LITERATURE SURVEY ON DESIGN AND DEVELOPMENT OF BRIQUETTE MAKING MACHINE

PRAVIN BHIMTE* , DR. A. V. VANALKAR**

*SCHOLAR DEPARTMENT OF MECHANICAL ENGINEERING KDK COLLEGE OF ENGINEERING NAGPUR , **ASSOCIATE PROFESSOR DEPARTMNET OF MECHANICAL ENGINEERING KDK COLLEGE OF ENGINEERING NAGPUR.

ABSTRACT : Agriculture industry produces large amount of crop waste with high volume and low density .This crop residue is difficult to handle
,transport and store .Farmers uses this waste for burning as fuel which causes pollution and also cannot retain as amuch as energy available in this waste .Also burning of such residue causes high amount of harmful gases ,ash ,particulate which is harmful for environment and human being .To arrest this pollution we can briquette making machine to make useful product from this waste. This technology uses agro- waste to convert it into useful eco-friendly products.This briquette are easy to handle store and good for combustion . Briquette gives energy which can be alternative to conventional fuels like coal, wood, crude oil products.This briquettes are cheap ,easy to available , does not cause any pollution maintains balance of environment .The present study shows literature review on design development of existing briquette making machine to compress this biomasss as dense solid fuel.

KEYWORDS : Crop residue , biomass extruder ;machine design
,fabrication ,briquettes.

INTRODUCTION : India is agriculture based country which produces huge quantity of agriculture waste . This waste spread over large area causes land pollution .On burning such solid waste produces smoke, gives incomplete combustion,causing air pollution.However ,this waste can be turned into a compleltly environment friendly source of enrgy through briquetting .It contains more oxygen and low carbon in comparison to
ther fuels. Agricultural residue are abundant available. Briquetting of biomass is a new technology in most Asian countries. The expansion of the use of biomass as an alternative source of energy for heating applications depends on three factors: residue availability for briquetting, adequate technologies and the market for briquettes . The difficulties in the development of biomass briquetting in Asia and in developing nations generally, is the development of appropriate briquetting technology that suitable for local conditions both in terms of the briquetting press itself for local manufacture and the briquettes. The failure of these machines have been attributed to some factors which include inappropriate or mis-match of technology technical difficulty and lack of knowledge to adapt the technology to suit local conditions excessive initial and operating cost of the machines and the low local prices of wood and charcoal. Some of the existing machines in the rural areas are either gender unfriendly or having poor production capacity and briquette quality and depends on direct human strength for densification. The need at the moment in the densification of biomass in developing countries is the development of an appropriate briquetting machine suitable to the local communities. For biomass to make a significant impact as fuel for rural communities.

OBJECTIVE : 1)To develope a low cost portable machine for rural as well as industrial use .

2) To design and develope machine for self help groups in rural areas 3)To make machine available for earning source

4) Develope system to use briquette as non conventional enrgy source

IDENTIFICATION OF PROBLEM :

1) High manufacturing and installation cost of machine.

2) Skilled operator and good safety equipements not available in rural areas.

Separate machines require for crushing , grinding and briquetting.

4) Different conditions (moisture ,temperature ,ash contain ,composition ,size ,shape) raw material available which requires to be handle seaprately which occupies large space .

METHODOLOGY :

Sufficient litrature is available on briquette making machine.the parameters responsible for the Design and Development of Agriwaste Briquette Making Machine ..

Following methodology is used :

The problems , advantage and present use of Agriwaste Briquette makig machine is studied.
then design of agriwaste briquette making machineis prepared using various therious .
The models prepared on various design parameters responsible for its performance and study with the help of actual performance and modifications are done.

HISTORY OF BRIQUTTING :

Briquetting is the densification of loose biomass. In 20 th century briquette as fuel emerged in bussiness entrprises. Several economic methods were developed to make briquettes without a binder in 1950 ,where multitude of factories throughout the world produced literally tens of millions of tons of usable and economic material that met the household and industrial energy needs. During the 2^{nd} World Wars, households in many European countries made their own briquettes from soaked waste paper and other combustible domestic waste using simple lever-operated presses.

Today's industrial briquetting machines, although much larger and more complex, operate on the same principle. Briquetting could be categorized into five main types depending on the types of equipment used; piston presses, screw presses, roller press, pelletizing, manual presses and low pressure briquetting.Biomass is acquiring increasing importance because of the growing domestic and industrial applications for heating, combined heat and power (CHP) and electricity generation in many countries.

