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DESIGN AND FABRICATION OF AGRICULTURE WEEDER

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ABSTRACT

In this work our team make agricultural equipment which is useful for farmer, this equipment is known as weeder cycle. In India most of people are farmer. For doing fieldwork maximum human power is used, but some present year's needs of workers are necessary but availability of workers are less for field work. So we will make rotor adjustment cycle .These weeder cycle is design by using inverter software. These weeder cycles will remove grass between two row. It will remove multiple grasses in less time, so work will more complicated in less time. Therefore less workers are required for remove grass.

INDEX TERMS — Agricultural, Weeder, Inventor.

INTRODUCTION

Weeder cycle is the equipment used in the agricultural field. In this equipment consist of Handle, Sprocket wheel, Rotor, Planet Gear, Chain, etc. The rotor and wheel are joined by the chain that will be attached to a frame.

The wheel is attached to sprocket wheel and the rotor is attached to planet gear and that sprocket and planet gear is joined by chain. That assembly is mounted on frame. By push the weedier cycle that pushing pressure rotated wheels. Then the rotation of wheel joined sprocket will be rotated. As well as planet gear it will be rotate by the assembly of attaching the chain. The Planet gear is attached to rotor so rotor will be rotated by the rotating of rotor. It enters in field land with its sharp edges teeth. Teeth removed grass and make soft favor which is useful for growth of plant. So this weeder cycle is most useful to farmers.

Rajvir Yadav [1] where weeder are continuously pushed, V–shape sweep is preferred and tool geometry of these cutting blades is based on soil-tool-plant interactions. Due to fragmented land holding the use of

mechanized weeders are very limited. Though many manually operated weeders are available they are not popular because farmers feel it to be heavy as compared to conventional hoes. Rajashekar M.**[2]**Mechanical weeding is preferred to chemical weeding because weedicide application is generally expensive, hazardous and selective. Besides, mechanical weeding keeps the soil surface loose by producing soil mulch which results in better aeration and moisture conservationShridhar h.s. [3]The aim of the project is to design, construct and test manual weeder, to provide the best opportunity for the crop to establish itself after planting and to grow vigorously up to the time of harvesting. Rajashekar M [4] manual weeding requires huge labour force and accounts for about 25 per cent of the total labour requirement which is usually 900 to 1200 man M hours/hectares. In India, this operation is mostly performed manually with cutlass or hoe that requires high labour input, very tedious and it is a time-consuming process. so weeder are necessary.Saeed Firouzi [5]Weed population in the groundnut fields is an important factor which affects product yields. Therefore, in order to improve production yield, weed control is a necessity. Laukik P.[6] India is set to be an agricultural based country approximately 75% of population of India is dependent on farming directly or indirectly. Our farmers are using the same methods and equipment for the ages. e.g. seed sowing, spraying, weeding etc. There is need for development of effective spraying and weeding machine for increasing the productivity.

MATERIALS AND METHODS

A. DESIGN CONSIDERATIONS OF WEEDERS.

Weeder Needs to have built-in adjustability to change the width of working. It should have some arrangement to avoid mud getting stuck between the teeth/blades and needs to be fitted with a guard. It should be simple in design also work in all season weather. It can be manufactured locally and sold at an affordable price.

B. MATERIAL PROPERTIES.

Table No.: 1.1 Weeder Material

Young's Modulus	210GPa
Compressive Strength	2.5e+008Pa
Density	7850 kg m-3
Coefficient of Thermal Expansion	1.2e-005 C-1
Specific Heat	434 J kg-1 C-1

C. INVENTOR

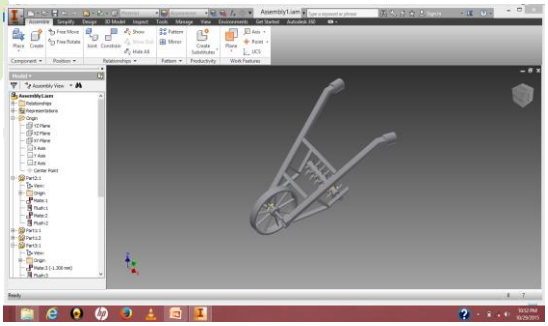

Fig. 2.1

Modeling is done in inventor 2014 software with calculated dimensions of classical design method. All detail part is modeled separately and assembled using constraint of motion.

