



AUTOMATIC GRASS COLLECTOR FOR SOLID WASTE MANAGEMENT

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ABSTRACT — Grass cutter machines have become very popular today. Most common machines are used for soft grass furnishing. In our project Grass cutter machine we are aimed to develop for operation and construction. This is mainly for the purpose of solid waste management. In India there is a great scope of grass cutter machine. In our country as well as other countries has also it is used in various fields for cutting the grass. The grass cutting machine is known as lawn mower. The grass cutting machine is available in the various types. but these are very costly and unaffordable also. Also, it requires a skilled person to operate it. Hence, it was found necessary to have a grass cutter with minimum initial cost and can be operated by unskilled labour..

This project is intended to help small-scale grain growers meet an increased demand for diverse, locally grown grains by designing a mini farming machine. To refine our prototype and final design, we worked closely with a three person review panel, made up of grain farmers and industrial designers. With this prototype, we hope to reduce the work of collecting the solid waste on small plots of land in cities and along the periphery of urban areas.

INTRODUCTION

The goal of this project is to reduce the labour work manually by collecting the grass and it is used for solid waste management for preparing manures.

Agriculture is demographically the broadest economic sector & plays a significant role in the overall economy of India is necessary. The main purpose of mechanization in agriculture is to improve the overall productivity and production. About 83.29% of the Indian Farm families have land holdings less than 2 to 3 acres. For them it is not required nor economical to purchase a full featured existing cultivating machines. Thus there is a need for smaller efficient multipurpose cultivating machine which would be more accessible & also considerably cheaper. The idea is to create the machine which will reduce the Labour & the cost required to cultivate crops. This machine has a capability and the economic value for fulfilling the needs of farmers having small land holdings(less than 2 acres). This machine is cost effective, easy to maintain & repairs for the farmers.

Our work in the project is to design and fabricate the multipurpose mini farming machine by performing various operation. We tried to design it in a simple way so that it will be easy for maintenance and use.

This machine will help small scale farmers for easy operation and less manual work. This will help them to save time and money. It will also help to increase productivity and make more profits. This will make them to use new technology in agriculture.

METHODOLOGY

In view of the renewed demand for local grains, our goal is to design an affordable, mini farming machine to help small-scale farmers more efficiently harvest their grain. The objectives we identified to accomplish our goal were:

1. Identify and interview local grain farmers and grain growing associations to learn more about current production and harvesting practices, grains produced, and emerging trends in local grain production.
2. Identify and interview farm equipment manufacturers and farmers who have built grain harvesters, in order to determine the current products available for our scale and research their current designs.



3. Conduct archival research and review patents on small-scale combine harvesters, binders, and threshers from the past.
4. Design our own mini farming machine. This chapter will discuss in detail the procedures and methodologies that we used to design our product and accomplish these objectives.

- v) Determining the size of component drawing and sending for Manufacture.
- vi) Preparation of component drawing and sending for manufacture.
- vii) Manufacturing and assembling the machine.
- viii) Testing the machine and for functioning

MATERIAL SELECTION

The proper selection of material for the different part of a machine is the main objective in the fabrication of machine. For a design engineer it is must that he be familiar with the effect, which the manufacturing process and heat treatment have on the properties of materials. The Choice of material for engineering purposes depends upon the following factors:

1. Availability of the materials.
2. Suitability of materials for the working condition in service.
3. The cost of materials.
4. Physical and chemical properties of material.
5. Mechanical properties of material.

Base plate, motor support, sleeve and shaft

- > Material used:
 - > Mild steel
 - > Reasons:
 1. Mild steel is readily available in market
 2. It is economical to use
 3. It is available in standard sizes
 4. It has good mechanical properties i.e. it is easily machinable
 5. It has moderate factor of safety, because factor of safety results in unnecessary wastage of material and heavy selection. Low factor of safety results in unnecessary risk of failure
 6. It has high tensile strength
 7. Low co-efficient of thermal expansion

DESIGN PROCEDURE

The general steps to be followed in designing the machine are as followed.

- i) Preparation of a statement of the problem indicating the purpose of the machine.
- ii) Selection of groups of mechanism for the desire motion.
- iii) Calculation of the force and energy on each machine member.
- iv) Selection of material.

