

DESIGN AND FABRICATION OF CHOPPING MACHINE FOR PALM FRUITS

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Abstract: Nowadays, agriculture especially palm fruit have some problem such as how to increase the productivity and profit and how to reduce the cost. There are many researches about palm, but there is no suitable cutting tool for the researchers in order to study the physical characteristic of palm fruit. This aims to build the palm fruit cutting machine for the researchers. This machine has three parts, driving part, cutting part, and palm fruits holding tool. It comprises three criterions, easy to fabricate, low cost and light weight. By using design and fabricate the mechanical cutter, the entire problem can solve easily.

The machine will be economical and efficient in cutting of palm fruit so most of the people involved in this business can afford it. The machine will also reduce human labour cost, and time keeping the quality of the fruit more or less unchanged. There are some procedures to solve this problem such as design using several concepts, sketching and modeling the design, fabricate the prototype using suitable material and test the functioning of this machine. So the objective is to fabricate the machine for the palm fruit cutting process.

1. Introduction

Cutting machine is an essential tool for the maintenance of yards. They vary in size, mode of operation, and power. Before proceed with design and fabrication, several criteria need to be identify such as easy to fabricate, low cost and flexible enough to perform several task with minor adjustment. Designing process begins[1-5] with selection of available standard part; handle for leverage for cutter and raw materials to fabricate the components. There are several concepts being considered before end up with finalize design. The main co[6-8]ept is to use a spring to push the palm backward after cutting. Manual handle is used to operate the machine and the high shearing blade to the cut the palm using the palm cutting machine.[9-11]

This Palm Cutting Machine includes the design, development, and testing of a cutter to

overcome the failure of the previous implementation. [12]It is operated by unskilled labourers. This chapter reviews about the major parts involved in palm cutting machine. The uses of those parts in this machine along are to be explained in detail. These parts are explained along with the dimensions as required for this machine.[13]

2. Problem Statement

In India especially southern part of the country where agriculture becomes the new focus which can give many advantages and benefits especially to our economy, politics and social. Palm fruit is one of the new targets in agriculture where still not much researchers and manufactures participate in this field.[14] From that there are some problems arise such as how to maximizing the profit, how to increase productivity and how to reduce the cost. One of the important activities in palm fruit is harvesting and cutting. This operation requires 60% of total labor and its transportation due to increase in wages of the labor and reduce in availability of labor leading to the high demand of the labor. So the ideas to reduce the dependent on workers in this process, this project comes to solve all this problem where the new invention for machinery in cutting which able to reduce the workers. By using the tools like machinery, the dependent on the worker can be reduce, productivity can be increase, the cost can be reducing and the profit can be increase. From that, the main objective for this project is to design and fabricate the prototype of a cutter to harvest palm fruit for commercial used can achieve.[15-16]

3. Working Methodlogy

Design concept generation refers to the actual conceptual design where the design concept is an approximate description[17-18] of the technology, working principles and form of the product. It has a detailed description on how the product will satisfy and meet requirements. Existing constraints may even be solved by having a good development in the design concept. The palm

cutting machine was developed based on the following considerations:[19]

- The availability of materials locally to reduce cost of production and maintenance of the machine.[20]
- The high speed shearing blade was introduced above the spring for effective cutting of the palm during the process and also for proper discharging of palm after cutting.
- The manual handle system was used for the pressing.
- It is desired that the palm should be well cut without breakage.

Manual handle operated palm cutting machine, in this type machine the high speed shearing blade with high sharp is attached at the spring top in triangular form and a strong spring system is attached and surrounded by rod[21] to avoid dislocation of the spring during operation. When the palm is placed on the spring top blade the handle is pressed manually to trisect the palm. While pressing on the palm the blade cut the palm and the spring goes down due to pressing. When the force applied to the handle reduces the spring moves up to eject the palm fruit. It cut palm in triangular shape so that the tricot fruit inside the palm is opened for use. [22]

4. Project Design Specialisation

Product Design Specification will give clear idea for the designer to understand the required specification to design the product. Based[23-25] on the results, which are derived from the literature study, user study, PDS will be generated. Here are some of the major criteria considered for product design specifications are shown below.[26-30]

- Name : Palm Cutting Machine
- Mechanism : High speed shearing blade with spring system
- Target Customer : Farmers or small scale industry
- Cutting Process : Manual operated
- Cutting Function : Handle operated
- Material : Mild steel for Blade, Steel for Fabricated body
- Manufacturing : Fabrication
- Safety : Avoid sharp corners, Safety guards
- Life of the product : 10 years
- Spring Diameter : 5 mm
- Production Rate : 40 palm per hour

5. Conclusion

In this modern world the time and cost has more weightage for each and every operation. So to

overcome this concept we have designed and fabricated the machine named Palm Cutting Machine to reduce the cost and to save human energy. In this project we have used very heavy and strong machine parts so as to eliminate the regular maintenance. We conclude that this machine is more useful to the large scale Palm cutting and the coir industry where the large numbers of fiber is needed. This machine has many advantages over other machines.

- Fast operation
- Less manpower requirement
- Labour requirement minimum
- Palm per hour high compared to traditional systems
- Cost less compared to traditional systems
- Low cost cutting solution
- Maximum utilization

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