Fabrication of Corn Separating Machine Using Separator

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Abstract- *In India, Corn is emerging as the third most important crop after rice and wheat, and it has significance as a source of a large number of industrial products besides its use as human food and animal feed Corn is also a versatile crop, allowing it to grow across a range of agro-ecological zones.Maize is one of the most important crops in the world agricultural economy. It is said to have originated from Mexico several thousand years back, even before Columbus landed in South America.Mechanization of threshing is gaining more importance in recent days. Due to the increased importance of mechanized threshing, several types of threshers have been introduced and evaluated throughout the country. Among them the commonly used ones on the Indian farm are spike tooth type, chaff cutter type, syndicator type and beater type meant for threshing specific crops.*

Keywords- Maize, Corn, Threshing, Machine.

I. INTRODUCTION

1. 1. India made most is a maize crop grown in summer and winter 60% to 70% of the   people grow maize but when it comes to harvesting we harvest it with the help of traditional machine like Haller, any other traditional equipment's
2. The maize harvested with the help of haler is often broken some maize and all the hard work done by the farmer is wasted and this maize harvesting machine is close 1   out of 100 houses is it not available everywhere because it is very expensive.
3. The farmer's hard work and energy sources like diesel from this machine also takes a lot.
4. So we make a modification of machine/Haller so in that you can harvest maize easily, you can buy this easily because this modified machine very less price as comparatively other.
5. Profit is compared to getting 90% earning because we don't use diesel and less effective and no wastage of maize like crush, mix-up etc.

II. OBJECTIVES

1. To Fabricate Corn Separating Machine to separate corns forms maize.
2. To separate corns and maze using separator in Corn Separating Machine.
3. To fabricate Corn Separating Machine so that it can operate 100kg corns per hour.
4. Separating cornsand maze without breakage of corns.

III. Working Model

Fig No.1 Fabrication of corn separating machine

IV. WORKING PRINCIPLE

The corn separating machine is simple in design and construction. In this machine corn is deseeded from the cob by shearing action between the threshing shaft and drum. The power from the motor which is been   placed at the base of the machine is transmitted to threshing shaft through v-belt drive. The speed ratio between the threshing shaft and motor is ¼ by using pulley.

The corn is fed through the hopper provided on the top of the corn separating machine. Then the corn descends through the clearance which is been provided between the drum and chains up to the point of contact that take between corn cob and drum and chains.

V. ADVANTAGES

1. The machine is in compact size as well as low incost.
2. The power consumption is low as well as the maintenance cost is alsolow.
3. Simple in design and fabrication and reliable tooperator.
4. High production in less time whit no damage of corngrains.
5. Any size of corn can bede-seeded.
6. No need of any safetydevice.
7. Benefit for small and medium scalefarmers

VI. RESULT AND CALCULATION

1. **Pulley:-**

RPM of driver pulley (N1) = 1440rpm
RPM of driven pulley (N2) = 540rpm

Diameter of driver pulley (D1) = 76.2mm
Diameter of driven pulley (D2) =?
N1 D1 =N2 D2
1440 * 76.2 = 540 * D2
1440*76.2/203.2 =D2

D2 = 203.2mm

Diameter of driven pulley is 203.2mm

2. Tension on belt (T1 & T2):-

For belt transmission between two pulleys, the following equation by Hall et al., 1961 are used.
μ = 0.3
Θ = 3.14
T1/T2 = eμΘ
T1/T2 = e (0.3*3.14)

T1 =2.56 T2

3. Torque transmitted by motor (T):-
Power (P) = 2238w
　　　RPM of motor =1440rpm
　　　P = 2πNT/60
　　　2238 = 2π*1440T/60 T = 14.84 N.m.

T = 14.84*10^3 N.mm

For big pulley tension T1& T2 Diameter = 203.2mm
T = (T1-T2)*R2
14.84*10^3 = (2.56T2-T2)*101.6

T2 =93.63N.mm

T1 =2.56*93.63

T1 =239.69N.mm

4. Shaft: -A solid Shaft made up of mild steel 40C8 having yield strength as 280Mpa was choose. This shaft was coupled to electric motor rotating at 1440 rpm. The following design parameters are a

Permissible Shear Stress (τ):-

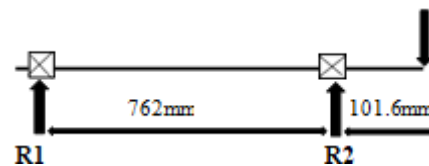i) When the external force acting on the component tend to slide the adjacent planes With respect to each other, the resulting stresses in these planes are called shear stress.

Factor of safety = 1.5 τ = Syt/ F.S.
τ = 0.5 (Syt) / F.S.
τ = 0.5 (280) /1.5

τ = 93.33N/mm2.

ii) **Bending Moment: -**

T1 + T2

T1+T2 =239.69+93.63
　　　　= 333.32N.mm
Let, R1+R2= 333.32 ……….. 　　(1)
Taking moment at R1,
R2*762= 333.32*863.6
∴R2 = 377.76 N
From equation (1). R1 = 44.44 N
Now, bending moment is given by,
Mb = (377.76*101.6) + (44.44 * 863.6)

Mb =76681N-mm

iii) **Shaft diameter on strength basis:**Transmission shafts are subjected to axial tensile force, bending moment or torsional moment or their combinations. Most of the transmission shafts are subjected to combined bending and torsional moments.
We know,
d3 = {[16 / (τ×π)] × (Mb^2 + T^2) ^0.5}
　= {[16 / (93.33×π)] × ((76681^2) + (14.46*10^3) ^2) ^0.5}
　d = 18.41 ≈20 mm

Shaft diameter = 20mm

iv) **Length of belt:-**
Central distance (C) = 482.6mm L= 2C+ (π (D + d))/2+ (D-d)/4C
L= 2*482.6 + π(203.2+76.2)/2 + (203.2-76.2)/4*482.6
L= 958.4+438.6+0.056

L=1397.056 mm

Length of belt is 1397.056mm.

VII. CONCLUSION

1. In Corn Separating Machine we fabricated the separator inside working chamber using separating corns and maize.
2. In Corn Separating Machine we fabricated the separator in the working chamber inside so this separator easily separated the corn and maize so reduce work and avoiding mix-up.
3. From the results or running of the Corn Separating Machine in one hour we achieved better result of the 100kg per hour.
4. In Corn Separating Machine we using Separator inside working chamber so maize and corn to reduce breakage of corns in this separator corns are easily comes.

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