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Design and Fabrication of Mechanical Weed Control Machine

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ABSTRACT

India contains 65% population depending on agriculture. Generally, Indian farmers use traditional way that is spray carry on backpack and weeding is done by bulls. Many other weeding methods are used by Indian farmers such as manual weeding, chemical weeding, biological weeding, thermal weeding etc. but all of these methods are time consuming as well as not economical for farming processes. All the problems caused in traditional way of weeding overcome using mechanical weed control machine. In developing the mechanical weed control machine especially considering the fact that the majority of farmers are having small land. So they can hardly afford costlier tractors. Main objective of this machine to reduce the manpower as in today labors are very hard to find. As well as the working time is more as rotary power from the cutter shaft is directly transmitted to specially designed blades of cutter. By using this machine weed cutting will be less as compared to traditional methods of weeding.

Keywords: Agriculture, Weeding, Mechanical weed control machine, Tractor, Cutter, Blades, Cutter shaft, Reducing manpower.

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I. INTRODUCTION

Agriculture is a backbone of Indian economy, majority of Indian population depends on agriculture. Agriculture products has prime important in the national economy. One of the major reasons for lack of agricultural productivity is weeds. A weed is essentially any plant which grows where it is unwanted. It is a plant that competes with crops for water, nutrients and light. This can reduce crop production. Some weeds have beneficial uses but not usually when they are growing among crops. Weeds decrease the value of land, particularly perennial weeds which tend to accumulate on long fallows; increase cost of cleaning and drying crops (where drying is necessary). Weeding is the removal of unwanted plants in the field crops. Weeds may be unwanted for a number of reasons. An important one is that they interfere with food and fibre production in agriculture, wherein they must be controlled in order to prevent lost or diminished crop yields. Weeds have long been a concern, perhaps as long as humans have cultivated plants. Manual weeding requires huge labour force and it is a time-consuming process. It is necessary to design the weeder which minimize the human effort and provide efficient work output. In general weed can be control using manual operations like hand axes or knives. There are so many machines developed in the market but they are not able to reach up to the customer satisfaction because of cost, complicated design, due to maintenance, etc. Main objective of our project is to reduce the manpower as in today's scenario labours are very hard to find as well as it reduces the working time. And this project to design is able to fulfil the present requirement for the weed control.

II. PROBLEM STATEMENT

From survey, we found one of the major reasons for lack of agricultural productivity is weeds. So we decided to select a project based on weed removal machine. The losses caused by weeds exceed the losses caused by any other category of agricultural pests. Weeds may be unwanted for a number of reasons. An important one is that they interfere with food and fibre production in agriculture, wherein they must be controlled in order to prevent lost or diminished crop yields.

A. OBECTIVES :

1. Pertaining to technical aspects: To design and model a weed control machine.

2. Pertaining to economy and cost:
   The cost should be minimum and affordable.

3. Machine should really help the farmer to reduce labor cost and to increase productivity.

4. Pertaining to size:
   The machine should be compact and able to perform its required function satisfactorily.

III. CONSTRUCTION

Mechanical Weed Control Machine consists of following components:

- Chassis
- Engine
- Differential
- Pulleys
- Pedestal Bearings
- Cutters
- Bolts
- Belt
- Handle
- Wheels

IV. WORKING

Weeding is the process of removing the weeds from the field. Weeder or Weed control machine is an agricultural machinery used to process of weed removing.

In this project the idea is to make the mechanization of small scale weed control machine. A 2-stroke petrol engine powers the entire mechanism of the cutter. The engine along with the cutter is mounted on the chassis. The chassis is supported on wheels at the front end and rear end.

1. Output power from the engine shaft is transmitted to shaft of differential assembly by using power transmitting devices like belts.
2. Vertical shaft of differential assembly is transmitting the power received from engine to the two cutter shafts which are fixed at the front end of chassis.
3. Two cutter shafts are having rotary motion. This motion also rotates the two cutters which are welded at the bottom of those two particular shafts.
4. Due to the rotation of the cutters at ground level in the field. The weed gets cut and thus the motive of the project gets accomplished.
5. Handle is attached at the rear end to move the machine throughout the field at where the weeding is desired.

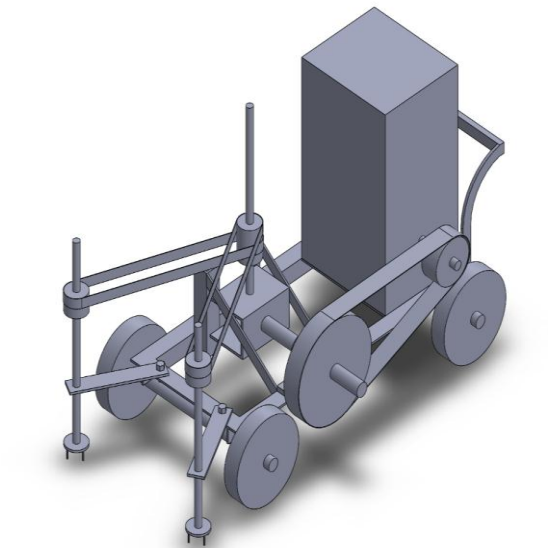

Fig: Model of Mechanical weed control machine

V. ANALYSIS

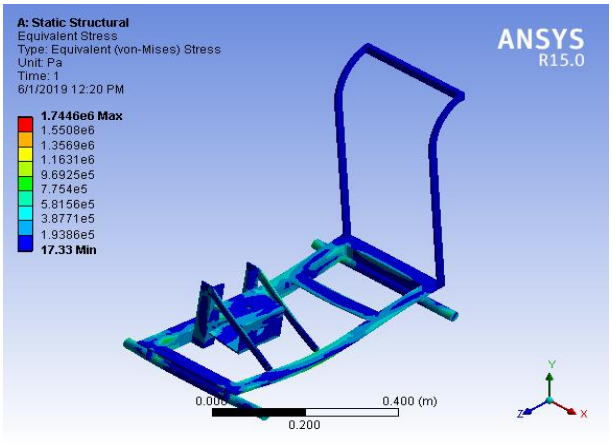

Fig: Stress Analysis

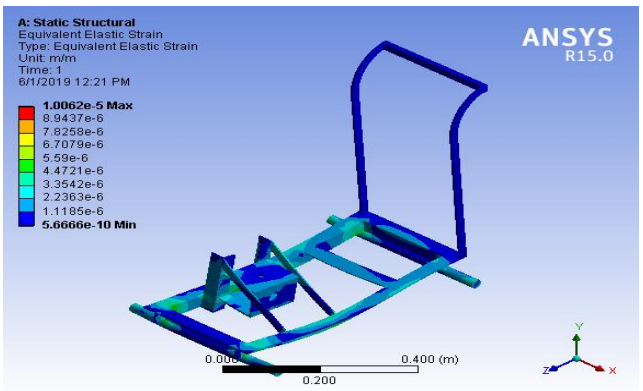

Fig: Stain Analysis

VI. CONCLUSION

The Weed removal machine is built to be compact and efficient to cut the weeds. The machine was tested on a field to check its weeding capability and efficiency. The test results were successful as the machine performed flawlessly. It can be concluded that the machine is comparatively compact and easy to handle. This machine is able to run of field effortlessly and the efforts of farmers are reduced. The cost of weeding using this machine is considerably less as compare to manual weeding. The weeders available in market are suitable for large farms, so this can be the best machine for the farmers with small land. This semi-automatic machine is developed to reduce the time and effort required for production up to the great extent also this machine manufacturing cost is less as compared to other.

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