

Design and Fabrication Onion Harvester

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Abstract: Agriculture plays a vital role in Indian economy. India is a country which is dependent on farming as a main source of income for many families. As far as Indian scenario is concerned, more than 75 percent farmers are belonging to small and marginal land carrying. So any improvement in the productivity related task help to increase Indian farmer's status and economy. Now a day's agriculture equipments have lot of limitation and it required more energy to operate. The purpose of the project is to fabricate and enhance the design specifications of onion harvesting machine for multipurpose onion which should be helpful for the farmers having less & marginal land. Further, the comparative study of onion harvesting from manual method, machine method and proposed machine method is discussed. It is observed from the results that, the proposed machine method shows reasonably good result when compared manual method and machine method

Keywords: Emission

I. INTRODUCTION

Onions can be harvested either manually or mechanically. In manual harvesting for home gardens, the ground is loosened around the onion bulbs using forked tools and bulb tops are pulled from the ground (Opara, 2003). In the mechanized method, growers employ tractors and specialized machines to harvest their crops. Field toppers, windrowers, and crop lifters are machines commonly used to assist growers. Field toppers slice the tops off of onions, removing unwanted foliage and weeds by moving debris away from the crop bed. Windrowers lift onions from their beds and push them into a row so that crop lifters may move onions into a trailer for transport (Mechanized, 2015). Typically, growers use the windrowing technique 1 - 2 weeks before onions are sent to storage facilities. Once onions have been windrowed, they are cured by drying in the field. It is a science and art of cultivation on the soil, raising onion s. It is also called farming. Agriculture plays a vital role in Indian economy. India is a country which is dependent on farming as a main source of income for many families. As far as Indian scenario is concerned, more than 75 percent farmers are belonging to small and marginal land carrying. So any improvement in the productivity related task help to increase Indian farmer's status and economy. The current agriculture equipments has lot of limitation and it required more energy to operate. In India agriculture is facing serious challenges like scarcity of agricultural labour, not only 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 labours in the society. Further, the agriculture farming system.

II. LITRATURE REVIEW

| S. No | Name of author | Title of paper | Outcome |
|-------|----------------------------------|--|--|
| 01. | Kawale Nagendra K. T. Ramappa | Status of Mechanization in Harvesting of Onion Crops | During the field evaluation, the prototype onion digger, with the above design values, performed as per the recommended standards with digging efficiency 97.7%. |
| 02. | Seid Hussen Muhie .. | Pre harvest production practices, and postharvest treatment and handling | In all the stone dust treated specified land areas the foliar protein and carbohydrate contents were also found to be low as compared to the control. |

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| | | methods for best quality onion bulbs | |
| 03. | S.Bondita N.Trinadh | Post harvest losses of onion cultivation | The leading cause of the high magnitude of post harvest loss in developing countries was ineffective logistics services .The post harvest losses reduce the quantity available, leading to increased cost of production and marketing and the price of products |
| 04. | Lokesh kumawat | Mechanization in Onion Harvesting and its performance:A Review and a conceptual design of onion harvester from Indian perspective | Harvesting of onion crops by hand is time consuming and cost intensive practice.delay in harvesting affects the shelf life of onion bulbs.hence the alternative method of harvesting of this produce are required as the availability of labour for farm operation is being reduce day by day |

III. MATERIAL SELECTION

This is made out of mild steel of length 4.5 ft and width 4.5 ft welded to the main frame. This is then ground to remove the welding burr and sharp corners on this the other assemblies are welded . Further, the shaft and wheels are attached . Thereafter, two solid shafts are used each shaft carries two cutter upper and lower, and also gives rotary motion to the cutters.

MILD STEEL FRAME

Mild steel is steel in which the main interstitial alloying constituent is carbon in the range of 0.12–2.0%. The American Iron and Steel Institute (AISI) definition says: Steel is considered to be carbon steel when no minimum content is specified or required for chromium, cobalt, molybdenum, nickel, niobium, titanium, tungsten, vanadium or zirconium, or any other element to be added to obtain a desired alloying effect; when the specified minimum for copper does not exceed 0.40 percent; or when the maximum content specified for any of the following elements does not exceed the percentages noted: manganese 1.65, silicon 0.60, copper 0.60.

BEARING

Roller Bearings are a type of rolling-element bearing that uses cylinders (rollers) to maintain the separation between the moving parts of the bearing (as opposed to using balls as the rolling element). The purpose of a roller bearing is to reduce rotational friction and support radial and axial loads. Compared to ball bearings, roller bearings can support heavy radial loads and limited axial loads (parallel to the shaft). They can operate at moderate to high speeds (although maximum speeds are typically below the highest speeds of ball bearings)

MOTOR

An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of torque applied on the motor's shaft. An electric generator is mechanically identical to an electric motor, but operates in reverse, converting mechanical energy into electrical energy

IV. PROCESS INVOLVED IN FABRICATION

METAL CUTTING PROCESS

A **cutting tool** or **cutter** is typically a hardened metal tool that is used to cut, shape, and remove material from a workpiece by means of machining tools as well as abrasive tools by way of shear deformation. The majority of these tools are designed exclusively for metals. There are several different types of single-edge cutting tools that are made from a variety of hardened metal alloys that are ground to a specific shape in order to perform a specific part of the turning process resulting in a finished machined part. Single-edge cutting tools are used mainly in the turning operations performed by a lathe in which they vary in size as well as alloy composition depending on the size and the type of material being turned

DRILLING PROCESS.

Drilling is a cutting process where a drill bit is spun to cut a hole of circular cross-section in solid materials. The drill bit is usually a rotary cutting tool, often multi-point. The bit is pressed against the work-piece and rotated at rates from hundreds to thousands of revolutions per minute. This forces the cutting edge against the work-piece, cutting off chips (swarf) from the hole as it is drilled. In rock drilling, the hole is usually not made through a circular cutting motion, though the bit is usually rotated. Instead, the hole is usually made by hammering a drill bit into the hole with quickly repeated short movements. The hammering action can be performed from outside the hole (top-hammer drill) or within the hole (down-the-hole drill, DTH). Drills used for horizontal drilling are called drifter drills.

ARC WELDING PROCESS

Arc welding is a welding process that is used to join metal to metal by using electricity to create enough heat to melt metal, and the melted metals, when cool, result in a binding of the metals. It is a type of welding that uses a welding power supply to create an electric arc between a metal stick ("electrode") and the base material to melt the metals at the point of contact. Arc welding power supplies can deliver either direct (DC) or alternating (AC) current to the work, while consumable or non-consumable electrodes are used.

The welding area is usually protected by some type of shielding gas (e.g. an inert gas), vapor, or slag. Arc welding processes may be manual, semi-automatic, or fully automated. First developed in the late part of the 19th century, arc welding became commercially important in shipbuilding during the Second World War. Today it remains an important process for the fabrication of steel structures and vehicles.

V. CONCLUSION

The purpose of the project is to fabricate a machine to carry out the operation like harvesting which should be helpful for the farmers having Less & Marginal Land. By the observations of the results and discussion, variation between manual method, machine method and proposed machine method, are described below:

The labors required for the proposed machine method is less than the manual method and equal to machine method. Further, the machine method cannot be suitable for small scale farmers as it is economically not feasible.

The time duration required for the proposed machine method is less than the manual method and more than machine method. Further, the machine method cannot be suitable for small scale farmers as it is economically not feasible. The cost required for harvesting the one acre land is also less by using proposed machine method.

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