

Design and Fabrication of Manually Operated Seed Sowing Machine

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Abstract - Seed sowing devices plays a wide role in agriculture field. Seed sowing operation is to put the seed and in rows and seed to seed spacing, cover the seeds with soil and provide proper compaction. In order to meet the full requirements of growing population and rapid industrialization modernization of agriculture is essential. The mechanization enable reducing labour and easy to maintained for higher crop production. Main idea of this project is design and fabricates the seed sowing machine in field. Traditional sowing is done by tractor or farmer which carry bull's, so this become costly for farmer which has small farmer land so to over come this problem a seed sowing machine is developed which will be beneficial for farmer for seed feeding on field.

Key Words: seed sowing machine, seed spacing, feed rate, crop, fabrication.

1. INTRODUCTION

This Indian economy is based on agriculture. Development in agriculture leads to raise economic status of country. In India farmers are facing problems due to unavailability of labours, traditional way of farming using non efficient farming equipment which takes lot of time and also increases labour cost. This is all about enhancement in seed sowing and fertilizer like farming operations by using manual operated seed sowing machine.

Hence for achieving best performance from a seed planter, the above limits should be optimized. Thus need to make proper design of the agriculture machine and also selection of the components is also required on the machine to suit the needs of crops. Traditional method of seed sowing based on assumptions of seed to seed spacing and depth of placement which is not at all efficient and beside this it requires lot of time and efforts too.

2. LITERATURE SURVEY

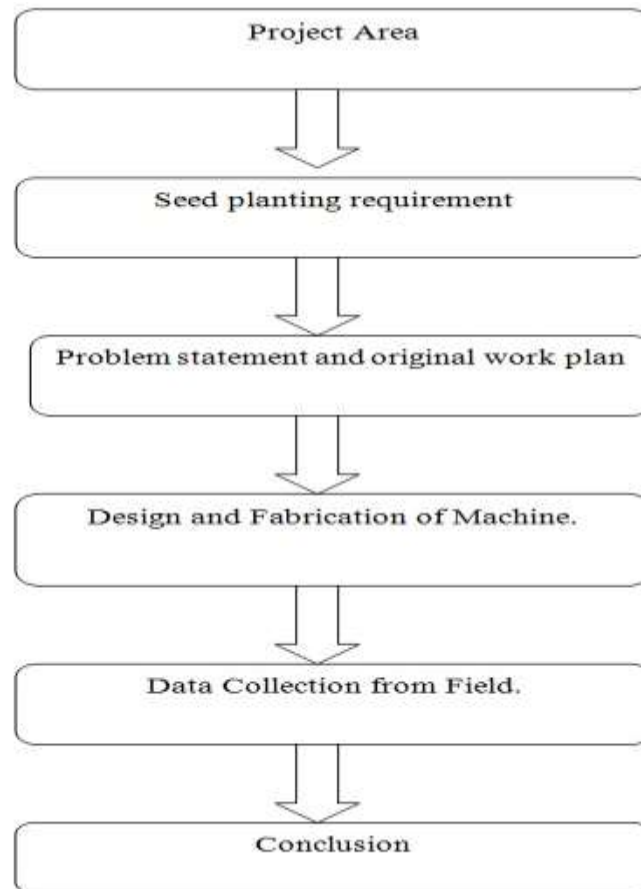
Agriculture in India has a significant history. Today, India ranks second worldwide in farm output. Still, agriculture is demographically the broadest economic sector and plays a significant role in the overall economic fabric of India. The various sowing methods used in India for seed sowing. The comparison between the traditional sowing method and the new proposed machine which can perform operation has number of advantages.

Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

3. OBJECTIVES

- To maintain the same distance between two seeds at the time of sowing process.
- Developed machine will be mostly used by the farmers for producing high yield crops with the minimum investment.
- Reducing the investment of the small farmers.

