

Design and Fabrications of Dung Log Making Machine

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Abstract: This paper presents automatic cow dung log making machine. Cow dung logs used as fuel for many purposes such as cooking, heating boilers, chambers and many other purposes. The main aspect is to automate the cow dung log making process. The purpose of study is to replace manual production to semi-automated process and also to increase production rate. The advantage of the process is to increase the production rate of cow dung logs and bhasma at minimum runtime of machine with respect to the environmental condition.

Keywords: Cow Dung Log, Electric Motor, horizontal vertical spiral, conical output, hopper, mixing blade.

I. PROBLEM STATEMENTS AND OBJECTIVE

Cow dung logs used as fuel for many purposes such as cooking, heating boilers, chambers and many other purposes. The main aspect is to automate the cow dung log making process. The purpose of study is to replace manual production to semi-automated process and also to increase production rate. The advantage of the process is to increase the production rate of cow dung logs at minimum runtime of machine with respect to the environmental condition.

II. METHODOLOGY

Firstly take required amount of cow dung preferably 2-3 days old because the moisture content in the dung decreases. Add binders in the cow dung, we have added charcoal to decrease the moisture content in it. The ratio of cow taken and the coal added can be taken according to the moisture content in the dung. For example for 70% of cow dung add 30% of charcoal powder. Now, pour the mixture in the hopper. The mixing blades in the hopper mixes the mixture properly. The mixing blades rotate with the help of sprocket and chain arrangement.

As the mixing blades rotate the mixture is pushed down in the vertical cylinder. In the vertical cylinder the vertical spiral present in it compresses the mixture and passes the mixture in the horizontal cylinder. A horizontal spiral is provided in the horizontal cylinder which pushes the mixture further to the conical shape outlet.

Conical shape outlet is provided in order to remove the remaining moisture content in the mixture because as the mixture is passes through it the mixture also gets compressed and the bonding between the particles in the mixture is increased, which increases the log strength. A rod is provided in the conical outlet in order to make the log hollow from inside. The purpose of making the log hollow is to make the drying process of the log easy.

III. MODIFICATIONS

A) HOPPER:

As in traditional machines the hopper generally has square shape opening for pouring the mixture. This is the most general shape used today. Ramming is to be done from time to time to push the mixture inside the cylinder. The ramming is to be done manually with the help of man power. The ramming should be consistent so that the mixture is fed properly in the grinding unit and the log can be formed properly without breaking.

Modification done in this machine is that the shape of the hopper is taken as conical so that the mixture can easily slide down into the cylinder for further process. The mixture does not stick to the surface of the conical hopper as it has low frictional resistance due to the shape.

B) MIXING BLADE:

To avoid the problem of ramming mixing blades are provided inside the hopper which rotates as the machine is started. The blade angle depends upon the diameter of the cone and may vary according to the shape and diameter taken in various machine designs. The blade is taken such that the blade should not touch the surface of the hopper.

The blade rotates with the help of the sprocket arrangement. Chain is provided on the sprocket to transmit the power to the mixing blade. Bevel gear arrangement is used to take the power from the gear box. Bearings are used for free rotation and to lower the friction. When the mixture is mixed with coal or clay or other binders it is poured inside the hopper. The mixture is mixed with the help of the mixing blade and the mixture slides down in the grinding unit.

C) VERTICAL SPIRAL:

In general machines there is only one horizontal spiral in the grinding unit. Modification in this machine is that a vertical spiral is provided just below the hopper inside the vertical cylindrical portion. The spiral is attached to the mixing blade rod. The blade and the spiral rotates at the same speed. The purpose of spiral is to push the mixture into the horizontal cylinder. The vertical spiral also compresses the mixture so that the mixture particles get bonded properly forming a mixture suitable for the log. An oiling chamber is provided on the vertical spiral cylinder for maintenance and oiling the spiral for proper working.

D) CONICAL OUTLET:

In some machines the outlet for log formation may be cylindrical, square shaped, rectangular etc.as per convenience of the user.

