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Design and Development of Sugarcane Bud and Coconut Deshelling Machine

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Abstract - *The purpose of this research is to improve the quality of cutting the coconut and sugarcane bud with least efforts and less man power. It reduces the chance of any danger while cutting the coconut along with this. This machine is portable device due to its less weight. The life span of the machine is good. Only the changing of cutting blades and drill tool must require after a certain cutting coconut and sugarcane bud frequently. It required less effort as compare to other cutting process of coconuts. The only need is checking the sharpness of blade. The presented paper will provide a brief idea in designing new machine with some of these instruments.*

1. INTRODUCTION

Automation plays a vital role in major things in day to day life. This is not only applicable in automotive industries. The necessary of automation is to reduce the human effort and to save the time. Here the tender coconut opening in easiest way is proposed. But most of the people cut the coconut and bud manually. But it is more difficult and skilled persons required. A common problem that many people are facing is punching and splitting the coconuts. The existing traditional tools used are unsafe and also needs skill and training. The risk of injury is more. Some machines for cutting coconuts into two parts but until no tool exists to punch a hole and split it open. This necessitates the development of cutting and punching coconut. The selected concept mainly consists of punch operated by a lever and torsion spring mechanism. When the coconut is to be punch the operator places the coconut on the top of the machine in rest position and the lever is raised and pressed against the tender coconut to punch a hole. The coconuts are placed in the rest position and the lever is raised and operated to cut the coconut. This selected concept is further analyzed in terms of its functionality and cost.

Fig -1: Deshelled young coconut and sugar bud

1.1 Literature Review

Nagarajan.N1 et.al [1]: The new proposed design is needed for removal of husk from the coconut. In this there are two pneumatic actuators. One is placed at the bottom of structure, it's for holding the coconut and another one is placed on the top of the structure connected with hinge joint for peeling the husk. In hinge joint there are five linkages used for dehusking the coconut. These are operated with the help of pneumatic actuators. The actuations are controlled by the 5/2 DC solenoid valve. After the de-husking process the coconut shell is taken to the next stage. This part is used for cutting the coconut shell. Here one pneumatic actuator is being used. For cutting operation the knife is attached to the pneumatic actuator. When the pneumatic actuator is actuated, the knife comes down with high force, breaking the coconut into two.

Prof. S. M. Fulmali1 et.al[2] : This machine is mainly design to cut the coconut and to make the hole in coconut with the help of various tools like cutting blade, hole making tool. The important thing about this machine is that it reduces the time of cutting the coconut, along with the coconut the various fruits can be cut out on these machines. The two operations can be done simultaneously there is no any extra attachment is required for performing the operations. The cost of the developed machine is very less so that it can be used in small restaurants and shops. This will definitely improve the productivity

H. Rajanikanth1, et.al [3]: this project is mainly design to cut and punch the coconut by using the compressor. This necessitates the development of a punch-cum-splitter for punching and splitting the tender coconut. The present work focuses on the development of a manually operated coconut punch-cum-splitter for extracting coconut water and coconut meat. In this direction, customer needs statement was translated to the concept; by concept generation. The best concept was selected using matrix and concept scoring matrix. The selected concept mainly consists of punch operated by a lever and torsion spring mechanism.

T. Roshni et.al [4]: The author has analyzed the feasibility of an power operated coconut punch-cum-splitter was developed for extracting coconut water and coconut meat. The nut of the screw rod was rotated with an electric motor and the drive was transmitted with a belt and pulley system. The tender coconut was placed on the top of the screw rod in natural rest position and was raised to press against either the punch or the blade fixed above the screw rod. The average energy requirement for punching and

splitting of the selected range were found to be 11.74 kJ and 12.13 kJ. An electric motor assisted apparatus was developed to punch and split open the tender coconuts. The force required for punching and splitting was found with a mean value of 712 N and 1277 N, respectively

1.2 Problem Definition

In India young coconut and sugarcane crop production are the important economical source of the farmers in various regions. Along with young coconut and sugarcane crop production is carried out on large scale in an India. The traditional methods of young coconut deshelling & sugarcane bud cutting are time consuming process because this process is carried out by manually. The young coconuts are cutting by means of using various devices such as knifes, hooks etc. Due to human involvement to complete the process for young coconut deshelling & sugarcane bud cutting time is consumed and by using the other devices there may be a chances of accidents takes place. In order to overcome such kind of difficulties we go for the coconut deshelling and sugarcane bud cutting machining process.

