

DESIGN AND FABRICATION OF CROP CUTTER MACHINE

Roshan Ghodkhande¹, Shivam Bhankhede², Ashish Chandurkar³, Sanket Chaudhari⁴, Shubham Chaudhari⁵, Shubham Dandekar⁶, Bhaushan Dorlikr⁷, Rupali Gawali⁸

¹Assistant Professor, Mechanical Engineering, DMIETR, Maharashtra, India

^{2,3,4,5,6,7,8}Student of Mechanical Engineering, DMIETR, Maharashtra, India

ABSTRACT

The crop cutting is important stage in agriculture field. Currently in India farmer used conventional method for crop cutting i.e. cutting of crop using labour but this method is lengthy and time consuming. This project aim is to design and fabrication of crop cutter machine. It helps to reduce farmer's effort and reduce time and to complete crop cutting work in time.

The machine consists of engine and different mechanisms. When compare to manual crop cutting by using this machine has a capacity to cut the crop in faster rate and economical. This machine targets the small scale farmers who have land area of less than 2 acres. This machine is compact and can cut up to two rows of soybean plant. It has cutting blades which cut the crop in a scissoring type of motion. A collecting mechanism is provided for the collection of crops to one side after cutting. This mechanism is also powered by chain drive arrangement.

Keyword — crop cutting, petrol engine, bevel gear, cutting mechanism, manual method..

I. INTRODUCTION

In the country like India where the main source of income is agriculture. Needs to concentrate in some aspects like how to increase productivity and profit, how to reduce cost and how to solve and ease the problems of workers. Recently Vidharbha has seen a shortage of skilled labour available for agriculture. Because of this shortage the farmers have transitioned to using harvesters. These harvesters are available for purchase but because of their high costs, they are not affordable.

In India agriculture has facing serious challenges like scarcity of agricultural labour, in peak working seasons but also in normal time. This is mainly for increased nonfarm job opportunities having higher wage, migration of labour force to cities and low status of agricultural labour in the society. In India two type of crop cutting like as manual method (conventional method) and mechanized type of crop cutter. The crop cutting is important stage in agriculture field. Currently Indian former used conventional method for crop cutting i.e. cutting crop manually using labour but this method is very lengthy and time consuming.

To design and manufacturing of multi crop cutter which is help to the Indian former which is in ruler side and small farm. It will reduce the cost of crop cutting field. It will help to increase economical standard in Indian former

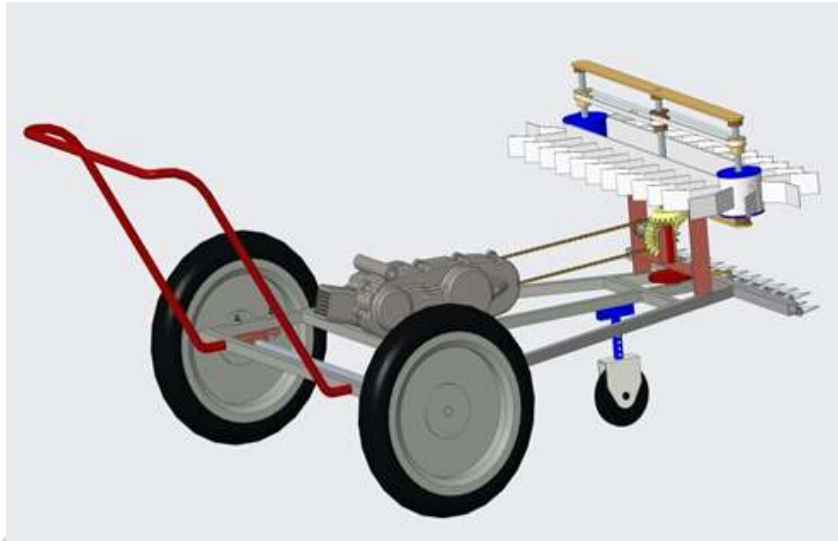
II. Methodology:

- Discuss with the local farmers who have small scale land holding and enquire about the harvesting practices and the crops produced and emerging trends in crop harvesting.
- Discuss with the agricultural equipment manufacturers to get information about various equipment that are available and are in demand.

