IOSR Journal of Engineering (IOSRJEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
Vol. XX, Issue XX (XXXXX. 2018), ||XX|| PP 23-28

Design and Manufacturing of Multitasking Seed Sowing Machine

A. S. Talekar, F. M. Shaikh, D. S.Dole, S. M. Awatade, V. S. Mane, S. D. Wankhede

(Department of Mechanical Engineering, M.E.S. College of engineering, S.P. Pune University, India)

Abstract:*The fundamental necessities for little scale trimming machines are, they ought to be appropriate for little ranches, basic in plan and innovation. In the cultivating procedure, frequently utilized regular seeding activity takes additional time and more works. The seed encourage rate is all the more however the time required for the aggregate task is progressively and the aggregate cost is expanded because of work, employing of gear is walking towards the fast development of all divisions including the agrarian part. To meet the future sustenance requests, the new strategies are utilized they won't influence the dirt surface yet will build the general harvest creation. Today, India positions second worldwide in cultivate yield. Around 75% individuals are living in the country territory are as yet subject to agribusiness. Around 43% of geological region is utilized for farming movement. Agribusiness has been the foundation of the Indian economy. This paper manages the different sowing techniques utilized as a part of India for seed sowing. The correlation between the conventional sowing technique and the new proposed machine which can play out various synchronous tasks and handle distinctive breadth of seeds.*

Keywords: *Crop Production, Design, Feed Rate, Labours. Manufacturing, Seed, Sowing.*

I. Introduction

The fundamental capacity of sowing activity is to sow the seed and manure in lines at required profundity and to keep up the separation between the seeds and give legitimate compaction over the seed[1-2]. A sowing machine is a gadget that plants or sows the yields, it burrows a wrinkle puts the seed or seeds into the wrinkle and covers it. Seed sowing machine guarantees consistency in seed broadcasting and spares time and cash. The column dividing for soybean seed is 15 to 18 inch and seed separating as 2 to 3 inch. For corn seed the column and seed dispersing is 15 inch and 6 inch separately. For groundnut which having around 7.2mm in breadth has push separating from 6 to 12 inch[2].

Manual strategy for seed planting, brings about low seed position, dispersing efficiencies and genuine spinal pain for the agriculturist which restrains the extent of field that can be planted. To accomplish the best execution from a seed grower, as far as possible are to be streamlined by Proper plan and determination of the parts required on the machine to suit the necessities of products.

The essential target of sowing activity is to put the seed and manure in lines at wanted profundity and seed to seed separating, cover the seeds with soil and give legitimate compaction over the seed [1]. The prescribed seed to seed dispersing and profundity of seed situation fluctuate from harvest to edit and for various agro- atmosphere conditions to accomplish ideal yields[3].

II. Factors Affecting Seed Emergence

Mechanical factors, which affect seed germination and emergence, are:

- The depth of placement of seed is uniform.
- Continues distribution of seed along rows.
- Diagonal displacement of seed is also constant.
- Soil should cover all over the seed.
- Proper spacing between two seed must be same.

To accomplish the best execution from a seed penetrate or grower, the above elements are to be upgraded by legitimate outline and determination of the segments required on the machine to suit the necessities of the products. The seed penetrate or grower can assume a vital part in controlling the physical condition. The metering framework chose for the seed ought not to harm the seed while in task.

Table 1: Daimeter of different seed

Seed name	Diameter(mm)
Arugula	2.5
Beet	7.5
Broccoli	3.5
Cabbage	3.5
Carrot	3.5
Cauliflower	3.5
Corn	13.5
Cucumber	9
Lettuce	6
Okra	7.5
Onion	6
Pea	10
Radish	4
Sun flower	2.5

Table 2: Details for the planting seed

Vegetable	Distance between plants(cm)	Planting depth (cm)
Asparagus	30	2.5-4
Beet	3-5	1.5
Broccoli	45-60	0.5-1.5
Cabbage	45	0.5-1.5
Carrot	3-5	1.5
Cauliflower	45-60	0.5-1.5
Corn	15-25	2.5
Okra	30	2.5
Onion	5-8	1.5-3
Pepper	60	1.5
Potato	25-30	10
Radish	2.5	1.2

III. Construction

Fig. 1: Seed sowing machine model

This gear comprises of Rectangular shape compartment in which the seeds can fill. The limit of this compartment is up to 8 kg to 10 kg. The holder is joined on the four wheeled transporter get together. The wheels made up with polymer material, holder having a metering plate with effectively fissionable with Allen keys,metering plate turn in holder, base of the compartment having a two gap and metering plate has number of openings rely upon size of seed. The plate will turn in compartment when the base openings of holder and meter plate gap correspond seeds will course through pipe to soil.

