
**ROTARY IMPACT CAPACITY PLASTIC CRUSHER ANALYSIS
MAX 35 KG/HOUR****Agus Septiana¹, Yudi Samantha², Haris Budiman³**¹Mechanical Engineering Faculty of Engineering Universitas Majalengka¹E-mail Penulis

Abstract

Plastik crusher machine is made with capacity of max 35 kg/hr, it is easy to operate. Especially can to destroy material of break Plastik containers of bottled water / wasteof Plastik. Formula and teori used are to design to crusher of Plastik, It is constructed based on standard measurement 50 x 50 x 150 cm with capacity 35 kg/hr. So resulted that yield times intersection of 23 kg/hr.

Keywords: *Polimer, Capacity, Crusher of Machine*

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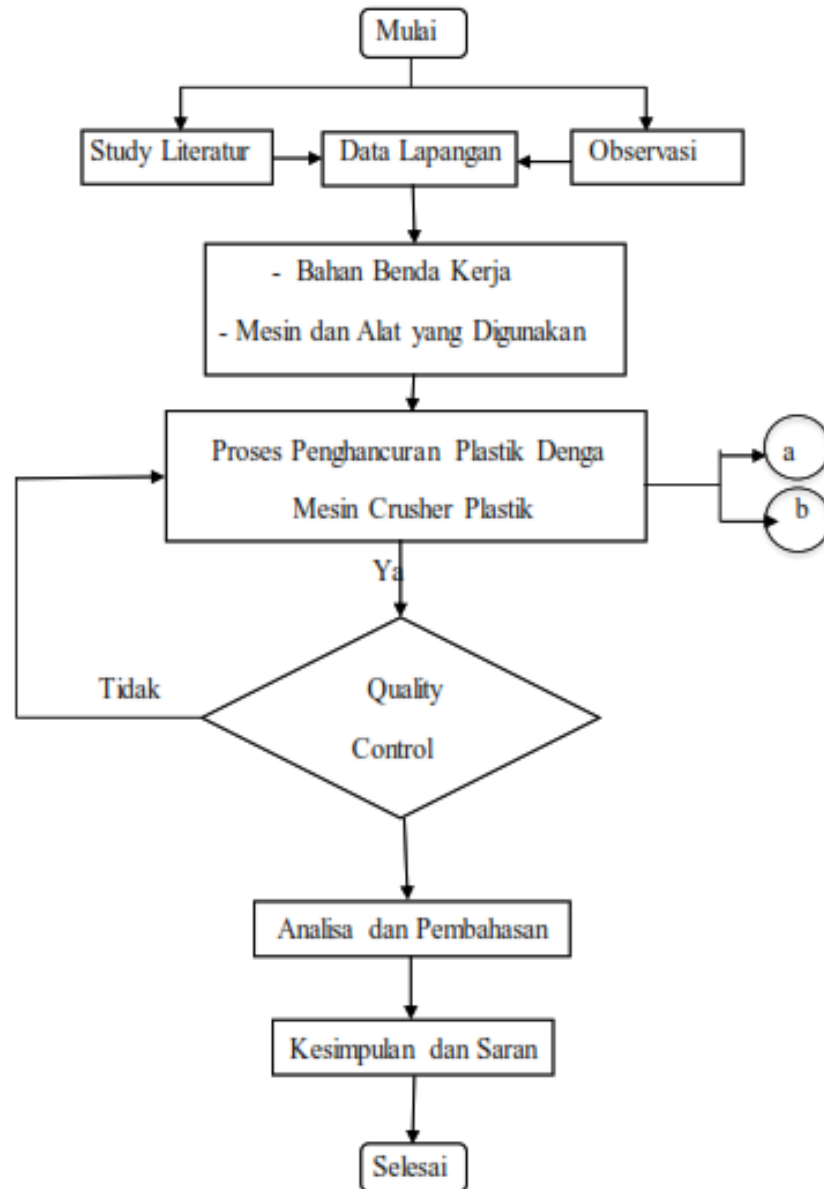
Introduction

Garbage is an object that is no longer used so that a lot of it is scattered around our environment, especially plastic waste that is difficult to decompose. The processing of plastic waste is only done by burning, even though if it is treated properly, used plastic waste will generate profits. In this modern era, many new technologies are being created. Including processing plastic waste so that plastic waste can be recycled by turning it into plastic ore with a crushing machine so that it can reduce waste and can create added power for the economy for the community.

The recycling process itself is carried out by first chopping used plastic waste into small flakes or granules, then recycling it in a plastic injection machine to make other shapes such as flower pots, children's toys, bathtubs, and others. Therefore, the author conducted research on the plastic crusher machine in the Cikijing Majalengka area so that it could be developed and useful for the author in particular, as well as the surrounding community in general and later expected to be able to solve the problems that arise.

