

MULTIPURPOSE AGRICULTURE MACHINE

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ABSTRACT —now a days, all other sector including agriculture sector will changes which will be needed because to meet the future food and other need .farmers will need to know new technologies ,which will not have much effect on crop yield if the future rains are reduced ,so that you will respond properly to the increased demand. Using new technology, farmers can increase production capacity. This technique is related to the entire process of sowing .traditional sowing method are time consuming & costly and labour intensive. For increase productivity need to replace this process to multipurpose seed sowing machine to reduce overall seed sowing cost , labour cost, efforts.

keywords: lead screw, wheel, rack & pinion, dc motor , pulley ,etc.

I. INTRODUCTION

Backbone of indian economy is agriculture field. India is an agriculture based country where more than 50% of population is depend on agriculture . agriculture is most important sector of Indian economy. India an agriculture sector for 18%of indian GDP and provide employment to 50% of the countries workforce. India is the largest producer of pulse, rice wheat ,spices & spices product so we developed vehicle that do the process for ploughing

,seed sowing, levelling. as compare to traditional machine this machine perform number of operation simultaneously.

II. LITERATURE REVIEW

International Research Journal of Engg. And Techonogy published in 2016 titled "Multipurpose Farm Machine"this paper is published by Prof.S.N.Waghmare, Dr.C.N. Sakhale, Rashmi S.Chimote they say that that the project will satisfy the need of small scale farmer because of they are not able to purchase costly agriculture equipment .machine require less man power and less time compare to traditional method so we manufacture it on large scale its cost get significantly reduce and we hope this wiil satisfy the partial thrust of Indian agriculture.so in this way we solve labour problem that is the need of todays farming in india.(ISSN2395-0056)[1]

International Journal For Science And Advance Research In Technology Published In 2017 Titled "Design And Fabrication Of Multipurpose Farming Machine" this paper is published by Sheikh Mohd ,Sahid Mohd . H.A.Hussain they say that we are redesigning the we are designing and fabricating a multipurpose farming machine is successfully tested in the farming field and reduces time up to 62.4% for

ploughing and 66% for seed sowing as compare to the traditional method . our main task is to developed technology have available to farmer at an affordable prise .One person can be easily handle this machine(ISSN:2395-1052)[2]

III. PROBLEM STATEMENT

- To increase the % of mechanization in agricultural field.
- To reduce the labour effort and animal effort which used in different process.
- To reduce the requirement of man power.
- Also to reduce excess time consumption for individual process.
- To reduce cost of planting process To overcome the problem of traditional machine.
- Economically or easily handle for small scale farmer.

IV. DESIGN

Weight (W):- 20 Kg

FOS =20% (for weight)

For maximum condition

$$20 + (20 * 20 / 100) = 24 \text{kg}$$

Based On 4 Wheels, Therefore,

For 1 wheel thrust = $24 / 4 = 6 \text{ kg}$

Force= Mass*Gravity

$$F = m * g$$

$$F = 6 * 9.81$$

$$F = 58.86$$

$$F \approx 60 \text{ N.}$$

Work = Force

*Distance Power =

Work/Time

P

$$= (\text{force} * \text{distance}) / \text{time}$$

$$P = \text{force} * \text{velocity}$$

Maximum speed of bot (assumed) = 10 km/hr

$$\text{Velocity} = 10 * (5 / 18) = 2.77 \text{ m/s}$$

$$\text{Power} = (60 \text{N}) * (2.77 \text{m/s})$$

Power $\approx 166 \text{ watt}$

CURRENT RATING

Power = Voltage * Current

$$P = V * I$$

$$166 = 12 \text{ V} * I$$

$$I = 166 / 12$$

$$I = 13.8 \text{ A.}$$

From above power and current rating we selected the 200 rpm motor by referring

standard specification of motor.

Design of various parts:

Rear wheel axle shaft design:

$$P = F * V \text{-----(1)}$$

Our whole assembly will have weight approximately equal to 60 kilograms. Thus total force acting will be on 4 wheels.

