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Design and Fabrication of Crop Harvesting Machine

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Abstract: ***This Model is designed with a low cost and useful for economically poor farmers. In the country like India where the main source of income is agriculture. Needs to concentrate in some aspect like how to increase productivity and profit, how to reduce cost and how to solve the problems of workers. There is 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.***
Keywords: Crop harvesting, Pro|Engineer software, Agriculture, Modeling.

I. INTRODUCTION

In the country like India where the main source of income is agriculture. Needs to concentrate in some aspect like how to increase productivity and profit, how to reduce cost and how to solve and ease the problems of workers. There is 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 labor 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.

Fig: Prototype Model of crop Harvesting Machine

Fig: Mechanism of crop Harvesting Machine

II. WORKING PRINCIPLE

The machine mainly works on the man power. As the pushing force applied by a man the wheels will rotate. As the wheels rotate the bevel gear which is connected to the axle. As the bevel gear rotates then the small bevel gear which is mounted will rotate. As the rod is connected to the bearing which is fixed to the small bevel gear the rod will rotate. It mainly works on the principle of converting rotatory motion to the sliding motion.

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III.LITERATURE SURVEY

Amar B. Mule studied that 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.
Dr. U.V. Kongre, Lokesh Shahare paper addresses the development and performance of human powered multi crop cutter. We have developed a mechanism for harvesting of crop cutter so that we can an easy harvesting in minimum period of time.

IV.COMPONENTS

A. Bevel Gear

Bevel gears are gears where the axes of the two shafts intersect and the tooth bearing faces of the gears themselves are conically shaped. Bevel gears are most often mounted on shafts that are 90 degrees apart, but can be designed to work at other angles as well. The pitch surface of bevel gears is a cone. The most familiar kinds of bevel gears have pitch angles of less than 90 degrees and therefore are cone-shaped. This type of bevel gear is called external because the gear teeth point outward. The pitch surfaces of meshed external bevel gears are coaxial with the gear shafts; the apexes of the two surfaces are at the point of intersection of the shaft axes.

Fig: Bevel Gear

B. Bearings

A bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part or for free rotation around a fixed axis or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts. Most bearings facilitate the desired motion by minimizing friction. Bearings are classified broadly according to the type of operation, the motions allowed, or to the directions of the loads (forces) applied to the parts.

Fig: Bearing

C. Wheels

A circular object that revolves on an axle and is fixed below a vehicle or other object to enable it to move easily over the ground. In its primitive form, a wheel is a circular block of a hard and durable material at whose center has been bored a circular hole through which is placed an axle bearing about which the wheel rotates when a moment is applied by gravity or torque to the wheel about its axis, thereby making together one of the six simple machines. When placed vertically under a load-bearing platform or case, the wheel turning on the horizontal axle makes it possible to transport heavy loads; when placed horizontally, the wheel turning on its vertical axle

Fig: Wheels

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D. Parts Of A Wheel

1) RIM
2) TIRE
3) CENTER BORE

E. Blades

The blades are the most important component in the crop harvesting machine. The blade will cut the crop by sliding movement. The blade is made of iron component in which one is fixed to the frame and the other is movable. As both the blades are in opposite direction it is to cut the crop. The length of the blade is 3 inches as it is of the length of the frame.

Fig: Blades

F. Frame

A frame is often a structural system that supports other components of a physical construction and/or steel frame that limits the construction's extent. The frame is structural body that supports the crop harvesting machine. Frame is the main component of the crop harvesting machine on which the whole system is laid. The size of the frame considered for this project is 3*4feet. As in order to cut the crop up to three lines of the crop.

