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# Optimization and Development of Pulverization Machine

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**Abstract:** A Pulverizer is a machine whose purpose is to shred or crush total material into lower pieces by the repeated blows of number of plates. These machines have multitudinous feathers of operations in multitudinous industriousness

A pulverizer or grinder is a mechanical device used for the grinding of multitudinous different types of paraphernalia. the pulverization is a machine which is used for the combine operation

The pulverizer is a machine that pulverizes large-sized solid raw paraphernalia to the demanded size. the capper is composed of coarse crushing, fine crushing, wind conveying and other bias, and achieves the purpose of the capper in the form of high-speed impact. using wind energy to form cream at one time, barring the traditional netting process. mainly used in mining, erecting paraphernalia and other industriousness. Prolusion Husbandry is now one of the most important sectors it plays a part Indian economy. In order to further develop this sector technology has come one of the main components. The farmers on the field burn ultimate of these wastes after the harvesting of crops. Thus the agricultural waste burning sensations is being repeated every year. In order to use these wastes for some profitable benefits, like power shops, industries. So the necessary of analogous machine was felt to use all kinds of agricultural waste after shredding, which could be provident and practicable. The design is developed and manufactures a machine which will be used for producing tattered organic wastes for farmers without any use of electricity, these organic wastes will increase the effectiveness than any other conventional means, which are obviously dangerous for mortal health, terrain, land etc. Corridor used for manufacturing such a machine are agitator, hopper, collector tank, bevel gear couples, pulleys flat belt drive and oaring medium.

**Keywords-** Pulverizer, vertical Impactcrusher, blades

## I. INTRODUCTION

Agriculture is now one of the most important sectors it plays a role Indian economy. In order to further develop this sector technology has become one of the main components. The farmers on the field burn most of these wastes after the harvesting of crops. Thus the agricultural waste burning phenomena is being repeated every year. In order to use these wastes for some economic benefits, like power plants, industries. So the necessary of such machine was felt to utilize all kinds of agricultural waste after shredding, which could be economical and practicable. The project is developed and manufactures a machine which will be used for producing shredded organic wastes for farmers without any use of electricity, these organic wastes will increase the efficiency than any other conventional means, which are obviously harmful for human health, environment, land etc. parts used for manufacturing such a machine are agitator, hopper, collector tank, bevel gear pairs, pulleys flat belt drive and paddling mechanism.

## II. LITERATURE SURVEY

It was also found out that the particle entering into the breakage process procures continuous breakage until it fails the classification function for breakage. Hence larger the parent particle the larger is the number of breakage process. Due to the dynamic nature impact breaking it was found that the classification function depends on the crusher design parameters (shape parameter and impact energy) and feed rate and also on the material strength parameters. The performance model is able to predict the product size distribution with reasonable accuracy even when important variations in both the rotor velocity and feed are imposed. The specific impact energy for a Horizontal shaft crusher is very less than that for a vertical shaft crusher. It was also found out that no other force acts on the particle during its free fly. The depth of penetration can be increased by decreasing rotor speed or increasing the height of fall. For effective crushing the velocity of free fall of the lump should be sufficient to reach the middle of head of the impact zone

### III. CALCULATIONS

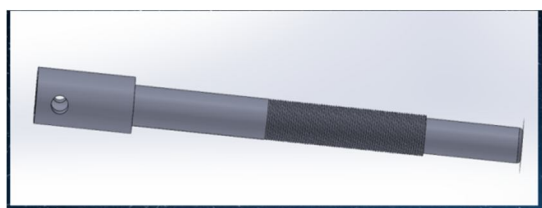
Theoretical calculations of Horizontal Impact Crusher are done as follows:

#### 3.1 Rotor Shaft

Material:- Stainless Steel

Shaft Dia-20mm , height-400mm

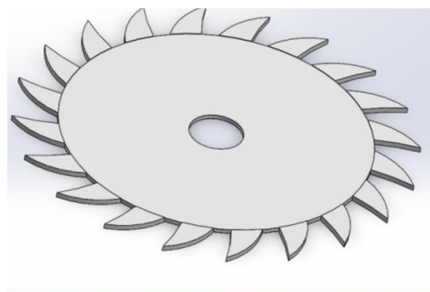
$$\begin{aligned} \text{Volume of Shaft} &:- \pi /4 * d^2 l \\ &= \pi /4 * 20^2 * 400 \\ &= 77754.41 \text{ mm}^3 \\ &= 125663.70 \text{ mm}^3 \end{aligned}$$



#### 3.2 Blades

There are four types of blades we are used in optimization and development of pulverization m/c

