

Design and Analysis of Multi Purpose Cutting Machine for Agriculture

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Abstract- The recently structured yield cutting unit works without utilizing any sort of fuel or electrical vitality and can be worked with more muscle power. This gear utilizes joined sharp edges for effective yield cutting. The present structured and manufactured harvest shaper can be utilized to cut the straws of various nourishment grain crops like Paddy, wheat and furthermore grass. It is basic in development and the working is simple. The yield shaper is really a use of unadulterated mechanical information to improve the nature of work with least work and time, extent of research in farming types of gear despite everything stays a prolific field for creative thoughts.

Keywords- Paddy Thresher, groundnut stripper, Straw cutting, Sugarcane Seed Cutting.

INTRODUCTION- in India agriculture has been confronting genuine difficulties like shortage of agrarian work, in top working seasons as well as in ordinary time. Then again cultivable land is diminishing due to urbanization; agricultural automation is one approach to beat this problem. The fundamental farming items in India are groundnut, paddy, sugarcane and wheat. A portion of these agriculture items are clarified underneath

For ranch of sugarcane, the sugarcane seed must be planted in wet soil. This sugarcane seed is only piece of sugarcane. In customary manner ranchers use to cut entire sugarcane in 5-6 sections, so that each part having 2-3 seeds. At that point those cut parts are planted in soil. Straw is remaining piece of Jowar and Maize plant, after evacuation of corn part. Rancher use to cut this straw and utilize

this cut parts as nourishment for pet animals like wild oxen, bull, cows and goat etc. Groundnut is one of the significant agriculture items in India. Rancher use to isolate groundnuts from its plants by physically. This requires more labour as 20-30 works for each section of land, and furthermore this is tedious operation. Rice is one of the most loved nourishments of India. Paddy is its underlying phase. Ranchers expelling this paddy from paddy plant called as paddy stripping, and this is finished by a few techniques. More often than not ranchers use to expel paddy from its plant by physically.

METHODOLOGY - Methodologies used in this machine are explained below.

1. Sugarcane Seed Cutting- The sugarcane seed cutting machine is essentially founded on CAM Activity. One shaft put vertically, the sharp cutting edge is put at the base of this pole. Rotator movement of the cam is changed over into linear movement of shaft. A pin is put at the base so misuse of sugarcane and sugarcane with seeds will be isolated.
2. Groundnut Stripper- Groundnut stripper comprises of elastic sharp edges mounted on the little shaft which will turn by engine. The intensity of engine is transmitted to the edges through shaft. The groundnut plant will be feed to cutting edges with the assistance of slider by physically. At that point turning cutting edges will isolate the groundnut from the plant.

3. Straw Cutter- Straw shaper comprises of three sharp edges which are mounted in roundabout ring that is associated with engine through belt drive. The intensity of engine is transmitted to the ring with the assistance of pulleys and belts. That pivoting cutting edges will cut the straw in little pieces.
4. Paddy Stripper- Paddy stripper comprises of two edges. These edges are mounted on one focal shaft, and that pole will associated with engine through pulleys and belt. The intensity of engine is transmitted to edges. The turning edges will isolate the paddy from plants.

Literature Survey-

- 1) "Rudolf charles, Et al" in his paper titled "Design and fabrication of crop cutter for multipurpose application" has stated The crop cutter was designed keeping small scale farmers in mind. This crop cutter which was designed is having good harvesting capacity for small farms. Since it does not utilise any engine for its operation, the cutting action is done by cranking of lever by hand.
- 2) "Pradeep Tyagi, Et al" in his paper titled "Design and fabrication of multi crop cutter" has stated The research work focusing on harvesting operation to the small land holder to cutting varieties of crop in less time and at low cost by considering the factor as power requirement, ease of operation , field condition, time of operation and climatologically condition.
- 3) "Marco Bentini, Et al" in his paper titled "Prototype for the harvesting of cultivated herbaceous energy crops, an

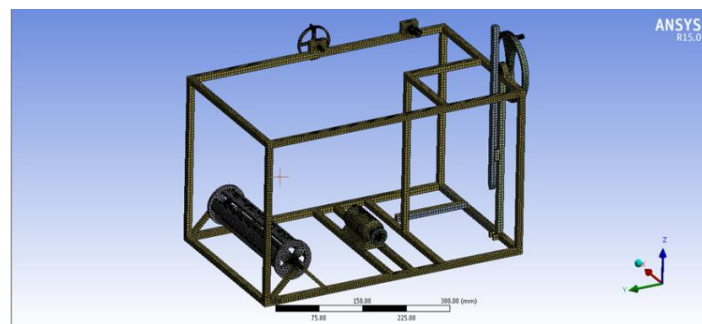
economic and technical evaluation" has stated to create a reliable supply chain it is necessary to achieve efficient and sustainable cultivation. In particular the phase of harvesting and pre-treatment of the biomass can improve its characteristics, increase energy density, and reduce storage, transport and handling costs.

