

Fabrication of Cane Peeling Machine and Sugarcane Skin Dehusker.

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Abstract: India is a nation characterized by agriculture. Among the diverse array of agricultural crops grown, sugarcane stands as one of the most significant producing crops in India. This project pertains to the notion of a sugarcane peeling attachment. The quantity of small-scale sugarcane juice operations requires manual cleaning of the sugarcane. This process takes considerable time and is laborious, since the sugar cane must be cleaned before being processed in the machine for juice extraction. This project involves the creation of an automated sugarcane peeling attachment that efficiently removes the peel when sugarcane is fed into it. This research seeks to minimize the overall time needed for manual peeling and alleviate operator fatigue resulting from the laborious peeling process. The suggested equipment is anticipated to peel sugarcane more rapidly with less fatigue.

Keywords: Cutting Peeling, Agriculture, Sugarcane, fatigue, time etc.

INTRODUCTION

Sugarcane is a well-established industrial crop cultivated and harvested effectively for the production of food and bioenergy. Peeling is the first procedure from harvest to processing and is a critical activity. The process of sugarcane peeling has been examined by several researchers and studies, indicating that sugarcane stems are harvested from the field. Sugarcane, or *Saccharum officinarum*, is a tall perennial grass of the Poaceae family. This adaptable crop originates from the tropical areas of Southeast Asia and has been grown for millennia for its sugary sap and fibrous stems. Sugarcane has significant economic value globally since it is the main source of sugar production. The plant's robust, succulent stems may to remarkable heights of up to 6 meters and are mostly formed of sucrose-laden tissue. Its cultivation need a warm temperature, enough rainfall, rich soil, and appropriate irrigation methods. Owing to its elevated sugar concentration, sugarcane has emerged as a significant commodity across several sectors, including food processing, biofuel generation, and medicinal uses.

LITERATURE REVIEW

Mr. Tagare V.S. et al. (2013), in their work titled "Design And Manufacturing Of Sugarcane Peeling Machine," indicated that upon activation, the motor drives the hollow shaft and worm gear. When the motor rotates, power is delivered at a 90-degree angle owing to the worm and worm gear mechanism. This is used to spin the rollers perpendicularly to the plane. The inner race of the bearing

and the hollow shaft are rotated by direct motor driving. As sugar cane is processed via the revolving hollow shaft, it first encounters brushes. These brushes first cleanse the sugar cane and eliminate the black carbon contained on it.

Ge Xinfeng et al. (2015), in their work titled "Design of Sugarcane Peeling Machine," said that the design concept incorporates both axial and cutting movements, with sugarcane being peeled by a rotating tool using a slider-crank mechanism. The peeling process with a spinning tool is inconsistent with the fiber development direction of sugarcane, resulting in imprecise cuts and incomplete peeling, which may easily damage the sugarcane. To enhance the efficiency of the sugarcane peeler, achieve consistent peeling, and minimize waste, an existing sugarcane peeler was upgraded, and a new automated sugarcane peeling machine was built. The findings indicate that the newly designed sugarcane peeler can peel sugarcane evenly and rapidly.

Zhang Dehui et al. (2015), in their work titled "Design of Sugarcane Peeling Machine Based on Motion Controller," elucidated the need of designing blades tailored to the properties of sugarcane to fulfill the requirements of the peeling process. This research presents a blade with an adjustable tool rod intended to accommodate varying radial dimensions and curvature.

El-Yamani et al. (2016), titled "Performance Evaluation of New Sugarcane Peeling Machine," aimed to build and assess the efficacy of a novel small-scale sugarcane peeling machine. The machine prototype was evaluated via actual trials conducted at a private sugarcane storage facility.

Prof. S. J. Kadam et al. (2018), in their work titled "DESIGN AND FABRICATION OF SUGARCANE

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PEELING MACHINE,” discuss the notion of a sugarcane peeling attachment. The quantity of small-scale sugarcane juice operations requires manual cleaning of the sugarcane.

M.M. AhmatAsim, N.N. Hisyamudin, S.R. Masrol He created a machine for peeling sugarcane bark/skin. The rising demand for sugarcane products and the advancement of the sugarcane sector have shown that the traditional peeling process is unable to meet this growing need. The issue pertained to our client, Sugarcane World, and Natural Organic Sugarcane. A novel design was introduced to address the peeling procedure by including a new blade equipped with rollers to facilitate the insertion and extraction of the sugarcane stalk inside the blade compartment. The engineering design process facilitated the conversion of the concept into CAD data, resulting in the construction of a prototype. The newly created prototype was tested, yielding little data for improvement.

Bundit Jarimopas et al. (October 8, 2008) He developed a prototype for an automated young coconut fruit cutting machine. The fruit comprises a husk, shell, meat, and juice. The fruit is often trimmed by hand, requiring significant physical strength and a big, sharp knife, making the process hazardous. Additional issues related to hand trimming include a scarcity of experienced staff and the significant duration required for the trimming process. They created a prototype of a young coconut fruit trimming machine that shown more promise.

FaraFarhana Binti Abdul Basek He conceptualized and created an orange peeler. An orange is a kind of citrus fruit often consumed by people. Oranges are an excellent source of vitamins, particularly vitamin C. Orange juice is a significant component of several individuals' breakfasts.