Out of those 4 wheels we have maximum load acting on rear wheels mounted on shaft. This shaft is subjected to approximately 50 kilograms of load. So force acting on shaft is given by,

$$F = m * g \text{----- (2)}$$

Calculation Of Motor

Power , $P = V * I$

$$P = 12 * I$$

$$P = 12 \text{ WATT}$$

Torque

$$P = \frac{2\pi NT}{60}$$

$$T = 3.81 \text{ N.M}$$

Design of pully

Dia. of bigger pully , $D = 27 \text{ mm}$

Dia. of smaller pully $d = 22 \text{ mm}$

Speed of longer pully = 30 rpm

Center Distance $C = 150 \text{ mm}$

Input

torque = 3.81 n.m

$$\frac{D}{d} = \frac{N}{n}$$

$$\frac{27}{22} = \frac{30}{n}$$

$$n = 24.444$$

Output Torque Transmitted

$$P = \frac{2\pi NT}{60}$$

$$T_2 = 4.6910 \text{ N. M}$$

Angle of contact

$$\alpha = 180 - 2 \sin^{-1} \left[\frac{D-d}{2c} \right]$$

$$\alpha = 180 - 2 \sin^{-1} \left[\frac{27-22}{2 * 150} \right]$$

$$\alpha = 178.097^\circ$$

Design Of Belt

$$V = \frac{\pi * D * N}{60 * 1000}$$

$$V = 0.04241 \text{ M/S}$$

Length Of Belt

$$L=2C+\frac{\mu(D+d)}{2}+\frac{D+d}{4C}$$

$$L=2C+\frac{1(27+22)}{2}+\frac{27+22}{4 \times 150}$$

$$L=324.5083\text{mm}$$

V. SPECIFICATION

Table No 1: Specification

Name of Component	Specifications	Qty
Frame	Martial-Mild steel Chemical Composition Element Content Carbon, C0.14 - 0.20 % Iron, Fe 98.81-99.26 %(as remainder) Manganese,Mn0.60-0.90 Phosphorous,P≤0.040% Sulfur, S≤ 0.050 %	20kg
Motor	RPM: 60 at 12V length: 44mm Motor dia:36mm Brush type: Precious metal	6
Rack and pinion	Material: Cast Iron Length of Rack: 350mm No. of teeth on pinion: 20 Thickness: 25mm	2
Wheel	Material: Plastic Diameter: 230mm	4
Lead screw	Diameter: 16mm Length: 500mm Material: Mild steel	1
Pulley	Material: Mild steel Diameter: 50mm Thickness: 25mm	2
Tank	Material: Mild steel Length: 100mm Breadth: 120mm Height: 75mm	1

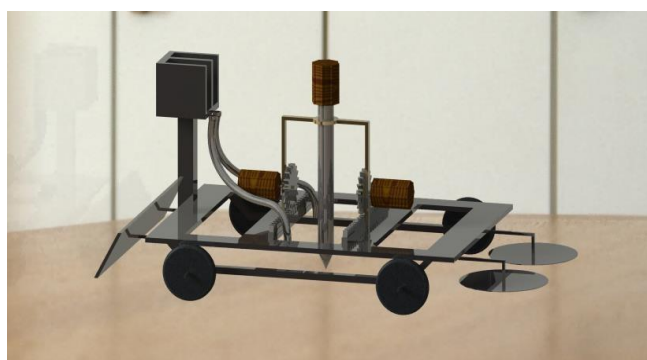


Fig1: Multiple Agriculture Machine

VI. CONCLUSION

Machine is Maintain row spacing and controls seed .It Control the seed depth and proper utilization of seeds can be done with less loss. Perform the various simultaneous operations and hence saves labor requirement, labor cost, labor time, total cost of saving and can be affordable for the farmers. A multipurpose

sowing machine is designed for small farmers to improve their productivity. The machine required less man power and less time compared to traditional methods, so if we manufacture it on a large scale its cost get sreduce and we hope this will satisfy the Indian farmer needs.

So in this way we can overcome the labour problem that is the need of today’s farming in India.

VII. REFERENCES

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