DESIGN & DEVELOPMENT OF CROP CUTTING MACHINE

Guided By:
Prof. M.D.PATEL

Prepared By: GROUP NO : 1
Patel Vikas D . 120780119082
Prajapati Piyush D . 120780119129
Patel Manish D. 120780119038
Joshi Harsh V 120780119008
OUTLINE

- Introduction
- Principle of manual operated crop cutting machine
- Objectives
- Methodology
- Material selection
- Experimental set up
- References
INTRODUCTION

- Mechanized agriculture is the process of using agricultural machinery to mechanize the work of agriculture, greatly increasing farm worker productivity.
- In modern times, powered machinery has replaced many jobs formerly carried out by manual labour or by working animals such as oxen, horses and mules.
- Mechanization involves the use of an intermediate device between the power source and the work.
- This intermediate device usually transforms motion, such as rotary to linear, or provides some mechanical advantage, such as speed increase or decrease.
INTRODUCTION

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- Crop cutter are used for harvesting of crops mostly at ground level.

- As the population of India increases day by day, there is increment of food, vegetables so need of farm mechanization also increases, machineries provides more operations in less time, but the machineries are very costly for the common man, it is not affordable for them, so manually operated machineries, equipment’s are also the most important factor.
INTRODUCTION
PRINCIPLE OF MANUAL OPERATED CROP CUTTING MACHINE

[1]
OBJECTIVES

➢ To modify the manually operated crop.

➢ To evaluate the performance of modified manually operated Reaper.

➢ The focus of this project is to make a combined harvesting and collecting machine for the small scale farmers of India who have land holdings less than two acres, to harvest grains more efficiently.
WHY SELECTION OF CROP CUTTING MACHINE
Crop is generally selected on the land holding of the farmer, greater the land holding, tractor operated vertical conveyer reaper is choose, for medium land holding power tiller mounted vertical conveyer reapers are preferred.
METHODOLOGY

1. Selection and study about related work
2. Material Selection
3. Design of experiment
4. Experimental set up
5. Design analysis
6. Conclusion
7. End
Manual operated crop cutting machine

Advantage:
- Easily operated.
- Skilled & unskilled farmers are also operated.
- No pollution.
- Easily adjustable the height of cutter.

Disadvantage:
- Consuming more man power.
- More time consuming.
- Less efficient due to engine operated machine.
## MATERIAL SELECTION

<table>
<thead>
<tr>
<th>sr.no</th>
<th>Component</th>
<th>no. of. Comp.</th>
<th>used material</th>
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<tbody>
<tr>
<td>1</td>
<td>Frame</td>
<td>1</td>
<td>Mild steel</td>
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<tr>
<td>2</td>
<td>Ground wheel</td>
<td>4</td>
<td>wood &amp; rubber</td>
</tr>
<tr>
<td>3</td>
<td>Rotating Disc (cutter)</td>
<td>1</td>
<td>Mild steel</td>
</tr>
<tr>
<td>4</td>
<td>Shafts</td>
<td>3</td>
<td>Mild steel</td>
</tr>
<tr>
<td>5</td>
<td>bevel gear</td>
<td>1 pair</td>
<td>High carbon steel</td>
</tr>
<tr>
<td>6</td>
<td>cycle:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>chain</td>
<td>1</td>
<td>High carbon steel</td>
</tr>
<tr>
<td></td>
<td>large chucker</td>
<td>1</td>
<td>High carbon steel</td>
</tr>
<tr>
<td></td>
<td>small chucker</td>
<td>1</td>
<td>High carbon steel</td>
</tr>
<tr>
<td>7</td>
<td>bearing</td>
<td>6</td>
<td>High carbon steel</td>
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</table>
Ground wheel

Inner dia. = 25 mm
Outer dia. = 20 cm
Cycle parts
Big chucker teeth=44
Small chucker teeth=18
Gear ratio=2.44
<table>
<thead>
<tr>
<th>bearing number</th>
<th>nominal bearing dimensions</th>
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<tr>
<td></td>
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<tr>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>6205</td>
<td>25</td>
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### SHAFT

<table>
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<th>Yield strength (MPa)</th>
<th>Ultimate tensile strength (MPa)</th>
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<td>mild Steel</td>
<td>247</td>
<td>841</td>
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</tbody>
</table>

Length of shaft=45 cm  
Dia. of shaft=25 cm
Bevel gear

Gear ratio = 1.6

Model
no. = 1L01 & 1L03
Pinion teeth: -16
Gear teeth: -10
Gear ratio: -1.6
PHOTOS OF MACHINE
ASSEMBLY
CONCLUSION

• Crop Cutting Machine which is available in market is very costly. We can make Crop Cutting Machine our self and we can used it for small-scale farmer. This machine is more efficient for small-scale farmer.

• After modification of manually operated reaper it work continuously and gives more efficiency than the machine before modify. Conveying mechanism now help to stop clogging and decreases the cutting losses. Continuous working leads to harvest crop in less time with minimum man power.
• This machine is able to run of field effortlessly and the efforts of farmers are reduced.

• The cost of harvesting using this machine is considerably less as compare to manual harvesting.

• All the components and subsystems of the reaper which included, the cutting system, transmission from motor to the cutting system and main frame have been fabricated successfully.
• The primary objective of the present work was to develop a reaper which is simple and cost effective. The objective has been successfully met, simple and cost effective reaper was developed.

• It makes the harvesting process faster hence reduces the time required to harvest the same amount of yield manually which will ultimately reduce the labour required leading to reduction in labour cost, thus leading to the economic development of farmers. This machine can be used by a large number of farmers as it is small, compact and is easily available.
REFERENCES


[2] Relationship between Stalk Shear Strength and Morphological Traits of Stalk Crops, by Li Liang and Yuming Guo.


[7] INTERNATIONAL JOURNAL FOR ENGINEERING APPLICATIONS AND TECHNOLOGY, DESIGN AND FABRICATION OF CROP REAPER.

[9] “Relationship between Stalk Shear Strength and Morphological Traits of Stalk Crops”, Li Liang, Yuming Guo. Luoyang Institute of Science and Technology, Shanxi Agricultural University. 2011 International Conference on Agricultural and Biosystems Engineering Advances in Biomedical Engineering Vols. 1-2.


THANK YOU