- 4) "Sandeep kumar, Et al" in his paper titled "Development of multipurpose Agriculture cutter" has stated we studied about harvesting operation to the small land holders for harvesting varieties of crop in less time and at low cost by considering different factors as power requirement , cost of equipment , ease of operation , field condition
- 5) "Dhatchanamoorthy.N, Et al" in his paper titled "Design and Fabrication of Multipurpose Agriculture Vehicle" has stated that harvester design is based on the design of brush cutter. The cutter is more robust and stronger. The denser vegetation can be cleared with it easily.
- 6) "Amar B. Mule, Et al" in his paper titled "Design And Fabrication Of Harvesting Machine" has stated the cutting and threshing machine for seed separation this method the crop are remove as mentioned in the traditional method. These method crops are tied together to from a bundle. These bundles are garnered and taken to threshing machine.
- 7) "Sharath Chandra, Et al" in his paper titled "Concept Design and Analysis of Multipurpose Farm Equipment" has stated that the recommended drown to row spacing seeds rate, seed to seeds

spacing and depth of seed placement vary from crop to crop and for different agro-climatic conditions to achieve optimum yields.

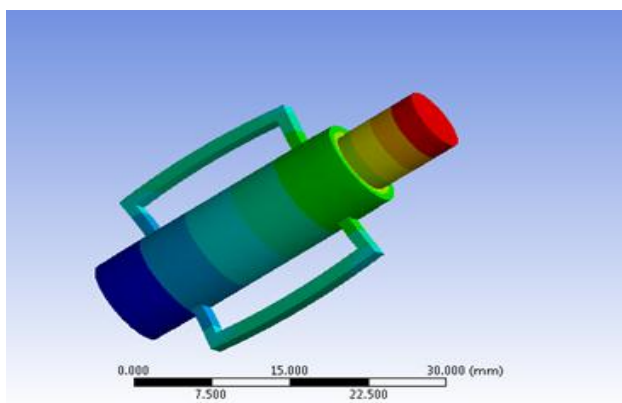
- 8) "J.P.Wagh, Et al" in his paper titled "Sensor Based Multipurpose Agricultural Cutter" Kinematic linkage design and drawing of mechanism for eccentric, movable arm bracket, movable blade arms , etc using 'Kinematic overlay method'. The kinematic linkage drawing will be developed in 2-d using Auto-Cad software.