IV. Working

Principle

Here the metering plate gets pivoting movement by angle outfit get together and the incline gears get the movement by raise wheels with the assistance chain and sprocket get together. The working standard of this machine is exceptionally straightforward and requires just a single man to work. It is a

twofold line seeding gadget appropriate for sowing distinctive yields. Seeding is proficient by simply driving the gadget in a pre-built up wrinkle. The sowing activity is to put the seed in wanted profundity and seed to seed dispersing, when the machine is pushed, with the assistance of metering plate the seeds are nourish in to the ground at amend rate and separation. Here the metering plate pivots anticlockwise way and which get a turning movement with the assistance of back wheels associated through chain sprocket, chain and slant adapt gathering. The plan made such that we can control the profundity of sowing. With the assistance of this machine the formers can spare parcel of work cost.

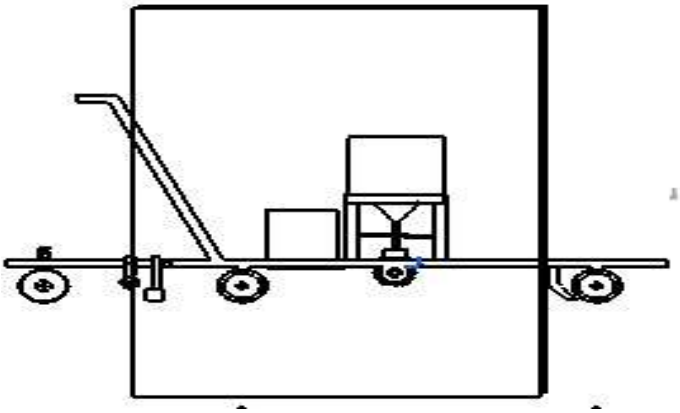

Fig. 2.Working principle of cotton seed sowing machine

V. Components Used

- Chain and sprocket
- Bevel gear
- Disc
- Seed storage tank
- Frame
- reciprocating pump

5.1 Chain and sprocket

Fig. 3: Chain and sprocket

A sprocket or sprocket-wheel is a profiled wheel with teeth, gear-teeth, or even sprockets that work with a chain, track or other punctured or indented material. The name 'sprocket' applies for the most part to any wheel whereupon spiral projections connect with a chain ignoring it. It is recognized from a rigging in that sprockets are never fit together straightforwardly, and varies from a pulley in that sprockets have teeth and pulleys are smooth. Sprockets are utilized as a part of bikes, cruisers, autos, followed vehicles, and other hardware either to transmit rotational movement between two shafts where gears are unacceptable or to confer direct movement to a track, tape and so forth.

5.2 Bevel gear

Two imperative ideas in adapting are pitch surface and pitch point. The pitch surface of a rigging is the non-existent toothless surface that you would have by averaging out the pinnacles and valleys of the individual teeth. The pitch surface of a standard rigging is the state of a barrel. The pitch point of a rigging is the edge between the substance of the pitch surface and the pivot. The most commonplace sorts of incline gears have pitch edges of under 90 degrees and hence are cone-molded. The pitch surfaces of fit outer angle gears are coaxial with the rigging shafts; the peaks of the two surfaces are at the purpose of crossing point of the pole tomahawks.

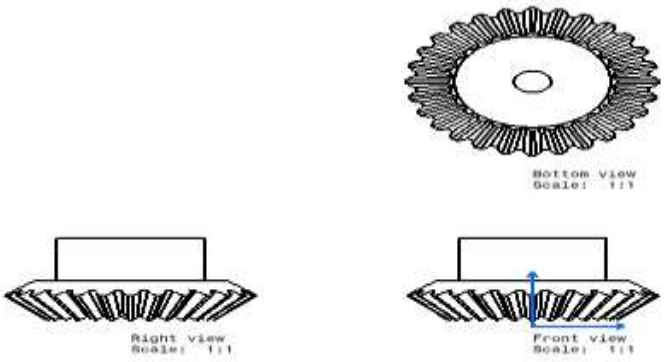

Fig.4
Bevel gear

5.3 Frame

Frame is made from hollow square pipe. Aim of frame to give support to the components. Material of the frame is mild steel.

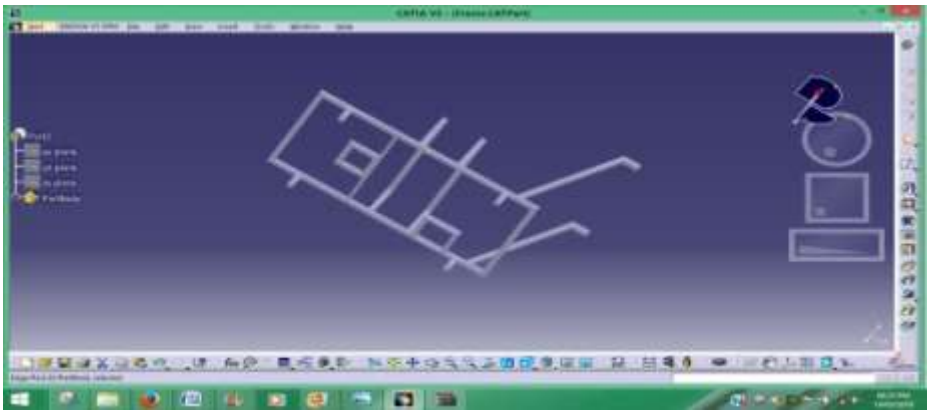

Fig. 5: Frame of cotton seed sowing machine

VI. Results And Discussions

We studied total deformation in shaft by using total deformation theory we get 0.2143 mm maximum deformation.