Fig: Frame

V. DESIGNING OF CROP HARVESTINGMACHINE USING PRO/E SOFTWARE

A. Frame

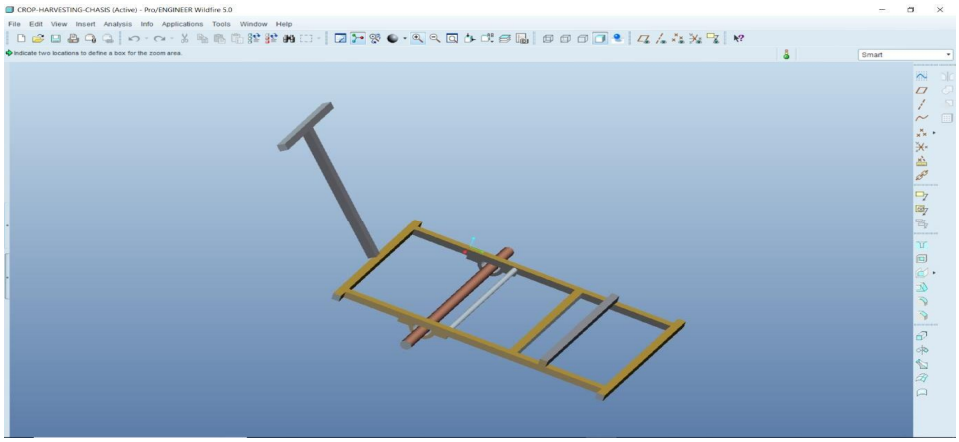

Fig: Frame Design

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B. Bearings

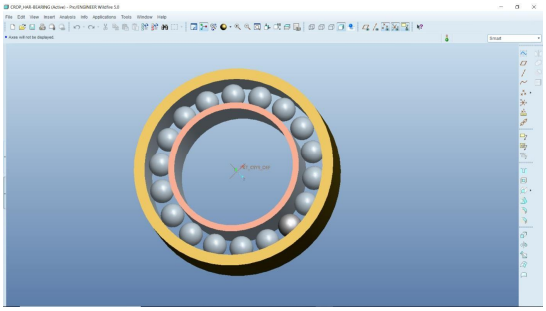

Fig: Bearings

C. Holder

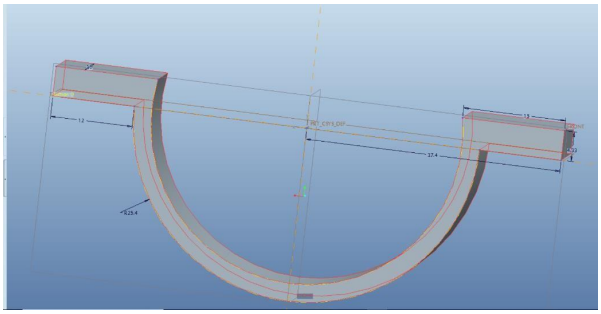

Fig: Holder

D. Bevel Gear

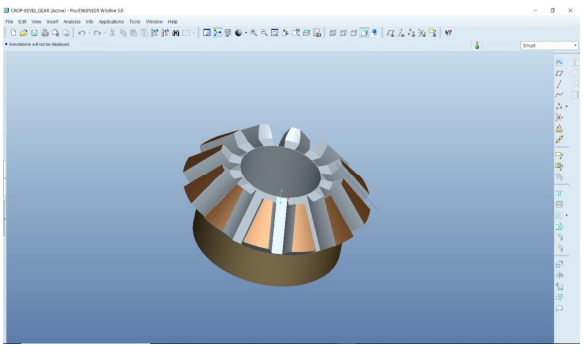

Fig: Bevel Gear

E. Blade

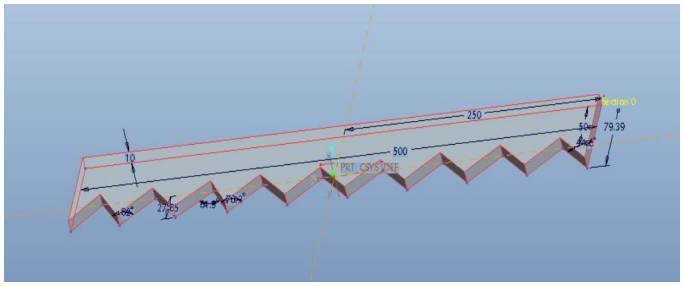

Fig: Blade

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F. Wheel

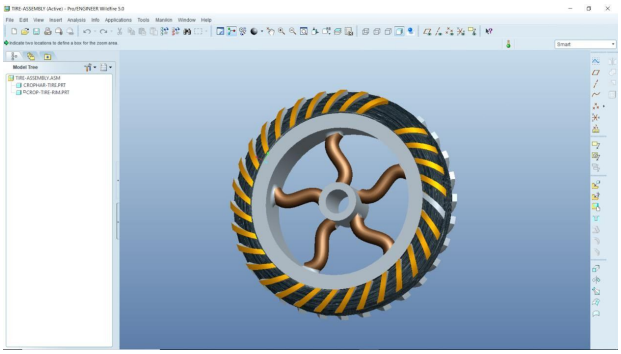

Fig: Wheel

G. Shaft

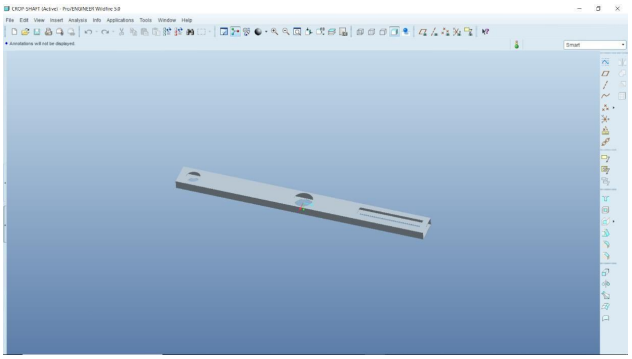

Fig: Shaft