1. PROCESS PLANNING

Process planning is an important function, which takes place directly after the design of a product. It takes the information received and creates a plan for manufacture. The process planning involves an application of systematic procedures, which involves following steps.

A) PRELIMINARY PART PRINT ANALYSIS

- 1) Size configuration
- 2) Material
- 3) Dimensional relationships an identification of various reference surfaces.
- 4) Implicit and explicit remarks regarding from error and finish.
- 5)

B) DETERMINATION LOGICAL SEQUENCE OF OPERATION

- 1) Identification of surface to be machined, selection of machine tool.
- 2) Supporting accessories, pictures, gauges etc.

1. COST STRUCTURE

2.

Cost estimation may be defined as the process of forecasting the expenses that must be incurred to manufacture a product. These expenses take into a consideration all expenditure involved in a design and manufacturing with all related services facilities such as pattern making, tool, making as well as a portion of the general administrative and selling costs.

2. PURPOSE OF COST ESTIMATING

1. To determine the selling price of a product for a quotation or contract so as to ensure a reasonable profit to the company.
 1. Check the quotation supplied by vendors.
 2. Determine the most economical process or material to manufacture the product.
 3. To determine standards of production performance that may be used to control the cost.

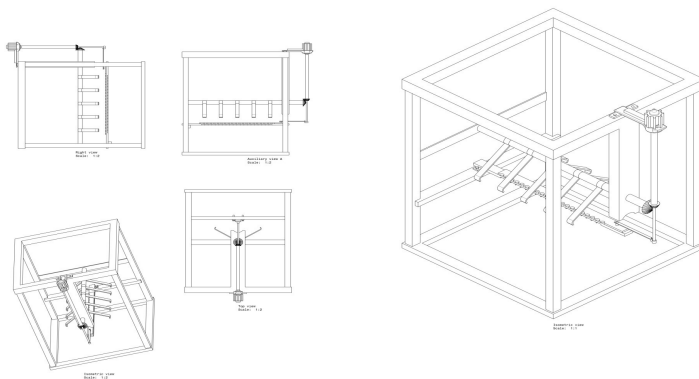
1. AUTONOMOUS MAINTAINENCE ACTIVITY:-

- 1) Conduct initial cleaning & inspection.
- 2) Eliminate sources of dirt debris excess lubricants.
- 3) Improve cleaning maintainability.
- 4) Understand equipment functioning.
- 5) Develop inspection skills.
- 6) Develop standard checklists
- 7) Institute autonomous inspection
- 8) Organize and manage the work environment
- 9) Manage equipment reliability.

to have motorcycle chains and sprockets to power transmission. But that will result an increase in weight. Therefore, instead of chain and sprocket speed reducing mechanism, a gear system should be used.

In this machine ground wheel supplies the power to operate transplanting arm and tray mechanism. Pulling the machine will rotate the ground wheel. Increasing the size and number of lugs (fins) around ground wheels will increase contact area of the ground wheel with the field and make it easy to operate. The machine has to pull to operate. Ergonomically it is better to push weight rather than to pull. So it is better to turn the handle and the power supplying mechanism to push the machine instead of pulling it. Use of aluminum and alloy for construction will help to reduce the weight of the machine. The machine used to plant 2 rows simultaneously. Number of plants per one hill can be increased while altering the tray moving distance and adding engine to power the operation. The dapog mat was compacted due to high tray angle. Tray angle should be reduced to avoid the problem. Suitable dapog for the machine must have amid layer 1cm or less thick. Increased thickness of the mud layer increases the power requirement to the planting arm.

DIAGRAM



RESULT

Prototype mechanism was evaluated in the field, and it worked. There were some points to be redesigned. Tray mechanism worked but the design should be altered or improved. The tray move to both left and right directions while the tray on a grove. That resulted high friction. Therefore it is better to have nylon bushes and iron or Aluminum rods to reduce the friction. Tray moving mechanism made using nylon Sprocket wheel. As the tension is high in that chain the nylon sprocket get damaged easily. It's better to use iron sprocket with same diameter and number of teeth to reduce the damage when tension is high. The sprocket and chain used for the machine Was foot cycle chains and sprockets. When machine is operated the sprockets get damaged by bending the teeth. So it is better