In many African countries such as Zimbabwe,Tanzania, Uganda, Kenya, Sudan, Rwanda, Niger, Gambia, Ethiopia and Senegal, have projects of briquetting , though not all of these are still functional. The raw materials most

commonly briquetted in Africa are coffee husks and groundnut shells while sawdust and cotton stalks are also
used.
The history of residue briquetting in Africa is largely one of single projects in various countries which have usually not been successful (FAO, 1990).
A survey carried by FAO, (1990) showed that many briquetting plants in East Africa have been faced by outright failures while others have had their operations marred by problems.
According to this survey, it was difficult to find a single agency-funded briquetting project which had been commissioned and was operating fully satisfactorily. The reasons that seemed to explain this failure includes:

1. Briquetting machinery ordered inappropriately.
2. Non-availability and high cost of the briquetting machines.
3. Poor projects.
4. firewood and charcoal have low local price which effect the marketing of briquettes and unacceptance of briquettes in the household sector.

LITERATURE REVIEW :

The Residual Base :

The potential agrowaste which do not pose any collection and drying problems, normally associated with biomass are Rice straw, rice husk, wheat stalks, coffee husk, maize stalks, cotton stalks, and leaf wastes.
Factors which can be consider to qualify a biomass fuel for use as feedstock for briquetting. Apart from its availability in large quantities, it should have the following characteristics:

Low Moisture Content :
Moisture content should be as low as possible, generaly in te range of 10 -15 percent. high moisture content will create difficulties in grinding and extra energy will be required for drying.

Ash content and composition :
Biomasss residues normally have lower ash content (except for rice husk with 20% ash) but their ashes content is higher in alkaline content , especially potash. An indicator of slagging behavior of the biomass teh ash content in different agrowaste. Generally, higher the ash content, higher wil be the slagging behaviour of briquettes. But this does not indicate that lower ash content in the biomasss wil give low slagging behaviour.

The operating temperature , the mineral compositions of ash and their percentage combined, determine the slagging behavior. Favourable conditions will increase the degree of slagging behaviour of briquette. Minerals like SiO2, Na2O and K2O are more troublesome.

Determining the slagging temperature of ash content in the material is very very difficult because this process is very complex. Generally slagging takes palace with biomass material havinf ash content more than 4% and less than 4% ash content material not show any slagging behaviour characteristics.
According to the melting compositions, they can be termed as fuels with a severe or moderate degree of slagging.

Flow Characteristics

The material shouls be granular and uniform so that it can flow easily into bunkers and storage silos. Some of the popular and excellent agrowaste are as follows:

1) Rice husk: Comparing with saw dust, this agro-residues have a higher ash content, higher potash content and have poor flow characteristics. However, rice husk is an exceptional biomass. It has good flow ability, normally available with 10 percent moisture and the ash contains fewer alkaline minerals, thereby it has a high ash sintering temperature. In fact it makes an excellent fuel although its cakorific value is less than wood and other agrowaste residues.

2. Groundnut shell: Low ash (2-3%) and moisture content less than 10%, it is an excellent material for briquetteing.

3. Cotton sticks: First this material get chopped finely and then get stored in dry form. It tends to be degrade during storage. Also it having higher content of alkaline minerals and needs to be used with caution.

4. Coffee husk: this material having low ash and available with 10% moisture content which is excellent for binding during compression . Coffe producing areas give such agrowaste.

5. Mustard stalks: Like cotton sticks, it is also an appropriate material for briquetting.

Characteristics of Briquettes

Briquettes must be consistent or otherwise cracks, scratches could appear, and fine elements would separate, which is not acceptable.

The more denser briquette more time will requre to it for burning

The standard DIN 51731 defines the interval of briquette density values from 1 to 1.4 kg/dm3(g/cm3). The standard DIN 52182 (additional standard DIN 51731) also describes the testing method for briquette density.
A piece of briquette is weighted and all its dimentions like length , diameter , height is also measured . Briquette density has to be calculated with the help of following formula .
PN = mN/VN (g/cm3)
Where, mN = briquette weight (g) , VN = briquette volume (cm3) RESULT :

1) Machine can be worked with any type of agricultural waste .

□□ For proper binnding of agro- waste, material it should be maximum 15 - 20mm length.

□□ "Swachha Bharat Mission" can be promoted by using social area unwanted grass , road side tress leaves, flowers .

□□ Agriwaste which produces glue during compression can be used to produce briquettes without adding binding material into them.

□□Farmer burning the agrowaste which causes environment pollution can be controlled.

□□ Rural youth and poor farmers can use this technology as self employement
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