

Design and Fabrication of Seed Sowing Machine

Girishkumar G S¹, Vivek C S², Ravichandra N³, Vikas B C⁴, Sahan S Bhusgunde⁵

¹Assistant Professor, Department of Mechanical Engineering, ATME College of Engineering, Mysuru, Karnataka, India.

^{2,3,4,5}UG Student, Department of Mechanical Engineering, ATME College of Engineering, Mysuru, Karnataka, India.

Abstract - Agriculture plays an important role in the life of economy. It is the backbone of our economy system. In this project work focused on seed sowing processes and tried to solve the problem. In this seed sowing machine each complete rotation of rotating wheel there is seeds falls from this seed drum and the seed plantation process can take place smoothly as well as without wastage of seeds. This system provides all the facility which can work efficiently.

Key Words: Agriculture, Seed sowing machine, Seeds, Multi-purpose, etc.

1. INTRODUCTION

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support Almost 17 percent of world population from 2.3 percent of world geographical area and 4.2 percent of world's water resources. In developing countries like India mechanization of agriculture was started on the use of improved hand tools and bullock drawn improvements. Farm mechanization aims at higher production rate reduction in human drudgery. India's achievements have been increasing tremendously, but not in mechanization. One of the barriers achieving complete mechanization is the land holdings and its fragmentation. Due to small land holding is not possible to mechanize all the farming operations. Large machines cannot be operated these small farms. Also our farmers cannot afford to buy large costly machines. One of the most important process in agriculture to increase revenue is seed sowing. Sowing is an art of placing seeds in the soil to have good germination in the field. An area or object that had seeds planted will be described as being sowed. Among the major field crops, ground nut, corn, oats, wheat, grasses and legumes are seeded, and maize and soybeans are planted.

A perfect seeding gives:

- Correct amount of seed per unit area.
- Correct depth at which seed is placed in the soil.
- Correct spacing between row-to-row and plant-to-plant.

In general, following are the different types of seed sowing methods.

(i) Broadcasting: Broadcasting is the process of random scattering of seed on the surface of seedbeds. It can be done manually or mechanically both. When broadcasting is done manually, uniformity of seed depends upon skill of the man. Soon after broadcasting the seeds are covered by planking or some other devices.

(ii) Dibbling: Dibbling is the process of placing and seeds in holes made in seedbed and covering them. In this method, seeds are placed in holes make at definite depth at fixed spacing. The equipment used for dibbling is called dibbler. This is very time consuming process, so it is not suitable for small seeds. Mostly vegetables are sown in this way.

(iii) Drilling: Drilling consists of dropping the seeds in furrow lines in a continuous flow and covering them with soil. Seed metering may be done either manually or mechanically. The number of rows planted may be one or more. This method is very helpful in achieving proper depth, proper spacing and proper amount of seed to be sown in the field.

(iv) Seed dropping behind the plough: It is very common method used in villages. It consists of a bamboo tube provided with a funnel shaped mouth. One man drops the seeds through the funnel and other man handles the plough and the bullocks. This is a slow and laborious method. [1] Suraj V Upadhyaya, et al., Just he insisted that innovative seed sowing equipment's. By using this innovative project of seed sowing equipment we can save more time required for sowing process and also it reduces lot of laborers cost. It is very helpful for small scale formers as it weighs less. [2] Kyada, A. R. et al., he showed that manual seed planter machine has considerable potential to greatly increase productivity. [3] Amol B. Rohokale, et al., He compared the different traditional seed sowing methods with the proposed machine and considering its limitations Ms. [4] Trupti A Shinde. et al., He explained the methodology of seed dropping of seed from the seed hopper. In each

complete rotation of rotating Wheel there is seeds falls from this seed drum and seed plantation process taken place smoothly and without wastage of seeds. [5] **Roshan V Marode, etc, al.**, He compared the different method of seed sowing and limitations of the existing machine; he was concluded that the multi-purpose seed sowing machine is more productive. [6] **Marode A. etc, al.**, In this paper explained the type of seed sowing method. A field is initially prepared with a plough to a series of linear cuts known as furrows. The field is then seeded by throwing the seeds over the field, a method known as manual broadcasting. The result was a field planted roughly in rows, but having a large number of plants when the seeds are scattered randomly with the help of hand on the soil.