a. Objectives of the Present Work Following objectives of the work are outlined. 1. To Design and developments of various components to build sugarcane bud and Coconut deshelling machine. 2. Fabricating and assembly of various components to build sugarcane bud and Coconut deshelling machine. 3. To carry out statistical analysis of process capability design and developed machining processes

2. Proposed Methodology of solving Identified Problem

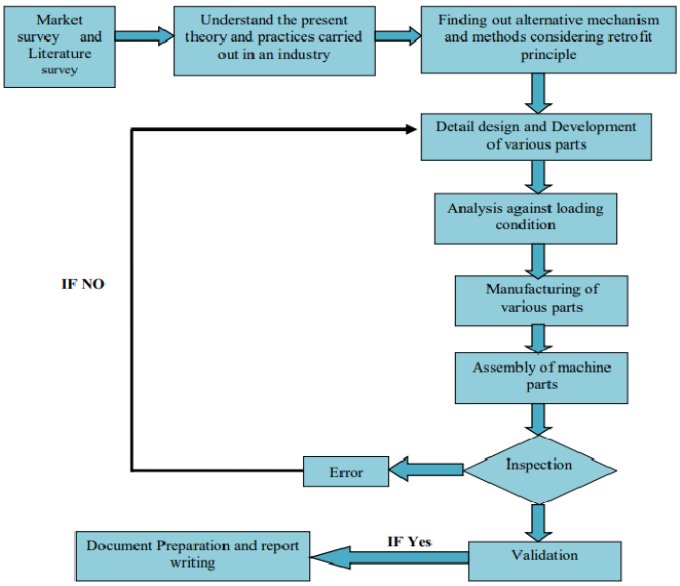

Fig -2: Flow chart of experiment Methodology

3. In case some prototype has to be fabricated then its tentative design and procedure for making.

This mechanism is used to cutting and punching the coconuts. The basic principle of the project is to apply the pressure to cut and punch the coconuts. Initially coconut is placed in the circular box. After that lever is attached to closed coil. It consist of frame , hydraulic or pneumatic pump ,funnel for collecting coconut water and pressure providing pipes along with this it also consist of blades, base, clamping nuts, frames, connecting bars etc. The pressure is applied on the lever to punch the coconut. After removing pressure lever comes to original position. After removing the water coconut is placed in that rectangular tray or funnel. Apply the pressure on the lever to cut the coconut by the use of knife or blades. It is very simple operation. It does not have more skill to cut the coconut. Thus working is carried out and similar to this. Various operations are carried for / as per the requirement. This mechanism can also be used for cutting various fruits such sugarcane, pineapple etc

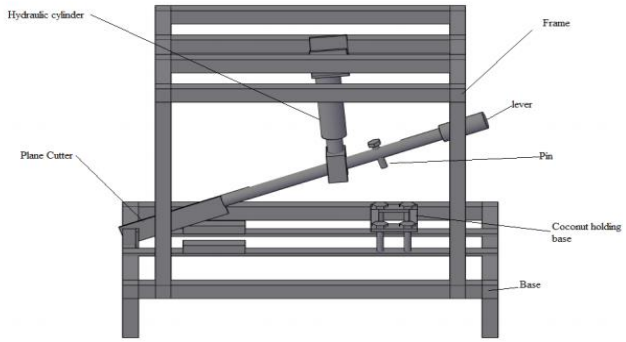

Fig - 3.1: Proposed coconut deshelling machine

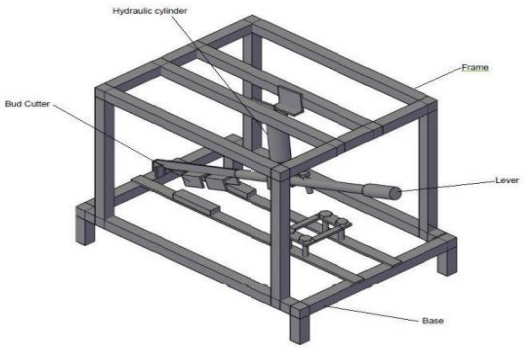

Fig -3.2:Proposed sugarcane bud cutting machine

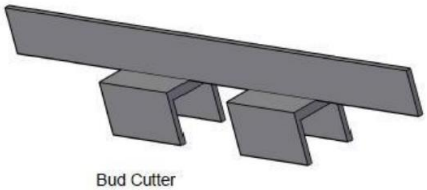

Fig -3.3 : Proposed sugarcane bud cutter attachment

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