Design Work-

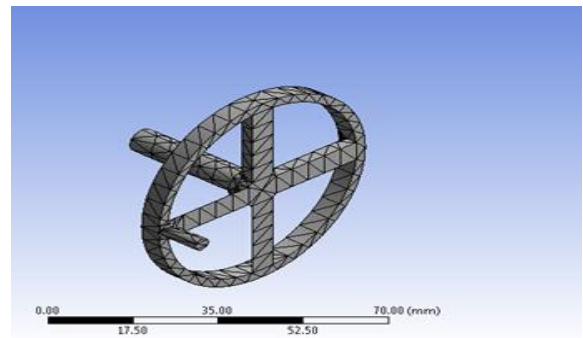


Machine Frame

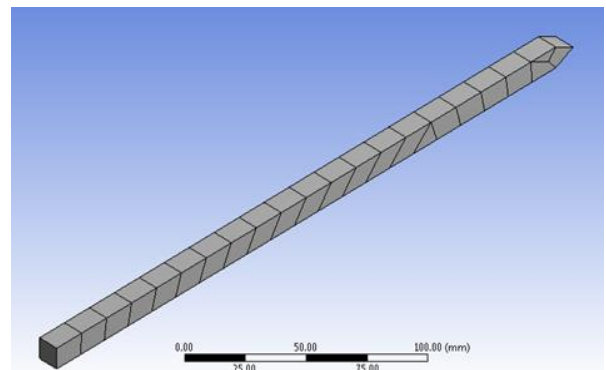
Design of Components -



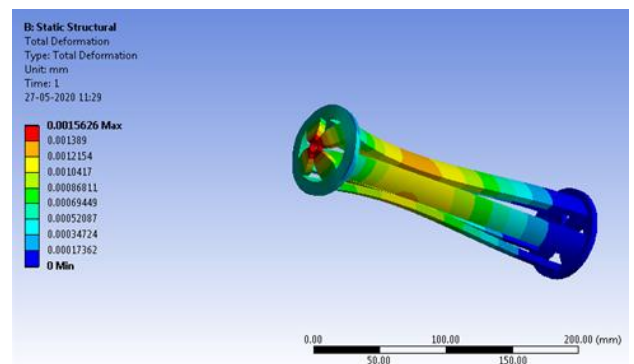
Groundnut Stripper



Straw Cutter Wheel



Sugarcane Seed Cutter



Paddy Stripper

Design and analysis Data-

- 1) Paddy Stripper-
 - Material- Structural Steel
 - Dimension- 250x70x70 mm
 - Volume- 1.528e+005 mm³
 - Force= 200N
 - Compressive Yield Strength= 250Mpa
 - Tensile Yield Strength= 250Mpa
 - Tensile Ultimate Strength= 460Mpa
 - Reference Temperature= 22 degree

2) Groundnut Stripper-
Material- Structural Steel
Dimension- 40x20x10 mm
Volume- 2889.4mm³
Force= 200N
Compressive Yield Strength= 250Mpa
Tensile Yield Strength= 250Mpa
Tensile Ultimate Strength= 460Mpa
Reference Temperature= 22 degree

3) Straw Cutter Wheel-
Material- Structural Steel
Dimension- 45x60x60 mm
Volume- 5057.4mm³
Force= 200N
Compressive Yield Strength= 250Mpa
Tensile Yield Strength= 250Mpa
Tensile Ultimate Strength= 460Mpa
Reference Temperature= 22 degree

4) Sugarcane Seed Cutter-
Material- Structural Steel
Dimension- 300x10x10mm
Volume- 3000mm³
Force= 200N
Compressive Yield Strength= 250Mpa
Tensile Yield Strength= 250Mpa
Tensile Ultimate Strength= 460Mpa
Reference Temperature= 22 degree

- The analysis has predicted a maximum deformation in all components is 0.0026566 meters to 0.0027802 meters.

Objectives-

- To perform more than each activity in turn.
- It is appropriate for high volume creation of farming item.
- To diminish the majority of handling time.

- To diminish work cost.
- To beat the issue of work emergencies.
- It should require Less Man Power.

Advantages-

- The machine has compact design lead to requirement of less workspace because of which operator can easily control over the machine handling.
- Due to less cost reduces the initial cost of machine allow poor farmers to buy this machine.
- The machine is suitable for small farms.
- Machining operation is quite easy.
- Machine is used for multi crop such as sugarcane, groundnut, straw, paddy, etc.

Future Scope-

The future extension for this machine is exceptionally wide. In showcase separate machines are accessible for singular activity and furthermore these machines are costlier. Some progressively number of tasks can be consolidated. What's more, a portion of the activities should be possible by physically dealing with. On the off chance that wheels are given to machine, at that point it can moved starting with one spot then onto the next spot.

Conclusion-

In multipurpose cutting machine, four individual activities are consolidated. By utilizing this machine the issue of work emergencies can be diminished, in light of the fact that it makes the procedure quicker and work required for work the machine is additionally less. It performs more than one activity, so preparing time can be spared. In the sugarcane seed cutting activity wastage of sugarcane can be controlled and sliced seeds are anything but difficult to planting. In the groundnut stripping activity rather than 10-20 works for each section of land just two works can isolate the groundnuts from plant by utilizing this machine. In the paddy stripping

activity while isolating paddy from plant wastage will be more in conventional strategies. By utilizing this machine wastage will be less and rather than 5-6 works just 2 works can do similar activities in least time. If this machine is utilized by most extreme number of ranchers certainly rancher can defeat the work emergencies issue, which lessens the works cost and procedure become quicker and simple

References-

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