2. WORKING PRINCIPLE

The working principle of our model will start by engine power transmission through chain and sprocket arrangement mechanism. Here engine power shaft is connected to rear axle of the wheel where it produces the torque produces movement of the vehicle and we can control the speed of the machine by controlling the throttle provided in the machine.

Simultaneously another sprocket of same size in rear axle is used to maintain the same speed to provide the rotational effect to the another shaft which is below the seed sowing machine equipment the shaft rotates at the same speed as that of rear axle rotates. Here another larger teeth sprocket is used to provide rotational effect to seed sowing machine shaft. As this shaft consists of two circular plates and made a slot at specified distance to easily pick the seeds from the hopper as the rear axle wheels turns due to power transmission of engine the seed are dropped by the circular plate. The circular plates are turned in clockwise direction as the rotational effects provided by shaft and seed are dropped into ground. We are maintaining the speed of the machine very low so it produces maximum amount of torque. Hence the model can be run smoothly on agricultural land.

The multiple operations or working conducted by our model is:

- Softening the soil
- Seed bed preparation
- Seed sowing
- Leveling of the soil

3. CAD MODEL OF MAIN COMPONENTS

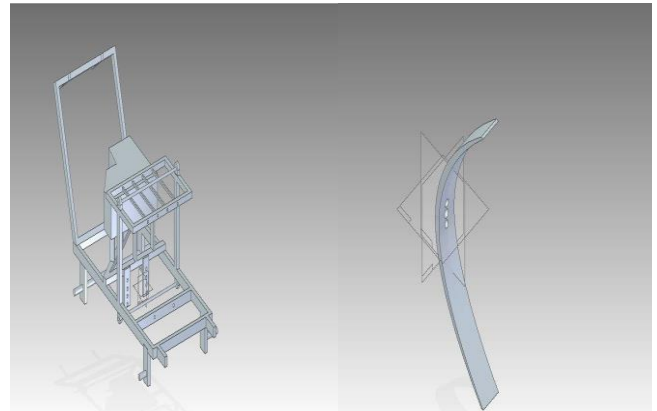


Fig. Frame & Furrow opener

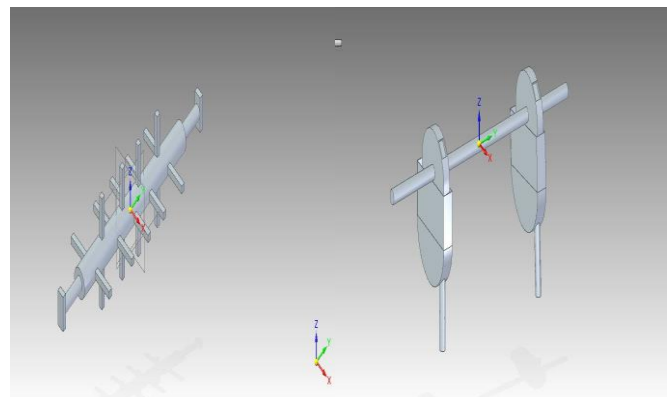


Fig. Soil softening blade & Hopper

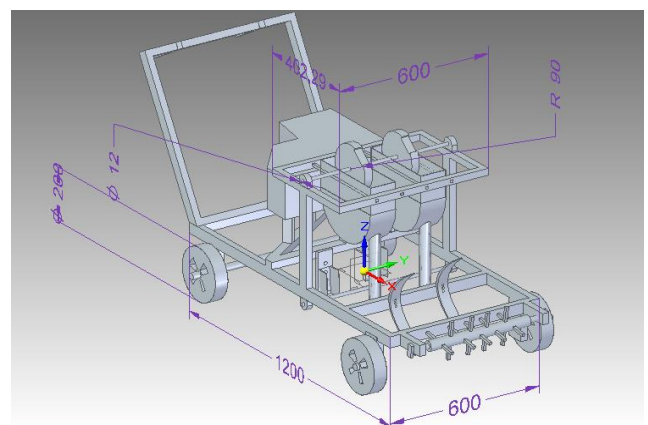


Fig. 3D view of CAD model

Table: Part list

PART NUMBER	PART NAME
1	SOIL SOFTENING BLADE
2	FURROW OPENER
3	HOPPER
4	CIRCULAR PLATE
5	SHAFT
6	ENGINE
7	SEED TUBE
8	SOIL CLOSING BLADE
9	GROUND WHEELS
10	MAIN FRAME