PROPOSED MODEL

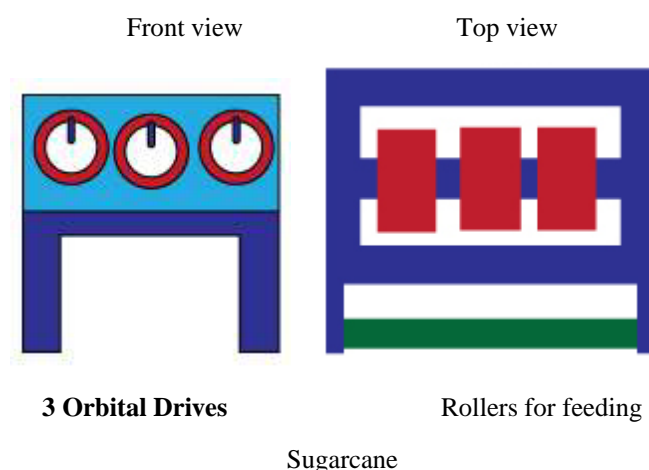


Fig 1: proposed model of the machine

The peeling process occurs in an orbital manner. The illustration above depicts the conceptual diagram of the second suggested proposal. The sugarcane will be introduced to the orbital drives via rollers, which have

Peeling an orange is a challenging task. Numerous issues must be addressed throughout the orange peeling process. A prevalent technique for peeling an orange involves using bare hands and a sharp knife. Peeling an orange is often seen inappropriate owing to the significant danger of harm; hence, many individuals are adopting a new approach for peeling oranges. This thesis addresses the design and development of an orange peeler using an ergonomic method. The aims of this thesis are to build an orange peeler using an ergonomic approach via SolidWorks and to model it using ALGOR.

SUGARCANE PEELING

The sugarcane peeler and cutter is a machine designed to remove the outer skin of sugarcane and to cut it to the specified length. In the sugar business, sugarcane is processed in a preparation channel, where the outer skin of the sugarcane contains dust particles. The outer coating of sugarcane, or husk, diminishes the flavor of sugar in its by products. It also aids in reducing the physical labor required for sugarcane peeling. Manual peeling results in the wastage of the fleshy portion of the sugarcane; hence, sugarcane peelers have been created to address this issue. The bagasse of sugarcane is used independently for power generating and paper making.

METHODOLOGY

The following methodology is implemented as a part of project. The entire approach to the project is divided into number of phases which are carried out as we approach the completion of project work. This not only sets the proper plan but also reduces the possibilities of errors as everything is planned in advance. The entire approach to the project is divided into following phases.

brushes around the inner circumference, as seen in the conceptual figure. After the sugarcane is introduced into the rollers.

The rollers extract the sugarcane with motor-driven power and direct it into an orbital drive brush cleaner. The brush traverses the orbital drive, cleaning the sugarcane on the outside surface and thus peeling it. Subsequent to the sugarcane exiting the orbital cleaner, the horizontal brush positioned at the front performs cleaning, hence facilitating multistage cleaning in a single pass. The suggested idea will be executed if idea One fails. The manufacturing cost of this machine is higher than that of the first proposal due to the inclusion of intricate drive trains.

WORKING METHODOLOGY

This approach is applied as part of the project. The project's methodology is segmented into many stages executed as we near the finish of the task. This not only establishes an appropriate strategy but also reduces the likelihood of mistakes, since everything is meticulously arranged beforehand. The comprehensive methodology for the project is segmented into the following stages.

Literature study:

This phase involves a concise examination of the existing systems. This entails examining traditional systems, identifying their shortcomings, reviewing multiple research articles, doing an in-depth analysis of scholarly work, and ultimately investigating the real-world challenges encountered. The issue definition is established and the goals are formulated based on the research.

Concept outline:

Following the issue characterization, the subsequent stage is to develop the project idea outline. Due to the absence of research articles on the present issue, the concept outline is produced based on project assumptions. The conceptual outline is proposed approximately at this phase, and development commences accordingly.

Initial Sketches and Trials

Upon the proposal of the idea outline, first drawings are created, and the design and manufacture processes commence. Due to the absence of reference materials, the majority of this research will rely on a trial-and-error methodology focused on results.

Material Survey and selection

The material survey is conducted to identify the most appropriate materials for the project based on the suggested idea. The selected materials must be appropriate and lightweight.

Trial one Execution

According to the concept outline, two ways for sugarcane peeling are offered. The first option with the highest likelihood of producing beneficial outcomes. The first suggested idea will be implemented, and the machine will

be built and constructed in accordance with concept number one. Upon completion of the machine, testing will be conducted to assess feasibility and efficiency. Should the procedure prove unsuccessful, we shall advance to the creation of the machine based on the second notion.

CONCLUSION

Following comprehensive literature study, building, and testing, a good sugarcane peeling machine with an efficiency of 80% was created using existing raw materials and methods. The almost linear sugarcane was manually loaded and transported to the bearing equipped with brushes. The machine's total performance is more efficient than that of previous models. The expenses associated with manufacturing and maintenance are comparatively low. Consequently, the machine will be embraced by industries due to its performance, cost-effectiveness, and ease of use.

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