Design and Development of Coconut Fiber Extraction Machine

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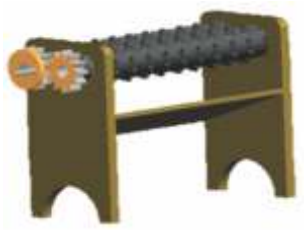
Abstract:

The scope of this project was to design and develop a coconut fiber extraction machine for farmers and small scale coir industries in India to provide an effective solution to the difficulties in existing process, reduce time and labour cost and to develop a compact coconut fiber extraction machine which could be used in remote villages so that unutilized husks from such areas could be tapped and fiber could be made available to the Coir Industry directly. This project was taken up to develop a promotional strategy for a new innovation and generate public awareness regarding the availability of a coconut fiber extraction machine in the market at a reasonable cost.

The project began with collection of information and data on user lifestyle and current process by which they perform their job. The current difficulties were analyzed. Interviews were held with users. A comparative bench marking study was done on similar processes used in other similar extraction processes. Along with this an ergonomic simulation was made to understand the user difficulties and manufacturing methods to get an overview to provide solution to the user to suit their requirement.

Concepts were generated keeping benchmarked product in view. Five concepts were generated with different functions and operating processes for coconut fiber extraction machine. Final concept was selected by considering the users' operating environment and maintenance, which could be used in small scale coir industries and in the farm sector. Considering the users' needs and buying capacity, a prototype was fabricated. This machine works with gear mechanism, in which 2 barrels rotates in opposite direction to extract fiber from coconut. Cutting pins are inserted in indexed holes to separate fiber and to give linear motion to coconut shell.

Validation was carried out with the user group and the feedback was positive. It was noticed that there is potential market for this product. Further work could be carried in terms of aesthetics, material and weight reduction by adopting advanced manufacturing techniques.



Concept 1

Concept 2

Concept 3

Concept 4

Final concept

Working model