Research methods

Flow Chart Analysis Of Rotary Impact Plastic Crusher Machine Capacity 35 Kg/Hour

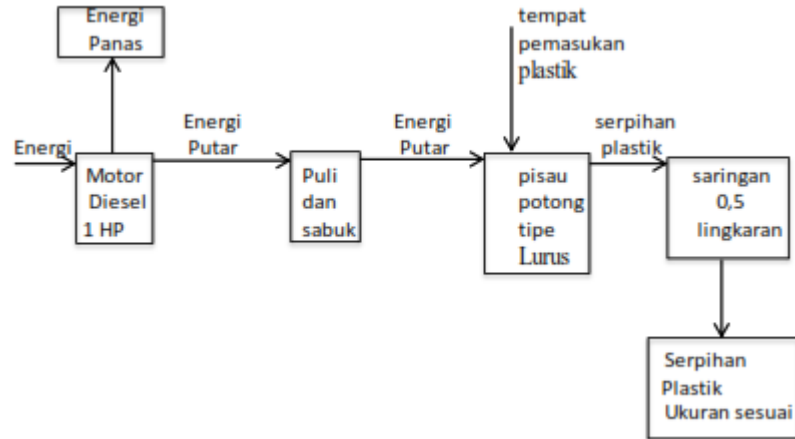


HOW PLASTIC CRUSHER MACHINE WORKS

The way this machine works is simple so that to use this tool one does not need to have special skills. To run this tool, it is enough to pull the rope provided on the diesel motor. The rotation of the Diesel motor (1) will rotate the first pulley (2) on the motor and will drive the V-belt (3) and can drive the second pulley (4) on the shaft. The second pulley will drive a shaft where it will drive the blade (5) to grind the used syringe. This machine uses a Diesel motor with a power of 1 HP with a rotation of 750rpm. The diesel motor will move the pulley mechanism on the blade shaft, so it will grind the used plastic through the funnel located on the top funnel of the machine. The material that has been prepared is in the form of used plastic bottles that have been collected from collectors, then put into a crushing machine. After that, the result of this milling is plastic seeds.

Results and Discussion

Plastic Crusher Machine Chart



Data Specification

ukuran mesin	pxxt = 50cmx50cmx150cm
ukuran pisau	pxl = 24cm x 7,5cm, tebal 0,5
sabuk	pxl = 120 cmx0,5cm
jumlah pisau	diam 4, gerak 10
saringan	pxl = 50cmx40cm d=0,7cm
luas penampang (a)	$24 \cdot 0,5 = 120 \text{ cm}^2$
Putaran poros	750 Rpm
Berat pisau	0,5 kg
Berat poros	1 kg
Motor diesel	merk IN-DA ZS1115
	Konsumsi BB 1/2 /Jam
Jenis pisau	Platper S45C
Jenis Puli	Puli Datar
Bahan poros	S45C

Belt selection

The belt used is a v belt type

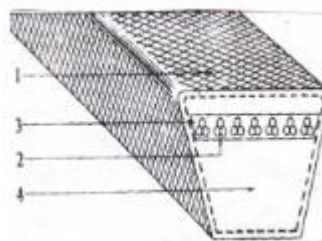


Figure 4.1 Belt cross-section

Description:

1. tarpaulin
2. Towing part
3. Wrapping rubber

4. Rubber pillow

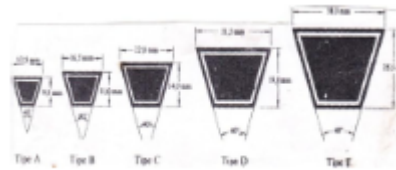


Figure 4.2 Belt Construction –V and Belt Section Size V

knife selection



Figure 4.3 knife sharpening

The knife is changed and sharpened every day so that the sharpness does not decrease, the knife used is made of S45C steel.

Motor power selection

Diesel engines are used in addition to being cheap, the fuel is not too expensive, but the lack of it causes air pollution. The diesel engine used is the IN-DA ZS1115 brand with a power of 2HP.

Research result

1. Transmitted power (kW)

If the power is given in horsepower (PS), it must be multiplied by 0.735 to get the power in KwP = 750x0,375 = 2,812 kW

2. Correction Factor (fc)

$$fc = 1,2$$

3. Plan power Pd (kW)

$$Pd = P. fc$$

$$Pd = 1,2 \cdot 2,812 \text{ kW}$$

$$Pd = 2,812 \text{ (kW)}$$

4. Plan moment : 3651 (kg.mm)

5. Shaft material, heat treatment, tensile strength

$$S45C, \sigma_B = 58 \text{ (kg/mm}^2\text{)}, S_f = 6,0. S_{f_2} = 2,0$$

6. Allowable shear stress

$$\tau_a \sigma_B (s_f \times s_{f_2})$$

$$\tau_a \quad 6,0 \times 2,0$$

$$\tau_a = 3 \text{ g mm}$$

7. Correction factor for torsional moment K_t , bending factor C_b .

$$K_t = 1,0$$

$$C_b = 2,0$$

8. Shaft Diameter $d = 50(\text{mm})$

9. The diameter of the bearing $D = 52\text{mm}$

$$\text{Filet radius} = 52-50/2 = 1,0(\text{mm})$$

$$\text{Keyway } 7 \times 4 \times = 28, \text{ filet } 0,4$$

10. The stress concentration on the step shaft is

$$F_c/\text{alur pasak}, D/d$$

$$1,2/28 = 0,042, 52/50 = 1,04, \beta = 1,37$$

The stress concentration on the shaft with the keyway is

$$0,4/28 = 0,014, \beta = 2,8, > \beta$$

11. Shear stress From equation (1.4)

$$\tau = 5,1 \times 3651/(28)^3 = 0,84 \text{ (kg/mm}^2\text{)}$$

12. $\alpha_2 : c_b K \tau = 3,45, 1,56 \times 1,0 \times 0,84 = 1,31 \text{ (kg/mm}^2\text{)}$

13. Shaft Diameters(mm)

$$d = 50\text{mm}$$

Shaft Material S35C

$$\phi 50 \times \phi 35$$

Conclusion

From the planning and calculations on the "Plastic Crusher Machine", the following conclusions are obtained:

1. The shaft used is made of S45S steel with a diameter of 50mm
2. The knife used is made of S45C steel, S45C steel is medium carbon steel containing carbon content between 0.3-0.6%.
3. Based on the test results, the capacity of the plastic crushing machine is 23kg/hour for HDPE (high density polyethylene) plastic, the maximum capacity is 35 kg/hour for pp plastic (polypropylene).

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