- Refer various international papers in small scale harvesters produced earlier.
- Design and fabricate the machine part.

III. Components:

- **Engine:** Petrol engine of 0.73Kw, 3000 rpm is used. And it is rope start type engine. Petrol engine is used because of it has good efficiency and easily available in rural area
- **Belt Drive:** The belt drives primarily operate on the friction principle. i.e. the friction between the belt and the pulley is responsible for transmitting power from one pulley to the other. In other words the driving pulley will give a motion to the belt and the motion of the belt will be transmitted to the driven pulley. V-Belts are used because its advantages over flat belts in compact transmission design. Engine power is transmitted to the spur gearbox with the help of belt drive.
- **Pedestal bearing:** Pedestal bearing is also known as Plummer block bearing. Pedestal bearing is used to support the rotating shaft with the help of compatible bearings. The fundamental application of pedestal bearing is to mount a bearing safely enabling its outer ring to be stationary while allowing rotation of the inner ring.
- **Cutter:** Cutter assembly consist of a sliding cutter plate and a stationery cutter plate. The cutters used are of triangular shape. In sliding cutter plate, cutter blade is riveted on 3 mm plate and in stationery cutter plate. The stationary cutter plate can be directly bolted and fixed on frame. Sliding cutter blade is provided with 2 slots of 80 mm on its ends; it allows sliding motion to be in straight line.
- **Cage:** The cage is holding equipment which provides cutter blade firmly on it and space to move while operation. It is attached to the frame of machine. The material of cage is mild steel. Its whole length is 1m and thickness is 25.4mm.
- **Collecting Mechanism :** The collecting belt is used to carry cut crops sideways. Proper collecting of crop is very important to reduce the grain losses during harvesting. Hence implementation of collecting mechanism increases the efficiency of harvesting machinery. This type of cutter machine are similar to horizontal conveying reapers except that the cut crop is collected on a platform and is being released occasionally to the ground in the form of a bunch by actuating a hand lever. Lead Acid batteries are the most suitable in existing technology for electric vehicle because they can deliver high output because of having capability to store high power per unit of battery mass, allowing them to be lighter and smaller than rectangular batterie.

Cad Model:**Fig: CAD model****IV. Working :**

- The machine performs mainly three operations cutting, collecting and bunching of the crops.
- The engine is mounted on the frame using nut and bolts.
- With the help of chain drive, Engine and input shaft of bevel gear box is connected.
- The output shaft of the bevel gearbox is connected to collecting mechanism using belt pulley system and the other end connected to the cutting mechanism using crank shaft system.
- We are using a single knife reciprocating cutter whose one blade is moving and other is stationary.
- The slider crank used to convert rotary to reciprocating motion for cutter. Scissoring action is obtained due to reciprocating movement.

V. Results And Conclusion:

From this work the following result were drawn for the work to be in 1 acre area without a multi crop cutter or manually, whereas by using a multi crop cutter we can complete the same work in the same area (1acre) with only one labor. The same throughout the day, as man get strained, whereas a machine cannot. Therefore, time can also be saved by using the multi crop cutter. It is concluded that the device is most economical.

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 harvesting using this machine is considerably less as compare to manual harvesting. The harvesters available in market are suitable for large farms, so this can be the best machine for the farmers with small land. The success of this machine depends on how the farmers receive this machine as their manually.

VI. Future scope:

- By replacing the motor we can use wheel operated cutter rotation by using the sprocket, chain.
- This machine can also be used for cutting other crops such as cotton stalks and maize.

- As the field is uneven, the cutter height varies from mode to node, so a slider mechanism can be used to vary the height of cutter from time to time.

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