In this machine we have provided a conical shape outlet so that the mixture gets compressed and the bonding between the particles should be increased giving some strength to the log. Conical shape also decreases the water and moisture from the mixture to some extent. A rod of 6mm diameter is provided between the conical section outlet to make the log hollow from inside so that the log can dry easily.

IV. RESULTS AND FINDING

For fabricating the automatic cow dung log machine with less human efforts the modifications suggested above proves to be helpful in many ways as discussed above. This modified dung log making machine not only reduce human efforts but also provides better eco friendly alternative for firewood. The production of dung log from cattle manure provides women in cattle camps a time saving, ecologically sustainable to chopping down and carrying of firewood. It also means the women would be less exposed to hazards and notably for their safety sadly associated with long walks looking for timber. As such, experimental method looks acceptable in rural as well as in urban areas.

This machine is user independent. The extraction of log from the die is completely automated this set up is simple, cost efficient also consumes low power for the operation. Fig-1 shows the automatic dung log making machine and fig-2 shows by product of dung log making machine respectively



Fig-1 : The Automatic Dung Log Making Machine



fig-2 : By product Of Dung Log Making Machine

V. PRACTICAL/SOCIAL IMPLICATIONS

The machine fabricated require some human effort for compressing the raw material. The requirement of human effort can be eliminated by using a less capacity motor to actuate horizontal spiral gradually for compressing the feed stock. This increases the compression pressure which helps in obtaining the good quality briquettes. And also this high pressure causes raw material to bind stiffly and this may also lead to elimination of using binder. By some minor changes in the compressing unit, the vertical spiral arrangement and horizontal spiral will allow the operator to apply maximum pressure as much as possible. And by using this mechanism fabrication cost can be reduced. Any type of feed stock can be used apart from the saw cow dung can be compacted to reduce waste management cost and facilitates the easy transportation of the same. In many rural areas, erratic voltage level and unreliable power supply are major problems, due to inadequate energy supply and ageing transmission leading to power cuts. To meet these uncertainty, use of solar energy may be the best, cheap and eco-friendly solution. Which reduces power consumptions and makes project green. Briquetted fuel can be used by the industrial, commercial and household sectors. It is ideally suited for use in the following areas:

Boilers	(sugar mills, paper mills, chemical plants, Cement, food processing units, oil extraction units etc.) using fuel for steam generation and heating.
Forges and Foundries	For metal heating and melting.
Brick kilns and Ceramic Units	For firing of furnaces.
Residential Heating	For winter heating in cold areas and in restaurants, canteens etc.
Agriculture	Heating Green houses , Nurseries and Chicken coops.

VI. CONCLUSION

The automatic cow dung log making machine has been successfully designed by implementing mechanical, electrical and control systems concepts. This machine is semi-automated machine to produce the cow dung logs With the use of this machine the production rate of the cow dung log have been increased at minimum runtime of the machine. The man power for the productions of cow dung log have been reduced. large volume of agricultural by products being generated in India and which constitute environmental hazards. but if wisely handled these wastes can then could be a better option for briquetting. Hence for an agricultural country like India that produces huge amount of agricultural waste every year, use of these waste as a briquette can be economically viable, sustainable and environment friendly solution. And also as machine

concerned, it can be concluded that by using simple mechanism with widely available machine element the machine cost could be lowered and makes fabrication economical and portable.

VII. REFERENCES

- [1] **S. Kannaki, S.Nithyapriya, M. Abinash, N. Gayatri, V. Harish, R. Manikandan, M. S. Kailash,** Design and Modeling of Automatic Cow Dung Log Making Machine, International Journal of Recent Technology and Engineering (IJRTE)
- [2] **Manjunath K S, Omprakash M, Niranjana Pange, Biradar Hanumanth,** Design and Fabrication of Briquetting Machine for Solid Waste, International Journal of Latest Engineering Research and Applications
- [3] **MR. KISHAN B S, MR. KIRAN KUMAR, MR. SANTHOSH T J, MR. CHARAN RAJ,** LOW COST, PORTABLE BRIQUETTING MACHINE RURAL USE, PROJECT REFERENCE NO.39S_BE_1791