Fig. Assembled seed sowing machine

	COMPONENTS	QTY	SPECIFICATION
1	FRAME	1	MILD STEEL DIMENSION: 40X20 mm
2	ENGINE	1	99CC,2-STROKE PETROL ENGINE
3	SOFT SOILENING BLADE	1	MILD STEEL SHAFTDIAMETER:30mm LENGTH:560mm BLADE LENGTH: 90mm, WIDTH:30mm
4	FURROW OPENER	2	FORGED STEEL LENGTH:320mm WIDTH:60mm THICKNESS:2mm
5	SEED HOPPER	2	GI WIDTH:100mm LENGTH:300mm DEPTH:105mm
6	CIRCULAR PLATE	2	MATERIAL = WOOD DIAMETER =180mm
7	SHAFT	2	MILD STEEL DIAMETER =12mm LENGTH= 600mm
8	SPROCKETS	6	Z1 = Z2 = Z3= Z4 = Z5 = 32 TEETH Z6 = 48 TEETH
9	CHAIN	3	BICYCLE CHAIN PITCH OF CHAIN =15mm
10	GROUND WHEEL	4	SOLID TYRE DIAMETER = 200 mm

ENGINE SPECIFICATIONS

Type	Air cooled , 2 stroke engine
Bore	51.7 mm
Stroke	52.4 mm
No. of Cylinders	One
Displacement	99cc
Max. Engine output	5.3 kW @ 5500 rpm
Max. Engine output	7.2 bHp @ 5500 rpm
Max. Torque	9.4 @ 4500 rpm

CONCLUSION

After the development and trail on the “Agricultural Automobile (Seed Sowing machine)”. Conclusion which we made is as follows:

- Based on the overall performance of the machine we can definitely say that the project will satisfy the need of small scale farmer, because of their requirements is full filled.
- The machine requires less man power and less time compared to traditional methods, the unit cost of the product can greatly reduce by mass production and we hope this will satisfy the partial thrust of Indian agriculture.
- Today’s major labour problem in farming can be solved.

REFERENCES

[1]Kannan and K Esakkiraja, Design Modifications in Multipurpose Sowing Machine, International Journal of Research in Aeronautical and Mechanical Engineering, 2014, 2, 35- 40.

[2]Roshan V Marode and Gajanan P Tayade, Design and Implementation of Multi Seed Sowing Machine, International Journal of Mechanical Engineering and Robotics Research, 2013, 2, 267-276.

[3]Gopal, D.D., More, V.M., Lokhande, M.S. and Joshi, S.G. Robotic Agriculture Machine. IJIRSET. 2014. 3 (Special Issue 4).

[4]Srinivas, R.Z. and Kokate, R.D. Advanced Agriculture System. IJRA. 2012. 1(2) 107-112.

[5]Aditya Kawadaskar, IJPRET, 2013; ISSN: 2319-507X Volume 1(8): 267-276Uttam. S.K and Das. S.K.”Row spacing, N and mulching on yield, RUE and Nutrient uptake of rain fed wheat” Madras Agricultural Journal. 81(10):534-537.

[6]Prof. R.V. Jadhav - Performance evaluation of tractor drawn multi-crop planter for sowing of ground nut.

[7]Sunil. [M.P.K.V.](2008-09) – Development and performance evaluation of multi-crop planter for low HP tractor (18.5Hp)

[8]Deshpande Shital. .[M.P.K.V.] (2010-11) - Performance Evaluation of Bullock Drawn Light-Weight multi crop planter.