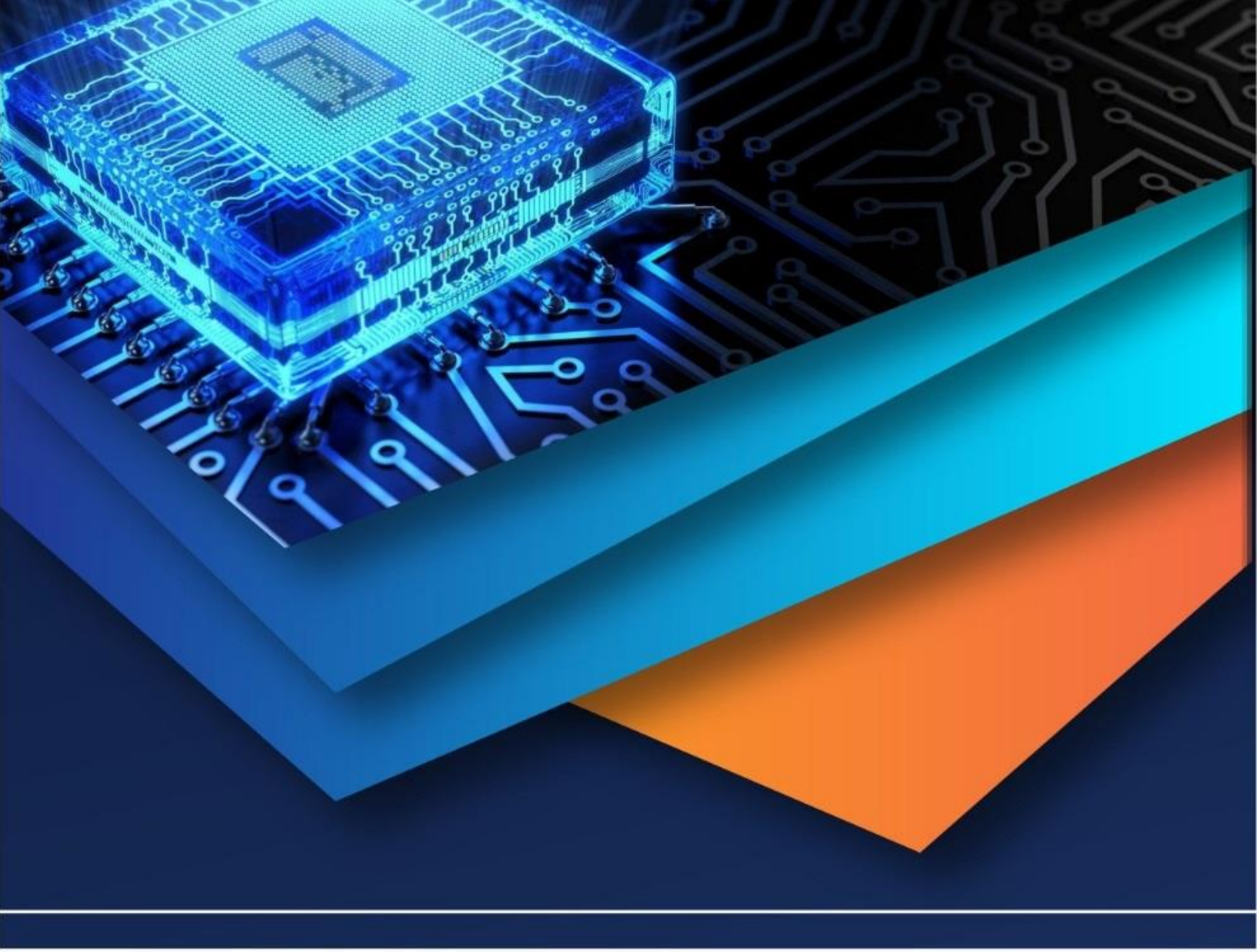
REFERENCES

[1] S.K. Kolawole and J.K. Odusote, “Design, Fabrication and Performance Evaluation of a Manual Clay Brick Moulding Machine” November 2012
[2] B.C. Harray, “Clay bricks production’’, Eyre and Spottiswood Publications Ltd. 5th Edition, pp 221-233, (1992).
[3] F.R.R. Ayala, Fabian Rene "Mechanical Properties and Structural Behaviour of masonry at Elevated temperature" University of Manchester,2010
[4] Mamta B. Rajgor 'Products Automation in Clay and Thermal Industry Waste" Volume 4 Issue7- July 2013
[5] shodhganga.inflibnet.ac.in Chafter-3 "MATERIAL PROPERTIES OF STRUCTURAL MASONRY"



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