H. Assembly Of Crop Harvesting Machine In Pro|E Software

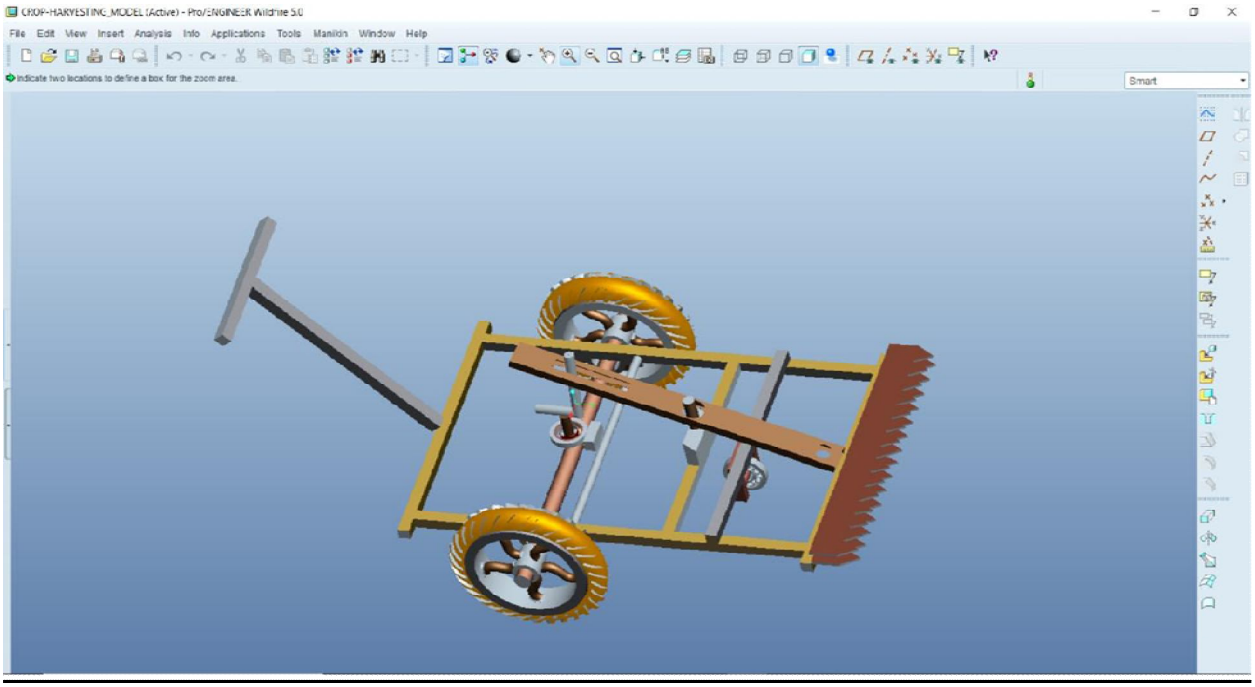

Fig: Assembly Of Crop Harvesting Machine

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VI. ADVANTAGES & DISADVANTAGES

A. *Advantages*

1) It reduces the dependence on labor
2) It does not require any fuel
3) It decreases the cost of expenditure on crop harvesting for farmer
4) It is low of cost
5) It is easy to handle
6) It is easy to prepare.

B. *Disadvantages*

1) Using of machinery leads to unemployment
2) It takes more time than fuel based machines
3) It cannot be more helpful for the people having large farming lands that is more than 5acres.