1-350mm , 2-300mm , 3-200mm , 4-150mm



#### 3.3 Drum

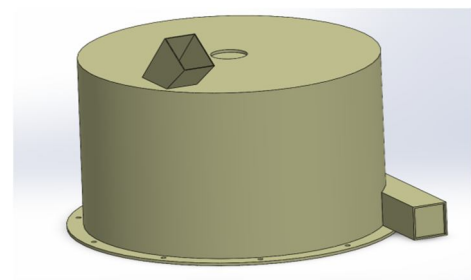
Material - Mild Steel

Dia of drum -450 mm

Height Of drum-300mm

Thickness-3mm

$$\text{Drum volume} = 0.048 \text{ m}^3$$



#### 3.4 Integrated Single Phase Induction Motor

1 HP Motor

Power :- 743 watt

Voltage :- 220v

N :- 2880rpm

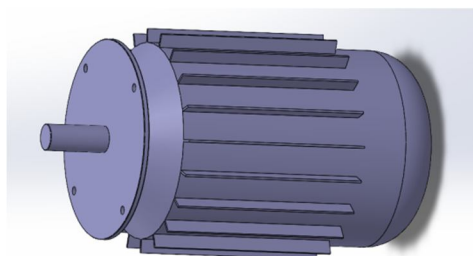
I :- 8 amp

$$P = \omega * T$$

$$743 = 2 \pi N / 60 * T$$

$$T = 743 * 60 / 2 * 3.14 * 2880$$

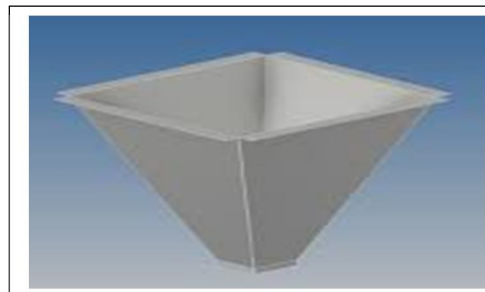
$$T = 2.015 \text{ N-m}$$



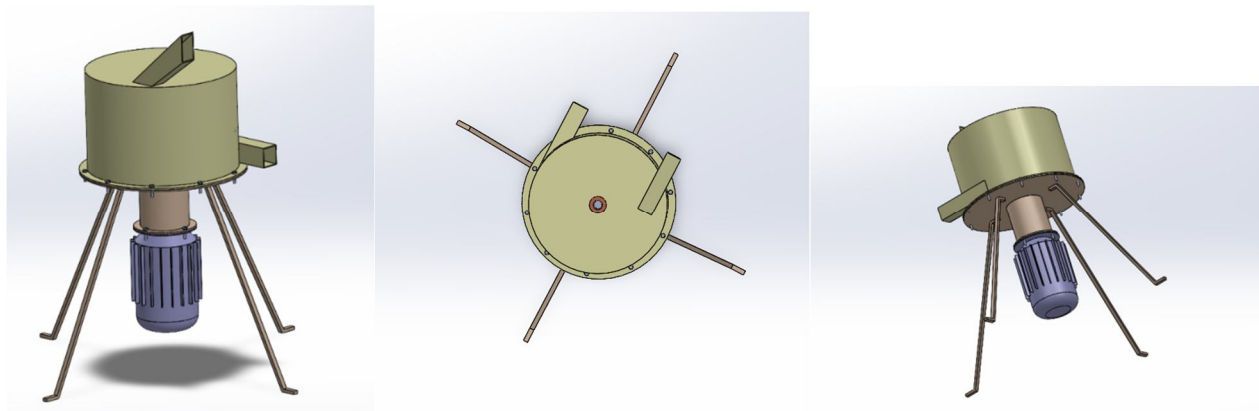
#### 3.5 Hopper

The hopper is the compartment of the machine through which the leaves was introduced into the pulverizing chamber.

the angle of the hopper was 45° to the horizontal thereby making it 350mm x 350mm x 400mm.



#### IV. CAD DESIGN AND FINAL ASSEMBLY



#### V. RESULT

The leaves pulveriser machine that has been developed to pulverized dried leaves ,The efficiency of the machine was evaluated at different motor speed 2880 rpm and 200 rpm with machine efficiency of 80% and 85% respectively. The machine was developed using locally available materials . The following results were gotten and recorded as shown in table

A. Below Experiment Are Performed On (DRY)Straw

Blade Size	Speed In RPM	O/p Size Of Material In mm
150mm	1440 rpm	26mm
150mm	2016rpm	22mm
200mm	1440rpm	22mm
200mm	2016rpm	20mm
300mm	1440rpm	19mm
300mm	2016rpm	15mm
350mm	1440rpm	13mm
350mm	2016rpm	10mm

**B. Below Experiment Are Performed On Combined Blades**

Blade Size	Speed In RPM	O/p Size Of Material In mm
150+200	1440rpm	10mm
200+300	2016rpm	8mm
300+350	1440rpm	6mm
150+350	2016rpm	12mm
200+300	1440rpm	12mm



Fig-Before pulverizer



Fig- After pulverizer (final result)

**VI. ADVANTAGE**

- A. More efficient
- B. Less cost
- C. Continuous production
- D. Less time taking
- E. Fulfill customers requirement

**VII.APPLICATION**

Brittle material can be crushed.

- A. *Materials*
  - 1) Charcoal
  - 2) Rock salt
  - 3) Alum
  - 4) Ferric alum
  - 5) Non- ferric alum etc.

**VIII. CONCLUSION**

Pulveriser machine has been developed to pulverized dried leaves or farming straws,cobs in other to increase the surface area , and can be use as additives in industries to making briquette

The project is developed and manufactures a machine which will be used for pulverizing organic wastes for farmers . parts used for manufacturing such a machine are agitator, hopper, collector tank, bevel gear pairs, pulleys flat belt drive and paddling mechanism.



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