4. METHODOLOGY



5. TYPES OF SOWING METHODS

Multi row traditional seeding devices with manual metering of seeds are quite popular with experienced farmers. In manual seeding, it is not possible to achieve uniformity in distribution of seeds. A farmer may sow at desired seed rate but inter-row and intra-row distribution of seeds is likely to be uneven resulting in bunching and gaps in field.

- **Dribbling:** Once the seeds are put in the holes, they are then covered with the soil. This saves time and labour and prevents the damage of seeds by birds.



Fig 1.Dribbling

- **Putting Seeds Behind The Plough:** It is dropping of seeds behind the plough in the furrow with the help of manual labour by hand.



Fig 2. Putting Seeds Behind The Plough

- **HAND SOWING:** A hand seeder can be used for sowing. Hand sowing may be combined with pre-sowing in seed trays. This allows the plants to come to strength indoors during cold periods.



Fig 3. Broadcasting

6. FACTORS AFFECTING SEED EMERGENCE

Mechanical factors, which affect seed emergence, are: Soil is covered uniformly over the seed. Its depth should be uniform with regard to placement of seed ..Its transverse displacement with regard to row also considered It should be distributed uniformly along the rows. .Loose soil getting is also prevented.

7. FABRICATION

For proposed work following components are fabricated.

7.1 Hopper It is an arrangement to store the seeds. Hopper capacity varies a from 2kg to 8kg. Due to the concentrated hopper very low quantity of seeds can also be sown.

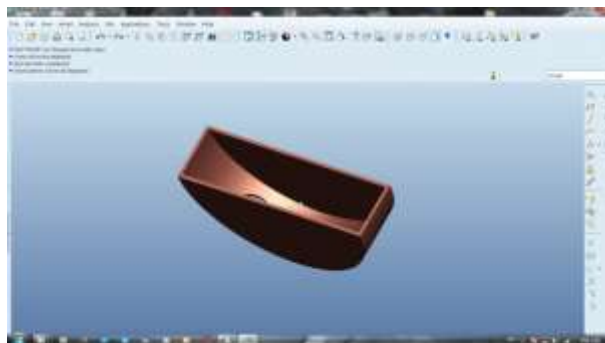


Fig 7.1.Hopper.

7.2 MAIN FRAME:For the proposed machine mild steel rectangular bar of 80mm x 60 mm and 3mm thickness were used to give the required rigidity.

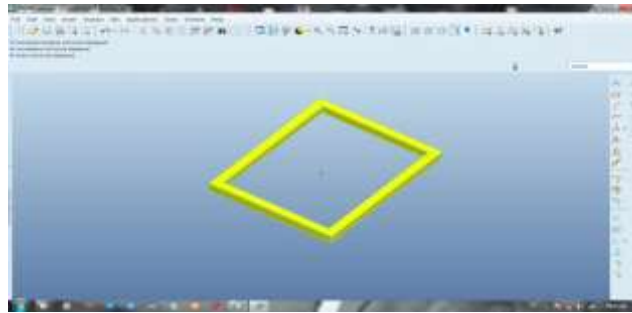


Fig 7.2 Frame.

7.3 FURROW OPENER: The Furrow opener made of mild steel square pipe. Nut and both were used to fasten the device to the frame through a hole drilled on the frame for adjusting sowing depth according to crop.



Fig 7.3.Furrow

7.4 SEED TUBE: The seed tube is made of M.S pipe 30mm diameter and 100 mm long. Two holes of 75mm diameter each were made at the hopper at the lower part of the hopper.

8. WORKING PRINCIPLE

First seed in the one section of hopper with manually. Height of handle is adjusted with help of adjustable furrow . While working furrow are penetrated in soil.

System that will made, uses the manual pull force to run mechanism. Rotary motion of ground wheels provided to the main shaft. When a labour pulls the machine, the motion is transmitted from ground wheels to shaft and then metering disc rotates. Seeds are came in slots of disc and due to rotation it came in other section where lower hole in hopper and seed discharge to soil with the help of seeder pipe. The seeds will get placed in the furrows through the pipes.