DESIGN CALCULATION

DESIGN OF FRAME

Material selected for frame is mild steel of grade 15

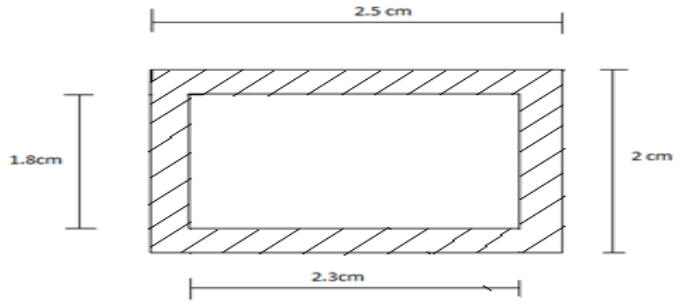

Fig.:3.1 Frame

Grade of mild steel =15
Tensile strength (N/mm^2) = 130
Tensile stress
a) Area :- A= (0.2×0.2) mm

b)Load : $\frac{Syt}{F.O.S} = \frac{F}{A}$

c)Bending Shear Strength :- $\tau_b = \frac{F}{A}$

Design of Wheel

1. Torque = F × perpendicular distance
2. Tangential Load (F_T) :- $F_T = \frac{Torque}{Radius \times \frac{no.of\ arms}{2}}$

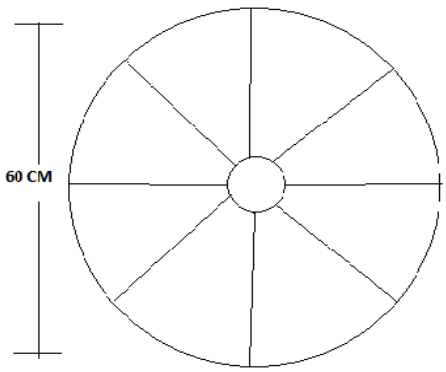

Fig.3.2.:WheeL

3. Bending moment :- $M_b = \frac{2T}{R \times n}$

4.Bending strength :- $\sigma_b = \frac{M}{Z}$

Design of Bracket

1. Compression strength :- $\sigma_c = \frac{P}{A}$

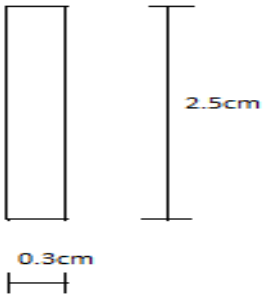

Fig.3.3: Bracket

2. Bending Strength: - $\sigma_b = \frac{M}{Z} = \frac{F \times perpandicular distance}{\frac{I}{y}}$

3. Tensile Strength: - $\tau = \frac{P}{A}$

4. Crushing strength: - $\sigma_{crushing} = 2\pi \times R \times l$

Design of Rotor

1. Bending Strength = $\sigma_b = \frac{P}{A}$

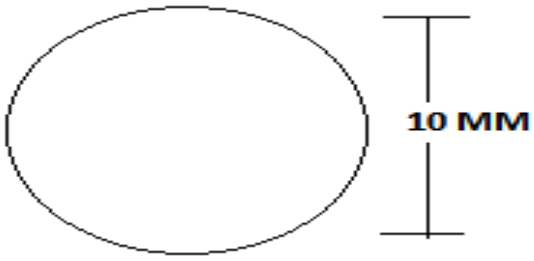

Fig.3.4:.rotor

FABRICATION

Fig:4.1

Fig:4.2

1) Wheel: Material Use For Wheel Is Mild Steel Then Cutting And Bending Done As Per Design Calculated Dimension's And Wheel Dimeter Is 60 Cm

2) Rotor: Material Use For rotor is same as wheel Mild Steel Then Select calculated design Dimensions. Curved blades are mounted on rotor so that when it will insert in soil maximum amount of soil will displace and removes maximum grass

3) Frame: Frame materal for this work is Mild Steel with Square Pipe Cutting And Welding As Per calculated design Dimensions.

CONCLUSION

Agricultural development plays important role as a driver of rural poverty reduction. The effort require to develop a weeder will meet the demand of farmers. The efficiency of weeder should be satisfactory and it is easy to operate. It was faster than the traditional method of removing weed. Less labor needed and it is more economical than hand weeding. Here do not use any fuel and power, Hence maintenance cost is very less. Cost of weeding by this machine comes to only one-third of the corresponding cost by manual laborers. The fabrication of Low cost Weeder is done with locally available material. The overall performance of the weeder was satisfactory.

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