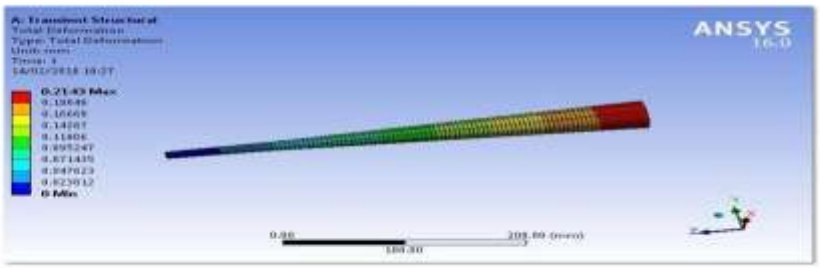

Fig. 6: Total deformation of shaft (transient structure)

\We have find out equivalent stress (von-mises) stress which is max 160Mpa

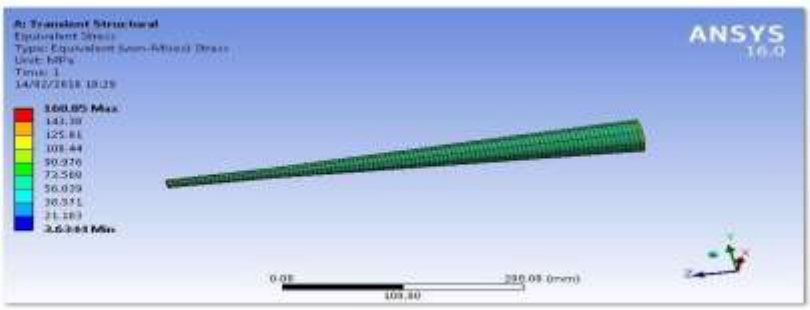

Fig. 7: Equivalent von mises stress (transient structural)

In transient structure we find out maximum principle stress, from this our design is safe according result.

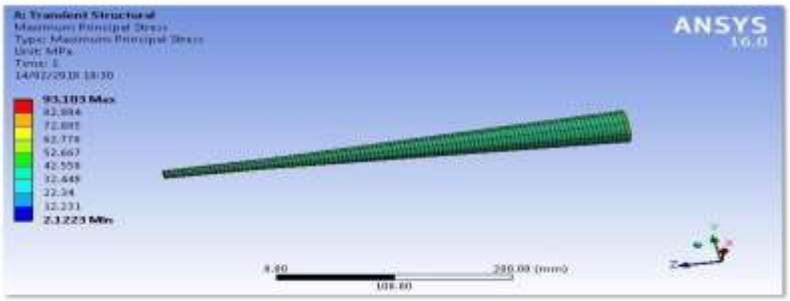

Fig. 8: Maximum principal stress (transient structural)

VII. Conclusion

We can design for more than two rows, also our design can be modified by using motor drive and it is also used for multiple crop size. It is a single system which contains multi attachments and can be easily assembled and dismantled comfortably. The equipment can do the work of 4 labours a day which reduces the labour cost of the farmer. It is user friendly machine which can handle various seed sizes. Due to this equipment crop yield, cropping frequency and seed planting increases. It is used to drop seed at constant distance due to this planting efficiency increases. This machine is made of durable and cheap material. So it is affordable for the small scale farmers.

References

1. Kyada, A. R, Patel, D. B. Design And Development of Manually Operated Seed Planter Machine" "
2. Amol B. Rohokale*, Pavan D. Shewale*, Sumit B.Pokharkar*, Keshav K. Sanap* A Review On Multi-Seed Sowing Machine" , International Journal of Mechanical Engineering and Technology, Vol.5, No. 2, pp. 180-186, 2014.
3. Design And Implementation Of Multi Seed Sowing Machine" Roshan V Marode1*, Gajanan P Tayade1 and Swapnil K Agrawal.
4. Adisa A F, Braide F. G, "Design And Development of Template Row Planter", Transnational Journal of Science and Technology August 2012 edition vol. 2, No.7
5. Design and Fabrication of Mulching CUM Automatic Paper Rolling and Tree Planting Machine (Abhishek Navghare, Anshul Tambekar, Harshit Pandey, VickyNavghade, Prof..Ranjeet Mane)
6. Braide, Njidda "Developed a Combined Jab Planter", tjournal, 1989
7. Abubakar, "The Principle of Jab Planter in Applying Fertilizers", 1987