9. CALCULATION

9.1DESIGN OF FURROW

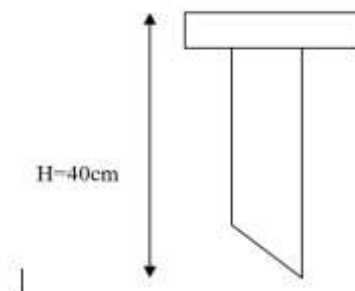


Fig: 9.1.2D View of Furrow

Force exert on the opener is

$$F_D = K_o * w * d$$

Where,

F_D =Draft Force

K_o =spe.soil resistance.

w =Width of opener.cm

d =Depth of opener.cm

Therefore, bending moment

$$M = \text{draft} * \text{length}$$

$$M = 35316 \text{ N.mm}$$

We take square pipe of 25.4*25.4mm²

So,

$$M = \sigma * z$$

$$35316 = \frac{\sigma * [25.4^4 - (25.4 - 8)^4]}{6 * 25.4}$$

$$\sigma_{\text{actual}} = 16.52 \text{ N/mm}^2$$

As actual bending stress is less than the theoretical bending stress for mild steel hence design is safe.

9.2 DESIGN OF FRAME

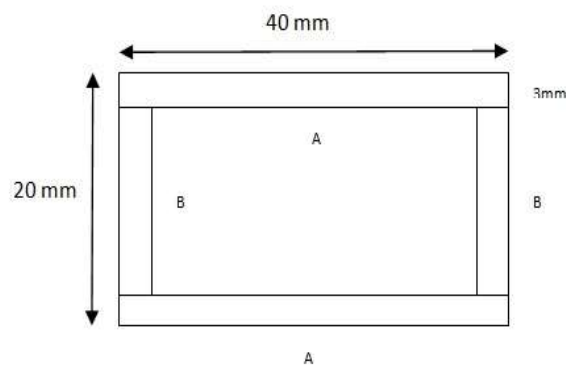


Fig: 9.2 Cross Section of Frame

We took 40mm*25mm*3mm rectangular pipe.

$$14.42 * 1000 = \sigma_{\text{act}} * \left[\frac{25 * (25 * 2)^3 - (25 - 6) * (25 * 2 - 6)^2}{6 * 50} \right]$$

$$\sigma = 4.74 \text{ N/mm}^2$$

10. OBSERVATION Type of seed:-Gram Capacity of hopper to carry Gram is 2 kg.



Tine in Sec 0. Graph between Distance vs. Time

11. ADVANTAGES

Less maintenance cost.

- Since seed can be poured at any required depth, the plant germination is improved.

- Dependency on labour also decreased. Also it saves time of sowing.
- Uniform placement of seeds in row with required distance.
- Proper compaction over the seeds is provided.

11. DISADVANTAGES

- Difficult to operate in moist condition.
- Seed Sowing for Cotton is Difficult.

12. SCOPE FOR FUTURE IMPROVEMENT: After installation and establishing successful working of the machine, it is proposed to concentrate on value engineering to increase the future value of the machine in all aspects. Presently, full focus is given only to design modification in seed metering mechanism for the benefit of the small farmers. At present, seed metering mechanism is used for sowing different types of seeds with single metering mechanism. We can use separate metering mechanism for every seeds. Thus, we can increase the value of the machine in future.

13. CONCLUSION: In this seed sowing machine is designed for the farmer having small farming land say 5 to 6 acres. Machine is made by low cost material like mild steel and wood. Which save the whole cost of project. This machine is suitable for seed feeding of various types of seed such as gram, toor and soyabeans at minimum cost for farmer so that he can easily afford. The proposed machine is fabricated to cost reduction, easy to maintain as well as reduces labour cost. Hence by using this machine we can flexibation of distance and control depth variation for seed feeding of different seeds feeding in field.

It is concluded that seed sowing machine has highly potential for increasing production of planting in small land.

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