VII. CONCLUSIONS

The Multi crop cutter is designed, fabricated and tested. This machine does not employees any use of power equipment's such as DC motors and it is fully human operated. The use of this machine makes the harvesting process faster hence reduce most of the cutting time and labor required to operate the machine is also less. This machine is helpful for small as well as big firms. This human powered machine will help to improve an economical condition. This is new type of machine which is different to the other cutting machine which are used for harvesting purpose till now.

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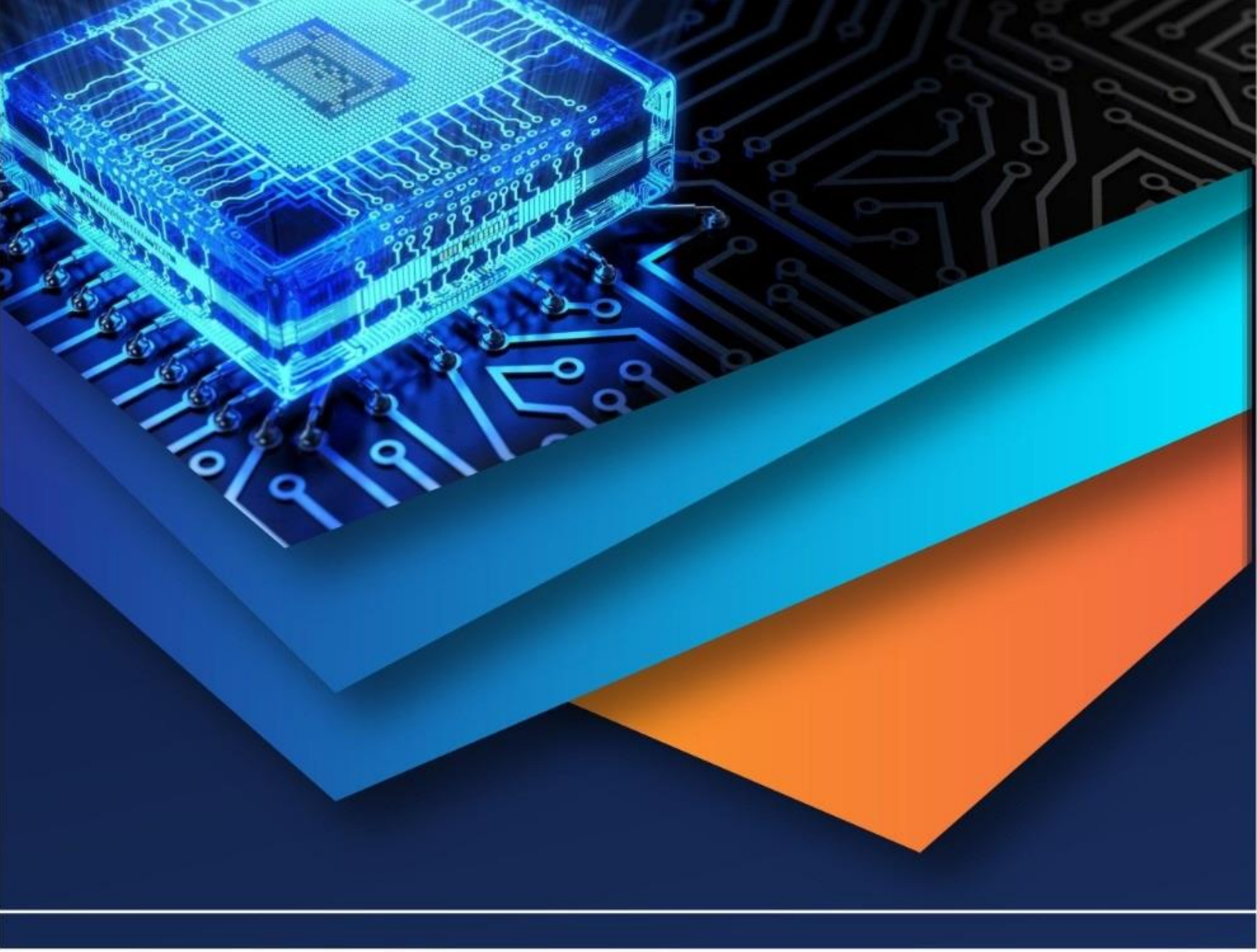

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